

ST MARY'S BAY WATER QUALITY IMPROVEMENT PROGRAMME



Monthly progress report: November 2016

Programme Activities in November

- Work in November has solely focussed on individual project initiatives

Upcoming Programme Activities

- **December 14 – Team Workshop – Moving Forward – Conclusion of phase 1**

The purpose of this workshop is to review and discuss the work to date, to make decisions on which improvement initiatives should be continued/taken forward to achieve programme objectives and to share views on how these initiatives are best taken forward. The outcome of this workshop will inform how the programme proceeds.

The workshop will also largely represent completion of Phase 1 of the programme (April through December 2016). The purpose of Phase 1 was to set objectives for the programme and then identify, assess and determine preferred improvement measures to meet these objectives, reporting on this to Council family executives before the end of the year.

Programme Refresh

In August 2016 the programme team identified a suite of potential improvement projects for the Bay, recognising that these would have very different levels of complexity, engineering design, operational implications, construction risk, community involvement and innovation potential. Consequently, the group identified three project subsets based on the timeframe in which meaningful progress/implementation could be made for the various projects.

- Short term (1 – 2 years)
- Medium term (3 – 5)
- Long term (5 – 10 years+)

The programme team was tasked with evaluating these potential improvements further and determining preferred options. The primary objective of all projects assessed as part of the St Marys Bay Water Quality Improvement Programme is to meet the programme specific objectives developed by the Programme Team, namely:

1. To enable contact recreation to occur safely in St Mary's Bay
2. To reduce and remove contaminant loads to the Bay as far as is practicable
3. To develop a programme of work that will progressively achieve this as quickly as practicable
4. To invest in projects to progressively achieve this; aligning these projects with long-term plans as far as is practicable

Projects should aim to provide the maximum “Whole of Community Value” for “Minimum Total Community Cost” (i.e. minimum cost irrespective of owning utility – remembering all are benefitting and billing the same ratepayers).

Programme Summary

This report provides a summary of programme outcomes ahead of a workshop on December 14.



Auckland Council
Te Kaitiaki Take Kōwhiri



Panuku Development Auckland
An Auckland Council Organisation

Watercare
An Auckland Council Organisation

Short-Term Projects – Outcomes Summary

	Immediate (before or during summer 2016/17)	Progress Update
I1	Understanding the Public Health Risk /making use of information	
	<ul style="list-style-type: none"> • Collation, review and presentation of existing monitoring data and initiatives - development of ongoing monitoring programme targeted to need • Hydrodynamic Modelling and potentially predictive • Contaminant Load Analysis • Risk Analysis 	<ul style="list-style-type: none"> • Review of existing monitoring programmes completed (report available). Main conclusions recommendations are: <ul style="list-style-type: none"> ○ Consolidate existing programmes into one centrally monitored initiative ○ Contaminants of concern are heavy metals and pathogens ○ Improve monitoring for these ○ Improve load monitoring for the Bay • Hydrodynamic model suitability reviewed, up to date network model inputs used. Overview simulations are considered reasonable and will be presented at the team workshop. Detailed bathymetry data for the Bay has been collected and available for input to improve local hydrodynamic predictions. • Load monitoring programmed for Q1 2017 to improve understanding of inputs to the Bay • As well as improving understanding of St Mary's Bay, this initiative is intended to be a pilot for Council in terms of how other areas could be examined
I2	Restrict Contact Recreation Access <ul style="list-style-type: none"> • Divert events elsewhere • Develop protocols for advising on water safety • Manage event areas within the Bay 	<ul style="list-style-type: none"> • New signage installed at the Bay • Proactive "man-management" by Westhaven – keeping people out of the water • Working with Council SafeSwim team who are currently reviewing monitoring and public communication protocols – will use outcomes of this review as they become available (Q1 2017)
I3	I/I studies and improvement works	Not progressed at this stage.
I4	Use new level sensor at Hackett St to reduce response times to potential DWO events, develop maintenance regimes to enable faster clearouts. Improve access to Hackett St manhole for WSL Operation Crews (develop protocol with AT & residents)	Completed. The new level sensor is in and being monitored. There have been no dry weather overflows since installation.
I5	Pre-discharge screening for Combined Sewer Overflows	This is not feasible at existing manholes for both technical and health and safety reasons, it has been reviewed by numerous experts, engineers and operators. Watercare is investigating a baffle plate arrangement at Hackett St, which is somewhat of an improvement over the existing situation but it is possible we are better to wait and incorporate screens as part of a mid-term project (next page).
I6	Investigate extent to which catchment properties have attenuation tanks /condition of these tanks, determine if this would make a significant difference to discharges, enforce maintenance /throttle sizing	A property search shows that there are few properties with these tanks – would not make a significant difference to existing flows. Could be useful as a minor improvement to a more significant initiative as /if redevelopment of sections occurs, noting that development controls already require new lots to not create new runoff..
I7	Road Network Improvements – installing Tetratrap traps to reduce the risk of large solids and other contaminants from the road network discharging to the Bay	Catchment design completed, contract has been let, the traps are being manufactured. In nearby areas the traps are proving a good success at catching road debris (photos supplied by Healthy Waters Operations team). It is pleasing to note the amount of sediment that can be trapped.



