

MANAGING TAURANGA'S STORMWATER: A COLLABORATIVE APPROACH

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ABSTRACT

In the last five years Tauranga City Council (TCC) has obtained comprehensive stormwater consents for all of Tauranga city. As one of the fastest growing areas in New Zealand, Tauranga faces many stormwater management challenges with urban development, existing flooding issues, and diverse and sensitive receiving environments.

TCC is collaborating with the Bay of Plenty Regional Council (BoPRC) and community stakeholders to create a stormwater management framework and catchment management plans which will meet the current and future needs of this growing city.

This paper describes TCC's inclusive approach to stormwater management. It covers the development of an overarching sub-regional flood risk management strategy in conjunction with BoPRC, Western Bay of Plenty District Council and community stakeholders which will set out roles, responsibilities and a whole of catchment approach for TCC's stormwater catchment management planning.

Other key components of TCC's stormwater management approach include collaboration with tangata whenua regarding cultural impacts and monitoring, working with BoPRC on pollution prevention initiatives, obtaining a Resource Management Act Delegation of Powers and TCC's Pollution Prevention Bylaw. The low impact design philosophy underpinning TCC's stormwater management approach is supported by the recently developed Stormwater Management Guideline, which is referenced through the Infrastructure Development Code.

KEYWORDS

Stormwater catchment management, flood risk mitigation, comprehensive stormwater consents, collaboration.

PRESENTER PROFILE

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Jane Groves has worked in the fields of stormwater and environmental management for over 14 years. For the last 10 years she has worked in Drainage Operations at Tauranga City Council, where her role focuses on stormwater and catchment management planning, stormwater policy and consenting of stormwater and drainage related works.

Celia Bowles has worked in the NZ and UK water industry for over 10 years. In the stormwater arena Celia has been involved in the development of stormwater guidelines, catchment management plans, flood risk management planning, stormwater pond asset management and is an advocate for low impact design. Celia is currently a Planning Engineer: Waters at Tauranga City Council.

1 INTRODUCTION

In the last five years Tauranga City Council (TCC) has obtained comprehensive stormwater consents (CSCs) for all of Tauranga city. As one of the fastest growing areas in New Zealand, Tauranga faces many stormwater management challenges with urban development, existing flooding issues, and diverse and sensitive receiving environments.

TCC is collaborating with the Bay of Plenty Regional Council (BoPRC) and community stakeholders to create a stormwater management framework and catchment management plans (CMPs) which will meet the current and future needs of this growing city.

Successful and unique approaches which have been taken in this journey have included; developing a more affordable and streamlined approach to obtaining 35 year consents, working collaboratively with BoPRC on a range of stormwater management tools, and stakeholder involvement in the development of CMPs and ongoing monitoring programmes.

As a result, this paper is beneficial to those involved in consenting stormwater discharges, developing CMPs and generally seeking a collaborative approach with its stakeholders.

2 BACKGROUND

In 2005, the BoPRC developed, in consultation with relevant territorial authorities, a Stormwater Strategy (Bay of Plenty Regional Council, 2005). This Stormwater Strategy outlined BoPRC's vision, strategic objectives and policies regarding stormwater management in the region. It also provided options for managing stormwater and encouraged territorial authorities to create their own stormwater strategies.

The BoPRC Stormwater Strategy split Tauranga City into 11 stormwater catchments and provided a methodology to prepare CMPs and CSC applications for each catchment. It also set due dates for lodging these CSC applications with BOPRC between 2006 and 2010. The BoPRC Stormwater Strategy prioritised CSC lodgement dates based on stormwater risks and the ecological and community values of the receiving environment.

By 2009, TCC had put substantial effort and funds into completing several stormwater hydraulic models (to confirm flooding issues and develop solutions), and in preparing and lodging one CMP and two CSC applications. With a further nine hydraulic models, ten CMPs, and nine CSC applications to prepare and lodge by 2010, it was realised that this methodology was unaffordable and impractical in terms of timing.

TCC found that hydraulic models were expensive to prepare, and were often out of date by the time they were required to confirm engineering solutions. TCC also found that the costs of traditional stormwater structural engineering solutions were beyond the community's budget and that other approaches could also be useful in managing stormwater.

During this long period, while the CMPs and CSC applications were being prepared, the existing stormwater network was effectively without consent. A new stormwater consenting approach was required.

3 TCC STORMWATER CONSENTING APPROACH

In 2009, TCC discussed the difficulties in achieving the programme as set out in the Stormwater Strategy with BOPRC and it was agreed that TCC would develop and propose a more achievable methodology.

In February 2010, TCC developed a 'Stormwater Consenting Approach' (Golder Associates, 2010) to guide the acquisition of CSCs and the production of CMPs. This approach was adapted from that defined in the BoPRC Stormwater Strategy, but consisted of a reduced number of CSCs, with CMPs written after the corresponding CSC was obtained. The timing of CMP lodgement would be agreed between TCC and BoPRC, and would be specified as a condition of the CSC. The key advantages associated with this revised approach were:

- **Knowledge to inform CMPs** - All existing structures and discharges would be consented prior to completion of the CMPs. In preparing the CSC applications, TCC would gain an understanding of the performance of the current network, the predominant effects that required managing, and data could be collected which would help to target the locations and scale of any hydraulic modelling required to address stormwater quantity issues. Monitoring requirements associated with the CSC would also assist TCC in decision making around management options and in implementing 'effects based' mitigation measures to address quality aspects.
- **Fewer catchments** - Stormwater catchments would be reviewed and amalgamated based on the stormwater reticulation, land based activity and receiving environment. This would provide a more consistent and efficient approach to managing the stormwater network.
- **New consents** - New small and/or low risk activities could be permitted under the CSC. New works and therefore new consents would have similar conditions, monitoring requirements and trigger levels as per the CSC, and subsequently transferring to the CSC, once constructed, would be a simpler task.
- **Demonstrate progress** - TCC could demonstrate that progress was being made in managing its stormwater catchments. TCC could plan and budget works over an achievable period.
- **More affordable** - Expenditure associated with any modelling work involved in preparing a CMP was spread out over a longer timeframe.
- **Obtain agreement** - Agreement with BoPRC on consent conditions that specified the level of detail required in CMPs could be obtained. In this way, TCC could be assured that its CMPs would be focussed, meet BoPRC's information requirements, and any rework requested would likely be minimal.
- **Focussed modelling** - TCC could prioritise modelling of catchments with known flooding issues. There would also be less rework of modelling and engineering design, as these stages could be completed closer to construction.

