Safe Networks: a collaborative programme for mitigating wastewater contamination in stormwater runoff

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Safe Networks Programme

- Background
- Programme goals
- Programme funding/resources
- Investigation methods
- Case study

Background

Safeswim raised public awareness and concerns over the safety of Auckland's beaches and streams for contact recreation (swimming)

Safe Networks was setup in 2018 to support Safeswim by investigating sources of faecal contamination

Background

Investigative programme to find how wastewater makes its way into stormwater networks, beaches and streams so these pathways can be mitigated

Overall Goal

Reduce public health risks at Safeswim sites for contact recreation by:

- Confirming sources of faecal contamination
- Tracking and mitigating human sources of faecal contamination
- Referring findings to other teams / local boards when faecal sources are non-human

Funding

The key to success

Budget: ~$2 million annually

Sources:

- Water quality targeted rate
- Watercare – cost share for joint public and private drainage investigations

Resources

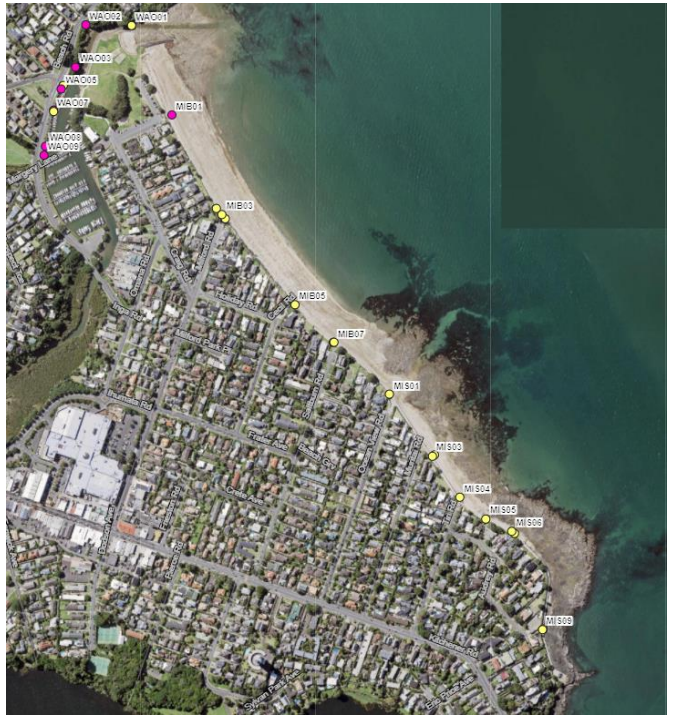

WATER QUALITY SAMPLERS
4 FTE
PROJECT MANAGERS
3 FTE
GIS SPECIALISTS
2 FTE
DEDICATED DRAINAGE SPECALISTS
6 FTE
COMMINICATIONS
0.5 FTE
COMPLIANCE OFFICERS
3 FTE
LABORATORY TESTING
AS REQUIRED
CCTV SPECALISTS
AS REQUIRED
PROGRAMME MANAGERS
2 FTE


SW & WW OPERATIONAL TEAMS
AS REQUIRED
ENVIRONMENTAL HEALTH
AS REQUIRED

Investigation Stages:
Outlet Screening (Stage 1)

Contaminant source characterisation at stormwater outlets and mouths of streams

Field observations/sampling - faecal indicator bacteria and DNA analysis



Investigation Stages:
Network Screening (Stage 2a)

