ENVELOPE

WASTEWATER HYDRAULIC MODEL REPORT

Mt Welcome

DOCUMENT CONTROL RECORD

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1.0 INTRODUCTION

1.1 BACKGROUND

The proposed development is located south of Pukerua Bay, within the Porirua Northern Growth Area. This land was rezoned as part of Council-led Plan Variation 1 to Plan Change 19 (PC19), which was notified in 2022 and is now operative.

This report addresses the wastewater modelling options and staging that could be utilised to service Mt Welcome Developments within the Northern Growth Area (NGA). This report should be read together with the infrastructure report (R001-v1-1753-02) to understand the proposed development scope.

1.2 LOCATION

The site is located at 422, 422A and 422B State Highway 59, Pukerua Bay, and encompasses a total area of 205.60 hectares. It formally comprises the following land parcels:

- Part Lot 1 DP 89102 (4.38 ha)
- Lot 2 DP 891020 (5.64 ha)
- Lot 1 DP 534864 (55.33 ha)
- Lot 2 DP 534864 (140.25 ha)
- Lot 1 DP 608433, Lot 1000 DP 608433 (34 Muri Road)
- Road Reserve (SH59 Corridor)

References to "the site" within this report refer collectively to all seven allotments, unless stated otherwise.

The site is situated in a rural area south of Pukerua Bay and north of Plimmerton, within the Porirua City boundaries in the Wellington region. It is bounded by State Highway 59 to the west and three adjoining land blocks to the north, east, and south.

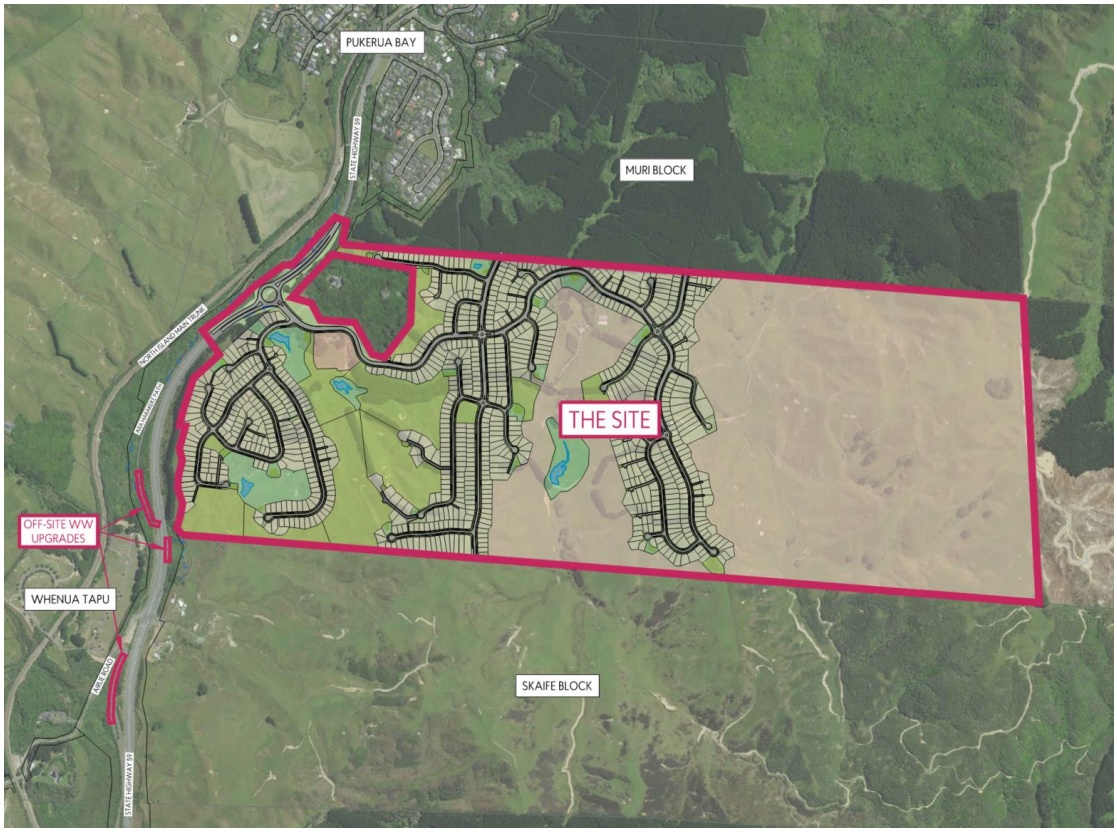


Figure 1. Site Extents Plan – Entire Site.

1.3 PROPOSED DEVELOPMENT

The proposed development comprises 949 residential allotments ranging in size from 316m² to 2,386m², enabling the construction of 949 future dwellings with an average lot size of around 523m². The development also includes a commercial centre to serve the new local community, together with associated three-waters infrastructure (wastewater, including storage facilities; stormwater management systems; and water reticulation), roading, and a connected network of pedestrian and cycling trails.

2.0 METHODOLOGY

2.1 WASTEWATER MODEL

A Porirua City Council (PCC) wastewater hydraulic model has been developed by Wellington Water. This calibrated model was provided by WWL in May 2024, and it was used to assess effects of the proposed development on the downstream network, identify constraints and develop mitigation and upgrade options within the network. This allowed us to assess the wastewater network capacity, network performance, and proposed pump station storage requirements for the proposed development. With the model results it is possible to identify system constraints and confirm the upgrades required to service the development.

This model has the following features:

- Software and Version: Infoworks ICM 2024.5
- Extent: The model considered all the catchments associated with the Porirua City wastewater treatment plant (WTP).
- Network scenarios: The following scenarios were included in the System Performance network:
    - Base. Built with 2018 information.
    - Forecasting scenarios for an existing 2033 and 2068 population.
- The model considered long-term rainfall scenarios for the dry (DWF) and wet weather flows (WWF) as follows.
    - DWF: Seven days starting the 08 Jan 2006. No rain in this period
    - WWF: Three days of rainfall starting the 04 April 2017. Total model simulation 7 days.

For more detailed information about the hydraulic model, refer to the following documents:

- Cannons Creek and Porirua Long-Term Flow Monitoring - Model Calibration Report. By Wellington Water Limited. August 2018.
- System performance assessment – Porirua Wastewater Network. By Stantec for Wellington Water Limited. December 2018.

2.2 CUT-OFF MODEL

For this project assessment, the model was cut off to just consider the network upstream of the existing public pump station 07 (model ID S070000). It was decided to reduce the extent of the model to allow the level of detail to be increased in a defined area, while reducing the simulation computational time for optioneering purposes. The final model extent is seen in Figure 2 below.

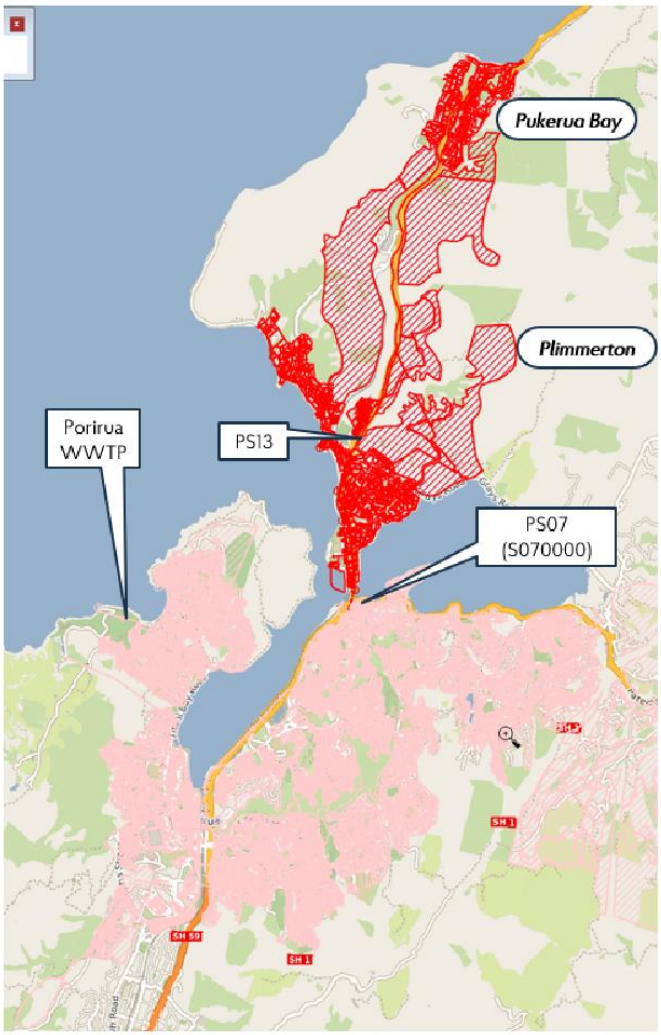


Figure 2. Cut off model extent.

3.0 MODEL DEVELOPMENT

3.1 OPERATION

Table 1 summarises the updates made to several pump stations relevant to the project. These changes reflect refinements to the model inputs and operational settings based on the latest information. Some parameters have been updated following correspondence with WWL, as referenced in Appendix 5.

Table 1. Model Update – Operational Updates.

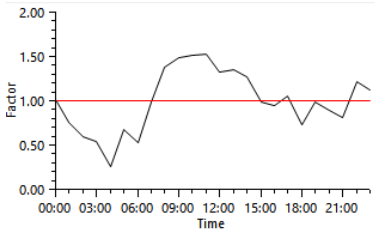
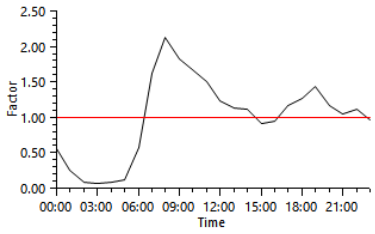
	Provided Model	Updated Model
Muri Road Pump Station PS-30 Asset ID: WWPS230 Location: 12 Muri Road.	P1 – Duty: 3.0l/s On: 73.5mRL | Off: 72.96mRL P2: 5.0l/s On: 73.8mRL | Off: 72.96mRL *Storage:* 2.9 m² | 4m height | 11.6m³ volume approx..	P1 – Duty: 6.0l/s On: 73.5mRL | Off: 72.96mRL P2: 12.0l/s On: 73.8mRL | Off: 72.96mRL *Storage:* No changes ** Email from Alister O'Callagha.*
Plimmerton Pump Station PS-13 Asset ID: WWPS31436	P1 – Duty: 30.0l/s On: -0.746mRL | Off: -1.342mRL P2: 71.0l/s On: -0.546mRL | Off: -1.342mRL *Storage:*	P1 – Duty: 68.0l/s On: -0.746mRL | Off: -1.342mRL *Storage:* No changes

Location: 212 St Andrews Road	14.0 m² | 5m height | 70.0m³ approx..	** Changes suggested by WWL (Manu Ward).*
Paremata Pump Station PS-08 Asset ID: WWPS31410 Location: 106 St Andrews Road	P1 – Duty: 50.0l/s On: -1.319mRL | Off: -1.619mRL P2: 25.0l/s On: -0.919mRL | Off: -1.619mRL P3: 37.0l/s On: -0.819mRL | Off: -1.619mRL *Storage:* 8.0m² | 4.5m height | 36.0m³ approx.	P1 – Duty: 62.0l/s On: -1.319mRL | Off: -1.619mRL P2: 20.0l/s On: -0.919mRL | Off: -1.619mRL *Storage:* No changes ** Changes suggested by WWL (Manu Ward)*

3.2 DRY WEATHER PARAMETERS

For the proposed draining areas, the model has been edited with the dry weather parameters shown in Table 2. Some of these values came from correspondence with WWL, see Appendix 5.

Table 2. Dry Weather Parameters.

	Provided Model	Proposed	
Flow Per Capita	ID: 364055_S130201A_PLIMMERTON Flow: 177.348l/day	ID: Residential 200 Flow: 200.0l/day	
Foul Profile	Peak factor: 1.53 	Peak factor: 2.12 	
Population	As provided model for the scenario 2018 (Base scenario). Upstream PS30:	**Mu Rd Stage 2** 1750 population 500 lots	**Mount Welcome** 3335 population 949 lots / 1 Commercial lot.
Base Flow	As provided model for the scenario 2018 (Base scenario).	Assume 0.1 l/ha for greenfield areas.	

These changes have been shared with WWL through internal correspondence.

3.3 WET WEATHER PARAMETERS

For the proposed draining areas, the model has been edited with the wet weather parameters shown in Table 3. Some of these values came from correspondence with WWL, see Appendix 5.

Table 3. Wet Weather Parameters.

		Provided Model	Proposed
Run Off	ID	364055_S130201A_PLIMMERTON	RUNOFF NEW DEV
	Run Off	Run Off area – Road: 0.5% Run Off area – pavement: 0.5% Run Off area – permeable: 3.2% Run Off area – GWI: 32%	Run Off area – Road: 0.2% Run Off area – pavement: 0.2% Run Off area – permeable: 2.0% Run Off area – GWI: 20% *Based on correspondence with WWL*
Ground	ID	364055_S130201A_PLIMMERTON	RUNOFF NEW DEV
	Soil depth (m)	1	1

	Provided Model	Proposed
Percolation coefficient (days)	0.5	0.8
Percolation threshold (%)	20	20
Percolation percentage infiltrating (%)	10	5
Baseflow coefficient (days)	0.01	0.01

The model considers an observed rainfall time series database from 00:00 on 04 April 2017 to 24:00 on 10 April 2017 (7 days). During this period, there are nearly three days of rainfall with a peak intensity of 30.54mm/hr, see Figure 3.

The model period was extended to consider some dry weather flow.

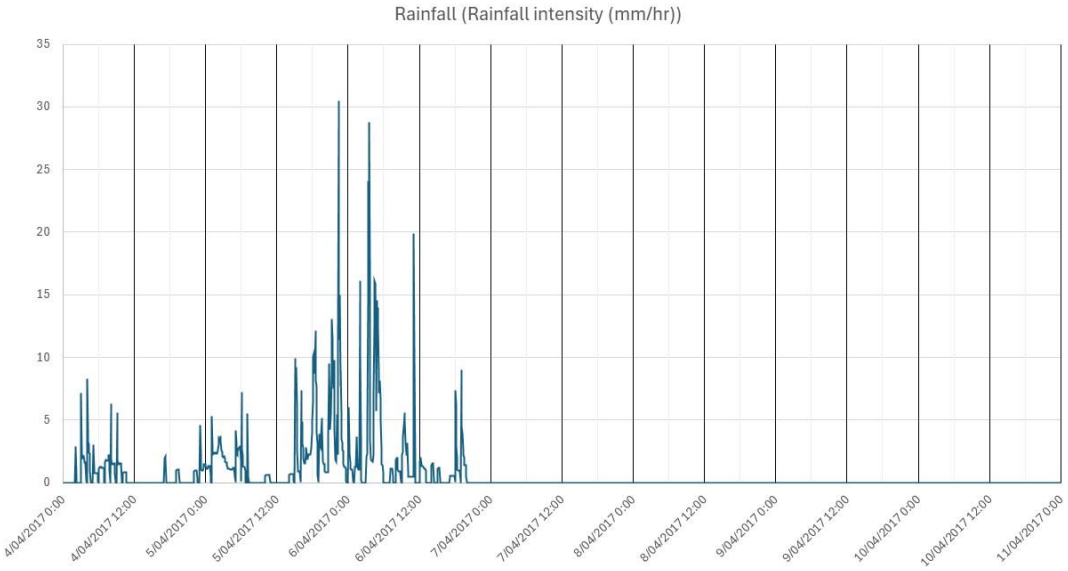


Figure 3. Wet Weather Flow – Rainfall Time Series.

3.4 NGA NETWORK SCHEME

Model results show that in the WWF, there are no overflows, see Appendix 2 for a base stage scenario. There were branches with a lack of capacity (surcharge state = 2), and they are located mainly from Pukerua 3 to Pukerua 8. Critical branches present a surcharge state larger than 1 at the branches Pukerua 3, 4, 9 and Plimmerton. It is evident that upstream of Pump Station 13 (PS13), the network has limited spare capacity. Other critical reach is located to the east of the pump station (along James Street), outside the main trunk line conveying flows toward Pukerua Bay. Overall, the existing network performs adequately under current (2018 baseline) conditions but has very limited available capacity to accommodate additional flows from the NGA without bulk upgrades. The following items represent key constraints within the network that limit upstream flows and future development capacity: shows the scheme used to evaluate the system performance of the existing public network. The level of service considered for this performance assessment corresponds to the existing scenario, the 2018 population for a WWF.

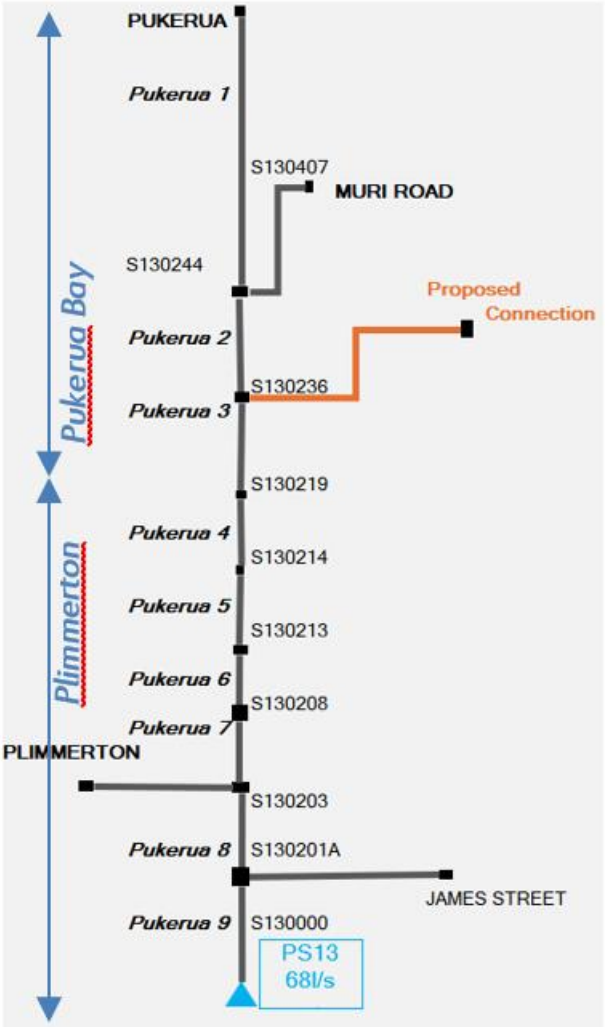


Figure 4. NGA Schema of The Provided Wastewater Model.

4.0 EXISTING SYSTEM PERFORMANCE

Model results show that in the WWF, there are no overflows, see Appendix 2 for a base stage scenario. There were branches with a lack of capacity (surcharge state = 2), and they are located mainly from Pukerua 3 to Pukerua 8. Critical branches present a surcharge state larger than 1 at the branches Pukerua 3, 4, 9 and Plimmerton. It is evident that upstream of Pump Station 13 (PS13), the network has limited spare capacity. Other critical reach is located to the east of the pump station (along James Street), outside the main trunk line conveying flows toward Pukerua Bay. Overall, the existing network performs adequately under current (2018 baseline) conditions but has very limited available capacity to accommodate additional flows from the NGA without bulk upgrades. The following items represent key constraints within the network that limit upstream flows and future development capacity:

- Reduction of pipe diameters between the branch Pukerua 4, from 315mm to 250mm, between manholes S130231 (PCC_W00792) and S130233 (PCC_WW007936).
- Low gradient values. Pukerua 4 with 0.42% and 8 with 0.325%.
- Pipe capacity reduction. See branches Muri Rd3, Pukerua 3, 4, 7 and 8.

