



STORMWATER PROFILE STATEMENT

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1 Introduction

1.1 Purpose

The purpose of this section of the report is to provide an overarching summary of how stormwater is currently managed within the Waipa District and to highlight strengths and weaknesses of the system. One key aim of examining stormwater issues, as identified by the Waipa District Growth Strategy and Implementation Plan, is to enable infrastructure needs to be proactively identified and planned for ahead of on-ground development. This section, in conjunction with the other sections of this report, will inform further study, the ultimate aim of which is to produce a growth strategy for the Waipa District which takes account of many different economic, social and environmental factors.

1.2 Scope

The main thrust of this phase of producing the District Growth Strategy is to collate the available information on stormwater infrastructure provision and future management of the system. There is also a section within this report discussing constraints and opportunities for future growth in Waipa District with respect to the stormwater infrastructure.

1.3 Definitions

WDC – Waipa District Council

EW – Environment Waikato

HCC – Hamilton City Council

Stormwater runoff – The portion of rainfall which cannot infiltrate the ground so runs off the land. It is generally this portion of the rainfall which it is most critical to manage with a drainage system.

Hydraulic neutrality – The restriction of peak discharges of stormwater runoff from a site, post-development, to the pre-development peak discharge volume.

Comprehensive Consents – comprehensive stormwater discharge consents held by Waipa District Council which cover all the discharges within a geographical area.

CoP – Waipa District Council's Code of Practice

AMP – Waipa District Council's Stormwater Asset Management Plan 2006-2016

SMP – Waipa District Council's Stormwater Management Plan (February 2008)

CBD – Central Business District

1.4 Limitations

This initial assessment has been a desk-top exercise based on the information available in the referenced reports, supplemented by a site visit and brief discussions with WDC staff.

2 Current Profile

2.1 General

Waipa District is approximately 1,473 km² in size and is largely rural in character. The drainage of the District is founded on three catchments as follows.

§ The Waikato River in the north of the District.

§ The Waipa River and its tributaries in the south and west of the District.

§ The peatland plateau in between the two river valleys.

The peatlands contain at least ten peat lakes which are highly valued by the community and have been subject to intensive scientific research. The peat lakes are sensitive receiving environments and where stormwater from local towns (e.g. Ohaupo) drains to these lakes, special low impact controls are being implemented by WDC and EW.

Waipa has two main urban centres, Cambridge and Te Awamutu, and four smaller townships. The urban areas are covered by five Comprehensive Consents from EW (Cambridge and Karapiro being combined under a single Comprehensive Consent). Plans showing the extent of these Comprehensive Consents are included at Appendix A.

WDC's stormwater strategy is largely governed by the conditions of these Comprehensive Consents, with which they have to comply. The following table is taken from the SMP and sets out the comprehensive stormwater consents it holds from EW.

Table 2.1: List of resource consents for stormwater discharges

Resource Consent Number	Relevant Urban Area	Authorised Activity
105460	Cambridge and Karapiro	Divert and discharge urban stormwater runoff, and associated contaminants, at multiple locations to Lake Te Ko Utu, Addison Street Stream, Arnold Street/Cambridge Road Stream, Karapiro Stream, Mangaone Stream, Waikato River, Lake Karapiro and land, and use discharge structures, within the vicinity of Cambridge/Leamington and Karapiro urban areas.
105461	Te Awamutu	Divert and discharge urban stormwater runoff, and associated contaminants, to the Mangapiko Stream, Mangaohoi Stream, Ruapahau Stream and land, and use discharge structures, within the vicinity of the Te Awamutu urban area that is reticulated by the Te Awamutu municipal stormwater system.
105462	Kihikihi	Divert and discharge stormwater runoff, and associated contaminants, to the Mangaohoi Stream, Puniu River and land, and use discharge structures, within the Kihikihi urban area that is reticulated by the Kihikihi municipal stormwater system.
105463	Pirongia	Divert and discharge urban stormwater runoff, and associated contaminants, to the Waipa River, Mangapiko Stream and land, and use discharge structures, within the vicinity of Pirongia urban area that is reticulated by the Pirongia municipal stormwater system.
105464	Ohaupo	Divert and discharge urban stormwater runoff, and associated contaminants, to Lake Rotomanuka, Lake Ngarotoiti, Lake Ngaroto, Turnwald Pond and land, and use discharge structures, within the vicinity of Ohaupo urban area that is reticulated by the Ohaupo municipal stormwater system.

The Water Services division of WDC manages the network of stormwater pipes, manholes, inlet and outlet structures, detention dams and ancillary assets. The assets owned and managed by WDC comprise the following:

§ 117km of pipelines

§ 2110 manholes

- § Public drains and detention dams
- § One Continuous Deflective Separation (CDS) unit
- § Two gross litter traps
- § Numerous on-site soakage systems
- § Numerous weirs and outfall structures

WDC's stormwater assets have been valued in a three year cycle since the first valuation in 1998 and their current value is in excess of \$35.5M. The majority of the subdivision of Cambridge, Te Awamutu and smaller townships occurred in the 1950's to 1970's and, because stormwater assets have a typical life of 80 years, the remaining life of the majority of the pipeline and manhole assets is 20 to 30 years. Despite the material life left in these assets, however, they are undersized due to climate change which has affected rainfall patterns and intensities.

The stormwater network is designed to provide for the collection and control of stormwater within the land being developed together with drainage from the entire catchment upstream of the network. The objective of the stormwater network is to regulate natural runoff to the extent that the effect of stormwater on the environment, property and people is contained within acceptable limits.

There are many documents relating to stormwater in the Waipa District which provide comprehensive details of the infrastructure. These reports include the following:

- § SMP - Stormwater Management Plan (February 2008)
- § Valuation of Infrastructural Assets (2007)
- § AMP - Asset Management Plan for Stormwater (June 2006)
- § LTCCP - Long Term Council Community Plan (2006 – 2016)
- § Water and Sanitary Services Assessment (January 2005)
- § Catchment Management Plans (July 2002) – for each of the five areas covered by the comprehensive consents

The content of these documents is not repeated in full below, but a brief summary of the key points is included.

2.2 Cambridge and Karapiro

The town of Cambridge is 697ha in size and the Cambridge catchments discharge to one of four receiving environments.

1. The Waikato River and other small tributaries
2. Lake Te Ko Utu
3. The Karapiro Stream
4. The Mangaone Stream

All stormwater flows directly or indirectly to the Waikato River. The Waikato River flows in an incised valley of 20 to 30m depth through Cambridge and hence the river bank terraces have natural protection from the Waikato River flooding. The impact of urban stormwater inflow on the quality of the Waikato River is thought to be almost insignificant in comparison to the effects of rural and other contaminants sources in the upstream catchment. The flow from the CBD of Cambridge is passed through a CDS before being discharged to the Waikato River. Lake Te Ko Utu is known to suffer quality problems due, at least in part, to the volume of urban stormwater which it receives. WDC have deflected one of the stormwater inlets to the lake and installed gross litter traps to alleviate this problem.

