Wellington Water

Draft He Rautaki Wai Āwhātanga | Stormwater Management Strategy

Our Journey to Wai Ora

APPENDICES

Our water, our future.

Te tuarua: Tāhuhu korero

Part Two: Technical and background information

NOTE – Currently placeholder text
(Appendices being improved between Nov & May).

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Appendix A
Glossary

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Table A-1: Glossary

Item	Description
Bioretention Device (raingardens bioretention swales)	Vegetated filtration systems designed to provide enhanced water treatment through combined physical and biological processes.
Catchment	A catchment is a basin shaped area of land often bounded by hills or mountains. Rainwater that falls on a catchment is collected naturally in streams and channels where it flows to a common outlet, such as a river or ocean. Reticulated networks that collect rainwater don't always follow surface features and therefore reticulated urban stormwater networks and their outlet can also be used to define catchment boundaries. Please see the definition that follows below for 'sub-catchment'.
Contaminant	Contaminants of focus to this SMS include E. coli (in freshwater) or Enterococci (in coastal water) (as a bacterial indicator of wastewater), Nutrients (which promote algal growth), Heavy metals (copper and zinc) (which are toxic to aquatic life), Sediment from surface wash-off, stream scour (erosion and stream downcutting), and Gross pollutants
Cross-connection	Where a wastewater pipe has been connected to a stormwater pipe, resulting in a discharge of untreated sewage to the stormwater network and receiving environment.
Dry Pond/ Detention Basin	"a temporary pool formed by capturing and releasing stormwater at a slow rate which drains down to the base of the pond between storm events" for Water Quantity management
Global Stormwater Discharge Consent	Resource consent from Greater Wellington Regional Council for Wellington Water to discharge stormwater from the stormwater networks.
Green Infrastructure	Engineering structures built as part of water sensitive design (WSD), including constructed wetlands, rain gardens, permeable paving, swales, and green roofs.
Gross Pollutant Trap	A device that removes solids typically greater than 5mm conveyed by stormwater runoff. Structures that use physical processes to trap solid waste such as litter and coarse sediment. They are commonly used as the primary treatment because they mostly remove large, non-biodegradable pollutants
Hauora	Health and well-being
Hydraulic neutrality	Land development, including increased imperviousness, does not increase the peak design discharge (post development) to greater than the peak design discharge (pre-development) for all events up to and including the 1% AEP rainfall including the predicted impacts of climate change (taken from Regional Standard for Water Services v3.0).
Hydrocarbon Management/ Oil and Water Separator	A stilling tank configured to separate lighter oily matter, scums, and hydrocarbons from stormwater

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Impermeable Impervious surfaces	Impervious surfaces mean those areas which prevent or impede the infiltration of stormwater into the soil, such as roads, paved areas, compacted soils or rock and buildings. as it entered in natural conditions prior to development.
Infiltration Device (Trench/Pit)	"devices that collect and hold (retain) water below ground for disposal to the groundwater table."
Integrated Catchment Management	A management approach that uses a catchment perspective for the provision of water services (drinking water, wastewater, and stormwater) in an integrated manner, in contrast to a piecemeal approach.
Ki uta ki tai	Translated as 'from the mountains to the sea'. This SMS uses ki uta ki tai as a concept that captures the practice of Integrated Catchment Management.
Living Roof (Green Roof)	"a roof largely covered by vegetation, growing in a substrate on top of waterproof and root-resistant layers."
Mahinga kai	As defined in the NRP - The customary gathering of food and natural materials, the food and resources themselves and the places where those resources are gathered.
Mana whakahaere	Power, authority, and obligations of tangata whenua to make decisions to uphold waterways as first priority
Mana whenua	The indigenous people (Māori) who have a historic and territorial rights over the land. It refers to iwi and hapū (Māori tribal groups) who have rights in the Wellington Region. As defined in the NRP- Māori with ancestral claims to a particular area of land and resources. Literally, translated as "authority over the land". Whanau, hapu and iwi are mana whenua of a particular rōhe, while Māori are tangata whenua of Aotearoa (New Zealand).
Manākitanga	Process by which tangata whenua show respect, generosity, and care for freshwater and for others
Māori customary use	As defined in the NRP - The interaction of Māori with fresh and coastal water for cultural purposes. This includes the cultural and spiritual relationships with water expressed through Māori practices, recreation and the harvest of natural materials.
Mauri	As defined in the NRP - An energy or life force that mana whenua consider exists in all things in the natural world, including people. Mauri binds and animates all things in the physical world. Without mauri, mana cannot flow into a person or object.
Pervious Paving	A constructed hard surface that allows water to pass through to the underlying soil layers. It can be used to reduce runoff and flooding; and help to replenish groundwater. Treatment processes provided by pervious paving are limited to filtration and sedimentation (with solids settling into the pore spaces of the pavement). Any system providing hard or trafficable areas which

