

Ref 695

**WESTERN BAY OF PLENTY DISTRICT COUNCIL**

**Ongare Point Stormwater  
Catchment Management Plan**

<b>QUALITY RECORD</b>	<b>Name</b>	<b>Date</b>	<b>Signature</b>
Prepared By:	N Cast	22/6/04	<i>Albert</i>
Reviewed By:	D Richardson	22/6/04	<i>DK</i>
Authorised By:	A G McCartney	25/6/04	<i>AGM</i>
Revised By:			

Prepared by:

Duffill Watts & King Ltd  
Level 2, Regency House  
1 Elizabeth Street  
PO Box 330  
TAURANGA  
Phone: (07) 928-3410  
Fax: (07) 928-3421  
E-mail: [dwk.tauranga@duffillwatts.com](mailto:dwk.tauranga@duffillwatts.com)

File No.: 55027/1/2/24  
Job No.: 43078  
Date: June 2004  
Ref: Ongare Point CMP

---

## EXECUTIVE SUMMARY

---

The Western Bay of Plenty District Council (WBOPDC) has identified the need for stormwater catchment management in some of the smaller settlements of the Western Bay of Plenty. This document provides an overview of the Ongare Point stormwater catchment, describing the catchment's characteristics and stormwater network.

Ongare Point is a small settlement north of Katikati with a catchment area just under 11 Ha. The catchment is bordered by the coast on one side, a reserve on another and farmland on the remainder. The Ongare Point area is zoned residential.

The existing stormwater network was modelled using the MOUSE drainage software and an ecological assessment of the catchment was prepared by Wildland Consultants.

Network upgrades were recommended as a result of the network modelling. The recommendations are based on maximum probable development using the current Western Bay of Plenty District Council Code of Practice and District Plan constraints. Should any of the current rules or controls change, stormwater discharge constraints may be required for further development.

The estimated cost of the recommended upgrade works totaled \$76,393 excl GST. This work is proposed to start in the 2006/2007 financial year and would take 3 years based on the assumed funding allocation.

The report produced by Wildland Consultants outlines recommendations for future management to protect the stormwater receiving environment. Recommendations include planting, management of the gully and bank stabilisation. The cost of the recommended work is estimated at \$20,000 excl GST, with work proposed to start in the 2009/2010 financial year.

It is recommended that the works be added to the Long Term Council Community Plan (LTCCP) for the residents of Ongare Point to discuss and review. This should include the extra planting and the management of the gully and waterways as recommended by Wildland Consultants. The gully and waterway enhancements should be encouraged as community projects.

It is also suggested that land coverage restrictions be placed on the catchment so the impervious area of the catchment does not go above 35% (or the C factor above 0.5).

**Western Bay of Plenty District Council  
Ongare Point Stormwater  
Catchment Management Plan**

**CONTENTS**

---

<b>1.0</b>	<b>INTRODUCTION</b>	<b>4</b>
<b>2.0</b>	<b>DESCRIPTION OF THE CATCHMENT</b>	<b>4</b>
	Description of the Ongare Point Catchment	4
	Soil Type and Characteristics	4
	Land Use	4
<b>3.0</b>	<b>REGULATORY INFORMATION</b>	<b>5</b>
	Western Bay of Plenty Subdivision and Development Code of Practice	5
	Western Bay of Plenty District Plan	5
	Environment Bay of Plenty	6
<b>4.0</b>	<b>EXISTING INFORMATION</b>	<b>6</b>
	Stormwater Network	6
	Marine Receiving Water Quality	7
	Ecological Characteristics	7
	Vegetation and Habitats	8
<b>5.0</b>	<b>CONSTRAINTS AND MODELLING ANALYSIS</b>	<b>8</b>
<b>6.0</b>	<b>IDENTIFIED STORMWATER PROBLEMS</b>	<b>9</b>
	Network	9
	Ecological	9
	Pollution	10
<b>7.0</b>	<b>REMEDIAL METHODS</b>	<b>10</b>
	Network	10
	Ecological	11
<b>8.0</b>	<b>RECOMMENDATION</b>	<b>11</b>



<b>APPENDIX A</b>	<b>12</b>
Location of the Ongare Point Catchment and EBOP Sampling Sites	12
<b>APPENDIX B</b>	<b>14</b>
Ongare Point District Plan Zoning Area and Existing Stormwater Network	14
<b>APPENDIX C</b>	<b>16</b>
Wildland Report “Ecological Assessment of Stormwater Catchments of Ongare Point, Western Bay of Plenty District”	16
<b>APPENDIX D</b>	<b>28</b>
Map of Floodable Areas	28
<b>APPENDIX E</b>	<b>30</b>
Recommended Stormwater Upgrades and Costs	30
<b>APPENDIX F</b>	<b>28</b>
Map of Recommended Stormwater Upgrades	28
<b>APPENDIX G</b>	<b>30</b>
Proposed Works Programme	30

---

## **1.0 INTRODUCTION**

---

The Western Bay of Plenty District Council (WBOPDC) has identified the need for stormwater catchment management in some of the smaller settlements of the Western Bay of Plenty. This document provides an overview of the Ongare Point stormwater catchment, briefly describing the catchment characteristics and stormwater network.

The existing stormwater network was modelled using the MOUSE drainage software, which allowed the network and recommended upgrades to be assessed for effectiveness.

This catchment management plan also incorporates the results of an ecological assessment of the catchment prepared by Wildland Consultants in November 2003.

---

## **2.0 DESCRIPTION OF THE CATCHMENT**

---

### **Description of the Ongare Point Catchment**

Ongare Point is a small settlement north of Katikati with a catchment area just under 11 Ha. The catchment is bordered by the coast on one side, a reserve on another and farmland on the remainder. A map showing the location of Ongare Point in is Appendix A.

### **Soil Type and Characteristics**

The soil type is predominantly Katikati sandy loam. This type of soil drains well and does not easily erode. Katikati sandy loam is suitable for residential development (including the installation of septic tanks) and horticulture such as orchards.

### **Land Use**

The Ongare Point area is zoned residential. The catchment has no potential for subdivision and expansion, based on district plan regulations. Appendix B is a map from the WBOPDC district plan and shows the actual zoning boundary for Ongare Point.

