TO	Whaitua Te Whanganui-a-Tara Committee
FROM	Project Team
DATE	17 August 2021
TOPIC	Wastewater Network Condition and Overflows by Subcatchment

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Background

The purpose of this memo is to highlight parts of Blyth (2020)[1] report on the current state of the wastewater network within Whaitua te Whanganui-a-Tara.

The Whaitua has been broken down to ~28 sub-catchments, which have been used to provide a local context on wastewater network issues, with information presented on the actual (and predicted) conditions of pipes and monitored wastewater overflows (including frequency and volumes). See the catchment map in **Appendix A**.

Understanding which catchments have the greatest length of poor quality wastewater pipes or are affected regularly by wastewater overflows will help the Committee identify where efforts may be prioritised, to help improve the state of their receiving environments, both coastal and freshwater.

A large proportion of the wastewater network is in poor / very poor condition (~32% from current estimates), with an average age of ~53 years old. High level cost estimates from Wellington Water[2] were undertaken to help inform the Committee, and considered:

- repair and replacement of wastewater pipes over a 30 year period
- include storage tanks at overflow locations to reduce frequencies of discharge to an average of ~1 per year
- inspection and renewal of private wastewater laterals

While these are considered very low confidence estimates, the totals ranged from $2.08 to 2.58 billion. These costs are only one factor necessary to improve water quality, with a high cost associated with reducing stormwater contaminants and also ensuring resilience in the potable network to meet future population demands.

Subsequently, providing some direction about where to focus efforts first with the limited funds available, will help provide direction to councils and Wellington Water while helping achieve community environmental goals.

Impacts

Poor condition pipes leak wastewater into the environment, have capacity issues (which can lead to overflows into the environment) and can be infiltrated by sea water, groundwater and stormwater. This further contributes to overflows, but also ongoing costs with pumping and treatment of greater volumes. Leakage happens under all flows (dry and wet weather), as do direct cross connections.

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[1] Blyth, J. M. 2020. Whaitua te Whanganui-a-Tara - An overview of the Wellington City, Hutt Valley and Wainuiomata Wastewater and Stormwater networks and considerations of scenarios that were assessed to improve water quality. Prepared for Greater Wellington Regional Council Whaitua Committee

[2] Wellington Water Limited. 2020b. Infrastructure interventions for water quality improvement within Urban Wellington. Prepared for Whaitua te Whanganui-a-Tara.

Overflows of wastewater can contaminate the receiving environment, although these typically occur during high flows where wastewater is heavily diluted.

Pipe Condition and Length

This section highlights the length/extent of only the poor and very poor condition wastewater pipes based on both visual observations then hypothetical extrapolations (for areas not inspected, but of similar age and material). The information is presented in **Figure 1**. Note- Te Awa Kairangi lower mainstem subcatchment is defined in GIS as the river channel.

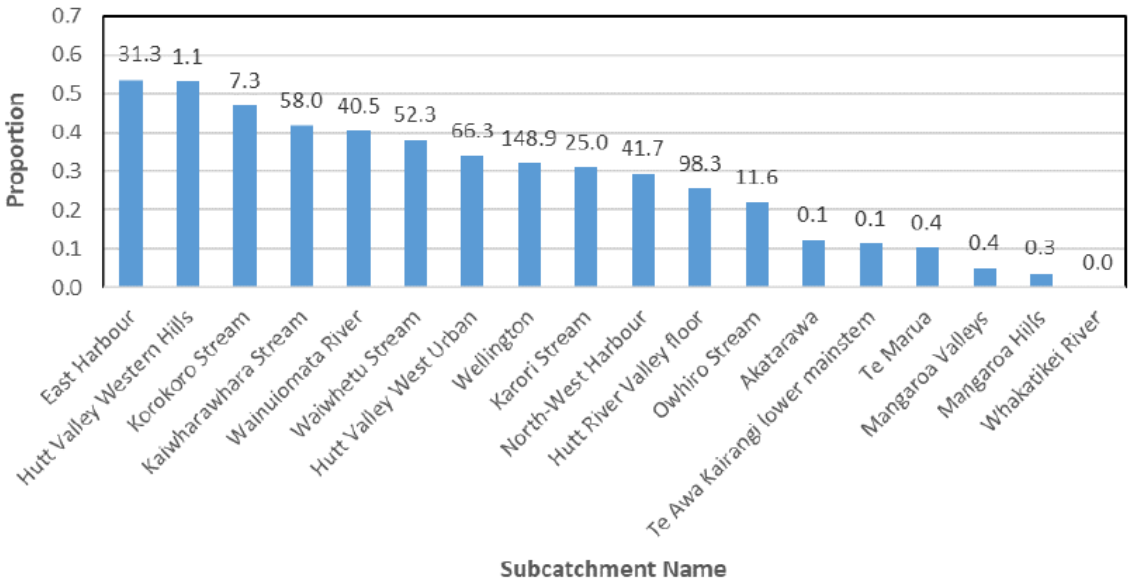

Figure 1. Proportion (and length in km presented above the bars) of poor/very poor wastewater pipes per subcatchment. For example, Wellington (city) has 148.9 km of poor/very poor condition pipes, representing ~32% (0.32 as a proportion) of its total wastewater pipe network.

