

# **FINAL REPORT NO.70**

Tauranga Southern Pipeline,  
Memorial-Strand Walkway, and  
East Coast Main Trunk Railway  
Bridge Upgrade

Assessment of Effects on the  
Environment - VOLUME 1

*Prepared for*

**Tauranga City Council**



*Tauranga City*

91 Willow Street  
Tauranga

2 November 2007

42066678

Project Manager:

  
.....  
Martin Evans  
Principal

URS New Zealand Limited

Project Director:

  
.....  
Mark Drury  
Chief Executive  
URS New Zealand Limited

Level 6, URS Centre  
13-15 College Hill, Auckland  
PO Box 821, Auckland  
New Zealand  
Tel: 64 9 355 1300  
Fax: 64 9 355 1333

Authors:

  
.....  
Bernice Meyle  
Senior Planner

Date: 2 November 2007  
Reference: R085  
Status: Final

  
.....  
Richard Jenkins  
Principal

## Contents

<b>Glossary .....</b>	<b>-i</b>
<b>Executive Summary .....</b>	<b>1</b>
<b>1 Introduction .....</b>	<b>1-1</b>
<b>1.1 The Projects.....</b>	<b>1-1</b>
<b>1.2 Purpose of this Report .....</b>	<b>1-2</b>
<b>1.3 Report Format .....</b>	<b>1-2</b>
<b>1.4 Drawings .....</b>	<b>1-2</b>
<b>2 Summary of Applications .....</b>	<b>2-1</b>
<b>2.1 Resource Consent Applications.....</b>	<b>2-1</b>
<b>2.2 Notices of Requirement to Designate Land .....</b>	<b>2-1</b>
<b>2.3 Other Consents and Approvals .....</b>	<b>2-1</b>
2.3.1 Historic Places Act 1993.....	2-1
2.3.2 Building Act 2004.....	2-1
2.3.3 Reserves Act 1977 .....	2-2
2.3.4 Related Consenting Issues.....	2-4
<b>3 Southern Pipeline Project.....</b>	<b>3-1</b>
<b>3.1 Background .....</b>	<b>3-1</b>
<b>3.2 Project Objectives.....</b>	<b>3-2</b>
<b>3.3 Description of Proposed Works .....</b>	<b>3-2</b>
3.3.1 Background Reports and Investigations.....	3-2
3.3.2 Overview.....	3-2
3.3.3 Construction Programme.....	3-3
3.3.4 Preferred Pipeline Route .....	3-3
3.3.5 Memorial – Strand Walkway Project .....	3-4
3.3.6 Railway Bridge Upgrade Project .....	3-4
3.3.7 Matapihi Landfall .....	3-5
3.3.8 Termination Point .....	3-6
3.3.9 Southern Pipeline System Configuration.....	3-6
3.3.10 Design Life.....	3-7
3.3.11 General Pipeline Construction.....	3-7
3.3.12 Disposal of Waste Fill .....	3-9

## Contents

3.3.13	Sediment Control – Main Pipeline and Pump Stations .....	3-10
3.3.14	Pipeline Size and Materials .....	3-10
3.3.15	Hydraulics .....	3-11
3.3.16	Pump Start Up .....	3-12
3.3.17	Water Hammer Control (Transient Pressure Waves) .....	3-12
3.3.18	Odour Control .....	3-12
3.3.19	Stream Crossings .....	3-13
3.3.20	Associated Pipeline Structures .....	3-13
3.3.21	General Pump Station Characteristics .....	3-16
3.3.22	Main Pump Stations .....	3-17
3.3.23	Local Pump Stations .....	3-18
3.3.24	Testing and Commissioning .....	3-18
3.3.25	Pipeline Maintenance .....	3-19
3.3.26	Pipeline Security .....	3-19
<b>3.4</b>	<b>Alternatives Considered.....</b>	<b>3-20</b>
3.4.1	Introduction .....	3-20
3.4.2	Alternatives to the Southern Pipeline Project.....	3-21
3.4.3	Pipeline Route Options .....	3-25
3.4.4	Assessment Process .....	3-27
3.4.5	Harbour Crossing Options .....	3-30
3.4.6	Additional Alignment Variations along the Proposed Pipeline Route.....	3-33
3.4.7	Alternative Design Details .....	3-34
<b>4</b>	<b>Memorial Strand Walkway Project.....</b>	<b>4-1</b>
<b>4.1</b>	<b>Background .....</b>	<b>4-1</b>
<b>4.2</b>	<b>Project Objectives.....</b>	<b>4-2</b>
<b>4.3</b>	<b>Description of Proposed Works .....</b>	<b>4-2</b>
4.3.1	Background Reports and Investigations.....	4-2
4.3.2	Overview.....	4-2
4.3.3	Proposed Pipeline Embankment, Walkway, and Beach Replenishment.....	4-2
4.3.4	Construction Methodology.....	4-3
4.3.5	Sediment Control.....	4-5
4.3.6	Walkway Treatment.....	4-6

## Contents

4.3.7	Additional Structures .....	4-6
4.3.8	Beach Restoration Considerations.....	4-7
<b>4.4</b>	<b>Alternatives Considered.....</b>	<b>4-9</b>
4.4.1	Walkway Options Outcome .....	4-11
<b>5</b>	<b>Railway Bridge Upgrade Project.....</b>	<b>5-1</b>
<b>5.1</b>	<b>Background .....</b>	<b>5-1</b>
<b>5.2</b>	<b>Project Objectives.....</b>	<b>5-1</b>
<b>5.3</b>	<b>Description of Proposed Works .....</b>	<b>5-2</b>
5.3.1	Background Reports and Investigations.....	5-2
5.3.2	Overview.....	5-2
5.3.3	Causeway Widening.....	5-3
5.3.4	Temporary Staging .....	5-4
5.3.5	Permanent Piles .....	5-4
5.3.6	Pile Cap Construction.....	5-5
5.3.7	Walkway and Cycleway.....	5-5
5.3.8	Southern Pipeline .....	5-6
5.3.9	Sediment Control.....	5-7
<b>5.4</b>	<b>Alternatives Considered.....</b>	<b>5-7</b>
<b>6</b>	<b>Submarine Pipeline Alternative for Harbour Crossing .....</b>	<b>6-1</b>
<b>6.1</b>	<b>Background .....</b>	<b>6-1</b>
<b>6.2</b>	<b>Project Objectives.....</b>	<b>6-1</b>
<b>6.3</b>	<b>Description of the Proposed Works.....</b>	<b>6-1</b>
6.3.1	Background Reports and Investigations.....	6-1
6.3.2	Pipeline Size and Materials .....	6-1
6.3.3	Construction Methodology.....	6-2
6.3.4	Submarine Pipeline Operation and Maintenance.....	6-5
6.3.5	Ongoing Pipeline Management .....	6-5
<b>6.4</b>	<b>Alternatives Considered.....</b>	<b>6-6</b>
<b>7</b>	<b>Consultation .....</b>	<b>7-1</b>
<b>7.1</b>	<b>Introduction .....</b>	<b>7-1</b>
7.1.1	Consultation Objectives.....	7-1
7.1.2	Overview of Consultation Process .....	7-1

## Contents

<b>7.2</b>	<b>Southern Pipeline Project .....</b>	<b>7-2</b>
7.2.1	Consultation Process.....	7-2
7.2.2	Consultation Outcomes: Southern Pipeline.....	7-6
<b>7.3</b>	<b>Memorial – Strand Walkway Project .....</b>	<b>7-9</b>
7.3.1	Consultation Process.....	7-9
7.3.2	Consultation Outcomes: Memorial – Strand Walkway .....	7-10
<b>7.4</b>	<b>Railway Bridge Upgrade Project .....</b>	<b>7-14</b>
7.4.1	TCC / ONTRACK Liaison .....	7-14
7.4.2	Consultation Process.....	7-14
7.4.3	Consultation Outcomes: Railway Bridge Upgrade .....	7-15
<b>7.5</b>	<b>Submarine Pipeline Alternative for Harbour Crossing .....</b>	<b>7-16</b>
<b>8</b>	<b>Existing Environment .....</b>	<b>8-1</b>
<b>8.1</b>	<b>Introduction .....</b>	<b>8-1</b>
<b>8.2</b>	<b>Southern Pipeline Project .....</b>	<b>8-1</b>
8.2.1	Geology and Soils .....	8-1
8.2.2	Ecology.....	8-3
8.2.3	Existing Land Use.....	8-6
8.2.4	Landscape and Visual .....	8-6
<b>8.3</b>	<b>Memorial Strand Walkway Project .....</b>	<b>8-7</b>
8.3.1	Geology and Soils .....	8-7
8.3.2	Shoreline Morphology and Coastal Processes .....	8-9
8.3.3	Harbour Sediments.....	8-12
8.3.4	Ecology.....	8-12
8.3.5	Stormwater Discharges .....	8-13
8.3.6	Landscape and Visual .....	8-14
<b>8.4</b>	<b>Railway Bridge Upgrade Project .....</b>	<b>8-15</b>
8.4.1	Geology and Soils .....	8-15
8.4.2	Harbour Hydrodynamics and Sediment Transport.....	8-16
8.4.3	Ecology.....	8-17
8.4.4	Landscape and Visual .....	8-18
<b>8.5</b>	<b>Submarine Pipeline Alternative for Harbour Crossing .....</b>	<b>8-18</b>
8.5.1	Geology and Soils .....	8-18
8.5.2	Harbour Hydrodynamics and Sediment Transport.....	8-19

## Contents

8.5.3	Ecology .....	8-19
8.5.4	Landscape and Visual .....	8-19
<b>9</b>	<b>Assessment of Environmental Effects and Mitigation.....</b>	<b>9-1</b>
<b>9.1</b>	<b>Introduction .....</b>	<b>9-1</b>
<b>9.2</b>	<b>Southern Pipeline Project .....</b>	<b>9-1</b>
9.2.1	Construction Effects .....	9-1
9.2.2	Operational Effects .....	9-11
9.2.3	Summary of Mitigation Measures .....	9-13
<b>9.3</b>	<b>Memorial - Strand Walkway Project .....</b>	<b>9-14</b>
9.3.1	Construction Effects .....	9-14
9.3.2	Operational Effects .....	9-19
9.3.3	Summary of Mitigation Measures .....	9-28
<b>9.4</b>	<b>Railway Bridge Upgrade Project .....</b>	<b>9-29</b>
9.4.1	Construction Effects .....	9-29
9.4.2	Operational Effects .....	9-37
9.4.3	Summary of Mitigation Measures .....	9-39
<b>9.5</b>	<b>Submarine Pipeline Alternative for Harbour Crossing .....</b>	<b>9-40</b>
9.5.1	Construction Effects .....	9-40
9.5.2	Operational Effects .....	9-44
9.5.3	Summary of Mitigation Measures .....	9-46
<b>9.6</b>	<b>Management Plan Framework .....</b>	<b>9-47</b>
<b>10</b>	<b>Consent Requirements.....</b>	<b>10-1</b>
<b>10.1</b>	<b>Introduction .....</b>	<b>10-1</b>
<b>10.2</b>	<b>Operative Bay of Plenty Regional Land Management Plan.....</b>	<b>10-1</b>
<b>10.3</b>	<b>Proposed Regional Water and Land Plan .....</b>	<b>10-1</b>
10.3.1	Earthworks.....	10-2
10.3.2	Pipelines Under or Over Streams.....	10-2
10.3.3	Wetlands.....	10-4
10.3.4	Summary of Consent Requirements Under LMP and PRWLP .....	10-5
<b>10.4</b>	<b>Regional Coastal Environment Plan .....</b>	<b>10-5</b>
10.4.1	Coastal Permits for Works in Coastal Marine Area .....	10-6
<b>10.5</b>	<b>Bay of Plenty Regional Air Plan .....</b>	<b>10-13</b>
<b>10.6</b>	<b>Tauranga District Plan – Land Use Consents .....</b>	<b>10-13</b>

## Contents

10.6.1	Permitted Activities and Consents.....	10-13
10.6.2	Permitted Activity Standards for Pipeline Construction.....	10-14
10.6.3	Special Ecological Sites .....	10-15
10.6.4	Natural Character Provisions .....	10-16
10.6.5	Earthworks.....	10-17
10.6.6	Noise and Disturbance .....	10-17
10.6.7	Modification or Destruction of Trees.....	10-18
10.6.8	Land-Use Consents for Reclamations.....	10-18
10.6.9	Summary of Land Use Consents Required under Tauranga District Plan.....	10-18
<b>10.7</b>	<b>Tauranga District Plan – Designations .....</b>	<b>10-20</b>
10.7.1	Designation of Land for Proposed Pump Stations .....	10-20
10.7.2	Designations of Other Requiring Authorities .....	10-20
<b>11</b>	<b>Statutory Assessment .....</b>	<b>11-1</b>
<b>11.1</b>	<b>Introduction .....</b>	<b>11-1</b>
<b>11.2</b>	<b>Matters to be Considered – Sections 104, 105, 107 RMA .....</b>	<b>11-1</b>
<b>11.3</b>	<b>Part II of the RMA .....</b>	<b>11-1</b>
11.3.1	Section 5 – Purpose and Principles .....	11-1
11.3.2	Section 6 – Matters of National Importance .....	11-2
11.3.3	Section 7 – Other Matters.....	11-3
11.3.4	Section 8 – Treaty of Waitangi .....	11-3
<b>11.4</b>	<b>Policy Statements, Regional and District Plans .....</b>	<b>11-3</b>
<b>11.5</b>	<b>New Zealand Coastal Policy Statement.....</b>	<b>11-4</b>
<b>11.6</b>	<b>Operative Bay of Plenty Regional Policy Statement .....</b>	<b>11-5</b>
11.6.1	Part I – Sub-Regional Overview and Issues.....	11-5
11.6.2	Part II – Region-Wide Issues, Objectives and Policies .....	11-6
11.6.3	RPS Proposed Change No. 1 Heritage Criteria .....	11-8
11.6.4	RPS Proposed Change No. 2 Growth Management.....	11-9
<b>11.7</b>	<b>Bay of Plenty Regional Plans .....</b>	<b>11-9</b>
11.7.1	Operative Bay of Plenty Regional Coastal Environment Plan.....	11-9
11.7.2	Operative Bay of Plenty Regional Land Management Plan .....	11-23
11.7.3	Proposed Bay of Plenty Regional Water and Land Plan.....	11-24
11.7.4	Operative Bay of Plenty Regional Air Plan.....	11-26



## Contents

<b>11.8</b>	<b>Tauranga District Plan</b> .....	<b>11-26</b>
11.8.1	Amenity Values (Chapter 3 TDP).....	11-26
11.8.2	Natural Resources (Chapter 4 TDP).....	11-28
11.8.3	Heritage (Chapter 5 TDP).....	11-30
11.8.4	Hazards (Chapter 6 TDP).....	11-31
11.8.5	Physical Resources (Chapter 7 TDP).....	11-31
<b>11.9</b>	<b>Other Relevant Matters</b> .....	<b>11-31</b>
11.9.1	SmartGrowth Strategy.....	11-31
11.9.2	Tauranga Tomorrow.....	11-33
11.9.3	Regional Land Transport Strategy.....	11-33
11.9.4	Integrated Transport Strategy for Tauranga.....	11-33
11.9.5	Reserve Management Plans.....	11-34
<b>11.10</b>	<b>Statutory Assessment Conclusions</b> .....	<b>11-35</b>
<b>12</b>	<b>Conclusions</b> .....	<b>12-1</b>
<b>13</b>	<b>Limitations</b> .....	<b>13-1</b>

## Tables, Figures, Appendices

### Tables

Table 3-1	Main Air Valve- Approximate Locations .....	3-14
Table 3-2	Main Drain Valve Approximate Locations .....	3-15
Table 3-3	Summary of Expected Site Inspection Frequencies .....	3-19
Table 3-4	Assessment Criteria within the QBLA Framework.....	3-27
Table 3-5	Summary of Route Options - Key Advantages and Disadvantages .....	3-29
Table 6-1	Approximate Timeline for Submarine Pipeline Option .....	6-4
Table 8-1	Tide levels for proposed pipeline route along Tauranga Harbour shoreline.....	8-11
Table 9-1	Residential Construction Noise Limits .....	9-5
Table 9-2	Protected Trees – Maleme Street to Fifth Avenue.....	9-8
Table 9-3	Significant Street Trees – Maleme Street to Fifth Avenue.....	9-9
Table 9-4	Protected Trees – Railway Causeway to Te Maunga .....	9-9
Table 10-1	Summary of land use consents required for earthworks, stream works and wetlands ....	10-5
Table 10-2	Summary of Coastal Permits Required for Memorial - Strand Walkway .....	10-6
Table 10-3	Summary of Coastal Permits Required for Upgrading of Railway Bridge (ONTRACK) ...	10-8
Table 10-4	Summary of Coastal Permits Required for Pipeline and Walkway/Cycleway Attached to Railway Bridge .....	10-9
Table 10-5	Summary of Coastal Permits Required for Submarine Pipeline.....	10-9
Table 10-6	Summary of Coastal Permits Required for Widening of Causeway and Placement of Pipeline and Walkway/Cycleway thereon .....	10-11
Table 10-7	Summary of Coastal Permits Required for Submarine Pipeline between Causeway and Matapihi Road and reclamation between end of Causeway and Matapihi Road .....	10-12
Table 10-8	Summary of Coastal Permits Required for reclamation south of Matapihi Road Pt 3A2A Matapihi.....	10-12
Table 10-9	Summary of Activities Requiring Land Use Consents Under Tauranga District Plan ....	10-18

### Figures

Figure 8-1	Typical Sea Cliff Geology for the Te Papa Peninsula.....	8-8
------------	----------------------------------------------------------	-----

## Tables, Figures, Appendices

### Appendices

<b>VOLUME</b>	<b>CONTENT</b>
Volume 1	AEE Document
Volume 2	Appendices A to C (Part I)
Volume 3	Appendices C (Part II) to D
Volume 4	Appendices E and F (Part I), Harbour Crossing Options Volumes I and II
Volume 5	Appendices F (Part II), Harbour Crossing Options Volume III, and Submarine Pipeline Crossing Construction Methodology
Volume 6	Appendices G to L
Volume 7	Appendices M to R
Volume 8	Appendices S to BB
Volume 9	Appendix CC
Volume 10	AEE Drawings

## Glossary

Abbreviation	Meaning
ADWF	Average Dry Weather Flow.
AEE	Assessment of Environmental Effects.
APE	Annual Probability of Exceedence, the likelihood of an earthquake or flood of a specified magnitude occurring.
CBD	Central Business District.
CCTV	Closed Circuit Television.
CIA	Cultural Impact Assessment.
CLMS	Concrete Lined Mild Steel.
CMA	Coastal Marine Area.
DHI MOUSE	A computer programme by DHI Limited called "MOUSE" that models wastewater flows in a pipe network.
diameter (m or mm)	This is the pipe outer diameter unless specified otherwise in metres or millimetres.
DoC	Department of Conservation.
Drogue	A 'parachute' or metal disc of the same diameter as the pipeline, which is dragged through the pipeline to clean it.
EBOP	Environment Bay of Plenty.
ECMT	East Coast Main Trunk (Railway).
First Flush	The first 6 mm or so of rainfall that typically contains the greatest level of contamination as surface runoff.
GRP	Glass Reinforced Plastic.
HAT	Highest Astronomical Tide.
HDD	Horizontal Directional Drill - a method of installing pipeline below the surface of the ground by drilling, without requiring surface excavation.

## Glossary

Abbreviation	Meaning
Inverted Siphon	Arrangement of a pipe, or pipes, that allows water to flow under gravity beneath natural or man-made obstructions. The pipes are full of liquid and flow starts when the water level at the upstream end is higher than the downstream end.
km	Kilometres.
LMP	Land Management Plan.
LTCCP	Long Term Council Community Plan.
m	Metres.
MD	Moturiki Datum.
MfE	Ministry for the Environment.
MHWM	Mean High Water Mark.
MHWS	Mean High Water Springs.
mm	Millimetres.
MoC	Minister of Conservation.
MSL	Mean Sea Level.
NOR	Notice of Requirement.
ONTRACK	New Zealand Railways Corporation (owner of the East Coast Main Trunk Railway).
PE	Polyethylene.
PIG	Pipeline Inspection Gauge. Typically a cylindrical bullet shaped solid foam swab that is passed through pipework to clean the pipeline.
Pigging	Method used to clean pipes full of liquid. A foam or metal swab (pig) is passed along the pipeline under water pressure.
PRWLP	Environment Bay of Plenty's Proposed Regional Water and Land Plan.

## Glossary

Abbreviation	Meaning
PWWF	Peak Wet Weather Flow.
Receiving Chamber	Large manhole located at the end of a pressure main, where it transitions into a gravity pipeline.
RL	Reduced Level. The level of a location in terms of the local specified datum. For the purposes of this report the datum is the Moturiki Datum.
RMA	Resource Management Act 1991.
Reno Mattress	Reno mattress is a 200mm thick wire mattress filled with rock.
SP	Southern Pipeline.
Staging	Temporary steel pipes and associated beams, supports and decking to form a working platform over water (similar to a pier).
TCC	Tauranga City Council.
Tremie	Placing of concrete under pressure underwater.
URS	URS New Zealand Limited.
VSD or VFD	Variable Speed or Frequency electrical devices (for pump motors).
WWTP	Wastewater Treatment Plant.

## Executive Summary

### ES 1 Introduction

Tauranga City Council (TCC) proposes to construct a new trunk sewer pipeline, the **Southern Pipeline**, to transfer wastewater flows from the southern parts of Tauranga to the Te Maunga Wastewater Treatment Plant (WWTP). The Southern Pipeline is required to cater for increased urban growth in the southern parts of the City and will also relieve pressure on the existing wastewater network. This is consistent with TCC's wastewater disposal strategy, which favours centralised treatment and the discharge of treated effluent via the ocean outfall at Papamoa. SmartGrowth, the regional growth strategy for the Western Bay of Plenty, has confirmed Te Maunga as a primary wastewater treatment facility for Tauranga City.

Modelling of the growth in the southern catchments based on the SmartGrowth projections indicates that the Southern Pipeline needs to be commissioned by 2011 to avoid wet weather wastewater overflows occurring.

As planning for the Southern Pipeline has progressed (commencing in 2005), opportunities to combine the pipeline works with other infrastructure projects were identified. These other projects have now been incorporated into the Southern Pipeline project and include:

- The construction of a high quality walkway/cycleway along part of the Te Papa Peninsula eastern foreshore between Memorial Park and The Strand (**Memorial – Strand Walkway** project). The Southern Pipeline will be placed within the walkway embankment;
- Attachment of the Southern Pipeline to a new walkway/cycleway which will in turn be attached to the East Coast Main Trunk (ECMT) Railway Bridge No. 71, with the bridge being structurally upgraded (**Railway Bridge Upgrade** project).

It is also noted that by intercepting wastewater flows at Memorial Park sufficient capacity is created to allow for the planned intensification of the Te Papa Peninsula, and this also frees up capacity on the Judea to Chapel Street wastewater treatment plant pipeline eliminating the need for pending major upgrading works.

In the event that neither the Memorial – Strand Walkway or Railway Bridge Upgrade projects proceed (or incur significant delays), alternative routes/methods to construct these particular sections of the Southern Pipeline have been identified. These include:

- Construction of the pipeline along Devonport Road, instead of the eastern foreshore of the Te Papa Peninsula;
- Laying a submarine pipeline across the bed of Tauranga Harbour from First Avenue, instead of attaching the pipeline to the upgraded railway bridge.

To prevent unnecessary delays that could result in wastewater overflows, the resource consents for these alternatives are also being sought as a backup measure<sup>1</sup>.

### ES 2 Purpose of AEE

An Assessment of Effects on the Environment (AEE) has been prepared which describes the proposed works, summarises the alternatives considered, consultation undertaken, assesses the actual and

---

<sup>1</sup> Some parts of the existing wastewater network are reaching capacity, and it is essential that the Southern Pipeline can be constructed within the project timelines in order to avoid potentially adverse effects on public health and the environment.

## Executive Summary

potential environmental effects of the works, and describes measures to avoid, remedy or mitigate any adverse effects.

Social, economic and cultural effects have been included as part of the assessment of environmental effects. These effects and mitigation measures have been addressed in relation to a number of different aspects along the Southern Pipeline route – including, for example, residential and commercial activities, transport, cultural activities and the like (refer Section 9 of the AEE).

The AEE forms part of the Resource Management Act 1991 (RMA) resource consent applications for the Southern Pipeline, Memorial – Strand Walkway, and Railway Bridge Upgrade projects – which are to be lodged with Environment Bay of Plenty and TCC.

### ES 3 Proposed Works

#### ES 3.1 Southern Pipeline

Key features include:

- i) Construction of a new 14.5 km trunk main sewer pipeline from Maleme Street, Greerton to the Te Maunga WWTP;
- ii) Construction of a new Maleme Street pump station and major re-construction of the Memorial Park pump station;
- iii) Construction of an integrated reclaimed embankment along part of the foreshore of the Te Papa Peninsula, from Sixth Avenue to 'The Concourse'<sup>2</sup> – which will accommodate both the pipeline (from Fifth Avenue) and a walkway/cycleway;
- iv) Attachment of the pipeline to a new walkway/cycleway, which will be attached to a strengthened ECMT Railway Bridge No. 71, and widening of the railway causeway at the eastern (Matapihi) end. The widened causeway will accommodate the pipeline, a new walkway/cycleway, and also provide construction and service access for the railway bridge;
- v) Reclamation on the Matapihi foreshore;
- vi) Construction of associated facilities including siphon structures, valve chambers, receiving chambers and air control structures.

In the event that the Memorial – Strand Walkway project proceeds, but the Railway Bridge Upgrade project does not proceed, the Southern Pipeline will be placed within the reclaimed foreshore embankment as far as First Avenue – at which point it will cross the harbour to Matapihi via a submarine pipeline sitting in the seabed.

#### **Alternatives Considered and Route Selection**

A number of wastewater treatment and disposal options were considered, including alternative options to a pipeline (for example upgraded reticulation, increased local storage capacity, and satellite treatment plants servicing the southern catchments). The conclusion was that a pipeline is the most cost effective option overall (refer Report No. 17, Appendix D). The subsequent pipeline route selection process included a detailed assessment of the constraints and opportunities that could affect the route. These factors included land ownership, cultural aspects, topography, the existing sewer capacity and layout, geotechnical, archaeological, ecological, traffic and other environmental issues.

<sup>2</sup> 'The Concourse' is the area at the southern end of The Strand.



## Executive Summary

The development of route options and selection of a preferred route has been a staged process. A wide range of options (over 50 potential routes) were initially identified. These were put through a coarse screening process to develop a reduced number of preliminary route options (five options and a number of sub-routes) for further investigation.

A Quadruple Bottom Line (QBL) assessment including social, economic, environmental and cultural considerations and risk analysis was undertaken for the remaining routes, leading to 'Western Route E' being recommended as the preferred pipeline route. The consideration of alternatives is described in detail in Section 3.4 of the AEE.

In December 2006 TCC resolved to adopt Western Route E, but with the preferred pipeline route being along part of the eastern foreshore of the Te Papa Peninsula between Fifth Avenue East and the ECMT Railway Bridge No. 71. Further opportunities to refine the route remained open and in late 2006 the opportunity to attach the pipeline to an upgraded railway bridge arose. The preferred route is shown on Drawing 12300-G-105-020 (Rev E).

In the event that the Memorial – Strand Walkway project cannot proceed within the desired timeframe to prevent wastewater overflows, this section of the Southern Pipeline would be constructed along Devonport Road instead of along the foreshore:

- For the railway bridge harbour crossing option, the pipeline would be laid along Devonport Road as far as Elizabeth Street. At this point it would divert down the eastern end of Elizabeth Street, before diverting north across 'The Concourse' to connect with the railway bridge.
- For the submarine pipeline harbour crossing option, the pipeline would be laid along Devonport Road as far as First Avenue. At this point it would divert down First Avenue eastwards to a valve chamber situated just above the foreshore, before crossing the sea bed to a widened railway causeway at Matapihi.

In the event that the Railway Bridge Upgrade project does not proceed, the Southern Pipeline will cross Tauranga Harbour by way of submarine pipeline in the bed of the harbour. Two pipes would be laid approximately 6 metres apart, from the foreshore below the eastern end of First Avenue across to the railway causeway on the eastern (Matapihi) side of the harbour. The two pipes would terminate at a valve chamber situated approximately one third of the way along the southern side of the causeway from the railway bridge. The causeway would still require widening (i.e. reclamation) along approximately two thirds of the southern side of the causeway, to accommodate the valve chamber and carry the Southern Pipeline to landfall at Matapihi.

### ES 3.2 Memorial – Strand Walkway Project

Key features of this component of the preferred route include:

- i) Construction of a reclaimed embankment along the eastern foreshore of the Te Papa Peninsula from Sixth Avenue to 'The Concourse'. On the seaward side, the embankment has a sloping face with surface treatment options including rip rap, placement of mortared stone, or rockcrete;
- ii) Construction of the Southern Pipeline (single pipe) within the reclaimed embankment;
- iii) Construction of a combined walkway/cycleway (minimum width of 3m) on top of the embankment;
- iv) Reconstruction/relocation of existing stormwater outfall structures;
- v) Reconstruction of existing boat ramps and steps onto foreshore;
- vi) Placement of sand (beach replenishment) on the seaward side of the embankment, south of Arundel Street to Seventh Avenue.

## Executive Summary

### **Walkway Alternatives Considered**

A number of different walkway options were identified, taking into account both different walkway types and alternative walkway routes. These options were evaluated using a QBL assessment and risk analysis. Relevant considerations included matters such as the hydrodynamics of the harbour, design life, local geological conditions, ecology, visual impact, and legal issues. There were 18 potential options (in combination with the Southern Pipeline), which were subsequently reduced to 6 main options and one mixed option.

The consideration of alternatives is described in detail in Section 4.4 of the AEE.

### **ES 3.3 Railway Bridge Upgrade Project**

Key features include:

- i) Strengthening of the existing East Coast Main Trunk (ECMT) Railway Bridge No. 71. New piles (approximately 1800mm diameter) will be placed on each side of the bridge, 4m out from the existing piers. The piles will be capped by concrete beams and the existing bridge superstructure will rest on top of these beams. Temporary staging will need to be constructed along both sides of the bridge to facilitate the strengthening works and this will be removed on completion of the works;
- ii) Widening of the existing causeway at the eastern (Matapihi) end of the railway bridge. A reclamation will be constructed along the southern side of the causeway, resulting in the causeway being widened from 24m (existing) to approximately 35m;
- iii) Construction of a new combined walkway/cycleway along the southern side of the strengthened railway bridge and widened causeway;
- iv) Placement of the Southern Pipeline beneath the new walkway/cycleway on the bridge and within the widened causeway at the Matapihi end.

### **Alternatives Considered**

A number of alternative harbour crossing options for the Southern Pipeline were evaluated. Attachment of the pipeline to the ECMT railway bridge was initially identified as a possible option, but was not pursued further because of the need to upgrade the bridge to provide for a higher standard under earthquake loading. The Southern Pipeline constitutes 'lifeline' infrastructure and attachment of the pipeline to the railway bridge therefore requires a higher level of risk management in terms of the possible consequences of an earthquake event.

However, in late 2006 the opportunity arose to undertake structural strengthening of the railway bridge. Attachment of the Southern Pipeline to the bridge has therefore been evaluated against the other pipeline harbour crossing options originally identified. This evaluation was undertaken using the same QBL assessment and risk analysis processes used to evaluate the original options. The railway bridge harbour crossing option scores favourably in relation to other harbour crossing options and has fewer extreme risks associated with it.

The consideration of alternative harbour crossing options is described in detail in Sections 3.4.5 and 5.4 of the AEE.

### **ES 4 Consultation**

Extensive consultation has been undertaken with interest groups and the community by way of individual meetings, written communications, hui and open days, articles in *Our City Views*, and provision of information on the TCC website.

Consultation and communication was undertaken with:

- |                                    |                  |
|------------------------------------|------------------|
| • The community along the pipeline | • Tangata whenua |
|------------------------------------|------------------|

## Executive Summary

route, including residents and businesses	
<ul style="list-style-type: none"> <li>Potentially affected foreshore residents</li> </ul>	<ul style="list-style-type: none"> <li>ONTRACK (rail owners)</li> </ul>
<ul style="list-style-type: none"> <li>Local interest groups (e.g. Tauranga Rowing Club)</li> </ul>	<ul style="list-style-type: none"> <li>The wider community</li> </ul>
<ul style="list-style-type: none"> <li>Regulatory authorities</li> </ul>	<ul style="list-style-type: none"> <li>TCC internal departments</li> </ul>

Key outcomes of the consultation process to date are summarised as follows:

- There is general community support for the Southern Pipeline project;
- There is concern about traffic disruption, and effects on accessing adjacent businesses and retail activity if the pipeline is constructed along Fraser Street and Devonport Road;
- The Southern Pipeline project, and particular sections of the pipeline route, are variously supported, not supported or opposed by different hapu and iwi groups. Amongst those opposed, concerns include the use of water as a medium for transporting human wastes, the transportation of others' human wastes through their rohe, and ultimately discharging human wastes to water;
- While there is wider community support for the Memorial - Strand foreshore walkway, the walkway is opposed by some foreshore residents. These residents are principally concerned about adverse effects in relation to security, foreshore ecology, loss of natural character, visual impact, property values, loss of vehicle and boat access to the foreshore, and loss of privacy;
- Consultation with Tangata Whenua has generally identified conditional support for the Memorial-Strand foreshore walkway;
- Tangata Whenua are generally opposed to the submarine pipeline harbour crossing option on cultural grounds (a pipeline carrying human waste through harbour waters is not the preferred option). For those hapu and iwi not opposed to the Southern Pipeline, the railway bridge harbour crossing option is preferred because it separates the pipeline from harbour waters. However, the Tangata Whenua seek a high quality of materials and construction to be used for the railway bridge option in order to minimise any risk of pipeline failure and contamination of the harbour.

To the extent practicable, the feedback from the consultation has been incorporated into the design of the pipeline and the proposed mitigation methods described in Section ES 6.

### ES 5 Summary of Consent Requirements

The majority of the Southern Pipeline is within TCC road reserve (around 10 km of the 14.5 km pipeline route). Consent is not therefore generally required under TCC's District Plan (permitted activity in the road). However, consent is required at regional level for a comprehensive earthworks consent for the whole pipeline.

No air discharge consents for treated sewer gas discharges are required.

The major requirements for consent are for works within the Coastal Marine Area, being:

- Reclamation for the foreshore walkway (approximately 1.5 hectare);
- Reclamation for the railway causeway widening (approximately 1 hectare);
- Permanent and temporary reclamations on the Matapihi foreshore (between 0.1 and 0.4 hectare - depending on whether access to private land can be agreed, in which case the smaller area applies);
- Upgrading of the ECMT Railway Bridge No. 71 (various coastal permits required).

## Executive Summary

- Construction of the submarine pipeline harbour crossing if the railway bridge upgrade does not proceed.

Because of their extent, some of these activities are Restricted Coastal Activities and require the consent of the Minister of Conservation.

It is expected that the consent applications will be fully publicly notified, which will enable people to lodge submissions and have their concerns addressed in a public hearing.

Consent is also required to pass through one Special Ecological Site (SES) at Te Maunga (SES 11).

### ES 6 Principal Environmental Effects and Mitigation

Once operational, the pipeline, new walkway/cycleway components and upgraded railway bridge will have the following positive environmental effects:

- 1) The Southern Pipeline will facilitate sustainable urban expansion at the extremities of the existing wastewater reticulation system and further intensification within existing urban areas. The pipeline will reduce the potential for wastewater contamination in the harbour and waterways, and will enhance public health and environmental protection;
- 2) The new foreshore walkway/cycleway and upgraded walking and cycling facilities on the railway bridge will provide enhanced public access to Tauranga's coastal environment and create new recreational opportunities (with positive implications for promoting public health and wellbeing). The foreshore walkway embankment design also provides the opportunity to reinstate a beach from Arundel Street alignment southwards to Seventh Avenue. In combination with the walkway, this will further enhance coastal access, public amenity and improve the visual appearance of this section of the coastline. It will also address the problem of coastal erosion currently being partly caused by existing foreshore structures;
- 3) Upgrading of the ECMT Railway Bridge No. 71 will secure rail operations for the long-term future, on a bridge which constitutes a regionally and nationally important transport infrastructure asset.
- 4) The provision of a new widened cycleway/walkway attached to the upgraded rail bridge will provide an alternative method to motor vehicle transport for direct public access to the Central Business District (CBD).

Given the design approach adopted for the different project components and proposed mitigation measures (including by way of conditions of consent), there will be no significant long-term adverse environmental effects associated with the operation of the Southern Pipeline, foreshore walkway and upgraded railway bridge and walkway.

Once established, the works will have no long-term adverse effects on marine ecology or the natural character and landscape values of this part of the harbour and surrounding environs. Mitigation measures include, for example, reconstruction of existing boat ramps and step access to provide adjoining residents with continued access to the foreshore following construction of the walkway.

The potential for short-term adverse environmental effects arises mainly through the construction phase of the project. The principal effects and proposed mitigation measures include:

- Release of sediment and other contaminants into the marine environment during construction of the foreshore walkway, railway bridge upgrade/causeway widening, and Matapihi foreshore reclamations. There is also the potential for sediment runoff as a result of the earthworks required to construct the landward component of the pipeline.

These effects will be addressed by way of an appropriate construction methodology, on-site settlement or other treatment of contaminants, and the implementation of a comprehensive Erosion and Sediment Control Plan.

## Executive Summary

- Disruption of marine ecosystems

Provided the construction of reclamations and structures is carefully managed to mitigate unnecessary disturbance or discharge of materials, impacts on ecosystems will be limited to localised areas only marginally larger than the extent of construction activities. Any effects will be short-lived due to the dynamic nature of the coastal environment. Benthic fauna in this part of the harbour are already tolerant of high levels of suspended solids in the water.

- Disruption of traffic and access (including delays and localised congestion, effects on accessing residential properties and businesses).

These effects will be addressed by way of an appropriate construction methodology and the implementation of Traffic Management Plans. Adopting the foreshore pipeline route will also mitigate traffic and access related effects along Devonport Road.

- Generation of dust and noise.

Dust mitigation measures will be implemented during construction (e.g. sweeping of loose material, dampening down) and construction activities will be required to comply with New Zealand Standard NZS6803: 1999 Construction Noise.

- The damage or removal of protected/significant trees

For the majority of the Southern Pipeline route, the pipeline can be placed in a way that avoids protected or significant trees. Construction of the foreshore walkway will require work within the dripline of two significant Pohutukawa trees. Appropriate construction techniques or design modifications will be implemented to ensure the welfare of these trees.

- Effect on train operations

A construction methodology will be adopted that minimises disruption to train movements.

A series of management plans (including, for example, the Erosion and Sediment Control and Traffic Management Plans referred to above) will be developed to avoid, remedy or mitigate adverse environmental effects during construction. The different management plans, processes and methods to be adopted during construction will be set out in detail in a comprehensive 'Construction and Environmental Management Plan' for the project.

## ES 7 Statutory Assessment

Of the resource consent applications to be lodged, the critical consents relate to works of limited duration such as earthworks or potentially contaminated discharges from construction of the railway bridge upgrade (or submarine pipeline if that were to take place); reclamations and structures that require the Minister of Conservation's consent; and the preservation and enhancement (if possible) of wetlands or sensitive coastal edge landscapes.

Most of the applications under the regional plans are for discretionary activity consents, with some being restricted coastal activities. A couple of activities are non-complying in terms of coastal natural character and Special Ecological Site provisions under the district plan. The various project components are generally consistent with, and find support through, the relevant objectives and policies of the New Zealand Coastal Policy Statement, regional plans and the district plan because they:

- Provide for the long-term growth of the city in an efficient, directed and sustainable manner in order to facilitate people's social, economic and cultural wellbeing;
- Reduce the likely contamination of the CMA by sewage in both the short and long-term;
- Provide for the enhancement of public access to the CMA over a reclamation and reinstated beach;

## Executive Summary

- Avoid the proliferation of structures in the CMA through co-location of the pipeline and walkway/cycleway on the existing railway bridge;
- Concentrate development in parts of the CMA already compromised by landward development or existing structures;
- Have been widely consulted on with all members of the community, including Maori.

Mitigation of adverse effects has been provided at the concept design stage, such that both the short-term construction effects and the long-term operational effects of the project can be managed in an acceptable manner.

## Section 1

## Introduction

### 1.1 The Projects

This report addresses three interrelated projects.

The **Southern Pipeline Project** is a Tauranga City Council (TCC) project designed to help meet the future wastewater needs of Tauranga City. The project involves the construction of a new trunk sewer pipeline to transfer wastewater flows from the southern parts of Tauranga to the Te Maunga Wastewater Treatment Plant (WWTP) to the northeast of the city.

The Southern Pipeline is required to cater for increased urban growth in the southern parts of the City and will also relieve pressure on the existing wastewater network. This is consistent with TCC's wastewater disposal strategy, which favours centralised treatment and the discharge of treated effluent via the ocean outfall at Papamoa. SmartGrowth, the regional growth strategy for the Western Bay of Plenty, has confirmed Te Maunga as a primary wastewater treatment facility for Tauranga City<sup>3</sup>.

Because the preferred Southern Pipeline route will intercept wastewater flows at Memorial Park, sufficient capacity is also included to allow for the planned intensification of the Te Papa Peninsula. This also frees up capacity on the Judea to Chapel Street wastewater treatment plant line, thereby eliminating the need for pending major upgrading works.

The Southern Pipeline is projected to service growth in the areas of Tauranga City being serviced by the pipeline until approximately 2051.

The proposed works include:

- Construction of a new 14.5 km pipeline from Maleme Street, Greerton to the Te Maunga WWTP;
- Major re-construction of the existing Maleme Street and Memorial Park pump stations;
- Construction of a reclaimed embankment along part of the foreshore of the Te Papa Peninsula;
- A pipeline crossing over the Tauranga Harbour via the upgrading of the East Coast Main Trunk railway bridge and widening of the causeway on the eastern (Matapihi) side of the harbour; and
- A range of associated hydraulic structures and other activities.

These works are collectively referred to as the '**Southern Pipeline Project**'.

As the planning phases of the Southern Pipeline Project progressed (between 2005 and early 2007), opportunities to combine the pipeline works with other infrastructure projects were identified and are now incorporated in the overall scope of the proposed works, as summarised below.

**Memorial – Strand Walkway Project:** TCC proposes to construct a section of the Southern Pipeline along the eastern side of the Te Papa Peninsula foreshore between Memorial Park and The Strand, and to combine this with a high quality walkway/cycleway along the coastal edge. This is known as the 'Memorial – Strand Walkway Project' (Walkway).

**Railway Bridge Upgrade Project:** The proposed (preferred) method for crossing over the Tauranga Harbour is to attach the Southern Pipeline to the existing, but upgraded, ONTRACK East Coast Main Trunk (ECMT) Railway Bridge No. 71 between the Tauranga central business district (CBD) and Matapihi. In order to achieve this, it is necessary to strengthen the existing railway bridge. The strengthening of the bridge will also provide increased robustness for rail access. ONTRACK<sup>4</sup> and TCC

<sup>3</sup> SmartGrowth Strategy and Implementation Plan – May 2004 and May 2007

<sup>4</sup> New Zealand Railways Corporation

## Section 1

## Introduction

have agreed to design and construct the works as an integrated project, referred to as the 'Railway Bridge Upgrade Project'.

Modelling of the growth in the southern catchments based on the SmartGrowth projections indicates that the Southern Pipeline needs to be commissioned by 2011 to avoid wet weather wastewater overflows occurring. Therefore in the event that neither the Memorial – Strand Walkway or Railway Bridge Upgrade projects proceed (or incur significant delays), alternative routes/methods to construct these particular sections of the Southern Pipeline have been identified. These include:

- Construction of the pipeline along Devonport Road, instead of the eastern foreshore of the Te Papa Peninsula;
- Laying a submarine pipeline across the bed of Tauranga Harbour from First Avenue, instead of attaching the pipeline to an upgraded railway bridge.

These alternatives are described in Sections 3 and 6 of this AEE. To prevent unnecessary delays that could result in wastewater overflows, the resource consents for the alternatives are also being sought as a backup measure.

### 1.2 Purpose of this Report

Aspects of the Southern Pipeline, Memorial – Strand Walkway, and Railway Bridge Upgrade projects require approvals under the Resource Management Act 1991 (RMA). These approvals include designation of land for wastewater purposes at Maleme Street and at Memorial Park, and numerous resource consents for activities on land and in the Coastal Marine Area (CMA).

The purpose of this report is to describe the proposed works for which approvals are sought, to summarise the alternatives considered and consultation undertaken, to assess the actual and potential environmental effects of the proposed works, and describe measures to avoid, remedy or mitigate any adverse effects. This information will provide the relevant consent authorities with a basis upon which to decide:

- (i) Whether the predicted environmental effects arising from the construction and operation of the Southern Pipeline and interrelated projects are acceptable (with any adverse effects being adequately avoided, remedied, or mitigated);
- (ii) Appropriate conditions of consent and monitoring.

The report has been prepared in accordance with sections 88, 168A and the Fourth Schedule of the RMA, which sets out the matters to be included in an Assessment of Effects on the Environment (AEE).

This report accompanies, and forms part of, the resource consent applications for the Southern Pipeline, Memorial – Strand Walkway, and Railway Bridge Upgrade projects. Separate AEEs have been prepared for the proposed upgrading of the Maleme Street and Memorial Park pump stations, with Notices of Requirement having already been issued for the designation of these pump stations.

### 1.3 Report Format

Because the range of consents required for the Southern Pipeline, Walkway and Railway Bridge Upgrade projects is broad, the sections of this AEE have been arranged so that only specific sections need be read in relation to particular applications.

### 1.4 Drawings

The drawing nomenclature is based on the project being divided into sections as explained below. Drawing No. G-101-002 Rev. B (refer Volume 10) shows the different sections. Each drawing has a discipline code and work package number. The drawing numbering system is, for example, for Drawing No. 12300-G-200-001 Revision C:-



## Section 1

## Introduction

12300 = Project reference number (common to all drawings so not included in text referencing)

G = "Discipline Code" (see key below)

200 = "Work Package"

001 = "Sheet Number"

Rev = "Revision letter reference in alphabetical order".

The reference key for the discipline codes is :-

G = General

C = Civil

D = Geotechnical

S = Structural

T = Traffic

The work package reference key is

100 = Project wide

200 = Pipeline

300 = Pump Stations

500 = Miscellaneous

600 = Harbour crossing

700 = Memorial Park to Strand walkway and beach replenishment

## Section 2

## Summary of Applications

### 2.1 Resource Consent Applications

The resource consent applications which have been lodged are listed in Section 10 and the activities for which the consents are sought are described and assessed in this AEE. A detailed schedule of the consent requirements and the relevant rules of the district and regional plans is included in Section 10 of this AEE.

The locations of the activities for which consent is sought are shown on the Project Drawing No. G-105-012 Rev. D.

TCC is the applicant for most of the listed consents, apart from those relating to the upgrading of the existing railway bridge, for which ONTRACK is the applicant.

### 2.2 Notices of Requirement to Designate Land

A Notice of Requirement for the designation of land for the Memorial Park pump station was issued separately in November 2007. For completeness, the proposed pump station works are also described in Section 3 of this AEE.

A Notice of Requirement for the designation of land for the Maleme Street pump station was issued in July 2007, as this structure needs to be constructed ahead of the remainder of the works to prevent wastewater overflows.

Both Notices of Requirement relate to the Southern Pipeline project.

### 2.3 Other Consents and Approvals

Other resource consents may need to be applied for at a later stage, for example, spoil disposal sites.

Section 177 RMA requiring authority approvals in principle have been sought and received from ONTRACK and Transit NZ. Copies of letters are given in Appendix AA.

For the Memorial Park pump station, Outline Plan details will be served at a later date, probably at the time at which approvals under the Memorial Park Reserve Management Plan are sought (refer Section 2.3.3).

#### 2.3.1 Historic Places Act 1993

A section 12 application for archaeological authority for work over the entire route has been granted by the NZ Historic Places Trust. A limited number of consent conditions have been appealed by TCC. The consent contains stringent conditions for archaeological supervision over the course of the project, commensurate with its scale.

Further s11 or s12 applications for archaeological authority have been lodged for the Anchorage subsection and will be lodged for the Ila/Poike subsection of the Southern Pipeline route, when this work occurs.

#### 2.3.2 Building Act 2004

Building consents are not required for the project, except possibly for structures (including retaining walls) that are not exempt under either section 9 or Schedule 1, and for some of the Memorial – Strand Walkway components.

## Section 2

## Summary of Applications

The entire project is classified as a network utility operation (NUO) system and the TCC is a network utility operator<sup>5</sup>. Under section 9 of the Act building consent is not required for a NUO system or part of a NUO system that is external to a building, and is connected to or is intended to be connected to, a building to provide for the successful function of the NUO system in accordance with the system's intended design and purpose. If a mast or aerial forms part of the building and is no more than seven metres in height above its point of attachment to the building, it too does not fall within the Building Act<sup>6</sup>.

In addition, pump stations and the like would most likely be included under the exempt building work provisions of the Act, being:

*Building work in connection with any detached building (except ...a building closer than its own height to any residential accommodation or to any legal boundary) that –*

- (i) *houses fixed plant or machinery, the normal visits to which are intermittent visits for routine inspection and maintenance of that plant or machinery; or*
- (ii) *into which, or into the immediate vicinity of which, people cannot or do not normally go*<sup>7</sup>

The rationale would appear to be that such systems would not be likely to be constructed other than within the terms of an appropriate code.

The proposed upgraded railway bridge walkway and handrails will comply with the Building Code which is a regulation under the Building Act 2004.

### 2.3.3 Reserves Act 1977

A number of reserves will be affected by parts of the project. These include Memorial Park where the existing pump station is to be re-built and expanded, Greerton Park, Pemberton Park, and Esk St Reserve.

Under section 48(1)(a) of the Reserves Act 1977 TCC, as the administering body, may grant easements over any part of a reserve for "any public purpose", and under section 48(1)(e) it may grant easements for *the provision of water systems*. In accordance with subsection (3) of the Act, if in considering any such application(s) the Council determines that:

- (a) *The reserve is vested in the Council's ownership and is not likely to be materially altered or permanently damaged; and*
- (b) *The rights of the public in respect of the reserve are not likely to be permanently affected by the establishment and lawful exercise of the right of way or other easement*

It will not then have to publicly notify its intention to grant the easement under subsection (2). If the Council determines that conditions (a) and (b) will not be satisfied then it is obliged to publicly notify its intention and give full consideration to all objections and submissions. The judgement over whether the proposed works would, in any particular instance, fail to satisfy conditions (a) and (b) and therefore need to be publicly notified rests with TCC as the administering body under the Act.

The process for notification is described in section 120 of the Reserves Act. Sections 48(4) and (5) of the Act describe the process of registering the easements with the District Land Registrar. It is anticipated that TCC will address these matters once it has reached a decision as to whether to grant the easements

<sup>5</sup> Section 7 Building Act 2004

<sup>6</sup> Section 8(1)(b)(iv)

<sup>7</sup> Schedule 1 Exempt building work, (i)(i)

## Section 2

## Summary of Applications

concerned. Section 48(6) allows easements to be granted to the administering body (TCC) in another capacity. This would be the case with the Southern Pipeline Project.

Subsection (1) requires TCC to obtain the Minister of Conservation's consent in granting easements. In 1999, the Minister of Conservation delegated certain powers under the Reserves Act to territorial authorities. However, the Minister only delegated the right to consent or refuse consent for easements to territorial authorities *where the activity concerned is provided for or contemplated in an approved management plan for the reserve or the activity is an existing use and the effects of the use will be the same or similar in character, intensity and scale.*

### **Memorial Park**

At Memorial Park the existing wastewater pump station is set well back on the site, away from the seaward margin. The reserve management plan for Memorial Park (prepared in accordance with section 41 Reserves Act) provides for the pump station<sup>8</sup>.

In relation to the goal of strengthening the premier status and recognition of the park, the management plan sets out two management statements relevant to the Southern Pipeline project:

*"Public utility and infrastructure development must be undertaken in a manner that does not unduly restrict future development of the park for its primary purpose as a passive recreation facility."*

*"The existing sewage pump station facility can expand and include new underground servicing, in accordance with the landscape concept plan."<sup>9</sup>*

These statements are reflected in the actions section:

*"Manage public utility and infrastructure to ensure that mitigation of potential adverse visual and odour effects are achieved. The existing sewage pump station shall install mitigation planting around its park border to further mitigate the visual and odour effects of the facility on the park."<sup>10</sup>*

The revised landscape concept plan shows an expanded area around the existing pump station<sup>11</sup>. Appendix 2 of the management plan sets out building assessment criteria for new buildings.

The proposed location and expansion of the pump station is considered to comply with the relevant section of the Reserves Act, having been contemplated in the management plan.

Part of the park is proposed to be used as a temporary construction layout area. Construction access to the proposed walkway will be via Seventh Avenue (in addition to The Strand at the northern end) as construction access via Sixth Avenue or Fifth Avenue East is limited.

### **Pipeline Easements across Reserves**

Neither the Memorial Park reserve management plan nor other management plans for Greerton Park and Pemberton Park appear to contemplate sewerage pipelines or other pipeline associated structures through these reserves. The only exception would be if the pipelines in Memorial Park were to be

---

<sup>8</sup> Tauranga City Council, *Memorial Park Management Plan*, December 2006

<sup>9</sup> Ibid, p. 25

<sup>10</sup> Ibid, p. 26. It should be noted that preventive and curative measures are available for odour mitigation. It is proposed to remain at all times within the permitted activity provisions of the Bay of Plenty Regional Air Quality Plan, which requires that odour not be offensive.

<sup>11</sup> Ibid. p. 33

## Section 2

## Summary of Applications

considered as existing uses. It is considered that the tests contained in the Reserves Act for delegated decision-making by TCC are not met and the Council will therefore need to forward any recommendation to grant easements to the Minister of Conservation for approval.

Wherever possible, locations for pump stations and associated equipment have been sought outside public reserves. Where there is a functional need to locate services within public reserves, an appropriate 'out-of-the-way' location has been identified. The measures proposed to mitigate any effects on public views, archaeological features, reserve character, the character of the coastal environment, and the immediate neighbourhood arising from the placement of those services in reserves should ensure that these effects are of a minor nature only. It is anticipated that none of the situations where it is proposed to locate services within reserves will materially alter or permanently damage the reserves or permanently affect the rights of the public with respect to the reserves.

The actual design and positioning of pipelines and services within the easement corridors will be determined during the detailed design stage of the project, in consultation with TCC's Parks officers. Given previous experience at the recent Omokoroa Wastewater Scheme (to the north of Tauranga), 15m pipeline easement corridors will be sought.

### **Reserves Act Consents**

The requirements outlined above for securing easements will be followed outside of the RMA consenting process.

### **2.3.4 Related Consenting Issues**

#### **Stormwater Consents**

TCC is currently in the process of applying for '*comprehensive stormwater discharge consents*' from EBoP under the PRWLP for catchments covering all of Tauranga City, giving TCC consent to discharge potentially contaminated stormwater from the urban environment of the city into the local receiving environment, typically local streams and Tauranga Harbour. Given the large number of catchments within the city area, TCC is addressing these in order of high to low concern so that areas with flooding or contamination issues are being addressed first, and catchments with little or no problems will be addressed at a later stage.

The wider stormwater catchment covering the Memorial – Strand Walkway project is known as 'Avenues'. This catchment is largely residential housing, and is well-drained due to the steep fall of the ground towards the Harbour. TCC has therefore confirmed that Avenues is regarded as a 'low risk' stormwater catchment, and that the comprehensive consent application may not be made for some years.

However, it has been identified that the pipeline and walkway construction provides an opportunity for TCC to address management of existing stormwater discharges along this section of foreshore, and to ensure the discharges are compliant with the PRWLP in preparation for later consent application by TCC.

#### **Harbourside Restaurant Resource Consents**

The Harbourside Restaurant holds a resource consent from Environment Bay of Plenty for the existing building and its occupation, and the existing piles within Tauranga Harbour Bed to the north, south and southeast of the building, and for an adjacent reclaimed areas to the southwest of the building and its occupation within the coastal marine area at the Strand Extension<sup>12</sup>. The consents endure until 30 April 2027. The piles closest to the restaurant's covered entrance are within the ONTRACK occupancy.

---

<sup>12</sup> EBoP Consent No. 04 0049.

## Section 2

## Summary of Applications

The restaurant also holds a resource consent for the reduction in car parking from the required 31 for the restaurant and offices, to 18 (13 for restaurant, 5 for office). Although technically sufficient land is held to accommodate all of the car parks that are subject of the consent, use of the carparks relies in part on access over SO 391193, the area of land reclaimed by the Tauranga Yacht and Power Boat Club, part of which TCC proposes to be held as esplanade reserve if it is able to obtain title to the area.

Several options have been discussed with Harbourside to determine how to minimise business disruption. Retention of parking is important. Options related to access to the building have included a covered way using the existing route, and construction of a new deck access from the north of the building using the present deck walkway that runs alongside the railway embankment. Arrangements for dedicated on-street parking for the restaurant to replace the car parking that will be lost from the restaurant's own land at the end of the Strand extension are being evaluated.

A variation to the Harbourside Restaurant's resource consents is likely to be required upon agreement being reached between TCC and the restaurant's owners in relation to parking, land access and other project related issues.

## Section 3

## Southern Pipeline Project

### 3.1 Background

The Southern Pipeline is required because:

- Urban expansion is occurring at the extremities of the existing reticulation system, and parts of the existing reticulation will have insufficient spare capacity to accommodate this growth;
- Wastewater flows need to be transferred away from Chapel Street WWTP (which has limited capacity) to the Te Maunga WWTP to adequately treat increasing wastewater flows in the future.

Urban expansion within Tauranga City is occurring at the extremities of the existing wastewater reticulation system. Further intensification is also planned within existing urban areas. Recent hydraulic modelling of the sewer reticulation system (refer Report No.18<sup>13</sup>, Appendix E) has confirmed that parts of the wastewater network are already reaching capacity and that capacity is likely to be exceeded in the near future.

Local wastewater tank storage options are able to temporarily relieve pressure in some areas (Report No. 18) but a strategic city-wide solution is required in order to provide for expected growth in Tauranga in the short to medium-term.

Options to establish new treatment facilities in the southern parts of Tauranga and to transfer waste to such facilities have been investigated (refer Report No.17<sup>14</sup>, Appendix D) and are considered to be impracticable (for time, cost and environmental reasons). Establishment of new facilities would also be inconsistent with the approach adopted in TCC's wastewater disposal strategy, which favours centralised treatment at Te Maunga WWTP and discharge of treated effluent via the ocean outfall at Papamoa (TCC has recently secured a 35-year consent for the discharge of treated effluent through the Papamoa outfall). SmartGrowth, the regional growth strategy for the Western Bay of Plenty, has confirmed Te Maunga as a primary wastewater treatment facility for Tauranga City.

Therefore, in order to address the future growth and network capacity issues, the construction of a new trunk main (the Southern Pipeline) from the Maleme Street Pump Station in Greerton to the Te Maunga WWTP is proposed. This pipeline will intercept wastewater flows from southern areas of Tauranga that would otherwise have gone to the Chapel Street WWTP, and will transfer this wastewater to the Te Maunga WWTP for treatment. The pipeline will have a design life of 100 years and is projected to meet the wastewater needs of southern catchment area development to the year 2051, based on SmartGrowth growth projections.

A detailed modelling analysis (DHI MOUSE model) of the existing Tauranga City wastewater infrastructure has been completed as part of the Southern Pipeline project. The modelling has identified that as well as transferring flows from the new development areas in the southern parts of Tauranga, the preferred pipeline will also enable capacity constraints within the existing network to be resolved<sup>15</sup>.

---

<sup>13</sup> URS New Zealand Limited, Report No. 18 *Mouse Model review and System Analysis – Tauranga Wastewater Network*, 18 April 2006

<sup>14</sup> URS New Zealand Limited, Report No. 17 *Southern Catchments Alternative Wastewater Options*, 23 January 2007

<sup>15</sup> See URS New Zealand Limited, Report No. 14 *Route Optimisation and Staging Options Report*, 2 April 2006  
\_\_\_\_\_, Report No. 18 *Mouse Model Review and Analysis with Addendum*, June 2006.

## Section 3

## Southern Pipeline Project

### 3.2 Project Objectives

The overall objectives for the Southern Pipeline project are to:

- Service areas of existing urban expansion and future growth;
- Relieve capacity constraints at the Chapel Street WWTP; and
- Implement actions arising from the SmartGrowth Strategy, specifically Action 1 of Section 7.4.3 relating to wastewater:

*“Implement the Tauranga Wastewater Disposal Strategy which includes discharging effluent via Te Maunga wetlands and the outfall pipeline”.*

In order to achieve these objectives, it is proposed to construct a new main trunk sewer to service the urban areas in the southern parts of Tauranga and to transfer the wastewater flows to the Te Maunga WWTP.

The more specific objective for the physical works is to construct a pipeline from the Maleme Street Pump Station to the Te Maunga WWTP that:

- Is safe, economical and robust;
- Protects the environment and public health;
- Minimises environmental and community disruption during construction, operation and maintenance;
- Is generally supported by the community and stakeholders; and
- Effectively collects and transports wastewater from southern Tauranga.

### 3.3 Description of Proposed Works

#### 3.3.1 Background Reports and Investigations

The appendices to this AEE contain the relevant investigative reports prepared for the Southern Pipeline project.

A summary of the findings from these reports is given in the relevant sections of this AEE.

#### 3.3.2 Overview

The proposed works for the preferred route are summarised in the following pages. More detailed technical descriptions are included in Appendix C of this AEE. The proposed works include:

- A new trunk main sewer pipeline of 14.5 km in length;
- External pipeline diameters from 0.35m diameter (Ila/Poike link) up to 1.1m in single pipe sections and up to 0.9m in the twin bore section along the main pipeline route, depending on material type selected;
- A new Maleme Street pump station and a new Memorial Park pump station;
- Upgrades or changes to other pump stations and associated rising main linkages (namely Anchorage siphon, Ila and Poike pump stations);
- Construction of a reclaimed embankment, including a beach replenishment (Memorial Park to a point on the coastline opposite Arundel Street) along part of the foreshore of the Te Papa Peninsula (which is also intended to accommodate a walkway/cycleway – refer Section 4 of this AEE);



## Section 3

## Southern Pipeline Project

- A pipeline crossing over the Tauranga Harbour, by either attaching the pipeline to the East Coast Main Trunk Railway Bridge No. 71 (which will be strengthened) or via submarine pipeline (refer Sections 5 and 6 of this AEE);
- Widening of the existing East Coast Main Trunk railway causeway; and
- Associated facilities including siphon structures, valve chambers receiving chambers and air control structures.

### 3.3.3 Construction Programme

The current programme is to commence construction in early 2008 with completion currently expected in late 2011.

The critical path item would be the railway bridge upgrade which is programmed to take 2.5 years to complete. By comparison, the alternative submarine pipeline harbour crossing option could take up to 2 years.

### 3.3.4 Preferred Pipeline Route

The preferred pipeline route (as set out in TCC resolution DC 357 Extension of Wastewater Network (Southern Pipeline), 14<sup>th</sup> December 2006 and TCC resolution DC 236, 24<sup>th</sup> July 2007) is described below and in Appendix BB.

Consents for alternative options over some sections of the pipeline route are also being sought (as a contingency, given the importance of providing the Southern Pipeline on time). Common to all options is the section of the route from Maleme Street to Memorial Park and then to Sixth Avenue, and the section of the route from the widened East Coast Main Trunk railway causeway to Te Maunga WWTP. Otherwise, the alternative route options for particular sections of the pipeline are identified as follows:

#### **Option DB – Devonport Road Pipeline and Railway Bridge Harbour Crossing:-**

The pipeline would be laid along Devonport Road (instead of the preferred route along part of the foreshore) and would pass through the CBD down Elizabeth Street to the railway bridge turning east, assuming use of the railway bridge as the harbour crossing is confirmed.

#### **Option DS – Devonport Road Pipeline and Submarine Harbour Crossing:-**

As for option DB, but with the pipeline then turning east down First Avenue (rather than Elizabeth Street) to the foreshore where a submarine pipeline would cross the harbour (in the event that negotiations to use the ONTRACK railway bridge are unsuccessful).

#### **Option FS – Foreshore Pipeline and Submarine Harbour Crossing:-**

The pipeline would be laid along the foreshore to the bottom of First Avenue, at which point it would turn eastwards and cross the harbour by way of dual submarine pipelines.

Therefore, the pipeline harbour crossing alternatives of upgraded ONTRACK railway bridge and submarine pipeline will form separate consent applications. The alternative pipeline route options from Sixth Avenue to the railway bridge (including the walkway) will also form separate applications.

The preferred route has taken into consideration constraints such as topography, land ownership, land stability, stormwater/flooding risk, physical obstacles and ease of construction. The proposed route for the Southern Pipeline is shown on Drawing No. G-105-020 Rev. E and comprises:

- Maleme Street to Memorial Park via Oropi Road, Fraser Street, Eighteenth Avenue and Devonport Road;

## Section 3

## Southern Pipeline Project

- Memorial Park, Devonport Road, Fifth Avenue East to The Strand along the western coastal foreshore encompassing a foreshore walkway/cycleway;
- A crossing of the harbour via the upgrading of the East Coast Main Trunk railway bridge;
- A widened railway causeway and then along the foreshore edge of Matapihi peninsula;
- From the road end along Matapihi Road to an unnamed paper road at approximately (NZMS 260 U14 930 856);
- Eastwards along an unnamed paper road to State Highway 2/29;
- Across the railway line and State Highways 2/29; and
- Along the rear of Baypark to the Te Maunga WWTP.

The section of the pipeline route and the associated walkway/cycleway between Memorial Park and The Strand is described in detail in Section 4 of this AEE (Memorial – Strand Walkway project). The railway bridge harbour crossing is described in detail in Section 5 of this AEE (Railway Bridge Upgrade project). The location of the activities for which consents are sought is shown on the attached Project Drawing No. G-105-012 Rev. D<sup>16</sup>.

The Southern Pipeline route is shown in more detail on Drawing Nos. G-105-021 to G-105-043 Rev. D.

### 3.3.5 Memorial – Strand Walkway Project

Part of the Southern Pipeline route involves laying the pipe within a new embankment reclamation along the section of the eastern foreshore of the Te Papa Peninsula, from Fifth Avenue East to the East Coast Main Trunk railway bridge. It is proposed that the embankment (which extends southwards to Sixth Avenue) will also serve as a walkway/cycleway. This section briefly describes the proposed placement of the pipeline within the embankment (i.e. beneath the proposed foreshore walkway). Details of the proposed walkway design are otherwise provided in Section 4 of this AEE.

The preferred method of laying the Southern Pipeline along this section is to partially bury the pipe in the seabed, and reclaim an embankment over the top as protection to the pipe. The average 'footprint' width of the embankment will be 14.5m (where the seaward side slopes down from the top of the embankment to meet natural seabed levels), but in some locations will be wider (up to 27m wide) to accommodate boat ramps and other features. It will have a 3m wide walkway/cycleway placed on the surface. Refer to Drawing Nos. C-701-001 to C-701-006 Rev. D and other 700 series drawings.

### 3.3.6 Railway Bridge Upgrade Project

Part of the Southern Pipeline route involves a crossing of the Tauranga Harbour. The TCC preferred method of crossing the harbour is to attach the pipeline under a new walkway to a strengthened railway bridge (East Coast Main Trunk Railway Bridge No. 71) from the southern end of The Strand (termed 'The Concourse' area), and to then lay the pipeline within a widened railway causeway to Matapihi.

This section briefly describes the proposed attachment of the pipeline to the railway bridge and widening of the causeway, assuming that use of the railway bridge is confirmed between ONTRACK and TCC. Further details, including the proposed structural upgrades to the railway bridge, are provided in Section 5 of this AEE.

<sup>16</sup> Drawing No. 12300-G-105-012 Rev D. Summary of Resource Consents required from Tauranga City Council and Environment Bay of Plenty.

## Section 3

## Southern Pipeline Project

### ***Bridge Upgrading and Installation of Pipeline and Walkway/Cycleway***

The design of the upgraded railway bridge involves installation of new piles (piers) alongside the existing bridge piers. This will allow a new superstructure to be added to the southern (upstream) side of the bridge. This will consist of a 3m wide pedestrian walkway/cycleway made of reinforced concrete attached to longitudinal steel/concrete beams spanning to each new pier. The Southern Pipeline will be supported off the bridge pier caps and hung from the concrete walkway/cycleway using pipe support brackets that allow for thermal movement of both the pipe and bridge.

If the railway bridge strengthening works do not proceed, then the Southern Pipeline crossing of the harbour will be achieved by way of submarine pipeline (refer Section 6 of this AEE).

### ***Causeway***

On reaching the railway embankment (causeway) at the eastern (Matapihi end) bridge abutment, the Southern Pipeline will then be buried within the causeway. The causeway will be widened by approximately 12m at the base to accommodate the new pipeline, with a protective barrier of rocks to shield the pipe from the marine environment. The pipeline will generally be placed at a minimum RL of 1.2m, which places it above the level of the highest likely tide in this part of the harbour for ease of construction. The pipeline will be located entirely outside the boundary with ONTRACK railway land.

### **3.3.7 Matapihi Landfall**

As described above, the landfall of the Southern Pipeline via either the upgraded railway bridge or submarine pipeline route will be onto a proposed reclamation along the southern side of the existing East Coast Main Trunk railway causeway. At Matapihi this reclamation will come ashore and be matched into existing ground levels. Drawing No. G-601-022 Rev.D shows two possible alignments for the pipeline from the point at which it comes ashore at Matapihi.

For the preferred alignment, the pipeline drops down into a trench crossing an area of accretion/reclamation and then a parcel of land described as Matapihi 1B1A (ML 17974), before entering the Matapihi Road road reserve. Although TCC could use the provisions of Part 8 of the Local Government Act 2002 (which relates to rights for Council sewerage over private land) to secure access for the pipeline across Matapihi 1B1A, it is TCC's wish to also secure legal access for the existing pathway connecting the railway bridge walkway and Matapihi Road that has crossed the western edge of 1B1A for a number of years. Negotiations with the owners of Matapihi 1B1A are still ongoing and if access through this parcel of land is unavailable, then the alternative pipeline alignment shown on the drawing will need to be followed.

For the alternative alignment, the pipeline again crosses part of the area of accretion/reclamation but is then placed across the seabed, making landfall again at the end of the Matapihi Road road reserve. A temporary reclamation is required to facilitate the construction of this alternative alignment, including a turning circle for construction vehicles (refer Drawing No. G-601-022 Rev D). The temporary reclamation would be removed once the pipeline was constructed. A small area of permanent reclamation would also be required to allow the existing walkway to be relocated onto the seaward side of the western boundary of Matapihi 1B1A in the event that negotiations with the owners of this parcel of land are unsuccessful.

Consent is sought for both the preferred and alternative pipeline alignments, including the necessary reclamations.

### ***Accretion/Reclamation***

The area of accretion/reclamation referred to above is the subject of a separate report regarding its status and the methods available to TCC to secure access for both the pipeline and for public access to

## Section 3

## Southern Pipeline Project

Matapihi Road<sup>17</sup>. The area in question shows elements of accretion between the end of Matapihi Road and the railway causeway. However, geotechnical investigations have identified that all accretion took place below MHWM, with subsequent reclamation (un-engineered) occurring over the top of this, such that the area has been generally brought above the level of MHWS. In terms of the Foreshore and Seabed Act 2004, the land created is classed as unauthorised reclamation, and is in the ownership of the Crown by virtue of section 18 of the Act. In the absence of the binding of the Crown by Part 8 of the Local Government Act 2002, which relates to rights for Council sewerage over private land, a registrable easement is being sought from the Minister of Lands for both the pipeline and the walkway. Later, TCC will seek to have the land vested in it as Esplanade Reserve. It is proposed to use this area of accreted/reclaimed land for a temporary construction layout area during the harbour crossing construction work (refer Drawing No. G-601-022 Rev.D).

### **Existing Wetland Drainage**

A small wetland exists in the northeast corner of the accreted/reclaimed area discussed above. The wetland currently drains through a culvert and small open drain to the foreshore. The Southern Pipeline will need to pass under the culvert/drain, with the latter being replaced and improved to minimise bed scour and scour in the beach area.

### **Additional Permanent Reclamation**

In addition to the possible reclamation on the seaward side of the Matapihi 1B1A (ML 17974) property, it is noted that a section of coastline immediately south of Matapihi Road (part Matapihi 3A2A ML 10870) is eroding into the sea. A significant portion of the site now lies within blue water title. An archaeological assessment of the area has identified that a significant archaeological site is disappearing as a consequence of the erosion (refer Report No. 50<sup>18</sup>, Appendix U). The Historic Places Trust has indicated its support for the construction of a small reclamation to stop this erosion. It is therefore proposed to construct a 5m wide permanent reclamation along the seaward margin of part Matapihi 3A2A, provided landowner approval can be obtained (refer Drawing No. G-601-022 Rev.D).

### **3.3.8 Termination Point**

The Southern Pipeline will be connected to the Te Maunga Wastewater Treatment Plant via a termination point inside the treatment plant boundary fence. Refer to Drawing No. G-200-001 Rev.C for an indicative site plan showing the location of the pipeline termination point.

### **3.3.9 Southern Pipeline System Configuration**

The first main pump station (Maleme Street) will transfer wastewater via a pressure main up Oropi Road hill to discharge into a Receiving Chamber at the start of an inverted siphon at a high point at the intersection with Chadwick Road. The flows continue through the inverted siphon along Fraser Street to discharge into a gravity section of pipe at Eighteenth Avenue. Flows will then drain via a gravity sewer into the wet well at the new Memorial Park pump station.