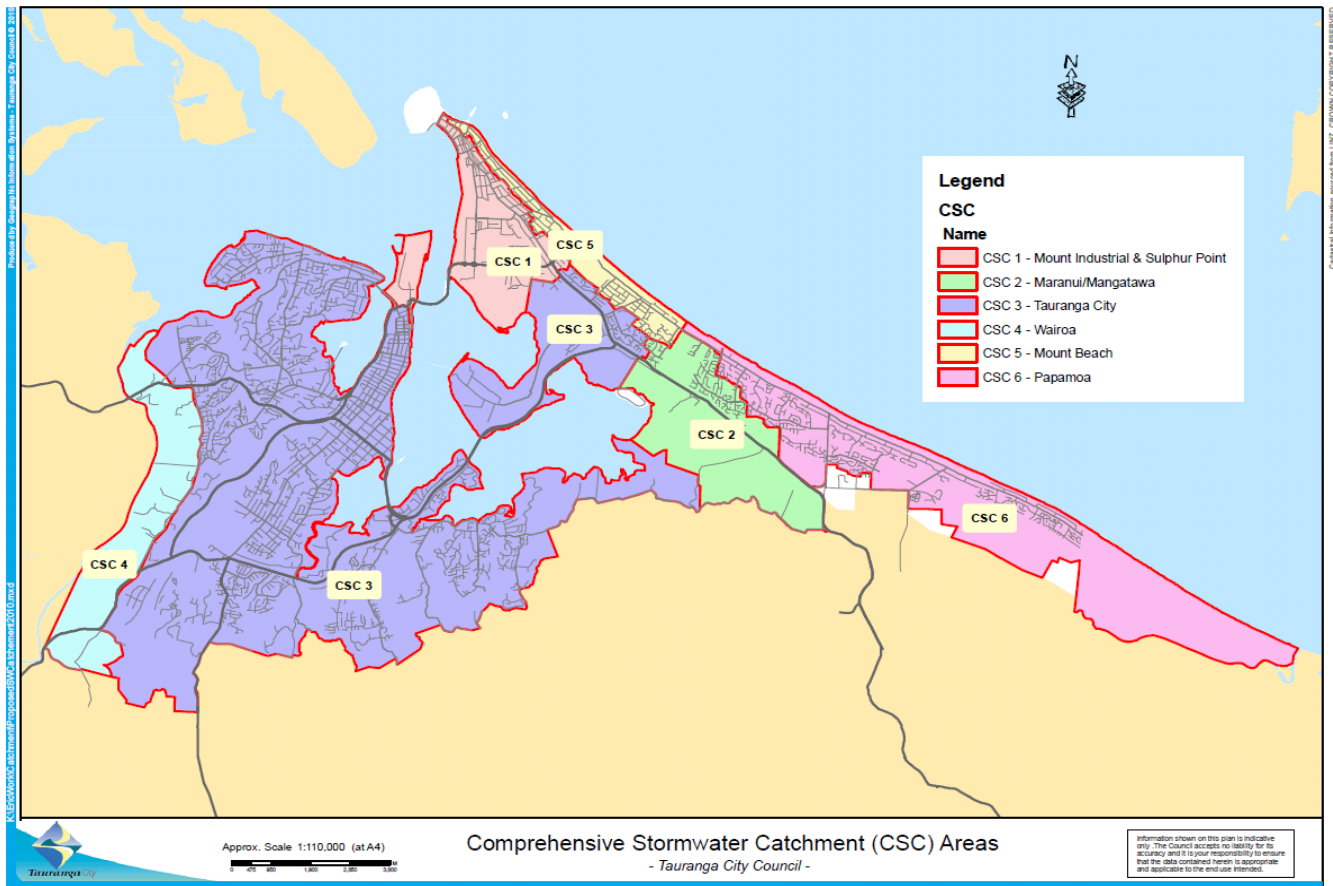
3.1 TAURANGA'S STORMWATER CATCHMENTS

3.1.1 CATCHMENT/SUB-CATCHMENT BOUNDARIES AND RATIONALISATION

BoPRC and TCC worked together to refine the approach and agree timeframes for submitting CSC applications. The approach was based on a total of six stormwater catchments differentiated by land use and receiving environment. The location and

extent of each (including sub-catchments where relevant), are described below and are depicted in Figures 1 and 2 respectively.