Table 4 shows the following constraints in the existing network (highlighted in red):

Table 4. Network properties and model results for a WWF 2018 scenario.

Network Properties							Model Results – WWF 2018 (April 04 to April 10, 2017)			
BRANCH	Min Diam (mm)	Max Diam (mm)	Min Gradient %	Max Gradient %	Min Full Capacity (L/s)	Max Full Capacity (L/s)	Max. Flow (l/s)	Acum Vol (m^3)	Volume lost (m^3)	Max SS*
Pukerua 2	250	250	1.40	5.38	71	140	46.8	8314	0	0.6
Pukerua 3	250	315	0.429	8.22	39	208	46.0	8320	0	1
Pukerua 4	250	375	0.423	1.02	39	179	44.0	8321	0	2
Pukerua 5	375	375	0.53	0.53	129	129	43.5	8313	0	0.4
Pukerua 6	375	375	0.52	1.00	128	177	43.5	8313	0	0.4
Pukerua 7	375	375	0.45	0.51	119	127	43.4	8316	0	0.49
Pukerua 8	375	375	0.325	0.425	101	115	55.2	9575	0	0.53
Pukerua 9	375	375	0.72	15.81	151	706	60.6	10258	0	1
Plimmerton	150	150	0.33	5.20	9	35	12.0	1258	0	2
James St	150	150	0.32	31.76	9	88	7.3	683	0	0.74

(*) Surcharge State. 1 = Surcharge by depth (by backflow). 2 = surcharge by flow (by capacity)

5.0 PROPOSED NETWORK DESIGN

5.1 PROPOSED NETWORK

Given the undulating topography, the wastewater network has been designed as a predominantly gravity-based system, supported by six pump stations and several localised low-pressure areas. The catchments contributing to each pump station are illustrated in Figure 5. A detailed description of the proposed network layout is provided in the Civil Infrastructure Report (R001v1-1753-02).

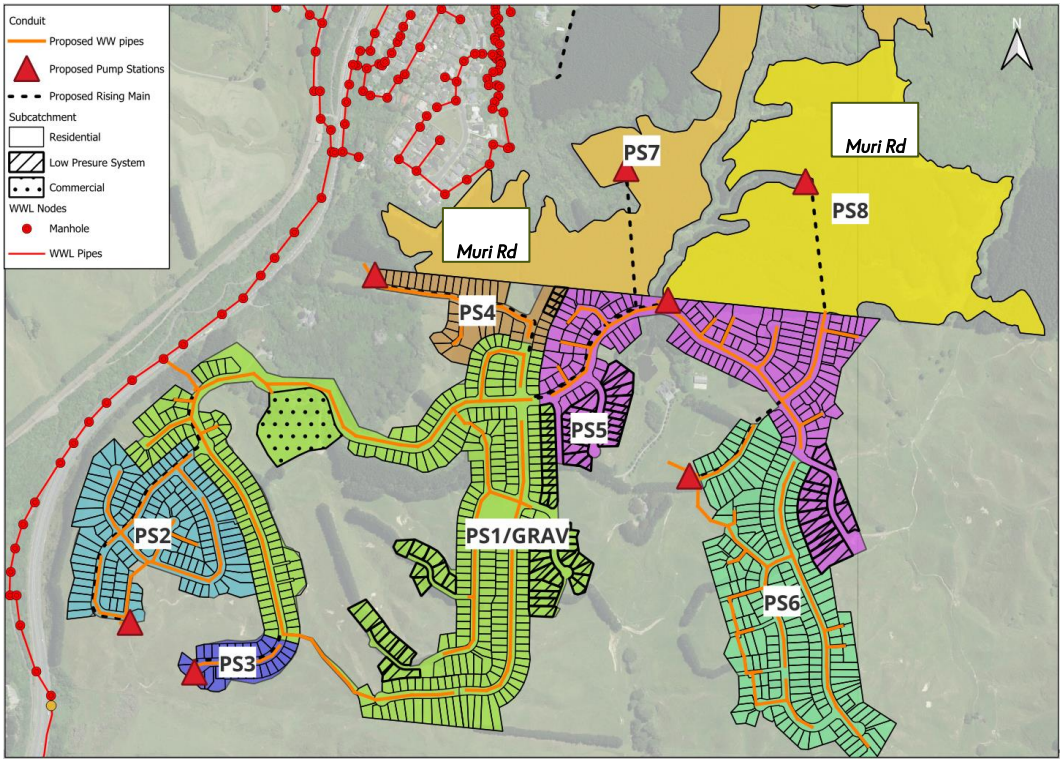


Figure 5. Model catchments.

The piped network is also designed to incorporate flows from the Muri Road development and convey them through this site to the SH59 bulk main. Collaborative discussions with the Muri Road project team are progressing to establish an integrated catchment solution.

Table 5 shows the main catchment descriptions for the wastewater design.

Table 5. Wastewater Catchment Description.

Asset ID	Gravity Area (ha)	Pressure Area (ha)	Gravity Lots	Pressure Lots	Yield (lots)	Population	Gravity Area (ha)
WWPS - 1	22.55	3.43	324	50	374	1309	22.55
WWPS – 2	8.90	0	136	0	136	476	8.90
WWPS – 3	1.71	0	27	0	27	94.5	1.71
WWPS – 4	3.03	0.15	38	4	42	147	3.03
WWPS – 5	10.83	3.16	139	32	171	598.5	10.83
WWPS – 6	13.83	0	203	0	203	710.5	13.83
WWPS - 7 Muri Rd West	15.25	0	250.0	0	250	875	15.25

5.2 MODELLED NETWORK

Table 6 summarises the wastewater network configuration adopted for the simulation. The proposed development ultimately discharges to the existing manhole PCC_WW007923 (model ID S130236), as shown in Figure 6.

In the model, low-pressure lots are assumed to discharge directly into the final gravity manhole, and no infiltration flow has been applied to these catchments.

Table 6. Modelled Network.

Nodes Total	232
Manholes	217
Storage	7
Outfall	8
Pipes	222
Orifice Fixed	2
Pump Fixed	8
Pipe Length (m)	9000
Pipe Size (mm)	150 - 300
Length 300mm	74m
Length 225mm	1565m
Length 150mm	7361m
Catchments	956
Catchments Contributing Area (ha)	82.76
Catchments Population Count	5086

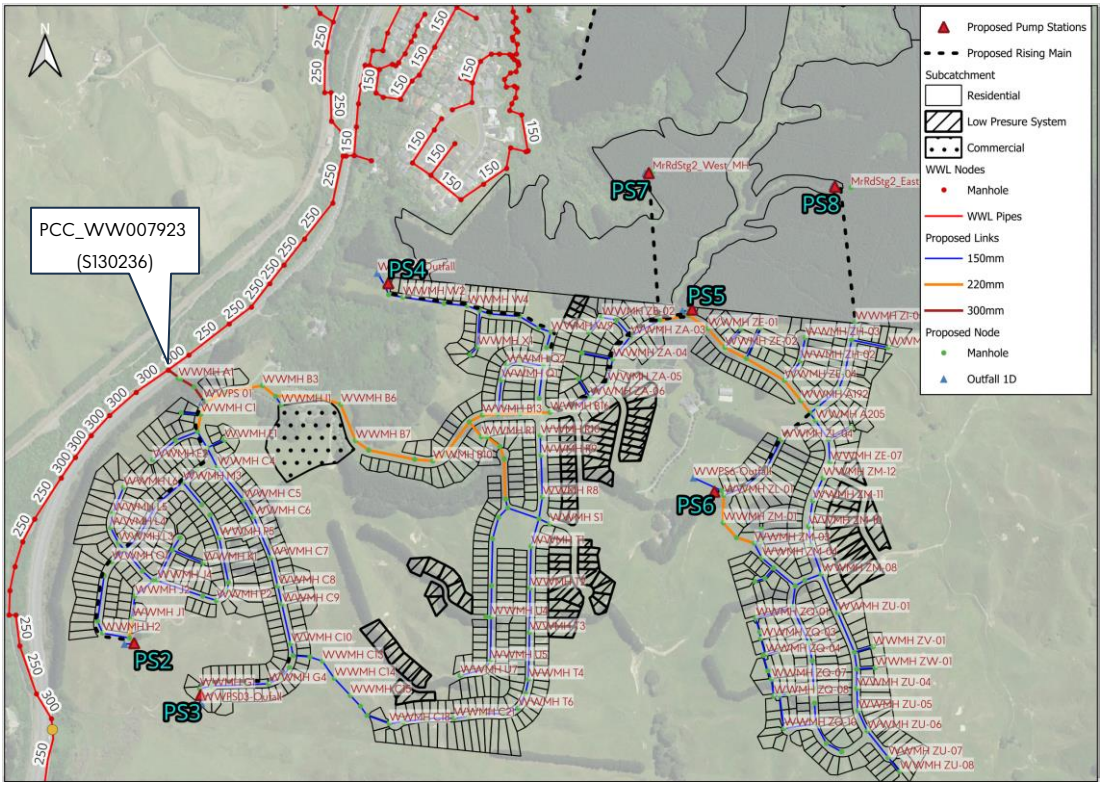


Figure 6. Proposed Wastewater Network.

5.3 PUMP AND STORAGE

Six wastewater pump stations are proposed across the Mt Wellington site. Five pump stations (PS2 to PS5) are designed solely to convey wastewater from local low points where gravity discharge is not achievable. Two pump stations (PS7 and PS8) were designed for the Muri East and West development, respectively. PS5 receives accumulated volume from other pump stations; from this, an accumulated ADWF has been included at the moment of the storage capacity. Pump Station 1 / attenuation tank (PS1) will serve as the primary peak wet-weather storage facility, providing the main attenuation function for the development prior to discharging to the existing bulk main. PS1 discharge rate will be controlled and rate-limited to align with the capacity of the downstream trunk network and the proposed bulk-main upgrades. Table 7 shows the proposed pump rates and wet well storage volumes. Appendix 1 includes the design calculation tables.

Table 7. Designed Pump Stations and Storage

Asset ID	Catchment	ADWF (l/s)	Acum. ADWF (l/s)	Design Storage [8hr] (m³)	Design Storage [12hr] (m³)	Design Storage [20hr] (m³)	No Pumps	Pump Rates (l/s)
WWPS - 1	Full Development	3.01	**11.70**	336.9	505.3	842.2	-	-
WWPS – 2	136 lots	1.09	=	31.5	47.3	78.8	1	6
WWPS – 3	27 lots	0.22	=	6.3	9.4	15.6	1	2
WWPS – 4	42 lots	0.34	=	9.7	14.6	24.3	1	2
WWPS – 5	171 lots	1.38	**7.04**	202.6	303.9	506.6	2	11 and 25
WWPS – 6	203 lots	1.63	=	47.1	70.6	117.7	1	7
(WWPS-7) Muri West*	250 lots	2.01	=	58.0	86.9	144.9	1	8.5
(WWPS-8) Muri East*	250 lots	2.01	=	58.0	86.9	144.9	1	8.5

5.4 MOUNT WELCOME WWF MODEL RESULTS

Appendix 2 shows a graph with the Mount Welcome model results for a level of service of WWF 2018. The model result shows that there is no overflow in the system, and the proposed network complies with the WWL specifications criteria in terms of velocity and capacity. The proposed development provides a peak discharge of approximately 56.24 L/s (14355m³ during the simulation period), servicing 1449 residential lots and a commercial area.

Table 8. Mount Welcome - WWF Model Results.

Asset ID	Max WWF (l/s)	Max. Vol (m³)	[8hrs] Max Storage (m³)	[12hrs] Max Storage (m³)	[20hrs] Max Storage (m³)
WWPS - 1	51.39	14363	-	-	-
WWPS – 2	4.2	1200	33	82	79
WWPS – 3	1.06	229	7	16	16
WWPS – 4	1.43	395	20	25	24
WWPS – 5	29.25	8991	92	322	546
WWPS – 6	6.54	1885	49	123	118
(WWPS-7) Muri West	15.6	2745	84	159	145
(WWPS-8) Muri East	16.03	2795	89	168	145

5.5 MODEL - STAGING

The proposed Mount Welcome development was divided into 25 stages of approximately 30 to 50 lots, as seen in Figure 7 and these were grouped by the addition of a new proposed pump station. Table 9 summarise the accumulated number of lots.

Table 9. Mt Welcome Staging description.

Stages	Accumulated No of Lots	Proposed Infrastructure
1-7	301	Gravity Network (GN)
8-12	472	GN + PS2
13	501	GN + PS2 + PS3
14	542	GN + PS2 + PS3 + PS4
15-18	738	GN + PS2 + PS3 + PS4 + PS5
19-23	949	GN + PS2 + PS3 + PS4 + PS5 + PS6
24	949 + Muri 1 (1199)	GN + PS1 + PS2 + PS3 + PS4 + PS5 + PS6 + PS7
25	949 + Muri 2 (1449)	GN + PS1 + PS2 + PS3 + PS4 + PS5 + PS6 + PS7 + PS8

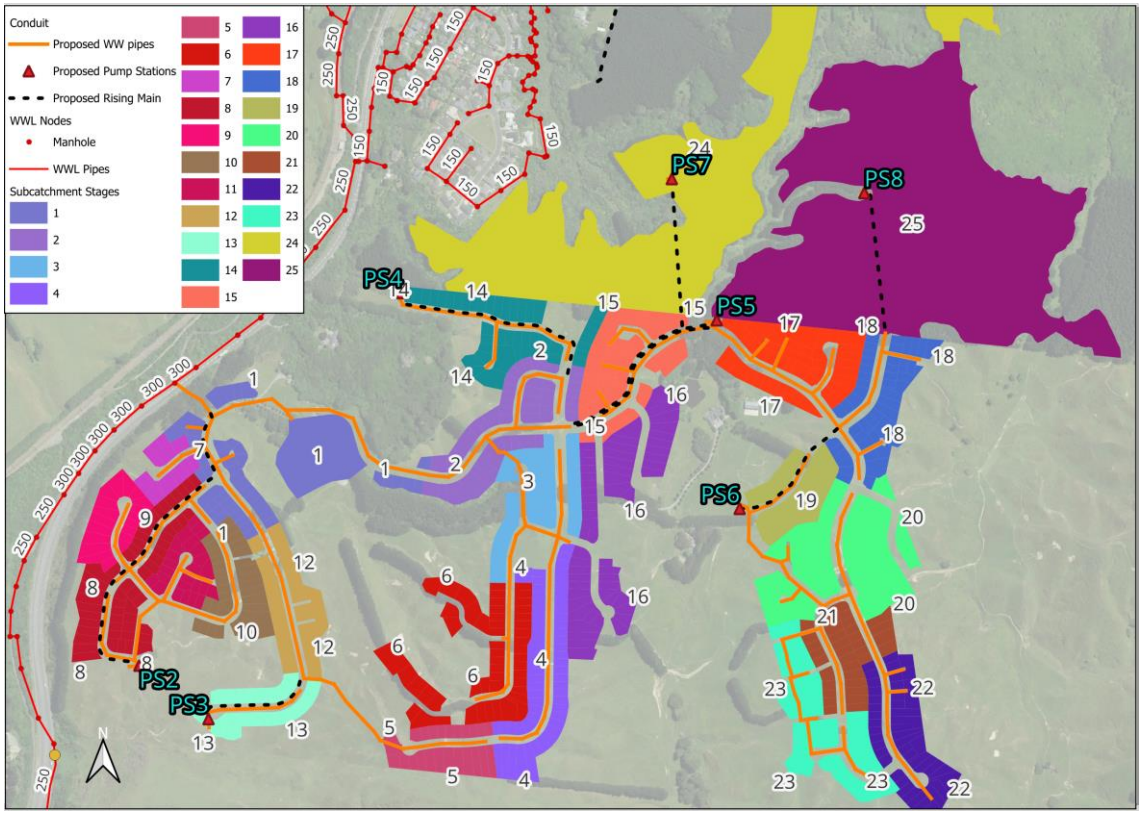


Figure 7. Mount Welcome – Stage locations

5.6 BASE STAGE - ASSUMPTIONS

The following are the main modelling assumptions for the assessment of wastewater impact:

- Population: 2018 population for all the stage scenarios around the catchment. These values were given in the provided model.
- Muri Road Development Stage 1: The development located at 34 Muri Road is not included in any of the stages. This development would discharge upstream pump station PS30.
- Plimmerton Farm development: This proposed development was not included into the assessment of the bulk main, due to the unknown development programme and the development discharging lower into the catchment. Development programmes are further detailed in the Infrastructure Report,

Appendix 3 and Appendix 4. shows the model results for the base stage scenario.

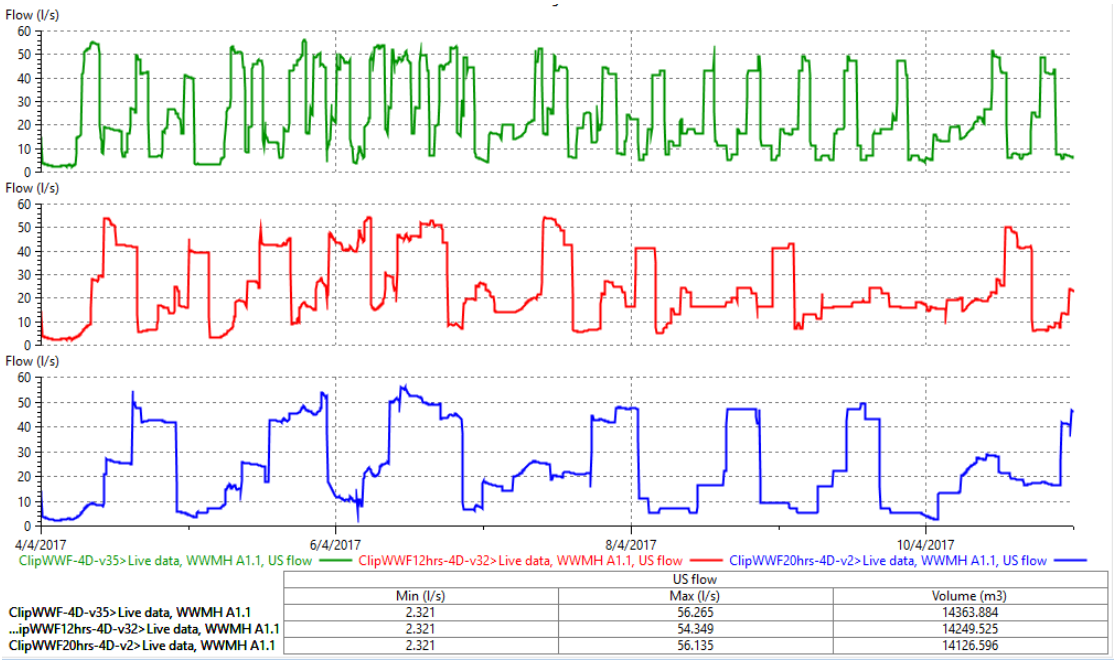
5.7 STAGING MODEL RESULTS

Table 10 shows the peak flows and the accumulated volume discharged into the existing network for the 8-, 12- and 20-hours storage duration together with the overflows in Pukerua Bay (between bulk manholes S130236 and S130218) and Plimmerton (manholes between S130218 and PS13). From the model results it is possible to confirm that just with the Mount Welcome development (stages 1 to 23) there is no overflows in the existing network, as soon as Muri Road development is included, both on-site storage and bulk network upgrades become essential to accommodate additional flows.