Memorial Park pump station is the second main pump station along the pipeline route. Flows from Memorial Park will be re-directed along a new pressure pipeline along the foreshore, over the railway bridge and along Matapihi Road. The pressure pipeline ends at a high point on Matapihi Road where the

<sup>17</sup> URS New Zealand Limited, Report No. 37 *Accretion and Reclamation South of the ECMT Causeway Matapihi*, 2 May 2007.

<sup>18</sup> Archaeology B.O.P, Report No. 50 *Archaeological Assessment-Tauranga City Council-Southern Pipeline Preferred Route Option-Section 3 Matapihi Peninsula*, January 2007.

## Section 3

## Southern Pipeline Project

flows discharge into a short length of gravity pipe that is used as the inlet to the second inverted siphon, at or around map reference NZMS 260 sheet U14 930856.

This second siphon is double barrelled (namely comprises two parallel pipes) and is the final section of the Southern Pipeline, carrying the wastewater across the relatively flat land behind Baypark and discharging into the Te Maunga WWTP.

### 3.3.10 Design Life

The Southern Pipeline (SP) has been sized to service approximately 80,000 people, which is the projected SP service population in 2051. The pipeline and pump station materials will have a projected 100 year design life. Mechanical and electrical equipment will have a design life of 15 to 25 years, while computer control systems have an approximate design life of 5 years.

### 3.3.11 General Pipeline Construction

Most of the Southern Pipeline is located within TCC road reserve and will most likely be installed using traditional open-cut trenching ('cut and cover' construction methodology). Some short lengths in specific locations may be installed using trenchless techniques such as horizontal directional drilling, pipe jacking, or tunnelling. These include places where the pipeline crosses busy road intersections, such as Fifteenth Avenue, the roundabout junction of Eleventh Avenue and Devonport Road, and State Highway 2/29 or where the pipeline crosses the ECMT railway. Consideration will also be given to areas where the impact of traffic disruption may be significant, such as at the road entrance to the Fraser Cove Shopping Centre (refer Drawing Nos. G-105-026 Rev. D and G-105-027 Rev. D).

The pipeline will largely be located within the sealed roadway, either within the parking zone (where possible), within the vehicle carriageway, or through parks, reserves and road berms to speed up construction and reduce the effects on traffic.

Construction will generally involve the following stages:

- Identification of existing services and obstacles along the route;
- Detailed route survey of all existing ground features and existing surface conditions;
- Saw cutting of any hard surface to minimise the trench width;
- Excavation of the trench and remove surplus soil;
- Supply and store the pipe on site, weld or bolt pipe joints;
- Install trench bedding, then lay the pipe, in compacted bedding material;
- Place compacted backfill in trench and reinstate surface;
- Remove waste soil and other excavated material to fill sites;
- Test and commission discrete lengths of pipe with clean water.

Pipes will be laid using one or more medium-sized excavators (20 to 30 tonne). The typical trench width will be 2m for pipes of 900mm diameter, with a minimum depth to the top of the pipe being 1m. In some areas deeper excavations will be required for pipeline hydraulic control reasons. For deeper trenches greater than 1.5m, battering of the trench sides or use of a trench shield will be required.

### Storage Areas

Temporary use of land along the pipeline route will be necessary for the storage of pipe lengths, and trench bedding and backfill material (gravels) for use in construction. Drawing Nos. G-105-023 Rev. D,

## Section 3

## Southern Pipeline Project

G-105-030 Rev. D, G-105-031 Rev. D and G-105-033 Rev. D show the location of proposed temporary storage areas at Greerton Park, Pemberton Park, Memorial Park and at Matapihi.

These storage areas will be fully reinstated to their original condition (or better) on completion of the project.

### **Reinstatement**

For trenches located within grassed areas, the ground surface will be reinstated with topsoil and grass seed to match the original surface type and level.

Road and footpath surfaces will be reinstated with compacted base course and covered with concrete, asphalt or chip seal to match the original surface level. Where the pipeline is required to be laid in the centre of a road carriageway, reinstatement including re-sealing of the road surface for a carriageway width (to prevent uneven surfaces within the traffic lanes) is likely.

### **Traffic Management**

Work within the roadway will be necessary for large portions of the construction work. Details of the traffic management will be the responsibility of the construction Contractor. However, an assessment of the likely impacts of construction on existing traffic flows has been carried out and is addressed in Section 9 of this AEE and Report No. 46<sup>19</sup> (Appendix S of this AEE).

### **Pump Stations**

The new pump stations will be predominantly below ground and only the electrical, control and site service buildings, and air pressure vessels where required, will be visible above ground. Each pump station will have large underground storage tanks for emergencies should the main pumps be unavailable for some reason. These tanks vary in size from 400m<sup>3</sup> (Ila) to around 2,000m<sup>3</sup> (Memorial Park).

### **Alternative Construction Methods**

There is the possibility of using Horizontal Directional Drilling (HDD) along several parts of the route from Fraser Street to Devonport Road where the ground is suitable. HDD is significantly more expensive than conventional trenching (even after allowing for underground service constraints and realignments). HDD also requires the main drilling machine to be located in one area for several weeks or months, resulting in more inconvenience to one group of the community. By contrast, trenching involves a moving work site progressing at around 20m per day, and only inconveniences local areas for a relatively short time.

HDD also requires the whole length of pipe (for that section) to be assembled in one piece or in significantly long lengths, so larger areas (such as parks or dedicated areas of road reserve) are required for several months to lay out the pipe.

The above factors limit the practicality of using HDD. It is also common practice not to construct pressure sewer mains under private residences, so using HDD to "shortcut" under private properties has been ruled out in these situations.

Opportunities to use HDD do exist for the following sections of the pipeline (at a cost premium):

- **Memorial Park to Elizabeth Street.** (Alternative Devonport Road route option) Memorial Park would be used as a pipe layout area, and the eastern end of Elizabeth Street would have limited access to allow the drill string to terminate.

<sup>19</sup> Traffic Design Group, Report No. 46 *Western Route E Traffic Management Assessment Report*, 25 June 2007

## Section 3

## Southern Pipeline Project

- **To avoid Merivale Shops.** The areas either side of the shops are constrained, so the length of HDD drilling would need to be around 2.5 km and use Yatton Park to layout pipe strings.
- **By-passing Oropi Road.** It may be possible to use HDD to partially construct up Oropi Road to the top of the hill near No 11 Oropi Road. This HDD route would require both the drilling machine and pipe layout to be in Greerton Park. Drilling from the same end as laying out the pipe increases costs and risks. The viability of the option will depend on the level of underground service congestion in Oropi Road and the cost/benefit of using this method.

The main advantages of HDD are that there would be minimal traffic disruption and less chance of damaging existing underground services.

### 3.3.12 Disposal of Waste Fill

It is estimated that 40,000 m<sup>3</sup> of waste 'soil', which is expected to be predominantly clean fill, will be produced from the pipeline trenches and from the two main pump stations – all of which require one (or more) specific disposal sites. The rate of fill production will depend on the number of construction teams working on the pipeline at any stage, which may number four or five.

Where excess fill is clean (the majority), disposal can be made to a cleanfill site operated in terms of the MfE guidelines<sup>20</sup>. A number of sites have been investigated as potential fill sites. These include:

- The former airport landfill, where the cost of site feasibility investigations was high and the likelihood of remediation being required was also high. There were also safety issues related to the proximity of the former landfill to the side of the airport runway. This site was not investigated further.
- A second potential fill site in airport ownership. This site had a fatal flaw, as an archaeological investigation indicated that it is likely that a historic pa site exists and should not be built over.
- Cambridge Road landfill. This is a closed landfill that is consented to receive fill material for contouring and rehabilitation of the landfill. The consent which terminates in 2030 appears not to have a limit on the amount of material deposited, although it was amended to accept 70,000 m<sup>3</sup> to reflect use during the construction of Takitimu Road between 1999 and 2003. In view of the likely quantity of material to be disposed of a variation to this consent is in order. About 14,000 m<sup>3</sup> would need to be disposed of at this site.
- Greerton Park remains an option, but initial indications are that filling of the park could worsen flooding upstream in the Pyes Pa/Maleme area. Additional detailed stormwater catchment analysis would be required to advance this site as a fill option.
- Hungahungatoroa Marae. The hapu had requested that soil generated from earthworks on the Matapihi Peninsula stay on the peninsula. A total of 8,300 m<sup>3</sup> of excess fill is likely to be produced from the peninsula. However, since the site appeared to have been used as a fill site for sawdust in the past, access for investigations (of potential contamination and stability issues) was required. This was not supplied within a timeframe suitable for obtaining consents.
- Waikari Marae. The offer was also made to Waikari Marae for material to be placed on the site. In addition, an offer was made to reclaim a small section of coast immediately south of Matapihi Road, where an archaeological site is eroding into the sea. No written response had been received in relation to these offers at the time of lodging this AEE.
- Te Maunga WWTP. This is another landfill consent held by TCC. If a satisfactory arrangement cannot be made for disposal to the Matapihi Peninsula (Hungahungatoroa or Waikari Marae), the excess fill material will be disposed of to this site. Additionally about 7,300 m<sup>3</sup> of excess fill is likely

<sup>20</sup> Ministry for the Environment, *A Guide to the Management of Cleanfills*, January 2002

## Section 3

## Southern Pipeline Project

to be generated on this section of the pipeline route, so that a total of 15,600 m<sup>3</sup> will need to be disposed of.

Provided the fill material falls within the definition of cleanfill, all material can be disposed of within the terms of the omnibus earthworks consent for the Southern Pipeline project.

The Maleme Street Pump Station (MSPS) site (No.25 Maleme Street) has recently been acquired by TCC and is situated in an industrial area. A car dismantling company previously used the site. Contaminated site investigations have been undertaken and only minimal contamination has been detected. Once the site has been vacated the surface soils will be retested and, if necessary, contaminated material taken to a licensed landfill. However the majority of the material is expected to be able to be disposed of as cleanfill.

It is proposed at this stage that cleanfill produced on the eastern side of the harbour (approx 16,000 m<sup>3</sup>) will be disposed at the old Te Maunga Landfill. Cleanfill produced on the western side (approx 24,000 m<sup>3</sup>) will be disposed as at the Cambridge Road cleanfill site. Excavated fill that contains asphalt or chip seal will be disposed at both Cambridge Road and Te Maunga as location dictates. This is estimated to be 2,000 m<sup>3</sup> of the total volume.

Variations to the existing resource consents for these fill sites, in order to facilitate the placement of the additional material, are being sought separately to the current applications.

### 3.3.13 Sediment Control – Main Pipeline and Pump Stations

During the works the Contractor will be required to take all practicable steps to reduce water saturation, erosion and sediment runoff. This will include the following:

- Use of temporary barriers to capture sediment runoff;
- Trench dewatering;
- Compaction of storage soil / gravel – graded to prevent ponding or sediment runoff;
- Measures to minimise dust.

Further details of erosion and sediment control are provided in Section 9 of this AEE. Specific sediment control measures for the Walkway and Railway Bridge Upgrade projects are provided in Sections 4 and 5 of the AEE.

### 3.3.14 Pipeline Size and Materials

It is expected that the majority of the Southern Pipeline will be constructed of Polyethylene (PE 100) with a pressure rating of either PN 8 or PN 10 (800 KPa or 1000 KPa) for the pressurised sections of the pipeline. The gravity flowing sections are expected to be PN 6.3 (630 KPa) or PN 8 (800 KPa) rated to provide for additional strength from surface loading.

The smallest pipe diameter will occur immediately downstream of Maleme Street pump station, where a rising main of approximately 700mm is proposed. The size increases incrementally as the flow increases downstream, from approximately 800mm (along Fraser Street) to 850mm (depending on pipe material selected) as the pipe discharges to the new Memorial Park pump station.

Polyethylene PE 100 has been selected as the most likely pipe material on the following basis:

- Good corrosion resistance. The wastewater is expected to be septic and likely to have high levels of hydrogen sulphide. PE100 is extremely resistant to chemicals in the wastewater.
- Continuously welded or electrofusion coupling jointing gives leak-free joints.
- Low pipe wall friction values which reduce pumping pressures.



## Section 3

## Southern Pipeline Project

- Good abrasion and damage resistance (the wastewater contains sands and grit which can erode pipes).
- Long material life (100 year design life for the pipeline).
- Low maintenance cost.
- Flexibility (for curves in alignment or depth) and survives unexpected forces (such as earthquake and loss of localised foundation support) extremely well.
- Good dynamic pressure characteristics (water hammer or surge).

The pressure main downstream of Memorial Park pump station is expected to be approximately 850 mm diameter, up to the high point on Matapihi (depending on pipe materials). The pipeline along the Walkway section will be the same size. At the high point on Matapihi, the pipeline will change to two 750 mm diameter pipes (depending on pipe material) running in parallel up to the discharge point at Te Maunga WWTP for the reasons explained in Section 3.3.20 of this AEE.

The exceptions to the use of the polyethylene pipe material are for the harbour crossing where either polyethylene, concrete-lined mild steel (CLMS), epoxy coated steel or Glass Reinforced Plastic (GRP) pipe will be used depending on the crossing option selected and the contractor's method of installation.

In some gravity or inverted siphon sections it may be more appropriate to use GRP or Polymer Concrete (a type of concrete that uses resin in lieu of cement to bind the aggregate). Due to the high stresses required to pull the submarine pipeline (should this harbour crossing option be selected), it is expected that the two submarine pipelines will be constructed of steel with an appropriate corrosion resistant lining and other corrosion protection measures (cathodic protection).

### 3.3.15 Hydraulics

A longitudinal section showing the pipeline route topography and hydraulic grade line is provided in Drawing Nos. G-200-101 Rev. E and G-200-102 Rev. E. The route incorporates a number of high and low points, with the two key high points being at Oropi/Chadwick Road and Matapihi Road – in both these locations the pressure system discharges into the non-pressurised sections of the Southern Pipeline. Both these sections require air control and treatment facilities and therefore odour control is proposed in both discharge chambers in the form of biofilters. Section 9 of this AEE assesses the odour effects from these points.

Minimum design velocities in the pipeline are determined by the need to minimise the settlement of solids and manage air that comes out of the wastewater along the pipeline. Typical guideline criteria for velocities are as follows:

- Minimum velocity to prevent particle settlement 0.7 m/s
- Minimum flushing velocity to re-suspend settled particles 1.1 to 1.2 m/s

Automated flushing of the pressure sections of pipeline at a minimum of 1.1 m/s will take place once every 24 hours to prevent build-up of particles or slime within the pipeline. Flushing of the pressure sections will carry through to the downstream inverted siphon and gravity sections, providing similar cleansing.

The maximum period of time the wastewater is within the pipeline (Retention Time) is estimated to be just over 24 hours in the early years of operation when flows are lowest. As the population of the southern areas of Tauranga grows, the flows will increase and the Retention Time will decrease. Rainfall in the area is expected to cause an increase in flow rates along the pipeline. Measurements at the Chapel Street WWTP and calculations of peak flows show that storm flows up to four times average dry weather flows (ADWF) are typical. The Southern Pipeline and associated pump stations have been designed for these peak flows. The gravity sections of pipeline will be laid at minimum gradients of 1:200 where

## Section 3

## Southern Pipeline Project

possible, although daily flushing flows from the pressure sections will ensure flat sections are 'cleaned out' by flushing at least daily to prevent blockages.

### 3.3.16 Pump Start Up

Due to the pipeline topography, the high points are expected to drain between some pumping sequences, and up to 40 m<sup>3</sup> of air could be drawn into the pipe at Pemberton Park.

This intake of air can introduce complexities into the operation of the pipeline, including water hammer and air locking problems, release of odorous air as the pipe refills, and slime growths (due to oxygen availability) causing additional friction inside the pipe. Pump start up will therefore require careful management to allow controlled venting of air from the drained sections of the pipeline and to prevent transient effects (water hammer) which could damage the pipe and associated valving. A Variable Speed Drive (VSD) or soft-start at the pump station will achieve this control. It is proposed that all the pumps will have VSD's installed.

### 3.3.17 Water Hammer Control (Transient Pressure Waves)

Under normal daily operation, the pump starting and stopping will be electronically controlled to prevent transient pressure waves.

Water hammer modelling of the pipeline has been carried out using *PIPE 2006* software. The main operational risk from water hammer is when the pump(s) shut down quickly due to a power failure, causing a pressure wave to travel quickly along the pipeline. This pressure wave can cause very low or very high pressures, which may cause permanent damage to the pipe and fittings.

The following methods will be used to control water hammer, to ensure that no unacceptably high or low pressures occur:

#### **Maleme Street Pump Station**

Water hammer control will be achieved by a combination of a number of specialist vacuum air valves along Fraser Street between Chadwick Road and Baycroft Avenue and an air/water pressure vessel at the pump station. Where vacuum air valves are used, odour control measures may be required.

#### **Memorial Park Pump Station**

Water hammer will be controlled using vacuum air valves along Matapihi Road and possibly air/water pressure vessels at the pump station.

Where vacuum air valves are used, odour control measures may be required.

### 3.3.18 Odour Control

At particular locations along the Southern Pipeline route there are pipeline features that could create nuisance odours and provision needs to be made for appropriate control measures. Locations where odour controls are likely to be needed are:

- The main pump stations – Maleme Street and Memorial Park
- Some air release valves – especially at Oropi/Chadwick Road
- Receiving Chambers – Eighteenth Avenue and Matapihi Road high point (NZMS sheet U14 933858)

Odours from these sources will be treated using biofilters or other media filters to be determined during detailed design. Details of the proposed biofilters at Eighteenth Avenue and Matapihi Road are shown in Drawing Nos. C-203-101 Rev. B and C-208-100 Rev. B and a detail of a typical odour control biofilter, as

## Section 3

## Southern Pipeline Project

will be used, at Oropi/Chadwick is provided in Drawing No. G-500-001 Rev. B. An assessment of odour effects is provided in Section 9 of this AEE.

### 3.3.19 Stream Crossings

A summary of the possible locations where the Southern Pipeline crosses culverts or water courses is provided on Drawing No. G-105-015 Rev. C. There are two significant crossings at Greerton Park (main pipeline) and Waimapu Stream (Ila/Poike link).

#### ***Stream near Greerton Park***

The Southern Pipeline will cross an unnamed stream at the north-western corner of Greerton Park by way of a pipe bridge. The pipe bridge will cross over the stream at approximately the level of the adjacent roadway. The pipe in this above ground section is likely to be steel or equivalent metal to provide resistance to external corrosion, vandalism, or possible sources of leaks or breakages.

The underside of the pipe bridge structure will be set at 0.5m above the 1:100 AEP.

#### ***Waimapu Stream***

The linking Ila/Poike pressure main will cross the Waimapu stream just north of the Oropi Road roundabout. The proposed pipe bridge will cross over the stream and surrounding wetland at approximately 0.5m above the 100 year flood level. The pipe in this above-ground section is likely to be concrete lined steel, GRP or equivalent metal to provide resistance to external corrosion and vandalism.

The stream embankments for both of the above pipe bridges will be reinforced with concrete blocks on each side to carry any thrust loads exerted by the pipe bridge onto the adjacent ground, as well as to prevent any scour issues along the stream banks due to the pipe bridge (refer Drawing No. G-500-008 Rev. B).

### 3.3.20 Associated Pipeline Structures

A number of smaller structures will be constructed as part of the Southern Pipeline project. These consist of:

- Air release and air inlet valves, and chambers;
- Drain valves and gritting out chambers;
- Receiving chambers;
- Siphon inlet and outlet chambers;
- Biofilters.

These structures will largely be installed underground and will be accessed via secure, lockable lids. During construction, support of the excavations for these structures will be put in place for any work greater than 1.5m in depth and the construction zone will be fenced.

#### ***Air Valves and Chambers***

The air valves are generally located on high points and are designed to "breathe" air in and out, as part of the pipeline surge pressure management, and to release small amounts of air and sewer gas to prevent accumulation of these in the pipeline. The air valves are connected to the pipeline by short lengths of pressure pipe connected at the top of the pipeline, can be isolated from the main pipeline by a valve, and will be located at intermediate high points along the pipeline where air is expected to collect. The specific location of the air valves will be confirmed during detail design. Preliminary locations are shown in Drawing No. G-200-002 Rev. B and are expected to be in the general locations given in Table 3-1.

## Section 3

## Southern Pipeline Project

The air valves will be installed inside concrete manhole structures. Where possible, these will be located out of the road carriageway for ease of access. If air discharge volumes are expected to be significant, the air vented from the valves will be piped to an odour management facility such as a biofilter or filtration cartridge.

Any air valves that are in remote locations, away from habitation, may be vented direct to the atmosphere with no odour control.

It is known from previous experience at TCC and other authorities around New Zealand that some air valves may experience minor leakage of wastewater. Malfunction of these air valves may also lead to very minor wastewater spills. To mitigate this, each manhole will either have a drain connected to the nearby local sewer network, allowing the leak to drain until detected and repaired by TCC during routine inspection and maintenance operations. Alternatively a small soak hole will be provided adjacent to the valve, or the valve will be placed in a small sealed chamber in environmentally sensitive areas. Discharges from these valves are regarded as being de-minimis.

Major leaks at an air valve are not common, and will be quickly discovered as the failure will cause the manhole to flood with wastewater and spill onto the ground surface. This type of failure would then be reported to TCC for inspection and the air valve repaired.

The failure frequency of the air valves will be minimised by specifying corrosion-resistant materials and testing of the valve once installed. The air valve design and installation will be such that regular inspection (typically between weekly to monthly) and testing can be performed by TCC including checking for any leaks.

**Table 3-1 Main Air Valve- Approximate Locations**

<b>Valve Number</b>	<b>Location</b>	<b>Approx. Map Reference</b>
1	Oropi Road/Maleme St. Intersection	U14 871 803
2	Oropi/Chadwick intersection	U14 872 806
3	Pemberton Park	U14 869 810
4	Yatton Park	U14 873 816
5	Merivale Shops	U14 875 821
6	Rail Bridge (west end)	U14 898 857
7	Matapihi School	U14 917 847
8.	Hungahungatoroa Road	U14 921 844
9.	Matapihi Road Railway Crossing	U14 927 849
10.	Phoenix Heights	U14 935 856
11.	Composting Plant	U14 944 850
12.	Te Maunga WWTP road	U14 949 852

### **Drain Valves and Grit Removal Chambers**

Drainage points will be provided near low points along the pipeline. These can be used in the extremely unlikely event that the Southern Pipeline needs to be drained for repairs or maintenance or access. Where practicable the drain points will discharge via a connection into the existing sewer system. Where this is not possible provision will be made for a pump well next to the drain point. Where a temporary pump cannot be installed and the wastewater pumped to the nearest sewer, a temporary holding tank will be used and the wastewater removed by tanker truck.

## Section 3

## Southern Pipeline Project

In most cases grit will be flushed along the pipeline by normal operation. However, in some locations such as at sharp bends, there remains a risk that grit could accumulate. In these circumstances the pipeline will be fitted with drain valves that can be opened to discharge any accumulated grit at low points in the pipeline as part of periodic maintenance. The valves will discharge into a “gritting-out” chamber (a concrete manhole chamber), sized to accommodate the gritting-out flow while the drain valves are opened and closed. This maintenance is expected to occur during low flows (for example at night) and no discharges to the environment are expected.

The risk of overflows caused by the drain valve failing partly open during the gritting-out operation will be mitigated by having two valves on each drain outlet connected to a short tee from the pipeline.

The valves will be located on dry land, away from watercourses and other sensitive environments as far as practicable. Refer Table 3-2 and Drawing No. G-200-002 Rev. B for the proposed drain valve locations, and the details on Drawing No. G-500-004 Rev. B.

**Table 3-2 Main Drain Valve Approximate Locations**

<b>Valve Number</b>	<b>Location</b>	<b>Approx. Map Reference</b>
1	Greeton Park	U14 872 806
2	Fraser Cove	U14 879 826
3	Railway Bridge end of The Strand	U14 898 857
4	New Embanking near Fifth Avenue	U14 896 853
5	Matapihi Foreshore	U14 908 853
6	Te Maunga siphon	U14 943 857
7	Matapihi Road Railway Crossing	U14 927 847
8	Matapihi wetland near Tip Zone	U14 947 851

### ***In-line Isolating Valves (also called “Sectioning Valves”)***

No in-line valves are proposed on the pressure mains. This is because the valves must be closed slowly and therefore are ineffective in minimising discharges in the event of pipeline damage. Neither can the valves be used to isolate sections of pipeline to minimise drainage volumes to allow for internal repairs, as it is unsafe to rely on a single valve in these circumstances. Installation of dual valves on a main line can have operational issues. There are also significant risks that once an inline isolating valve is closed it cannot be easily reopened, as these types of valves are hard to maintain in a corrosive environment and can be prone to jamming resulting in significant delays in recommissioning the pipeline. Large pipelines such as the Southern Pipeline do not commonly have in-line isolating valves for the above reasons.

### ***Access Chambers on Gravity Sections***

Access manholes will be located at a maximum spacing of approximately 200m on each gravity section of the pipeline. Each will have a heavy duty cover placed flush with the ground surface. All lids and manhole joints will be constructed and sealed to minimise infiltration of surface water into the Southern Pipeline and minimise any odour emissions.

### ***Receiving Chambers***

These are typically over-sized manhole chambers at the end of pump mains. They are designed to allow sufficient volume for upsurges of flow when pumps start.

## Section 3

## Southern Pipeline Project

### ***Siphon Inlet and Outlet Chambers***

Each inverted siphon has an inlet and outlet chamber. Inlet chambers typically have a number of weirs and valving to allow the system operators to flush each pipe within the inverted siphon system with a high volume of wastewater in order to clean the pipeline "barrel" of the inverted siphon. The valves are usually automated and controlled via a central communication system. The inlet chambers require measures to collect and treat the air being displaced by the flushing flows. The outlet chamber will be sufficiently large to allow for initial hydraulic upsurges of flow in the chamber and will be fitted with air inlet vents to allow uninhibited gravity flow on the downstream side of the chamber. The inlet vents are typically fitted with automatic dampers to prevent odorous gases from escaping from the vent.

### ***Biofilters***

The purpose of biofilters is to treat odorous air discharged from the air valves, receiving chambers and pump stations along the pipeline route. Treatment in the biofilter is by means of bacterial activity and adsorption within a media such as a bark and compost mixture. The three main biofilters will be near Oropi Road, Eighteenth Avenue, and on Matapihi paper road. The biofilter at Oropi Road will collect air discharged from the Maleme Street pump station pressure pipeline and from the start of the inverted siphon along Fraser Street.

A second biofilter proposed at the paper road on Matapihi will treat air from the discharge of the Memorial Park pressure pipeline that discharges into the siphon section at the high point.

The need for odour control is determined for each individual location. Preliminary sizing is based on 5 air changes per hour, and air retention time of approximately 60 seconds. This is a conservative allowance.

The biofilters have been located as far as practical from adjacent residential properties, although no adverse effects are expected and no air discharge consent is required.

An assessment of odour effects is otherwise provided in Section 9 of this AEE.

### **3.3.21 General Pump Station Characteristics**

#### ***Pump Station Emergency Storage***

Each main pump station will have emergency storage capacity to hold a minimum 4 hours of Average Dry Weather Flow from the local catchment, plus storage for flushing the pipeline and allowance for upstream drain down volumes. The full storage capacity will be used only during power failure or when the whole pump station is inoperable for some reason. In terms of the emergency storage capacity to be provided, 1,200 m<sup>3</sup> of nett storage is required for Maleme Street by 2051, 2,000 m<sup>3</sup> at Memorial Park, and 400 m<sup>3</sup> for 11a. Actual tank volumes will be slightly larger to allow for dead space at the bottom and adequate freeboard at the top of the tank. The emergency storage tanks will be on-line, with wastewater draining into the tanks by gravity as required.

#### ***Controls Building***

A building will be constructed adjacent to the new wet well at each pump station (at Memorial Park, the existing controls building may be extended and used for this purpose). This will house electrical control equipment, key pump parts and servicing equipment. The building floor level will be set at a minimum of 500mm above the TCC 1 in 100 year AEP flood level in each case.

#### ***Duty and Standby Pumps***

A standby pump will be installed on both main pump stations which will automatically turn on in the event of a failure of one of the duty pumps. Each pump will be equipped with soft-start and soft-stop units to minimise power consumption and to reduce any water hammer effects. Use of variable speed devices (VSDs) on these pumps will be reviewed at detailed design stage.

## Section 3

## Southern Pipeline Project

### **Stand by Power Generation**

Each pump station will have a diesel generator which will power sufficient pumps to minimise the risks of wet weather wastewater overflows at the pump stations. At Maleme Street, a building will be constructed adjacent to the controls building to house the backup generator. The associated diesel storage tank will be located externally next to the generator building. The building floor level will be set at a minimum of 500mm above the TCC 1 in 100 year AEP flood level.

### **Controls and Telemetry**

As with all other pump stations in Tauranga City, the pumps will be controlled by a PLC (programmable logic controller) unit linked to the water level sensing system within the pump station wet well. System information including low level, high level and pump fault alarms will be relayed to the TCC centralised base station via telemetry. The system will be monitored 24 hours a day, 7 days a week.

### **Flow Meter**

A flow meter will be installed on the discharge side of both main pump stations to enable the PLC to monitor flows for TCC.

## 3.3.22 Main Pump Stations

### **Maleme Street Pump Station**

**Short-Term Upgrade:** The present pump station is at capacity and overflows are likely during periods of peak flow within the next two or three years. To cope with this (while the Southern Pipeline is being constructed) a single new storage tank will be constructed on the new pump station site, in order to serve as additional storage for the existing pump station. The arrangement will be designed so that once the flow at the existing pump station reaches 62 L/sec (the existing peak capacity of the pump station) the flow will be diverted to the new storage by gravity flow and will then be pumped back to the existing pump station when the peak flows have reduced.

**Long-Term:** As part of the remainder of the Southern Pipeline construction, a new, higher capacity Maleme Street pump station is to be constructed on a larger site, near to the existing pump station. The new site at 25 Maleme Street has been purchased by TCC for this purpose. The storage tank as described above will then be used to provide emergency storage over the lifetime of the Southern Pipeline, in the event of power failures or when the pumps are down at Maleme Street.

Once all parts of the new pump station are constructed, the existing pump station at 31 Maleme Street will be de-commissioned.

The new pump station will be provided with a diesel generator to power and start all pumps as a contingency measure.

The new Maleme Street pump station will have up to 7 pumps (4 small, 3 large) that pump in series to a peak flow rate of approximately 0.46 m<sup>3</sup>/s. The total design pumping head is approximately 500 kPa (assuming a Colebrook-White roughness coefficient  $k = 0.5$  mm) to meet the 2051 Peak Wet Weather Flow rate.

Daily pipeline flushing will provide a flow velocity of 1.1 to 1.2 m/s as required.

### **Memorial Park Pump Station**

The new Memorial Park pump station will be located within Memorial Park, immediately west of the existing minigolf site, and adjacent to the existing pump station. A preliminary pump station concept plan is provided in Drawing No. C-302-002 Rev. C. This pump station will receive wastewater from the central/eastern parts of Te Papa Peninsula (the 'Avenues', Greerton, and CBD areas), the Maungatapu Peninsula, as well as pumped flows from Maleme Street Pump Station.

## Section 3

## Southern Pipeline Project

The Memorial Park pump station currently operates at flow rates much lower than those expected through the Southern Pipeline. The existing pump station currently pumps wastewater to the Chapel Street WWTP and cannot be taken out of commission during construction of the Southern Pipeline. Therefore a new pump station is required adjacent to the existing pump station, with a greater flow capacity to handle all incoming wastewater from the Southern Pipeline as well as central parts of Tauranga City and other catchments previously served by the old Memorial Park pump station.

The pump station will have up to 6 pumps (2 small, 4 large) that pump in series to a peak flow rate of approximately 0.82 m<sup>3</sup>/s. The total design pumping head is approximately 500 to 600 kPa (assuming a Colebrook-White pipe roughness coefficient  $k = 0.5$  mm) to meet the 2051 Peak Wet Weather Flow rate.

Daily pipeline flushing will provide a flow velocity of 1.1 to 1.2 m/s as required.

The pump station will consist of a wet well/pump chamber and a large emergency storage tank. The wet well will be approximately 8m deep to suit the existing incoming sewers. Both these structures will be built predominantly underground (refer Drawing No. C-302-003 Rev. B). Other structures include the pump station control cabinetry, diesel storage and a diesel generator, which will be housed in a building constructed above the flood plain level specified in the district plan.

Excavations required for the pump station construction will be contained within the area set aside in the Memorial Park Reserve Management Plan for the wastewater pump station. Use of sheet-piles or similar earth retention measures will be required to brace the excavation while the concrete tanks are constructed.

The entire construction area will remain fenced to prevent access by the public.

### 3.3.23 Local Pump Stations

It is currently proposed to upgrade the Ila pump station and associated rising main by providing additional wastewater storage capacity of approx 400 m<sup>3</sup> and a new 350mm diameter rising main from Ila to Maleme Street Pump Station. Analysis of the Ila/Poike System has indicated that this new 350mm diameter pipeline is not required to be operational until approximately 2016.

Consents are being sought for this work at this time as allowing for planning and construction, the work is likely to be required very shortly after the Southern Pipeline is operational (around 2 to 3 years). The timing of the upgrade is dependent on the rate of development in the Hairini, Ila and Poike catchments.

The proposed new pipeline route follows the existing rising and gravity mains from Ila to Poike and then extends down Windermere Drive, Poike Road, across the Waimapu Stream to Oropi Road and Maleme Street Pump Station.

An aerial pipeline stream crossing is required at the Waimapu Stream.

### 3.3.24 Testing and Commissioning

Prior to pressure testing, the pipe will be cleaned of construction debris by passing a 'PIG' or similar cleaning swab or drogue along the whole pipeline length. On completing of the pigging, pressure testing of pipeline sections will commence.

Pipelines will be tested in sections probably first with air and then with water. Test pressures are typically 50% more than normal operating pressures. Once each section has passed the test, and on completion of each section of pressure main or inverted siphon, the complete length of main will be retested at a similar pressure to confirm that there is no leakage. While the water could be obtained from various sources, it is likely to be obtained from the TCC reticulated water supply using either the pipeline or a tanker to convey the water to each test area.

On completion, the test water will most likely be discharged in a controlled manner to the stormwater system as it will be clean or alternatively it may be pumped to the wastewater treatment plant.



## Section 3

## Southern Pipeline Project

All equipment will be factory tested and pre-commissioned in place prior to connecting to the scheme. A rigorous series of pre-commissioning tests will be undertaken on each piece of equipment and operating parameters documented and witnessed prior to commissioning the whole scheme.

It is envisaged that the scheme will be pre-commissioned in sections prior to a commissioning of the project as a whole.

Only clean water will be used during pre-commissioning and final commissioning work.

### 3.3.25 Pipeline Maintenance

Routine maintenance of the Southern Pipeline and associated structures will be minimal, with a summary of the anticipated inspections and frequencies shown in Table 3-3. Internal pipeline inspection may be carried out using CCTV (closed circuit television) but this will be done rarely. Works (including pigging) will be undertaken as required if pipe blockage or damage occurs (these would be regarded as emergency works).

**Table 3-3 Summary of Expected Site Inspection Frequencies**

<b>Structure</b>	<b>Purpose of Inspection</b>	<b>Estimated Frequency <sup>21</sup></b>
Main Pump Stations (Memorial Park, Maleme Street)	Check Operation / Cleaning as required	Weekly
Off-line Pump Stations (Poike)	Check Operation / Cleaning as required	Weekly
Single Air Valves	Check Operation/ Visual inspection for leaks	Bi-monthly
Transient Control Air Valves (near Chadwick Road, Fraser Street and on Matapihi Road)	Flush valves with clean water and visual inspection	Weekly
Drain Valves	Check Operation	Annually
Isolating Valves (siphons)	Check Operation	Annually
Pipe Bridges (Waimapu, at Greerton Park)	Paint/ Cleaning as required	Every 5 to 10 years
Pressure vessels (pump stations)	Corrosion resistance	Every ten years for internal inspections.

### 3.3.26 Pipeline Security

The majority of the Southern Pipeline is underground and will be constructed of continuously welded pipe with a minimum number of flanged joints, thereby minimising potential loss of wastewater via leakage.

All above ground sections of the pipeline will be made with continuously welded steel, GRP, or stainless steel to maximise resilience and minimise susceptibility to cracking, rupture or malicious damage. This includes the two stream crossings (near Greerton Park and Waimapu streams) and the railway bridge harbour crossing.

The railway bridge pipeline harbour crossing will most likely use GRP material, as this length of the pipeline will be enclosed within the bridge structure and less susceptible to damage from third parties.

<sup>21</sup> Telemetry links allow the pump station's performance to be monitored continuously by TCC.

## Section 3

## Southern Pipeline Project

All pump station buildings and valve chambers will be robustly constructed and will be permanently locked to avoid break-in and vandalism of pipeline facilities. Pump station sites will be fenced for security purposes.

Most polyethylene (PE) pipe “failures” are due to third party damage or become apparent during the initial testing and proving stages of the pipeline.

The most common forms of third party damage are caused by excavator buckets from excavation works (other than the SP project) or from directional drilling contractors installing other services. To minimise these events and associated adverse effects the following is proposed:-

- a) 24 hour, 7 days a week (24/7) notification procedures are in place for leakage responses.
- b) Maintenance staff have set (contracted) response times to emergencies and an emergency shutdown procedure.
- c) TCC will have at least two permanent repair kits and several spare pipe lengths available for each diameter and material type of the Southern Pipeline to enable rapid permanent repairs to take place.
- d) TCC to hold electrofusion coupler or patch repairs for the PE pipework for each pipe diameter or, failing this, ensure that permanent repair couplers or repair patches are readily available in New Zealand or Australia.
- e) Fit all pump stations with pressure sensors on the rising mains to raise a “low pressure” alarm in the event of a pipeline pressure drop caused by serious leakage. Alarms to be monitored 24/7.
- f) Provide for wastewater in the rising mains to drain back to the pump station emergency storage tanks by manual activation of large-diameter bypass valves.
- g) Provide an integrated reticulation system to maximise flexibility and minimise risks of wastewater overflows. Look at opportunities to install some additional in-line or off-line underground storage at key locations for extreme emergencies. Existing sewage reticulation pipelines near the Southern Pipeline be retained for mitigating emergencies (where practicable).
- h) Provide pipeline drain points (valves and manholes) at all low points on the Southern Pipeline.
- i) Consider the use of a parallel main laid adjacent to the Southern Pipeline at Matapihi (because there is no local sewage in the area). It is noted that such a parallel line may not be suitable for use by local reticulation unless multiple isolating valves were used.
- j) Develop a contingency and operating plan for emergency situations.

### 3.4 Alternatives Considered

#### 3.4.1 Introduction

A range of design and route alternatives have been considered throughout the development of the Southern Pipeline project to date. This process has included consideration of:

- Alternatives to the development of a new interceptor pipeline (i.e. alternatives to the Southern Pipeline project);
- Alternative routes for the Southern Pipeline;
- Alternative routes and harbour crossing methods for the preferred pipeline route; and
- Alternative alignment options for the preferred route.

## Section 3

## Southern Pipeline Project

The main outcomes of the assessment process have been to confirm the need for the Southern Pipeline, to confirm the proposed pipeline route from Maleme Street to Te Maunga, and to confirm the proposed harbour crossing method.

The following section describes the alternatives considered and the assessment process.

### 3.4.2 Alternatives to the Southern Pipeline Project

Alternatives to the Southern Pipeline Project are discussed in Report No. 17 *Southern Catchments Alternative Wastewater Options*, 23 January 2007 (refer Appendix D).

The objective of that report was to confirm that alternative wastewater collection, treatment and disposal options for the southern catchments of Welcome Bay, Pyes Pa / Pukemapu and Pyes Pa West / Tauriko (industrial area) had been thoroughly investigated. In addition, TCC wished to confirm the rationale for the Southern Pipeline.

The alternatives considered for wastewater management in the southern catchment areas have included:

- i) Manage the capacity of the existing reticulation to 'absorb' the ongoing development of the southern catchments – effectively a 'do-minimum' option;
- ii) Upgrade the local reticulation system to meet future wastewater demands, rather than construction of the Southern Pipeline;
- iii) Provide storage at local pump stations to extend the life of the current system to meet growth projections;
- iv) Use Chapel Street WWTP for treatment of flows from the southern catchments instead of Te Maunga; and
- v) Develop one or more satellite treatment plants in the southern catchments and associated system(s) for disposal of wastewater effluent, if (ii) and (iii) above are not feasible.

The assessment of those options was based on a review of previous work which considered issues and options for the southern catchments, as well as extensive 'DHI MOUSE' network modelling to investigate and model the capacity of the existing wastewater network.

#### **Reticulation and Storage Upgrade Options**

The results from Mouse modelling undertaken in November 2006 confirmed TCC's earlier predictions that the reticulation system transporting wastewater from the southern catchments to Chapel Street WWTP will be at or over capacity in the year 2011. Overflows are expected to occur during storm (wet weather) events by 2011.

Some options tested with the MOUSE model also investigated the use of storage to defer or avoid construction of the Southern Pipeline. The outcomes of that work are documented in the following reports:

- Report No. 14, *Route Optimisation and Staging Options Report*, 2 April 2006 (refer Appendix C)
- Report No. 18, *Mouse Model Review and System Analysis Tauranga Wastewater Network Technical Report*, 18 April 2006 (refer Appendix E)
- Addendum (Report No. 18A), *Mouse Model Review and System Analysis Tauranga Wastewater Network*, Technical Report Addendum June 2006 (refer Appendix E)

Conclusions from those reports were that storage in the southern catchments would not alleviate overflows at Judea Pump Station and at Maleme Street pump station. Significant volumes of storage (8,700 m<sup>3</sup>) would be required at Maleme Street pump station, at a minimum cost of \$8.5 million, to

## Section 3

## Southern Pipeline Project

mitigate overflows in the immediate upstream and downstream catchments until 2016, but not beyond this date. Therefore, storage alone is unlikely to be a cost effective option.

Without provision of pump station storage it was determined that there would be insufficient capacity for the existing reticulation to contain all flows, even if flows from new developments were limited. Already the existing network is at or very near capacity, and any further flows added will contribute to the likelihood of overflows from the drainage system if no further upgrade work is carried out.

If localised reticulation and/or pump station storage were to be recommended, then the existing capacity limits at Judea pump station would remain a key problem for TCC that would not be resolved without either upgrading of the Judea system to Chapel Street WWTP, or redirection of a portion of the Chapel Street WWTP flows away from Judea.

The “do nothing” approach was determined to be unsustainable as there is insufficient spare capacity in the existing sewer system and in most cases the existing system could not easily be upgraded (for example through private property, special ecological sites etc).

Providing additional storage at local pump stations had a number of issues including:-

- Inadequate existing space on TCC owned land for storage.
- High cost of providing storage.
- The necessity for a major pump station upgrade (including mechanical and electrical) in conjunction with the storage.

### **Modelling of Southern Pipeline**

Further modelling of the Southern Pipeline was undertaken and included assessment of options for providing storage at local pump stations to extend the life of the current system to meet growth projections, and further consideration of the role of all or part of the proposed interceptor pipeline system versus localised reticulation upgrade options. The outcomes of this work are documented in the following report:

Report No.25, *Future Mouse Model Tauranga Wastewater Network Report*, 1 February 2007 (refer Appendix E)

Conclusions from this report were that the Southern Pipeline will provide capacity for flows from the southern catchments up until 2051. In addition, there are further benefits, the key one being that by redirecting a large proportion of Tauranga’s wastewater to Te Maunga WWTP the capacity issues currently noted at Judea pump station and downstream to Chapel Street are relieved. This is a significant saving to TCC as upgrade work in the Judea pipeline is now not regarded as critical, with some capacity being freed up to take new flows in the future from development in the western areas of Tauranga once the Southern Pipeline is operational.

### **Upgrade / Expansion of Chapel Street WWTP**

Part of the original justification for proceeding with the Southern Pipeline project in early 2005 was that Chapel Street WWTP is nearing capacity, with little room for expansion, therefore creating a need to divert flows away from Chapel Street to the Te Maunga WWTP.

In October 1999, Montgomery Watson (now MWH) issued two reports describing an investigation of treatment capacity at Chapel Street WWTP. In early 2006 this previous work was re-assessed by MWH, who confirmed that the existing treatment process *could* be upgraded to increase treatment capacity.

In response to that work, an alternative wastewater management option was identified which also involved construction of an interceptor pipeline, but one which would transfer increased wastewater flows to Chapel Street WWTP rather than Te Maunga. This option would require construction of additional raw

## Section 3

## Southern Pipeline Project

sewage and treated wastewater storage and larger raw sewage and reclaimed water pump stations at the Chapel Street site.

Although technically feasible, the disadvantages associated with further expansion and upgrading of Chapel Street WWTP include reduced flexibility, increased risk of adverse environmental effects, potential issues with the proximity to adjacent land uses, age of the existing structures, and liquefaction risk during an earthquake event. Further expansion at Chapel Street would also be inconsistent with the SmartGrowth Strategy which promotes the Te Maunga WWTP as Tauranga's main site for wastewater treatment.

### ***Satellite Treatment and Disposal Issues and Options***

Report No. 17 also considered options for providing satellite treatment plants at the three southern catchments of Pyes Pa West / Tauriko, Pyes Pa / Pukemapu and Welcome Bay, and options for treated effluent disposal. Disposal options include discharge of treated effluent to the ocean via the existing Papamoa Ocean Outfall; to the Tauranga Harbour; to land; to wetland; and to river/stream.

In summary, the reasons why the establishment of a new treatment plant (or plants) in the southern part of Tauranga are not considered to be feasible alternatives are:-

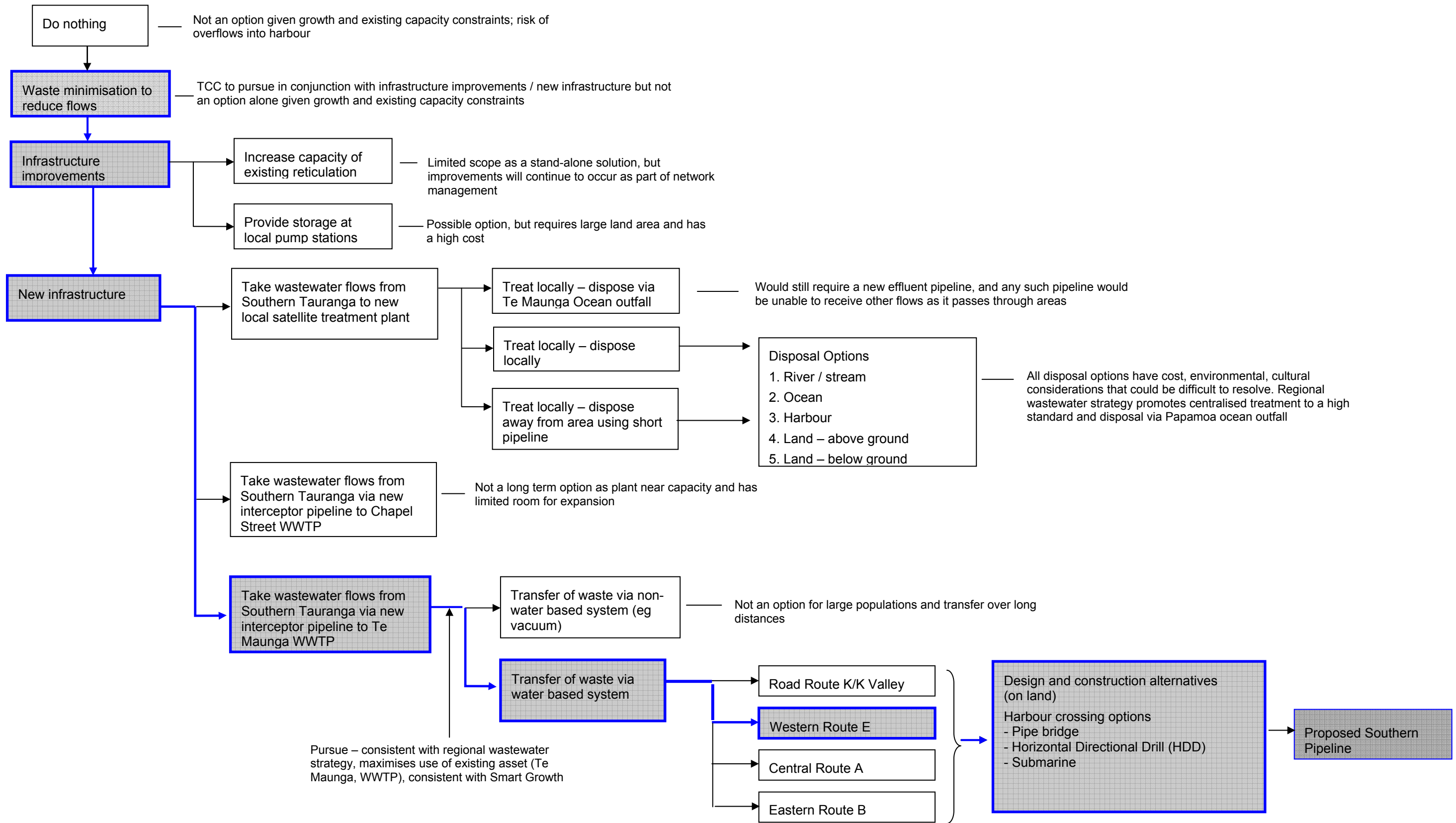
- i) Cost prohibitive due to onerous treatment and disposal requirements;
- ii) Raises significant cultural concerns/issues;
- iii) Likely to meet strong community opposition to discharge to harbour, whether direct or indirect;
- iv) Will ultimately result in a discharge of treated wastewater into the harbour. Additional nutrient load in the harbour may exacerbate concerns over nuisance blooms of sea lettuce (*Ulva* species) which, according to EBoP literature, frequently give rise to aesthetic and recreational or commercial problems;
- v) A timeframe of 5 to 10 years to implement would be required and would not address current reticulation capacity problems;
- vi) Limited availability of suitable land area for effluent disposal;
- vii) Loss of economies of scale for centralised treatment at Te Maunga;
- viii) Increased operational requirements for new treatment plant and disposal system.

### ***Summary of Alternatives to the Southern Pipeline***

The work undertaken and reported in the "*Southern Catchments Alternative Wastewater Options Report*" (Report No. 17, Appendix D) confirms the need for the proposed Southern Pipeline. The flow chart on Page 3-24 over summarises the alternatives which have been considered as part of that work or in earlier investigations.

Section 3

Southern Pipeline Project



## Section 3

## Southern Pipeline Project

### 3.4.3 Pipeline Route Options

#### Overview

The development of route options and the selection of a final route has been a staged process. Following the development of a wide range of options in the initial route assessment phase, a coarse screening of these was undertaken to develop a reduced number of preliminary route options, with further investigation of those options leading to a recommendation for a preferred route, known as 'Western Route E'.

The assessment of alternative route options was comprehensive, and took around 18 months from the initial investigations to the point at which TCC was able to confirm Western Route E as the preferred option.

Western Route E is now the proposed route, and is generally referred to in this AEE as the proposed or preferred pipeline route.

The route assessment and selection phase of the Southern Pipeline project is documented in the key report listed below and summarised in the following text:-

- Report No. 20A, *Southern Pipeline Route Selection Report*, 5 May 2006 (refer Appendix C).

Following completion of the Route Selection Report, further investigations were undertaken in relation to routes via the Kopurererua Valley. That further work is documented in the following reports:-

- Report No. 30, *Southern Pipeline Kopurererua-Valley Route Summary*, 16 October 2006 (refer Appendix C); and
- Report No. 32, *Western Route E, K-Valley and Road Route K Comparison*, 16 November 2006 (refer Appendix C).

#### Initial Route Options

A range of alternative pipeline routes were identified in the 'initial route options' phase of the Project. The key components of this phase were to:-

- Identify constraints and opportunities;
- Identify and investigate route options; and
- Identify 'preliminary route options' for further assessment.

The initial assessment of options was undertaken on the basis of individual route sections. Individual route sections were then combined to create main routes and route alternatives within each corridor. In many instances the individual route sections were common to a number of different routes and route variations.

The initial route options were assessed having regard to a range of engineering and design requirements, land tenure, environmental, cultural, social and economic issues.

Following consideration of over 50 individual route sections, a preferred route and one or more alternatives within each of four main corridors was identified. These options are referred to as the Preliminary Route Options.

The preliminary route options, along with all of the route sections considered are shown on Drawing Number G-104-060 Rev. E, Route Options Summary Plan.

In summary, the main route corridors identified for further consideration were:-

- Hairini / Maungatapu / Matapihi (eventuating as "Central Route A");

## Section 3

## Southern Pipeline Project

- Hairini / Welcome Bay (eventuating as “Eastern Route B”);
- Greerton / Tauranga Central / Matapihi (eventuating as “Western Route E”); and
- Kopurererua Stream Valley / Tauranga Central / Matapihi (eventuating as “Road Route K”).

An earlier route option considered via Welcome Bay and Kairua Road was discounted early due to the additional length (20.8km in total) and additional pump station requirements making it too expensive relative to the other options.

A route option via the Tauranga Harbour Bridge was also considered but not investigated in detail for the following reasons:- the route would be significantly longer than the shortest routes, has poor route security, has significant lengths through very highly trafficked areas and would be constrained by the new harbour bridge. As other route options had fewer constraints and would be less expensive to construct, no detailed investigation was undertaken on the Harbour Bridge Route.

### **Preliminary Route Options**

The main pipeline routes considered in the preliminary route options phase are summarised below.

**Central Route A** passes through Hairini, Maungatapu and Matapihi. A harbour crossing would be required between the Maungatapu and Matapihi peninsulas. The key overall objective for this corridor was to develop the most direct route between Maleme Street and the Te Maunga WWTP.

**Eastern Route B** passes through Hairini and Welcome Bay, and to the rural area of Ngapeke. A harbour crossing is proposed from Asher Road to the Te Maunga WWTP was proposed. The key overall objective for this route has been to reduce the extent of work within the state highway corridor and to establish a route to collect wastewater from the Welcome Bay urban area as well as other parts of southern Tauranga.

**Western Route E** passes through the suburbs of Parkvale, Tauranga South and Tauranga Central before crossing the harbour to Matapihi peninsula where it joins the Route A corridor. The key overall objective for the Western Route E corridor has been to avoid running parallel to the SH2/29 corridor and to use existing TCC land.

**Road Route K** follows the Takitimu Drive toll route, passes through Tauranga Central and then crosses the harbour to Matapihi peninsula. Route K also joins the Route A corridor at Matapihi. The Route K corridor was introduced as an alternative towards the end of the Initial Route Options Phase (September 2005). Key overall objectives for the Road Route K corridor have been to avoid major reinstatement costs associated with works in local roads, and to link to the Judea pump station.

All of the above route options require a crossing of the Tauranga Harbour. Harbour crossing options considered in association with the routes were to attach to existing road or rail bridges, construct a separate bridge, place the pipeline in a trench in the seabed, or to place the pipeline at depth under the seabed using a technique called Horizontal Directional Drilling (HDD).

A route variation which was also considered in the preliminary route options phase was to construct the pipeline to Chapel Street and provide additional storage capacity to allow for wastewater buffering prior to and after treatment. This option, known as the **Chapel Street Route** has a different overall philosophy to the other route options as it would involve storage and treatment at the Chapel Street WWTP and the *treated* wastewater would then be transferred to Te Maunga via the existing reclaimed water pipeline, across the Harbour Bridge. Other route options transfer *untreated* wastewater to Te Maunga. The option to increase flows to Chapel Street is described earlier, in Section 3.4.2 of this AEE.



## Section 3

## Southern Pipeline Project

### 3.4.4 Assessment Process

#### QBL Assessment Framework

The assessment of route options has had regard to various social, economic, environmental and cultural considerations, and has been undertaken in accordance with the decision making requirements of the Local Government Act 2002 (LGA), including s.77 Requirements in Relation to Decisions. Technical investigations and consultation with key stakeholders was an important part of this process.

A 'Quadruple Bottom Line' assessment framework ('QBLA') was developed for the Southern Pipeline project to assist with the comparison between options and the selection of a preferred pipeline route. A QBLA framework is one which incorporates consideration of social, economic, environmental and cultural matters. The assessment framework also contains matters directly relevant to an assessment of alternatives process under the Resource Management Act 1991 (RMA).

The matters considered in the comparative assessment of options are summarised below:

**Table 3-4 Assessment Criteria within the QBLA Framework**

<b>Section 77 (1) LGA2002 requirements in relation to decisions</b>	<b>Information and criteria within the QBLA framework</b>
A local authority must, in the course of the decision-making process,--- a) seek to identify all reasonably practicable options for the achievement of the objective of a decision; and	Description of options
b) assess those options by considering--- (i) the benefits and costs of each option in terms of the present and future social, economic, environmental, and cultural well-being of the district or region; and	Social: short-term and long-term Economic: short-term and long-term Environmental: short-term and long-term Cultural: short-term and long-term
(ii) the extent to which community outcomes would be promoted or achieved in an integrated and efficient manner by each option; and	Community outcomes e.g. as presented in SmartGrowth, Tauranga Tomorrow and other Council policy documents
(iii) the impact of each option on the local authority's capacity to meet present and future needs in relation to any statutory responsibility of the local authority; and	Impact on TCC's capacity to meet present and future needs
(iv) any other matters that, in the opinion of the local authority, are relevant; and	Other matters, including: risk rating; options for staging or corridor expansion; major consent requirements; timeliness of completion
(c) if any of the options identified under paragraph (a) involves a significant decision in relation to land or a body of water, take into account the relationship of Maori and their culture and traditions with their ancestral land, water, sites, waahi tapu, valued flora and fauna, and other taonga.	Relationship of Maori with ancestral land, waters etc.

The QBLA process included the scoring of each route option to reflect the potential short-term and long-term effects. The short-term effects are generally related to the construction period and may occur for a duration of only 3 – 6 months or less, in any given location. The potential long-term effects (both positive and negative) are associated with the physical presence and ongoing operation of the pipeline and in many instances will occur for the 100 year life of the pipeline. Accordingly, the long-term effects associated with the project were weighted more than that of the short term effects (a three times weighting).

## Section 3

## Southern Pipeline Project

Section 77 (1) LGA also requires TCC to consider other matters including community outcomes, impact on TCC's capacity to meet present and future needs; and relationship of Maori with ancestral land, waters etc. These matters were considered in the route selection process, but were not individually scored in the QBLA table as there is a large degree of overlap between these other matters and the social, economic, environmental and cultural issues which have been scored.

### ***Inclusion of Risk in the QBLA Framework***

Risk is inherent with the development of any significant infrastructure project and has the potential to delay or negatively impact (e.g. financial, environmental, cultural, social etc) the project.

A risk analysis approach was also applied in the comparative assessment of route options, with the intention of maximising opportunity and reducing risk for the project as a whole and for the pipeline routes. The relative risks of each of the route options were incorporated within the QBLA process.

The relative scores arising from the QBL and risk analysis process were used as a guide only for the comparative assessment of options and did not necessarily determine a preferred route for the Southern Pipeline. Other broader strategic considerations include the overall hydraulic flexibility offered by a particular route and the potential for dual use of a pipe-bridge (e.g. for other services or access).

### ***Possible Route Optimisation and Staging***

The options assessment process also included consideration of options to stage construction or to optimise design for the Southern Pipeline so as to meet TCC's future projected cash flow requirements for the City over the period from 2006 to 2016. Examples of staging include:-

- Constructing one pipeline to serve the southern areas for 25 years from Maleme Street to Te Maunga, with a second pipeline to be constructed 25 years hence; and
- To construct half the 'full sized Southern Pipeline from Maleme Street to Memorial Park within the next few years, followed by construction of the full sized pipe from Memorial Park to Te Maunga after 25 years.

Optimisation options considered and the conclusions developed are presented in:-

- Report No. 14, *Southern Pipeline Route Optimisation and Staging Options*, 2 April 2006 (refer Appendix C).
- Report Nos. 44 and Addendum Report 44A, *QBLA and Risk Summary*, 6 June 2007 (refer Appendix R)

There are some cost savings to be made by using alternative methods of construction or alternative routes in some locations, however, the Optimisation / Staging Report demonstrates that only construction of the full Southern Pipeline will effectively mitigate existing reticulation capacity problems whilst also allowing for future growth in the southern and western parts of Tauranga.

### ***Outcomes of Route Options Assessment***

#### ***Advantages and Disadvantages***

The issues associated with each of the main pipeline route options are summarised in Section 8 of Report No. 20A (*Route Selection Report*, 5 May 2006) and key advantages and disadvantages are noted in Table 3-5 below.

## Section 3

## Southern Pipeline Project

**Table 3-5 Summary of Route Options - Key Advantages and Disadvantages**

<b>Route Option</b>	<b>Key advantages</b>	<b>Key disadvantages</b>
Central Route A – Bridge	Shortest and most direct route Opportunity to combine with pedestrian / cycle facility Avoids works in Tauranga Central	Relies on access through private land in multiple ownership. Bridge likely to be more difficult to consent (and take longer).
Central Route A – HDD <sup>22</sup>	Shortest and most direct route One of the three most economic routes Avoids works in Tauranga Central	Relies on access through private land in multiple ownership. Does not provide medium or long term resolution for Judea to Chapel Street constraints.
Western Route E – Bridge	Hydraulic flexibility Least impact on identified ecological and archaeological sites Opportunity to combine with pedestrian / cycle facility	Significant disruption to traffic and community during construction. Need to mitigate landscape impacts associated with additional bridge. Greater potential impacts on environment, which will need to be mitigated.
Western Route E – HDD	Hydraulic flexibility One of the three most economic routes Least impact on identified ecological and archaeological sites	Significant disruption to traffic and community during construction.
Chapel Street Route	Hydraulic flexibility No new harbour crossing required	Significant disruption to traffic and community during construction (more than Route E). Inconsistent with SmartGrowth Strategy which promotes Te Maunga WWTP for future expansion. High risk option.
Road Route K – HDD	Least road reinstatement works One of the three most economic routes	Longest route. Geotechnical issues over significant length of route.
Road Route K – Bridge	Least road reinstatement works Opportunity to combine with pedestrian / cycle facility	Longest route. Landscape impacts associated with additional bridge. Bridge likely to be more difficult to consent (and take longer).
Eastern Route B – HDD	Avoids works in Tauranga Central	Issues in crossing Rangataua Bay. Does not provide medium or long term resolution for Judea to Chapel Street constraints.
Eastern Route B – Trench	Avoids works in Tauranga Central	Significant cultural and environmental issues. Does not provide medium or long term resolution for Judea to Chapel Street constraints.

### **QBLA Assessment Outcomes**

The ranking of the route options using the QBLA framework varied depending upon the relative weighting attributed to short-term and long-term impacts. Generally, the options that consistently scored well under

<sup>22</sup> HDD = Horizontal Directional Drilling

## Section 3

## Southern Pipeline Project

this process were Central Route A and Western Route E (with HDD). Western Route E became increasingly favourable as the weighting of the long-term effects increased over the short-term effects.

With risk also incorporated in the assessment, Central Route A becomes less desirable (largely due to the risks associated with securing access to land in multiple ownership, and to a lesser extent, the risks associated with long term security of works within the State Highway corridor).

The Chapel Street Route option also scored well under the QBLA framework, largely because this option avoided the need for a harbour crossing (and therefore the associated cost and environmental impacts). However, expansion of the Chapel Street WWTP site to handle additional flows is considered to be an undesirable long term solution due to reduced flexibility, increased risk of adverse environmental effects, proximity to adjacent land uses and liquefaction risk.

### **Recommendations of the Preliminary Route Options Assessment**

Having regard to the information contained within the Route Selection Report, the later reports which reconsidered the Kopurererua Valley Routes, and the Southern Catchments Alternative Wastewater Options Report, the preferred route for the Southern Pipeline was Western Route E. This route follows Fraser Street, Eighteenth Avenue and Devonport Road.

Western Route E route was considered to meet the overall objectives for the project and in particular, it offered additional hydraulic flexibility compared to other routes, including the ability to address existing capacity constraints in the trunk system at Memorial Park and downstream of Judea. The route overall also scored well when all social, economic, environmental and cultural matters were considered.

At the time the routes were assessed and the preferred route selected, the preferred harbour crossing method for Western Route E was to place the pipeline under the seabed using a submarine pipeline. However the benefits associated with a separate pipe bridge plus public walkway were also acknowledged and further investigations on the harbour crossing method were initiated.

Western Route E is now the proposed route for the Southern Pipeline and from this point on in this AEE is generally referred to as the "proposed pipeline". The alternative harbour crossing options are discussed in the following section.

### **3.4.5 Harbour Crossing Options**

#### **Overview**

TCC confirmed Western Route E as the preferred route in December 2006 subject to considering the options for crossing Tauranga Harbour in more detail.

The options considered and the assessment undertaken is documented in Report No. 26, *Harbour Crossing Options*, 5 October 2006 (refer Appendix F).

Methods considered to cross the harbour were:

- To use HDD and place the pipeline at a depth 50 metres to 70 metres below the seabed, or
- To lay a submarine pipe on or just under the seabed surface, or
- To construct a new pipe bridge, possibly combined with pedestrian and cycle access.

The five harbour crossing options considered at that time were:-

#### **Option 1: Bridge and Embankment**

Pipe bridge and embankment from The Strand to Matapihi Road end, generally parallel to the existing railway bridge and with a widened embankment adjacent to the existing railway embankment;

## Section 3

## Southern Pipeline Project

### **Option 2: Submarine and Embankment**

Submarine pipeline from First Avenue and a widened embankment to Matapihi Road end;

### **Option 3: Horizontal Directional Drill (HDD)**

HDD from First Avenue (or The Strand) to Matapihi Road end (no embankment required);

### **Option 4 Submarine Direct**

Submarine pipeline directly from First Avenue to Matapihi Road end (no embankment required); and,

### **Option 5 Submarine Memorial to Matapihi**

Submarine pipeline from Memorial Park to Matapihi Road end (no embankment required)

All harbour crossing options are from Tauranga CBD to Matapihi, on an alignment to the south of the existing East Coast Main Trunk Railway Bridge No. 71.

Attaching the Southern Pipeline to the existing railway bridge (without strengthening) was considered in the earlier route selection phase of the project, but was not pursued further due to the inability of the existing structure to provide the degree of structural security considered necessary by TCC for the pipeline under earthquake conditions, and hence the associated lack of long term security in attaching to the railway bridge<sup>23</sup>. However, as discussed below, this was subsequently reconsidered following further discussions with ONTRACK.

### **Assessment Process and Outcomes**

The assessment of the harbour crossing options incorporated consideration of a range of technical, social, economic, environmental and cultural aspects.

A summary of the key issues associated with each of the harbour crossing options is presented in the Executive Summary of the Harbour Crossing Options Report<sup>24</sup>. A comparative assessment of the options was undertaken using a QBLA framework, as outlined earlier in Section 3.4.4 of this AEE.

Tauranga Harbour has significant conservation, landscape and cultural values. Harbour crossing options which involve placement of the pipeline under the seabed were generally considered preferable to other options from an economic and landscape point of view. However a crossing over the harbour on a pipe bridge was regarded as having advantages for maintenance access and also provided an opportunity for dual use (e.g. for other services or for pedestrian/cycle access).

The initial outcomes of the QBLA had indicated that Option 3: HDD and Option 1 Bridge and Embankment scored best when all relevant social, economic, environmental and cultural matters were considered<sup>25</sup>. These results were useful to assist with the comparative assessment of options when issues other than direct costs are evaluated.

Following preparation of the Harbour Crossing Options Report, a workshop took place with Councillors, Council officers and consultant staff (9 October 2006) to review the initial QBLA of the harbour crossing options. The outcomes of that workshop were as follows.

Significant concerns were raised in relation to the potential traffic and business disruption associated with stringing of pipelines for the HDD option during construction, the potential risks of a pipeline breakage in a strong earthquake and the increasing costs of the option (following geotechnical investigations, the costs of this option had effectively doubled compared to earlier assessments). Therefore, although the HDD

<sup>23</sup> URS New Zealand Limited, Report No. 26 *Harbour Crossing Options Report*, 5 October 2006.

<sup>24</sup> Ibid., Executive Summary

<sup>25</sup> Ibid., p.13-3 (Option Comparison)

## Section 3

## Southern Pipeline Project

option had previously been favoured from an environmental and cultural viewpoint, the potential business disruption, high risk and high cost outweighed other perceived benefits.

The construction of a separate pipe bridge with a new walkway was another harbour crossing option which initially scored well in the assessment process. However, the benefits associated with a new walkway, long term security and ease of maintenance access for the pipeline were not considered to be so great as to justify the additional cost associated with a new bridge (around \$6m higher than other options), or to justify the perceived landscape and visual impacts associated with a new stand-alone bridge structure.

Having considered the various costs and benefits associated with the harbour crossing options, the conclusion of the October workshop was a preference for the submarine pipeline from First Avenue and a widened railway embankment to Matapihi Road end ("Option 2: Submarine and Embankment"). The main advantages of this option were considered to be the lower visual impact, relative ease of repair in a major earthquake event, and lower cost compared to other options.

The outcomes of the harbour crossing options workshop are recorded in the meeting minutes.

Following the October workshop, a further harbour crossing option became available for consideration as a result of discussions between TCC, ONTRACK and government officials. This is discussed below.

### ***Proposed Harbour Crossing on Strengthened Railway Bridge***

After TCC had considered the harbour crossing options as presented in the October 2006 report (and as summarised above), ONTRACK confirmed it would be prepared to advance the upgrading of the existing East Coast Main Trunk Railway Bridge No. 71 provided funding could be obtained. Following further discussion between ONTRACK and TCC, the decision was made to design strengthening works so that the bridge would withstand an earthquake with an Annual Probability of Exceedence (APE) of 0.04% (1-in-2500 year event).

This presented the opportunity for TCC to attach the pipeline to the strengthened railway bridge, and also to construct a new walkway along the side of the bridge. The provision of the walkway not only replaces the existing narrow footbridge, which is at the end of its design life, but also provides an opportunity to fulfil TCC's long term cycle and walkway strategy. The 'back-up' option, in the event that the railway bridge upgrade does not proceed, is to construct a submarine pipeline. Because of the importance of delivering the pipeline in a timely manner, consent is also being sought for this back-up submarine pipeline option. The railway bridge and submarine pipeline harbour crossing options are described in detail in Sections 5 and 6 of this AEE.

Attaching the pipeline to a strengthened railway bridge is the preferred option for the harbour crossing, for the following reasons:-

- It represents an efficient use of resources by both users in both physical and financial terms. For example, the railway causeway widening required by TCC to accommodate the pipeline and walkway/cycleway can be used by ONTRACK to provide construction access to the bridge;
- It avoids proliferation of structures in the CMA by using an existing structure;
- It limits the proliferation of structures in the harbour by accommodating the railway/pipeline/walkway/cycleway on the same structure, thereby reducing the impact on a scarce resource;
- It provides a high quality walkway/cycleway across the harbour;
- It facilitates maintenance of the railway bridge; and
- It adds to the security of a strategic transportation link – both as a national link and a link to the Port of Tauranga.

## Section 3

## Southern Pipeline Project

### 3.4.6 Additional Alignment Variations along the Proposed Pipeline Route

Since the preferred pipeline route was selected, some further alignment variations along the route have been investigated as a means to minimise potentially significant traffic disruption during construction and to reduce overall costs.

The alignment variations considered have included:-

- Alternative alignment from Maleme Street to Fraser Street (e.g. via land west of Glenlyon Avenue or via reserve land);
- Alternative alignments between Memorial Park and The Strand, either following Devonport Road or via the foreshore;
- Alternative alignments at the Matapihi landfall, either as a trenched pipeline across the area of accretion/reclamation and thence via the property 1B1A (ML 17974) at the end of Matapihi Road, or by way of a small reclamation seaward of this property to join Matapihi Road.

#### ***Maleme Street to Fraser Street***

Possible route variations at the southern end of the pipeline are to establish a more direct route from the Maleme Street pump station to Fraser Street (partly via private land), or to avoid parts of Fraser Street by traversing reserve land adjacent to the Waimapu Stream and Estuary.

Options considered included:-

- a) From the north western end of Greerton Park, lay the pipeline through Crown land adjacent to the Waimapu stream, turn west up Knox Place and then onto Chadwick Road. The route was rejected because:-
  - The Crown land is a known timber and sawdust landfill with difficult ground conditions and a high water table;
  - The embankment leading up to the narrow Knox Place service lane is unstable and would require HDD through private land;
  - Costs are higher than the Oropi road option.
- b) Lay the Southern Pipeline through the TCC refuse transfer station site west of the proposed Maleme Street pump station site, through private land at the toe of the hillside behind the properties on the western side of Glenlyon Avenue and then HDD along the end of Oropi Road and Fraser Street. Although the route is shorter it was rejected because of:-
  - Difficulties in securing an easement through private land;
  - Very poor ground conditions at base of the hillside;
  - Risk of land instability;
  - Significantly higher HDD costs over open trenching.

#### ***Memorial Park to The Strand***

Following further consideration of the options, TCC has resolved that the foreshore route for the Southern Pipeline is the preferred route. An alternative would be to place the pipeline in Devonport Road from Memorial Park to Elizabeth Street (for rail bridge option). Although this would avoid the need for pipeline works in the Coastal Marine Area and have less ecological impact, there would be considerable disruption to road users and businesses during the construction phase if Devonport Road were to be used.

## Section 3

## Southern Pipeline Project

Considering the Southern Pipeline project in conjunction with TCC's other longer term transport objectives for developing the city, a combined foreshore walkway and pipeline would save the city approximately \$2 million. Moreover, it creates an opportunity to enhance access to the foreshore and improve the general quality of the foreshore environment.

The Quadruple Bottom Line (QBL) assessment and risk analysis processes described in Section 3.4.4 of this AEE were used to evaluate and compare the alternative options of placing the Southern Pipeline in Devonport Road versus along the foreshore, between Fifth Avenue East and Elizabeth Street. The results of this evaluation are presented in Report No. 44 *Southern Pipeline and Foreshore Walkway – QBLA and Risk Summary Report*, 6 June 2007 (refer Appendix R).