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	also provides for downward percolation of stormwater runoff." There are two types of pervious pavement: 1) Porous paving - surface paver blocks are pervious so water travels through the pavers. 2) Permeable paving; surface paver blocks are impervious and water travels through the gaps between blocks.
Rainwater Tank	Tanks which are used to collect water from the roof and detain it prior to release. (Auckland Council, 2017) Water collected in rainwater tanks can be re-used on site for household use or for the detention of water.
Rangatiratanga	Self-determination, sovereignty, independence, autonomy.
Riparian Planting	The planting of areas beside rivers and streams to enhance habitat quality, biodiversity and to reduce contaminants getting into water, stabilise banks, shade the water and provide natural inputs (leaf, insect, and wood fall) to the aquatic system to contribute food sources and habitat.
Sand Filters	Used in water purification treatment and consisting of layers of sand arranged with coarseness of texture increasing downwards. Picks up sediment and filters out chemicals in the water.
Stewardship	Obligation of all New Zealanders to manage freshwater for sustainability in present and future generations.
Stormwater Sub-Catchment Mgmt Plan (SCaMP)	Plan for managing stormwater runoff generated in a sub-catchment to meet specific water quality and quantity objectives.
Stormwater	As defined in the Natural Resources Plan - Runoff that has been intercepted, channelled, diverted, intensified, or accelerated by human modification of a land surface, or runoff from the external surface of any structure, because of precipitation and including any contaminants contained therein. For the avoidance of doubt, stormwater excludes discharges associated with earthworks, vegetation clearance, break-feeding and cultivation that are managed under rules in section 5.3 of the Plan.
Stormwater Network	As defined in the Natural Resources Plan - The network of devices designed to capture detain, treat, transport, and discharge stormwater, including but not limited to kerbs, intake structure, pipes, soak pits, sumps, swales, and constructed ponds and wetlands, and that serves a road or more than one property.
Sub-catchment	The distinction between a catchment and sub-catchment is a management decision. Every catchment can be geographically divided into numerous smaller and smaller sub-catchments. To this SMS, a sub-catchment is a geographically defined management unit.

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Swale	Planted channels used to treat stormwater runoff. They direct and slow stormwater across vegetation, grass, or similar ground cover and through the soil."
Te Ika Rō Wai	Wellington Water's shared vision for safe and healthy water, respect for the environment, and a resilient network.
Te Mana o Te Wai	Te Mana o te Wai – the status of water - refers to the vital importance of water. When managing freshwater, it ensures the health and well-being of the water is protected and human health needs are provided for before enabling other uses of water. It expresses the special connection all New Zealanders have with freshwater.
Territorial Authorities	City and District councils.
Wai ora	Water which gives life
Wastewater overflows	A site where underground flows of wastewater can overflow into the stormwater network when the pipe capacity of the sewer network is exceeded, typically during wet weather (driven from inflow of rainwater and infiltration of groundwater), untreated wastewater overflows out of network. Unconstructed wastewater overflows can occur at manholes and gully traps. Constructed wastewater overflows are designed fail-safes to ensure that sewage does not backflow into residential properties or onto land where it could cause an immediate health risk, but instead results in discharges to the stormwater network or directly to land or water.
Water Sensitive Design (WSD)	A stormwater engineering principle that seeks to maintain and enhance the natural water cycle for the built environment, resulting in better water quality, flood mitigation and enhanced natural character.
Wet Pond/ Retention Basin	Detains stormwater inflows in a permanent pond or basin and then releases the water in a controlled manner.
Wetland	Densely vegetated with water-loving plants that mimic the treatment processes of natural wetlands with detention, fine filtration, and biological adsorption, to remove contaminants from stormwater runoff."
Whaitua	Whaitua is the Māori word for catchment or space. For the purposes of the Greater Wellington Natural Resources Plan, the Wellington Region is divided into five Whaitua. Two Whaitua within the Wellington Region are of focus in this SMS – Te Awarua-o-Porirua Whaitua and Whaitua te Whanganui-a-Tara.

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Appendix B
Schedule N: Stormwater Management Strategy

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Natural Resource Plan for the Wellington Region - Schedule N: Stormwater management strategy

The purpose of a stormwater management strategy for a local authority or state highway stormwater network is to:

- provide a strategy for how sub-catchments within the stormwater network will be managed in accordance with any relevant objectives identified in this Plan, including any relevant Whaitua-specific objectives, and
- describe how the stormwater network will be managed in accordance with good management practice, that evolves through time, to minimise the adverse acute, chronic, and cumulative effects of stormwater discharges on fresh and coastal water.