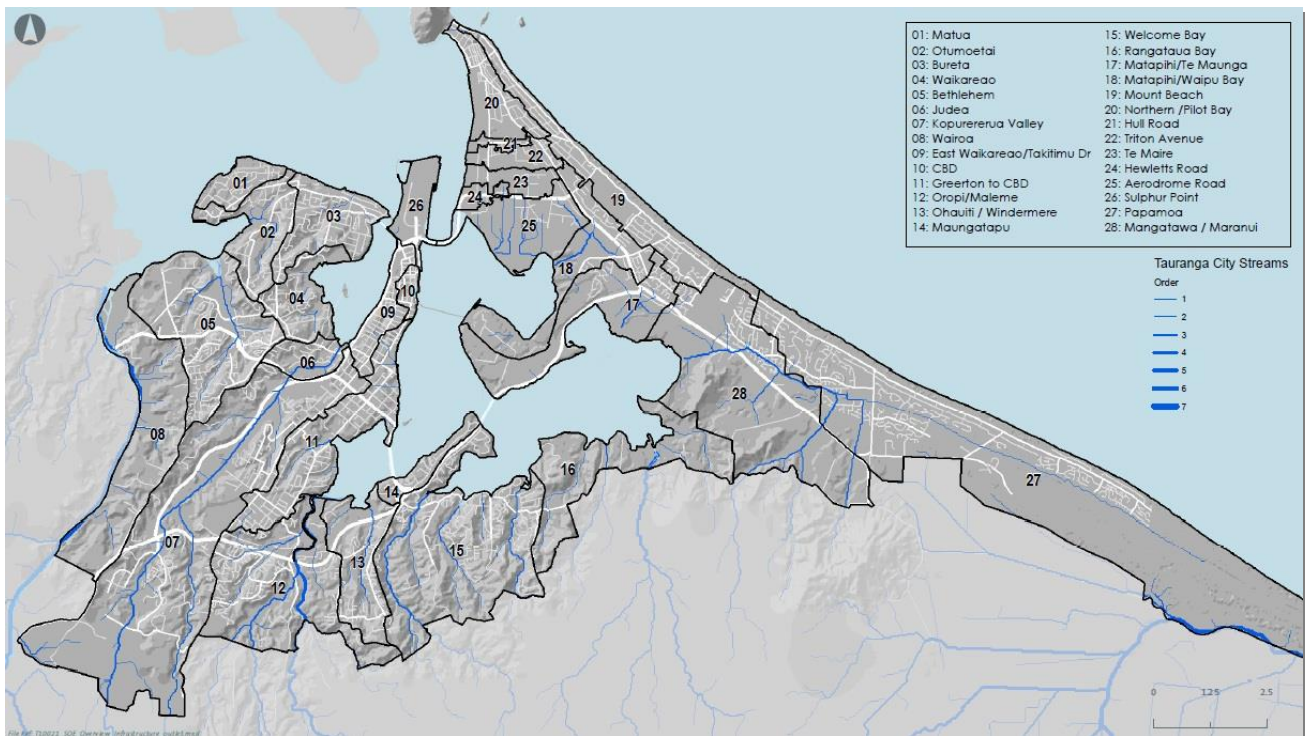
Figure 1: TCC Catchment Boundaries



- CSC1: Mount Industrial and Sulphur Point** (discharging to the Tauranga Harbour) consisting of 7 sub-catchments (20-26). This catchment was separated from the other catchments discharging into Tauranga Harbour on the basis of its highly industrial land based activities.
- CSC2: Maranui/Mangatawa** (discharging to Rangataua Bay/Tauranga Harbour). A joint NZ Transport Agency (NZTA)/TCC application was submitted for stormwater activities in this catchment. The consents sought were to be held by either TCC or NZTA as follows; by NZTA for aspects relating to construction of the Tauranga Eastern Link (TEL) motorway and the proposed treatment wetland, and by TCC for long term-aspects, particularly stormwater discharges from TEL and urban areas. This consent was obtained in 2009.
- CSC3: Tauranga City** (discharging to the Tauranga Harbour) comprising 18 sub-catchments (1-18). This catchment, which amalgamated all other catchments discharging into Tauranga Harbour, contains mainly residential land use with pockets of commercial and industrial activity.
- CSC4: Wairoa** (discharging to the Wairoa River). This catchment contains the small portion of the wider Wairoa River catchment which lies within TCC's boundary. Land to the west and south of this catchment falls within Western Bay of Plenty District Council (WBoPDC) jurisdiction.

- **CSC5: Mount Beach** (discharging to the ocean beach, Bay of Plenty). This catchment contains commercial and residential land use discharging to the Pacific Ocean.
- **CSC6: Papamoa** (discharging to ground and to the ocean beach, Bay of Plenty plus flood overflow to the Kaituna River). This catchment is mainly residential and encompasses Papamoa and the new development areas of Papamoa East and Te Tumu. The consent application was part of a Plan Change process and the consent was obtained in 2009.

Figure 2: TCC Sub-Catchment Boundaries and Watercourses



The sub-catchments within these six primary catchments were defined to enable specific issues and mitigation to be identified, and associated sub-catchment specific CMPs to be developed.

Further rationalisation of catchments was carried out through the application process resulting in the stormwater network of Tauranga City being covered by only three CSCs, *Tauranga City*, *Maranui/Mangatawa* and *Papamoa*.

3.1.2 CATCHMENT / SUB-CATCHMENT CHARACTERISATION - STATE OF THE RECEIVING ENVIRONMENT ASSESSMENT (SORE)

Following development of the Stormwater Consenting Approach, and acceptance by BoPRC, a State of the Receiving Environment Report (SoRE) (Beca & Boffa Miskell, 2011) was prepared as supporting information to the Tauranga City CSC application. The SoRE was intended to define the characteristics of the City receiving environment for stormwater discharges. More specifically, this report defined the characteristics and quality of waters (fresh and marine), sediments, invertebrates and fish in the receiving environment in order to establish a baseline from which future change could be measured. The report also identified where problem areas were, or are likely to be in the future, and on the basis of this knowledge where remedial action or mitigation may be required.

The SoRE report was prepared in four stages; a desk top analysis of existing data gathered from over 100 sources, a gap analysis to identify where additional data was required, collection of additional data including sampling and analyses, and the preparation of the report. The SoRE can be considered a 'snapshot' of the existing receiving environment.

4 TAURANGA CITY COMPREHENSIVE STORMWATER CONSENT

4.1 SCOPE

The Tauranga City CSC was obtained in November 2012 and covers the catchments (and associated sub-catchments) of Mount Industrial and Sulphur Point (CSC1), Tauranga City (CSC3), Wairoa (CSC4) and Mount Beach (CSC5). As noted above, the Maranui/Mangatawa CSC (CSC2) and the CSC for the coastal strip of Papamoa (CSC6) were both obtained in 2009 to allow for construction of the TEL motorway and development of the rapidly growing Papamoa East area respectively. All TCC's CSCs have duration of 35 years.

The Tauranga City CSC, which covers the majority of Tauranga City, authorises the following:

- The discharge of stormwater from the existing stormwater network;
- Associated activities such as the use, maintenance and reconstruction of structures; and,
- Additional stormwater discharges and structures, over and above the existing network at the time of granting the consent, where such discharges and structures have been authorised under resource consents granted by BoPRC and are to be incorporated into the CSC.

In simplistic terms, new structures, and new discharges falling outside the scope of that prescribed in the CSC, would require new consents. Discharges into TCC's stormwater network from 'high risk facilities', as identified in Schedule 4 of the BoPRC Regional Water and Land Plan, were also explicitly excluded, unless separate discharge consent was obtained, transferred to TCC, and included as part of the CSC. Similarly, existing privately held consents were excluded, unless transferred to TCC through the vesting process.