When considering a pipeline only (i.e. in the absence of a foreshore walkway), construction of the Southern Pipeline in Devonport Road generally has less significant social, economic, environmental and cultural impacts, significantly lower capital and whole of life costs, and a lower risk profile compared to construction of the pipeline along the foreshore.

However, the combination of a pipeline and walkway along the foreshore scored better than a pipeline and walkway along Devonport Road in terms of the QBL assessment (refer Report No. 44).

TCC officers consider it impractical to construct an integrated walkway/cycleway along Devonport Road without seriously affecting the immediate community and other city road users.

### ***Matapihi Landfall***

The preferred route for the pipeline and walkway at the Matapihi landfall is to generally follow the preferred alignment shown on Drawing No. G-601-022 Rev. D, which runs through private land (Matapihi 1B1A - ML 17974) at the end of Matapihi Road.

Land owner permission or an easement for this preferred route has yet to be obtained and therefore an alternative alignment via a small reclamation around the above property has been retained as an option. Resource consent is sought for this alternative option as a back-up.

### **3.4.7 Alternative Design Details**

It is expected that detailed design alternatives will continue to be considered as the design progresses. These would likely be matters of detail and are unlikely to affect the overall scope of the project as described earlier in this AEE, or the current consent process.



## Section 4

## Memorial Strand Walkway Project

### 4.1 Background

The option of a coastal walkway has been identified in TCC documents for a number of years. A previous *Walking and Cycling Strategy*<sup>26</sup> showed a route along the foreshore from the cemetery above Dive Crescent at the northern end of the CBD to Memorial Park and thence to Fraser Street, other streets and to Turret Road. In 2004 a further report was prepared to assess the resource consent/RMA issues<sup>27</sup>.

In the most recent LTCCP (2006), funds were set aside for investigations for such a walkway. The intention is to provide a network of walkways and cycling tracks throughout the city and the LTCCP specifically emphasises enabling people to walk around the harbour from the 'Avenues' end of Tauranga, via Memorial Park and into the CBD. Two stages are proposed: Harbourside to The Strand reclamation, and Memorial Park – Strand. The latter is for the development of a high quality walkway and the rehabilitation of the seawalls along the coastline, many of which are currently not consented<sup>28</sup>.

In line with the LTCCP, the *Integrated Transport Strategy* completed in August 2006 shows a route from The Strand to south of Memorial Park in part on the road and in part along the coastline, and an overall extensive network of proposed cycleways, dual-use paths and walkways to form a city-wide network. TCC has previously taken opportunities as they have arisen to form parts of the route, including through land owned by government.

Following a TCC Councillor workshop in August 2006, URS was instructed to prepare a feasibility report in order to assess the options for beach restoration along sections of the foreshore and a walkway between Memorial Park and The Strand. The report determined that only one section of beach could feasibly be re-established. For the remainder of the route, three possible options for the walkway and the pipeline were identified at that time<sup>29</sup>.

Council had considerable concern about the potential impacts from laying the Southern Pipeline along Devonport Road on retailing and other businesses in the CBD as construction was likely to take about three to four months and would include restrictions on use of footpaths (one side only) and the redirection of traffic. Although the consultants' recommendation had been for a route along Devonport Road as the most cost-effective option in terms of the Southern Pipeline, TCC viewed the issue in the wider context of city development in which a further section of the walkway/cycleway route could be combined by accommodating the walkway atop a foreshore reclamation housing the pipeline. This also would mitigate potential community and business disruption along Devonport Road. The opportunity to undertake the construction of the walkway between Memorial Park and The Strand arose as a TCC Councillor initiative at the time of the decision on options for the Southern Pipeline.

Although the harbour is an estuary, this part of Tauranga Harbour is highly modified, with human presence being dominant, and the presence of hard and impervious surfaces along the foreshore margins. Along the harbour edge between Memorial Park and The Strand there is great variety in construction materials for retaining walls. One of the outcomes of the walkway project will be to provide greater uniformity of harbour edge in place of structures that in most cases are not consented, with many being poorly constructed. Shortcomings of the existing structures (as a result of type of structure built)

---

<sup>26</sup> Produced by TCC in about June 2001.

<sup>27</sup> Kemble Group Limited, *Memorial Park Harbourside Walkway Project: Planning and Resource Management Pre-feasibility Assessment*, March 2004.

<sup>28</sup> LTCCP 2006 – 2016 p. 39.

<sup>29</sup> URS New Zealand Limited, Report No. 31 *The Strand – Memorial Park Walkway Beach Restoration Feasibility Investigation*, 29 November 2006.

## Section 4

## Memorial Strand Walkway Project

include beach lowering immediately in front of the structures, scour landward as a result of significant storm events, erosion at the ends of seawalls, and undermining of the sea cliff.

### 4.2 Project Objectives

The Council's objectives for the walkway are:-

- Developing a high quality and safe public access along the foreshore, including
  - Connection of Memorial Park, being TCC's premier park, to Tauranga CBD
  - Integration with wider TCC network of pedestrian / cycleways
- Constructing a walkway with minimal environmental and social effects
- Providing enhanced recreational opportunities for the local and wider community
- Providing a visually coherent aspect to this section of coastline plus consistency in appearance.

### 4.3 Description of Proposed Works

#### 4.3.1 Background Reports and Investigations

The appendices to this AEE contain the investigative reports prepared for the walkway project. A summary of the findings from these reports is contained in the relevant sections of this AEE.

#### 4.3.2 Overview

The proposed foreshore walkway works include:

- Construction of a reclaimed embankment along the foreshore from Sixth Avenue to the Harbourside 'Concourse'. On the seaward side the embankment has a sloping face with possible surface treatment options including rip rap, placement of stone, or rockcrete;
- Construction of a combined walkway/cycleway (3m wide) on top of the embankment;
- Construction of the Southern Pipeline (single pipe) within the reclaimed embankment;
- Reconstruction/relocation of existing stormwater outfall structures;
- Beach replenishment on the seaward side of the embankment south of Arundel Street;
- Reconstruction of existing boat ramps and steps onto the foreshore.

#### 4.3.3 Proposed Pipeline Embankment, Walkway, and Beach Replenishment

It is proposed to install the Southern Pipeline along the harbour foreshore from Fifth Avenue East northwards to First Avenue or Elizabeth Street depending on the harbour crossing option selected. Geotechnical investigations show that the characteristics of the foreshore substrate would not support a pipeline south of Fifth Avenue East.

The pipeline will be buried in a 14.5m wide (average) by 1m – 2.5m deep embankment structure. The top of the embankment will be levelled to form a 3m wide walkway/cycleway, and this will be extended south to Sixth Avenue. The total length of walkway/cycleway along the foreshore will be approximately 895m, and this will allow pedestrian movement from Memorial Park to The Strand.

The outer slope of the embankment will be battered on a 2H:1V to 3H:1V slope, and faced with protective armouring, and the toe of the embankment slope constructed to mitigate the effects of scour.

## Section 4

## Memorial Strand Walkway Project

The southern section of the foreshore south of Arundel Street location is a low energy environment that previously contained a beach landform. Therefore, it is considered appropriate to construct a replenished beach here. This will be approximately 8m wide, 300m long, and will extend to south of Seventh Avenue. About 1,200 m<sup>3</sup> of sand will be required and this could be supplied from the Sulphur Point dredge material or sand quarries near Hamilton. These sand sources will have to have appropriate characteristics of size, shape, colour and composition for placement along the harbour foreshore.

At its northern end the beach will be held in place by a 16m – 20m long groyne at 0.5m higher than the beach at approximately the Arundel Street location. This structure will mitigate the northwards longshore drift process and be designed to act as a sand trap.

Beach replenishment does not stop beach erosion and ongoing maintenance will be required to re-shape the beach and replace sand losses after storm events. Beach erosion will still occur, and a very large storm could remove all the replenished beach sand in a few hours. This natural erosion process would affect any beach landform, and is a risk that cannot be mitigated. However, the volumes of sand in this beach landform are small, and complete restoration would not be expensive. In the absence of a major storm, it is expected that the beach will need to be re-supplied with a 200 to 300 m<sup>3</sup> of sand every three to five years.

There are numerous stormwater outlet pipes along the shoreline. These will be placed so that they do not cause beach or mudflat erosion at their discharge points. It is also intended to route some of the smaller pipes into larger outlets, thereby reducing the total number of discharge points (refer Section 4.3.4 below).

Boat ramps, slipways and other foreshore access points occur, and it is proposed to generally re-establish these where appropriate.

### 4.3.4 Construction Methodology

Construction of the preferred pipeline/walkway embankment is envisaged to commence from Seventh Avenue, with the pipeline joining at Fifth Avenue East and progressing north towards the East Coast Main Trunk Railway Bridge No. 71. Access from the northern end at The Strand will also be constructed at the same time and the two work sites progressed towards each other. Construction access from Sixth and Seventh Avenue is preferred to minimise traffic effects on the narrow Fifth Avenue East access. In view of the presence of a large, mature Pohutukawa tree close to the road margin at Sixth Avenue, a decision has been made to use Seventh Avenue as the main construction access point at the southern end of the walkway. This will require additional temporary works including:

- Provision of a construction layout area and turning circle in Memorial Park for construction traffic;
- Construction of a temporary embankment from Seventh Avenue to Sixth Avenue (where the reclamation for the walkway proper will start). The temporary embankment will be constructed by importing selected rock fill material and placing it on a geotextile separation layer over the current seabed;
- Removal of the temporary embankment on completion of construction, and tidying-up of the seawall between Sixth and Seventh Avenues with sand placement; and
- Reinstatement of the beach between Sixth and Seventh Avenues. This will tie in with the beach replenishment that is proposed between Sixth Avenue and Arundel Street. The stormwater pipeline at Sixth Avenue will need to be relocated, and the beach replenishment will need to tie in with the public boat ramp.

The proposed sequence for constructing the embankment along the foreshore for the pipeline/walkway is as follows:

- a) Install sediment control measures (refer Section 4.3.5) and all other necessary environmental controls along the foreshore prior to any physical works on the seabed.

## Section 4

## Memorial Strand Walkway Project

- b) Excavate seabed to between 0.5m and 0.75m below current ground level for levelling purposes. At some locations no excavation will be required. Some levelling of the seabed will be required during low tide prior to installation of a Reno mattress.
- c) Lay geotextile on the excavated surface as a separation layer between natural soils and fill above.
- d) Install previously assembled Reno mattresses (galvanised and PVC coated for corrosion protection) over the cleared and levelled surface. The seaward end of the mattress will be buried at least 0.5m below seabed in a small trench.
- e) Construct landward side retaining walls along property boundaries if required.
- f) Construct the embankment using selected crushed rock/gravel by end-tipping to bring the seaward face of the embankment up to approximately RL1.7m (Moturiki datum). Compaction of the rock/gravel fill will be undertaken during placement. The embankment could be temporarily constructed at 1H:1V batters to provide the required width to allow two lanes (approximately 8m width total) for trucks.
- g) Repeat steps a) to f) to advance the construction along the foreshore.
- h) Following construction of the embankment to temporary line and levels, excavate a trench within the constructed gravel fill for the pipeline. This trench is likely to be inundated at high tide levels.
- i) Construct the pipeline using bedding material wrapped within a geotextile material. Fill the pipe trench above the pipe with crushed rock/gravel fill. Install any tie-down anchors against floatation if required.
- j) Install other works (namely stormwater pipelines and sewer diversions, lighting, CCTV and electrical).
- k) Trim seaward side of the embankment to 2H:1V.
- l) Place and compact the specified filter material and rock rip-rap for coastal erosion protection.
- m) Place and compact the excess gravel fill on the landward side of the embankment where possible.
- n) Construct walkway surfaces, planting and walkway furniture.

The construction area for the proposed temporary embankment is 15m wide on average. The erosion and sediment control measures would be placed at a maximum of 2m away from the toe of the works. The seabed in this location predominantly comprises sands with some silts so any resultant effects of sediment would therefore be minimal as the disturbed materials would be re-deposited quickly. The principal effects would be in terms of discoloured water caused by some floating sediments (fine colloidal particles).

The proposed works include levelling of the seabed by excavating 500mm to 750mm of material and disposing of it off-site. The construction methodology is such that works within the tidal zone would be undertaken during low tide, in short sections to ensure that effects are kept to a minimum. Sediment release during construction of the gabion key and reno mattress will be kept to a minimum by using either an aqua dam or a floating sediment curtain (as described in Section 4.3.5 of this AEE). The embankment is proposed to be constructed using clean rock fill material to minimise the potential for sediment release.

Following completion of the walkway embankment, the temporary construction embankment will be removed and a sand beach will be placed for the purposes of reinstatement.

## Section 4

## Memorial Strand Walkway Project

Owing to the presence of predominantly sandy material, it is expected that the maximum ground settlements for the permanent walkway will be in the order of 200mm to 700mm and would be reached within a year following the end of construction.

### **Stormwater Pipeline Modifications**

A number of existing stormwater outlets (both public and private) will need to be regraded and extended through the embankment reclamation to the foreshore. It is intended to re-route and combine these into fewer outlets wherever possible. The following construction methodology is anticipated:

- The work will be undertaken during dry weather, with low or no stormwater flows as far as practicable;
- Any necessary silt fencing or equivalent will be installed between work areas and neighbouring land before works commence. A floating sediment curtain will also be installed around the seaward side of the work area (refer Section 4.3.5);
- A partial barrier to temporarily block piped flow will be formed by fitting a sealed bulkhead to the lower half of the pipe. This will allow for some overflow. A pump will be installed immediately above the bulkhead and any stormwater flows pumped around the works area. Sandbags or similar will be used to temporarily bund the pipe while the bulkhead is constructed;
- At the completion of the works and installation of the outlet structure, the bulkhead and pump will be removed and stormwater allowed back along the pipe;
- The new stormwater outlet structures will be extended further out into the harbour, with rip rap protection at the end of the stormwater pipeline. This is to ensure stormwater will not erode the proposed beach replenishment, intertidal mud flats, or interfere with the walkway embankment and wastewater pipeline;
- The work area will be kept clean and work debris removed at the end of each working day or in the event of a sudden storm.

The stormwater outlets will be mapped and recorded in TCC's asset management plans.

### **4.3.5 Sediment Control**

The following sediment control measures will be implemented during construction of the reclaimed embankment and installation of the Southern Pipeline:

- A geotextile separation layer will be used between the seabed and imported fill material;
- Clean graded rock (such as GAP 20-100) with minimal fine textured material will be used as fill through the intertidal range. Rock or fill with more fines may be used above the MHWS level, but will be wrapped in geotextile to minimise the migration of fines;
- The construction surface will be sloped back towards the landward side in order to direct sediment laden runoff from work areas away from the foreshore;
- A silt fence or equivalent will be constructed along the landward extent of the works where there is the potential for sediment discharge from the works site;
- No washing of concrete truck bowls or the like will be undertaken on site. A wheel wash or similar truck cleaning will be installed at the exit points from the site to minimise soil material on roads;
- A floating sediment curtain or silt fence will be positioned 2m away from the toe of the reclamation works. This will be removed as particular sections of the work are completed;

## Section 4

## Memorial Strand Walkway Project

- Appropriate sediment control measures (silt fence, filter Soxx or equivalent) will be installed along the top outside (seaward) edge of the completed fill and left in place until installation of the Southern Pipeline and construction of walkway surfaces is completed;
- All erosion and sediment control measures will be undertaken in accordance with Environment Bay of Plenty Erosion and Sediment Control Guidelines – 2001/03.

### ***Removal of Temporary Construction Embankment***

The following methodology is anticipated for removing the temporary embankment between Seventh Avenue and Sixth Avenue:

- A floating sediment curtain will be installed around the work area;
- No machines will work directly in the tide;
- The sediment control measures will be removed from the top outer edge of the temporary fill;
- The redundant material will be removed and trucked off site. All works in the intertidal area will be undertaken when the tide is out;
- The floating sediment curtain will be removed;
- Imported sand will be placed over the site of the temporary reclamation.

### **4.3.6 Walkway Treatment**

In terms of the walkway surface, a slip resistant exposed aggregate or a brushed concrete surface, set with timber strips at regular intervals is proposed over the majority of the walkway with possibly some timber surfaces under trees. The seaward edge of the walkway need not be fenced provided the height to ground does not exceed 1m. The fencing of the landward boundary will be a critical element for security where adjoining properties are at a similar level to the walkway and would be a matter of negotiation with landowners. It is anticipated that fences will be largely see-through and augmented by planting of coastal species.

The lighting solutions considered for the Walkway are based on the lowest category (P4) complying with the requirements of AS/NZS 1159.3.1 and without exceeding the environmental limits for glare and spill lighting defined in AS 4282.

Technical reviews have concluded that the lighting can be designed to minimise glare and spill lighting to the adjacent properties and CCTV cameras can be located to minimise visual impact. Consequently there will be no adverse effects in this regard (refer Section 9 of this AEE).

### **4.3.7 Additional Structures**

A number of properties along the foreshore route have riparian rights, and some of these have boat ramps and steps at the boundary. Others have blue water titles, where the land has eroded away and the private landowner owns a portion of seabed.

TCC proposes to provide new boat ramps and steps immediately in line with the present structures, so that owners can still enjoy access to the sea from their properties consistent with their existing access. The proposals are shown in the attached drawings (refer Drawing Nos. C-701-001 to C-701-006 Rev.D, C-701-253 Rev.B, C-701-255 Rev.B, and C-701-256 Rev.A). Although such boat ramps would not be private ramps, use by others would generally be limited by access restrictions at either end of the walkway; although close neighbours might be able to use them.

At 1 First Avenue and 2 First Avenue where there are slip-way rails fixed to the beach, a channel will be formed in the walkway to allow boats to continue to be slipped for maintenance a few times a year. The channel in the walkway will be crossed with a bridge that will be on rollers and able to be slid across on

## Section 4

## Memorial Strand Walkway Project

two launching rails to land on the top of the concrete retaining wall. The form of the bridge has not been explicitly decided but it is likely to be similar to, but wider than, the 1.2 m wide aluminium gangways used to get on to the TCC owned pontoons moored off the Strand. These use a truss as the handrail and main load bearing structure. To make them conform to the Building Code requirements for handrails they will need infill panels. A wider gangway capable of taking a light vehicle (up to 2800kg) could be used instead of pedestrian bridges.

Maintenance would be undertaken by TCC. A Maintenance Management Plan will be prepared for the walkway operation including provision for use of the boat ramps and stairs (as required).

In respect of properties with riparian rights but no boat ramps or steps, TCC would not oppose applications to EBoP for boat ramps required after the walkway has been constructed, provided the proposal(s) did not compromise the walkway and Southern Pipeline. Construction of these new structures would need to follow construction requirements acceptable to the council.

### 4.3.8 Beach Restoration Considerations

#### ***Arundel Street to Memorial Park Beach Replenishment***

The current proposal is for a restored beach along the shoreline between Seventh Avenue and Arundel Street. The possibility of extending this south along the entire Memorial Park shoreline is the subject of a separate project. The latter is the area most used for recreation purposes, and creation of a beach here would likely present fewer technical difficulties. Beach restoration is not proposed for the remainder of the shoreline northwards between Arundel Street and First Avenue. This is because the latter is a relatively high energy shoreline and does not appear to have previously contained a natural beach, apart from a section less than 100m long beach at the end of First Avenue which was probably due to the presence of the former swimming enclosure. It would be difficult to retain sand in beach compartments along this section of the shoreline. This section of shoreline is also less readily accessible by public access. For these reasons it is considered inappropriate to establish pocket beaches between Arundel Street and First Avenue.

#### ***Arundel Street to Seventh Avenue***

A sand beach is proposed for the shoreline between Seventh Avenue and Arundel Street, a distance of approximately 300 metres.

The beach sand will likely be material with a  $D_{50}$  diameter of 1.25 mm, which is similar to the existing beach sand ( $D_{50}$  is the size sieve mesh that 50% of the sand will pass through). This would support a beach face slope of about 10 degrees to the horizontal. Larger sized sand material (1.50 – 2.00 mm) could also be used as this may be more stable in the prevailing wave environment. However, larger material can be less aesthetically pleasing for beach users, and the beach face would be steeper.

The beach should be placed against the protective armouring face of the walkway embankment, and formed so that the top surface is at approximately 1.5m above Moturiki Datum. A backshore of approximately 1m width at this 1.5m level could be provided, before sloping the beach face down at approximately 1:5 to the estuary bed. The total width of the beach would thus be approximately 7m – 8m.

The purpose of this arrangement is to ensure that wave action at high tide does not extend across the beach and impact on the rockcrete face of the embankment. This would result in scour effects and loss of sediment from the beach face. The maximum depth of sand required will vary depending upon the harbour shoreline topography, but would typically be 0.5m – 1m. The total volume of sand required to be imported would be approximately 1,200 m<sup>3</sup>.

## Section 4

## Memorial Strand Walkway Project

### ***Other beaches***

A small beach landform is present at the end of First Avenue and the pipeline embankment and walkway will be constructed through and over the rear of this landform. Beach replenishment for this area was also investigated.

It was considered that a restored beach 10m – 15m out from its present location would be unstable. The area is very close to the main channel that passes beneath the railway bridge, and is thus subject to significant tidal currents. In addition, the foreshore here slopes relatively steeply into deeper water, and the shoreline is thus exposed to wave forces for a longer period during the tidal cycle. These two factors combine to make this a higher energy environment than elsewhere along the proposed pipeline route, and retaining a beach here would therefore be technically difficult. In addition, the area is less accessible and is very close to existing dwellings.

If beach restoration were to be pursued in this location, it would be necessary to install large groynes to the north and south of First Avenue. These would need to project out into the tidal channel, and thus would likely affect the current regime, potentially changing scour patterns around the nearby railway bridge piers. About 300 m<sup>3</sup> of sand would need to be placed along this 100m section to form a three to five metre wide beach at high tide. Regular replenishment of sand would be required. Given these considerations, it is not recommended that a beach be established here.

The remainder of the shoreline from Arundel Street to First Avenue is also a relatively high energy shoreline, with deeper water close in to the shoreline, and does not appear to have previously contained a significant natural beach. Given the higher wave energy environment, it would be difficult to retain sand in beach compartments along this shoreline.

Given the above considerations, it is considered inappropriate to establish new beaches, or renourish existing beaches from Arundel Street north.

### ***Groyne***

It will be necessary to provide a groyne structure off the end of the Arundel Street position on the foreshore constructed at right angles to the shoreline, and extending out from the shoreline approximately 16m – 20m (a distance slightly more than the existing boat ramp at Sixth Avenue) to act as a barrier to trap the longshore drift of sand to the north. This groyne is required to hold the restored beach in place.

The top of the groyne should be at 1.7m above MD tapering down to be approximately 0.5m above the beach level all the way to the end of the groyne, and could be constructed from a variety of materials. A timber pile structure would be appropriate here, and it should be placed a minimum of 1m below the estuary mudflat surface to mitigate scour effects from wave action.

### ***Sand Source***

An important issue in any beach restoration project is determining where the sand is to be sourced. The sand should be appropriately sized, clean, well rounded, of suitable colour and mineral composition, and be sourced from locations taking into account cultural considerations. Two sand sources have been identified, being sand from the dredging at Sulphur Point (if the sand is suitable on that dredge) or imported from Hamilton.

### ***Maintenance***

Maintenance of the beach will be required at regular intervals. This would include raking of the sand to remove litter and other objects, reshaping the beach face, and moving sand away from the headlands. This is a low energy environment and the beach sand will not be regularly reworked by wave action to naturally refresh and clean any sediment. Thus raking/cleaning would be required, particularly to remove accumulations of sea lettuce before they begin to decompose.



## Section 4

## Memorial Strand Walkway Project

Sand will inevitably be lost from the beach due to longshore drift, and wave attack will gradually reduce the sand size (attrition), allowing it to be washed off shore. Thus, it will be necessary to periodically replace sand to the beaches, either by retrieving it from north of the Arundel Street groyne, and/or bringing in new material.

The replenished beach will require maintenance, to keep the sand clean and safe for public use, to maintain an appropriate beach shape, and to ensure an adequate volume of sand is retained.

The frequency of cleaning maintenance will depend on usage patterns and the accumulation of decomposing sea lettuce and litter. During summer it might be necessary to undertake maintenance on a weekly basis. A bobcat with a suitable sand rake attachment would probably suffice.

Reshaping the beach may also be necessary, possibly after each fortnightly series of spring tides. Any sand that was being worked down the beach face onto the mudflats would need to be returned to a higher level on the beach. Again, a suitably equipped bobcat would probably be able to rake this sand up the beach.

If this regular small-scale maintenance is carried out, there should be less need for topping up of the volume of beach sand. Sand loss will probably mainly occur during major storms, but as the harbour is a generally low wave energy environment, it is expected that a few hundred cubic metres of sand may only be required every three to five years.

### 4.4 Alternatives Considered

In order to make a reasoned assessment of the walkway options available the following factors were investigated:

- Suitability in terms of the area occupied and space required for the walkway
- Hydrodynamics of the harbour
- Design life
- Geotechnical aspects
- Visual setting
- Local geomorphology
- Topography
- Ecology
- Legal situation

Options considered included so-called 'soft' options. However, in this section of the harbour, the likely wave damage will be such that soft options are considered to be unfeasible except in the area where beach replenishment is proposed<sup>30</sup>. In this circumstance it was considered that a structure with a lesser sea-facing slope (with respect to the horizontal) would be preferable in terms of preventing toe scour than a vertical slope, even if the area of occupation of the seabed and the area of seabed disturbance would be greater.

The Council's LTCCP had initially allowed for a timber boardwalk. URS and TCC staff subsequently determined, on the basis of technical and visual considerations, that a more appropriate structure to

<sup>30</sup> Seventh Avenue to Arundel Street. A further project is proposed to replenish the beach in front of Memorial Park, but it is not part of this AEE.

## Section 4

## Memorial Strand Walkway Project

combine the two components (being a walkway and a pipeline) would be a low embankment. There was also a need to assess the Walkway as a stand-alone project.

It was recognised that there were other walkway and walkway/pipeline combined options requiring assessment. In May 2007 these options were developed and evaluated using the Quadruple Bottom Line (QBL) assessment and risk analysis processes described in Section 3.4.4 of this AEE.

Eighteen option combinations (walkway and pipeline) were identified. These were subsequently reduced to seven main options which are described below:

**Option 1** – Pipeline in Devonport Road, no walkway

**Option 2** – Pipeline and walkway in Devonport Road

**Option 3** – Pipeline (2 submarine pipelines) and raised (piled) boardwalk in foreshore.

**Option 4** – Pipeline and retained walkway in foreshore.

**Option 5** – Pipeline and embankment walkway in foreshore.

**Option 6** – Pipeline (2 submarine pipelines) and offset raised (piled) boardwalk in foreshore.

**Option 7** – Pipeline in Devonport Road and embankment walkway in foreshore.

Technical aspects that affect the options are summarised below:-

- If the Southern Pipeline could not be easily accessed 24 hours a day, 7 days a week it was determined that there would be a need for a duplicate pipeline, so that one line could be closed down if necessary.
- The geology of the harbour's western margin (refer Section 8 for more detail) is such that north of Fifth Avenue East the ground is predominantly sands and construction of the pipeline any deeper than 3m would require significant temporary works during construction. At some locations the pipeline may need to be supported on long piles (up to 20m) depending on ground conditions in the immediate locality. South of Fifth Avenue East there is a "crust" of sand up to 1m thick underlain by soft estuarine mud extending up to 30m deep. The soft mud is unsuitable as a foundation for the pipeline.
- The presence of predominantly sandy material north of Fifth Avenue East is suitable to build an embankment as the maximum ground settlements are likely to occur within a year. A timber walkway would require the supporting piles to be driven approximately 10m into the seabed. A retained walkway foundation may have higher settlement unless more extensive piling is used. An embankment structure is considered to be the most viable option.
- Hydrodynamic studies of the harbour have shown that no beach replenishment north of Arundel Street would be practical unless a significant number of groynes were built to hold the sand.
- The hydrodynamic studies of the area also showed that wave energy was low, although tidal currents north of Arundel Street were of higher energy. Some form of solid face protection of the walkway would be required, and any timber piles would require scour protection (or need to be very deep) north of Arundel Street.
- There are a number of stormwater pipelines from the city discharging along the harbour. A review of these has been undertaken (refer to the memo in Appendix N ) and it has been determined that the stormwater lines can be combined where practical and that no stormwater treatment will be required.

In this regard it is proposed to connect some of the smaller pipelines into a single pipeline that will then run parallel to, and at the back of, the walkway to a number of common discharge points. These common points will be selected during detailed design. Once the exact levels of the Southern Pipeline have been determined, a number of drain lines will cross the embankment at right angles

## Section 4

## Memorial Strand Walkway Project

over and under the pipeline as appropriate. The outlet to the stormwater pipes will be through stone rip rap to minimise scour effects.

- There is an existing gravity sewer pipeline along the foreshore between Second Avenue and The Strand. This services a limited number of the adjoining coastal properties. The pipeline is constructed of asbestos cement pipework, is 33 years old and will need to be replaced as part of the walkway project. It is proposed to install one or two small 'modern' local pump stations along the route and install a modern small bore reticulation system as part of the Walkway project. The sewerage will be pumped to the existing Elizabeth Street pump station.

### 4.4.1 Walkway Options Outcome

A TCC Councillor workshop on the walkway and combined walkway/pipeline options was held on 11 May 2007 at which options, risks, pros and cons and costs were presented. Councillors indicated at this meeting that 'Option 5' (pipeline and embankment walkway in foreshore) with a rockcrete surface finish was the preferred choice. Report No. 44 and Addendum Report No. 44A (Appendix R) summarises the different options, QBL assessments and risk analysis undertaken.

Advantages and disadvantages of the foreshore walkway options are outlined as follows:

#### **Option 1 – Pipeline in Devonport Road, No Walkway**

This option did not meet TCC's long term strategic objectives in relation to providing for pedestrian and cycle access.

#### **Option 2 – Pipeline and Walkway in Devonport Road**

The walkway/cycleway component of this option was considered to be impractical by TCC's transportation staff.

#### **Option 3 – Pipeline (2 Submarine Pipelines) and Raised (Piled) Boardwalk in Foreshore**

The originally proposed timber boardwalk (as set out in the LTCCP) would require timber piles at 4 m centres with cross bracing. This would effectively prevent coastal access from foreshore properties, have a high visual impact, and higher maintenance costs. Two submarine pipelines would be required.

#### **Option 4- Pipeline and Retained Walkway in Foreshore**

Although hugging the coastline more than Option 5 and taking less of the coastal marine area (around 0.5 hectares), this option effectively prevents access from foreshore properties and due to the height above estuary bed level would require a handrail on the seaward side, which would be visually obtrusive.

#### **Option 5- Pipeline and Embankment Walkway in Foreshore**

Is the preferred option as only one pipeline is required and earthquake risks to the pipeline in the embankment are less than for other options. The embankment structure is less susceptible to settlement and will have better performance in an earthquake than the other options. It also provides a suitable pipeline foundation. Options for retaining coastal property access to the harbour remain and no handrail is required on the seaward side.

The principal disadvantage of Option 5 is the slightly larger area of Coastal Marine Area occupied by the embankment (being around 1.3 hectares).

Option 5 has three possible surface finishes for the sloping (seaward) face of the embankment, being:-

- loose rip rap which can be placed by machine,
- mortared stone, or
- rockcrete formed to look like rocks (which can be formed to provide walking surfaces to low tide)

## Section 4

## Memorial Strand Walkway Project

### ***Option 6- Pipeline (2 Submarine Pipelines) and Offset Raised (Piled) Boardwalk in Foreshore***

This option has one of the highest costs and one of the highest risks. However it does better meet privacy and security issues raised by coastal property owners. Boat access for these properties could be achieved by creating a channel or raised portion of the walkway at one location to allow access to deeper water.

### ***Formal Outcome***

Combining the Southern Pipeline with the construction of a foreshore embankment walkway/cycleway ('Option 5') with a rockcrete finish (wherever practicable) was selected as the preferred option by Council on 24 July 2007 (TCC resolution DC 236).

## Section 5

# Railway Bridge Upgrade Project

### 5.1 Background

The railway bridge across the Tauranga Harbour was constructed as part of the East Coast Main Trunk (ECMT) Railway. It was designed in 1915 and completed in 1924, linking Tauranga to Kawerau, and also connecting to the Port of Tauranga. Because of the connection to the contemporary Port of Tauranga, it is a bridge of regional and national importance.

From the east the railway runs first through the Matapihi peninsula, part in a cutting and part on fill to the harbour edge. The railway then runs along a causeway reclamation of some 700 m in length which was constructed across the harbour shallows to the bridge itself. The bridge connects the railway to the Tauranga CBD.

The existing bridge is approximately 450m long and consists of 15 spans of steel truss and 15 sets of concrete piles (including end abutments). Each span of the bridge is about 32m long and consists of simple steel trusses about 6m high on each side of the rail track, with a connecting steel floor and roof system. The concrete piers are dual piles each about two metres in diameter, with a concrete diaphragm wall between them.

The bridge geometry in plan is a radial curve for the first six spans from the Tauranga side, the remaining spans being straight. In elevation the bridge is level from the Tauranga side for the first eight spans then falls at about 1 per cent grade for the remainder of the bridge towards Matapihi.

Most of the bridge structure is either readily visible for inspection, or can be reasonably ascertained by studying the design drawings from 1915. There are however, limited records available to confirm the actual founding depth of the piers achieved in construction.

From the construction drawings it appears that each pile was intended to be embedded about 40 ft (12m) into the seabed. At the time of the design and construction, geotechnical engineering was poorly understood. Piles for structures of this nature were usually designed by previous experience and/or empirical rules of thumb.

A recent geotechnical investigation undertaken adjacent to the existing railway bridge gives a good indication of the conditions in the vicinity. This shows that most (around two-thirds) of the existing piles are most likely to be founded on reasonable to good materials. The remaining third are founded on very weak estuarine sediments and could fail in a significant earthquake. In addition some pile foundations have been scoured by water flow.

ONTRACK reports that the bridge is performing well in service, is fit for its current purpose, and is likely to remain serviceable for train traffic (with ongoing inspection and preventative maintenance) for at least another 50 years. However, as it is now proposed that the bridge also carries the Southern Pipeline, it has been determined that underpinning the existing piles to a more robust founding is necessary to extend the lifespan and to address the potential for liquefaction of harbour floor materials in the event of a large earthquake.

### 5.2 Project Objectives

ONTRACK has been actively monitoring the condition and performance of the bridge as part of its ongoing national maintenance programme. However, prior to the Southern Pipeline initiative ONTRACK did not have immediate plans to upgrade this bridge.

TCC wishes to provide a crossing of the Tauranga Harbour for the Southern Pipeline that will provide safety and security for at least 100 years. Reports by ONTRACK<sup>31</sup> and URS<sup>32</sup> on the existing bridge

<sup>31</sup> ONTRACK, Report No. 56 *Bridge 71 East Coast Main Trunk, ONTRACK Underpinning Scheme*, 4 December 2006

## Section 5

# Railway Bridge Upgrade Project

indicate an expected continued lifespan of around 50 years in the current form. Both reports concur that the bridge could be seriously damaged in an earthquake with less than a 100 year return period.

Accordingly it was agreed between ONTRACK and TCC that should the bridge be used to convey the Southern Pipeline, upgrading it to meet the project objectives would be necessary.

Upgrading the East Coast Main Trunk Railway Bridge No. 71 for the Southern Pipeline presents multiple opportunities for all the stakeholders to benefit:

- Upgrading of an ONTRACK asset to higher levels of security and safety.
- Securing rail access for the long-term future on an existing structure of regional and national importance.
- Upgrading the existing walkway on the bridge to a high quality, wider and safer access over the harbour for pedestrian and cycle access.
- Integration with the wider TCC transportation network by providing a cycleway to the Matapihi peninsula.
- Providing a structurally secure route across the harbour for the Southern Pipeline.
- Providing a structurally secure route across the harbour for a walkway/cycleway.
- Preserving and enhancing an iconic and lasting asset for the people of Tauranga.

This project provides an opportunity for two authorities to work collaboratively to provide a multiple purpose crossing of the Tauranga Harbour while minimising economic, aesthetic and environmental impacts.

## 5.3 Description of Proposed Works

### 5.3.1 Background Reports and Investigations

Appendices G and W contain the early investigative reports prepared for the Railway Bridge Upgrade project. While these reports provide useful background information, it is noted that the technical assessments and design have advanced significantly since the reports were initially prepared.

### 5.3.2 Overview

It is proposed to upgrade the existing railway bridge by underpinning the existing piers with new piles in order to increase the bridge's structural integrity (particularly in the event of a large earthquake) and to increase its lifetime, in order to accommodate the Southern Pipeline.

In order to construct the new pier system, there are certain enabling works required to give access to the bridge for construction activities to proceed. The bridge is to remain operational for rail and pedestrian traffic during construction. This requirement influences, in part, the construction requirements for the upgrading project.

Access for the bridge works and delivery of materials is proposed to be from the Matapihi end. This is for two reasons:

<sup>32</sup> URS New Zealand Limited, Report No. 10 *Southern Pipeline Harbour Crossings Options*, 9 January 2006

## Section 5

## Railway Bridge Upgrade Project

- The area available at the Tauranga CBD end of the bridge (adjacent to the Harbourside Restaurant) is insufficient to accommodate the required construction materials, equipment, vehicles and associated facilities.
- To accommodate the Southern Pipeline and new walkway/cycleway, the existing causeway from the end of the bridge to landfall at Matapihi needs to be widened. The widened causeway can therefore serve a dual purpose of providing access to the bridge during the construction period and a permanent pipeline and walkway structure.

From the end of the causeway, temporary staging will be constructed to create access for construction. The staging will be constructed on both sides of the bridge. From this staging the new piles can be constructed and horizontal supports put in place. The existing walkway will remain in place and useable during construction, but will be physically separated from the construction zone (probably by fences) for safety reasons.

A temporary lay-down area will be established at the Matapihi end of the causeway. Access to the bridge for all of the construction works except those related to upgrading Pier 1 at the western (Tauranga CBD side) abutment will be via the widened causeway.

Some of the construction requirements will place some temporary limitations on rail traffic. A level crossing at the seaward end of the causeway will be needed to allow construction traffic to access the staging on the northern (seaward) side from the opposite southern (estuary) side.

The new piles will be placed at the same centres longitudinally as the existing, but will be placed some distance outside the existing piers in order to avoid weakening the existing piers during construction. The existing piles will remain load-bearing; that is, there is no intention to remove these piles on completion of the upgrading works.

ONTRACK is undertaking all design work for the bridge upgrading, with TCC supplying details of its requirements. TCC is undertaking the design of the walkway/cycleway.

### 5.3.3 Causeway Widening

It is proposed to widen the existing railway causeway from Matapihi to the start of the bridge. As noted above, this will serve two purposes: to provide construction access to the bridge for upgrading works, including access to the temporary staging and to accommodate the new walkway/cycleway and Southern Pipeline as it runs to shore at Matapihi Road.

The existing causeway is 632m long and 24m wide. It is proposed to widen it to a finished working width of 35m (refer Drawing No. G-601-003 Rev. F).

The material used to widen the causeway will comprise general hardfill material, delivered to site by road. A geotextile membrane would be placed underneath the area to be widened, and the fill material end-tipped over this. Earthmoving machinery would be used to level and spread the material and provide compaction.

The finished top level of the causeway would be approximately 1m above MHWS level. The average overall height of the causeway would be about 2.5m. At this level the causeway would be able to absorb the expected waves (less than 0.15m high with a period of 2 seconds 95% of the time). The southern (estuary) side of the causeway would be sloped at an inclination of 2 horizontal to 1 vertical, and be protected by rip-rap rock to prevent tidal scour and washout. The existing rip-rap rock boulders would be left intact under the new causeway embankment.

## Section 5

## Railway Bridge Upgrade Project

### 5.3.4 Temporary Staging

Temporary staging would be constructed along both sides of the existing railway bridge (refer Drawing Nos. S-602-007 Rev. 4 to S-602-011 Rev. 4). The staging will remain in place for the duration of the construction project (approximately 2.5 years), but will be removed immediately after the completion of works. Placing staging on both sides of the bridge at the same time will allow work to be carried out simultaneously on piles on both sides of the bridge, thereby significantly reducing the construction period.

The staging will be accessed via the causeway from the Matapihi end. The staging will be constructed progressively as work progresses on each pile set. At the peak of construction, the staging will need to extend from the Matapihi end (Pier 15) to Pier 2.

A turning area (placed on temporary staging) is proposed at the eastern bridge end of the causeway, to enable vehicles to manoeuvre and turn as required before heading out onto the temporary staging. This is to avoid vehicles having to reverse over long distances, which would have safety as well as noise implications (audible reversing alarms). The turning area may be in the order of up to approximately 35m diameter. It is proposed that the turning area be sited on the southern (estuary) side of the bridge, and offset from the causeway and rail line to minimise the potential for blocking the rail line and to avoid disruption to train traffic (refer Drawing No. S-602-011 Rev.4).

The staging may need to support cranes capable of lifting up to 150 tonnes weight. Accordingly it is likely that the temporary staging will be constructed from 600mm diameter hollow steel tubes, likely driven up to 20m into the seabed by a pile driving rig. Given the weak harbour silts, cross-bracing may be required. The temporary piers are likely to be in the order of 7m apart, except for in the centre where a clear span of 13m is proposed (to allow a navigation channel to be maintained for rowers and other boat traffic) and will be aligned with the present main channel under the existing bridge. The working surface would likely be a timber platform or possibly a rail line, depending on the selected contractor's methodology.

At the conclusion of the construction works on the bridge, the temporary staging will be removed.

### 5.3.5 Permanent Piles

Each of the new piers will comprise twin piles, one placed either side of the existing piles (the existing piles will remain). There will be a total of 28 new piles constructed within the harbour (those piles for Pier 1 will be on land at the Tauranga CBD end). The new piles would be placed approximately 4m away from the existing piles. This is to avoid undermining the old piers, which will continue to support the bridge until the upgrading is complete. The new piles will be approximately 1800mm in diameter, and will be founded approximately 40m deep, depending on ground conditions. This would equate to a founding level of about 46m below rail level.

The method of construction will depend to a degree on the contractor, but it is envisaged to be generally as follows for each pile:

- Two steel casings (an outer and an inner casing) would be either vibrated or driven into the seabed.
- Material from the inside of the piles would then be excavated by clam shell bucket or pneumatic suction. The excavated material (likely to consist of saturated silts, clays and sand) will be placed in sealed trucks, so that the material can be transported off-site without major discharge of sediment laden water into the harbour.
- An end plug of steel encased pre-cast concrete would then be driven at founding level to compact the ground beneath the pile, in order to increase load capacity. This would be driven using a steel driving mandrel.
- Steel reinforcing would then be placed inside the pile.



## Section 5

## Railway Bridge Upgrade Project

- Concrete would be pumped (tremied) into the bottom half of the pile, with the displaced water being removed and settled in a sealed container. The settled water (which is expected to have a high pH – namely will be alkaline or ‘caustic’) would then be discharged gradually at a low rate into the harbour (refer Section 9.4 of this AEE for an assessment of the effects of this discharge). Concrete pumping will be repeated in order to fill the top-half of the pile, but in dry conditions so minimal water discharges will occur.

### 5.3.6 Pile Cap Construction

Each of the concrete piles would be capped by a concrete beam about 20m x 3m x 3.5m. This would likely be constructed in-situ, at least in part. The existing bridge superstructure will remain above the pile caps.

For the parts of the existing piers that will be in contact with new concrete, a construction joint will be prepared. Any rubble generated during this process will be caught by using mesh nets suspended under the new piers or equivalent and disposed of off-site. Falsework and formwork for the new pile cap would then be mounted onto the existing pier. The pile cap reinforcing cage and post-tensioning cables would then be placed, and concrete pumped into the formwork. Concrete curing is likely to take approximately one week. The formwork would then be removed and post-tensioning and grouting of the cables undertaken.

### 5.3.7 Walkway and Cycleway

#### ***Existing Walkway***

The existing walkway is primarily a timber-framed structure cantilevered off the rail bridge’s steel trusses on steel brackets. The construction of this came about after considerable public pressure and involved substantial financial contributions by a range of parties, including the government, both former County and Borough Councils, the Combined Tribal Footbridge Committee and the Tukairangi Tribal Committee. There is archival evidence that in the fifteen-year period between 1940 and 1955 (prior to the addition of the dedicated walkway), 14 people were killed while walking over the railway bridge, and another six injured by falling or being hit by railway jiggers<sup>33</sup>. Other data suggested that 100 people per day walked over the railway bridge, saving a (then) 17-mile journey by the road between Matapihi and Tauranga.

The access to the landfall onto the causeway appears never to have been more than a path composed of railway ballast. More recently a footpath has been constructed by TCC that sits on the part of the causeway that is lower than the rest of the railway embankment.

The existing timber walkway on the railway bridge is very narrow in width and in need of significant repairs. Ongoing maintenance would be required to keep the walkway in a safe and serviceable state.

#### ***Proposed Walkway and Cycleway***

TCC’s intention is to replace both the footbridge on the railway bridge and the recently constructed footpath on the causeway to Matapihi with an upgraded facility. The overall use of the area will be legalised by new agreements between TCC, ONTRACK and the landowner whose land is crossed at the Matapihi end of the route, where the connection is made with Matapihi Road.

---

<sup>33</sup> Letter from GJ Pedersen, Chairman of the Matpihi Residents’ Association, to Hon Mr Nash, Parliament Buildings, Wellington, dated 5 December 1955.

## Section 5

## Railway Bridge Upgrade Project

The proposed walkway will:

- Have a clear width of about 4m
- Be designed to appropriate loads to New Zealand Building Code
- Be designed with handrails and surfaces to New Zealand Building Code
- Provide a facility suitable for cyclists<sup>34</sup>
- Provide a facility suitable for disabled users<sup>35</sup>

That part of the walkway/cycleway on the bridge will consist of a pair of precast concrete beams (commonly known as 'tee-roff' beams), spanning some 32m between each pile cap. A concrete decking slab will be placed over the tee-roff beams to provide a walking and cycle surface.

Limited prefabrication will be undertaken at Matapihi. The tee-roff beams will then be taken along the construction staging and transferred sideways using a crane at the end of beam to lower each onto its supports or brought to site by barge. Formwork for the cast in-situ concrete diaphragms and slabs will then be prepared and concrete poured. The hand rails and final fixings will then be installed. Pedestrians and cyclists will be diverted to the new spans and the old walkway demolished.

The new walkway/cycleway will be slightly separated from the railway, increasing safety over the current situation. The new walkway will also sit slightly higher than the existing. This is a function of the matching of the undersides of the soffits of the new and old bridges; that is, the underside of the existing steel trusses will match the underside of the new walkway/cycleway.

### 5.3.8 Southern Pipeline

#### **Pipe Size and Material**

The external pipe diameter on the railway bridge will be approximately 900mm with flange faces being over 1200mm. The pipe material for the bridge crossing will most likely be GRP (as is the sewer line over the existing harbour bridge from Chapel Street to Te Maunga). PE pipe is less likely, as the pipe will be exposed to air temperatures and PE has a high expansion and contraction which are material properties that are more difficult to manage.

PE and CLMS pipe could have fully welded joints whereas GRP is likely to have flanged joints at approximately 6m to 12m centres. Refer Section 3.3.14 of this AEE for further explanation on pipeline material types.

The pipeline will be attached to the walkway support beams and deck using flexible metal brackets.

#### **Pipeline Transition onto the Railway Bridge – Pier 1 Vertical Bend**

At the Tauranga CBD end of the route, the pipeline has to transition from below ground (either along the foreshore walkway, or from First Avenue down to the foreshore) to run along the railway bridge. To achieve this change in level, the pipeline will exit from below ground and rise vertically immediately adjacent to railway bridge Pier 1 (refer to Drawing No. S-602-101 Rev. C for pier location). This allows

<sup>34</sup> Using Austroads Standard (Part 14 - Bicycles) and the NZ supplement to the Austroads Guide; and consulting with the Cycling Advocacy Network (CAN)

<sup>35</sup> Comply with the intent of NZS 4121: Design for Access and Mobility – Buildings and Associated Facilities (this standard is primarily intended for buildings).

## Section 5

## Railway Bridge Upgrade Project

the vertical section of pipeline to be braced against the pier, providing thrust restraint to the top pipe bend. The total change in angle from the ground to the railway bridge is estimated at 90 degrees.

At the top of the vertical section, the pipe will then turn east to run horizontally along the bridge. The riser will be fixed to the bridge by suitably designed clamps.

Being above ground level, the riser could be exposed to accidental damage, for example by impacts from the decks of reversing delivery trucks that are turning in the parking area outside the Harbourside Restaurant. Therefore to protect the riser from such damage, a collision guard will surround the riser section, designed to withstand the selected design impact. The collision guard will be fixed to the bridge so that accidental loads are not transferred to the pipeline but are absorbed by the pier structure.

At this location (near Pier 1) a small air valve is proposed. An air valve is also required at the Matapihi end as this will be set as a 'high point' in the pipeline vertical alignment. The air valve at Pier 1 will be enclosed in a chamber and the small amounts of air vented from the valve will be treated in an odour treatment facility located in the Harbourside 'Concourse' area.

### **Operation and Maintenance**

The pipeline across the harbour is a pressure main with a normal operating pressure of approximately 600kPa. The pipeline itself will require minimal if any maintenance once installed.

There will be a requirement to check the fittings holding the pipe to the railway bridge and pipe flange bolts at 6 to 12 monthly intervals. The air value at Pier 1 will require monthly inspection and flushing with clean water (which will be discharged back into the pipeline). Access to the pipeline will be achieved by having removable panels in the walkway deck. The walkway bridge will be designed to permit maintenance vehicle access. These vehicles will be able to lift walkway panels should maintenance be required.

### **5.3.9 Sediment Control**

Sediment control measures are outlined in Section 4 of this AEE in relation to construction of the reclaimed embankment for the Memorial – Strand Walkway project. These measures also generally apply to the proposed widening of the railway causeway to Matapihi.

### **Trenching for Pipeline**

Trenching for placement of the Southern Pipeline will generally occur above MHWS along the railway causeway reclamation, but will be in the intertidal zone (and therefore periodically inundated) for the required section of foreshore reclamation at the Matapihi landfall.

In both these situations, sediment discharge is not considered to be a significant issue because of the clean rock utilised as fill and the clean material to be used as pipe bedding. It is not anticipated that dewatering of the trench will be required. Sediment retention measures (silt fence, filter soxx or similar) will be retained along the top (seaward) edge of the reclaimed areas during trenching and placement of the pipeline.

## **5.4 Alternatives Considered**

The purpose of upgrading the railway bridge is to give the required protection under seismic loading for the Southern Pipeline and the bridge. The bridge was not otherwise on ONTRACK's immediate upgrading or replacement programme. Under other circumstances ONTRACK would have continued to undertake repairs as required.

## Section 5

## Railway Bridge Upgrade Project

However, attachment of the combined Southern Pipeline and walkway/cycleway to the railway bridge has been evaluated against the other pipeline harbour crossing options previously identified. This evaluation was undertaken using the Quadruple Bottom Line (QBL) assessment and risk analysis processes described in Section 3.4.4 of this report. Report No. 44 and Addendum Report No. 44A (Appendix R)<sup>36</sup> summarise the outcomes of this assessment. The railway bridge option scores favourably in relation to other harbour crossing options, and has fewer extreme risks associated with it. The greatest risks for this option relate to cost exceedence and resolution of land ownership issues.

---

<sup>36</sup> URS New Zealand Limited, Report No. 44 *QBLA and Risk Summary*, 6 June 2007

## Section 6

# Submarine Pipeline Alternative for Harbour Crossing

## 6.1 Background

The submarine pipeline option was one of a number of possible harbour crossing options considered. Selection of the submarine pipeline route described in this section of the AEE ('Submarine Pipeline Option 2' shown on Drawing No.G-601-002 Rev. E) was based on extensive investigations which are described in more detail in Report Nos. 20A and 26 (refer Appendices C and F).

The submarine pipeline has been retained as the fall-back harbour crossing option because negotiations with ONTRACK to attach the Southern Pipeline to an upgraded East Coast Main Trunk Railway Bridge No. 71 have not yet concluded. On 14 December 2006 TCC formally resolved "*That the preferred option for the harbour crossing of the Southern Pipeline is attaching to the existing bridge provided agreement can be gained with the owners of the bridge. If agreement cannot be gained, the preferred option is to lay a submarine pipeline*".

TCC has determined that all seabed crossing options should comprise double pipelines, in order to provide an element of redundancy. For the submarine pipeline harbour crossing option, the twin pipelines would run from a valve station adjoining the foreshore at the end of the First Avenue road reserve to a similar valve station on a newly reclaimed embankment parallel to the existing railway causeway on the Matapihi side of the harbour (refer Drawing Nos.G-601-024 Rev. C and G-601-025 Rev. C).

In the assessment of harbour crossing options undertaken in October 2006, it was concluded that the submarine pipeline would need to be located approximately 50 metres from the railway bridge in order to minimise the risk of scour around the existing bridge piers during construction.

The submarine pipeline was identified as the second lowest risk option (based on the number of extreme and high risks) but is likely to require significant repairs after the design earthquake event. The pipeline could be accessed by divers for repair, but the repair of such damage would be expected to take several weeks due to access difficulties.

Tangata whenua favour the railway bridge harbour crossing option over the submarine pipeline option (refer Section 7 of this AEE).

## 6.2 Project Objectives

The submarine pipeline harbour crossing option forms part of the Southern Pipeline project. The objectives for this option are the same as those for the pipeline project as a whole (refer Section 3.2 of this AEE).

## 6.3 Description of the Proposed Works

### 6.3.1 Background Reports and Investigations

Appendix F contains the investigative reports prepared for the Southern Pipeline harbour crossing options, including the submarine pipeline option.

### 6.3.2 Pipeline Size and Materials

The submarine pipeline would be a twin steel pipeline of nominal 700mm – 800mm diameter pipe, internally coated with epoxy or cement mortar and with an external concrete coat to protect and weight the pipe, securing it in the seabed. Polyethylene (PE) pipe is not considered to be suitable due to the high pulling forces required to install the pipeline. The two pipes would be laid approximately 6m apart so that should one pipe be damaged, there is less chance of the second pipe incurring the same level of damage. The total length of submarine pipeline would be approximately 600m.

## Section 6

# Submarine Pipeline Alternative for Harbour Crossing

Cathodic protection would be provided for the steel pipe, using either passive sacrificial anodes (aluminium/zinc alloy) or impressed current to minimise sewage and saltwater corrosion of the pipe. The pipeline wall thickness will be sized for the installation loads and stresses which will be significantly larger than during the longer term pipeline operation. Therefore the steel pipeline will also have additional steel thickness which further reduces the corrosion damage risk.

### 6.3.3 Construction Methodology

#### **Overview**

The preferred methodology is to pull each of the two pipelines across the seabed (from east to west) using winches mounted adjacent to the foreshore on the western side of the harbour. Once in position, each pipeline would be settled into the seabed to achieve somewhere between 1m – 2m of cover over the top of the pipeline. Based on their hydrodynamic assessment of the harbour, ASR has advised that a minimum of 2m cover would be required in order to avoid the submarine pipelines from being exposed during their 100 year design life (refer Report No. 72, Appendix H). Further sections of pipe would then be laid to connect both the western and eastern ends of each pipeline to valve chambers. At the western end, the valve chamber would be constructed adjacent to the foreshore at the bottom of First Avenue (refer Drawing No.G-601-024 Rev. C). At the eastern end, the valve chamber would be constructed part way along the southern side of the East Coast Main Trunk railway causeway (refer Drawing No.G-601-025 Rev. C). From this valve chamber, a single pipeline would then be laid within a new reclaimed embankment along the southern side of the causeway until reaching landfall at Matapihi.

The construction methodology is described in more detail below (the methodology and sequence of construction is otherwise provided in Appendix F).

#### **Bathymetric survey**

Prior to the commencement of construction a marine bathymetric survey of the seabed would be undertaken along the proposed submarine pipeline route to confirm the seabed profile. This survey would be repeated on completion of the work to ensure the pipeline position and conditions were recorded as a baseline for future monitoring and maintenance work.

#### **Temporary Works**

Site access and a temporary working area would be established adjacent to the foreshore at the eastern (Matapihi) end of the East Coast Main Trunk railway causeway. A temporary reclamation may also be required, depending on the alignment eventually confirmed for the Southern Pipeline once landfall is reached at Matapihi (refer Section 3.3.7 of this AEE and Drawing No.G-601-022 Rev. D). These areas would be used to store materials and equipment. Together with the new embankment, the land on Matapihi will serve as a fabrication area for stringing together the submarine pipelines prior to them being dragged in to position on the seabed (refer description following). In order to facilitate the fabrication and launching of the pipelines, a temporary 'railway' would need to be constructed, with sections of pipeline being joined together and transported on rail bogies.

Pedestrian access to the causeway and railway bridge walkway would be maintained during construction, with a temporary security fence installed between the existing footpath and the construction site. Vehicle access would be maintained at the end of Matapihi Road, with all site traffic using either the temporary reclamation or gaining access across private land (Matapihi 1B1A ML 17974) if this can be negotiated.

Site access and a temporary working area would also need to be established at the western end of the submarine pipeline route, adjacent to the foreshore below First Avenue. Temporary works would include the construction of foundations and a support structure for the large winches required to drag the two submarine pipelines into position across the bed of the harbour. Temporary trestles, scaffolds and work platforms would also be required for manoeuvring and working on sections of pipeline.

## Section 6

# Submarine Pipeline Alternative for Harbour Crossing

Within the Coastal Marine Area, temporary sheet piled cofferdams (or similar structures) would be constructed at the eastern and western ends of the submarine pipeline tow-paths (i.e. where the pipelines enter and exit the water). The location of these cofferdams is shown on Drawing Nos.G-601-024 Rev. C and G-601-025 Rev. C. The cofferdams provide a working area within which the submarine pipelines can be connected to the valve chambers, and would also assist in limiting disturbance to adjoining sections of foreshore during construction. Sand excavated from the cofferdams would likely be stockpiled in 'geobags' (fine meshed bags made from geotextiles) at the site, ready to be replaced once the cofferdams were removed.

Temporary guide piles would need to be placed in the harbour along the submarine pipeline route (refer Drawing No.G-601-024 Rev. C for indicative position of piles). Apart from delineating the route, these piles would ensure that the required degree of separation was achieved between the two pipelines and would also provide mooring for barges. At the eastern (Matapihi) end of the route guide piles would also be required to prevent the submarine pipelines from being damaged as they were pulled into the tighter radius of curvature required to achieve the correct route alignment (the greatest loads on the pipelines would be incurred during construction). These piles would be placed at approximately 50m centres. All temporary piles would be fitted with navigational aids (markings and lights) in accordance with the Tauranga Harbourmaster's requirements.

### ***Preparatory Dredging***

The seabed along the pipeline route would be pre-dredged using either an excavator on a barge and/or a "plough" dragged along the seabed. The purpose of this is to smooth out the bed surface to allow positioning of each pipeline, removing any hillocks or other prominent features. Sand and other bed material would be locally displaced and the smoothing operation would not involve the excavation or removal of large amounts of material.

### ***Pipeline Embankment***

A reclaimed embankment would be constructed immediately adjoining the southern side of the existing East Coast Main Trunk railway causeway, extending out from the eastern (Matapihi) shore. The existing railway causeway would be left intact under the new embankment (refer Drawing No.G-601-003 Rev. F). Construction of the embankment (effectively widening of the existing causeway) has already been described in Section 5.3.3 of this AEE. For the submarine pipeline harbour crossing option, however, the new embankment would be constructed approximately two thirds of the way along the southern side of the causeway (as opposed to the full length of the causeway for the railway bridge upgrade option).

The new embankment would initially be constructed to an intermediate level, in order to facilitate winching of the fabricated sections of submarine pipeline from the Matapihi shoreline to their required position on the seabed. Once the two submarine pipelines were in place and eastern valve chamber constructed, a single connecting pipeline would be laid along the partially completed embankment. Construction of the embankment would then be continued over the top of this pipeline, until the finished level of the embankment was reached. The finished level of the embankment would be above MHWs and below the level of the railway. The estuary side of the new embankment would be battered and protected by rip-rap, to prevent tidal scour and washout.

### ***Pipeline Placement***

Each pipeline would be fabricated (sections welded together) in the temporary work area adjoining the Matapihi foreshore and along the widened embankment. As fabrication was completed, the pipeline would be pulled along the temporary railway track and towed off the end of the partially completed embankment (refer above) into position along the seabed. A winch mounted adjacent to the foreshore on the western side of the harbour would be used to pull each pipeline from east to west across the bed. The winch would need to be anchored in place either by "rock" anchors into the sea cliff at the bottom of First Avenue, using the foundations of the permanent valve chamber or by a temporary "deadman" weight (refer Drawing No.G-601-024 Rev. C).

## Section 6

# Submarine Pipeline Alternative for Harbour Crossing

Once in position, each pipeline would be settled into the seabed to achieve somewhere between 1m to 2m of cover over the top of the pipe. This would be achieved by 'jetting' the pipelines into the bed. A purpose made pipe-jetting machine would use high pressure water jets to fluidise sand and other bed material around the pipe and eduction nozzles would then deposit the material clear of the pipeline alignment. It is anticipated that the bulk of the displaced material would be deposited somewhere between 2m to 5m from the pipeline centreline, but this depends on tidal currents and the rate at which jetting is progressed. The jetting machine would make multiple passes along the pipeline, gradually lowering the pipe down in increments of approximately 400mm during each pass. The jetting machine would be operated and serviced from a barge travelling back and forth along the pipeline route on the water surface. The depth of loose to medium dense recent sand sediments across the harbour varies from 3m to 6m. There is soft estuarine mud underlying the sand layer. Should this soft layer be exposed during construction, seating of the pipeline at the final level could become difficult. Once the pipeline is jetted in to the required depth, the resulting trench would backfill with sediment from the deposition action of the flow in the main channel.

The second submarine pipeline would be installed using the same methodology, but following a slightly different alignment to achieve a 6m approximate separation between the pipes.

The jetting process will inevitably disturb sediment from the seabed. The best practicable option would be taken to minimise the spread of material (including, for example, limiting the speed at which the jetting machine progresses and use of shrouds to contain the material). However, some sediment plumes will inevitably be created, which may temporarily affect the clarity of the water in the harbour in the immediate vicinity.

### Reinstatement

On completion of the twin submarine pipelines, valve chambers and reclaimed embankment all plant, equipment and temporary works (including cofferdams and guide piles) would be removed. The inter-tidal areas at the cofferdam sites may require sand fill to minimise future seabed weakness in these locations. The potential for seabed weakness would be minimised by locating the cofferdams as close as practically possible to the main channel in the estuary, where natural seabed restoration is effective. No significant scour at the edges of the cofferdam would be expected due to the short duration of these temporary structures in the harbour. However imported selected material is likely to be required to be placed and compacted in the excavations to stabilise the seabed on completion of the work.

### Construction Timeline

An approximate timeline for construction of the submarine pipeline harbour crossing option is provided in Table 6-1, including the period of time required for all works at First Avenue.

**Table 6-1 Approximate Timeline for Submarine Pipeline Option**

Task ID	Task	Estimated duration, weeks	Working at First Avenue	Working in the Estuary
1	Build the eastern embankment along railway (Matapihi side).	45		45
2	Build railway and pipeline strings.	13		
3	Contractor sets at First Avenue, including winch and cofferdam.	6	6	
4	Underwater pipeline work including guide piles and sheet piles Matapihi end.	13		12
5	Pull pipelines across harbour.	2	2	



## Section 6

# Submarine Pipeline Alternative for Harbour Crossing

Task ID	Task	Estimated duration, weeks	Working at First Avenue	Working in the Estuary
6	Fix transition pieces at each end and backfill trenches.	6	1	5
7	Build valve chambers.	12	12	
8	Remove temporary works and reinstate.	8	4	4

Overall, construction could take up to two years depending on the contractor's methodology and the level of resources applied.

### 6.3.4 Submarine Pipeline Operation and Maintenance

The choice of which of the two submarine pipelines is in service at any given time would be controlled at the valve chamber at the western end of the pipelines. This chamber would contain valves arranged to divert the wastewater flow down one or the other of the two pipeline barrels, depending on maintenance and operational requirements. At any given time one of the pipelines would act as the 'duty' pipeline, with the other acting as the 'standby' pipeline. It is envisaged that the duty and standby pipelines would be alternated every week. Contingency pipeline operations such as pigging would be undertaken as required if blockage or damage occurs. The valves would be electrically actuated by remote control. A small enclosure inside the chamber would house the necessary controls and instrumentation. An aerial would be required for telemetry communications, with the aerial being positioned and coloured to minimise any additional visual impact.

The western valve chamber size will be confirmed during detail design. Given the equipment it would be required to contain, it is anticipated that the chamber will have dimensions of approximately 6m (width) by 7m (length) by 6m (height), with the majority of the structure buried underground (refer Drawing No.G-601-024 Rev. C). The chamber would be designed to withstand the design seismic and tsunami events, and the local geotechnical and marine conditions.

Should either of the pipelines become exposed then this does not necessarily mean the pipeline is at risk, as the pipelines have concrete protection. However, if it appears that the pipeline may lose ground support, the placement of coarse sand, rocks or other armouring will be necessary.

Any loss of pipeline support, from the scouring or lowering of the seabed, would be very gradual. Therefore any undermining can be anticipated in advance by regular dive inspections along the pipeline alignment. Five to ten yearly visual dive inspections of the pipeline are therefore proposed. It is also recommended that a full bathymetry survey of the pipeline and surrounding area occur approximately every 20 years to confirm the rate at which the anticipated long-term changes in the seabed (as assessed in this AEE) are occurring.

TCC would likely Gazette the submarine pipeline, pursuant to the Submarine Cables and Pipelines Act 1996, to assist in achieving its long term protection (Gazettal would, for example, require the pipeline to be shown on navigational charts).

### 6.3.5 Ongoing Pipeline Management

The submarine pipeline may be subject to future risk of movement, accidental damage, exposure, or settlement.

Any construction methodology proposed within the harbour has an inherent risk of non-uniform seating of the pipeline due to the difficult underlying seabed materials. Should this occur, 'free spans' of the pipeline could lose their support, resulting in extra pipe stresses and likely differential settlement. This risk would be minimised by design and careful on-site construction supervision. Other risks and associated mitigation measures include:

## Section 6

# Submarine Pipeline Alternative for Harbour Crossing

- The submarine pipeline is exposed to local current or buoyancy effects. The external concrete coating will be designed to protect against movement, without being so heavy that it causes excessive pipeline settlement during normal conditions. The pipeline will be protected from local currents by being in a trench with natural backfill and temporary guide piles during the installation process;
- The pipeline may float from under its backfill or settle because of liquefaction in the event of an earthquake<sup>37</sup>. The movement caused by liquefaction and subsequent flotation and or settlement could damage the pipeline. Repair can be affected by using divers.
- If the pipeline becomes undermined and exposed for any reason, any free spans can be subject to flow-induced oscillations, resulting in pipe failure. Inspections every year for the first two years, and regularly thereafter, should address this issue by allowing long spans to be identified and fixed by placement of selected sand filling or other engineered backfill.

The proposed concrete-coated heavy wall steel pipe is exceptionally robust and tolerant of accidental damage. The pipe will have a high capacity to accept the excessive movements that may occur during natural disasters such as severe earthquakes.

Tauranga already has some experience of buried pipelines with the three existing inverted siphons from Anchorage Grove across the harbour to Turret Road. No problems due to flotation or settlement issues are known with these pipelines.

## 6.4 Alternatives Considered

### *Alternative Submarine Crossing Locations*

Locating the submarine pipeline crossing in this part of the harbour (immediately upstream of the railway bridge) was found to be superior in relation to flow alterations, sedimentation impacts, visual appearance and boating safety compared with the other two submarine pipeline locations originally selected by URS and assessed by ASR. Disadvantages associated with placing the submarine pipeline further south in the harbour (towards Memorial Park) included the following:

- Significant potential for muds to build up in the zone between the pipe (embankment or trench) and railway causeway if the pipe was laid on the surface of the seabed. These muds may degrade the inter-tidal zone and change the biota in the local area. Burying the submarine pipeline within the seabed is therefore preferable, and is what is being proposed.
- Sediment plumes in the harbour waters may result during the process of burying the pipeline, particularly if jetting were used, as the harbour bed comprises a greater proportion of finer mud particles further south near Memorial Park, compared with the larger sand sized particles measured near the railway bridge.
- For a submarine pipeline direct from First Ave or Memorial Park to the Matapihi Road end there is potential to introduce a longer term weakness along the trench line far in the intertidal mud flat areas as the fine mud particles are not easily replaced and compacted to original condition leaving a weakness at the surface. Back filling with sand, of a particular designed grain size, would be required to minimise this effect. However permanent "soft spots" along the pipe trench in the intertidal areas may still exist.
- This surface weakness also provided an increased risk of the pipeline trench forming a permanent preferential drainage pathway for incoming and outgoing tides for these two alternative routes.

<sup>37</sup> A 1:500 APE earthquake may be sufficient for liquefaction to occur within the Harbour.

## Section 6

# Submarine Pipeline Alternative for Harbour Crossing

- Construction of a submarine pipeline across the intertidal mudflats would require trestles (pier like structures) across the mudflats as the water is too shallow for barges and jetting equipment. Excavation would most probably need to be by conventional excavator. Semi-permanent damage of the intertidal mud flats could result.

For the Memorial Park to Matapihi direct submarine pipeline route option ('Option 5' shown on Drawing No. G-601-002 Rev. E), the sand bank in the centre of the estuary moves over time and therefore there remains a potential for variable loads on a submarine pipeline in this area and also a greater risk of exposing the pipeline in the future.

## Section 7

## Consultation

### 7.1 Introduction

This section of the AEE describes the consultation process undertaken for the Southern Pipeline, Memorial – Strand Walkway, and Railway Bridge Upgrade projects, and then for each of those projects, provides a summary of the main consultation outcomes.

Where possible, TCC has responded to the issues and concerns raised through the consultation process to date. These responses are reflected in both:

- The selection of preferred options/design approaches for the different project components (refer Sections 3 – 6 of this AEE); and
- Proposed mitigation measures (refer Section 9 of this AEE).

The consultation process and consultation outcomes for the Southern Pipeline project are summarised in this section of the report and further information is also contained within the following documents (contained in Appendix B):-

- Report No. 4 – “*Iwi Consultation Summary Report*” (21 September 2005);
- Report No. 15 – “*Summary of Community Communications and Consultation, Phase 1 & 2, Southern Pipeline Project*” (16 February 2006); and
- Report No. 67 – “*Phase 3 Iwi Consultation*” (June 2007).

#### 7.1.1 Consultation Objectives

The overall objectives for the consultation process to date for the Southern Pipeline, Memorial – Strand Walkway and Railway Bridge Upgrade projects have been:

- To provide information on the project;
- To identify and respond to key issues raised by stakeholders and the general community that will assist in implementing the project;
- To meet the requirements of the Resource Management Act 1991, Local Government Act 2002 and Historic Places Act 1993;
- To comply with all policies and guidelines of the Tauranga City Council (TCC) and Environment Bay of Plenty (EBOP) in undertaking all consultation; and
- To conduct consultation and communication in an efficient and effective way to meet significant milestones.

#### 7.1.2 Overview of Consultation Process

The consultation and communications process has included:-

- Provision of summary information and plans to a range of organisations;
- Correspondence via letter and e-mail;
- Telephone discussions, meetings, hui;
- Newsletters and information brochures;
- Articles in TCC’s ‘*Our City Views*’;
- Pipeline project display in TCC offices;

## Section 7

## Consultation

- Information on TCC web site – a link to the Southern Pipeline information page is located on the main TCC web site; copies of the project newsletters are also included on this page;
- Open days / road shows – a number of these took place between April 2006 and August 2007;
- Meetings with Project Steering Group (PSG); and
- Meetings with Tangata Whenua Collective.

The Southern Pipeline Project Steering Group (PSG) comprises TCC Councillors, TCC senior staff members, members of the Tangata Whenua Collective, TCC's Iwi Liaison Officer, a representative from industry, and members of the consultant's team.

The Tangata Whenua Collective is an advisory committee of Tauranga City Council, the membership of which comprises representatives of iwi and hapu of Tauranga City.

While not written by TCC, an ongoing series of articles in both the *Bay of Plenty Times* and *Weekend Sun* have also provided information about the Southern Pipeline project, including pipeline harbour crossing options and the foreshore walkway.

### 7.2 Southern Pipeline Project

#### 7.2.1 Consultation Process

##### ***Tangata Whenua***

Consultation with tangata whenua has involved numerous meetings with iwi and hapu representatives and communities. Eight hapu and three iwi have been consulted, reflecting the wide scope of the options considered over a large part of the Tauranga district. The hapu include Ngai Tamarawaho, Ngati Ruahine, Ngai Te Ahi, Ngati He, Ngai Tukairangi, Ngati Tapu, Ngati Kuku and Ngapotiki. The iwi are Ngati Ranginui, Ngaiterangi and Ngati Pukenga.

In addition to the above, tangata whenua representatives have participated as members of the PSG.

A number of Maori Land Trusts were also consulted when it was identified that specific land blocks may be affected.

Consultation with tangata whenua was conducted in three distinct phases:

- 1<sup>st</sup> Phase      Inception and development (development of Constraints Map and Initial Route Options);
- 2<sup>nd</sup> Phase      Options investigated (Preliminary Route Options); and
- 3<sup>rd</sup> Phase      Assessment of Environmental Effects for the Preferred Route.

##### 1<sup>st</sup> Phase Consultation

This initial phase of consultation was conducted between June and August 2005. Seven meetings were held with tangata whenua hapu and iwi. The main purpose of the meetings was to introduce the project and team members, identify key contacts and confirm levels of participation.

The preparation of a Consultation and Communications Plan assisted with the identification of potentially affected tangata whenua groups. This identification process included drawing upon information from TCC's iwi and hapu contacts list<sup>38</sup>, maps providing a general indication of hapu and iwi areas of interest<sup>39</sup>, TCC's Iwi Liaison Officer, and the knowledge of the senior cultural advisor appointed to the project.

