Western Bay of Plenty Integrated Catchment Management Plan

Integrated Catchment Management Plan for Central Catchments

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Client: Western Bay of Plenty District Council (WBOPDC)

ABN: N/A

Prepared by

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Quality Information

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Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	31-Jul-2015	Draft for Client Review - Resource Consent Application	Bob Shaw Principal Water Resources Engineer	
B	15-Feb-2016	Draft for Consultation- Resource Consent Application	Bob Shaw Principal Water Resources Engineer	
C	6-March-2017	Consent Lodgement	Bob Shaw Principal Water Resources Engineer	

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1.0 Introduction

1.1 Scope

There are thirteen identified urban areas within the Western Bay of Plenty District, comprising four large communities and nine small settlements. Western Bay of Plenty District Council (WBOPDC) currently holds a Comprehensive Stormwater Consent (CSC) for Omokoroa catchment and seeks to obtain a CSC for two of these small urban settlements, namely Te Puna West and Minden. These three settlements are located within the area known as *Central Catchments*.

A Catchment Management Plan (CMP) was prepared by Professional Management Services 2009 Ltd (PMS) in November 2013 and reviewed in July 2014[1] as a basis for this CSC application. It was based on the Bay of Plenty Regional Council (BOPRC) Guidelines for the Development of Comprehensive Stormwater Consent Applications and Catchment Management Plans No 2005/002[2].

A gap analysis was undertaken in February 2015 by URS (an AECOM Company) and identified various deficiencies – refer to Appendix A for a copy of the technical and statutory gap analysis. AECOM Consulting Services New Zealand Ltd (AECOM) has been engaged to prepare an Addendum[3] to the CMP for Central Catchment – Te Puna West and Minden urban settlements. Subsequently, this document provides:

- Amendments to the CMP in the following sections:
  - Section 1: Introduction
  - Section 2: Description of Extent of Catchment
  - Section 3: Existing Information
  - Section 4: Identification of Stormwater Management Issues
  - Section 5: Assessment of Environmental Effects
- Additional section 6 addresses the statutory assessment;
- Section 7 (Recommendations) is an amendment to section 6 of the CMP.

This CSC application is for:

- The discharge of stormwater to land, wetlands, and water from multiple locations within the urban settlements of Te Puna West and Minden;
- Associated land disturbing activities and activities within the Coastal Marine Area (CMA) and/or watercourses;
- Maintenance activities on stormwater network;
- Urban areas of Te Puna and Minden settlements only, i.e. the application does not include any rural areas.

There are a number of existing resource consents within the Central Catchment (identified in sections 3.4 and 5.3 of this addendum). As identified in the main CMP document, all responsibilities for these consents will be surrendered pursuant to s138 RMA once the CSC is granted.

The CMP identified various exclusions to this CSC application, based on BOPRC Guidelines No 2005/002[2] in terms of:

- Discharge of contaminated stormwater from industrial areas;

[1] Comprehensive Stormwater Discharge Consent Central Catchments, Urban Stormwater Catchment Management Plan (CMP) CSZ1-Small Settlements on behalf of WBOPDC version 2, PMS dated July 2014
[2] Bay of Plenty Regional Council (BOPRC) Guidelines for the Development of Comprehensive Stormwater Consent (CSC) Applications and Catchment Management Plans (CMPs) No 2005/002
[3] This subject document represents the Addendum to CMP for Te Puna West and Minden Urban Stormwater Catchments, AECOM, 2015

- Greenfield activities;
- Earthworks (bulk earthworks) – although earthworks associated with installation of stormwater infrastructure will be included as part of the CSC.

These exclusions remain under BOPRC's responsibility as linked to commercial and industrial areas however should be included as part of the assessment of environmental effects on the catchment.

Letter from WBOPDC to Te Puna Heartlands dated 16 September 2014 states that:

Council and BOPRC are in agreement that industrial and commercial zones will remain as BOPRC's responsibility and will require separate consents which will be assessed and monitored by qualified BOPRC resources. The effects of runoff from industrial zones are considered by the Regional Council who requires interceptors and similar treatment devices prior to discharge if there is a risk to the environment. If there are industrial/commercial areas that do discharge into Council's network then these are considered in the analysis for pipe sizing. Both Councils are committed to integrated catchment management planning.

1.2 Objective

This section of the CMP was considered appropriate therefore no additional information is required. A list of catchment values is reproduced from the WBOPDC LTP 2015-2025 in Section 3 of this addendum and linkages between these values, catchment issues and proposed stormwater management approaches is presented in Table 19.

1.3 Legislative Background

Gaps in the CMP have been identified in the legislative background section and amendments are addressed in section 6 Statutory Assessment of this Addendum to CMP. Resource consent requirements have been identified in section 7.3 of this Addendum.

1.4 Consultation

In addition to this section it is noted that one Cultural Impact Assessment (CIA) has been completed by Pirirakau[4] and this is contained within Appendix P of the CMP. Additional details are to be added once outcome of further consultation is known. Consultation is ongoing and additional consultation details/outcomes will be included in this report once these are available.

1.5 Clarification of Addendum formatting

This section has been added to clarify the formatting of this Addendum to CMP, i.e.:

- A comment at the start of some sections has been added to provide additional explanation on the extent of the modification of the additional/amended section;
- Where text is shown in strikethrough, it means that the original CMP text has been deleted and modified by the text inserted for this addendum;
- Text in Bold denotes additional prose provided in this addendum.

[4] Refer Pirirakau hapu cultural values as defined in Pirirakau Incorporated Society Cultural Impact Assessment, Western Bay of Plenty District Council Comprehensive Stormwater Consent Central Catchment 2014.

This section supplements the Section 2 of the CMP.

2.0 Description of Extent of Catchment

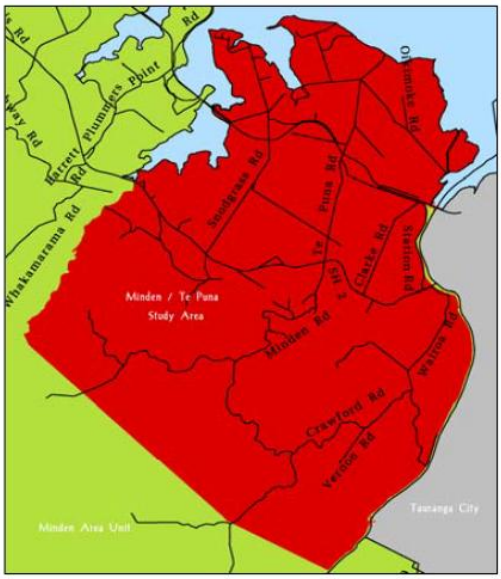
2.1 Study Area

The initial CMP[1] did not clearly depict the catchment delineation and its sub catchments.

Existing reports mention Te Puna and Minden (Te Rangituanehu) catchments as part of Central Catchments (Kaimai) within Western Bay of Plenty District (WBOPD) – refer scope of CMP in section 1.1 of this Addendum.
This CSC application concern only the urban catchment areas of Te Puna West (urban-residential catchment area) and Minden rural-residential catchment area. It excludes the Minden Lifestyle zone – refer Appendix A of the CMP – WBOPDC Stormwater sub catchments small settlements Te Puna-Minden.

This area has been put in context in regard to the Te Puna/Minden catchment as referenced in the Te Puna Community Plan dated 2007[5] (see Figure 1) and the District boundaries and sub catchments (as provided in the Kaimai State of Environment (SoE) report written by Wildlands in 2010 – refer Figure 2).

Figure 1 Te Puna and Minden Catchments in relation to WBOPD, refer Te Puna Community Plan, March 2007[5]



Map showing study area in Minden/Te Puna

Map showing location of Minden/Te Puna in relation to the rest of the Western Bay of Plenty District.

Clarification of the catchment boundaries as well as stormwater and wastewater networks is provided as follows:

- Figure 3 provides delineation of both Te Puna West and Minden urban stormwater catchments in the region (including Omokoroa – which is excluded from the scope of this CMP) and
- Figures 4 and 5 depict each urban stormwater catchment (Te Puna West and Minden) with their landuse.

The following description provides additional context to the study area and stormwater management catchments subject to this CSC application.

[5] Te Puna Community Comprehensive Development Plan, on behalf of the Heartlands Te Puna Community Plan Working Group, March 2007

The non-technical CMP summary dated 2014[6] prepared by PMS states: *The small settlements, are small urban areas with a development potential that is relatively minor due to restrictions in the District Plan i.e. they are fully developed with little opportunity for intensification. This includes Te Puna and Minden. The Minden Lifestyle Zone spans over a significantly bigger footprint. Its development potential is regulated by a Structure Plan and restricted by the difficult geological situation.*

In small urban areas, stormwater from roofs is largely discharged to the ground and road runoff is captured by a mixture of pipes and swales. Grass swales act as a treatment device by cleaning the stormwater before it is discharged to the wider environment. Stormwater from the small settlements is not likely to have adverse effects on the receiving environments provided erosion control is adequate and stormwater swales are maintained.

Several open drains (including Waitui drain, North east drain, Lindoch Drain and other unnamed drains –(refer Figure 7 in section 3.5) are present within the Te Puna West urban catchment but no natural streams appear to be present in that area.

Three tributaries of Oturu Creek are depicted within Minden urban catchment.

The piped stormwater network at Te Puna West and Minden include mainly small diameter stormwater pipes and manholes (refer sections 3.1 and 3.2) which convey stormwater to various stormwater discharge points. Seven stormwater discharge points are depicted in Figure 4, including five within Te Puna West urban catchment discharging directly to the Tauranga harbour and one discharging to the Te Puna Estuary. Two consented stormwater discharge points are depicted in Minden urban stormwater catchment with various stormwater pipes (refer Figure 5).

A list of open drains maintained by Council is provided in Table 1 by the Asset Management Plan for Stormwater Version 2013 dated 20/01/2014. A more comprehensive list is attached in Appendices B and C and a summary is provided in section 3.2 (WBOPDC 2017). They also convey stormwater within the catchment.

Table 1 Te Puna and Minden Stormwater Outfalls Maintained by WBOPDC, refer Asset Management Plan for Stormwater Version 2013 dated 20/01/2014

Location	Description
Minden	Start of Minden*
Minden	Off Oliver Road
Te Puna	Off Snodgrass Road between 434 and 436

*: Further information (address) is provided in section 3 and full detail of the stormwater conveyance systems and assets is attached in Appendices B and C respectively.

Note: This does not align with map from GIS (refer Figure 4)

[6] Western Bay of Plenty District Council Comprehensive Stormwater Consent Application Non-technical Summary Report, PMS, 10 June 2014

Figure 2 Kaimai Central Catchments with District boundaries, Wildland Consultants 2010

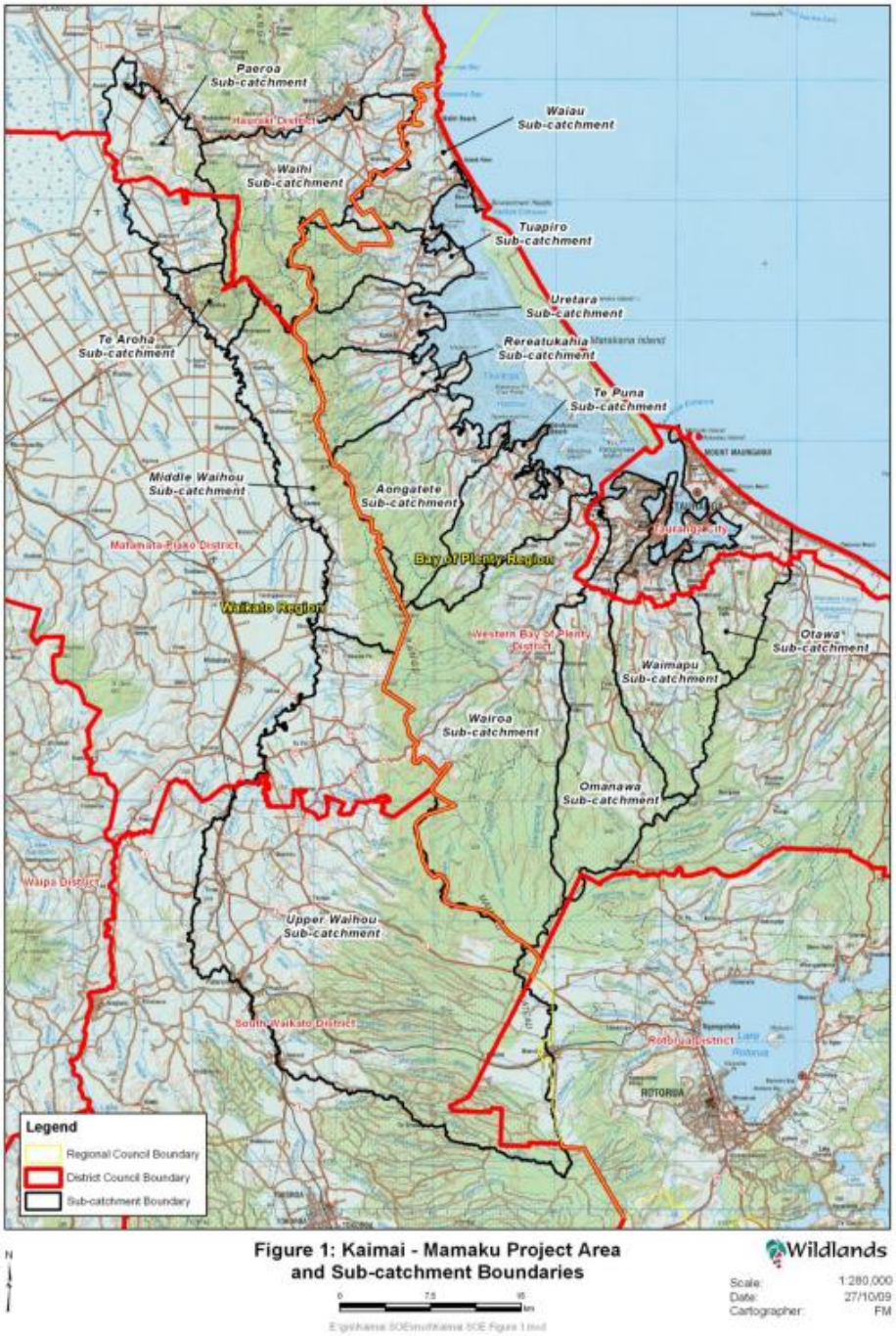


Figure 1: Kaimai - Mamaku Project Area and Sub-catchment Boundaries

Wildlands

Scale: 1:280,000
Date: 27/10/09
Cartographer: FM

Figure 3 Te Puna and Minden Urban Stormwater Catchments Location within WBOPD Central Catchments

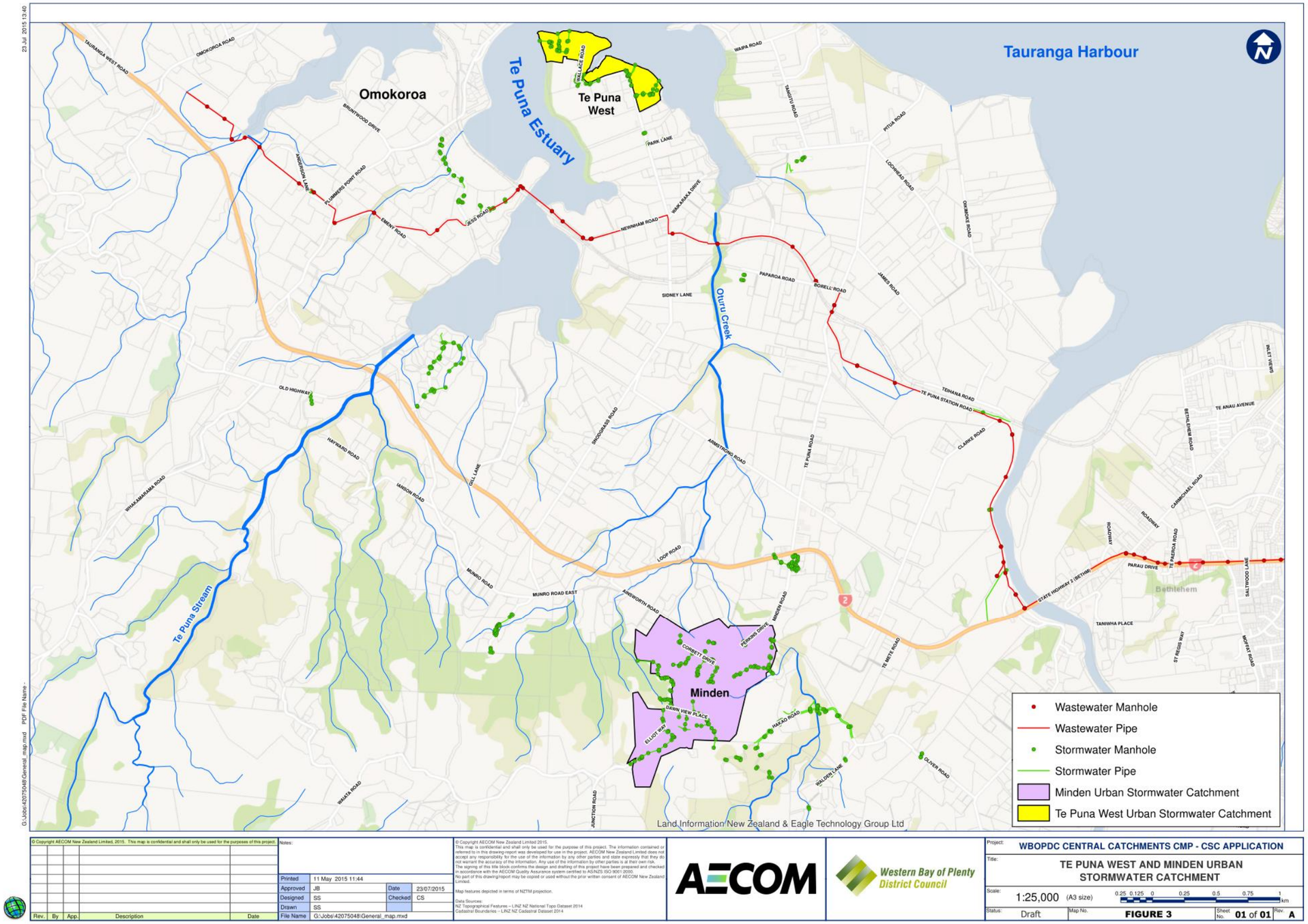


Figure 4 Te Puna West Urban Stormwater Catchment

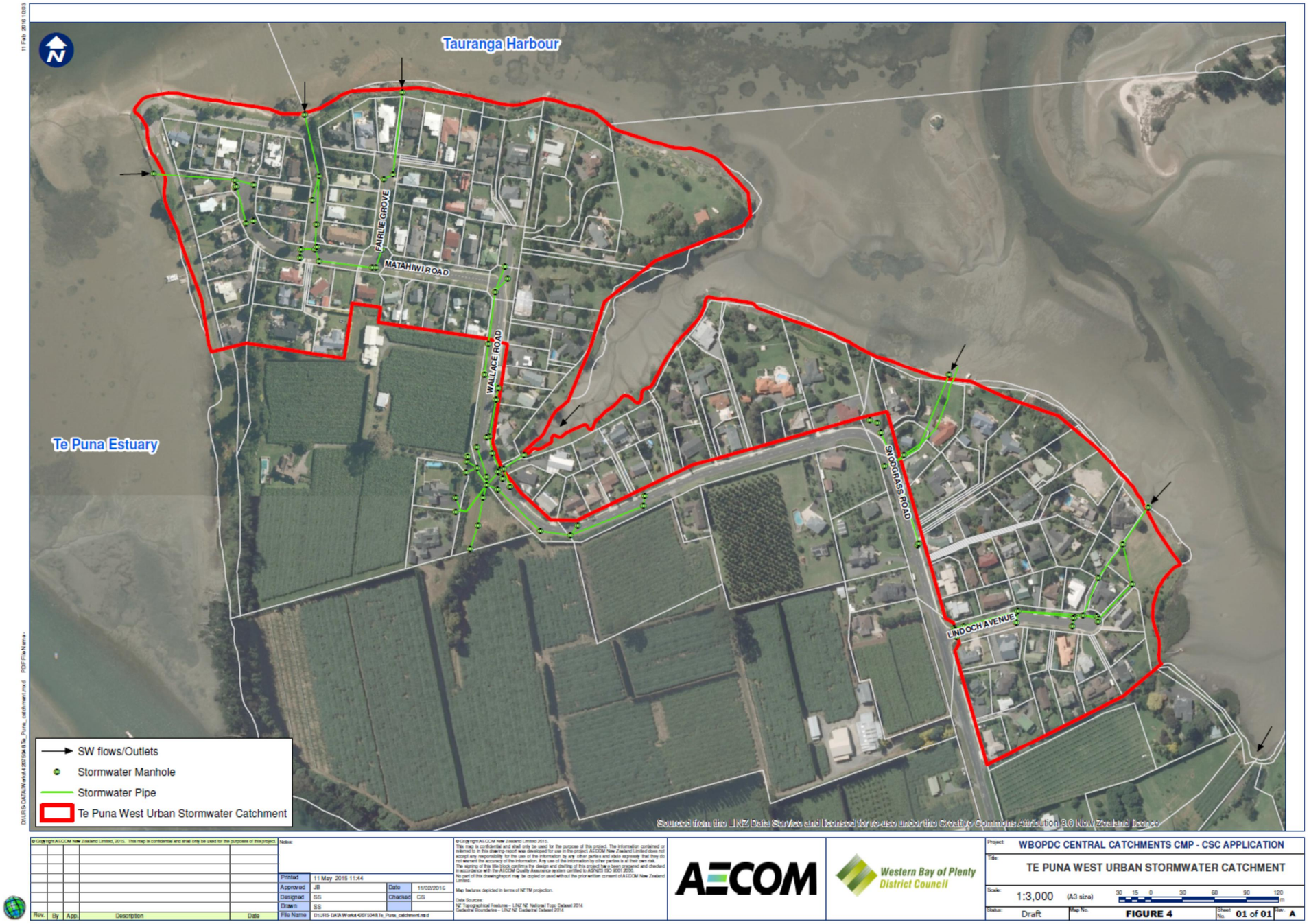
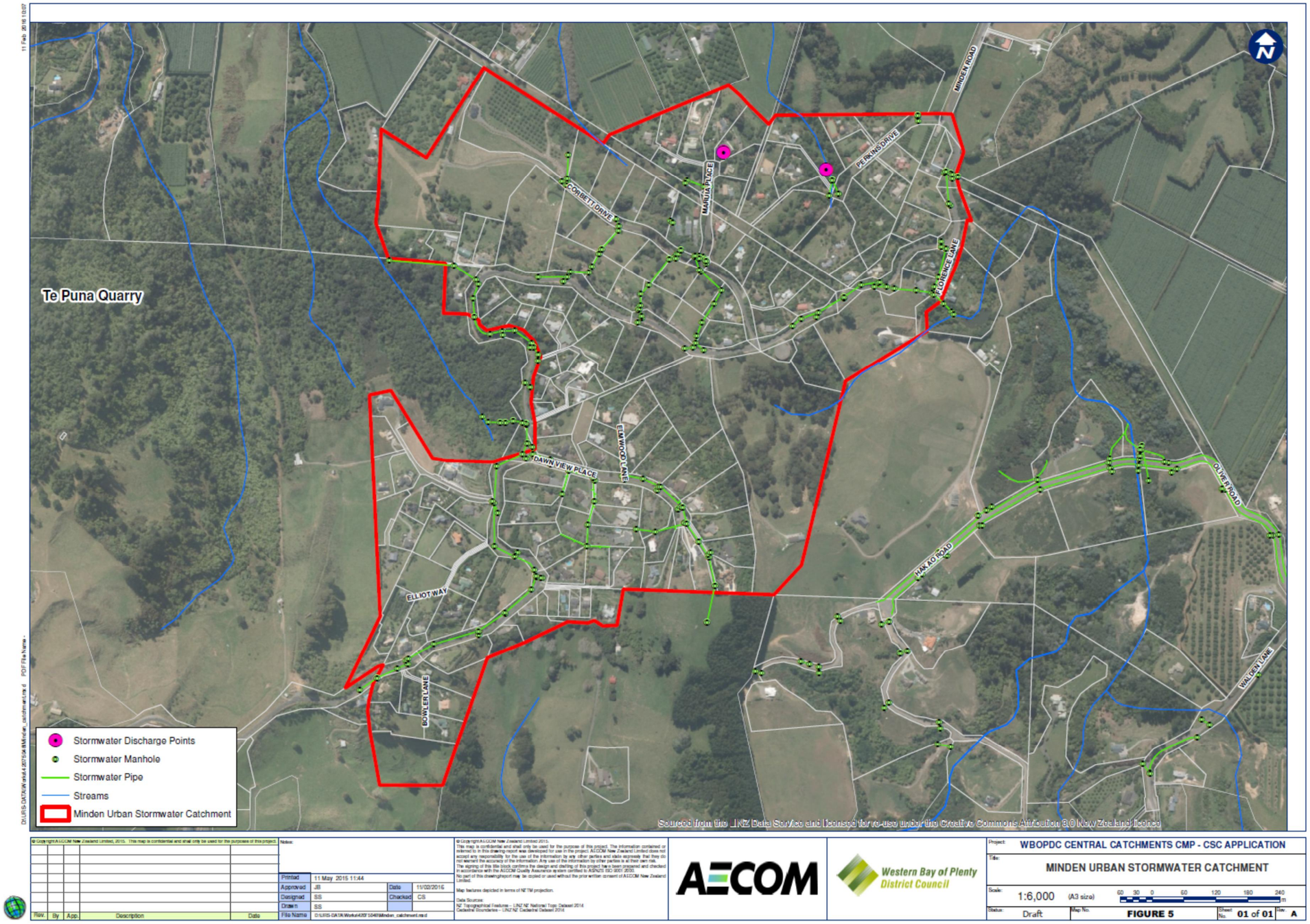


Figure 5 Minden Urban Stormwater Catchment



2.2 Geology and Soil

This section is considered appropriately addressed in the CMP therefore no additional information is required.

2.3 Land Use and Future Development

Gaps were identified regarding the land use within Central Catchments. Table 2 below provides a breakdown of landuse for Te Puna and Minden, derived from GIS shape files provided by WBOPDC and based on the urban catchment boundaries.

Table 2 Te Puna and Minden Catchments Landuse Breakdown (reference: WBOPDC GIS shape files 2015)

Catchments	Te Puna		Minden	
Landuse	(m²)	%	(m²)	%
Indigenous Forest	-	-	58,659	6.7
Pine Forest - Closed Canopy	-	-	2,228	0.3
Gorse and Broom	-	-	6,335	0.7
High Producing Exotic Grassland	47,871	23.1	494,134	56.6
Other Exotic Forest	9,540	4.6	33,436	3.8
Built-up Area	149,965	72.3	183,991	21.1
Orchard and Other Perennial Crops	-	-	41,961	4.8
Broadleaved Indigenous Hardwoods	-	-	52,931	6.1
Total	**207,376**	**100**	**873,674**	**100**

-: landuse type not identified within this catchment.

The Te Puna Community Plan[5] indicates that:

- Te Puna West urban residential landuse includes: Small coastal residential area on medium sized sections displaying a wide range of housing styles from 'baches' to substantial executive homes.
- Minden Rural Residential landuse includes: Large lot residential development on the Minden hill and at Te Karaka Drive and well developed housing on large lots with urban level roading.

Various future developments are likely to happen in the future and include:

· Minden Lifestyle zone as depicted in Appendix A of the CMP (however excluded from the scope of the CSC for Te Puna West and Minden urban catchments) as per the Te Puna Community Plan[5] dated 2007;

· Te Puna West development (refer Te Puna Community Plan dated 2007[5]) could include:

- Growing nodes of Bethlehem and Omokoroa industrial zone established at Te Puna Station Road;
- Possible marina concept for canal housing adjoining the Wairoa River re-development of the Minden/Te Puna commercial area;
- Te Puna Tavern site extensive lifestyle investment with an eye to future development a sewage pipeline dissecting the locality to connect Omokoroa with the Chapel Street treatment plant;

- Maori housing aspirations and the opportunities for Maori economic development recreational pressure on the Te Puna area servicing issues at Te Puna West residential area.

· Implementation of Western Bay of Plenty Subregion's SmartGrowth Strategy and Implementation Plan.

· In order to manage and mitigate any potential stormwater run-off effects due to infrastructure development required for growth needs (refer section 6.8 of the addendum).

Each case growth will need to be carefully planned in order to maintain and enhance catchment values.

2.4 Catchment Values

Catchment values were not clearly identified in the CMP.

The well beings values identified for both Te Puna West and Minden catchments (as indicated in Table 2 of the CMP (page 13) are summarised hereafter. They have been considered in the context of these available reports (refer Cultural Impact Assessment[4], Ecological Assessments[7] and LTP[8]) and therefore could relate to wider catchment.

As per the gap analysis dated February 2015 (refer Appendix A), it was recommended that Tangata Whenua values be represented as a separate value and that public health be separated from social value. Amendments have been made and are depicted in the following Tables 3 and 4.

Values and objectives are anticipated to be agreed at a joint workshop with WBOPDC, Tangata Whenua and key stakeholders as part of the consultation process (refer section 7.4).

Tangata whenua values and description are based on Pirirakau Incorporated Society Cultural Impact Assessment, Western Bay of Plenty District Council Comprehensive Stormwater Consent Central Catchment dated 2014[4]. It states that: *Te Puna and the Minden known by Pirirakau as Te Rangituanehu which is how this CIA will reference the area meaning the setting of the sun as explained by a Pirirakau kaumatua form a portion of the Pirirakau rohe tribal area. The Pirirakau rohe extends from the Wairoa River to the Waipapa River from the moana sea to the Kaimai ridge with extended interests into Athenree.*

Environment, social, cultural, public health and economic values for Te Puna and Minden catchments are detailed in Tables 3 and 4. Tangata Whenua / cultural values are given for the Pirirakau area, comprising Te Puna and Minden, as depicted in Figure 6.

[7] Refer Ecological Assessments of Stormwater at Te Puna WBOPD, Wildlands, 2005; and Ecological Assessments of Stormwater at Minden, Wildlands, 2009

[8] Refer Western Bay of Plenty District Council (WBOPDC) Long Term Plan (LTP) 2015-2025.

Figure 6 Cultural Impact Assessment Area of Concern: Pirirakau Area comprising Te Puna and Minden

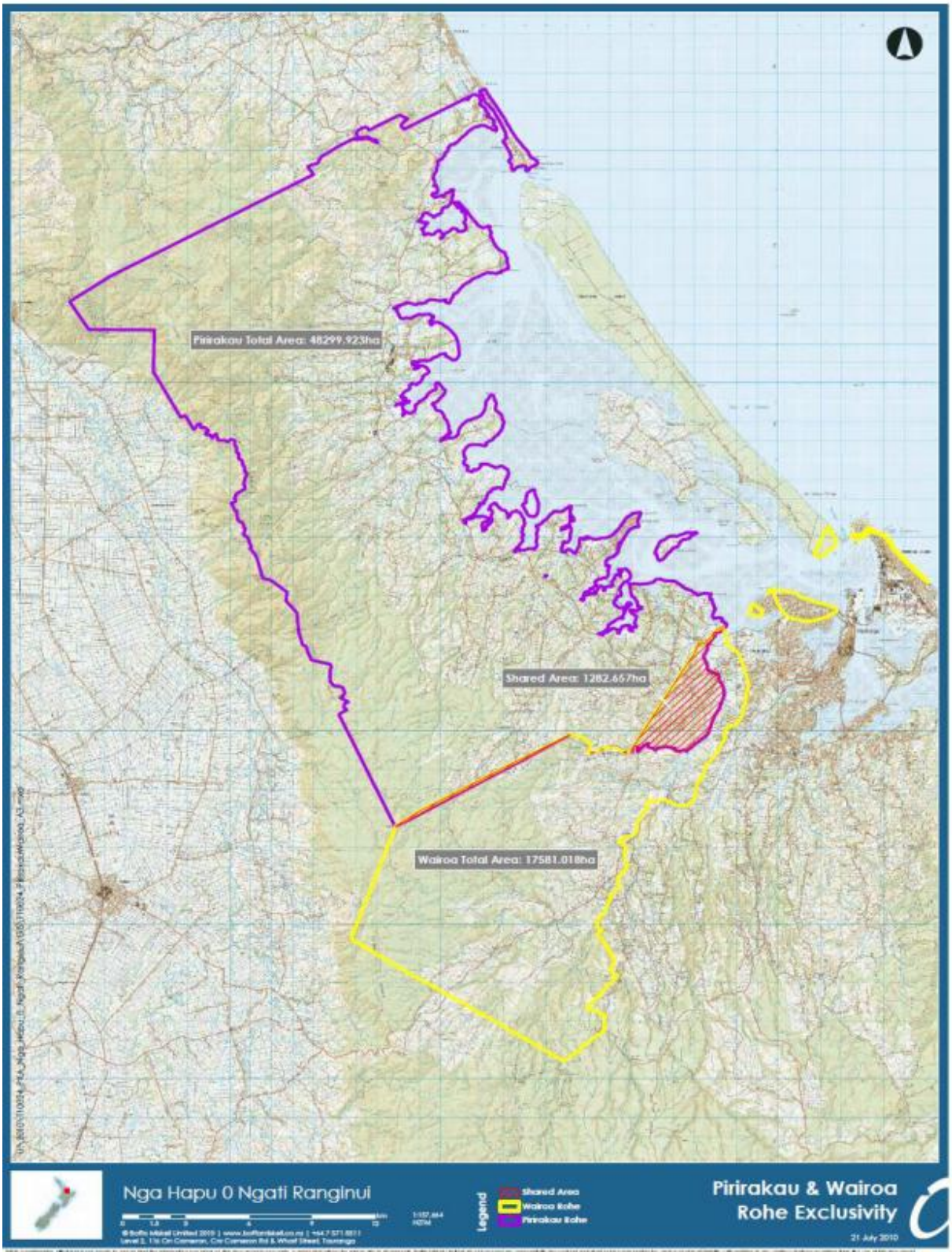


Table 3 Te Puna Catchment Values

Well beings	Values	Identification of values within Te Puna Catchment[9],[10]	Location within Catchment
Environment and Ecological	Original vegetation and creeklines	Intertidal vegetation such as mangrove shrubland and oioi-searush sedgeland: 3ha (4.5%)	West, North and East of the catchment boundary
		Residential areas, orchard building and gardens/reserves: 32ha (48%)	Throughout within the catchment
		Kiwifruit orchards including shelterbelts and hedges + other orchards (tomato, citrus): 28.5ha (42.7%)	Mainly located south western part of the catchment
		Exotic treeland i.e. radiata pine-dominant treeland 2.3 ha (3.5%)	Consists of buffer located south western of the catchment between kiwi orchards and intertidal vegetation
		Indigenous plantation Kauri (Agathis australis): 1.1ha (1.7 %) No indigenous terrestrial vegetation and habitat types within the catchment. It mainly consists of orchards and residential/commercial areas.	Centre of the catchment
	Native water birds, fish, aquatic fauna and flora	**Fish -** Mosquito fish (gambusia affinis) were present at the artificial pond location on the eastern side of the peninsula. Most likely that other fish i.e. short fin eels (Anguilla australis) be present in those waterways. **Flora -** Thirty indigenous vascular plants and forty exotic flora species reported in Te Puna catchment. **Birds -** No threaten birds/plants species and very limited waterways for indigenous fish. Intertidal flats in Tauranga Harbour represent a very significant ecological value for	Various locations within the wider Te Puna catchment (No fish records within Te Puna West urban stormwater catchment due to the absence of streams).

[9] Refer Ecological Assessment of Stormwater at Te Puna WBOPD, Wildlands, 2005
[10] Refer Pirirakau hapu cultural values as defined in Pirirakau Incorporated Society Cultural Impact Assessment, Western Bay of Plenty District Council Comprehensive Stormwater Consent Central Catchment 2014.

Well beings	Values	Identification of values within Te Puna Catchment[9],[10]	Location within Catchment
Environment and Ecological	Native water birds, fish, aquatic fauna and flora	waders, kaimoana and seagrass. Five species of indigenous birds and seven introduced species were recorded in 2005. In addition wading species were found within intertidal habitats.	
	Visually attractive riparian vegetation along the river banks (weed free)	Steep banks and rock/timber walls separate residential properties from the Tauranga harbour and Te Puna Estuary.	North and East of the catchment
	Existing wetland areas and intertidal zone which attract large numbers of water birds	Intertidal vegetation on the margins: mangroves, oioi and searush.	West, north and East of the catchment boundary
	Remains of vegetation and native animals of special conservation	See above native ecological values	
	Natural creek banks as opposed to concrete and sheet piling	Steep banks and rock/timber walls separate residential properties from the harbour.	North and East of the catchment
	Stream health and water quality	Very shallow waterways scoring very low habitat provision.	Various locations within the wider Te Puna catchment (Note: Te Puna West urban stormwater catchment does not include any streams).
	Maintain groundwater quality and avoid any potential contamination to groundwater by restricting use and monitoring	Three aquifers are used within Central Catchments[11] (refer Gordon 2001, WBOPDC 1998). The groundwater uses include agricultural irrigation (orchard / horticulture / kiwi fruit irrigation) and water supply/ domestic use, (refer section 5.3 of the addendum).	Aquifers located within Tauranga Two groundwater bores have been identified as part of the environmental monitoring program undertaken by BOPRC at Kaimai Central Catchment. These bores include: (i) Wairoa at Lower Kaimai: use for quantity and quality rainfall measurement to

[11] Based on Review of Groundwater Resources in the Bay of Plenty Region, Institute of Geological & Nuclear Sciences Limited, 2005

Well beings	Values	Identification of values within Te Puna Catchment[9],[10]	Location within Catchment
			monitor groundwater recharge availability. (ii) Bore 2504 is located at Otumoetai Tauranga.
Social[12],[13]	Boating and secondary contact recreation throughout the catchment	Refer to water resources within the catchment and receiving waters (section 5.2 of the Addendum) and reserves in section 4.2.1 of the CMP – maintenance of drainage reserve.	Within entire catchment
	Swimming		
	Fishing and consumption of fish / shellfish.		
	Recreational areas with water features which are visually pleasing and safe		
	Walking and bike tracks following the River with no visual pollution.		
	Facilities and use of waterways with environmental and cultural education and awareness themes.	Refer to Water Resources within the catchment and receiving waters (section 5.2 of the Addendum) Stormwater awareness documentation was distributed by WBOPDC as part of the consultation for CSC application, refer Stormwater Brochure[13]. Other education programs include: (i) Cleaner Production Programme, aimed at industry, targeting sectors and locations (e.g. kiwifruit industry); and (ii) Zero Waste Education Programme for schools (refer section 4.2.1 of the CMP).	Within entire catchment
Tangata Whenua (Cultural)[14]	Protecting the mana of the hapu;	Numerous archaeology artefacts	
		Sites of significance within Te Rangituanehu (Minden)- as part of the wide area of interest for	

[12] Refer Western Bay of Plenty Disctrict Council (WBOPDC) Long Term Plan (LTP) 2015-2025.
[13] Refer WBOPDC CSC Comprehensive Stormwater Consent Brochure dated May 2014
[14] Refer Pirirakau hapu cultural values as defined in Pirirakau Incorporated Society Cultural Impact Assessment, Western Bay of Plenty District Council Comprehensive Stormwater Consent Central Catchment 2014 – this is based on a wider area than the Te Puna West urban stormwater catchment.