Mid-Term Projects – Outcomes Summary

As Healthy Waters has been assessing options, the following secondary considerations have been added to improve alignment between proposed projects and overall Council family business and asset management objectives.

- i. Acknowledge that a long-term plan needs to be implemented for the wider combined sewer network. This plan will be complex and require significant funding. As far as practicable short and medium term improvement projects be a logical “first step” towards achieving the long-term strategy and not preclude its effective implementation
- ii. Projects should minimise ‘wasted’ cost by not building or minimising the building of assets that will not be functional in the long term
- iii. Projects should maximise overall benefits to the community by catering for areas other than St Mary’s Bay as far as practicable.
- iv. Where possible, projects should take advantage of current or near-future requirements for asset renewal and upgrades, minimising additional cost to that already programmed by Council and CCOs.

Projects should aim to provide the maximum “Whole of Community Value” for “Minimum Total Community Cost” (i.e. minimum cost irrespective of owning utility – remembering all are benefitting and billing the same ratepayers).

Mid-Term “Also-rans” – these projects are considered not technically feasible and/or do not fulfil basic programme objectives.

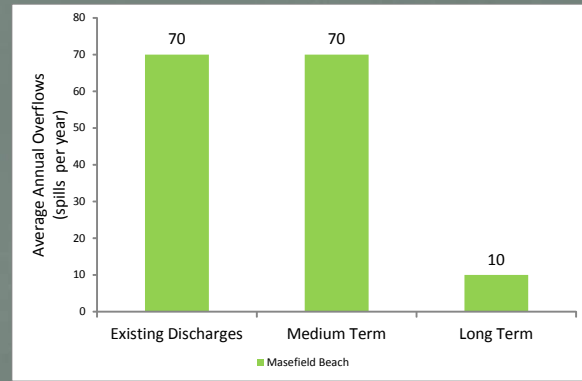
	Short –Mid-Term (2 – 5years)	Update
SM1	Combined Sewer Overflow Storage facilities prior to discharge/Stormwater storage facilities	Not considered technically or economically feasible. There are very few spaces available to construct storage tanks, the ground conditions in these spaces are not good for construction of such facilities and the volumes required are large (4000 – 6000 m3).
SM5	Bioremediation /Bioengineering	Can not be constructed at a scale that can meet water quality objectives – could be used as an add-on /value add to another option
SM6	Living Machines to treat discharges	Can not be constructed at a scale that can meet water quality objectives – could be used as an add-on /value add to another option. Potentially more useful than bioengineering as could be visible and educational
SM3	Screening and Disinfection of CSOs	<ul style="list-style-type: none"> • This project has been through a feasibility assessment. • The cost is in the order of 15M • It reduces the frequency of overflows from once a week to once a month – highly space constrained in terms of space for the treatment plant and higher capacity becomes very technically difficult and expensive. • Process feasibility cannot be guaranteed – there is a lengthy period of data collection and concept validation to be undertaken. • Significant construction risk • Operationally difficult – requires screening facility to be operated in St Marys park • Does not benefit areas other than St Marys and does not fit in with a longer-term network management strategy • Sunk investment – once long-term network strategy has been decided on – stranded assets. • Not preferred by technical team.