<sup>38</sup> Tauranga City Council, Iwi and Hapu Contacts within the Tauranga City Council area - March 2006.

## Section 7

## Consultation

The tangata whenua hapu and iwi identified for consultation during the 1<sup>st</sup> phase were:

- Ngai Tamarawaho, with interests from Maleme St to the CBD;
- Ngati Ruahine, with interests at the Waimapu River and Poike;
- Ngai Te Ahi, with interests at Poike, Hairini, Maungatapu and Kaitemako;
- Ngati He, with interests at Maungatapu, Welcome Bay and eastern side of Matapihi;
- Ngai Tukairangi, with interests at Matapihi;
- Ngati Tapu, with interests at Matapihi and CBD;
- Ngati Kuku, with interests at Matapihi;
- Ngapotiki, with interests at Welcome Bay, Te Maunga and Rangataua Estuary;
- Ngati Ranginui, with wide interests between Hairini, Waimapu and the CBD (the western side of the Tauranga harbour);
- Ngaiterangi, with wide interests between Maungatapu, Welcome Bay, Rangataua Estuary, Te Maunga and Matapihi (the eastern side of the Tauranga harbour);
- Ngati Pukenga, with interests in the Rangataua Harbour and Ngapeke; and
- Tauranga Moana Tangata Whenua Collective (iwi and hapu representative advisory committee to TCC).

The particular people consulted and their roles within the respective iwi and hapu, are identified in the various meeting notes contained in Appendix B.

Consultation included a presentation to the Tangata Whenua Collective, meetings with representatives of all three iwi and eight hapu, the provision of maps, aerial photography and brochures. Minutes for each meeting were taken and distributed.

Generally consultation was constructive and honest. Tangata whenua openly identified locations of sites and areas of significance, significant issues and articulated preferences for consultation and information requirements. Of the eleven groups, two stated their opposition to the project. This opposition (before any routes had been identified) appeared to have been associated with the cultural concerns with using water as a medium for transporting waste rather than the location or route of the pipeline. One of these opposition groups, Ngapotiki, indicated that it did not wish to participate at that time.

### 2<sup>nd</sup> Phase Consultation

The second phase of consultation supported the investigation of route options. This was conducted between October 2005 and February 2006.

Telephone contact was maintained during this phase with all eleven hapu and iwi with interests in the Southern Pipeline route options. A spreadsheet was used to track iwi and hapu receipt of a letter and map regarding the options, whether they wished to prepare a Cultural Impact Assessment, and whether they required further meetings.

<sup>39</sup> Tauranga City Council, Maps as a general guide to the Hapu and iwi of Tauranga Moana. 2005-2006.

## Section 7

## Consultation

Consultation was undertaken with Ngati Kuku, Ngati Tapu, Ngai Tukairangi, Ngai Te Ahi, Ngati He, Ngati Pukenga, Ngai Tamarawaho, Ngapotiki and Ngai Tukairangi Orchard Trust (a significant land manager at Matapihi)<sup>40</sup>.

### 3<sup>rd</sup> Phase Consultation

This phase of consultation supported an assessment of the preferred route and sub-options. This was conducted between May 2006 and May 2007. A review of the consultation strategy occurred at this stage to check any changes to representation and areas of interest. It also reflected on the broader range of potentially affected tangata whenua regarding the pipeline harbour crossing options<sup>41</sup>. Six hapu and two iwi were identified, together with their interest areas, as follows:-

- Ngati Ruahine, with interests at Maleme St, Waimapu River Valley, to Fifteenth Ave;
- Ngai Tamarawaho, with interests at Waimapu River, Maleme St to Railway Bridge;
- Ngai Te Ahi, with interests at Waimapu River;
- Ngati Tapu, with interests at The Strand, Matapihi;
- Ngai Tukairangi, with interests at Matapihi;
- Ngapotiki, with interests at Te Maunga;
- Ngaiterangi, with interests at Matapihi to Te Maunga;
- Ngati Ranginui, with interests at Maleme St to the East Coast Main Trunk railway bridge<sup>42</sup>; and
- Tangata Whenua Collective.

Again, the particular people consulted and their roles within the respective iwi and hapu are identified in the various consultation minutes provided in Appendix B.

Consultation focused on the pipeline harbour crossing options between The Strand and Matapihi, the foreshore options between Memorial Park and The Strand, and Matapihi.

### Preparation of Cultural Impact Assessments

The preparation of Cultural Impact Assessments (CIA) provided a further opportunity to canvass the views of tangata whenua. Initially the project methodology provided for the production of a CIA that would assist in identifying a preferred Southern Pipeline route. This was to have been prepared by the senior cultural advisor appointed to the project. During consultation with tangata whenua, however, it became clear that hapu and iwi would not accept one single CIA for the project and requested that each hapu prepare its own cultural impact assessment.

Hapu potentially affected by the various route options were given the opportunity to complete a CIA. A draft brief was prepared and circulated to the groups between August and October 2005<sup>43</sup>. Ngati Kuku, Ngai Te Ahi, Ngati He, Ngai Tukairangi, Ngati Tapu, Ngai Tamarawaho, and Ngati Pukenga took up the opportunity and completed CIA reports between December 2005 and June 2006.

---

<sup>40</sup> Tauranga City Council. Summary of Community Consultation and Communication, Phase I and II – Southern Pipeline. p1.

<sup>41</sup> Southern Pipeline – Proposed Methodology for consultation with Tangata Whenua, May 16, 2006.

<sup>42</sup> Ibid.

<sup>43</sup> Southern Pipeline – Brief for hapu/iwi Cultural Impact Assessments, 26 August 2005.

## Section 7

## Consultation

Ngapotiki hapu requested that the project use the cultural impact report prepared during the wastewater consents project<sup>44</sup>, and Ngati Ruahine provided a map showing their sites of significance around the Waimapu River and Poike. Ngati Ranginui preferred that hapu lead the development of cultural impact assessments and Ngaitearangi would assist Matapihi hapu<sup>45</sup>.

In addition, two further cultural impact assessments were prepared as follows:

- Cultural Impact Assessment – Foreshore walkway and pipeline between Memorial Park and The Strand, Boffa Miskell Ltd, May 2007; and
- Cultural Impact Assessment – Cross Harbour Options, Boffa Miskell Ltd, May 2007.

The various Cultural Impact Assessments are provided in Appendix Z.

### ***Directly Affected Landowners and Occupiers***

One of the key objectives for the early pipeline route identification process was to minimise as far as practicable the need to use land in private ownership. Consequently, few privately owned properties are directly affected by the proposed pipeline route.

The alignment for the Southern Pipeline is entirely within land in Crown or TCC ownership, with the exception of a portion of land directly abutting Pier 1 of the railway bridge at The Strand (owned by the Harbourside Restaurant) and a parcel of land at Matapihi described as 1B1A Matapihi (owned by GM and PE Fisher).

These affected land owners have been contacted directly by TCC representatives to discuss the project.

### ***Other Stakeholders***

Consultation with a range of other stakeholder organisations was undertaken by letter. A map was produced detailing the various route options with a corresponding explanation of each route. A list of those stakeholder organisations to whom the information package was sent is provided in Appendix B.

Stakeholder organisations contacted included relevant departments within TCC, EBOP, Department of Conservation (DoC), New Zealand Historic Places Trust (NZHPT), Transit New Zealand (Transit), ONTRACK, network utility operators and Port Tauranga.

### ***Consultation with Wider Community***

The main objective of wider community engagement was to raise public awareness about the Southern Pipeline project, including route options, harbour crossing options and the foreshore walkway. Interested parties were also invited to contact the TCC Project Manager for further information or to discuss the project.

The methods used to provide project information to the wider community were listed earlier, in Section 7.1.2. Further information on the dates, venues, and information content provided using the different methods is contained in Appendix B.

<sup>44</sup> List of iwi and hapu responses to letter regarding routes and CIA's as at Monday 7 November 2005 and File note Ngapotiki/Rangataua Bay, 20 December 2005. p1.

<sup>45</sup> List of iwi and hapu responses to letter regarding routes and CIA's as at Monday 7 November 2005.



## Section 7

## Consultation

### 7.2.2 Consultation Outcomes: Southern Pipeline

#### *Tangata Whenua*

The outcomes of consultation undertaken with tangata whenua are reported in detail in Appendix B, with key overall outcomes summarised as follows:-

- Consultation with Ngai Tamarawaho confirmed general support for the use of the road reserve for the Southern Pipeline between Maleme Street and The Strand (western side of the Tauranga Harbour), but with some concerns relating to the potential discovery of archaeological evidence, and a wish to have untitled land offered back to Ngai Tamarawaho.
- The use of the road reserve between the end of Matapihi Road and Te Maunga (eastern side of harbour) has met with strong opposition from Ngai Tukairangi and Ngapotiki.
- Ngai Tukairangi opposes the pipeline generally with concerns regarding potential urbanisation of Matapihi, and lack of benefit to the community. There was also some concern for a road reserve which is under claim. The road reserve appeared to have been part of lands confiscated in 1865.
- Ngapotiki opposes conventional wastewater infrastructure, in particular the use of water as a medium for transporting and discharging human waste.
- Ngati Tapu has requested that historical water supply issues be addressed.

#### *Directly Affected Landowners and Occupiers*

Consultation with the owners of the two properties directly affected by the works are ongoing.

Particular issues in relation to the Harbourside Restaurant site include future development proposals, temporary and permanent impacts on the carparking area, and access arrangements.

The directly affected property at Matapihi is in residential use. Matters raised in relation to the proposed works include temporary and permanent access arrangements, nature and extent of construction activity and potential works along the coastal edge. Discussions with the owners are ongoing.

#### *Other Stakeholders*

Key matters of interest or concern raised in consultation with other stakeholders are summarised below.

##### Tauranga City Council

- TCC Parks and Leisure did not express a preference for any particular pipeline route in the options assessment stage, but prefer that no new or expanded pump stations are placed on reserves. Other processes also need to be considered for the preferred route – e.g. review of Reserve Management Plans; consideration of alternatives to the use of reserves for the pipeline or for construction layout; and consultation with adjoining landowners.
- TCC's transportation department has an interest in walkway and cycleway options and physical works within public roads.
- TCC's solid waste group have an interest in the composting facility at Te Maunga and the existing landfill sites owned by TCC.

##### Environment Bay of Plenty

- A number of meetings took place with EBOP representatives to discuss the route options, the preferred route, geotechnical investigations, consenting requirements and the extent of environmental assessment required.

## Section 7

## Consultation

- Early matters raised included: design considerations for streams subject to scour; detail on construction methodology and contractor resources for directional drilling options; the need for clear justification for any new bridge; and the need for any new structure to match the profile of existing bridges.

### Department of Conservation

- The DoC representative consulted acknowledged the importance of the proposed pipeline and considered that the potential impacts would likely be limited to stream crossings and crossings of the Tauranga Harbour.
- Particular considerations were that drilling or other works should be undertaken in a manner which minimises disturbance to tidal flats and maintains an appropriate buffer to the estuary edge; and that known shellfish beds or wader roosting areas (e.g. the stopbanks of the Te Maunga Oxidation Ponds) should be avoided.

### New Zealand Historic Places Trust

- In the initial route options phase, NZHPT advised that the high density of recorded archaeological sites in the Southern Pipeline study area would require early archaeological assessment of routes, and that an Authority would be required from the Trust if there is 'reasonable cause' to suspect an archaeological site may be affected.
- A number of meetings took place with NZHPT representatives to discuss the project, and more specifically, the geotechnical investigations which took place during 2006 and 2007.
- A general authority for the project under Section 12 of the Historic Places Act 1993 to destroy, damage or modify archaeological sites has been granted for the project (conditions of which are currently under appeal by TCC).

### Transit New Zealand

- Meetings took place with Transit in 2005 and 2006 to discuss the pipeline route options and preliminary plans were provided.
- Issues were raised in relation to the extent of works within the State Highway, construction methodology and alignment options.
- Transit identified future State Highway upgrading proposals relevant to the consideration of route options, namely: widening of SH29 north of Poike roundabout, grade separation of Hairini interchange, and upgrading of the Maungatapu – Matapihi road bridge.
- In January 2007 acceptance in principle was given by Transit for the pipeline works affecting the State Highway 2/29 corridor.

### ONTRACK

- In the early stages of consultation on the pipeline route options, ONTRACK advised the Project Team that any pipeline crossing of the railway at right angles would be considered in a similar process to that of any other utility crossing; and that any pipeline routes within the railway corridor that inhibit the development of the railway (e.g. future track duplication) would be discouraged.
- In March 2007 approval in principle was given by ONTRACK for the pipeline works crossing the rail corridor at Matapihi and Te Maunga, subject to a number of construction conditions.

### Utility Operators

#### *Telstra Clear*

## Section 7

## Consultation

- No particular concerns were raised in relation to the Southern Pipeline, apart from an expectation that adequate precautions would be taken to avoid damage to existing services, and a wish to remain informed of project progress.
- At some stage in the future, it is understood that a telecommunications duct may be installed from Bayfair along Matapihi Road to the East Coast Main Trunk railway bridge.

### *Telecom*

- No particular concerns were identified, other than the need to accurately locate services.

### *Natural Gas Corporation*

- The implications of the high pressure gas pipeline located within the Kopurererua Valley were noted.

### *TrustPower, PowerCo, Transpower*

- No particular concerns were identified, other than the need to accurately locate services.
- Transpower confirmed that the proposed pipeline route will pass under existing high voltage transmission lines at several localities. This being the case, agreement from Transpower to any works affecting the transmission corridor would be subject to conditions relating to minimum separation distances and excavation works in relation to transmission lines.

### Port of Tauranga

- Particular interest was raised in relation to potential for delays or inconvenience to Port traffic during the construction phase.

### **Consultation with Wider Community**

Over 800 people requested to be registered on the project information database, and numerous articles appeared in local newspapers.

Open days took place in late March 2007 to provide an opportunity for interested parties to gain more information on the Southern Pipeline project, including the foreshore walkway, harbour crossing and railway bridge upgrade, and to discuss any issues or concerns. The open days took place at five locations, with the duration of each ranging from two to seven hours. 39 people attended the open days.

The main issues arising from the open days included:-

- Effects of pipeline construction on residential access.
- Timing for provision of water supply and opportunities to connect to the Southern Pipeline in Matapihi.
- Potential infrastructure costs to individuals in Matapihi.
- Timing and programming of construction in Fraser Cove; need to advise businesses of proposed works well in advance.
- Support for upgrade of the rail bridge and rail bridge walkway.
- Support for the foreshore walkway and for the Southern Pipeline project in general.
- Issues associated with adverse impact on individuals for the perceived benefit of others located away from the area of works.
- Implications of rail bridge upgrade – e.g. this would mean that moving the rail track from The Strand (central city) would never happen?

## Section 7

## Consultation

- Opposition to the foreshore walkway, including particular concerns relating to:-
  - Impacts of works on fish habitat and migration.
  - Permanent loss of beach by being buried under walkway.
  - Loss of direct access to beach.
  - Loss of visual amenity.
  - Impacts on privacy and security.
  - Costs and timeframes associated with works along foreshore.
  - Lighting and noise impacts.
- Dredging at Sulphur Point was blamed for the loss of sand along the beach by many parties.
- Robustness of the overall pipeline route selection process was questioned, along with other alternatives considered (eg other harbour crossings and localised treatment at Tauriko and Welcome Bay).

A follow up meeting with representatives of the Fraser Cove business area occurred in April 2007. Key concerns related to the length of construction, open trenching, noise, dust and traffic impacts. Representatives discussed timing of works and advised dates of the week and times during the day that they would prefer construction across the main entrance to occur. TCC has undertaken to continue consultation with the business representatives (and other parties) prior to and during construction.

### 7.3 Memorial – Strand Walkway Project

The consultation process and consultation outcomes for the Memorial – Strand Walkway project are summarised below and further information on consultation with tangata whenua is included in Report No. 62 – “Phase 3 Iwi Consultation” (June 2007), contained in Appendix B of this AEE.

#### 7.3.1 Consultation Process

##### ***Tangata Whenua***

Tangata whenua were consulted on the Memorial – Strand Walkway project as part of the overall consultation approach for the Southern Pipeline, as outlined in Section 7.2.1 of this AEE.

##### ***Directly Affected Landowners and Occupiers***

The alignment for Memorial – Strand Walkway along the foreshore is entirely within land in Crown or TCC ownership. Part of the pipeline traverses a portion of land directly abutting Pier 1 of the railway bridge at The Strand, which is owned by Harbourside Restaurant. Consultation with the owner’s representative is ongoing.

The foreshore route adjoins numerous other properties along the coastal edge. Consultation has been undertaken by TCC officers meeting individually with landowners along the foreshore. Initial consultation was carried out between March and May 2007 and consultation is ongoing. An initial round of meetings was held at the concept development stage so that people could provide an input into the proposal.

A second phase of consultation with individual foreshore property owners has been undertaken, including a presentation/workshop on 15 May 2007 to explain walkway options. This was open to the public. The second phase of consultation was aimed at addressing owners’ concerns, particularly in relation to riparian rights, blue water titles, other legal issues, special walkway design considerations and urban design aspects of the proposed reclamation and walkway.

## Section 7

## Consultation

### **Other Stakeholders**

A range of other stakeholders who could potentially be affected by the establishment and operation of a foreshore walkway have also been consulted. These include Mainstreet Tauranga, the body corporate of Devonport Towers, Tauranga Rowing Club, Tauranga Harbour Master and Tauranga Harbour Protection Society.

### **Consultation with Wider Community**

The Walking and Cycling Strategy adopted by TCC in 2001 envisaged a walkway/cycleway along the foreshore from Memorial Park to The Strand. During the development of that strategy a full public consultation process was undertaken.

In 2004 TCC adopted an Integrated Transport Strategy after a full public consultation process. That strategy incorporated the existing Walking and Cycling Strategy into an overarching transport strategy.

The more recent open days relating to the Southern Pipeline project (March 2007) also included general information on the proposed foreshore walkway and pipeline. Feedback from those open days is summarised earlier, in Section 7.2.2 of this AEE.

### **7.3.2 Consultation Outcomes: Memorial – Strand Walkway**

#### **Tangata Whenua**

##### Submission by Tangata Whenua Collective to TCC 2006 Annual Plan

The Tangata Whenua Collective supported in principle the construction of the Memorial Park to Strand foreshore walkway by way of submissions to the 2006-2016 LTCCP.<sup>46</sup>

##### Outcomes of Project Consultation

Consultation with tangata whenua generally confirmed strong support for the foreshore walkway. The Cultural Impact Assessment did not identify any adverse cultural effects from the construction and operation of a walkway. The assessment acknowledged that there may be some positive benefits from the walkway including improved access and opportunities for cultural signage and interpretation.

Other matters that were identified in consultation with tangata whenua or in the Cultural Impact Assessment included the following:-

- There are opportunities to recognise the kaitiaki role through monitoring of earthworks and to be advised of unearthing of taonga, koiwi (human remains) and other Maori archaeological material or features.
- The construction of the walkway and pipeline would involve the importing of fill and bedding material, that is, a reclamation. The retention of the natural profile of the beach below the reclamation, use of local materials, and high amenity value were considered appropriate measures to mitigate adverse effects on the environment.
- The location of the proposed walkway and pipeline is not a known shellfish gathering or fishing area. Whilst unlikely, tangata whenua consider that the operation of the pipeline carries a risk of failure and that any failure within close proximity to the Tauranga Harbour should be avoided. Accordingly it is considered that high quality, ample capacity and monitoring / response systems should be implemented.

---

<sup>46</sup> Tauranga City Council Dataworks Reference 825507.

## Section 7

## Consultation

- Potential beach sand replenishment is supported by historical and traditional associations, as well as in principle by tangata whenua. Locally sourced sand (ideally from Tauranga Harbour) and fill material that is not from a wahi tapu or site of significance is the material preferred by tangata whenua; and sand should be extracted from a reputable and sustainable source.

On the basis of the consultation undertaken, it is understood that:-

- Ngai Tamarawaho conditionally support the walkway (including pipeline) project.
- Ngati Tapu originally provided conditional support to the walkway, but no recent communication (during 2007) has occurred to confirm the level of this support.
- Ngai Tukairangi are not directly affected by this proposal, but oppose the Southern Pipeline project in its entirety due to issues at Matapihi.
- The iwi runanga of Ngaiterangi and Ngati Ranginui are supportive of the walkway, however, do not wish to veto the right of hapu to express their position.

### ***Directly Affected Landowners and Occupiers***

As a result of consultation to date, a significant amount of information has been gathered by TCC staff in relation to the effects on those property owners and occupiers in the immediate neighbourhood and adjoining the proposed foreshore walkway.

There are 43 properties between Sixth Avenue and The Strand adjoining the foreshore. An esplanade reserve separates 25 of those properties from the foreshore, while the remaining 18 properties have Riparian Rights. Of the 43 properties, 21 have cross lease titles, while the remaining 22 properties have freehold titles.

As at 22 August 2007 TCC staff had consulted with 39 of the 43 property owners and occupiers. The remaining four property owners had not responded to the request for consultation.

Of those property owners consulted, support or opposition for the construction of a walkway along the foreshore is summarised below:

- 26 property owners and occupiers oppose the walkway;
- 9 property owners and occupiers support the walkway; and
- 8 property owners and occupiers neither oppose nor support the walkway, or have not responded to TCC's request to be consulted.

Based on the outcome of consultation to date, the following matters have been identified by those consulted as having a potential effect on the environment should the proposed walkway be constructed.

### Security

Security was the most common concern raised by those consulted. Of those consulted, 32 parties are concerned that the proposed walkway will promote unlawful behaviour in their neighbourhood by providing easy access to properties situated along the foreshore. Many of those consulted recalled past occasions when properties have been unlawfully entered from the foreshore. Concern was expressed that the walkway would promote increased unlawful entry from the foreshore, together with an alternative escape route for trespassers either via the foreshore or Devonport Road.

On the other hand, three of those consulted consider the walkway may enhance security by providing adequate lighting, fencing and crime prevention if surveillance is incorporated into the walkway design.

## Section 7

## Consultation

### Ecosystem

Of those consulted, 18 parties raised concerns about the effect the proposed walkway will have on the ecosystem both during and subsequent to construction. They are particularly concerned about the effects on birds, shellfish and crab life along the foreshore, as well as the loss of beach area.

### Privacy and Lifestyle

Of those consulted, 17 own and occupy properties with dwellings at or near to the same elevation as the proposed finished level of the walkway. They raised concern that their privacy will be affected by walkway users looking directly into their properties, dwellings and living areas. Whereas those property owners currently enjoy almost complete privacy, they feel they will lose that privacy and this will affect the lifestyle to which they have become accustomed.

### Visual Effects

Thirteen of the parties consulted consider the proposed walkway will have a negative visual impact, both when looking seaward from their properties and from the sea looking ashore towards their properties. They consider the proposed walkway will act as a visual barrier and that seeing past such a structure will be difficult.

On the other hand, a further five property owners and occupiers submitted the proposed walkway will enhance their visual outlook.

### Property Values

Eight parties consulted responded that the proposed walkway will result in a reduction in value of their properties. They consider property values will be affected as a result of the adverse environmental impacts created by the existence of the proposed walkway. Of particular concern are the impacts of adverse visual effects, loss of privacy and security.

### Vehicle and Boat Access

Access to the foreshore for the launching of various types of craft was raised by 11 of those consulted. They responded that currently they have access to the foreshore for launching craft as well as other recreational uses, and raised concern that such access may be impeded by the walkway.

One property owner raised concern that emergency vehicles may not be able to access properties via the foreshore as they currently can. They responded that the walkway will provide a barrier preventing such access. On the other hand, concern was raised that the walkway may be used by motor cycles unless proper barriers are erected to prevent such access.

### Natural Character

A number of those consulted raised concerns that a walkway will interfere with the natural character of the foreshore by the mere nature of its presence. Of those consulted eight would like to see the foreshore returned to its natural state by importing sand to reinstate sandy beaches along parts of the foreshore.

Some of those consulted responded that the walkway and the preservation of the natural character could be integrated.

### Safety

Concern was raised by four of those consulted that walkway users, particularly young children, may fall from the walkway into the sea causing harm to themselves.

One of those consulted commented that the walkway would enhance safety by providing a safe platform on which to traverse the foreshore.

## Section 7

## Consultation

### Land Stability

Three of those consulted felt that the proposed walkway embankment would enhance land stability along the foreshore by preventing the sea from further eroding the foreshore.

### Southern Pipeline

In addition to the walkway consultation, those same 43 property owners/occupiers were asked to comment on TCC's proposal to integrate the Southern Pipeline with the proposed foreshore walkway.

Of those consulted 15 responded that the pipeline should not be constructed along the foreshore between Memorial Park and The Strand; instead they consider it should be constructed along Devonport Road. They responded that the temporary traffic disruption incurred on Devonport Road would be minor compared to the permanent environmental effects of constructing the pipeline along the foreshore. On the other hand, three of those consulted opposed the pipeline following Devonport Road.

Of those consulted, eight responded they would agree to the pipeline following the foreshore provided that it was completely buried and not integrated into a walkway.

### **Other Stakeholders**

#### Mainstreet Organisation

Mainstreet Tauranga undertook a survey of its members within the Tauranga Central Business District. The survey asked members to identify their preferred route for the Southern Pipeline, based on the following two options to consider and choose from:

- Option 1: "The Southern Pipeline and Coastal Walkway be integrated and run along the Foreshore (Memorial Park to the Railway Bridge)", or
- Option 2: "The Southern Pipeline and Coastal Walkway not be integrated and the pipeline goes down Devonport Road (Memorial Park to Elizabeth Street)".

In responding to the survey members were asked to state the number of people within the business who supported the option chosen. The results of the survey are as follows:

- Number of people supporting Option 1: 285
- Number of people supporting Option 2: 68

A number of those members surveyed provided comments supporting their choice. In essence those supporting Option 1 commented that the proposed walkway would be an asset to Tauranga City and there would be no disruption to their businesses while it was being constructed.

On the other hand some of those supporting Option 2 commented that any disruption to their businesses would be minimal, felt that TCC should not be spending rates money on non-essential services and commented that the environmental risk of a sewage spill into the harbour was too great should the pipeline be damaged.

#### Devonport Towers

The Body Corporate of Devonport Towers situated at 72 Devonport Road ran the same survey as Tauranga Mainstreet. The results of that survey were as follows:

Fourteen out of a total of 50 residential apartment owners responded to the survey.

- Number of people supporting Option 1: 26
- Number of people supporting Option 2: 1



## Section 7

## Consultation

Several of those surveyed provided comments supporting their choice of Option 1. Those comments generally supported the concept of promoting cycling and walking within and around the City.

### Tauranga Rowing Club

TCC staff consulted members of the executive of the Tauranga Rowing Club. Those members expressed support in principle to the walkway and pipeline following the foreshore from Memorial Park to the East Coast Main Trunk railway bridge. They support any crime prevention initiatives that can be integrated into the walkway design such as monitored surveillance cameras.

They expressed some caution regarding any initiative to replenish beaches in the area, particularly the possible environmental effects on the seabed with further silting of the channels which the Rowing Club use.

### Tauranga Harbour Master

TCC staff and URS (on council's behalf) have consulted the Tauranga Harbour Master, otherwise known as the Maritime Manager. The Maritime Manager is employed by EBOP who will be the consent authority should the walkway and integrated pipeline proceed. That being the case the Maritime Manager was not able provide any comments that may compromise future consenting processes.

The Maritime Manager did, however, confirm that on the basis of information provided during consultation to date there were no apparent navigation issues with the proposed embankment walkway. He commented that TCC would need to ensure that any proposed structure in the Coastal Marine Area was able to meet the requirements of the Regional Coastal Plan.

### Tauranga Harbour Protection Society

TCC officers have consulted with residents along the foreshore between Memorial Park and 'The Concourse' area, which included members and the Chairman of the Tauranga Harbour Protection Society. The purpose of the meetings was to talk through the components of the walkway and options being considered. This consultation commenced at the beginning March 2007 and is still continuing, with a second phase now having commenced. To date, the Protection Society has expressed opposition to the walkway project.

### Department of Conservation

Meetings have been held with the Department of Conservation (DoC), the latest being on 3 May 2007. DoC has stated that it supports a coherent, well designed and public access along the coastal edge.

## 7.4 Railway Bridge Upgrade Project

### 7.4.1 TCC / ONTRACK Liaison

TCC and ONTRACK have been in discussions relating to the Southern Pipeline and railway bridge upgrading project since mid 2006. Fortnightly meetings / conference calls have taken place since early 2007 involving representatives from each organisation and their consultants. Technical construction issues have been debated, discussed and resolved as have planning, legal and other matters.

The outcome of this liaison process has been the development of the current proposal for which resource consents are now sought, by both TCC and ONTRACK.

### 7.4.2 Consultation Process

#### ***Tangata Whenua***

Tangata whenua were consulted on the Railway Bridge Upgrade project as part of the overall consultation approach for the Southern Pipeline, as outlined in Section 7.2.1 of this AEE.

## Section 7

## Consultation

### ***Directly Affected Landowners and Occupiers***

In June – July 2007 TCC undertook further consultation with eleven property owners in the Elizabeth Street and First Avenue area whose properties overlook the Tauranga Harbour, and in particular the railway bridge and the location of the possible submarine pipeline harbour crossing option.

Consultation with the owner of Harbourside Restaurant and ING (NZ) Limited, the owners of the office block at the end of Elizabeth Street, has also been undertaken.

### ***Other Stakeholders***

General information has been available to the wider community on the Railway Bridge Upgrade project through the range of methods listed in Section 7.1.2 of this AEE. Other stakeholders consulted have included the Tauranga Rowing Club and Tauranga Harbour Master.

ONTRACK has advised the rail operator, Toll Holdings, of the proposed railway bridge and causeway works.

### ***Consultation with Wider Community***

The recent open days relating to the Southern Pipeline project (March 2007) also included general information on the proposed railway bridge upgrade. Feedback from those open days is summarised earlier, in Section 7.2.2 of this AEE.

## **7.4.3 Consultation Outcomes: Railway Bridge Upgrade**

### ***Tangata Whenua***

Consultation with tangata whenua regarding the proposed railway bridge upgrade, including installation of the Southern Pipeline and new walkway/cycleway, confirmed that this is generally the preferred harbour crossing option. There are, however, concerns regarding potential visual impact and effects on traditional shellfish resources.

Extensive consultation has been undertaken with a number of hapu and iwi as well as a review of cultural impact reports prepared by hapu, an iwi management plan and other literature. The key matters identified include:

- Considerable tangata whenua concern for any potential failure of the pipeline during operation that would result in wastewater entering the Tauranga Harbour;
- Concern regarding the proximity of a wastewater pipeline to the Tauranga Harbour, which is an ancestral icon and food gathering area;
- Opposition in principle to the use of water as a medium for transporting human waste;
- Recognition and protection of any sites of significance to Maori;
- The estuarine margins have been a traditional shellfish harvesting area.

The relevant Cultural Impact Assessment (refer Report No. 69A<sup>47</sup>, Appendix Z) outlines that attachment to the existing railway bridge is preferred on cultural grounds with the expectation that there should be measures in place to minimise construction debris and material falling into the harbour, use of high quality pipeline and construction methods to minimise any potential failure, provision of access to pipeline for repair and maintenance as required, and minimisation of visual impact.

<sup>47</sup> Boffa Miskell Limited, Report No. 69A *Cultural Assessment of Cross Harbour Options*, May 2007

## Section 7

## Consultation

The existing walkway attached to the railway bridge has a cultural association with the Maori community who fund-raised for half the cost of construction. Local kaumatua officially opened and blessed the walkway.

Attaching the Southern Pipeline to the upgraded railway bridge (beneath the proposed new walkway/cycleway along the southern side) separates the pipeline containing human waste from the harbour waters and as such would not affect the mauri of the harbour.

The Matapihi estuarine flats are associated with traditional harvesting of shellfish, however, the ecological survey did not identify any harvestable species. The extensions to the causeway will cause some long term loss of foreshore and seabed.

### ***Directly Affected Landowners and Occupiers***

Having explained both the upgraded railway bridge and submarine pipeline harbour crossing options, each of the eleven residential property owners consulted and the Harbourside and office building owners were asked if they had a preferred option. All of the owners expressed a preference for the railway bridge option. They cited various reasons for this preference, including that:

- The railway bridge upgrade option would result in less environmental impact, during both construction and long-term operation;
- The railway bridge option provides additional benefits such as a more secure rail network and improved pedestrian and cycle access.

The property owners were also asked to express an opinion regarding the proposed upgrade of the 'Harbourside Concourse' area immediately adjoining the western end of the railway bridge. All of those consulted considered that the area would be greatly enhanced (in terms of both aesthetic appeal and security) by the proposed works. One property owner expressed concern that TCC should not plant any additional trees in the Concourse area, as this may interfere with views. ING requested provision for some additional parking in the area.

### ***Other Stakeholders***

#### Tauranga Rowing Club

The Tauranga Rowing Club was contacted regarding the proposed railway bridge upgrade in early February 2007. The club requested that the minimum clearance between bridge piers be 9 metres and that two passages be retained. For construction reasons, a single clearance of 13 metres has been allowed for as part of the upgrade proposal.

#### Tauranga Harbour Master

The railway bridge upgrade was discussed with the Tauranga Harbour Master in May 2007. Matters discussed included the bridge span arrangements, access for rowing during construction, impacts on moorings and process to advise mooring holders of the proposed works.

## **7.5 Submarine Pipeline Alternative for Harbour Crossing**

### ***Tangata Whenua***

Tangata whenua were consulted on alternative pipeline harbour crossing options as part of the overall consultation approach for the Southern Pipeline, as outlined in Section 7.2.1 of this AEE. Matters arising from that consultation in regard to the submarine pipeline option are summarised as follows:

- The submarine pipeline harbour crossing option would cut directly across the harbour bed and its traditional channel, considered by Maori to have been created by the moving of Mauao from the great forest of Hautere to its current position.

## Section 7

## Consultation

- A pipeline carrying human waste permanently submerged in the Tauranga Harbour would not be considered appropriate from a cultural perspective. Any potential risk of failure and the ability to repair and maintain in this area would need to be carefully considered as pipeline failure (and consequent release of human effluent into the harbour) would cause significant offence to tangata whenua and diminish the mauri of the harbour.
- Special care would also be required to avoid potential sites of significance to Maori at the approaches and landing areas for a submarine pipeline – in particular, the former pa of Mareanui above the escarpment in the Elizabeth Street to Second Avenue area and Te Mania Pa on the southern side of Matapihi Road.

### ***Directly Affected Landowners and Occupiers***

As noted earlier, TCC undertook further consultation in June - July with eleven property owners in the Elizabeth Street and First Avenue area whose properties overlook the Tauranga Harbour, and in particular the railway bridge and the location of the possible submarine pipeline harbour crossing option.

The results of this consultation are reported earlier, in Section 7.4.3.

### ***Other Stakeholders***

Targetted consultation with other key stakeholders, particularly EBOP and DoC took place during the harbour crossings investigation phase in early – mid 2006 and with DoC on 3 May 2007. Particular issues raised in relation to a submarine pipeline included the impacts associated with the choice of construction methodology, extent of sediment disturbance arising from 'jetting' of the pipeline in place, impact on bird roosting areas and security of the pipeline (e.g. to prevent damage or leaks).

### ***Wider Community***

General information on the harbour crossing options, including the submarine pipeline, was available to the wider community during the options investigation phase for the pipeline route. Harbour crossing options were identified in Council publications<sup>48</sup> and interested parties invited to contact TCC's Project Manager.

---

<sup>48</sup> For example, "Our City Views", December 2005, October 2006; "Word on the Street", November 2006

## Section 8

## Existing Environment

### 8.1 Introduction

The characteristics of the existing local environment in which the component parts of the Southern Pipeline, Memorial - Strand Walkway, and Railway Bridge upgrade projects are to be constructed provide a context for assessing the nature and significance of environmental effects associated with the projects.

This section of the AEE sets out the findings of various investigations relating to the existing environment.

### 8.2 Southern Pipeline Project

#### 8.2.1 Geology and Soils

A preliminary geotechnical assessment was undertaken as part of the Southern Pipeline route options assessment, including for Western Route E the proposed pipeline route for which consent is now being sought (refer Report No. 11<sup>49</sup>, Appendix C). This preliminary assessment involved extensive desktop research (including a review of all of the known existing borehole data held by EBOP and TCC) and a site walkover. Further geotechnical investigations were subsequently undertaken for the proposed pipeline route traversing the Matapihi Peninsula (refer Report No. 62<sup>50</sup>, Appendix Q). The latter investigations involved a combination of desktop research, site walkover, and the excavation of test pits along the proposed route (within road reserve) to assess ground conditions. A detailed site specific investigation has been undertaken at the proposed Maleme Street Pump Station site (No. 25 Maleme St).

Based on these investigations, the geological conditions encountered along the Southern Pipeline route are summarised below. Conditions relating to the Tauranga Harbour sections of the route (the foreshore pipeline/walkway and railway bridge/submarine pipeline alternative harbour crossing options) are separately addressed in Sections 8.3.1, 8.4.1, and 8.5.1 of the AEE.

Based on the investigations, the ground conditions identified from the test pits along the Matapihi section of the pipeline route are expected to be similar to the majority of the pipeline route within the proposed trench dimensions for the pipeline, except for the following route sections:

- Maleme Street (low-lying section of the pipeline route)
- Fraser Street (section of road immediately adjoining Waimapu Estuary)
- Te Maunga/Bay Park

Apart from these sections, similar ground conditions are assumed because of the common geological history of the wider area affected by the Southern Pipeline project. A more detailed investigation will be conducted immediately prior to detailed design.

Geological conditions are summarised as follows, commencing with the Matapihi section (and those sections of the pipeline route along the Te Papa Peninsula for which conditions are assumed to be similar) and then separately addressing the three sections identified above. Placing the geotechnical findings in context, it is expected that the Southern Pipeline will be laid within the upper 2m and 6m layers of material (namely the pipeline trench will be at least 2m deep).

---

<sup>49</sup> URS New Zealand Limited, Report No. 11 *Southern Pipeline Project – Preliminary Geotechnical Report*, 28 August 2007

<sup>50</sup> URS New Zealand Limited, Report No. 62 *Southern Pipeline – Preliminary Geotechnical Report for Matapihi Section*, 11 July 2007

## Section 8

## Existing Environment

### ***Matapihi Peninsula Section (Matapihi Road) and Te Papa Peninsula (Oropi Road through to Memorial Park/end of Elizabeth St)***

#### **Sub-Soil Stratigraphy (in order from ground level downwards)**

- Fill consisting of various materials including sub-base gravel to a depth of up to 0.5m below ground level.
- Below the fill material, Younger ash material comprising stiff silts and loose to medium dense sand layers to a depth of at least 3m below ground level. Within the Younger ash sequence, presence of a loose sand layer (Rotoehu ash).
- Below the Rotoehu ash, Hamilton ash sequence comprising silts with varying amount of sands.

#### **Groundwater Levels**

- Investigations along Matapihi Road indicated that the ash sequence (Younger and Hamilton ashes) is predominantly dry. However, a perched groundwater table is expected within the Younger ashes in some locations.

For the reasons outlined above, these ground conditions are assessed to similarly apply to the majority of the Te Papa Peninsula section of the pipeline route (Oropi Road through to Memorial Park and thence northwards to the end of Elizabeth Street, if the Devonport Road backup route option is required).

### ***Maleme Street (low-lying section of the route)***

#### **Sub-Soil Stratigraphy**

- Fill consisting of various materials including sub-base gravel, which would generally be expected to be found to a depth of up to 1m below ground level.
- Below the fill material, alluvial soils comprising firm to stiff silts and sands with intermediate peat layers - to a depth of at least 3m below ground level.
- Soft estuarine sediments (clayey silts) underlie the alluvium to a depth of 15m below ground level.
- Ignimbrite (loose to medium dense sands) underlies the estuarine sediments.

#### **Groundwater Levels**

- Hand augers and borehole information indicate depths to groundwater level of 2m below the current ground level.

### ***Fraser Street (section of road immediately adjoining Waimapu Estuary)***

Recent borehole data from the neighbouring Fraser Cave shopping centre development was reviewed in arriving at the following assessment.

#### **Sub-Soil Stratigraphy**

- Fill embankment consisting of various materials including sub-base gravel, which would generally be expected to be found to a depth of up to 2m below road level.
- The natural ground below road embankment comprises soft estuarine sediments (soft to firm organic rich clayey silts) to depths of up to 15m.
- Ignimbrite (loose to medium dense sands) underlies the estuarine sediments to a depth of at least 29.5m below ground level.

## Section 8

## Existing Environment

### Groundwater Levels

- Very shallow groundwater (surface to 1m depth) levels were encountered in previous field investigations by others.

### *Te Maunga/Bay Park*

#### Sub-Soil Stratigraphy

- The underlying soils comprise foredune sands with shallow overlying fill at some locations.
- The sands are loose to medium dense, fine to coarse grained.

#### Groundwater Levels

- Very shallow groundwater (surface to 1m depth) levels are expected.

## 8.2.2 Ecology

### **Watercourses**

The Southern Pipeline route crosses a number of small watercourses on the western side of the Tauranga Harbour. One of the more substantial streams is a small channelised tributary of the Waimapu Stream near the intersection with Glenlyon Avenue. This and another tributary run through the industrial area to the west of Oropi Road (including Maleme Street), before entering Greerton Park and eventually flowing into the main Waimapu Stream at the head of the Waimapu Estuary. The stream is signposted as being contaminated and is therefore expected to be inhabited only by pollution tolerant aquatic species.

There are two other small streams along this part of the pipeline route, one at the Esk Street Reserve and another just before Brook Street. Both of these streams are piped beneath Fraser Road. Drawing No. G-105-015 Rev. C summarises the stream and stormwater culverts crossed by the Southern Pipeline.

There are a number of watercourses in the Te Maunga area which are either modified waterways or manmade drains and have low ecological values. Only two of these watercourses have riparian vegetation. Fish surveys have revealed the presence of freshwater and estuarine species, dominated by tolerant short finned eels (*Anguilla australis*) and the invasive *Gambusia*.

### **Wetlands**

Three wetland areas are traversed by the pipeline route in the area east and immediately west of State Highway 2/29, being the final section of the pipeline where it approaches the Te Maunga WWTP. Most of this section of the route in the Te Maunga area is situated on farmland which is a heavily modified environment with little ecological value. The area is primarily common open pasture and is used by some coastal bird species. Argentine ant populations are known to be present in the Te Maunga area. These ants are a biosecurity threat and as such consideration needs to be given to minimising the spread of the ants during any work undertaken in the area. Report No. 29 (Appendix I) based on field work undertaken by URS describes these wetland areas in detail<sup>51</sup>.

#### Western Wetland

A small fresh water wetland which has become overwhelmed by exotic weeds is situated immediately west of State Highway 2/29. Vegetation is dominated by established pampas (*Cortaderia selloana*), willow (*Salix fragilis*), and blackberry (*Rubus fruticosus*). Chaffinches (*Fringilla coelabs*), silvereyes (*Zosterops lateralis*), and blackbirds (*Turdus merula*) are common in this area. The only watercourse identified in the

<sup>51</sup> URS New Zealand Limited, Report No. 29 *Te Maunga Ecological Assessment*, 1 June 2007

## Section 8

## Existing Environment

area was a small roadside drain. No existing studies or literature was found regarding this area, and the wetland is considered to be of low ecological value.

### Eastern Wetland (Special Ecological Site 11)

A wetland immediately east of State Highway 2/29 constitutes the northern portion of Special Ecological Site (SES) 11. This is identified as a 'moderate quality habitat' in the Tauranga District Plan. Vegetation consists of oioi (*Apodasmia similis*) and sea rush (*Juncus kraussii var. australiensis*), bounded by mangroves (*Avicennia marina australasica*) in the Coastal Marine Area and along the edges in drains. The area has high edge effects<sup>52</sup> and is threatened by weeds - particularly at the northern tip which has little saltwater influence. Yorkshire fog (*Holcus lanatus*) and blackberry (*Rubus fruticosus*) are present, and the large stopbank to the east of the site is dominated by pampas (*Cortadeia selloana*). Most of this area still retains high quality saltmarsh however, and the site was found to contain at least two pairs of the North Island fernbird (*Bowdleris punctata vealeae*) which is classified as a threatened species by the Department of Conservation (DoC). A DoC survey undertaken in the early 1990s found six fernbirds around this area.

### Far Eastern Wetland (Special Ecological Site 12)

Further east, the pipeline route skirts the boundary of a Conservation Zone, and will pass through the north-western part of Special Ecological Site (SES) 12. SES 12 is a wetland identified as a 'habitat of high quality' in the Tauranga District Plan. This area consists of a modified fresh water wetland succeeding to high quality saltmarsh vegetation, and mangrove forest in the Coastal Marine Area. Parts of SES 12 have been highly modified, particularly immediately east of the existing composting facility where the land has been cleared and flattened. The Southern Pipeline will pass through this already modified area. Parts of the wetland have been drained, and vehicle tracks and weeds are prevalent in the northern freshwater section.

The areas of saltmarsh vegetation east and south of the compost plant stormwater pond remain relatively undisturbed. Fourteen fernbirds were seen and/or heard within this area during a walkover ecological inspection carried out during the preparation of this AEE. In addition, at least one fernbird was heard just outside SES 12 in lower quality saltmarsh and weedy vegetation south of the composting plant. Previous ecological studies of the area have indicated the presence of the following bird species: Australasian harrier, pukeko, pied stilt, as well as the threatened North Island fernbird and banded rail.

### ***Tauranga Harbour – Estuarine Ecology***

The foreshore pipeline/walkway and railway bridge/submarine pipeline alternative harbour crossing components of the Southern Pipeline project will impact upon part of Tauranga Harbour between the Te Papa and Matapihi Peninsulas. The estuarine habitat in this part of the harbour consists of both intertidal and subtidal habitats. These habitats are described in more detail in Sections 8.3.4, 8.4.3, and 8.5.3 of this AEE, for the individual harbour related components of the project. However, a general overview of the harbour environment is provided below, based on information obtained from a survey of the benthic ecology in the area (Appendix J<sup>53</sup>).

---

<sup>52</sup> An edge effect is the effect of one ecosystem on an adjacent ecosystem, where factors influencing one ecosystem may be carried over into the edge of the second ecosystem. The term is most commonly used with reference to the boundary between a natural habitat, and disturbed or developed land. The effect on the edge of a natural habitat will be much greater than that seen in the area of the natural habitat further from the edge. Edge effects are especially pronounced in small habitat fragments where they may extend throughout the patch. Edge effects can result from exposure to sunlight or wind which can dry out areas, encourage growth of weed species and ultimately change the composition of the ecology in that area.

<sup>53</sup> Cawthron Institute, Report No. 38 *Benthic Ecological Survey for the Proposed Tauranga Southern Pipeline*, August 2007.



## Section 8

## Existing Environment

The survey comprised nine intertidal and nine subtidal sampling stations. At each station, samples of surficial sediments were collected for analysis of grain size distribution, organic content, and concentrations of key contaminants (cadmium, copper, lead, zinc, petroleum hydrocarbons, and polycyclic aromatic hydrocarbons). Core samples were also undertaken to evaluate the infaunal community. An assessment of epibiota was undertaken by quadrant analysis for the intertidal sampling stations and field notes/photographs. The subtidal stations were not assessed for epibiota due to strong, reversing tidal currents. A dive transect was also included along the supporting piers of the existing East Coast Main Trunk Railway Bridge No. 71, in order to describe hard substrate encrusting communities and associated biota.

### Intertidal Ecology

The eastern and western shores of the harbour in the area of the proposed Southern Pipeline component projects are dominated by two types of intertidal habitat - sea grass (*Zostera*) beds and open flats of unconsolidated mobile sands. *Zostera* is the dominant epiflora on the eastern sand flats, but its distribution is limited to well defined beds. The western shore can be classed as open sandy flat, but narrows to an intertidal beach of less than 15m approaching the northern (Strand) end.

The mix of epifauna and sediment infauna on the two shores indicates a healthy and productive intertidal environment with the community diversity being generally high. Some variation in habitat type and tidal zonation has been observed, however intertidal communities are not significantly distinct. *Zostera* is generally considered a relatively sensitive habitat of some ecological importance. Healthy *Zostera* ecosystems generally support highly diverse and productive invertebrate and fish communities, including juvenile and larval fish stages.

No specific taxa of special scientific interest or rarity were identified from the intertidal communities. Dominant species recorded from both shores included the mud flat snails *Diloma subrostrata* and *Zeacumantus subcarinatus*. The whelk *Cominella glandiformis* was also widespread on both shores, and the limpet *Notoacmea helmsi* was common at the two east shore *Zostera* stations.

Cockles (*Austrovenus stutchburyi*) appear to be widespread and were found at every intertidal sample station except one on the western shoreline. The cockles in the areas surveyed were generally small in size, with 98% being smaller than the 20mm width at which they are conventionally harvested.

Sea lettuce (*Ulva* sp.) is prevalent in the Tauranga Harbour as a whole but did not exceed 1% cover at the time of the benthic survey. Previous studies have suggested that increases of sea lettuce can be related to climatic factors such as seasonal changes of water temperature<sup>54</sup>. Sea lettuce grows attached to both intertidal and subtidal substrates, but in this part of Tauranga Harbour much of the tide-line *Ulva* is present as drift - particularly along the western shoreline.

### Subtidal Ecology

The subtidal habitat is affected by the high currents in the area of the railway bridge and as such the fauna found in this area are dependent on the relative stability of substrate. Observed substrates varied from hard consolidated mixtures of sand, gravel and shell hash with relatively stable though sparse macrophyte cover, to deep soft mobile drifts of medium to coarse sands. The seabed on the western side of the channel appeared generally more stable, with consolidated mixed substrates of sand and shell hash and greater incidence of macrophyte cover and other encrusting biota.

As a result of the artificial structures associated with the railway bridge, an artificial reef community has established in this area of the harbour. A diverse and productive community of encrusting organisms and

---

<sup>54</sup> Park, S.G. 1996. Sea lettuce monitoring in the Bay of Plenty. Changes in abundance, nutrients and environmental influences for the period June 1992 – June 1996. Environment B.O.P Environmental Report 96/23, Environment B.O.P Whakatane, New Zealand.

## Section 8

## Existing Environment

the associated biota are evident, and larger fish species were noted during the survey including triplefins (*Forsterygion* sp.), spotties (*Notolabrus celidotus*) and kingfish (*Seriola lalandi*).

Infaunal communities were characterised by high taxonomic diversity, with over 90 species identified across all sampling stations. These included worms, shrimps, amphipods, crabs, sea stars, fish, algae, sea cucumber, sponge, anemones, chitons, snails, limpets, and bivalves. As with the seabed habitat, the sediment infauna found at each sampling station varied in density depending on the stability of the substrate.

No organisms or communities of special ecological value or scientific interest were noted during the subtidal survey.

### 8.2.3 Existing Land Use

The aerial photographs on Drawing Nos. G-105-021 Rev. D to G-105-043 Rev. D show existing land use and development along the Southern Pipeline route.

As it progresses north up the Te Papa Peninsula from Maleme Street pump station, the Southern Pipeline will be located within a built-up urban area.

At the start of the pipeline route in Maleme Street the area is zoned industrial business and is almost entirely developed. Once into Oropi Road the area is industrial, with residential on the eastern side of the road. North of this the route is primarily residential, with commercial areas at Merivale and Fraser Cove. North of Fraser Cove the pipeline will continue along Fraser Street before turning left into Eighteenth Avenue, and thence turning right into Devonport Road. The pipeline will run along Devonport Road as far as Memorial Park. Both Eighteenth Avenue and Devonport Road in this area are bordered by residential activity, interspersed with cemeteries, schools and public reserves. Northwards the area is primarily residential.

North of the Eleventh Avenue intersection the pipeline route drops down into Memorial Park, with the route running north along the western boundary of the park. Within Memorial Park the pipeline passes in close proximity to QEII Memorial Hall, a mini-golf course, and the Memorial Pool (public swimming baths).

The pipeline route re-emerges onto Devonport Road at the northern end of Memorial Park, where the surrounding activity is residential. At Sixth Avenue the route diverts down a local access road to Fifth Avenue East, before running along the foreshore towards the Tauranga CBD. Existing residential activity adjoins the foreshore route, including a number of private boatsheds. The route extends 950m northwards to 'The Concourse', an unauthorised reclamation presently used primarily for parking.

In the event that the foreshore pipeline/walkway does not proceed, the pipeline route would continue along Devonport Road. Residential activity predominates along Devonport Road north of Sixth Avenue, but becomes progressively more business oriented closer to the CBD, especially in the vicinity of Second Avenue northwards.

Having crossed the Tauranga Harbour by way of either the railway bridge or submarine pipeline, the Southern Pipeline makes landfall on the Matapihi Peninsula. At Matapihi the area is rural, with the pipeline route passing (in the road reserve) farms and orchards. The route then crosses the East Coast Main Trunk Railway and State Highway 2, before entering land designated for wastewater treatment purposes at Te Maunga. The majority of this land remains in pastoral use, but also contains a composting plant and the existing Te Maunga WWTP. The pipeline route terminates at the WWTP.

### 8.2.4 Landscape and Visual

Once constructed, the majority of the Southern Pipeline project will be below ground and will have no visual impact. A landscape and visual assessment has not therefore been undertaken for the overall pipeline route. Such assessments have, however, been undertaken for the Memorial - Strand Walkway and Railway Bridge Upgrade project components (refer Sections 8.3.6 and 8.4.4 of this AEE for a description of existing landscape character in relation to these projects).

## Section 8

## Existing Environment

The existing pump station at Memorial Park will require to be upgraded and the new building will be constructed of materials as required by the recently published Reserve Management Plan.

### 8.3 Memorial Strand Walkway Project

#### 8.3.1 Geology and Soils

##### *Site Description*

The foreshore section of the Southern Pipeline route, in combination with the Memorial - Strand Walkway, is proposed between Fifth Avenue East and the East Coast Main Trunk Railway Bridge No. 71. This section of the AEE provides a summary of geology and geotechnical conditions contained in Reports No: 11, 26 and letter report (refer Appendix O) for the walkway project.

The ground level on the landward side of the foreshore is relatively flat between Fifth Avenue East and Arundel Street. Generally, from Arundel Street northwards, the ground level rises at a moderate angle (15°) for a 10m wide strip of land, before rising typically at a steep angle of 35°, to the top of the cliff. The cliffs are typically 15 to 20m above sea level.

Several of the private properties along the foreshore currently have some form of seawall armouring, for example gabion walls, rock boulders or concrete walls. These walls vary in height from 0.5m to 1.5m. The only locations where no sea wall armouring exists are along the end of the TCC road reserves (First, Second and Fourth Avenues).

##### *Geology and Geotechnical Conditions along Foreshore*

The following is a summary of geological/geotechnical conditions along the foreshore pipeline/walkway alignment.

##### *Sea Cliff Geology & Geotechnical Conditions*

The following is a typical sequence (based on desktop research and exposed cliff map at Fourth Avenue) of geological/subsoil layers in the sea cliffs, from the top of the cliff downwards:

- The sea cliffs along the Te Papa Peninsula comprise an upper layer of 3m to 5m of Younger Ashes comprising silts and sands.
- The bottom layer of the Younger Ash sequence comprises Rotoehu Ash, chiefly loose, medium coarse sands.
- A chocolate brown palaeosol (typically 100mm to 300mm thick) generally forms a distinctive separation layer between the Younger Ashes and the older underlying (Hamilton) Ash. The palaeosol is a brittle, hard soil layer that was petrified during the deposition of the Younger Ash sequence from the Taupo Volcanic Zone.
- The Hamilton Ash comprises orange brown silts and clays that are generally stiff to very stiff in consistency. The Hamilton Ash sequence is typically 2m to 5m thick.
- The soils underlying Hamilton Ash comprise Pahoia Tephra. This material comprises inter-fingered silts and sands which are generally medium dense/stiff in consistency.
- The loose sands of Rotoehu Ash overlying the palaeosol are prone to piping erosion within the exposed cliff faces. Thus the material above the palaeosol is prone to landslips.
- It is well known that the sea cliffs within the Tauranga region are prone to landslip hazard. Within the built environment, the likelihood of this hazard is increased due to greater stormwater and groundwater flows. The failures have mainly been observed above the palaeosol. However, some

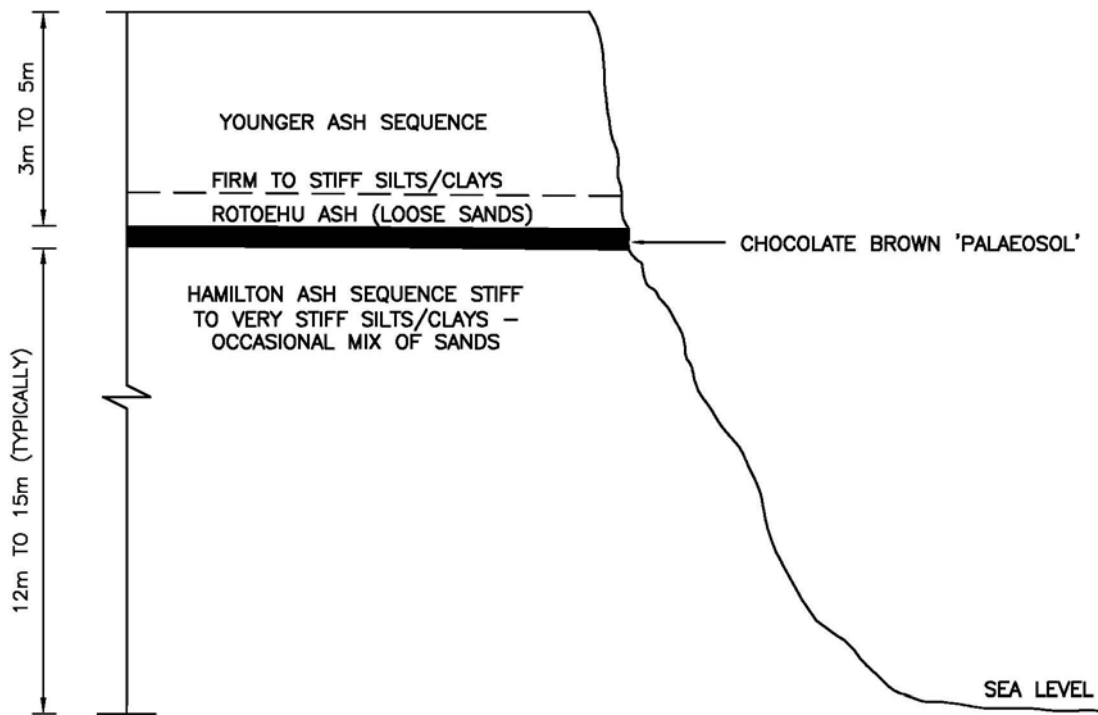
## Section 8

## Existing Environment

failures do extend into the Hamilton Ash sequence, as the failure progresses beyond the initial extent.

Figure 8-1 shows the typical sea cliff geology for the Te Papa Peninsula.

**Figure 8-1 Typical Sea Cliff Geology for the Te Papa Peninsula**



### **Foreshore Geology and Geotechnical Conditions**

Heavy Dynamic Cone Penetrometer (HDCP) testing (Report No.11<sup>55</sup>, Appendix C) and boreholes drilled (Report No 26, Appendix F) by URS along the foreshore indicate the following geology within the beach area:

- In the proximity of Memorial Park and Sixth Avenue, the beach is underlain by a mantle (typically 0.5m thick) of loose to medium dense sands. Underlying this sand layer, there is very soft to soft estuarine mud (silt with some clay). This material is considered unsuitable to support the Southern Pipeline, even when encased in an embankment above the seabed.
- From Fifth Avenue East northwards, the mantle of beach sand is underlain by inter-fingered sands and silts (fluvial sediments) with pumice deposits. These soils are typically 2m to 3m thick and are loose to medium dense in consistency. The soils are therefore considered suitable to construct the Southern Pipeline.
- The soils underlying the pumiceous deposits (typically 2m below seabed) comprise loose to medium dense, medium-coarse sands. This layer was found to be under artesian pressure with hydrostatic

<sup>55</sup> URS New Zealand Limited, Report No. 11 *Preliminary Geotechnical Report*, 28 August 2007

## Section 8

## Existing Environment

pressures measured at 0.5m above ground level in Borehole 12 (BH12) (refer Drawing No. G-601-002 Rev. E for location of boreholes).

- The artesian pressures impart difficult excavating conditions under the seabed due to sand boiling. Therefore, it is recommended to keep any excavation within the seabed to a minimum and above the confined artesian aquifer.

### **Site walkover assessment**

A site walkover assessment was carried out by a URS senior geotechnical engineer on 5 March 2007. The walkover assessment was carried out during low tide so that the full length of foreshore from Sixth Avenue to The Strand could be walked.

The purpose of the assessment was to identify the presence of landslide debris at the toe of the cliffs and to assess the likelihood of any future landslips affecting the Southern Pipeline and the walkway along the foreshore.

The following key observations were made during the walkover assessment:

- Most of the private properties along the foreshore have some type of sea wall/retention structure (coastal erosion protection).
- The structures vary in type from rock armouring to vertical concrete faced walls. The walls vary in height from 0.5m to 1.5m above seabed. Ongoing erosion was observed under a few sea walls. Reconstruction was noted on some seawalls affected by ongoing erosion.
- The gabion walls were observed to have deteriorated and to have suffered the most damage (e.g. Second Avenue).
- In locations where the TCC road reserve extends to the foreshore there are currently no coastal protection works, although Fourth Avenue appears to have a damaged 0.5m to 1m high gabion wall over part of the foreshore length.
- For the steep cliff faces within private property, some retention works were observed, along with some works undertaken to enable construction of residential structures.
- Two recent landslips were observed along the foreshore; Fourth Avenue and cliffs north of First Avenue. Both landslips were observed to be mainly within the top 3m to 5m of cliff face, namely, within the Younger Ash sequence. Some work has been undertaken to remedy the instability within the private land near First Avenue.
- Several stormwater outlets were observed along the foreshore. The stormwater outlets (roof water and public) would need to be redirected during the proposed works.
- There is a 150mm diameter sewer pipeline with associated man holes along the northern third of the foreshore section, which would either have to be protected or decommissioned/relocated during the proposed works.

### **8.3.2 Shoreline Morphology and Coastal Processes**

This section of the AEE describes the morphodynamics (landforms and process regimes) affecting the Tauranga Harbour shoreline from Memorial Park north to the Railway Bridge/Strand area (from Seventh Avenue to Elizabeth Street). This provides the environmental baseline conditions for the proposed walkway embankment and beach restoration.

#### **Tide levels**

Fundamental to the matters discussed in this report are elevations with respect to sea level. The seaward location of property boundaries and the landward margin of the Coastal Marine Area are defined

## Section 8

## Existing Environment

by the level of Mean High Water Spring Tides. Beach landforms are formed within and above the intertidal zone, and in the case of the harbour beaches these occur in the upper part of the tide range from about the level of mean high water neap tides to about 1.5 m above sea level, which is above the level of highest astronomical tides. Therefore it is important to know the location of the Mean High Water Springs, Mean High Water Neaps, Highest Astronomical Tide, and Mean Sea Level. On the LINZ website these levels are defined as follows.

- MEAN HIGH WATER SPRINGS (MHWS) is defined as the average of the levels of each pair of successive high waters, during that period of about 24 hours in each semi-lunation (approximately every 14 days), when the range of the tide is greatest.
- MEAN HIGH WATER NEAPS (MHWN) is defined as the average of the levels of each pair of successive high waters, during that period of about 24 hours in each semi-lunation (approximately every 14 days), when the range of the tide is least. They occur approximately one week after spring tides.
- MEAN SEA LEVEL (MSL) is the average level of the sea surface over a long period, preferably 18.6 years, or the average level which would exist in the absence of tides.
- HIGHEST ASTRONOMICAL TIDE (HAT) is the highest tidal level that can be predicted to occur under average meteorological conditions over 18.6 years.

For surveying purposes the level of MHWS used is that calculated over a full 18.6 year tidal cycle. All of these levels are with respect to Chart Datum (0.0 m), which is a water level so low that the tide will seldom fall below it.

At Tauranga, Chart Datum for tide level predictions is defined as being 4.103 metres below bench mark BC 84 (LINZ code B309), a stainless steel pin set in the concrete foundation at the NE corner of the Port of Tauranga Ltd administration building. However, surveyors use a different datum, known as the Moturiki Datum (MD), which is based on levels determined from a tide gauge on Moturiki Island some 1.25 km north of the port tide gauge, and situated on the open coast rather than inside Tauranga Harbour. The zero level for this datum is approximately mean sea level (de Lange and Gibb, 2000<sup>56</sup>).

Topographic survey data for the present study was provided by RPC Ltd Consulting Surveyors, using the Moturiki Datum (MD). de Lange and Gibb (*ibid*) note that high tide levels in Tauranga Harbour near the central business district (ie along the proposed pipeline route) are 0.07 metres above the corresponding level on the Moturiki Datum and at the Port of Tauranga. Therefore the adopted tide levels for the shoreline along the proposed pipeline/walkway route are expected to be as listed in Table 8-1. These tide levels are also as used by ASR in its harbour hydrodynamic investigations<sup>57</sup>, and all other project documentation.

---

<sup>56</sup> de Lange, W. P., and J.G. Gibb, 2000. Seasonal, inter-annual, and decadal variability of storm surges at Tauranga, New Zealand. *NZ Journal Marine Freshwater Research* 34: 419-434

<sup>57</sup> ASR Limited, Report No. 72 *Southern Pipeline Estuarine and Hydrodynamic Physical Process Assessments*, August 2007

## Section 8

## Existing Environment

**Table 8-1 Tide levels for proposed pipeline route along Tauranga Harbour shoreline**

	LINZ Datum (Port of Tauranga)	Moturiki Datum (Moturiki Island)	Pipeline route (Moturiki Datum)
<b>Highest astronomical tide</b>	2.08 m	1.19 m	1.26 m
<b>Mean high water springs</b>	1.88 m	0.84 m	0.91 m
<b>Mean high water</b>		0.79 m	0.86 m
<b>Mean high water neaps</b>	1.60 m	0.57 m	0.64 m
<b>Mean sea level</b>	1.03 m	0.00 m	0.07 m
<b>Mean low water neaps</b>	0.44 m	-0.51 m	-0.44 m
<b>Mean low water</b>		-0.664 m	-0.594 m
<b>Mean low water springs</b>	0.13 m	-0.71 m	-0.64 m
<b>Lowest astronomical tide</b>	-0.12 m	-0.963 m	-0.893 m

Note: LINZ tide levels are those predicted for the period 1/1/2000 – 31/12/2018. MHWS/MHWN and MLWS/MLWN for Moturiki Datum are calculated from LINZ levels. Pipeline route levels are MD+0.07 m.

The above tide levels are predicted for normal meteorological conditions, and the actual level may be different, particularly during storms. Thus de Lange and Gibb (*ibid*) report that in April 1968 the tide level rose to 1.587 metres (MD) as a result of the storm surge that occurred when ex-tropical cyclone Gisele passed over Tauranga. TCC has set a minimum building level of 2.7 metres (MD) in part to take account of the flooding that occurs with these short-term sea level changes.

### **Existing Shoreline Environment**

The proposed foreshore pipeline/walkway embankment extends along 960m of the city shoreline of Tauranga Harbour, from the Strand/Elizabeth Street south to Seventh Avenue/Memorial Park.

The northern 660m of shoreline from Elizabeth Street to Arundel Street<sup>58</sup> is backed by a 15m high steep coastal cliff, while the southern 300m is backed by a low coastal terrace.

These two sections of the shoreline are reflected in different hydrodynamic environments along the foreshore. The southern low energy section is separated from the main tidal channels by up to 200m of mudflats, and is subject to limited wave energy for only 2 – 3 hours either side of high tide.

The northern section is close to the main tidal channel, and has deeper water along it at high tide and is thus exposed to both tidal current flows, and higher wave energy. This section of foreshore is subject to wave and tidal current action for all but about 2 hours either side of low tide. There has been slow

<sup>58</sup> Locations are given with reference to where road reserves meet the shoreline. These are in order from north to south: Elizabeth Street, First Avenue, Second Avenue, Third Avenue, Fourth Avenue, Arundel Street, Fifth Avenue East, Sixth Avenue, and Seventh Avenue. However, the road reserves of Third Avenue, Fourth Avenue, and Arundel Street do not extend right to the shoreline. For the purposes of this report references to these roads are as if they do extend directly to the shoreline

## Section 8

## Existing Environment

erosion on the western shoreline from the railway bridge to the south, including the area around First Avenue (Refer Report No.72<sup>59</sup>, Appendix H).

Historic aerial photographs and other anecdotal records show that the southern section of the foreshore formerly supported a narrow sand beach landform up to 10m wide. This has been eroded away, either by slow longshore drift processes, and/or rapid erosion during storm events. There has been no natural supply of sand to the shoreline to replace this material.

At present, almost all of this shoreline is backed by sea walls. These are ad hoc structures of many different designs and levels of effectiveness. Under the present wave, storm and tide conditions, with seawalls and no natural supply of sand, beach landforms are not stable features along this shoreline.

The small amounts of sand that remain along the foreshore show that sand sized sediment occurs in the harbour in the upper part of the tide range, and these are distinctively separate sediment bodies to the mudflats. Accumulations of sand on the south side of boat ramps show that longshore drift processes move sand to the north.

### 8.3.3 Harbour Sediments

Studies on the existing harbour sediments were undertaken by Cawthron Institute in early 2007. Report No. 38<sup>60</sup> in Appendix J provides a detailed analysis of the outcomes from this investigation.

A series of samples were taken and analysed for organic content, grainsize distribution and concentrations of key compounds. Core samples were also taken to evaluate the sediment benthic community.

In summary the intertidal sediments along the foreshore are dominated by fine, medium and coarse sands (125µm – 1mm) with relatively little variation in sediment texture between stations. All of the seabed contaminants were present at levels well below those at which a biological effect would be expected. The generally low sediment organic content, silt and clay fraction was found to be slightly higher for the western side of the channel (namely along the foreshore)

### 8.3.4 Ecology

#### ***Intertidal Area between Memorial Park and Railway Bridge***

A general overview of estuarine ecology in this part of the Tauranga Harbour is provided in Section 8.2.2 of this AEE, with further information on estuarine ecology provided in Appendix J<sup>61</sup>.

The western shoreline south of the railway bridge consists of a narrow intertidal zone from the bridge to approximately Fourth Avenue (generally less than 10m) which then increases to an area which is much wider (greater than 80m) to the north of Memorial Park. The sediment substrate in the narrow section of intertidal zone is made up of a relatively consolidated mix of gravels and finer material overlain with medium to coarse sands. The wider area nearer to Memorial Park comprises mobile sands.

---

<sup>59</sup> ASR Ltd, Marine Consulting and Research, Report No. 72 *Southern Pipeline Estuarine and Hydrodynamic Physical Process Assessments*, August 2007

<sup>60</sup> Cawthron Institute, Report No. 38 *Benthic Ecological Survey for the Proposed Tauranga Southern Pipeline*, August 2007

<sup>61</sup> Cawthron Institute, Report No. 38 *Benthic Ecological Survey for the Proposed Tauranga Southern Pipeline*, August 2007.



## Section 8

## Existing Environment

This intertidal sediment environment is dynamic in nature and as a result the biota present in the area is assumed to be well adapted to periodic disturbances from extreme weather and tidal events. Sampling indicated a healthy and productive intertidal environment, with community diversity generally high at all stations. There were no specific taxa of special scientific interest or rarity identified in this area.

Dominant epibenthic species recorded included mud flat snails (*Diloma subrostrata* and *Zeacumantus subcarinatus*), whelk (*Cominella glandiformis*) and limpet (*Notoacmea helmsi*). Dominant infaunal species included the polychaete (*Prionospio* sp.), the worm *Aonides* sp., and the rag worm (*Perinereis vallata*). Macrophyte species were limited to sea lettuce (*Ulva* sp.) and agar seaweed (*Gracilaria* sp.), with no eel grass (*Zostera* sp.) identified at the sampling stations. *Ulva* and *Gracilaria* were present as unattached drift and were recorded as less than 1% cover at any station.

### **Birds**

A review of existing information on avifauna of the Tauranga Harbour was undertaken, focusing on the area of foreshore between Memorial Park and the railway bridge in the vicinity of the proposed pipeline/walkway embankment (refer Appendix K)<sup>62</sup>. There were no reports in the literature review undertaken that this foreshore area provides a significant shorebird roost, nesting site or feeding area. There is however limited published information on birdlife specifically along this section of coastline. A field study of the bird population in this area is to be undertaken in the Spring to further evaluate the use of the foreshore area by coastal seabirds.

### **8.3.5 Stormwater Discharges**

Stormwater samples were collected from a single rainfall event to obtain information on existing stormwater discharges to the foreshore between Memorial Park and The Strand and which would require treatment once the proposed foreshore walkway embankment was constructed.

A comprehensive discharge consent is required if stormwater discharges to the harbour are greater than 80 L/s (5% AEP rainfall), in accordance with the provisions of the Regional Coastal Environment Plan.

At present there are four known public stormwater outlets and several private outlets from individual house lots along the walkway route. Approximate flow rates were calculated for each public discharge, and all were shown to exceed the 80 L/s limit. Calculations for a typical single large house lot showed that the consent discharge limit was not reached for smaller private discharges. This demonstrates that a consent will be required for the larger public stormwater discharges.

Stormwater quality testing was carried out (refer memo in Appendix N) at a number of the existing outlets to determine typical contaminant and suspended solid levels in the stormwater. Four samples were taken and tested for a range of contaminants including sediments, heavy metals (lead, copper, zinc) and hydrocarbons. Details of the sampling procedure, the sample results, and a sample location plan are described in detail in the memo in Appendix N.<sup>63</sup>

The samples were taken at low tide during first flush of a rain event following a period of fine weather.

### **Results**

The following conclusions are based on a single sample taken at first flush after a period of four to five days of relatively dry weather, and can only be regarded as broadly representative of the stormwater from the urban discharges along the walkway alignment.