Well beings	Values	Identification of values within Te Puna Catchment[9, 10]	Location within Catchment
Tangata Whenua (Cultural)	Maintaining our spiritual and physical cultural beliefs; Protecting the sensitive sites and burial grounds of our tupuna; Supporting and restoring abundant mahinga kai resources, particularly restoration in areas where they formerly flourished; Protecting the quality of the waters of Tauranga moana and our rivers and water linkages; Protecting wahi tapu / wahi taonga; Protecting cultural land and seascapes; Achieving a sufficient 'cap' on development in areas of cultural sensitivity; The Protection, enhancement and maintenance of Mauri; The protection of taonga (natural environment and resources) Enhancing access to areas of cultural significance and mahinga kai throughout our rohe tribal area.	*CIA include:*	
		Parts of the landscape are tapu and it is considered to be important as a fish nursery. Wahi tapu is located in the middle reaches of the Te Hakao area, adjacent to the East Coast Main Trunk Railway and Te Puna Station Road.	Te Hakao stream – upper catchment has a low-lying wetland that extends from the mouth of the Wairoa River, past Pukewhanake to the foot of Te Rangituanehu (Minden).
		Te Rangituanehu – Minden range: No major Pa on these hills however archaeological discoveries may recant this suggestion.	
		He Huarahi ki Pukewhanake – Pathway to Pukewhanake (Track) Branch of the Wairere track ran from Whakamarama to Te Puna, via Waiwhatawhata over Te Rangituanehu.	
		He Huarahi ki Te Puna – Pathway to Te Puna (Track) This track was a branch from Waiwhatawhata, around the western side of Te Rangituanehu to reach Parewhataroa, Raropua, Poututerangi, Oikimoke and Pukewhanake.	
		Puna Tapu – Sacred spring Waahi tapu (Puna) adjacent to the upper reaches of the Oturu Stream.	Vicinity of Te Puna Quarry
		Waahi Nohonga – Resting place **Elevated land and a swamp extending from the base of Te Rangituanehu to the Te Puna Stream. This area was a waahi nohoan.**	**East of the lower reaches of the Te Puna stream (this location appears to be within the Te Puna West stormwater urban catchment)**
		Sites of significance outside Te Rangituanehu (Minden) as part of the wide area of interest for CIA include:	
		Te Irihanga Pa	north west of Irihanga

Well beings	Values	Identification of values within Te Puna Catchment[9],[10]	Location within Catchment
		Waiwhatawhata Pa	
		Waiorooro (mouth of the Hakao Stream) The length of Te Hakao was tapu, fishing could take place at two places, at the mouth, Waiorooro, and at its confluence with the Wairoa River.	
		The Ruangangara Stream (Ohourere Stream)	
		He Huarahi ki Te Awa: Valley through which the Ruangangara Stream runs extended from Whakamarama Pa, to Waiwhatawhata, Te Irihanga, and downstream to its confluence with the Wairoa River.	
Public Health	Watercourses safe for swimming, contact recreation and food gathering.	Applicable to the entire catchment, in particular those recreational areas where red level action of analysed parameters (*E.coli* and enterococci) have been periodically reached: receiving environment and recreational areas at Te Puna West (Te Puna Drains: Waitui, NE and Lindoch Drains).	Several open drains (including Waitui drain, North east drain, Lindoch Drain and other unnamed drains - refer Figure 7 in section 3.5) are present within the Te Puna West urban catchment but not stream appear to be present in that area. These drains discharge to Tauranga Harbour and Te puna Estuary.
Economic	Property values improved by waterway location or with views of waterways	Appropriate implementation of stormwater management into existing areas and future development.	Throughout the catchment.
	Stormwater suitable for reuse	Potential use of rain tanks to collect runoff for reuse where appropriate.	Throughout the catchment.

Table 4 Minden Catchment Values

Well beings	Values	Identification of values within Minden Catchment[15], [16]	Location within Catchment
Environment and Ecological	Original vegetation and creeklines	Vegetation Type 1: Secondary forest	Centre of catchment
		Vegetation Type 2: Treefernland	Spread all around the catchment
		Vegetation Type 3: Mixed indigenous and exotic forest (3A) and scrub (3B)	Centre and western part of catchment
		Vegetation Type 4: Enhancement and restoration plantings	Mainly western side of the catchment at catchment boundary
		Vegetation Type 5: Wetland	East of the catchment
		Vegetation Type 6: Exotic plantation forest	Mainly eastern and western side of the catchment
		Vegetation Type 7: Pasture, horticulture, residential, and gardens.	Reminding of the catchment
	Native water birds, fish, aquatic fauna and flora	**Fish** - Nine indigenous species of fish have been recorded in the waterways including longfin eel (Anguilla dieffenbachii) which is classified as 'Chronically Threatened - Gradual Decline' (Hitchmough et al. 2007). **Flora** - Flora species visible from public roads consist of: indigenous species and exotic species with a very limited range of indigenous vascular plants. A wide range of naturalised adventive vascular plant species was observed, including some which are invasive species, e.g. brush wattle, willow-leaved hakea, pampas, Taiwan cherry, and woolly nightshade. **Birds -** Twenty bird species were observed during 2009 Ecological Assessment, including eleven indigenous species. The indigenous species were fantail (Rhipidura fulginosa), tui (Prosthemadera novaeseelandiae), silvereye (Zosterops lateralis), grey warbler (Gerygone igata), paradise duck	Te Puna Stream, Oturu Creek and Wairoa River

[15] Refer Ecological Assessment for the Minden Structure Plan WBOPD, Wildlands Report dated 2009 – based on wider Minden catchment than the Minden urban stormwater catchment (refer Figure 11 and section 5.2).
[16] Refer Pirirakau hapu cultural values as defined in Pirirakau Incorporated Society Cultural Impact Assessment, Western Bay of Plenty District Council Comprehensive Stormwater Consent Central Catchment 2014 – this is based on a wider area than the Minden urban stormwater catchment.

Well beings	Values	Identification of values within Minden Catchment[15], [16]	Location within Catchment
Environment and Ecological	Native water birds, fish, aquatic fauna and flora	(Tadorna variegata), spur-winged plover (Vanellus miles), Australasian harrier (Circus approximans), welcome swallow (Hirundo tahitica), white-faced heron (Ardea novaehollandiae), kingfisher (kotare, Halcyon sancta), and pukeko (Porphyrio porphyrio). The exotic species recorded were Australian magpie (Gymnorhina tibicen), house sparrow (Passer domesticus), mallard duck (Anas platyrhynchos), song thrush (Turdus philomelos), blackbird (Turdus merula), yellowhammer (Emberiza citrinella), goldfinch (Carduelis carduelis), starling (Sturnus vulgaris), and blackbird (Turdus merula). **Fauna** – no available information	
	Visual attractive riparian vegetation along the river banks (weed free)	A- partially revegetated with indigenous species such as manuka, karamu, harakeke, and ti kouka. Exotic species include tree lucerne (which has been planted at the site), pampas, and pasture grasses.	I'Anson Road (A)
		B- ornamental and enhancement plantings of indigenous species such as tarata, ramarama Lophomyrtus bullata), houhere (Hoheria populnea), akeake (Dodonaea viscosa), ti kouka, mahoe, kauri (Agathis australis), and harakeke.	I'Anson Road (B)
		C- headwaters of a small stream located in a pasture-clad gully	Munro (C)
		D- southern end of this gully has recently been cleared of the treefernland that remains further downstream.	**Minden Road (D)[17]**
		E- not easily observed from public land, but the surrounding vegetation appears to be predominantly pasture.	**Corbett Drive (E)**[17]
		F- Species on the pond banks include pampas, gorse, and Japanese honeysuckle (Lonicera japonica). West of Walden Road, the stream flows into a gully where radiata pine are emergent over mamaku (Vegetation Type 3).	**Walden Road (F)**[17]
		G- Stream banks include gorse, Juncus articulatus, Juncus effusus, and ring fern.	Oliver Road (G)
		H- Planted species on the south side of the road include Carex virgata, harakeke, totara (Podocarpus totara), and ramarama. Arum lily (Zantedeschia	Crawford Road (H)

[17] Those locations are included within the Minden urban stormwater catchment. The rest of ecological areas (A, B, C, G, H, I and J) are located outside of the Minden stormwater urban catchment.

Well beings	Values	Identification of values within Minden Catchment[15], [16]	Location within Catchment
Environment and Ecological		aethiopica) and broad-leaved dock (Rumex obtusifolius) are abundant.	
		I- gully, pasture.	Crawford Road (I)
	Visual attractive riparian vegetation along the river banks (weed free)	J- The riparian margins are planted with indigenous species such as karamu, kohuhu, ti kouka, harakeke, manuka, and koromiko . The site is surrounded by mamaku, black wattle, and gorse Other species include ponga, mahoe, kawakawa, black wattle, and tree privet.	Hakao Road (Site J).
	Existing wetland areas and intertidal zone which attract large numbers of water birds	Wetland area located on the eastern side of the catchment	
	Remains of vegetation and native animals of special conservation	See above native ecological values	
	Natural creek banks as opposed to concrete and sheet piling	See above native ecological values	
	Stream health and water quality	Few tributaries of Oturu Creek depicted on Figure 5 of the Addendum. No monitoring was available for Minden urban stormwater catchment on stream health and water quality.	Tributaries of Oturu Creek
	Maintain groundwater quality and avoid any potential contamination to groundwater by restricting use and monitoring	Three aquifers are used within Central Catchments[18] (refer Gordon 2001, WBOPDC 1998). The groundwater uses consist of agricultural irrigation (orchard / horticulture / kiwi fruit irrigation) and water supply/ domestic use, (refer section 5.3 of the Addendum).	Aquifers located within Tauranga - Two groundwater bores have been identified as part of the environmental monitoring program undertaken by BOPRC at Central Catchment. These bores include: (i) Wairoa at Lower Kaimai: use for quantity

[18] Based on Review of Groundwater Resources in the Bay of Plenty Region, Institute of Geological & Nuclear Sciences Limited, 2005

Well beings	Values	Identification of values within Minden Catchment[15], [16]	Location within Catchment
			and quality rainfall measurement to monitor groundwater recharge availability. (ii) Bore 2504 is located at Otumoetai Tauranga.
Social[19] [20]	Boating and secondary contact recreation throughout the catchment	Refer to water resources within the catchment and receiving waters (section 5.2) and reserves in section 4.2.1 of the CMP – maintenance of drainage reserve.	Within entire catchment
	Swimming		
	Fishing and consumption of fish / shellfish		
	Recreational areas with water features which are visually pleasing and safe		
	Walking and bike tracks following the River with no visual pollution		
	Facilities and use of waterways with environmental and cultural education and awareness themes	Refer to Water Resources within the catchment and receiving waters (section 5.2). Stormwater awareness documents was distributed by WBOPDC as part of the consultation for CSC application, refer Stormwater Brochure[13]. Other education programs include: (i) Cleaner Production Programme, aimed at industry, targeting sectors and locations (e.g. kiwifruit industry); and (ii) Zero Waste Education Programme for schools (refer section 4.2.1 of the CMP).	Within entire catchment
Tangata Whenua (Cultural)[21]	Protecting the mana of the hapu;	<u>Sites of significance within Te Rangituanehu (Minden) as part of the wide area of interest for CIA include</u>:	low-lying wetland that extends from the mouth

[19] Refer Western Bay of Plenty Disctrict Council (WBOPDC) Long Term Plan (LTP) 2015-2025.
[20] Refer WBOPDC CSC Comprehensive Stormwater Consent Brochure dated May 2014

Well beings	Values	Identification of values within Minden Catchment[15], [16]	Location within Catchment
Tangata Whenua (Cultural)	Maintaining our spiritual and physical cultural beliefs; Protecting the sensitive sites and burial grounds of our tupuna; Supporting and restoring abundant mahinga kai resources, particularly restoration in areas where they formerly flourished; protecting the quality of the waters of Tauranga moana and our rivers and water linkages; Protecting wahi tapu / wahi taonga; Protecting cultural land and seascapes; Achieving a sufficient 'cap' on development in areas of cultural sensitivity; The Protection,	Te Hakao stream – upper catchment. Parts of this landscape are tapu and it is considered to be important as a fish nursery. Wahi tapu is located in the middle reaches of the Te Hakao area, adjacent to the East Coast Main Trunk Railway and Te Puna Station Road.	of the Wairoa River, past Pukewhanake to the foot of Te Rangituanehu (Minden)
		Te Rangituanehu – Minden range: No major Pa on these hills however archaeological discoveries may recant this suggestion.	
		He Huarahi ki Pukewhanake – Pathway to Pukewhanake (Track) Branch of the Wairere track ran from Whakamarama to Te Puna, via Waiwhatawhata over Te Rangituanehu.	
		He Huarahi ki Te Puna – Pathway to Te Puna (Track) This track was a branch from Waiwhatawhata, around the western side of Te Rangituanehu to reach Parewhataroa, Raropua, Poututerangi, Oikimoke and Pukewhanake.	
		Puna Tapu – Sacred spring Waahi tapu (Puna) adjacent to the upper reaches of the Oturu Stream.	Vicinity of Te Puna Quarry
		Waahi Nohonga – Resting place Elevated land and a swamp extending from the base of Te Rangituanehu to the Te Puna Stream. This area was a waahi nohoan.	East of the lower reaches of the Te Puna stream
		<u>Sites of significance outside Te Rangituanehu (Minden) include:</u> Te Irihanga Pa	north west of Irihanga
		Waiwhatawhata Pa	
		Waiorooro (mouth of the Hakao Stream) The length of Te Hakao was tapu, fishing could take place at two places, at the mouth, Waiorooro, and at its confluence with the Wairoa River.	
		The Ruangangara Stream (Ohourere Stream)	
		He Huarahi ki Te Awa	

[21] Refer Pirirakau hapu cultural values as defined in Pirirakau Incorporated Society Cultural Impact Assessment, Western Bay of Plenty District Council Comprehensive Stormwater Consent Central Catchment 2014– this is based on a wider area than the Minden urban stormwater catchment.

Well beings	Values	Identification of values within Minden Catchment[15], [16]	Location within Catchment
	enhancement and maintenance of Mauri; The protection of taonga (natural environment and resources) Enhancing access to areas of cultural significance and mahinga kai throughout our rohe tribal area.	Valley through which the Ruangangara Stream runs extended from Whakamarama Pa, to Waiwhatawhata, Te Irihanga, and downstream to its confluence with the Wairoa River.	
Public Health	Watercourses safe for swimming, contact recreation and food gathering.	Applicable to the entire Minden urban Stormwater catchment.	Tributaries of Oturu Creek discharging to Waikaraka Estuary and ultimately to the Tauranga Harbour.
Economic	Property values improved by waterway location or with views of waterways	Currently some waterways reaches have been identified as depreciated opportunities exist for enhancement of ecological catchment values and therefore potential economic values.	Throughout the catchment.
	Stormwater suitable for reuse	Potential use of rain tanks to collect runoff for reuse where appropriate.	Throughout the catchment.

This section supplements and amends the Section 3 of the CMP.

3.0 Existing Information

3.1 Hydrological Modelling

Gaps were identified in the hydraulic modelling section of the CMP in particular the following were noted:

- Only 50 year flood map (included within DWK report 2005[22]) for Te Puna is provided. AECOM recommends carrying out 100 year hydrological modelling for Te Puna to be compliant with the BOPRC guidelines No 2005/002[2] (and provide determination of 1% AEP flood levels as required in section 3.3 of the CMP).
- No hydrological modelling work was carried out for Minden area. AECOM recommends undertaking 50 year and 100 year hydrological modelling for this catchment.
- Incorrect statement on page 42: "The design floods are represented by estimated rainfall intensities."
- The CMP mentioned that WBOPDC has applied adjustment of climate change rainfall intensity since 2007 (page 42), however no updated hydrological modelling results have been provided as a result of this adjustment.

The current stormwater model for Te Puna was not available at the time of writing this report and the hydrological modelling for Minden was missing therefore this section could not be amended to address all the gaps listed above. The following amendments are suggested to be read in conjunction with section 3.1 of the CMP:

3.1.1 Te Puna West Hydrological Modelling 2005

Modelling scope, methodology and findings (DWK Report 2005[22]) are summarised below:

- Scope of the hydrologic modelling for Te Puna West, a small residential settlement located south east of the Katikati Township. The stormwater network was modelled using the MOUSE drainage software. However, the model was not available at the time of writing the Addendum therefore this could be addressed as a CSC condition for Te Puna West.
- Objectives of the modelling were to check the capacity of the current stormwater network, to determine flood levels and suggest any options to mitigate those stormwater issues.
- Results of the modelling included recommendations on the network upgrade based on maximum probable development using the current WBOPDC Code of Practice and District Plan constraints (refer sections 3.2 and 5.1 of the Addendum for details of guidelines). Specifically, the following were recommended:
- Stormwater propositions concern mostly piped system upgrade due to topographical and space constraints;
- Upgrade of stormwater assets as part of capital works to be added to the Long Term Council Community Plan (LTCCP);
- Maintenance of assets to be included as well;
- Implementation of land coverage restrictions in order to limit the catchment imperviousness to 35% (or the factor C above 0.5).

Table 5 provides a summary of the recommended stormwater options to be implemented within Te Puna West catchment resulting from the hydrological modelling and comparison to the existing upgrades in 2012 and existing stormwater network as depicted in Figure 4 (in section 2.1 of the Addendum).

[22] Duffil Watts & King Ltd (DWS) Te Puna West Stormwater Catchment Management Plan, Hydrological Modelling Report, 2005

Table 5 Te Puna Hydrologic Modelling Results Proposed Stormwater Works and Status (refer DWK 2005 and Drawing Flood Hazard Areas vs Stormwater Upgrades dated 2012)

Project	Type of Project	Timeframe	Status in October 2012[23]	Status in 2015 – ref GIS stormwater information
Matahiwi Road Stage 1	New pipe's installation and pipes upgrades	2007-2008	Upgrade but different than DWS Hydrological Modelling Report's recommendation	Upgraded and existing
Wallace Road Stage 1	Pipes upgrade	2008-2009	Partially upgraded as per DWS Hydrological Modelling Report, pipe connections to property on 41 Wallace Road were not existing.	Upgraded and existing
Matahiwi Road Stage 2	New pipes' installation	2008-2009	Upgraded as per DWS Hydrological Modelling Report	Upgraded and existing
Lindoch Avenue	Pipes upgrade	2009-2010	Upgraded as per DWS Hydrological Modelling Report	Upgraded and existing
Snodgrass Road	New pipe's installation and pipes upgrades	2010-2011	Partially upgraded as per DWS Hydrological Modelling Report	Upgraded and existing
Wallace Road Stage 2	New pipes' installation and pipes upgrades	2011-2012	Upgraded as per DWS Hydrological Modelling Report	Upgraded and existing
Fairlie Grove	Pipes upgrade	2011-2012	Partially upgraded as per DWS Hydrological Modelling Report	Upgraded and existing

3.1.2 Minden Hydraulic Modelling

There is no information regarding hydraulic modelling for Minden and this is required by BOPRC Guidelines No 2005/002[2] and in this instance it could be addressed as part of the CSC conditions for Minden urban stormwater catchment as it is particularly important for any future developments.

3.2 Existing Stormwater Network

3.2.1 Existing Stormwater Conveyance Systems

Details of existing stormwater pipes within Te Puna and Minden catchments are provided in Appendix B. A total of 299 stormwater conveyance systems have been reported including:

- Nine grass swales within Minden;
- Three open drains within Minden;
- 287 stormwater pipes including 208 stormwater pipes within Minden and 79 stormwater pipes within Te Puna.

Based on the information provided by WBOPDC 2017, three stormwater pipes are planned to be upgraded in Te Puna on Wallace Road.

[23] Refer Drawing Flood Hazard Areas vs Stormwater Upgrades – Overall layout plan 2% AEP (1 in 50 years) dated October 2012 prepared by Spiire for WBOPDC in Appendix H of CMP dated 2014.

3.2.2 Existing Stormwater Assets

Appendix C provides details about stormwater catchpits, grates etc. A total of 267 assets have been reported in Te Puna and Minden urban catchments as follow:

- 130 manholes including 32 in Te Puna and 98 in Minden;
- 106 catchpits including 12 in Te Puna and 94 in Minden;
- Three (culvert) boxes including one in Te Puna and two in Minden;
- Eight culvert inlets in Minden;
- Six stormwater headwall structures in Minden;
- Nine rodding eye in Minden (all located in Dawn View Place).

Based on the information provided by WBOPDC 2017, three stormwater assets (two manholes and one box) are planned to be upgraded in Te Puna on Wallace Road.

3.3 Existing Stormwater Management Requirements

Stormwater management requirements are summarised in section 3.2 of the CMP and updated as part as this modified section. A gap has been identified in terms of stormwater flow and volume assessment, thus the following amendments are suggested (in sections 3.2 and 5.1 of the Addendum).

DWS 2005 reported on the 2% AEP and stormwater constraints within Te Puna catchment. Proposed upgrades were recommended to take into account the existing stormwater management requirements from the following guidelines:

- Bay of Plenty Regional Water and Land Plan (RWLP)[24];
- Bay of Plenty Regional Coastal Environment Plan (BOPCP): refer Water Quality Policy WQ3 and Schedule 10 - Coastal Water Quality Classifications: Equivalent Qualitative and Quantitative Standards[25];
- Stormwater Management Guidelines for the Bay of Plenty Region[26];
- Western Bay of Plenty District (WBOPDC)'s Standard Requirements for Development – Subdivision and Development Code of Practice.

An assessment against the relevant provisions of these documents is presented in Table 12 of Section 5.1 of this Addendum. A review of hydraulic modelling for Te Puna West and review of the network upgrades in order to carry out an assessment of flow by the applicable guidelines may be addressed as part of CSC condition.

Minden has not been modelled therefore could not be assessed by the guidelines. This is anticipated to be part of the Resource Consent condition. Following stormwater modelling of Minden urban stormwater catchment, an assessment of flows by the guidelines may be part of the CSC condition.

3.4 Determination of 1% AEP Flood Levels

A determination of 1% AEP flood levels was not included in the CMP. As the stormwater model was not provided for Te Puna and no modelling has been carried out for Minden, it is not possible to predict the areas within the Central catchment (Te Puna and Minden) where 1% AEP flood levels are anticipated. This remains as a gap and may be addressed as a CSC condition for both urban stormwater catchments at Te Puna West and Minden.

[24] Bay of Plenty Regional Water and Land Plan, 2008 – refer to Rules 30, 30A, 30B, 30C and 37.
[25] Bay of Plenty Regional Coastal Plan (BOPCP) amended 22 February 2011 – Water quality based on Schedule 10 - Coastal Water Quality Classifications: Equivalent Qualitative and Quantitative Standards.
[26] Stormwater Management Guidelines for the Bay of Plenty Region, Guideline 2012/01 dated April 2012

3.5 Existing Consents within the Catchment(s)

The list of existing Consents was identified as incomplete in the CMP. A review of the existing Consents has been conducted and Table 6 summarises those existing Consents:

Most of the consents concern groundwater, and stormwater consents have been displayed in bold in Table 6 for clarity purposes.

Table 6 Central Catchment Current Existing Consents (Te Puna and Minden Catchments) – source: BOPRC 2016 (List of consent within Te Puna and Minden)

CONSENT No	NAME	ADDRESS	APPLICANT ADDRESS	PURPOSE	ISSUED DATE	EXPIRY DATE	EASTING	NORTHING	WATER USE RATE	WATER USE DAILY	MAX RATE VALUE (L/s)	MAX DAILY QUANT VALUE	MAX DAILY QUANT IRRIGATE VALUE	WATER BODY	BORE No
20483-0	Russell A D	89 TE PUNA ROAD, TE PUNA, TAURANGA	Cliff Road, Ohope 3121	TAKE WATER FROM BORE FOR HORTICULTURE IRRIGATION		2026-10-01	1870969	5824469	2 L/s	126 m3/d	2.03		127		64
20811-0	Opihi Nurseries Ltd	OPIHI NURSERY, SNODGRASS ROAD, TE PUNA	9 Waikaraka Drive, R D 2, Te Puna, Tauranga 3172	HORTICULTURAL IRRIGATION		2026-10-01	1869986	5826210	3 L/s	36 m3/d	3.16		36		4450
20815-0	**Western BOP District Council**	**MARUIA PLACE, MINDEN, TAURANGA**	**Private Bag 12803, Greerton, Tauranga 3143**	**DISCHARGE STORMWATER**		**2026-10-01**	**1870352**	**5822840**			**104**	**6240**		**TE PUNA STREAM**	
20866-0	Fraser L & R	GILL LANE, TE PUNA	Gill Lane, R D 2, Tauranga 3172	DOMESTIC USE & IRRIGATION		2026-10-01	1868551	5824222	Null L/s	20 m3/d	3.79		130		4214
20973-0	Allan ME	229 SNODGRASS ROAD, TE PUNA	20 Park Lane, RD 2, Tauranga 3172	ORCHARD IRRIGATION		2026-10-01	1869629	5825442	L/s	m3/d	6.32		369		4019
21121-2	Dave Robertson Family Trust	I'ANSON ROAD, TE PUNA, TAURANGA	33I Anson Road, R D 6, Tauranga 3176	ORCHARD IRRIGATION		2026-10-01	1867656	5824138			1.67		144		
21188-0	**Western BOP District Council**	**MINDEN ROAD SUBDIVISION, MINDEN ROAD, TAURANGA**	**Private Bag 12803, Greerton, Tauranga 3143**	**DISCHARGE STORMWATER**		**2026-10-01**	**1870545**	**5822807**			**120**			**WAIKARAKA STREAM TRIBUTARY**	
21382-1	Bateman GA	NEWNHAMS ROAD, TE PUNA, TAURANGA	48 Newnham Road, RD 4, Tauranga 3174	ORCHARD IRRIGATION		2026-10-01	1869441	5826109			3.2		208	Bore	
21404-0	Haallan Trust	158 ARMSTRONG ROAD, TE PUNA	158 Armstrong Road, Te Puna, Tauranga 3172	ORCHARD IRRIGATION		2026-10-01	1869932	5824826	1.88 L/s	216 m3/d	1.88		216		4380
21465-0	Bryant SF	ARMSTRONG ROAD, TE PUNA	143 Armstrong Road, R D 2, Te Puna, Tauranga 3172	ORCHARD IRRIGATION		2026-10-01	1869817	5824411	0 L/s	50 m3/d	2		143		1059
21682-0	Johnsen CM & KE	GILL LANE, TE PUNA	30 Gill Lane, R D 2, Te Puna, Tauranga 3172	ORCHARD IRRIGATION		2026-10-01	1868751	5824198	0 L/s	0 m3/d	2.7		197		4310
21807-0	P & G Nielson Limited	52 BORELL ROAD, TAURANGA	52 Borell Road, RD 2, Tauranga 3172	IRRIGATION: KIWIFRUIT & NURSERY		2026-10-01	1870942	5825921	0 L/s	30 m3/d	1.26		100		424
21941-0	Somerfield RB	TEIHANA ROAD, TAURANGA	Glenavon Roses, 34 Teihana Road, RD 6, Tauranga 3176	HORTICULTURAL IRRIGATION-KIWIFRUIT		2026-10-01	1872425	5824808	3.47 L/s	300 m3/d	3.47		300		4620
63292-0	Western BOP District Council	PORIPORI ROAD, & CRAWFORD ROAD, TAURANGA	C/- Opus Consultants Limited, PO Box 646, Tauranga 3140	EARTHWORKS TO EXTEND CULVERT	2007-02-14 0:30	2041-10-31 0:30	1869380	5818856							
63714-0	Scapens Family Trust	398 SNODGRASS ROAD, RD 2, TAURANGA	398 Snodgrass Road, Te Puna, Tauranga 3172	Take geo from bore & dis geo to Harbour	2006-09-21 0:30	2026-08-31 0:30	1869802	5827208			2	130		Tauranga Harbour	Harbour
65309-0	Zawadi Trust - The Trustees	220 Te Puna Road, Te Puna	220 Te Puna Road, RD 6, Tauranga 3176	Take water from bore for irrigation and frost	2008-07-07 0:30	2018-06-23 0:30	1871471	5825488	L/s	m3/d	20		720		10758

3.6 Monitoring Results

This section focusses on receiving environment monitoring results and the monitoring requirements are addressed in section 7.5 (initially section 6.5 of the CMP). The following amendments include a summary of receiving environment monitoring results.

A review of the following environmental results/reports has been undertaken:

- Western Bay of Plenty Recreational Water Quality and Shellfish Monitoring, EBOP - BOPRC, 2007-2008;
- Western Bay of Plenty Comprehensive Stormwater Consents Environmental Assessment, December 2012, Freshwater Solutions Environmental Consultant Ltd;
- Bay of Plenty Regional Council Te Puna Environmental Monitoring Results (2006-2015), January 2015;
- Ecological Assessment of Stormwater at Te Puna WBOPD, Wildlands, 2005;
- Ecological Assessment of Stormwater at Minden WBOPD, Wildlands, 2009;
- State of Environment Assessment for the Catchments of the Kaimai Range and Northern Mamaku Plateau; Wildlands, 2010.

Sections 3.5.1 to 3.5.4 provide detail of receiving environment monitoring across the Central Catchments' area and provide relevant context for Te Puna and Minden. Section 3.5.5 summarises stormwater sampling results at Western and Eastern Catchments therefore not directly relevant to the area of concern for this CSC application however it provides an indicative stormwater quality baseline within WBOP area.

3.6.1 2007-2008 WBOP – Central Catchment Monitoring

Water quality was monitored at several locations in the Central Catchments in 2007 and 2008 as part of the recreational water quality and shellfish monitoring. Results are summarised in Table 7 and bold are the locations relevant to Te Puna West and Minden urban stormwater catchments; other results at Central Catchments have been included for comparison purposes. Samples were analysed for enterococci, *E. coli* and Faecal coliforms. Faecal Coliforms have been analysed in various shellfish at Central Catchments sampling locations i.e. pipi at Tilby Point and Pilot Quay, oysters at Te Puna and horse muscles at Te Puna 2.

Table 7 Central Catchments Water Quality Monitoring in 2007-2008

Central Catchments Sampling Sites	Maximum concentrations of Enterococci, *E. coli* and Faecal Coliforms (CFU/100mL)					
	Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08
Enterococci Omokoroa (Omokoroa Beach)	<	<	<	<	<	<
Enterococci Te Puna (Waitui)	<	800	<	<	<	<
Enterococci Pahoia (End of Beach)	<	<	<	230	<	<
E.coli Katikati (Uretara Stream)	650	<	<	280	<	260
E.coli Wairoa River (below Mc Laren Falls Dam)	<	<	<	<	<	930
Faecal Coliforms Shellfish Tauranga Harbour (Tilby Point)	<	<	<	<	<	NA
Faecal Coliforms Shellfish Tauranga Harbour (Pilot Quay)	<	<	<	<	3,000	NA
Faecal Coliforms Shellfish Tauranga Harbour (Te Puna)	<	<	9,000	<	5,000	NA
Faecal Coliforms Shellfish Tauranga Harbour (Te Puna 2)	<	<	<	<	NA	NA

Green, Amber and Red colour shading has been used to reference the water quality with respect to Enterococci, *E.coli* and faecal coliforms analysed at the monitoring sites within Central catchments. Table 8 provides trigger levels for green, amber and red levels.

Table 8 Trigger Levels for Enterococci, *E.coli* and Faecal Coliforms (Ref Ministry for the Environment Guidelines[27])

Trigger Levels	Green Enterococci/ *E.coli*: Safe Mode FC: Acceptable	Amber Enterococci/ *E.coli*: Alert Mode FC: marginally acceptable	Red: Enterococci/ *E.coli*: Action Mode FC: unacceptable
Enterococci (cfu/100mL)	<140	140	280^
***E.coli* (cfu /100mL)**	<260	260	550
Faecal Coliforms (FC)	<230	230	330
Recommended Management Response	Routine Monitoring	Increased monitoring, identification of possible sources	Public warnings, increased monitoring and source investigation

^Trigger levels based on single samples except for red level of Enterococci which is based on two consecutive samples.

Cfu: count in colony forming units

Enterococci levels at Central catchment locations between 2007 and 2008 indicate:

- the red level was reached in November 2007 at Te Puna (Waitui) (850 cfu/100mL), indicating that public warnings, increased monitoring and source investigation be undertaken. It is unknown whether additional monitoring was carried out following that occurrence.
- The amber level was recorded in January 2008 at Pahoia (230 cfu/100mL), indicating monitoring to be increased and source of contamination to be investigated.

E.coli levels at Central catchment locations between 2007 and 2008 indicate:

- The red level was reached at two occasions: in October 2007 at Uretara Stream - Katikati (650 cfu/100mL) and in March 2008 at Wairoa River (930 cfu/100mL);
- The amber level was recorded twice at Katikati in January and March 2008 (280 cfu/100mL and 260 cfu/100mL respectively).

Receiving environment monitoring results indicate periodic exceedance of recreational water quality and shellfish monitoring parameters and therefore potential effects on the environment and the community as those areas are used for recreational purposes. Additional monitoring of *E.coli*, enterococci and faecal coliforms should be undertaken at Te Puna West (Waitui drain) to monitor those potential impacts on the receiving environment and public health.

3.6.2 2008 Non Routine Stormwater Quality Sampling

A snapshot, non-routine stormwater quality sampling event was undertaken by WBOPD within Te Puna at a stormwater outlet located along Matahiwi Road (refer Appendix K of CMP) on 12 September 2008. Parameters analysed were: pH, Total Suspended Solids (TSS) and Total Petroleum Hydrocarbons (TPH). pH was monitored (6.6) as being lower than the guideline range (7.2-7.8) and TSS was much lower (6 g/m³) than trigger level (150 g/m³). TPH concentration was not available for comment.

Only one sampling event was recorded and therefore it is not possible to qualify the stormwater quality and to conclude on any effects of the stormwater discharge on the receiving environment. This is specific to one particular sub catchment area, i.e. that drain to the discharge point on Matahiwi Road.

[27] Surveillance, alert and action levels for fresh and marine waters (Ministry for the Environment mfE/MoH, 2003) – New Zealand Recreational Water Guidelines.

3.6.3 2006-2015 BOPRC – Te Puna Monitoring

Monitoring undertaken by BOPRC[28] was conducted at the locations depicted in Figure 7. Each of the localities shown in yellow is a freshwater discharge and has been analysed for various parameters. *E. coli* has been used as an indicator of faecal contamination (refer Figure 9). The water samples are evaluated for enterococci in marine waters and for *E. coli* in freshwaters. The environmental monitoring at Te Puna West from 2006 to 2015 indicated:

- high levels of bacteria and ammonium-nitrogen (NH_4-N);
- eastern drains recorded occasional high indicator bacteria levels;
- bathing surveillance site was monitored (at the confluence between Te Puna Estuary and Tauranga Harbour – refer orange dot on Figure 7) and provided good water quality for recreation purposes;
- contamination of the foreshore adjacent to contaminated drains appeared to be the main risk identified by BOPRC. In particular, an oyster survey was undertaken on the opposite side of the estuary to the contaminated drains and little viral contamination was found when compared to other shellfish beds in the southern end of Tauranga Harbour. The report indicated that during two storm events in 2008 positive Faecal- RNA bacteriophage typical of both animal and human sources was detected.

Faecal contamination evidence was recorded within Te Puna and is most likely due to rural sources and septic tanks. Microbial Source Tracking (MST) results have shown that Waitui and Lindoch drains (located within Te Puna West – refer Figure 7) are contaminated with human faecal material. Analysis has confirmed the presence of human faecal bacteria, almost certainly from septic tanks (refer BOPRC 2015[28]).

The microbiological results are combined with information about the catchment to provide a 'Suitability for Recreation' grading. The gradings range from 'Very Good' to 'Very Poor'. The Waitui Reserve is one of two locations out of 33 sites monitored across the Bay of Plenty Region where the water quality has been assessed as 'Poor'.

Figure 7 Bay of Plenty Monitoring Sites at Te Puna West (refer BOPRC 2015[28])

[28] Bay of Plenty Regional Council Te Puna Environmental Monitoring Results, January 2015

Overall concentrations of faecal coliforms at Waitui Drain have been recorded between 2003 and 2013 and are depicted in the Figure 8. The concentrations of faecal coliforms generally exceeded the bathing surveillance red alert limit, indicating actions need to be implemented i.e. public warnings, increased monitoring and source investigation. These results indicate potential impacts on public health and this is consistent with the results provided in section 3.5.1.