Sub-catchment sampling to track contamination to neighbourhood level

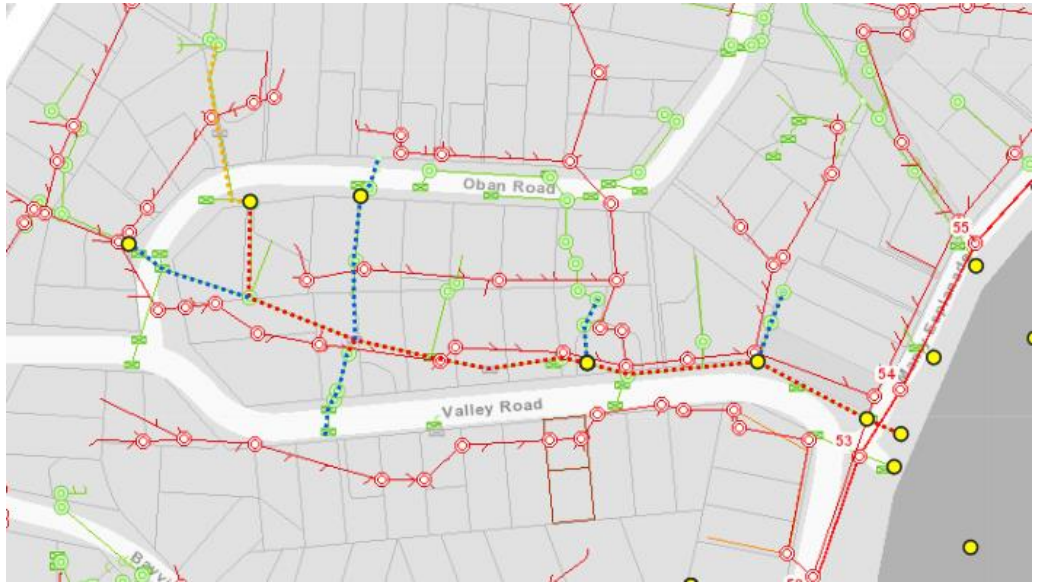
Field observations and sampling for faecal indicator bacteria

Investigation Stages:

Public and Private Drainage Investigations (Stages 2b and 3)

Public and Private stormwater and wastewater asset inspections using CCTV, smoke testing, dye testing, visual walkovers and sampling - quick tests