<sup>62</sup> URS New Zealand Limited, Report No. 47 *Memorial Park to The Strand Walkway Bird Report*, 5 July 2007.

<sup>63</sup> URS New Zealand Limited, Memorandum *Results of Stormwater sampling and Treatment Recommendations, Memorial – Strand Walkway project*, 7 May 2007.

## Section 8

## Existing Environment

The sample results showed that while some small exceedences of ANZECC guidelines occurred, the stormwater was generally within typical low to medium contamination ranges for all contaminants as given in the Urban Runoff Data.<sup>64, 65</sup>

The exception to this was zinc, where an elevated concentration was measured in a discharge from southern end of The Strand. It is expected the source of this zinc is either from galvanised roofs, and/or heavy metal dust produced by vehicle movement in the area.

### 8.3.6 Landscape and Visual

An assessment of natural character, landscape and visual effects was undertaken by Boffa Miskell Ltd (Boffa), a specialist landscape and environmental consulting company.

The following is a summary of the existing landscape characteristics of the eastern coastal edge of the Te Papa Peninsula, between Memorial Park and Elizabeth Street (refer Appendix CC)<sup>66</sup>:

- The characteristics of the coastal edge between Memorial Park and Elizabeth Street are mixed/varied with a predominantly low quality.
- At the southern end, where the adjacent landform is at a lower terrace level, the private property interface with the coastal edge is more intimate. Edge characteristics along this stretch however, are varied with a mix/match of retaining structures and boat sheds apparent. Generally however, the coastal edge between Memorial Park and No.252 Devonport Road, (where the landform changes to accommodate the steep escarpment) is well maintained and tidy, with little evidence of weeds and rubbish.
- Moving alongside the steeper coastal escarpment, where the private residences are located at the higher terrain level, the coastal edge is strongly characterised by the vegetation (including weeds) on the escarpment. The presence of boat sheds and variety of edge treatments, also influence the character of this area, as does the influence of the tide, whereby access to the coastal edge/foreshore between No.252 Devonport Road and First Avenue is limited to low tide access only;
- Finally, the northern part of the coastal edge (north of First Avenue and south of Elizabeth Street), is characterised by the presence of private properties being located at a lower terrace level beneath the coastal escarpment. However, the quality of the coastal edge is compromised by the different sea wall protection treatment associated with each individual private property and the presence of buildings constructed up to the MHWS level;
- The presence of sand (held in place by the old railway lines) and the more natural, less formal edge treatment at First Avenue and No.1 First Avenue, adds an element of natural coastal character to the area. This quality is then lost again outside No.5 First Avenue and No's 1-3 Elizabeth Street, where this edge is strongly characterised as urban by the vertical retaining walls and commencement of deep water as the harbour channel proper passes close to the CBD.

---

<sup>64</sup> The ANZECC Guideline typically provides values **after mixing** in a marine environment, and therefore are regarded as conservative for collected stormwater samples.

<sup>65</sup> URS memo dated 7 May 2007 contained in Appendix N

<sup>66</sup> Boffa Miskell Ltd, *The Southern Pipeline Project – Tauranga, Memorial Park to Matapihi Section – Assessment of Natural Character, Landscape and Visual Effects*, 21 August 2007.

## Section 8

## Existing Environment

### 8.4 Railway Bridge Upgrade Project

#### 8.4.1 Geology and Soils

Geotechnical investigations were undertaken in assessing different harbour crossing options for the Southern Pipeline (refer report No. 26<sup>67</sup>, Appendix F). These investigations included Heavy Dynamic Cone Penetrometer (HDCP also commonly known as continuous SPT, refer Report No. 11, Appendix C for more details) testing and the drilling of boreholes. The borehole locations ('BH') are shown on Drawing No. G-601-002 Rev. E.

The following is a summary of the geotechnical conditions in the Tauranga Harbour (refer Drawing Nos. D-607-001 Rev. C and D-607-002 Rev. C for geological cross sections):

##### **Recent Sediments**

- Recent marine sand deposits were encountered to 3m depth on the western (city) side, and to about 22m in borehole BH2.
- These sand deposits typically comprise medium to coarse sands with abundant shells and are generally loose (SPT 'N'<sup>68</sup> of less than 10) to medium dense (SPT 'N' less than 30) in consistency.
- The upper sand deposits are generally mobile namely, the top metre of sediments are subject to movement during tidal movements. More information regarding the specifics of sediment movement and transport can be found in the ASR Report No. 72 (Appendix H).
- Borehole BH3 encountered a 15m thick estuarine mud deposit from a depth of 18m below seabed. The material comprised organic rich clayey silts of soft to firm consistency. However, these deposits were not encountered in any other boreholes (BH1, BH2, BH4 to BH6) along this long section. It is inferred from this information that the main channel/river may have been draining through this area in the recent geological past (last 3,000 years).
- Estuarine mud was also encountered in boreholes BH7 and BH8, in the vicinity of the eastern abutment of the railway bridge.

##### **Reworked Volcanic Sediments**

- Reworked volcanic sediments are fluvial (stream/river deposits) sediments deposited within the harbour during a period of low sea levels. The sediments are inferred to have been deposited typically in near horizontal layers of alternating sands and silts.
- The reworked volcanic sediments were encountered from depths of 5m to 22m below seabed level, down to 55m. These sediments were found to be typically sensitive during field investigations, namely, the residual soil shear strength is considerably less than the peak shear strength, so the soils may lose strength if worked by machinery. However, allophane content testing of recovered

---

<sup>67</sup> URS New Zealand Limited, Report No. 26 *Harbour Crossing Options*, 5 October 2006

<sup>68</sup> Penetration resistance is tested by hammering a solid cone into the subject material and counting the number of blows per 100mm penetration. The results are then converted to a standard SPT (N) blows per 300mm using available empirical correlations. The lower the "N" number the weaker the soil.

## Section 8

## Existing Environment

soil indicated most samples to have less than 5% allophane content, which suggests that the soils are not particularly sensitive.

- In general, the top layer of the sediments comprised white/light grey pumiceous sensitive silts of firm to stiff consistency. This layer is typically 2m to 3m thick, moderately dense and is generally underlain by medium to coarse sands.
- The underlying sediments comprised fine to medium grained sands with inter-fingered silt layers. These deposits were generally of medium dense (SPT 'N' value between 10 to 30) consistency, with the silt layers being firm to stiff.
- Dense to very dense (SPT 'N' value greater than 50), fine to medium grained, uniformly graded sands were encountered between 25m to 55m below seabed.
- It was noted that whilst sands were tested *insitu* to be dense to very dense, there was no apparent 'core cohesion' observed within the recovered soil core, namely, core could be indented by finger pressure with ease, when unconfined.

### **Undifferentiated Ignimbrite**

- The reworked volcanic deposits are underlain by undifferentiated Ignimbrite at a depth of 50m to 55m below current seabed level. The top surface of this Ignimbrite represents an unconformity and has been eroded to form an inferred 'paleo-valley'.
- Within the extent of the boreholes drilled (down to 75m maximum), two distinct Ignimbrite layers were encountered; an upper layer comprised of dark green/ brown welded dense to very dense, fine to medium grained sands and the bottom layer comprised brown/buff brown silts of hard soil to extremely weak rock consistency.

The soil (undifferentiated Ignimbrite) core recovered has shown signs of apparent cohesion (welding), as most of the core was hard to break with finger pressure and difficult to indent with fingernails.

### **8.4.2 Harbour Hydrodynamics and Sediment Transport**

#### **Existing Harbour Conditions**

ASR Limited (ASR), a specialist marine consulting and research company, assessed the existing hydrodynamics of the Tauranga Harbour and then reported on proposed pipeline harbour crossing options<sup>69</sup>. Numerical modelling showed that the currents at the study location in the immediate vicinity of the southern side railway bridge exceed 0.9m per second. The existing causeway and the bridge piers create flow constriction and increased current velocity across the channel. The estimated net sediment transport through southern Tauranga Harbour near the rail bridge is a maximum of 20,000 cubic metres per year.

The sediment and hydrodynamic model results, as well as field observations, indicate that the estuary in the study region is relatively stable and presently close to being in 'dynamic equilibrium'. The estuary's known tendency to be relatively stable, relates not only to the equilibrium morphology but also to the low net transport rates, particularly in the presence of shell lags. As grain sizes and current velocities

---

<sup>69</sup> ASR Limited, Report No. 72 *Southern Pipeline Estuarine and Hydrodynamic Physical Process Assessments*, August 2007.

## Section 8

## Existing Environment

determine the sediment fluxes, subtle variations in grain size can lead to equilibrium conditions, where changing grain sizes can balance out the effect of changing currents. In the presence of new artificially created structures, a slightly changed dynamic equilibrium would be anticipated to occur.

On the inter-tidal zone south of the causeway, flood currents are blocked by the presence of the causeway, while the stronger ebb currents result in net sediment transport to the north. In the channel offshore, flood dominance completes a sediment re-circulation loop, which exists south of the rail bridge on the eastern side of the channel. In terms of construction impacts, any interruption to sediment transport within this loop is likely to be felt over the full span of the loop.

Historical data analyses (e.g. aerial photographs, bathymetry comparisons and previous studies of the Tauranga Harbour) were used to understand that environment and as a “reality check” of the models. Conclusions reached were that:

- The harbour bed is broadly in ‘dynamic equilibrium’ where the bars and channels and sedimentary features move around dynamically, but overall stay in the same general location and condition over time scales of decades.
- The seabed in locations where dredging has occurred (e.g. Stella Passage) or where causeways/ bridges have been constructed (e.g. the railway bridge) have adjusted to the new structure and therefore have not remained in the dynamic equilibrium state described above. However, the effects do not extend far from these specific sites, noting that the dredging of the passage may be causing a very slow loss of sediment further upstream in the Town Reach.
- There has been slow erosion on the western shoreline from the railway bridge to the south.

### **Existing Railway Bridge**

Examination of the seabed near the existing railway bridge piers shows that the bridge has caused localised scour, which appears to have reached equilibrium but has not affected the overall sediment dynamics of the region. Currently the mean maximum scour depth observed is 2.15m and the average total length of the scour holes is 53m.

### **8.4.3 Ecology**

A general overview of estuarine ecology in this part of the Tauranga Harbour is provided in Section 8.2.2 of this AEE, with further information on estuarine ecology provided in Appendix J<sup>70</sup>.

Subtidal sediments were collected at varying distances from both north and south of the railway bridge. Observed substrates varied from hard consolidated mixtures of sand, gravel and shell hash to deep soft drifts of sands. The seabed on the western side of the channel appeared more stable, with greater incidence of macrophyte cover and encrusting biota. Scavenging crustaceans (hermit crabs, and decorator crabs) also appeared common in these areas. The hard bridge structures and the stable zones close to the piers provide an artificial reef with a diverse collection of colonising organisms and wide ranging species.

Substrates with higher stability were found to support a greater range and higher density of epibiota. Where recorded, macrophyte biota included red seaweeds (rodophytes) and sea lettuce (*Ulva* sp.). Small sponges were also noted. A broad range of infauna species were recorded at all stations, with lower densities found in the more mobile sands along the eastern channel.

No species or communities of unique or special ecological importance have been identified.

---

<sup>70</sup> Cawthron Institute, Report No. 38 *Benthic Ecological Survey for the Proposed Tauranga Southern Pipeline*, August 2007.

## Section 8

## Existing Environment

### 8.4.4 Landscape and Visual

An assessment of natural character, landscape and visual effects was undertaken by Boffa Miskell Ltd (Boffa), a specialist landscape and environmental consulting company.

The following is a summary of the existing landscape characteristics of the 'Concourse' area, railway bridge, causeway, and Matapihi landfall relevant to the Railway Bridge Upgrade project (refer Appendix CC)<sup>71</sup>:

#### **Concourse**

- Overall the character of the Concourse area is one that is strongly urban but also one that exhibits a "left-over" space which serves no real purpose, other than to provide vehicular access to the adjacent private properties and as a parking area for the Harbourside Restaurant and the activity in the "green boat shed". No quality amenity values are evident and the area has an unkempt / uncared for / neglected feel. The coastal edge is of a poor visual amenity and pedestrian access in and around the area is also poor. Combined with the aural amenity intrusion from use of the railway line by freight trains, the overall amenity values in this area are considered to be low. This is despite the proximity of the area to the harbour and the CBD.

#### **Railway Bridge**

- The character of the existing railway bridge structure is strongly influenced by the functional design and simplicity of its construction. However, the quality of the bridge character is diminished at a local scale, due to graffiti and left over structures, and the limited width of the existing walkway/cycleway on the bridge. Having said this, the experience offered to users of the public walkway/cycleway is unique in that it allows for an intimate and elevated experience of the harbour environment, providing for unique views of the wider area.

#### **Causeway**

- The railway causeway is also a structural/functional element in the harbour. Public access provision exists. However, this is provided by way of a very narrow path, which is poorly maintained and at a relatively low level (below the railway line) which, alongside the flax growth, reduces the experiential quality for users. The predominance of weeds and rubbish also reduces the quality of this area.

#### **Matapihi Landfall**

- The Matapihi "gateway" area is less modified and exudes a more rural character than the western, more urban, side of the harbour. Public access to the coast and over the harbour is well provided. Landform, land use and vegetation patterns contribute to the strongly rural coastal character of the area. However, weeds and the presence of urban elements (such as the causeway) reduce natural character values.

## 8.5 Submarine Pipeline Alternative for Harbour Crossing

### 8.5.1 Geology and Soils

A summary of the geotechnical conditions in the Tauranga Harbour is provided in Section 8.4.1 of this AEE.

<sup>71</sup> Boffa Miskell Ltd, *The Southern Pipeline Project – Tauranga, Memorial Park to Matapihi Section – Assessment of Natural Character, Landscape and Visual Effects*, 21 August 2007.

## Section 8

## Existing Environment

### 8.5.2 Harbour Hydrodynamics and Sediment Transport

A field investigation and numerical modelling study was undertaken by ASR to determine the potential hydrodynamic effects associated with construction of the harbour crossing options.

The following is a synopsis of the full report on the submarine pipeline crossing option, a copy of which is in Appendix H<sup>72</sup>.

The analysis showed that the preferred submarine route (for which consent is now being sought) was found to be superior in relation to flow alterations and sedimentary impacts, than other submarine pipeline routes. The preference is to bury the pipe. The proposed submarine route is recommended for these reasons and because negligible environmental effects are anticipated along this route.

Bathymetry transects further from the bridge show natural fluctuations in the channel depth of 1m - 2m over the 100 year design life of the pipeline. Fluctuations appear to be greater than 2m on the steeper channel flanks. Without repetitive historical bathymetry data, the probability of pipeline exposure cannot be precisely determined. However if the pipeline is to remain buried a depth of 2m burial, as proposed it would be in accordance with the fluctuations identified by the channel cross-sections analysis.

### 8.5.3 Ecology

A general overview of estuarine ecology in this part of the Tauranga Harbour is provided in Section 8.2.2 of this AEE, with further information on estuarine ecology provided in Appendix J<sup>73</sup>.

The subtidal area in the vicinity of the railway bridge is made up of a substrate which is well-flushed by tidally reversing currents. Sediment infauna exhibits high taxonomic diversity with varying population density consistent with the relative stability of the substrate. The area that would be affected by the submarine pipeline is essentially free of macrophyte cover. Refer Section 8.4.3 of this AEE for further information.

No species or communities of unique or special ecological importance have been identified.

### 8.5.4 Landscape and Visual

An assessment of natural character, landscape and visual effects was undertaken by Boffa Miskell Ltd (Boffa), a specialist landscape and environmental consulting company.

The following is a summary of the existing landscape characteristics of the railway causeway and Matapihi landfall relevant to the Submarine Pipeline alternative harbour crossing option (refer Appendix CC)<sup>74</sup>:

#### **Causeway**

- The railway causeway is also a structural/functional element in the harbour. Public access provision exists however, this is provided by way of a very narrow path, which is poorly maintained and at a

---

<sup>72</sup> ASR Limited Report No. 72, *Southern Pipeline Estuarine and Hydrodynamic Physical Process Assessments*, August 2007.

<sup>73</sup> Cawthron Institute, Report No. 38 *Benthic Ecological Survey for the Proposed Tauranga Southern Pipeline*, August 2007

<sup>74</sup> Boffa Miskell Ltd, *The Southern Pipeline Project – Tauranga, Memorial Park to Matapihi Section – Assessment of Natural Character, Landscape and Visual Effects*, 21 August 2007.

## Section 8

## Existing Environment

relatively low level (below the railway line) which, alongside the flax growth, reduces the experiential quality for users. The predominance of weeds and rubbish also reduces the quality of this area.

### ***Matapihi Landfall***

- The Matapihi “gateway” area is less modified and exudes a more rural character than the western, more urban, side of the harbour. Public access to the coast and over the harbour is well provided. Landform, landuse and vegetation patterns contribute to the strongly rural coastal character of the area, however weeds and the presence of urban elements (such as the causeway) reduce natural character values.



## Section 9

# Assessment of Environmental Effects and Mitigation

## 9.1 Introduction

This section of the AEE addresses the actual and potential environmental effects associated with the Southern Pipeline, Memorial – Strand Walkway, and Railway Bridge Upgrade projects (including the submarine pipeline alternative harbour crossing option) and identifies measures for avoiding, remedying or mitigating adverse effects. Where applicable, the proposed measures take into account feedback received during consultation.

Because of the below-ground location of the majority of the Southern Pipeline works, the ongoing operational effects of the pipeline on the land-based environment will be confined to discrete locations where the pump stations, air vents, biofilters and valves are to be located. For the below-ground works, most of the environmental effects will be generated during construction, where open trenching in the road reserve will be undertaken.

For the foreshore walkway/pipeline reclamation and pipeline harbour crossing works, however, there is the potential for a range of ongoing operational effects in addition to construction effects.

## 9.2 Southern Pipeline Project

### 9.2.1 Construction Effects

#### 9.2.1.1 Sediment Discharge

During construction of the Southern Pipeline, potential effects on water quality could arise from sediment discharge from the erosion of exposed soil surfaces associated with trenching and other excavation works, including below-ground pump station construction. The receiving environments of any sediment discharge would generally be the Tauranga city stormwater reticulation system, and subsequently the water bodies and the marine environment into which they discharge.

Such effects will however be avoided or mitigated by maintaining road and berm areas in a clean state, and installing and maintaining erosion and sediment controls in accordance with standard engineering practice, throughout the proposed works. A finite length of trench will be opened at any one time, and will be backfilled prior to the commencement of excavation works on the next section. Fill stockpiles will be placed in a way that minimises sediment runoff away from the working areas. Whilst some discharge of fine sediment could occur during rainfall events, this is unlikely to have long term significant adverse effects on the receiving environment given the implementation of the proposed erosion and sediment control measures.

The water from trench dewatering will either comprise clean filtered well-point water or potentially silt laden groundwater pumped directly from the trench base. Where necessary a holding tank will be used to provide sediment settlement prior to discharge to ensure that suspended solid concentration is minimised. Alternatively, where practicable, groundwater collected from trenches will be discharged to level, vegetated ground as a means to trap and remove sediments from the water. Where unavoidable, discharges into either existing watercourses or onto overland-flow paths will be used, with discharge water passing through silt fences and/or hay bales to trap sediment. These will be suitably located and stabilised if required, to ensure that no erosion or subsidence arises at the point of discharge and that the discharges meet the sediment control guidelines required by Environment Bay of Plenty (EBoP). All erosion and sediment controls will comply with the principles of EBoP's '*Erosion and Sediment Control Guideline for Land Disturbing Activities*' (Sept 2001).

Specific details of earthworks management for each section of the pipeline route will be developed in the construction management plans which will be submitted by the contractor for approval as the project develops. However because of site limitations, particularly as the majority of the route will be within road reserve and will be limited to a 10m wide working area, there may not be enough room for stockpiling of material. This will require either immediate removal of the material to landfill or, if there is another section

## Section 9

# Assessment of Environmental Effects and Mitigation

completed, backfilling to that section of the trench. Small stockpiles will be required, with runoff and siltation managed by a series of hay bales and silt fences, or equivalent methods. No central stockpile is proposed. The contractor will prepare a construction management plan (including detailed provision for environmental impact mitigation) prior to commencement of any earthworks or construction activity. In addition, prior to the commencement of construction works, a stormwater and sediment control management plan will be prepared and agreed to by TCC and EBoP.

Special measures will be taken during construction of the Southern Pipeline along the Memorial-Strand Walkway alignment and across the Tauranga Harbour (railway bridge upgrade and submarine pipeline harbour crossing options) to ensure that the risk of sediment discharge into harbour waters is either minimised or appropriately managed. These measures have been outlined in Sections 4 to 6 of this AEE and the associated environmental effects are addressed in Sections 9.3.1.1, 9.4.1.1, and 9.5.1.1.

### **Matapihi Foreshore Reclamations**

As outlined in Section 3.3.7 of this AEE, one of the two possible alignments for the Southern Pipeline where it comes ashore at Matapihi requires a temporary reclamation to facilitate construction. In addition, a 5m wide permanent reclamation is proposed along part of the Matapihi foreshore, adjoining the seaward margin of land described as Part Matapihi 3A2A. The purpose of the latter reclamation is to protect a significant archaeological site from ongoing erosion into the sea. Both of these reclamations are shown on Drawing No. G-601-022 Rev. D.

A separate Erosion and Sediment Control Plan (ESCP) has been prepared for the coastal reclamation sections of the Southern Pipeline project, including the Matapihi foreshore reclamations described above (refer Report No. 54<sup>75</sup>, Appendix V). The ESCP details good practise measures required to provide control of erosion and sediment discharges in the Coastal Marine Area during construction. The ESCP will form part of the comprehensive Construction and Environmental Management Plan for the Southern Pipeline, Memorial – Strand Walkway project (refer Section 9.6 of this AEE).

With regard to the Matapihi foreshore reclamations, the proposed works will be long but their narrow width means that the site will be comparatively small. A new timber retaining wall will be constructed first and a silt fence will be placed on the inside face of this wall. This should be adequate for sediment control, however a floating sediment curtain or floating silt fence will be positioned approximately 2m away from the toe of the works if required. Although these may be less efficient than land based sediment control measures because of tidal and wave energy, they will still retain a significant portion of any sediment that may be generated from the works. However, the primary emphasis will be placed on using construction methods that minimise the generation of sediment. This includes using clean, graded rock fill material with minimal fines.

Overall, it is considered that the potential sediment loss from the reclamation construction works will be low, and is likely to be insignificant in relation to a very much larger receiving environment that is naturally turbid.

### **9.2.1.2 Dust**

Pipeline construction has the potential to generate dust. Whether or not dust results in nuisance effects is dependent on many factors – including the type of material that is being excavated, the way in which the material is handled and, probably most importantly, the proximity of the construction works to activities that may be sensitive to dust.

There are a range of commonly used dust mitigation measures, the use of which will be incorporated in the Construction Management Plan for the project. However, even with the use of these measures there

---

<sup>75</sup> Erosion Management Ltd, Report No. 54 *Tauranga City Council – Southern Pipeline – Erosion and Sediment Control Plan – Coastal Reclamation*, 16 August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

is still the potential for dust nuisance to occur in some circumstances. Additional dust mitigation measures will be required in these circumstances.

The following provides an assessment of likely dust nuisance for different sections of the Southern Pipeline route, identifying those locations where additional mitigation measures may be required during construction.

### ***Maleme Street Pump Station***

This component of the pipeline project requires one of the largest individual areas of excavation. However, the site is in the middle of an industrial area, and has a high ground water table, with no particularly sensitive neighbouring activities that have the potential to be affected by dust. The closest residential properties are located more than 300m away and therefore extremely unlikely to be affected by dust. In these circumstances the use of standard dust mitigation measures will be sufficient to control any potential for dust nuisance, and the potential for adverse effects is considered to be no more than minor.

### ***Sections of Pipeline within Road Reserve***

On the western side of the harbour, this includes the route sections from Maleme Street to Merivale shopping centre, Merivale shopping centre to Fraser Cove shopping centre, Fraser Cove shopping centre to Memorial Park, and Memorial Park to Fifth Avenue East. It also includes the section of Devonport Road northwards from Fifth Avenue, should the option of placing the pipeline along the foreshore not proceed.

For all of these sections the pipeline construction works are within road reserve. The pipe will be located in a trench, with the excavated material either being removed for disposal off-site or used to backfill previously completed sections of pipeline installation. While these works are at times relatively close to residential properties (within 20m), the fact that the work will be within a trench and there will be little or no long-term stockpiling of materials means there is little potential for dust nuisance. Any potential that does exist can be controlled through the use of standard mitigation measures such as sweeping loose material, or use of water trucks or water sprays to dampen fill material. The potential for dust nuisance to occur is therefore considered to be no more than minor.

### ***Merivale and Fraser Cove Shopping Centres***

The potential for dust generation in these locations will not be any greater than for other areas along the pipeline route. However, depending on the nature of business activities located there, the perception for dust nuisance effects may be greater. In addition there are some businesses, for example cafes with outdoor seating at Fraser Cove shopping centre, where real dust nuisance effects could be experienced.

A more intensive dust control regime will be required through the shopping areas should this work occur during a long period of dry weather. Such a regime could include hand spraying of water and hand brooming.

### ***Memorial Park Pump Station***

As with Maleme Street, works at the Memorial Park pump station will involve a large excavation, although most of it will be below the water table. However, unlike Maleme Street this location could be considered sensitive with a number of widely used public amenities in close proximity.

While the use of standard dust mitigation measures will minimise effects for the majority of park users, there is the potential for dust to impact on the adjoining swimming pool and mini-golf activities. The issue with the swimming pool will potentially be the additional cleaning burden that could occur from dust. It is considered necessary to erect dust fences around the pump station construction site to minimise the potential for dust nuisance on these two facilities. Because the mini-golf facility is located in such close proximity to the works, this activity may still experience some adverse effects in a long dry summer

## Section 9

# Assessment of Environmental Effects and Mitigation

notwithstanding the use of a dust fence. Other potential mitigation options, such as mist sprays, may therefore need to be discussed with the mini-golf operator.

### **Matapihi Peninsula**

The pipeline will primarily travel within the road reserve on the Matapihi Peninsula. As this area comprises predominantly rural land, there is relatively low potential for effects on residential properties, with any dust being generated no different to that which might occur from some permitted rural activities. Some residential properties located off Phoenix Heights are within 10m of the works, and care will need to be taken when works are adjacent to these properties to ensure that standard dust mitigation measures are put in place.

The works will also pass close to a large number of Kiwifruit and Avocado orchards. While the Kiwifruit orchards are surrounded by windbreaks, care will need to be taken to minimise dust generating activities – particularly when pollination is occurring, because dust can discourage bees from pollinating Kiwifruit. Likewise, the quality of the fruit can be reduced if there are large amounts of dust on them. While the nature of the works and standard mitigation measures will minimise the potential for dust generation, it is recommended that as far as practicable the works be carried out at a time when the Kiwifruit vines are dormant or, in the case of Avocados, at a time when the potential to affect fruit quality is minimised.

### **Matapihi Peninsula to Te Maunga WWTP**

This section of the works will primarily occur on TCC owned land, with minimum potential for effects given the distance of the works from any sensitive activity. The use of standard dust mitigation measures will ensure that any effects are no more than minor.

#### **9.2.1.3 Noise**

The majority of the Southern Pipeline will be located within the Road Zone of the Tauranga District Plan (e.g. Fraser Street, Matapihi Road). Within the Road Zone, pipelines are a Permitted Activity. Rule 24.3.1.11 (c) of the District Plan specifies noise limits for construction activities carried out within the Road Zone. Construction noise for permitted activities in the Road Zone shall comply with NZ Standard NZS6803: 1999 Acoustics - Construction Noise.

Compliance with NZS6803 is also required for construction noise in the Rural and Business zones (Rules 21.2.1.10 (c) and 20.2.1.12 (e), respectively, in the District Plan). For example, at the eastern end of the route approaching the Te Maunga WWTP, the pipeline crosses land zoned Industrial Business.

A noise assessment (refer Report No. 61<sup>76</sup>, Appendix Y) has determined that construction works within road are expected to comply with the daytime noise limits of the Construction Noise Standard (which apply between 7.30am and 8.00pm, Monday to Friday, and between 7.30am to 6.00pm on Saturdays). This applies to the majority of the Route. Residential noise limits are given in Table 9-1.

---

<sup>76</sup> Design Acoustics Ltd, Report No. 61 *Noise Report for Southern Pipeline*, 23 July 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

**Table 9-1 Residential Construction Noise Limits**

Time Period	Weekdays (dBA)		Saturdays (dBA)		Sundays and Public holidays (dBA)	
	Leq	Lmax	Leq	Lmax	Leq	Lmax
0630-0730	65	75	45	75	45	75
0730-1800	80	95	80	95	55	85
1800-2000	75	90	45	75	45	75
2000-0630	45	75	45	75	45	75

**Leq** = typical "average" noise levels over the measurement time period

**Lmax** = from bangs, impacts and very noisy activities (such as concrete cutting and the like) to control peak noise levels

Higher noise limits apply at Industrial or Commercial Business zoned properties outside of normal working hours (6pm to 7.30am the following day). This is because these kinds of premises are typically vacant during night time hours and hence there is less potential for sleep disturbance or any other adverse noise effects. However, if there are residential properties nearby (within 60m) then the stricter night time noise limits for residential receivers (as per Table 9-1) still need to be complied with.

There is potential for construction to occur during night time hours at a number of locations along Fraser Street and Devonport Road, including:

- (i) Oropi Road (western end).
- (ii) The Merivale shops.
- (iii) The Fraser Cove Shopping Centre entranceway.
- (iv) The intersections at Chadwick/Fraser Streets, at Devonport Road/15th Avenue, and at Devonport Road/11th Avenue.

Construction work at night time is desirable to mitigate disruption to road traffic during daytime hours, especially during the peak hours at busy arterial intersections.

A different method of constructing the Southern Pipeline, by directional drilling or tunnelling, may be used to avoid open-trenching at the road intersections in item (iv) above in order to minimise disruption to road traffic. Progress is likely to be slower at these locations due to the different construction procedure and it is expected that the duration of construction work at these locations could exceed 15 calendar days and will involve night time work.

At the locations identified above there are residential properties nearby, for which compliance with stringent 45 dBA Leq and 75 dBA Lmax noise limits is unlikely to be achievable. At these locations, it is considered that a compromise solution needs to be found, in order to permit construction work during night time hours, if this is necessary. The Best Practicable Option to minimise noise shall be implemented, and preparation of a Noise Management Plan including methods of noise mitigation (temporary noise barriers or acoustic enclosures) for each of these areas will be prepared prior to commencement of construction.

## Section 9

# Assessment of Environmental Effects and Mitigation

Consent is therefore sought for the application of this standard for all construction in residential and commercial areas for specific levels of noise emissions by equipment where compliance with NZS 6803 cannot be achieved. This will relate primarily to the installation of the pipeline by drilling beneath busy road intersections and entranceways. Although not of long duration, the impact component may be unsettling to residents. In addition, because the sea tends to limit attenuation, even activities such as bulldozer activity during the construction of the railway causeway reclamation could cause a nuisance in certain circumstances.

NZS 6803 provides a range of mitigation measures, including the provision of noise management plans and resident liaison. A draft Noise Management Plan is appended to Report No. 61 (refer Appendix Y). The construction contractor will be required to supply a finalised Construction Noise Management Plan prior to commencement of the work, to include selection of quiet machinery, programming of noisy work to suit adjacent activities, and selection of appropriate work techniques to minimise noise. The Construction Noise Management Plan must be provided to the Chief Executive Officer of Tauranga City Council (or nominee), that demonstrates how the provisions of NZS 6803:1999 Acoustics – Construction Noise will be complied with.

### 9.2.1.4 Traffic

There will be impacts on the local traffic along the route of the Southern Pipeline, as the majority of the pipeline is to be constructed within either the road carriageway, or at the side of the road in the parking zones. Where possible however, the pipe will be realigned outside the roadway beneath the footpath, berm or adjacent reserve land. The final location of the pipeline is dependent largely on the location of the existing infrastructure and services along the proposed corridor, and the ease with which these can be constructed alongside, or moved if needed, to make space for the new pipeline.

The proposed construction methodology involves the area of open ground and associated works to extend up to an estimated 200m along the roadway at any one time. This means that any road works, and therefore restrictions to vehicle and pedestrian movement, will be limited to a 200m long zone at any one pipe laying site. This zone will move along the pipeline route as the pipe is laid.

Trench depths will typically be between 3m and 5m. Temporary stop and go traffic management would be envisaged either side of the working zone, with a minimum 3m wide vehicle lane for directed traffic. In many places two lanes of traffic can be maintained.

In the interests of progressing the construction programme, the contractor may decide to use multiple crews to install the pipeline within the roadway. This could result in several separate 200m road works zones being active at one time. If multiple crews are proposed to be used, traffic management will be reviewed carefully to ensure the impacts on overall traffic flows in the wider area are not worsened significantly by a faster construction programme and multiple work sites.

The impact of the works on local traffic has been modelled using specialist traffic modelling software and the results including details of the expected traffic effects and proposed mitigation are provided in Report No 46<sup>77</sup> (refer Appendix S).

Possible impacts on residents and businesses identified include:

- General access restrictions to businesses, driveways, footpaths, and adjoining roads when the 200m open trenching zone is operating in these areas.
- Other utilities disruption if relocation or temporary shutdown is necessary.
- Restrictions on on-street parking, including temporary closure of parking areas.

<sup>77</sup> Traffic Design Group, Report No. 46 *Western Route E Traffic Management Assessment Report*, 25 June 2007.

## Section 9

# Assessment of Environmental Effects and Mitigation

- Traffic delays due to working hours coinciding with peak traffic periods (0700-0900 and 1500-1800).

### **Traffic Effects of Pipeline Construction in Devonport Road**

The effect of pipeline construction within Devonport Road near the Tauranga CBD would have a greater impact on local vehicle traffic, other road users and pedestrians compared to the foreshore pipeline option (i.e. combined with foreshore walkway/cycleway).

Traffic disruption could have potential effects on commercial activities, particularly retailing in the local area. The route is classified as a 'District Arterial Road' and carries in the order of 1,500 vehicles per hour during the peak hour. Because the duration of construction works would be significant (in the order of three to four months overall for this section), if not properly managed the effects on businesses could be significant, including for example, added pressure on businesses already financially stressed. Report No. 46 outlines the delays likely to be experienced by vehicle traffic using Devonport Road, should this route be followed instead of the foreshore. This was a factor in TCC's decision-making in December 2006, where the foreshore walkway route was favoured for this section of the Southern Pipeline.

Should the combined foreshore pipeline/walkway not proceed, the proposed construction methodology along Devonport Road would be essentially the same as that described for the main Southern Pipeline (refer Section 3.3.11 of this AEE). Report No. 46 identifies two alternative options for pipeline installation along the road - horizontal directional drilling (HDD) and open trenching. The former has been largely discounted on the grounds of cost and the concentration of work activities at one location for a longer period, but remains an option for small sections of the pipeline, for example crossing busy road intersections.

Where possible, the pipeline would be realigned outside the roadway beneath the footpath or berm to reduce the traffic impact. The final location of the pipeline would be largely dependent on the location of the existing infrastructure and services along the proposed corridor, and the ease with which these can be constructed alongside, or moved if needed, to make space for the new pipeline.

#### **9.2.1.5 Effects on Coastal Morphology and Coastal Processes**

As outlined in Section 3.3.7 of this AEE, one of the two possible alignments for the Southern Pipeline where it comes ashore at Matapihi requires a temporary reclamation to facilitate construction (refer Drawing No. G-601-022 Rev. D).

The URS geomorphologist<sup>78</sup> has advised that the proposed temporary reclamation in the inter-tidal zone for the duration of the construction period will have less than minor adverse effects on the wave, tide, sediment movement and landform systems in the area. This is a very low wave energy environment where the small changes that naturally occur happen over periods of several years. Short term placement of the temporary working area will not significantly interrupt these processes in this area. Prior to the temporary reclamation works commencing it is recommended that the beach sand deposits be removed and stockpiled. When the works are removed, the beach sand can be reinstated in order to re-establish the existing curve of the shoreline between the end of Matapihi Road and the railway causeway.

#### **9.2.1.6 Ecology**

Being located largely within already modified road reserve, the majority of the Southern Pipeline will have no significant effect on local ecology. However, some specific locations are of ecological importance and are discussed below.

Special Ecological Site (SES) 11 will be traversed by the pipeline to the east of State Highway 2/29, on the final section of the route to the Te Maunga WWTP. SES 12 may also be affected, however it is

---

<sup>78</sup> Dr Mark Mabin, Senior Environmental Scientist, URS New Zealand Limited

## Section 9

# Assessment of Environmental Effects and Mitigation

anticipated that the pipeline route will pass to the north of this wetland. These wetlands are identified as being of moderate to high quality in the Tauranga District Plan, and are a habitat of the threatened North Island fernbird. The specific areas to be impacted by the pipeline construction are however, highly modified with abundant weed populations and are consequently considered to have low to moderate ecological value. In addition, the area to be affected by the pipeline construction will comprise only a small percentage of the overall wetland. No ongoing pipeline operational effects will occur, other than a requirement for occasional maintenance access.

The mitigation measures recommended for these wetland areas during pipeline construction are outlined in Section 11 of this AEE. With the proposed mitigation, ecological effects on the wetlands are considered to be minor.

### 9.2.1.7 Effects on Protected and Significant Trees

An arboricultural assessment was undertaken for the Southern Pipeline route, to assess the potential impact of pipeline construction on trees along the route (refer Report No. 49<sup>79</sup>, Appendix T). The assessment included all trees protected under the Tauranga District Plan and trees considered significant in terms of TCC's Vegetation Management Strategy. Trees were assessed along the pipeline route from Maleme Street to Fifth Avenue East on the Te Papa Peninsula, and from the eastern end of the East Coast Main Trunk railway causeway to Te Maunga for the Matapihi section of the pipeline route. A separate arboricultural assessment was undertaken for the Memorial – Strand foreshore pipeline/walkway route and this is addressed in Section 9.3.1.7 of this AEE.

Protected trees (i.e. protected under the Tauranga District Plan) along the Southern Pipeline route between Maleme Street and Fifth Avenue East are listed in Table 9-2. These trees are all located on private property or in reserves away from the road, but their driplines extend over the road reserve or very close to it.

**Table 9-2 Protected Trees – Maleme Street to Fifth Avenue**

<b>Tree Number</b>	<b>Tree Species</b>	<b>Address</b>	<b>Trunk Diameter</b>	<b>Height</b>	<b>Reference<sup>80</sup></b>
<b>P1</b>	<i>Agathis australis</i>	549 Fraser Street	550mm	15.5m	279
<b>P2</b>	<i>Agathis australis</i>	549 Fraser Street	650mm	15m	279
<b>P3</b>	<i>Angophora costata</i>	Memorial Park	1640mm	29m	3
<b>P4</b>	<i>Metrosiderous excelsa</i>	246 Devonport Road	1700mm	18m	247
<b>P5</b>	<i>Quercus robur</i>	190 Devonport Road	1020mm	20m	244
<b>P6</b>	<i>Dacrydium cupressinum</i>	184 Devonport Road	1150mm	17m	242
<b>P7</b>	<i>Ulmus procera</i> 'Louis van Houtte'	152 Devonport Road	610mm	9m	241

<sup>79</sup> Arbor Care Ltd, Report No. 49 *Arboricultural Impact and Evaluation Appraisal relating to: The Installation of the Southern Pipeline and the Effects on any Notable or Significant Trees*, 5 June 2007

<sup>80</sup> This is the 'site number' given for each tree in *Appendix 16B: Register of Notable and Landscape Trees* in the Tauranga District Plan.



## Section 9

# Assessment of Environmental Effects and Mitigation

Significant street trees along this section of the pipeline route are listed in Table 9-3. These particular trees were identified as being significant because of their size and age, and are all located within TCC road reserve or parks.

While not formally protected under the District Plan, the removal of these trees is undesirable and particular care needs to be taken when carrying out physical construction works in proximity to them.

**Table 9-3 Significant Street Trees – Maleme Street to Fifth Avenue**

<b>Tree Number</b>	<b>Species</b>	<b>Location</b>	<b>Trunk Diameter</b>	<b>Height</b>	<b>Distance (trunk to kerb)</b>
<b>S1</b>	<i>Melia azedarach</i>	Opposite 539 Devonport Road.	850mm	13m	6m
<b>S2</b>	<i>Juglans nigra</i>	Outside 542 Devonport Road	1710mm	26m	5m
<b>S3</b>	<i>Ulmus procera</i>	Outside 538 Devonport Road	1280mm	26m	5m
<b>S4</b>	<i>Melia azedarach</i>	Outside 534 Devonport Road	1060mm	20m	5m
<b>S5</b>	<i>Erythrina indica</i>	Outside 533A Devonport Road	1180mm	18m	0m
<b>S6</b>	<i>Podocarpus totara</i>	Corner of 15 <sup>th</sup> Ave. And Devonport Road	740mm	13m	12m
<b>S7</b>	<i>Platanus X hispanica</i>	Outside Park Apartments. Northern tree	1460mm	30m	7m
<b>S8</b>	<i>Platanus X hispanica</i>	Outside Park Apartments. Middle tree	1580mm	30m	7m
<b>S9</b>	<i>Platanus X hispanica</i>	Outside Park Apartments. Southern tree	2950mm	30m	10m
<b>S10</b>	<i>Araucaria heterophylla</i>	In Roundabout at end of Fifth Avenue	840mm	25m	4m

Protected trees along the Southern Pipeline route between the railway causeway and Te Maunga are listed in Table 9-4. These trees have their crowns either over the road reserve or very close to it, and could be affected by construction of the Southern Pipeline.

**Table 9-4 Protected Trees – Railway Causeway to Te Maunga**

<b>Tree Number</b>	<b>Tree Species</b>	<b>Address</b>	<b>Trunk Diameter</b>	<b>Height</b>	<b>Reference<sup>81</sup></b>
<b>P8</b>	<i>Eucalyptus Spp.</i>	R/511 <sup>82</sup> Matapihi Road	2630mm	25m	437
<b>P9</b>	<i>Dacrydium cupressinum</i>	R/398 Matapihi Road	730mm	13.5m	438

<sup>81</sup> Again this is the 'site number' given for each tree in *Appendix 16B: Register of Notable and Landscape Trees* in the Tauranga District Plan.

<sup>82</sup> Addresses starting with 'R/' refer to rural property numbers.

## Section 9

# Assessment of Environmental Effects and Mitigation

Tree Number	Tree Species	Address	Trunk Diameter	Height	Reference <sup>81</sup>
		(Matapihi School)			
P10	<i>Dacrydium cupressinum</i>	R/398 Matapihi Road (Matapihi School)	1100mm	13.5m	438
P11	<i>Eucalyptus Spp.</i>	R/345 Matapihi Road	1690mm	19m	433

The general conclusion of the arboricultural assessment is that all protected and significant trees can be avoided in constructing the Southern Pipeline, although this will need to be confirmed at the detailed design stage. Any activity within the dripline of a protected tree that has the potential to damage any part of the tree requires a resource consent. For this reason, the majority of the works have been designed to maintain a minimum clearance of 3m from all the protected and significant trees, thereby preventing any such damage from occurring. If construction closer than 3m is required, then specialist arboricultural advice will be sought in order to minimise effects.

Detailed design of the pipeline route will ensure that the works will not cause damage to any of the trees identified above, and will also generally avoid or minimise damage and destruction of adjacent vegetation where practicable. This includes altering the soil due to excavation or compaction of soils; damaging root systems through amputation, cutting or crushing, and damage to the tree through fire or poisoning.

The arborist recommends supervision during construction, so that areas under the dripline of trees are kept free of construction materials and machinery. Other guidance is provided that will be incorporated into the Construction Management Plan (refer Report No. 49).

### 9.2.1.8 Archaeological Sites

Three archaeological assessments were undertaken in relation to the landward components of the Southern Pipeline route (refer Appendix U). Separate assessments were undertaken for the foreshore walkway and pipeline harbour crossing options and these are addressed in Sections 9.3.1.8, 9.4.1.9 and 9.5.1.8 of this AEE.

#### ***Te Papa Peninsula***

The first of the archaeological assessments<sup>83</sup> addressed the section of pipeline route extending north up the Te Papa Peninsula from Maleme Street. The assessment concluded that construction of this section of the Southern Pipeline will not impact on any recorded archaeological features. However, ground disturbance associated with the project occurs within 100m of a number of recorded sites and there is also a possibility that unrecorded subsurface archaeological sites will be encountered during construction earthworks.

#### ***Matapihi Peninsula***

The second assessment<sup>84</sup> addressed the section of pipeline route extending east across the Matapihi Peninsula, from the railway causeway to the southern end of Phoenix Heights. The assessment concluded that construction of this section of the Southern Pipeline will not impact on any recorded archaeological features. However, ground disturbance associated with the project occurs within 50m of

<sup>83</sup> Archaeology B.O.P, Report No.50 *Archaeological Assessment-Tauranga City Council-Southern Pipeline Preferred Route Option-Section 1 Te Papa Peninsula*, January 2007

<sup>84</sup> Archaeology B.O.P, Report No.50 *Archaeological Assessment-Tauranga City Council-Southern Pipeline Preferred Route Option-Section 3 Matapihi Peninsula*, January 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

10 recorded sites and there is also a possibility that unrecorded subsurface archaeological sites will be encountered during construction earthworks.

### *Te Maunga*

The third assessment<sup>85</sup> addressed the section of pipeline route extending east from State Highway 2 to the Te Maunga WWTP. The assessment concluded that construction of this section of the Southern Pipeline will not impact on any recorded archaeological features. However, the nearest recorded archaeological site (U14/306) is located within 100m of the pipeline. There is a possibility, albeit low, that organic artefacts may be encountered during trenching associated with the pipeline installation surrounding this site.

For all three of these route sections, archaeological monitoring is recommended during earthworks. A mitigation strategy will be developed in the event that unrecorded archaeological features/artefacts are encountered during ground disturbance associated with construction. In the latter regard a New Zealand Historic Places Trust authority to modify, damage, or destroy any unrecorded archaeological sites encountered during earthworks has been sought under section 12 of the Historic Places Act 1993.

## 9.2.2 Operational Effects

### 9.2.2.1 Positive Effects – Public Health and Environment

The Southern Pipeline is a strategic and long term (over 100 years) asset for the people of Tauranga. Its purpose is to contain and transfer untreated wastewater from the southern and central parts of the City to Te Maunga WWTP for treatment prior to discharge through the ocean outfall at Papamoa.

The pipeline will prevent sewage contamination in the harbour and will enhance public health and environmental protection.

The system will be designed to also relieve capacity issues at the Chapel Street WWTP and the Judea trunk sewer mains and thereby provide an opportunity to maximise the existing assets.

### 9.2.2.2 Noise

Certain components of the Southern Pipeline will generate noise during operation. The design of the pipeline is at an early stage and noise control treatment will need to be addressed during detailed design. However, the following noise mitigation measures are anticipated:

- Air and drain valves will be housed in concrete chambers that will significantly mitigate any noise effects. Most air and drain valves have no noise. Air valves located along Fraser Street between Chadwick Road and Merivale Shops may have the potential for occasional noise.
- Noise from air blowers associated with the biofilters used to treat sewer gases is likely to be treated by a heavy lid to the valve chambers (sealed airtight). A silencer may be required to the blower vent air inlet pipe which penetrates the lid. The blower and associated pipework may need to be isolated from the surrounding structure (supported with anti-vibration mounts). Where the pipes penetrate the lid and walls, a resilient sleeve may need to be used so that there is not a direct connection between the pipes and the structure.
- In relation to the pump stations at Maleme Street and Memorial Park, noise control is likely to consist of filled concrete block wall construction and heavy roof construction, with acoustically treated inlets and outlets for ventilation.

---

<sup>85</sup> Archaeology B.O.P, Report No.50 *Archaeological Assessment-Tauranga City Council-Southern Pipeline Preferred Route Option-Section 4 Te Maunga*, January 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

Overall it is considered that the noise performance standards in the Tauranga District Plan can be met once appropriate mitigation measures have been incorporated into the final pipeline design.

### 9.2.2.3 Odour

The sewage within the Southern Pipeline has the potential to be odorous as a result of natural degradation processes. Consequently, there is the potential for odours to be discharged at any location where the pipeline “breathes” or vents, such as at locations like the pump stations, air valves and at the siphon inlet structures.

Odour treatment will be required at many of these vent locations, where there is the potential for odour nuisance to occur. The odorous gases will be treated by either biofiltration or absorption through a carbon filter. These are both well proven technologies, with biofilters already used on a number of pump stations in Tauranga and at both of the existing wastewater treatment plants to treat odours and remove the potential for odour nuisance to occur.

Biofilters treat the air by passing it through a media that supports bacteria, which metabolise the odorous components as a food source. In New Zealand the media is typically bark, scoria or pumice, although other media have been successfully used. The media is contained in a suitable enclosure such as a post and timber-lined excavation and may be landscaped and planted with small plants to appear like a bark garden bed.

The typical size of biofilters will be 5m wide by 5m long, although the optimum size for the Southern Pipeline is likely to vary depending on the specific location.

Absorption filters will be used at locations where lower air flows are expected. These work by physically absorbing and binding the odorous compounds onto an absorbing media, which is typically activated carbon.

The odour treatment equipment will be selected and sized during detailed design.

### 9.2.2.4 Effects on Coastal Morphology and Coastal Processes

As outlined in Section 3.3.7 of this AEE, a 5m wide permanent reclamation is proposed along part of the Matapihi foreshore, adjoining the seaward margin of land described as Part Matapihi 3A2A (refer Drawing No. G-601-022 Rev. D). The purpose of this reclamation is to protect a significant archaeological site from ongoing erosion into the sea.

The URS geomorphologist<sup>86</sup> has advised that in the longer term the new shoreline alignment along this section of the Matapihi coastline, including the proposed permanent reclamation, will generally be stable unless severely impacted by storms. The curved shoreline segments are tied into the natural shore with very gentle angles and so reasonably approximate the present shore alignment. The incident low energy wave process regime should not cause adverse effects.

It is likely that slow erosion of the archaeological site has contributed some sand to the accretion of material between Matapihi Road and the railway causeway. Once the archaeological site shoreline is stabilised, this supply of sand will cease and the rate of accretion will slow.

### 9.2.2.5 Landscape and Visual Effects

The majority of the Southern Pipeline will be below ground and once constructed will have no landscape and visual effects. Associated above-ground structures (e.g. air valves, odour treatment devices) will not

---

<sup>86</sup> Dr Mark Mabin, Senior Environmental Scientist, URS New Zealand Limited

## Section 9

# Assessment of Environmental Effects and Mitigation

be prominent and will have no more than minor visual effects. Pipe bridges will be painted in a recessive colour to blend into the surrounding background as far as practicable.

### 9.2.2.6 Amenity Values

The majority of the Southern Pipeline will be below ground and once constructed will have no effect on amenity values along the pipeline route. In those locations where associated above-ground structures (e.g. pipe bridges, air valves, odour treatment devices) are required, the visual impact and any other effects arising from the operation of these devices will be no more than minor. On this basis, any effects on amenity values in these locations will be no more than minor.

### 9.2.3 Summary of Mitigation Measures

Proposed mitigation measures in respect of the construction and operational effects of the Southern Pipeline are summarised as follows:-

- (i) A Construction and Environmental Management Plan will be prepared for the works.
- (ii) Residents and immediately affected parties or neighbours will be notified well in advance of the construction of the pipeline in their area.
- (iii) Appropriate erosion and sediment control measures will be implemented and maintained throughout all aspects of earthworks construction. This includes the implementation of a specialised Erosion and Sediment Control Plan for coastal reclamation works at Matapihi.
- (iv) Trench and excavation dewatering liquid will be treated by settlement prior to discharge.
- (v) Dust will be managed by maintaining site cleanliness, good construction practise, water sprays, and where necessary adopting alternative mitigation measures for specific adjoining activities. As far as practicable, works on the Matapihi Peninsula in the vicinity of orchards will be carried out at a time of year when the Kiwifruit vines are dormant or, in the case of avocados, at a time when the potential to affect fruit quality is minimised.
- (vi) Construction noise will be mitigated by adopting the Best Practical Option for sensitive areas and meeting the construction noise requirements of the District plan in other areas.
- (vii) At critical "pinch points" where the pipeline trenching may affect businesses, pipe laying will either be done at night (where noise levels permit) or alternatively during off-peak times (in terms of business or school activities).
- (viii) Specific measures will be taken to mitigate the effects of pipeline construction on traffic, as follows:
  1. Construction areas for open trenching will generally be restricted to a maximum length of 200m, progressing at a rate of approximately 20m per day. However, several crews would likely be operating on different sections of the route.
  2. A 10m wide construction zone will likely be maintained. This configuration of construction is likely to require a lane closure (northbound lane to remain open), with stop/go traffic management. In critical areas two lanes will be maintained while reducing the construction area.
  3. Normal working hours would be Monday to Saturday, 0700 – 1900. In heavily congested areas work outside these hours may be required.
  4. Daily reviews of (morning/evening peak) traffic management would be required to ensure optimal working arrangements are maintained.

## Section 9

# Assessment of Environmental Effects and Mitigation

5. In some areas construction would be limited to periods outside the peak periods of 0700 – 0900 and 1500 – 1800. Near schools peak periods of 0800-1000 and 1400-1600 would be observed.
  6. Special work in some critical locations would be carried out during school holidays or at night where practicable.
  7. Special provision will be made for relocating carparking and bus stops affected by the works. These details will be finalised in consultation with affected parties and TCC staff.
  8. Individual property access will be maintained at all times, except when physical works are occurring on the vehicle crossing in question.
- (ix) For critical infrastructure crossings such as the State Highways and railway crossings a “carrier” pipe will be tunnelled under the road/railway and the Southern Pipeline inserted in the carrier pipe.
  - (x) Protected and significant trees will be avoided wherever possible. Where works are occurring in the vicinity of such trees, an arborist will ensure that appropriate measures are taken to minimise any effects on tree health.
  - (xi) Long term there will be minimal effects from the presence of the pipeline as the majority of the structure is underground. There will be occasional need to access air valves or possible drain valves for cleaning.
  - (xii) Appropriate noise mitigation measures will confirmed at detailed design stage for particular operational components of the pipeline (e.g. blowers).
  - (xiii) Air discharges from pump stations and the air valves, manholes and receiving chambers along the pipeline route will be mitigated using odour control beds.

## 9.3 Memorial - Strand Walkway Project

### 9.3.1 Construction Effects

#### 9.3.1.1 Sediment Discharge

A separate Erosion and Sediment Control Plan (ESCP) has been prepared for the coastal reclamation sections of the project, including the Memorial - Strand Walkway (refer Report No. 54<sup>87</sup>, Appendix V). This plan details good practise measures required to provide control of erosion and sediment discharges in the Coastal Marine Area during construction. The ESCP will form part of the comprehensive Construction and Environmental Management Plan for the Southern Pipeline, Memorial – Strand Walkway project (refer Section 9.6 of this AEE).

With regard to the foreshore embankment reclamation works for the Memorial – Strand Walkway project, the proposed works will be long but their narrow width means that the site will be comparatively small. This small area will have a flat surface consisting of non-erodible rock fill with minimal fine material, and therefore the potential levels of sediment expected from the works will be low. The comprehensive construction measures and methodology outlined in the ESCP are expected to further reduce this level of sediment. Only low quantities of sediment are therefore anticipated to be discharged from the site after treatment through the proposed sediment control measures.

<sup>87</sup>Erosion Management Ltd, Report No. 54 *Tauranga City Council - Southern Pipeline - Erosion and Sediment Control Plan – Coastal Reclamation*, 16 August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

Floating sediment curtains or floating silt fences will be used to trap sediment and will be positioned up to 2m away from the toe of the works. Although these may be less efficient than land based sediment control measures because of tidal and wave energy, they will still retain a significant portion of any sediment that may be generated from the works. However, the primary emphasis will be placed on using construction methods that minimise the generation of sediment. This includes using clean, graded rock fill material with minimal fines.

Any discharged sediment is expected to be fine particulate and colloidal material arising from clay sized particles and very fine silts. This material will take a long time to settle, and the low to moderate energy environment of the local coastal environment is expected to keep this fine material in suspension and disperse it over a wide area. Natural flocculation of sediment particles will occur because of the saline environment of the local Tauranga Harbour, but the widely dispersed nature of the sediment means that the low levels anticipated from the works are unlikely to have any detrimental effect on the ecosystems in the area.

This material may however temporarily degrade local water clarity during construction because the discharge from the sediment retention measures is likely to be turbid. However, this will be to an inter-tidal environment that often has poor clarity, particularly during storm events when the discharge from the works is likely to occur. Any effect that may occur on the clarity of this receiving environment is expected to be local in nature, short lived and have no significant effect on the aquatic life.

Overall, it is considered that the potential sediment loss from the proposed activity is low, and is likely to be insignificant in relation to a very much larger receiving environment that is naturally turbid.

### 9.3.1.2 Dust

Construction of the foreshore embankment reclamation will use clean, high quality aggregates and employ best construction practices. Notwithstanding this, there is a high potential for some adjoining residential properties (particularly where living areas are within only 5m – 10m of the works) to experience dust nuisance on occasions – particularly during strong on-shore winds. The contractor will therefore be required to implement appropriate dust suppression measures during construction, such as use of hand held water sprays, regular surface cleaning, and prompt sealing of exposed surfaces that could be prone to dust generation. It is also recommended that other potential dust mitigation measures be discussed with these residents on a case by case basis should dust become an issue.

### 9.3.1.3 Noise

The proposed Memorial – Strand Walkway reclamation works are located within the Coastal Marine Area (CMA). There are no rules in the Regional Coastal Environment Plan relating to noise from construction work carried out within the CMA. Rule 20.2.4(a) of the Coastal Plan applies to normal day-to-day operations in the CMA, and not to short-term construction noise.

A noise assessment has been undertaken for the proposed works and recommends that noise from construction carried out within the CMA should be required to comply with the Construction Noise Standard NZS6803:1999 (refer Report No. 61<sup>88</sup>, Appendix Y). Such an approach would be consistent with the accepted noise limits for construction of the landward component of the Southern Pipeline (and other development) within Tauranga City.

For the middle section of the proposed walkway, adjacent residential dwellings are generally located at the top of the bank overlooking the harbour. With this separation distance (and screening provided by the top of the bank) the noise assessment predicts that noise from construction of the foreshore walkway embankment will be 55-60 dBA Leq and 65-70 dBA Lmax at nearest affected dwellings. This would comply with the noise limits of the Construction Noise Standard.

<sup>88</sup> Design Acoustics Ltd, Report No. 61 *Noise Report for Southern Pipeline*, 23 July 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

At the southern and northern ends of the proposed walkway, however, a number of residential dwellings are located at the bottom/on the side of the lower terrace. Due to their closer proximity to construction activities, these dwellings will be exposed to higher noise levels. Noise levels of 70-75 dBA Leq and 85-90 dBA Lmax are predicted. This is likely to comply with the Construction Noise limits, assuming "typical duration" of construction work (less than 20 weeks at any one location).

Consent is therefore sought for the application of the Construction Noise Standard for all construction in the CMA and for specific levels of noise emissions from construction equipment where compliance with NZS 6803 cannot be achieved. This will relate primarily to the construction of temporary and permanent embankments (together with the Southern Pipeline), which may take approximately nine months to construct.

NZS 6803 provides a range of mitigation measures, including the provision of noise management plans and liaison with affected residents. A draft Noise Management Plan is appended to Report No. 61 (refer Appendix Y). The construction contractor will be required to supply a finalised Construction Noise Management Plan prior to commencement of the work, to include selection of quiet machinery, programming of noisy work to suit adjacent activities, and selection of appropriate work techniques to minimise noise. The Construction Noise Management Plan must be provided to Environment Bay of Plenty and the Chief Executive Officer of Tauranga City Council (or nominee), that demonstrates how the provisions of NZS 6803:1999 Acoustics – Construction Noise will be met.

### 9.3.1.4 Traffic

The advantage of laying the Southern Pipeline along the foreshore in conjunction with the Memorial - Strand Walkway project is that the effect of pipeline construction on vehicle traffic, other road users and pedestrians in Devonport Road from Fifth Avenue East to First Avenue is minimal. (Refer Section 9.2.1.4 of this AEE for an assessment of traffic effects associated with laying the pipeline along this section of Devonport Road instead of along the foreshore).

Construction traffic is anticipated to comprise 8 tonne truck loads of fill material (and possible small amounts of waste fill being removed) from the construction site at an estimated 10 to 20 truckloads per day, as well as delivery of the lengths of pipeline. The entry point for construction traffic to the foreshore site is likely to be Sixth or Seventh Avenue, with some access also necessary from The Strand. The small number of truck loads (about 2 per hour) means the impact on local traffic on Devonport Road will be negligible and any traffic disruptions will be minor (refer Report No. 46<sup>89</sup>, Appendix S). A traffic management plan will be developed by the contractor as a part of the works.

Pedestrian and vehicle access along the foreshore route will be closed during the construction period, for safety reasons.

### 9.3.1.5 Effects on Coastal Morphology and Coastal Processes

As outlined in Section 4.3.4 of this AEE, a temporary construction embankment of up to 1.2m RL (Moturiki Datum) is likely to be required between Seventh Avenue and Sixth Avenue for the purposes of constructing the foreshore walkway embankment and pipeline. The temporary embankment would be placed on a geotextile separation layer over the existing foreshore. At the completion of construction the embankment would be removed and the underlying beach replenished with sand. The effects of the temporary embankment on channel flows would be de minimis. Otherwise the embankment would result in a temporary loss of beach during construction.

---

<sup>89</sup> Traffic Design Group, Report No. 46 *Western Route E Traffic Management Assessment Report*, 25 June 2007



## Section 9

# Assessment of Environmental Effects and Mitigation

### 9.3.1.6 Ecology

#### **Intertidal Ecology**

Most effects from mechanical disturbance associated with the foreshore embankment and pipeline construction are likely to be short-lived due to the dynamic, well-flushed nature of the immediate benthic environment. With appropriate management of construction activities, including the implementation of comprehensive sediment control measures, significant impacts on habitat areas beyond the construction footprint will be largely avoided.

#### **Fish Movement**

Construction activities will not create a barrier to fish movement within the harbour channel. Minor changes in turbidity (due to any sediment discharges) will not adversely affect fish.

#### **Birds**

Based on the literature available (refer Report No. 47<sup>90</sup>, Appendix K), the area of foreshore between Memorial Park and the railway bridge in the vicinity of the proposed pipeline/walkway embankment is considered not to provide a significant shorebird roost or nesting site, and is not an area of prime importance for feeding. However, given that information in relation to this stretch of foreshore is limited, a field study is recommended to further assess the bird population in this area. Such a study is recommended to be carried out in the Spring, during breeding season.

### 9.3.1.7 Effects on Protected and Significant Trees

An arboricultural assessment was undertaken for the foreshore walkway route, to assess the potential impact of walkway/pipeline embankment construction on trees along the route (refer Report No. 52<sup>91</sup>, Appendix T). Development along the harbour edge has generally been designed in a manner that is in keeping with the coastal area and protects as much of the coastal native vegetation as possible.

The arboricultural assessment notes that there are not many trees along the foreshore route and recommends that any good native specimens (particularly Pohutukawa) be retained. As the proposed embankment is located along the harbour edge, there should be no significant damage to native trees because there are not likely to be any major roots in the harbour area. Significant trees along the foreshore route include:

- A small Pohutukawa near the Harbourside Restaurant carpark area. This is the only existing tree in this area and should be retained, or else relocated within the same area if retention is impracticable.
- A large Pohutukawa at the bottom of 188 Devonport Road, which hangs over the harbour edge. Every attempt will be made to keep the walkway/cycleway to the outer region of the crown, requiring only the removal of smaller branches. This will, however, mean that the walkway is some distance out from the existing harbour wall. A closer position would require more substantial pruning, although the arboricultural assessment indicates that the tree is mature enough to handle such pruning.

<sup>90</sup> URS New Zealand Limited, Report No. 47 *Memorial Park to Strand Walkway Bird Report*, 5 July 2007

<sup>91</sup> Arbor Care Ltd, Report No. 52 *Arboricultural Impact and Evaluation Appraisal relating to: The Construction of a Walk Way in Conjunction with the Southern Pipeline Project from The Stand Car Park to Fifth Avenue East*, 26 April 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

- A large Pohutukawa on the TCC reserve area at the bottom of Fifth Avenue East. This tree hangs low over the harbour edge and over a small stream/drain. The walkway will either need to be taken around the outside of the tree or could run under the crown, with the latter requiring several branches up to 200mm in diameter to be removed in order to provide adequate clearance. The assessment indicates that this level of pruning should have no significant long-term effect on the health of the tree.

Otherwise there are several non-native trees along the route that will require removal or crown lifting. Notably, for two Poplars located in the vicinity of 206 Devonport Road, removal is recommended. These trees are both re-sprouting after falling over and will be unstable. An Agonis tree is also drooping over the route below 236 Devonport Road. The arboricultural assessment indicates that this tree is not a good specimen and its removal would not be a major loss to the area. It could be replaced with a better specimen (possibly Pohutukawa).

Detailed design of the foreshore walkway will ensure that the construction works minimise damage to the Pohutukawa trees identified above, and will also generally avoid or minimise damage and destruction of adjacent vegetation where practicable.

The arborist recommends supervision during construction, particularly where excavations are required within the dripline of trees. Other guidance is provided that will be incorporated into the Construction Management Plan (refer Report No. 52).

### 9.3.1.8 Archaeological Sites

A preliminary archaeological assessment was undertaken for the foreshore walkway route in November 2006 (refer Report No. 51<sup>92</sup>, Appendix U). A more comprehensive assessment, including field survey inspection, was subsequently undertaken in January 2007 (refer Report No. 50<sup>93</sup>, Appendix U).

The survey did not identify any intact archaeological sites that may be affected by construction of the reclaimed foreshore embankment. Archival research identified both pre-historic Maori and pre-1900 European activity above and below the coastal escarpment, but twentieth century development in both areas has obscured, damaged or destroyed archaeology relating to this activity. The available literature indicates that there are no recorded archaeological maritime sites such as hulks or ship wrecks in the immediate vicinity of the project.

Notably, Maranui Pa was located on the eastern side of Devonport Road, just south of the East Coast Main Trunk Railway Bridge No. 71 in the vicinity of First Avenue. However, the Pa's exact location remains unclear and it has likely been largely destroyed by twentieth century commercial and residential development in this area. Midden deposits may extend down slope in the vicinity of the proposed coastal walkway, but no archaeological features were noted during the January 2007 field survey. Any surviving remains relating to the Pa would have high archaeological significance and archaeological monitoring is recommended during all earthworks. Protocols already developed for other parts of the Southern Pipeline project will also apply to this section of the route.

<sup>92</sup> Archaeology B.O.P, Report No. 51 *Preliminary Archaeological Assessment, The Strand – Memorial Park Beach Project Tauranga City*, November 2006

<sup>93</sup> Archaeology B.O.P, Report No.50 *Archaeological Assessment-Tauranga City Council-Southern Pipeline Preferred Route Option-Section 1 Te Papa Peninsula*, January 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

### 9.3.2 Operational Effects

#### 9.3.2.1 Positive Effects

There are a number of long-term positive environmental effects associated with the Memorial – Strand Walkway.

An engineered embankment walkway prevents the coastal erosion currently being caused by existing foreshore structures. Erosion effects will be minimised by specific design of the embankment slopes and foundations.

Public access will be provided to this section of the foreshore during all but extreme tidal or weather conditions. A new recreational opportunity is created (with positive implications for promoting public health) and accessibility is improved between the Tauranga CBD and existing Memorial Park recreational facilities. The foreshore walkway will provide an alternative route with higher amenity values (coastal views, less exposure to traffic noise and motor vehicle emissions) for people wanting to walk into the CBD from southern areas of the Te Papa Peninsula.

The foreshore embankment design presents an opportunity to reinstate a beach from Arundel Street alignment southwards to Seventh Avenue, further enhancing public amenity and visual appearance. This also provides additional recreational opportunities.

#### 9.3.2.2 Effects on Coastal Morphology and Coastal Processes

A comprehensive assessment has been undertaken of the physical coastal process regimes along the section of shoreline affected by the Memorial – Strand Walkway project (refer Report No. 58<sup>94</sup>, Appendix M and Report No. 72<sup>95</sup>, Appendix H).

##### ***Footprint of Embankment and Restored Beach***

The reclaimed foreshore embankment, containing the Southern Pipeline and supporting the walkway/cycleway, will extend for approximately 900m from Sixth Avenue to the 'Harbourside Concourse'. The average 'footprint' width of the embankment will be 14.5m, with a maximum footprint width of 27m at the bottom of First Avenue. The total footprint will be approximately 1.3 hectares in area.

The restored beach will extend from Seventh Avenue to level with Arundel Street, a distance of approximately 300m. It will extend out 8m from the edge of the walkway between Arundel Street and Sixth Avenue (200m), and 13m from the existing path between Sixth Avenue and Seventh Avenue (100m). The total footprint will thus be 0.29 ha between Arundel Street and Seventh Avenue. However, some of this footprint will be on the batter slope of the embankment, so that a maximum width of about 5m of sand could be placed on the mudflats.

Combining the above data, the footprint of the reclaimed embankment and renourished beach will be approximately 1.5 hectares extending along some 980m of shoreline.

---

<sup>94</sup> URS New Zealand Limited, Report No. 58 *Memorial Park to Strand Walkway, and Beach Renourishment Component*, 26 June 2007

<sup>95</sup> ASR Ltd, Marine Consulting and Research, Report No. 72 *Southern Pipeline Estuarine and Hydrodynamic Physical Process Assessments*, August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

### ***Effect on area of Coastal Marine Area***

The Coastal Marine Area (CMA) is defined by the position of the sea at the time of the tide at Mean High Water Spring (MHWS) tides. From the drawings appended to this AEE, it can be seen that the effect of the embankment and beach renourishment will be to shift the line of MHWS permanently up to 17m seaward of its present position in the worst case. In most places along the foreshore walkway/pipeline route the displacement will be less than this value. However, assuming the maximum displacement it is calculated that the CMA will be reduced by approximately 1 hectare in area in the long-term, depending on the final design configuration.

### ***Effects on Harbour Shoreline, Area and Tidal Prism***

The placement of the embankment and renourished beach will affect the existing harbour shoreline length, area, and volume of the tidal prism.

Tauranga Harbour has at least 240 km of shoreline, and the southeast arm in which the Memorial – Strand Walkway project will occur has 45 km of shoreline. The 980m of shoreline affected by the project represents 0.4 % of the total harbour shoreline, and 2.1 % of the southeast harbour shore. Most of the existing 980m of shoreline affected is backed by numerous short sections of sea wall constructed to different designs. The proposed reclaimed foreshore embankment will replace this ad hoc situation with a coherently designed and engineered sea wall. The proposed renourished beach will replace a previously existing landform along this stretch of shoreline.

The total area of Tauranga Harbour is 21,400 ha, and the southeast arm covers 2,100 ha, with 1,700 ha of mudflats exposed at low tide. The proposed 1 hectare (approximate) of reclamation represents less than 0.007% and 0.07 % respectively of these areas. The reclamation occurs at the harbour edge in the intertidal zone. It will reduce the low tide area of the southeast arm by less than 0.1%. Given these very small proportional areas, the spatial effect of the proposed reclamation is considered to be de minimis.

### ***Effects on Tidal Currents***

The tidal current regime was described in Section 8.3.2 of this AEE. In the southern part of the foreshore walkway project area, south of about Arundel Street, mudflats protect the shoreline from being directly impacted by the main tidal current channels, and water only occurs at the shoreline for a few hours either side of high tide. At this stage of the tidal cycle, current velocities are slow, reducing to zero at the peak of high tide. Given this low energy environment, and the approximate 11m displacement of the shoreline in the 1.7 km wide harbour here, it is considered the reclamation will have a less than minor effect on the tidal current regime.

North of Arundel Street, the tidal channel is closer to the shore, and for about 400m from south of Fourth Avenue to near First Avenue, the toe of the embankment will be subject to tidal flow throughout the tidal cycle. At low tide, about 0.2m of water may still be at the base of the embankment. The 2H:1V to 3H:1V face of the embankment will be smooth, and present little resistance to the flow. The trend of the reclamation shoreline will be parallel to the existing shoreline, which will have been displaced by up to 17m depending on final detailed design. Given the low tide channel here is over 500m wide, and the shoreline trend will not be altered, it is considered there will be a less than minor effect on tidal current velocity and flow paths along this section of the reclamation.

### ***Potential Effects of Beach Replenishment***

The beach replenishment will be a permanent effect on the shoreline. As discussed in Section 8 of the AEE there has been a natural beach in this environment in the past, and the proposal will therefore re-establish the former situation. In this regard, the effect will be to enhance the shoreline environment by improving recreational amenity values.

The renourished beach will be placed as an extra component of the Memorial – Strand Walkway project. The environment will already have been affected by construction of the reclaimed walkway/pipeline

## Section 9

# Assessment of Environmental Effects and Mitigation

embankment, and the beach will therefore function as a soft shoreline edge for this reclamation. In this way it will enhance these 300m of shoreline environment, as the edge of the embankment will be protected from wave action by the beach sand.

The northern end of the beach will be held in place by a groyne. Groynes can have adverse effects on beach environments as they do not add sand to the coastal sediment budget, and they interrupt the longshore drift of sand. While this results in a build-up of sand on the up-drift side of the structure, it causes erosion and loss of sand from the down-drift side. However, this situation does not apply here. Sand is being added to the shoreline, and the placement of a groyne in this low energy environment to function as a sand trap in an integrated beach replenishment programme is an appropriate use for such a structure.