The Cambridge North Residential zone drains to the Mangaone Stream but includes swales, dry ponds and soakage trenches to limit and treat the stormwater flow to the stream.

It has been noted that areas within Cambridge suffer from flooding problems due to undersized stormwater reticulation and inadequate provision for overland flows.

Karapiro is 41ha in size and has seven stormwater catchments. The largest of these catchments drains to soak holes. Two of the other catchments drain to Lake Karapiro, on the Waikato River, and the remaining four drain to the Waikato River below the Karapiro Dam.

2.3 Te Awamutu

Te Awamutu is approximately 805ha in size. Most of the town drains to the Mangapiko and the Mangaohoi Streams, although a small portion drains to the Ruapahau Stream. Some of the industrial areas have been built in the floodplain of these streams and are floodable in extreme events. All of these streams are in a relatively poor state and, whilst the effect of stormwater inflows from Te Awamutu is significant, the Mangapiko and Mangaohoi Streams are impacted mainly by upstream rural catchments. All stormwater flows eventually to the Waipa River.

The town does not have a full stormwater reticulation system. Where the town is served by stormwater reticulation it is known to be undersized in places. The result of this is that there have been illicit connections of stormwater pipes to the sanitary sewer network.

Some areas in Te Awamutu are known to have flooding problems although work has begun to rectify these problems.

2.4 Kihikihi

Kihikihi is approximately 251ha in size. The stormwater network of the town discharges to tributary streams of the Mangaohoi Stream and Puniu River, both of which eventually flow to the Waipa River.

Kihikihi's reticulation system comprises a network of stormwater pipes and open drains.

2.5 Pirongia

Pirongia is a similar size to Kihikihi and covers approximately 269ha. The majority of the stormwater network discharges either directly or via small tributary streams to the Mangapiko Stream or Waipa River. Some parts of the township, however, particularly near the perimeter, do not drain to the pipe network but instead drain to adjacent farmland via overland flow or discharge directly to streams. Also, some roadside catchpits are connected directly to soak holes which are designed to cope with storms of low intensity only. Eventually runoff from the perimeter catchments and any water from the catchpits which cannot soak away will end up in either the Mangapiko Stream or Waipa River.

There have been some minor stormwater ponding issues in Pirongia.

2.6 Ohaupo

Ohaupo township is approximately 75ha in area and is located on low hills surrounded by peat land. The North Island trunk railway line runs in a valley to the west of the township. The railway has open drains running southwards along either side of it. These drains discharge to one of the peat lakes, Lake Ngarotoiti, which itself discharges into another peat lake, Lake Ngaroto.

The stormwater from the majority of the Ohaupo urban area drains to the railway drains, west of the town. The impact of the stormwater runoff from Ohaupo on the quality of the peat lakes is thought to be almost insignificant in comparison to the impact of the rural runoff within the catchment of the lakes.

There have been no recorded incidences of surface flooding in Ohaupo.

3 Trends and Growth

3.1 General Growth

Both the population and the number of new properties in Waipa District are expected to increase. Statistics NZ growth scenarios predict growth in the District to at least 2021. This growth in development will have a

significant impact on the volume of stormwater which has to be dealt with. It is likely that much of the increase in stormwater runoff will come from subdivision of existing sections. This may be the hardest element of stormwater to plan for as there will be no overarching scheme for disposal.

3.2 Climate Change

In recent years, there has been an increase in the incidence of extreme weather events around the world. Research published by the New Zealand Government¹ suggests that rainfall in New Zealand will become more frequent and intense in the future. This would be expected to increase the frequency with which the stormwater system is overloaded. The Government's document "Preparing for Climate Change" provides a checklist for considering climate change effects in plans such as District Plans. This checklist should be used to ensure adequate allowance is provided in new infrastructure designs to protect against future climate change.

3.3 Impact on Stormwater Infrastructure Provision

At a strategic level it is difficult to predict the likely potential increase in stormwater runoff due to new development because the increase in impermeable areas resulting from growth are as yet unknown. If a policy of hydraulic neutrality is pursued, it is also difficult to tell how much of the new attenuation will be put in by developers on their own schemes and how much might be put in by the Council, funded by Development Contributions, on larger schemes or as a result of subdivision.

WDC have forecast that 2006 and 2011 approximately 18% per annum of the total stormwater expenditure will be on new growth. The forecast for the period 2011 to 2016 more than doubles to 38% of total expenditure being spent on new growth.² Capital expenditure for asset development (to address growth issues) totals \$3,094,000 over the 10 year planning period of the AMP, averaging \$310,000 per year.

4 Management Considerations

4.1 General

WDC has certain roles and responsibilities with respect to stormwater management within the Waipa District, the key amongst which are as consent holder of Comprehensive Consents from EW and as asset manager of the stormwater network. As consent holder, WDC is responsible for complying with the Comprehensive Consents and their conditions. As stormwater network manager, WDC is responsible for the provision of stormwater services, for its long term planning and for ensuring that the system operates to the designed level of service set out in the Stormwater Management Plan and the CoP.

A program of modelling the existing stormwater networks in Te Awamutu and Cambridge has been started but is as yet some way from completion due to funding issues. This modelling will only be pipe modelling rather than full catchment modelling so will not provide a comprehensive picture of what happens during rainfall events in these towns. The modelling will, however, go some way to informing how much extra development can be connected to the existing system and help plan improvement works to alleviate existing flooding issues.

4.2 Comprehensive Stormwater Discharge Consents

Condition 1 of the general conditions accompanying WDC's Comprehensive Stormwater Discharge Consents, states that any new diversion or discharge to the municipal stormwater system should "not increase peak discharge rates to receiving waters", i.e. there is a general presumption that new developments should be hydraulically neutral. (This condition may not apply if it can be demonstrated that there will be no adverse additional effects on the environment or downstream properties as a result of increasing peak discharge rates).

¹ "Preparing for Climate Change" <http://www.climatechange.govt.nz/resources/local-govt/preparing-for-climate-change-jul04/html/index.html> and "Climate Change Effects and Impacts Assessment" <http://www.climatechange.govt.nz/resources/local-govt/effects-impacts-may04/index.html>

² AMP, p x

4.3 Design Criteria for New Stormwater Infrastructure

WDC encourages the use of low impact stormwater design. Stormwater design criteria within Waipa District, as stated in the SMP, includes:

- § Onsite disposal via ground soakage as the primary method of disposal (where ground conditions allow);
- § Stormwater attenuation / treatment; and
- § Secondary flow paths to provide for stormwater runoff that exceeds the design storm.

Dealing with stormwater at source is an effective way of minimising the impact on existing stormwater infrastructure and reducing the risk of downstream flooding due to increased runoff rates from greater impermeable areas.