Figure 8 Waitui Drain Monitoring of Faecal Coliforms 2003-2013

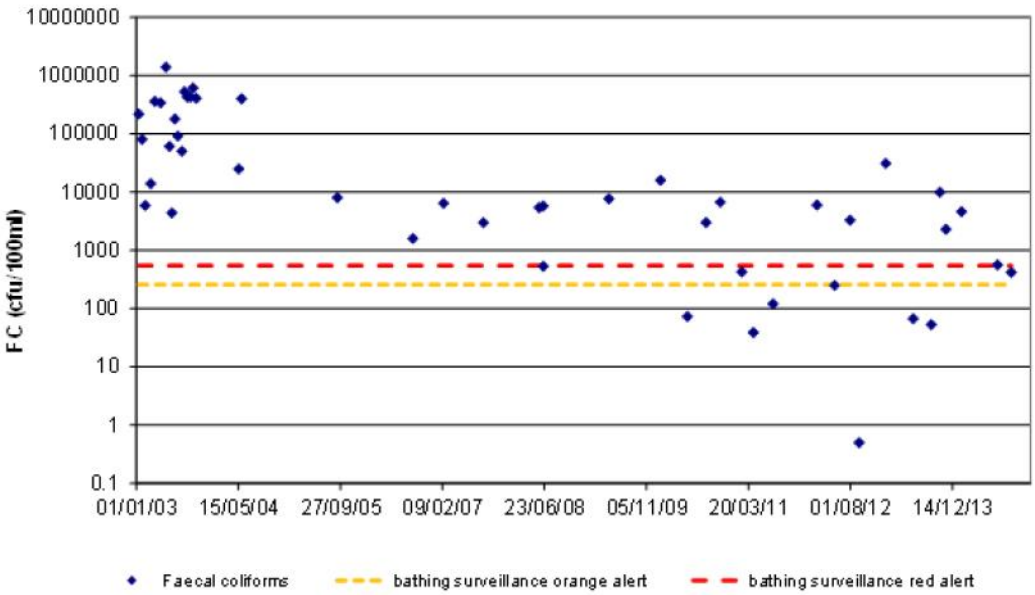
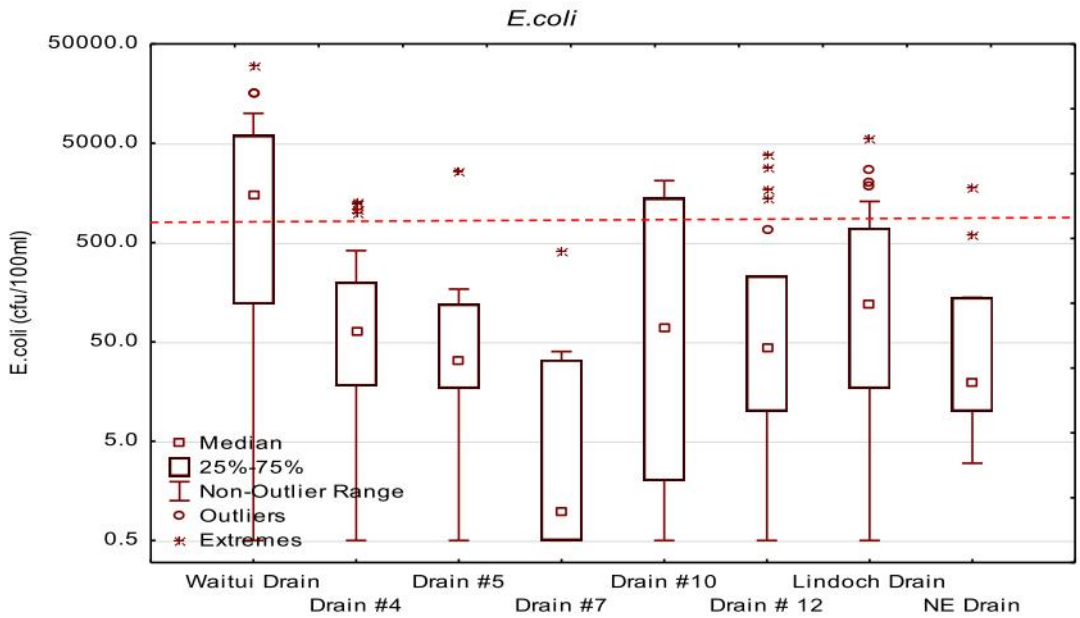


Figure 9 Te Puna Drains Monitoring of *E.coli* 2006-2015



3.6.4 Ecological Assessments at Te Puna and Minden

Photographs of both catchments (depicting tributaries, open drains and artificial ponds within and in the vicinity of both urban stormwater catchments) are provided in the Wildlands Consultants Ecological Assessment reports for Te Puna and Minden.

3.6.4.1 Ecological Assessment at Te Puna

The conclusion of the Te Puna ecological assessment carried out by Wildlands in 2005[9] indicates that:

- No indigenous terrestrial vegetation or habitat was identified however indigenous intertidal vegetation was dominated by mangroves, oioi and searush.
- No threatened bird or plant species were recorded
- Very limited habitat was identified for freshwater fish.

Ecological opportunities identified as part of the stormwater management improvement program (as part of the Te Puna Community Plan[5] and Bay of Plenty Stormwater Stategy – SmartGrowth Program – refer section 6 of the Addendum) include: creation of small ponds and riparian planting to improve water quality and stream values of the open drains. Invasive weed control and locally-sourced indigenous species establishment is recommended.

Intertidal vegetation could be improved by indigenous plantings, organic rubbish removal and awareness of local residents to cease dumping organic waste in these areas.

3.6.4.2 Ecological Assessment at Minden

The conclusion of the Minden ecological assessment carried out by Wildlands in 2009 indicates that:

- Two significant ecological features were identified in the WBOPDP: sites U14/4 and U14/52. A wetland which lies just beyond the north western corner of the study area and adjacent to the Te Puna Stream has been identified as a Category 3 natural area in Tauranga Ecological District.
- Seven vegetation and habitat types were identified (refer section 2.4 Catchment Values and Table 4 of the Addendum for further details) with four vegetation types dominated by (or comprising significant) indigenous species. Other vegetation types mainly constitute exotic species with very limited indigenous vascular plants. No indigenous species have been identified as being threatened or uncommon.
- Nine indigenous species of fish have been recorded in waterways that drain the study area, including longfin eel (*Anguilla dieffenbachii*) which is classified as 'Chronically Threatened-Gradual Decline' (Hitchmough et al. 2007).
- Eleven indigenous species of birds were recorded and all are relatively common.

Based on the level of constraint for the development of SmartGrowth study[29] as per Te Puna Community Plan and BOP Stormwater Strategy (refer section 6), the ecological assessment concluded that;

- Vegetation Type 5 (wetlands) and streams present a high level of constraint for future urban development;
- Vegetation Types 1 (secondary forest), 2 (treefernland), 3 (mixed indigenous-exotic forest and scrub), and 4 (restoration plantings) are moderately constrained; and
- Vegetation Type 7 has a low level of constraint.
- However, if more detailed ground-based surveys were undertaken, the ecological significance and level of constraint of some sites may be revised.

Ecological opportunities identified in the framework of stormwater management improvement include: stormwater detention and treatment systems that may be implemented within streams at Minden area, in association with riparian planting and enhancement and removal of fish barriers. It was recommended that:

- ongoing protection and improved riparian management be implemented to all gullies and streams in Minden area.

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[29] SmartGrowth Study identifies potential ecological constraints to future urban development based on the three-tier system used to assess the significance of ecological features. *Ecological constraints to development in the Western Bay of Plenty*. Wildland Consultants Ltd 2003, Prepared for SmartGrowth project team.

- Invasive ecological weeds be controlled in particular within vegetation type 1 (secondary forest) including wilding pines, pampas, brush wattle, woolly nightshade, Taiwan cherry, willow-leaved hakea, and tree privet.

3.6.5 2010-2011 Stormwater and Benthic Macroinvertebrate Sampling

Freshwater Solutions Ltd[30] carried out stormwater quality, stream sediment, instream and riparian habitat and benthic macroinvertebrate sampling in April 2010 and storm event sampling undertaken in July 2010, October 2010 and April 2011 as well as sediment sampling was undertaken in September 2010 within the major settlements of the Western and Eastern Catchments. Central Catchments (Te Puna and Minden being small urban settlements) do not include any major settlements therefore no monitoring was undertaken in this area. Monitoring was carried out at the five most heavily developed catchments or subcatchments considered to be the worst case scenario in terms of environmental monitoring in the WBOPD and therefore water quality at Te Puna and Minden was anticipated to be better than the water quality monitored in the Western and Eastern catchments. The results are summarised below for a WBOPDC context but catchment specific data is required to enable targeted statements about Te Puna and Minden to be made.

Overall, an assessment of water samples in 2010-201 during recorded storm events revealed that most sites fall below the 90% trigger values stated in the ANZECC (2000) guidelines, except for Te Puke where metal concentrations (arsenic, chromium, copper, lead and zinc) downstream of industrial land use exceeded the guidelines. Lower benthic macroinvertebrate community values were reported during the sampling in 2010 when compared to the 2001-2008 BOPRC monitoring.

The following receiving environment assessment was concluded:

- Waihi Beach – Two Mile Creek (Western Catchment) has an open water receiving environment and existing water and ecological values below the high tide mark are unlikely to be sensitive to stormwater discharges.
- Te Puke – Ohineanganga Stream Western and Eastern Tributaries (Eastern Catchment): low benthic macroinvertebrate community values and sensitivity to stormwater discharges are reported for the lower reaches of the western tributary, with moderate native fish values that result from the presence of good native fish habitat upstream and downstream in the Ohineanganga Stream. Current water and sediment quality could be adversely affecting the ecological values that exist in the lower reaches of the western tributary.
- Katikati – Uretara Stream and Unnamed Drain (Western Catchment): Overall low benthic macroinvertebrate community values, moderate to high native fish values and sensitivity to stormwater discharges are reported. The receiving environment is a depositional area within the upper harbour that is likely to support significant ecological values and be sensitive to stormwater discharges.

Eastern Catchments have been assessed as being sensitive to stormwater discharges. Given the other monitoring that has been undertaken in relation to Minden and Te Puna, it is likely that stormwater discharges will impact the receiving environment of Central Catchments and will continue to do so especially during future development.

[30] Western Bay of Plenty Comprehensive Stormwater Consents Environmental Assessment, December 2012, Freshwater Solutions Environmental Consultant Ltd

This section supplements and amends the Section 4 of the CMP.

4.0 Identification of Stormwater Management Issues

4.1 Stormwater Quantity

4.1.1 Flooding

4.1.1.1 Flood Hazard Maps

Flood Hazard maps were not included in the CMP. As the Te Puna stormwater model was not provided, it is not possible to include the areas within the Central catchments for both Te Puna and Minden catchments where flood levels are anticipated. Hydrologic modelling is recommended at these two catchments to address those gaps.

4.1.1.2 Secondary Flow Paths

Determination of secondary flow paths were not included in the CMP and could not be determined as part of this Addendum due to a lack of information provided. This remains as a gap that could be addressed as part of CSC condition.

4.1.1.3 Development within 1% AEP area

Determination of 1% AEP flood levels was not included in the CMP. As stormwater models were not available, it is not possible to predict and map the areas within the Central catchment where 1% AEP flood levels are anticipated. This remains as a gap that could be addressed as a CSC condition.

Based on the information available, it is not clear whether flooding is an issue in Central Catchments and specifically Te Puna West and Minden urban stormwater catchments.

4.1.2 Stream Bank Erosion

It is not clear from the CMP and subsequent information requested whether stream bank erosion is an issue. Based on BOPRC Guidelines for the Development of Comprehensive Stormwater Consent Applications and Catchment Management Plans No 2005/002[2], gaps have been identified in terms of the location of stream bank erosion in the CMP however, as these locations have not been provided by WBOPDC, amendments could not be made in this Addendum. Therefore, it is not possible to identify and map areas of stream bank erosions for both Te Puna and Minden urban stormwater catchments.

4.1.3 Stormwater Quantity Improvement Methods

This section is intended to provide methods for improvement in terms of stormwater quantity. As hydrologic modelling outputs and stream bank erosion locations were not available, specific methods for improvements could not be identified.

In general terms, the existing section 4.1.5 of the CMP, the following supplementary information could be added:

Stormwater management guidelines No 2012/001 for the Bay of Plenty Region[26] provide for implementation of a treatment train approach and standards in terms of water quantity and water quality.

Stormwater quantity can generally be managed using various approaches such as:

- Ponds

Ponds provide stormwater quantity attenuation and can release flows at a rate that matches predevelopment hydrology. Water quality ponds are generally categorised as either wet ponds (with a permanent pool) or dry/detention ponds that detain water for a period after rainfall events. The primary mechanism for contaminant removal is sedimentation. As with wetlands the need for land to construct a pond is often a constraint.

· Wetlands

In addition to the primary functionality of providing treatment, attenuation of peak stormwater flows can be provided by limiting the discharge of treated stormwater into the receiving environment.

The attenuation element of a stormwater device should be designed to manage the volume that would otherwise contribute to flooding during rain events. Constructed wetlands consist of shallow vegetated pond areas. Wetlands are only practicable where space is available for construction. Wetlands remove contaminants through a combination of mechanisms including sedimentation, aerobic digestion and adhesion of contaminants to vegetation.

· Low Impact Design (LID) and Water Sensitive Urban Design (WSUD)

LID and WSUD are a design philosophy that can be applied at both a local and catchment level. The LID approach takes the natural features of a catchment and focuses on enhancement and protection of these being incorporated to the design. Guideline Document GD04 “Auckland Council Guideline for Water Sensitive Design” provides detailed information on this design approach (mainly for residential land development). In addition, Stormwater Management Guidelines 2012/01 for BOPR[26] emphasize on the importance of considering LID as a design element to reduce increases in stormwater runoff volume and provides design procedures for incorporation of LID into site design.

Management principles that would apply under an LID or WSUD approach include:

- Minimise disturbance of soils;
- Preserve and recreate natural landscape features;
- Reduce effective impervious cover;
- Stormwater disposal should mimic, to the extent possible, the natural drainage processes that currently exist;
- Modifications to existing natural drainage patterns should be kept to a minimum;
- Riparian margins to be designated, planting and protected;
- Effective impervious area increases should be kept to a minimum;
- Disconnect impervious surfaces;
- Utilise conveyance and stormwater treatment methods that also provide ecological and amenity benefits;
- Appropriate methods to hold stormwater back (detention) before dispersal into waterways should be employed.

· Rainwater tanks

Where rainwater is collected from the roof areas and used for non-potable water uses such as toilet flushing, laundry and outdoor use, then this stormwater does not enter the stormwater system. Instead it is returned to the soil, enters the wastewater pipe network and is treated at the wastewater treatment plant. Accordingly rainwater tanks can reduce the treatment requirements for other downstream systems.

The implementation of rainwater tanks for all plumbing within all proposed buildings could attenuate the 2year ARI to pre developed levels. The “greenfield” nature of the development at Minden also offers the potential to implement these systems in the planning/design stages at more affordable costs compared to retrofitting existing developments.

4.2 Stormwater Quality

Stormwater treatment is a process that collects contaminated stormwater runoff and treats it to remove some or all of the contaminants contained within it. A number of treatment devices are possible such as swales, vegetated filter strips, sand filters, ponds and wetlands. The selection and sizing of a device is dependent on the catchment characteristics and the sensitivity of the receiving environment. Detail on stormwater treatment devices is provided in section 4.2.4 of this Addendum.

4.2.1 Current Stormwater Quality Management

There are currently no stormwater treatment devices within Central Catchment (for both Te Puna West and Minden urban settlements). A few swales / rain tanks were mentioned in reports (refer Non-Technical Summary Report[6] dated PMS, 10 June 2014) however locations have not been identified, therefore could not be clarified and displayed on a Figure.

It is proposed that the paragraph regarding Construction monitoring within the subsection Monitoring Programme of the CMP be amended to ensure stormwater is appropriately managed during construction through implementation of erosion and sediment control measures.

With respect to public awareness and education; the WBOPDC CSC Brochure dated May 2014[13] promotes to the community the following actions to maintain/enhance stormwater quality:

- Never put anything into a storm drain;
- Direct downpipes away from paved surfaces and/or use a rain tank;
- Vegetate bare ground with native plants;
- Use pesticides and fertilisers sparingly;
- Properly dispose of hazardous house-hold waste.

As described in the CMP, the stormwater quality objectives are to be consistent with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000) and compliant with the Ministry for the Environment Guidelines[31] (refer section 3.5 of this Addendum). Additional stormwater treatment requirements have been listed in section 3.2 of this Addendum.

4.2.2 Potential Sources of Contamination

AECOM recommended the following in the 2014 gap analysis (refer Appendix A of the Addendum):

- Contaminant load (either modelling or monitoring results) as included in Appendix K should be summarised in detail within this section or under a separate heading.
- There should be a separate section/heading for wastewater system or sewage treatment within the catchment detailing septic tanks, wastewater overflows, etc.

On this basis, the following subsections are intended to supplement to existing text in section 4.2.2 of the CMP.

4.2.2.1 Contaminant Load Modelling

A Contaminant Load Model (CLM) was carried out for Te Puna and Minden in terms of concentrations of Total Suspended Solids (TSS), Zinc, Copper and Total Petroleum Hydrocarbons (TPH). Concentrations of contaminants in regard to the landuse for Te Puna and Minden catchments are provided in Tables 9 and 10.

Note: Te Puna and Minden areas (m²) as defined in CLM 2006 are different than those calculated by GIS and based on the catchment boundaries of Te Puna West and Minden urban stormwater catchments.

The 2006 CLM approach assumed that no treatment was implemented within those catchments. Results of the 2006 CLM indicate:

- Urban grass lands is the main source for TSS generation, i.e. 87% for Te Puna and 93% for Minden (less than 7% for roads, paved surfaces other than roads and roofs for both catchments);
- Zinc is mostly generated by roads (42% for Te Puna and 60% for Minden). Zinc concentration generated by paved areas other than roads in Te Puna is 37% and for Minden 29%. In addition roofs represent 21% of the zinc source generation at Te Puna and only 0.2% for Minden.

[31] Surveillance, alert and action levels for fresh and marine waters (Ministry for the Environment mfE/MoH, 2003) – New Zealand Recreational Water Guidelines.

- Roads generate the most copper (71% for Te Puna and 81% for Minden) with other paved areas (27% for Te Puna and 17% for Minden) and a slight portion from roofs runoff (less than 3% for both catchments);
- TPH are only generated by roads for both catchments.

Table 9 Te Puna Contaminant loading (Ref CLM based on ARC guidelines – May 2006) based on 5 year 10 minutes first flush event i.e. flow rate of 277L/s and event volume of 166m³.

Land Use	Area (ha)	%	Contaminant Load (g per year)			
			Total Suspended solids (TSS)	Zinc	Copper	Total Petroleum Hydrocarbons
Roofs	1,113.8	7	5,569.1	44.6	0.9	0.0
Roads (total)	4,390.4	28	17,561.6	92.2	30.7	482.9
Paved Surfaces other than roads	1,151.0	7	23,020.2	80.6	11.5	0.0
Urban Grass lands	8,915.3	57	312,035.2	0.0	0.0	0.0
Urban Stream Channel	0.0	0	0.0	0.0	0.0	0.0
Total Loads	**15,570.50**	**100**	358,186.0	217.3	43.1	482.9

Table 10 Minden Contaminant loading (Ref CLM based on ARC guidelines – May 2006) based on 5 year 10 minutes first flush event i.e. flow rate of 2,432L/s and event volume of 1,459m³.

Land Use	Area (ha)	%	Contaminant Load (g per year)			
			Total Suspended solids (TSS)	Zinc	Copper	Total Petroleum Hydrocarbons
Roofs	5,462.3	2	27,311.4	218.5	4.4	0.0
Roads (total)	11,774.9	5	335,799.7	1,202.2	392.2	6,069.9
Paved Surfaces other than roads	8,254.7	4	165,093.3	577.8	82.6	0.0
Urban Grass lands	196,474.3	89	6,876,599.3	0.0	0.0	0.0
Urban Stream Channel	0.0	0	0.0	0.0	0.0	0.0
Total Loads	**221,966.2**	**100**	7,404,803.6	1,998.5	479.2	6,069.9

The average contaminant concentrations of zinc, copper and TPH for Te Puna and Minden is summarised in Table 11. When compared to the ANZECC 2000 guidelines[32], it indicates that concentrations of zinc and copper are below the trigger levels recommended.

[32] National Water Quality Management Strategy – Australian and New Zealand Guidelines for Fresh and Marine Water Quality trigger values, ARC 2006

Table 11 Average contaminant concentrations at Te Puna and Minden catchments (Ref ARC CLM 2006)

	Average Concentrations (µg/L)		
	Zinc	Copper	Total Petroleum Hydrocarbons (TPH)
Te Puna	4.33	1.08	1.12
Minden	1.93	0.58	0.68
Guidelines (ANZECC 2000)[32]	8	1.3	-

In summary, for the CLM study area of Te Puna and Minden, the CLM results indicate that the sources of contaminants are:

- Urban grass lands are the most significant sources of TSS;
- Roads are by far the most significant contributor of copper to stormwater contamination;
- Roads and paved surfaces other than roads are the primary sources of zinc (roofs being a secondary source);
- Roads are the sole source of TPH in the study catchment.

4.2.2.2 Wastewater Contamination: Wastewater Network and Septic tanks

4.2.2.2.1 Septic Tanks

The Te Puna West stormwater drains (refer Figures 4 and 7) appear to have relatively small catchments comprised largely of residential dwellings on small sites, where the dwellings are served by septic tanks.

A report was written by BOPRC regarding Wastewater at Te Puna in April 2015[33]. It provides information on the water quality monitoring and waste water treatment devices (septic tanks) used within the catchment.

Water quality monitoring indicated that septic tanks are at times contaminating the foreshore in Te Puna West due in some cases to their installation into a high water table and poor soil. BOPRC recommended that septic tank systems be upgraded to meet the required standard. Based on the water quality monitoring and in particular the *E.coli* results (refer section 3.5), several drains at Te Puna West (Waitui drain, the Lindoch drain and the NE drain) recorded periodic *E.coli* above the red action level, therefore with a significant potential to impact on public health. Wastewater contamination is an important source of stormwater contamination and contamination to the receiving environment. Therefore the current level of wastewater treatment does not seem adequate.

The report details that rainwater collection tanks on a tank stand outside the dwelling, and a small septic tank were implemented in the 1950s. Over the years, typical dwelling size has increased, along with water use and associated wastewater production. Wastewater that has been partially treated in a septic tank is discharged to a land application area for further treatment and assimilation into the environment. However, this process does not seem to work effectively at Te Puna, due to high water table and discharge of wastewater into soak holes at many properties (Te Puna West).

In some cases, ground water (i.e. saturated conditions) was encountered as close as 300-400 mm from the ground surface (refer BOPRC Wastewater Report 2015), meaning that where a soak hole is used to dispose of wastewater in these conditions, most of the bacteria will enter the groundwater without further treatment and will eventually discharge into the estuary or on to the foreshore.

A colour grading for wastewater level of service assessment has been chosen, based on information about the existing wastewater system, and site characteristics including depth of groundwater, area available on the section, slope and proximity to surface water. Results regarding the waste water level of service are indicated below:

[33] BOPRC Te Puna Wastewater –Background Information Report, April 2015

- Green: Consented or permitted system (7 properties ~ 5%)
- Yellow: Resource consent possible with no modification (1 property ~ 1%)
- Orange: Upgrade work required (71 properties ~ 53%)
- Red: Unable to meet the standard required (54 properties ~ 41%)

To comply with the BOPRC On-Site Effluent Treatment (OSET) Regional Plan, the following were to be implemented at Te Puna West (considered as 'maintenance zone'):

- Septic tanks to be emptied, inspected, repaired and reported on at regular intervals.
- Reticulation of the community is scheduled for completion by the end of the 2016/2017 financial year. Specific issue related to wastewater reticulation system is described in section 4.2.2.2.2.

4.2.2.2.2 Wastewater Network

Wastewater management options to address the waste water issues and potential contamination of the receiving environment by waste water were suggested as follow:

- Option 1- Reticulation of all properties in Te Puna West with discharge to the Omokoroa transfer pipeline.
- Option 2 - Reticulation of all properties in Te Puna West community and the construction of a new wastewater treatment plant.
- Option 3 - Upgrade of all septic tanks to Aerated Wastewater Treatment System (AWTS) units and the construction of a centralised disposal field to take - the treated waste.

Option 1 was considered the most practical and cost effective option. The timeframe intended for the implementation is as follow:

- December 2015 to March 2016: property owner commitment to proceed, formal Council approval, design detail and final estimate.
- 2016-2017: scheme construction.

This project is anticipated to provide solutions to the groundwater and stormwater contamination in this area and therefore reduce contamination of the receiving environment.

Figure 10 Te Puna West – Proposed Sewerage Reticulation Area, BOPRC April 2015

4.2.2.3 Other Potential Sources of Contamination

Other potential sources of contamination within Te Puna West and Minden urban stormwater catchments include:

- Te Puna Quarry located west of Minden (refer Figure 5 in section 2) may generate potential contamination on the receiving environment;
- Any closed landfill areas could generate potential leachate effects to the receiving environment.
- Industrial/commercial areas are likely to generate /have generated contaminants (pollution incidents may have occurred in the past).

4.2.3 Stormwater Treatment Requirements

A review of the various stormwater treatment statutory documents has been undertaken and stormwater treatment at the small urban settlements needs to comply with the criteria defined in Table 12, refer section 5.1 of this Addendum.

As mentioned in the Regional Coastal Environment Plan Review Strategic Policy Publication 2012/04 dated April 2012: *The Regional Coastal Environment Plan and the Regional Water and Land Plan both contain policies and rules around discharges of contaminants to water, disturbance of wetlands, disturbance in the coastal environment (earthworks) and activities associated with river and drainage schemes. The Plan that applies depends on whether the location is in the coastal marine area or not.*

Those tasked with implementing the Plan noted inconsistencies between the Plan and the Regional Water and Land Plan. Examples included rules and policies regarding stormwater discharges; permitted activity status of enhancement and restoration projects; and permitted activity status of works undertaken as part of the river and drainage schemes.

Table 12 in section 5.1 of the addendum provides a summary of the updated stormwater treatment requirements (initially provided in the CMP).

4.2.4 Stormwater Quality Improvement Methods

As the Te Puna and Minden are small urban settlements (although Te Puna and Minden have significant different landuses), there are numerous options available for stormwater treatment. BOPRC and WBOPDC support, where practical a "treatment train" approach, that is, a range of stormwater management practices providing the best all round solution, with no heavy dependence on any one individual system (refer Stormwater Management Guidelines 2012/01 for BOPR[26])

As stated in BOP RWLP 2014 section 4.2.5 paragraph 8: *it is the intent of this regional plan to encourage the discharge of stormwater to land soakage, where this is appropriate to the environmental limitations of the site. Land soakage is preferable to discharges to surface water bodies. Low Impact Design of urban areas (e.g. minimising the area of impermeable surfaces and retaining natural flood retention areas), and innovative management of stormwater (e.g. swales, land soakage, wetlands, infiltration systems, reuse of stormwater) are emphasised in Methods 119, 120, 138, 139 and 140* in section 4.2.4.

A range of practices is discussed in general terms below:

· Vegetative Filter Strips and Swales

These options rely on the passage of water across areas of dense vegetation cover to reduce contaminant loading. They generally do not provide the desired suspended solid removal on their own, though they can reduce the size requirements for any treatment device installed downstream. Vegetative filter strips and swales also aid in the infiltration of stormwater runoff and can be aesthetically appealing. The devices are particularly appropriate for use around heavily trafficked road, carparks and storage areas.

Vegetative filter strips and swales are more commonly used where grades are less than approximately 5%. However, with the use of regular riprap drop structures, swales can be applied to sites with overall ground slope of up to 10% while keeping the swale grades of up to 5%. The Te Puna urban catchment is overall flat with slope gradients approximately 0.8% therefore this will makes the application of swales to provide an element of stormwater quality for the roading network ideal. Minden urban catchment slope gradient being approximately 8.9% on average, therefore swales would not be easily applied everywhere in the Minden urban catchment.

· Permeable Pavement

Permeable pavement designs allow stormwater to infiltrate through the paving surface into the sub-base. Potential benefits are primarily associated with stormwater treatment by filtration through the pavement structure in particular the sub-base, and lesser runoff rates and volumes than conventional pavement due to infiltration and storage of stormwater within the sub-base. Permeable paving is best suited to parking areas rather than heavily trafficked roads.

· Filter Devices

This option involves the construction of structures that filter the contaminants by filter mediums. These devices range from concrete chambers that can be placed online on existing stormwater pipe systems to a more natural "rain garden" approach comprising a small depression infilled with a sand/soil filter/growing medium.

· Wetlands

Wetlands rely on the slowing down of stormwater runoff in shallow impoundment devices that are densely vegetated to allow some settlement or adhesion of the suspended solids to the vegetation. If properly constructed, these devices can have a high aesthetic and habitat value.

- Ponds

Ponds were historically used to manage stormwater quality and quantity and, similar to wetlands, their functionality is reliant on impoundment of contaminants within excavations. The depth of these devices is prone to fluctuating thermal dynamics and can contribute to reduce Dissolved Oxygen downstream.

- Proprietary Treatment Devices

Another stormwater quality treatment option is the use of Proprietary Treatment Devices. Various ‘off the shelf’ stormwater treatment devices are currently available in the marketplace i.e. StormFilters, SandFilters, Downstream Defenders, Continuous Deflector Separator (CDS) units and catchpit filter bag systems. These devices have both high capital and maintenance costs and are generally more appropriate for infill development situations. These devices are mostly implemented in commercial and industrial areas and therefore may not be applicable to most of the small urban catchments of Te Puna West and Minden where built-up areas are mostly used as residential areas.

This section supplements and amends the Section 5 of the CMP.

5.0 Assessment of Environmental Effects

5.1 Overview of Potential Effects

Environmental effects anticipated on the receiving environment are listed in section 5.2 of the CMP.

It is proposed that the following Table 12 be added to reflect the assessment of stormwater quantity and quality against the guidelines listed in section 3.2 of this addendum.

Table 12 Stormwater assessment of Te Puna West and Minden urban catchments against guidelines

Parameters	Criteria	Assessment of Proposed Stormwater Upgrades for Te Puna West (DWS 2005)	Assessment of Existing Stormwater Network (2015)
Bay of Plenty Regional Water and Land Plan (RWLP)[34]			
Maximum discharge	Shall not exceed 125 L/s (10 min 10%)	Assumed based on WBOPDC Code of Practice and District Plan Constraints however no detail on the flow rate (L/s) was provided therefore this could not be assessed. In addition, CLM calculated peak flow for Te Puna (277L/s) and Minden (2,432.1 L/s) based on 5 year, 10 min first flush (refer section 4.2.2.1 of the addendum). This indicates that flow in 2006 did not comply with the maximum discharge.	The Te Puna West model was not provided and not reviewed following the network upgrades therefore this could not be assessed. No hydraulic modelling available for Minden
Total Suspended Solids (TSS) concentration	150g/m³		
Grease/oil	Free		
Erosion / flooding	Works shall be designed, constructed and maintained not to cause erosion or flooding or to adversely affect any land or property owned or occupied by another person		
Stormwater Discharge quality	shall not contain: - hazardous substances, or - substances that are toxic to aquatic ecosystems (as measured relative to the ANZECC Guidelines for Fresh and Marine Water Quality, 2000).		
Bay of Plenty Regional Coastal Environment Plan (BOPCP)[35]			

[34] Bay of Plenty Regional Water and Land Plan, 2008 – refer to Rules 30, 30A, 30B, 30C and 37.
[35] Bay of Plenty Regional Coastal Plan (BOPCP) amended 22 February 2011 – Water quality based on Schedule 10 - Coastal Water Quality Classifications: Equivalent Qualitative and Quantitative Standards

Parameters	Criteria	Assessment of Proposed Stormwater Upgrades for Te Puna West (DWS 2005)	Assessment of Existing Stormwater Network (2015)
Water Quality Policy WQ3 Urban land use will be managed to ensure that stormwater does not cause estuarine and harbour water quality to fail the standards set in schedule 10 (see below) or cause accumulation of contaminants in harbour or estuary sediment at levels which have adverse effects on marine life.	The following techniques should be considered: (a) source control, (b) integrated management of whole stormwater catchments, (c) minimising the total area of impermeable catchment surfaces, (d) maximising disposal of stormwater to ground, except where this would cause flooding, instability or groundwater contamination, (e) minimising the possibility of cross contamination of stormwater systems with sewage, (f) the installation of stormwater treatment devices in new or upgraded stormwater systems, (g) ensuring that the layout of subdivision and services facilitates the retention and enhancement of riparian margins and wetlands.	The only recommendation provided by DWS report for Te Puna West was the implementation of land coverage restrictions in order to limit the catchment imperviousness to 35% (or the factor C above 0.5) – criteria (c) of WQ3. It appears that the building cover proportion represents 72% of the total area of Te Puna West (refer Table 2 in section 2.3 of the Addendum). The CLM also refers to impervious areas proportion of 35% of the total Te Puna West area (refer CLM, Table 9, section 4.2.2.1 of the Addendum).	This should be assessed following the implementation of stormwater management options within Te Puna West and Minden urban stormwater catchments.
Schedule 10 - Coastal Water Quality Classifications: Equivalent Qualitative and Quantitative Standards			
The water shall not be rendered unsuitable for bathing by the presence of contaminants.	Enterococci must not exceed 280cfu/100mL[27]	Exceedance was reported at Te Puna West (Waitui drain) in November 2007 indicating enterococci levels of 800cfu/100mL, exceeding the trigger level of microbiological monitoring as per schedule 10 of BOPCP (refer section 3.5.1 of this Addendum).	

Parameters	Criteria	Assessment of Proposed Stormwater Upgrades for Te Puna West (DWS 2005)	Assessment of Existing Stormwater Network (2015)
Microbiological monitoring within all harbours and estuaries, and into the open coast out to a distance of 400 m from the line of mean high water springs (Schedule 10 Water Quality Classification)		It is recommended that a follow up monitoring of water quality at Te Puna West drains and shellfish sampling be undertaken after completion of the waste water reticulation system. Minden: No monitoring was available therefore this could not be assessed.	
Aquatic organisms shall not be rendered unsuitable for human consumption by the presence of contaminant. Microbiological Monitoring within all harbours and estuaries, and into the open coast out to a distance of 400 m from the line of mean high water springs	The median faecal coliform content of samples taken over a shellfish-gathering season shall not exceed a Most Probable Number (MPN) of 14/100 mL, and not more than 10% of samples should exceed an MPN of 43/100 mL (using a five-tube decimal dilution test).	Te Puna West and Minden: No monitoring was available for median and 10% of samples analysed for faecal coliforms therefore this could not be assessed. It is recommended that a follow up monitoring of water quality at Te Puna West drains and shellfish sampling be undertaken after completion of the waste water reticulation system. The only information provided for Te Puna West (Waitui drain) monitoring of faecal coliforms generally indicated higher concentrations than the bathing surveillance red alert (refer section 3.5.3 of this Addendum).	
Stormwater Management Guidelines for the Bay of Plenty Region[26]			
Primary water quantity objective of treatment devices:	Match the pre-development and post-development peak flow rates for the 50% and 10% Annual Exceedence Probability (AEP) rainfall events, depending on catchment location	This should be assessed following the implementation of stormwater management options (installation of stormwater treatment devices) within Te Puna West and Minden urban stormwater catchments.	
Primary water quality objective of the treatment devices	No exceedance against water quality conditions of the relevant Plan(s) for: nutrients in lake catchments, sediment, metals, and other contaminants of	This should be assessed following the implementation of stormwater management options (installation of stormwater treatment devices) within Te Puna West and Minden urban stormwater catchments.	

Parameters	Criteria	Assessment of Proposed Stormwater Upgrades for Te Puna West (DWS 2005)	Assessment of Existing Stormwater Network (2015)
	concern on a case-by-case basis.		
Western Bay of Plenty District (WBOPDC)'s Standard Requirements for Development – Subdivision and Development Code of Practice			
Minimum design standard for a primary (piped) stormwater system	5 year return period (20% AEP)	Model used 20% AEP unless no safe secondary flow path was available	The model for Te Puna West was not provided and not reviewed following the network upgrades therefore this could not be assessed. No hydraulic modelling available for Minden
Minimum design standard for stormwater systems to protect important recreation fields, and streets without alternative access	10 year return period (10% AEP)	N/A as this type of stormwater system was not proposed as part of the 2005 DWS recommendations.	
Minimum design standard for stormwater systems (residential property, commercial and industrial building)	50 year return period (2% AEP)	N/A as this type of stormwater system was not proposed as part of the 2005 DWS recommendations.	
Minimum design standard for stormwater systems to protect major communal facilities related to supply of electricity, telecommunications and water and sewage disposal systems and bridges	100 year return period (1% AEP)	N/A as this type of stormwater system was not proposed as part of the 2005 DWS recommendations.	

N/A: Not applicable as may have been superseded or may not be applicable for the subject catchment.

5.2 Identification of Resources within the Catchment and Receiving Waters

The gap analysis (refer Appendix A of this addendum) indicated that:

- No reference sub-catchment map for Minden is available for the identification of sub-catchment and stream locations as numbered in page 66 of the CMP.
- Detailed description of the receiving environment including both streams and marine receiving environment was missing and should be provided within the CMP text.

The following text is provided to address those gaps:

The following features are identified within Te Puna and Minden catchments, as per the findings of the Ecological Assessments:

- Te Puna: Only a few small drains have been identified within Te Puna area and one artificial pond (refer Figure 4 in section 2 and Figure 7 in section 3 of the Addendum).
- Minden: Two significant ecological features (as per the Western Bay of Plenty District Plan) were identified in the WBOPD: sites U14/4 and U14/52 (Site U14/4 extends from near the end of Ainsworth Road, westward to Minden Road. Site U14/52 comprises five areas west of Ainsworth Road, in the vicinity of Te Puna Quarry Park – refer Figure 5 in section 2 of the Addendum). A wetland which lies just beyond the north western corner of the study area and adjacent to the Te Puna Stream has been identified as a Category 3 natural area in Tauranga Ecological District.

Figure 11 has been provided in the Ecological Assessment for Minden area (Wildlands 2009), which is clearly much larger than the Minden urban stormwater catchment area, and is included in this section for reference (refer Ecological Assessments Figures in Appendix L of the CMP). Figures 4 and 5 in section 2.1 of this Addendum depict Te Puna West and Minden landuse with the existing stormwater network and artificial ponds.

Note: Some of the receiving waters/ecological features identified above are located in the surroundings of Te Puna and Minden catchments but not within the urban catchments, as defined in this CMP. However the stormwater urban catchments drain to the same receiving waters and receiving environment.

The well beings values identified for both Te Puna and Minden catchments (as indicated in Table 2 of the CMP – p. 13) have been summarised in section 2.4 of this Addendum document (Tables 3 and 4).

Additional text for section 5.2 of the CMP includes the identification of the streams and receiving waters for Te Puna and Minden areas.

The receiving waterbodies at Te Puna include very few open drains and one artificial pond discharging to the Tauranga Harbour (the receiving waters). Stormwater at Te Puna discharge directly to the Tauranga harbour or Te Puna Estuary:

- by overland flow or
- is channelled through small pipes discharging to the harbour or
- is discharged to soakage.

The aquatic receiving environment for Minden catchment (refer Figure 11) includes:

- Te Puna River (western side of the catchment);
- Oturu Creek (centre of the catchment); and
- Wairoa River (eastern side of the catchment).

Minden urban stormwater catchment includes a few tributaries of Oturu Creek discharging to Oturu Creek and to the Waikaraka Estuary. These waters then flow into the Tauranga Harbour.

A summary of the receiving environments for Te Puna and Minden catchment is provided in Tables 13 and 14 respectively.