Importing sand into a coastal environment can have adverse amenity effects if it is of a different size, shape, and colour to the natural sand. The source of sand for the renourishment will be finalised at the detailed design stage. Options that have been investigated include sand from harbour dredging at Sulphur Point. This is available in suitable quantities about every two years when maintenance dredging is required. Although sand characteristics vary between dredging, it is expected this would be very appropriate material as it will have very similar composition and shape as the natural sand. Other sources have been investigated from quarries near Hamilton. This material also has suitable characteristics, and comprises volcanic sand that is not inconsistent with the natural material in Tauranga Harbour.

Wave action will work on the replenished beach at around high tide. The rear of the beach will be at 1.5m (Moturiki Datum), which will be 0.6m above MHWS levels and so provide an allowance for wave run-up from the low energy wave that will affect the shore. It is envisaged that large storm events will cause damage to the replenished beach, eroding sand from the face and depositing it on the mudflats. This is a natural process that cannot be mitigated. In many instances, the sand lost is returned to the beach during subsequent calmer weather. For the replenished beach, it is recommended that regular maintenance be carried out, particularly after storm events. This would focus on returning lost sand to the beach or replenishing sand from outside sources, and re-shaping the beach to maintain a good volume of sand in the upper part of the beach profile adjacent to the walkway.

It is apparent that local wave conditions cause longshore drift of sand to the north. This process will continue with the replenished beach, and thus occasional maintenance will be required to return sand to the south, and add extra material to top up the beach if sand is permanently lost after major storm events.

Sea level rise will affect the beach, and over the next 50 years it could rise by between 0.24m to 0.7m. The main effect of this will be to increase the maximum level to which wave action reaches, and this will probably increase the amount of maintenance that will be required to retain a stable beach profile. Over this time frame, it should be possible to adapt to the effects of sea level rise, and with appropriate maintenance as outlined above, the beach will not be significantly adversely affected.

### **Potential Effects of Boat Ramps**

As previously outlined, the existing boat ramps act as groynes to trap the very small quantities of sand that move along the upper foreshore by longshore drift processes driven by waves at high tides. Also, where the ramps extend out onto the mudflats, there is a small amount of local scour due to wave action at the margin of the ramps and the mudflats. This is minor, and mitigated by small ad hoc extensions to the ramps, such as the concrete aprons along the edges of the Sixth Avenue public boat ramp. If the boat ramps are re-established, these sand trapping and scour effects will need to be mitigated.

Where the boat ramps are re-established across the walkway embankment and out onto the mudflats minor wave scour will occur around the edges. This can be mitigated by bedding the base of the ramps below the mudflats, or using reno mattress in a similar manner to that proposed for the embankment itself.

## Section 9

# Assessment of Environmental Effects and Mitigation

Placing the boat ramps across the replenished beach will result in them effectively operating as groynes. The ramps should be constructed so they sit approximately 0.2m above the level of the adjacent beach sand. This will help to stop sand moving over the ramp and partially burying it. There will be a buildup of sand on the southern side of the ramps, and a loss of sand from the northern sides, resulting in a trend towards different sand levels on either side of the ramps. This is likely to be a slow process, and can be mitigated during the regular beach re-shaping maintenance that has already been recommended.

### ***Potential Effects along the Walkway Embankment***

Placement of the reclaimed foreshore embankment and its rip-rap or rockcrete outer face will effectively create a new seawall up to some 17m (depending on final detailed design) out from the present system of ad hoc structures along this section of the foreshore. The overall effect will be to enhance this environment as the present structures are not integrated with each other and are variously ineffective and subject to toe scour.

Sea lettuce is an existing nuisance along the high tide line of this shore. The proposed outer face of the embankment will be designed to be as steep and as smooth as possible so as to reduce the potential for sea lettuce to become tangled on the structure. If cleaning is required, the smooth face should make it easier to dislodge the algae.

An adverse effect associated with sea walls is scour erosion at the base. In open coastal setting the US Army Corps of Coastal Engineers' rule of thumb is to allow for wave induced scour to a depth equal to the water depth along a vertical wall structure. The embankment has been designed with a 2H:1V to 3H:1V face, and this sloping structure will dissipate some of the wave energy. Along most of the embankment, water depths at MHWS will be less than 1m. Taking account of these factors and the low wave energy environment, it is considered appropriate to allow for 1m of scour at the base of the embankment, and the reno mattress/gabion base will be designed to mitigate this effect by self-lowering into any scour hole as it develops. The embankment toe may have some erosion, particularly north of First Avenue. Additional sheet pile foundations will be used in this area to mitigate the potential effect of any long-term scouring.

### ***Potential Effects along the Walkway***

The walkway/cycleway will be placed on top of the reclaimed foreshore embankment. Hydrodynamic effects on this structure will relate to inundation from wave splash, storm surge and in the long term due to sea level rise. The level of the proposed walkway has been set at 1.7m above Moturiki Datum along the beach section, and 1.5m north of here. This is assessed to be approximately 0.8m and 0.6m above MHWS respectively for this part of the harbour. Some wave splash may affect the walkway at around the time of MHWS tides on days when strong east or southeast winds are blowing. The sloping face of the embankment will reduce the wave splash, but some wetting is possible. This is considered to be no more than a nuisance effect that is not likely to occur more than a few times per year.

Storm surge events that raise water levels above MHWS are also likely to cause wave splash effects, and very large storm surges such as that associated with ex-Tropical Cyclone Giselle will cover the walkway. These are considered to be transient effects lasting no more than a few hours, during times of adverse weather when the walkway will have very limited public use, and could be managed by temporary closure.

### **9.3.2.3 Effects on Harbour Hydrodynamics**

ASR Ltd has assessed the effects of the proposed walkway/pipeline embankment on harbour hydrodynamics (refer Report No. 72<sup>96</sup>, Appendix H).

---

<sup>96</sup> ASR Ltd, Marine Consulting and Research, Report No. 72 *Southern Pipeline Estuarine and Hydrodynamic Physical Process Assessments*, August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

Numerical modelling undertaken to determine the effects of the walkway embankment on the channel circulation and sand banks suggests that residual velocities would change by 1-2 cm/s within 50m – 70m of the embankment and generally the currents would remain unchanged over most of the area. From the southern end of the embankment north to Third Avenue, the existing offshore sand flat is unlikely to be affected by the presence of the walkway. However, for the section of walkway between Third Avenue and Second Avenue some erosion is expected at the toe of the embankment, particularly towards First Avenue. Along the section from First Avenue northwards, the beach in front of the walkway may be lost slowly by erosion. Numerical modelling predictions of the rate of erosion were not undertaken, but observations at other locations in the Town Reach indicate that bed levels at the toe of the walkway may drop by around 2m over a period of decades (in the order of eighty years).

In the current design of the walkway toe, a scour depth of 1m has been allowed for over the whole length of the walkway embankment. ASR considers that larger scour may occur, especially from Second Avenue northwards. In the absence of longer term bathymetry data for this specific area and without undertaking detailed sediment modelling (which only has a 30% accuracy), an estimate of the final scour depths cannot be made. A study of the scour in front of the seawalls further north in the Town Reach has been instructive. In response to ASR's assessment, additional scour protection in the form of sheet piling and placement of a reno mattress may need to be provided in the future for the walkway embankment north of Second Avenue (refer Drawing No. C-701-256 Rev. A). It is proposed to establish a scour monitoring programme over a number of years to assess the rate at which scour is occurring and whether over a longer period additional scour protection is necessary.

Regarding the velocities and potential for erosive currents near the western wall at the East Coast Main Trunk Railway Bridge No. 71, model studies indicate that this location is not prone to high sediment loads. It is likely that this area will be relatively stable through time, with a slow adjustment to the new circulation conditions.

### 9.3.2.4 Ecology

#### *Intertidal Ecology*

The foreshore walkway embankment will result in the loss of an area of high-tide soft-sediment habitat. Much of the upper beach in this area has already been altered by previous shoreline modifications (e.g. installation of retaining seawalls). In addition, the dynamic nature of the intertidal sediment environment requires that the biota living on and within it is well adapted to periodic disturbances. As a result it is anticipated the ecological communities will re-establish fairly rapidly as the beach re-equilibrates to a slightly altered high-tide boundary.

The introduction of new intertidal hard substrate, in the form of facing material on the seaward side of the sloping embankment, will represent a change in the principal intertidal habitat for the shoreline north of Arundel Street. This will amount to an incremental increase in the total area of such habitat already occurring within the harbour, both natural and artificial, and is expected to result in an increase of encrusting communities.

Beach replenishment proposed along the shoreline south of Arundel Street will require periodic depositions of imported sand. This will have a short-term effect on intertidal sediment communities, but would be limited to a strip approximately 6m to 11m wide. Some smothering of benthic communities would result, but it is assessed that re-colonisation would occur rapidly.

#### *Fish*

There may be some loss of shallow water intertidal habitat – suitable for juvenile and larval fish stages. In the overall scale of Tauranga Harbour, this loss will not be significant.

## Section 9

# Assessment of Environmental Effects and Mitigation

### 9.3.2.5 Stormwater Discharges into Coastal Marine Area

There are 29 existing stormwater outlet pipes from roads and properties along the shoreline between Sixth Avenue and Elizabeth Street. All of these outlets will need to cross the foreshore walkway embankment and the exact manner of this crossing will be determined at the detailed design stage.

Following construction of the embankment, the stormwater will be discharged to the harbour in two different shoreline settings:

- (i) Adjacent to the renourished beach; or
- (ii) Adjacent to the walkway embankment.

Along the section of the shoreline where beach renourishment is proposed, there are twelve stormwater outfalls, including large structures at Fifth, Sixth and Seventh Avenues. It is not appropriate for these to discharge directly onto the beach as this would erode the sand. The pipes will be placed adjacent to or within boat ramps and routed to discharge onto the mudflats beyond the outer toe of the beach sand. This will promote better mixing in the harbour waters, so as to avoid adverse effects on water quality at the shoreline. A concrete pad would be provided at the discharge point to mitigate potential for scour of the mudflat sediment.

It may also be possible to reduce the number of outfalls by combining smaller pipes along the inside of the walkway embankment structure and routing them to larger pipes. The large outfalls at the ends of Fifth, Sixth and Seventh Avenues could be used as discharge points for nearby smaller outlets. In this way the twelve existing discharge points could be reduced to six.

North of Arundel Street the walkway embankment will not have an adjoining beach. Here the stormwater outlet pipes can be routed beneath the embankment to discharge close to the base of the embankment toe, with a concrete pad to spread the flow to ensure the discharge does not cause scour.

Stormwater sampling was undertaken to determine whether existing discharges along the foreshore between Memorial Park and The Strand would require treatment once the proposed walkway is constructed (refer Memorandum<sup>97</sup>, Appendix N). The results of this sampling have already been discussed in Section 8.3.5 of this AEE.

The following general conclusions are reached regarding the effects of stormwater discharge once the foreshore walkway embankment and beach renourishment are completed:

- The foreshore walkway/cycleway will have minimal impact on stormwater quantities, because the contributing sub-catchments would be unaffected by the work, resulting in no expected increase in flows discharged along the foreshore. Stormwater runoff quantities from the surface of the walkway/cycleway itself will be insignificant in the context of the contributing up stream sub-catchments.
- The stormwater sampling results indicated lower levels of suspended solids than expected, but higher levels of zinc contamination (particularly dissolved zinc). The source of zinc contamination is likely to be a combination of roof runoff and the highly trafficked roads in the contributing sub-catchments.
- No treatment of stormwater is proposed as part of the Memorial – Strand Walkway project. While it is recognised that existing activities in the contributing catchments are resulting in elevated zinc levels in the stormwater discharges, this is unrelated to the proposed walkway. Operation of the walkway is not envisaged to contribute further zinc loading to these discharges.

---

<sup>97</sup> URS New Zealand Limited, Memorandum *Results of Stormwater Sampling and Treatment Recommendations, Memorial – Strand Walkway Project*, 7 May 2007



## Section 9

# Assessment of Environmental Effects and Mitigation

- A concrete pad will be required at the stormwater outlets to ensure that the discharges do not cause any scour at the toe of the walkway embankment.

### 9.3.2.6 Cultural Impact

A separate Cultural Impact Assessment (CIA) was undertaken for the proposed foreshore walkway/cycleway, including placement of the Southern Pipeline within the reclaimed embankment (refer Report No. 65<sup>98</sup>, Appendix Z). The CIA incorporated consultation outcomes from earlier meetings with local iwi and hapu in 2005 and 2006.

The Memorial – Strand Walkway is well supported by the Maori community, with no adverse effects from the construction and operation of a walkway being identified. Retention of the natural profile of the beach below the proposed reclamation, use of local materials, and high amenity value will mitigate any adverse effects on the environment. This area is not a known shellfish gathering or fishing area.

Positive benefits of the foreshore walkway include:

- Improved access along the foreshore;
- Increased awareness of the culture and traditions of the area, particularly given the opportunity to provide signage and interpretation that informs people of the cultural significance of the area;
- Restoring or replicating the historic and traditional character of a sandy beach.

Concern has been expressed on many occasions about the possible dangers of pollution of harbour waters, and damage or destruction of shellfish beds by over-exploitation or other causes. The Maori people place very high priority on conservation of the food resources of the harbour and ask that any activity likely to affect their quality and continuing existence be given very careful consideration.

Whilst recognised as being unlikely, placement of the Southern Pipeline within the foreshore embankment does carry a risk of pipeline failure and the potential release of untreated wastewater into the harbour. Measures are therefore required to reduce the potential for pipeline failure. Use of high quality materials, ample flow capacity, and adequate monitoring/response systems are being sought by the Maori community.

The beach replenishment is supported by historical and traditional associations, as well as in principle by tangata whenua. Locally sourced sand that is not from a wahi tapu or site of significance is preferred. Sand should be extracted from a reputable and sustainable source. Preference is given to sand extracted from a local source such as the Tauranga Harbour.

In summary, tangata whenua have requested the following mitigation measures in relation to the construction and operation of the combined foreshore walkway/pipeline:

- (i) Monitoring of earthworks (kaitiaki role) be undertaken as per protocols developed between tangata whenua and TCC;
- (ii) Appropriate interpretation or signage recognising features of significance along the Walkway should be discussed further with tangata whenua, in particular Ngai Tamarawaho;
- (iii) In constructing the Southern Pipeline component of the foreshore walkway, consideration be given to retaining as much of the natural foreshore profile as possible, and locating the pipeline as far up the beach as is practically possible;

<sup>98</sup> Boffa Miskell Limited, Report No. 65 *Cultural Impact Assessment for the Construction of a Foreshore Walkway & Wastewater Pipeline Between Memorial Park & The Strand, Tauranga, May 2007*

## Section 9

# Assessment of Environmental Effects and Mitigation

- (iv) Minimising the risk of pipeline failure through the use of high quality materials, design, and monitoring/response systems;
- (v) TCC to provide ongoing consultation and updates regarding operational performance of the pipeline;
- (vi) In obtaining sand for the beach replenishment, care should be taken to ensure the source of the sand is not a wahi tapu or site of particular significance to Maori. Preference should be given to sand extracted from a local source such as the Tauranga Harbour.

### 9.3.2.7 Landscape and Visual Effects

An assessment of natural character, landscape and visual effects has been undertaken (refer Appendix CC<sup>99</sup>). The following is a summary of effects on natural character, landscape and visual amenity for the proposed walkway/cycleway and beach replenishment in the landscape character areas between Memorial Park and The Strand and at the Harbourside Concourse.

#### **Memorial Park to No. 252 Devonport Road**

The finished form of the walkway will be consistent with the underlying landform within this section of the walkway route, whereby the proposed walkway/cycleway surface is to be at a relative level that is similar to or lower than the existing private property ground level of the “low terraced landform” to the immediate west. Thereby, perceived access to the coastal environment will remain intact for these residents. Easy access to the coastal environment for the public will remain at road reserve connections. The existing tidy quality of the coastal edge will be enhanced further through a more consistent public edge treatment (the walkway/cycleway), with a further enhancement through the proposed beach replenishment. Overall, for this section of the walkway, it is considered that the works represent a positive effect and will enhance existing natural character and landscape values.

#### **No. 252 Devonport Road to First Avenue**

This section of the walkway will provide a strong “grounding” landscape element between the steeper escarpment landform and the harbour. Currently this section of coastal edge is of a generally low quality and public access is limited. The proposal will increase public access provision and will represent a consistent and appropriate form of coastal protection as a transition between the land and harbour. Increased access to this steeper landform will enable both public and private property to be better accessed so that much needed weed maintenance and rehabilitation planting can be undertaken, thereby providing for an improved landscape quality.

#### **First Avenue to Elizabeth Street**

The second lower terrace landform in this section of the walkway route has a very low level of natural character and landscape values due in part to its proximity to the more urban part of the city and the variety of existing edge treatments. Again, the proposal is considered to provide an improved landscape quality in this area, while natural character values remain unchanged.

#### **Harbourside Concourse Area**

The natural character and landscape values of this area are not of a high level given the existing strongly urban character. Visual amenity values in this area are currently low given the lack of maintenance being undertaken. The coastal edge is also strongly influenced by urban characteristics and is in a poor visual

<sup>99</sup> Boffa Miskell Limited, *The Southern Pipeline Project – Tauranga, Memorial Park to Matapihi Section – Assessment of Natural Character, Landscape and Visual Effects*, 21 August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

condition. The overall amenity values in this area are low, despite the proximity of the area to the harbour and CBD. It is therefore considered that the proposal will significantly improve the amenity values of the Councourse area.

In summary, for the landscape character areas in question (Memorial Park to The Strand and The Concourse), the highly modified coastal edge currently has a low level of natural character and landscape values. The proposed walkway will either enhance or provide the opportunity for further enhancements to be undertaken by way of opening up access to this part of the coastal edge, which is currently difficult to access and maintain.

### Visual Effects

The key viewing audiences who could potentially be adversely affected are the private residents adjoining and/or overlooking the foreshore between Memorial Park and The Strand. While the proposed foreshore walkway/cycleway will ultimately replace some existing waterscape within the foreground of each private view, the remaining panoramic view of the wider harbour environs will otherwise continue to be present.

Provided there is a quality response to the design of the walkway's visual features (for example, fencing and planting treatment) the visual assessment concludes that changes to these private views would not be adverse (refer Appendix CC). Rather these viewing audiences will experience a changed view that includes certain positive elements within the various vistas. Those localised sections of the adjoining walkway/cycleway that will be visible from each individual property, whilst being different from the existing outlook, will add a new and consistent visual quality to the coastal edge.

#### 9.3.2.8 Foreshore Access for Adjoining Residents

Currently there are seven private boat ramps and one public boat ramp, four sets of slipway rails, and various steps along the shoreline between Memorial Park and The Strand – all of which provide adjoining residents with access to the foreshore and harbour. Riparian rights are held by a number of properties along this section of coastline<sup>100</sup>.

In designing the proposed walkway/cycleway, consideration has been given to ensuring that disturbance to landowners' rights is minimised and that they maintain their access across the new embankment so that they can continue to have access to the harbour. As part of the consultation with landowners, undertakings have been made to reinstate all boat ramps and steps as a way of preserving people's access (even though that access would now be across the reclamation). This includes the construction of sets of steps at all locations where riparian rights are held and the provision of boat crossings over the reclamation, and boat ramps over the seaward side of the reclamation. Drawing Nos. C-701-001 to C-701-006 Rev. D show the location of these proposed boat ramps and steps. Although some of these ramps and steps would effectively be available to other users, directly adjoining properties would have right of access preserved. In addition, access by other vessels would be limited by the vehicular access restrictions at each end of the walkway.

Several properties along the foreshore walkway route have blue water titles. That is, the land has eroded away and the legal boundary of the land is now below MHWS. The configuration of the proposed reclamation is such that, with owners' permissions the blue water component of the titles would be restored to land. Where approvals cannot be obtained the embankment will be retained along the property boundary and the intervening area would be tidal (refer cross-sections on Drawing Nos. C-701-001 to C-701-006 Rev. D).

---

<sup>100</sup> Where riparian rights are held, the owner of land abutting on water is entitled to access and egress from that body of water. The legal position on riparian rights is a civil matter and consents for the Memorial – Strand Walkway can proceed without necessarily resolving riparian rights issues.

## Section 9

# Assessment of Environmental Effects and Mitigation

The walkway has incorporated specific design components to meet particular land owner access requirements where possible (for example at No. 2 First Avenue).

### 9.3.2.9 Light Spill and Glare

The effects of the proposed night time lighting along the Memorial – Strand Walkway have been assessed in terms of light spill and glare (refer Report No. 59<sup>101</sup>, Appendix X), in relation to adjoining residential properties. The assessment concludes that for both the proposed medium level lighting (lights mounted on 3.5m high poles) and low level lighting (lights mounted at a height of approximately 1m), the requirements of AS 4282: *Control of the obtrusive effects of outdoor lighting* can be met in terms of minimising glare and light spillage on to adjoining properties.

### 9.3.2.10 Amenity Values

The Memorial – Strand Walkway will provide a significant amenity to city dwellers, providing access to a part of the harbour otherwise only available between limited tidal cycles.

Property owners immediately adjoining the walkway have expressed concern over amenity aspects such as security, lighting and loss of privacy. Security and privacy concerns will be mitigated by providing boundary fencing and screen planting, in consultation with individual property owners. CCTV monitoring will be provided at walkway entry points in order to provide additional security. Light spill onto adjoining properties has been addressed in Section 9.3.2.9.

### 9.3.3 Summary of Mitigation Measures

Proposed mitigation measures in respect of the construction and operational effects of the Memorial – Strand Walkway are summarised as follows:-

- (i) A Construction and Environmental Management Plan will be prepared for the works.
- (ii) Appropriate erosion and sediment control measures will be implemented and maintained during construction of the foreshore embankment reclamation, replacement boat ramps/steps, and beach renourishment. This includes the implementation of a specialised Erosion and Sediment Control Plan for coastal reclamation works.
- (iii) Dust generation will be reduced by using clean, graded rock fill material with minimal fines for construction of the reclaimed embankment. Dust suppression and containment measures will otherwise be implemented. Particular measures will be discussed with adjoining residents on a case by case basis should dust become an issue.
- (iv) Construction noise will be mitigated by requiring compliance with the Construction Noise Standard NZS 6803. This may include limiting working hours and where practicable using equipment with noise controls.
- (v) Construction traffic access will be limited to Seventh Avenue and The Strand, with only occasional access at Fifth Avenue East and Sixth Avenue.
- (vi) Detailed design of the foreshore walkway will ensure that the construction works minimise damage to significant Pohutukawa trees identified along the route, and will also generally avoid or minimise damage and destruction of adjacent vegetation where practicable.
- (vii) Foreshore and cliff erosion – the walkway will be designed to minimise the existing beach and cliff erosion by designing the seaward face of the embankment to absorb the wave and current energies currently causing erosion. Additional scour protection in the form of sheet

<sup>101</sup> URS New Zealand Limited, Report No. 59, *Southern Pipeline Walkway Lighting*, 26 June 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

piling and placement of a reno mattress at the toe of the reclaimed embankment will be provided north of Second Avenue.

- (viii) Ongoing monitoring and beach management for the replenished beach and new boat ramps.
- (ix) Existing riparian rights access to the water will be mitigated by providing new boat ramps and steps access, and where appropriate modifying the walkway to accommodate such access. This may result in occasional closure of the walkway to the public to allow for continued foreshore property owner requirements.
- (x) Security concerns will be mitigated by the provision of CCTV surveillance at the walkway entrances and other access points. Lighting will be provided along the walkway at night. Neighbouring property owners will have the option of a boundary fence and/or selected plantings to act as a barrier between their property and the walkway.
- (xi) Stormwater discharges will be reduced and specific harbour bed erosion controls installed.

## 9.4 Railway Bridge Upgrade Project

### 9.4.1 Construction Effects

#### 9.4.1.1 Sediment and Other Discharges

Potential discharges to the harbour may occur from the following construction activities associated with the upgrade of East Coast Main Trunk Railway Bridge No. 71:

- Widening of the causeway at the eastern (Matapihi) end of the railway bridge;
- Pile driving (for both temporary and permanent piles);
- Leakage from material excavated from within the permanent piles;
- Displaced water during concrete pumping into the permanent pile casings;
- Minor leakages of cement or sediment from pier and walkway construction (these are considered to be de minimis);
- Removal of temporary piles at the completion of works.

#### ***Erosion and Sediment Control***

As previously outlined, a separate Erosion and Sediment Control Plan (ESCP) has been prepared for the coastal reclamation sections of the Southern Pipeline project, including the widening of the existing railway causeway (refer Report No. 54<sup>102</sup>, Appendix V). The ESCP details good practise measures required to provide control of erosion and sediment discharges in the Coastal Marine Area during construction. The ESCP will form part of the comprehensive Construction and Environmental Management Plan for the Southern Pipeline project (refer Section 9.6 of this AEE).

With regard to the railway causeway widening (reclamation) works, the proposed works will be long but their narrow width means that the site will be comparatively small. This small area will have a flat surface consisting of non-erodible rock fill, and the potential levels of sediment generation expected from the works will therefore be low. The comprehensive construction measures and methodology discussed in the ESCP are expected to further reduce this level of sediment generation. Only low quantities of

<sup>102</sup> Erosion Management Ltd, Report No. 54 *Tauranga City Council – Southern Pipeline – Erosion and Sediment Control Plan – Coastal Reclamation*, 16 August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

sediment are therefore anticipated to be discharged from the site after treatment through the proposed sediment control measures.

A floating sediment curtain or floating silt fence will be positioned approximately 2m away from the toe of the reclamation works. Although these types of fences may be less efficient than land based sediment control measures because of tidal and wave energy, they will still retain a significant portion of any sediment that may be generated from the works. However, the primary emphasis will be placed on using construction methods that minimise the generation of sediment. This includes using clean, graded rock fill material with minimal fines. Material placed to widen the causeway will be compacted as soon as possible to avoid the potential for dislodgment.

Although minimised, any discharged sediment is expected to be fine particulate and colloidal material arising from clay sized particles and very fine silts. This material will take a long time to settle, and the low to moderate energy environment of the local coastal environment is expected to keep this fine material in suspension and disperse it over a wide area. Natural flocculation of sediment particles will occur because of the saline environment of the local Tauranga Harbour, but the widely dispersed nature of the sediment means that the low levels anticipated from the works are unlikely to have any detrimental effect on the ecosystems in the area (refer also Section 9.4.1.7 of this AEE).

This material may however temporarily degrade local water clarity because the discharge from the sediment retention measures is likely to be turbid. However, this will be to an inter-tidal environment that often has poor clarity, particularly during storm events. Any effect that may occur on the clarity of this receiving environment is expected to be local in nature, short lived and have no significant effect on the aquatic life.

Overall, it is considered that the potential sediment loss from the proposed causeway widening (reclamation) works is low, and is likely to be insignificant in relation to a very much larger receiving environment that is naturally turbid.

It is notable that the quantity of sediment generated by the railway bridge pier excavation works will be significantly less than if the submarine pipeline harbour crossing option were adopted (refer Sections 6.3.3 and 9.5.1.1 of this AEE).

In addition to implementing the ESCP for reclamation works, best practice methodology will be utilised to minimise fugitive discharges and to contain, treat, and/or collect contaminants for disposal. The following points are relevant:

- While pile driving will generate local bed disturbance and sediment entrainment, these effects will be short-term and localised. No significant adverse effects are therefore anticipated.
- During pile excavations the clam shell bucket will be emptied into a water tight truck for settlement of the solids prior to disposal of the material off-site at an approved cleanfill location. The settled liquid will be treated similarly to other dewatering discharges prior to discharge to the harbour (probably via a vertical dropper pipe in mid channel). However, small volumes of sediment-laden water are likely to escape and discharge into the harbour.

### **Other Discharges**

Water displaced from the pile casings during the tremie concrete placing process would be contaminated by silt and alkaline cement. The options for managing this discharge are:

- Settlement of suspended material, then discharging the water into the sea; or
- Removing it via suction to a tanker truck for off-site disposal.

The volume of water displaced would be approximately 100m<sup>3</sup> for each of the 30 piles, at a maximum rate of approximately 20m<sup>3</sup> per hour. The work would be intermittent over the 2 year construction period, with 1 to 2 piles being poured per month.

## Section 9

# Assessment of Environmental Effects and Mitigation

If the contaminated water is to be discharged into the harbour, then the option of dosing it to reduce its high alkalinity has also been considered. This would require the transportation, storage and handling of a neutralising agent (acid) within the coastal environment, which poses its own risks for adverse effects on the environment. The intention is therefore to rely on the diluting effect of the harbour waters, without dosing prior to discharge. The effects of this discharge are considered in detail in Section 9.4.1.7 of this AEE.

Some machinery will need to remain above the CMA for the duration of construction – for example, the large crane to be operated along the temporary construction staging. This large machinery will therefore need to be re-fuelled and serviced in situ. The accidental discharge of fuels and lubricants from construction machinery will be managed by:

- Bunding around fuel and lubricant tanks on barges and in construction areas near the CMA;
- Conducting regular machinery inspections and maintenance to ensure leaks are avoided;
- Providing a spill cleanup kit on site at all times in case of minor spillages.

### 9.4.1.2 Dust

As with the construction of the foreshore walkway embankment, construction of the railway causeway widening will involve the placement of a large volume of clean stone. Unlike the foreshore walkway area, however, there are no residences in close proximity to the works that could potentially be affected by dust nuisance.

The potential for dust to enter, and potentially adversely affect, the marine environment will be minimised by the standard dust mitigation measures to be put in place as part of the Construction and Environmental Management Plan. Consequently the effects are considered to be no more than minor.

### 9.4.1.3 Noise

The railway bridge upgrade works are located within the CMA. There are no rules in the Regional Coastal Environment Plan relating to noise from construction work carried out within the CMA. Rule 20.2.4(a) of the Coastal Plan applies to normal day-to-day operations in the CMA, and not to short-term construction noise.

A noise assessment has been undertaken for the proposed works and recommends that noise from construction carried out within the CMA should be required to comply with the Construction Noise Standard NZS6803:1999 (refer Report No. 61<sup>103</sup>, Appendix Y). Such an approach would be consistent with the accepted noise limits for construction of the landward component of the Southern Pipeline (and other development) within Tauranga City.

Upgrading of the railway bridge and widening of the causeway will require the following noise-generating construction activities:

- Earthworks machinery for causeway widening.
- Driving piles (both temporary and permanent).
- Internally excavating the pile casings.
- Dropping concrete plugs to the bottom of the inner casings. Then using a heavy hammer to drive the plugs.

---

<sup>103</sup> Design Acoustics Ltd, Report No. 61 *Noise Report for Southern Pipeline*, 23 July 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

- Placing a steel reinforcing cage inside the piles.
- Pumping concrete into the pile casings.
- Pumping out displaced water.
- Preparing construction joints.

Depending on the location of the piling, noise levels of 75-90 dBA Lmax are predicted at the nearest affected residential or rural dwellings. Assuming long-term duration of construction work (greater than 20 weeks) there is potential for piling to exceed the 85 dBA Lmax noise limit set in the Construction Noise Standard (NZS6803:1999) which applies between 7:30 am and 6 pm (refer Report No. 61).

Consent is therefore sought for the application of the Construction Noise Standard for all construction in the CMA and for specific levels of noise emissions where compliance with NZS 6803 cannot be achieved. This will relate primarily to the installation of temporary piles for the staging and to pile-driving for the main piles. Although not of long duration and being carried out during day time, the impact component is likely to be unsettling to residents, especially as the work moves closer to the western shore. In addition, because the sea tends to limit attenuation, even the activity of excavation machinery during construction of the causeway widening could cause a nuisance in certain circumstances.

NZS 6803 provides a range of mitigation measures, including the provision of noise management plans and liaison with affected residents. A draft Noise Management Plan is appended to Report No. 61 (refer Appendix Y). The construction contractor will be required to supply a finalised Construction Noise Management Plan prior to commencement of the work, to include selection of quiet machinery, programming of noisy work to suit adjacent activities to the extent practicable, and selection of appropriate work techniques to minimise noise. The Construction Noise Management Plan must be provided to Environment Bay of Plenty and the Chief Executive Officer of Tauranga City Council (or nominee), that demonstrates how the provisions of NZS 6803:1999 Acoustics – Construction Noise will be met.

### 9.4.1.4 Vibration

Marshall Day Acoustics has undertaken a desktop review of the piling operations for the railway bridge upgrade, in order to predict the vibration effects on the closest buildings in the vicinity (refer Report No. 66<sup>104</sup>, Appendix Y). Of particular concern is the Harbourside Restaurant, because of its proximity (about 20m from the nearest pile) to the proposed works and the relative age of the building's sub-floor structure and piles. Other commercial buildings in the vicinity were also included in the assessment as concerns had been raised during the consultation process.

The German DIN 4150:1999 Standard for assessing short-term vibration on structures and the results of geotechnical investigations undertaken in the vicinity of the Harbourside Restaurant were used to predict the vibration effects of piling. The predicted vibration levels indicate that compliance with the recommended vibration criteria at the Harbourside Restaurant is likely for vibration piling activities. However, the percussive pile driving operations associated with pre-cast concrete placement may produce higher vibration velocity levels that could exceed the criteria. The vibration effects on other commercial buildings in the area are predicted to be no more than minor.

The following actions are therefore proposed in terms of monitoring and reducing the potential vibration effects on the Harbourside Restaurant during piling operations:

- A condition survey of the restaurant building will be conducted prior to the commencement of piling, with continued inspections at periodic intervals during construction;

<sup>104</sup> Marshall Day Acoustics Ltd., Report No. 66 *Tauranga Rail Bridge Construction Vibration*, 3 August 2007



## Section 9

# Assessment of Environmental Effects and Mitigation

- Vibration will be measured during construction;
- A Vibration Management Plan will be prepared and implemented should the vibration monitoring or condition surveys indicate any problems during construction;
- There will be regular liaison with the owner of the restaurant throughout the construction period.

### 9.4.1.5 Traffic

#### ***Effect on Road Traffic***

The effects of the railway bridge upgrade works on vehicle traffic, other road users and pedestrians in Matapihi Road are expected to be minimal, as most of the construction work will be based on the (widened) railway causeway and the bridge.

Construction traffic is anticipated to comprise approximately 10 to 20 truckloads per day of construction material (and possible small amounts of removal of waste fill) to and from the construction site, plus delivery of the lengths of pipeline after completion of the bridge works.

The site entry point for construction traffic is likely to be Matapihi Road, with some minor access necessary from The Strand. The small number of truck movements (about 2 per hour) means the impact on local traffic on Matapihi Road or The Strand will be negligible.

A more detailed traffic management assessment will be carried out once the design of the railway bridge upgrade and pipeline crossing is finalised. A Traffic Management Plan will be developed by the contractor as a part of the works.

It is intended that the existing walkway across the railway bridge and causeway will remain open for pedestrian and cycle access during construction. However, closure or access restrictions may be required for short periods for safety reasons. Public consultation and notices will advise users of any access restrictions.

It is expected that The Strand carpark will be closed during the construction period. Outside of working hours, provision will be made for parking for patrons of the Harbourside Restaurant.

#### ***Effect on Train Operations***

The existing railway bridge is crossed by, in the order of, 25-30 trains per day. There is an imperative to keep the line open for this traffic to the greatest extent possible and to minimise disruption to individual train movements. Apart from being impractical, the level of train traffic is also the reason why the railway itself cannot be used for the delivery of construction materials.

The arrangements needed for the continued operation of the railway network place significant constraints on the works.

Toll Holdings has been advised of the works through established channels by ONTRACK in relation to the bridge and causeway works. Obligations will be placed upon contractors to facilitate Toll's continued uninterrupted use of the line. This may affect the timing of some aspects of the work, for example, requiring night work when it would otherwise not be undertaken.

There is a need to minimise the number of vehicle movements across the railway line, and particularly to provide an area where large vehicles can safely turn and manoeuvre without potentially blocking the line. This necessitates constructing a vehicle manoeuvring area off the track, on the southern (estuary) side. In order to minimise the impact on the harbour, the turning area will be constructed in part on the widened causeway and in part on a temporary approximately 35m radius staging area comprising a 7m grid of steel piles, the same as for the rest of the temporary piled staging.

## Section 9

# Assessment of Environmental Effects and Mitigation

### **Effect on Harbour Traffic**

Provision will be made for marine traffic in the navigable estuary channel during the bridge upgrade works. The existing speed limit of 5 knots will apply. A wider span (13m) will be provided along the temporary bridge staging works to retain a navigable channel sufficient for the Tauranga Rowing Club and other recreational boat users. Details of the consultation with the Rowing Club are provided in Section 7 of this AEE.

#### **9.4.1.6 Effects on Harbour Hydrodynamics**

A field investigation and numerical modelling study was undertaken by ASR Ltd (ASR) to determine the potential hydrodynamic effects associated with construction of the Southern Pipeline harbour crossing options. A second phase of investigation related to the proposed Railway Bridge Upgrade project – including the effects of both the temporary and new permanent piers to be constructed as part of the bridge works (refer Report No. 72<sup>105</sup>, Appendix H).

The following summarises ASR's assessment of the hydrodynamic effects associated with the temporary construction works. The effects of the permanent works, including the railway causeway widening, are addressed in Section 9.4.2.2 of this AEE.

Numerical modelling studies indicate that the temporary construction piles required for the bridge upgrade works will temporarily alter the flow characteristics, in both the existing bridge configuration and the proposed new configuration (with the permanent bridge piers installed). The temporary piles will not significantly alter the overall sediment transport regime, but will contribute to a rearrangement of the existing scour hole geometry around the existing bridge piers. It is possible that the extent of the scour holes will widen and deepen. ASR recommends that observations be carried out around the base of the bridge at three monthly intervals during construction to measure the scour. Scour protection could be placed around the existing bridge piers if the need arises. Such protection would consist of rocks or geotextile mats.

The possible effects of the temporary 35m diameter turning platform at the eastern abutment of the railway bridge were also investigated. The presence of the turning platform piles has the potential to impact on the flow velocity and patterns as the ebb tide currents are forced to run east to west along the railway causeway. For this reason ASR recommended that the edge of the platform be located at least 15m east of the tip of the causeway. This will put the platform in an area of overall shallower water, lower current velocities and inside the area shadowed by the causeway during flood tides. This recommendation has been adopted (refer Drawing No. S-602-011 Rev. 4).

#### **9.4.1.7 Ecology**

Cawthron Institute has assessed the ecological effects associated with construction of the railway bridge upgrade option (refer Report No. 38<sup>106</sup>, Appendix J).

##### **Subtidal Ecology**

The construction methodology proposed for both the temporary staging work and new railway bridge piles will minimise both the benthic area directly disturbed and the amount of excavated material introduced

---

<sup>105</sup> ASR Ltd, Marine Consulting and Research, Report No. 72 *Southern Pipeline Estuarine and Hydrodynamic Physical Process Assessments*, August 2007

<sup>106</sup> Cawthron Institute, Report No. 38 *Benthic Ecological Survey for the Proposed Tauranga Southern Pipeline Harbour Crossing*, August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

into harbour waters. Where physical disturbance of channel bed soft-sediment habitat is unavoidable, recovery is expected to be rapid following completion of the project.

The subtidal benthic environment is currently well flushed by tidal currents and the substrate is relatively dynamic in nature over much of the channel area. The estuarine character of this environment also results in benthic communities that are naturally tolerant of short-term turbidity increases. This, coupled with the consistently low sediment organic carbon and contaminant levels, suggests that no significant impacts are likely to arise from sediment re-suspension during the temporary and localised construction activities.

### ***Intertidal Ecology***

Less than 0.2 hectare of intertidal seagrass (*Zostera*) habitat on the eastern shoreline will be unavoidably lost during the proposed causeway widening and pipeline trenching works. Because it is anticipated that significant impacts from the construction works will be kept to within a relatively narrow margin around the construction footprint, the total seagrass area potentially affected is very small relative to that existing in the harbour as a whole. Seagrass beds represent a habitat of high biological diversity and productivity, providing an important habitat for a range of organisms. Seagrass is also known to be relatively sensitive to mechanical disturbance and recovery, where it occurs, is mostly slow. This habitat has been in decline in Tauranga Harbour over recent decades, from causes mostly attributable to human activities within the catchment. To ensure that the causeway widening and pipeline installation works will lead to no further degradation of this habitat in the wider channel or harbour area, efforts will be made to avoid or minimise damage to adjacent seagrass beds outside the area directly impacted by construction activities. In addition to implementation of the specialised Erosion and Sediment Control Plan, any route used to cross the intertidal sandflat with equipment, materials or project personnel will be restricted to narrow corridors which exclude, where possible, existing areas of seagrass habitat.

### ***Sediment Transport/Discharge***

Most of the harbour channel benthic area comprises a relatively dynamic sediment environment. It is therefore expected that both intertidal and subtidal benthic communities will adjust rapidly to any localised changes in sediment texture, erosion and accretion arising from the construction works.

### ***Fish Movement***

Construction activities will not create a barrier to fish movement within the harbour channel and no longer-term effects on harbour fish populations are anticipated.

### ***Discharge of Pier Casing Water***

As outlined in Section 9.4.1.1 of this AEE, one option for handling the water displaced from the pile casings during the tremie concrete placing operation is to provide for settlement of suspended material, and then discharge the water into the sea. The diluting effect of the harbour waters would then be relied upon to reduce the high alkalinity of this cement laden water.

Cawthron Institute has investigated the effects of discharging the pier casing water, and the results of this investigation are provided as an addendum to Report No. 38<sup>107</sup> (refer Appendix J). The following is a summary of Cawthron's key findings.

Seawater pH is typically in the range of 8.0 – 8.3 in New Zealand coastal waters. The pH of estuarine waters such as in the Tauranga Harbour is more variable than that of the open sea, being more typically in the range 7.5 – 8.4. There are no current official guidelines for limiting pH changes in sea waters, but

---

<sup>107</sup> Cawthron Institute, Report No. 38 *Benthic Ecological Survey for the Proposed Tauranga Southern Pipeline Harbour Crossing*, August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

the Australian and New Zealand (ANZECC 2000) guideline documents refer to pH changes in sea waters being maintained within the range of 8.0 to 8.4. The earlier ANZECC (1992) guidelines used a criterion whereby, in marine waters, the pH should not be permitted to vary by more than 0.2 units from the normal or background values. Based on the latter, in order to avoid significant adverse ecological effects, a pH change of more than 0.2 units resulting from a discharge should be avoided outside an appropriate mixing zone boundary.

A settled effluent of seawater which has been in contact with fresh cement may have a pH approaching 11 and would require a dilution of 200:1 in a marine receiving environment before a pH shift of 0.2 units or less is attained.

Both the Bay of Plenty Regional Coastal Environment Plan and the RMA provide for a zone of “reasonable mixing” where non-compliance with consent limits and/or water quality standards is allowable, provided that adverse effects observed within such a mixing zone would satisfy the condition of being “no more than minor”.

To provide the best environmental outcome for the railway bridge upgrade project, discharge of the settled effluent should occur over a period of significant ebb tidal flow (e.g. for no more than four hours beginning one hour into the ebb). The proposed dimensions for a mixing zone beyond which a 200:1 dilution should be achieved are as follows:

- No greater than 120m wide (33% of the channel width at the bridge location) and situated to avoid bank and channel bed contact.
- No more than 300m down-current of the discharge point.

Preliminary dispersion modelling indicates that, in order to minimise the size (and specifically the length) of the zone of non-compliance with applicable guideline limits, the discharge should be configured to maximise initial dilution providing the recommended spatial limits are met. This can be achieved by discharging at a rate of no more than 2L/s through a vertically mounted diffuser on the down-current (northern) face of one of the temporary staging piles. Dilution calculations have been confirmed by ASR (refer Report No. 72<sup>108</sup>, Appendix H).

To minimise discharge plume contact with benthic habitats, it is proposed that the lowest port of the discharge diffuser be positioned no less than 3m above the channel bed.

### 9.4.1.8 Effects on Protected and Significant Trees

There are no protected or significant trees affected by the Railway Bridge Upgrade project.

### 9.4.1.9 Archaeological Sites

An archaeological assessment was undertaken for the harbour crossing section of the Southern Pipeline route (refer Report No. 50<sup>109</sup>, Appendix U). The assessment concluded that construction of this section of the pipeline (including the railway bridge harbour crossing option) will not impact on any recorded archaeological features, and it is unlikely that unrecorded features would be encountered during construction. According to New Zealand Archaeological Association records there are no recorded archaeological sites within the waters of the Tauranga Harbour that would be affected by this section of the pipeline.

---

<sup>108</sup> ASR Ltd, Marine Consulting and Research, Report No. 72 *Southern Pipeline Estuarine and Hydrodynamic Physical Process Assessments*, August 2007

<sup>109</sup> Archaeology B.O.P, Report No.50 *Archaeological Assessment-Tauranga City Council-Southern Pipeline Preferred Route Option-Section 2 Harbour Crossing*, January 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

### 9.4.2 Operational Effects

#### 9.4.2.1 Positive Effects

There are a number of long-term positive environmental effects associated with the Railway Bridge Upgrade project. The benefits of a combined scheme which includes upgrading the railway bridge and attaching the Southern Pipeline and a new walkway/cycleway are summarised as follows:

- The project will facilitate the establishment of the Southern Pipeline, the positive effects of which have already been outlined in Section 9.2.2.1 of this AEE;
- No additional major structures are required to be placed in the CMA;
- Upgrading the bridge will secure rail access for the long-term future on an existing structure of regional and national importance;
- The provision of a modern walkway/cycleway to replace the existing antiquated footbridge will assist in giving effect to TCC's transportation strategy.

#### 9.4.2.2 Effects on Harbour Hydrodynamics

ASR undertook numerical modelling to assess the effects of placing permanent new bridge piers and widening the existing causeway at the eastern (Matapihi) end of the bridge (refer Report No. 72<sup>110</sup>, Appendix H).

The modelling suggests that the interaction between the existing bridge piles and the proposed new 1.8m diameter (adjoining) piles is likely to deepen the edges of the existing scour holes in the channel direction, and the maximum depth of the pier scour is likely to be changed. As the scour hole development process is governed by tidal hydraulic processes, the combined maximum scour hole could be greater than the predicted maximum scour depth of 2.5m for the individual piles. Given that the new piles are designed to support the railway bridge by replacing the weight carrying role of the existing piles, and with the new piles being embedded some 40m – 50m deep, ASR has concluded that no scour protection will be required.

In terms of environmental effects, construction of the new piles is unlikely to cause any unforeseen problems and the impacts would be minor and localised. The modelling undertaken by ASR indicates that widening the existing railway causeway will slightly change flow velocities in the region immediately adjacent to the causeway, and that this will be observed at the extreme western tip of the causeway and along the southern side.

#### 9.4.2.3 Ecology

##### **Subtidal Ecology**

The benthic ecological survey undertaken by Cawthron Institute (refer Report No. 38<sup>111</sup>, Appendix J) assessed the long-term ecological effects of the railway bridge upgrade option. The new bridge piles and associated structures will effectively double the area of subtidal hard substrates in this part of the harbour channel. It is expected that these new surfaces will be colonised by an encrusting community similar to that observed on the existing bridge piers. It is noted, however, that as with any new hard substrate in a

---

<sup>110</sup> ASR Ltd, op cit.

<sup>111</sup> Cawthron Institute, Report No. 38 *Benthic Ecological Survey for the Proposed Tauranga Southern Pipeline Harbour Crossing*, August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

harbour environment, the potential exists for colonisation by invasive organisms introduced by shipping vectors.

### ***Intertidal Ecology***

Widening of the existing railway causeway by approximately 15m to carry the Southern Pipeline will result in the loss of less than 1 hectare of an intertidal area of relatively clear sand with no ecological features of special importance. Impacts outside the proposed embankment extension footprint are expected to be both minor and temporary in nature with rapid recovery following project completion.

The survey undertaken by Cawthron Institute identified no significant shellfish resources in the intertidal area expected to be affected by the project. The sometimes high densities of cockles occurring on the eastern (Matapihi) sand flats were found to be present only as juveniles of smaller than the typically harvestable size. Furthermore, this population is not expected to be significantly adversely affected by construction of the pipeline harbour crossing.

#### **9.4.2.4 Cultural Impact**

A Cultural Impact Assessment (CIA) was undertaken for the Southern Pipeline harbour crossing options (refer report No.69A<sup>112</sup>, Appendix Z). Attachment of the Southern Pipeline to the railway bridge is preferred over the submarine pipeline harbour crossing option on cultural grounds. Preliminary concept drawings of the pipeline attachment and walkway structures received support from the iwi and hapu consulted.

The walkway attached to the existing railway bridge has a cultural association with the Maori community who fund raised for half the cost of construction. Local kaumatua also officially opened and blessed this walkway.

Upgrading of the railway bridge would see the construction of new piles adjacent to existing bridge piers. Whilst these would be permanent structures in the seabed they are associated with existing pier alignments. The Southern Pipeline itself would not be in the water, rather underneath a walkway. This separates the pipeline with human waste from the harbour waters and as such would not affect the mauri. The iwi and hapu consulted with seek the use of high quality materials and a high standard of construction in order to minimise any risk of pipeline failure. The railway bridge option provides a high level of accessibility to repair and maintain the pipeline.

The Matapihi estuarine flats are associated with traditional harvesting of shellfish, however, the ecological survey did not identify any harvestable species. The extensions to the causeway will cause some long term loss of foreshore and seabed.

It will be important to ensure that the fill material used for widening of the railway causeway is not sourced from a site of significance to Maori or a wahi tapu.

#### **9.4.2.5 Landscape and Visual Effects**

An assessment of natural character, landscape and visual effects has been undertaken (refer Appendix CC<sup>113</sup>). The following is a summary of effects for the proposed railway bridge upgrading and causeway widening works.

---

<sup>112</sup> Boffa Miskell Limited, Report No. 69A *Southern Pipeline - Cultural Impact Assessment of Cross Harbour Options, Tauranga Harbour*, May 2007

<sup>113</sup> Boffa Miskell Limited, *The Southern Pipeline Project – Tauranga, Memorial Park to Matapihi Section – Assessment of Natural Character, Landscape and Visual Effects*, 21 August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

### **Railway Bridge Upgrade**

Due to graffiti and 'left over' structures, and the limited width of the existing walkway/cycleway, it is considered that visual amenity values within this character area are currently low. The proposed bridge upgrading works (including attachment of a new walkway/cycleway) and ongoing maintenance will ensure that a positive outcome is achieved, whilst maximising the potential to fully appreciate the harbour environment experience from this unique perspective.

### **Railway Causeway Widening**

Similar to the railway bridge character area, existing public access along the railway causeway consists of a very narrow path, which is poorly maintained and at a relatively low level (below the railway line). Flax overgrowth and the predominance of weeds and rubbish further reduce the experiential quality and amenity for users. It is considered that the proposal, whilst being a larger structure in the coastal environment, will improve the amenity values of the area for users of the walkway/cycleway without adversely affecting natural character and landscape values which are considered to remain similar to those which currently exist.

#### **9.4.2.6 Light Spill and Glare**

The effects of the proposed night time lighting for the new walkway/cycleway along the upgraded railway bridge have been assessed in terms of light spill and glare (refer Report No. 60<sup>114</sup>, Appendix X), in relation to train operations. The assessment concludes that for both the proposed medium level lighting (lights mounted on 3.5m high poles) and low level lighting (lights mounted at a height of approximately 1m), the requirements of AS 4282: *Control of the obtrusive effects of outdoor lighting* can be met in terms of minimising glare and light spillage on to the adjoining railway line. In particular, there would be no glare effects which could distract train drivers.

#### **9.4.2.7 Amenity Values**

The upgrading of East Coast Main Trunk Railway Bridge No. 71, and attachment of the Southern Pipeline and a new walkway/cycleway to the bridge, will not significantly alter the visual amenity values of this part of Tauranga Harbour. The provision of an improved walkway/cycleway will provide a significant amenity, with enhanced and more aesthetically pleasing access between the Tauranga CBD and Matapihi.

### **9.4.3 Summary of Mitigation Measures**

Proposed mitigation measures in respect of the construction and operational effects of the Railway Bridge Upgrade project, including attachment of the Southern Pipeline and a new walkway/cycleway, are summarised as follows:-

- (i) A Construction and Environmental Management Plan will be prepared for the works.
- (ii) Appropriate erosion and sediment control measures will be implemented and maintained during construction of the railway causeway widening. This includes the implementation of a specialised Erosion and Sediment Control Plan for the works.
- (iii) If water displaced from the pile casings during concrete placement is to be discharged into the harbour, then settlement of solids will occur prior to discharge and the rate and timing of the discharges will be controlled to minimise potential effects.

---

<sup>114</sup> URS New Zealand Limited, Report No. 60, *Southern Pipeline – Walkway Lighting (Rail Bridge and Matapihi Causeway)*, 26 June 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

- (iv) Dust generation will be reduced by using clean, graded rock fill material with minimal fines for the causeway widening works. Appropriate dust suppression and containment measures will otherwise be implemented in order to minimise dust entering the marine environment.
- (v) Construction noise will be mitigated by requiring compliance with the Construction Noise Standard NZS 6803 wherever practicable. This may include limiting working hours and where practicable using equipment with noise controls.
- (vi) With regard to vibration effects during piling, condition surveys of the Harbourside Restaurant will be undertaken (both before and during construction), vibration will be measured during construction, a Vibration Management Plan will be prepared, and there will be ongoing liaison with the owner of Harbourside Restaurant during construction.
- (vii) A detailed Construction Traffic Management Plan will be prepared.
- (viii) At detailed design and construction stage, high quality materials will be selected and a high standard of construction implemented for the Southern Pipeline component of the project in order to minimise any risk of future pipeline failure.
- (ix) The existing railway bridge piers will be monitored for scour.

## 9.5 Submarine Pipeline Alternative for Harbour Crossing

### 9.5.1 Construction Effects

#### 9.5.1.1 Sediment and Other Discharges

##### ***Submarine Pipeline Placement***

As outlined in Section 6.3.3 of this AEE, construction of the submarine pipeline harbour crossing option for the Southern Pipeline involves activities that will release sediment and other bed material into the harbour estuary. These activities include:

- Preparatory dredging of the seabed.
- Settling of the pipelines into the seabed using 'jetting' or other excavation methods.

These activities will inevitably disturb sediment. For the preparatory dredging, sand and other bed material would be locally displaced and this activity will not involve the excavation or removal of large amounts of material. Jetting of the two submarine pipelines into the bed will displace a significant volume of material (up to 20,000m<sup>3</sup> of sediment being ejected into the water column) and it is likely to create sediment plumes within the estuary. It is anticipated that the bulk of the displaced material would be deposited somewhere between 2m to 5m from the pipeline centrelines, but this depends on tidal currents, the particular equipment being used, and the rate at which jetting is progressed. The best practicable option will be taken to minimise the spread of material. This could, for example, include limiting the speed at which the jetting machine is progressed along the pipelines and using shrouds to minimise the spread of the displaced material.

The ecological effects of sediment release into the estuary during construction are addressed in Section 9.5.1.6 of this AEE.

##### ***Near-Shore Excavations***

As also outlined in Section 6.3.3 of this AEE, temporary works within the CMA will include the construction and excavation of sheet piled cofferdams (or similar structures) at the eastern and western ends of the submarine pipeline. Silt curtains would be installed in the foreshore and railway causeway areas likely to be affected by sediment from the cofferdam excavations, although much of the 4m to 6m deep excavation will be in sands.



## Section 9

# Assessment of Environmental Effects and Mitigation

Options for the storage and disposal of material excavated in the near-shore area include:

- (i) Stockpiling locally inside additional temporary sheet piled enclosures;
- (ii) Stockpiling outside of, and immediately adjacent to, the southern sides of the cofferdams;
- (iii) Placing the material in 'geobags' immediately adjacent to the cofferdams;
- (iv) Stockpiling in a floating barge for re-use (for smaller volumes);
- (v) Barging offsite to an already consented spoil site.

It is proposed to replace as much of the excavated material, which is predominantly sands, as practicable. To the extent possible, sands would be replaced in the same layers in which they were excavated. The most likely method for material storage (and re-use) would be geobags. Additional, appropriately sized, sand would be imported to make up any shortfall of material on completion of the works.

Erosion and sediment controls (as set out in Report No. 54<sup>115</sup>, Appendix V) would be implemented where practicable (namely outside areas with high tidal currents where the controls would be impractical).

### **Railway Causeway Widening**

As with the railway bridge harbour crossing option, the submarine pipeline crossing also requires widening of the existing East Coast Main Trunk railway causeway. For the submarine pipeline option, however, a new reclaimed embankment would be constructed only two thirds of the way along the southern side of the causeway (as opposed to the full length of the causeway for the bridge upgrade option – refer Drawing No. G-601-027 Rev. C).

Erosion and sediment control measures for the railway causeway widening have already been outlined in Section 9.4.1.1 of this AEE and will equally apply for the submarine pipeline option (refer also Report No. 54<sup>116</sup>, Appendix V).

### **Other Discharges**

The accidental discharge of fuels and lubricants from construction machinery will be managed by:

- Bunding around fuel and lubricant tanks on barges and in construction areas near the CMA;
- Conducting regular machinery inspections and maintenance to ensure leaks are avoided;
- Truck refuelling operations being conducted off-site;
- Providing a spill cleanup kit on site at all times in case of minor spillages.

#### **9.5.1.2 Dust**

Construction of the railway causeway widening will involve the placement of a large volume of clean stone. There are no residences in close proximity to the works that could potentially be affected by dust nuisance.

<sup>115</sup> Erosion Management Ltd, Report No. 54 *Tauranga City Council – Southern Pipeline – Erosion and Sediment Control Plan – Coastal Reclamation*, 16 August 2007

<sup>116</sup> Erosion Management Ltd, Report No. 54 *Tauranga City Council – Southern Pipeline – Erosion and Sediment Control Plan – Coastal Reclamation*, 16 August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

The potential for dust to enter, and potentially adversely affect, the marine environment will be minimised by the standard dust mitigation measures to be put in place as part of the Construction and Environmental Management Plan. Consequently the effects are considered to be no more than minor.

### 9.5.1.3 Noise

A noise assessment has been undertaken for the construction of the submarine pipeline harbour crossing option (refer Report No. 61<sup>117</sup>, Appendix Y).

As outlined in Section 6.3.3 of this AEE, various works would take place at the Matapihi end of the cross-harbour route (e.g. construction of a reclaimed embankment to widen the railway causeway, submarine pipeline fabrication). The noise assessment concludes that noise generated from these works would comply with the daytime construction noise limits at nearest rural dwellings at the end of Matapihi Road.

Construction will require piling activities, including sheet piling for the coffer dams and the placement of temporary guide piles along the pipeline route. However, the placement of these piles would generate less noise than the heavy piling activities associated with the railway bridge upgrade option.

The preferred construction methodology is to pull each of the two submarine pipelines across the seabed (from east to west) using winches mounted adjacent to the foreshore at the bottom of First Avenue, on the western side of the harbour and possibly on the eastern side. Noise level information for a typical winch indicates that noise from a hydraulic winch would be 70-75 dBA Leq at nearest dwellings (on the western side) and this would comply with the daytime noise limits for "typical duration" of construction work (Construction Noise Standard NZS6803: 1999).

However, winching the pipelines into place may need to extend into the night time period, and in this case winch noise would not be able to comply with the stringent 45 dBA Leq noise limit. Acoustic mitigation such as a barrier or enclosure around the winch is likely to reduce noise by 10-20 dBA (and bring noise down to 55-60 dBA), but this is still unlikely to comply with the night time noise limit. The noise assessment recommends preparation of a Noise Management Plan for this aspect of the work (refer Report No. 61 in Appendix Y).

### 9.5.1.4 Traffic

The effects of the submarine pipeline works on vehicle traffic, other road users and pedestrians in Matapihi Road are expected to be minimal, as the construction work will take place in the temporary work areas and railway causeway area at the far end of Matapihi Road (refer Drawing No. G-601-022 Rev. D).

Construction traffic would mainly comprise trucks delivering the lengths of steel pipeline for fabrication and rock to be used for the railway causeway widening, as well as small quantities of waste fill that might be removed by truck. The number of truck movements is estimated 10 to 20 truckloads per day. The main entry point for construction traffic to the site would be Matapihi Road, with some minor access necessary from The Strand. The small number of truck loads (about 2 per hour) means the impact on local traffic on Matapihi Road or The Strand would be negligible.

A more detailed traffic management assessment would be carried out once the design of the submarine pipeline is finalised, should this pipeline harbour crossing option be progressed instead of the railway bridge upgrade option. A Traffic Management Plan would be developed by the contractor as a part of the works.

It is intended that the existing walkway along the railway causeway would remain open for pedestrian and cycle access during construction. However, closure or access restrictions may be required for short periods for safety reasons. Public consultation and notices would advise users of any access restrictions.

<sup>117</sup> Design Acoustics Ltd, Report No. 61 *Noise Report for Southern Pipeline*, 23 July 200

## Section 9

# Assessment of Environmental Effects and Mitigation

Provision would be made for marine traffic in the navigable estuary channel during the submarine pipeline works. All temporary piles would be fitted with navigational aids (markings and lights) in accordance with the Tauranga Harbourmaster's requirements.

### 9.5.1.5 Effects on Harbour Hydrodynamics

ASR has assessed the potential hydrodynamic effects associated with the construction of the submarine pipelines (refer Report No. 72<sup>118</sup>, Appendix H). Construction of the pipelines is predicted to alter the hydrodynamics and sediment transport in the main channel, but only at a very local scale for a short period. The impact of the pipelines by trapping sand or changing current flows during placement would be negligible, except locally at the pipe where currents passing over the top temporarily accelerate while the pipe remains exposed above the surface of the harbour bed (i.e. prior to being 'jetted' into the seabed). No effects on the nearby railway bridge are anticipated. Refer also to Section 9.5.2.2 of this AEE regarding operational hydrodynamic effects.

### 9.5.1.6 Ecology

#### **Subtidal Ecology**

The benthic ecological survey undertaken by Cawthron Institute (refer Report No. 38<sup>119</sup>, Appendix J) indicates that sediment and other bed material displaced by the submarine pipeline 'jetting' operation (refer Section 6.3.3 of this AEE) could result in the loss by smothering of benthic communities occupying an area of the channel bed in the order of 5-6 hectares. The natural tolerance of estuarine communities to a certain amount of sediment deposition is likely to limit significant smothering impacts to within 100m of each pipeline and lead to relatively rapid recolonisation of the area. The strong tidal currents would serve to disperse the unconsolidated deposits over time and the natural sediment circulation in the Town Reach channel would eventually re-establish a physical benthic habitat and community structure similar to that currently existing.

A mud fraction of up to 10% in channel bed sediments would result in a significant turbidity plume from the pipeline jetting operation. While the suspended solids concentration of this plume is likely to exceed that of natural turbidity events along its centre-line, it is expected that the relatively short duration of the jetting operation (days rather than weeks), the dispersive tidal current flows and the natural tolerance to high turbidity of estuarine communities would result in no more than minor and relatively localised ecological impacts.

#### **Intertidal Ecology**

With regard to the railway causeway widening works, less than 0.2 hectare of intertidal seagrass (*Zostera*) habitat on the eastern shoreline will be unavoidably lost during the proposed reclamation and trenching works. Because it is anticipated that significant impacts from the construction works will be kept to within a relatively narrow margin around the construction footprint, the total seagrass area potentially affected is very small relative to that existing in the harbour as a whole. Seagrass beds represent a habitat of high biological diversity and productivity, providing an important habitat for a range of organisms. Seagrass is also known to be relatively sensitive to mechanical disturbance and recovery, where it occurs, is mostly slow. This habitat has been in decline in Tauranga Harbour over recent decades, from causes mostly attributable to human activities within the catchment. To ensure that the

---

<sup>118</sup> ASR Ltd, Marine Consulting and Research, Report No. 72 *Southern Pipeline Estuarine and Hydrodynamic Physical Process Assessments*, August 2007

<sup>119</sup> Cawthron Institute, Report No. 38 *Benthic Ecological Survey for the Proposed Tauranga Southern Pipeline Harbour Crossing*, August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

railway causeway widening and pipeline installation works will lead to no further degradation of this habitat in the wider channel or harbour area, efforts will be made to avoid or minimise damage to adjacent seagrass beds outside the area directly impacted by construction activities. In addition to implementation of the specialised Erosion and Sediment Control Plan, any route used to cross the intertidal sandflat with equipment, materials or project personnel will be restricted to narrow corridors which exclude, where possible, existing areas of seagrass habitat.

### 9.5.1.7 Effects on Protected and Significant Trees

There are no protected or significant trees directly affected by the submarine pipeline harbour crossing option for the Southern Pipeline.

### 9.5.1.8 Archaeological Sites

An archaeological assessment was undertaken for those sections of the Southern Pipeline route applicable to the submarine pipeline harbour crossing option (refer Report No. 50<sup>120 121</sup>, Appendix U). This includes the landward area at the eastern end of First Avenue and the harbour area between the Te Papa and Matapihi Peninsulas.

Notably, Maranui Pa was located on the eastern side of Devonport Road in the vicinity of First Avenue. However, the Pa's exact location remains unclear and it has likely been largely destroyed by twentieth century commercial and residential development in this area. Midden deposits may extend down slope in the vicinity of the construction area for the submarine pipeline, but no archaeological features were noted during the January 2007 field survey. Any surviving remains relating to the Pa would have high archaeological significance and archaeological monitoring is recommended during all earthworks. Protocols already developed for other parts of the Southern Pipeline project will also apply to this section of the route.

Otherwise construction of the submarine pipeline harbour crossing option would not impact on any recorded archaeological features, and it is unlikely that unrecorded features would be encountered during construction. According to New Zealand Archaeological Association records there are no recorded archaeological sites within the waters of the Tauranga Harbour that would be affected by this section of the pipeline.

## 9.5.2 Operational Effects

### 9.5.2.1 Positive Effects

The submarine pipeline harbour crossing option forms part of, and will facilitate completion of, the Southern Pipeline project. The Southern Pipeline is a strategic and long term (over 100 years) asset for the people of Tauranga. Its purpose is to contain and transfer untreated wastewater from the southern and central parts of the City to Te Maunga WWTP for treatment prior to discharge through the ocean outfall at Papamoa.

The pipeline will prevent sewage contamination in the harbour and will enhance public health and environmental protection.

---

<sup>120</sup> Archaeology B.O.P, Report No.50 *Archaeological Assessment-Tauranga City Council-Southern Pipeline Preferred Route Option-Section 1 Te Papa Peninsula*, January 2007

<sup>121</sup> Archaeology B.O.P, Report No.50 *Archaeological Assessment-Tauranga City Council-Southern Pipeline Preferred Route Option-Section 2 Harbour Crossing*, January 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

The system will be designed to relieve capacity issues at Chapel Street and the Judea trunk mains and thereby provide an opportunity to maximise the existing assets.

The submarine pipelines will be buried and therefore not have any significant visual effects.

### 9.5.2.2 Effects on Harbour Hydrodynamics

ASR assessed the long-term implications of placing submarine pipelines in the location shown on Drawing No. G-105-034 Rev. D (refer Report No. 72<sup>122</sup>, Appendix H). Investigations undertaken by ASR suggest that the existing railway bridge and causeway influence estuary flow patterns to a distance of approximately 40m – 50m both upstream and downstream. The proposed route for the submarine pipelines falls outside this area of influence. Bathymetry transects further north or south from the railway bridge show natural fluctuations in the channel depths of 1m – 2m over the 100 year design life of the pipelines. Fluctuations appear to be greater than 2m on the steeper channel flanks. In order to avoid the likelihood that sections of pipeline may become exposed over their design life, burial depths of at least 2m would be required. It is however proposed to re-check the predicted fluctuations in the harbour bed over the next year to reconfirm ASR's assessment. The final burial depth of the pipeline would be reconfirmed following this survey work. Should the pipeline become exposed *and* it appears that a 'free-span' could develop, then the pipeline could be re-buried by the deposition of sand or other material as a mitigation measure. Regular dive inspections would be conducted along the pipeline as a monitoring measure (refer Section 6.3.5 of this AEE).

With regard to the widening of part of the East Coast Main Trunk railway causeway, the modelling undertaken by ASR indicates that widening will slightly change flow velocities in the region immediately adjacent to the causeway, and that this will be observed at the extreme western tip of the causeway and along the southern side.

### 9.5.2.3 Ecology

The benthic ecological survey undertaken by Cawthron Institute (refer Report No. 38<sup>123</sup>, Appendix J) indicates that widening of the existing railway causeway by less than 15m to carry the Southern Pipeline will result in the loss of less than 1 hectare of an intertidal area of relatively clear sand with no ecological features of special importance. Impacts outside the proposed embankment extension footprint are expected to be both minor and temporary in nature with rapid recovery following project completion.

The survey identified no significant shellfish resources in the intertidal area expected to be affected by the project. The sometimes high densities of cockles occurring on the eastern (Matapihi) sand flats were found to be present only as juveniles of smaller than the typically harvestable size. Furthermore, this population is not expected to be significantly adversely affected by construction of the pipeline harbour crossing.

---

<sup>122</sup> ASR Ltd, Marine Consulting and Research, Report No. 72 *Southern Pipeline Estuarine and Hydrodynamic Physical Process Assessments*, August 2007

<sup>123</sup> Cawthron Institute, Report No. 38 *Benthic Ecological Survey for the Proposed Tauranga Southern Pipeline Harbour Crossing*, August 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

### 9.5.2.4 Cultural Impact

A Cultural Impact Assessment (CIA) was undertaken for the Southern Pipeline harbour crossing options (refer Report No. 69A<sup>124</sup>, Appendix Z). The submarine pipeline option is not considered appropriate on cultural grounds.

The submarine pipeline would cut directly across the harbour bed and the traditional channel created by the moving of Mauao from the great forest of Hautere to its current position. A pipeline carrying human waste permanently submerged in the Tauranga Harbour would not be considered appropriate from a cultural perspective. Any potential risk of failure and the ability to repair and maintain in this area would need to be carefully considered as failure would cause significant offence to tangata whenua and diminish the mauri of the Tauranga harbour. The Matapihi estuarine flats are associated with traditional harvesting of shellfish. It is likely that the pipeline trench will involve considerable earthworks. This may have significant effects on the habitat. This said, the ecological survey did not identify any harvestable species. The extensions to the railway causeway will cause some long term loss of foreshore and seabed. As the submarine pipeline option is significantly under water, there is likely to be no permanent visual impact.

### 9.5.2.5 Landscape and Visual Effects

The majority of the submarine pipeline crossing would be either beneath the harbour or below ground (within the widened railway causeway) and once constructed will have no landscape and visual effects. Any associated above-ground structures would not be prominent and will have no more than minor visual effects. The western valve chamber, adjacent to the foreshore at the bottom of First Avenue, would be predominantly below-ground (refer Drawing No. G-601-024 Rev. C). The above-ground portion could be finished in a recessive colour and/or screen planted. The eastern valve chamber would be constructed within the widened railway causeway and would not protrude above the top of the causeway embankment (refer Drawing No. G-601-025 Rev. C).

The landscape and visual effects of the railway causeway widening have otherwise already been addressed in Section 9.4.2.5 of this AEE.

### 9.5.2.6 Amenity Values

The majority of the submarine pipeline crossing would be either beneath the harbour or below ground (within the widened railway causeway) and once constructed would have no effect on amenity values. In those locations where associated above-ground structures (e.g. western valve chamber) are required, the visual impact and any other operational effects would be no more than minor.

## 9.5.3 Summary of Mitigation Measures

Proposed mitigation measures in respect of the construction and operational effects of the submarine pipeline harbour crossing, are summarised as follows:-

- (i) A Construction and Environmental Management Plan will be prepared for the works.
- (ii) Appropriate erosion and sediment control measures will be implemented and maintained during construction of the submarine pipeline crossing. This includes the implementation of a specialised Erosion and Sediment Control Plan for the coastal reclamation works required to widen the railway causeway and construct cofferdams. In addition, the best practicable option

---

<sup>124</sup> Boffa Miskell Limited, Report No. 69A *Southern Pipeline - Cultural Impact Assessment of Cross Harbour Options, Tauranga Harbour*, May 2007

## Section 9

# Assessment of Environmental Effects and Mitigation

will be used to minimise the spread of sediment and other bed material displaced by the pipeline 'jetting' operation. This could, for example, include limiting the speed at which the jetting machine is progressed along the pipelines and using shrouds to minimise the spread of the displaced material.

- (iii) Dust generation will be reduced by using clean, graded rock fill material with minimal fines for the reclamation (causeway widening) works. Appropriate dust suppression and containment measures will otherwise be implemented in order to minimise dust entering the marine environment.
- (iv) Construction noise will be mitigated by requiring compliance with the Construction Noise Standard NZS 6803. This may include limiting working hours and where practicable using equipment with noise controls. A Noise Management Plan will be prepared for pipeline winching operations.
- (v) A detailed Construction Traffic Management Plan will be prepared.
- (vi) Ongoing bathymetry and diver surveys of the seabed and pipeline.

## 9.6 Management Plan Framework

The following management plan framework is proposed for undertaking the Southern Pipeline, Memorial – Strand Walkway, and Railway Bridge Upgrade projects in order to avoid, remedy or mitigate adverse environmental effects. The management plan framework comprises a series of plans to be prepared prior to construction, during construction and after construction.

Management plans to be prepared prior to the commencement of construction will describe the design detail of the permanent works, the proposed methodology for construction of those works, and the proposed monitoring regime to check the effectiveness of those works.

The management processes and methods to be undertaken during construction will be set out in detail in a comprehensive Construction and Environmental Management Plan (CEMP).

The CEMP will be prepared prior to commencement of works in accordance with the proposed conditions of the designation and resource consents. It will either be a single, all encompassing plan, or will comprise a series of individual plans as nominated in proposed conditions.

In summary, the topics to be incorporated within the CEMP will include:

- Construction programme;
- Management responsibilities;
- Communications with residents, businesses and other stakeholders;
- Health and safety of construction staff and the public;
- Site access via land and water;
- Site management, including materials storage, office and parking locations;
- Methods of work on land and in the CMA;
- Refuelling and maintenance;
- Construction noise, dust and vibration;
- Area-based noise management plans where night work is proposed;
- Traffic management, pedestrian and cyclist access and safety;

## Section 9

# Assessment of Environmental Effects and Mitigation

- Erosion and sediment control;
- Management of contaminated land;
- Management of archaeological and waahi tapu discoveries; and
- Contingency plans (e.g. for management of any accidental spills).