4.2 REQUIREMENT FOR CMPS

The Tauranga City CSC also identified specific parts of the city which required CMPs based on known flooding issues, stormwater/ receiving environment quality information and associated land based activities. The Tauranga and Maranui/Mangatawa CSCs set timeframes for preparing and lodging CMPs with BoPRC for the following catchments:

- **Mount Industrial and Sulphur Point (Module 2)** – This CMP encompasses the highly industrialised and commercial areas of Mount Maunganui and Sulphur Point;
- **Maranui/Mangatawa (Module 3)** – This CMP incorporates the urban Maranui area and the mainly rural area of Mangatawa. It was required due to complexities around stormwater management throughout the catchment, specifically associated with construction of the Tauranga Eastern Link (TEL) by NZTA, and long-term catchment stormwater discharges. The associated split of functions, responsibilities and cost sharing arrangements between NZTA and TCC would also be documented within this CMP;

- **Oropi/Maleme (Module 4)** – This CMP addresses the Oropi/Maleme industrial and commercial precinct, some of which is subject to flooding, and discharges from the Maleme Street industrial area and surrounds to the sensitive receiving environment of Waimapu Estuary;
- **Wairoa (Module 5)** – This CMP addresses the TCC stormwater network discharging to the Wairoa River (a small proportion of the overall river catchment) and was requested by local hapu, due to the Wairoa River’s cultural significance.
- **Mount Beach (Module 6)** – This CMP incorporates the catchment which discharges to outfalls along Mount Maunganui beach to the Pacific Ocean. It will be prepared and lodged with BoPRC in 2015.

4.3 STORMWATER MANAGEMENT PRINCIPLES

The Tauranga City CSC stipulates overarching stormwater management principles (developed to achieve objectives in 2005 Strategy and 2010 Consenting Approach) which, where practicable shall be given effect. This philosophy is reflected in TCC’s CMPs and states the following:

- **Encourage Low Impact Design** - Generally, to encourage and where appropriate for new development or redevelopment, require the use of Low Impact Design solutions as a preferred option for stormwater management where this is practicable. The aim is to mimic natural stormwater runoff characteristics to provide treatment and attenuation, thereby helping to reduce the adverse off-site effects associated with stormwater from developed sites. Examples of Low Impact Design solutions may include, but are not limited to the use of grassed swales and rain gardens for stormwater treatment and flow attenuation;
- **Erosion Control** - The mitigation and avoidance of erosion resulting from the discharge of stormwater;
- **Ground Soakage** - The use of ground soakage as a preferred option for the disposal of stormwater from roofs of buildings where such discharge does not exacerbate subsurface instability;
- **Riparian Planting** - The use of indigenous and site appropriate riparian planting to achieve improved water quality and habitat outcomes. Riparian planting should provide for erosion control while not impeding capacity, flows or system maintenance;
- **Wetlands** - The creation, enhancement, protection and use of wetlands to achieve improved water quality and biodiversity outcomes; and,
- **Stormwater Detention Ponds** - The use of stormwater detention ponds to provide treatment and attenuation of stormwater where other low impact design solutions are not practicable.

The development and implementation of TCC’s Stormwater Management Guideline (SMG), which is described later in this paper, assists in ensuring that the above philosophy is adopted both by TCC and other parties, when implementing stormwater management methods throughout Tauranga City.

4.4 CSC CONSULTATION

The Tauranga City CSC application was a publicly notified process. However, a key part of the application process was consultation with key stakeholders while preparing the application and during the public notification period.

4.4.1 ORGANISATIONAL STAKEHOLDERS

A series of workshops were held where organisational stakeholders such as the Department of Conservation, Toi Te Ora Public Health, NZTA, BoPRC, WBoPDC, Fish and Game and Forest and Bird Society were invited to provide their feedback on stormwater issues across Tauranga City. At these workshops, stakeholders worked together to identify land based activities which affected the quality and quantity of stormwater and the receiving environment in each catchment across the city.

TCC also worked with these stakeholders to agree draft proposed consent conditions for the Tauranga City CSC.

4.4.2 TANGATA WHENUA

There are three iwi located in Tauranga City CSC area: Ngati Ranginui, Ngai Te Rangī, and Ngati Pukenga. TCC's Tangata Whenua Collective provides a forum for Tauranga hapu from these iwi to meet to discuss and debate local authority concerns and allow the Collective to implement initiatives to advance and protect the interests of tangata whenua.

The draft Tauranga City CSC application was presented to the Collective and it was agreed that a cultural advisor would prepare a chapter in the application on the effect of the stormwater activity on cultural values and customary practices, and TCC would work directly with hapu in preparing Cultural Impact Assessments (CIAs) for specific CMPs.

During the public notification period, three groups, Ngati Ranginui, Rangiwaea Marae and Ngati Kahu requested that Cultural Effects, Monitoring and Mitigation Plans (CEMMPs) be prepared for each CMP. These CEMMPs would utilise TCC's stormwater quality and receiving environment monitoring data as carried out under CSCs, and interpret that data in terms of pre-agreed cultural indicators. In this way, the effects of the stormwater activity on cultural values and customary practices could be assessed.

The engagement by TCC of these CIAs and CEMMPs with the various iwi and hapu is discussed in more detail in Section 5.3.1.

5 CATCHMENT MANAGEMENT PLANS

5.1 'GENERIC' CATCHMENT MANAGEMENT PLAN

Although not a consent requirement, TCC elected to prepare a Generic CMP (Module 1) to cover five of the six stormwater catchments, CSC1 through CSC5. A catchment specific CMP has already been prepared for the Papamoa (CSC6) catchment, and this catchment therefore sits outside the scope of the Generic CMP. It is however likely that this CMP will be incorporated into the Generic CMP at its first five-yearly review.

The Generic CMP describes how TCC manages stormwater for the entire city, including those areas which do not have a specific CMP. It allows stormwater management information that is common to all catchments to be included in one document, rather than be repeated throughout each catchment specific plan. As it contains information relevant to the catchment specific CMPs, the Generic CMP would be reviewed and updated when the catchment specific CMPs are reviewed.

The Generic CMP demonstrates TCC's integrated management approach to stormwater across Tauranga City. It outlines and incorporates the key stormwater issues and objectives for all catchments and addresses the effects of stormwater discharges on all receiving environments. Detail is provided on the potential suite of management methods available to TCC to mitigate identified issues and a means is provided to evaluate these options leading to a preferred approach.