Figure 11 Minden Catchment Study Area, refer Wildlands Ecological Assessment 2009

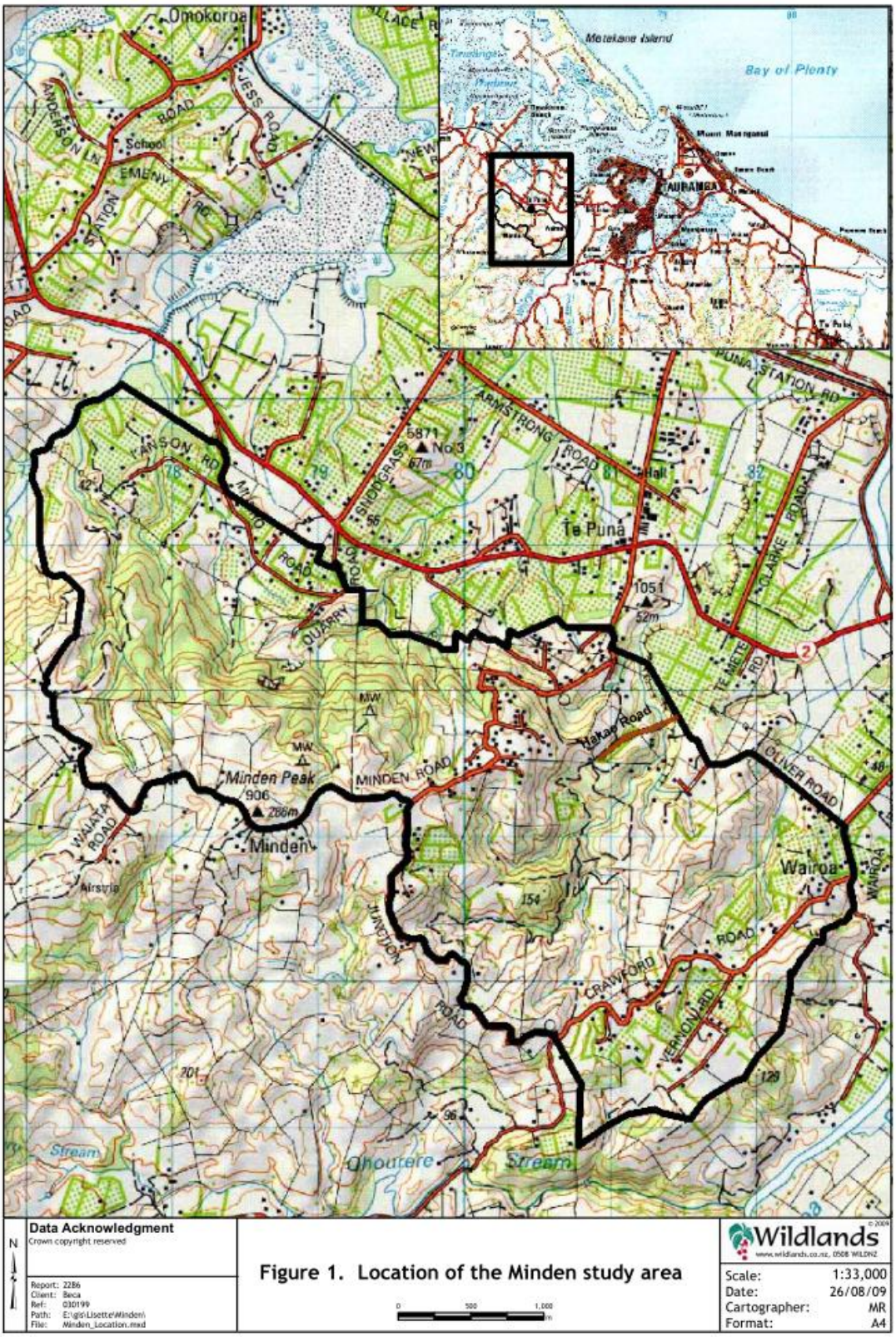

Table 13 Identification of Receiving Environment within Te Puna West Catchment[7]

Receiving Environment	Waterways	Location	Stormwater Characteristics
Tauranga Harbour	Open channels/ drains	Present at several locations within the catchment (northern and eastern sides of the peninsula)	-
Tauranga Harbour	NA	Present at several locations within the catchment	Numerous small pipes 100-150mm diameter discharging to larger ones
Tauranga Harbour	NA	Eastern side of the peninsula	Artificial pond with ephemeral drain (refer Figure 4 of the Addendum)
Tauranga Harbour	Small open drain	Eastern side of the peninsula	Small open drain
Te Puna Estuary	Waitui Drain (TBC)	Western side of the peninsula	Stormwater flows from orchards without drains.

Table 14 Identification of Receiving Environment within Minden (wider) Catchment[7]

Receiving Environment	Site	Waterways	Location	Stormwater Characteristics	Ecological Features
Te Puna Stream flows into Te Puna Estuary and to Tauranga Harbour	A	Tributary of Te Puna Stream (North)	It flows under I'Anson Road, from south to north	On the southern side of the road, the waterway is impounded behind an artificial bund. It discharges via an overhanging, open pipe, into a culvert that passes under the road.	The overhanging pipe is a barrier to fish passage. It has been partially revegetated with indigenous species such as manuka, karamu, harakeke and ti kouka. Exotic species include tree lucerne (which has been planted at the site), pampas, and pasture grasses.
Te Puna Stream flows into Te Puna Estuary and to Tauranga Harbour	B	Tributary of Te Puna Stream (South)	It flows under I'Anson Road, from south to north	This tributary flows into the same valley as the stream described above.	Ornamental ponds, and both north and enhancement plantings of indigenous species such as tarata, ramarama Lophomyrtus bullata), houhere (*Hoheria populnea*), akeake (*Dodonaea viscosa*), ti kouka, mahoe, kauri (*Agathis australis*), and harakeke were identified at this location.
Te Puna Stream flows	C	Tributary of Te Puna	Munro	It is assumed that this waterway flows	Headwaters of a small stream located

Receiving Environment	Site	Waterways	Location	Stormwater Characteristics	Ecological Features
into Te Puna Estuary and to Tauranga Harbour		Stream		into the stream that later flows beneath I'Anson Road at Location B	in a pasture-clad gully.
Oturu Creek, which flows into the Waikaraka Esutary and to Tauranga Harbour	**D**	**Minden Road - unknown Stream**	**Minden Road**	The headwaters of this stream arise in a gully adjacent to Minden Road.	Southern end of this gully has recently been cleared of the treefernland that remains further downstream.
Oturu Creek, which flows into the Waikaraka Esutary and to Tauranga Harbour	**E**	**Corbett Drive - unknown Stream**	**Corbett Drive**	There is a small stream and a pond on the north side of Corbett Road. A large pipe carries water underground from the end of Corbett Drive into the pond.	This location is not easily observed from public land, but the surrounding vegetation appears to be predominantly pasture.
Oturu Creek, which flows into the Waikaraka Esutary and to Tauranga Harbour	**F**	**Walden Road - unknown Stream**	**It flows under Walden Road, from east to west**	On the eastern side of the road there is a dammed pond within a matrix of rough pasture, recently excavated soil, and felled pine.	Species on the pond banks include pampas, gorse, and Japanese honeysuckle (Lonicera japonica). West of Walden Road, the stream flows into a gully where radiata pine are emergent over mamaku (Vegetation Type 3). Other species include ponga, mahoe, kawakawa, black wattle, and tree privet.
Oturu Creek, which flows into the Waikaraka Esutary of Tauranga Harbour.	G	Oliver Road - unknown Stream	Oliver Road	South of Oliver Road, a channelised stream flows through pasture .	Stream banks at this location include gorse, Juncus articulatus, Juncus effusus, and ring fern. The stream flows in a culvert beneath Oliver Road.
Unnamed stream which flows into the Wairoa River	H	Crawford Road - unknown Stream	Southern side of Crawford Road, near the intersection with	It flows under the road in a culvert. On the south side of Crawford Road the stream flows through a residential garden.	Planted species on the south side of the road include Carex virgata, harakeke, totara (*Podocarpus totara*), and ramarama. Arum lily

Receiving Environment	Site	Waterways	Location	Stormwater Characteristics	Ecological Features
			Vernon Road		(*Zantedeschia aethiopica*) and broad-leaved dock (*Rumex obtusifolius*) are abundant. On the south side of Crawford Road the stream flows through a residential garden.
Unnamed stream which flows into the Wairoa River	I	Crawford Road - unknown Stream, Tributary of Wairoa River	On the western side of Crawford Road	A stream arises in gully that is clad in pasture. It flows into an impoundment before discharging into the gully and flowing towards Wairoa River .	Ecological features at this location include gully and pasture.
Unnamed stream which flows into the Wairoa River	J	Hakao Road - unknown Stream	Hakao Road, new road extending southwest from Oliver Road.	Hakao Road crosses a gully where a length of stream has been confined to a half-pipe.	The riparian margins are planted with indigenous species such as karamu, kohuhu, ti kouka, harakeke, manuka, and koromiko. The site is surrounded by mamaku, black wattle, and gorse.

Note: In bold in the above Table are the receiving waters identified within Minden Urban Stormwater Catchment.

5.3 Summary of Potential Threats to Resource Values

It was identified in the gap analysis that this section did not include assessment of groundwater effects, therefore the following text is provided to supplement original section 5.3 of the CMP.

As previously mentioned in section 4.2.2, wastewater would potentially contaminate groundwater and the receiving environment at Te Puna West. Indeed, many of the soils in the lower areas of Te Puna West are poorly drained and/or have a high water table. This makes it very difficult to effectively treat wastewater within the property boundaries and partially treated wastewater from septic tanks is therefore discharged directly into ground water which then flows on to the foreshore or into the estuary.

Figure 12 depicts the locations of groundwater wells within Te Puna and Minden, with consented wells displayed in Figure 13.

Note that Te Puna and Minden areas displayed in Figures 12 and 13 do not represent the catchment boundaries but have been used as reference for the whole Te Puna/Minden area as defined in the Te Puna Community Plan 2007[5]. This is considered appropriate as groundwater resources are not confined by jurisdictional boundaries and contamination is likely to migrate beyond the urban catchment boundaries.

Groundwater information provided by BOPRC indicates that Te Puna West urban stormwater catchment is included in the Te Puna groundwater 'allocated recharge area' and Minden urban stormwater catchment is included within Oturu groundwater 'available area' (refer Figure 12) .

The details of groundwater use indicate the use of the groundwater resource in both stormwater urban catchments (refer Figure 13):

- 14 current groundwater consents have been reported as per Table 6 in section 3.4.
- Most of the consents (10) concern agricultural irrigation (orchard / horticulture / kiwi fruit irrigation) and
- The remaining groundwater wells (four) consented are for water supply/domestic use.

Tables 15 and 16 list all the bores consents within Te Puna Minden area (refer to red catchment area in Figure 12) for Te Puna Town and Tauranga city (of relevance for Te Puna area) and in summary there are:

- 15 current valid bore consents in Te Puna and 17 in Tauranga (Te Puna area);
- 16 surrendered consents in Te Puna and 12 in Tauranga;
- Six expired consents in Te Puna and three in Tauranga;
- Other consents did not provide details on status of the bores.

Although groundwater wells are not located within Te Puna and Minden urban stormwater catchments (area of concern in the CMP for CSC application), the above summary indicates that is extensively used in this area and therefore potential contamination of the groundwater could affect the receiving environment. Contamination of groundwater could potentially impact public health.

Figure 12 Central Catchments Groundwater Wells Locations (reference Bay of Plenty Regional Council 2015)

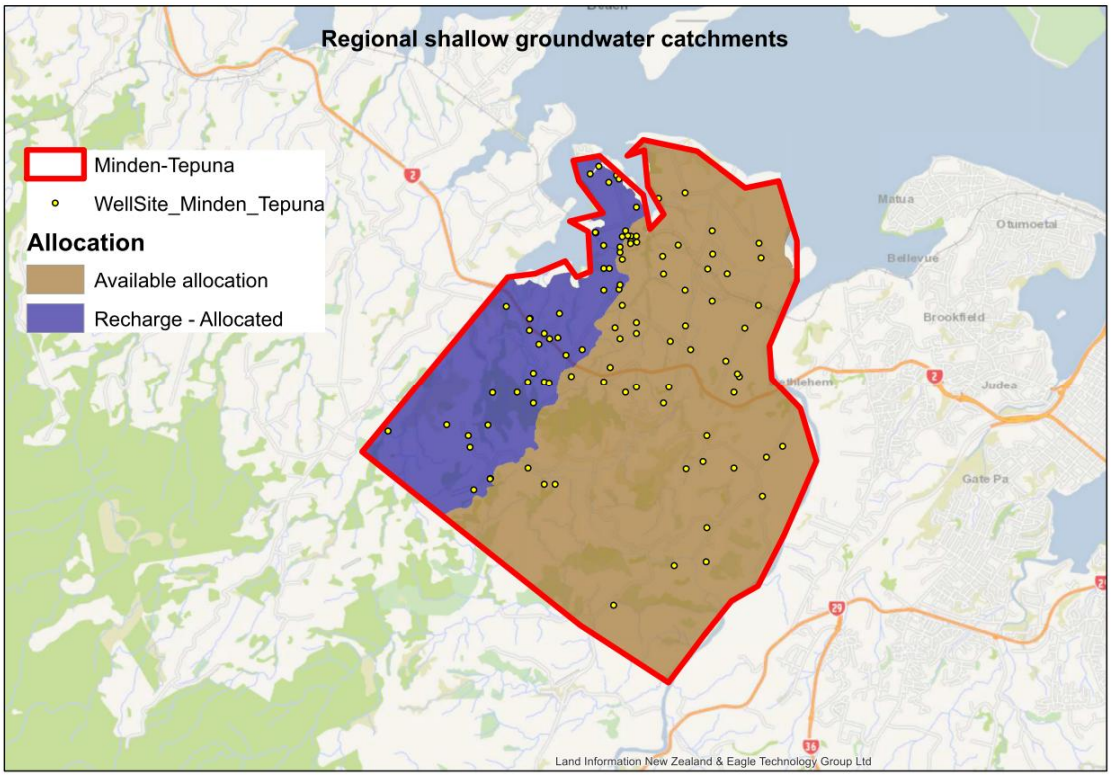

Figure 13 Central Catchments Groundwater Consents (reference Bay of Plenty Regional Council 2015)

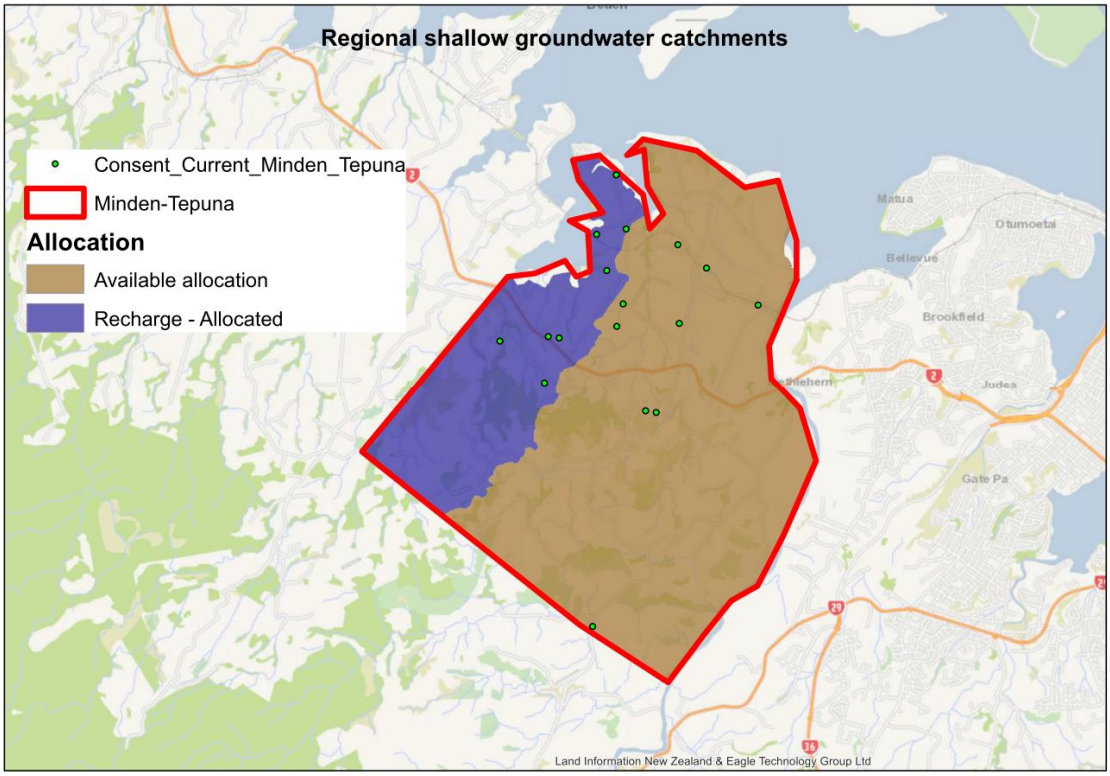
Regional shallow groundwater catchments
Consent_Current_Minden_Tepuna
Minden-Tepuna
Allocation
Available allocation
Recharge - Allocated
Matua
Otumoetai
Bellevue
Brookfield
Bethlehem
Judea
Gate Pa
Land Information New Zealand & Eagle Technology Group Ltd

Table 15 Groundwater Bores Use within Kaimai Central Catchments (refer Bay of Plenty Regional Council 2015) – Te Puna Town

WELL No	CONSENT NO	CONSENT STATUS	COMPANY NAME	ADDRESS	TOWN	BORE DEPTH	TEMPE-RATURE (°C)	RL of Ground	Allocation Zone	Geology Layer	EASTING	NORTHING	Geological Unit	Date Drill Complete	BoreStatus
1059	21465	Current	Kiamai View Orchard Ltd	ARMSTRONG ROAD	TE PUNA	213.4	-	25	Oturu	Rhyolite	2780006	6385904	Waiteariki	1984-12-14	-
1483	64528	Current	-	100 Munro Road	Te Puna	613	52	25.59	Te Puna	-	2778500	6385060	Aongatete		In use
1499	637140	Current	Scapens Family Trust	-	-	420	42	0	-	-	2780036	6388722	-	1998-07-27	In use
2654	65161	Current	-	17 James Road	Te Puna	220	-	23.28	-	-	2781810	6387270	Unknown	2004-07-27	-
2663	630070	Current	-	56 WALLACE ROAD	TE PUNA	341	39	4.5	Te Puna	Ignimbrite	2779549	6388751	Aongatete	2004-06-10	-
4019	20973	Current	-	229 SNODGRASS ROAD	TE PUNA	114.3	-	25.26	Te Puna	-	2779900	6387000	Waiteariki	1982-06-10	-
4055	20311	Current	-	STATION ROAD	TE PUNA	274.5	-	1.9	Waiora_Wairoa	-	2781800	6386400	Waiteariki	1979-01-19	-
4214	20866	Current	Rattray S	GILL LANE	TE PUNA	518.16	30	36.92	Te Puna	-	2778800	6385700	Aongatete	1981-07-27	-
4294	65137	Current	Pilcher Farms Ltd	134 Borell Road	Te Puna	533.4	56	13.82	Oturu	-	2780408	6387489	Aongatete	1997-09-22	-
4310	21682	Current	-	GILL LANE	TE PUNA	148.44	-	43.61	Te Puna	-	2778953	6385719	Waiteariki	1985-01-25	-
4380	21404	Current	-	158 ARMSTRONG ROAD	TE PUNA	97.54	-	28.25	Oturu	-	2780141	6386320	Waiteariki	1983-12-01	-
4450	20811	Current	Opihi Nursery	OPIHI NURSERY SNODGRASS ROAD	TE PUNA	-	-	20.74	Te Puna	-	2780200	6387700	Unknown	1981-02-25	-
10758	65309	Current	-	220 Te Puna Road	Te Puna	285	-	28.65		Rhyolite	2781716	6386990	Unknown	2005-12-22	-
11743	666560	Current	Bruntwood Farms Ltd	4 Te Karaka Drive	Te Puna	145	28	27.89	-	-	2778430	6386071	-	2010-07-14	In use
12046	672680	Current				585	50	0	-	-	2778788	6384881	-	2013-01-14	heating
100105	628870	Current	-	61 OLIVER ROAD -TO Walden Lane		135		55.1	-	-	2781629	6383421	-	-	-
12298	680370	Current	Bruntwood Farms	32 Gill Lane	Te Puna	251	19	0	-	-	2778979	6386170	-	2014-11-20	

Table 16 Groundwater Bores Use within Kaimai Central Catchments (refer Bay of Plenty Regional Council 2015) – Tauranga Town (applicable as some are located within Te Puna Area)

WELL No	CONSENT NO	CONSENT STATUS	COMPANY NAME	ADDRESS	TOWN	BORE DEPTH	TEMPE-RATURE (°C)	RL of Ground	Allocation Zone	Geology Layer	EASTING	NORTHING	Geological Unit	Date Drill Complete	BoreStatus
56	20500	Current	-	WALLACE ROAD TE PUNA	TAURANGA	271.3		2.75	Te Puna	Ignimbrite	2779708	6388889	Aongatete	1978-11-29	
64	20483	Current	-	89 TE PUNA ROAD TE PUNA	TAURANGA	179.8		33.27	Oturu	Ignimbrite	2781305	6385941	Waiteariki	1979-03-08	
1659	213822	Current	-	NEWNHAMS ROAD TE PUNA	TAURANGA	390.1	47	11.22	Te Puna	Ignimbrite	2779652	6387661	Aongatete	1983-03-04	
1665	213821	Current	-	NEWNHAMS ROAD TE PUNA	TAURANGA	182.9	28	10.64	Te Puna	Rhyolite	2779642	6387669	Waiteariki	1983-09-14	
2323	212611	Current	-	SNODGRASS ROAD TE PUNA	TAURANGA	426.7	57	8.59	Te Puna	Ignimbrite	2780402	6388136	Aongatete	1981-09-30	
2534	202041	Current	-	SNODGRASS ROAD TE PUNA	TAURANGA	335.3		6.95	Te Puna		2780080	6388655	Aongatete	1978-04-01	capped
4132	210981	Current		OKIMOKE ROAD TE PUNA	TAURANGA	365.76	40	29.74	Te Puna area		2782662	6387469	Aongatete	1979-08-24	
4179	210921	Current		SNODGRASS ROAD	TAURANGA			24.05	Te Puna		2780100	6387400	Unknown		
4269	21091	Current	Hegarty Land Holdings Ltd	TE PUNA ROAD	TAURANGA	114		28.71	Oturu		2781300	6386600	Waiteariki	1982-12-06	
4397	21746	Current		217 WAIROA ROAD	TAURANGA	115.82	21	43.52	Waiora_Wairoa		2782725	6382782	Waiteariki	1985-07-01	
4637	652880	Current		171 SNODGRASS ROAD TE PUNA	TAURANGA	259		29.46		Rhyolite	2780080	6386617		1983-11-30	
4880	22055	Current	Equality (BOP) Incoporated	CNR GILL LANE & SH 2 TE PUNA	TAURANGA	161.5		24.43	Te Puna		2778700	6385800	Waiteariki		
4965	202041	Current	J K Allan Trust	SNODGRASS ROAD TE PUNA	TAURANGA	274.5		17.43			2779892	6388594			
10215	615270	Current	Western Bay of Plenty District Council	409 CRAWFORD ROAD	TAURANGA	200		39.33			2779980	6380770	Unknown		In use
12313	681230	Current	ML Jones Family Trust	948 State Highway 2	Tauranga	190	19	0			2778425	6385856		2015-04-20	In use

Existing Tables 10 to 12 in section 5.3 and Tables 13 to 15 in section 5.4 of the CMP have been updated to reflect groundwater hazards (refer pages 70 to 74 of the CMP).

Groundwater Hazards have been added to amend Tables 10, 11 and 12 in section 5.3 of the CMP as follows:

Table 10 (amended CMP Table): Threats to environmental/ecological values and their impact

Threats to Environmental Ecological	Level of Risk	Impacts
Groundwater Hazards due to Human Activity – Wastewater contamination (leakage from septic tanks and wastewater reticulation system)	High	The majority of sewage treatment within the catchment is via on-site wastewater systems. Potential waste water contamination could contaminate stormwater and the receiving environment.
		Groundwater quantity assessed in 2005 indicated that: · Drilling has commenced in 2000 for new water supply for Omokoroa · Well yields typically 1-7 L/s · Wells depth typically 100-300+ m deep near the coast and 100-200m deep in the foothills · All works completed and new Omokoroa water supply has been commissioned and is operational Groundwater quality was identified for Central Catchments as: · Boron concentration below 0.3mg/L · Arsenic concentration below 0.01mg/L · Chloride concentration below 250mg/L · Sodium concentration below 200mg/L · Elevated chloride or sodium concentrations were recorded in coastal bores in Omokoroa area. · Elevated iron concentrations were recorded in some areas (not detailed in the report).
Water quality – Contamination of streams/harbour	High	Poor water quality will impact ecosystems and well beings.
Natural Disaster / Climate Change – Flooding	Low	Due to the likelihood of the flooding event, this is considered as low risk for environmental values.

Table 11 (amended CMP Table): Threats to social values and their impact

Threats to Social Values	Level of Risk	Impacts
Groundwater Hazards due to Human Activity – Wastewater contamination (leakage from septic tanks and wastewater reticulation system)	Low	Groundwater contamination will impact public and therefore have potential effects on social/awareness programs.
Natural Disaster / Climate Change – Flooding	Low	Due to the likelihood of the flooding event, this is considered as low risk for social values.

Table 12 (amended CMP Table): Threats to economic values and their impact

Threats to Economic	Level of Risk	Impacts
Groundwater hazards – Additional costs anticipated if contaminated groundwater	Medium	Additional costs to be anticipated if groundwater is contaminated due to numerous groundwater consents within Te Puna and Minden.
Natural Disaster / Climate Change – Flooding	Medium	Due to the likelihood of the flooding event with high economic impacts, this is considered as medium risk for economic values.

Two additional tables are proposed to address the changes as per section 2.4, as follow:

- separate cultural and social: Table 11b will focus on threats to Tangata Whenua / Cultural values and their impact;
- separate social and public health: Table 12b will focus on public health values and their impacts.

In addition, the scoring system (refer Table 9 of the CMP pages 70-71) for the threats needs to be updated to reflect the Public Health and Tangata Whenua/cultural values.

Table 9 (amended CMP Table): Scoring system for the threats and the different resource values

Values	Score
Environmental and Ecological Values	Unchanged from CMP
Social Values	5 = Very High Social and Recreational Negative Impacts 4 = High Social and Recreational Negative Impacts 3 = Moderate impacts on visual and recreational attractive 2 = Slight impacts on visual and recreational 1= Limited impacts on visual and recreational
Tangata Whenua / Cultural Values	5 = High Cultural Impacts on Sacred places (location with strong spiritual significance and tapu) 4 = High impacts on cultural values (Site of cultural and heritage significance) 3 = Moderate impacts on Cultural values (Site of cultural and heritage significance) 2 = Slight impacts on Cultural values (Site of cultural and heritage significance) 1= Limited impacts on Cultural values (Site of cultural and heritage significance)
Public Health Values	5 = Very High Impacts on Public Health 4 = High impacts on Public Health 3 = Moderate impacts on Public Health 2 = Slight impacts on Public Health 1= Limited impacts on Public Health
Economic Values	Unchanged from CMP

Table 11b (**additional Table**): Threats to Tangata Whenua / Cultural values and their impact

Threats to Tangata Whenua / Cultural	Level of Risk	Impacts
Groundwater Hazards due to Human Activity – Wastewater	Medium	Groundwater contamination will impact community and therefore have potential effects on community engagement and programs.

Threats to Tangata Whenua / Cultural	Level of Risk	Impacts
contamination		
Water Quality – Contamination of streams/harbour	High	Effect on mauri of watercourses and indigenous biodiversity.
Human Activity – Erosion, disturbance of ecosystems	Medium	Land Stability / Erosion / Sea Level Rise The foreshore and/or bed of the streams could be disturbed and culturally impacted
Natural Disaster / Climate Change – Flooding	Low	Due to the likelihood of the flooding event, this is considered as low risk for cultural values
Human Activity – Stormwater Development	Medium	Cultural Values of historical and spiritual significance could be impacted. Effects on mahinga kai/mahinga maataitai (places to gather food/fishing grounds).

Table 12b (**additional Table**): Threats to Public Health values and their impact

Threats to Public Health	Level of Risk	Impacts
Accidents related to natural disaster and vandalism*	Low/Medium	Potential impacts on public health and public safety
Accidents related to construction*	Low/Medium	Potential impacts on public health and public safety
Groundwater Hazards due to Human Activity – Wastewater contamination (leakage from septic tanks and wastewater reticulation system)	High	Contaminated groundwater would affect public health given the number of consented takes in Te Puna /Minden urban stormwater catchments
Water Quality – Contamination of streams/harbour	High	Use of recreational areas, oysters/shells in Harbour that could be contaminated and affect public health

* These threats have been originally identified in Table 11 of the CMP.

In the CMP, no potential threats were identified however high level of risk was noted due to groundwater hazards, potential contamination of wastewater and streams/harbour which will impact all catchments values: environment, social, Tangata Whenua/cultural, public health and economic values. In addition, flood hazard was not considered as a threat in the CMP and should be considered as it may impact environmental, social, public health and cultural values at a low risk level and economic values at a moderate risk level.

5.4 Recommended Methods to Protect Catchment Resources

The potential catchment values in the CMP have been divided into three categories: Ecological, Social/Cultural, and Economic. However Tangata Whenua values were missing in the CMP assessment and public health values needed to be separated from social values (refer section 5.3 and Appendix A of the Addendum).

Additional text is provided in the amended Tables 13 and 14 and additional Tables 14b and 14c below to address cultural issues and public health.

Table 13 (amended CMP Table): Methods for the protection of the environmental and ecological values

Threats to Environmental and Ecological Values	Recommended Methods
Human Activity - Development	Include ecological restorative measures in relation to stormwater discharge to natural watercourses or pond collection areas.
Human Activity – Other	Unchanged from CMP
Agriculture – Horticulture	Unchanged from CMP
Pest Animals	Unchanged from CMP
Pest Plants	Unchanged from CMP
Groundwater Hazards due to Human Activity – Wastewater contamination (leakage from septic tanks and wastewater reticulation system)	Waste water reticulation system should provide waste water treatment and therefore limit the risk to groundwater contamination. This will limit potential contamination of stormwater and thus the receiving environment (refer section 4.2.2.2).
Water quality – Contamination of streams/harbour	Receiving environment monitoring of Te Puna and Minden to ensure water quality is maintained to provide habitat for well beings.
Natural Disaster / Climate Change – Flooding	Hydraulic Modelling of Te Puna and Minden to be undertaken to identify potential flooding risk and impacts on environmental values. Stormwater management to be put in place as appropriate.

Table 14 (amended CMP Table): Methods for the protection of the social values

Threats to Social Values	Recommended Methods
	Moved to a separate Table (refer Table 14c)
Recreational Uses and Visual Amenities	Unchanged from CMP
Groundwater Hazards due to Human Activity – Wastewater contamination (leakage from septic tanks and wastewater reticulation system)	Specific awareness programs to limit groundwater contamination. Maintenance of septic tanks and post consent enforcement.
Water quality – Contamination of streams/harbour	Specific awareness programs to enhance water quality; Opportunities for improved community awareness and engagement.
Natural Disaster / Climate Change – Flooding	Opportunities may exist to incorporate areas of stormwater run-off ponds Hydraulic Modelling of Te Puna and Minden to be undertaken to address potential flooding risk and impacts on social values.

Table 14b (**additional Table**): Methods for the protection of the Tangata Whenua / Cultural values

Threats to Tangata Whenua / Cultural Values	Recommended Methods
Groundwater Hazards due to Human Activity – Wastewater contamination (leakage from septic tanks and	Waste water reticulation system should provide waste water treatment and therefore limit the risk to groundwater contamination (refer section 4.2.2.2). This will limit potential

Threats to Tangata Whenua / Cultural Values	Recommended Methods
wastewater reticulation system)	contamination of stormwater and thus the receiving environment and Tangata Whenua values.
Water quality – Contamination of streams/harbour	Include ecological restorative measures to cultural values and places of significance in relation to stormwater discharge to natural watercourses or pond collection areas. Opportunities may exist for rejuvenation of Maori traditional restorative projects by collaboration between WBOPDC and Pirirakau (refer CIA dated 2014[4]).
Natural Disaster / Climate Change – Flooding	Hydraulic Modelling of Te Puna and Minden to be undertaken to address potential flooding risk and impacts on cultural values.
Human Activity – Erosion, disturbance of ecosystems	Sediment control through the instability of Te Rangituanehu (Minden area – refer Figure 6 in section 2.4)
Human Activity – Stormwater Management	Encourage and promote the replenishment of native plant species in communication with Pirirakau to promote native fauna, to provide emission benefits and promote birdlife.

Table 14c (**additional Table**): Methods for the protection of the Public Health values

Threats to Public Health Values	Recommended Methods
Accidents related to natural disaster and vandalism*	Unchanged from CMP
Accidents related to construction*	Unchanged from CMP
Groundwater Hazards due to Human Activity – Wastewater contamination (leakage from septic tanks and wastewater reticulation system)	· Waste water reticulation system should provide waste water treatment and therefore limit the risk to groundwater contamination (refer section 4.2.2.2). This will limit potential contamination of stormwater and thus the receiving environment and public health values. · Specific programs to ensure groundwater quality is monitored to avoid any potential risk on public health. · Maintenance of on-site wastewater treatment systems.
Water Quality – Contamination of streams/harbour	Receiving environment monitoring of Te Puna and Minden to ensure water quality is maintained to provide safe environment for bathing, contact recreation and food gathering.
Natural Disaster / Climate Change – Flooding	Hydraulic Modelling of Te Puna and Minden to be undertaken to address potential flooding risk and impacts on public health values such as wastewater discharges to stormwater system or receiving environment.

* These threats have been originally identified in Table 11 of the CMP.

This section has been added to the CMP to provide a statutory assessment of the CSC for Te Puna and Minden urban catchments.

6.0 Statutory Assessment – AECOM Addendum

In addition to Section 1.3 *Legislative Background*, within the main CSC document, the following statutory analysis has been undertaken.

6.1 Resource Management Act 1991

6.1.1 Part 2 Matters

The purpose and principles of the Act 1991 (RMA) are contained in Part 2. The following section provides an analysis against the relevant provisions of Part 2:

Section 5 – Purpose of the RMA

The purpose of the RMA is to "*promote the sustainable management of natural and physical resources" [s.5(1)]. "Sustainable management" under s5(2) means*

managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while-

a. Sustaining the potential of natural and physical resources) excluding minerals) to meet the reasonably foreseeable needs of future generations; and

b. Safeguarding the life supporting capacity of air, water, soil, and ecosystems; and

c. Avoiding, remedying, or mitigating any adverse effects of activities on the environment."

As discussed in Section 5 of this report and with the main CMP, the proposed CSC will not result in any adverse effects. Therefore, the proposed CSC will ensure the sustainable management of the land and water resource, enabling people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety.

Section 6 – Matters of National Importance

The following matters of national importance are applicable in this instance – from s6 RMA

a. The preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, 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; and

e. The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga."

As indicated in sections 4 and 5 of this report, the proposed CSC recognises and provides for the identified Matters of National Importance, through the relevant, proposed management, monitoring and mitigation measures, in addition to the consultation undertaken to date.

Section 7 – Other Matters

Section 7 of the RMA sets out matters to be given particular regard to in managing the use, development, and protection of natural and physical resources. Relevant matters include:

(a) Kaitiakitanga;

(b) The efficient use and development of natural and physical resources;

(c) The maintenance and enhancement of amenity values; and

(f) The maintenance and enhancement of the quality of the environment.

Kaitiakitanga has been recognised through consultation, and the CIA details, and will continue to be provided for through the CSC conditions and the CMP. The CSC will result in more efficient use and development of land within the catchment; while managing the effects of stormwater runoff treatment and disposal on the receiving environment.

Section 8 – Treaty of Waitangi

The proposed works, as part of the overall proposed CSC , are not considered to conflict with any duties or obligations under the Treaty of Waitangi.

6.1.2 Section 104 - Consideration of Application

Under s.104(1) of the RMA, when considering an application for resource consent, a consent authority must, subject to the Part 2 RMA matters outlined above, have regard to:

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

(b) Any relevant provisions of –

(i) a national environmental standard:

(ii) other regulations:

(iii) a national policy statement:

(iv) a New Zealand coastal policy statement:

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

(vi) a plan or proposed plan; and

(c) Any other matter the consent authority considers relevant and reasonably necessary to determine the application."

Under s.104B of the RMA, after considering an application for a Discretionary Activity, a consent authority:

"(a) May grant or refuse the application; and

(b) If it grants the application, may impose conditions under s.108 RMA."

The existing environment comprises the existing uses, those permitted in the future by a rule in the plan, and consented activities (including those yet to be implemented). It is not the environment as it may have been many years ago before development within the central catchment was established, or the environment as it might be at some point in the future if, for example, substantial change has occurred.

6.1.3 S.105 RMA: Matters relevant to certain applications

This application is for a CSC (discharge permits), and the consent authority must therefore, in addition to the matters in section 104(1), have regard to—

– *the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*

– *the applicant's reasons for the proposed choice; and*

– *any possible alternative methods of discharge, including discharge into any other receiving environment.*

In this regard, the impact on the receiving environment has been assessed through the investigations undertaken as part of the main CSC. Such investigations include but are not limited to, ecological assessments for the Te Puna and Minden areas (as contained within Appendix L of the Main CSC document), hydraulic modelling, an overview of the discharge points and relevant community plans/visions.

6.1.4 S.107 RMA: Restriction on grant of certain discharge permits

The effects of the proposed CSC sought have been assessed to ensure that potential adverse effects on the environment will not result in the conditions described under Section 107, which are set out below, for ease of reference:

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

· *(a) The discharge of a contaminant or water into water; or*

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

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

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

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

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

· *(e) Any emission of objectionable odour:*

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

· *(g) Any significant adverse effects on aquatic life.*

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

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

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

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

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

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

Given the assessments undertaken in relation to the proposed CSC application, and all the information provided including in section 4 and 5 of this report, the effects in the receiving waters, after reasonable mixing will be acceptable.

6.2 National Environmental Standards

The National Environmental Standards (NES) that are relevant to the proposed CSC include the following:

The NES for Sources of Human Drinking Water came into effect 20 June 2008 and relates to a natural water body such as a lake, river or groundwater; used to supply a community with drinking water. It complements Ministry of Health legislation for improving drinking water supply and delivery. This ensures a comprehensive approach to managing drinking water from source to tap. The NES requires regional councils to ensure that effects of activities on drinking water sources are considered in decisions on resource consents and regional plans. There are also relevant drinking water standards to address water quality and health related aspects.

There is also a proposed NES on Ecological Flows and Water Levels 2008 to promote consistency in the way decision are made on whether the variability and quantity of water flowing in rivers, ground water systems, lakes and wetlands is sufficient. The proposed NES is currently on-hold pending decisions on the Government's freshwater reform programme.

The previously proposed NES for Measurement of Water Takes is now regulations under section 360(1)(d) of the RMA.["s360(1)(d) - requiring the holders of water permits, discharge permits, coastal permits, or land use consents granted for any activity that would otherwise contravene section 13, to keep records for any purpose under this Act, and prescribing the nature of records, information, and returns, and the form, manner, and times in or at which they shall be kept or furnished:"]

6.3 New Zealand Coastal Policy Statement 2010

The NZCPS provides direction for the management of the Coastal Environment.

Policy statements and plans produced by the regional and territorial authorities are required to give effect to the NZCPS. Matters addressed in the NZCPS include:

- Preservation of the natural character of the coastal environment;
- Protection of those characteristics of the coastal environment that have special value to tangata whenua;
- Provision for appropriate subdivision, use and development of the coastal environment; and
- The Crown's interest in the land in the CMA.

These matters are addressed in the objectives, policies, rules and other provisions of the Bay of Plenty Regional Policy Statement and the Bay of Plenty Regional Coastal Environment Plan.

A number of policies within the NZCPS are particularly relevant to the proposed CSC including:

Objective 1 – Relating to safeguarding the integrity, form, functioning and resilience of the coastal environment and sustaining its ecosystems, including marine and intertidal areas, estuaries, dunes and land.