---

### 3.0 REGULATORY INFORMATION

---

#### **Western Bay of Plenty Subdivision and Development Code of Practice**

The Subdivision and Development Code of Practice (COP) is in place to

*“maximise efficient use of resources to ensure that any development in the district is to an appropriate long term, cost effective and minimum uniform standard which benefits the community”.*

The COP outlines detailed requirements for the stormwater network. A summary of the main requirements that relate to the Ongare Point catchment are as follows:

- The minimum design standard for a primary (piped) stormwater system in the District is a 5 year return period (20% AEP).
- The minimum design standard for stormwater systems to protect important recreation fields, and streets without alternative access is a 10 year return period (10% AEP).
- The minimum design standard for stormwater systems to protect residential property, commercial and industrial buildings is a 50 year return period (2% AEP).
- The minimum design of stormwater systems to protect major communal facilities related to supply of electricity, telecommunications and water and sewage disposal systems and bridges is a 100 year return period (1% AEP).

#### **Western Bay of Plenty District Plan**

The residential zone rules specify the following as a controlled activity;

*“More than one dwelling per lot, subject to a minimum net land area of 350m<sup>2</sup> per dwelling on sewered lots and 800m<sup>2</sup> on unsewered lots”*

The Ongare Point catchment is unsewered.



## Environment Bay of Plenty

Environment Bay of Plenty (EBOP) has approved General Authorisation No 8 to provide for relatively small stormwater discharges. This authorisation dates back to the Water and Soil Conservation Act which permitted a Regional Council to authorise a number of minor or inconsequential uses of natural water by issuing a General Authorisation. When the Resource Management Act came into effect each General Authorisation became incorporated into the regional rules.

The provisions of General Authorisation No 8 are as follows:

*“Clean stormwater may be discharged (excluding waste) into natural water provided that:*

- a) The maximum discharge shall not exceed the flow from a 300 mm pipe on a flat grade or equivalent of 80 litres per second.*
- b) The suspended solids concentration of the water discharged does not exceed 150 g/m<sup>3</sup>.*
- c) The water discharged is substantially free of grease and oil.*
- d) The works shall be designed, constructed and maintained in such a manner so as not to cause erosion or flooding or to adversely affect any land or property owned or occupied by another person”.*

---

## 4.0 EXISTING INFORMATION

---

### Stormwater Network

The catchment currently consists of 470 metres of stormwater pipe, 3 manholes and 2 catch pits. The pipes in the catchment are a range of sizes from 100 mm to 675 mm in diameter and are mostly made of concrete. Appendix B shows a map of the existing stormwater reticulation.

There is one discharge points in the Ongare Point catchment (see the Wildland report Figure 2 in Appendix C).

- Potu Road Channel

A man made channel is present along the southern side of Potu Road; the stormwater is then piped underground to an outlet at the harbours edge.

## Marine Receiving Water Quality

EBOP regularly sample five sites throughout the bathing season (the start of November till the end of March) near the Ongare Point catchment. The location of the sites is shown in appendix A. Following is a table showing the sampling sites, sample site number and the median enterococci value (cfu/100ml) for the 2003/2004 bathing season.

<i>Sampling Site</i>	<i>Sampling Site Number</i>	<i>Median Enterococci Result (cfu/100mL)</i>
Ongare Point – End of Ongare Pt Road	BOP160023	3
Tanners Point Beach	BOP160031	30
Anzac Bay – Bowentown Domain	BOP160028	24
Pios Ocean Beach	BOP160029	3
Athenree Motor Camp	BOP160030	9

All the sampling results are assessed against the Marine Water Quality Guidelines which are as follows:

<b>Safe Mode</b>	single sample < 140 cfu/100ml
<b>Amber / Alert Mode</b>	single sample > 140 cfu/100ml
<b>Red / Action Mode</b>	2 consecutive samples over 280 cfu/100ml

In the 2003/2004 bathing season only one sample was higher than 140 cfu/100ml, the rest are all under. This higher sample was taken at the Anzac Bay site and recorded 180 cfu/100ml. The following samples were back in the safe mode zone.

## Ecological Characteristics

A report prepared in November 2003 by Wildland Consultants for Duffill Watts and King Ltd presented a summary of ecological information, habitat and vegetation characteristics of the Ongare Point area. No significant natural areas were identified from the study (see Appendix C for the Wildland report).

The Tauranga Harbour although is identified as visually significant and includes all the land 40 metres inland from mean high water springs (MHWS). The Tauranga Harbour is recognised in the RCEP as an “Area of Significant Conservation or Cultural Value” and also as an “Outstanding Natural Feature or landscape”.



## Vegetation and Habitats

There are no in flowing waterways in the catchment and the stormwater is mostly piped or channeled to the harbour.

There is a stream that is highly modified and channelised adjacent to the Ongare stormwater catchment, more information can be found in Appendix C.

The channel in Potu Road is bordered by lawn and exotic plants and watercress grows in the channel

---

## 5.0 CONSTRAINTS AND MODELLING ANALYSIS

---

The WBOPDC data for the Ongare Point catchment was adapted and used together with a detailed topographical survey of the entire catchment for the construction of a MOUSE drainage model of the area. This method of analysis allows accurate representation of existing and future systems and is only limited by the accuracy of the data used. A topographical survey of the catchment confirmed council GIS data of existing reticulation features.

The maximum probable development potential in the catchment was approximated by assuming a maximum impervious ratio of 35% (this equates to a C factor of 0.5) which is based on a statistical development figure for Katikati prior to reticulated sewerage. The maximum development potential therefore is based on current Code of Practice and District Plan requirements, a minimum lot size of 800m<sup>2</sup>. Should permitted activities change the recommendations may no longer be representative. The Tahawai area population is expected to grow by approximately 34% by the year 2021 with the possible expansion at Ongare Point absorbed by infill subdivision and rezoning. Infill subdivision is covered by the assumed maximum impervious ratio and current development constraints. Adjacent catchments are independent of the currently zoned residential catchments.

The annual exceedance probability (AEP) used was 2% (i.e. equivalent to a 50 year return period) to determine potential areas of flooding. In all cases piped reticulation was sized using a 20% AEP event, unless no safe secondary flowpath was available, in which case the 2% AEP was used.

It has been assumed in this study that no reticulated sewerage will be available. If this should change the recommended upgrades in this report may not meet Councils current LOS (level of service) requirements without additional constraints on private stormwater discharges.