Under the full NGA development, total overflow volumes are approximately 360m^3, 562m^3, and 578 m^3 for the 8-, 12-, and 20-hour storage scenarios respectively, assuming no PS1 attenuation or bulk upgrades. These differences arise from the way the internal pump stations at Mount Welcome discharge to the network—shorter storage durations result in more frequent pump activation, which reduces the peak load on the downstream system over time, as illustrated in Figure 8.

Table 10. Model Results WWF-2018 – Bulk network overflows.

Stage	Acum. No Lots	Proposed Infrastructure	Storage Vol. Duration	Mount Welcome Max Flow/Vol	Pukerua Bay Overflow	Plimmerton Overflow
1-12	472	Gravity network +PS2	8 hrs	15.7 l/s | 4455 m³	None	None
			12 hrs	16.0 l/s | 4475 m³		
			20 hrs	17.2 l/s | 4420 m³		
1-14	542	Gravity network +PS2 +PS3+PS4	8 hrs	19.59 l/s | 5093 m³	None	None
			19 hrs	19.3 l/s | 5120 m³		
			20 hrs	20.6 l/s | 5033 m³		
1-18	738	Gravity network +PS2+PS3+PS4+PS5	8 hrs	30.7 l/s| 6854 m³	None	None
			12 hrs	28.1 l/s | 6835 m³		
			20 hrs	27.3 l/s | 6662 m³		
1-23	949	Gravity network +PS2+PS3+PS4+PS5+PS6 ***See Appendix 3.***	8 hrs	31.26 l/s | 8855 m³	None	None
			12 hrs	31.2 l/s | 8831 m³		
			20 hrs	32.0 l/s | 8778 m³		
1-24	1199	Gravity network +PS2+PS3+PS4+PS5 +PS6+PS7	8 hrs	55.9 l/s | 11586 m³	[1] S130219 (96 m³)	None
			12 hrs	56.2 l/s | 11535 m³	[1] S130219 (74 m³)	[3] S133404 (92 m³), S130207 (61 m³) and S130204 (47 m³)
			20 hrs	54.1 l/s | 11382 m³	[1] S130219 (66 m³)	[3] S133404 (57 m³), S130207 (33 m³) and S130204 (10 m³)
1-25 FULL	1449	Gravity network +PS2+PS3+PS4+PS5 +PS6+PS7+PS8. ***See Appendix 3 and Appendix 4*** for the full development scenario.	8 hrs	56.3 l/s | 14355 m³	[1] S130219 (193 m³)	[3] S133404 (84 m³), S130207 (49 m³) and S130204 (34 m³)
			12 hrs	54.4 l/s | 14250 m³	[1] S130219 (189 m³)	[3] S133404 (192 m³), S130207 (108 m³) and S130204 (74 m³)
			20 hrs	56.2 l/s | 14127 m³	[1] S130219 (187 m³)	[3] S133404 (204 m³), S130207 (118 m³) and S130204 (69 m³)



	US flow		
	Min (l/s)	Max (l/s)	Volume (m3)
ClipWWF-4D-v35>Live data, WWMH A1.1	2.321	56.265	14363.884
...ipWWF12hrs-4D-v32>Live data, WWMH A1.1	2.321	54.349	14249.525
ClipWWF20hrs-4D-v2>Live data, WWMH A1.1	2.321	56.135	14126.596

Figure 8. Mt Welcome full development discharge for different storage duration

Figure 8 illustrates the discharge profiles for each storage scenario—8 hours (green), 12 hours (red), and 20 hours (blue). While the total discharged volume is the same across all scenarios, the 8-hour storage option distributes flows more evenly, resulting in improved flow management from the site and preventing overflows within the bulk network.

Table 11 shows the maximum storage capacity per pump station and the pump activation count within the modelling period. Notice that the PS5 wet weather pump is needed when the Muri development is in place. Under this combined, fully developed NGA scenario, substantial storage capacity is required to manage peak wet-weather discharges as seen in the 20-hour duration for PS-5.

Table 11. Model Results WWF-2018 – Maximum Storage and Pump Station activation count.

	Storage Vol. Duration	Stage 1-12	Stage 1-14	Stage 1-18	Stage 1-23	Stage 1-24	Stage 1-25 [Full]
PS-2	8 hrs	33 m³ [24]	33 m³ [24]	33 m³ [24]	33 m³ [24]	33 m³ [24]	32 m³ [24]
	12 hrs	49 m³ [17]	49 m³ [17]	49 m³ [17]	49 m³ [17]	49 m³ [17]	49 m³ [17]
	20 hrs	82 m³ [11]	82 m³ [11]	82 m³ [11]	82 m³ [11]	82 m³ [11]	82 m³ [11]
PS-3	8 hrs	-	7 m³ [25]	7 m³ [25]	7 m³ [25]	7 m³ [25]	7 m³ [25]
	12 hrs	-	10 m³ [18]	10 m³ [18]	10 m³ [18]	10 m³ [18]	10 m³ [18]
	20 hrs	-	36 m³ [6]	36 m³ [6]	36m³ [6]	6 m³ [6]	36 m³ [6]
PS-4	8 hrs	-	10 m³ [25]	10 m³ [25]	10 m³ [25]	10 m³ [25]	10 m³ [25]
	12 hrs	-	15 m³ [17]	15 m³ [17]	15 m³ [17]	15 m³ [17]	15 m³ [17]
	20 hrs	-	24 m³ [11]	24 m³ [11]	24 m³ [11]	24 m³ [11]	24 m³ [11]
PS-5	8 hrs	-	-	61 m³ [20] and [0]	61 m³ [16] and [0]	91 m³ [18] and [14]	92 m³ [16]and [25]
	12 hrs	-	-	196 m³ [7] and [0]	196 m³ [10] and [0]	321 m³ [6] and [3]	321 m³ [11]and [10]
	20 hrs			282 m³ [5] and [0]	282 m³ [8] and [0]	545 m³ [5] and [2]	545 m³ [8]and [8]
PS-6	8 hrs	-	-	-	49 m³ [21]	49 m³ [21]	49 m³ [21]
	12 hrs	-	-	-	74 m³ [15]	74 m³ [15]	74 m³ [15]
	20 hrs	-	-	-	123 m³ [21]	123 m³ [21]	123 m³ [21]
PS-7	8 hrs	-	-	-	--	83 m³ [19]	83 m³ [19]
	12 hrs	-	-	-	--	90 m³ [14]	90 m³ [14]
	20 hrs	-	-	-	--	160 m³ [9]	160 m³ [9]
PS-8	8 hrs	-	-	-	-	-	89 m³ [19]
	12 hrs	-	-	-	-	-	102 m³ [13]

	20 hrs	-	-	-	-	-	170 m³ [9]

Hydraulic modelling indicates that Mt Welcome can discharge via gravity without on-site attenuation at PS1 or bulk network upgrades if developed solely. This provides a peak discharge of approximately 31.26 L/s, servicing 949 residential lots and a commercial area. This scenario assumes no concurrent NGA development and demonstrates the feasibility of gravity servicing while deferring the need for large-scale storage infrastructure.

6.0 ALTERNATIVE OPTIONS

To address the constraints identified in Section 5, three mitigation approaches have been assessed:

- Bulk network upgrades only,
- On-site attenuation/storage only, and
- A combined approach using both bulk upgrades and storage at PS1.

Each option is summarised below, including the various internal pump-rate settings and storage configurations assessed.

6.1 BULK NETWORK UPGRADES ONLY

Under this option, development flows are mitigated solely by increasing the downstream conveyance capacity of the existing wastewater trunk main. No on-site attenuation is provided.

The following upgrades along the bulk network are considered:

- **Upgrade 1.** 210m of the existing DN225 wastewater main to DN375. This section follows the Ara Harakeke Pathway alignment, avoiding the trafficable off-ramp from SH59 to Airlie Road.
- **Upgrade 2**. 22m section of the existing DN225 wastewater main to DN375. Two approaches are being considered: either replacing the existing main in its current alignment or installing a new section within the SH59 berm
- **Upgrade 3**. The final stage of works involves upgrading approximately 163m of the existing DN225 main to DN375. This may be achieved either by replacing the existing pipe or by constructing a new bypass.

These upgrades will increase trunk-main capacity from 66 L/s to 93 L/s, providing an additional 27 L/s of conveyance and resulting in approximately 47 L/s of available capacity near Mt Welcome.

Table 12 shows some of the results after upgrades 1 to 3 and 1 to 4.

Table 12. Model Results WWF 2018 – Option with bulk network upgrade.

Stage	Proposed Solution	Mount Welcome Max Flow	Pukerua Bay Overflow	Plimmerton Overflow
1-24	v-2 Replace trunk pipe S130221.1, S130219.1, S130224, S130225 and S130226	55.6 [14355m³]	None	[3] S133404 (14 m³), S130207 (26 m³) and S130204 (5 m³)
	v 30 Replace trunk pipe S130221.1, S130219.1, S130224, S130225 and S130226. Sealing S130207	55.6 [14355m³]	None	[3] S133404 (28 m³), and S130204 (16 m³)
1-25	v-2 Replace trunk pipe S130221.1, S130219.1, S130224, S130225 and S130226	55.6 [14355m³]	None	[3] S133404 (126 m³), S130207 (174 m³) and S130204 (61 m³)
	v 31 Replace trunk pipe S130221.1, S130219.1, S130224, S130225 and S130226. *See Appendix 3.*	55.6 [14355m³].	None	[3] S133404 (226 m³), and S130204 (135 m³)

Residual overflows remain under full development scenarios. The approximate lost volume (spill) during the simulation period, with a development until stage 24 is 45 m³, and after the full development is 361 m³.

6.2 ATTENUATION TANK ONLY

This option manages development flows by throttling discharge at PS1 and providing on-site attenuation storage before connection to the trunk network. No downstream bulk upgrades are undertaken.

A number of configurations have been simulated to optimise the volume of the tanks, and at the same time reduce the spill volume downstream and ensure the tank is emptied. These simulations are shown in Table 13. The use of this attenuation device is more effective in order to reduce overflows downstream.

Table 13. Model Results WWF 2018 – Option with PS1 / attenuation tank.

Stage	Proposed Solution	Mount Welcome Max Flow	Pukerua Bay Overflow	Plimmerton Overflow
1-24	v-2 PS1-20l/s Grav: 15l/s Storage: 605 m³|360m²	35 l/s [11100m³]	[1] S130219 (23 m³)	[3] S133404 (91 m³), S130207 (80 m³) and S130204 (20 m³)
	v-32 Grav: 27l/s +1 Storage: 697 m³ | 400 m²	28.l/s [10950m³]	None	None
1-25	v-2 PS1-15l/s Grav: 12.1l/s Storage: 1936 m³. | 400m²	27.1 l/s [14349m³]	None	None
	v-32 Grav: 27l/s +1 Storage: 1584 m³ | 400 m² ***See Appendix 3.***	28 l/s [13398m³]	None	None

The use of this attenuation device is more effective than an upgrade only option in order to reduce overflows downstream.

6.3 COMBINED NETWORK UPGRADES AND ATTENUATION

This hybrid option utilises both upstream attenuation and targeted downstream upgrades to optimise performance and reduce reliance on very large tank volumes.

Table 14 summarises the assessment of various combinations of gravity discharge, pump discharge, and attenuation storage, along with the resulting overflows at key locations in the network.

Table 14. Model Results WWF 2018 – Option with bulk upgrade and PS1.

Stage	Proposed Solution	Mount Welcome Max Flow	Pukerua Bay Overflow	Plimmerton Overflow
1-24	v-2 PS1-20l/s Grav: 15l/s Storage: 605 m³ Replacing bulk pipes (1 to 3).	35 l/s [11100m³]	[1] S130219 (23 m³)	[3] S133404 (91 m³), S130207 (80 m³) and S130204 (20 m³)
	v34 Grav: 27l/s +1 Storage: 688 m³ Replacing bulk pipes (1 to 4).	28.L/S 10960m³	None	None
1-25	v-10 PS1-0l/s Grav: 40+2 l/s Storage: 377 m³ Replacing bulk pipes (1 to 3). ***See Appendix 3.***	42.2 l/s [14435m³]	None	S133404 (79 m³) S130207 (42 m³) and S130204 (33 m³)

Stage	Proposed Solution	Mount Welcome Max Flow	Pukerua Bay Overflow	Plimmerton Overflow
	v-17 PS1-0l/s Grav: 40+1 l/s Storage: 457 m³ Replacing bulk pipes (1 to 3).	41.3 l/s [14081m³]	None	S133404 (91 m³) S130207 (33 m³) and S130204 (30 m³)
	v-19 Grav: 30+5 l/s Storage: 635 m³ Replacing bulk pipes (1 to 4). ***See Appendix 3.***	36/14296m³	None	S133404 (61 m³) and S130204 (3 m³)
	v-23 Grav: 30l/s +1 Storage: 826 m³ Replacing bulk pipes (1 to 4).	31l/s/11871 [P1-SPILL]	None	S133404 (37 m³) and S130204 (20 m³)
	v-25 Grav: 25l/s +0.5 Storage: 1033 m³ Replacing bulk pipes (1 to 4).	25.5L/S 12986m³ [P1-SPILL]	None	None
	v-28 Grav: 27l/s +1 Storage: 1241 m³ Replacing bulk pipes (1 to 4).	28.55L/S 13304m³ [P1-SPILL]	None	None /S133404 (3 m³)
	v30 Grav: 27l/s +1 Storage: 1587 m³ Replacing bulk pipes (1 to 4). ***See Appendix 3. and Appendix 4.***	28.L/S 13398m³	None	None

7.0 CONCLUSIONS

General Conclusions:

- Unsteady-flow modelling provides a more accurate representation of the existing network's performance under the assumptions outlined in Section 9.1
- The wet weather flows with historic rainfall data reflect a better representation of the inflows and infiltration within the wastewater network.
- The modelling outputs have been used to develop a compliant wet-weather network design, incorporating six pump stations that meet the following standards:
    - Regional Standard for Water Services, RSWS, Version 3.0.
    - Regional Wastewater Model Specification: Modelling Specifications – Draft 2020
    - Wellington Water's Pressure Sewer Design Guide and Water Services Association of Australia WSA 0716.

Staging Key Conclusions:

- The full development discharges a peak flow of 56.2 l/s servicing 1449 residential lots and a commercial area (1.7 ha). The final discharged manhole is PCC_WW007923 (model ID S130236). This peak flow considers the fully developed Mount Welcome internal design, where pump rates and storage volumes are critical to end up with this value. This flow and volume impact the existing wastewater network, generating a total overflow of 389m³, see Table 10. This assessment does not include any attenuation or storage at PS1, nor does it account for bulk network upgrades.
- The Mount Welcome development, excluding Muri Road Stage 2, can discharge a peak gravity flow of approximately 32 L/s without impacting the downstream network or creating any new overflows
- Including the Muri Road development, both on-site storage and bulk network upgrades become essential to accommodate fully developed flows.
- An assessment of different pump storage duration designs was undertaken, providing more confidence in the proposed wastewater design. The 8-hour storage duration for the proposed pump stations results in a lower impact on the downstream network, as seen in Figure 8 and Table 10.

- The bulk upgrade option increases the capacity in the Porirua Bay reaches (near to Mt Welcome); however, this allows more flow going down where the network near PS13 turns more critical. The bulk upgrades essentially move the overflows from Pukerua Bay to Plimmerton with a maximum overflow volume of 361m³, if attenuation at PS1 is not considered, see Table 12.
- Using PS1, or an attenuation device upstream of the discharge point, is the most effective option for reducing downstream overflows. This approach can reduce peak flows from 56.2 L/s to approximately 28 L/s, keeping the system within critical capacity without further upgrades to the existing network and without causing downstream spills. However, the required storage volume for this device is significant, and at larger sizes it becomes impractical as a standalone solution.
- A combination of bulk upgrades and on-site storage within PS1 can limit the site discharge to 28 L/s and prevent overtopping in the bulk network upstream of PS13. For the fully developed site, this approach would require approximately 1,590m³ of storage.
- Alternatively, combining bulk upgrades with on-site storage to limit discharge to 42 L/s reduces the required PS1 storage volume to 380m³. However, this scenario results in some overtopping in the downstream network near Plimmerton. These effects could be mitigated through additional downstream upgrades or network sealing, which should be considered when it becomes critical in later development stages.

8.0 ADHERENCE TO THE EXPERT CONDUCT CODE.

While this is not a matter before the Environment Court, the author of this report has read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 ('Code'). The author has complied with the Code in the preparation of this report.

The data, information, facts and assumptions the author has considered as part of this report are set out in this report. The reasons for the conclusions of the report are also set out in this report. Unless stated otherwise, this report is within the author's expertise, and the author has not omitted to consider material facts known to him that might alter or detract from the opinions expressed.

9.0 LIMITATIONS

This report has been prepared for the project described to us and its extent is limited to the scope of work agreed between the client and Envelope Engineering Limited. No responsibility is accepted by Envelope Engineering Limited or its directors, servants, agents, staff or employees for the accuracy of information provided by third parties and/or the use of any part of this report in any other context or for any other purposes.