Wastewater Overflows

Overflows from the wastewater network to the stormwater network primarily occur during wet weather events, with many occurring at constructed locations. These were installed as important fail-safes to protect public health and prevent large sewage failures resulting in waste discharges into urban environments. Many of these constructed sites are monitored, but not all. Some overflows do occur at unmonitored and unconstructed sites (for example where a manhole lid surcharges and wastewater is deposited locally, often due to network capacity issues).

Typically, many overflows are heavily diluted due to stormwater and are likely to have reduced environmental impacts than if they occurred at low flows/dry weather. Over two years (2018 and 2019), ~304,000 m^3 of *monitored* wastewater overflowed into the environment. This represent ~0.64% of the *annual* average volume of treated wastewater discharged to the coastal environment.

It is worth noting that overflows are hard to measure accurately, are not monitored at all locations and are highly variably annually, depending on the climatic (rainfall) conditions each year.

The following tables present:

- **Table 1** – wastewater overflow volumes and frequency by subcatchment
- **Table 2** – ranked list (top 10) of constructed wastewater overflow assets by *frequency*
- **Table 3** – ranked list (top 10) of constructed wastewater overflow assets by *volume*

Table 1. 2018 and 2019 wastewater overflows by volume and frequency per subcatchment.

Sub Catchment	No. of recorded Overflows	No. of overflow locations	% (whole Whaitua)	Overflow Volume Estimate (m^3)	2018 Events	2019 Events	Avg /year
Wellington	156	51	57%	17,799	19	30	24.5
Wainuiomata River	82	14	30%	88,637	18	23	20.5
Owhiro Stream	5	3	2%	104	0	4	2
North-West Harbour	4	3	1%	2	2	1	1.5
Karori Stream	8	2	3%	678	2	3	2.5
Kaiwharawhara Stream	2	2	1%	-	1	1	1
Waiwhetu Stream	6	2	2%	2,596	3	2	2.5
Hutt River Valley floor	12	1	4%	194,598	9	3	6
Hutt Valley West Urban	0	0	0%	-	0	0	0

Table 2. Most problematic *monitored* wastewater overflow locations ranked by frequency of overflows (highlighting significant network capacity issues).

Rank	Location Name	No. of Overflows 2018 & 2019	Percentage (%) of recorded events within that catchment	Volume Est (m^3)	Subcatchment
1	Wellington Road	26	63%	20,777	Wainuiomata River
2	Kent & Wakefield (WW2693)	19	39%	2,601	Wellington
3	60 Kent Terrace (WW30078)	12	24%	2,034	Wellington
4	Silverstream Storm Tank Discharge Events	12	100%	194,598	Hutt River Valley floor
5	Oriental Pde, (S End Central Fire S), TP96 Moa Point	10	20%	585	Wellington
6	23 Rowe Parade (710002R00936)	15	37%	8,834	Wainuiomata River
7	Pump Station 23	9	18%	-	Wellington
8	Manhole located outside 50 Fraser Street	7	17%	300	Wainuiomata River
9	Taranaki/Ghuznee St (WW35569)	7	14%	37	Wellington
10	Wainuiomata Storm Tank	7	17%	51,282	Wainuiomata River

Table 3. Most problematic *monitored* wastewater overflow locations ranked by volume of overflows. Note that due to the climatic variabilities (and variation of local storm events), some assets may contribute a greater volume under different years (for example, 5th ranked Murphy Street in Wellington City would be considered 2nd rank if 2016/17 data was used).