The Waipa District Land Drainage and Stormwater Bylaw 2008, however, states that:

- “(a) Where possible, all properties shall dispose of stormwater generated within a property boundary through a public stormwater drain.
- (b) If a property is not able to connect to the public stormwater drain, or the stormwater system is at capacity, stormwater generated within the property boundary shall be disposed of on site, via a Council approved soakage system.
- (c) If a public stormwater drain is not available or a soakage system is not viable, an alternative method of disposal must be submitted for approval by Council, prior to construction.”

Although there are maintenance issues with private soakage drainage and a communal, publically maintained soakage system may be preferable, there is clear intent in the SMP to encourage on site soakage. Therefore, the bylaw and SMP appear to present a slightly conflicting message.

WDC’s primary stormwater design criteria are those contained in the CoP. However, the Stormwater Management Plan indicates that HCC’s Development Manual may be used to manage environmental effects and assist with compliance with the comprehensive stormwater consents. HCC’s Development Manual is only a method of compliance not a regulatory code, but WDC staff have highlighted the anomaly that the design criteria within the Waipa CoP and HCC’s Development Manual stipulate different peak discharge rates as the criteria for designing new development. This exposes WDC to a degree of risk and, therefore, needs to be addressed.

5 Strategic Opportunities & Constraints

5.1 General

There are some factors which will influence general stormwater policy within Waipa District for new development. These include:

- § Legislative change: Legislative change can significantly affect the Council’s ability to meet minimum levels of service, and may require improvements to infrastructure assets. Changes in environmental standards and the Resource Management Act 1991 in particular may affect stormwater disposal options.
- § Changes in Customer Expectations: Customer expectations are increasingly tending towards higher levels of service, particularly the extent and frequency of stormwater flooding and ponding on property and roads during and after storms.
- § Climatic Changes: Climatic changes linked to the ‘Greenhouse’ effect may result in more intense storm events.

The above factors, together with increased customer expectations and environmental awareness, will lead to additional capacity requirements and improved stormwater system design where stormwater is treated to

remove contaminants, excess sediment and rubbish. In turn, this will ensure that the quality of water in waterways is improved and relatively contaminant free.

Flood protection systems will need to be monitored to ensure that they still meet minimum levels of service and Council will continue to monitor flood levels and rainfall data to evaluate whether design standards are adequate.

5.2 Opportunities

There are a number of opportunities for promoting sustainable growth within the current legislature of Waipa District and some changes which could be made to promote sustainable development.

The 2006-2016 Stormwater AMP provides a detailed plan for managing future demand, risk and asset renewals. Following the strategies for demand management, strategic planning and data management and evaluation contained in the AMP should provide effective management of the growth of Waipa District.

One key opportunity that should not be overlooked is the adoption of regulations that are strengthened to steer new development outside of flood prone areas rather than just requiring floor-levels to be raised above flood levels. This has a number of advantages as follows:

- § there is no loss of floodplain storage due to building in the floodplain;
- § there are no issues of safe, dry access to properties in the floodplain during a flood event; and
- § there are less likely to be any future problems with flooding if climatic change increases flood levels beyond what was originally allowed for.

The proposed strategy for regulation in the AMP is not considered strong enough to steer development away from flood prone areas.

Strict enforcement of the policy of hydraulic neutrality is another opportunity and this is currently being done by WDC. This will reduce the need for expensive upgrades to the stormwater system to increase capacity for new growth. Maintaining the status quo, in terms of stormwater runoff from new developments, means that there should be no net increase in runoff which has to be dealt with by the existing system. If developers are required to include an allowance for the impacts of future climate change within their designs this will further 'future proof' the existing system. The proposed strategy in the AMP for substituting demand on the stormwater network recommends consideration of on-site detention of stormwater. Stronger guidance should be developed on this matter and, in particular, on the use of alternative methods of on-site stormwater storage such as plastic cellular systems. The maintenance implications and liabilities of stormwater detention structures needs to be considered, however, particularly if they are to be vested in Council.

There is also an opportunity to develop a comprehensive and up-to-date GIS database that includes all stormwater assets and flood risk data. This database could include information on pipe capacity and areas at risk from fluvial or groundwater flooding and, therefore, be used to inform where new development should be located and the type of upgrades which might be required as a result of new development.

5.3 Constraints

There are a number of stormwater issues which could constrain development. The lack of pipe capacity in the existing reticulation systems in Cambridge and Te Awamutu especially and the lack of stormwater reticulation in Te Awamutu. A number of catchments that are sensitive to further development have also been identified in the Stormwater Management Plan, due to issues such as poor ground conditions preventing soakage working as an effective form of drainage. The ecological value of some of the water bodies which receive stormwater from the Waipa District have, also, been negatively affected by the inflow of urban stormwater. Compliance with the Comprehensive Stormwater Consents should protect these water bodies. It is possible, however, that further development within the catchment of these water bodies will make it harder to comply with the Comprehensive Consents and, therefore, constrain the amount or type of development which can occur. New

developments coming forward in the sensitive catchments may have to provide a greater degree of stormwater attenuation or treatment than other areas.

6 Base Case Conclusions

- § WDC's future stormwater strategy will be largely governed by the Comprehensive Consents they hold from EW. They have to comply with the conditions of these consents, therefore growth within the Comprehensive Consent areas must be managed such that it does not breach existing Comprehensive Consents.
- § Some flooding problems exist in Cambridge and Te Awamutu due to undersized stormwater reticulation and inadequate provision for overland flows, thus, new developments in these catchments will have to be carefully controlled to prevent exacerbation of the problems until they can be rectified.
- § There is no stormwater reticulation in parts of Te Awamutu, thus, development in un-reticulated catchments will have to be carefully controlled until reticulation is constructed.
- § There is the potential for mixed guidance on stormwater design as a result of WDC allowing the use of HCC's Development Manual as a method of compliance since this differs in some regards from their own CoP. There is potentially conflicting guidance surrounding the policy of soakage drainage between the SMP and the Waipa District Land Drainage and Stormwater Bylaw 2008. There also appears to be little guidance on allowing for future climate change when designing new stormwater systems.
- § There is an opportunity to clarify stormwater guidance and improve stormwater legislation to help Council manage growth in the District.
- § The AMP sets out some good strategies to help manage growth in the District.
- § The District could benefit from the collation of all existing and upcoming stormwater asset information onto a single GIS database.
- § The District is benefitting from WDC requirement that new developments are hydraulic neutrality. This is likely to reduce the amount that the Council needs to spend on new infrastructure.