APPENDICES

APPENDIX 1
WASTEWATER DESIGN TABLES

Client	Classic developments NZ Ltd
Project Site	Mt Welcome SH 59 - Pukerua Bay- Porirua
Envelope Ref	1753-02
Version	1
Date	30/10/2025

ENVELOPE

WASTEWATER MAXIMUM DEVELOPMENT FLOWS - PUMPSTATION

WWPS 1 STORAGE

Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	324.00	50.00	374.00		**WWPS 1 - Residential**
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	3.877	1.000	-		Wellington 5.3.2.1
Total ADWF	2.608	0.403	3.011	litres/second	Ave Dry Weather Flow
Total PDWF	10.112	0.403	10.515	litres/second	Peak Dry Weather Flow
Total PWWF	12.175	0.403	12.577	litres/second	Peak Wet Weather Flow
Catchment Area	22.55	3.43	25.98	ha	
Pipe Length	3.38	0.00	3.38	km	
Total Discharge used for pipe sizing L/s) =					**12.68**

WWPS 2

Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	136	0	136.00		**WWPS 2 - Residential**
People per dwelling	3.500		-		Assumed max occupants per unit
ADWF per person	0.002		-	litres/s	Wellington 5.3.1.3
Peaking factor PF	4.670	1.000	-		Wellington 5.3.2.1
Total ADWF	1.095		1.095	litres/second	Ave Dry Weather Flow
Total PDWF	5.112		5.112	litres/second	Peak Dry Weather Flow
Total PWWF	5.867		5.867	litres/second	Peak Wet Weather Flow
Catchment Area	8.90		8.90	ha	ha
Pipe Length	1.24	0.00	1.24	km	km
Total Discharge used for pipe sizing L/s) =					**5.87**

WWPS 3

Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	27	0	27.00		**WWPS 3 - Residential**
People per dwelling	3.500		-		Assumed max occupants per unit
ADWF per person	0.002		-	litres/s	Wellington 5.3.1.3
Peaking factor PF	6.495	1.000	-		Wellington 5.3.2.1
Total ADWF	0.217		0.217	litres/second	Ave Dry Weather Flow
Total PDWF	1.412		1.412	litres/second	Peak Dry Weather Flow
Total PWWF	1.532		1.532	litres/second	Peak Wet Weather Flow
Catchment Area	1.71		1.71	ha	ha
Pipe Length	0.20	0.00	0.20	km	km
Total Discharge used for pipe sizing L/s) =					**1.53**

WWPS 4

Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	38	4	42.00		**WWPS 4 - Residential**
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	5.793	1.000	-		Wellington 5.3.2.1
Total ADWF	0.306	0.032	0.338	litres/second	Ave Dry Weather Flow
Total PDWF	1.772	0.032	1.804	litres/second	Peak Dry Weather Flow
Total PWWF	2.042	0.032	2.075	litres/second	Peak Wet Weather Flow
Catchment Area	3.03	0.15	3.18	ha	ha
Pipe Length	0.44	0.00	0.44	km	km
Total Discharge used for pipe sizing L/s) =					**2.04**

WWPS 5

Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	139	32	171.00		**WWPS 5 - Residential**
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	4.490	1.000	-		Wellington 5.3.2.1
Total ADWF	1.119	0.258	1.377	litres/second	Ave Dry Weather Flow
Total PDWF	5.024	0.258	5.281	litres/second	Peak Dry Weather Flow
Total PWWF	5.915	0.258	6.173	litres/second	Peak Wet Weather Flow
Catchment Area	10.83	3.16	13.99	ha	ha
Pipe Length	1.46	0.00	1.46	km	km
Total Discharge used for pipe sizing L/s) =					**5.91**

WWPS 6					
Development	**Gravity**	**Pressure**	**Total**	**Units**	**Comments**
Number of dwellings	203.00	0.00	203.00		**WWPS 6 - Residential**
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	4.275	1.000	-		Wellington 5.3.2.1
Total ADWF	1.634		1.634	litres/second	Ave Dry Weather Flow
Total PDWF	6.987		6.987	litres/second	Peak Dry Weather Flow
Total PWWF	8.104		8.104	litres/second	Peak Wet Weather Flow
Catchment Area	13.83	0.00	13.83	ha	ha
Pipe Length	1.83	0.00	1.83	km	km
Total Discharge used for pipe sizing L/s) =					**8.10**

WWPS MrRdStg2West					
Development	**Gravity**	**Pressure**	**Total**	**Units**	**Comments**
Number of dwellings	250.00	0.00	250.00		**WWPS MrRdStg2West - Residential**
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	4.193	1.000	-		Wellington 5.3.2.1
Total ADWF	2.013		2.013	litres/second	Ave Dry Weather Flow
Total PDWF	8.438		8.438	litres/second	Peak Dry Weather Flow
Total PWWF	15.879		15.879	litres/second	Peak Wet Weather Flow
Catchment Area	15.25	0.00	15.25	ha	ha
Pipe Length	12.20	0.00	12.20	km	km
Total Discharge used for pipe sizing L/s) =					**15.88**

WWPS MrRdStg2East					
Development	**Gravity**	**Pressure**	**Total**	**Units**	**Comments**
Number of dwellings	250.00	0.00	250.00		**WWPS MrRdStg2East - Residential**
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	4.163	1.000	-		Wellington 5.3.2.1
Total ADWF	2.013		2.013	litres/second	Ave Dry Weather Flow
Total PDWF	8.378		8.378	litres/second	Peak Dry Weather Flow
Total PWWF	16.089		16.089	litres/second	Peak Wet Weather Flow
Catchment Area	15.80	0.00	15.80	ha	ha
Pipe Length	12.64	0.00	12.64	km	km
Total Discharge used for pipe sizing L/s) =					**16.09**

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WASTEWATER MAXIMUM DEVELOPMENT FLOWS - PUMPSTATION

CONCEPT WASTEWATER SIZING

Node	Catchment Area (Residential)	Number of dwellings	Catchment Area (Commercial)	ADWF (Residential)	PDWF (Residential)	PWWF (Residential)	PWWF (Combined)	Cumulative PWWF,	PIPE CROSS-SECTIONAL AREA	PIPE MATERIAL	'n' FACTOR	PIPE SIZE	SLOPE	VELOCITY	CAPACITY	SPARE CAPACITY	GRAVITY PIPE LENGTH
	ha	no	ha	l/s	l/s	l/s	l/s	l/s				mm	%		l/s	l/s	m
WWPS1	25.98	374	1.74	3.01	10.51	12.58	12.68	31.98	0.020	PE	0.011	**160.00**	1.000	0.63	**21.4**	-10.6	3381.00
				11.70	19.20	68.30	68.40										
WWPS2	8.90	136	0.00	1.09	5.11	5.87	5.87	5.87	0.020	PE	0.011	**160.00**	1.000	0.29	**21.4**	**15.5**	1238.00
				1.09	5.11	5.87	5.87										
WWPS3	1.71	27	0.00	0.22	1.41	1.53	1.53	1.53	0.020	PE	0.011	**160.00**	1.000	0.08	**21.4**	**19.8**	198.00
				0.22	1.41	1.53	1.53										
WWPS4	3.18	42	0.00	0.34	1.80	2.07	2.07	2.07	0.020	PE	0.011	**160.00**	1.000	0.10	**21.4**	**19.3**	443.00
				0.34	1.80	2.07	2.07										
WWPS5	13.99	171	0.00	1.38	5.28	6.17	6.17	17.11	0.020	PE	0.011	**160.00**	1.000	0.85	**21.4**	**4.3**	1461.00
				7.04	10.94	46.24	46.24										
WWPS6	13.83	203	0.00	1.63	6.99	8.10	8.10	8.10	0.020	PE	0.011	**160.00**	1.000	0.40	**21.4**	**13.3**	1832.00
				1.63	6.99	8.10	8.10										
WWPSMrRdStg2West	15.25	537	0.00	2.01	8.44	15.88	15.88	15.88	0.020	PE	0.011	**160.00**	1.000	0.79	**21.4**	**5.5**	1461.00
				2.01	8.44	31.97	31.97										
WWPSMrRdStg2East	15.80	374	0.00	2.01	8.38	16.09	16.09	16.09	0.020	PE	0.011	**160.00**	1.000	0.80	**21.4**	**5.3**	1832.00
				2.01	8.38	16.09	16.09										

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ENVELOPE

WASTEWATER MAXIMUM DEVELOPMENT FLOWS - STORAGE DIMENSIN

CONCEPT WASTEWATER SIZING

	REQUIREMENTS						NTWK PROPERTIES						STORAGE / WET WELL PROPERTIES												PUMP STATION			
Pump Station	**Cumulative ADWF litres/second**	**PDWF litres/second**	**PWWF litres/second**	**Storage Required (hours)**	**Total Storage Required (L)**	**Total Storage Required (m3)**	**Wet Well Ground Level [mRL]**	**Discharge Invert Level [mRL]**	**Discahrge Pipe Slope [%]**	**Discharge Pipe Length**	**Discharge Pipe Diam [mm]**	**Depth to US Suffit [m]**	**Storage Type**	**Number Wet Well**	**Diam [m]**	**Length [m]**	**Width [m]**	**Area Storage [m²]**	**Height (Above Pump Start Level) [m]**	**Permanent Wet Well Height [m]**	**Free Level [m]**	**Total Heigh [m]**	**New Floor Level**	**Invert Outfall Pipe [mm]**	**Swicth ON Level [mRL]**	**Swicth OFF Level [mRL]**	**Pump Rate [l/s]**	**Pump 1 Rate [m³/s]**
Pumpstation 1	11.70	19.20	32.0	**8.0**	336863.5	**336.9**	59.074	56.502	0.75%	6.70	300	2.22	RECT	1	1	15	5	75.00	4.49	0.1	2.22	6.8	52.26	56.85	56.85	52.36	20.00	0.020
Pumpstation 2	1.09	5.11	5.9	**8.0**	31530.2	**31.5**	52.915	50.302	1.00%	15.00	300	2.16	CIRC	1	3.5			9.62	3.28	0.1	2.16	5.5	47.37	50.75	50.75	47.47	6.00	0.006
Pumpstation 3	0.22	1.41	1.5	**8.0**	6259.7	**6.3**	62.787	60.649	1.50%	13.50	300	1.64	CIRC	1	2.5			4.91	1.28	0.1	1.64	3.0	59.77	61.15	61.15	59.87	2.00	0.002
Pumpstation 4	0.34	1.80	2.1	**8.0**	9737.3	**9.7**	83.784	82.309	1.50%	19.50	300	1.00	CIRC	1	2.5			4.91	1.98	0.1	1.00	3.1	80.70	82.78	82.78	80.80	2.00	0.002
Pumpstation 5	7.04	10.94	17.1	**8.0**	202628.2	**202.6**	109.771	107.502	2.00%	7.50	300	1.82	CIRC	3	3.2			72.38	2.8	0.1	1.82	4.7	105.05	107.95	107.95	105.15	11.00	0.011
Pumpstation 6	1.63	6.99	8.1	**8.0**	47063.5	**47.1**	110.627	107.892	2.00%	10.00	300	2.24	CIRC	2	2.5			19.63	2.4	0.1	2.24	4.7	105.89	108.39	108.39	105.99	7.00	0.007
Pumpstation 7	2.01	8.44	15.9	**8.0**	57960.0	**58.0**	96.5	94.5	1.00%	10.00	300	1.60	CIRC	2	3			28.27	2.05	0.1	1.60	3.8	92.75	94.90	94.90	92.85	8.50	0.009
Pumpstation 8	2.01	8.38	16.1	**8.0**	57960.0	**58.0**	132.5	130.5	1.00%	10.00	300	1.60	CIRC	2	3			28.27	2.05	0.1	1.60	3.8	128.75	130.90	130.90	128.85	8.40	0.008

Client	Classic developments NZ Ltd
Project Site	Mt Welcome SH 59 - Pukerua Bay- Porirua
Envelope Ref	1753-02
Version	1
Date	13/11/2025

ENVELOPE

WASTEWATER MAXIMUM DEVELOPMENT FLOWS - STORAGE DIMENSION

CONCEPT WASTEWATER SIZING

	REQUIREMENTS						NTWK PROPERTIES						STORAGE / WET WELL PROPERTIES												PUMP STATION			
Pump Station	**Cumulative ADWF litres/second**	**PDWF litres/second**	**PWWF litres/second**	**Storage Required (hours)**	**Total Storage Required (L)**	**Total Storage Required (m3)**	**Wet Well Ground Level [mRL]**	**Discharge Invert Level [mRL]**	**Discahrge Pipe Slope [%]**	**Discharge Pipe Length**	**Discharge Pipe Diam [mm]**	**Depth to US Suffit [m]**	**Storage Type**	**Number Wet Well**	**Diam [m]**	**Length [m]**	**Width [m]**	**Area Storage [m²]**	**Height (Above Pump Start Level) [m]**	**Permanent Wet Well Height [m]**	**Free Level [m]**	**Total Heigh [m]**	**New Floor Level**	**Invert Outfall Pipe [mm]**	**Swicth ON Level [mRL]**	**Swicth OFF Level [mRL]**	**Pump Rate [l/s]**	**Pump 1 Rate [m³/s]**
Pumpstation 1	11.70	19.20	32.0	**12.0**	505295.3	**505.3**	59.074	56.502	0.75%	6.70	300	2.22	RECT	1	1	25	10	250.00	2.02	0.1	2.22	4.3	54.73	56.85	56.85	54.83	20.00	0.020
Pumpstation 2	1.09	5.11	5.9	**12.0**	47295.4	**47.3**	52.915	50.302	1.00%	15.00	300	2.16	CIRC	2	2.5			19.63	2.41	0.1	2.16	4.7	48.24	50.75	50.75	48.34	6.00	0.006
Pumpstation 3	0.22	1.41	1.5	**12.0**	9389.5	**9.4**	62.787	60.649	1.50%	13.50	300	1.64	CIRC	1	2.2			3.80	2.47	0.1	1.64	4.2	58.58	61.15	61.15	58.68	2.00	0.002
Pumpstation 4	0.34	1.80	2.1	**12.0**	14605.9	**14.6**	83.784	82.309	1.50%	19.50	300	0.88	CIRC	1	2.5			4.91	2.98	0.1	0.88	4.0	79.82	82.90	82.90	79.92	2.00	0.002
Pumpstation 5	7.04	10.94	17.1	**12.0**	303942.2	**303.9**	109.771	107.502	2.00%	7.50	300	1.82	RECT	1	1	15	8	120.00	2.53	0.1	1.82	4.4	105.32	107.95	107.95	105.42	11.00	0.011
Pumpstation 6	1.63	6.99	8.1	**12.0**	70595.3	**70.6**	110.627	107.892	2.00%	10.00	300	2.24	CIRC	3	2.2			34.21	2.06	0.1	2.24	4.4	106.23	108.39	108.39	106.33	7.00	0.007
Pumpstation 7	2.01	8.44	15.9	**12.0**	86940.0	**86.9**	96.5	94.5	1.00%	10.00	300	1.60	CIRC	2	3			28.27	3.07	0.1	1.60	4.8	91.73	94.90	94.90	91.83	8.50	0.009
Pumpstation 8	2.01	8.38	16.1	**12.0**	86940.0	**86.9**	132.5	130.5	1.00%	10.00	300	1.60	CIRC	2	3			28.27	3.07	0.1	1.60	4.8	127.73	130.90	130.90	127.83	8.40	0.008

Client	Classic developments NZ Ltd
Project Site	Mt Welcome SH 59 - Pukerua Bay- Porirua
Envelope Ref	1753-02
Version	1
Date	13/11/2025

ENVELOPE

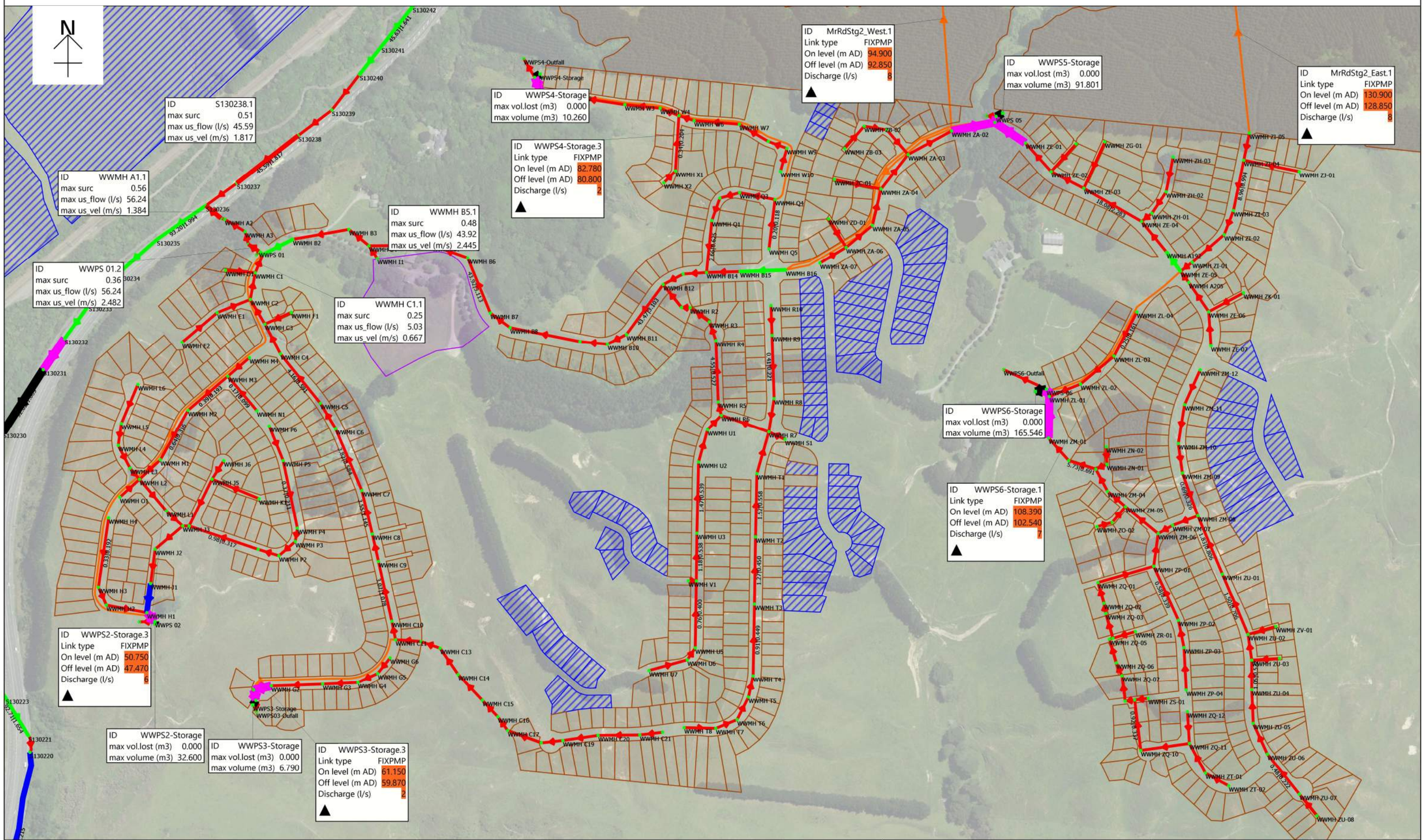
WASTEWATER MAXIMUM DEVELOPMENT FLOWS - STORAGE DIMENSIN

CONCEPT WASTEWATER SIZING

	REQUIREMENTS						NTWK PROPERTIES						STORAGE / WET WELL PROPERTIES												PUMP STATION			
Pump Station	**Cumulative ADWF litres/second**	**PDWF litres/second**	**PWWF litres/second**	**Storage Required (hours)**	**Total Storage Required (L)**	**Total Storage Required (m3)**	**Wet Well Ground Level [mRL]**	**Discharge Invert Level [mRL]**	**Discahrge Pipe Slope [%]**	**Discharge Pipe Length**	**Discharge Pipe Diam [mm]**	**Depth to US Suffit [m]**	**Storage Type**	**Number Wet Well**	**Diam [m]**	**Length [m]**	**Width [m]**	**Area Storage [m²]**	**Height (Above Pump Start Level) [m]**	**Permanent Wet Well Height [m]**	**Free Level [m]**	**Total Heigh [m]**	**New Floor Level**	**Invert Outfall Pipe [mm]**	**Swicth ON Level [mRL]**	**Swicth OFF Level [mRL]**	**Pump 1 Rate [l/s]**	**Pump 1 Rate [m³/s]**
Pumpstation 1	11.70	19.20	32.0	**20.0**	842159	**842**	59.1	56.5	0.75%	6.70	300	2.22	RECT	1	1	30	12	360.00	2.34	0.1	2.22	***4.7***	54.41	56.85	56.85	54.51	20.00	0.020
Pumpstation 2	1.09	5.11	5.9	**20.0**	78826	**79**	52.9	50.3	1.00%	15.00	300	2.16	CIRC	2	3.2			32.17	2.45	0.1	2.16	***4.7***	48.20	50.75	50.75	48.30	6.00	0.006
Pumpstation 3	0.22	1.41	1.5	**20.0**	15649	**16**	62.8	60.6	1.50%	13.50	300	1.64	CIRC	1	3			7.07	2.21	0.1	1.64	***3.9***	58.84	61.15	61.15	58.94	2.00	0.002
Pumpstation 4	0.34	1.80	2.1	**20.0**	24343	**24**	83.8	82.3	1.50%	19.50	300	0.88	CIRC	1	3			7.07	3.44	0.1	0.88	***4.4***	79.36	82.90	82.90	79.46	2.00	0.002
Pumpstation 5	7.04	10.94	17.1	**20.0**	506570	**507**	109.8	107.5	2.00%	7.50	300	1.82	RECT	1	1	25	10	250.00	2.03	0.1	1.82	***4.0***	105.82	107.95	107.95	105.92	11.00	0.011
Pumpstation 6	1.63	6.99	8.1	**20.0**	117659	**118**	110.6	107.9	2.00%	10.00	300	2.24	RECT	1	1	10	5	50.00	2.35	0.1	2.24	***4.7***	105.94	108.39	108.39	106.04	7.00	0.007
Pumpstation 7	2.01	8.44	15.9	**20.0**	144900	**145**	96.5	94.5	1.00%	10.00	300	1.60	RECT	1	1	10	5	50.00	2.9	0.1	1.60	***4.6***	91.90	94.90	94.90	92.00	8.50	0.009
Pumpstation 8	2.01	8.38	16.1	**20.0**	144900	**145**	132.5	130.5	1.00%	10.00	300	1.60	RECT	1	1	10	5	50.00	2.9	0.1	1.60	***4.6***	127.90	130.90	130.90	128.00	8.40	0.009

APPENDIX 2
MT WELCOME NETWORK – MODEL RESULTS

SP ENV Clip 2018 Stages 8hrStrg (version 2) (Scenario Stage 01-25 Upgrd 01)
ClipWWF-4D-v2>Stage 01-25 Upgrd 01 Live data



PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER MODEL RESULTS 2018
POPULATION -WWF
FULL DEVELOPMENT

Total Overflow in this view:
Max. Surcharge State:
1: Not surcharged. Where the ratio of water depth (max_depth) to pipe height (conduit_height) is 0 or less than 1.
1: Surcharged by depth
2: Surcharged by flow.