---

## 6.0 IDENTIFIED STORMWATER PROBLEMS

---

### Network

The MOUSE model was used to check the capacity of the existing stormwater system, determine flooding levels and identify required upgrades to the system. There are three identified floodable areas, two on Esplanade Road and the other on Harbour View Road and down to the reserve. The Harbour View Road problems are due to the development of sections across the natural flow paths, increasing the risk of flooding in the properties in a 50 year flood. The existing piped stormwater system would be unable to cope with the predicted flow resulting in the excess water flowing through the properties. For this reason these systems have been given a high priority.

The removal of deficient systems has been prioritised using three categories; high, medium and low. The following criteria were used to categorise these systems.

1. High – Upgrades of deficient systems that could cause major flooding of private property if not upgraded.
2. Medium – Upgrades of deficient systems to alleviate flooding of private property.
3. Low – Upgrades of deficient systems in flooding areas that do not cause major problems and do not flood private property.

Deficient systems are those which do not meet Councils current code of practice requirements either under existing development or maximum probable development. Details of the deficient systems are listed in Appendix E and illustrated in Appendix F.

### Ecological

The existing ecological values should be protected and enhanced if possible. This includes; streams, wetlands and estuaries. This will improve the quality of stormwater that is discharged into the harbour.

The health of streams and channels also need to be considered, as there is a risk of losing ecological value of streams and channels and also bank erosion is a possibility.



## Pollution

No industrial or commercial areas exist at Ongare Point. Catchments are residential or rural/residential use with relatively low traffic volumes, producing limited pollution potential. No specific treatment systems are recommended other than the control of erosion caused by high velocity stormwater flows.

---

## 7.0 REMEDIAL METHODS

---

All recommended remedial methods are determined using maximum probable development information based on the current Code of Practice and District Plan constraints (see section 5). It is assumed that no reticulated wastewater system will be available for this area therefore minimum section sizes are 800m<sup>2</sup> (similar to Katikati before reticulated sewerage was installed).

### Network

Details of the recommended upgrades, predicted costs and proposed programme are shown in appendices E and G. The Development Impact Fee (DIF) contribution is the estimated proportion of the cost of increasing the pipe sizes if subdivision was to occur. This was calculated by looking at the parcel sizes in the catchment and working out the percentage land area that could be developed further under the current code of practice standards. This percentage of the estimated upgrade cost was the total DIF amount.

The order of work listed in the proposed works programme (appendix G) was established by ranking the work based on priority. The work was then grouped so work in similar areas is carried out in consecutive years. It is possible to change the order of the work within each priority category.

Methods other than a piped system were considered but topographical and space constraints prevent other options such as swales being used.

Appendix F contains a map showing green coloured areas which can be developed without any upgrade of the stormwater systems. Red areas require stormwater upgrades before development can occur, or restrictions placed on new stormwater discharges.

The approximate cost of the proposed capital works is \$76,393 excl GST. This work is proposed to be started in the 2006/2007 financial year and would take 3 years based on current funding allocation.



## **Ecological**

The report produced by Wildland Consultants outlines recommendations for future management to protect the stormwater receiving environment. The report recommends the following:

- Fence the riparian margins and plant a 10 – 20 m wide strip of indigenous vegetation on either side to stabilise banks and provide habitat for aquatic and terrestrial species<sup>1</sup>.

The cost of this work is expected to be around \$20,000 excl GST, with work starting in the 2009/2010. This work could become part of community projects.

---

## **8.0 RECOMMENDATION**

---

It is recommended that the suggested capital works be added to the Long Term Council Community Plan (LTCCP) for the residents of Ongare Point to discuss and review the proposed works programme. This should include the extra planting recommended and the management of the gully and waterways as recommended by Wildland Consultants. The riparian margin enhancement should be encouraged as community projects. A suggested programme of works is given in Appendix G.

It is also suggested that land coverage restrictions be placed on the catchment so the impervious area of the catchment does not go above 35% (or the C factor above 0.5).

---

<sup>1</sup> Consultation and collaboration with the landowner will be necessary.


**APPENDIX A**


---

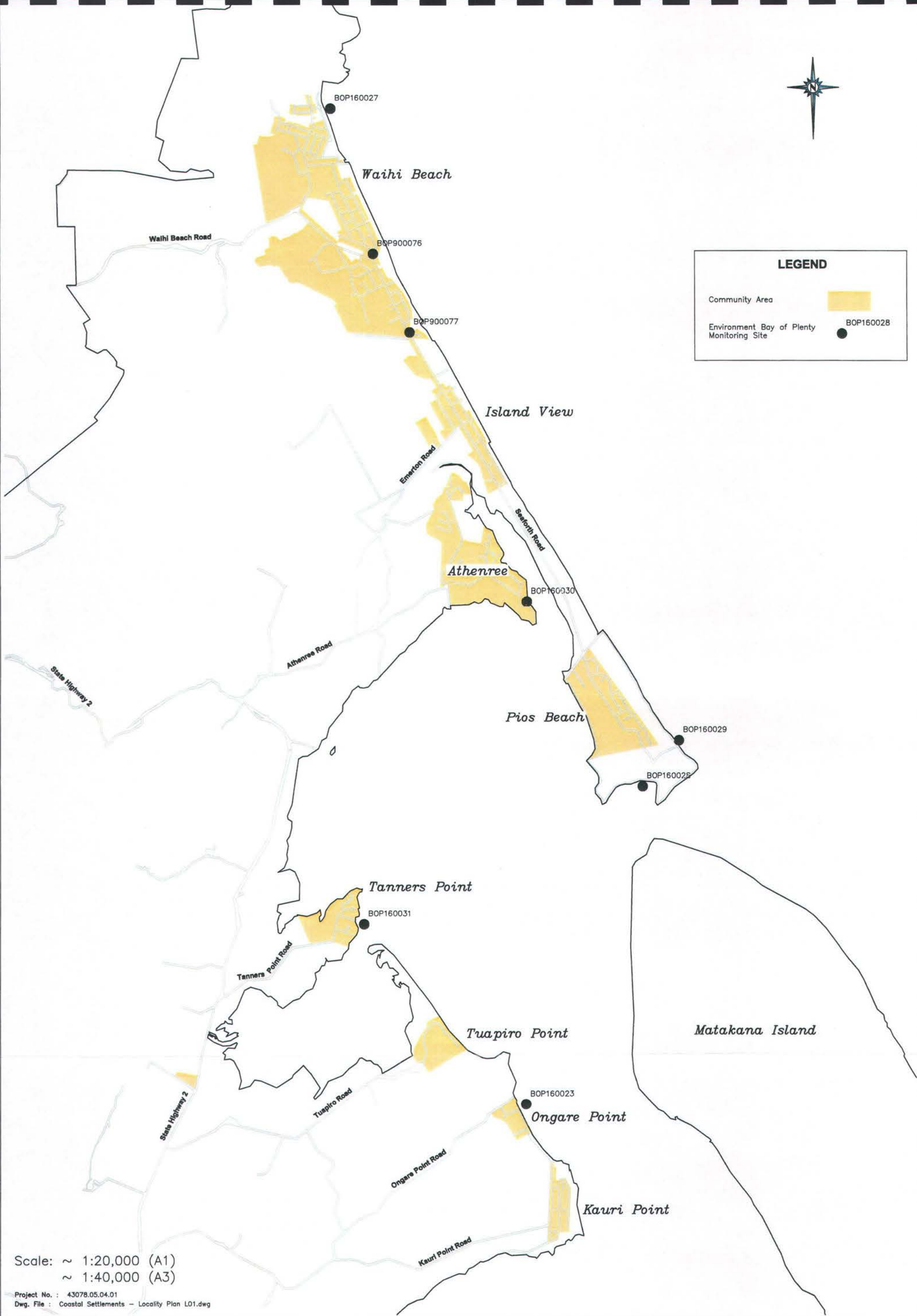
**Location of the Ongare Point Catchment and  
EBOP Sampling Sites**