7 Recommendations for Further Work

- § Clarity on how stormwater from new developments is to be dealt with in a sustainable way and what design criteria are to be used, particularly in relation to industrial areas which, it is understood, currently are not required to attenuate stormwater discharge.
- § Compiling the best available flood information for input onto the GIS database, recognising where this is deficient or probably wrong (e.g. in the case of the Mangapiko Stream modelled by EW in 1984) and adding to GIS system. (This is basically an update of the Flood Hazard Area on the District Plan and/or hazard maps.)
- § Compiling the best available capacity and condition information for input onto the GIS database to inform development.
- § Mapping sensitive catchments on GIS database.
- § Further investigation into the implications of new and infill developments within the sensitive catchments and the level of growth they can stand.
- § Developing the District Plan to steer development away from potentially flood prone areas.
- § Undertake a workshop within the Council to establish guidance on preferred stormwater attenuation devices and how the vestment of such devices will be handled, particularly with respect to maintenance issues and liabilities.

Appendix A

Stormwater Catchment Plans



LEGEND
LAND USES - FROM DISTRICT PLAN

Residential Land Use	Reserve / School Land Use	Commercial Land Use	Industrial Land Use	Rural Residential Land Use	Rural Land use	Future Development Land Use	

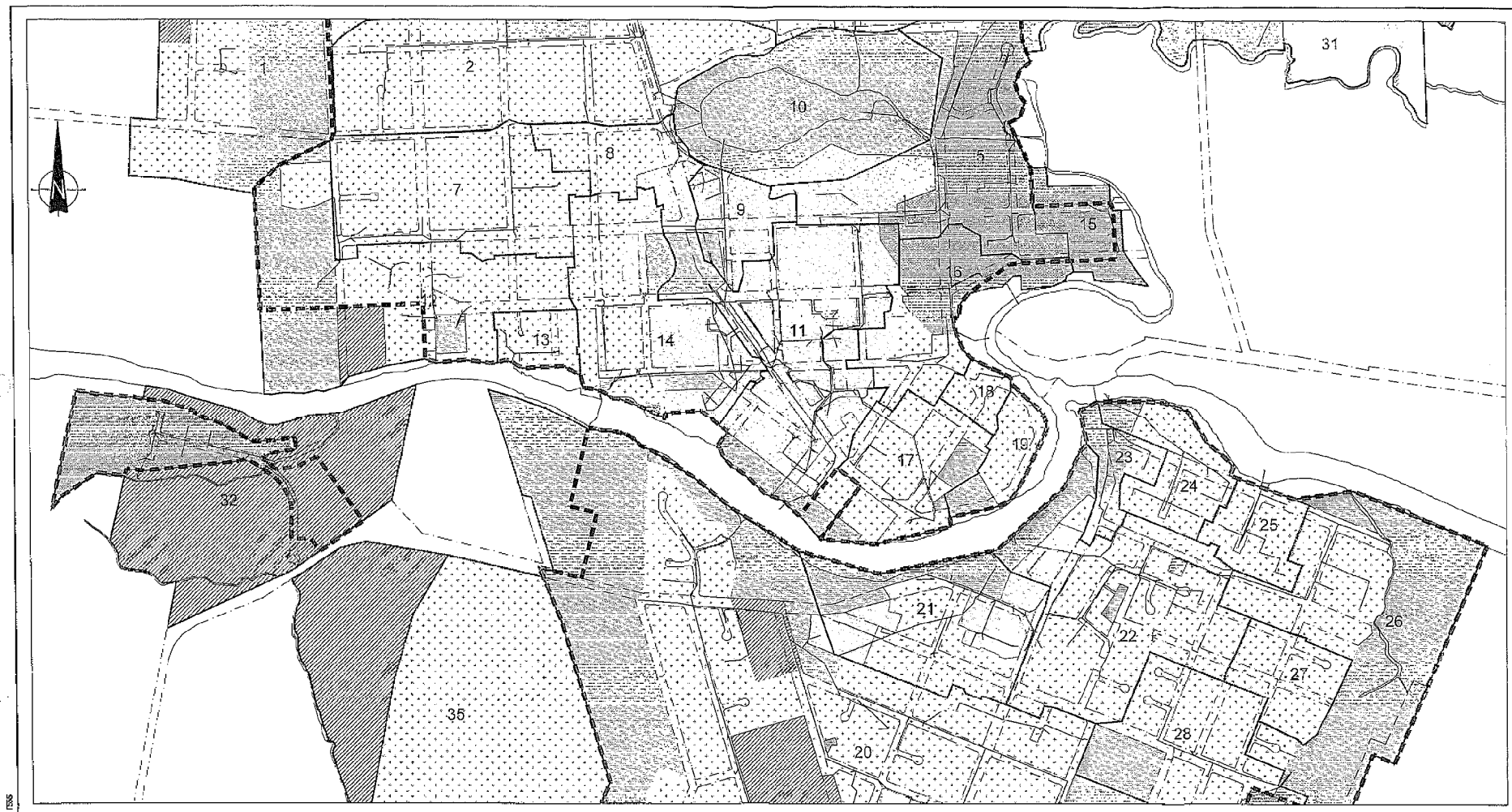
Stormwater catchments
 Consent boundary

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WAIPA DISTRICT COUNCIL
Stormwater Management Plan
Cambridge 1 of 3

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LEGEND
LAND USES - FROM DISTRICT PLAN

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	Stormwater catchments
	Consent boundary