Objective–2 - To preserve the natural character of the coastal environment and protect natural features and landscape values.

Objective–3 - To take account of the principles of the Treaty of Waitangi, recognise the role of tangata whenua as kaitiaki and provide for tangata whenua involvement in management of the coastal environment.

Objective–6 - To enable people and communities to provide for their social, economic, and cultural wellbeing and their health and safety, through subdivision, use, and development.

Policy–2 - The Treaty of Waitangi, tangata whenua and Māori heritage.

Policy–6 - Activities in the coastal environment.

Policy –11 - Indigenous biological diversity (biodiversity).

Policy –13 - Preservation of natural character.

Policy –14 - Restoration of natural character.

Policy –15 - Natural features and natural landscapes.

The proposed CSC is in keeping with the relevant objectives and policies of the NZCPS. As indicated in section 4 and 5 of this report, the works will ensure that there will be no adverse effects on the integrity, form and function of the nearby coastal environment.

6.4 National Policy Statement Freshwater Management 2014

The NPS for Freshwater Management was made operative on 1 August 2014 and sets out the objectives and policies for freshwater management under the Resource Management Act 1991. The NPS for Freshwater Management states: "*This national policy statement sets out objectives and policies that direct local government to manage water in an integrated and sustainable way, while providing for economic growth within set water quantity and quality limits. The national policy statement is a first step to improve freshwater management at a national level*".

The Treaty of Waitangi is recognised as follows:

"The Treaty of Waitangi (Te Tiriti o Waitangi) is the underlying foundation of the Crown–iwi/hapū relationship with regard to freshwater resources. Addressing tāngata whenua values and interests across all of the well-beings, and including the involvement of iwi and hapū in the overall management of fresh water, are key to meeting obligations under the Treaty of Waitangi.

All New Zealanders have a common interest in ensuring the country's freshwater lakes, rivers, aquifers and wetlands are managed wisely."

With regards to national bottom lines, the NPS has identified two compulsory values for freshwater management:

- Ecosystem health; and
- Human health for recreation

In terms of tangata whenua values, the NPS states:

"Freshwater objectives for a range of tāngata whenua values are intended to recognise Te Mana o te Wai. Iwi and hapū have a kinship relationship with the natural environment, including fresh water, through shared whakapapa. Iwi and hapū recognise the importance of fresh water in supporting a healthy ecosystem, including human health, and have a reciprocal obligation as kaitiaki to protect freshwater quality."

Essentially, the NPS for Freshwater Management is *"about recognising the national significance of fresh water for all New Zealanders and Te Mana o te Wai."*

In this regard Appendix 1 of the NPS sets out national values and uses for freshwater; including such compulsory aspects as:

- the health and mauri of water (ecosystem health), and
- the health and mauri of people (human health for recreation).

Other additional values include

- the health and mauri of the environment (natural form and character);
- food gathering, places of food (mahinga kai, fishing);
- cultivation (irrigation and food production, animal drinking water);
- Sacred waters / Wahi Tapu;
- Municipal and domestic water supply;
- economic or commercial development (commercial and industrial use, hydro-electric power generation);
- Navigation (transport and tauranga waka).

As demonstrated in the information provided in the main CSC document and including in section 4 and 5 of this report, the proposed CSC will not result in any adverse effects that are contrary to relevant policy directions in the NPS.

6.5 Operative Regional Policy Statement

The Regional Policy Statement is a document prepared under the Resource Management Act 1991 (RMA) to sustainably manage the region's natural and physical resources. The second generation RPS became operative on 1 October 2014.

Proposed Change 1 (Coastal Policy) was publicly notified on 1 October 2014, and relates specifically to the natural character maps and attributes for Motiti coastal waters and Okurei Point (Maketu). The proposed CSC is not inconsistent with the provisions for Coastal Policy in Proposed Change 1.

Proposed Change 2 (Natural Hazards) was publicly notified on 1 October 2014 and seeks to insert natural hazard provisions into the newly operative RPS. The change will guide those preparing regional, city and district plans and considering resource consent applications in managing land use and associated activities according to the level of natural hazard risk they are subject to. The proposed CSC addresses flood hazard aspects and is not inconsistent with the provisions for natural hazards in Proposed Change 2.

The relevant provisions of the Regional Policy Statement include the following sections:

- Section 2.6 Iwi resource management
- Section 2.7 Matters of National Importance
- Section 2.8 Urban and rural growth management
- Section 2.9 Water quality and land use
- Section 2.10 – Water Quantity

The proposed CSC is generally consistent with the relevant objectives and policies of the Operative Regional Policy Statement.

6.6 Operative Bay of Plenty Regional Coastal Environment Plan

The operative BOP Regional Coastal Environment Plan (RCEP) was amended on 22 February 2011 to remove restricted coastal activities in accordance with the NZCPS 2010 provisions; and will remain active until the new Plan is approved. Submissions have now closed for the Proposed BOP Regional Coastal Pan, and hearings and deliberations are underway.

Under the RCEP, the Central Catchment discharges into areas identified as:

- Outstanding Natural Feature and Landscape (Tauranga Harbour);
- Area of Significant Conservation or Cultural Value (in the Coastal Marine Area);
- SSCMA-15: Park Lane (Oturu Creek) Inlet
  - Species of note: Australasian bittern, Banded rail, North Island fernbird;
  - Other species: Pukeko, New Zealand kingfisher, White-faced heron .
- SSCMA-16: Waipa Road
  - Species of note: Banded rail, North Island fernbird;
  - Other species: Pukeko, New Zealand kingfisher, White-faced heron .

Works within the CMA include:

- Installation and maintenance of inlet & outfall structures and associated scour protection
- Installation and maintenance of energy dissipation devices and fish passages

- Installation and maintenance of treatment devices/swales, debris deflectors
- Construction, operation and maintenance of stopbanks, floodgates, spillways, pump stations, retention and detention structures and dams, and weirs/measurement stations to protect property from flooding and to safeguard communities.
- Piping of watercourses/artificial lining, widening and channelling
- Sediment management, including channel realignment, diversions and sediment relocation and, installation and maintenance of rock revetment, training groynes and enhanced due care
- Weed control by herbicide, Vegetation removal and Vegetation planting
- Pipeline crossings of streams/watercourses
- Maintenance of flood ways/secondary flow paths
- Mitigation works and ecological enhancement works in streams and watercourses
- Earthworks associated with installation of stormwater infrastructure including detention dams, swale construction, protection works, mitigation works, and flood ways

In relation to Chapter 9: *Coastal Discharges*, specifically Objective 9.2.2 and Policies 9.2.3 (a-d); Chapter 12 *Occupation of Space*, specifically Objective 12.2.2 and Policies 12.2.3 (a); Chapter 13 *Structures*, specifically Objective 13.2.2 and Policies 13.2.3 (a, e, g, h–l); Chapter 14 *Disturbance and Deposition*, specifically Objective 14.2.2 (a) and Policies 14.2.3 (a, e-g); and Chapter 18 *Historic and Cultural Heritage*, specifically Objective 18.2.2 and Policies 18.2.3 (a, d, e), the following comments are made:

- The proposal has been assessed with reference to the following Schedules of the RCEP:
  - Ninth Schedule - Information Requirements for Coastal Permit Applicants;
  - Thirteenth Schedule – Water Quality Standards;
  - Fourteenth Schedule – Areas of Significant Cultural Value.
- Given the proposed management and mitigation measure identified in section 6.3 of the main CSC document and sections 4 and 5 of this report, it is considered that works and structures within the CMA will be generally consistent with the relevant objectives and policies identified.

6.7 Bay of Plenty Regional Water and Land Plan

Chapter 4 of the RWLP addresses issues arising from the discharge to water and land.

The proposed CSC has been assessed against the relevant Objectives contained in Part 4.1.2 and with the relevant Policies contained in Part 4.1.3. In this regard the following relevant comments are made:

- The proposed CSC has been assessed against the relevant objectives and policies set out in Parts 4.1.2 and 4.1.3 of the RWLP, and as demonstrated in section 4 and 5 of this report, addresses potential adverse effects on the environment.
- Comprehensive consultation has been undertaken with regards to the change in conditions to the CSC, with the process having taken into account the cultural values of tangata whenua acknowledged for the area.
- As indicated in section 5 of this report, the effects on water quality within the Central Catchment can be mitigated to be less than minor and acceptable, subject to appropriate stormwater management (refer section 7). Overall, the CSC will not have an adverse effect on the life-supporting capacity of fresh water, including on any ecosystem associated with fresh water.
- Overall, given the assessment of effects detailed in section 5 of this report, the proposed CSC will be consistent with the relevant objectives and policies of Parts 4.12 and 4.13 of the RWLP.

- The discharge of stormwater to surface water is permitted under Rule 30, provided certain criteria are met; although this does not provide for discharges to a surface water body already covered by a CSC.
- Rule 30A provides for the discharge of stormwater to surface water as a Restricted Discretionary activity, provided certain criteria are met relating to rate of discharge, and suspended solids concentrations, amongst other criteria. Where the discharge does not fully comply with Rules 30 and 30A, it is a Discretionary activity under Rule 37 (refer to Flow diagram 9 – Stormwater Discharges, RWLP). In this regard, Rule 30A provides for known discharges easily assessed and addressed by way of consent conditions, whereas the RWLP describes how Rule 37 (Discretionary) applies to (but is not limited to) comprehensive catchment discharge consents for stormwater, as well as for large scale applications (trade and industrial premises, contaminated sites).
- Rules 31 and 31A address the discharge of stormwater to land soakage as a Permitted activity and Restricted Discretionary activity respectively, depending on meeting certain criteria.
- Rule 33 provides for the discharge of water to water as a Permitted activity where the discharge is to the same surface water body and the water quality is the same as the receiving waters.
- Rule 37 addresses all other discharges to water or land, which identifies such discharges as Discretionary; and requires an assessment of Schedule 9 and the Water Classification Map. As noted above, Rule 37 provides for comprehensive catchment discharge consents for stormwater, such as this application seeking to change CSC conditions.
- The Te Puna Stream is identified as a an Aquatic Ecosystem (Bay of Plenty) stream under the Proposed Water Quality Classification – Version 8.0 – March 2004 (refer to Water Classification Map - BOP Region Plan No C1823, scale 1:250 000).
- Other streams and tributaries within the catchment are classified as Bay of Plenty Regional Base Line under the Proposed Water Quality Classification – Version 8.0 – March 2004 (refer to Water Classification Map - BOP Region Plan No C1823, scale 1:250 000).
- Under Schedule 9 – Water Quality Classification Standards and Criteria, Section 4 addresses the Aquatic Ecosystem (Bay of Plenty) Water Quality Classification, and Section 9 addresses Regional Baseline (Bay of Plenty) Water Quality Classification. These sections set out the required standards to be addressed by the discharge after reasonable mixing of the discharge with the receiving water. This aspect has been taken into account within the original CSC documentation and appendices and also this report, including sections 4 and 5; along with the management, monitoring and mitigation measures proposed. Given this, the effects on water quality in the receiving waters after reasonable mixing, will be acceptable.
- Rule 85 addresses any modifications to wetlands as a Discretionary activity;

6.8 Bay of Plenty Stormwater Strategy – October 2005

This Stormwater Strategy (SS) outlines the stormwater issues confronting the Bay of Plenty region. The purpose of the SS is to assist the region's Territorial Authorities (TAs) by providing a framework they can use to produce their own localised stormwater strategies and action plans. The SS promotes using the principles outlined in the document to ensure stormwater is managed consistently across the region, and ensure that the effects of stormwater discharges are dealt with adequately. It recognises the statutory responsibilities the different authorities have, and the benefits of addressing stormwater management on a comprehensive basis across the Bay of Plenty.

The SS also meets an objective of the Western Bay of Plenty Subregion's SmartGrowth Strategy and Implementation Plan. SmartGrowth provides six principles to govern stormwater management in the Western Bay of Plenty sub-region. These principles are:

i. Stormwater is viewed as a resource

ii. Stormwater is treated to protect the environment

iii. *Forward planning and implementation of a stormwater system with sufficient capacity to support intensified urban development*

iv. *Pollution of the Tauranga Harbour is actively avoided*

v. *Flood protection meets or exceeds legislative requirements*

vi. *Water quality in the coastal marine area is maintained and enhanced.*

SmartGrowth recognises that increased intensification may cause accelerated stormwater run-off, so infrastructural requirements for growth need to be planned for. SmartGrowth proposes careful management and assessment of effects of intensification on stormwater runoff through long-term implementation plans. Structure Plans establish a long-term vision and implementation plan for the development of new urban areas, as is relevant for the Central Catchment; including defining how to manage stormwater over the longer term. The SmartGrowth Strategy drives towards managing growth and development in a way that ensures that adverse environmental effects are minimised. The use of CSCs that embody the six principles is an effective way to manage the effects of stormwater.

The SS provides useful information and guidance details, particularly in relation to managing stormwater within the Central Catchment on a comprehensive stormwater catchment (CSC) basis. The Proposed CSC sought meets the principles set out above for the SmartGrowth strategy.

The SS sets out a Stormwater Strategy Vision to provide a framework for stormwater management issues to be addressed in an integrated, comprehensive and consistent manner throughout the Bay of Plenty region. The mission statement is outlined in BOPRC's Long Term Council Community Plan (LTCCP) as follows:

"Working with our communities for a better environment"

This includes:

(a) The effective and efficient management of the region's land, air, water, coastline and territorial sea, and

(b) The enhancement and conservation of the biodiversity and the physical, social and economic characteristics of the region that make it a desirable place to live in, produce in, and visit.

Environment Bay of Plenty's LTCCP, adopted 17 June 2004 sets out the community outcome statements for the Bay of Plenty community. These cover a wide range of topics, key amongst them in relation to the management of stormwater are the following:

Land

- *Healthy and productive soils*
- *Appropriate land use*

Water

- *Plentiful water*
- *Healthy lake, river, ground and coastal waters*
- *Efficient water use*

Hazards and Safety

- *Protected and prepared communities*
- *Accident-free lakes, rivers and coastal waters.*

The SS vision statement is as follows:

The vision for the SS is that in 10 years time, subsequent to the implementation of this strategy, the following will be achieved:

• People and communities in the Bay of Plenty region will experience fewer flooding problems.

• Contamination of the regions waterways, including their sediments, will bereduced.

• The properties and qualities of the waterways of the Bay of Plenty region will be protected and enhanced, ensuring that life can be supported, both within the waters and along the banks.

• The interests of tangata whenua will be preserved and the mauri of water will be maintained.

The SS also sets out overriding objectives as follows:

The vision statement establishes a focus for the development of the overall environmental goals or objectives and establishes a focus for the development of the stormwater strategy for the Bay of Plenty region.

The principal objective therefore for Environment Bay of Plenty and the TAs of the region, is to manage the effects of the region's stormwater runoff in an integrated manner, with regard to:

• Minimising hydrologic modification;

• Minimising contamination and the risk of contamination;

• Maintaining good water quality, enhancing degraded water quality and where unavoidable, minimising impacts;

• Mitigating the effects of flooding;

• Protecting health and safety of its people and safety of land and property;

• Maintaining healthy ecosystems and enhancing degraded ecosystems;

• Having regard to cultural values, including protecting and enhancing the mauri of fresh and marine waters

This application involves a CSC approach for the Te Puna and Minden catchments; and the application is considered to meet these SS provisions for the mission, vision and objectives.

6.9 Western Bay of Plenty District Plan

The proposed CSC will also reflect WBOPDC direction through aligning with a number of objectives and policies of the District plan; in particular those contained within Section 10 - *Infrastructure, Network Utilities & Designations* – including objectives 10.2.1(1), 10.2.1(2), 10.2.1(5) and policies 10.2.2(1) and 10.2.2(2). The proposed CSC which involves the identified management and mitigation measures (refer to previous sections of this report), is directly related to the provision, operation and maintenance of stormwater infrastructure required to efficiently and effectively meet the current and foreseeable needs of the District.

The proposed CSC is not contrary to the purpose and direction of the Minden Lifestyle Zone or Te Puna Business Park Structure Plan, both of which fall within the Central Catchment.

Overall, it is considered that the proposed CSC would better achieve the sustainable management purposes of the RMA, which is the ultimate objective to be achieved through the implementation of the WBOP District Plan.

6.10 Other Relevant Matters

6.10.1 Environmental Defence Society of New Zealand v The New Zealand King Salmon Co. Limited & Others [2014] NZSC 38 (NZ King Salmon Decision)

The NZ King Salmon Decision was issued by the Supreme Court in April 2014. While the decision has primary relevant to plan change processes under the RMA, it also has important ramifications for resource consent applications. The decision enforces the need to interpret individual objectives and policies carefully and give those that are directive and specific greater weight than those that are less directive and more general. This is relevant equally to resource consent and plan change processes.

In the NZ King Salmon Decision the directive nature of two policies in the NZCPS, with the use of the word "avoid", meant that there was no need to refer back to Part 2 of the RMA. The private plan change had to "give effect to" (which was held to mean "implement") the NZCPS pursuant to Section 67(3) and there was no need to refer back to Part 2 and apply an overall broad judgement as to whether the application would be granted.

However pursuant to Section 104 of the RMA decisions for resource consent applications are to be made "subject to Part 2" and decision makers are only required to "have regard" to the NZCPS and other national and regional planning documents. This difference in wording means that an overall broad judgement approach will still apply for resource consents. This has been confirmed in the recent decision of the Environment Court in KPF Investments Limited v Marlborough District Council [2014] NZEnvC 152.

This application has assessed the proposed CSC in light of the NZ King Salmon Decision and the KPF Investments Decision and has given the appropriate weight to the relevant objectives and policies of the NZCPS. The proposed CSC is in keeping with these relevant objectives and policies.

6.10.2 Te Puna Community Plan

The Te Puna Community Plan, under council planned initiatives, identifies that stormwater improvements are scheduled for the Te Puna west community. Such improvements are likely to complement the management of the proposed CSC, through improved stormwater infrastructure.

This section provides additional information to supplement the Section 6 of the CMP

7.0 Recommendations

7.1 Combined Quantity and Quality Measures

Options analysis or assessment is required by BOPRC. This text seeks to provide such an evaluation by identifying a range of possible stormwater management approaches and identifying the types of location where it would be appropriate to implement them. Given that specific devices and locations have not been identified and modelled in either the hydrological and hydraulic model or the CLM a more specific evaluation has not been completed at this time.

A range of stormwater management options that could be applied by retrofitting within existing urban areas or in response to new development is provided in Table 17. It is noted that the majority of the contaminants of concern are associated with roads and paved surfaces other than roads with zinc leaching occurring from roofs in some areas. The evaluation of stormwater management devices is focussed on the treatment of these sources.

In terms of water quantity, new development and existing development with particularly high levels of impervious areas such as commercial and industrial zones present the most potential benefit for the management of peak flows and management of total runoff volumes in a manner that aims to match predevelopment hydrology.

Table 18 presents the assessment matrix for each of the different stormwater management options and their applicability to the land use of the subject catchments. It highlights the following points:

- Biofiltration (swales and filter strips) have the highest overall treatment value due to their relatively low cost and good level of contaminant removal for the most important attached pollutants and fine sediments.
- Wetlands, pervious paving and rain gardens are second highest, all with approximately the same rating. Although the wetlands and rain gardens have higher removal efficiency, they have a higher cost.
- Extended detention ponds have approximately the same rating as wetlands and rain gardens but have the added benefit of effectively managing large volumes of stormwater runoff to enable discharges to better mimic the natural hydrological regime.
- Proprietary devices such as Sand Filters, StormFilters and primary separators have the lowest rating with only low to medium removal efficiencies and relatively high cost.
- Source control is used to reduce contaminants at source such as zinc leaching products that could be contaminating stormwater from roof run off. Retrofitting of existing buildings would not be a feasible solution therefore this should only be implemented on new development.
- Riparian management and planting are ecological opportunities that provide benefits to enhance stream quality, contaminant removal, ecological enhancement, public health and social/cultural benefits.

Based on the LTP 2015-2025, Table 19 provides issues, benefits, opportunities and recommendations for the catchment values regarding stormwater management.

Potential applicability to the landuse at Te Puna West and Minden urban stormwater catchments is provided in Table 20.

7.1.1 Engineering Solutions

Future development areas such as Te Puna West and Minden, as per Te Puna Community Plan and Minden lifestyle Zone could include Water Sensitive Urban Design (WSUD) options such as bioretention devices, green roofs, rainwater tanks and reduction of impervious areas in order to treat at source and reduce any potential leaching of contaminants from roof materials. More traditional engineering solutions such as ponds, wetlands and swales would also be applicable.

Within Minden area, it is noted that gullies and streams within the catchments and sub catchments may be suitable, for use as components of the management approach for stormwater retention, conveyance and treatment, when combined with associated riparian planting and enhancement.

Proprietary devices and treatment swales are appropriate measures to manage sediment, heavy metals and TPH contaminants from highly traffic roads.

7.1.2 Non Engineering Solutions

In addition to engineered solutions a range of non-engineering approaches to stormwater management should also be considered. These include:

- Monitoring performance against levels of service for stormwater and waste water systems (including septic tanks).
- Implementation of a clear stormwater management strategy for the Western Bay of Plenty District including policies, SMART objectives, monitoring performance, reporting and review.
- Clear District Plan policy, objectives and rules to encourage the implementation of stormwater management devices in order to manage the effects of future development and the development of higher risk activity zones such as industrial areas.
- Public awareness and education with respect to discharge of contaminants which can be entrained in stormwater and the effects that they have on the community values and the environment.
- Implementation of programmes for community engagement in riparian planting and stream enhancement.
- Targeted environmental monitoring programmes to determine the levels of stream erosion contamination of water sources and overall stream health. This would be helpful in setting environmental baselines in areas ear marked for future development or where high risk activities occur. Environmental trends over time can then be monitored. This could also include a follow up of water quality monitoring in drains following installation of waste water reticulation system.
- Clear strategy and rules around identification of flood prone areas and flood plains associated with rules to manage development in such areas.

WBOPDC has already begun to implement non engineering approaches through the 2007 Te Puna Community Plan[5] which sets out the following objectives: landuse strategy and priorities:

- *a strong planning process to give effect to the community's vision and values including planning and co-ordinating activities.*
- *improved infrastructure including roading, pedestrian and cycleways, parks, public transport, swimming pools and sewerage services at Te Puna West.*
- *planning framework that reduces encroachment onto productive rural areas and conflict between different land use activities. Maintain Te Puna as a green wedge between Tauranga and Omokoroa urban areas through an orderly land use plan that provides for multi use options while reducing conflict between activities.*
- *encourage work opportunities to provide more local "off farm" employment.*
- *retaining Te Puna physically characterised by rural activities and services. Limited provision for commercial and retail activities focusing on local services. Enhance the community focal points by markets and character signage.*
- *an environment where wetlands and riparian margins and significant landscapes are protected and enhanced.*

7.1.3 Stormwater Management Options

The optimal solution for any given development is likely to be a combination of both engineered and non-engineered approaches, as per Table 19.

Table 17 Central Catchments Stormwater Quantity and Quality Evaluation Matrix

Treatment Approach	Well Beings			Recommendations
	Social/Cultural	Economic	Environment	
Wetland	Can be applied at catchment or larger subcatchment scale Typically managed by Council Awareness and education of public water quality issues Offers opportunity for improved amenity and aesthetics of device Can effectively manages flood risk	Significant footprint of wetland for large catchment or subcatchment scale Each wetland will be relatively costly to construct and maintain but serves multiple properties as “community” scale device	Water quality, water quantity, Fish passage issues can be effectively addressed Improved water quality of streams and less potential for stream erosion. Significant earthworks Sediment, traffic and noise management required during construction	Apply for community/catchment scale stormwater management Council to specify design construction requirements/ controls in Contract Conditions. Contractors to carry out work during low flow periods to minimise sediment transport. Device to be vested in council to facilitate effective operations and maintenance. Health and safety requirements to be incorporated into design. Signage to warn public of stormwater discharge during flood events.
Detention Pond	Can be applied at catchment or larger subcatchment scale Typically managed by Council Awareness and education of public water quality issues Offers opportunity for improved amenity and aesthetics of device Can effectively manage flood risk	Significant development required to allow footprint of pond Each pond will be relatively costly to construct and maintain but serves multiple properties as “community” scale device	Effective water quantity and peak flow management as well as treatment. Improved water quality of streams and less potential for stream erosion. Significant earthworks Sediment, traffic and noise management required during construction	Apply for community/catchment scale stormwater management Council to specify design construction requirements/ controls in Contract Conditions. Contractors to carry out work during low flow periods to minimise sediment transport. Device to be vested in council to facilitate effective operations and maintenance. Health and safety requirements to be incorporated into design. Signage to warn public of stormwater discharge during flood events.
Rain Gardens	Typically applied close to source and involves a number of devices serving relatively small catchments Often private or body corp ownership Enforcements and control over maintenance and operation can be challenging. Awareness and education of public water quality issues Offers opportunity for improved amenity and aesthetics of device At source treatment aligns with cultural values Less effectively manages flood risk for large storm events	Land required for rain garden, but option for creation of common greenspace area within the development Lower per unit cost relative to wetlands and ponds but each unit only manages runoff from singe or few properties. Potential increase in Council performance management and enforcement costs.	Improved water quality of streams and less potential for stream erosion. Minimal earthworks Some potential dust, noise and traffic issues but of short duration during construction	Council to specify design and construction requirements/ controls in Contract Conditions. Council to put performance monitoring and enforcement mechanisms in place. Contractors to carry out work to minimise sediment release. Minimise land effects by incorporating into the concept design of subdivision. Community participation to be encouraged.
Biofiltration (Swales, Filter Strips)	Requires commitment to implementing water sensitive design in development Typically applied close to source and involves a number of devices serving relatively small catchments Often private or body corp ownership Enforcements and control over maintenance and operation can be challenging.	Often located within road reserve Lower per unit cost relative to wetlands and ponds but each unit only manages runoff from singe or few properties. Potential increase in Council performance management and enforcement costs.	Contaminant removal before discharging to receiving environment Minimal earthworks Some potential dust, noise and traffic issues but of short duration during construction	Construct along where the grade is less than 5% or provide erosion protection. Council to specify design and construction requirements/ controls in Contract Conditions. Contractors to carry out work to minimise sediment release.

Treatment Approach	Well Beings			Recommendations
	Social/Cultural	Economic	Environment	
	Awareness and education of public water quality issues At source treatment aligns with cultural values Less effectively manages flood risk for large storm events			
Pervious paving for parking areas	Awareness and education of public water quality issues Can improve amenity Usually located within private developments and managed as such. Less effectively manage flood risk for large storm events	Need to incorporate outside of high traffic areas. Relatively high construction and maintenance costs compared to conventional road structure.	Improved runoff quality Moderate earthworks Some potential dust, noise and traffic issues but of short duration during construction	Construct along with roads and within lots in low traffic environments Council to specify construction requirements/ controls in Contract Conditions. Contractors to carry out work to minimise sediment release.
Riparian Management and Planting	Potential to increase recreational and amenity value Stream restoration/enhancement aligns with cultural values	High potential of Riparian management, planting and enhancement within Minden catchment Potential to increase property values. Relatively low cost to implement especially with community involvement.	Improvements to instream ecosystem, water quality and erosion protection. Restoration opportunities.	Community participation to be encouraged. Council to specify construction requirements/ controls in Contract Conditions. Contractors to carry out work using less intrusive transport.
Rain tanks	Opportunities for water reuse	Land required for tank Cost per property to install Potential for reduced use of potable water.	Peak discharge management for smaller storms and resultant potential to reduce downstream erosion effects	Minimise aesthetic and land effects by incorporating into the architectural design of buildings.
Primary Separators (StormFilters Enviropod)	No benefits on social/recreational unless coupled with other management options	Installation and operational costs for developers and property owners	Separators and enviropods provide stormwater pretreatment only solids removal Treatment at source	Minimise aesthetic and land effects by incorporating into the architectural design of buildings.
Source Control	Treatment at source can offer improved accountability of property owners for stormwater management Can reduce choice of building materials to limit potential leaching of zinc and copper. At source treatment aligns with cultural values	Difficulty to enforce, need to be implemented on new roof construction	Contaminant removal at source - TSS, zinc and copper	Minimise land effects by incorporating into the concept design of subdivision and building design.

Table 18 Central Catchment Stormwater Quantity and Quality Assessment Matrix

Stormwater Management Options	Applicability	Impacts on the Catchment Values				
		Environmental	Economic	Social	Cultural	Public Health
Wetland	All landuse with sufficient area for wetland footprint. Community Device for catchment / sub catchment scale.	HIGH REMOVAL EFFICIENCY	HIGH COSTS**	SLIGHT POSITIVE IMPACT	SLIGHT POSITIVE IMPACT	POSITIVE IMPACT
Extended Detention Pond	All landuse with sufficient area for pond footprint. Community Device for catchment / sub catchment scale.	MEDIUM REMOVAL EFFICIENCY	MEDIUM COSTS**	SLIGHT POSITIVE IMPACT	SLIGHT POSITIVE IMPACT	POSITIVE IMPACT
Rain Gardens	Urban Areas: Residential, commercial industrial. Smaller sub catchment scale.	HIGH REMOVAL EFFICIENCY	HIGH COSTS	POSITIVE IMPACT	POSITIVE IMPACT	SLIGHT POSITIVE IMPACT
Biofiltration (Swales, Filter Strips)	Urban and Residential Areas. Road side. Smaller sub catchment scale.	MEDIUM REMOVAL EFFICIENCY	LOW COSTS***	SLIGHT POSITIVE IMPACT	SLIGHT POSITIVE IMPACT	POSITIVE IMPACT
Pervious paving for parking areas	Urban Areas: Commercial Areas and higher density residential development.	MEDIUM REMOVAL EFFICIENCY	MEDIUM COSTS	NO IMPACT	NO IMPACT	NO IMPACT
Riparian Management and Planting	Stream and Gullies	POSITIVE IMPACT	MEDIUM COSTS	POSITIVE IMPACT	POSITIVE IMPACT	SLIGHT POSITIVE IMPACT
Rain tanks	Urban Areas: Residential, commercial industrial.	MEDIUM REMOVAL EFFICIENCY	MEDIUM COSTS	SLIGHT POSITIVE IMPACT	SLIGHT POSITIVE IMPACT	POSITIVE IMPACT
Primary Separators (StormFilters Enviropod)	Industrial Areas	LOW REMOVAL EFFICIENCY	LOW COSTS***	NO IMPACT	NO IMPACT	POSITIVE IMPACT
Source Control	New Development: Residential, commercial industrial areas.	MEDIUM REMOVAL EFFICIENCY	HIGH COSTS*	NO IMPACT	NO IMPACT	POSITIVE IMPACT

LEGEND:

	Environmental	Economic	Social / Cultural
	Low removal efficiency	High costs	No impact
	Medium removal efficiency	Medium costs	Slight positive impacts
	High removal efficiency/positive impact	Low costs	Positive impacts

NOTES:
* It would be difficult to enforce for new roof construction therefore could generate more costs.
** Higher cost per unit constructed but serves greater number of properties.
*** Lower cost per unit installed but only single or few properties served.

Table 19 Proposed Opportunities for Te Puna and Minden catchments in relation to the catchment values (refer WBOPDC LTP 2015-2025)

Catchment Values	Value	Issue	Benefit	Opportunity	Recommendation
Environment	Original vegetation and creeklines	Stream degradation through erosion by inadequately controlled discharges. Barriers for fish, contamination from sediment and pollutants. Beach erosion from stormwater outlets. Transfer of stormwater borne contaminants including suspended sediments	The appropriate stormwater management can reduce the amount of sediment reaching sensitive receiving environments, such as wetlands, estuaries and harbours, after high rainfall events. The stormwater management can help prevent other contaminants from reaching sensitive receiving environment.	Install appropriate stormwater management where required. Opportunity for creation of vegetation and habitat provision (e.g. saline wetland, freshwater wetland and terrestrial coastal communities). It would provide habitat for indigenous fish.	Continue to monitor discharges to comply with the consent conditions set by the Bay of Plenty Regional Council (BOPRC).
	Native water birds, fish, aquatic fauna and flora				
	Visually attractive riparian vegetation along the river banks (weed free)				
	Existing wetland areas and intertidal zone which attract large numbers of water birds				
	Remains of vegetation and native animals of special conservation				
	Natural creek banks as opposed to concrete and sheet piling				
	Stream health and water quality				
	Maintain groundwater quality and avoid any potential contamination to groundwater by restricting use and monitoring				
Social	Boating and secondary contact recreation throughout the catchment	Disruption during the implementation of works. Individuals can affect the stormwater network and neighbouring properties by altering natural flowpaths on their property Flooding can affect public health and safety. Stormwater can cause public health issues through the bacterial contamination of beaches where wastewater contamination occurs.	The stormwater network can manage the risk of damage from flooding to individual properties. Effective stormwater management provides a safe living environment for the whole community in relation to flood risk and potential contact with contaminants.	Opportunities may exist to incorporate stormwater management approaches with rejuvenation of Maori traditional restorative projects and social programs.	Continue to advise landowners of potentially flood-prone areas. Monitor new developments to ensure natural flowpaths are maintained. Implement public education and awareness programme
	Swimming				
	Fishing and consumption of fish / shellfish.				
	Recreational areas with water features which are visually pleasing and safe				
	Walking and bike tracks following the River with no visual pollution.				
	Facilities and use of waterways with environmental and cultural education and awareness themes.				
Cultural	Protecting the mana of the hapu;	Contamination of the receiving environment is unacceptable to Tangata Whenua especially where wastewater contamination occurs.	Stormwater management can help in protecting sites of cultural and historical significance from erosion and flooding. Acknowledges the significance of the receiving waters and the need to improve the mauri of water bodies, which improves health and well-being.	Opportunities may exist to incorporate stormwater management approaches with rejuvenation of Maori traditional restorative projects and social programs.	Continuing to better identify sites of cultural significance. Continue to monitor discharges to comply with the consent conditions set by the BOPRC.
	Maintaining our spiritual and physical cultural beliefs;				
	Protecting the sensitive sites and burial grounds of our tupuna;				
	Supporting and restoring abundant mahinga kai resources, particularly restoration in areas where they formerly flourished				
	Protecting the quality of the waters of Tauranga moana and our rivers and water linkages;				
	Protecting wahi tapu / wahi taonga;				
	Protecting cultural land and seascapes				
	Achieving a sufficient 'cap' on development in areas of cultural sensitivity;				
	The Protection, enhancement and maintenance of Mauri;				
	The protection of taonga (natural environment and resources);				
	Enhancing access to areas of cultural significance and mahinga kai throughout our rohe tribal area.				
Public Health	Watercourses safe for swimming, contact recreation and food	Potential contamination may impact	Maintaining public health is a priority	Opportunities to maintain and	Manage wastewater treatment

Catchment Values	Value	Issue	Benefit	Opportunity	Recommendation
	gathering.	public health (recreational, groundwater use, oyster etc.)	for WBOPDC	enhance water quality and therefore maintaining public health.	(through adequate wastewater reticulation system and septic tanks appropriately maintained) and discharges to reduce the risk of stormwater and groundwater contamination. Continue to monitor discharges to comply with the consent conditions set by the BOPRC.
Economic	Property values improved by waterway location or with views of waterways Stormwater suitable for reuse Reduction in damage caused due to flood inundation/contamination	Capital and operational costs of stormwater infrastructure. Ability to recover costs through rates based on development contributions. Deficient systems risk incurring costs due to damage in flood events and clean up of contamination	The stormwater network reduces the potential for damage and erosion to property, essential utilities and transport infrastructure. Efficiencies are available through integrating stormwater activities with others such as land use planning, transportation planning and industrial development.	Effective Implementation of stormwater management approaches will provide opportunity to reduce costs of potential flood event, contamination of the receiving environment and degraded public health. Manages risk of damage due to flooding and contamination	Continue to promote value for money by integrating stormwater upgrades with other projects. Focus on new development, areas of high risk activity and protection of sensitive receiving environments.

Table 20 Recommendations Summary for Te Puna and Minden Catchments

Recommended Solution No.	Related Issues	Issue Types	Opportunities	Location	Description of the Action	Relevant Objective(s)
1	Flooding	Potential Flooding	To be defined depending on Hydraulic modelling to be undertaken for Te Puna and Minden Maintain OLFP	Locations to be defined within Te Puna and Minden urban Catchments - opportunities for improvement of the stormwater network	Undertake Hydraulic Modelling, provide recommendation to address any potential flooding issue Review of the stormwater network	Mitigate the adverse effects of impervious surface on minimum flows and flooding issue
2	Flooding	Drainage	Stormwater detention and treatment systems installation, combined with ecological restoration opportunities (e.g. associated riparian planting and enhancement – refer Stream Actions).	Locations to be defined	Stormwater Detention in ponds linked to harbour by small streams. Ecological opportunities for creation of vegetation and habitat provision (e.g. saline wetland, freshwater wetland and terrestrial coastal communities). It would provide habitat for indigenous fish.	Provide a recharge of Stream
3	Receiving Environment / Groundwater Hazards	Contamination Management	Improve Wastewater Treatment Reticulation	Te Puna West	Install wastewater reticulation system within Te Puna West to provide level of service and avoid potential contamination of groundwater, stormwater and receiving environment.	Reduce Contaminant Discharge
3b	Receiving Environment / Groundwater Hazards	Contamination Management	Septic tanks to be emptied, inspected, repaired and reported on at regular intervals.	Te Puna West	Monitor and maintain septic tanks to avoid potential contamination of groundwater, stormwater and receiving environment.	Reduce Contaminant Discharge
3c	Receiving Environment / Groundwater Hazards	Contamination Management	Following the completion of wastewater reticulation undertake a follow-up monitoring of faecal indicator bacteria, microbial sources and nutrient concentrations and shellfish flesh in drains.	Te Puna West (e.g. Waitui and Lindoch drains)	Monitor any potential contaminant reduction in the drains.	Reduce Contaminant Discharge
4	Receiving Environment	Contamination Management	Stormwater Treatment Combination of community and at source devices for new development or high risk areas (existing and new development).	Locations to be defined	Install a stormwater treatment pond/wetland with various LID biofiltration devices (swales, raingardens) in order to reduce contaminant discharge / improve stormwater quality	Reduce Contaminant Discharge, improve water quality and aesthetics
5	Receiving Environment	Erosion and Sediment Control	Consistent specification of requirements to control sediment release during construction.	Streams / gullies / drains: Locations to be defined	Preventive actions for potential stream bank instability and erosion such as riparian planting, improved riparian management of gullies and streams.	Mitigate potential sedimentary related effects associated with land disturbing activities
6	Streams	Stream Bank instability	To be defined following identification of stream erosion (if any) and extent of impact within the Minden and Te Puna West Urban Stormwater Catchments – through targeted environmental monitoring programmes / Stream ecological assessment.	Streams / gullies / drains: Locations to be defined	Preventive actions for potential stream bank instability and erosion such as riparian planting, improved riparian management of gullies and streams.	Reduce any potential stream bank instability and erosion
7	Streams	Fish Barrier	Ecological Opportunity	Minden Fish barriers	Removal of fish barriers within Minden area (as part of ecological opportunities) to be addressed when stormwater pond(s) are constructed.	Maintain or enhance fish passage for appropriate species by avoiding, remedying or mitigating effects of artificial barriers
8a	Streams	Maintenance and Enhancement	Opportunity for Social Action / Community participation to be	Open Drains within Te Puna West (i.e. adjacent	Open Drains Maintenance and Management Improvement of watercourse quality and	Maintain or enhance instream values

Recommended Solution No.	Related Issues	Issue Types	Opportunities	Location	Description of the Action	Relevant Objective(s)
			encouraged	to Te Puna Station Road and adjacent to Te Puna Estuary and Tauranga Harbour). Esplanade Reserve	reduced effects at discharge points.	
8b	Streams	Maintenance and Enhancement	Ecological Opportunity Enhancement of watercourses	Te Puna West open drains and Minden watercourses (Oturu Creek Tributaries)	Protect watercourses and drains and provide ecological enhancement: this could include in particular control of stormwater discharge contaminants and implementation of invasive weed control.	Maintain or enhance instream values (water quality at streams and discharge points)
9	Streams	Mitigation and Enhancement	Riparian Planting Implementation of programmes for community engagement in riparian planting and stream enhancement.	Various locations within Te Puna and Minden catchments	Riparian planting within Te Puna and Minden areas (as part of ecological opportunities): Gully sides should be planted with locally-sourced indigenous species and opportunities for fish passage need to be considered and addressed when stormwater ponds are constructed.	Reduce instream temperatures improve reach connectivity by planting or enhancing riparian vegetation.
10	Streams	Maintenance Action	Swales / Stormwater treatment devices regular maintenance		Various stormwater treatment devices installation to reduce the discharge of contaminants - Swales maintenance plan	Maintain high water quality by avoiding, remedying or mitigating contaminant inputs Protect human health
11	Streams	Potential Development Action	Cycling, Walking Tracks	Various locations within Te Puna and Minden catchments	Opportunity for creating potential interlinked network of walking and cycling tracks, when gully systems will be retired and planted.	Provide recreational area with social/cultural benefits
12	Statutory	Flooding - Economic	Community Engagement	Flood prone areas and flood plains to be identified (TBC)	Clear strategy and rules around identification of flood prone areas and flood plains associated with rules to manage development in such areas.	Provide statutory background to manage development in flood prone areas and flood plains.
13	Statutory	Stormwater Strategy - Economic	Community Engagement	Applicability throughout WBOPD	Implementation of a clear stormwater management strategy for the Western Bay of Plenty District including policies, SMART objectives, monitoring performance, reporting and review.	Compliance with Stormwater CSC conditions Benefits to economic, environmental, cultural, social and public health values.
14	Social & Public Health	Stormwater Discharge of Contaminants	Social Opportunity	Applicability throughout WBOPD	Public awareness and education with respect to discharge of contaminants which can be entrained in stormwater and the effects that they have on the community values and the environment.	Reduce dumping waste into stormwater and maintaining protection of the environment.