The strategic objectives identified in the Generic CMP are derived from the Stormwater Strategy. The objectives are listed for each of the key issue topics identified – flooding and stormwater quantity, water and sediment quality, stream health and erosion, and marine ecosystems. These are then related to the specific issues identified through consultation and those identified following completion of the SoRE report.

The CSC specifies a CMP review frequency of five-yearly from the approval date of the CMP for any given catchment or sub-catchment to ensure information remains current and that any changes can be incorporated.

5.2 CATCHMENT SPECIFIC CATCHMENT MANAGEMENT PLANS

Catchment specific detail, over and above that provided in the Generic CMP, regarding receiving environments, the outcome of hydrology assessments/modelling, environmental monitoring and consultation is included in catchment specific CMPs. Within each specific CMP a range of catchment recommendations is provided including a prioritised programme of works. The catchment specific modules are intended to be read in conjunction with the Generic CMP (Module 1). These catchment specific CMPs, and the rationale for their inclusion in the CSCs, are described in Section 4.2.

Review clauses within the CSC/CMP and the submission of annual and five-yearly monitoring reports to BoPRC, stakeholders and iwi allow for additional CMPs, over and above these CMP modules, to be requested by these parties at a later date. TCC may also elect to prepare further catchment specific CMPs in the future if specific issues are identified in other areas of the city.

5.3 CMP CONSULTATION

Consultation was undertaken concurrently for the four catchment specific CMPs (Modules 2 – 5) with the objective of creating greater time and cost efficiencies for both TCC and its stakeholders. Stakeholders for CMP consultation were as for the CSC process described in Section 4.4 above, with the addition of specific hapu groups for each catchment.

5.3.1 TANGATA WHENUA

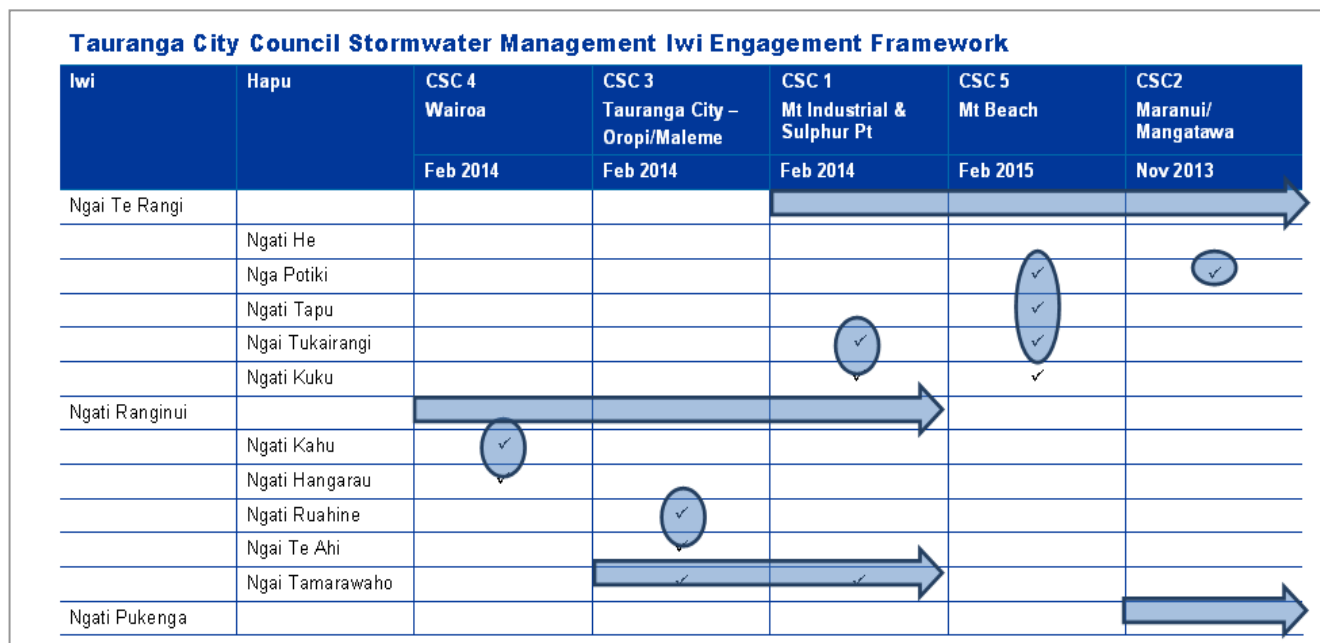
The Tauranga City CSC specifies that *TCC shall record within CMPs the cultural values of iwi and hapu with mana whenua over the catchment area and related environment, and detail how such cultural values are integrated into stormwater management in that area.*

TCC has a number of iwi and hapu protocol agreements which have been developed to identify issues of cultural significance to tangata whenua and to provide guidelines on how TCC and tangata whenua work together in Tauranga City. These protocol agreements have been utilised in all of TCC's engagement with iwi and hapu.

Consultation carried out by TCC included meetings/hui with each of the parties relevant to each CMP as set out in Figure 3 below. The project team also reported to Tangata Whenua Collective to ensure that all the relevant parties were aware of the CMP process.

Each of Tauranga City’s iwi, Ngai Te Rangi, Ngati Ranginui and Ngati Pukenga were engaged to prepare a CIA encompassing all of Tauranga City for inclusion in the Generic CMP, and each relevant hapu group was engaged to provide a CIA for the catchment specific CMPs. Some hapu groups provide combined CIAs but the majority preferred to write their own individual CIA.

Figure 3: Iwi Engagement Framework



In response to submissions from specific iwi and hapu groups during the CSC application process, TCC is also in the process of engaging Cultural Effects Monitoring and Mitigation Plans (CEMMPs) for specific catchments of Tauranga City. These CEMMPs follow on from CIAs (which identify areas of cultural significance and the effect of the stormwater activity on customary practices) and relate the stormwater activity to pre-agreed cultural indicators. The CEMMPs then interpret the results of stormwater quality and receiving environment monitoring information carried out by TCC in its long-term monitoring programme in terms of these cultural indicators.

The cultural indicators are as follows:

- The presence and abundance of taonga fish and shellfish species;
- The ability to eat kai moana and kai awa;
- The visible presence of pollution, foams, oil, sediment and gross pollutants;
- The ability to access the foreshore of traditional seafood gathering areas; and
- The abundance of taonga plant and bird species relevant to the CMP area.