Cross connection identification and asset inspections at street/property level



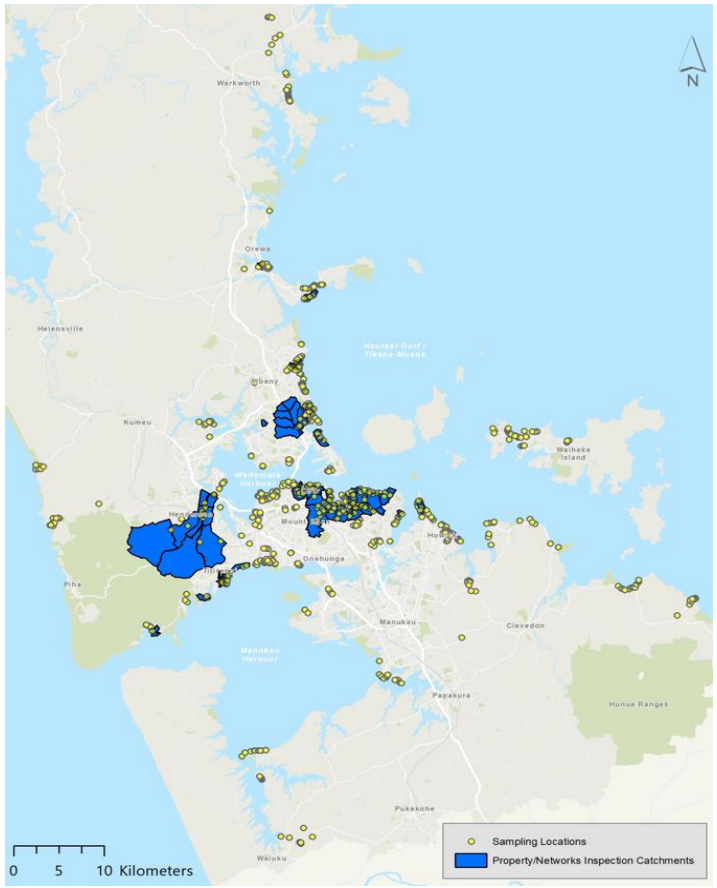
PROGRAMME OPERATIONAL SCALE

Regionwide Scale

Investigations Completed to Date

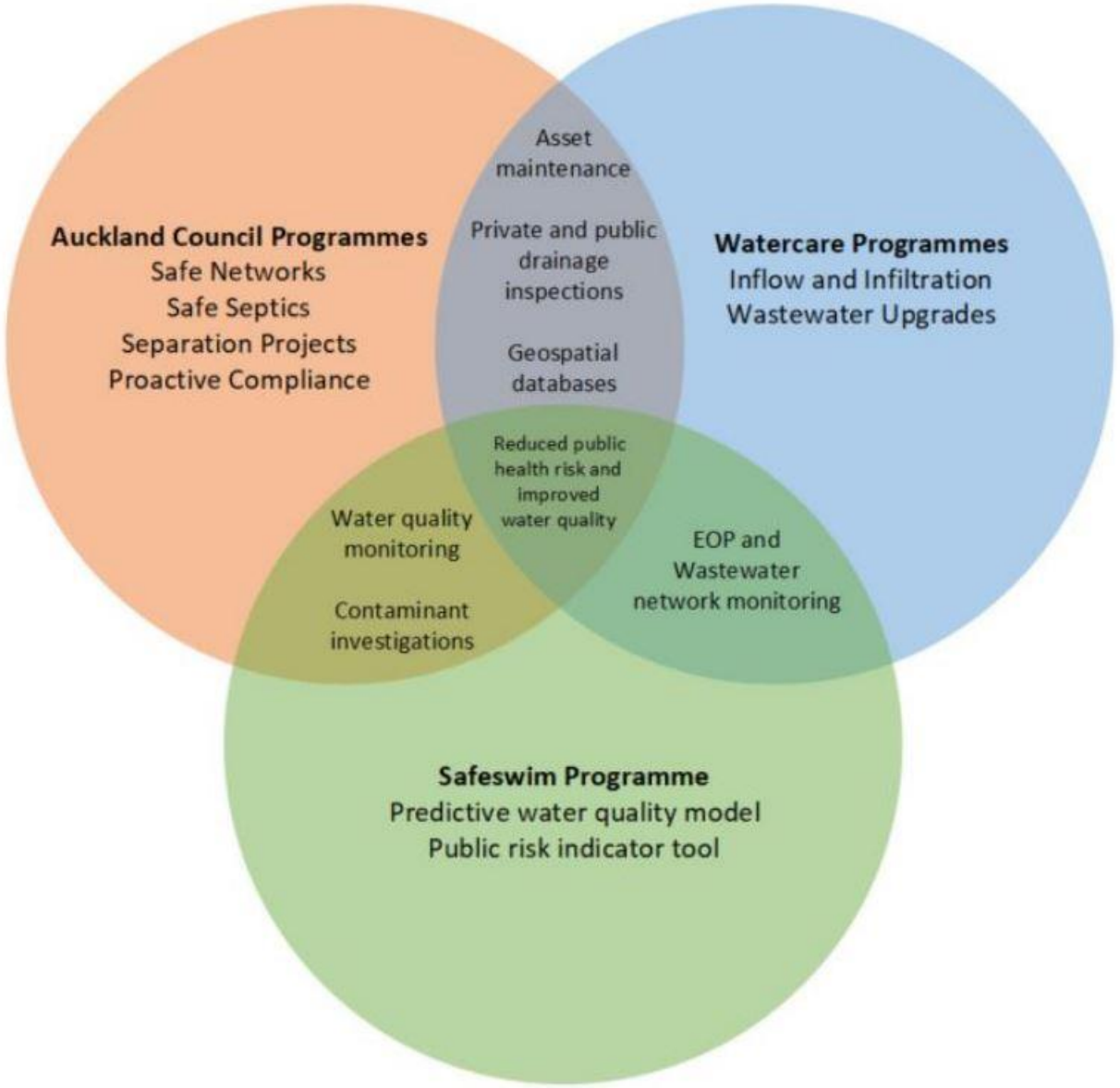
Approximately 12 full life cycle catchment investigations per year

Outlet screening investigations	57
Network screening investigations	34
Public asset investigations	26
Private drainage inspections	31



CROSS-DEPARTMENT/ ORGANISATIONAL INVOLVEMENT

Collaboration is Key



Data Systems

- ESRI applications – Field Maps / Survey123
- Moata – Safe Networks Sampling database
- ArcGIS Desktop Applications and Dashboards
- Public Viewer – Safe Networks