**LEGEND**



Community Area 

Environment Bay of Plenty Monitoring Site  BOP160028



Scale: ~ 1:20,000 (A1)  
~ 1:40,000 (A3)

Project No. : 43078.05.04.01  
Dwg. File : Coastal Settlements - Locality Plan L01.dwg

<p>Client</p>  <p>Western Bay of Plenty District Council</p>	<p>Project</p> <p><b>COASTAL SETTLEMENTS CATCHMENT MANAGEMENT PLAN</b></p>	<p>Sheet Title</p> <p><b>LOCALITY PLAN</b></p>	<p>Job No.</p> <p>43078</p>	<p>Sheet No.</p> <p>L01</p>	 <p>Duffill Watts &amp; King Ltd CONSULTING ENGINEERS</p>
---	--	--	-----------------------------	-----------------------------	--







**APPENDIX B**

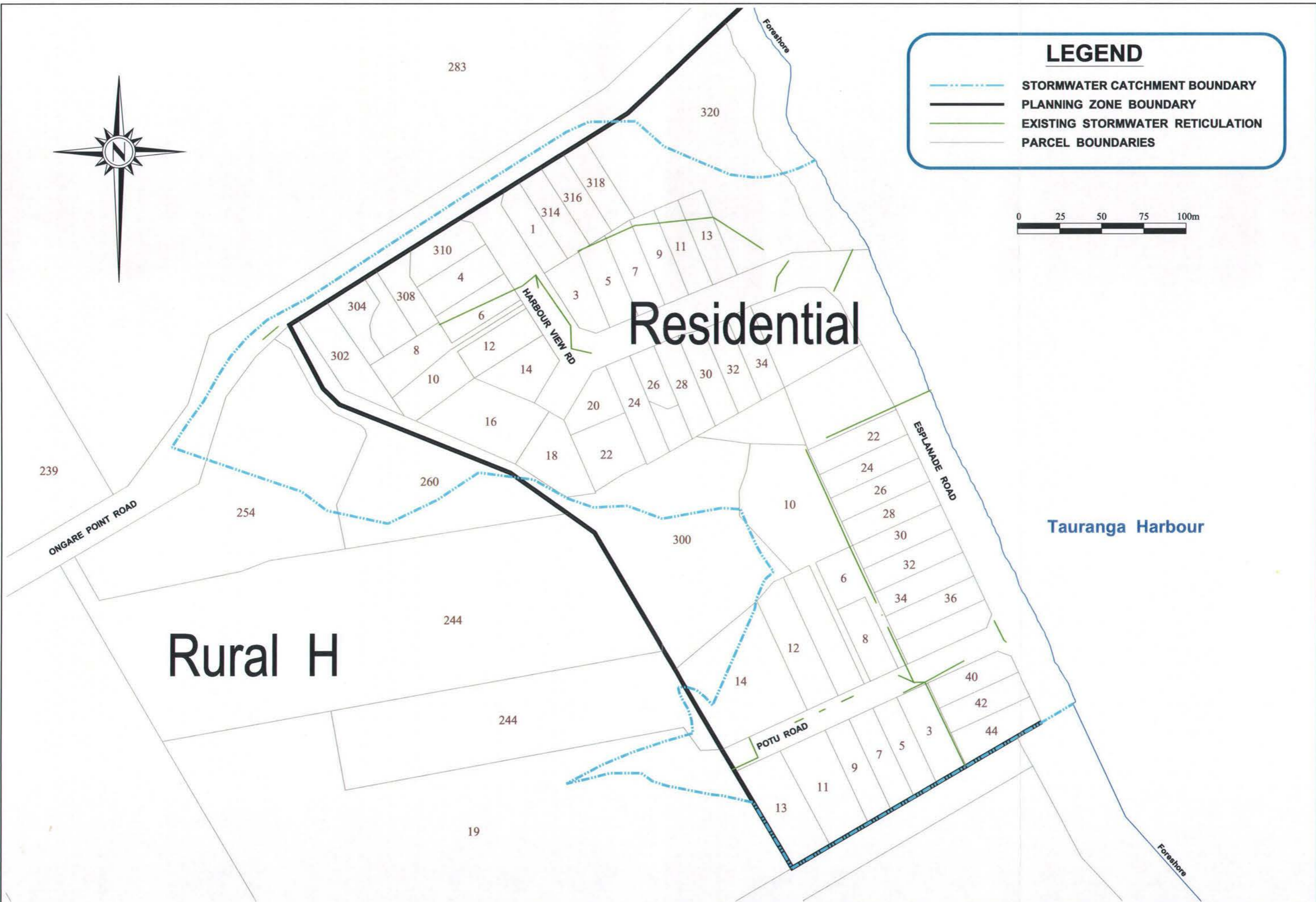
---

**Ongare Point District Plan Zoning Area and  
Existing Stormwater Network**





**LEGEND**

-  STORMWATER CATCHMENT BOUNDARY
-  PLANNING ZONE BOUNDARY
-  EXISTING STORMWATER RETICULATION
-  PARCEL BOUNDARIES



Scales: ~ 1:1000 (A1)  
 ~ 1:2000 (A3)