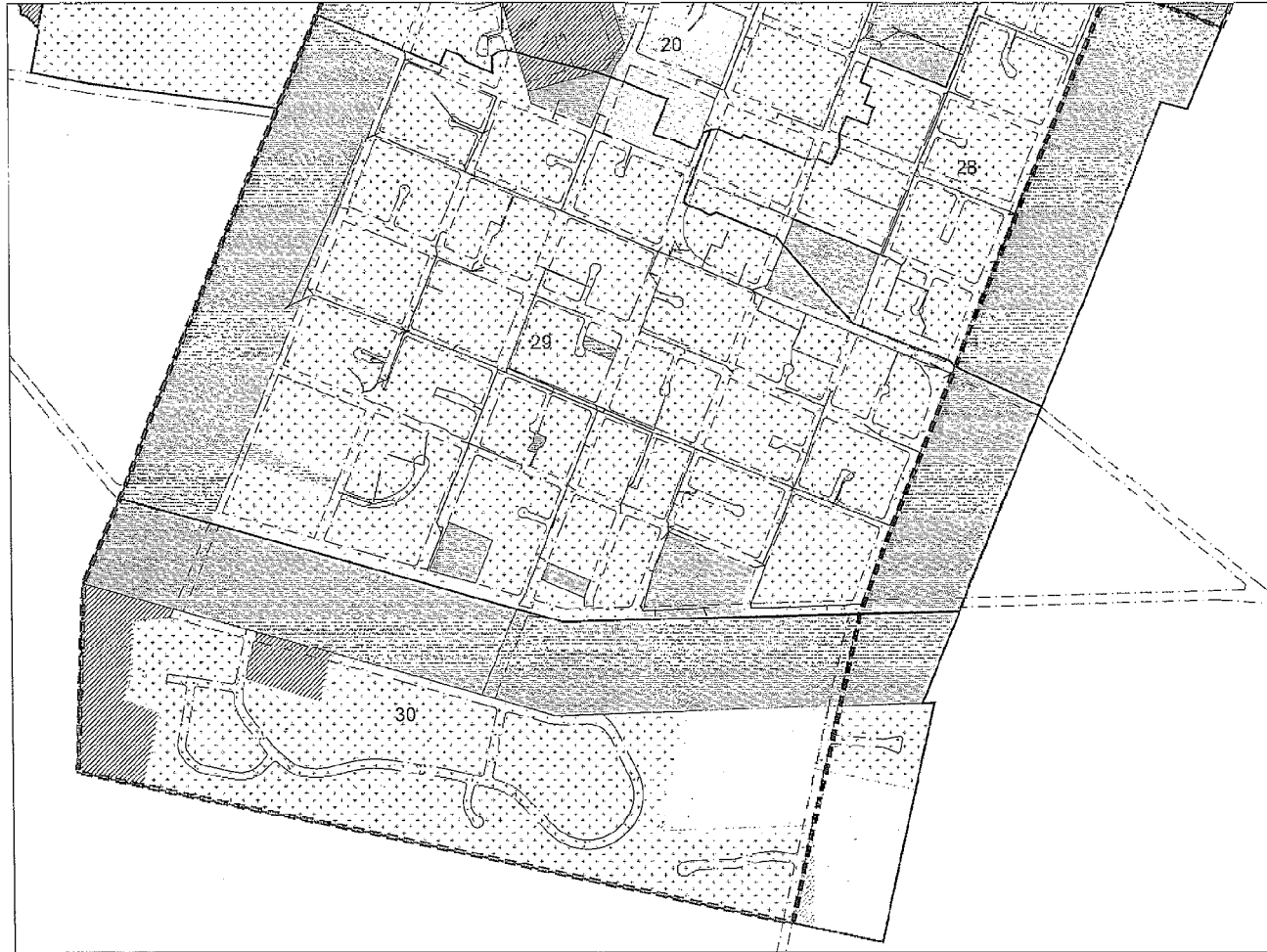
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WAIPA DISTRICT COUNCIL
Stormwater Management Plan
Cambridge 2 Of 3

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LEGEND

LAND USES - FROM DISTRICT PLAN



SCALE 1: 10,000
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WAIPA DISTRICT COUNCIL
Stormwater Management Plan
Cambridge 3 of 3

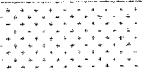
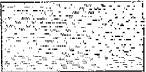







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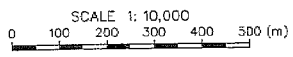
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LAND USES - FROM DISTRICT PLAN

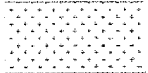

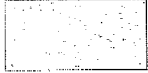




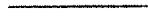

-  Residential Land Use
-  Reserve / School Land Use
-  Commercial Land Use
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-  Rural Land use
-  Future Development Land Use
-  Stormwater catchments
-  Consent boundary

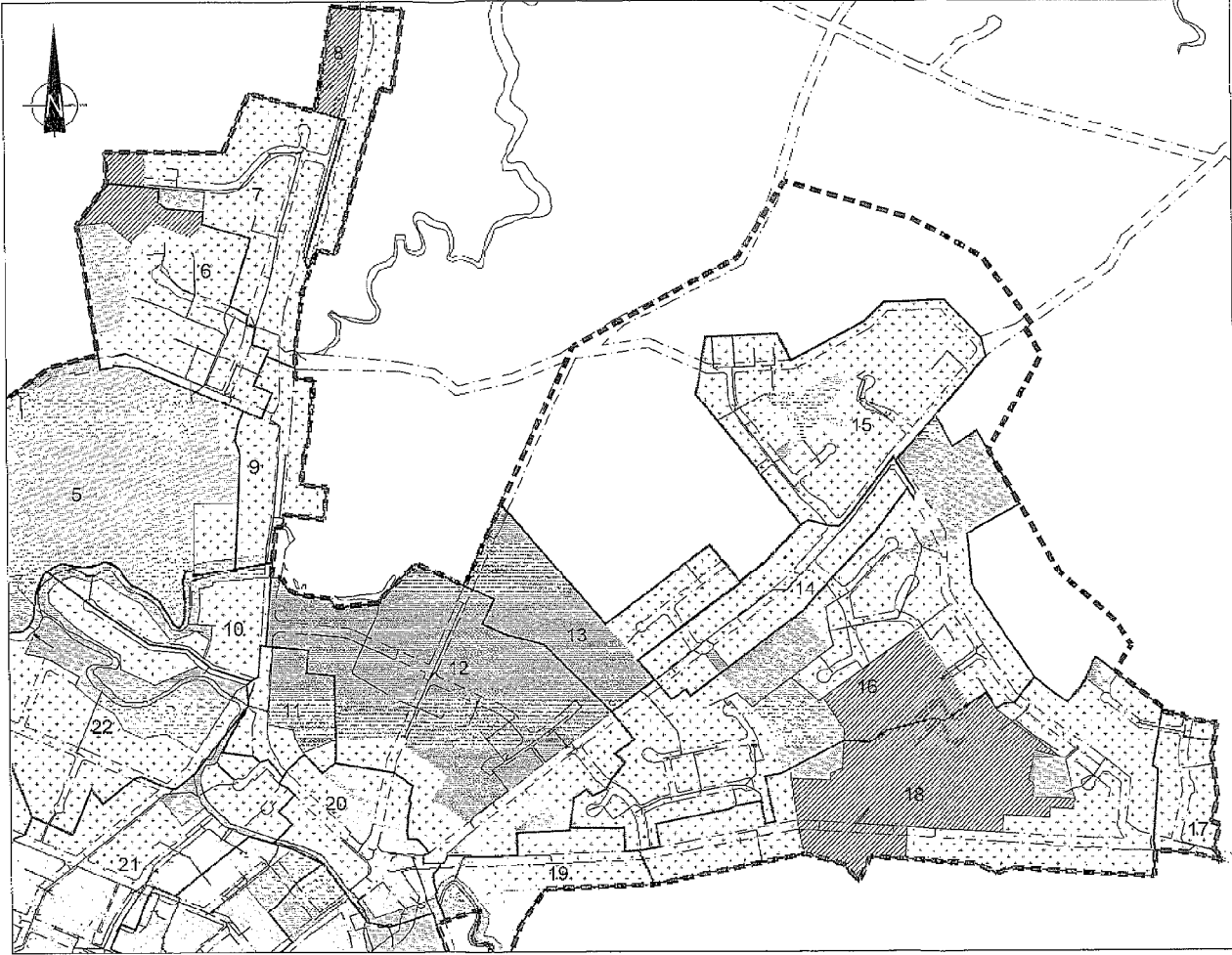


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LAND USES - FROM DISTRICT PLAN

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-  Reserve / School Land Use
-  Commercial Land Use
-  Industrial Land Use
-  Rural Residential Land Use
-  Rural Land use
-  Future Development Land Use
-  Stormwater catchments
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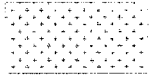
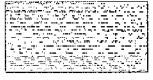
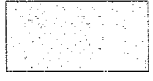