Additional management plans to be prepared during construction will cover the detail of works to occur at particular stages and/or at a particular locality (e.g. detailed Erosion and Sediment Control Plans, or the Traffic Management Plans).

Plans for the ongoing operational management of permanent works (e.g the Maintenance and Operation Plan for the sewerage system) will occur after completion of works.



## Section 10

## Consent Requirements

### 10.1 Introduction

A number of consents are required for the proposed works under the regional and district plans. The scope of the consents ranges from minor details, for example, where the Southern Pipeline will connect into the railway bridge at Pier 1, to an earthworks consent for the entire pipeline route.

The relevant regional plans are:

- Operative Bay of Plenty Regional Land Management Plan, February 2002
- Operative Bay of Plenty Regional Coastal Environment Plan, July 2003
- Operative Bay of Plenty Regional Air Plan, December 2003
- Proposed Bay of Plenty Regional Water and Land Plan (as at April 2007).<sup>125</sup>

The relevant District Plan is the Operative Tauranga District Plan, February 2005.

The key provisions of these plans, and the consent requirements under each, are discussed in the following sections.

### 10.2 Operative Bay of Plenty Regional Land Management Plan

The Regional Land Management Plan (LMP) has been largely superseded by the Proposed Bay of Plenty Regional Water and Land Plan, which is largely being treated as operative as appeals are settled. The only provisions now relevant to this project are the provisions relating to wetlands.

Wetlands are defined as:

*“permanently or intermittently wet areas, shallow water, and land and water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions.”*

Wetland modification is defined as:

*“enhancement, adjustment of the water table, drainage, excavation or infilling of the wetland or burning or destruction of the wetland vegetation.”*

There are provisions of the plan that affect particularly the section of the Southern Pipeline route between State Highways 2/29 and the Te Maunga Wastewater Treatment Plant, an area nearby on the western side of SH 2/29, the WWTP and the wetland associated with the Waimapu Stream, where a pipe bridge is to be constructed across the stream.

### 10.3 Proposed Regional Water and Land Plan

Significant parts of this plan are effectively operative, including most rules relevant to this project. These relate particularly to Section 9.11 – Activities in the beds of rivers, streams and lakes, and Section 9.11 – Structures and earthworks. The wetlands provisions have been amended by resolution of appeals but await sign-off by the Environment Court before they can be treated as operative.

The Proposed Regional Water and Land Plan (PRWLP) as at 13 July 2007 was used for this assessment of consent requirements.

<sup>125</sup> This plan is becoming operative as appeals are settled, see s19A Resource Management Act.

## Section 10

## Consent Requirements

### 10.3.1 Earthworks

Where trenching will be required over the entire land route and where clean fills that do not produce leachate are classed as earthworks, a comprehensive consent is sought for the project, as a discretionary activity. This will accommodate to a degree the present uncertainty over particular sections of the route where final decisions over the location of the pipeline have not yet been made.

A discretionary activity consent under Rule 1C will also include earthworks in the Erosion Hazard Zone, on slopes greater than 35 degrees and on coastal land between 0-20m of the CMA on the coastal margin (the areas at First Avenue and Elizabeth Street, and the access off Fifth Avenue East onto the beginning of the foreshore reclamation if this option were selected), and the rest of the project on account of the volumes involved.

Dust during construction would be subject to a construction management plan, so that the provisions of the regional air quality plan (including dust management) would be met.

### 10.3.2 Pipelines Under or Over Streams

The following rules are treated as operative (s19(1)):

- Rule 56 Permitted – lines, cable or pipeline under the bed of a river, stream or lake.
- Rule 56A Discretionary restricted – lines, cables, or pipelines under the bed of a river, stream or lake.
- Rule 58 Permitted – culverts and single span bridges constructed by district or city councils or Transit NZ within urban areas or within 1 kilometre upstream of urban areas;
- Rule 58A Controlled – culverts constructed by district or city councils or Transit within urban areas or within one kilometre upstream of urban areas where fill height is greater than 1.5m and no greater than 2.5m, or multiple culverts in the crossing;
- Rule 58B Discretionary restricted – culverts constructed by district or city councils or Transit within urban areas or within one kilometre upstream of urban areas where fill height is greater than 2.5m; and
- Rule 59D Controlled – culverts with fill height is greater than 1.5m and no greater than 2.5m, or multiple culverts in the crossing.
- Rule 59E Discretionary restricted – culverts where fill height is greater than 2.5m.
- Rule 61 Permitted – service crossings attached to bridges.

#### **What Constitutes a Stream**

The definition of a stream is relevant in the consideration of the various planning controls, particularly as they relate to crossings, for example, of culverts and drains.

The regional plan defines *modified watercourse*, *drain*, *farm drain*, *roadside drain*, *Land Drainage Canal*, and *river*. A river includes intermittent watercourses but not ephemeral flowpaths.

For the purposes of the Southern Pipeline project, the following pertains: drains, roadside drains, farm drainage canals that are part of a land drainage scheme are not rivers, streams or modified watercourses and need not be considered in terms of consenting for stream crossing purposes. This may affect a range of culverts along the pipeline route. This interpretation would seem to mean that crossing the drains at Patterson's Farm and Te Maunga need not be consented; nor would crossing the drain at Matapihi as it relates to the road. Nor would it apply to Maleme Street - East to Oropi Road and West (although the latter is a little unclear as to its meaning).

## Section 10

## Consent Requirements

Modified watercourses are modified streams and rivers, and included within their meaning would be land drainage canals through wetland and swamp that follow a historic natural watercourse or natural drainage channel. This would include culverts, where the drainage path is not necessarily changed, but the stream has been channelled. The relevant rule is Rule 58 below, which is subject to a range of conditions.

**“Rule 58 Permitted – Culverts and Single Span Bridges Constructed by District or City Councils or Transit NZ within urban areas or within 1 kilometre upstream of urban areas**

*The use, erection, reconstruction, placement, alteration or extension of a culvert or single span bridge in, on, under or over the bed of a river, stream, or lake, where the structure:*

- 1 Is constructed and maintained by a district or city council, or its contractors, exercising its functions under the Local Government Act 1974, or by Transit NZ or its contractors, exercising its functions under the Transit New Zealand Act 1989, and*
- 2 Is located within an Urban Area or Settlement, or within one (1) kilometre upstream of any Urban Area or Settlement, and*
- 3 Is not located where the adjacent land slope is greater than 35°; and*
- 4 Is not located in a wetland,*

*is a permitted activity subject to the following conditions:*

*[...] “*

The conditions relate to numerous matters including design requirements, timing of works and construction methodology.

If the conditions to the permitted activity cannot be met, the activity would become a discretionary activity under Rule 71, part of which is to be treated as operative and part of which is subject to a Variation.

Some doubt has arisen, however, because when the Rules 58 and 60 (related to non-urban areas) are compared, the latter, although otherwise word-for-word contains specific reference to pipe bridges. The implication is therefore, that (even if unintended) pipe bridges in urban areas are not provided for as permitted activities. Application for discretionary activity consent is therefore being made in relation to Oropi Road and Poike Road as a precaution, in case there is a technical difference between a single span bridge and a pipe bridge.

### **Oropi Road**

Being on the eastern side of Oropi Road, no consent needs to be sought, as it is classed as a drain.

### **Poike Road**

At Poike Road, where a small diameter line between the Poike pump station and the Maleme Street pump station will cross the Waimapu Stream, the activity would also be discretionary, and a wetland consent will be required under the LMP and PRWLP Rule 80. This will be determined at the stage of detailed design, but at present it is anticipated that the pipeline will be partly in the wetland, but not in the bed of the stream.

Application could also be made for a pipeline under the bed of a river in terms of Rule 56. Overall, however, the option of a pipe crossing under the bed of a river or stream is less attractive at this location than elsewhere because of the prospect of technical difficulties associated with submerged vegetation.

## Section 10

## Consent Requirements

### Fraser Street

The Southern Pipeline at Fraser Cove will run along the north-west margin of the street. Two crossings under culverts that run under Fraser Street are proposed. The culvert at the south end is being constructed by another contractor who will place two ducts under the culvert to provide for the insertion of single (or twin) pipes. This would fall within the *permitted activity* Rule 58.

### 10.3.3 Wetlands

Wetlands are defined in the plan as including:

*“permanently or intermittently wet area, shallow water, and land water margins that support a natural ecosystem of plants.”*

Further,

*“For the avoidance of doubt, the term ‘wetland’ applies to waterbodies, and intermittently wet areas. The term does not apply to dry land that does not support a natural ecosystem of plants and animals that are adapted to wet conditions, and that occurs within an area commonly referred to in its entirety as a wetland. ..*

*The edge of a wetland (i.e. where a wetland becomes land) should be determined by a person with appropriate expertise.”*

A range of photos are provided to give guidance for the determination of what constitutes a wetland, but the advice of an expert is also recommended.

The proposed pipeline will cross one and maybe two wetlands, depending on its final configuration. These are defined in the District Plan as Special Ecological Site (SES) 11 and SES 12 although the extent of the latter particularly should be determined by survey<sup>126</sup>. Presently in relation to SES 12, the pipeline is shown to cross an area of wetland, but it is known that the area has been highly modified during composting operations. The pipeline crosses through the northern tip of SES 11.

Discretionary activity consent will be required for the modification of a wetland. The rule is awaiting sign-off by the Environment Court. Rule 80 Discretionary – Modification of a Wetland specifies a range of circumstances where applications for a discretionary activity must be made. These include:

*“... modification of a wetland not otherwise addressed by (1) to (4) above (which the activity proposed is not) and causes any of the following adverse effects on the wetland:*

*Degradation of water quality, including through the discharge of sediment or other contaminants.*

*Changes to water flow and quantity, and drainage.*

*Erosion of land and soil resources where the activity causes or induces erosion that is persistent or requires active erosion control measures. Includes land instability, sour, severe pugging, and damage to margins, banks or land within the wetland.*

*Where the wetland is in the bed of a stream, river or lake, the disturbance, removal, damage, or destruction of any plant or the habitats of any plants or animals in the wetland.”*

<sup>126</sup> Richard Hart, *Te Maunga Wetlands – Conservation Area Management Strategy and Enhancement Plan*, 19 April 2006 notes that the wetland in the area extends beyond the confines of SESs 11 and 12, but a walkover suggests that the pipeline will be outside of the wetland.

See also Hamish Dean, *Te Maunga Wetlands: Ecological assessment and management recommendations*, February 2006, Natural Environments Limited.

## Section 10

## Consent Requirements

The explanation to the Rule notes:

*“... It is appropriate to restrict modification activities as wetlands are particularly vulnerable to adverse effects. Although it is recognised that maintenance and enhancement activities may be necessary to sustain the wetland, it is necessary to ensure that large scale enhancement activities are carried out to avoid, remedy or mitigate any adverse effects on wetland values.*

*When assessing resource consent applications under this rule, Environment Bay of Plenty will have particular regard to, but not be limited to, the following provisions:*

*Objective 4, 5, 6, 8, 46, 59*

*Policy 5, 11, 14, 15, 17, 18, 19, 20, 21, 83, 114, 115, 116*

*Method 12, 16, 17, 19, 20, 46, 50 ”*

The objectives, policies and methods are assessed in Section 11 of this AEE.

### 10.3.4 Summary of Consent Requirements Under LMP and PRWLP

The land use consents required for earthworks, stream works and wetlands under the LMP and PRWLP are set out in Table 10-1 below.

**Table 10-1 Summary of land use consents required for earthworks, stream works and wetlands**

	Activity	Provision	Location
1	Earthworks	Rule 1C PRWLP	<u>Discretionary</u> . Earthworks for entire project; including beach renourishment above MHWS; works in Erosion Hazard Zone First Avenue or Elizabeth Street only; and works within 0-20 m MHWS.
2	Stream crossings	Rule 71 PRWLP	<u>Discretionary</u> . Pipe bridge crossing of Waimapu Stream.
3	Wetlands	10.5.7.1 LMP	<u>Discretionary</u> . Waimapu Stream between end of Poike Road and Oropi Road, SSL 113 and SSL 30 where route passes SH2/29 towards Te Maunga; also area wetland immediately opposite approximately position NZ Topographic U14 Tauranga 857937; also U14 909853 at Matapihi where the reclamation comes ashore.
4	Wetlands	Rule 80 (not in effect) PLWMP	<u>Discretionary</u> . Waimapu Stream between end of Poike Road and Oropi Road, SSL 113 and SSL 30 where route passes SH2/29 towards Te Maunga; also area wetland immediately opposite approximately position NZ Topographic 260 U14 Tauranga 857937; also NZ Topographic 260 U14 909853 at Matapihi where the reclamation comes ashore.

All of the activities are discretionary activities.

## 10.4 Regional Coastal Environment Plan

The main consent requirements for the Southern Pipeline, Memorial – Strand Walkway and Railway Upgrade projects are under the Operative Bay of Plenty Regional Coastal Environment Plan 2003 (RCEP).

The RCEP identifies the Tauranga Harbour as an area of *significant conservation and cultural value* and the harbour has also been ranked as an *outstanding site of specific wildlife interest*. The harbour also meets the International Union for the Conservation of Nature (IUCN) criteria as a wetland of international importance for wading birds.

The consents required under the RCEP are summarised later in this section of the AEE.

## Section 10

## Consent Requirements

### 10.4.1 Coastal Permits for Works in Coastal Marine Area

Coastal permits are required for the following activities:

- Memorial – Strand Walkway;
- Upgrading of the East Coast Main Trunk Railway Bridge No. 71 (Note: the applicant for these consents is ONTRACK);
- Pipeline and walkway/cycleway attached to the railway bridge;
- Submarine pipeline First Avenue or Elizabeth Street to widened causeway;
- Widening of causeway and placement of pipeline (Note: this will be required either for a pipeline on the railway bridge or the submarine pipeline harbour crossing option, although the latter would be reduced in length);
- Submarine pipeline between widened causeway and Matapihi Road (if landward option unavailable);
- Discharges of stormwater to the CMA;
- Discharges of contaminants to the CMA; and
- Activity consents for the various elements.

The coastal permits required for these works are summarised in the following tables. Where consents would be obtained under the same rules, but would be differentiated by conditions (for example, duration) separate consents are sought.

**Table 10-2 Summary of Coastal Permits Required for Memorial - Strand Walkway**

	Activity	Rule	Classification
1	<b>Stormwater discharges</b> – any discharge except as expressly provided for or prohibited by other rules in this plan, including trench dewatering.	Rule 2 9.4.2(b)	<u>Discretionary</u> : This rule applies where the application cannot meet the permitted activity rule of 9.2.4(a) that the suspended solids be less than 150g/m <sup>3</sup> , the discharge water be substantially free of grease, oil, scums and foam; and the maximum discharge less than 80 L/sec of a five-year return period storm.  Relates to trench dewatering, redirected existing stormwater discharges, stormwater during construction, and solids such as debris from redundant structures in the CMA, for example, seawalls.
2	<b>Occupation of CMA</b> – Occupation of seabed by reclamation in coastal marine area (CMA) owned by the Crown or vested in EBOP	Rule 17 12.2.4(a)	<u>Discretionary</u> . Includes occupation, construction, use, and maintenance of reclamation for pipeline and walkway/cycleway, including continued maintenance for those parts below MHWS.
3	<b>Occupation of CMA</b> – Occupation of seabed by structure in CMA owned by the Crown or vested in EBOP	Rule 17 12.2.4(a)	<u>Discretionary</u> . Includes occupation, construction, operation, use, and maintenance of structures including boat ramps, steps, cantilevered decks, sewerage and stormwater structures.
4	<b>Structures for public access</b> – Erection or placement of structures within permanently navigable harbour water for the specific purpose of providing public access to and along the CMA.	Rule 24 13.2.4(b)	<u>Discretionary</u> . For construction, use, operation and maintenance of structures including for example, boat ramps, steps to water's edge, and cantilevered decks.
5	<b>Structures</b> Erection, reconstruction, placement, alteration, extension,	Rule 31	<u>Discretionary</u> . For construction, use, operation and

## Section 10

## Consent Requirements

	Activity	Rule	Classification
	demolition, removal or abandonment of structures in the Coastal Management Zone not expressly provided for or prohibited by other rules of the plan	13.2.4(h)	maintenance of <ul style="list-style-type: none"> <li>ramps to be constructed seaward of reclamation;</li> <li>also for any work associated with seawall between Sixth and Seventh Avenue once temporary reclamation removed,</li> <li>Southern Pipeline itself,</li> <li>pump stations and pipelines associated with redirected 150mm sewer including construction, operation, use, maintenance. Includes elements of demolition.</li> </ul>
7	<b>Disturbance and deposition</b>	14.2.4(e)	<u>Discretionary</u> . For disturbance and deposition associated with construction of structures and reclamation. Includes scraping of top 500mm of seabed prior to reclamation and for burial of geotextile edge of seaward margin of reclamation.
8	<b>Disturbance and deposition</b>	14.2.4(e)	<u>Discretionary</u> . For boreholes for further geotechnical investigations along shoreline located 0 - 15 m from property boundaries. Route is NZS 260 Tauranga U14 894844 to 897856.
9	<b>Reclamation</b>	NZCPS S1.1(c)	Activity of reclaiming foreshore or seabed which equals or exceeds one hectare, extends greater than 100m in any direction is a <u>restricted coastal activity</u> . Also includes tidying up of coastal edge around the unauthorised reclamation at the 'Concourse' (SO 391193).
10	<b>Reclamation</b>	NZCPS S1.1(c)	<u>Discretionary</u> . Beach replenishment, including continued replenishment over life of consent. To be considered together with reclamation under NZCPS S1.1(c) above, as relates to a continuation of the same reclamation, and covers in part the seaward margin of the southern section of the reclamation.
11	<b>Disturbance and deposition</b>	Rule 45 14.2.4(b)	<u>Discretionary</u> . Beach replenishment between Sixth and Seventh Avenues including continued replenishment over the life of the consent where replenishment is not associated with the reclamation.
12	<b>Removal of reclamation</b>	15.2.4(c)	<u>Discretionary</u> . Relates to <ul style="list-style-type: none"> <li>removal of section between Sixth and Seventh Avenues at conclusion of project, and</li> <li>removal of wider construction reclamation back to finished contours at conclusion of project (generally reduction of seaward face batter from 1H:1V to 2H:1V or 3H:1V).</li> </ul>
13	<b>Noise</b> exceeding 45dBA L10; LMAX of lower of 75dBA or background noise plus 30 dBA	20.2.4(a)	<u>Discretionary</u> . The RCP contains noise rules in respect of activities and subject to NZS 6801:1991. The Plan does not however contain any rule or reference to construction noise, which is governed by NZS 6803.

The consents required for the Memorial – Strand Walkway in terms of the District Plan are set out in Table 10-9.

## Section 10

## Consent Requirements

**Table 10-3 Summary of Coastal Permits Required for Upgrading of Railway Bridge (ONTRACK)**

	Activity	Rule	Classification
1	<b>Discharges of contaminants</b> – Any discharge except as expressly provided for or prohibited by other rules in this plan. Relates to discharges during maintenance and construction.	Rule 2 9.2.4(b)	<u>Discretionary</u> Not expressly provided for as a permitted activity: <ul style="list-style-type: none"> <li>stormwater;</li> <li>discharges of sediment during pile driving, temporary pile removal, and pile excavation;</li> <li>discharge of wastewater from pile construction.</li> </ul>
2	<b>Occupation of CMA</b> by structure owned by the Crown or vested in EBOP.	Rule 17 12.2.4(a)	<u>Discretionary</u> Including occupation, construction, operation, use, and maintenance of temporary staging for purpose of upgrading bridge.
3	<b>Occupation of CMA</b> by structure owned by the Crown or vested in EBOP.	Rule 17 12.2.4(a)	<u>Discretionary</u> . For upgrading railway bridge, including occupation, construction, operation, use and maintenance of upgraded bridge.
4	<b>Reconstruction, alteration, or extension of structures</b> in the Coastal Management Zone not expressly provided for or prohibited by other rules of the plan	Rule 31 13.2.4(h)	<u>Discretionary</u> For upgrading/extending bridge.
5	<b>Reconstruction, alteration, or extension of structures</b> in the Mooring Zone not expressly provided for or prohibited by other rules of the plan	s77C RMA	<u>Discretionary</u> For upgrading/extending bridge
6	<b>Erection, reconstruction, placement, alteration, extension, demolition, removal or abandonment of structures</b> in the Coastal Management Zone not expressly provided for or prohibited by other rules of the plan	Rule 31 13.2.4(h)	<u>Discretionary</u> For temporary structures, for example: trestles, piles, superstructure and similar works associated with upgrading/extending bridge.
7	<b>Erection, reconstruction, placement, alteration, extension, demolition, removal or abandonment of structures</b> in the Mooring Zone not expressly provided for or prohibited by other rules of the plan	s77C RMA	<u>Discretionary</u> For temporary structures, for example: trestles, piles, superstructure and similar works associated with upgrading/extending bridge.
8	<b>Disturbance</b> and deposition on foreshore and seabed (excavate, drill, move, tunnel etc) including the removal of sand, shell or shingle.	Rule 45 14.2.4(b) Rule 50 14.2.4(e)	<u>Discretionary</u> Including removal of material for piling for permanent piles; and deposition of rock fill around existing piles for scour protection if required during construction.
9	<b>Disturbance</b> and deposition on foreshore and seabed (excavate, drill, move, tunnel etc) including the removal of sand, shell or shingle.	Rule 45 14.2.4(b) Rule 50 14.2.4(e)	<u>Discretionary</u> For piling for temporary piles.
10	<b>Noise</b> exceeding 45dBA L10; LMAX of lower of 75dBA or background noise plus 30 dBA	Rule 91 20.2.4(a)	<u>Discretionary</u> The RCP contains noise rules in respect of activities and subject to NZS: 6801: 1991. The Plan does not however contain any rule or reference to construction noise, which is governed by NZS 6803.  Also consent required for Best Practicable Option for piling.



## Section 10

## Consent Requirements

Overall, the consent for the upgraded railway bridge would be a discretionary activity.

**Table 10-4 Summary of Coastal Permits Required for Pipeline and Walkway/Cycleway Attached to Railway Bridge**

	Activity	Rule	Classification
1	<b>Discharges</b> – Any discharge except as expressly provided for or prohibited by other rules in this plan.	Rule 2 9.2.4(b)	<u>Discretionary</u> Discharges of untreated stormwater from walkway/cycleway that do not meet the permitted activity standards and discharges during construction, use, operation and maintenance.
2	<b>Occupation of air space</b> in the CMA	Rule 17 12.2.4(a)	<u>Discretionary</u> Including occupation, construction, use, operation and maintenance of pipeline and walkway/cycleway.
3	<b>Erection, reconstruction, placement, alteration, extension, demolition, removal or abandonment of structures</b> in the Coastal Management Zone not expressly provided for or prohibited by other rules of the plan	Rule 31 13.2.4(h)	<u>Discretionary</u> For construction, use, operation and maintenance of the pipeline and walkway/cycleway.
4	<b>Erection, reconstruction placement, alteration, extension, demolition, removal or abandonment of structures</b> in the Mooring Zone not expressly provided for or prohibited by other rules of the plan	s77C RMA	<u>Discretionary</u> There is no provision in the plan for structures other than moorings to be place in the Mooring Zone.
5	<b>Noise</b> exceeding 45dBA L10; LMAX of lower of 75dBA or background noise plus 30 dBA	Rule 91 20.2.4(a)	<u>Discretionary</u> The RCP contains noise rules in respect of activities and subject to NZS 6801: 1991. The Plan does not however contain any rule or reference to construction noise, which is governed by NZS 6803.

Overall the pipeline and walkway on the railway bridge would be a discretionary activity.

**Table 10-5 Summary of Coastal Permits Required for Submarine Pipeline**

	Activity	Rule	Classification
1	<b>Any discharge</b> except as expressly provided for or prohibited by other rules in this plan	Rule 2 9.2.4(b)	<u>Discretionary</u> This rule applies where the application cannot meet the permitted activity rule of 9.2.4(a) that the suspended solids less than 150g/m <sup>3</sup> , the discharge water be substantially free of grease, oil, scums and foam; and the maximum discharge less than 80 L/sec of a five year return period storm. <ul style="list-style-type: none"> <li>required for for dewatering the coffer dam for valve chamber construction and for dewatering of valve chamber excavations during construction; and,</li> <li>discharge of sediment laden coastal water from coffer dams.</li> </ul>
2	<b>Occupation</b> of CMA	Rule 17 12.2.4(a)	<u>Discretionary</u> Includes occupation, construction, use, operation, and maintenance of pipeline for wastewater purposes.
3	<b>Occupation</b> of CMA	Rule 17 12.2.4(a)	<u>Discretionary</u> Includes occupation, construction, use, operation, and maintenance for temporary structures.

## Section 10

## Consent Requirements

	Activity	Rule	Classification
4	<b>Erection</b> or placement of structures within permanently navigable harbour water for submarine cables and pipelines	Rule 23 13.2.4(b)	<u>Discretionary</u> For submarine pipeline and associated construction activity. Details of construction dependant on contractor but would include temporary structures to enable construction of the pipeline, including coffer dam on western side of harbour and guide piles.
5	<b>Erection</b> of temporary navigational aids and other structures associated with submarine pipeline construction.	Rule 31 13.2.4(h)	<u>Discretionary</u> Relates to guide piles to be placed in groups of three across harbour not in permanently navigable waters; and to other structures, including coffer dam on western tip of expanded causeway reclamation. All structures to be removed on conclusion of winching operation.
6	<b>Erection</b> or placement of structures within permanently navigable harbour water for submarine cables and pipelines in Mooring Zone.	s77C RMA	<u>Discretionary</u> For submarine pipeline and associated construction activity. Details of construction dependant on contractor but would include temporary structures to enable construction of the pipeline, including coffer dam on western side of harbour and guide piles.
7	<b>Erection</b> of temporary navigational aids and other structures associated with submarine pipeline construction in Mooring Zone.	s77C RMA	<u>Discretionary</u> Relates to guide piles to be placed in groups of three across harbour not in permanently navigable waters; and to other structures, including coffer dam on western tip of expanded causeway reclamation. All structures to be removed on conclusion of winching operation.
8	<b>Disturbance</b> of, deposition on, dredging of, or removal of sand (and shingle and shell) from foreshore or seabed	Rule 50 14.2.4(e)	<u>Discretionary</u> For uncontrolled sediment re-suspension and deposition during 'smoothing' of seabed prior to pipe laying; Also for uncontrolled sediment re-suspension and deposition during jetting in or pipe burial.
9	<b>Disturbance</b> of, deposition on, dredging of, or removal of sand (and shingle and shell) from foreshore or seabed	Rule 50 14.2.4(e)	<u>Discretionary</u> For temporary guide piles and coffer dams. Related to sediment removal from within coffer dams, such material to be deposited temporarily to geo-textile bags for re-interment on conclusion of work.
10	<b>Disturbance</b> of, deposition on, dredging of, or removal of sand (and shingle and shell) from foreshore or seabed	Rule 50 14.2.4(e)	<u>Discretionary</u> For additional boreholes for further geo-technical investigations. Route is 50m either side of proposed pipeline locations reference approximately NZ 260 U14 Tauranga 898855 to 904854.
11	<b>Noise</b> exceeding 45dBA L10; LMAX of lower of 75dBA or background noise plus 30 dBA	Rule 91 20.2.4(a)	<u>Discretionary</u> The RCP does not contain any rule or reference to construction noise which is governed by NZS 6803.
12	<b>Taking and diversion</b> of coastal water	Rule 13 10.2.4(d)	<u>Discretionary</u> Relates to jetting in operations where water is blasted under pressure into sediments in order to lower pipeline into trench on seabed; also includes diverting coastal water from coffer dams.

Overall, consent for a submarine pipeline is a discretionary activity.

Note also that s89 RMA applies, which contemplates, where the reclamation will result in new land being created in the district, that applications for resource consents be lodged and consented prior to the reclamation being undertaken (see Table 10-8). This is relevant for the valve chamber in the Matapihi side of the harbour that is proposed for the submarine pipeline. The valve chamber on the other side would be above MHWS.

## Section 10

## Consent Requirements

**Table 10-6 Summary of Coastal Permits Required for Widening of Causeway and Placement of Pipeline and Walkway/Cycleway thereon**

	Activity	Rule	Classification
1	<b>Discharges of contaminants</b>	Rule 2 9.4.2(b)	<u>Discretionary</u> This rule applies where the applicant cannot meet the permitted activity rule of 9.2.4(a) that the suspended solids be less than 150g/m <sup>3</sup> , the discharge of water be substantially free of grease, oil, scums and foam; and the maximum discharge less than 80 L/sec for a five-year return period storm. Relates to trench dewatering, and stormwater during construction.
2	<b>Occupation of CMA</b> by structure owned by the Crown or vested in EBOP.	Rule 17. 12.2.4(a)	<u>Discretionary</u> Includes occupation, construction, use, operation and maintenance of reclamation.
3	<b>Occupation of Coastal Marine Area</b> by structure owned by the Crown or vested in EBOP	Rule 17. 12.2.4(a)	<u>Discretionary</u> Includes occupation, construction, use, operation and maintenance of wastewater pipeline.
4	<b>Noise</b> exceeding 45dBA L10; LMAX of lower of 75dBA or background noise plus 30 dBA	Rule 91 20.2.4(a)	<u>Discretionary</u> The RCP contains noise rules in respect of activities and subject to NZS: 6801: 1991. The Plan does not however contain any rule or reference to construction noise which is governed by NZS 6803.
5	<b>Reclamation</b>	Rule 76 15.2.4(b) NZCPS S1.1(c)	Any activity reclaiming foreshore or seabed which equals or exceeds one hectare, extends greater than 100m in any direction is a <u>restricted coastal activity</u> .  Includes scraping of top 500 mm of seabed prior to reclamation and for burial of geotextile edge at seaward margin of reclamation.

The consent for widening of the causeway (reclamation) is a restricted coastal activity requiring Ministerial consent in relation to reclamation. All parts would require public notification.

Note also that title could be applied for from the Minister under section 355 and 355AA of the RMA for both the causeway and the Memorial – Strand walkway. However, this would be limited to 50 years. Granting of such title is entirely at the Minister's discretion and not part of this consenting regime.

In the alternative a registrable easement might be sought from the Minister of Lands in order to protect access to the pipeline and the public's access to the walkway/cycleway.

A s89(2) discretionary activity consent is also sought for the operation, use and maintenance of the reclamation for the purpose of the wastewater pipeline and walkway/cycleway, and for its use by the railway operator for maintenance of the railway and railway bridge, for those sections that are located within the district on completion of reclamation, see Table 10-8.

## Section 10

## Consent Requirements

**Table 10-7 Summary of Coastal Permits Required for Submarine Pipeline between Causeway and Matapihi Road and reclamation between end of Causeway and Matapihi Road <sup>127</sup>**

	Activity	Rule	Classification
1	<b>Discharges of contaminants</b>	Rule 2 9.4.2(b)	<u>Discretionary</u> This rule applies where the applicant cannot meet the permitted activity rule of 9.2.4(a) that the suspended solids be less than 150g/m <sup>3</sup> , the discharge of water be substantially free of grease, oil, scums and foam; and the maximum discharge less than 80 L/sec for a five-year return period storm. Relates to trench dewatering, and stormwater during construction.
2	<b>Occupation of CMA</b> by structure owned by the Crown or vested in EBOP	Rule 17. 12.2.4(a)	<u>Discretionary</u> . Includes occupation, construction, use and maintenance of the reclamation prior to its removal at completion of works.
3	<b>Occupation of CMA</b> by structure owned by the Crown or vested in EBOP	Rule 17. 12.2.4(a)	<u>Discretionary</u> Includes occupation, construction, use operation and maintenance of pipeline for wastewater purposes.
4	<b>Disturbance</b> of, deposition on, dredging of, or removal of sand (and shingle and shell) from foreshore or seabed	Rule 50. 14.2.4(e)	<u>Discretionary</u> Relates to trenching to seabed for burial of pipeline; and reinstatement on removal of reclamation.
5	<b>Damming and diversion of coastal water</b>	Rule 14, 10.2.4(e)	<u>Discretionary</u> Trenching down to natural foreshore would be required, along with trench shoring (similar to a coffer dam).
6	<b>Structures</b>	Rule 31 13.2.4(h)	<u>Discretionary</u> For pipeline buried through reclamation into seabed.
7	<b>Reclamation</b> of seabed	Rule 76. 15.2.4(b)	<u>Discretionary</u> For 10m strip on western side of unauthorised reclamation and a 35 m turning circle for trucks approaching/leaving causeway.
8	<b>Removal</b> of reclamation	15.2.4(c)	<u>Discretionary</u> Removal of all or part of reclamation post project.
9	<b>Noise</b> exceeding 45dBA L10; LMAX of lower of 75dBA or background noise plus 30 dBA	Rule 91 20.2.4(a)	<u>Discretionary</u> The RCP contains noise rules in respect of activities and subject to NZS: 6801: 1991. The Plan does not however contain any rule or reference to construction noise which is governed by NZS 6803.

This option may be needed if a satisfactory arrangement can not be made through private property to join Matapihi Road (refer Section 3.3.7 of this AEE). The activity of use and operation of the reclamation prior to its removal is subject to a s89(2) application (see Table 10-8).

**Table 10-8 Summary of Coastal Permits Required for reclamation south of Matapihi Road Pt 3A2A Matapihi**

	Activity	Rule	Classification
1	<b>Structures</b>	Rule 31 13.2.4(h)	<u>Discretionary</u> Seawall to accommodate reclamation, including its construction and maintenance.

<sup>127</sup> This option may be required if a satisfactory conclusion cannot be reached in respect of the land-based option whereby the pipeline would exit the causeway and run across the foreshore above MHWs before connecting with Matapihi Road.

Subsequent to construction of any submarine pipeline, the location will need to be Gazetted pursuant to the Submarine Cables and Pipelines Protection Act 1996, and shown on relevant hydrographic charts.

## Section 10

## Consent Requirements

	Activity	Rule	Classification
2	Reclamation of seabed	Rule 76 15.2.4(b)	<u>Discretionary</u> For 5m strip to protect eroding archaeological site.
3	Noise exceeding 45dBA L10; LMAX of lower of 75dBA or background noise plus 30 dBA	Rule 91 20.2.4(a)	<u>Discretionary</u> The RCEP contains noise rules in respect of activities and subject to NZS: 6801: 1991. The Plan does not however contain any rule or reference to construction noise which is governed by NZS 6803.

Note that no occupation consent is required, as the area is in a 'blue water' title, Pt 3A2A Matapihi.

If both reclamations described above are undertaken in tandem, the resulting reclamation might result in a restricted coastal activity consent being required. However, if the reclamation south of Matapihi Road were to follow the removal of the reclamation north of Matapihi Road, the benchmark would not be met.

### 10.5 Bay of Plenty Regional Air Plan

The plan became operative in December 2003. Rule 17 would generally apply. This provides that activities not subject to an express rule shall be a *permitted* activity subject to compliance with a number of conditions including visibility and odour. The specific condition relating to odour – Rule 17(b) – is that:-

*“The discharge must not result in objectionable or offensive odour... beyond the boundary of the subject property or into water; ...”*

In Rule 19(w)(i), the discharge of contaminants into air from 'municipal sewage treatment plants' is identified as a *discretionary* activity, but this specifically excludes discharges from sewage pumping stations (in which case Rule 17 applies).

Therefore, for any discharges to air from the project (in particular any pumping stations), consent would only be required if the discharge could not meet all of the conditions in Rule 17 of the Plan in which case the activity would be a *discretionary* activity (Rule 19(z)).

At all sites adequate treatment devices are proposed so that the permitted activity rule can be met. Should odour become an issue, further curative devices would be added to ensure that discharges fall within the permitted activity rule.

### 10.6 Tauranga District Plan – Land Use Consents

#### 10.6.1 Permitted Activities and Consents

The provisions of the Tauranga District Plan authorise many of the public utilities that may need to be laid within road margins and other areas, provided associated above ground structures are limited in size (see Chapter 24, especially Table 24-1).

#### ***New Pipelines***

New construction of pipelines is a permitted activity in terms of Table 24-1 being:-

*“Underground pipelines conveying water, stormwater, wastewater and associated pump stations (with above ground dimensions less than 50m<sup>2</sup> gross floor area)... including aerial crossings of bridges, structures or streams, and ancillary equipment, including regulator stations, but not compressor stations.”*

This is the case in virtually all areas except Conservation zoned land, where the above activities would be controlled activities; and in relation to the Maleme Street and Memorial Park pump stations where the above ground structures will be in excess of 50m<sup>2</sup> – in those situations, designations are proposed. The provision related to aerial crossings apply where the pipeline joins the railway bridge (if this option is used), as the bridge runs above land where it exits the embankment at the CBD end and begins its

## Section 10

## Consent Requirements

crossing of the estuary to the first pier that is located in the CMA. In terms of ancillary equipment, there would likely be air valves and associated odour control structures (biofilter beds or activated carbon).

If the pipeline is not underground it would be a discretionary activity in, among others, the Recreation A, Conservation, or any Business zones. This will affect small sections of the pipeline where the approach to the railway bridge is made, or a submarine pipeline entering or exiting the CMA. However, placing the pipeline in association with a bridge would bring it within the ambit of a permitted activity.

Although many roading and network utility activities are provided for as permitted activities in the Road Zone, provisions of overlay zonings also apply unless the land is designated for the proposed work. This has the potential to increase the number of resource consents required for the project as other district-wide controls apply.

### 10.6.2 Permitted Activity Standards for Pipeline Construction

#### *Pipeline Construction*

The permitted activities of new construction would have to comply with the standards applicable to permitted activities, in this case the conditions contained in Section 24.3.1 of the District Plan. Most of these do not apply in the Road Zone, but would be relevant where new construction was to be undertaken in the Conservation zone, principally in relation to setbacks from site boundaries and the height of above-ground structures, if any.

As the pipeline runs along the foreshore in the land identified as SO 391193, s89(2) consent is required for the land-use activity in unzoned land. An omnibus consent for all areas falling within the section's ambit is being sought, that is, for the Memorial – Strand walkway, SO 391193, the causeway reclamation, the Matapihi reclamation, and for the reclamation south of Matapihi Road for the protection of the archaeological site.

A disturbance consent is required for land affected by the Natural Character Coastal Environment provisions, in this case 20.2.2.2 and 22.2.2.2 at Pier 1 and within 60m of 1B1A Matapihi Road; and for use of the adjoining wetland for the same activity of a construction lay-down area. In addition, where above ground construction were undertaken in zones other than the road zone, buildings and structures facing most other zones would need to be set back 5 metres from the road boundary and landscape planting might be required. None of these would likely be of relevance unless odour control measures were of significant size.

Noise and disturbance conditions applicable in the zone in which the activity was located would apply, but not to activities in the Road Zone. NZS 6803:1999 Acoustics: Construction Noise would apply for the whole construction works, including to activities in the Road Zone. The limitation would relate to night-time work, which is required at the bottom of Oropi Road hill, Fraser Cove shops, Merivale shops, Chadwick Road/Fraser Street, Devonport Road/Fifteenth Avenue, Devonport Road/Eleventh Avenue, Devonport Road from Memorial Park to First Avenue and Elizabeth Street, including both First Avenue and Elizabeth Streets east of Devonport Road; and First Avenue foreshore (for winching for the submarine pipeline option) for which consent must be sought. The exterior lighting and glare controls of the relevant zone would apply, except in the Road Zone. The contractor would consider these matters in the preparation of construction management plans.

Protection of natural resources is required by the District Plan, including the obtaining of relevant consents from EBOP, and discharge of stormwater and any waste water. These provisions are general and would normally be covered by consents from EBOP. The controls apply in all zones. The general hazardous substances thresholds apply as for each zone, but these are items for construction management plans.

The dust provisions would apply, that is no activity may create a dust nuisance.

## Section 10

## Consent Requirements

### Temporary Activities

Temporary activities associated with approved construction projects are covered by the provisions of the temporary activities rule, 11.3.3 applicable to all zones<sup>128</sup>. Any temporary activity of longer than three consecutive days' duration must have a traffic management plan prepared for it, and the plan must be supplied to the Council prior to the commencement of the activity<sup>129</sup>. The traffic management plan must include:

- All site entry and access points;
- Parking layout;
- Pedestrian routes and
- Traffic control measures that address safety issues.

The plan must be prepared in consultation with the Council. Where access is to be had direct to a State Highway or located with a boundary that adjoins the State Highway, Transit New Zealand (Transit) must be notified 10 days prior to commencement of the works.

Buildings cannot exceed 50m<sup>2</sup>, nor remain on site for more than 30 days after issues of the Code of Compliance Certificate, where one is required.

Temporary activities cannot be located in Sites of Ecological Significance. Signs are also controlled. Where compliance cannot be achieved, the activity becomes a limited discretionary activity.

In relation to temporary lay-down areas, parks have been considered as prospective sites. The provisions of the Reserves Act 1977 and reserves management plans preclude this without consent of the Minister of Conservation. However, given the importance of lay-down areas on the route, a minimum of three sites on reserves will be sought, Greerton Park, Pemberton Park and at Memorial Park in the area close to Seventh Avenue (identified as Jordan Field). At Matapihi and Te Maunga, sufficient space is available in road reserves or in other zoned land for reserves not to be used.

Sites would be used for such activities as the stockpiling of materials and spoil, pipe storage, and machinery parking, along with porta-cabins. The areas would be fenced. Reinstatement would follow on completion of the section of work which would in turn be determined by the number of teams working on the route. The Memorial Park lay-down area would be required for the duration of the construction of the Memorial – Strand Walkway.

### 10.6.3 Special Ecological Sites

Three Special Ecological Sites are potentially affected by the pipeline:

- (i) Fraser Road, where the pipeline will cross immediately adjacent to coastal sites identified as SES 4 Waimapu Estuary and Stream (Map Section 6 ES7);
- (ii) A section of the SES 5 Map Section 6 ES 08) where the Poike pump station is located, and
- (iii) The area immediately before landward approaches to the Te Maunga Wastewater Treatment Plant where the pipeline will cross the railway and state highway 2/29, and then pass over an area identified as SES 11 (Map Section 6 ES12).

<sup>128</sup> Tauranga District Plan Section 11.3.3

<sup>129</sup> This links in with the street opening permit rules.

## Section 10

## Consent Requirements

The provisions of the Road Zone in relation to TCC owned roads do not override the provision of Rule 14.1(b) and (c). The rule in the plan would make trenching for a pipeline or pipeline bridge across or adjacent to part of a Special Ecological Area a non-complying activity by virtue of Rules 14.1(a), (b) and (c). 'Adjacent' is defined as within 20m of the shaded area shown on the Maps ES 1-20.

If construction is undertaken on the northern side of Fraser Street, the 20m distance criterion should be met, otherwise it would be a non-complying activity for the reason that earthworks in excess of 20m<sup>3</sup> would be undertaken within 20m of SES 4.

The State Highway that is adjacent to SES 11 is designated as Limited Access Road (LAR) and the underlying zoning is Road. An activity not related to the designation of LAR (i.e. the pipeline) must comply with the provisions of the underlying zoning and thus consent must be sought for a non-complying activity.

The pipeline at Te Maunga will skirt SES 12, but were it to pass through the SES, the designation for the WWTP would override the Section 14 General Natural Resource Rules in the District Plan.<sup>130</sup>

In addition, the Regional Land Management Plan and Proposed Regional Water and Land Plan have provisions related to wetlands that would apply to the area immediately adjacent to State Highways 2 / 29 and the Te Maunga WWTP, the Waimapu Stream at the proposed pipe bridge crossing, and the wetland in the north-east corner of the unauthorised reclamation at Matapihi, adjoining 1B1C3 Matapihi.

### 10.6.4 Natural Character Provisions

An area in the Rural Activity zone is affected by the natural character provisions of the District Plan. This is the section where the pipeline makes landfall at Matapihi, which has overlays of Coastal Landscape Policy Area (Matapihi), and Flood Hazard Policy Area. The provisions of Rule 21.2.2.1 provide that:

*"Within:*

- a. 60 metres inland of Mean High Water Spring (MHWS) in a Rural zone.*
- b. Not applicable.*
- c. 20m of any perennially flowing stream or river.*
- d. Not applicable.*
- e. Within the Coastal Landscape Policy Area in a Rural or Marae (Rural) Community Zone at Matapihi Peninsula.*
- f. Any wetland greater than 10 square metres.*

*No activity shall result in:*

- g. The erection of any building*
- h. The clearance of more than 20m<sup>2</sup> of indigenous vegetation in any 12-month period*
- i. The removal, deposition or disturbance of more than 50m<sup>3</sup> of earth in any 12-month period*
- j. The removal of a native tree greater than 6m in height.*

<sup>130</sup> It is noted that SES 12 as shown in the district plan maps (Section 6, ES 13) appears larger than its true extent. This may be a result of the development for waste management purposes on the site.



## Section 10

## Consent Requirements

*Notwithstanding any other rule in the Plan, any permitted activity that does not meet these conditions (other than Rule 21.2.2.1(d) or (e)) shall be a non-complying activity (see Rule 21.6). “*

This will affect that part of the route where the pipeline makes landfall at Matapihi, where the pipeline would cross from the reclamation to the road or where it made landfall at the beach. It would also affect any area used for a lay-down area, where gravel would be overlain on geo-textile matting, for example 1B1A Matapihi and the adjoining site to the north adjacent to 1B1C3 Matapihi. The activity would be a discretionary activity in this area.

A similar provision pertains in the Recreation and Leisure and Conservation Zones at Rule 22.2.2.1 and in the Residential Activity zone at Rule 19.2.2.1, although the restriction on disturbance is 20m<sup>3</sup> in both of these zones. This will affect the pipeline as it rises from the ground at Pier 1, where the land is zoned in part Recreation and Business. The controls apply 15m inland of MHWS, and there is in particular a restriction on the erection of any structure or building. The activity would be a non-complying activity in this area. For the beach replenishment project some of the sand will be placed above MHWS, so that it too would be a non-complying activity.

### 10.6.5 Earthworks

The District Plan is largely silent on the issue of earthworks, generally relying on the regional plans, although *earthworks* is defined in the District Plan (Section 10) to mean:

*“The alteration of land contours on any site, including:*

*Disturbance of land by moving, removing, placing or replacing soil or by excavation or cutting, filling or backfilling*

*Recompacting of existing natural ground.”*

The District Plan also refers to *approved earthworks* being:

*“earthworks that are a permitted activity under the operative regional land management plan or the proposed land and water plan or in accordance with the conditions of any resource consent imposed by the Bay of Plenty Regional Council; and*

*N/A*

*Granted in accordance with the conditions of any land use consent imposed by the Tauranga City Council, or*

*Earthworks having a permitted activity status under the Tauranga District Plan (Section 10 Definitions)”*

At the larger scale applicable to the Southern Pipeline project, the plan appears to simply accept the earthworks provisions of the Operative Land Management Plan and the Proposed Regional Water and Land Plan. Therefore generally no consents would be needed for earthworks under the District Plan except in terms of the Natural Character provisions of the various zones which relate to areas in close proximity to MHWS or rivers.

### 10.6.6 Noise and Disturbance

The noise and disturbance permitted activity rules for the Road Zone are set out in Chapter 24 of the District Plan. Construction noise is covered by NZS 6803: 1999 Acoustics – Construction Noise. For most sections of the route, compliance with NZS 6803 will be a condition placed upon the contractor. However, in certain areas where night work in particular is required, a resource consent should be applied for, as compliance with NZS 6803 will not be able to be achieved. The justification for night work will be other reasons, for example, maintenance of commercial viability, or serious and unavoidable traffic disruption. A noise management plan would be expected to accompany the application. This would be expected to reflect the content required for noise management plans under 24.3.11(d)(iv).

## Section 10

## Consent Requirements

Presently the areas identified as requiring a resource consent for noise purposes are:

- bottom of Oropi Road hill,
- Merivale shops,
- Fraser Cove shops,
- Chadwick/Fraser Streets,
- Devonport Road/Fifteenth Avenue,
- Devonport Road/Eleventh Avenue,
- Devonport Road to First Avenue or Elizabeth Street, including First Avenue and Elizabeth Street east of Devonport Road;
- First Avenue on foreshore (winching for submarine pipeline).

In addition, resource consents for construction noise in the CMA are also required (see section 10.7.15).

### 10.6.7 Modification or Destruction of Trees

A detailed assessment has been undertaken of trees that are likely to be affected by construction. This relates to both Appendix 16B: Register of Notable and Landscape Trees and to trees on Council land. The arborist's report is included with this application (refer Report Nos. 49 and 52<sup>131</sup>, Appendix T).

The pipeline route has been located to avoid protected trees as far as practicable.

The District Plan sets out objectives for protecting outstanding landscapes, including all land surrounding the Tauranga Harbour. Rules are provided to protect all indigenous vegetation immediately adjacent to MHWS.

### 10.6.8 Land-Use Consents for Reclamations

Section 89(2) of the RMA provides for applications for resource consents to be lodged with councils and for consideration of those applications as if the land were part of the district. This applies to land to be reclaimed as part of the project works and for the areas where unauthorised reclamation has previously taken place.

### 10.6.9 Summary of Land Use Consents Required under Tauranga District Plan

**Table 10-9 Summary of Activities Requiring Land Use Consents Under Tauranga District Plan**

	Activity	District Plan provision	Location
1	Earthworks, structures within Natural	Rule 22.2.2.1	<u>Non-complying</u> Applies in respect of Recreation zoned land as pipeline rises from ground to link with underside of railway bridge. Also applies to

<sup>131</sup> Arbor Care Ltd, Report No. 49 *Arboricultural Impact and Evaluation Appraisal Relating to: The Installation of the Southern Pipeline and the Effects on any Notable and Significant Trees*, 5 June 2007

Arbor Care Ltd, Report No. 52, *Arboricultural Impact and Evaluation Appraisal Relating to: The Construction of a Walk Way in Conjunction With the Southern Pipeline Project From the Strand Car Park to Fifth Avenue East*, 26 April 2007

## Section 10

## Consent Requirements

	Activity	District Plan provision	Location
	Character: Coastal Environment		earthwork of sand deposition for beach replenishment.
2	<b>Activities in road zone</b> within 20m of Special Ecological Sites	14.1 (b), (c) applies notwithstanding any other rule in the Plan	<u>Non-complying</u> LAR designated road with road zone underlying zone adjacent to SES11.
3	<b>Activities in Coastal Landscape Policy Area</b> (Matapihi)	Rule 21.2.2.1 applying 60m inland of MHWS in a Rural Zone and within Coastal Landscape Policy Area in a Rural or Marae (Rural) Community Zone at Matapihi Peninsula – affects earthworks >50m <sup>3</sup> , bush removal greater than 20m <sup>2</sup> per year and natives greater than 6m in height	<u>Discretionary</u> Landfall at Matapihi between reclamation and reclamation south of Matapihi Road (covered by s89(2) consent); applicable to lay-down area on Matapihi 1B1A Matapihi
4	<b>Noise</b> in excess of NZS 6803:1999	Rules 24.3.1.11. (24.4(a)).	<u>Limited discretionary activity</u> Affects bottom of Oropi Road hill, Merivale shops, Fraser Cove shops, Chadwick/Fraser Streets, Devonport Road/Fifteenth Avenue, Devonport Road/Eleventh Avenue, Devonport Road to First Avenue or Elizabeth Street, including First Avenue and Elizabeth Street east of Devonport Road; First Avenue on foreshore (winching for submarine pipeline).
5	<b>Land-use consents</b> for land to be reclaimed	s89(2) RMA	<p><u>Discretionary activity</u> Relates to reclamations and activities thereon. S89(2) contemplates that applications for resource consents be lodged and consent prior where the reclamation will result in new land being created in the district, as will happen with the:</p> <ul style="list-style-type: none"> <li>• Memorial – Strand walkway – for activity as a walkway/cycleway and for pipeline buried beneath, including construction, use, operation, and maintenance;</li> <li>• pipeline causeway adjacent to the railway embankment – including chamber as pipeline enters sea; for activity as a walkway/cycleway and for pipeline buried beneath; and for use, operation and maintenance of same;</li> <li>• reclamation at Matapihi immediately north of Matapihi Road for construction, use, operation and maintenance of a site access and as a site lay-down area, including associated disturbance for the period of construction; walkway/cycleway and for pipeline buried beneath; including its use, operation and maintenance;</li> <li>• the construction, use, operation and maintenance of a site access and lay-down area on the unauthorised reclamation, including associated disturbance for the period of construction; for activity as a walkway/cycleway and for pipeline buried beneath;</li> <li>• small reclamations at Matapihi immediately south of Matapihi Road;</li> </ul>

## Section 10

## Consent Requirements

	Activity	District Plan provision	Location
			<ul style="list-style-type: none"> <li>unauthorised reclamations Strand (the area known as SO 391193) and for tidied up coastal edge of SO 391193 for construction and use as wastewater pipeline; also for earthworks and structures in area.</li> <li>beach replenishment between Arundel and Seventh Avenue where land brought from below MHWS to above MHWS.</li> </ul>

### 10.7 Tauranga District Plan – Designations

#### 10.7.1 Designation of Land for Proposed Pump Stations

The proposed pump station works at Maleme Street and at Memorial Park do not fall within the permitted activity status for utilities in the District Plan. As these are critical public works, the sites will be designated by TCC for wastewater purposes. The Maleme Street Notice of Requirement (NoR) to designate land for the pump station has already been issued and was notified in July 2007.

The Memorial Park pump station is within a reserve and the construction activities in particular may temporarily affect the use and amenity of the reserve. A notice of requirement to designate land for the Memorial Park pump station was issued in November 2007. The relevant reserve management plan contemplates the reconstruction and expansion of the pump station, but not the use of the reserve for the laying of pipelines or as a lay-down area.

#### 10.7.2 Designations of Other Requiring Authorities

The Southern Pipeline route crosses State Highways 2 / 29 near Te Maunga. This land is designated by Transit as Limited Access Road.

The pipeline also crosses the rail corridor at Matapihi and near Te Maunga. This land is designated for railway purposes. The Requiring Authority for this designation is ONTRACK.

In both cases, TCC has received approval in principle for the crossings, subject to conditions. Final approval in terms of s177 RMA will be obtained once detailed design has been completed.

In the vicinity of the railway bridge, the pipeline will be accommodated into the embankment at Pier 1. The work will largely be related to the upgrading of Pier 1 and will be the subject of an outline plan by ONTRACK.

In addition, consultation has also been undertaken with Transpower, operator of the national grid. Particular constraints will operate at the construction stage when work is undertaken in close proximity to the Transpower lines.

## Section 11

## Statutory Assessment

### 11.1 Introduction

This section of the AEE identifies and provides a summary of the relevant statutory provisions requiring consideration under the Resource Management Act 1991 (RMA). Consent for the Southern Pipeline, Memorial-Strand Walkway, and Railway Bridge Upgrade projects (including the alternative submarine pipeline harbour crossing option) is required under sections 9, 12, 14 and 15 of the RMA.

Section 9 RMA relates to restrictions on the use of land, in this case primarily earthworks for which provisions are set out in regional plans. Section 12 RMA places restrictions on the use of the CMA, including for this project, reclamation, occupation, deposition and removal of sediments.

Section 14 RMA relates to damming, diversion and use of water in the CMA. Section 14 is particularly relevant to construction of the submarine pipeline, should this harbour crossing option be pursued. For example, it would apply to a coffer dam (if required) or to the use of jetting machines used to settle a submarine pipeline into the seabed.

Section 15 RMA relates to the discharge of contaminants or water into water and the discharge of contaminants to land.

In addition Section 117 RMA applies, as two aspects of the proposal, being the Memorial – Strand Walkway and the railway causeway widening are restricted coastal activities. The relevant applications for restricted coastal activities must be publicly notified, and what would otherwise be the regional council's decision under other circumstances becomes a recommendation to the Minister of Conservation.

### 11.2 Matters to be Considered – Sections 104, 105, 107 RMA

Sections 104, 104B, and 104D of the RMA set out the matters to be considered when deciding on resource consents. In addition, in relation to activities that would do something contrary to section 15 (discharge of contaminants), consideration must also be given to sections 105 and 107 RMA. The consideration of all applications is subject to Part II of the RMA.

An assessment of Part II of the RMA is set out below, followed by consideration of the relevant statutory documents.

### 11.3 Part II of the RMA

#### 11.3.1 Section 5 – Purpose and Principles

The purpose of the RMA in section 5(1) is “... to promote the sustainable management of natural and physical resources.” Sustainable management is defined in section 5(2).

The Southern Pipeline project will promote the sustainable management of natural and physical resources, including the physical resource of the sewerage system. In particular, the project will provide for the present and future public health needs of the Tauranga community.

The project will also assist to safeguard the life-supporting capacity of the Tauranga Harbour through the avoidance of wastewater discharges to the harbour and waterways, both in the medium and long-term. As a result, the proposed work will contribute to the preservation of the marine ecosystem of Tauranga Harbour. This is seen as sustaining the potential of this resource to meet the foreseeable needs of future generations and better enabling the Tauranga and wider Western Bay communities to provide for their social, economic and cultural wellbeing and health and safety.

With regard to the potential for adverse effects, the installation, operation and maintenance of the Southern Pipeline can be undertaken in a manner that will avoid, remedy and mitigate those potential effects on the surrounding residential, commercial, rural and marine receiving environments. Conditions

## Section 11

## Statutory Assessment

imposed on the designation and resource consents will further ensure that the potential adverse effects on natural and physical resources arising from the works are minimised.

With regard to the Memorial – Strand Walkway and associated reclamation, the presence of the built environment, including the highly modified shoreline, provides an opportunity for public access while mitigating some of the adverse effects of previous development on the shoreline.

Upgrading the railway bridge will assist in securing rail operations for the long-term future, on a bridge which constitutes a regionally and nationally important transport infrastructure asset. This will sustain the potential of a significant physical resource to meet the needs of future generations and better enables the Tauranga and wider Bay of Plenty communities to provide for their social, economic, and cultural wellbeing.

### 11.3.2 Section 6 – Matters of National Importance

The section 6 RMA matters of national importance relevant to the Southern Pipeline, Memorial-Strand Walkway, and Railway Bridge Upgrade projects (including the alternative harbour crossing option) are:-

- (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:*
- (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 recognised customary activities.*

For the reasons outlined in Section 9 of this AEE the Southern Pipeline project will be constructed and operated in a manner that is consistent with recognising and providing for the above matters. The sewerage works have been designed to ensure that inappropriate use and development do not occur, but instead support the planned development of the city. Being located largely within already modified road reserve, the majority of the Southern Pipeline will have no significant effect on local ecology. While the pipeline route traverses Special Ecological Site (SES) 11, the proposed mitigation measures during construction will ensure that any ecological effects on the wetland are no more than minor.

The Memorial – Strand walkway and upgraded walking and cycling facilities on the railway bridge will significantly enhance public access to and along the CMA.

The Tauranga Harbour is identified as an Outstanding Natural Feature and Landscape in the Regional Coastal Environment Plan (RCEP). An assessment of natural character, landscape and visual effects has concluded that the harbour components of the projects will result in positive outcomes (refer Appendix CC<sup>132</sup>).

<sup>132</sup> Boffa Miskell Limited, *The Southern Pipeline Project – Tauranga, Memorial Park to Matapihi Section – Assessment of Natural Character, Landscape and Visual Effects*, 21 August 2007

## Section 11

## Statutory Assessment

The relationship of Maori, their culture and traditions has been taken into consideration in the assessment of the Southern Pipeline, Memorial – Strand Walkway and Railway Bridge Upgrade projects. The relevant consultation process, and the outcomes of that consultation process are summarised in Section 7 of this AEE.

### 11.3.3 Section 7 – Other Matters

The section 7 RMA matters relevant to the proposed pipeline, walkway, and railway bridge upgrade projects are:

- (a) *Kaitiakitanga:*
- (aa) *The ethic of stewardship:*
- (b) *The efficient use and development of natural and physical resources:*
- (c) *The maintenance and enhancement of amenity values:*
- (d) *Intrinsic values of ecosystems:*
- (f) *Maintenance and enhancement of the quality of the environment:*

The Southern Pipeline will be consistent with the principles identified in section 7 of the RMA. As demonstrated in Section 7 of this AEE, consultation has been undertaken with tangata whenua and measures identified to mitigate their concerns. Extensive consultation has been undertaken and, where possible, concerns raised in the consultation process have been taken into account. Tangata whenua's role as kaitiaki of their resources has also been taken into account. It is noted, however, that some of the issues raised in consultation do not relate to the current projects and cannot realistically be met by the projects. The proposed work will result in the efficient use and development of natural and physical resources by enabling the development of a more compact urban area.

Provision of the Memorial-Strand foreshore walkway, together with beach replenishment from Arundel Street southwards, and enhanced walking and cycling facilities across the railway bridge will enhance both amenity values and the quality of this part of the coastal environment.

### 11.3.4 Section 8 – Treaty of Waitangi

Section 8 of the RMA states:

*“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).”*

The pipeline, walkway, and railway bridge upgrade projects are consistent with giving effect to the principles of the Treaty of Waitangi. The works, despite disturbance during construction, and an increase in the area of reclamation in the harbour, are not considered to result in adverse effects upon kaimoana. It is considered that these applications have taken into account the principles of the Treaty of Waitangi, especially through the consultation process.

## 11.4 Policy Statements, Regional and District Plans

Statutory documents relevant to the consideration of resource consent applications for the Southern Pipeline, Memorial – Strand Walkway and Railway Bridge Upgrade projects (including the alternative submarine pipeline harbour crossing option) are the:

- New Zealand Coastal Policy Statement;
- Operative Bay of Plenty Regional Policy Statement;

## Section 11

## Statutory Assessment

- Operative Bay of Plenty Regional Coastal Environment Plan;
- Operative Bay of Plenty Regional Land Management Plan;
- Proposed Bay of Plenty Regional Water and Land Plan;
- Operative Bay of Plenty Regional Air Plan; and
- Operative Tauranga District Plan.
- The relevant provisions of these policy statements and plans are discussed in following sections.

Other relevant documents include:

- SmartGrowth Strategy
- Tauranga Tomorrow
- Regional Land Transport Strategy
- Integrated Transport Strategy
- Draft Harbour Reserves Management Plan 2007<sup>133</sup>
- Memorial Park Reserve Management Plan 2006
- Active Reserve Management Plans

### 11.5 New Zealand Coastal Policy Statement

The New Zealand Coastal Policy Statement (NZCPS) contains a broad framework of policies to be given effect to through the preparation of policy statements and plans and the control of activities within the coastal environment.

A number of policies within the NZCPS are particularly relevant to the proposed works including:

- Policy 1.1.1 – relating to preservation of the natural character of the coastal environment;
- Policy 1.1.4 – relating to protection of the integrity, functioning, and resilience of the coastal environment;
- Policy 2.1.1 – relating to the protection of the characteristics of the coastal environment of special value to the tangata whenua;
- Policy 3.2.2 – relating to avoidance of adverse effects of subdivision, use or development in the coastal environment;
- Policy 3.5.2 – relating to the enhancement of public access to and along the CMA; and
- Policy 4.2.2 – relating to the provision for consultation with Tangata Whenua.

The main project components within the CMA (and therefore affected by the above policies) are the Memorial – Strand foreshore walkway and beach replenishment, railway bridge upgrading, widening of the railway causeway, and the Matapihi foreshore reclamations.

The development of public access in relation to these components occurs in areas where natural character has already been compromised, is adjacent to existing structures in the case of the railway bridge and the causeway, and avoids cumulative effects on the use of the environment. In particular, for the Memorial – Strand walkway, the large variety of man-made coastal edge treatments represents a highly modified coastal edge with lower natural character, landscape and visual amenity values.

<sup>133</sup> Submissions closed 31 July 2007



## Section 11

## Statutory Assessment

Similarly, the character of the railway bridge is strongly influenced by its functional design and simplicity of construction. The causeway demonstrates high structural/functional characteristics.

In contrast, at Matapihi, although there has been unauthorised reclamation in the past, the surrounding environment is consistent with many other areas of the Tauranga Harbour. Although not pristine, the area is less modified than the western shore, being predominantly rural in use.

The dynamic processes of the harbour environment, including water quality and biota, will be affected by construction activities (refer Section 9 of this AEE), but the effects will be minimised by the construction techniques used and the preparation of a comprehensive Construction and Environmental Management Plan. This will ensure compliance with Policy 1.1.4 of the NZCPS. Overall, the construction of the Memorial – Strand reclamation, the upgrading of the railway bridge, and widening of the causeway are likely to have no more than a minor effect on existing dynamic processes arising from the movement of sediments and water.

With regard to Policy 3.5.2, construction of the Memorial – Strand walkway, and provision of enhanced walking and cycling facilities on the railway bridge and widened causeway, will provide for and improve access to the CMA in a manner which is consistent with the NZCPS.

Although coastal reclamation can in some circumstances be considered detrimental, in this case it will greatly enhance public access to and along the CMA.

With reference to Policies 2.1.1 and 4.2.2, an outline of the consultation process that TCC has engaged in with tangata whenua is provided in Section 7 of this AEE. Consultation has been undertaken in three phases, beginning in 2005 and continuing to July 2007 (refer also Appendices B and Z to this AEE).

Overall, it is considered that the proposed works are consistent with the relevant policies in the NZCPS.

### 11.6 Operative Bay of Plenty Regional Policy Statement

The Regional Policy Statement (RPS) provides an overview of the significant resource management issues of the region and contains objectives, policies and methods to achieve integrated management of the natural and physical resources of the region. The objectives and policies of the RPS are umbrella provisions that are given effect to in the various regional and district plans.

#### 11.6.1 Part I – Sub-Regional Overview and Issues

Part I of the RPS identifies six sub-regions and outlines resource management issues pertinent to each. The proposed works are located within the Tauranga sub-region.

The RPS recognises that the Tauranga sub-region is one of the fastest growing areas in New Zealand, which places continuing pressure on land and other resources. The RPS also identifies that careful management of development is essential to ensure that a compact and efficient urban form is achieved and that adverse environmental effects are minimised. Rural residential development is also a significant component of growth in the sub-region that raises issues of servicing, compatibility with more traditional rural activities and potential loss of rural landscape character.

The Tauranga Harbour is recognised as an outstanding wildlife habitat and an area of exceptional botanical and conservation values. However, this value is identified as deteriorating in some areas as a result of sewage discharges and other sources of contaminants (refer RPS Issue 3.2.1).

The Southern Pipeline will ensure that discharges into the harbour do not occur and will provide an appropriate method of wastewater transfer to accommodate existing and future development on the southern margins of the city. The proposed pipeline will therefore be consistent with Part I of the RPS.

## Section 11

## Statutory Assessment

### 11.6.2 Part II – Region-Wide Issues, Objectives and Policies

Part II of the RPS sets out issues, objectives and policies in relation to various components of the regional environment. Those chapters of particular relevance to the pipeline, walkway, and railway bridge upgrade projects include Chapter 5 – Resource Management Practice, Chapter 6 – Land, Chapter 7 – Air, Chapter 8 – Fresh Water, Chapter 9 – The Coastal Environment and Chapter 13 – Physical Resources / Built Environment. The statutory considerations listed in each of these chapters are numerous. Those provisions of particular relevance to the proposed works under each chapter heading of the RPS are set out below.

#### **RPS Chapter 5 – Resource Management Practice**

Directly relevant objectives and policies in Chapter 5 are:-

*Objective 5.3.2(a)*

*Policy 5.3.2(b)(ii)*

*Objective 5.3.6(a)*

These relate to the relationships and roles of tangata whenua; and the need to avoid, remedy or mitigate adverse effects of activities on social, economic and cultural well-being.

Extensive consultation has been undertaken as part of this project, consistent with the RPS. The consultation has been undertaken so that concerns might be identified and mitigation provided if possible. This is evidenced in the various consultation reports<sup>134</sup>.

The potential adverse effects of the proposed works are assessed in detail in Section 9 of this AEE and the associated technical appendices, together with measures to avoid, remedy, or mitigate adverse effects.

#### **RPS Chapter 6 – Land**

The directly relevant objective in Chapter 6 is:-

*Objective 6.3.1(a) “The adoption of sustainable land use and management practice”*

The RPS recognises the importance of avoiding, remedying or mitigating adverse effects of development while managing use and development to enable people and communities to provide for their economic, social and cultural well-being.

The effects of the proposed works have been identified, along with measures for mitigating those effects – refer Section 9 of this AEE and the associated technical appendices.

#### **RPS Chapter 7 – Air**

Directly relevant objectives and policies in Chapter 7 are:-

*Objective 7.3.2(a)*

*Policy 7.3.2(b)(i)*

*Policy 7.3.2(b)(iii)*

<sup>134</sup> URS New Zealand Limited and Boffa Miskell Limited, Report No. 4 *Iwi Consultation Summary Report*, 21 September 2005,

URS New Zealand Limited and Boffa Miskell Limited, Report No. 15 *Summary of Community Communications and Consultation Phase 1 and 2*, 16 February 2006

Boffa Miskell Limited, Report No. 67 *Phase 3 Iwi Consultation*, June 07

## Section 11

## Statutory Assessment

The relevant objective is that “no significant adverse effects on people and the environment result from discharges of chemical, odorous and particulate contaminants into the air”. The associated policies seek to avoid, remedy or mitigate the adverse effects of discharges to air and also to provide for the discharge of contaminants to air in situations where there are no significant adverse effects on air quality.

Discharges to air from the various components of the Southern Pipeline and ancillary equipment will meet the permitted activity provisions of the Regional Air Quality Plan. There will therefore be no significant adverse effects on air quality.

### **RPS Chapter 8 – Fresh Water and Chapter 9 – The Coastal Environment**

Directly relevant objectives and policies in Chapter 8 – Fresh Water are:-

*Objective 8.3.1(a)*  
*Policy 8.3.1.(b)(ii)*  
*Policy 8.3.1.(b)(iii)*

These relate to the maintenance and enhancement of fresh water and groundwater resources, and the need to avoid, remedy or mitigate adverse effects arising from diffuse and point source discharges of contaminants.

Directly relevant objectives and policies in Chapter 9 – Coastal Environment are:-

*Objective 9.3.1(a)*  
*Objective 9.3.2(a)*  
*Policy 9.3.2(b)(i)*  
*Policy 9.3.2(b)(ii)*  
*Objective 9.3.3(a)*

These relate to the preservation of the natural character of the coastal environment, protection of outstanding natural features and landscapes, maintenance and enhancement of water quality, and accessibility to the CMA.

Taken together, the objectives and policies relating to fresh and coastal water quality are fundamental to the Southern Pipeline project. Without the pipeline both freshwater and coastal waters are likely to be contaminated with sewage within the next few years. The project will enable continued development of the city without compromising the water quality of rivers and streams or the Tauranga Harbour.

The bulk of the physical works for the Southern Pipeline project will be in road reserve. The four main elements potentially affecting the natural character components in Objective 9.3.1(a) are the Memorial – Strand Walkway, railway bridge upgrading, causeway widening and the Matapihi reclamations.

**Memorial – Strand Walkway:** In relation to the walkway, the section of coast in question is of lower natural character, having been fairly extensively modified (refer Appendix CC). In addition, although the entire harbour is identified as an outstanding natural feature, the foreshore margin in the vicinity of the proposed walkway is not identified as an area of significant conservation or cultural value. In relation to access by the public to the CMA, the Memorial – Strand Walkway will significantly enhance public access to the CMA.

A specialised Erosion and Sediment Control Plan (ESCP) has been prepared for the coastal reclamation sections of the project (refer Report No. 54<sup>135</sup>, Appendix V). Implementation of the ESCP will ensure that coastal water quality is protected to the greatest extent possible during construction.

<sup>135</sup> Erosion Management Ltd, report No. 54 *Tauranga City Council – Southern Pipeline – Erosion and sediment Control Plan – Coastal Reclamation*, 16 August 2007

## Section 11

## Statutory Assessment

**Railway Bridge Upgrading:** The work proposed is less intrusive compared to some of the other pipeline harbour crossing options considered. In particular, the new piles will be aligned with the existing bridge piers, and the pile caps that will support the structure will sit under the existing bridge.

Use of the widened bridge for the purpose of a walkway/cycleway and the Southern Pipeline where widening is required for structural reasons (the new piles cannot be too close to the existing piles) represents an efficient use of resources in the harbour and avoids the proliferation of separate structures and associated effects on the natural character of the coast.

In terms of discharges arising from construction, these will be temporary only and measures have been outlined in Section 9 of this AEE to mitigate to the maximum extent possible the effects on the harbour. In particular, the handling of sediments during the excavation of the piles, and for the discharge of cement contaminants arising from the piling operation.

**Causeway Widening:** Constructing an additional embankment immediately alongside the existing causeway will minimise its effect on harbour dynamics, as described in the ASR report and addendum, Appendix H<sup>136</sup>.

**Matapihi reclamations:** The reclamations in this part of the harbour will be in two parts - a widening seaward of the area presently crossed by the walkway north of Matapihi Road, and another reclamation to retain an archaeological site immediately south of Matapihi Road. The former reclamation would be temporary (if even required); while the latter would be permanent (refer Section 3.3.7 of this AEE for further explanation). For the permanent reclamation, preservation of the coastline would be subservient to retention of an important archaeological site, which is supported by the Matapihi Ohuki Trust.

### **RPS Chapter 13 – Physical Resources / Built Environment**

Directly relevant objectives and policies in Chapter 13 are:-

*Objective 13.3.1(a)*

*Policy 13.3.1(b)(v)*

*Policy 13.3.1(b)(vi)*

These relate to the development of a built environment that enables efficient use, development and protection of natural and physical resources, the efficient use and development of existing and future infrastructure and utility networks, and the need to avoid, remedy or mitigate adverse effects arising from the use and development of the built environment.

In remedying actual and potential adverse effects on the marine receiving environments and making provision for the treatment of wastewater from ongoing development in southern parts of the city, the Southern Pipeline will ensure that an appropriate level of infrastructural services are provided for development of the city until 2051.