Client 	Project <b>ONGARE POINT CATCHMENT          MANAGEMENT PLAN</b>	Sheet Title <b>PLAN          ZONING AREAS</b>	Job No. <b>43078</b>	Sheet No. <b>P02</b> 2 of 4 shts	
--	---	--	-------------------------	--	---

**APPENDIX C**

---

**Wildland Report “Ecological Assessment of  
Stormwater Catchments of Ongare Point, Western  
Bay of Plenty District”**



ECOLOGICAL ASSESSMENT OF  
STORMWATER CATCHMENTS AT  
ONGARE POINT,  
WESTERN BAY OF PLENTY DISTRICT

NOVEMBER 2003

Contract Report No. 773c

Report prepared for

DUFFILL WATTS AND KING LTD  
P.O. BOX 330  
TAURANGA



WILDLAND CONSULTANTS LTD, HARRINGTON HOUSE, HAMILTON STREET, P.O. BOX 13-077, TAURANGA  
Ph 07-577-0729, Fax 07-571-1685

99 SALA STREET, P.O. BOX 7137, TE NGAE, ROTORUA  
Ph 07-343-9017, Fax 07-343-9018, email mail@wildlands.co.nz, www.wildlands.co.nz



## CONTENTS

1.	INTRODUCTION	1
2.	PROJECT OBJECTIVES	1
3.	METHODOLOGY	2
4.	SUMMARY OF EXISTING ECOLOGICAL INFORMATION	2
5.	VEGETATION AND HABITATS	2
6.	FUTURE MANAGEMENT	4
	REFERENCES	5
	APPENDICES	
1.	Site photographs	6

### PROJECT TEAM

William Shaw - Project management, oversight, report compilation.  
Fiona Fields - Field work, report compilation.  
Ian Kusabs - Fisheries assessment.

© *Wildland Consultants Ltd 2003*

This report has been produced by Wildland Consultants Ltd for Duffill Watts and King. All copyright in this report is the property of Wildland Consultants Ltd and any unauthorised publication, reproduction, or adaptation of this report is a breach of that copyright.



## 1. INTRODUCTION

This project was commissioned by Duffill Watts and King for the Western Bay of Plenty District Council. The objectives of the project were to provide information to underpin the future management of stormwater in Ongare Point, a small settlement north of Katikati, in the Western Bay of Plenty. The settlement is adjacent to Tauranga Harbour and adjoins rural land where the predominant land uses are pastoral and horticultural.

The study identifies and provides an assessment of the inflowing and receiving waterways within the Ongare Point stormwater catchment and recommendations are made for future stormwater management. This report provides a description of vegetation and habitats, outlines the species present, and provides an approach to the future management of stormwater in this area.

## 2. PROJECT OBJECTIVES

Wildland Consultants Ltd were commissioned by Duffill Watts and King to:

- Identify relevant available data sources.
- Collate and review existing information.
- Obtain relevant digital data.
- Assist with the development of objectives for the management of stormwater in Western Bay of Plenty settlements.
- Develop base map(s) showing land cover/vegetation/habitats, and the locations of streams, rivers, wetlands, and any other waterways.
- Map and describe significant natural resources, including networks of natural areas and receiving waters. Include all sites already identified in statutory planning documents.
- Describe and evaluate the relative health/condition of waterways flowing into settlements and receiving stormwater from settlements.
- Assess opportunities to improve stormwater management by the use of riparian protection, planting, stormwater detention, and treatment.
- Undertake above assessments by walk-through surveys along each waterway, capturing a photographic record of each one.

### 3. METHODOLOGY

Relevant ecological information was obtained from existing sources and significant natural areas within the catchment were identified and mapped.

A walk-through field inspection of the catchment was undertaken in November 2003. Waterways, wetlands, stormwater channels, and outflow points were inspected and assessments were made of ecological values.

### 4. SUMMARY OF EXISTING ECOLOGICAL INFORMATION

Terrestrial ecological surveys have not been undertaken previously at Ongare Point. There are no significant ecological sites identified in the WBOP District Plan or Bay of Plenty Regional Coastal Environment Plan within the catchment. However, Tauranga Harbour is recognised in the Bay of Plenty Regional Coastal Environment Plan (RCEP) as an 'Area of Significant Conservation or Cultural Value' and also as an 'Outstanding Natural Feature or landscape' and the Tauranga Harbour Landward Edge has been identified as a visually significant landscape feature and includes all land in a strip that extends 40 metres inland from Mean High Water Springs (MHWS).

### 5. VEGETATION AND HABITATS

No inflowing waterways are present within the settlement and receiving stormwater is mostly channelised or piped to outlets on the harbour margin. The following is a description of the receiving freshwater catchments and associated riparian habitats (refer to Figure 1). Photographs of each site are shown in Appendix 1.

#### Site ON1: Stream channel (Plate 1, Appendix 1)

A stream present to the south of Ongare Point settlement, within privately-owned land. The stream is not within the catchment boundary of the settlement and does not currently receive stormwater from the settlement. The stream is highly modified and channelised, flowing slowly over a mud/silt stream bed and characterised by small, shallow pools and runs. It is overgrown with marginal aquatic vegetation. Approximately 250 metres upstream from the harbour the stream has been dammed to form a series of small ponds. The channel is surrounded by grazed pasture in the lower reaches and an orchard upstream. It is not fenced off from the surrounding pasture and the vegetation along the stream banks consists of pasture grasses, rushes (*Juncus spp.*), and watercress (*Nasturtium officinale*). The channel has a high sediment load and the banks appear to be at risk of erosion due to the lack of riparian vegetation.

Avifauna recorded at the time of field inspection include pied stilt (*Himantopus himantopus ssp. leucocephalus*), black-backed gull, white-faced heron, and Indian myna (*Acridotheres tristis*).