7.2 Capital Works

A summary of planned capital works has been identified as a gap in the CMP and is proposed to be added, refer Table 21 below.

Table 21 Central Catchment Planned Stormwater Physical Capital Works

Planned CAPEX Physical Projects	Timeframe
Stormwater Network Upgrade / Comprehensive Stormwater Consents	2016-2020
District Wide Stormwater Modelling	2016-2019
Small Communities Stormwater Infrastructure rehabilitation	2016-2018
Minden Stormwater Investigation and Remedial Work	2016-2020

Section 7.2.1 is proposed to be added to the original section 6.2 of CMP.

7.2.1 Compliance with Historic Places Act 1993

With reference to section 6.2.1 of the main CSC documentation, entitled *Compliance with Historic Places Act 1993*, it is noted that new the legislation is the Heritage New Zealand Pouhere Taonga Act 2014 (HNZPT) and that this has replaced the Historic Places Act 1993. The detail within this section remains relevant to the HNZPT.

7.3 Resource Consent Requirements

In addition to section 6.3 of the CMP, the following specific consent requirements have been identified:

Regional Water and Land Plan (RWLP)

- Under the RWLP consent is required under Rule 37 - *Discharges to Water or Land* – for a **Discretionary Activity**. The explanation of this rule indicates that it applies to comprehensive catchment discharge consents for stormwater.
- Works associated with the CSC may also require a resource consent pursuant to:
  - Section 9(3)(a) and Rule 10.5.4.3 RWLP;
  - Section 13(1)(a) RMA;
  - Section 13(1)(b) RMA;
  - Section 13(1)(d) RMA;
  - Section 14(1)(a) RMA;
  - Section 15(1)(a) RMA, Rule 30A RWLP;
  - Section 15(1)(b) RMA and Rule 30C RWLP.
  - Rule 85 RWLP (wetland modifications)

Regional Coastal Environment Plan

- If the discharge of stormwater to the CMA cannot meet the permitted activity criteria of Rule 9.2.4(a) RCEP then resource consent is required under Rule 9.2.4(b) as a **Discretionary Activity**.
- Works associated with the CSC may also resource consent pursuant to:
  - Section 12(1)(b) RMA, Rule 12.2.4(a) RCEP (occupation of land and any part of the CMA); and Rule 13.2.4(b) RCEP (erection of permanent submarine pipelines).
  - Section 12(1)(c, d and e) RMA and Rule 14.2.4(b) RCEP (disturbance of and deposition on foreshore or seabed)

- Rule 14.2.4(j) RCEP (removal, damage, destruction of indigenous vegetation on foreshore or seabed)

7.4 Other Recommended Methods

Gaps have been identified regarding the other recommended stormwater methods to be implemented within the subject catchment such as Low Impact Design (LID) and other Best Practicable Options (BPOs). Table 20 in section 7.1 suggests a range of options that could be implemented to Te Puna and Minden urban stormwater catchments.

The options will be progressed by WBOPDC in a series of workshops with Tangata Whenua, key stakeholders and the community to identify the preferred options and agree a strategy for implementation.

It is also proposed that a catchment management plan (CMP) be prepared within 12 months of the consent commencing and that this be reviewed on a five yearly basis. Further details are in section 7.6 and a draft CMP framework is attached in Appendix D. Given that much of the information required for this application is set out in various documents, including the PMS details and AECOM reports, the CMP approach will help simplify future monitoring and compliance aspects.

7.5 Monitoring Procedures and Performance Review

Item (1) of the CMP refers to resource consents monitoring. A proposed monitoring approach is detailed in this section, as the CSC is to replace approximately 100 resource consents.

The following amendments (refer Table 22) are proposed which include the monitoring requirements initially in section 3.5 of the CMP:

7.5.1 Monitoring Requirements

It is understood that most of the stormwater discharges within the district are from stormwater catchments that are unlikely to result in significant effects in the receiving environment and do not warrant intensive sampling at this time.

Following discussions with BOPRC's Consent Officer, Environmental Scientist and Pollution and Prevention Manager, the following requirements in relation to the monitoring to support the comprehensive stormwater consent application have been agreed upon:

- *In each of the major settlements (Waihi Beach, Katikati and Te Puke) choose the watercourse which receives most of the stormwater and/or the poorest quality of stormwater (e.g. from industrial or commercial use, high traffic volume roads and/or dense residential areas) and provide justification for choosing the particular watercourse as being the worst case scenario.*
- *Take one upstream and one downstream sediment sample during late summer (March/April) and during winter (June/July) and analyse the samples for the 6 most common metals (Zinc, Copper, Chromium, Lead, Nickel, Arsenic) and total hydrocarbons.*
- *Undertake a Benthic Invertebrate Community Assessment of samples taken at the same locations as the sediment samples above. Benthic invertebrate (incl. Insects, worms and molluscs) are a key part of a stream ecosystem. Monitoring their presence and health is a powerful tool to assess background water quality.*
- *Undertake initial "first flush" sampling of key stormwater discharges points (outlets) coupled with a desktop assessment of the likely stormwater contaminant levels from within each of the key stormwater catchments in order of identifying discharges and therefore receiving environments of potential concerns.*
- *Provide any other supporting information from other sources such as compliance monitoring results, fish surveys, environmental assessments etc.*

Table 22 Te Puna and Minden CSC Monitoring and Review

CSC Monitoring and Review Conditions	Conditions comments
Develop a monitoring program including sampling locations, frequency, process and reporting.	Water quality of the stormwater is recommended to be monitored regularly in order to detect any potential contamination and enhance the quality of water bodies. CMP initially suggested monitoring at major settlements however monitoring at Te Puna and Minden would be relevant due to the CSC area of concern. It is recommended that at least key contaminants of concern for urbanised catchments be monitored: · Total Suspended Solids; *E.coli*, enterococci and Faecal coliforms for sewer contamination investigation; · Metals (Zinc, Copper) and · total hydrocarbons. In addition, it is recommended that following the completion of wastewater reticulation, a follow-up monitoring of faecal indicator bacteria, microbial sources and nutrient concentrations and shellfish flesh be undertaken at Te Puna West drains.
Compliance of monitoring and definition of trigger levels	Trigger levels to be defined for flow and marine waters based on: ANZECC (2000) guidelines, Bay of Plenty Regional Coastal Environment Plan (BOPCP) and MfE marine guidelines[27].
Actions in case of non-compliance	Actions to be developed such as: · Response to pollution incidents and tracking of causes (including bathing water quality where appropriate); · Additional targeted monitoring to isolate the cause of any adverse trend; · Signage to inform the public in recreational areas; · Other specific actions could include stormwater treatment devices check and maintenance (performance upgrades for devices monitored); · Enforcement against polluters; etc.
Review of monitoring program	Timeframe, frequency, reviewers will be proposed and specific non-compliance events will trigger shorter timeframes

7.5.2 CSC Performance Review

Performance review of CSC for Te Puna and Minden will include:

- Revision and update of the catchment management plan: proposed every 5 years[36];
- Review of the CSC conditions - frequency and conditions of review will be provided in the CSC Performance Review conditions;
- Compliance with the LTP 2015-2025 Stormwater Goals and Targets i.e.:
  - Flood events[37]
    - The number of times flooding occurs outside identified flood-prone urban areas during a one-in-50 year or less storm event will be limited to 3 events per year for 2016, 2017 and 2018, 3 events for the period 2019-2021 and 3 events for the period 2022-2025. This performance measure is assessed on a per event basis i.e. flooding in more than one location in a single event will be counted as 1.
    - Resident satisfaction level with stormwater systems, as monitored by the Annual Residents Survey; percentage of residents who are "very satisfied" or "satisfied": greater or equal to ≥65% for 2016, 2017 and 2018, 2019-2021 and 2022-2025.
  - Stormwater Assets Level of Service
    - Based on the number of flooding events that occur within the District. For each flooding event (district wide), the number of habitable floors affected (expressed per 1,000 properties connected to Council's stormwater system): shall not exceed 30 (3%) per event per year in 2016, 2017 and 2018, and for the periods 2019-2021 and 2022-2025.
    - Compliance with Council's resource consents for discharge from our stormwater system, measured by the number of 0 abatement notices, 0 infringement notices, 0 enforcement orders, and 0 convictions received by Council in relation to those resource consents for the period 2016-2025.
  - Customer Responses to Stormwater Issues
    - The median response to attend a flooding event, measured from the time that Council receives the notification to the time that service personnel reach the site shall not exceed 120 minutes for the period 2016-2025.
    - The number of complaints received by Council about the performance of its stormwater system, expressed per 1,000 properties connected to the Councils stormwater system shall not exceed 30 for the period 2016-2025.

7.6 Proposed Conditions

The following table identifies conditions proposed as part of this ICMP application.

Table 23 Proposed Conditions

Draft Conditions proposed on behalf of WBOPDC
1. The consent holder shall within 12 months of the commencement of this consent, complete the Te Puna/Minden Comprehensive Stormwater Catchment Management Plan to ensure consistency with the conditions of this consent. 2. The consent holder shall complete a review of the Te Puna/Minden Comprehensive Stormwater Catchment Management Plan no later than XXXX 2023 and at five yearly intervals thereafter. 3. The review shall be undertaken in consultation with the Chief Executive of the Regional Council or delegate; and shall include as a minimum: a. Identification of stormwater management issues, effects, options and mitigation; b. Effectiveness of the following general principles of stormwater management: i. Use of Low Impact Design solutions where practicable;

[36] Refer Letter from WBOPDC to Te Puna Heartlands dated 16 September 2014.
[37] As defined in Long Term Plan 2012-2025 for Stormwater: *Flooding event has been defined as an overflow of stormwater from a territorial authority's stormwater system that enters a habitable floor (Non-Financial Performance Measures Rules 2013).*

ii. Use of wide grassed swales for stormwater treatment and flow attenuation; and iii. Use of appropriate riparian planting where practicable, to achieve improved water quality and habitat outcomes; c. All available data collected on rainfall events/frequency and updated flood modelling; d. Consideration of any Iwi/Hapu Management Plans that have been lodged with the Bay of Plenty Regional Council; e. Updated asset management details for stormwater management infrastructure; f. Updated list of any private stormwater discharge consents to be included in the Te Puna/Minden Comprehensive Stormwater Catchment consent; g. Details on monitoring, and communications with stakeholders. 4. At the conclusion of each review of the Te Puna/Minden Comprehensive Stormwater Catchment Management Plan, the consent holder shall submit a report to the Chief Executive of the Regional Council, or delegate, of the outcome of the review and shall include a copy of the revised Catchment Management Plan. The report shall be made available to the public on request.
5. The consent holder shall within 12 months after completion of the Tauranga Harbour inundation modelling, undertake flood prediction modelling for the Te Puna and Minden urban areas. After completing the flood prediction modelling, the consent holder shall submit a report to the Chief Executive of the Regional Council, or delegate, of the outcome of the modelling and shall include a copy of the modelling data and analysis details. The report shall be made available to the public on request.

Appendix A

WBOPDC - Central Catchment Stormwater Urban Catchments CMP Gap Analysis, URS (AECOM), February 2015

16 February 2015

Coral-lee Ertel
Utilities Asset Engineer Drainage
Western Bay of Plenty District Council
1484 Cameron Road
Greerton
Private Bag 12803
Tauranga 3143

Reference: 42075048-4110L001

Dear Carol-lee

Comprehensive Stormwater Consents Application - Central Catchments Technical Review

Western Bay of Plenty District Council (WBOPDC) have been progressing development of, and consent applications for, Comprehensive Stormwater Catchment Management Plans (CMP) covering three catchments within the District namely the Western, Central and Eastern catchments. Development of the CMP's has included preparation of draft catchment management plans, draft assessment of effects on the environment (AEE), consultation with the community and draft regional resource consent applications.

In order to standardise the consent application process and ensure the CMP and AEE documents reflect the current legislative framework and industry practice WBOPDC has engaged URS New Zealand Limited – an AECOM Company (URS) to provide technical advice and support to assist WBOPDC finalise and lodge the CMP resource consent applications.

The scope of this letter report only covers the Central, Te Puna, catchments – Phase one Technical Review and GAP Analysis.

The following documents were provided by WBOPDC and formed the basis for the technical review and GAP analysis:

- Comprehensive Stormwater Consent Application Central Catchments – Catchment Management Plan No. CSZ1 Catchment Small Settlements DRAFT, Volumes 1 and 2 dated November 2013 prepared by Professional Management Services 2009 Limited (PMS);
- Comprehensive Stormwater Consent Brochure undated;
- Comprehensive Stormwater Consent Application Non-Technical Summary Report Central Catchment prepared by WBOPDC & PMS undated;
- WBOPDC letters to Te Puna Heartlands Inc dated 4 June, 28 July and 16 September 2014;
- Letter from Te Puna Heartlands Inc to WBOPDC undated (assumed to be dated 17 July 2014 based on WBOPDC reply letter of 28 July 2014;
- Comprehensive Stormwater Consent Application Central Catchments – Catchment Management Plan No. CSZ1 Catchment Small Settlements, Volumes 1, 2 and 3 dated July 2014 prepared by PMS.

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Our general comments are summarised below and while some of our concerns have been/maybe addressed in the information provided in volumes 2 and 3, due to the structure of the documents this is not easily sourced. The specific technical review and GAP analysis are tabulated and provided as Attachments 1 and 2.

General comments:

a) It would be usual for the industrial and commercial areas in a catchment or sub-catchments to be included in the scope of a CMP. AEE and any consents sought. Likewise any potential areas for growth or development would be specifically identified and shown on a map;

b) It would be usual to consider the catchment as a whole - ie Rural and urban parts;

c) Further to a) and b) above while greenfield sites may well secure their own discharge consents in the future (based on whatever development occurs there), these need to be integrated with the CMP parameters – as the stormwater management system will likely be vested in council, and council will end up taking on the respective consenting responsibilities;

d) There is almost no coverage of the specific receiving environments - ie current state and issues as they pertain to relevant streams and coastal areas or groundwater resources/users in the soakage areas;

e) Catchment objectives are not specific and do not link well to the issues listed in later sections;

f) Hydrological modelling seems inadequate and out of date. It is not clear if the flood assessments take into account current expectations of climate change or if and how hydrological neutrality is achieved or will be achieved;

g) Much of the monitoring section seems irrelevant to these catchments. It needs to be more specific to the streams and water bodies/coastal environment for these catchments;

h) Issues seem non catchment specific and do not clearly address discharge effects on water courses or coastal waters they discharge into or groundwater;

i) Mitigation and management methods would typically prescribe, non-structural ie policy, District plan, codes of practice and education and community initiatives and structural ie infrastructure solutions - ponds,wetlands, reticulation upgrades etc;

j) Section 4.2.1. The term source control has been incorrectly applied. It is the control of stormwater *AT SOURCE* ie through avoidance of contaminants generation by specifying roofing materials, on site retention/detention or biofiltration/swales;

k) Section 4.2. Potential sources of contamination - would logically come much earlier in the report;

l) Landfills and roads would also be covered off as potential discharges (point and diffuse respectively) and at least stated if any exist within the catchment;

m) The AEE section does not seem to address streams and coastal environment;

n) No clear Best Practicable Option (BPO) for stormwater management for these specific catchments is identified. This would normally cover stormwater quality measures, and stormwater quantity measures to address hydrological neutrality and flood mitigation. The BPO would normally be accompanied by an outline of a process for implementation of the recommended BPO;

o) Further work or investigations is required to inform/confirm the BPO that should be listed;

p) The CMP would normally clearly demonstrate the linkage between catchment specific objectives, issues currently faced and recommended solutions;

q) Lack of ongoing Iwi/Hapu engagement, particularly in relation to both the NPS for Freshwater and any Iwi management plans/BOPRC documents requiring tangata whenua participation; as well as CIA findings for Pirirakau;

r) Further consultation required with stakeholders and wider community.

Our overall assessment is that the Comprehensive Stormwater Consents Application document is poorly structured , confusing in terms of what is being assessed and applied for and incomplete in its coverage of the current legislative framework, general issues, investigations/modelling, environmental effects and recommendations.

We are available to discuss the finds of our Phase one technical review and GAP analysis and develop a strategy with WBOPDC to progress the Central Catchment resource consent application.

Please do not hesitate in contacting either of the undersigned to arrange a meeting.

Yours sincerely
URS New Zealand Limited

Bob Shaw
Principal Water Resources Engineer

Richard Harkness
Principal Environmental Planner

ATTACHMENTS

- **Attachment 1 - Central Catchments RMA Review and GAP Analysis**
- **Attachment 2 - Central Catchments CMP Review and GAP Analysis**

ensures the integrity of this electronic information is maintained. Storage of this electronic information should at a minimum comply with the requirements of the Electronic Transactions Act 2002.

Limitations

URS New Zealand Limited (an AECOM Company) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Western Bay of Plenty District Council and only those third parties who have been authorised in writing by URS to rely on the report.

It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report.

It is prepared in accordance with the agreed scope of work and for the purpose outlined in the URS Contract Note ICMP001 dated 16 December 2014.

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This report was prepared between January and February 2015 and is based on the conditions encountered and information reviewed at the item of preparation. URS disclaims responsibility for any changes that may have occurred after this date.

This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by URS for use of any part of this report in any other context.

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It is the responsibility of third parties to independently make inquiries or seek advice in relation to their particular requirements and proposed use of the relevant property.

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Attachment 1

Western Bay of Plenty District Council Comprehensive Stormwater Consents Application

Central Catchments RMA Review and GAP Analysis

Section	Comments	
1.1 Scope	Introduction is a bit confusing. What consents have been granted? Was the application under 61181 granted or have all the areas been split up into separate consents? Exclusions – Discharge of contaminated stormwater from industrial areas. States that this responsibility lies with BOPRC, but should include some assessment of the effects on the catchment. Does include treated stormwater discharge from industrial sites however. Exclusions – Greenfield activities. States that this responsibility lies with BOPRC, but should include some assessment of the effects on the catchment. Only includes earthworks associated with installation of stormwater infrastructure. Bulk earthworks are to be covered by BOPRC, no consideration of earthworks less than BOPRC thresholds.	
1.3 Legislative Background	**Document**	**Comments**
	RMA	Misses proper assessment of Sections 5, 6, 7 and 8 of the RMA. No mention of Sections 7 and 8. NB – RMA reforms will come into effect on 3 March 2015 and will need to be incorporated. No assessment of Section 104.
	Other National Documents	- No assessment of the NZCPS. - No assessment of the NPS for Freshwater Management 2011. - No mention of King Salmon Decision.
	Regional Documents	- Have not addressed the second generation RPS now that is has been made operative in October 2014 and no mention of Proposed Change 1 (Coastal Policy) and Proposed Change 2 (natural Hazards). - Need further assessment of BOPRC Water and Land Plan in regard to assessing the proposed with the relevant objectives and policies and Rules. Namely, Rules 30, 30A, 37, 31, 31A, 33 and 85. Assessment under Schedule 9 – Water Quality Classification needed. No indication of consent triggers. - Additional assessment of the BOPRC coastal plan is required. - Additional assessment of Stormwater strategy is needed. - No assessment or indication of water quality classification standards and assessment against schedule 9. - No identification of rivers and streams under the Water Classification Map within the BOPRC Water and Land Plan.
	Local Documents	- No mention of Te Puna Community Plan within this section – is within Section 2 but provides a broad statement. Would be helpful to elaborate on stormwater issues stated within the plan. - Could help to elaborate on District Plan relevant objectives and policies to reinforce that the CMP reflects Western Bay's direction. - No mention of Minden Lifestyle Zone or Te Puna Business Park Structure Plan within this section. Outlines that the study area is within the structure plan outline within Section 2.0 of the report.

1.4 Consultation	- Initial consultation was done for all catchments and no specific consultation has taken place for the central catchment area. Consultation was general with a workshop held. A workshop was held with the Tangata Whenua forum. No specific feedback was sought from specialist groups of interest namely Te Puna Heartlands. One CIA has been completed by Pirirakau. Doesn't seem to be any mention of the CIA within the report.
6.2 Capital Works	- Need to update section to reflect the Heritage New Zealand Pouhere Taonga Act 2014.

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Attachment 2

Western Bay of Plenty District Council Comprehensive Stormwater Consents Application

Central Catchments CMP Review and GAP Analysis

Suggested CMP Scope By BOPRC's Guidelines for the Development of Comprehensive Stormwater Consent Applications and Catchment Management Plans	**Relevant WBOPDC CMP No CSZ1 sections**	**Comments**
1.0 Introduction	1.0	
Scope	1.1	Discharge of stormwater from industrial and trade premises is not included in this Comprehensive Stormwater Consent (CSC) application. This may be acceptable, given that the Guideline for the Development of Comprehensive Stormwater Consent Applications and Catchment Management Plans (BOPRC) allows exclusion of specific discharges from industrial activities. Nevertheless, it is not clear to URS if it is a common understanding between WBOPDC and BOPRC that consents in relation to discharges from industrial sites lie with BOPRC. It is unclear if there is a mutual agreement between WBOPDC and BOPRC that stormwater discharge associated with greenfield activities in river beds, lakes, water courses and in the coastal marine area can be excluded from this CSC application.
Objective	1.2	Appropriate, no further comments.
Legislative background	1.3	Refer planning assessment
Consultation	1.4	Refer planning assessment
2.0 Description of Extend of Catchment	2.0	
Study Area	2.1	There is not a clear map showing the actual catchment boundary and delineation of the sub-catchments. The sub-catchment maps within Appendix A are not fit for purpose. No catchment boundary for Te Puna is provided. Catchment boundary for Minden appears to be loose end lines rather than polygons. It is not clear if only the small settlement area within Minden is included in this CMP or not. The sub-catchment maps for Minden included in Appendix A is confusing. Zoomed-in Stormwater reticulation and discharge points layout maps should be provided. The current layout maps are too small for viewing purpose.
Geology and soil	2.2	No comments

Land use	2.3	A tabulated land use percentage breakdown within the subject catchment shall be provided.
3.0 Existing Information	3.0	
Hydrological Modelling	3.1	Modelling scope, methodology and findings (DWK Report 2005) should be summarised within the CMP main text. No hydrological modelling work was carried out for Minden area. Only 50 year flood map (included within DWK report 2005) for Te Puna is provided. Incorrect statement on page 42: "The design floods are represented by estimated rainfall intensities." CMP mentioned that WBOPDC has applied adjustment of climate change rainfall intensity since 2007 (page 42), however no updated hydrological modelling results have been provided as a result of this adjustment.
Assessment of flows by Guidelines	3.2	Guideline flows are summarised, however no assessment is provided.
Determination of 1% AEP flood levels	3.3	Not provided.
Existing consents within the catchment	3.4	List is incomplete. It was mentioned on page 6 that approximately 100 stormwater consents are to be replaced by this CSC. The list in Appendix J only contains 12.
Monitoring requirements and results	3.5	Part of this section can potentially be relocated to Section 6.5, specially the monitoring requirements agreed with BORPC. Monitoring results are not summarised adequately within this section.
4.0 Identification of Stormwater Management Issues	4.0	
4.1 Stormwater Quantity	4.1	
Flood hazard maps		Current flood maps do not meet BOPRC's requirements, as noted within the CMP text (page 50).
Secondary flow paths		Currently the secondary flow paths have not been identified, which is noted within the CMP text (page 51).
Development within 1% AEP area		Unavailable due to the missing of 1% AEP flood map. It may be noted that if the same development code for 2% AEP is applicable for 1% AEP area, the approach can be considered as conservative.
Stream bank erosion		It is unclear if this is considered as a catchment issue or not. The text is too generic. It is unknown if this is due to the lack of investigation by WBOPDC.

Methods for improvement		Too generic. This needs to be tailored to the issues identified above.
4.2 Stormwater Quality	4.2	
Current stormwater quality management		It will be ideal to have a map showing the location of the stormwater treatment devices, as there are only a few within the subject catchment. Construction Monitoring as part of contractual obligation under NZS3910 (Page 59) are not necessarily relevant to stormwater quality monitoring, hence irrelevant. Performance monitoring and other environmental monitoring reports within Appendix K should be summarised in detail in a separate section named: Current Stormwater Quality.
Potential sources of contamination		There should be a separate section/heading for wastewater system or sewage treatment within the catchment. Contaminant load (either modelling or monitoring results) as included in Appendix K should be summarised in detail within this section or under a separate heading.
Stormwater treatment requirements		Too generic. Specific treatment targets should be specified by WBOPDC. Alternatively the specific treatment targets within the cited guidelines/technical publications should be specified within the CMP. Some of these documents do not have exactly the same treatment targets associated with design approaches, and some have been superseded.
Methods for improvement		Not specific to any identified issues, as noted within the text that Stormwater Strategy Review is to be carried out in 2013/2014 (should have already occurred at this stage).
5.0 Assessment of Environmental Effects	5.0	
Identification of resources within catchment and receiving waters	5.2	No reference sub-catchment map for Minden is available for the identification of sub-catchment locations as numbered in page 66. The catchment values as indicated in Table 2 (page 13) shall be summarised into a separate heading/section, either within this chapter or in chapter 2. Detailed description of the receiving environment including both streams and marine receiving environment should be provided within the main CMP text. This is missing.
Summary of potential threats to resource values	5.3	Too generic. Groundwater hazards need to be assessed, as the majority of sewage treatment within the catchment is via on-site wastewater

		systems. No potential threats have been identified.
Recommended methods to protect catchment resources	5.4	The potential catchment values have been categorised into three aspects: Ecological, Social/Cultural, and Economic. However Tangata Whenua values are missing in the assessment. URS consider that public health value should be an individual item in this section, rather than being part of social/cultural values.
6.0 Recommendations	6.0	
Combined quantity and quality measures	6.1	Option analysis or assessment, as required by BOPRC, is missing. The identified measures are mostly very generic. Some specific measures or integrated projects that have potential to improve both quantity and quality should be identified.
Capital works (Tabulate physical works)	6.2	Summary of planned capital works should be tabulated within the CMP main text. Refer to Planning Assessment.
Resource consent requirements	6.3	No comments (covered within the URS Attachment 1 RMA Assessment).
Other recommended methods	6.4	Other potential approaches may include LID and other BPOs
Monitoring procedures and performance review	6.5	Item (1) refers to resource consents monitoring. However the CSC monitoring should be detailed in this session, particularly when the CSC is to replace approximately 100 resource consents. No performance monitoring is currently proposed, and no performance review provisions are mentioned in this section.

Appendix B

Central Catchment Existing Stormwater conveyance systems (Te Puna and Minden Catchments), WBOPDC 2017

Appendix B Central Catchment Existing Stormwater Conveyance Systems (Te Puna and Minden Catchments), WBOPDC 2017

GIS No	Asset Type	Location	Street Name	Length	Diameter / Height	Material	Class	Drain Design Life	Remaining Life	Drain Age (Yrs)	Scheduled for upgrade
SWPI3052	SW Pipe	Minden	DAWN VIEW PLACE	2.2	225	CO	PN6	100	74	25.52	No
SWPI3053	SW Pipe	Minden	DAWN VIEW PLACE	7.3	150	uPVC	C	100	74	25.52	No
SWPI3054	SW Pipe	Minden	DAWN VIEW PLACE	47.3	300	CO	PN6	100	74	25.52	No
SWPI3055	SW Pipe	Minden	DAWN VIEW PLACE	40.9	300	CO	PN6	100	74	25.52	No
SWPI3057	SW Pipe	Minden	DAWN VIEW PLACE	2.4	225	CO	PN6	100	74	25.52	No
SWPI3058	SW Pipe	Minden	DAWN VIEW PLACE	34.2	300	CO	PN6	100	74	25.52	No
SWPI3059	SW Pipe	Minden	MINDEN ROAD	6.1	225	CO	PN6	100	74	25.52	No
SWPI3060	SW Pipe	Minden	MINDEN ROAD	13.7	300	CO	PN6	100	74	25.52	No
SWPI3061	SW Pipe	Minden	MINDEN ROAD	15.4	225	CO	PN6	100	74	25.52	No
SWPI3062	SW Pipe	Minden	MINDEN ROAD	11.8	300	CO	PN6	100	74	25.52	No
SWPI3063	SW Pipe	Minden	DAWN VIEW PLACE	8.4	225	CO	PN6	100	74	25.52	No
SWPI3064	SW Pipe	Minden	DAWN VIEW PLACE	6.8	225	CO	PN6	100	74	25.52	No
SWPI3065	SW Pipe	Minden	DAWN VIEW PLACE	4.8	225	CO	PN6	100	74	25.52	No
SWPI3066	SW Pipe	Minden	DAWN VIEW PLACE	34.1	225	CO	PN6	100	74	25.52	No
SWPI3067	SW Pipe	Minden	DAWN VIEW PLACE	35.6	225	CO	PN6	100	74	25.52	No
SWPI3068	SW Pipe	Minden	DAWN VIEW PLACE	8.5	225	CO	PN6	100	74	25.52	No
SWPI3069	SW Pipe	Minden	DAWN VIEW PLACE	3.4	225	CO	PN6	100	74	25.52	No
SWPI3070	SW Pipe	Minden	DAWN VIEW PLACE	56.2	225	CO	PN6	100	74	25.52	No
SWPI3071	SW Pipe	Minden	DAWN VIEW PLACE	9.2	225	CO	PN6	100	74	25.52	No
SWPI3072	SW Pipe	Minden	DAWN VIEW PLACE	3.8	225	CO	PN6	100	74	25.52	No
SWPI3073	SW Pipe	Minden	DAWN VIEW PLACE	31.2	225	CO	PN6	100	74	25.52	No
SWPI3075	SW Pipe	Minden	DAWN VIEW PLACE	3.1	225	CO	PN6	100	74	25.52	No
SWPI3076	SW Pipe	Minden	DAWN VIEW PLACE	40.8	300	CO	PN6	100	74	25.52	No
SWPI3077	SW Pipe	Minden	DAWN VIEW PLACE	35.7	300	CO	PN6	100	74	25.52	No
SWPI3078	SW Pipe	Minden	DAWN VIEW PLACE	55.1	300	CO	PN6	100	74	25.52	No
SWPI3079	SW Pipe	Minden	DAWN VIEW PLACE	3.8	225	uPVC	C	100	74	25.52	No
SWPI3080	SW Pipe	Minden	DAWN VIEW PLACE	6.7	225	CO	PN6	100	74	25.52	No
SWPI3081	SW Pipe	Minden	DAWN VIEW PLACE	70.0	300	uPVC	C	100	74	25.52	No
SWPI3082	SW Pipe	Minden	MINDEN ROAD	39.3	300	CO	PN6	100	84	15.52	No
SWPI3083	SW Pipe	Minden	MINDEN ROAD	42.0	300	CO	PN6	100	84	15.52	No
SWPI3084	SW Pipe	Minden	MINDEN ROAD	21.5	300	CO	PN6	100	84	15.52	No
SWPI3085	SW Pipe	Minden	MINDEN ROAD	1.6	300	CO	PN6	100	47	52.52	No
SWPI3086	SW Pipe	Minden	MINDEN ROAD	9.9	300	CO	PN6	100	84	15.52	No
SWPI3087	SW Pipe	Minden	MINDEN ROAD	5.3	225	CO	PN6	100	47	52.52	No

GIS No	Asset Type	Location	Street Name	Length	Diameter / Height	Material	Class	Drain Design Life	Remaining Life	Drain Age (Yrs)	Scheduled for upgrade
SWPI3088	SW Pipe	Minden	MINDEN ROAD	55.7	300	CO	PN6	100	84	15.52	No
SWPI3089	SW Pipe	Minden	MINDEN ROAD	87.7	300	CO	PN6	100	84	15.52	No
SWPI3090	SW Pipe	Minden	MINDEN ROAD	7.8	225	CO	PN6	100	47	52.52	No
SWPI3091	SW Pipe	Minden	MINDEN ROAD	1.4	225	CO	PN6	100	47	52.52	No
SWPI3092	SW Pipe	Minden	MINDEN ROAD	60.1	300	CO	PN6	100	84	15.52	No
SWPI3093	SW Pipe	Minden	MINDEN ROAD	1.3	300	CO	PN6	100	47	52.52	No
SWPI3094	SW Pipe	Minden	MINDEN ROAD	66.3	300	CO	PN6	100	84	15.52	No
SWPI3095	SW Pipe	Minden	MINDEN ROAD	27.1	300	CO	PN6	100	84	15.52	No
SWPI3097	SW Pipe	Minden	MINDEN ROAD	9.5	300	CO	PN6	100	47	52.52	No
SWPI3098	SW Pipe	Minden	MINDEN ROAD	2.3	300	CO	PN6	100	47	52.52	No
SWPI3099	SW Pipe	Minden	MINDEN ROAD	12.8	450	CO	PN6	100	84	15.52	No
SWPI3100	SW Pipe	Minden	MINDEN ROAD	9.5	300	CO	PN6	100	47	52.52	No
SWPI3101	SW Pipe	Minden	MINDEN ROAD	1.8	300	CO	PN6	100	47	52.52	No
SWPI3102	SW Pipe	Minden	MINDEN ROAD	42.7	450	CO	PN6	100	84	15.52	No
SWPI3103	SW Pipe	Minden	MINDEN ROAD	80.6	450	CO	PN6	100	84	15.52	No
SWPI3104	SW Pipe	Minden	MINDEN ROAD	18.9	300	CO	PN6	100	47	52.52	No
SWPI3105	SW Pipe	Minden	MINDEN ROAD	69.9	450	CO	PN6	100	84	15.52	No
SWPI3106	SW Pipe	Minden	MINDEN ROAD	53.5	450	CO	PN6	100	84	15.52	No
SWPI3107	SW Pipe	Minden	MINDEN ROAD	23.1	450	CO	PN6	100	84	15.52	No
SWPI3108	SW Pipe	Minden	MINDEN ROAD	1.3	300	CO	PN6	100	74	25.52	No
SWPI3109	SW Pipe	Minden	MINDEN ROAD	34.1	600	CO	PN6	100	84	15.52	No
SWPI3110	SW Pipe	Minden	MINDEN ROAD	3.5	600	CO	PN6	100	84	15.52	No
SWPI3111	SW Pipe	Minden	MINDEN ROAD	1.4	300	CO	PN6	100	84	15.52	No
SWPI3112	SW Pipe	Minden	MINDEN ROAD	6.4	600	UN	UN	100	84	15.52	No
SWPI3113	SW Pipe	Minden	MINDEN ROAD	17.5	600	UN	UN	100	84	15.52	No
SWPI3119	SW Pipe	Minden	MINDEN ROAD	9.3	375	CO	PN6	100	47	52.52	No
SWPI3120	SW Pipe	Minden	MINDEN ROAD	11.9	300	CO	PN6	100	47	52.52	No
SWPI3121	SW Pipe	Minden	MINDEN ROAD	11.6	300	CO	PN6	100	47	52.52	No
SWPI3122	SW Pipe	Minden	MINDEN ROAD	13.8	300	CO	PN6	100	47	52.52	No
SWPI3123	SW Pipe	Minden	MARUIA PLACE	26.9	600	CO	PN6	100	68	31.52	No
SWPI3124	SW Pipe	Minden	MARUIA PLACE	7.6	225	CO	PN6	100	68	31.52	No
SWPI3125	SW Pipe	Minden	MARUIA PLACE	7.2	225	CO	PN6	100	68	31.52	No
SWPI3126	SW Pipe	Minden	MARUIA PLACE	11.2	450	CO	PN6	100	68	31.52	No
SWPI3127	SW Pipe	Minden	MARUIA PLACE	4.7	225	CO	PN6	100	68	31.52	No
SWPI3128	SW Pipe	Minden	MARUIA PLACE	9.0	450	CO	PN6	100	68	31.52	No
SWPI3133	SW Pipe	Minden	CORBETT DRIVE	3.3	225	CO	PN6	100	68	31.52	No