ENVELOPE

APPENDIX 3
BULK NETWORK – MODEL RESULTS

SP ENV Clip 2018 Stages 8hrStrg (version 35) (Scenario 0 - No Development)
ClipWWF-4D-v35>0 - No Development Live data

Scenario: NO DEVELOPEMENT

Stage: 0
Proposed Number of Lots: 0
Mt Welcome Storage Duration: -

Level of Service: W WF 2018 Population
Upgrades: None

N

ID S130238.1
max surc 0.51
max us_flow (l/s) 46.10

ID WWPS 01.2
max surc 0.10
max us_flow (l/s) 0.00

ID WWMH A1.1
max surc 0.11
max us_flow (l/s) 0.00

ID S130221.1
max surc 0.87
max us_flow (l/s) 45.65

ID S130219.1
max surc 2.00
max us_flow (l/s) 44.04

ID S130204
max vol.lost (m3) 0.000

ID S130207
max vol.lost (m3) 0.000

ID S130202.1
max surc 0.53
max us_flow (l/s) 55.15

ID 77045.1
max surc 1.00
max us_flow (l/s) 59.71

ID S130000
max vol.lost (m3) 0.000

ID S133404.1
max surc 0.64
max us_flow (l/s) 7.22

ID S133404
max vol.lost (m3) 0.000

Node [2114]
Node Types : node_type
Color/Symbol (abs)
Break
Connect 2D
Manhole
Outfall
Outfall 2D
Pond
Storage
flvol : sim.flvol (m3)
Color/Size/Circles
< 2
>= 2
>= 10
>= 500
Conduit [2077]
max_Surcharge : sim.max_Surcharge
Line Color/Line Width
< 0.5
>= 0.5
>= 0.8
>= 1
>= 2
Subcatchment [726]
System Type : system_type
Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color/Line Width
#NOT
combined
foul
other
overland
sanitary
storm
Flap valve [5]
Orifice [2]
Pump [62]
Weir [1]
Polygon [1114]
category_id : category_id
Fill Visibility/Fill Color/Line Visibility/Line Color/Line Width
#NOT
Forecast ID Small Area

Total Overflow in this view:
Max. Surcharge State:
1: Not surcharged. Where the ratio of water depth (max_depth) to pipe height (conduit_height) is 0 or less than 1.
1: Surcharged by depth
2: Surcharged by flow.

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER MODEL RESULTS 2018 POPULATION -WWF

ENVELOPE

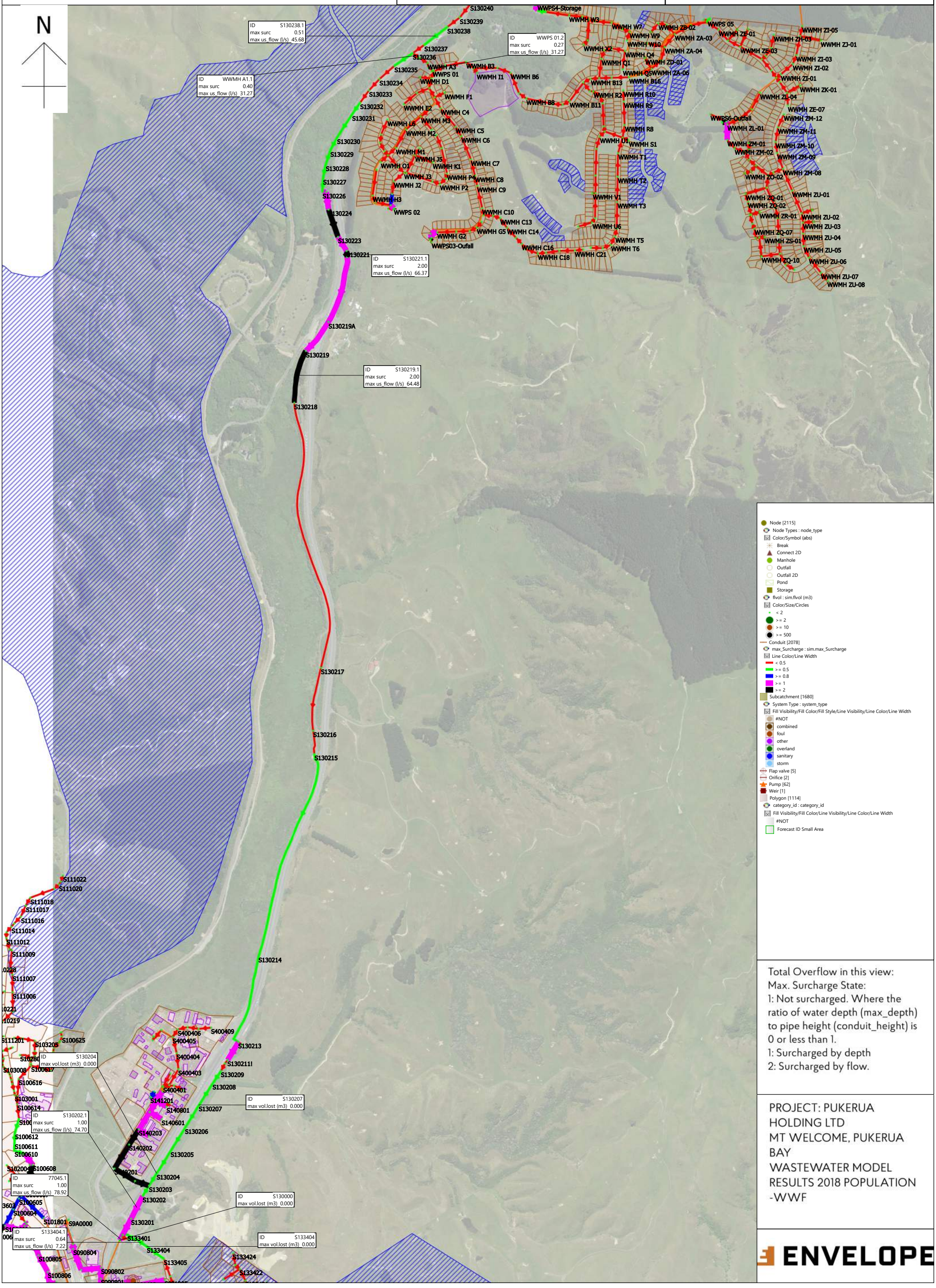
SP ENV Clip 2018 Stages 8hrStrg (version 35) (Scenario Stage 01-23)
ClipWWF-4D-v35>Stage 01-23 Live data

Scenario: MT WELCOME STAGES 1-23 (NO MURI ROAD)

Stage: 1-23
Proposed Number of Lots: 949
Mt Welcome Storage Duration: 8 HR

Level of Service: W WF 2018 Population
Upgrades: None

N



Node [2115]
Node Types : node_type
Color/Symbol (abs)
Break
Connect 2D
Manhole
Outfall
Outfall 2D
Pond
Storage
flvol : sim.flvol (m3)
Color/Size/Circles
< 2
>= 2
>= 10
>= 500
Conduit [2078]
max_Surcharge : sim.max_Surcharge
Line Color/Line Width
< 0.5
>= 0.5
>= 0.8
>= 1
>= 2
Subcatchment [1680]
System Type : system_type
Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color/Line Width
#NOT
combined
foul
other
overland
sanitary
storm
Flap valve [5]
Orifice [2]
Pump [62]
Weir [1]
Polygon [1114]
category_id : category_id
Fill Visibility/Fill Color/Line Visibility/Line Color/Line Width
#NOT
Forecast ID Small Area

Total Overflow in this view:
Max. Surcharge State:
1: Not surcharged. Where the ratio of water depth (max_depth) to pipe height (conduit_height) is 0 or less than 1.
1: Surcharged by depth
2: Surcharged by flow.

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER MODEL RESULTS 2018 POPULATION -WWF

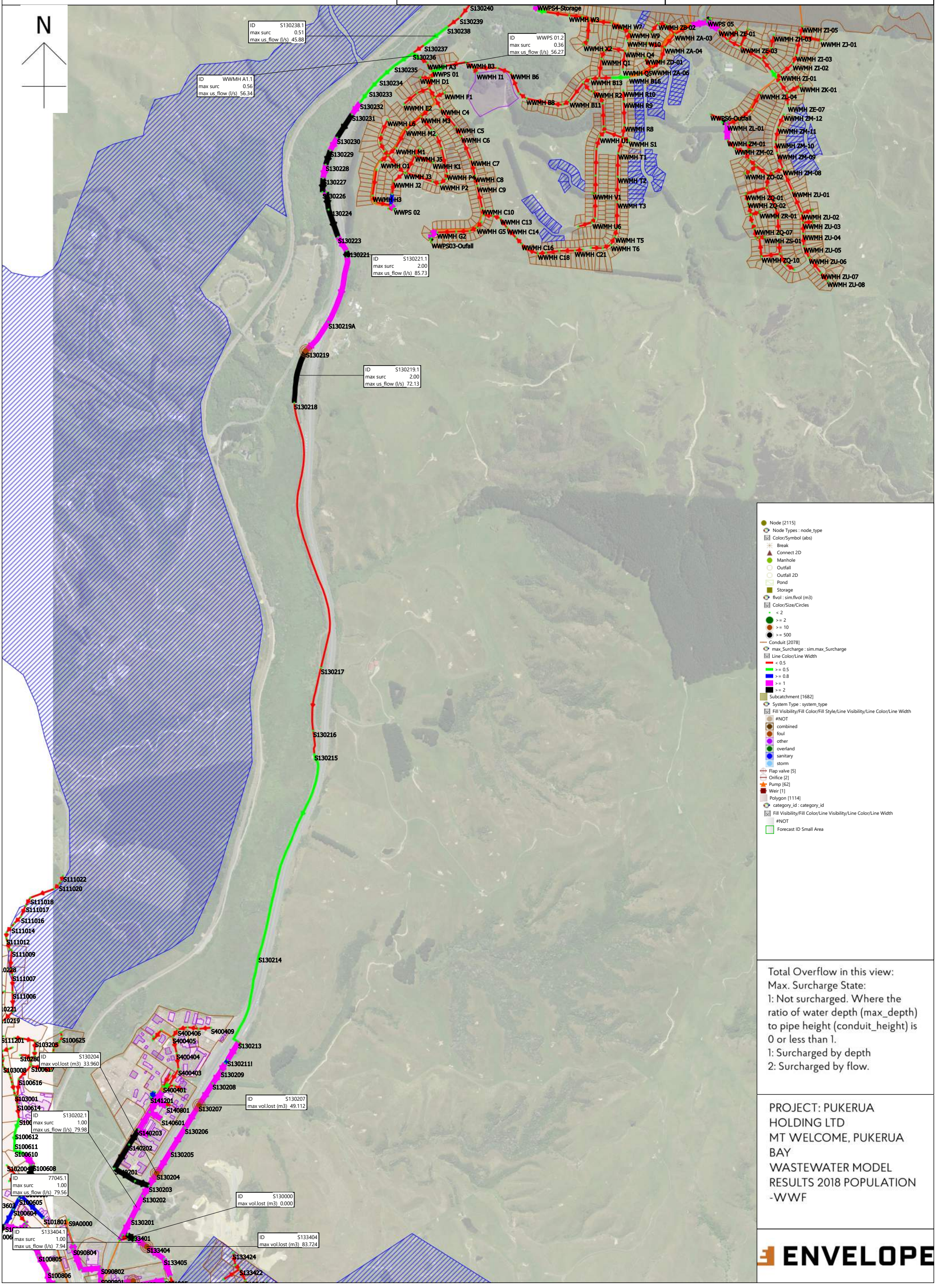
ENVELOPE

SP ENV Clip 2018 Stages 8hrStrg (version 35)
ClipWWF-4D-v35>Live data

Scenario: FULL DEVELOPMENT

Stage: 1-25
Proposed Number of Lots: 1449
Mt Welcome Storage Duration: 8 HR

Level of Service: W WF 2018 Population
Upgrades: None



Total Overflow in this view:
Max. Surcharge State:
1: Not surcharged. Where the ratio of water depth (max_depth) to pipe height (conduit_height) is 0 or less than 1.
1: Surcharged by depth
2: Surcharged by flow.

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER MODEL RESULTS 2018 POPULATION -WWF

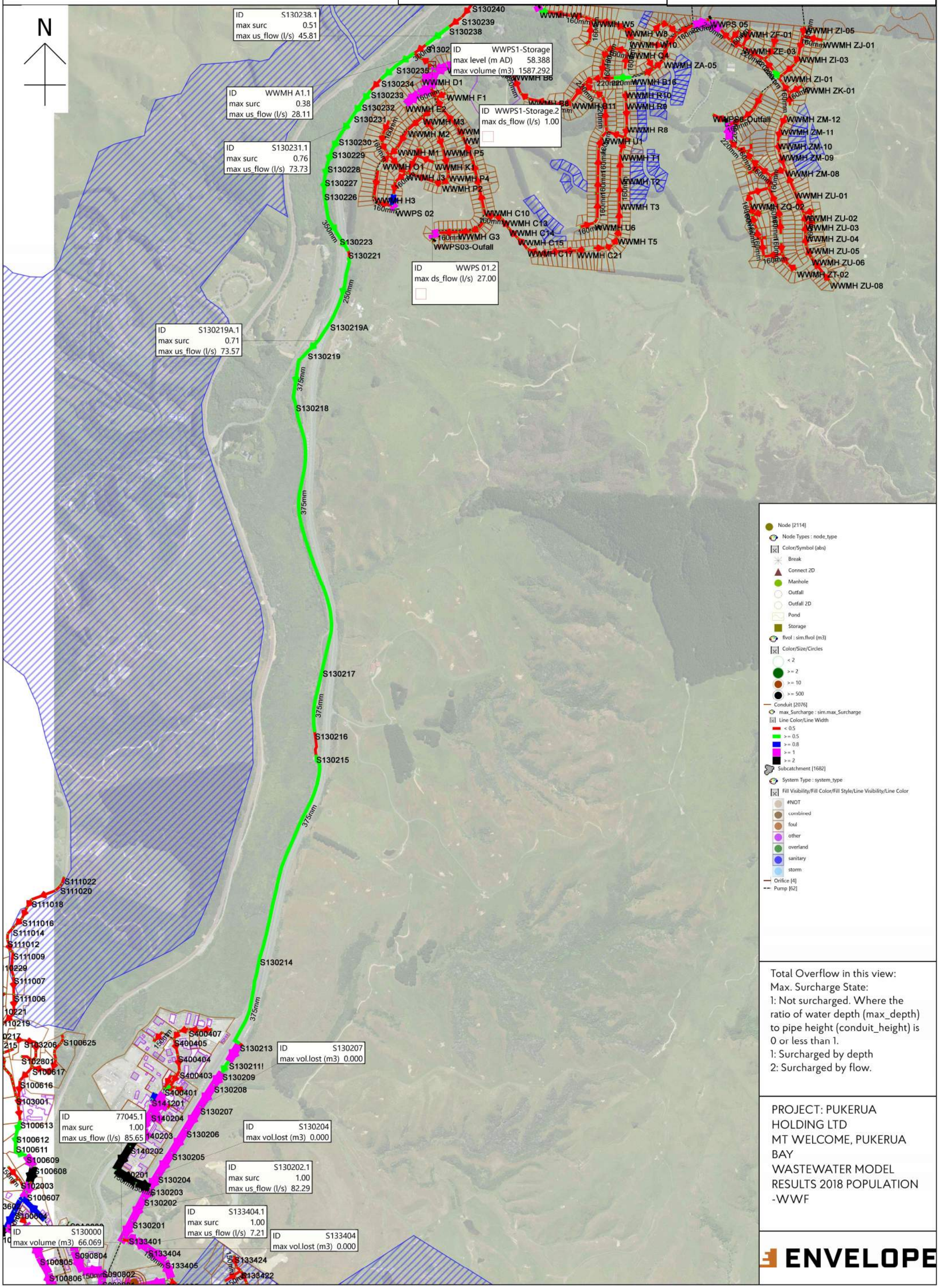
ENVELOPE

SP ENV Clip 2018 Stages 8hrStrg (Scenario Stage 01-25 Upgrd 02)
ClipWWF-4D-v30>Stage 01-25 Upgrd 02 Live data

Scenario: FULL DEVELOPMENT - BULK NETWORK UPGRADES AND PUMP STATION 1

Stage: 1-25
Proposed Number of Lots: 1449
Mt Welcome Storage Duration: 8 HR

Level of Service: WWF 2018 Population
Upgrades: Grav: 27l/s +1| Storage: 1587 m³
+ Bulk Upgrades



Total Overflow in this view:
Max. Surcharge State:
1: Not surcharged. Where the ratio of water depth (max_depth) to pipe height (conduit_height) is 0 or less than 1.
1: Surcharged by depth
2: Surcharged by flow.