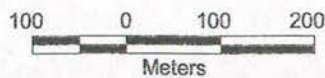




Figure 1 Ongare Point - landcover, stormwater outlets, and channels

Legend

-  Catchment boundary
-  Property boundary
-  Stream/channel
-  Stormwater outlet
-  Stormwater channel
-  Residential properties and roads
-  Coastal forest/scrub
-  Pasture/grassland
-  Reserve
-  Primarily horticultural





An assessment of fisheries values was carried out by Ian Kusabs in November 1998, using trapping and spotlighting methods. Three species were found: banded kokopu (*Galaxias fasciatus*), inanga (*Galaxias maculatus*), and shortfinned eel (*Anguilla australis*). Inanga were abundant and widely distributed throughout the stream and particularly common in the small pools. A single banded kokopu was found in the upper stream. Banded kokopu are often found in coastal creeks and streams. Nevertheless, it was surprising to find a banded kokopu in such a highly modified stream. Shortfinned eels were abundant throughout the stream, which provides ideal habitat for this lowland eel species. None of these three species are classed as threatened and inanga and shortfinned eel are widely distributed and common throughout New Zealand.

Site ON2: Potu Road channel (Plates 2-3, Appendix 1)

A human-made channel is present along the southern side of Potu Road, which carries stormwater flows to an outlet at the harbours edge. Much of the channel is ephemeral in nature and was dry at the time of the field inspection. The channel runs along the roadside edge of residential gardens and as such is bordered by lawn and exotic garden plantings. Watercress is present within the channel. Approximately half way down Potu Road the channel is piped underground towards the outlet. The channel has no ecological value.

## 6. FUTURE MANAGEMENT

The following general principles should be followed for stormwater management:

- Ensure that existing ecological values are protected, and enhanced if possible. In the Western Bay of Plenty this includes freshwater wetlands (even if small and degraded), streams (including provision for fish passage if they provide habitat for freshwater fish), remnants of terrestrial indigenous vegetation (even small remnants are of significant ecological value), wader habitat in estuaries, and saltmarsh vegetation and fauna habitats in estuaries.
- Provide detention and settling areas within the stormwater catchment (subject to protection or enhancement of above features), to avoid or minimise inflows of contaminants into receiving waters.
- Provide information to landowners who contribute stormwater, advising them of the potential damage caused by the introduction of contaminants into the stormwater system.
- Consult with landowners where stormwater channels and receiving waters are within privately-owned land and work in collaboration (where possible) to achieve a holistic approach to stormwater management.
- Provide, where possible, vegetated riparian buffers along all open stormwater channels that have actual or potential ecological values (with provision for ongoing maintenance if required).



- Riparian buffers should be planted with locally-sourced indigenous species appropriate to the site character (lists of species can be provided if required).
- Manage the stormwater system as part of an integrated network of public open space and natural areas recognising that even small streams, wetlands, and other natural features may have significant ecological values.

The stream channel to the south west of Ongare Point is not within the catchment boundary of the settlement and does not currently receive stormwater from the settlement. However, it has significant potential for restoration and habitat enhancement. It is recommended that a 10-20 m wide riparian buffer zone is fenced off from the surrounding pasture and planted with appropriate indigenous species. This will help to prevent bank erosion and sedimentation of the channel and harbour as well as providing improved habitat for fish species. If in the event of future subdivision in this area, the riparian buffer zone should be maintained.

A summary of future management recommendations for Ongare Point is as follows:

- Fence riparian margins and plant a 10-20 m wide strip of indigenous vegetation on either side to stabilise banks and provide habitat for aquatic and terrestrial species<sup>1</sup>.

## REFERENCES

Environment Bay of Plenty 2003: Bay of Plenty Regional Coastal Environment Plan. *Resource Planning Publication 2003/08*. Environment Bay of Plenty, Whakatane.

Western Bay of Plenty District Council 2002: Western Bay of Plenty District Plan. Western Bay of Plenty District Council, Tauranga.

<sup>1</sup> Consultation and collaboration with the landowner will be necessary to achieve these objectives.

SITE PHOTOGRAPHS



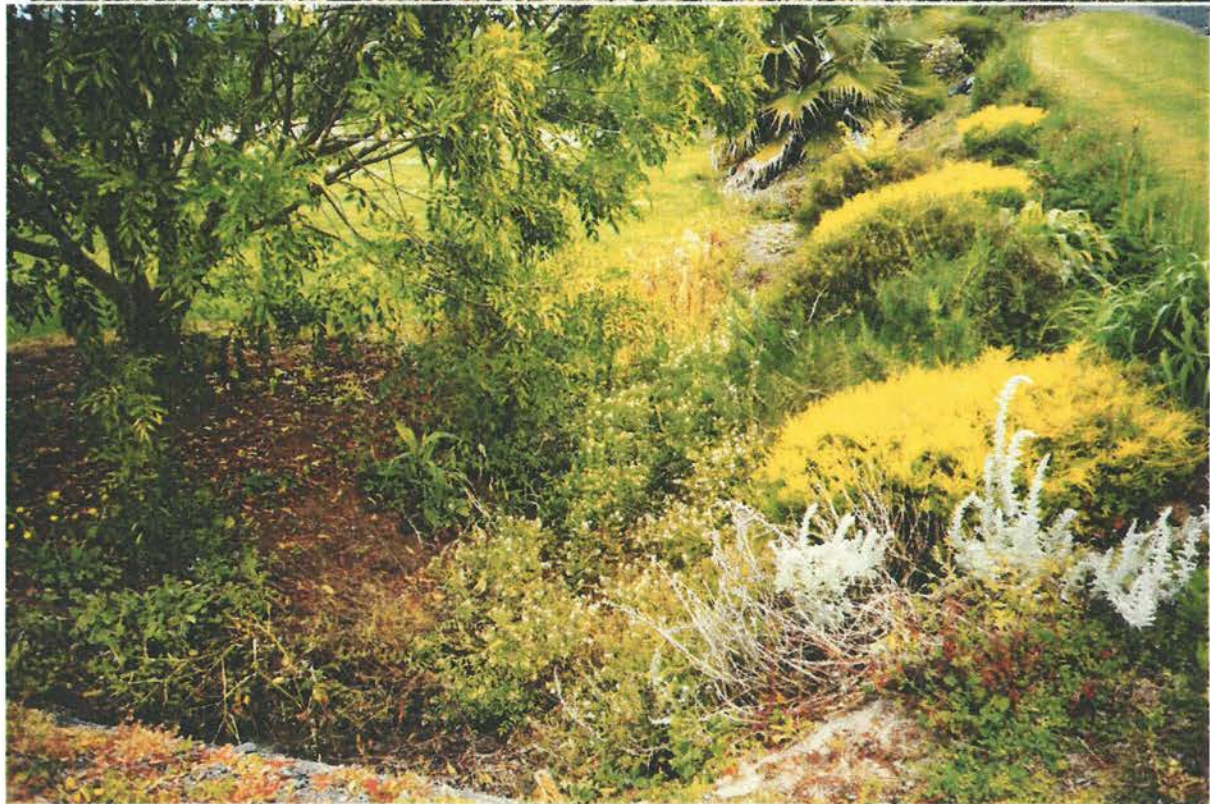


Plate 2: Site ON2 - Potu Road stormwater channel.