The proposed scheme has been designed to cater for the long-term growth of the southern parts of the city while avoiding, remedying and mitigating the adverse effects on the environment from wastewater discharge to the coastal environment. The Southern Pipeline will be consistent with the objectives and policies of Chapter 13 of the RPS.

### **11.6.3 RPS Proposed Change No. 1 Heritage Criteria**

Proposed Change No. 1 to the RPS (Heritage Criteria) relates primarily to the amended provisions of section 6 of the RMA. The proposed change is before the Environment Court awaiting a consent order, except in relation to two wide-ranging appeals which have been set down for November 2007.

<sup>136</sup> ASR Ltd, Marine Consulting and Research, Report No. 72 *Southern Pipeline Estuarine and Hydrodynamic Physical Process Assessments*, August 2007

## Section 11

## Statutory Assessment

The Southern Pipeline and associated projects have fully canvassed the range of heritage issues likely to arise in a project of this kind. In particular, full consultation has been undertaken with Maori, and an application for a general authority under Section 12 of the Historic Places Act 1993 (HPA) has been made. The application is underlain by a series of archaeological reports (refer Appendix U to this AEE) relating to all sections of the route. The consent conditions associated with the archaeological authority are wide-ranging. Supervision by an archaeologist and iwi or hapu members is anticipated for much of the length of the pipeline.

### 11.6.4 RPS Proposed Change No. 2 Growth Management

Proposed Change No. 2 incorporated (in Chapter 17A) the principles and policies that arose out of SmartGrowth, the 50-year growth strategy for the Western Bay of Plenty. The SmartGrowth Strategy was adopted by the councils of Tauranga City, Western Bay of Plenty District and Environment Bay of Plenty (EBOP) in May 2004. EBOP's decisions on Proposed Change No. 2 were made on 7 November 2006, but several appeals challenge the entire plan change.

Directly relevant issues and objectives within Proposed Change No. 2 are those relating to sequencing and servicing of new development, for example Issues 17A.2 (h) and (l), Objective 17A.3.1(a) and Policies 17A.3.1(b)(v), 17A.3.1(b)(ix) and 17A.3.1(b)(xv).

The Southern Pipeline project has been developed on the basis of the urban growth predictions for Tauranga City, and the need to appropriately service that growth. Accordingly, it is generally consistent with the objectives and policies of Proposed Change No. 2.

The SmartGrowth Strategy which formed the basis for the proposed change is underlain by a robust series of reports and extensive public consultation and is discussed later in this section of the AEE.<sup>137</sup>

## 11.7 Bay of Plenty Regional Plans

### 11.7.1 Operative Bay of Plenty Regional Coastal Environment Plan

The Operative Bay of Plenty Regional Coastal Environment Plan (RCEP) contains a range of provisions related to the coastal environment.

The main project components within the CMA are the Memorial – Strand walkway, railway bridge upgrading, causeway widening and the Matapihi reclamations. The Memorial – Strand walkway and most of the railway bridge are in the Coastal Management Zone, as are parts of the causeway and the Matapihi reclamations. Part of the railway bridge is within the Mooring Zone, and part of the causeway and the Matapihi reclamations are also within an area with an overlay zoning of Area of Special Conservation or Cultural Value (ASCV).

Issues, objectives, and policies of the RCEP are set out below, along with a brief discussion of the implications of the southern pipeline, walkway, and railway bridge upgrade projects (including the alternative submarine pipeline harbour crossing option) in terms of those provisions.

#### 11.7.1.1 Natural Character (RCEP Chapter 4)

##### **Relevant objectives and policies**

The key issue identified in the RCEP with regard to natural character is that *“there is ongoing and often incremental loss and degradation of natural character through inappropriate subdivision, use, and development in the coastal environment”* (Issue 4.2.1).

---

<sup>137</sup> A revised SmartGrowth Strategy was released in May 2007 following further public consultation.

## Section 11

## Statutory Assessment

The natural character objective in the RCEP is:

*“Objective 4.2.2 The preservation of the natural character of the coastal environment and its protection from inappropriate subdivision, use and development.”*

The policies most relevant to the proposed works are, in summary:

Policy 4.2.3 (a) – to recognise that there are areas of exceptional natural character which require preservation and for which no development is appropriate (this includes the Coastal Habitat Preservation Zones); and

Policy 4.2.3 (b) – to recognise that most of the coast has some degree of natural character which needs to be protected from inappropriate use and development.

The latter policy identifies relevant parts of the RCEP to be used as a guide to the relative weight to be attached to the protection of natural character in particular localities. Tauranga Harbour in its entirety is identified as an Outstanding Natural Feature and Landscape. Other areas potentially affected by the proposed works are also identified as sites of ecological, conservation or cultural significance.

The Fifth Schedule of the RCEP contains “Management Guidelines for Natural Features and Landscapes”. Guidelines relevant to the proposed works are those under the headings of S5.3 – Estuarine and S5.4 – Harbour.

Other natural character policies which are generally relevant are Policy 4.2.3 (g) relating to the restoration of natural character where appropriate, Policy 4.2.3 (i) relating to preferred areas for new development (being in the port and harbour development zones); and Policy 4.2.5 (b) relating to the preferred species for use in natural character rehabilitation.

### **Discussion**

A large proportion of the harbour is classified as an Area of Significant Conservation Value (ASCV 4), and the entire harbour is classified as an Outstanding Natural Feature and Landscape. The overlay zoning of ASCV4 Tauranga Harbour (Tauranga Moana) applies to the area of the harbour east of the railway bridge, and also south of the bridge outside of a narrow coastal band that hugs the shoreline at least as far south as Memorial Park. The Coastal Management Zone is the zoning applicable to the entire length of the Memorial – Strand walkway, along with the outstanding natural feature and landscape overlay.

Other relevant zonings are the Mooring Zone which lies in part to the north and south of the railway bridge. Everywhere else (in relation to the current projects) is zoned Coastal Management Zone. On the eastern side of the harbour, the proposed causeway and Matapihi reclamations fall entirely within ASCV4.

The RCEP text describes the area’s importance in terms of habitat for nationally vulnerable species of coastal birds and local, national and international migratory shorebirds that feed on the intertidal flats and roost on nearby shell banks and sandy spits. There is a population of international migratory wader birds as well as endemic species.

However, the various technical assessments undertaken for the harbour components of the pipeline, walkway and bridge upgrading projects demonstrate that the particular areas subject to reclamation are not of high significance in terms of the overall natural character values of the harbour and that the works will not significantly alter those values.

Having regard to the assessment of effects presented in Section 9 of this AEE, it is generally considered that the proposed works are not inconsistent with the relevant natural character objectives and policies of the RCEP. The reasons for this conclusion are summarised below:

- An assessment of natural character has concluded that the existing character is generally low in the areas affected by the proposed works (refer Sections 8, 9 and Appendix CC of this AEE).

## Section 11

## Statutory Assessment

- The coastal edge on the western side of the harbour is already significantly modified, therefore the proposed walkway in this modified environment will have a lesser impact in terms of loss of natural character.
- The upgrading of the railway bridge occurs immediately alongside the existing structure, therefore minimising any further impact on natural character.
- Construction of the submarine pipeline harbour crossing would have no long term adverse effects on natural character.
- While the causeway widening will result in a larger structure in the coastal environment, natural character values will remain similar to those which currently exist.
- The overall impacts of reclamation on the rural / coastal character of the Matapihi coastal edge are no more than minor. While this edge retains a degree of natural character, it has generally been modified to such an extent that the proposed works can be accommodated without further significant impact on existing character.
- The northern most of the two reclamations on the Matapihi foreshore, if required, is temporary and would be removed once construction of the Southern Pipeline is complete. The existing beach area would be reinstated following removal of the temporary reclamation.
- A detailed site reinstatement and landscaping plan will be prepared as part of the detailed design of the works. This would incorporate elements which reflect natural character values of the wider environment (e.g materials used and vegetation types).

Policy 4.2.3 (i) of the RCEP identifies preferred development areas in the coastal environment. The proposed Southern Pipeline route was confirmed following comprehensive consideration of alternative options (Section 3.4 of this AEE). Based on the outcome of the consideration of alternatives, it is not feasible to locate the proposed works within the RCEP's preferred development areas.

### 11.7.1.2 Natural features and landscapes (RCEP Chapter 5)

#### **Relevant objectives and policies**

The RCEP identifies the Tauranga harbour, including its sub-tidal components as an outstanding natural landscape. A key issue in the plan is the ongoing degradation of the values of natural features and landscapes (Issue 5.2.1).

The relevant natural features and landscape objective is:-

*Objective 5.2.2 The maintenance of the quality of the outstanding and regionally significant landscape features.*

The relevant policies are:-

- Policy 5.2.3 (a)
- Policy 5.2.3 (b)
- Policy 5.2.3 (c)
- Policy 5.2.3 (d)
- Policy 5.2.3 (h)
- Policy 5.2.3 (i)

In summary, these relate to the maintenance of the qualities of the outstanding and regionally significant natural features and landscapes, recognition and protection for natural features and landscapes of district or local significance, and, at a more detailed level, the design of reclamations, seawalls and other structures.

## Section 11

## Statutory Assessment

### Discussion

Having regard to the assessment of effects presented in Section 9 of this AEE, it is generally considered that the proposed works are not inconsistent with the relevant natural features and landscape objective and policies of the RCEP. The reasons for this conclusion are summarised below.

- The proposed Memorial – Strand walkway / cycleway is located in a modified landscape environment, containing a proliferation of varied coastal protection and retaining structures. The proposed works will provide a coherent seaward edge through the general uniformity of the structure, following the natural curve of the shoreline.
- Although an engineered structure (reflecting various technical requirements), the walkway formation also incorporates visual interest through boat ramps and steps onto the foreshore, and beach replenishment south of Arundel Street.
- The widening of the existing railway bridge, rather than construction of an additional bridge, avoids the proliferation of structures within the coastal landscape.
- New piles for the proposed bridge upgrade will be in line with the existing piles, such that the proposed works will not significantly alter the visual appearance of the existing bridge in the wider landscape context.
- The overall contour of the new reclamation for causeway widening will be such that from most viewpoints, it will be indistinguishable from the existing causeway.
- The proposed permanent reclamation adjoining the Matapihi foreshore is relatively low, in the region of 900mm, and when viewed from the walkway / cycleway on the railway bridge, the causeway and from the western shore, will be barely discernable. However, at close range the proposed timber sea wall will create a more abrupt and clearly delineated coastal edge in comparison with the existing less formal coastal edge.<sup>138</sup>
- Overall, it is considered that with appropriate attention to design detail, the proposed works will not degrade existing landscape values, nor detract from the outstanding natural landscape of the Tauranga harbour.

### 11.7.1.3 Flora and fauna (RCEP Chapter 6)

#### Relevant objectives and policies

The RCEP identifies as a key issue, the ongoing loss and degradation of significant vegetation and habitats within the coastal environment (Issue 6.2.1).

The relevant objective is:-

Objective 6.2.2 *The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna within the coastal environment.*

The relevant policies are:-

- Policy 6.2.3(a)
- Policy 6.2.3(b)
- Policy 6.2.3(c)

<sup>138</sup> Boffa Miskell Limited, Report No. 53 *The Southern Pipeline Project – Tauranga, Memorial Park to Matapihi Section - Assessment of Natural Character, Landscape and Visual Effects*, 21 August 2007



## Section 11

## Statutory Assessment

In summary, these relate to preservation of ecological values and the need to avoid or remedy adverse effects, and to promote and encourage appropriate protection of sites and areas of significance.

### Discussion

Having regard to the assessment of effects presented in Section 9 of this AEE, it is generally considered that the proposed works are not inconsistent with the relevant flora and fauna objective and policies of the RCEP. The reasons for this conclusion are summarised below:

- The proposed Memorial – Strand walkway / cycleway, railway bridge upgrade, causeway widening and Matapihi reclamations do not occur within areas identified as a significant habitat of indigenous fauna.
- While the foreshore walkway embankment will result in the loss of an area of high tide soft sediment habitat, the dynamic nature of this intertidal environment means that the biota living there are well adapted to periodic disturbances. As a result, the ecological communities will re-establish fairly rapidly as the beach re-equilibrates to a slightly altered high tide boundary. There may be some loss of shallow intertidal habitat – suitable for juvenile and larval fish stages. In the overall scale of Tauranga Harbour, however, this loss will not be significant.
- The new railway bridge piles and associated bridge structures will effectively double the area of subtidal hard substrates in this part of the harbour channel. It is expected that these new surfaces will be colonised by an encrusting community similar to that on the existing bridge piers.
- While construction of the twin submarine pipelines would result in significant turbidity, the tidal current flows and the natural tolerance to high turbidity of estuarine communities would result in no more than minor and relatively localised ecological impacts.
- Widening of the existing railway causeway will result in the loss of less than 1ha of an intertidal area with no ecological features of special importance.
- Appropriate measures will be undertaken during construction to ensure that potential adverse effects on the site of ecological significance at Te Maunga (District Plan SES 11; RCEP SSCMA 29) are minimised.

#### 11.7.1.4 Public access (RCEP Chapter 7)

##### **Relevant objectives and policies**

The RCEP gives effect to the NZCPS policies, with detailed provisions that seek to promote and enhance public access.

The relevant objective is:-

*Objective 7.2.2 The maintenance and enhancement of appropriate public access to and along the coastal marine area.*

Policies of particular relevance to the proposed works are, in summary:-

Policy 7.2.3(a) – to promote public access to and along the CMA and ensure that public access is restricted only in certain circumstances; and

Policy 7.2.3(d) – to design new facilities to maximise public use and access as well as private use.

One of the relevant methods for implementation of the objectives and policies is Method 7.2.4(d) which encourages district councils to manage the cumulative effects of recreation on the coastal environment by *“reducing the effects of informal boat launching by considering the provision and maintenance of formal boat launching facilities in appropriate locations.”*

## Section 11

## Statutory Assessment

### Discussion

Having regard to the assessment of effects presented in Section 9 of this AEE, it is generally considered that the proposed works are not inconsistent with, and in some cases give effect to, the relevant public access objective and policies of the RCEP. The reasons for this conclusion are summarised below:

- The Memorial – Strand walkway and upgraded walking and cycling facilities on the railway bridge/causeway will significantly enhance public access to and along the CMA.
- The walkway design incorporates provision for replacement boat ramps and steps for the use of adjoining property owners, thereby maximising both public use and access as well as private use.
- During construction, public access may need to be restricted at certain times in order to protect public health and safety. Temporary access restrictions may also be imposed during times of scheduled maintenance of the completed works, where required to protect public health and safety.

### 11.7.1.5 Tangata Whenua interests (RCEP Chapter 8)

#### Relevant objectives and policies

The objectives of the RCEP with regard to tangata whenua interests are:-

*Objective 8.2.2(a) The involvement of tangata whenua in management of the coastal environment.*

*Objective 8.2.2(b) The protection of the characteristics of the coastal environment of special spiritual, cultural and historical significance to tangata whenua.*

*Objective 8.2.2(c) Sustaining the mauri of coastal resources.*

The relevant policies are:-

- Policy 8.2.3(a)
- Policy 8.2.3(b)
- Policy 8.2.3(c)
- Policy 8.2.4(c)
- Policy 8.2.4(j)
- Policy 8.2.4(k)

These policies relate to the recognition of the significance of the coastal environment to tangata whenua, the provision of customary uses and management practices, and the roles of tangata whenua and EBOP.

### Discussion

Having regard to the summary of consultation and effects presented in Sections 7 and 9 of this AEE, it is generally considered that the process for development of the project has been consistent with the relevant objectives and policies of the RCEP which relate to tangata whenua interests. It is acknowledged however, that aspects of the works do not have the support of all parties. In summary:-

- Extensive consultation has been undertaken with tangata whenua, as evidenced by the material in Section 7 of this AEE;
- The consideration of alternatives for the Southern Pipeline route and harbour crossing options has had regard to a range of cultural concerns;
- Consultation with tangata whenua has generally identified conditional support for the foreshore walkway;

## Section 11

## Statutory Assessment

- Attachment of the pipeline to the railway bridge separates the pipeline from the harbour waters and as such would not affect the mauri of the harbour;
- It is acknowledged that tangata whenua do not support the proposed placement of the pipeline within the foreshore walkway or the submarine harbour crossing option; and
- The Matapihi estuarine flats are associated with traditional harvesting of shellfish, however, the ecological survey did not identify any harvestable species.

### 11.7.1.6 Discharges (RCEP Chapter 9)

#### **Relevant objectives and policies**

The relevant objective in the RCEP is:-

*Objective 9.2.2 Maintenance and enhancement of the water quality and mauri of the Bay of Plenty coastal marine area.*

The relevant policies are:-

Policy 9.2.3 (b)

Policy 9.2.3 (c)

Policy 9.2.3 (e)

Policy 9.2.3 (f)

In summary, these policies are that discharges must not have significant adverse effects on ecological or amenity values, discharges must not cause water quality to be unsuitable for contact recreation, and that activities which could result in accumulation of persistent toxic contaminants should be avoided. Policy 9.2.3 (f) sets out the matters to be considered when determining what constitutes reasonable mixing (i.e. once the discharge is within the receiving environment).

Matters related to the Coastal Water Quality Classifications, including the effects indicators, are set out in the Thirteenth Schedule of the RCEP. The relevant provisions are S13.2.1 and S13.2.2.

#### **Discussion**

Having regard to the assessment of effects presented in Section 9 of this AEE, it is generally considered that the proposed works are not inconsistent with the relevant objective and policies of the RCEP relating to discharges. The reasons for this conclusion are summarised below:

- Discharges from the upgrading works on the railway bridge and associated walkway/cycleway will be to the sea, following settlement of suspended material. It is considered that these discharges can fall within the permitted activity provisions of the RCEP, as can discharges from the Memorial Park – Strand reclamation itself. At Matapihi, the discharges will be through land to soakage.
- Stormwater runoff from proposed new walkway/cycleway facilities will not generate adverse effects on existing water quality.
- The proposed foreshore walkway, including reconfiguration of existing stormwater outlets will not change the quality of stormwater discharged to the CMA from contributing catchments.
- New stormwater outlets will be designed to minimise erosion of the foreshore.
- A specialised Erosion and Sediment Control Plan (ESCP) has been prepared for the coastal reclamation sections of the project. Implementation of the ESCP will ensure that coastal water quality is protected to the greatest extent possible during construction.

## Section 11

## Statutory Assessment

- Following settlement of suspended material, cement contaminated water from railway bridge piling operations will be discharged to the harbour. Any adverse effects of the discharge on receiving water quality will be no more than minor, after reasonable mixing.
- Proactive steps (e.g. regular inspections and maintenance) will be taken to avoid any discharge of contaminants in relation to the operation of machinery above the CMA during the railway bridge upgrade works.

### 11.7.1.7 Occupation of space (RCEP Chapter 12)

#### **Relevant objectives and policies**

Occupation of space in the CMA requires consent in the RCEP as a discretionary activity. The key issue identified in the plan relates to exclusive occupation and the associated adverse effect on public use of the CMA and cultural values (Issue 12.2.1).

The relevant objective and policy are:-

*Objective 12.2.2 Provision for the exclusive occupation of land and any related part of the coastal marine area while avoiding, remedying or mitigating any associated adverse environmental effects.*

*Policy 12.2.3(a) To recognise and provide for the benefits to the wellbeing of present and future generations of maintaining public access to the Coastal Marine Area. Public access should only be restricted where the criteria in policy 7.2.3(a) apply, or specific areas have been identified in accordance with method 7.2.4(a).*

#### **Discussion**

In addition to the permanent works, the project will require the temporary exclusive occupation of the seabed for the duration of construction of the reclamations and the temporary staging for the railway bridge upgrading. In addition, the pipeline and walkway / cycleway attached to the railway bridge require consent for the occupation of air space.

Having regard to the assessment of effects presented in Section 9 of this AEE, it is generally considered that the proposed works are not inconsistent with the relevant objective and policies of the RCEP relating to occupation of space. The reasons for this conclusion are summarised below:

- The Memorial – Strand walkway specifically provides for and will enhance public access to and along the CMA.
- Exclusive occupation of the CMA is required for the piles of the upgraded railway bridge. However, this represents only a minor increase over the existing occupation. Access to the railway corridor will be restricted for health and safety reasons, but public access will be facilitated by the provision of an adjacent walkway / cycleway on the bridge.
- Occupation of seabed by the submarine pipelines would not preclude public access.
- The widened causeway embankment incorporates a walkway / cycleway. Public access will be available at all times except if temporary restrictions are required during scheduled maintenance in order to protect public health and safety.

### 11.7.1.8 Structures (RCEP Chapter 13)

Structures to be constructed in the CMA include the extended railway bridge, including the temporary works, stormwater outlets and the boat ramps and steps that will be constructed as part of the Memorial – Strand walkway project. They also include structures associated with the submarine pipeline, should that harbour crossing option be pursued.

## Section 11

## Statutory Assessment

The walkway reclamation will be within the Coastal Management Zone and the railway bridge is partly in the Coastal Management Zone and partly in the Mooring Zone. Much of the Coastal Management Zone is acknowledged as being unmodified or relatively unmodified. However the appropriateness of some development in the CMA is recognised in the issues, objectives and policies of the RCEP.

A key issue in the RCEP is that the maintenance of existing structures and the provision of future structures within the CMA can adversely affect the environment (Issue 13.2.1).

### **Relevant objectives and policies**

The relevant objective for structures is:-

*Objective 13.2.2 Any structures in the Coastal Marine Area are to be appropriate.*

The relevant policies, in summary are:-

Policy 13.2.3 (e) – to allow some structures in the Coastal Management Zone where appropriate;

Policy 13.2.3 (g) – to discourage proliferation of structures and promote efficient use of existing structures, facilities and network utility corridors;

Policy 13.2.3 (h) – to avoid, remedy or mitigate any adverse effects of structures;

Policy 13.2.3 (i) – to take into account the effects on coastal hydrological and geomorphic processes;

Policy 13.2.3 (j) – to control nuisance effects to adjoining occupiers of the CMA or nearby land;

Policy 13.2.3 (k) – to design stormwater outfall structures to minimise coastal erosion; and

Policy 13.2.3 (l) – to avoid impacts on navigation and mooring within navigation channels and mooring areas.

### **Discussion**

Having regard to the assessment of effects presented in Section 9 of this AEE, it is generally considered that the proposed works are not inconsistent with the relevant objective and policies of the RCEP which relate to structures. The reasons for this conclusion are summarised below:

- The proposed boat ramps and steps associated with the Memorial – Strand walkway are considered to be appropriate within the CMA because they replace existing facilities and provide access to the CMA.
- Potential scour effects associated with the new boat ramps will be mitigated by bedding the base of the ramps below the mudflats, or using Reno mattresses in a similar manner to that proposed for the walkway embankment.
- It is intended to re-route and combine existing stormwater outlets, achieving a fewer number of outlets where possible. New stormwater outlets will be designed to minimise erosion of the foreshore.
- The railway bridge is to be upgraded because it represents an opportunity for co-location of the Southern Pipeline and an upgraded walkway / cycleway. The bridge is also a structure of regional and national significance to the economy.
- The works are the minimum necessary to fulfil the objectives of both ONTRACK and TCC, and are appropriate to the area in which the bridge is located. Importantly, its use to carry the pipeline will avoid the proliferation of structures in the harbour by co-locating a range of activities on an existing structure.

## Section 11

## Statutory Assessment

- Temporary structures required during construction (eg the approximate 35 m diameter turning circle at the end of the causeway widening) have been located in a way that minimises adverse scour and other hydrodynamic effects.
- With regard to long-term hydrodynamic effects, construction of the new (permanent) bridge piles will have only minor and localised effects. Widening of the causeway will slightly change flow velocities in the immediate area.
- Mitigation measures to address noise, dust and other short term construction effects have been addressed in Section 9 of this AEE. Implementation of the proposed Construction and Environmental Management Plan will ensure that potential adverse effects are avoided, remedied or mitigated.
- The temporary staging for the railway bridge upgrading works may affect parts of the mooring area immediately north and south of the Harbourside Restaurant in the vicinity of Pier 2. This will be unavoidable, but will be limited to the 2 ½ year period required for the upgrading works.
- The temporary piers will be placed at 7m spacings and may need to be cross-braced. However, specific allowance has been made for continued navigation under the bridge via one 13m portal that has been designed in consultation with the Harbourmaster and the rowing club.
- The permanent upgraded bridge structure will however, be no more limiting on navigation or mooring than existing, as the new piers will be aligned with the existing piers.
- In terms of hydrodynamic effects, the submarine pipeline would be placed within the seabed (at a depth of up to 2m) and in a location that falls outside the area of influence in terms of flow patterns associated with the existing railway bridge.
- Provision would be made for marine traffic in the navigable estuary channel during the submarine pipeline works (should this option be pursued). All temporary piles would be fitted with navigation aids (markings and lights).

### 11.7.1.9 Disturbance, deposition and extraction (RCEP Chapter 14)

#### **Relevant objectives and policies**

Disturbance and deposition will be a temporary outcome of the proposed work in a range of sections: the Memorial – Strand walkway, the railway bridge, the submarine pipeline, the causeway, and the small Matapihi reclamations and seabed trenching. The beach replenishment along the foreshore north of Memorial Park will also involve deposition of material.

The relevant objective is:-

*Objective 14.2.2(a) Provisions for disturbance and deposition within the coastal marine area only as appropriate and while avoiding, remedying or mitigating any associated adverse environmental effects.*

The relevant policies are:-

Policy 14.2.3 (f)  
Policy 14.2.3 (k)  
Policy 14.2.3 (n)  
Policy 14.2.3 (p)  
Policy 14.2.3 (q)

These policies relate to the need to avoid, remedy or mitigate any adverse environmental effects, recognition of the need for protection of the CMA, timing and duration of works, and construction methodology.

## Section 11

## Statutory Assessment

### Discussion

Having regard to the assessment of effects presented in Section 9 of this AEE, it is generally considered that the proposed works are not inconsistent with the relevant objective and policies of the RCEP which relate to disturbance, deposition and extraction. The reasons for this conclusion are summarised below:

- Temporary disturbance and deposition will be an outcome of the construction phases of the project which could have adverse effects on the environment if not appropriately managed. As previously discussed, an Erosion and Sediment Control Plan has been prepared for the reclamation works (Memorial – Strand walkway, causeway and Matapihi reclamations).
- In respect of the railway bridge upgrading, disturbance of the seabed and deposition of sediment will be minimised by the methods proposed (e.g. the use of driven temporary piles and excavation from within the pile casings for the permanent piles). Some deposition will occur, but this is considered to be of minor consequence given the natural conditions of sediment flows for this area of the harbour.
- Placement of the twin submarine pipelines (should this harbour crossing option be pursued) will disturb sediment. The best practicable option will be taken to minimise the spread of material. This could for example include limiting the speed at which the jetting machine is progressed along the pipelines and using shrouds to minimise the spread of displaced material.
- The ecological assessment has concluded that while sediment disturbed by the pipeline jetting operation would have some adverse effect on benthic communities, this effect would be limited in extent and communities would re-establish.
- Once the submarine pipelines are jetted into the seabed the resulting trenches would naturally backfill with sediment.

The Memorial – Strand walkway project also incorporates beach replenishment south of Arundel Street. Having regard to the relevant objectives and policies, the key matters are:-

- The beach replenishment will occur adjacent to the proposed Memorial – Strand walkway, and between Sixth and Seventh Avenues to mitigate the potential adverse effects associated with removal of the temporary construction access reclamation. Beach replenishment is considered appropriate in these areas as it will enhance amenity values and recreational opportunities in the vicinity of Memorial Park and the Tauranga CBD.
- The source of sand for the proposed beach renourishment will be finalised at the detailed design stage. Options that have been investigated include sand from harbour dredging at Sulphur Point. This is available in suitable quantities about every two years when maintenance dredging is required. Although sand characteristics vary between dredging, it is expected this material would be appropriate as it will have very similar composition and shape as the natural sand. Other sources have been investigated from quarries in the middle Waikato valley near Hamilton. This material also has suitable characteristics, and comprises volcanic sand that is not inconsistent with the natural material in Tauranga Harbour.

### 11.7.1.10 Reclamation (RCEP Chapter 15)

#### Relevant objectives and policies

The RCEP acknowledges the need for, or the appropriateness of reclamations in certain circumstances, but considerable tests must be satisfied. The relevant objective of the RCEP which relates to reclamations is:-

*“Objective 15.2.2 (a) Provision for reclamations within the coastal marine area that are either necessary or otherwise appropriate while avoiding, remedying or mitigating any associated adverse environmental effects.”*

## Section 11

## Statutory Assessment

The relevant policies are:-

- Policy 15.2.3 (b) – To take a precautionary approach to reclamations within the Coastal Management Zone; and to consider effects on siltation rates; flushing of harbours and estuaries; the life supporting capacity of harbours and estuaries; and hydrodynamic, geomorphic and ecological processes.
- Policy 15.2.3 (e) – “To discourage the proliferation of new reclamations and encourage the efficient use of existing land and reclamation as alternatives to new reclamations.”
- Policy 15.2.3 (g) – Relating to the construction materials and design of new reclamations.
- Policy 15.2.3 (i) – “To consider the adverse effects and practicality of removing reclamation in comparison to the beneficial effects of removing reclamation.”

The RCEP, amongst other things, expects firm evidence of need for a reclamation, as natural character is always affected, and as permanent reclamation always result in the loss of a part of the CMA from public usage.

The main components of the project are considered below, with reference to the matters contained in the objectives and policies. The overall conclusion of the assessment is that the policy intent in relation to reclamations is met, both in terms of need and / or appropriateness, and in terms of the precautionary approach to the assessment of effects.

### **Discussion**

Having regard to the assessment of effects presented in Section 9 of this AEE, it is generally considered that the proposed works are not inconsistent with the relevant objective and policies of the RCEP which relate to reclamations. The reasons for this conclusion are summarised below:

#### *Necessity / appropriateness*

- The proposed Memorial – Strand walkway reclamation will significantly enhance public access to and along the CMA. The walkway / cycleway will provide direct and level access between the Tauranga CBD and Memorial Park, TCC’s ‘premier’ park. The development of a high standard access between these key community facilities is considered to be an appropriate use of the CMA.
- Alternatives to the Memorial – Strand reclamation were considered in the development of the project, with a piled boardwalk being the most likely alternative. Although reclamation permanently removes part of the CMA, this was considered to be the best alternative as a long-term community asset. It was concluded that a boardwalk would effectively prevent coastal access to / from adjoining properties (due to the required design and location of the structure), have a high visual impact, and higher maintenance costs. A reclaimed embankment also prevents an opportunity to reinstate a beach from Arundel Street southwards, further enhancing public amenity, recreational opportunities and visual appearance within the CMA.
- The proposed Southern Pipeline is a strategic asset required to service further growth in Tauranga and prevent adverse public health and environmental effects. In order to reach the Te Maunga WWTP, the pipeline must cross Tauranga Harbour.
- A number of alternative harbour crossing options were evaluated, with the preferred options (attachment of the pipeline to the railway bridge, followed by submarine pipeline) both requiring widening of the existing railway causeway. Although further causeway reclamation will permanently remove part of the CMA, this option was considered best overall when social, cultural, environmental and economic considerations were taken into account (refer Section 3.4.5 of this AEE). The reclamation is necessary in order to accommodate the public work and also provides for the establishment of an enhanced walkway / cycleway across this part of the harbour.



## Section 11

## Statutory Assessment

- The northern reclamation at Matapihi is necessary to provide construction access in the event that access to private land is unable to be secured (refer Section 3.3.7 of this AEE). The reclamation would be temporary and removed once construction of the Southern Pipeline is complete. The existing beach area would be reinstated following removal of the temporary reclamation.
- The purpose of the southern reclamation at Matapihi is to protect a significant archaeological site which is disappearing as a result of coastal erosion. This reclamation is proposed as a measure to protect the site and the reinstatement of the land also assists to off-set other cultural issues arising from the Southern Pipeline project. In this context, the reclamation is considered appropriate as part of the wider project works. Although the hapu would prefer to have all of the land that has eroded away reinstated (about 20m), all that is required in order to retain the archaeological site is approximately 5m in width over the 180m length of the site.

### *Effects – precautionary approach*

- With regard to potential effects arising from reclamation, detailed reports have been prepared on siltation rates, flushing, the life supporting capacity of the harbour, and hydrodynamic, geomorphic and ecological processes. The potential effects and proposed mitigation measures are outlined in Section 9 of this AEE.
- The construction methodology, including a specialised Erosion and Sediment Control Plan for the reclamations is designed to ensure that sediment release is controlled by the use of rock with few fines, and also where necessary, the use of geotextile blankets.

### *Proliferation of reclamations and efficient use of existing land and reclamation*

- A number of alternatives were considered for the location of the Memorial – Strand walkway and foreshore pipeline, including route options on land along Devonport Road or use of existing esplanade reserves along the coastal edge. The reasons for discounting these alternative options are outlined in Sections 3.4 and 4.4 of this AEE.
- The use of existing (private) land along the coastal edge for the proposed works is not feasible due to topography, the likely extent of earthworks required, and the location of existing dwellings. Pockets of existing esplanade reserves are not contiguous and of insufficient width.
- The proposed causeway widening involves extension of an existing reclamation rather than creation of a standalone reclamation, thereby avoiding proliferation of new reclamation. The existing reclamation is not wide enough to accommodate the pipeline and an enhanced walkway / cycleway without encroachment into the railway corridor.
- With regard to the northern Matapihi reclamation, the preferred pipeline route utilises existing land (refer Drawing No. G-601-022 Rev. D). The temporary reclamation will only be required if an agreement cannot be reached to gain access through this private land.
- As previously discussed, the southern Matapihi reclamation is proposed in order to protect a significant archaeological site, while also re-establishing some of the landward context for that site.

### *Construction materials and design*

- The materials for the Memorial – Strand walkway and causeway reclamations will be inert, being clean, graded rock fill material. Prior removal of fines will ensure contaminants will not leach into the harbour.
- The detailed design of the foreshore walkway reclamation will incorporate materials that are compatible with the amenity values and natural character of the area, which is already a highly modified section of the harbour. When viewed from the sea, the effect of the work will be to unify the coastal edge by removing or covering over the eclectic range of seawalls that presently line the harbour edge.

## Section 11

## Statutory Assessment

- The materials used for the causeway widening will be broadly similar to those of the existing causeway. In this location, where a strongly utilitarian function already exists, such a finish is considered to be appropriate.
- For the southern Matapihi reclamation a new timber retaining wall will be constructed, with geo-textile material being placed on the inside face prior to backfilling, with fill material drawn from nearby trenching. The reclaimed area will be grassed on conclusion of filling.

### *Reclamation removal*

- A temporary reclamation between Sixth and Seventh Avenues is required for construction access to the Memorial – Strand walkway. Direct access from Fifth Avenue East and Sixth Avenue is not practicable for heavy vehicles and equipment because of the configuration of those roads and the presence of substantial trees.
- The temporary reclamation between Sixth and Seventh Avenues will be removed at the end of the project. As part of the mitigation works, the affected foreshore will be reinstated with sand, effectively an extension of the beach replenishment project.
- The temporary reclamation at Matapihi (if required) is also proposed to be removed once construction of the Southern Pipeline is complete. The existing beach area would be reinstated following removal of the temporary reclamation.
- Appropriate mitigation measures will be taken during construction to ensure that any potential adverse effects associated with both the construction and removal of the temporary reclamations are minimised. The detail of the mitigation to be undertaken will be incorporated in the Construction and Environmental Management Plan (refer Section 9 of this AEE).

### 11.7.1.11 Hazardous substances (RCEP Chapter 17)

The relevant policy is Policy 17.2.3(g): *To avoid, remedy or mitigate any adverse environmental effects of the storage, use or transportation of hazardous substances within the coastal environment.*

Procedures for the handling of hazardous substances such as fuel will be incorporated within the Construction Management Plan. Wherever possible, activities such as refuelling of construction plant will take place on land. In some circumstances, this will not be practicable, e.g. operation of a large crane on the temporary staging associated with the railway bridge upgrading works. In this circumstance refuelling from a small diesel tanker would take place in a temporary bunded area and a clean up kit would be available.

### 11.7.1.12 Noise (RCEP Chapter 20)

The relevant objectives and policies relating to noise in the CMA are Objective 20.2.2 and Policy 20.2.3. These seek to protect the coastal environment from the adverse effects of noise.

Potential noise emissions and measures to mitigate adverse noise effects are assessed in Report No. 61, Appendix Y<sup>139</sup>.

As discussed in Section 9.4.1.3 of this AEE, NZS 6803:1999 Acoustics Construction Noise is the appropriate standard for construction activities in most circumstances and will be adopted for the proposed works in the CMA.

However, pile driving for the temporary staging and permanent pile casings is likely to exceed the construction noise standards intermittently over the construction period.

<sup>139</sup> Design Acoustics Limited, Report No. 61 *Noise Assessment Report for Southern Pipeline*, 23 July 2007

## Section 11

## Statutory Assessment

The construction contractor will be required to submit a detailed Noise Management Plan to EBOP in order to demonstrate how the provisions of the construction noise standards will be achieved, and in cases where those standards cannot be achieved, that the best practicable option is being applied in respect to noise.

### 11.7.2 Operative Bay of Plenty Regional Land Management Plan

#### 11.7.2.1 Introduction

The Regional Land Management Plan (LMP) and its replacement, the Proposed Regional Water and Land Plan (PRWLP), give effect to the general direction set by the Regional Policy Statement (RPS). The principal policies addressed in the plan cover sustainable land management, soil conservation, riparian management, protection of wetlands, and integration of land and water management.

Overall the proposed works will be undertaken in a manner that avoids any significant or long-term effects on regional land use, water quality in watercourses adjoining, or crossed by the pipeline, or wetlands. Accordingly, it is submitted that the proposed works will be undertaken in a manner which is consistent with the relevant objectives and policies of the regional plans. Erosion and sediment controls will be established in accordance with the principles of EBoP's *Erosion and Sediment Control Guidelines for Earthworks, 2001*.

The relevant rules are contained within the PRWLP, with the exception of the provisions related to wetlands.

#### 11.7.2.2 Wetlands

##### **Relevant objectives and policies**

The relevant objectives and policies of the LMP in relation to wetlands are:-

Objective 7.4.2(a) *The retention and enhancement of the values of the remaining wetlands in the Bay of Plenty*

Policies 7.4.3(a), 7.4.3(b)<sup>140</sup>, 7.4.3(f)

Methods 7.4.4: 7.4.4(c)

The objectives and policies of the LMP promote that the protection of small wetlands is of importance particularly where drainage of many large wetlands has been undertaken in the past.

##### **Potentially affected wetlands**

The wetlands objectives and policies are implemented by rules in the plan which require, as a minimum, discretionary activity consent applications for disturbance of wetlands.

For this project the critical wetland is identified as SES 11 in the District Plan (SSL 113 in the RCEP). The proposed works involve trenching through the northern tip of SES 11 adjacent to SH 2 / 29 at Te Maunga. A range of mitigation measures are proposed in order to minimise the long term impacts of the work.

The wetland identified as SES 12 in the District Plan (SSL 30 in the RCEP) is potentially affected, but a site visit suggests that the pipeline will now be outside the wetland<sup>141</sup>.

---

<sup>140</sup> Land Management Plan Appendix 4 does not include the wetland areas at Te Maunga.

<sup>141</sup> Reuben Fraser (EBoP), Bernice Meyle (URS, for TCC) 8 June 2007.

## Section 11

## Statutory Assessment

In addition, there is a small degraded wetland opposite SES 11 on the eastern side of SH 2 / 29, although this was assessed as not warranting special measures in the ecological report.

Other potentially affected wetlands are at:-

- Waimapu Stream at the crossing point for the pipe bridge; and
- A salt marsh wetland at Matapihi (at NZMS 260 Tauranga U 14 909853).

### **Construction through wetlands**

A detailed Erosion and Sediment Control Plan(s) will be submitted to EBOP prior to commencement of works. Mitigation measures for works in the vicinity of wetlands would likely include the following:

- Lifting vegetation from the working area and laying it nearby for reinstatement on completion of the section of trench laying;
- Minimisation of trench width;
- Reinstatement using soil material directly from the site;
- Maintenance of existing drainage patterns, including, for example, the use of bentonite plugs;
- Weed control to be undertaken after reinstatement and annually thereafter; and
- Precautions to ensure that the Argentine Ant is not spread from the WWTP site.

### **11.7.3 Proposed Bay of Plenty Regional Water and Land Plan**

The Proposed Bay of Plenty Regional Water and Land Plan (PRWLP) provides a closely cross-referenced set of issues, objectives, policies and rules for the management of resources in the region. Significant parts of the plan are in effect, although some provisions await sign-off by the Environment Court. Relevant sections are listed below.

#### **11.7.3.1 Earthworks**

A discretionary activity consent is required for earthworks 0 – 20 m from MHWS, works in an Erosion Hazard Zone, and for earthworks which do not satisfy the other provisions in the plan. When assessing the application, particular regard must be given to the following provisions contained in the plan:

Objectives 4, 5, 9, 15, 17, 19, 28, 29, 31;  
Policies 5, 14, 15, 17, 18, 20, 21, 42, 45; and  
Methods 12, 19, 20, 46, 50, 89, 175.

The application for earthworks consent is able to satisfy the objectives and policies of the plan through specific site management where required, and through the preparation of erosion and sediment control plans. In general, each section of the pipeline will be limited to a 200m working area at any one time. Maintenance of strict site management, the provision of erosion and sediment control measures, and removal of material from site (either as backfill for completed sections, or to landfill) will ensure that the policies of the plan can be met.

There will also be the discharge of sediment contaminated water from dewatering, as set out below.

Section 9 of this AEE contains a more detailed assessment of the potential effects associated with earthworks activities and the proposed mitigation measures.

## Section 11

## Statutory Assessment

### 11.7.3.2 Taking of water and discharge from dewatering of construction sites

The taking of water and discharge of sediment contaminated water from dewatering during construction is permitted in the PRWLP provided certain conditions are met (Rule 42).

The relevant conditions will be incorporated into the contract documents to ensure compliance with the plan. It is considered that the standards can be met using appropriate management techniques as set out in EBoP's *Erosion and Sediment Control Guidelines for Earthworks, 2001*.

### 11.7.3.3 Pipe Bridge over Waimapu Stream

Rules 51 to 71 of the PRWLP control activities in, on, under or over the beds of rivers, streams (including modified watercourses) and lakes. Multiple crossings of streams, culverts, drains, farm drains, drainage channels and farm drainage schemes are to be undertaken as part of the project.

Subject to confirmation at detailed design stage, the Southern Pipeline will cross Oropi Road as a pipe bridge, effectively mirroring the existing water main on the other side of the road. Another pipe bridge will cross the Waimapu Stream between the end of Poike paper road and Oropi Road. Oropi Road is, however, classed as a drain and not subject to further consent.

Most of the other crossings will be under or over culverts, including at Fraser Cove. Most of the culvert crossings have been assumed to be over or under modified watercourses, and thus subject to control. However, the location of all of these is unknown, especially for the smaller culverts. Advice to date from EBOP is that the works are considered to be covered by permitted activity Rule 58. However, a discrepancy in the wording of Rules 58 and 60, applicable to urban and non-urban areas respectively, has seen a precautionary lodging of applications under Rule 71, for a discretionary activity.

The provisions of the PRWLP contain an exhaustive list of objectives, policies and methods against which applications are to be assessed. The relevant matters to be considered are:-

Objectives 4, 5, 6, 8, 46, 46A, 47, 48, 50, 50A

Policies 5, 11, 14, 15, 17, 18, 19, 20, 21, 81, 82, 83, 84, 87, 89, 90, 91, 93, 93B, 93C

Methods 12, 16, 17, 19, 20, 46, 50, 157, 158, 161, 173, 175, 176A, 176B, 176C, Schedule 1, 2, 3<sup>142</sup>

With appropriate design, it is considered that the objectives and policies of the PRWLP can be met.

In relation to the consideration of effects on cultural values, a summary of consultation undertaken with tangata whenua is contained in Section 7 of this AEE (refer also Appendices B and Z). Specific consultation has been undertaken in relation to the Waimapu Stream pipe bridge, with tangata whenua seeking to observe earthworks in the area and at other sensitive sites nearby.

Objectives 47, 48 and Policy 84 (relating to structures in, on, under or over the bed of streams) can be met by appropriate design, bearing in mind that tunnelling under the Waimapu Stream is not considered practicable in this case. There will be no discharges to the water bodies themselves.

### 11.7.3.4 Wetlands

Although the LMP provisions related to wetlands remain in force, consideration also needs to be given to the provisions of the PRWLP which also address wetlands. The plan's provisions and assessment criteria are comprehensive, and are contained in Section 8 of the PRWLP. Directly relevant provisions are:-

Para 1 – which clarifies the scope of the wetlands provisions;  
Issues 49, 49A, 49B, 49C;

<sup>142</sup> Objective 50A and Policies 93B and 93C are no longer found in the plan.

## Section 11

## Statutory Assessment

Objectives 59, 59A, 60A;  
Policies 114, 115, 116, 119, 121B;

These issues, objectives and policies generally seek to acknowledge the importance and vulnerability of wetlands and seek to preserve, protect and enhance wetlands where viable.

A range of methods to achieve the objectives and policies are set out in the PRWLP. For example, methods 12, 16, 17, 19, 20, 46 and 50 are generally relevant.

With the implementation of an appropriate construction methodology and mitigation measures (e.g. refer to earlier discussion on LMP and Report No. 29), it is considered that the trenching of the pipeline at the various locations can reasonably be achieved without detriment to the wetlands identified as SES 11 and SES 12, immediately east of SES 11 (beside SH 2 / 29), and the Waimapu Stream.

### 11.7.4 Operative Bay of Plenty Regional Air Plan

The Regional Air Plan provides for the control of discharges of contaminants into the air in the whole of the Bay of Plenty Region. The Plan recognises that the quality of air contributes to people's quality of life. Those objectives and policies in the Proposed Air Plan that are particularly relevant to the proposed wastewater system include:

*“Objective 1 Maintain and protect air quality in the Bay of Plenty region and instances or areas where air quality is degraded, to enhance it by specifically addressing discharges into air of gases, particulates, chemicals, agrichemicals, combustion and odour.*

*Objective 2 Avoid, remedy or mitigate the adverse effects of all discharges of contaminants into the air on the environment ... “*

Associated Policies 1(a) and 4 are also relevant. These relate respectively to the avoidance of significant adverse effects and to the use of the best practicable option approach in order to prevent or minimise adverse effects on air quality.

As outlined in Section 3.3.20 of this AEE, operation of the Southern Pipeline will involve air discharges at various points along the pipeline route. Where there is the potential for odour nuisance to occur, odorous gases will be treated by either biofiltration or absorption through a carbon filter. It is therefore considered that operation of the pipeline will be able to satisfy the above provisions of the Regional Air Plan.

## 11.8 Tauranga District Plan

The Tauranga District Plan (TDP) contains numerous objectives, policies and rules relevant to the project in terms of landscape, natural values, heritage and activities in the road zones.

### 11.8.1 Amenity Values (Chapter 3 TDP)

#### **Relevant objectives and policies**

The District Plan acknowledges that intensification of land-use activities throughout the district has the potential to create adverse effects on the amenity values and the health and safety of communities (Issue 3.1). Chapter 3 of the plan sets out extensive policy in relation to amenity values, noise, dust, exterior lighting and glare, and traffic safety. The objectives and policies relevant to the proposed works include:-

- Objective 3.1.1 – Noise and Vibration in All Zones
  - Policy 3.1.1.1 – Vibration
  - Policy 3.1.1.2 – Noise Received in Residential Areas
- Objective 3.1.2 – Exterior Lighting and Glare
  - Policy 3.1.2.1 – Exterior Lighting and Glare

## Section 11

## Statutory Assessment

The proposed Southern Pipeline will service future intensification within Tauranga. The pipeline will prevent sewage contamination in the harbour and waterways and in so doing will protect public health and the environment.

As Tauranga continues to intensify, demand on open space and recreational opportunities will increase. The proposed Memorial – Strand walkway will assist in meeting this demand.

### **Amenity**

The bulk of the Southern Pipeline project on land will occur as a permitted activity within the road reserve. The specific controls for the amenity effects of works in the road reserve (such as noise and disturbance, exterior lighting and glare) are set out in Chapter 24 of the District Plan.

Detailed methods for compliance will be set out in construction management plans that will apply in relation to each area through which the pipeline will be constructed, see Section 9 of the AEE. These will deal with almost all aspects of construction. Traffic reports have been prepared and mitigation measures recommended (Report No. 46, Appendix S<sup>143</sup>).

It is expected that the proposed works will achieve compliance with all relevant amenity aspects of the District Plan, except in certain circumstances where night-time work for trenching is to be undertaken in order to minimise traffic and business disruption. Best practicable options would need to be applied to ensure that the noise effects associated with working at night are not unreasonable.

### **Noise**

An acoustics assessment has been undertaken for the project works (Report No. 61, Appendix Y<sup>144</sup>) and a summary of potential noise effects is included in Section 9.2.1.3 of this AEE.

It is expected that compliance with the construction noise standard NZS 6803:1999 will be achieved for day time noise limits. However in some locations works will need to be undertaken at night time in order to avoid traffic and business disruption. Given the proximity of residential activity, the applicable noise standards will be unlikely to be achievable for night time work.

The noise assessment incorporates a draft noise management plan which will apply to the various areas that will be affected. Mitigation will be a key element.

### **Vibration**

A vibration report has been prepared in relation to the landward effects of piling operations for the railway bridge upgrade. Building condition surveys and ongoing monitoring are recommended, with a vibration management plan to be prepared and implemented if required.<sup>145</sup>

### **Lighting**

Most of the pipeline route will be in road reserve, so that apart from safety lighting during trenching, no additional lighting will be required during construction.

Low level lighting is to be provided along the Memorial – Strand walkway, as described in Section 4 of this AEE, and for the walkway / cycleway on the railway bridge.

---

<sup>143</sup> Traffic Design Group, Report No. 46 *Western Route E Traffic Management Assessment Report*, 25 June 2007

<sup>144</sup> Design Acoustics Limited, Report No. 61 *Report for Southern Pipeline*, 23 July 2007

<sup>145</sup> Marshall Day Acoustics Ltd., Report No. 66 *Tauranga Rail Bridge Construction Vibration*, 3 August 2007

## Section 11

## Statutory Assessment

An assessment has concluded that there will be no adverse light spill and glare effects on adjoining activities (refer Report Nos. 59 and 60, Appendix X).

### 11.8.2 Natural Resources (Chapter 4 TDP)

Provisions for the protection of natural resources are set out in Chapter 4 of the District Plan. Emphasis is placed on the preservation and, if possible, enhancement of outstanding landscapes and wetlands in the district. The District Plan sets out the background and significance of these resources.

#### **Landscapes**

The relevant landscape objectives of the District Plan are:-

*Objective 4.1.1 To protect and, where appropriate, enhance the visual qualities of the outstanding landscape features of Tauranga District.*

*Objective 4.1.2 To protect, and where appropriate, enhance the landscape qualities of Tauranga District and its harbour.*

Policy 4.1.1.1 identifies the outstanding landscape features within the District and seeks to protect their landscape qualities. The proposed works will affect the following identified landscape features:-

- All land surrounding Tauranga Harbour containing indigenous vegetation contiguous with mean high water springs (MHWS);
- Matapihi Peninsula, containing all land seaward of the Coastal Landscape Policy Area ... ;
- Waimapu Stream and marshlands and their margins; and
- Tauranga Harbour.

Other landscape policies which are relevant to the proposed works are:-

Policy 4.1.2.1 – Landscape Character; and

Policy 4.1.2.2 – Coastal Environment – Landscape Qualities.

Within the jurisdiction of the District Plan, the majority of the Southern Pipeline will be below ground and once constructed will have no landscape and visual effects. Associated above ground structures (e.g. air valves) will not be prominent and will have no more than minor visual effects. Pipe bridges will be painted in a recessive colour to blend into the surrounding landscape as far as practicable. In this case, the work is generally consistent with the above objectives and policies.

The landscape and visual effects associated with the works within the CMA are discussed elsewhere within this AEE and in technical appendices.

#### **Coastal margins and sensitive habitats**

A key issue identified in the District Plan is the pressure placed on ecologically sensitive coastal and harbour margins arising from population growth (Issue 4.2). The associated objectives and policies are consistent with the direction provided by the RMA and NZCPS, including the need to maintain ecosystems in a manner that will be self sustaining in perpetuity. Wetlands are identified as being particularly susceptible to development because of the lack of value placed on them in the past, and because they tend to continue to be affected by the effects of, for example, farm drainage schemes, as is the case at Te Maunga.

The relevant District Plan objectives and policies relating to coastal margins and sensitive habitats are identified below, followed by a response with regard to the proposed works for which consents are sought.



## Section 11

## Statutory Assessment

Objective 4.2.1 – Preservation of the Natural Character of the Coastal Environment and Riparian Areas  
Policy 4.2.1.1 and 2 – Effects on Coastal Environment and Riparian Areas  
Policy 4.2.1.3 – Effects on Aquatic Ecosystems and Habitats  
Policy 4.2.1.4 – Established Facilities within the Coastal Environment  
Policy 4.2.1.5 – Precautionary Approach (to be undertaken in the consideration of effects that are not well understood)

Natural character is supported through provisions in each zone of the District Plan. In the Rural Zone, through which much of the pipeline runs on the Matapihi peninsula, the relevant rule is Rule 21.2.2.1 which restricts works in natural character areas. The same rule applies elsewhere, for example, in Chapter 22 Recreation and Leisure and Conservation Zone rules.

Part of the work proposed on the Matapihi Peninsula falls within the Landscape Policy Area (Matapihi) overlay and is also within 60m of MHWS. The natural character controls in Rule 21.2.2.1 also apply as the pipeline crosses SH 2 / 29 before crossing into SES 11.

Most of the other work in the Matapihi Peninsula area is within road reserve. The road reserves are areas of previous disturbance, generally with low ecological values.

The temporary disturbance of road reserve is considered not to be significant, provided appropriate earthworks controls are maintained, as the permanent impacts will be limited to a buried pipeline, rather than to above ground structures.

Where stream crossings are proposed, the use of pipe bridges will ensure natural character values are maintained, consistent with Policy 4.2.1.3.

A precautionary approach has been taken in the assessment of potential effects for this project, consistent with Policy 4.2.1.5.

Objective 4.2.2 – To Sustain Natural Resources by Protecting the Functioning and Integrity of Ecosystems  
Policy 4.2.2.1 – Value of Ecosystems  
Policy 4.2.2.3 – Location of Activities  
Policy 4.2.2.6 – Sensitive Ecological Areas

A detailed assessment of effects on the ecology of the area in terms of construction and operation has been undertaken (refer Appendices I, J and K). The overall effects have been determined to be temporary and / or minor for the reason that extensive mitigation has been incorporated at the preliminary design stage (e.g. alignment variations), and appropriate measures will be undertaken during construction. In addition, the environment in which the work is to be undertaken is already largely modified.

The assessment of effects has indicated that, provided appropriate construction methods are used, and appropriate mitigation undertaken, the effects on the environment will be minor in accordance with Objective 4.2.2 and Policy 4.2.2.3.

Objective 4.2.3 – Protecting Special Ecological Sites  
Policy 4.2.3.1 – Significant Ecological Habitats  
Policy 4.2.3.2 – Special Ecological Sites

Aboricultural assessments have identified potentially affected trees within the vicinity of the project works (including those that are listed in Appendix 16A of the District Plan). One report was prepared for the road route and the other for the Memorial - Strand walkway.

The general conclusion of the assessment is that all protected and significant trees can be avoided in constructing the Southern Pipeline, although this will need to be confirmed at detailed design stage. With regard to the proposed foreshore walkway route, a small number of significant trees are potentially affected. The proposed alignment of the walkway has been amended to provide additional clearance for these trees, and construction works will be undertaken in a way that generally avoids or minimises damage to these trees.

## Section 11

## Statutory Assessment

With regard to the Special Ecological Sites (SES), the District Plan identifies a very limited range of activities that are permitted within those areas, beyond which the activities become non-complying and must satisfy the stringent tests of section 104D. A land use consent application has been made with respect to works affecting SES 11 at Te Maunga.

In the SES 11 area, the quality of riparian values will be maintained by returning in situ soils to the trenched areas, and by returning plants that have been removed and stockpiled to the disturbed area where practicable. Re-use of plant material ensures eco-sourcing and is an economic approach.

Mitigation is proposed at all stages of the project, including returning disturbed land to its previous condition on completion of the works.

### **Aquatic ecosystems**

Issues, objectives and policies related to aquatic ecosystems and the natural character of those systems are set out in Section 4.3 of the District Plan.

The relevant objectives and policies are:-

- Objective 4.3.1 – Water Quality and Quantity – Stormwater and Wastewater
- Policy 4.3.1.5 – Stormwater Discharges in the Coastal Environment
- Policy 4.3.1.6 – Stormwater Discharges to the Coastal Environment
- Policy 4.3.1.7 – Stormwater and Wastewater Quality

Policy 4.3.1.7 is particularly relevant. This policy is that:-

*“Land-use activities should not discharge any contaminant or water containing any contaminants into a stormwater or wastewater system or on to land that will result in a cumulative adverse affect on the quality of the District’s soil or groundwater systems.”*

The Southern Pipeline project gives effect to this policy as it will provide for the long-term management of wastewater from the district.

Methods for appropriate control of sediment laden stormwater will be set out in the construction management plan that will be submitted later in the project.<sup>146</sup>

### **11.8.3 Heritage (Chapter 5 TDP)**

#### **Relevant objectives and policies**

Chapter 5 of the District Plan sets out a range of objectives and policies related to the relationships of Maori with water, land and other taonga; heritage sites, objects and values; and heritage management. Included in these policies are undertakings related to taonga such as water and land, and to consultation. Extensive consultation with Maori has been undertaken as part of the projects, as outlined in Section 7 of this AEE.

Chapter 16 of the District Plan sets out the specific rules related to modifying and removing trees, heritage buildings and archaeological sites. The outcome of arboricultural assessments undertaken for the project have already been summarised in relation to Chapter 4 of the District Plan.

Archaeological assessments have been undertaken for all sections of the pipeline route, including works in the harbour. These assessments are reported in Section 9 of this AEE and are contained in Appendix U. It is generally concluded that the works will not impact on any recorded archaeological features.

<sup>146</sup> This is controlled by the conditions to Rule 42 of the Proposed Regional Water and Land Plan. The Rule is in effect.

## Section 11

## Statutory Assessment

Section 12 HPA applications for a general authority have been lodged for the works. Protocols for archaeological supervision and the presence of tangata whenua have been developed, as well as protocols for the handling of taonga and koiwi.

An application for a specific authority under Section 11 of the HPA for works associated with the protection of the archaeological site immediately south of Matapihi Road will be made at a later date.

### 11.8.4 Hazards (Chapter 6 TDP)

Relevant objectives and policies in this chapter of the District Plan are:-

Objective 6.1.3 – Hazard Management – Flooding

Policy 6.1.3.1 – Design of Stormwater Systems

Policy 6.1.3.2 – Avoidance of Flood Prone Areas

These policies are generally relevant to some of the proposed beach replenishment works where they will fall above MHWS, and to parts of the Southern Pipeline located within identified flood hazard areas. Identified flood hazard areas in the District Plan include low lying land adjoining the coast and watercourses.

The provisions of the District Plan seek to ensure that appropriate engineering input is provided rather than placing absolute restrictions on development.

Structures that will be placed in flood plain areas include the wet wells for the Memorial Park pump station and parts of the buried Southern Pipeline. These will be appropriately designed taking into account the potential for inundation. For example, the Memorial Park pump station will be a sealed system and in the event of inundation of the surrounding land, there should be no discharge of contaminated water from that facility.

With regard to the stormwater outlets that are to be relocated along the foreshore as part of the Memorial – Strand walkway, detailed design and consultation with adjoining landowners will determine the final configuration with the overall objective being to avoid the potential for flooding of adjacent properties.

### 11.8.5 Physical Resources (Chapter 7 TDP)

The objective and policy most relevant to consideration of the land use consents for the Southern Pipeline are:-

*Objective 7.1.1 Urban Consolidation*

*Policy 7.1.1.1: Effect of New Urban Development*

The Southern Pipeline is designed to service the proposed urban form which is an outcome of the Smart Growth strategy. The strategy envisages elements of both greenfield development and urban intensification while maintaining urban amenity values and rural landscape values and versatile soils. An immediate effect of the proposed pipeline will be to provide sufficient capacity to avoid discharges of raw sewage during storm events. The Southern Pipeline will also provide wastewater capacity for future urban development.

## 11.9 Other Relevant Matters

### 11.9.1 SmartGrowth Strategy

The SmartGrowth Strategy and Implementation Plan was launched in May 2004 and was the result of a collaborative effort among the sub-region's local authorities. Each recognised the likelihood of continued long-term growth pressure. In addition, communities were concerned about quality of life and the protection of the values that make the area a desirable place to live. A strategy review was initiated in mid 2006 and the revised strategy adopted in May 2007.

## Section 11

## Statutory Assessment

### **Wastewater**

With regard to infrastructure, the focus is on meeting the needs of residential growth areas, residential intensification nodes and employment nodes. The strategy confirms that optimum use of existing infrastructure is to be made before developing infrastructure in new areas (Section 1.4.1 SmartGrowth).

The wastewater section of the strategy (Section 7.4.3 SmartGrowth) sets out a range of growth issues and principles for the management of wastewater. The relevant wastewater principles are summarised as follows:-

- Forward planning and investment in reticulated sewerage systems to support intensified growth;
- Reduction in wastewater volumes by adopting a water conservation approach, reduction in wastewater contaminant loads, and integrated sustainable urban water approaches;
- Future growth areas to meet acceptable health, safety and environmental standards for wastewater treatment and disposal;
- Water quality in the CMA to be maintained and enhanced;
- Pollution of harbours and waterways to be actively avoided;
- Proactive and effective trade waste management, including waste minimisation and clean technologies; and
- To take into account the Mauri model of sustainability in decision making.

A key action in the strategy (Action 1 p.155) is to: *“Implement the Tauranga Wastewater Disposal Strategy which includes discharging effluent via Te Maunga wetlands and the outfall pipeline”*.<sup>147</sup>

The Southern Pipeline will transfer wastewater flows from the southern parts of Tauranga to the Te Maunga WWTP. The pipeline caters for increased urban growth in the southern parts of the City and will also relieve pressure on the existing wastewater network. This is consistent with TCC’s Wastewater Disposal Strategy, which favours centralised treatment and the discharge of treated effluent via the ocean outfall at Papamoa.

SmartGrowth has confirmed Te Maunga as a primary wastewater treatment facility for Tauranga City. The Southern Pipeline is entirely consistent with and gives effect to the wastewater principles and actions in the SmartGrowth Strategy.

### **Harbours and open space**

Section 7.1.3 of the SmartGrowth Strategy identifies Tauranga Harbour as requiring special recognition because it is a natural feature in the coastal environment that is internationally significant and also at the heart of many people’s connection to the sub-region. The Strategy seeks to concentrate any new harbour coast development in and around areas already compromised by existing development.

In turn, Section 7.2.9 identifies, amongst other things, the following ongoing approach: *“provide, restore and maintain continuous harbour margins that provide for public access and natural character”*.<sup>148</sup>

---

<sup>147</sup> The *Tauranga Wastewater Disposal Strategy* is a collection of reports prepared during the 1990s and early 2000s. See URS New Zealand Limited, Report No. 17, *Southern Catchments Alternative Wastewater Options*, 23 January 2007 which reviewed these reports.

<sup>148</sup> P.118 *SmartGrowth Strategy and Implementation Plan* May 2007

## Section 11

## Statutory Assessment

In explanation the Strategy states that this recognises the importance of access and the creation of continuous networks.

The Memorial – Strand walkway and upgraded walking and cycling facilities on the railway bridge will form part of a continuous public access network along and across the coast. The proposed works are occurring in an area already compromised by existing development.

### **Transport**

The SmartGrowth Strategy recognizes that cycling and walking are an important component of a wider transport strategy. The Strategy also requires implementation of the Integrated Transport Strategy for Tauranga (p.144 SmartGrowth) which includes walking and cycling.

The Memorial – Strand walkway and upgraded walking and cycling facilities on the railway bridge are consistent with and give effect to both TCC's Integrated Transport Strategy and the relevant SmartGrowth vision and principles.

With regard to rail, the SmartGrowth Strategy recognizes the importance of rail, in particular, that *"future rail (freight and passenger use) is enabled through protection of adequate corridors and backup land for ancillary activities"* (Principle 6, p.138 SmartGrowth). The upgrading of the railway bridge will secure rail access for the long term future on an existing structure of regional and national importance. In so doing, the work is consistent with the SmartGrowth Strategy.

### **11.9.2 Tauranga Tomorrow**

The vision of Tauranga Tomorrow is of a city that will have *"vibrant, healthy and diverse communities"* and a *"clean, green, valued environment"*. An effective wastewater collection and treatment system is a critical component of a health community and a clean environment. In this case, the proposed Southern Pipeline is consistent with and gives effect to the vision in Tauranga Tomorrow.

In addition, the Memorial – Strand walkway and upgraded walking and cycling facilities on the railway bridge is consistent with Action D34 in the strategy, being to *"improve walking and cycling linkages within Tauranga so people can walk and cycle around the harbour"*.

### **11.9.3 Regional Land Transport Strategy**

The Bay of Plenty Regional Land Transport Strategy (June 2007) was prepared in accordance with the provisions of the Land Transport Management Act 2003 (LTMA). The vision of the Regional Land Transport Strategy (RLTS) is *"an integrated, safe, sustainable land transport system that meets the current and developing needs of the people of a vibrant and growing region"* (RLTS p.xiv).

The proposed walkway and cycleway improvements are consistent with this vision and give effect to components of the RLTS which seek to improve facilities for pedestrians and cyclists.

The RLTS also acknowledges the important role of rail, particularly in the movement of freight. The upgrading of the railway bridge provides for the long-term use of the rail corridor. It also enables the development of a significantly improved facility for pedestrians and cyclists, consistent with the RLTS.

### **11.9.4 Integrated Transport Strategy for Tauranga**

A key objective of the Integrated Transport Strategy (ITS) for walking and cycling is to *"Develop a city-wide network of interconnected walking and cycling facilities"* (Objective D1).

The Walking and Cycling Network Plan in Appendix D of the ITS shows a proposed dual use walkway / cycleway along the coastal edge between Memorial Park and The Strand. It also shows the existing dual use walkway/cycleway across the railway bridge.

## Section 11

## Statutory Assessment

The Memorial – Strand walkway and upgraded walkway / cycleway facilities on the railway bridge are consistent with and give effect to the ITS and the Network Plan. These component parts will form part of a wider integrated cycling and walking network.

### 11.9.5 Reserve Management Plans

Reserve management plans are in place for all of the parks that are likely to be affected by construction of pipelines, pump stations, and as lay-down areas. These include Memorial Park pump station and associated pipelines, the use of Jordan Field (within the northern end of Memorial Park), Greerton Park and Pemberton Park as construction lay-down areas; and Anchorage Grove in relation to the reticulation and pump station upgrading. Turret Road is also scheduled to have minor work undertaken as part of the Anchorage Grove siphon upgrade.

The temporary use of reserves for lay-down areas is permitted under the District Plan subject to conditions.

It appears that no previous pipelines have had easements created and none of the reserve management plans prepared for these areas provide for the granting of pipeline easements for wastewater purposes. Construction of the Southern Pipeline will require the appropriate procedures to be followed under the Reserves Act 1977.

#### **Memorial Park Reserve Management Plan 2006**

Memorial Park is recognised as a Premier Park that provides a harbour side focal point within Tauranga city. The Memorial Park Reserve Management Plan (MPRMP) identifies a number of goals, management statements and actions. Relevant provisions include the following:-

- Management Statement 5.1.1 (f) – *“A shared walkway/cycleway along the park coastline, which connects to the proposed walkway to the railway bridge and other key walkways throughout the park is essential.”*
- Management Statement 5.4.1 (h) – *“Public utility and infrastructure development must be undertaken in a manner that does not unduly restrict future development of the park for its primary purpose as a passive recreational facility.”*
- Management Statement 5.4.1 (i) – *“The existing Sewage Pump Station facility can expand and include new underground servicing, in accordance with the Landscape Concept Plan.”*

Specific actions are subsequently identified to give effect to these management statements.

Management Statement 5.1.1 (f) anticipates a walkway connection between Memorial Park and the CBD, and makes specific provision within the reserve for works to connect to that facility.

The proposed Memorial Park pump station upgrade works will be contained within the area denoted as ‘Sewage Plant Extension’ on the Landscape Concept Plan. The detailed design of the pump station upgrade will have regard to the specific actions and Building Assessment Criteria (Appendix 2) in the MPRMP relating to design of buildings and mitigation planting.

#### **Other Reserve Management Plans**

Other relevant reserve management plans include the Draft Harbour Reserves Management Plan and the Active Reserves Management Plan.

Appropriate measures will be taken to ensure that impacts on reserves are minimised. For example, this will include, where practicable: minimising the area of reserve occupied, providing advance notice to regular reserve users and minimising the duration of occupation. In addition, the reserves will be appropriately reinstated on completion of construction. In the long-term, the use of the reserve will not be adversely impacted.

## Section 11

## Statutory Assessment

### 11.10 Statutory Assessment Conclusions

The relevant provisions of the RMA for considering applications are sections 104, 104B and 104D. For applications that involve discharges, sections 105 and 107 are relevant as well.

In essence, these statutory provisions require consideration of Part II RMA matters, relevant objectives and policies, and environmental effects. In particular whether or not any adverse effects will be more than minor and whether or not the activities will be contrary to relevant objectives and policies.

Relevant objectives and policies of the NZCPS, regional plans, and the district plan have been addressed earlier in this section of the AEE. With appropriate mitigation, the proposed works are generally consistent with (and in some cases give direct effect to) the relevant objectives and policies.

An assessment of actual and potential effects arising from the activities is presented in Section 9 of this AEE and in associated technical appendices. Overall, it is concluded that the projects will have a number of significant positive effects and that any adverse effects can be appropriately avoided, remedied or mitigated.

Particular project components are addressed below, in cases where a more detailed assessment is required to support the above general conclusions.

## Section 12

## Conclusions

The Southern Pipeline is required to cater for increased urban growth in the southern parts of Tauranga City and will also relieve pressure on the existing wastewater network. Some parts of the existing network are reaching capacity and once operational the pipeline will reduce the potential for sewage contamination in the harbour and waterways, thereby enhancing public health and environmental protection. A number of alternative wastewater treatment and disposal options were considered, including alternative options to a pipeline. It was concluded that the Southern Pipeline is the most cost effective option overall. The pipeline will be a long-term (100 year) strategic asset, projected to service the growth of Tauranga City until approximately 2051.

In transferring wastewater flows from the Maleme Street pump station to the Te Maunga Wastewater Treatment Plant, the preferred pipeline route coincides with the construction of a walkway/cycleway along the foreshore between Memorial Park and The Strand. The preferred method of crossing the harbour is then to place the Southern Pipeline beneath a new walkway/cycleway attached along the side of a structurally upgraded East Coast Main Trunk Railway Bridge No. 71. In addition to facilitating construction of the Southern Pipeline, the new foreshore walkway/cycleway and upgraded walking and cycling facilities on the railway bridge will provide enhanced public access to Tauranga's coastal environment and the central business district, creating new recreational opportunities. The foreshore walkway design also provides the opportunity to reinstate a beach from Arundel Street alignment southwards to Seventh Avenue. In combination with the walkway, this will further enhance coastal access, public amenity and improve the visual appearance of this section of the coastline. Upgrading of the railway bridge will secure rail operations for the long-term future, on a bridge which constitutes a regionally and nationally important transport infrastructure asset.

The potential for adverse environmental effects arises mainly through the construction phase of the Southern Pipeline, Memorial – Strand Walkway, and Railway Bridge Upgrade projects. The implementation of a comprehensive Construction and Environmental Management Plan, together with other mitigation measures outlined in Section 9 of this AEE, will ensure that any adverse construction effects are adequately avoided, remedied, or mitigated and will be no more than minor. Once operational the projects will have a number of positive environmental effects (as outlined above), with any actual or potential adverse effects being no more than minor.

In the event that the Railway Bridge Upgrade project does not proceed (or incurs significant delays), the placement of submarine pipelines across the seabed will provide an alternative harbour crossing option for the Southern Pipeline. The construction and operational effects of this alternative option have been addressed in Section 9 of the AEE and it is concluded that any adverse effects can be avoided, remedied, or mitigated.

The various project components are generally consistent with, and find support through, the relevant objectives and policies of the New Zealand Coastal Policy Statement, regional plans, and the Tauranga District Plan.

In summary, both the construction and operational aspects of the projects are able to satisfy all relevant matters and threshold tests required to be considered under the RMA. Subject to the projects being undertaken generally in terms of the information presented in this AEE, and with appropriate conditions being attached to the full range of consents, it is considered appropriate that the applications be granted.



## Section 13

## Limitations

URS New Zealand Limited (URS) has prepared this Assessment of Effects on the Environment (AEE) in accordance with the usual care and thoroughness of the consulting profession for the use of Tauranga City Council (TCC). It is based on generally accepted practices and standards at the time it was prepared. It is prepared in accordance with the scope of work contracted by TCC to URS and for the purpose outlined in support of resource consent applications for the Southern Pipeline, Memorial Strand-Walkway and Railway Bridge Upgrade Projects in Tauranga. No other warranty, expressed or implied, is made as to the professional advice included in this AEE.

The methodology adopted and sources of information used by URS are outlined in this AEE. Some of the information contained in this AEE was obtained from third parties. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions in third party information and data. No indications were found during our investigations that information contained in this AEE, as provided to URS, was false.

This AEE was prepared between April and October 2007 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time. Investigations have been specific to the locations where those investigations occurred and different conclusions and opinions may be reached on the basis of additional information from other locations. The information provided in this AEE is considered to be a fair and reasonable assessment of current conditions.

This AEE should be read in full. No responsibility is accepted for use of any part of this AEE in any other context apart from the purpose for which it has been prepared. This AEE does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.