Case Study: Browns Bay

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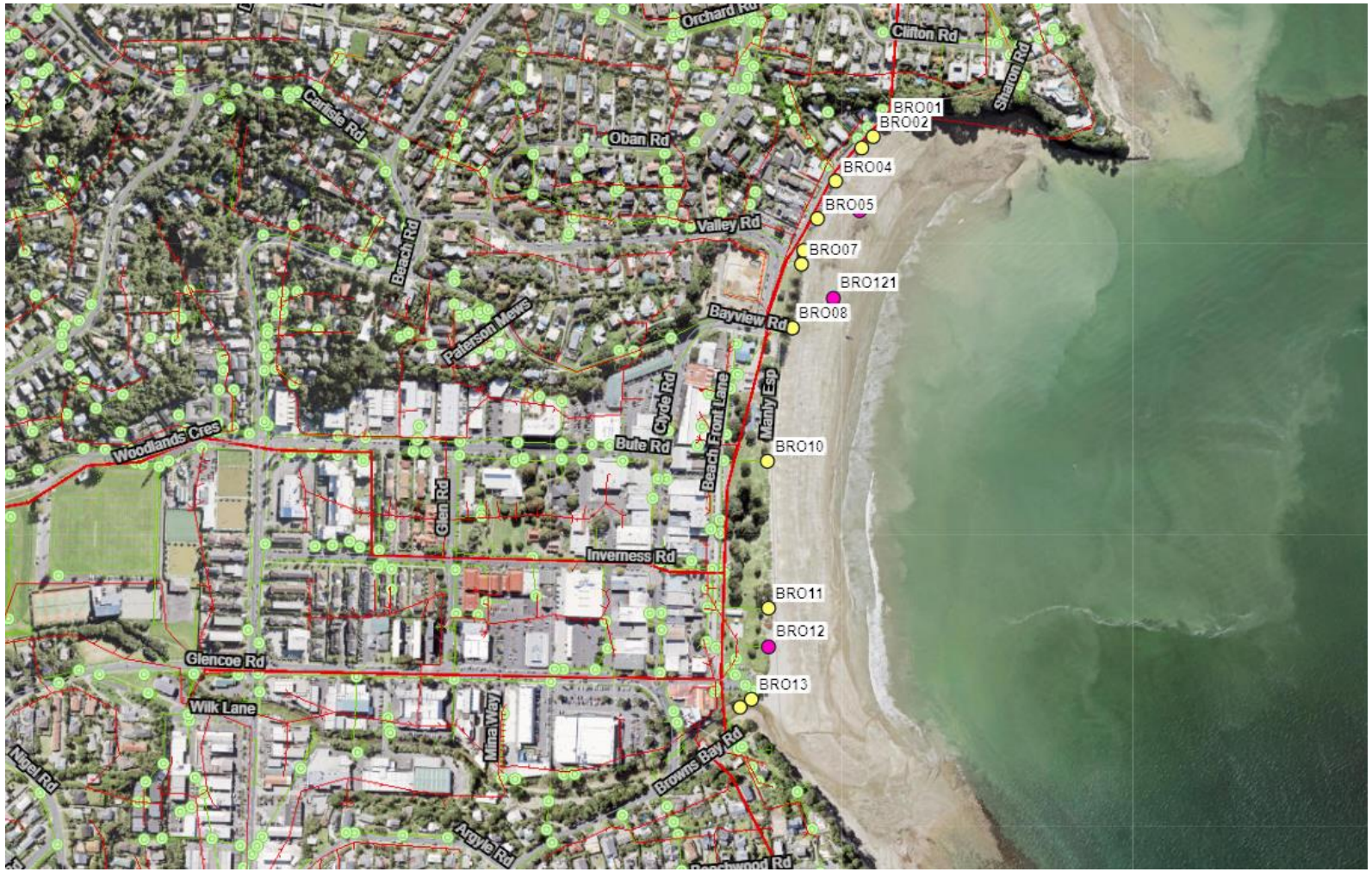
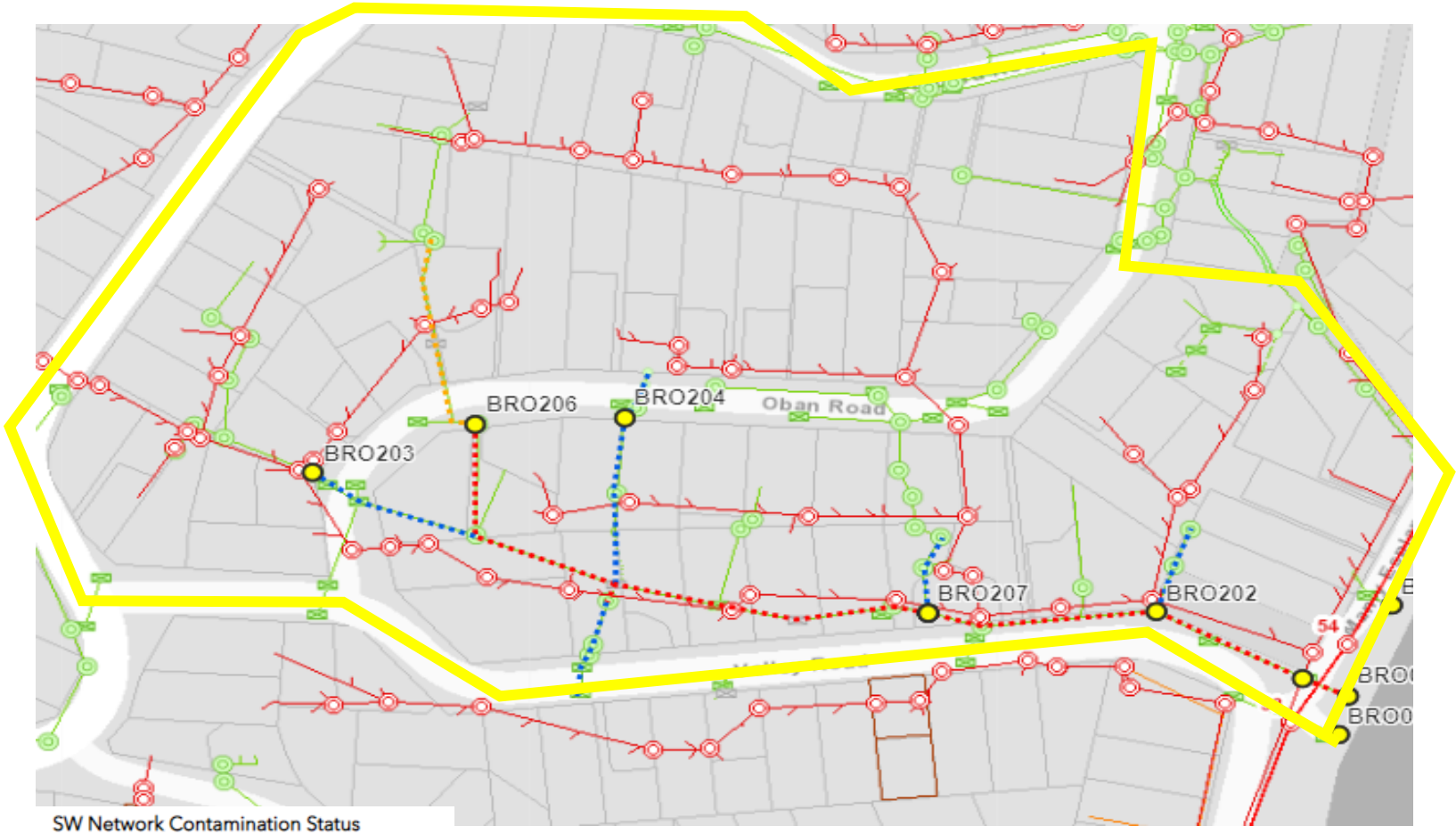
Stage 1