**APPENDIX D**

---

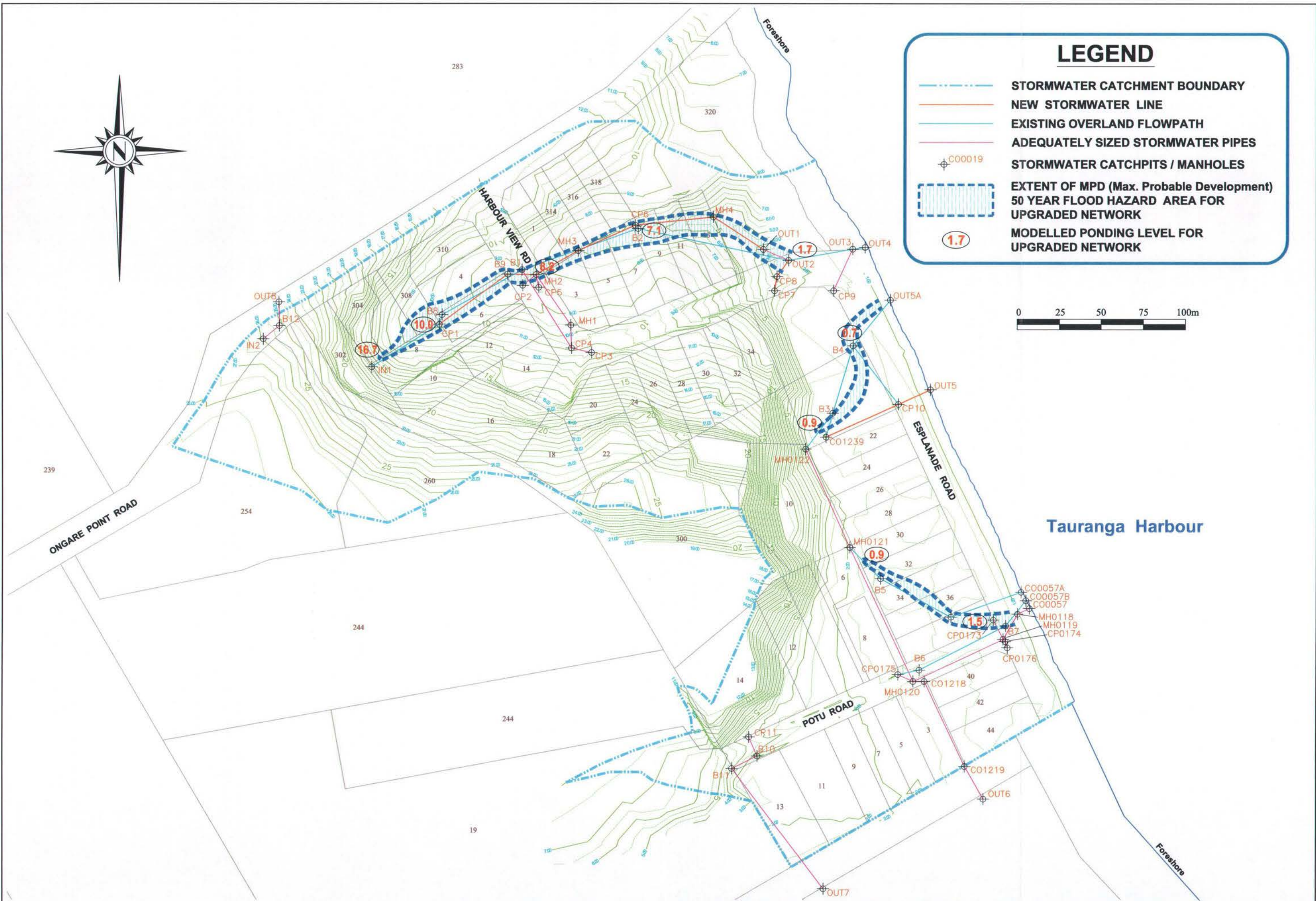
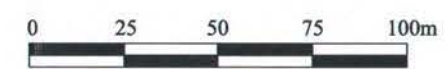
**Map of Floodable Areas**





# LEGEND

- STORMWATER CATCHMENT BOUNDARY
- NEW STORMWATER LINE
- EXISTING OVERLAND FLOWPATH
- ADEQUATELY SIZED STORMWATER PIPES
- STORMWATER CATCHPITS / MANHOLES
- EXTENT OF MPD (Max. Probable Development)  
50 YEAR FLOOD HAZARD AREA FOR UPGRADED NETWORK
- MODELLED PONDING LEVEL FOR UPGRADED NETWORK



Client 	Project <b>ONGARE POINT CATCHMENT MANAGEMENT PLAN</b>	Sheet Title <b>PLAN FLOOD HAZARD AREAS (UPGRADED NETWORK)</b>	Job No. <b>43078</b>	Sheet No. <b>P02</b> <small>3 of 5 shts</small>	
------------	--	--	-------------------------	---	--