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER MODEL RESULTS 2018 POPULATION -WWF

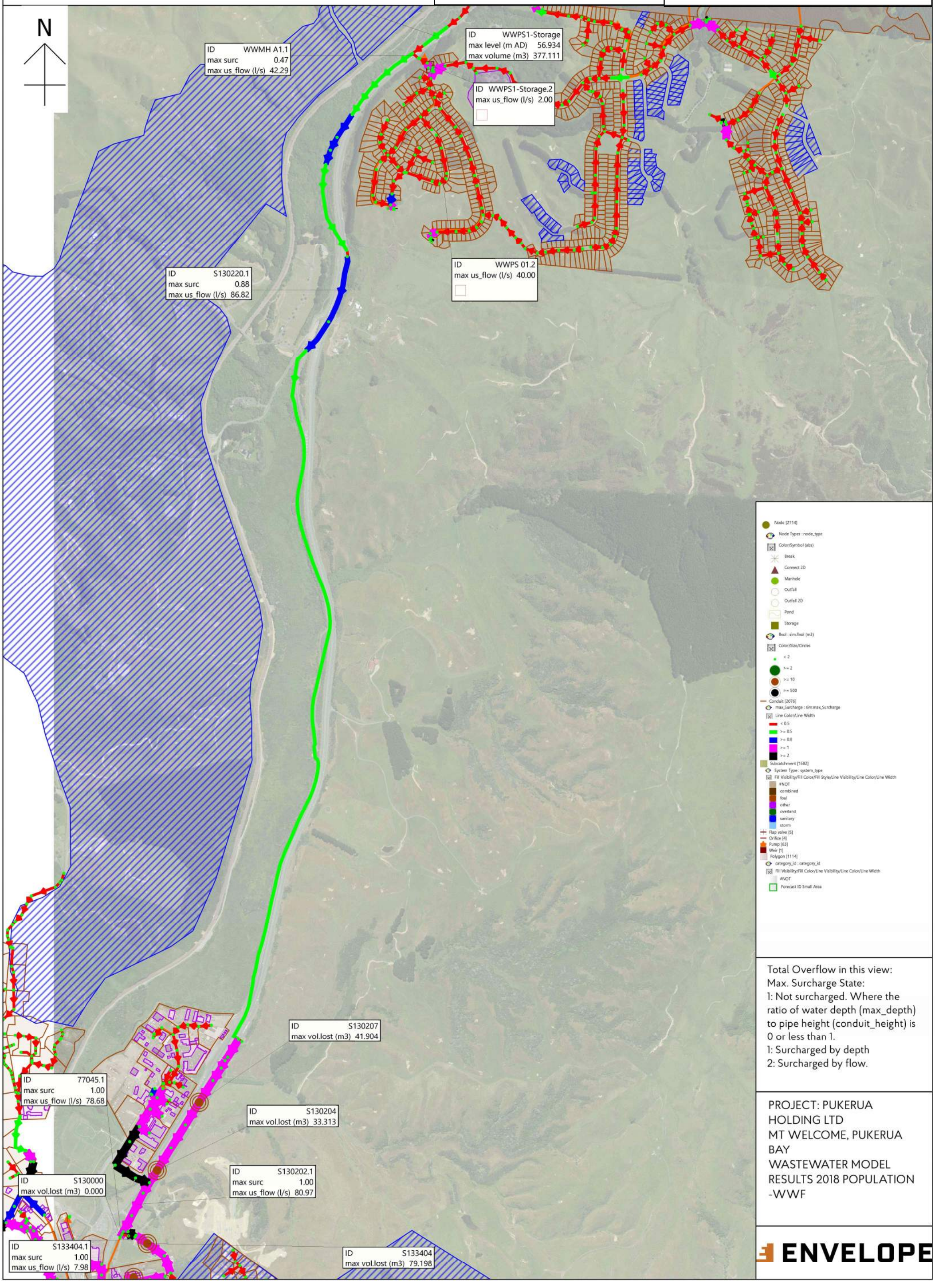
ENVELOPE

SP ENV Clip 2018 Stages 8hrStrg (version 10) (Scenario Stage 01-25 Upgrd 02)
ClipWWF-4D-v10>Stage 01-25 Upgrd 02 Live data

Scenario: FULL DEVELOPMENT - BULK NETWORK UPGRADES AND PUMP STATION 1

Stage: 1-25
Proposed Number of Lots: 1449
Mt Welcome Storage Duration: 8 HR

Level of Service: WWF 2018 Population
Upgrades: PS1-0l/s | Grav: 40+2 l/s | Storage: 377 m³
+ Bulk Upgrades



Total Overflow in this view:
Max. Surcharge State:
1: Not surcharged. Where the ratio of water depth (max_depth) to pipe height (conduit_height) is 0 or less than 1.
1: Surcharged by depth
2: Surcharged by flow.

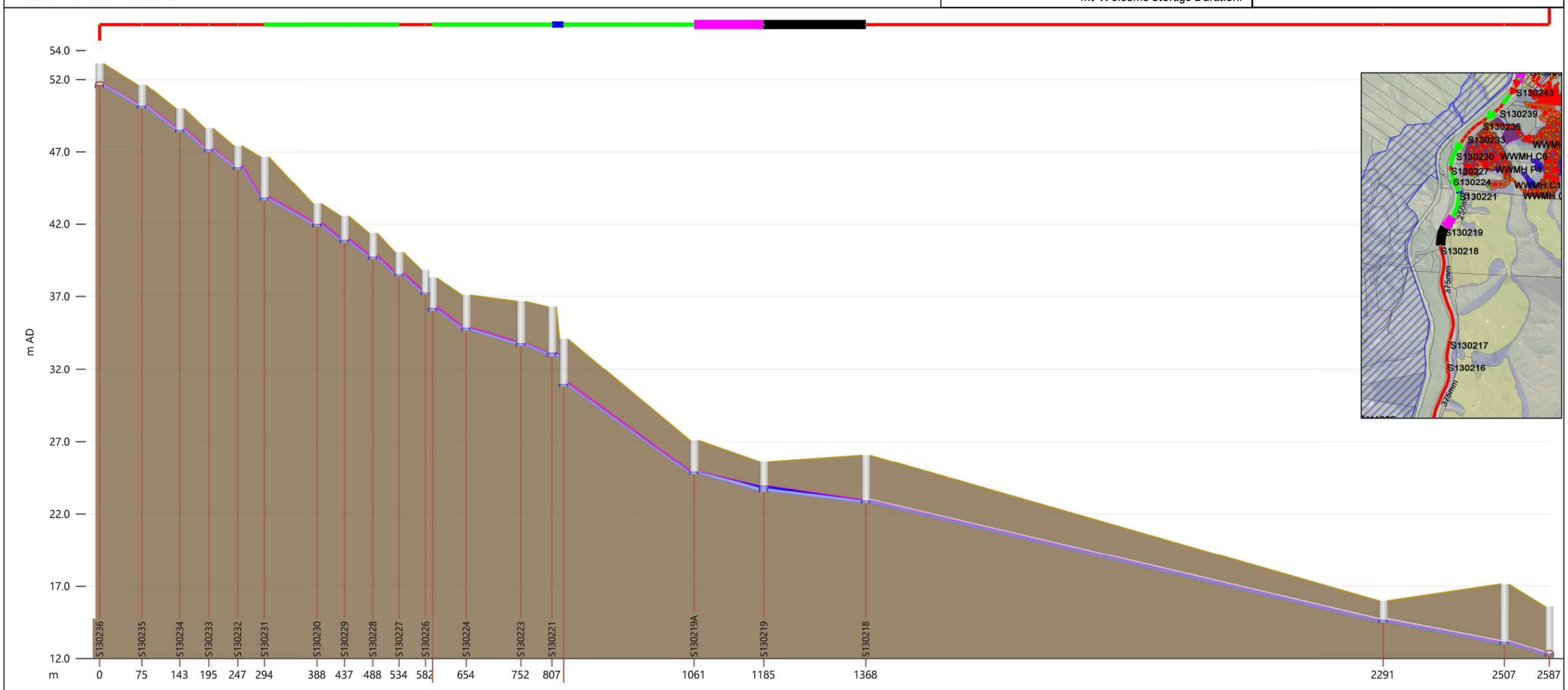
PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER MODEL RESULTS 2018 POPULATION -WWF

ENVELOPE

APPENDIX 4
BULK NETWORK – MODEL RESULTS PROFILES

Network: SP ENV Clip 2018 Stages 8hrStrg
Simulation Name: ClipWWF-4D-v35>0 - No Development Live data
Simulation Time: maximum

Scenario: NO DEVELOPMENT
Stage: 0
Proposed Number of Lots: 0
Mt Welcome Storage Duration: -
Level of Service: WWF 2018 Population
Upgrades: None



Link	S130236.1	-	-	-	-	S130231.1	-	-	-	-	-	S130224.1	-	-	S130220.1	S130219A.1	S130219.1	S130218.1	S130217.1	S130216.1
width (mm)	300	300	300	300	300	250	250	250	250	250	250	250	300	-	250	315	250	375	375	375
us inv (m AD)	51.470	50.000	48.360	47.000	-	43.630	41.830	40.730	-	-	36.000	34.640	33.610	-	30.800	24.730	23.520	22.750	14.500	13.000
ds inv (m AD)	50.070	48.430	47.070	45.860	-	41.900	40.800	39.650	-	-	34.710	33.680	32.960	-	24.730	23.520	22.750	14.500	13.000	12.180
Length (m)	75.5	67.6	51.8	51.7	47.7	93.9	49.2	50.3	46.7	47.2	59.9	97.5	55.5	-	232.7	124.5	182.1	923.2	216.4	80.1
surc	0.42	0.39	0.39	0.40	0.36	0.55	0.53	0.52	0.50	0.50	0.52	0.66	0.53	-	0.57	1.00	2.00	0.38	0.38	0.35
DS flow (l/s)	45.94	45.91	45.87	45.86	45.81	45.78	45.77	45.75	45.74	45.73	45.72	45.68	45.65	-	45.62	44.18	43.84	43.64	43.60	43.57
DS velocity (m/s)	1.644	1.777	1.820	1.745	2.057	1.670	1.750	1.766	1.845	1.867	1.768	1.324	1.335	-	1.569	0.723	1.219	1.150	1.150	1.262

Node	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S130224	S130223	-	S130220	S130219A	S130219	S130218	S130217	S130216	-
ground (m AD)	-	51.630	49.990	-	-	46.660	43.416	-	-	-	-	-	-	-	37.092	36.670	-	34.100	27.102	25.620	26.070	16.000	17.150	-
Flood level (m AD)	-	51.630	49.990	-	-	46.660	43.416	-	-	-	-	-	-	-	37.092	36.670	-	34.100	27.102	25.620	26.070	16.000	17.150	-
flood dep (m)	-	-1.512	-1.514	-	-	-2.892	-1.453	-	-	-	-	-	-	-	-2.280	-2.919	-	-3.177	-2.230	-1.703	-3.188	-1.359	-4.019	-
level (m AD)	-	50.118	48.476	-	-	43.768	41.963	-	-	-	-	-	-	-	34.812	33.751	-	30.923	24.873	23.917	22.882	14.641	13.131	-
vol.lost (m3)	-	0.000	0.000	0.000	-	0.000	0.000	-	-	-	-	-	-	-	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	-

- Node [2115]
- Node Types : node_type
- Color/Symbol (abs)
  - Break
  - Connect 2D
  - Manhole
  - Outfall
  - Outfall 2D
  - Pond
  - Storage
- flvol : sim.flvol (m3)
- Color/Size/Circles
  - < 2
  - >= 2
  - >= 10
  - >= 500
- Conduit [2078]
- max_Surcharge : sim.max_Surcharge
- Line Color/Line Width
  - < 0.5
  - >= 0.5
  - >= 0.8
  - >= 1
  - >= 2
- Subcatchment [1682]
- System Type : system_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color
  - #NOT
  - combined
  - foul
  - other
  - overland
- sanitary
- storm
- Orifice [2]
- Pump [62]

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER PROFILE: PROJECT
DISCHARGE TO PS13 (PUKERUA BAY)

DESIGNED: MH
DATE: 11/11/2025
PROJECT No: 1753-02
DRAWING No: 01

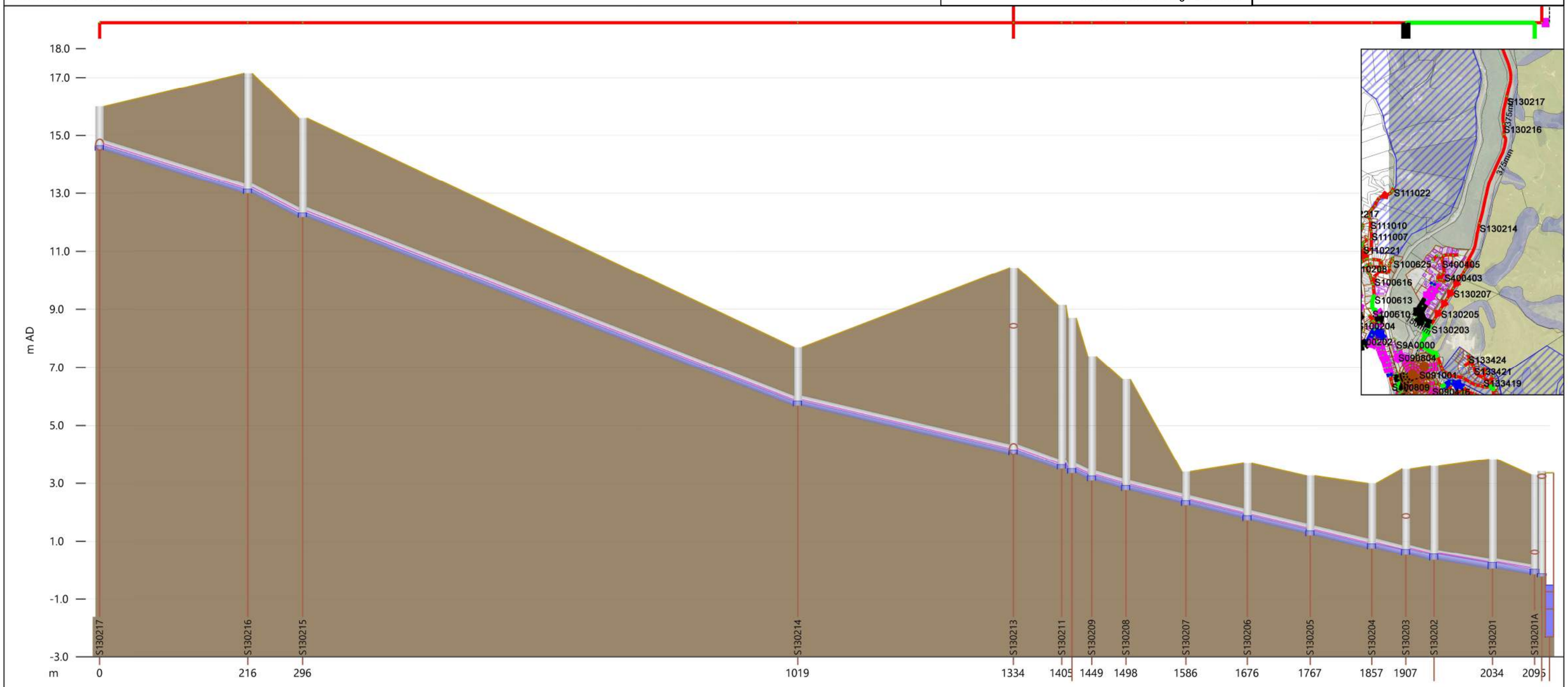
SCALE: 1:2000

0 2 km

ENVELOPE

Network: SP ENV Clip 2018 Stages 8hrStrg
Simulation Name: ClipWWF-4D-v35>0 - No Development Live data
Simulation Time: maximum

Scenario: NO DEVELOPMENT
Stage: 0
Proposed Number of Lots: 0
Mt Welcome Storage Duration: -
Level of Service: WWF 2018 Population
Upgrades: None



Link	S130217.1	S130216.1	S130215.1	S130214.1	S130213.1	-	-	-	S130208.1	S130207.1	S130206.1	S130205.1	-	-	S130202.1	S130201.1
width (mm)	375	375	375	375	375	-	375	375	375	375	375	375	375	375	375	375
us inv (m AD)	14.500	13.000	12.180	5.680	4.000	-	-	3.090	2.760	2.240	1.720	1.200	0.750	0.525	0.350	0.050
ds inv (m AD)	13.000	12.180	5.680	4.000	3.500	-	-	2.830	2.310	1.790	1.270	0.750	0.525	0.350	0.050	-0.150
Length (m)	216.4	80.1	722.8	314.9	70.5	-	28.8	49.9	87.6	89.7	91.7	89.9	49.7	41.2	85.3	61.6
surc	0.38	0.35	0.40	0.40	0.37	-	0.38	0.40	0.41	0.41	0.41	0.42	0.49	0.52	0.53	0.53
DS flow (l/s)	43.60	43.57	43.50	43.46	43.46	-	-	43.44	43.43	43.41	43.40	43.39	43.38	55.15	55.13	55.13
DS velocity (m/s)	1.150	1.262	1.045	1.045	1.159	-	-	1.040	1.040	1.040	1.040	0.980	0.834	0.952	0.928	1.124

Node	S130217	S130216	S130215	S130214	S130213	-	-	-	S130208	S130207	S130206	S130205	S130204	-	S130202	S130201	-
ground (m AD)	16.000	17.150	15.600	7.700	10.423	9.147	-	-	6.597	3.400	3.690	3.260	2.990	3.486	3.591	3.827	-
Flood level (m AD)	16.000	17.150	15.600	7.700	10.423	9.147	-	-	6.597	3.400	3.690	3.260	2.990	3.486	3.591	3.827	-
flood dep (m)	-1.359	-4.019	-3.289	-1.869	-6.283	-	-	-	-3.684	-1.007	-1.816	-1.907	-2.082	-	-3.046	-3.578	-
level (m AD)	14.641	13.131	12.311	5.831	4.140	3.629	-	-	2.912	2.393	1.874	1.353	0.908	0.710	0.545	0.249	-
vol.lost (m3)	0.000	0.000	0.000	0.000	0.000	0.000	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-

- Node [2115]
- Node Types : node_type
- Color/Symbol (abs)
- Break
- Connect 2D
- Manhole
- Outfall
- Outfall 2D
- Pond
- Storage

- flvol : sim.flvol (m3)
- Color/Size/Circles
- < 2
- >= 2
- >= 10
- >= 500
- Conduit [2078]
- max_Surcharge : sim.max_Surcharge
- Line Color/Line Width
- < 0.5
- >= 0.5

- >= 0.8
- >= 1
- >= 2
- Subcatchment [1682]
- System Type : system_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color
- #NOT
- combined
- foul
- other
- overland

- sanitary
- storm
- Orifice [2]
- Pump [62]

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER PROFILE: PROJECT
DISCHARGE TO PS13 (PLIMMERTON)