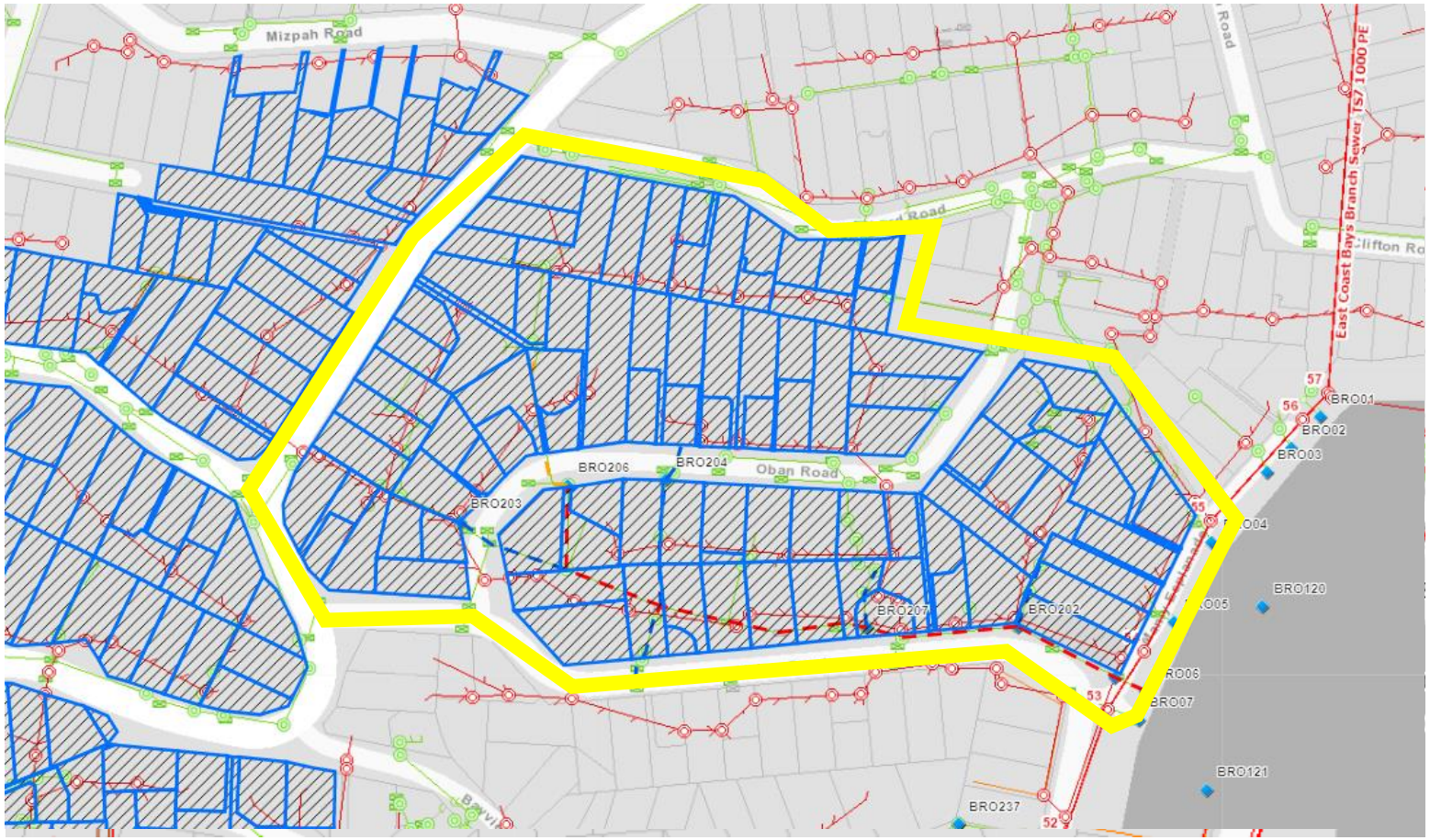
Case Study: Browns Bay

Stage 2a



Case Study: Browns Bay

Stage 2b and 3



Case Study: Browns Bay

Location	Rainfall previous 48 hours (mm)	BRO06 Stormwater outlet	
Parameter	Rainfall previous 48 hours (mm)	Enterococci (MPN/100 ml)	E. coli (MPN/100 ml)
18/10/2019	0.00	440	16,000
19/10/2019	1.00	4900	160,000
21/10/2019	0.00	<10	11,000
22/10/2019	7.00	310	4900
23/10/2019	2.50	210	1500
26/10/2019	1.00	2400	4,400,000
27/10/2019	0.00	120000	1,700,000
29/10/2019	2.00	2700	20,000
30/10/2019	2.00	20000	620
31/10/2019	0.00	6100	110,111
1/11/2019	0.00	44000	130000
2/11/2019	0.00	240000	260000
3/11/2019	0.00	9200	280,000
4/11/2019	0.00	460	6500
5/11/2019	0.00	<10	10
6/11/2019	0.00	16000	730000
7/11/2019	0.00	5800	870000
8/11/2019	0.00	1000	48000
9/11/2019	0.00	12000	200000
10/11/2019	11.00	3700	25000
11/11/2019	15.00	3100	190000
12/11/2019	25.00	12000	9200
13/11/2019	13.50	28000	13000
16/11/2019	0.50	230000	20000
17/11/2019	0.00	550000	730000
18/11/2019	13.00	37000	6900
19/11/2019	14.50	24000	770
20/11/2019	2.50	330000	10000
23/11/2019	0.00	34000	520000
24/11/2019	0.00	88000	610000
27/11/2019	0.00	19000	73000
Repairs Complete			
28/11/2019	0.00	740	740
29/11/2019	0.00	1600	680
30/11/2019	0.00	830	880
1/12/2019	0.00	430	320
2/12/2019	4.00	430	250
3/12/2019	8.00	41	110
4/12/2019	1.50	140	150
5/12/2019	0.50	31	230
6/12/2019	0.00	74	240
7/12/2019	0.00	110	120
8/12/2019	0.00	550	120
11/12/2019	0.00	560	170
13/12/2019	0.00	250	10