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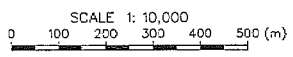
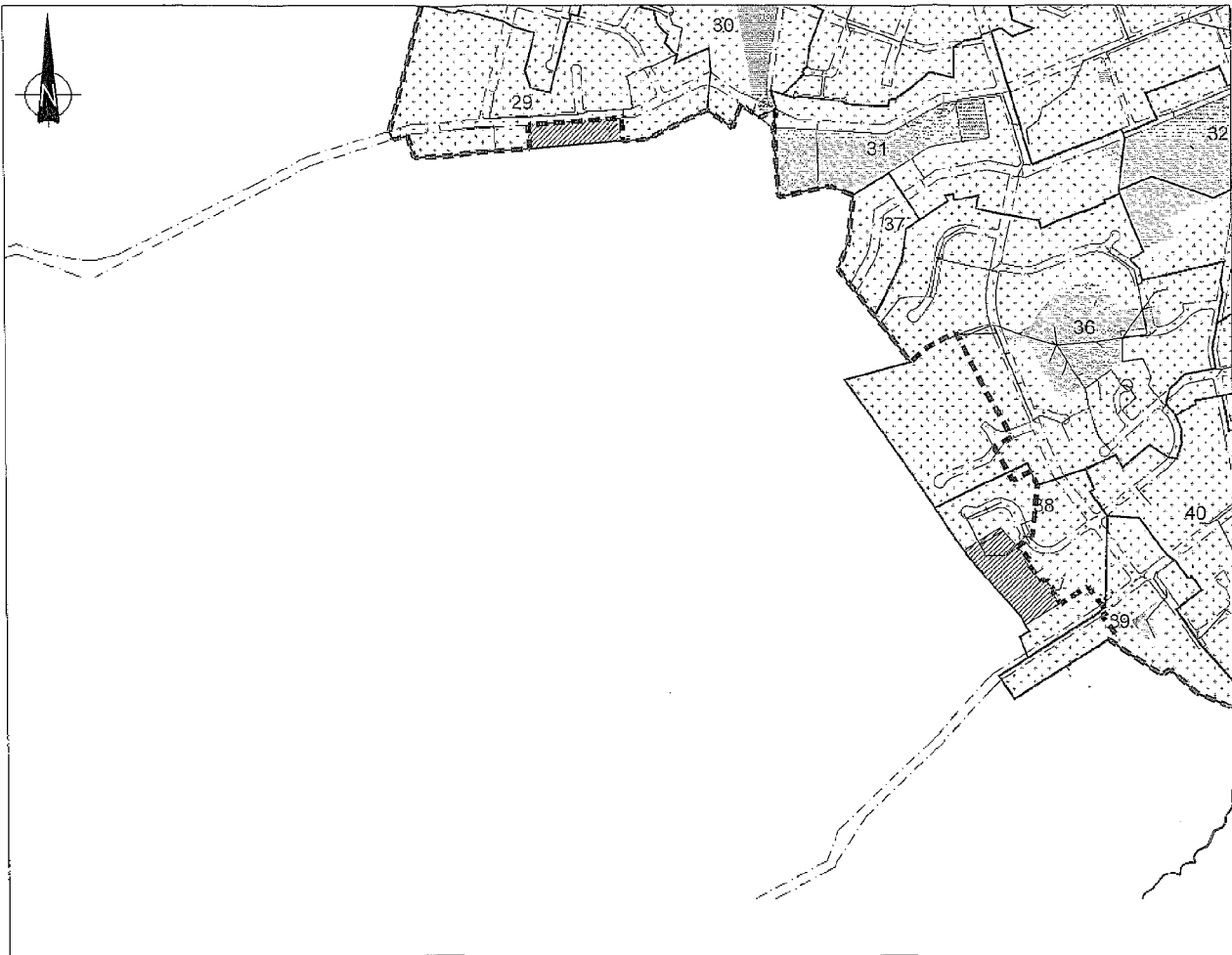
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	APPROVED	VJC	11/11
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PROJECT No.		61007	


WAIPA DISTRICT COUNCIL
Stormwater Management Plan
Te Awamutu 2 of 4

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LEGEND
LAND USES - FROM DISTRICT PLAN

-  Residential Land Use
-  Reserve / School Land Use
-  Commercial Land Use
-  Industrial Land Use
-  Rural Residential Land Use
-  Rural Land use
-  Future Development Land Use
-  Stormwater catchments
-  Consent boundary



 Tonkin & Taylor Environmental & Engineering Consultants	DRAWN: dwn Sep 06 DRAFTING CHECKED: [initials] 07/06 APPROVED: [initials] 09/09 CADFILE: L:\61007\61007-F01
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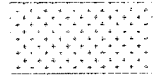