**APPENDIX E**

---

**Recommended Stormwater Upgrades and Costs**

Street name	To	Link From	Priority	Exist size (mm)	New size (mm)	Length (m)	Cost/m (\$)	Amount (\$)	Amount per job group (\$)
Harbour View Road - Stage 1	CP1	B9	High	0.225	0.375	50.14	\$220	\$11,031	\$15,549
	B9	MH2	High	0.225	0.450	16.73	\$270	\$4,517	
Harbour View Road - Stage 2	MH2	MH3	High	0.450	0.525	28.59	\$300	\$8,578	\$45,905
	MH3	CP6	High	0.450	0.525	37.03	\$300	\$11,110	
	CP6	MH4	High	0.450	0.525	46.84	\$300	\$14,051	
	MH4	OUT1	High	0.450	0.525	35.41	\$300	\$10,623	
	CP7	CP8	Low	0.225	0.300	8.57	\$180	\$1,542	
Esplanade Road	CO1239	CP10	Low	0.300	0.375	47.05	\$220	\$10,351	\$14,939
	CP10	OUT5	Low	0.300	0.375	20.86	\$220	\$4,589	
<b>Total</b>								\$76,393	\$76,393

Cost Covered by DIF's                    \$38,196  
 Cost Covered by current residents      \$38,196



**APPENDIX F**

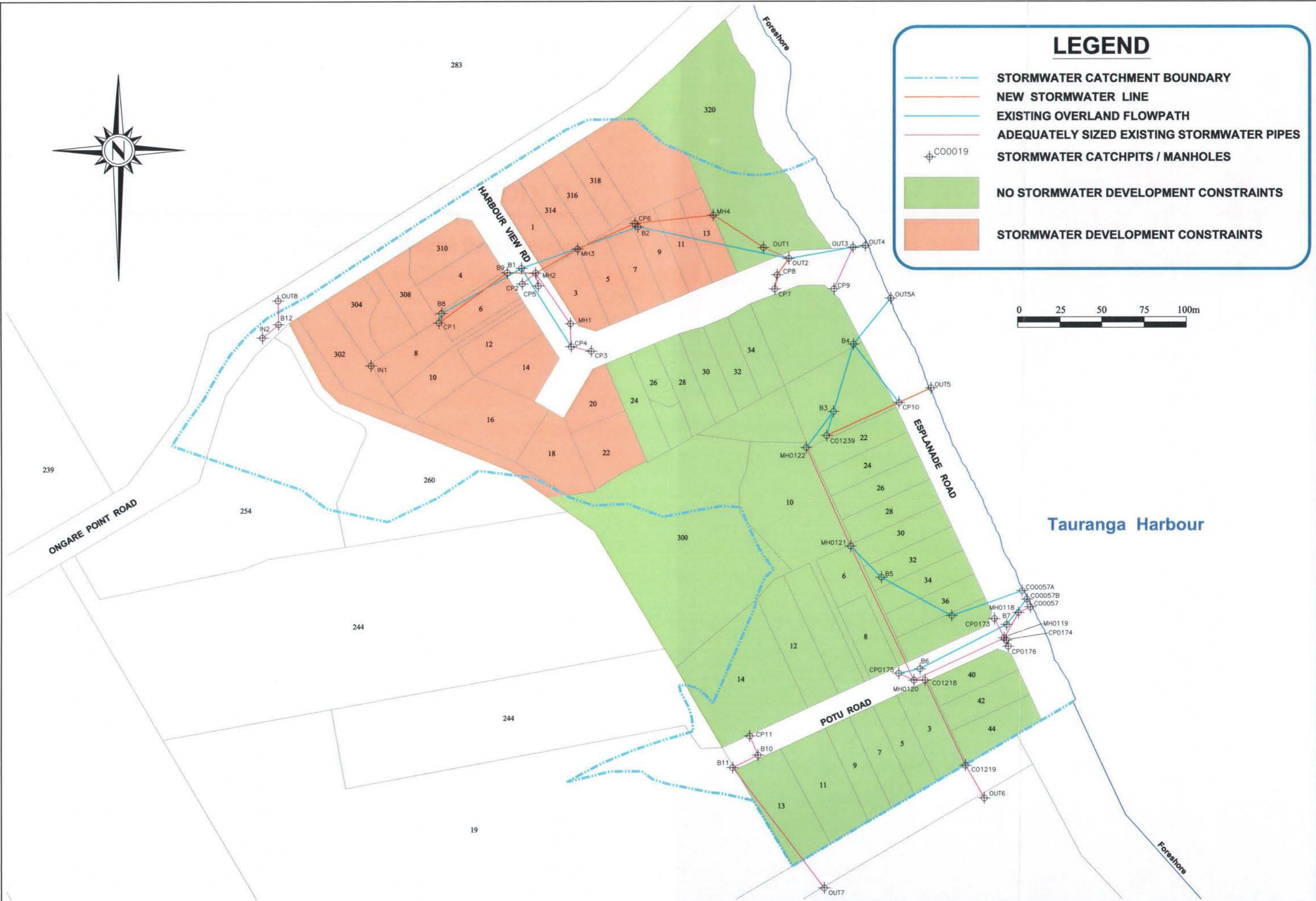
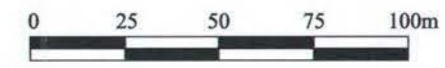
---

**Map of Recommended Stormwater Upgrades**



### LEGEND

- - - STORMWATER CATCHMENT BOUNDARY
- NEW STORMWATER LINE
- EXISTING OVERLAND FLOWPATH
- ADEQUATELY SIZED EXISTING STORMWATER PIPES
- C00019 STORMWATER CATCHPITS / MANHOLES
- NO STORMWATER DEVELOPMENT CONSTRAINTS
- STORMWATER DEVELOPMENT CONSTRAINTS



Scales: ~ 1:1000 (A1)  
 ~ 1:2000 (A3)

Client 	Project <b>ONGARE POINT CATCHMENT          MANAGEMENT PLAN</b>	Sheet Title <b>STORMWATER MODEL          &amp; PROPOSED UPGRADES</b>	Job No. <b>43078</b>	Sheet No. <b>P02</b> <small>2 of 4 sheets</small>	
------------	---	---	-------------------------	---	--



### Proposed Stormwater Works Programme for Ongare Point

ID	Task Name	Estimated Cost	2006	2007	2008	2009	2010	
			1	2	3	4	5	
1	<b>Network Upgrades</b>	\$76,393.00						
2	Harbour View Road - Stage 1	\$15,549.00						
3	Harbour View Road - Stage 2	\$45,905.00						
4	Esplanade Road	\$14,939.00						
5								
6	<b>Ecological Projects</b>	\$20,000.00						
7	Fence Riparian Margin and plant indigenous species	\$20,000.00						