The detail of a stormwater management strategy shall correspond with the level of risk to receiving water quality arising from stormwater discharges in each catchment or sub-catchment. Detailed asset information and management strategies need not be included in the stormwater management strategy where this is set out in a related asset, or other management plan that is provided to the Wellington Regional Council.

At a minimum, a stormwater management strategy shall:

Management objectives

(a) identify the relevant water quality objectives in this Plan that the local authority or state highway stormwater network is to be managed in accordance with, and
(b) identify any other relevant objectives for which the local authority or state highway stormwater network will be managed, and
(c) for discharges via another stormwater network, identify the requirements of any relevant discharge consents for the receiving network and integrate the strategies to the extent practicable, and

Catchment characteristics

(d) include plans and descriptions of the local authority or state highway stormwater network within each catchment or sub-catchment, including identifying:
    (i) catchment areas, boundaries, major stormwater infrastructure and monitoring points, and
    (ii) piped streams within the network that are of significance to mana whenua, as identified with mana whenua, and
    (iii) constructed overflows, pump stations and other wastewater infrastructure for local authority stormwater networks, and
    (iv) existing and potential future land uses (including roads) and categorisation of these for their likely contribution of contaminants to stormwater, and
    (v) contaminated land and Hazardous Activities and Industries List (HAIL) activities at a high risk of contributing contaminants to stormwater, and
(e) using the above to identify the key risks associated with activities and land uses in the catchment or sub-catchment to receiving water quality from stormwater discharges, and

Strategic actions

(f) prioritise all catchments or sub-catchments covered by the consent for implementation actions or mitigation measures, based on monitoring carried out in accordance with Policy P74 and the assessment of effects, in order to maintain or improve the receiving water quality, and
(g) where relevant, describe how water quality will be improved in any water body identified as a priority for improvement in Schedule H2 or in any fresh or coastal water body that fails to meet a national bottom line for a relevant value in the National Objectives Framework, and
(h) describe how discharges from the local authority or state highway stormwater network will be maintained or improved, through time, to meet the objectives described in (a), (b) and(c), including any relevant targets, timeframe and methods, and

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Management options

(i) describe how stormwater discharges from new impervious surfaces from greenfields and brownfields development and/or new or redeveloped roads will be managed to minimise the adverse quality and quantity effects of post-development stormwater discharges, including in accordance with Policies P83 and P84, and

(j) identify options for minimising contaminant inputs into the local authority or state highway stormwater network from land use activities at high risk of generating stormwater contaminants, such as contaminated land, road intersections, interchanges and overpasses with high traffic volumes, areas with significant galvanised steel roofing and HAIL activities, and

(k) describe how for local authority stormwater networks, the adverse effects of wastewater interaction with stormwater will be minimised in accordance with Policies P87 and P88, and

Localised effects

(l) using a risk based approach, identify stormwater discharge points where there are more likely to be significant adverse effects as a result of a specific discharge, with consideration of attributes that are targeted to the relevant receiving environment and implement an appropriate monitoring programme.

(m) when the monitoring in (1) above provides evidence of significant adverse effects resulting from a specific stormwater discharge, describe how the localised adverse effects of discharges from the local authority or state highway stormwater networks will be prioritised for reduction.

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Appendix C
Wastewater Network Overflow Programme

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Our wastewater network is a critical public health intervention that has saved numerous lives. It originated in the 1890s to reduce outbreaks illness, such as typhoid and dysentery, that sweep through the urbanised areas. Today the council-owned wastewater networks are vast series of pipes and connections that carries waste from toilets and sinks from private properties to one of four wastewater treatment plants in Porirua, Karori and Miramar in Wellington, and Seaview in Lower Hutt. After being treated, it is discharged via long outfalls to the ocean.

However untreated wastewater can get into the stormwater system (and stormwater discharges) which can result in unsafe water for swimming and playing, excessive algal growth that degrades ecosystem health and contaminated shellfish that are unhealthy for humans to eat. The four most typical ways that untreated wastewater gets into the stormwater network is shown in the table below.

Table C-1 Four typical ways that untreated wastewater gets into the stormwater network