Mid-Term “Contenders” – these projects are considered technically feasible and provide significant levels of benefit to St Mary’s Bay

A long-term network strategy for the wider combined network is being developed by Healthy Waters and Watercare. This will either comprise extensive network separation or purposeful retention and augmentation of the combined network. Any improvement programme needs to be developed so that a functional asset base is retained irrespective of which strategy is selected. In order to provide significant benefit to the Bay, one of these projects (or a combination or slightly different configuration) is required.

Programme	Description	Overview Risks	Benefits
1. Network Separation (separate the stormwater and wastewater networks)	The following network separation options have been considered: <ul style="list-style-type: none"> • Full separation by constructing new WW network – 22M • Full separation by constructing new SW network – 26M + pipe rehabilitation costs of existing network • Partial separation (i.e. only installing the new public drains and then either forcing or waiting for the individual householders to connect) This option is summarised on Figure 1. An indicative programme for complete separation is 4 – 6 years.	<ul style="list-style-type: none"> • Experience in NZ and elsewhere indicates that water quality improvements are often not achieved - i.e. often you can't get all the wastewater out of the stormwater and vice versa. This is particularly the case with partial separation (public network only installed) – can be a long wait for development or sales or the public works act to force property owners to connect to the new network • Significantly more disruptive to the community than retaining and utilising the existing network – every street and every property is impacted upon • Significantly more programme risk through the consent process • Significantly more political risk if Public Works Act invoked or “sneaky” additional costs passed on to ratepayers for the private drainage 	<ul style="list-style-type: none"> • The storm and wastewater flows will not come into contact and storm flows into the Bay will no longer be contaminated with wastewater (once complete separation has been achieved) • If Watercare/Council is more concerned with cashflows can be undertaken over a long period of time – with concurrent delay in achieving WQ benefits
2. Network optimisation (retain the combined networks)	The option shown on Figure 2 has been devised as an example of how the existing combined network could be reconfigured to minimise overflows to the environment. If the long-term network management strategy is retention of the combine network, the new pipeline from Hackett to Sarsfield will be replumbed into the planned Waterfront Interceptor. If the long-term strategy is separation, the existing combined network pipes and new diversion pipe and outfall will be retained to convey stormwater only. This is a lower cost and better technical practice approach than retaining the combined pipes for stormwater. Stormwater will be discharged to a higher energy environment than St Mary’s Bay, reducing potential environmental impacts. This option is summarised on Figure 2. An achievable programme to undertake these works is 3 – 4 years.	<ul style="list-style-type: none"> • Return flow to branch 5 sewer needs to be carefully controlled • Operation of the larger collector system needs careful design to ensure adequate flushing and control of potential odour and air issues • Marine outfall component needs careful consideration if operational integration with wider network strategy is required. • Construction in Pt Erin park needs consideration 	<ul style="list-style-type: none"> • Other than in very heavy weather (estimated to occur around 1-2 times per year) Combined Sewer overflows will be removed from the Bay. • The total number of overflows to Masefield Beach will also be reduced due to the use of the diversion pipeline as a storage component and the return pump station to Branch 5, reducing public health risk in this area. • Existing overflows at Sarsfield Street can be plumbed into the system • Overflows will be screened, removing the potential for gross solids washing through to either Bay. • Lower programme risk – does not require consent from every householder or Public Works Act process. • Marine outfall component is scheduled to be undertaken as a priority project due to existing poor condition. Marginal cost only to upgrade it for this programme.

At the meeting on December 8 between Watercare and Auckland Council, it was agreed that programme 2 was a both a good solution for St Mary’s Bay and a pragmatic first step forward in meeting longer-term network objectives. There are obvious operational and design interfaces between Watercare and Healthy Waters in terms of implementing this programme as successfully as possible. Continued effective collaboration will be essential, including using the close relationships of Panuku and Westhaven with Mana Whenua and local stakeholders to assist in an outreach programme commencing in early 2017.