DESIGNED: MH
DATE: 11/11/2025
PROJECT No: 1753-02
DRAWING No: 02

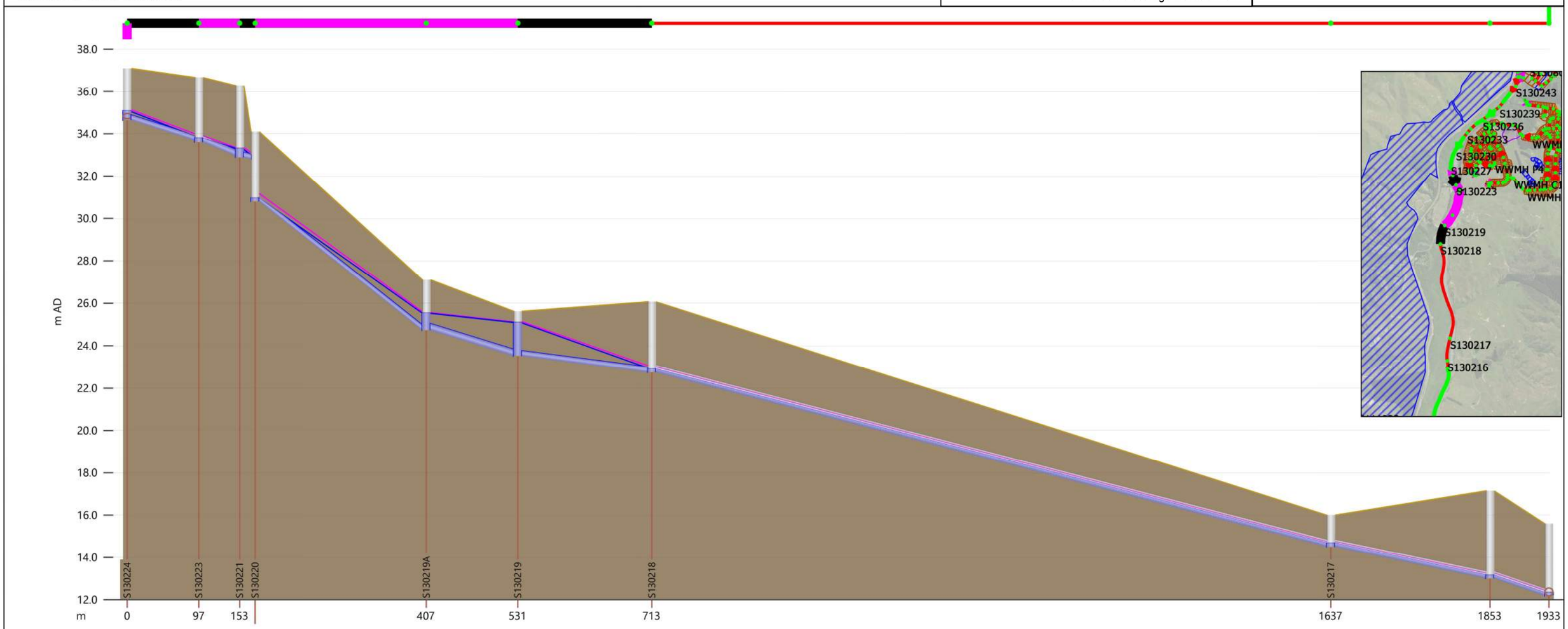
SCALE: 1:2000

0 2 km

ENVELOPE

Network: SP ENV Clip 2018 Stages 8hrStrg (version 35) (Scenario Stage 01-23)
Simulation Name: ClipWWF-4D-v35>Stage 01-23 Live data
Simulation Time: maximum

Scenario: MT WELCOME STAGES 1-23 (NO MURI ROAD)
Stage: 1-23
Proposed Number of Lots: 949
Mt Welcome Storage Duration: 8 HR
Level of Service: WWF 2018 Population
Upgrades: None



Link	S130224.1	-	-	S130220.1	S130219A.1	S130219.1	S130218.1	S130217.1	S130216.1
width (mm)	250	300	-	250	315	250	375	375	375
us inv (m AD)	34.640	33.610	-	30.800	24.730	23.520	22.750	14.500	13.000
ds inv (m AD)	33.680	32.960	-	24.730	23.520	22.750	14.500	13.000	12.180
Length (m)	97.5	55.5	-	232.7	124.5	182.1	923.2	216.4	80.1
surc	2.00	1.00	-	1.00	1.00	2.00	0.47	0.47	0.43
DS flow (m3/s)	0.06647	-	-	0.06524	0.06456	0.06447	0.06439	0.06436	0.06435
DS velocity (m/s)	1.513	1.337	-	1.724	0.733	1.487	1.278	1.279	1.406

Node	-	S130223	-	S130220	S130219A	S130219	S130218	S130217	S130216	-
ground (m AD)	-	36.670	-	34.100	27.102	25.620	26.070	16.000	17.150	-
Flood level (m AD)	-	36.670	-	34.100	27.102	25.620	26.070	16.000	17.150	-
flood dep (m)	-	-2.879	-	-3.139	-1.568	-0.522	-3.157	-1.325	-3.990	-
level (m AD)	-	33.791	-	30.961	25.535	25.098	22.913	14.675	13.160	-
vol.lost (m3)	-	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	-

- Node [2115]
- Node Types : node_type
- Color/Symbol (abs)
  - Break
  - Connect 2D
  - Manhole
  - Outfall
  - Outfall 2D
  - Pond
  - Storage
- flvol : sim.flvol (m3)
- Color/Size/Circles
  - < 2
  - >= 2
  - >= 10
  - >= 500
- Conduit [2078]
- max_Surcharge : sim.max_Surcharge
- Line Color/Line Width
  - < 0.5
  - >= 0.5
  - >= 0.8
  - >= 1
  - >= 2
- Subcatchment [1680]
- System Type : system_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color/Line Width
  - #NOT
  - combined
  - foul
  - other
  - overland
  - sanitary
  - storm
- Flap valve [5]
- Orifice [2]
- Pump [62]
- Weir [1]
- Polygon [1114]
- category_id : category_id
- Fill Visibility/Fill Color/Line Visibility/Line Color/Line Width
  - #NOT
  - Forecast ID Small Area

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER PROFILE: PROJECT
DISCHARGE TO PS13 (PUKERUA BAY)

DESIGNED: MH
DATE: 21/11/2025
PROJECT No: 1753-02
DRAWING No: 01

SCALE: 1:2000

ENVELOPE

Network: SP ENV Clip 2018 Stages 8hrStrg (version 35) (Scenario Stage 01-23)
Simulation Name: ClipWWF-4D-v35>Stage 01-23 Live data
Simulation Time: maximum

Scenario: MT WELCOME STAGES 1-23 (NO MURI ROAD)
Stage: 1-23
Proposed Number of Lots: 949
Mt Welcome Storage Duration: 8 HR
Level of Service: W WF 2018 Population
Upgrades: None

Link	S130217.1	-	S130215.1	S130214.1	-	-	-	S130208.1	S130207.1	S130206.1	S130205.1	-	-	S130202.1	-
width (mm)	375	375	375	375	375	-	375	375	375	375	375	375	375	375	375
us inv (m AD)	14.500	13.000	12.180	5.680	4.000	-	3.090	2.760	2.240	1.720	1.200	0.750	-	0.350	0.050
ds inv (m AD)	13.000	12.180	5.680	4.000	3.500	-	2.830	2.310	1.790	1.270	0.750	0.525	-	0.050	-0.150
Length (m)	216.4	80.1	722.8	314.9	70.5	-	49.9	87.6	89.7	91.7	89.9	49.7	41.2	85.3	61.6
surc	0.47	0.43	0.50	0.50	0.46	-	0.50	0.51	0.51	0.51	0.53	0.60	0.71	1.00	1.00
DS flow (m3/s)	0.06436	0.06435	0.06427	0.06419	0.06416	-	-	0.06411	0.06409	0.06407	0.06405	-	-	0.07465	-
DS velocity (m/s)	1.279	1.406	1.158	1.181	1.288	-	1.181	1.180	1.180	1.180	1.079	0.980	-	0.995	1.245

Node	S130217	S130216	S130215	S130214	S130213	-	-	-	S130207	S130206	S130205	-	-	-	-	-
ground (m AD)	16.000	17.150	15.600	7.700	10.423	-	-	6.597	3.400	3.690	3.260	2.990	-	3.591	3.827	-
Flood level (m AD)	16.000	17.150	15.600	7.700	10.423	-	-	6.597	3.400	3.690	3.260	2.990	-	3.591	3.827	-
flood dep (m)	-1.325	-3.990	-3.258	-1.832	-6.249	-	-	-3.646	-0.969	-1.777	-1.868	-2.042	-	-	-3.321	-
level (m AD)	14.675	13.160	12.342	5.868	4.174	-	-	2.950	2.431	1.913	1.392	0.948	-	0.617	0.506	-
vol.lost (m3)	0.000	0.000	0.000	0.000	0.000	-	-	0.000	0.000	0.000	0.000	0.000	-	0.000	0.000	-

Node [2115]
Node Types : node_type
Color/Symbol (abs)
Break
Connect 2D
Manhole
Outfall
Outfall 2D
Pond
Storage

flvol : sim.flvol (m3)
Color/Size/Circles
< 2
>= 2
>= 10
>= 500
Conduit [2078]
max_Surcharge : sim.max_Surcharge
Line Color/Line Width
< 0.5
>= 0.5
>= 0.8
>= 1
>= 2

Subcatchment [1680]
System Type : system_type
Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color/Line Width
#NOT
combined
foul
other
overland
sanitary
storm
Flap valve [5]
Orifice [2]

Pump [62]
Weir [1]
Polygon [1114]
category_id : category_id
Fill Visibility/Fill Color/Line Visibility/Line Color/Line Width
#NOT
Forecast ID Small Area

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER PROFILE: PROJECT
DISCHARGE TO PS13 (PLIMMERTON)

DESIGNED: MH
DATE: 21/11/2025
PROJECT No: 1753-02
DRAWING No: 02

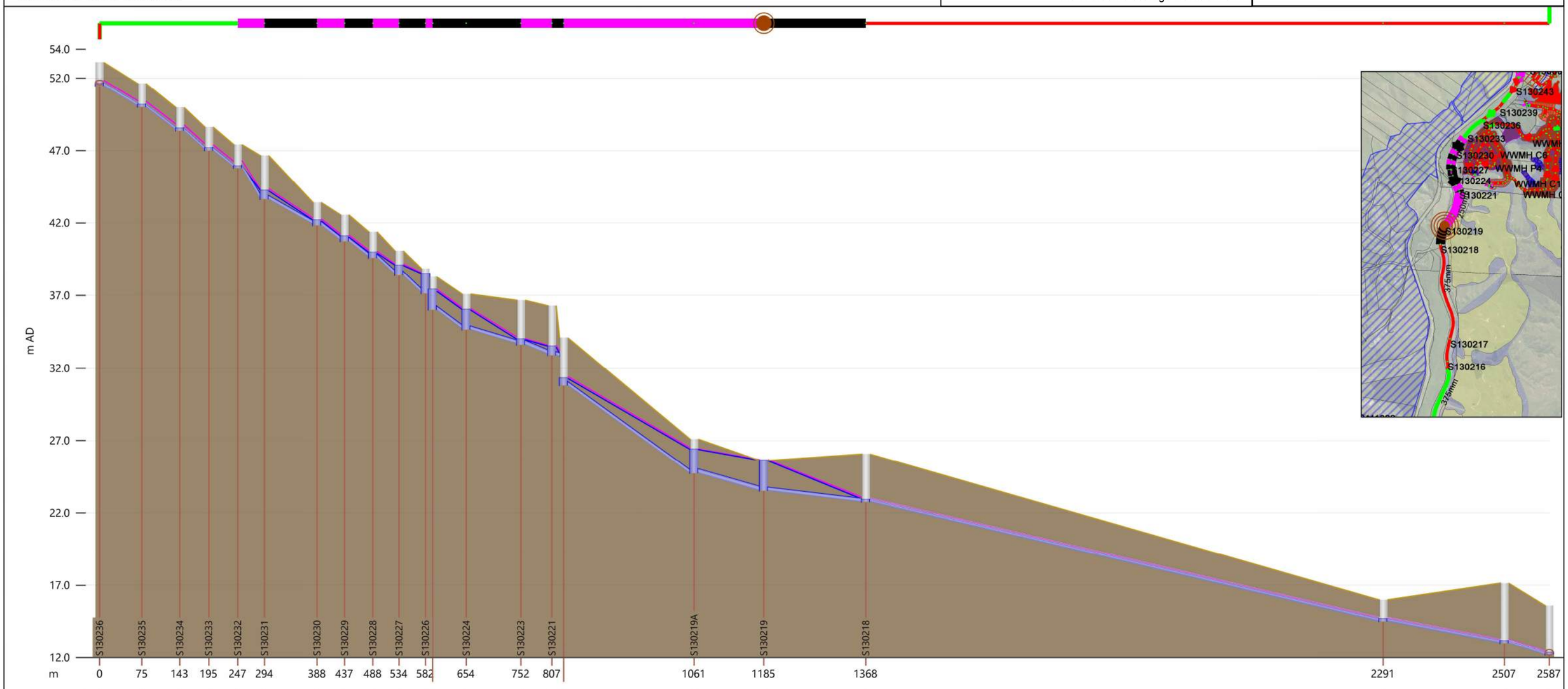
SCALE: 1:2000

0 2 km

ENVELOPE

Network: SP ENV Clip 2018 Stages 8hrStrg
Simulation Name: ClipWWF-4D-v35>Live data
Simulation Time: maximum

Scenario: FULL DEVELOPMENT
Stage: 1-25
Proposed Number of Lots: 1449
Mt Welcome Storage Duration: 8 HR
Level of Service: WWF 2018 Population
Upgrades: None



Link	S130236.1	-	-	-	-	S130231.1	-	-	-	-	-	S130224.1	-	-	S130220.1	S130219A.1	S130219.1	S130218.1	S130217.1	S130216.1
width (mm)	300	300	300	300	300	250	250	250	250	250	250	250	300	-	250	315	250	375	375	375
us inv (m AD)	51.470	50.000	48.360	47.000	-	43.630	41.830	40.730	-	-	36.000	34.640	33.610	-	30.800	24.730	23.520	22.750	14.500	13.000
ds inv (m AD)	50.070	48.430	47.070	45.860	-	41.900	40.800	39.650	-	-	34.710	33.680	32.960	-	24.730	23.520	22.750	14.500	13.000	12.180
Length (m)	75.5	67.6	51.8	51.7	47.7	93.9	49.2	50.3	46.7	47.2	59.9	97.5	55.5	-	232.7	124.5	182.1	923.2	216.4	80.1
surc	0.62	0.58	0.57	0.59	1.00	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00	-	1.00	1.00	2.00	0.50	0.50	0.46
DS flow (l/s)	92.34	92.20	92.12	92.02	90.65	89.82	89.53	89.74	88.92	-	88.35	85.74	85.73	-	85.67	85.67	71.98	71.98	71.98	71.98
DS velocity (m/s)	1.990	2.167	2.224	2.124	2.077	1.930	1.986	2.011	2.528	3.546	1.990	1.820	1.356	-	1.743	0.931	1.596	1.315	1.316	1.449

Node	-	-	-	-	-	-	-	-	-	-	-	-	-	-	S130224	S130223	-	S130220	S130219A	S130219	S130218	S130217	S130216	-
ground (m AD)	-	51.630	49.990	-	-	46.660	43.416	-	-	-	-	-	37.092	36.670	-	34.100	27.102	25.620	26.070	16.000	17.150	-
Flood level (m AD)	-	51.630	49.990	-	-	46.660	43.416	-	-	-	-	-	37.092	36.670	-	34.100	27.102	25.620	26.070	16.000	17.150	-
flood dep (m)	-	-1.448	-1.453	-	-	-2.414	-1.220	-	-	-	-	-	-1.060	-2.671	-	-2.783	-0.705	0.000	-3.147	-1.314	-3.980	-
level (m AD)	-	50.182	48.537	-	-	44.246	42.196	-	-	-	-	-	36.032	33.999	-	31.317	26.398	25.620	22.923	14.686	13.170	-
vol.lost (m3)	-	0.000	0.000	0.000	-	0.000	0.000	-	-	-	-	-	0.000	0.000	-	0.000	0.000	192.826	0.000	0.000	0.000	-

- Node [2115]
- Node Types : node_type
- Color/Symbol (abs)
  - Break
  - Connect 2D
  - Manhole
  - Outfall
  - Outfall 2D
  - Pond
  - Storage
- flvol : sim.flvol (m3)
- Color/Size/Circles
  - < 2
  - >= 2
  - >= 10
  - >= 500
- Conduit [2078]
- max_Surcharge : sim.max_Surcharge
- Line Color/Line Width
  - < 0.5
  - >= 0.5
  - >= 0.8
  - >= 1
  - >= 2
- Subcatchment [1682]
- System Type : system_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color
  - #NOT
  - combined
  - foul
  - other
  - overland
- sanitary
- storm
- Orifice [2]
- Pump [62]

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER PROFILE: PROJECT
DISCHARGE TO PS13 (PUKERUA BAY)

DESIGNED: MH
DATE: 11/11/2025
PROJECT No: 1753-02
DRAWING No: 01

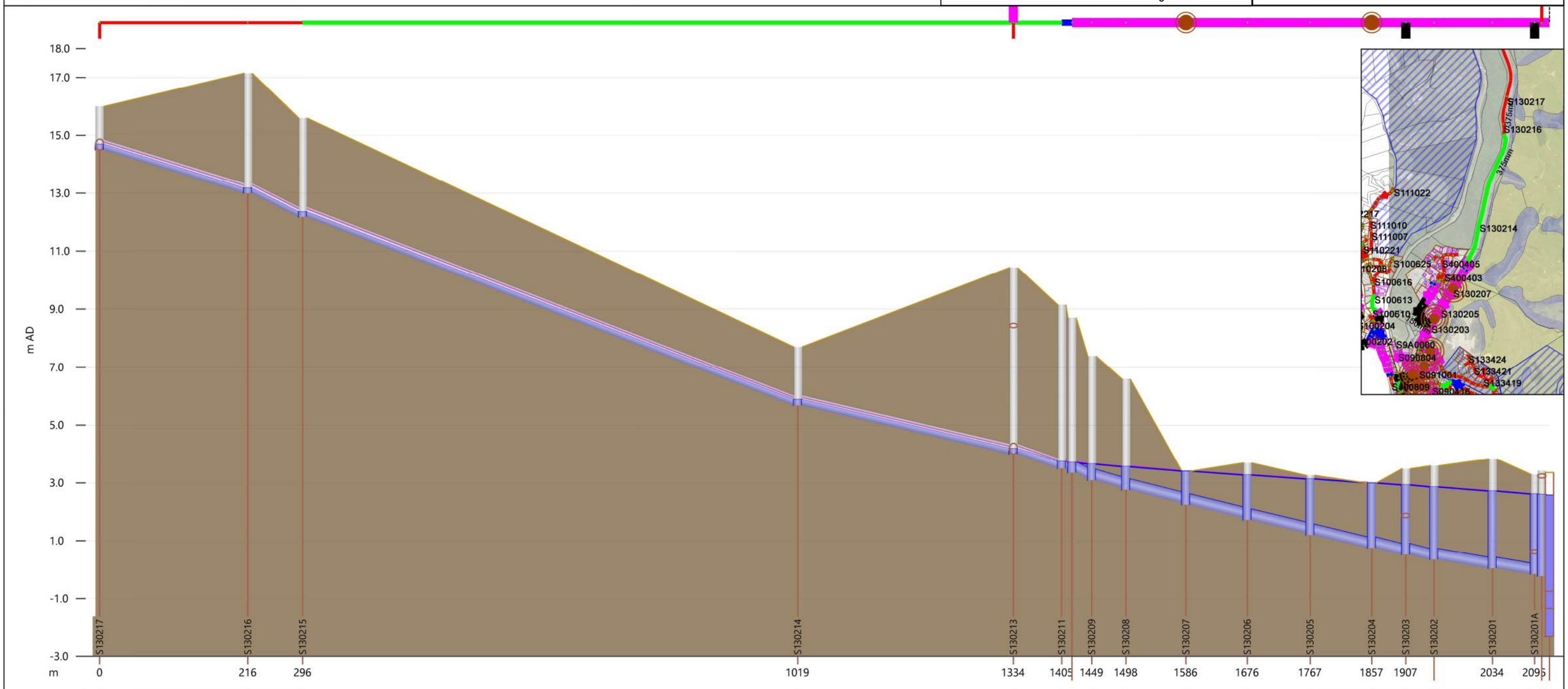
SCALE: 1:2000

0 2 km

ENVELOPE

Network: SP ENV Clip 2018 Stages 8hrStrg
Simulation Name: ClipWWF-4D-v35>Live data
Simulation Time: maximum