In agreeing to engage this CEMMP work, TCC has elected to undertake further monitoring, over and above that specified in the CSC conditions for plant and bird species. Assessment of the other cultural indicators will utilise data collected through the long-term monitoring programme.

The outcome of this interpretation will be incorporated into the relevant CMP and the CEMMP will be reviewed on a five-yearly cycle, to coincide with the five-yearly review of

the CMP required as a condition of the CSC. The CEMMP monitoring and subsequent reviews will be carried out for the duration of the CSC (35 years).

Overall the feedback from tangata whenua confirms their wish to be involved in stormwater quality monitoring and to be kept informed of changes in stormwater quality over a period of time.

5.3.2 ORGANISATIONAL STAKEHOLDERS

Other consultation carried out in support of the CMPs included a workshop with the identified key parties and government agencies whereby copies of the draft generic and catchment specific CMPs were discussed and provided for comment.

A flyer drop to all businesses and residents in the CMP areas inviting feedback regarding stormwater issues was also undertaken. This flyer consisted of a one-page brochure describing the purpose of the CMPs, identified key stormwater issues and any mitigation carried out by TCC or programmed in response to these issues.

Through this process, TCC received relatively few responses, the majority (less than 50) relating to flooding within the Mount Industrial and Sulphur Point catchment. TCC were reassured by the number and nature of responses received across all catchments, that issues within the draft CMPs were targeted/identified appropriately.

6 STORMWATER MANAGEMENT FRAMEWORK

There are a number of key regulations, policies and controls that direct the management of stormwater within Tauranga City, and these are therefore addressed in TCC's CMPs.

A key focus for TCC in recent times has been recognition of the importance of a collaborative cross-boundary approach to stormwater management in Tauranga City. Simply, the need for TCC to work collectively with BoPRC and WBoPDC to set objectives and define the methodology to achieve these objectives for catchments discharging into Tauranga Harbour.

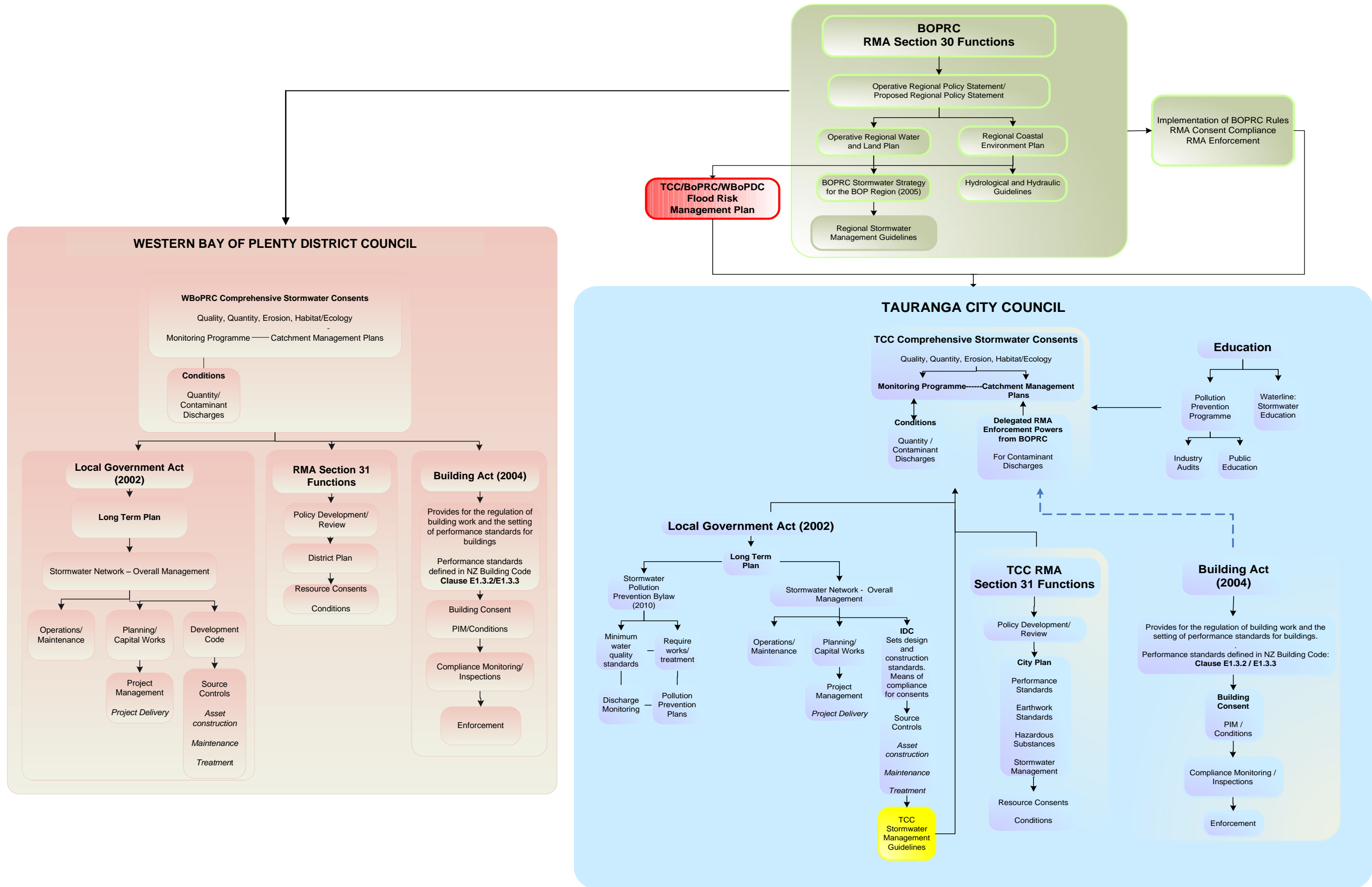
Figure 4 demonstrates the connectivity between the various components of this Stormwater Management Framework and highlights the importance of the recently initiated 'Sub-Regional Flood Risk Management Plan' which has been established to facilitate cohesiveness between these three agencies.

The Integrated Stormwater Project (ISP) is also discussed in this section in recognition of TCC's intent to look at the management of flood risk within Tauranga City holistically. That is, consideration of all structural and non-structural methods available.