GIS No	Asset Type	Location	Street Name	Length	Diameter / Height	Material	Class	Drain Design Life	Remaining Life	Drain Age (Yrs)	Scheduled for upgrade
SWPI3134	SW Pipe	Minden	CORBETT DRIVE	2.4	225	CO	PN6	100	68	31.52	No
SWPI3135	SW Pipe	Minden	CORBETT DRIVE	9.3	300	CO	PN6	100	68	31.52	No
SWPI3136	SW Pipe	Minden	CORBETT DRIVE	8.8	450	CO	PN6	100	68	31.52	No
SWPI7905	SW Pipe	Minden	CORBETT DRIVE	45.0	225	CO	PN6	100	68	31.52	No
SWPI3140	SW Pipe	Minden	MINDEN ROAD	21.6	300	CO	PN6	100	82	17.60	No
SWPI3141	SW Pipe	Minden	MINDEN ROAD	34.4	300	CO	PN6	100	82	17.60	No
SWPI3142	SW Pipe	Minden	MINDEN ROAD	9.5	300	CO	PN6	100	82	17.60	No
SWPI3143	SW Pipe	Minden	MINDEN ROAD	56.2	300	CO	PN6	100	82	17.60	No
SWPI3144	SW Pipe	Minden	MINDEN ROAD	2.0	300	CO	PN6	100	82	17.60	No
SWPI3145	SW Pipe	Minden	MINDEN ROAD	39.4	300	CO	PN6	100	82	17.60	No
SWPI3146	SW Pipe	Minden	MINDEN ROAD	35.5	300	CO	PN6	100	82	17.60	No
SWPI3147	SW Pipe	Minden	MINDEN ROAD	3.8	300	CO	PN6	100	82	17.60	No
SWPI3148	SW Pipe	Minden	MINDEN ROAD	15.5	300	CO	PN6	100	82	17.60	No
SWPI3149	SW Pipe	Minden	MINDEN ROAD	22.7	300	CO	PN6	100	82	17.60	No
SWPI3150	SW Pipe	Minden	MINDEN ROAD	15.2	300	CO	PN6	100	82	17.60	No
SWPI3151	SW Pipe	Minden	MINDEN ROAD	41.3	300	CO	PN6	100	82	17.60	No
SWPI3152	SW Pipe	Minden	FLORENCE LANE	29.8	300	CO	PN6	100	86	13.52	No
SWPI3153	SW Pipe	Minden	FLORENCE LANE	5.2	300	CO	PN6	100	70	29.52	No
SWPI3156	SW Pipe	Minden	FLORENCE LANE	11.1	225	CO	PN6	100	70	29.52	No
SWPI3157	SW Pipe	Minden	FLORENCE LANE	25.0	300	CO	PN6	100	70	29.52	No
SWPI3158	SW Pipe	Minden	FLORENCE LANE	14.4	300	CO	PN6	100	70	29.52	No
SWPI3159	SW Pipe	Minden	FLORENCE LANE	20.5	300	CO	PN6	100	70	29.52	No
SWPI3160	SW Pipe	Minden	MINDEN ROAD	55.4	225	CO	PN6	100	70	29.52	No
SWPI3161	SW Pipe	Minden	MINDEN ROAD	8.9	225	CO	PN6	100	70	29.52	No
SWPI3162	SW Pipe	Minden	MINDEN ROAD	15.3	225	CO	PN6	100	70	29.52	No
SWPI3163	SW Pipe	Minden	MINDEN ROAD	4.8	300	CO	PN6	100	70	29.52	No
SWPI3164	SW Pipe	Minden	MINDEN ROAD	61.5	300	CO	PN6	100	70	29.52	No
SWPI3165	SW Pipe	Minden	MINDEN ROAD	3.5	300	CO	PN6	100	70	29.52	No
SWPI3166	SW Pipe	Minden	MINDEN ROAD	9.8	300	CO	PN6	100	70	29.52	No
SWPI3167	SW Pipe	Minden	MINDEN ROAD	3.4	300	CO	PN6	100	70	29.52	No
SWPI3171	SW Pipe	Minden	PERKINS DRIVE	28.4	300	CO	PN6	100	72	27.52	No
SWPI3174	SW Pipe	Minden	MINDEN ROAD	45.8	450	CO	PN6	100	84	15.52	No
SWPI3175	SW Pipe	Minden	PERKINS DRIVE	29.4	225	CO	PN6	100	72	27.52	No
SWPI4047	SW Pipe	Minden	WALDEN LANE	13.5	300	CO	PN6	100	83	16.52	No
SWPI4050	SW Pipe	Minden	WALDEN LANE	18.1	525	CO	PN6	100	83	16.52	No
SWPI3683	SW Pipe	Minden	DAWN VIEW PLACE	35.9	150	uPVC	C	100	75	25.35	No

GIS No	Asset Type	Location	Street Name	Length	Diameter / Height	Material	Class	Drain Design Life	Remaining Life	Drain Age (Yrs)	Scheduled for upgrade
SWPI3682	SW Pipe	Minden	DAWN VIEW PLACE	60.5	150	uPVC	C	100	75	25.35	No
SWPI3686	SW Pipe	Minden	DAWN VIEW PLACE	39.7	150	uPVC	C	100	75	25.35	No
SWPI3685	SW Pipe	Minden	DAWN VIEW PLACE	45.6	150	uPVC	C	100	75	25.35	No
SWPI3684	SW Pipe	Minden	DAWN VIEW PLACE	44.5	150	uPVC	C	100	75	25.35	No
SWPI3887	SW Pipe	Minden	DAWN VIEW PLACE	87.0	150	uPVC	C	100	75	25.35	No
SWPI3888	SW Pipe	Minden	DAWN VIEW PLACE	46.0	150	uPVC	C	100	75	25.35	No
SWPI5565	SW Pipe	Minden	OLIVER ROAD	10.5	300	CO	X	100	94	5.60	No
SWPI5566	SW Pipe	Minden	OLIVER ROAD	5.4	300	CO	X	100	94	5.60	No
SWPI5567	SW Pipe	Minden	OLIVER ROAD	16.8	375	CO	X	100	94	5.60	No
SWPI5568	SW Pipe	Minden	OLIVER ROAD	5.2	300	CO	X	100	94	5.60	No
SWPI5571	SW Pipe	Minden	OLIVER ROAD	19.8	525	CO	X	100	94	5.60	No
SWPI5572	SW Pipe	Minden	OLIVER ROAD	7.8	300	CO	X	100	94	5.60	No
SWPI5573	SW Pipe	Minden	OLIVER ROAD	7.7	300	CO	X	100	94	5.60	No
SWPI5574	SW Pipe	Minden	OLIVER ROAD	10.2	300	CO	X	100	94	5.60	No
SWPI5575	SW Pipe	Minden	OLIVER ROAD	7.7	300	CO	X	100	94	5.60	No
SWPI5577	SW Pipe	Minden	OLIVER ROAD	7.8	300	CO	X	100	94	5.60	No
SWGS0009	Grass Swale	Minden	OLIVER ROAD	52.9	0	NAT	UN	80	74	5.60	No
SWPI5579	SW Pipe	Minden	OLIVER ROAD	12.8	300	CO	X	100	94	5.60	No
SWPI5580	SW Pipe	Minden	OLIVER ROAD	16.7	375	CO	X	100	94	5.60	No
SWPI5581	SW Pipe	Minden	OLIVER ROAD	5.2	300	CO	X	100	94	5.60	No
SWPI5582	SW Pipe	Minden	OLIVER ROAD	16.8	375	CO	X	100	94	5.60	No
SWPI5583	SW Pipe	Minden	OLIVER ROAD	5.2	300	CO	X	100	94	5.60	No
SWGS0011	Grass Swale	Minden	OLIVER ROAD	252.8	0	NAT	UN	80	74	5.60	No
SWGS0012	Grass Swale	Minden	OLIVER ROAD	983.6	0	NAT	UN	80	74	5.60	No
SWGS0013	Grass Swale	Minden	OLIVER ROAD	733.9	0	NAT	UN	80	74	5.60	No
SWPI7862	SW Pipe	Minden	MINDEN ROAD	55.2	225	CO	UN	100	81	18.52	No
SWPI7863	SW Pipe	Minden	MINDEN ROAD	10.7	225	CO	UN	100	81	18.52	No
SWPI7864	SW Pipe	Minden	MINDEN ROAD	34.0	225	CO	UN	100	81	18.52	No
SWPI7865	SW Pipe	Minden	MINDEN ROAD	13.9	225	CO	UN	100	81	18.52	No
SWPI7866	SW Pipe	Minden	MINDEN ROAD	27.8	225	CO	UN	100	81	18.52	No
SWPI7867	SW Pipe	Minden	MINDEN ROAD	9.5	225	CO	UN	100	81	18.52	No
SWPI7868	SW Pipe	Minden	MINDEN ROAD	47.2	225	CO	UN	100	81	18.52	No
SWPI7869	SW Pipe	Minden	CORBETT DRIVE	8.3	225	CO	UN	100	81	18.52	No
SWPI7870	SW Pipe	Minden	CORBETT DRIVE	13.6	300	CO	UN	100	81	18.52	No
SWPI7871	SW Pipe	Minden	CORBETT DRIVE	2.8	300	CO	UN	100	81	18.52	No
SWPI7872	SW Pipe	Minden	MINDEN ROAD	3.4	0	CO	UN	100	81	18.52	No

GIS No	Asset Type	Location	Street Name	Length	Diameter / Height	Material	Class	Drain Design Life	Remaining Life	Drain Age (Yrs)	Scheduled for upgrade
SWPI7873	SW Pipe	Minden	MINDEN ROAD	1.9	225	CO	UN	100	81	18.52	No
SWPI7874	SW Pipe	Minden	MINDEN ROAD	63.1	225	CO	UN	100	81	18.52	No
SWPI7875	SW Pipe	Minden	MINDEN ROAD	12.4	225	CO	UN	100	81	18.52	No
SWPI7876	SW Pipe	Minden	MINDEN ROAD	16.1	225	CO	UN	100	81	18.52	No
SWPI7877	SW Pipe	Minden	MINDEN ROAD	10.0	225	CO	UN	100	81	18.52	No
SWPI7878	SW Pipe	Minden	MINDEN ROAD	20.4	225	CO	UN	100	81	18.52	No
SWPI7879	SW Pipe	Minden	MINDEN ROAD	12.9	225	CO	UN	100	81	18.52	No
SWPI7880	SW Pipe	Minden	MINDEN ROAD	28.1	300	CO	UN	100	81	18.52	No
SWPI7881	SW Pipe	Minden	MINDEN ROAD	41.7	300	CO	UN	100	81	18.52	No
SWPI7882	SW Pipe	Minden	MINDEN ROAD	29.3	300	CO	UN	100	81	18.52	No
SWPI7883	SW Pipe	Minden	CORBETT DRIVE	51.9	300	CO	UN	100	81	18.52	No
SWPI7884	SW Pipe	Minden	MINDEN ROAD	8.9	225	CO	UN	100	81	18.52	No
SWPI7885	SW Pipe	Minden	MINDEN ROAD	8.7	225	CO	UN	100	81	18.52	No
SWPI7886	SW Pipe	Minden	MINDEN ROAD	39.2	300	CO	UN	100	81	18.52	No
SWPI7887	SW Pipe	Minden	MINDEN ROAD	23.4	300	CO	UN	100	81	18.52	No
SWPI7888	SW Pipe	Minden	MINDEN ROAD	6.9	225	CO	UN	100	81	18.52	No
SWPI7889	SW Pipe	Minden	MINDEN ROAD	23.7	300	CO	UN	100	81	18.52	No
SWPI7890	SW Pipe	Minden	MINDEN ROAD	49.5	300	CO	UN	100	81	18.52	No
SWPI7891	SW Pipe	Minden	MINDEN ROAD	16.6	300	CO	UN	100	81	18.52	No
SWPI7893	SW Pipe	Minden	MINDEN ROAD	34.2	375	CO	UN	100	81	18.52	No
SWPI7894	SW Pipe	Minden	MINDEN ROAD	28.4	375	CO	UN	100	81	18.52	No
SWPI7895	SW Pipe	Minden	MINDEN ROAD	49.6	375	CO	UN	100	81	18.52	No
SWPI7896	SW Pipe	Minden	MINDEN ROAD	122.4	375	CO	UN	100	81	18.52	No
SWPI7897	SW Pipe	Minden	MINDEN ROAD	12.4	300	CO	UN	100	81	18.52	No
SWPI7901	SW Pipe	Minden	MINDEN ROAD	8.1	225	CO	UN	100	81	18.52	No
SWPI7902	SW Pipe	Minden	MINDEN ROAD	13.4	225	CO	UN	100	81	18.52	No
SWPI7903	SW Pipe	Minden	CORBETT DRIVE	2.1	0	CO	UN	100	81	18.52	No
SWPI3139	SW Pipe	Minden	CORBETT DRIVE	5.0	225	CO	PN6	100	68	31.52	No
SWPI7933	SW Pipe	Minden	MINDEN ROAD	20.6	225	CO	UN	100	81	18.52	No
SWPI7934	SW Pipe	Minden	MINDEN ROAD	22.6	225	CO	UN	100	81	18.52	No
SWPI7978	SW Pipe	Minden	MINDEN ROAD	5.5	0	UN	UN	100	84	15.52	No
SWPI7979	SW Pipe	Minden	CORBETT DRIVE	5.3	0	UN	UN	100	68	31.52	No
SWOD0533	Open Drain	Minden	CORBETT DRIVE	5.9	0	UN	UN	80	48	31.52	No
SWPI3051	SW Pipe	Minden	DAWN VIEW PLACE	5.9	225	CO	PN6	100	74	25.52	No
SWPI3056	SW Pipe	Minden	DAWN VIEW PLACE	6.4	225	CO	PN6	100	74	25.52	No
SWPI3074	SW Pipe	Minden	DAWN VIEW PLACE	1.0	225	CO	PN6	100	74	25.52	No

GIS No	Asset Type	Location	Street Name	Length	Diameter / Height	Material	Class	Drain Design Life	Remaining Life	Drain Age (Yrs)	Scheduled for upgrade
SWPI3096	SW Pipe	Minden	MINDEN ROAD	2.8	300	CO	PN6	100	47	52.52	No
SWPI3114	SW Pipe	Minden	MINDEN ROAD	15.0	600	UN	UN	100	84	15.52	No
SWPI3115	SW Pipe	Minden	MINDEN ROAD	10.1	600	UN	UN	100	84	15.52	No
SWPI3116	SW Pipe	Minden	MINDEN ROAD	22.4	600	UN	UN	100	84	15.52	No
SWPI3117	SW Pipe	Minden	MINDEN ROAD	15.4	600	UN	UN	100	84	15.52	No
SWPI3118	SW Pipe	Minden	MINDEN ROAD	12.6	300	CO	PN6	100	47	52.52	No
SWPI3129	SW Pipe	Minden	MARUIA PLACE	7.2	225	CO	PN6	100	69	30.52	No
SWPI3130	SW Pipe	Minden	MARUIA PLACE	3.7	225	CO	PN6	100	69	30.52	No
SWPI3131	SW Pipe	Minden	MARUIA PLACE	34.1	225	CO	PN6	100	69	30.52	No
SWPI3132	SW Pipe	Minden	AINSWORTH ROAD	6.0	225	CO	PN6	100	69	30.52	No
SWPI3137	SW Pipe	Minden	CORBETT DRIVE	0.8	225	CO	PN6	100	68	31.52	No
SWPI3138	SW Pipe	Minden	CORBETT DRIVE	6.7	225	CO	PN6	100	68	31.52	No
SWPI3154	SW Pipe	Minden	FLORENCE LANE	21.2	300	CO	PN6	100	70	29.52	No
SWPI3155	SW Pipe	Minden	FLORENCE LANE	6.3	300	CO	PN6	100	70	29.52	No
SWPI3168	SW Pipe	Minden	MINDEN ROAD	8.4	225	CO	PN6	100	70	29.52	No
SWPI3169	SW Pipe	Minden	MINDEN ROAD	11.9	450	CO	PN6	100	70	29.52	No
SWPI3170	SW Pipe	Minden	PERKINS DRIVE	0.8	300	CO	PN6	100	72	27.52	No
SWPI3172	SW Pipe	Minden	PERKINS DRIVE	7.7	225	CO	PN6	100	72	27.52	No
SWPI3173	SW Pipe	Minden	PERKINS DRIVE	3.0	150	uPVC	C	100	72	27.52	No
SWPI4046	SW Pipe	Minden	WALDEN LANE	120.9	0	uPVC	C	100	83	16.52	No
SWPI4048	SW Pipe	Minden	WALDEN LANE	22.0	100	UN	UN	100	83	16.52	No
SWPI4049	SW Pipe	Minden	WALDEN LANE	14.7	375	CO	PN6	100	82	17.52	No
SWPI5556	SW Pipe	Minden	OLIVER ROAD	11.9	300	CO	X	100	94	5.60	No
SWPI5557	SW Pipe	Minden	OLIVER ROAD	16.6	300	CO	X	100	94	5.60	No
SWPI5558	SW Pipe	Minden	OLIVER ROAD	12.8	300	CO	X	100	94	5.60	No
SWPI5559	SW Pipe	Minden	OLIVER ROAD	11.6	300	CO	X	100	94	5.60	No
SWPI5560	SW Pipe	Minden	OLIVER ROAD	24.8	300	CO	X	100	94	5.60	No
SWPI5561	SW Pipe	Minden	OLIVER ROAD	13.1	300	CO	X	100	94	5.60	No
SWPI5562	SW Pipe	Minden	OLIVER ROAD	14.3	300	CO	X	100	94	5.60	No
SWPI5563	SW Pipe	Minden	OLIVER ROAD	10.4	300	CO	X	100	94	5.60	No
SWPI5564	SW Pipe	Minden	OLIVER ROAD	15.5	300	CO	X	100	94	5.60	No
SWPI5569	SW Pipe	Minden	OLIVER ROAD	18.2	375	CO	X	100	94	5.60	No
SWPI5570	SW Pipe	Minden	OLIVER ROAD	11.9	375	CO	X	100	94	5.60	No
SWGS0005	Grass Swale	Minden	OLIVER ROAD	5.1	0	UN	UN	80	74	5.60	No
SWGS0006	Grass Swale	Minden	OLIVER ROAD	116.8	0	UN	UN	80	74	5.60	No
SWOD0091	Open Drain	Minden	OLIVER ROAD	20.2	0	UN	UN	80	74	5.60	No

GIS No	Asset Type	Location	Street Name	Length	Diameter / Height	Material	Class	Drain Design Life	Remaining Life	Drain Age (Yrs)	Scheduled for upgrade
SWGS0007	Grass Swale	Minden	OLIVER ROAD	38.6	0	UN	UN	80	74	5.60	No
SWGS0008	Grass Swale	Minden	OLIVER ROAD	17.4	0	UN	UN	80	74	5.60	No
SWOD0092	Open Drain	Minden	OLIVER ROAD	17.9	0	UN	UN	80	74	5.60	No
SWPI5576	SW Pipe	Minden	OLIVER ROAD	67.0	2,400	CA	UN	100	94	6.18	No
SWPI5578	SW Pipe	Minden	OLIVER ROAD	2.7	375	CO	X	100	94	5.60	No
SWGS0010	Grass Swale	Minden	OLIVER ROAD	44.6	0	UN	UN	80	74	5.60	No
SWPI0087	SW Pipe	Te Puna	WALLACE ROAD	25.8	225	CO	X	100	93	6.92	No
SWPI0088	SW Pipe	Te Puna	WALLACE ROAD	16.8	225	CO	X	100	93	6.92	No
SWPI0089	SW Pipe	Te Puna	WALLACE ROAD	49.3	300	CO	X	100	93	6.92	No
SWPI0665	SW Pipe	Te Puna	MATAHIWI ROAD	13.2	300	CO	X	100	95	5.17	No
SWPI0666	SW Pipe	Te Puna	MATAHIWI ROAD	2.9	225	CO	X	100	95	5.17	No
SWPI0667	SW Pipe	Te Puna	MATAHIWI ROAD	45.5	600	CO	X	100	95	5.17	No
SWPI0668	SW Pipe	Te Puna	MATAHIWI ROAD	23.2	225	CO	X	100	95	5.17	No
SWPI0669	SW Pipe	Te Puna	MATAHIWI ROAD	59.9	600	CO	X	100	95	5.17	No
SWPI1749	SW Pipe	Te Puna	MINDEN ROAD	7.3	225	PP	PN8	100	94	6.34	No
SWPI1750	SW Pipe	Te Puna	MINDEN ROAD	5.6	0	UN	UN	100	48	52.08	No
SWPI3021	SW Pipe	Te Puna	MATAHIWI ROAD	1.6	225	CO	PN6	100	53	47.00	No
SWPI3023	SW Pipe	Te Puna	MATAHIWI ROAD	6.0	225	CO	PN6	100	53	47.00	No
SWPI3026	SW Pipe	Te Puna	MATAHIWI ROAD	35.9	225	CO	PN6	100	53	47.00	No
SWPI3028	SW Pipe	Te Puna	FAIRLIE GROVE	78.2	300	CO	PN6	100	46	54.00	No
SWPI3030	SW Pipe	Te Puna	WALLACE ROAD	6.8	225	CO	PN6	100	86	14.00	No
SWPI3031	SW Pipe	Te Puna	WALLACE ROAD	5.4	225	CO	PN6	100	86	14.00	Yes
SWPI3032	SW Pipe	Te Puna	WALLACE ROAD	23.7	525	CO	PN6	100	86	14.00	Yes
SWPI3033	SW Pipe	Te Puna	WALLACE ROAD	17.5	300	CO	PN6	100	47	53.00	No
SWPI3035	SW Pipe	Te Puna	SNODGRASS ROAD	40.9	300	CO	X	100	96	4.25	No
SWPI3036	SW Pipe	Te Puna	LINDOCH AVENUE	10.5	225	CO	PN6	100	65	35.00	No
SWPI3037	SW Pipe	Te Puna	LINDOCH AVENUE	2.8	225	CO	PN6	100	65	35.00	No
SWPI3041	SW Pipe	Te Puna	LINDOCH AVENUE	38.3	225	CO	PN6	100	65	35.00	No
SWPI3042	SW Pipe	Te Puna	LINDOCH AVENUE	39.4	225	CO	PN6	100	65	35.00	No
SWPI3517	SW Pipe	Te Puna	WALLACE ROAD	7.5	225	CO	PN6	100	86	13.92	No
SWPI3602	SW Pipe	Te Puna	MINDEN ROAD	62.7	375	CO	PN6	100	74	26.08	No
SWPI3603	SW Pipe	Te Puna	MINDEN ROAD	8.4	300	CO	PN6	100	74	26.08	No
SWPI3604	SW Pipe	Te Puna	MINDEN ROAD	11.6	300	CO	PN6	100	74	26.08	No
SWPI3605	SW Pipe	Te Puna	MINDEN ROAD	11.5	300	CO	PN6	100	74	26.08	No
SWPI3606	SW Pipe	Te Puna	MINDEN ROAD	5.5	375	CO	PN6	100	74	26.08	No
SWPI3607	SW Pipe	Te Puna	MINDEN ROAD	23.5	375	CO	PN6	100	74	26.08	No

GIS No	Asset Type	Location	Street Name	Length	Diameter / Height	Material	Class	Drain Design Life	Remaining Life	Drain Age (Yrs)	Scheduled for upgrade
SWPI3965	SW Pipe	Te Puna	MATAHIWI ROAD	3.3	225	CO	X	100	95	4.91	No
SWPI3966	SW Pipe	Te Puna	MATAHIWI ROAD	50.5	450	CO	X	100	95	4.91	No
SWPI3967	SW Pipe	Te Puna	MATAHIWI ROAD	11.5	450	CO	X	100	95	4.91	No
SWPI5637	SW Pipe	Te Puna	WALLACE ROAD	29.6	300	CO	X	100	94	5.58	No
SWPI5638	SW Pipe	Te Puna	WALLACE ROAD	18.2	300	CO	X	100	94	5.58	No
SWPI5639	SW Pipe	Te Puna	WALLACE ROAD	7.7	225	CO	X	100	94	5.58	No
SWPI5640	SW Pipe	Te Puna	WALLACE ROAD	11.0	300	CO	X	100	94	5.58	No
SWPI5641	SW Pipe	Te Puna	WALLACE ROAD	34.9	300	CO	X	100	94	5.58	No
SWPI5642	SW Pipe	Te Puna	WALLACE ROAD	2.9	225	CO	X	100	94	5.58	No
SWPI5643	SW Pipe	Te Puna	WALLACE ROAD	16.2	300	CO	X	100	94	5.58	No
SWPI5644	SW Pipe	Te Puna	WALLACE ROAD	17.4	300	CO	X	100	94	5.58	No
SWPI5645	SW Pipe	Te Puna	WALLACE ROAD	2.4	225	CO	X	100	94	5.58	No
SWPI5646	SW Pipe	Te Puna	WALLACE ROAD	3.7	300	CO	X	100	94	5.58	No
SWPI5921	SW Pipe	Te Puna	WALLACE ROAD	10.1	225	CO	X	100	94	5.66	No
SWPI5922	SW Pipe	Te Puna	WALLACE ROAD	73.9	300	CO	X	100	94	5.66	No
SWPI5923	SW Pipe	Te Puna	WALLACE ROAD	11.5	225	CO	X	100	94	5.66	No
SWPI5924	SW Pipe	Te Puna	WALLACE ROAD	28.7	300	CO	X	100	94	5.66	No
SWPI5925	SW Pipe	Te Puna	WALLACE ROAD	56.0	300	CO	X	100	94	5.66	No
SWPI5926	SW Pipe	Te Puna	WALLACE ROAD	11.1	300	CO	X	100	94	5.66	No
SWPI5955	SW Pipe	Te Puna	MATAHIWI ROAD	0.8	225	uPVC	C	100	95	4.91	No
SWPI5956	SW Pipe	Te Puna	MATAHIWI ROAD	23.3	600	CO	X	100	95	5.17	No
SWPI6328	SW Pipe	Te Puna	SNODGRASS ROAD	2.3	225	CO	X	100	96	4.25	No
SWPI6329	SW Pipe	Te Puna	SNODGRASS ROAD	38.0	300	CO	X	100	96	4.25	No
SWPI6330	SW Pipe	Te Puna	SNODGRASS ROAD	4.4	225	CO	X	100	96	4.25	No
SWPI6331	SW Pipe	Te Puna	SNODGRASS ROAD	9.7	225	CO	X	100	96	4.25	No
SWPI6332	SW Pipe	Te Puna	SNODGRASS ROAD	30.9	300	CO	X	100	96	4.25	No
SWPI6401	SW Pipe	Te Puna	LINDOCH AVENUE	8.7	300	CO	Z	100	97	2.92	No
SWPI6402	SW Pipe	Te Puna	LINDOCH AVENUE	1.5	300	CO	X	100	97	2.92	No
SWPI6403	SW Pipe	Te Puna	LINDOCH AVENUE	9.3	300	CO	X	100	97	2.92	No
SWPI6404	SW Pipe	Te Puna	LINDOCH AVENUE	53.0	300	CO	X	100	97	2.92	No
SWPI6405	SW Pipe	Te Puna	LINDOCH AVENUE	53.9	300	CO	X	100	97	2.92	No
SWPI6406	SW Pipe	Te Puna	LINDOCH AVENUE	1.9	300	CO	X	100	97	2.92	No
SWPI6407	SW Pipe	Te Puna	LINDOCH AVENUE	8.9	300	CO	Z	100	97	2.92	No
SWPI6408	SW Pipe	Te Puna	LINDOCH AVENUE	7.8	300	CO	X	100	97	2.92	No
SWPI6409	SW Pipe	Te Puna	LINDOCH AVENUE	15.4	300	CO	Z	100	97	2.92	No
SWPI6410	SW Pipe	Te Puna	LINDOCH AVENUE	3.5	300	CO	X	100	97	2.92	No

GIS No	Asset Type	Location	Street Name	Length	Diameter / Height	Material	Class	Drain Design Life	Remaining Life	Drain Age (Yrs)	Scheduled for upgrade
SWPI6411	SW Pipe	Te Puna	LINDOCH AVENUE	2.2	300	CO	X	100	97	2.92	No
SWPI6412	SW Pipe	Te Puna	LINDOCH AVENUE	45.3	450	CO	X	100	97	2.92	No
SWPI6413	SW Pipe	Te Puna	LINDOCH AVENUE	39.3	450	CO	X	100	97	2.92	No
SWPI6414	SW Pipe	Te Puna	LINDOCH AVENUE	42.0	225	CO	PN6	100	65	35.00	No
SWPI6436	SW Pipe	Te Puna	WALLACE ROAD	29.9	225	CO	PN6	100	86	13.92	No
SWPI6437	SW Pipe	Te Puna	MINDEN ROAD	58.6	375	CO	PN6	100	74	26.08	No
SWPI6438	SW Pipe	Te Puna	MINDEN ROAD	4.3	225	uPVC	UN	100	48	52.08	No
SWPI6439	SW Pipe	Te Puna	MINDEN ROAD	1.4	225	uPVC	UN	100	48	52.08	No
SWPI6483	SW Pipe	Te Puna	WALLACE ROAD	23.3	525	CO	UN	100	48	52.08	No
SWPI6484	SW Pipe	Te Puna	WALLACE ROAD	26.2	525	CO	UN	100	48	52.08	No
SWPI6485	SW Pipe	Te Puna	WALLACE ROAD	12.7	525	CO	UN	100	48	52.08	No
SWPI6486	SW Pipe	Te Puna	WALLACE ROAD	16.3	0	UN	UN	100	86	13.92	Yes
SWPI6758	SW Pipe	Te Puna	SNODGRASS ROAD	101.5	325	CO	UN	100	86	14.08	No

Appendix C

Central Catchment Existing Stormwater Assets (Te Puna and Minden Catchments), WBOPDC 2017

Appendix C Central Catchment Existing Stormwater Assets (Te Puna and Minden Catchments), WBOPDC 2017

GIS No	Asset Type	Location	Street Name	Pit Size 1	Pit Material	Pit Design Life	Remaining Life	Pit Age (Yrs)	Scheduled for upgrade
SWCP2098	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWMH1541	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	54	25.52	No
SWMH1542	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	54	25.52	No
SWMH1543	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	54	25.52	No
SWMH1544	Manhole	Minden	MINDEN ROAD	1,050	PC	80	54	25.52	No
SWMH1545	Manhole	Minden	MINDEN ROAD	1,050	PC	80	54	25.52	No
SWMH1546	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	54	25.52	No
SWMH1547	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	54	25.52	No
SWMH1548	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	54	25.52	No
SWMH1549	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	54	25.52	No
SWMH1550	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	54	25.52	No
SWMH1551	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	54	25.52	No
SWMH1552	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	54	25.52	No
SWMH1553	Manhole	Minden	DAWN VIEW PLACE	600	PC	80	54	25.52	No
SWMH1554	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	54	25.52	No
SWMH1555	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1556	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1557	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1558	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1559	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1560	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1561	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1562	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1563	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1564	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1565	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1566	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1567	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1568	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1569	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1570	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1571	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1572	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No

GIS No	Asset Type	Location	Street Name	Pit Size 1	Pit Material	Pit Design Life	Remaining Life	Pit Age (Yrs)	Scheduled for upgrade
SWMH1573	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1574	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWMH1575	Manhole	Minden	MINDEN ROAD	0	UN	80	64	15.52	No
SWHW0103	Headwall	Minden	MARUIA PLACE	0	UN	80	48	31.52	No
SWMH1578	Manhole	Minden	MARUIA PLACE	1,050	PC	80	48	31.52	No
SWMH1580	Manhole	Minden	CORBETT DRIVE	1,050	PC	80	48	31.52	No
SWMH7815	Manhole	Minden	CORBETT DRIVE	0	PC	80	48	31.52	No
SWMH1581	Manhole	Minden	MINDEN ROAD	1,050	PC	80	62	17.60	No
SWMH1582	Manhole	Minden	MINDEN ROAD	1,050	PC	80	62	17.60	No
SWMH1583	Manhole	Minden	MINDEN ROAD	1,050	PC	80	62	17.60	No
SWMH1584	Manhole	Minden	MINDEN ROAD	1,050	PC	80	62	17.60	No
SWMH1585	Manhole	Minden	MINDEN ROAD	1,050	PC	80	62	17.60	No
SWMH1586	Manhole	Minden	MINDEN ROAD	1,050	PC	80	62	17.60	No
SWMH1587	Manhole	Minden	MINDEN ROAD	1,050	PC	80	62	17.60	No
SWMH1588	Manhole	Minden	FLORENCE LANE	1,050	PC	80	66	13.52	No
SWMH1589	Manhole	Minden	FLORENCE LANE	1,050	PC	80	50	29.52	No
SWMH1590	Manhole	Minden	FLORENCE LANE	1,050	PC	80	50	29.52	No
SWMH1591	Manhole	Minden	FLORENCE LANE	0	UN	80	50	29.52	No
SWMH1592	Manhole	Minden	FLORENCE LANE	1,050	PC	80	50	29.52	No
SWMH1593	Manhole	Minden	FLORENCE LANE	1,050	PC	80	50	29.52	No
SWMH1594	Manhole	Minden	MINDEN ROAD	1,050	PC	80	50	29.52	No
SWMH1595	Manhole	Minden	MINDEN ROAD	1,050	PC	80	50	29.52	No
SWMH1596	Manhole	Minden	MINDEN ROAD	1,050	PC	80	50	29.52	No
SWMH1597	Manhole	Minden	MINDEN ROAD	900	PC	80	50	29.52	No
SWMH1600	Manhole	Minden	MINDEN ROAD	1,050	PC	80	64	15.52	No
SWCP2154	Catchpit	Minden	PERKINS DRIVE	0	UN	60	32	27.52	No
SWHW0053	Headwall	Minden	WALDEN LANE	0	UN	80	63	16.52	No
SWHW0054	Headwall	Minden	WALDEN LANE	0	UN	80	63	16.52	No
SWRE0056	Rodding Eye	Minden	DAWN VIEW PLACE	150	UN	80	55	25.35	No
SWRE0056	Rodding Eye	Minden	DAWN VIEW PLACE	150	UN	80	55	25.35	No
SWMH1872	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	55	25.35	No
SWMH1872	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	55	25.35	No
SWMH1872	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	55	25.35	No
SWMH1872	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	55	25.35	No
SWMH1872	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	55	25.35	No

GIS No	Asset Type	Location	Street Name	Pit Size 1	Pit Material	Pit Design Life	Remaining Life	Pit Age (Yrs)	Scheduled for upgrade
SWMH1872	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	55	25.35	No
SWMH1872	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	55	25.35	No
SWMH1873	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	55	25.35	No
SWMH1873	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	55	25.35	No
SWMH1874	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	55	25.35	No
SWMH1874	Manhole	Minden	DAWN VIEW PLACE	1,050	PC	80	55	25.35	No
SWRE0057	Rodding Eye	Minden	DAWN VIEW PLACE	150	UN	80	55	25.35	No
SWRE0057	Rodding Eye	Minden	DAWN VIEW PLACE	150	UN	80	55	25.35	No
SWRE0057	Rodding Eye	Minden	DAWN VIEW PLACE	150	UN	80	55	25.35	No
SWRE0057	Rodding Eye	Minden	DAWN VIEW PLACE	150	UN	80	55	25.35	No
SWRE0058	Rodding Eye	Minden	DAWN VIEW PLACE	150	UN	80	55	25.35	No
SWRE0058	Rodding Eye	Minden	DAWN VIEW PLACE	150	UN	80	55	25.35	No
SWRE0058	Rodding Eye	Minden	DAWN VIEW PLACE	150	UN	80	55	25.35	No
SWCP0475	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWMH1576	Manhole	Minden	MINDEN ROAD	0	UN	80	61	18.52	No
SWMH7805	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7806	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7807	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7808	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7809	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7810	Manhole	Minden	CORBETT DRIVE	0	PC	80	61	18.52	No
SWMH7811	Manhole	Minden	CORBETT DRIVE	0	PC	80	61	18.52	No
SWMH7812	Manhole	Minden	CORBETT DRIVE	0	PC	80	61	18.52	No
SWCP3421	Catchpit	Minden	MINDEN ROAD	0	PC	60	41	18.52	No
SWMH7813	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7814	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7816	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWCP3424	Catchpit	Minden	MINDEN ROAD	0	PC	60	41	18.52	No
SWMH7817	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7818	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7819	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7820	Manhole	Minden	CORBETT DRIVE	0	PC	80	61	18.52	No
SWMH3668	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH3669	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH3670	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No

GIS No	Asset Type	Location	Street Name	Pit Size 1	Pit Material	Pit Design Life	Remaining Life	Pit Age (Yrs)	Scheduled for upgrade
SWMH3671	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7821	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH3672	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH3673	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7823	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7822	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7835	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWMH7836	Manhole	Minden	MINDEN ROAD	0	PC	80	61	18.52	No
SWCP3410	Catchpit	Minden	MINDEN ROAD	0	UN	60	44	15.52	No
SWHW0104	Headwall	Minden	CORBETT DRIVE	0	UN	80	48	31.52	No
SWCP2096	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2097	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2099	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2100	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2101	Catchpit	Minden	MINDEN ROAD	0	UN	60	34	25.52	No
SWCP2102	Catchpit	Minden	MINDEN ROAD	0	UN	60	34	25.52	No
SWCP2103	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2104	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2105	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2106	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2107	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2108	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2109	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2110	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2111	Catchpit	Minden	DAWN VIEW PLACE	0	UN	60	34	25.52	No
SWCP2112	Catchpit	Minden	MINDEN ROAD	0	UN	60	44	15.52	No
SWCP2113	Catchpit	Minden	MINDEN ROAD	0	UN	60	44	15.52	No
SWCP2114	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2115	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2116	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2117	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2118	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2119	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2120	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2121	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No

GIS No	Asset Type	Location	Street Name	Pit Size 1	Pit Material	Pit Design Life	Remaining Life	Pit Age (Yrs)	Scheduled for upgrade
SWCP2122	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2123	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2124	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2125	Catchpit	Minden	MINDEN ROAD	0	UN	60	34	25.52	No
SWCP2126	Catchpit	Minden	MINDEN ROAD	0	UN	60	44	15.52	No
SWCI0962	Culvert Inlet	Minden	MINDEN ROAD	0	UN	0	0	52.52	No
SWCP3428	Catchpit	Minden	MINDEN ROAD	0	PC	60	7	52.52	No
SWCP2127	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2128	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2129	Catchpit	Minden	MINDEN ROAD	0	UN	60	7	52.52	No
SWCP2130	Catchpit	Minden	MARUIA PLACE	0	UN	60	28	31.52	No
SWCP2131	Catchpit	Minden	MARUIA PLACE	0	UN	60	28	31.52	No
SWCP2132	Catchpit	Minden	MARUIA PLACE	0	UN	60	28	31.52	No
SWCP2133	Catchpit	Minden	MARUIA PLACE	0	UN	60	29	30.52	No
SWCP2134	Catchpit	Minden	MARUIA PLACE	0	UN	60	29	30.52	No
SWMH1579	Manhole	Minden	MARUIA PLACE	1,050	PC	80	49	30.52	No
SWBX0816	Box	Minden	AINSWORTH ROAD	0	UN	60	29	30.52	No
SWCP2135	Catchpit	Minden	CORBETT DRIVE	0	UN	60	28	31.52	No
SWCP2136	Catchpit	Minden	CORBETT DRIVE	0	UN	60	28	31.52	No
SWCP2137	Catchpit	Minden	CORBETT DRIVE	0	UN	60	28	31.52	No
SWCP2138	Catchpit	Minden	CORBETT DRIVE	0	UN	60	28	31.52	No
SWBX1023	Box	Minden	CORBETT DRIVE	0	UN	60	28	31.52	No
SWCP2140	Catchpit	Minden	MINDEN ROAD	0	UN	60	42	17.60	No
SWCP2141	Catchpit	Minden	MINDEN ROAD	0	UN	60	42	17.60	No
SWCP2142	Catchpit	Minden	MINDEN ROAD	0	UN	60	42	17.60	No
SWCP2143	Catchpit	Minden	MINDEN ROAD	0	UN	60	42	17.60	No
SWCP2144	Catchpit	Minden	MINDEN ROAD	0	UN	60	42	17.60	No
SWCP2145	Catchpit	Minden	FLORENCE LANE	0	UN	60	30	29.52	No
SWCP2146	Catchpit	Minden	MINDEN ROAD	0	UN	60	30	29.52	No
SWCP2147	Catchpit	Minden	MINDEN ROAD	0	UN	60	30	29.52	No
SWCP2148	Catchpit	Minden	MINDEN ROAD	0	UN	60	30	29.52	No
SWCP2149	Catchpit	Minden	MINDEN ROAD	0	UN	60	30	29.52	No
SWCP2150	Catchpit	Minden	MINDEN ROAD	0	UN	60	30	29.52	No
SWMH1598	Manhole	Minden	MINDEN ROAD	1,050	PC	80	50	29.52	No
SWCP2151	Catchpit	Minden	PERKINS DRIVE	0	UN	60	32	27.52	No