Rank	Location Name	No. of Overflows 2018 & 2019	Volume Est (m^3)	Subcatchment	Comment
1	Silverstream Storm Tank Discharge Events	12	194,598	Hutt River Valley floor	243,480 m^3 in 2016/17
2	Wainuiomata Storm Tank	7	51,282	Wainuiomata River	18,059 m^3 in 2016/17
3	Wellington Road	26	20,777	Wainuiomata River	12,977 m^3 in 2016/17
4	23 Rowe Parade (710002R00936)	15	8,834	Wainuiomata River	25,727 m^3 in 2016/17
5	Murphy Street (WW38277)	4	6,259	Wellington	~60,918 m^3 in 2016/17
6	Main Road (710006R00896)	5	3,150	Wainuiomata River	2,694 m^3 in 2016/17
7	WW18884	4	2,919	Wellington	
8	Kent & Wakefield (WW2693)	19	2,601	Wellington	1,712 m^3 in 2016/17
9	Barber Grove Pump Station	4	2,596	Waiwhetu Stream	4,439 m^3 in 2016/17
10	60 Kent Terrace (WW30078)	12	2,034	Wellington	

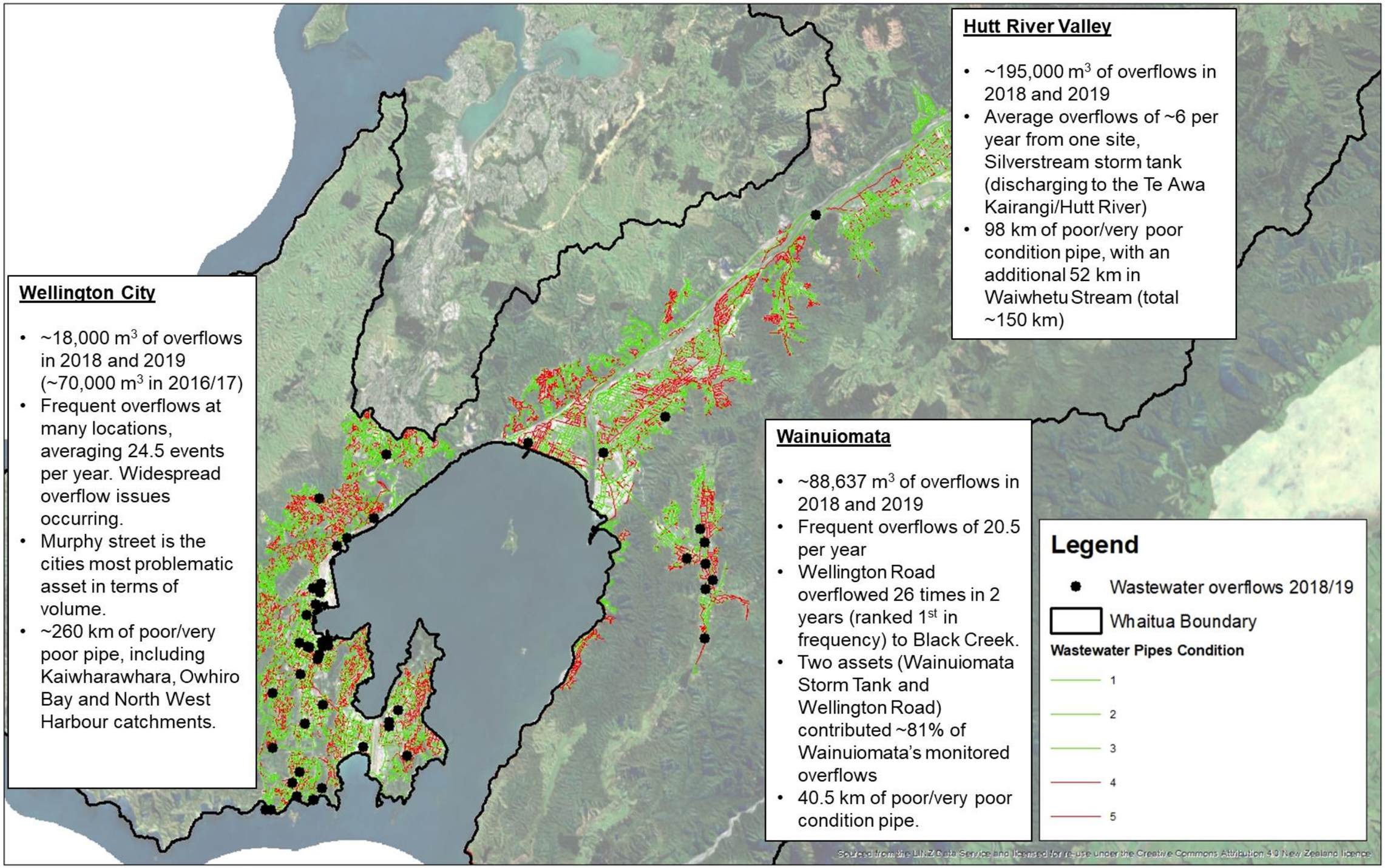

Figure 2. Overview of wastewater pipes and their conditions and locations of monitored overflows in 2018 and 2019.

Appendix A – Subcatchment Map and Expert Panel Assessment Units