6.1 SUB-REGIONAL FLOOD RISK MANAGEMENT STRATEGY

TCC, WBoPDC and BoPRC have collectively committed to the preparation of a Sub-regional Flood Risk Management Strategy to cover the respective areas of the two territorial authorities which are located in the western part of the Bay of Plenty. The preparation of this plan is facilitated and funded by BoPRC, but will assist all parties by providing an overarching framework for the management of flood risks associated with watercourses which traverse both territorial areas.

Figure 4: Stormwater Management: Bay of Plenty – Framework, Policy, Controls



Through the preparation of catchment specific CMP's for Wairoa and Oropi/Maleme, it was recognised by TCC that a 'whole of catchment' approach was required to mitigate flood risk associated with the Wairoa and Waimapu Rivers respectively. Upper catchment influences (and any necessary mitigation/management) could not be achieved by TCC alone, and collaboration with WoPBDC and BoPRC was essential. At this time, there was no formalised mechanism to enable this to occur.

BoPRC had, in its Long Term Plan (LTP), identified the need for a 'Regional Flood Risk Management Plan', but this piece of work was subsequently omitted from its 2014/2015 Annual Plan. TCC recognised the value of this work, submitted on this plan and this package of work, albeit at a 'sub-regional' level was subsequently reinstated.

TCC, WBoPDC and BoPRC collectively agreed that the key objectives of the Flood Risk Management Plan would be to:

- Improve the understanding of natural watercourse and catchment processes that influence flood risk;
- Encourage and increase integration between agency work packages (existing, proposed or required);
- Provide clear guidance on how flood risks in relation to watercourses will be managed in the future;
- Outline clear roles and responsibilities of each agency; and,
- Set a programme of actions for future management going forward.

Development of this plan commenced in 2013 and will continue over, at a minimum, the next two years, the output of which will feed into TCC's and WBoPDC's CMPs, and all agencies' LTP processes. It is likely that a range/combination of non-structural and structural methods will be proposed in this plan, including potential utilisation of 'emergency management' or 'managed retreat' in extreme events.

6.2 INTEGRATED STORMWATER PROJECT – FLOOD MITIGATION

The Integrated Stormwater Project (ISP) was established by TCC in July 2013 with the primary aim of mitigating and reducing stormwater damage and impacts on property due to flooding, in both residential and commercial/industrial areas of Tauranga City. It incorporates a wider cross-organisational approach to stormwater management that does not solely rely on solutions through the provision of infrastructure alone, rather recognises the benefits of implementing a 'multi-pronged' approach to managing flood risk by placing more emphasis on non-structural solutions.

A range of functional workstreams have been established within TCC to address flood risk over the coming years as follows:

- **Modelling outputs** through Flood Hazard Mapping will be used to inform the design work for mitigation/remedial works where required and also will be used to update property records in relation to flood risk.
- **Short term stormwater improvements** will be carried out as required in advance of full catchment remedial works to offer some flood relief.

- **Regulatory options** to address flood risk will be investigated and reported to Elected Members for discussion and direction on completion of all flood hazard mapping.
- **Engineering options** will be investigated for catchments as modelling is completed. Preferred solutions will be prioritised and programmed in the LTP.

Progress and outcomes from these workstreams will be incorporated into relevant catchment specific CMPs as they are reviewed in accordance with their five-yearly review cycle. The methods utilised within these workstreams to address flood risk are described in further detail within Section 6.3 below.

6.3 STORMWATER MANAGEMENT METHODS

The methods utilised by TCC take into account the intent of the ISP project whereby a multi-pronged approach considering both non-structural and structural flood risk mitigation measures will be considered for implementation. The sub-regional flood risk management planning work currently underway with BoPRC and the WBoPDC ensures that these methods are not developed and implemented by TCC in isolation of other agencies, and therefore, without consideration of upper catchment effects.

6.3.1 NON-STRUCTURAL METHODS

In relation to stormwater quality, non-structural options include the development of policies, processes and education initiatives which focus on reducing the likelihood of contaminants entering the public stormwater system and ultimately the receiving environment.

TCC's underlying philosophy is to prevent degraded/contaminated water from entering the public stormwater as opposed to treating the combined outflow from many sites, which is less effective and less reliable. This is supported through the implementation of TCC's Stormwater Pollution Prevention Programme, the Stormwater (Pollution Prevention) Bylaw, Resource Management Act Delegation of Powers, and education initiatives described below.

For managing stormwater quantity/flooding issues, non-structural options are most appropriately implemented as regulatory measures through the Tauranga City Plan (TCP). The TCP regulates land use, development and subdivision. Regulatory measures such as setting maximum impervious coverage and/or minimum building floor levels; purchasing flood prone properties or restricting development on flood prone land are considerations, and limiting discharge from new development. Other options such as emergency management and managed retreat are also available for more extreme situations.

Pollution Prevention Programme

TCC's Pollution Prevention Programme was established in 2002 with the objective of raising awareness of stormwater pollution issues, and over time, gaining a level of control over stormwater discharges into TCC's stormwater network. The focus of this programme is to manage contaminants at the source before discharges enter the TCC stormwater network. This programme is implemented in conjunction with the BoPRC's Pollution Prevention Programme, and consequently many of programme functions and tasks are undertaken jointly by both agencies.

The programme undertakes spill response and targeted industrial audits in conjunction with BoPRC which may lead to landowners obtaining their own site specific consents which sit outside TCC's CSCs. These 'high risk' site consents provide a mechanism for TCC to ensure discharges from these sites are managed prior to discharge into TCC's

stormwater network. The programme also publishes and disseminates best practice material and runs workshops, seminars and training courses in relation to stormwater quality, pollution prevention and industry best practice. It also facilitates the "Drains are Just for Rain" programme in schools.

Stormwater (Pollution Prevention) Bylaw

The Stormwater (Pollution Prevention) Bylaw was introduced in 2010 with the primary objective of enabling TCC to gain a level of control over contaminants discharges into its stormwater network. The focus of the Bylaw is on private site management so that the TCC CSCs are not compromised by the cumulative effects of contaminated discharges entering the public stormwater system.