Masefield Beach

Separation Options Considered

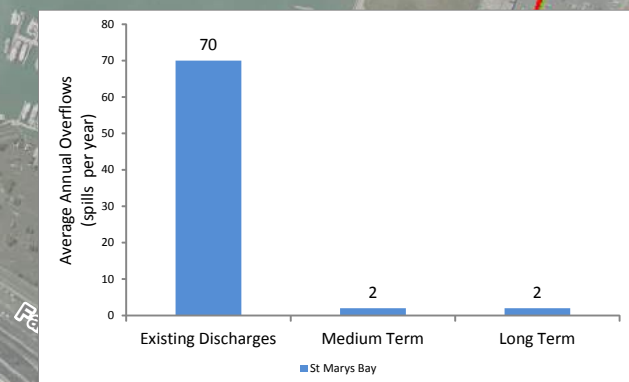
- Full Separation (SW) Cost \$26m
- Full Separation (WW) Cost \$23m
- Partial Separation (public only SW) \$18m
- Partial Separation (public only WW) \$15m

Of these the preferred option is Full WW separation because:

- Technically feasible to install a new sealed PE network for WW with minimal infiltration.
- Smaller pipe bore construction/ quicker less construction risk
- The Whole of Community cost is lower
- Control over benefits realisation – if only public WW network is constructed benefits may never be realised

BUT SEPARATION IS NOT THE PREFERRED SOLUTION FOR ST MARYS BAY DUE TO SIGNIFICANT RISKS:

- 1) Cost tend to exceed project estimates
- 2) Efficiency in terms of reducing overall contamination is doubtful
- 3) Widespread disruption to the Community
- 4) Risk of programme delay due to landowners withholding landowner approval.

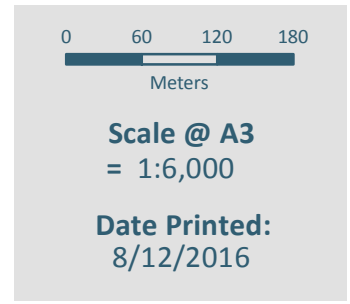


Mid-Term Programme 1 - Network separation analysis summary. A minimum achievable timeframe is 5 – 6 years – highly contingent on obtaining individual property owner consents.



St Marys Bay Medium Term Network Optimisation Programme

Component Projects - Programme Benefits - Separation



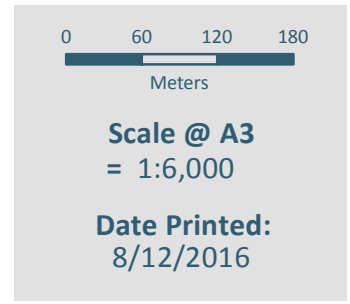


Mid-term Programme 2 :Network Optimisation Outline Programme. The network optimisation has been designed as a series of projects that can be implemented concurrently to achieve maximum environmental benefit as quickly as possible. A minimum achievable timeframe to carry out all the design, consenting and construction work is 3 – 4 years.



St Marys Bay Medium Term Network Optimisation Programme

Component Projects - Programme Benefits - Store and Convey Indicative Route



Long-Term Network Management Options

	Long-Term (5 - 10 yrs +)	Objective /Description
L1a	Central Interceptor (wastewater and stormwater) plus Waterfront Interceptor (wastewater only) plus separation works	Work is progressing and the two major options have been through a costing and technical review process. The work is highly preliminary and due to the regional scale and complexity, needs thorough technical review and evaluation.
L1b	Central Interceptor (wastewater and stormwater) plus Waterfront Interceptor (wastewater and stormwater)	
L2	Aquifer Recharge	The hydrogeology in this area is not suitable.
L2	Water Reuse	Can not be constructed at a scale that can meet water quality objectives and very difficult to operate from variable and peaky sewer overflows. Not considered technically feasible. A sewer mining plant would work more effectively if this location was thought suitable for a pilot scale facility.

In terms of a long-term network management strategy, Watercare and Healthy Waters are working together to determine a preferred approach for the 2017 long-term plan.