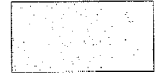




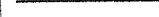

WAIPA DISTRICT COUNCIL
Stormwater Management Plan
Te Awamutu 3 of 4

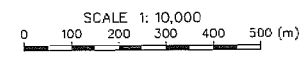
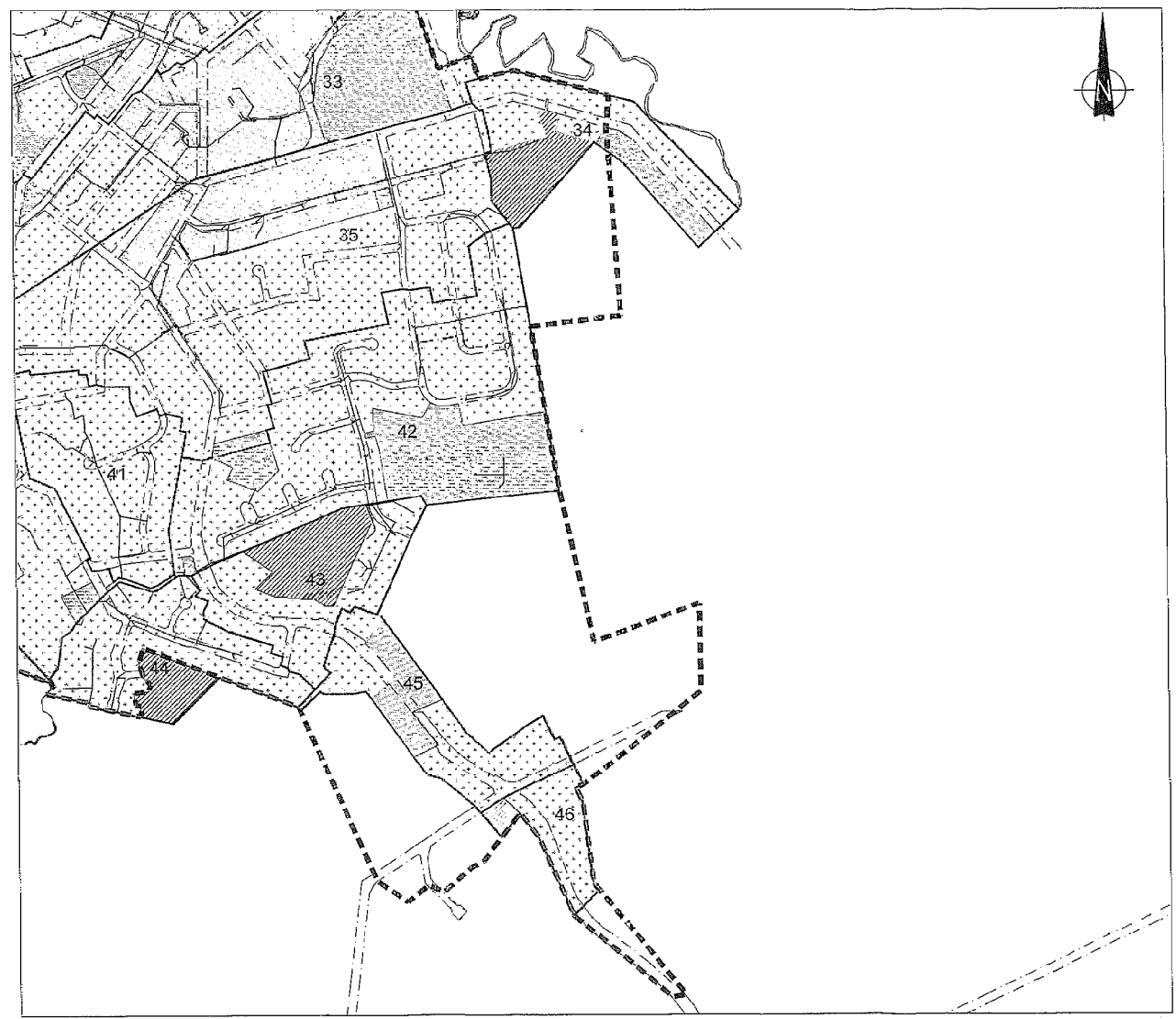
FIG. No. Figure 9

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LEGEND
LAND USES - FROM DISTRICT PLAN

-  Residential Land Use
-  Reserve / School Land Use
-  Commercial Land Use
-  Industrial Land Use
-  Rural Residential Land Use
-  Rural Land use
-  Future Development Land Use
-  Stormwater catchments
-  Consent boundary

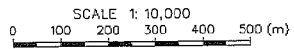
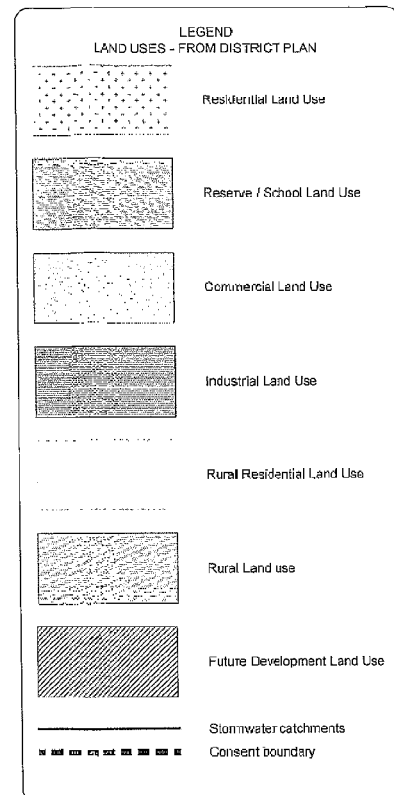


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WAIPA DISTRICT COUNCIL
Stormwater Management Plan
Te Awamutu 4 of 4

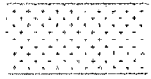

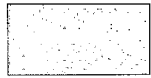

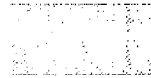

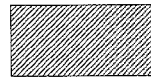


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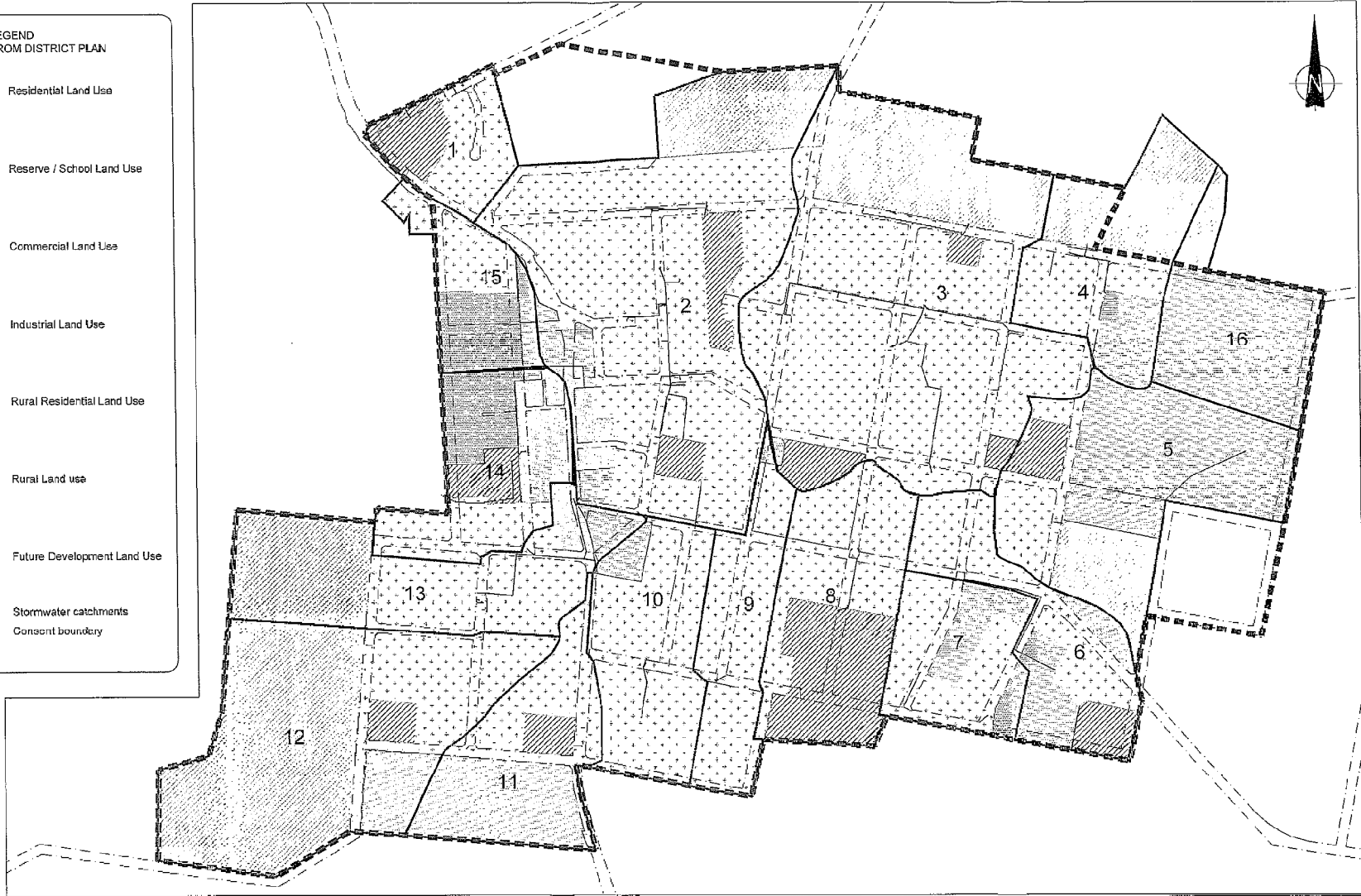