Delegation of Powers

TCC has acquired a Delegation of Powers under the Resource Management Act (RMA, 1991) from BoPRC for enforcement related activities. This delegation enables TCC to manage unauthorised discharges of contaminants to the stormwater system under Section 15 of the RMA. The delegation provides for a much greater scope of enforcement mechanisms and penalties, as compared to those afforded by the Stormwater (Pollution Prevention) Bylaw, and is applied by TCC in instances of more serious and/or repeat offending.

Tauranga City Plan (TCP)

The TCP provides objectives, policies and rules to allow for the sustainable management of land use, subdivision and development in the City. Key objectives and policies address the collection, disposal and treatment of stormwater from sites and rules provide for the implementation of those objectives and policies.

Proposed objectives, policies and rules are included which address earthworks, flooding and avoidance of development in flood prone areas, ensuring the location and design of stormwater systems minimises flood effects, removes pollutant loads as far as practicable, minimises runoff and maximises localised infiltration and contribute positively to amenity and pedestrian connections where possible.

As noted earlier in the paper, TCC intends to focus on improving stormwater management through the 'Regulatory Options' workstream of the ISP to address flood risk throughout the city. A comprehensive review of existing stormwater management provisions within the TCP is programmed for completion within the next two to five years.

Stormwater Management Guidelines

TCC's Stormwater Management Guidelines 2012 (SMG) sits alongside the Tauranga City Infrastructure Development Code and inform stakeholders of the overarching philosophy of stormwater management as per the CSCs, and how they can be applied when implementing stormwater management methods throughout Tauranga City. The SMG provides information for all stakeholders on how to implement Low Impact Design methods when developing or re-developing sites.

The SMG was developed in collaboration with BoPRC, who also simultaneously prepared a set of complementary guidelines for use at regional level. Stakeholder workshops were held during the development of the guidelines as a joint exercise providing an opportunity for feedback and refinement of both documents with input from local experts.

Flood Hazard Mapping

As part of the ISP modelling workstream, TCC is in the process of updating existing flood risk information across the city. The flood risk information indicates which properties are predicted to be flooded in 1% AEP (current) or 2% AEP (future) rainfall events. Updated flood hazard information is verified against actual flood events (where available) and will be made publicly available. The flood hazard maps will be updated as and when any work is done on the stormwater system to reduce the potential risk of flooding.

Work and collaboration through the Sub-Regional Flood Risk Management Strategy as, discussed above, ensures that the modelling parameters and assumptions are consistent throughout the Western Bay of Plenty subregion enabling comparison of modelling outputs by TCC, WBoPDC and BoPRC if required.

6.3.2 STRUCTURAL METHODS

Structural options are implemented as appropriate and are documented and programmed within the CMPs.

Based on the findings of the SoRE report, a large proportion of the catchments in Tauranga City (mainly those in residential areas) are deemed to currently not warrant any specific stormwater quality structural response. However, some specific areas within a number of sub-catchments were assessed as having a 'poor' receiving environment and, therefore, a potential stormwater issue that may need to be addressed or monitored for implementation in the future.

With the exception of a small number of stormwater quantity/flooding mitigation works currently underway, no further works are anticipated until the outcome of flood hazard mapping and subsequent option evaluation processes have been completed.

7 LESSONS LEARNED

Through the acquisition of TCC's CSC and in preparing its CMPs, a number of key lessons were learned by TCC, which can be imparted to others who may be undertaking these tasks.

Cost efficiency and timeliness: TCC's revised approach to consenting, namely rationalising catchments and preparing a Generic CMP for the whole city, provided a more cost efficient and timely process for obtaining CSCs and preparing CMPs. The rework required in reviewing catchment specific CMPs on a five-yearly basis will be significantly reduced as information common to all catchments is contained in only one document, the Generic CMP. Consultation on all catchment specific CMPs was undertaken concurrently, again achieving cost and resource savings, and reducing the number of interactions required with stakeholder parties.

Targeted: The Tauranga CSC was acquired before the Generic and catchment specific CMPs were prepared ensuring that the existing stormwater network and discharges were authorised as a matter of urgency. Through the CSC process, stormwater issues across the City were able to be identified, enabling TCC to collaboratively agree, with its stakeholders, which catchment specific CMPs should be developed as a priority. Furthermore, engineering option assessments and flood hazard mapping are undertaken closely together, minimising the degree of rework that may have been required had modelling already been completed some time ago.

Consistency: There is an opportunity for TCC to align monitoring and other CSC consent conditions for both the Maranui/Mangatawa and Papamoa CSCs to the Tauranga City CSC. In this way, these two catchment consents could be incorporated into the Tauranga City CSC, and the CMP for Papamoa could also be encompassed by the Generic CMP. All of Tauranga City would then be covered by only one CSC.

High risk sites/activities: Exclusion from TCC's CSCs of high risk sites/activities and the requirement for these sites to obtain their own site specific discharge consents ensures that discharges from these activities are appropriately managed prior to entering TCC's stormwater network. In this way, TCC's CSCs are not comprised by these third party discharges.

Long-term monitoring trends and requirement for mitigation: The development of the SoRE report drew large quantities of receiving environment quality information into one place, which has been of benefit for this and future projects. This 'repository' of data will enable TCC to determine, on a long-term basis, effects on the receiving environment which can be attributed its stormwater activity, and consequently where further management of effects/catchment specific CMPs may be required in the future. This approach ensures that TCC resources and finances are appropriately targeted with expenditure only after long-term monitoring confirms the need.

Collaborative approach: TCC took a collaborative approach to consultation with its stakeholders, in particular tangata whenua. This provided an opportunity for TCC to build relationships with key parties and gain a better understanding of their issues and concerns. In this way, appropriate mitigation measures could be jointly agreed and incorporated into the catchment specific CMPs. The time taken to undertake this consultation and agree an appropriate approach cannot however be underestimated.

Working relationships: Good close working relationships with regional and territorial authorities (if relevant) is paramount to achieving good outcomes on a 'whole of catchment' basis. The Sub-Regional Flood Risk Management Plan project currently underway in the Bay of Plenty ensures that outcomes and actions are targeted appropriately and roles and responsibilities between agencies are clearly defined.

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The collaborative effort and support provided by the WBoPDC and BoPRC throughout the acquisition of TCC's CSCs and the production of CMPs is acknowledged. The importance of having successful relationships with these key parties is of paramount importance to TCC and provides the foundation for much of the stormwater catchment management planning work carried out in Tauranga City.

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