What	How Wastewater can get into Stormwater Discharges
Private cross connections	Mistakenly connecting private wastewater laterals from a building's toilet to the stormwater system is a potential source of stormwater contamination. Connections of roof downpipes directly to the wastewater lateral or mistakenly connecting stormwater laterals to the wastewater system can also cause rainwater to overwhelm the sewer pipes resulting in overflows of untreated wastewater from gully traps and manholes**.**
Wastewater overflows.	Where wastewater networks have insufficient capacity due to excessive infiltration of rainwater or groundwater, overflows of untreated wastewater can occur into stormwater network during high rainfall events or through leaks in the wastewater system contributing to the stormwater networks. Constructed overflows provide a pressure release mechanism which allows for wastewater (which is untreated but may be diluted through an increase in rainwater) to enter the stormwater network, rather than have untreated wastewater spill onto land creating an immediate public health risk.
Leaking Private Public Wastewater Networks	Aging and poor condition public and private wastewater networks that are leaking into the ground through pipe failures or leaking joints in the infrastructure. This wastewater is leaching into the ground and is connecting with high ground water tables or seeping into public stormwater networks or waterways.
Public Manhole and Pump Station overflows, including Gully trap overflows	This is public and private networks that have blocked or network condition issues resulting in network backing up and surcharging through manholes etc. These overflows typically overflow on land, but through natural flow paths can make their way to stormwater networks or water ways. This can also occur when networks are in poor condition and allow infiltration into network through rain events that can result in mixing of stormwater and result in overflows in public and private networks, through manhole lids, chamber lids or private gully traps.

Figure C 1 illustrates how an integrated approach between wastewater management and stormwater management is needed to reduce the discharge of intreated wastewater to the environment.

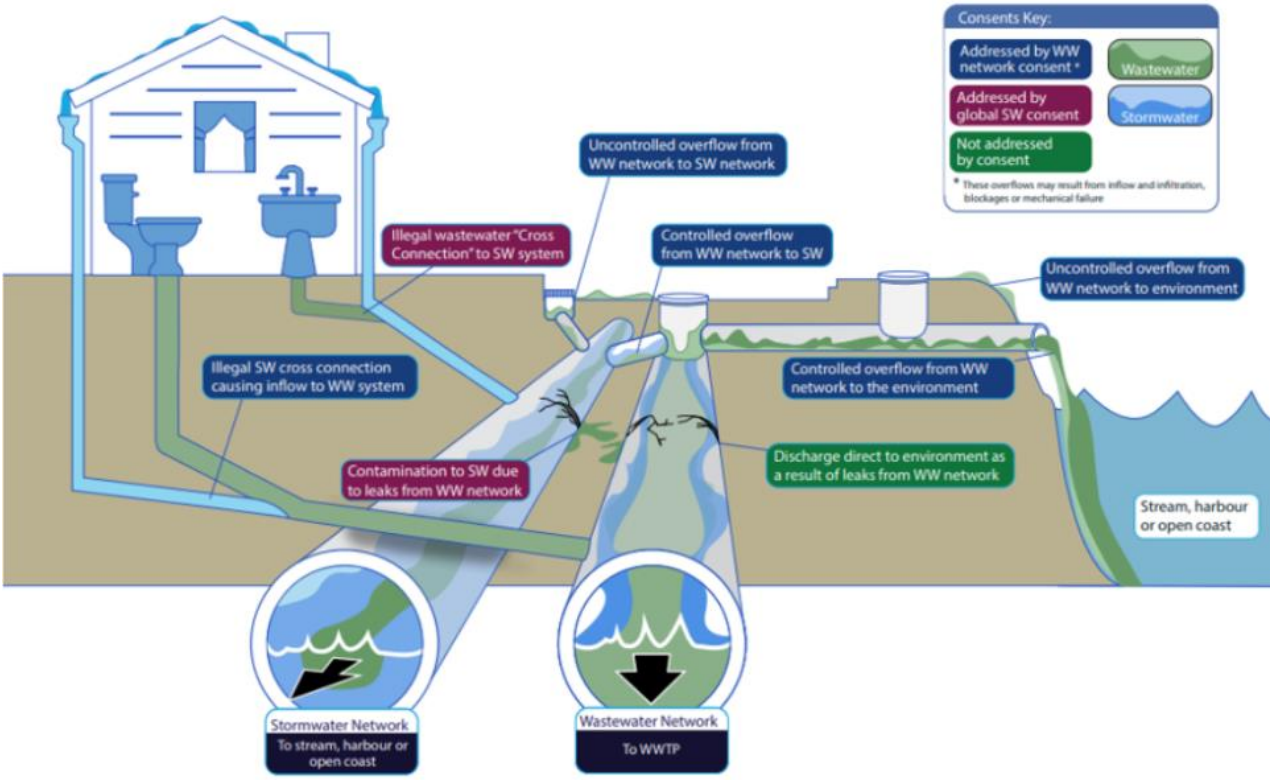

Figure C 1 Untreated wastewater can discharge to the environment when wastewater pipes are overwhelmed with rainwater and when wastewater is connected to stormwater

This SMS includes work programmes to monitor for indicators of wastewater in stormwater discharges and to respond where wastewater occurs. Where the wastewater originates from faults in the public wastewater network, the management approach to rectify these faults will be directed by the Wastewater Network Overflow Programme, which will be subject to specific consent conditions.