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	SCALES (AT A3 SIZE) 1: 10000
	PROJECT No. 61007

WAIPA DISTRICT COUNCIL
Stormwater Management Plan
Pirongia


LEGEND
LAND USES - FROM DISTRICT PLAN

-  Residential Land Use
-  Reserve / School Land Use
-  Commercial Land Use
-  Industrial Land Use
-  Rural Residential Land Use
-  Rural Land use
-  Future Development Land Use
-  Stormwater catchments
-  Consent boundary



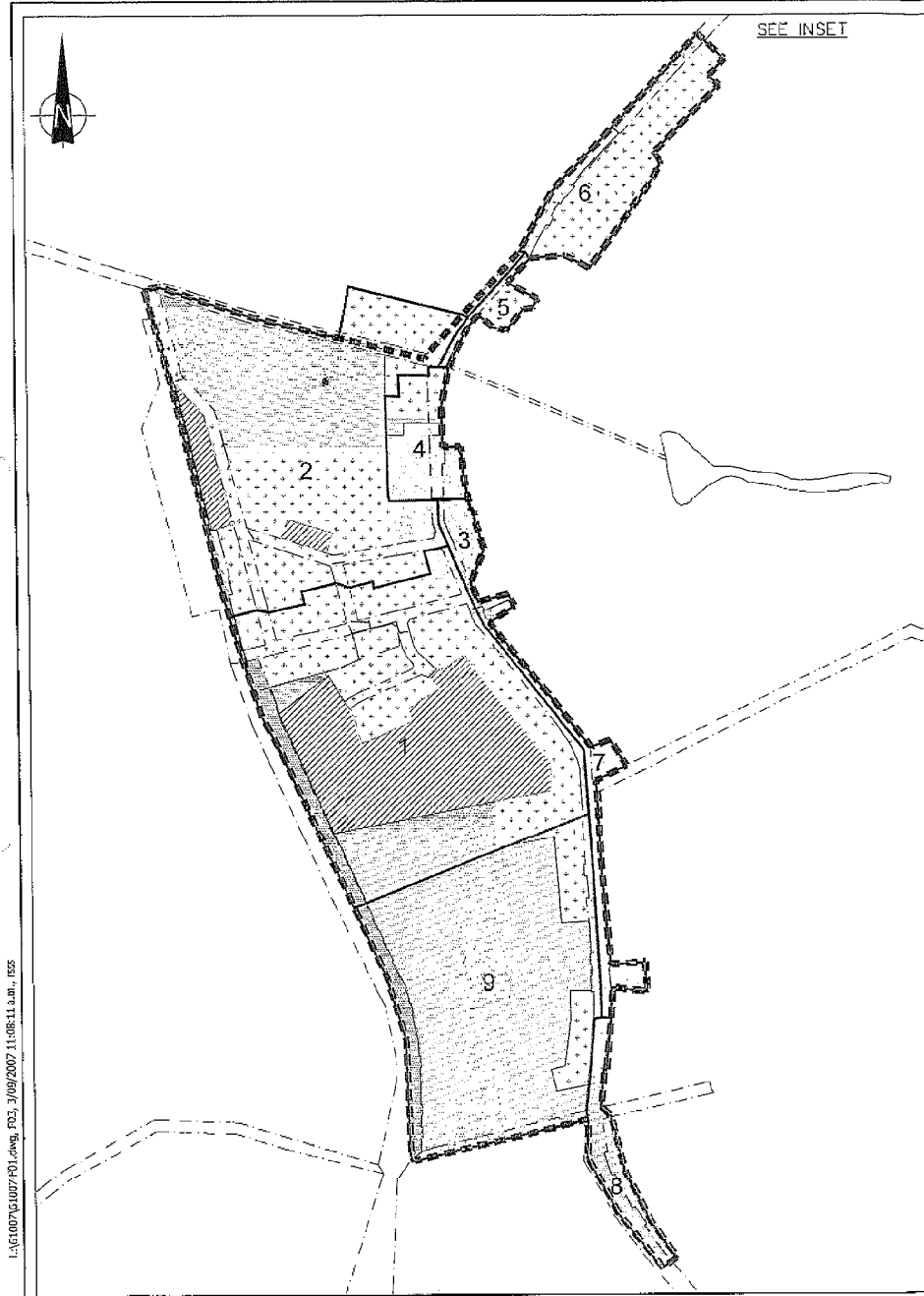
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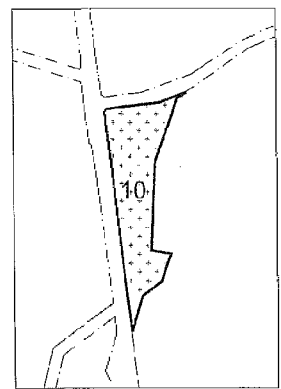
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	PROJECT No. 61007
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	FIG. No. Figure 2

WAIPA DISTRICT COUNCIL
Stormwater Management Plan
Kihikini

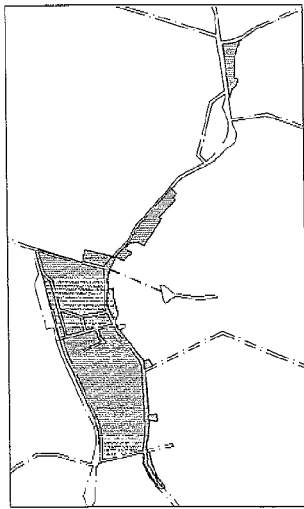
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SEE INSET



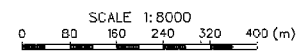
INSET



LOCATION PLAN

LEGEND
LAND USES - FROM DISTRICT PLAN

- Residential Land Use
- Reserve / School Land Use
- Commercial Land Use
- Industrial Land Use
- Rural Residential Land Use
- Rural Land use
- Future Development Land Use
- Stormwater catchments
- Consent boundary



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WAIPA DISTRICT COUNCIL
Stormwater Management Plan
Ohapo

FIG. No. Figure 3

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