Programme Benefits

Steady improvements to water quality

Developing strong relationships

Increased awareness:

- Community
- Water industry
- Drainage contractors

Challenges

Weather

Criticality of funding.
More sampling = more funding and resources needed

Constant new sources of contamination

External influences affecting budgets and resourcing

Managing large amounts of data

Realities

Building expertise takes time and continuous improvement

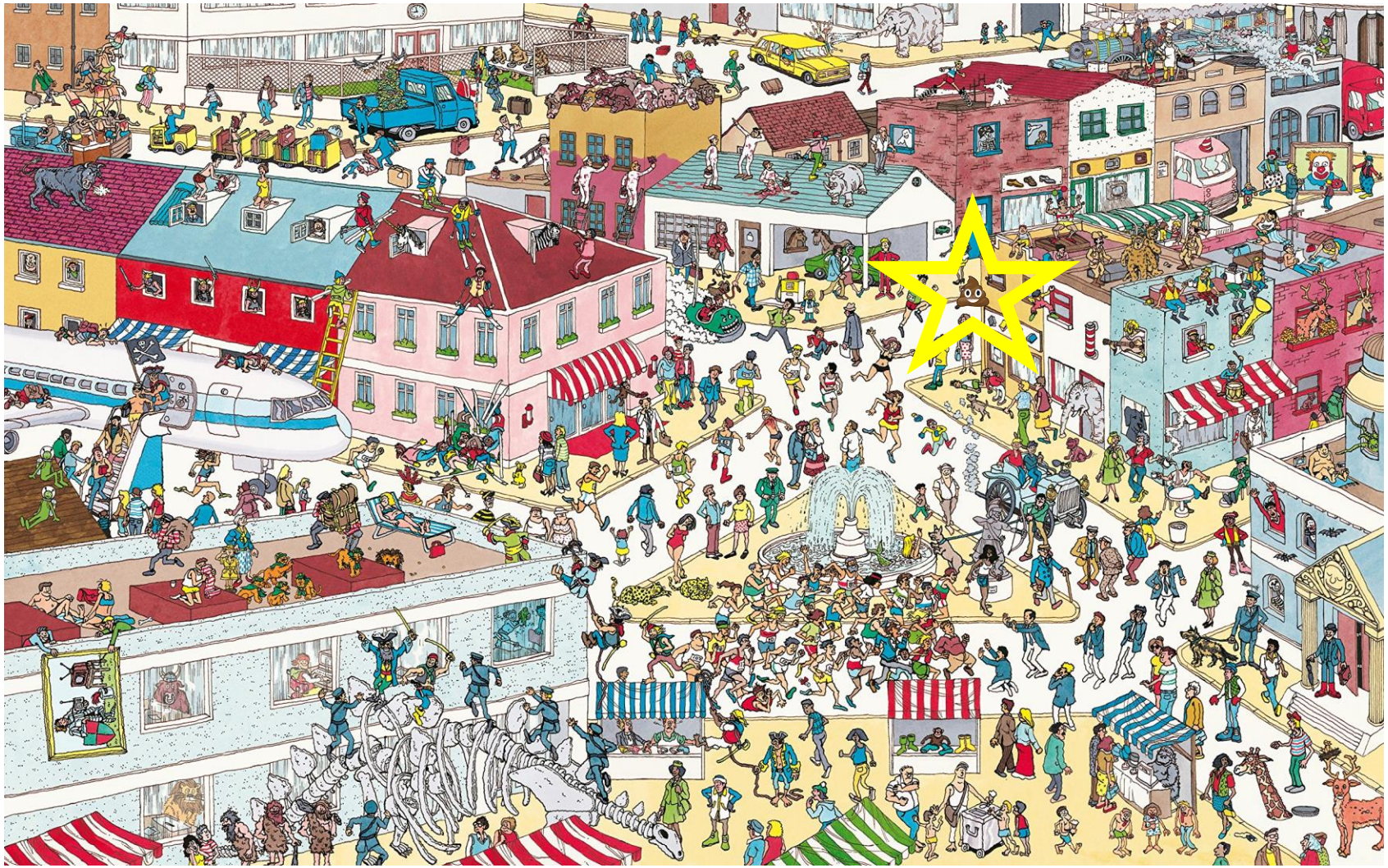
Underground drainage systems are complex and evolving

Managing needs and expectations

Luck. Right place, right time

Find the poo

Find the poo



Questions??