GIS No	Asset Type	Location	Street Name	Pit Size 1	Pit Material	Pit Design Life	Remaining Life	Pit Age (Yrs)	Scheduled for upgrade
SWCP2152	Catchpit	Minden	PERKINS DRIVE	0	UN	60	32	27.52	No
SWCP2153	Catchpit	Minden	PERKINS DRIVE	0	UN	60	32	27.52	No
SWMH1599	Manhole	Minden	PERKINS DRIVE	1,050	PC	80	52	27.52	No
SWCI1091	Culvert Inlet	Minden	WALDEN LANE	0	UN	0	0	16.52	No
SWCI1092	Culvert Inlet	Minden	WALDEN LANE	0	UN	0	0	16.52	No
SWHW0056	Headwall	Minden	WALDEN LANE	0	UN	80	62	17.52	No
SWHW0055	Headwall	Minden	WALDEN LANE	0	UN	80	0	0.00	No
SWCP0473	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0478	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0481	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCI0018	Culvert Inlet	Minden	OLIVER ROAD	0	UN	0	0	5.60	No
SWCP0482	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0483	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCI0019	Culvert Inlet	Minden	OLIVER ROAD	0	UN	0	0	5.60	No
SWCP0486	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0489	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0493	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0494	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0495	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0498	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWMH0419	Manhole	Minden	OLIVER ROAD	1,050	PC	80	74	5.60	No
SWCI0020	Culvert Inlet	Minden	OLIVER ROAD	0	UN	0	0	5.60	No
SWCP0506	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0510	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0511	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0513	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCI0021	Culvert Inlet	Minden	OLIVER ROAD	0	UN	0	0	5.60	No
SWCP0514	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCI0022	Culvert Inlet	Minden	OLIVER ROAD	0	UN	0	0	5.60	No
SWCP0516	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0517	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0518	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0522	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP0525	Catchpit	Minden	OLIVER ROAD	0	UN	60	54	5.60	No
SWCP3419	Catchpit	Minden	MINDEN ROAD	0	PC	60	41	18.52	No

GIS No	Asset Type	Location	Street Name	Pit Size 1	Pit Material	Pit Design Life	Remaining Life	Pit Age (Yrs)	Scheduled for upgrade
SWCP3420	Catchpit	Minden	MINDEN ROAD	0	PC	60	41	18.52	No
SWCP3422	Catchpit	Minden	MINDEN ROAD	0	UN	60	41	18.52	No
SWCP3423	Catchpit	Minden	MINDEN ROAD	0	PC	60	41	18.52	No
SWCP3426	Catchpit	Minden	MINDEN ROAD	0	PC	60	41	18.52	No
SWCP3425	Catchpit	Minden	MINDEN ROAD	0	PC	60	41	18.52	No
SWCP3427	Catchpit	Minden	MINDEN ROAD	0	PC	60	41	18.52	No
SWCP3409	Catchpit	Minden	MINDEN ROAD	0	PC	60	41	18.52	No
SWCP3408	Catchpit	Minden	MINDEN ROAD	0	PC	60	41	18.52	No
SWCP2139	Catchpit	Minden	CORBETT DRIVE	0	PC	60	28	31.52	No
SWBX0811	Box	Te Puna	WALLACE ROAD	0	UN	60	46	14.00	Yes
SWCP0746	Catchpit	Te Puna	MATAHIWI ROAD	0	UN	60	55	5.17	No
SWCP0749	Catchpit	Te Puna	MATAHIWI ROAD	0	UN	60	55	4.91	No
SWCP2304	Catchpit	Te Puna	WALLACE ROAD	0	UN	60	46	13.92	No
SWCP2305	Catchpit	Te Puna	WALLACE ROAD	0	UN	60	46	13.92	No
SWCP2306	Catchpit	Te Puna	WALLACE ROAD	0	UN	60	46	13.92	No
SWCP2307	Catchpit	Te Puna	WALLACE ROAD	0	UN	60	46	13.92	No
SWCP2308	Catchpit	Te Puna	WALLACE ROAD	0	UN	60	46	13.92	No
SWCP2309	Catchpit	Te Puna	WALLACE ROAD	0	UN	60	46	13.92	No
SWCP3203	Catchpit	Te Puna	MINDEN ROAD	0	PC	60	8	52.08	No
SWCP3204	Catchpit	Te Puna	MINDEN ROAD	0	PC	60	8	52.08	No
SWCP3233	Catchpit	Te Puna	WALLACE ROAD	0	UN	60	8	52.08	No
SWCP3234	Catchpit	Te Puna	WALLACE ROAD	0	UN	60	8	52.08	No
SWMH0021	Manhole	Te Puna	WALLACE ROAD	1,050	PC	80	73	6.92	No
SWMH0125	Manhole	Te Puna	MATAHIWI ROAD	1,050	PC	80	75	5.08	No
SWMH0126	Manhole	Te Puna	MATAHIWI ROAD	1,050	PC	80	75	5.17	No
SWMH0127	Manhole	Te Puna	MATAHIWI ROAD	1,050	PC	80	75	4.91	No
SWMH0128	Manhole	Te Puna	MATAHIWI ROAD	1,050	PC	80	75	4.91	No
SWMH0200	Manhole	Te Puna	MINDEN ROAD	1,050	PC	80	74	6.34	No
SWMH0201	Manhole	Te Puna	MINDEN ROAD	1,050	PC	80	74	6.34	No
SWMH0460	Manhole	Te Puna	WALLACE ROAD	1,050	PC	80	66	14.00	Yes
SWMH0620	Manhole	Te Puna	WALLACE ROAD	1,050	PC	80	74	5.66	No
SWMH0621	Manhole	Te Puna	WALLACE ROAD	1,050	PC	80	74	5.66	No
SWMH0622	Manhole	Te Puna	WALLACE ROAD	1,050	PC	80	74	5.66	No
SWMH0623	Manhole	Te Puna	WALLACE ROAD	1,050	PC	80	74	5.66	No
SWMH1532	Manhole	Te Puna	LINDOCH AVENUE	1,050	PC	80	45	35.00	No

GIS No	Asset Type	Location	Street Name	Pit Size 1	Pit Material	Pit Design Life	Remaining Life	Pit Age (Yrs)	Scheduled for upgrade
SWMH1532	Manhole	Te Puna	LINDOCH AVENUE	1,050	PC	80	45	35.00	No
SWMH1533	Manhole	Te Puna	LINDOCH AVENUE	1,050	PC	80	45	35.00	No
SWMH1533	Manhole	Te Puna	LINDOCH AVENUE	1,050	PC	80	45	35.00	No
SWMH1534	Manhole	Te Puna	LINDOCH AVENUE	0	UN	80	45	35.00	No
SWMH1690	Manhole	Te Puna	SNODGRASS ROAD	1,050	PC	80	76	4.25	No
SWMH1691	Manhole	Te Puna	SNODGRASS ROAD	1,050	PC	80	76	4.25	No
SWMH1692	Manhole	Te Puna	SNODGRASS ROAD	1,050	PC	80	76	4.25	No
SWMH1804	Manhole	Te Puna	WALLACE ROAD	1,050	PC	80	66	13.92	Yes
SWMH1834	Manhole	Te Puna	MINDEN ROAD	1,050	PC	80	54	26.08	No
SWMH1835	Manhole	Te Puna	MINDEN ROAD	0	UN	80	54	26.08	No
SWMH3442	Manhole	Te Puna	LINDOCH AVENUE	1,050	UN	80	77	2.92	No
SWMH3443	Manhole	Te Puna	LINDOCH AVENUE	600	PC	80	77	2.92	No
SWMH3444	Manhole	Te Puna	LINDOCH AVENUE	1,050	PC	80	77	2.92	No
SWMH3445	Manhole	Te Puna	LINDOCH AVENUE	1,050	PC	80	77	2.92	No
SWMH3446	Manhole	Te Puna	LINDOCH AVENUE	1,050	PC	80	77	2.92	No
SWMH3447	Manhole	Te Puna	LINDOCH AVENUE	1,050	PC	80	77	2.92	No
SWMH3457	Manhole	Te Puna	WALLACE ROAD	0	PC	80	66	13.92	No
SWMH3459	Manhole	Te Puna	MINDEN ROAD	0	UN	80	54	26.08	No
SWMH3460	Manhole	Te Puna	MINDEN ROAD	1,050	PC	80	54	26.08	No

Appendix D

Catchment Management Plan Framework

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Catchment Management Plan (CMP)

Central Catchments - Te Puna and Minden Urban Catchments

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Catchment Management Plan (CMP)

Central Catchments - Te Puna and Minden Urban Catchments

Client: Western Bay of Plenty District Council (WBOPDC)

Co No.: N/A

Prepared by

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Document Catchment Management Plan (CMP)

Ref 42075048

Date 21-Feb-2017

Prepared by Louis Morell and Caroline Secretin

Reviewed by Richard Harkness and Justine Bennett

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
Draft	21-Feb-2017	For Consent Lodgement	Bob Shaw Associate Director - Water	

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1.0 Introduction

Section One – Introduction will provide an overview of the Comprehensive Stormwater Consent (CSC) to be held by Western Bay of Plenty District Council (WBOPDC) for the respective Te Puna and Minden urban catchments, the scope and purpose of this CMP and its structure. The framework for this section is set out below:

1.1 Background

1.2 Scope

1.3 Objectives

1.3.1 Long Term Objectives

- Water Quantity Objectives
- Water Quality Objectives
- Ecological Objectives
- Visual Quality and Recreational Objectives

1.3.2 Short Term Objectives

Sample text is set out below, which is subject to change, after being reviewed to finalise the Catchment Management Plan:

Scope:

The scope of the Catchment Management Plan (CMP) and associated application for a Comprehensive Stormwater Consent (CSC) is to allow Western Bay of Plenty District Council WBOPDC) and Bay of Plenty Regional Council (BOPRC) to better control the discharge of stormwater from all the land within a catchment area.

Managing stormwater is a continuous improvement process. The strategic focus is on developing, continually improving and implementing actions for encouraging the protection of the stormwater environment.

In order to better manage those activities, the CMP is to be developed, and then reviewed continually to incorporate any new knowledge gathered.

The CMP:

- Describes the scope and purpose of the CMP.
- States appropriate management objectives.
- Identifies the legislative background and key stakeholders.
- Describes the catchment.
- Identifies existing catchment conditions.
- Establishes the values of the catchment.
- Identifies threats to these values.
- Identifies management issues and causes.
- Evaluates potential management options.
- Presents recommendation for performance monitoring.

The CMP is focused on the existing and potential urban area of the catchment.

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Objectives

Stormwater management objectives for the catchment have been developed to express the outcomes, WBOPDC and the community seek to achieve in relation to the protection of the resource values within the catchment identified in this CMP.

Stormwater management objectives include both long term commitments to a vision for the future of the catchment to be implemented in the Long Term Plan (LTP) and short term quantifiable measures towards these long term objectives. The short term objectives for stormwater management form the basis for identifying management actions that can be implemented into the Asset Management Plan (AMP) within a 3 to 5 year time period.

Long Term Objectives

The vision, as defined through Government regulations and the consultation process with Tangata Whenua and the Community, is the sustainable development of the catchment so that the existing resource values can be enjoyed by future generations.

The three overall long term commitments have been defined as following:

- Provide for the integrated and comprehensive management of stormwater, based on the design philosophy of minimising runoff and maximising quality through low impact design solutions.
- Implement and maintain stormwater management methods that mitigate adverse effects on the water quality and water levels of the streams, the Tauranga Harbour, and other receiving environments.
- Progressive improvement of the existing stormwater system.

To achieve these overall long term commitments the following long term objectives have been set:

Water Quantity Objectives

A major issue for stormwater management is to address the risk of flooding in the lower catchment. Therefore, all actions for improvement in stormwater management aim to ensure consistency with the objectives of flood management and environmental flows.

The water quantity objectives most relevant to stormwater management in the catchment include the following:

- Protect the existing urban area from the effects of flooding as necessary by upgrading infrastructure and identifying secondary flow paths.
- Protect water levels in natural wetlands.
- Protect or restore a proportion of moderate flows and high flows.
- Maintain or restore the natural inundation patterns and distribution of flood waters supporting natural wetlands and floodplain ecosystems.
- Maintain the rates of rise and fall of stream heights within natural bounds.
- Minimise the impact of instream structures.
- Maintain or rehabilitate estuarine processes and habitat.

Water Quality Objectives

The long term stormwater quality objectives aim to sustain current or likely future environmental values for natural water flows. The objectives are to be consistent with the National Water Quality Management Strategy (NWQMS) and the Australian and New Zealand Environment and Conservation Council's (ANZECC) guidelines for fresh and marine water quality 2000; as well as the National Policy Statement for Freshwater Management 2014.

The water quality objectives most relevant to stormwater management in the catchment include the following:

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- Protect and improve the aquatic ecosystems through appropriate stormwater treatment.
- Understand the links between human activity (both community and Tangata Whenua uses, including indigenous values associated with mahinga kai, waahi tapu and mauri) and water quality.
- Set effective management frameworks, including cooperative, regulatory, feedback and auditing mechanisms.
- Establish a Monitoring and Assessment Programme.
- Initiate appropriate management response.

Ecological Objectives

The ecological objectives for the catchment are to protect and maintain the existing aquatic and riparian habitats for the waterways within the urban areas and the receiving environment (both freshwater and marine).

The ecological objectives identified for stormwater management in this Plan are limited to the interaction between stormwater and the ecosystem.

The stormwater management objectives of the plan are as following:

- Minimise the loss of habitat quantity and the degradation of habitat quality of receiving environments, associated wetlands, riparian and coastal margins, and estuarine/harbour waters.
- Identify and implement riparian planting to areas where ecological gains are most likely.

Visual Quality and Recreational Objectives

Objectives have also been identified to maintain and enhance (where practical) the visual quality of the catchment. The long term social objectives for stormwater are to maximise the visual amenity of the stormwater system and ensure stormwater quality is consistent with desired recreational uses.

- Avoid adverse effects on sites of significant cultural, historic and spiritual value.
- Maintain stormwater corridors and coastal margins that have identified recreational values.

Short Term Objectives

The three overall short term commitments have been defined as following:

- Agree on Level of Service (LOS) and establish any necessary changes to WBOPDC's Stormwater Strategy, AMP and the standard practice codes.
- Undertake ongoing assessments in relation to primary and secondary flow paths.
- Establish a progressive capital works programme focused on upgrading infrastructure that is below WBOPDC's current LOS.

These short term objectives are linked to existing catchment values with the overall aim being to improve water quality and maintaining the recreational values of the ecosystem within the urban areas of the catchment. The quantifiable short term commitments towards the long term objectives described above form the basis for the development of stormwater management actions.

The purpose of this CMP is to develop an integrated management approach to stormwater in the Te Puna/Minden catchment (Central Catchment). This plan outlines and incorporates the key stormwater issues and objectives for this catchment and addresses the effects of stormwater discharges on its receiving environments - comprising several open drains (including Waitui drain, North-east drain, Lindoch Drain and other un-named drains), and tributaries for Oturu Creek within the Minden catchment, and the Tauranga Harbour. Detail is provided on the suite of management methods implemented, programmed or available in the future to mitigate identified issues, including a means to evaluate proposed options leading to a preferred approach.

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Catchment specific detail regarding receiving environments, environmental monitoring and consultation is included in this plan as are a range of catchment recommendations including a programme of works.

2.0 Existing Environment

Section Two – will provide an overview of the receiving environment.

The framework for this section is set out below:

2.1 Study Area

2.2 Geology and Soil

2.3 Land Use and Future Development

2.4 Receiving Environment Monitoring Results

2.4.1 2007-2008 WBOP – Central Catchment Monitoring

2.4.2 2008 Non Routine Stormwater Quality Sampling

2.4.3 2006-2015 BOPRC – Te Puna Monitoring

2.4.4 Ecological Assessments at Te Puna and Minden

2.4.5 2010-2011 Stormwater and Benthic Macroinvertebrate Sampling

Sample text is set out below, which is subject to change, after being reviewed to finalise the Catchment Management Plan:

Study Area:

Identification of the catchment boundaries as well as stormwater and wastewater networks is provided as follows:

- Figure 1 provides delineation of both Te Puna West and Minden urban stormwater catchments
- Figures 2 and 3 depict each urban stormwater catchment (Te Puna West and Minden) with their landuse.

The following description provides additional context to the study area and stormwater management catchments subject to this CSC application.

The small settlements are urban-residential areas with a development potential that is relatively minor due to restrictions in the District Plan i.e. they are fully developed with little opportunity for intensification. This includes Te Puna West and Minden. The Minden Lifestyle Zone spans over a significantly bigger footprint. Its development potential is regulated by a Structure Plan and restricted by the difficult geological situation.

In small urban areas, stormwater from roofs is largely discharged to the ground and road runoff is captured by a mixture of pipes and swales. Grass swales act as a treatment device by cleaning the stormwater before it is discharged to the wider environment. Stormwater from the small settlements is not likely to have adverse effects on the receiving environments provided erosion control is adequate and stormwater swales are maintained.

Several open drains (including Waitui drain, North east drain, Lindoch Drain and other unnamed drains) are present within the Te Puna West urban catchment but no natural streams appear to be

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present in that area.

Three tributaries of Oturu Creek are depicted within Minden urban catchment.

The piped stormwater network at Te Puna West and Minden include mainly small diameter stormwater pipes and manholes which convey stormwater to various stormwater discharge points. Seven stormwater discharge points are depicted in Figure 2, including five within Te Puna West urban catchment discharging directly to the Tauranga harbour and one discharging to the Te Puna Estuary. Two consented stormwater discharge points are depicted in Minden urban stormwater catchment with various stormwater pipes (refer Figure 3). The respective open drains maintained by Council are set out in the relevant Asset Management Plan for Stormwater - Version 2013 dated 20/01/2014.

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Figure 1 Te Puna West and Minden urban stormwater catchments

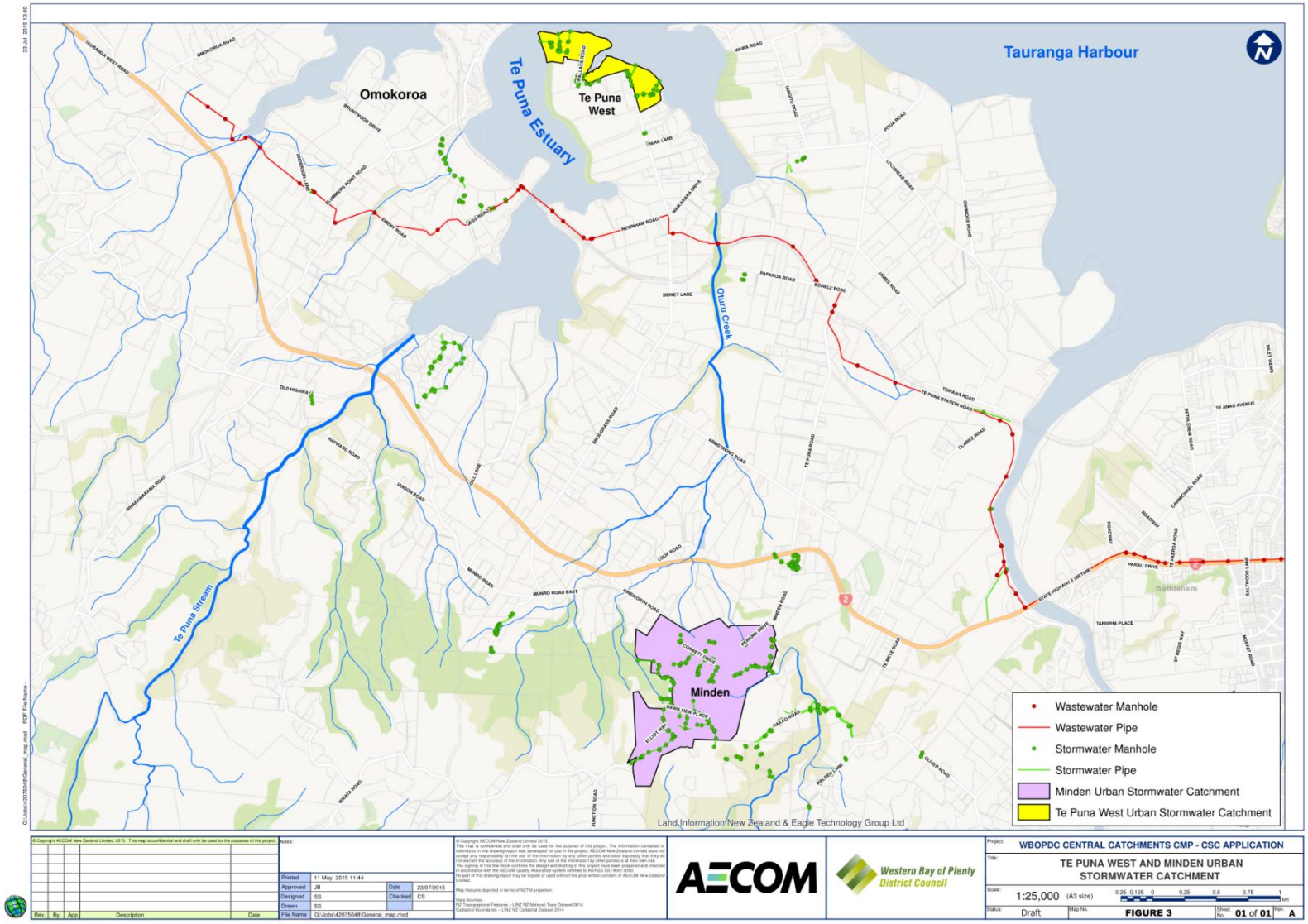

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Figure 2 Te Puna West Urban Stormwater Catchment

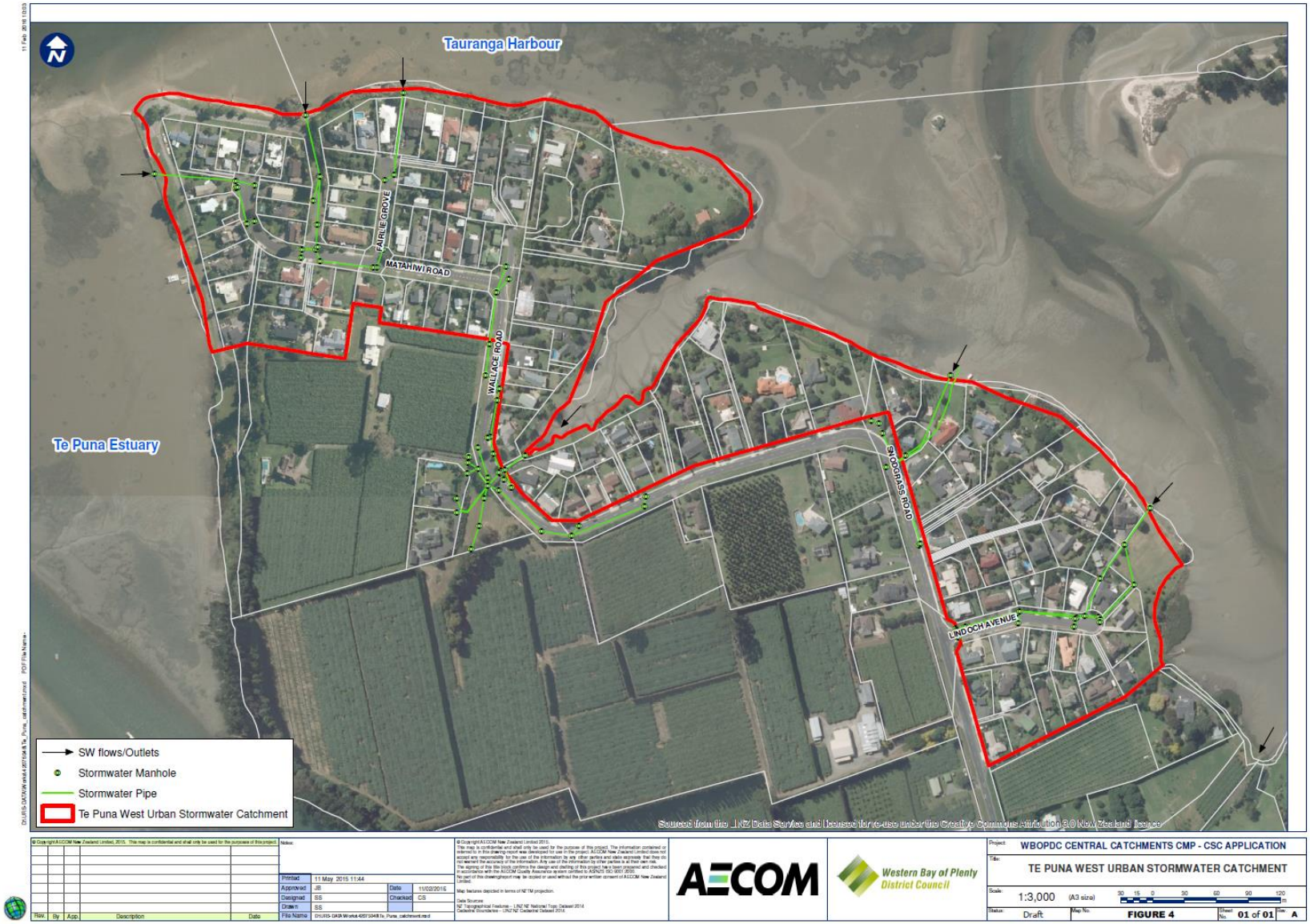

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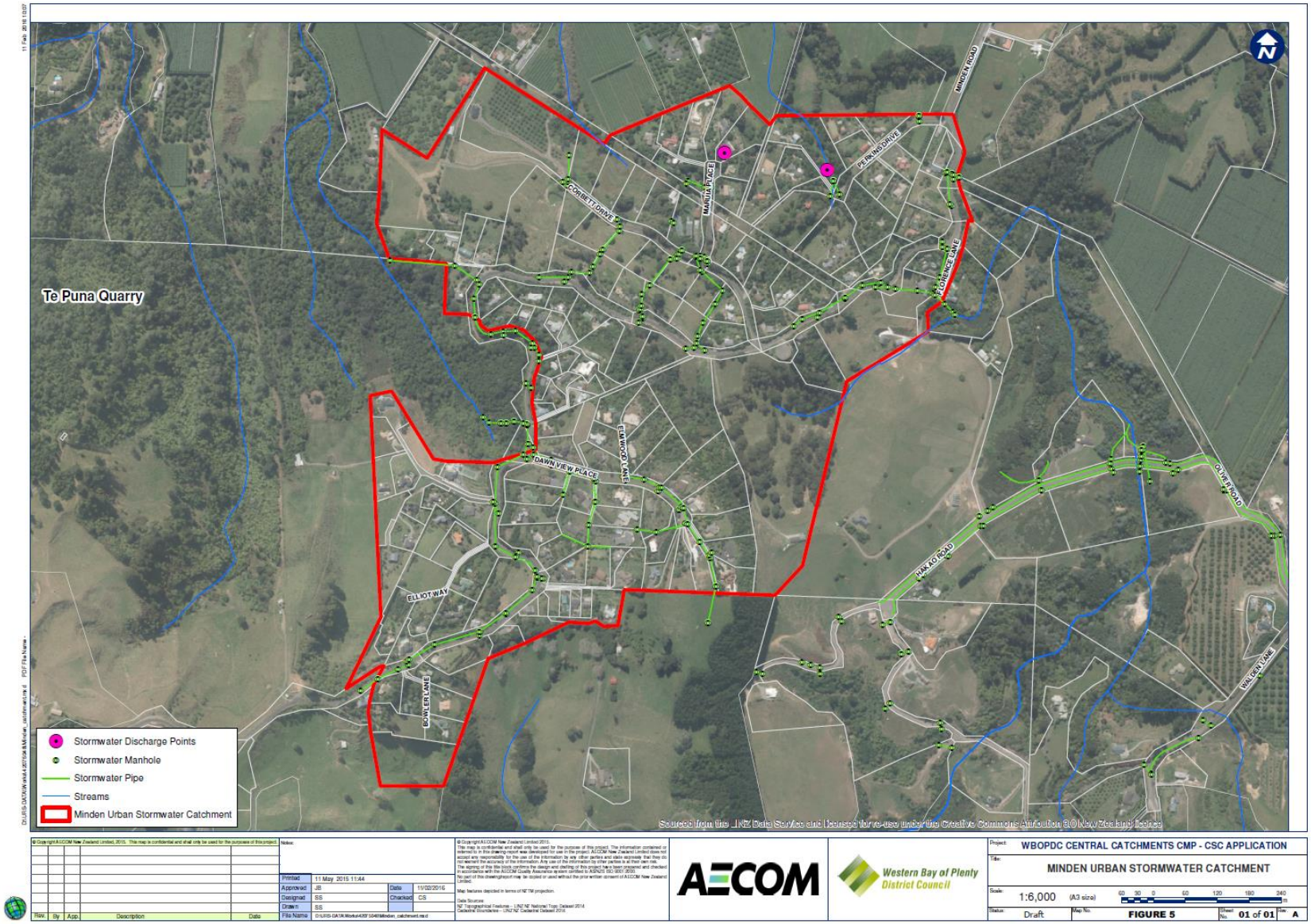
Figure 3 Minden Urban Stormwater Catchment



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3.0 Stormwater Network

Section Three – will provide an overview of the stormwater network and hydrological modelling.

3.1 Existing Stormwater Network

3.2 Hydrological Modelling

3.2.1 Te Puna West Hydrological Modelling

3.2.2 Minden Hydrological Modelling

3.3 Existing Stormwater Management

3.4 Determination of 1% AEP Flood Levels

4.0 Catchment Values

Section Four – will provide an overview of the catchment values of the respective catchments. Based on these catchment values, this section will provide a range of catchment specific stormwater management objectives.

5.0 Existing Consents

Section Five – will provide an overview of the existing consents held (to be surrendered) within the catchments. Refer to Table 1 below:

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Table 1 Central Catchment Current Existing Consents (Te Puna and Minden Catchments) – source: BOPRC (List of consent within Te Puna and Minden)

CONSENT No	NAME	ADDRESS	APPLICANT ADDRESS	PURPOSE	ISSUED DATE	EXPIRY DATE	EASTING	NORTHING	WATER USE RATE	WATER USE DAILY	MAX RATE VALUE (L/s)	MAX DAILY QUANT VALUE	MAX DAILY QUANT IRRIGATE VALUE	WATER BODY	BORE No
20483-0	Russell A D	89 TE PUNA ROAD, TE PUNA, TAURANGA	Cliff Road, Ohope 3121	TAKE WATER FROM BORE FOR HORTICULTURE IRRIGATION		2026-10-01	1870969	5824469	2 L/s	126 m3/d	2.03		127		64
20811-0	Opihi Nurseries Ltd	OPIHI NURSERY, SNODGRASS ROAD, TE PUNA	9 Waikaraka Drive, R D 2, Te Puna, Tauranga 3172	HORTICULTURAL IRRIGATION		2026-10-01	1869986	5826210	3 L/s	36 m3/d	3.16		36		4450
20815-0	**Western BOP District Council**	**MARUIA PLACE, MINDEN, TAURANGA**	**Private Bag 12803, Greerton, Tauranga 3143**	**DISCHARGE STORMWATER**		**2026-10-01**	**1870352**	**5822840**			**104**	**6240**		**TE PUNA STREAM**	
20866-0	Fraser L & R	GILL LANE, TE PUNA	Gill Lane, R D 2, Tauranga 3172	DOMESTIC USE & IRRIGATION		2026-10-01	1868551	5824222	Null L/s	20 m3/d	3.79		130		4214
20973-0	Allan ME	229 SNODGRASS ROAD, TE PUNA	20 Park Lane, RD 2, Tauranga 3172	ORCHARD IRRIGATION		2026-10-01	1869629	5825442	L/s	m3/d	6.32		369		4019
21121-2	Dave Robertson Family Trust	I'ANSON ROAD, TE PUNA, TAURANGA	33I Anson Road, R D 6, Tauranga 3176	ORCHARD IRRIGATION		2026-10-01	1867656	5824138			1.67		144		
21188-0	**Western BOP District Council**	**MINDEN ROAD SUBDIVISION, MINDEN ROAD, TAURANGA**	**Private Bag 12803, Greerton, Tauranga 3143**	**DISCHARGE STORMWATER**		**2026-10-01**	**1870545**	**5822807**			**120**			**WAIKARAKA STREAM TRIBUTARY**	
21382-1	Bateman GA	NEWNHAMS ROAD, TE PUNA, TAURANGA	48 Newnham Road, RD 4, Tauranga 3174	ORCHARD IRRIGATION		2026-10-01	1869441	5826109			3.2		208	Bore	
21404-0	Haallan Trust	158 ARMSTRONG ROAD, TE PUNA	158 Armstrong Road, Te Puna, Tauranga 3172	ORCHARD IRRIGATION		2026-10-01	1869932	5824826	1.88 L/s	216 m3/d	1.88		216		4380
21465-0	Bryant SF	ARMSTRONG ROAD, TE PUNA	143 Armstrong Road, R D 2, Te Puna, Tauranga 3172	ORCHARD IRRIGATION		2026-10-01	1869817	5824411	0 L/s	50 m3/d	2		143		1059
21682-0	Johnsen CM & KE	GILL LANE, TE PUNA	30 Gill Lane, R D 2, Te Puna, Tauranga 3172	ORCHARD IRRIGATION		2026-10-01	1868751	5824198	0 L/s	0 m3/d	2.7		197		4310
21807-0	P & G Nielson Limited	52 BORELL ROAD, TAURANGA	52 Borell Road, RD 2, Tauranga 3172	IRRIGATION: KIWIFRUIT & NURSERY		2026-10-01	1870942	5825921	0 L/s	30 m3/d	1.26		100		424
21941-0	Somerfield RB	TEIHANA ROAD, TAURANGA	Glenavon Roses, 34 Teihana Road, RD 6, Tauranga 3176	HORTICULTURAL IRRIGATION-KIWIFRUIT		2026-10-01	1872425	5824808	3.47 L/s	300 m3/d	3.47		300		4620
63292-0	Western BOP District Council	PORIPORI ROAD, & CRAWFORD ROAD, TAURANGA	C/- Opus Consultants Limited, PO Box 646, Tauranga 3140	EARTHWORKS TO EXTEND CULVERT	2007-02-14 0:30	2041-10-31 0:30	1869380	5818856							
63714-0	Scapens Family Trust	398 SNODGRASS ROAD, RD 2, TAURANGA	398 Snodgrass Road, Te Puna, Tauranga 3172	Take geo from bore & dis geo to Harbour	2006-09-21 0:30	2026-08-31 0:30	1869802	5827208			2	130		Tauranga Harbour	Harbour
65309-0	Zawadi Trust - The Trustees	220 Te Puna Road, Te Puna	220 Te Puna Road, RD 6, Tauranga 3176	Take water from bore for irrigation and frost	2008-07-07 0:30	2018-06-23 0:30	1871471	5825488	L/s	m3/d	20		720		10758

D R A F T

6.0 Discharges consented

Section Six – will describe and locate the discharges consented by the CSC.

7.0 Identification of Stormwater Management Issues

Section Seven - looks at the ways the objectives covered in Sections 1 and 4 will be achieved and how issues within the catchment can be addressed.

7.1 Stormwater Quantity

7.1.1 Flooding

- Flood Hazard Maps
- Secondary Flow Paths
- Development within 1% AEP area

7.1.2 Stream Bank Erosion

7.1.3 Stormwater Quantity Improvement Methods

- Ponds
- Wetlands
- Low Impact Design (LID) and Water Sensitive Urban Design (WSUD)
- Rainwater tanks

7.2 Stormwater Quality

7.2.1 Current Stormwater Quality Management

7.2.2 Potential Sources of Contamination

7.2.2.1 Contaminant Load Modelling

7.2.2.2 Wastewater Contamination: Wastewater Network and Septic tanks

7.2.2.2.1 Septic Tanks

7.2.2.2.2 Wastewater Network

7.2.2.3 Other Potential Sources of Contamination

7.2.3 Stormwater Treatment Requirements

7.2.4 Stormwater Quality Improvement Methods

- Vegetative Filter Strips and Swales
- Permeable Pavement
- Filter Devices
- Wetlands
- Ponds
- Proprietary Treatment Devices
- Other

D R A F T

8.0 Assessment of Environmental Effects

Section Eight – describes the actual and potential effects on the respective catchments from development across the catchment with respect to flooding and stormwater quantity, water and sediment quality, ecology and habitat, and social and cultural values etc.

9.0 Option Evaluation and Recommendations

Section Nine – will evaluate a range of potential management options against catchment objectives and stormwater quantity and quality requirements. Assessment will be made against economic, environmental, social, cultural and Public Health factors.

Section Nine will also identify catchment specific recommendations for mitigation through appropriate stormwater management approaches. These may be either implemented or programmed for implementation. Further non-structural and structural recommendations for the management of stormwater quantity, quality and stream improvements, may also be referenced.

10.0 Monitoring Procedures and Review

Section Ten – describes the programme of environmental and hydrological monitoring that will (likely) be required by the CSC that will measure the level to which the objectives set out in Section 4 are being achieved. The monitoring locations and outcome of monitoring carried out throughout the catchment will be identified.

11.0 Communication

Section Eleven – will list key stakeholders and the type of communication/consultation undertaken to date and that proposed in the future.

This section will describe the outcome of previous communication/consultation with stakeholders and cultural impact assessments, including the identification of further issues and comment on the programme of actions/works.

12.0 CMP Review

Section Twelve – will describe the process, scope and frequency of the CMP review as required by the CSC.