Scenario: FULL DEVELOPMENT
Stage: 1-25
Proposed Number of Lots: 1449
Mt Welcome Storage Duration: 8 HR
Level of Service: WWF 2018 Population
Upgrades: None



Link	S130217.1	S130216.1	S130215.1	S130214.1	S130213.1	-	-	-	S130208.1	S130207.1	S130206.1	S130205.1	-	-	S130202.1	S130201.1	
width (mm)	375	375	375	375	375	-	375	375	375	375	375	375	375	375	375	375	
us inv (m AD)	14.500	13.000	12.180	5.680	4.000	-	-	3.090	2.760	2.240	1.720	1.200	0.750	0.525	0.350	0.050	
ds inv (m AD)	13.000	12.180	5.680	4.000	3.500	-	-	2.830	2.310	1.790	1.270	0.750	0.525	0.350	0.050	-0.150	
Length (m)	216.4	80.1	722.8	314.9	70.5	-	28.8	49.9	87.6	89.7	91.7	89.9	49.7	41.2	85.3	61.6	
surc	0.50	0.46	0.54	0.54	0.65	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
DS flow (l/s)	71.98	71.98	71.98	71.98	71.98	-	-	71.98	71.98	71.98	71.97	71.84	71.85	80.11	77.63	77.20	
DS velocity (m/s)	1.316	1.449	1.185	1.228	1.327	-	-	1.228	1.228	1.228	1.228	1.110	1.064	1.020	1.003	1.260	

Node	S130217	S130216	S130215	S130214	S130213	-	-	-	S130208	S130207	S130206	S130205	S130204	-	S130202	S130201	-
ground (m AD)	16.000	17.150	15.600	7.700	10.423	9.147	-	-	6.597	3.400	3.690	3.260	2.990	3.486	3.591	3.827	-
Flood level (m AD)	16.000	17.150	15.600	7.700	10.423	9.147	-	-	6.597	3.400	3.690	3.260	2.990	3.486	3.591	3.827	-
flood dep (m)	-1.314	-3.980	-3.247	-1.818	-6.237	-	-	-	-3.036	0.000	-0.418	-0.126	0.000	-	-0.730	-1.109	-
level (m AD)	14.686	13.170	12.353	5.882	4.186	3.742	-	-	3.561	3.400	3.272	3.134	2.990	2.931	2.861	2.718	-
vol.lost (m3)	0.000	0.000	0.000	0.000	0.000	0.000	-	-	0.000	49.112	0.000	0.000	33.960	0.000	0.000	0.000	-

- Node [2115]
- Node Types : node_type
- Color/Symbol (abs)
  - Break
  - Connect 2D
  - Manhole
  - Outfall
  - Outfall 2D
  - Pond
  - Storage
- flvol : sim.flvol (m3)
- Color/Size/Circles
  - < 2
  - >= 2
  - >= 10
  - >= 500
- Conduit [2078]
- max_Surcharge : sim.max_Surcharge
- Line Color/Line Width
  - < 0.5
  - >= 0.5
  - >= 0.8
  - >= 1
  - >= 2
- Subcatchment [1682]
- System Type : system_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color
  - #NOT
  - combined
  - foul
  - other
  - overland
- sanitary
- storm
- Orifice [2]
- Pump [62]

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER PROFILE: PROJECT
DISCHARGE TO PS13 (PLIMMERTON)

DESIGNED: MH
DATE: 11/11/2025
PROJECT No: 1753-02
DRAWING No: 02

SCALE: 1:2000

0 2 km

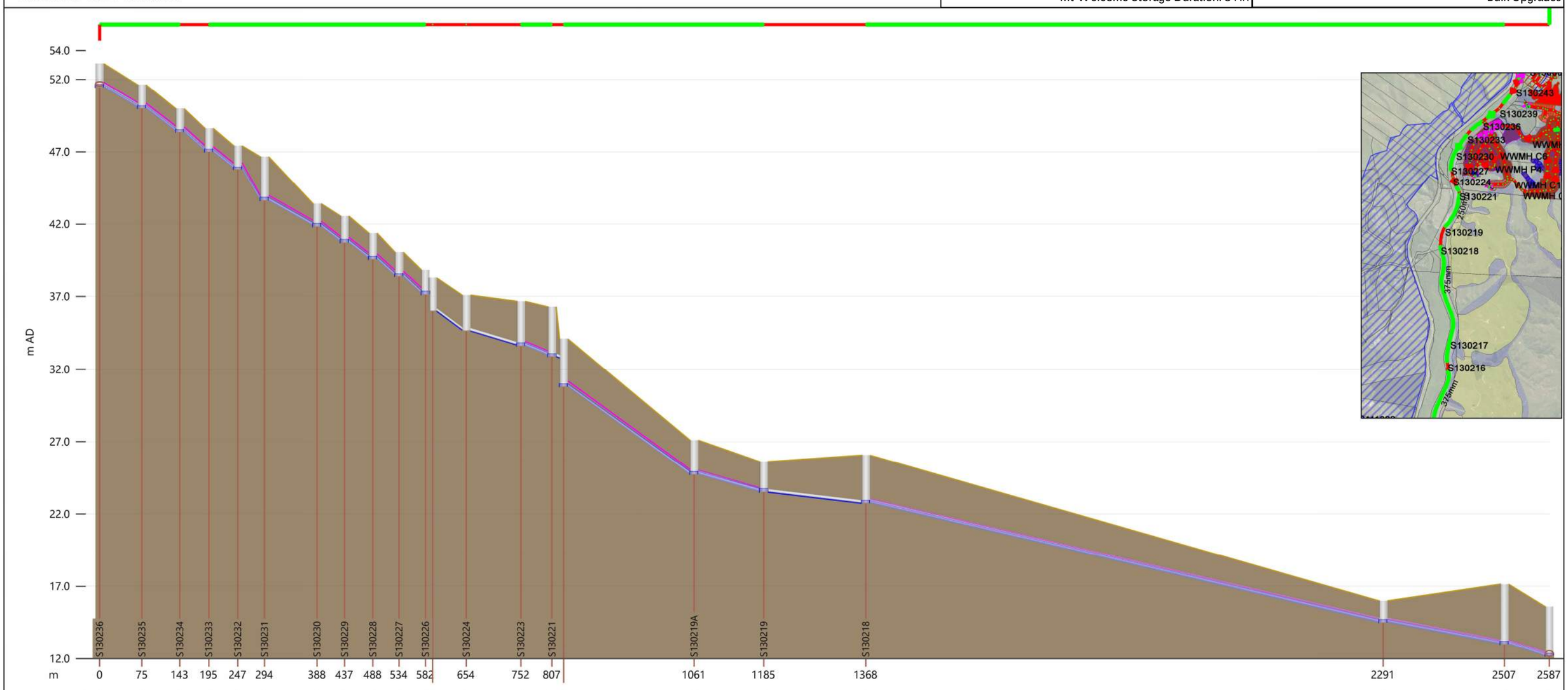
ENVELOPE

Network: SP ENV Clip 2018 Stages 8hrStrg
Simulation Name: ClipWWF-4D-v30>Stage 01-25 Upgrd 02 Live data
Simulation Time: maximum

Scenario: FULL DEVELOPMENT - BULK NETWORK UPGRADES AND PUMP STATION 1

Stage: 1-25
Proposed Number of Lots: 1449
Mt Welcome Storage Duration: 8 HR

Level of Service: WWF 2018 Population
Upgrades: Grav: 27+1 l/s | Storage: 1587m³
+ Bulk Upgrades



Link	S130236.1	-	-	-	-	S130231.1	-	-	-	-	-	S130224.1	-	-	S130220.1	S130219A.1	S130219.1	S130218.1	S130217.1	S130216.1
width (mm)	300	300	300	300	300	250	250	250	250	250	250	250	300	-	250	315	250	375	375	375
us inv (m AD)	51.470	50.000	48.360	47.000	-	43.630	41.830	40.730	-	-	36.000	34.640	33.610	-	30.800	24.730	23.520	22.750	14.500	13.000
ds inv (m AD)	50.070	48.430	47.070	45.860	-	41.900	40.800	39.650	-	-	34.710	33.680	32.960	-	24.730	23.520	22.750	14.500	13.000	12.180
Length (m)	75.5	67.6	51.8	51.7	47.7	93.9	49.2	50.3	46.7	47.2			55.5		232.7	124.5		923.2	216.4	80.1
surc	0.54	0.51	0.50	0.52	0.57	0.76	0.72	0.71	0.68	0.67			0.63		0.78	0.71		0.50	0.50	0.46
DS flow (l/s)	73.77	73.76	73.75	73.75	73.73	73.69	73.70	73.68	73.67	73.67			73.62		73.57	73.54		73.12	72.98	72.96
DS velocity (m/s)	1.882	2.044	2.097	2.005	2.078	1.851	1.954	1.975	2.073	2.101			1.582		1.795	1.239		1.321	1.321	1.454

Node	-	-	-	-	-	-	-	-	-	-	-	-	S130224	S130223	-	S130220	S130219A	S130219	S130218	S130217	S130216	-
ground (m AD)	-	51.630	49.990	-	-	46.660	43.416	-	-	-	-	-	37.092	36.670	-	34.100	27.102	25.620	26.070	16.000	17.150	-
Flood level (m AD)	-	51.630	49.990	-	-	46.660	43.416	-	-	-	-	-	37.092	36.670	-	34.100	27.102	25.620	26.070	16.000	17.150	-
flood dep (m)	-	-1.476	-1.480	-	-	-2.829	-1.392	-	-	-	-			-2.865	-	-3.125	-2.179	-1.876	-3.145	-1.312	-3.979	-
level (m AD)	-	50.154	48.510	-	-	43.831	42.024	-	-	-	-			33.805	-	30.975	24.923	23.744	22.925	14.688	13.171	-
vol.lost (m3)	-	0.000	0.000	0.000	-	0.000	0.000	-	-	-	-			0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	-

- Node [2115]
- Node Types : node_type
- Color/Symbol (abs)
  - Break
  - Connect 2D
  - Manhole
  - Outfall
  - Outfall 2D
  - Pond
  - Storage
- flvol : sim.flvol (m3)
- Color/Size/Circles
  - < 2
  - >= 2
  - >= 10
  - >= 500
- Conduit [2078]
- max_Surcharge : sim.max_Surcharge
- Line Color/Line Width
  - < 0.5
  - >= 0.5
  - >= 0.8
  - >= 1
  - >= 2
- Subcatchment [1682]
- System Type : system_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color
  - #NOT
  - combined
  - foul
  - other
  - overland
- sanitary
- storm
- Orifice [2]
- Pump [62]

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER PROFILE: PROJECT
DISCHARGE TO PS13 (PUKERUA BAY)

DESIGNED: MH
DATE: 11/11/2025
PROJECT No: 1753-02
DRAWING No: 01

SCALE: 1:2000

0 2 km

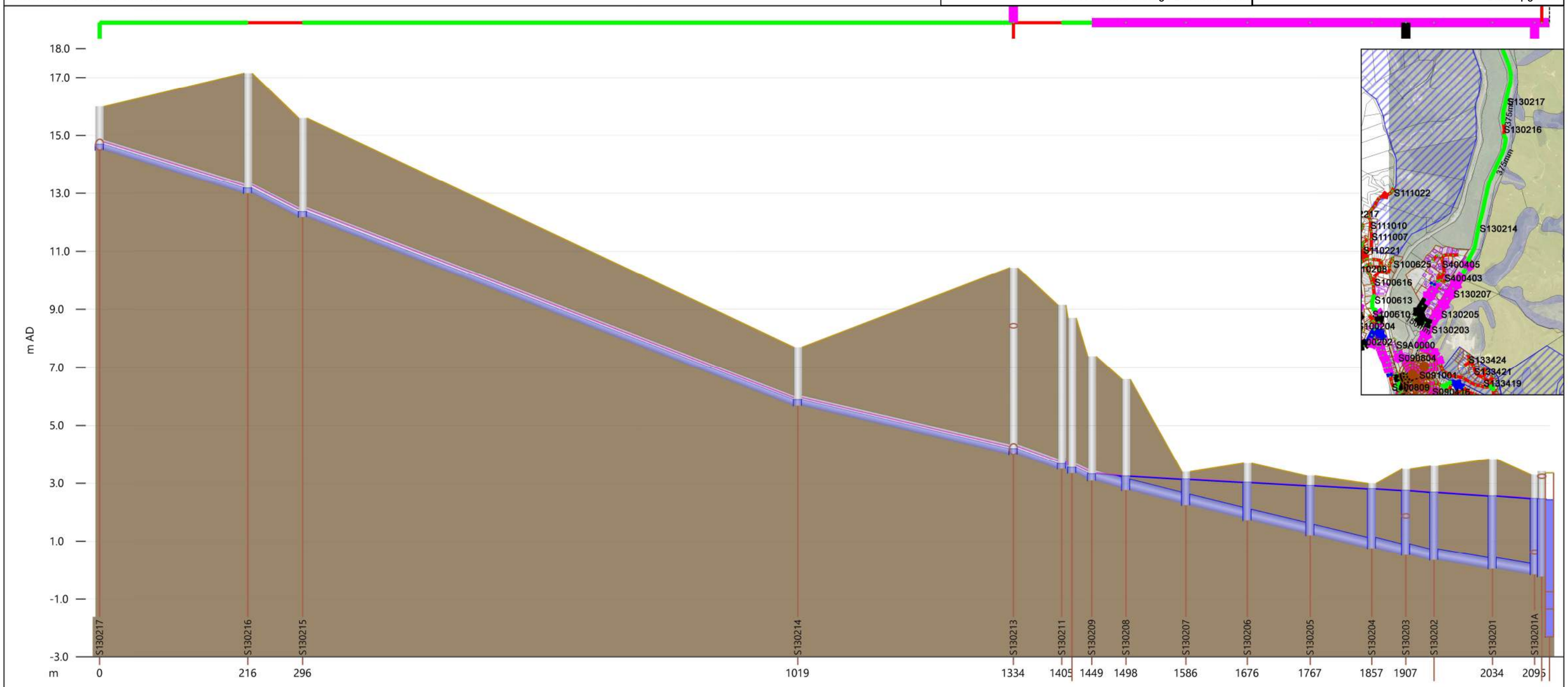
ENVELOPE

Network: SP ENV Clip 2018 Stages 8hrStrg
Simulation Name: ClipWWF-4D-v30>Stage 01-25 Upgrd 02 Live data
Simulation Time: maximum

Scenario: FULL DEVELOPMENT - BULK NETWORK UPGRADES AND PUMP STATION 1

Stage: 1-25
Proposed Number of Lots: 1449
Mt Welcome Storage Duration: 8 HR

Level of Service: WWF 2018 Population
Upgrades: Grav: 27+1 l/s | Storage: 1587m³
+ Bulk Upgrades



Link	S130217.1	S130216.1	S130215.1	S130214.1	S130213.1	-	-	-	S130208.1	S130207.1	S130206.1	S130205.1	-	-	S130202.1	S130201.1	
width (mm)	375	375	375	375	375	-	375	375	375	375	375	375	375	375	375	375	
us inv (m AD)	14.500	13.000	12.180	5.680	4.000	-	-	3.090	2.760	2.240	1.720	1.200	0.750	0.525	0.350	0.050	
ds inv (m AD)	13.000	12.180	5.680	4.000	3.500	-	-	2.830	2.310	1.790	1.270	0.750	0.525	0.350	0.050	-0.150	
Length (m)	216.4	80.1	722.8	314.9	70.5	-	28.8	49.9	87.6	89.7	91.7	89.9	49.7	41.2	85.3	61.6	
surc	0.50	0.46	0.54	0.54	0.49	-	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
DS flow (l/s)	72.98	72.96	72.63	72.34	72.27	-	-	72.20	72.14	72.07	72.00	71.93	71.88	82.30	82.19	82.15	
DS velocity (m/s)	1.321	1.454	1.187	1.230	1.329	-	-	1.229	1.229	1.229	1.228	1.105	0.979	1.030	1.017	1.288	

Node	S130217	S130216	S130215	S130214	S130213	-	-	-	S130208	S130207	S130206	S130205	S130204	-	S130202	S130201	-
ground (m AD)	16.000	17.150	15.600	7.700	10.423	9.147	-	-	6.597	3.400	3.690	3.260	2.990	3.486	3.591	3.827	-
Flood level (m AD)	16.000	17.150	15.600	7.700	10.423	9.147	-	-	6.597	3.400	3.690	3.260	2.990	3.486	3.591	3.827	-
flood dep (m)	-1.312	-3.979	-3.246	-1.817	-6.237	-	-	-	-3.353	-0.267	-0.667	-0.348	-0.186	-	-0.908	-1.269	-
level (m AD)	14.688	13.171	12.354	5.883	4.186	3.671	-	-	3.243	3.133	3.023	2.912	2.804	2.744	2.682	2.558	-
vol.lost (m3)	0.000	0.000	0.000	0.000	0.000	0.000	-	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-

- Node [2115]
- Node Types : node_type
- Color/Symbol (abs)
  - Break
  - Connect 2D
  - Manhole
  - Outfall
  - Outfall 2D
  - Pond
  - Storage
- flvol : sim.flvol (m3)
- Color/Size/Circles
  - < 2
  - >= 2
  - >= 10
  - >= 500
- Conduit [2078]
- max_Surcharge : sim.max_Surcharge
- Line Color/Line Width
  - < 0.5
  - >= 0.5
  - >= 0.8
  - >= 1
  - >= 2
- Subcatchment [1682]
- System Type : system_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color
  - #NOT
  - combined
  - foul
  - other
  - overland
- sanitary
- storm
- Orifice [2]
- Pump [62]

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER PROFILE: PROJECT
DISCHARGE TO PS13 (PLIMMERTON)

DESIGNED: MH
DATE: 11/11/2025
PROJECT No: 1753-02
DRAWING No: 02

SCALE: 1:2000

0 2 km

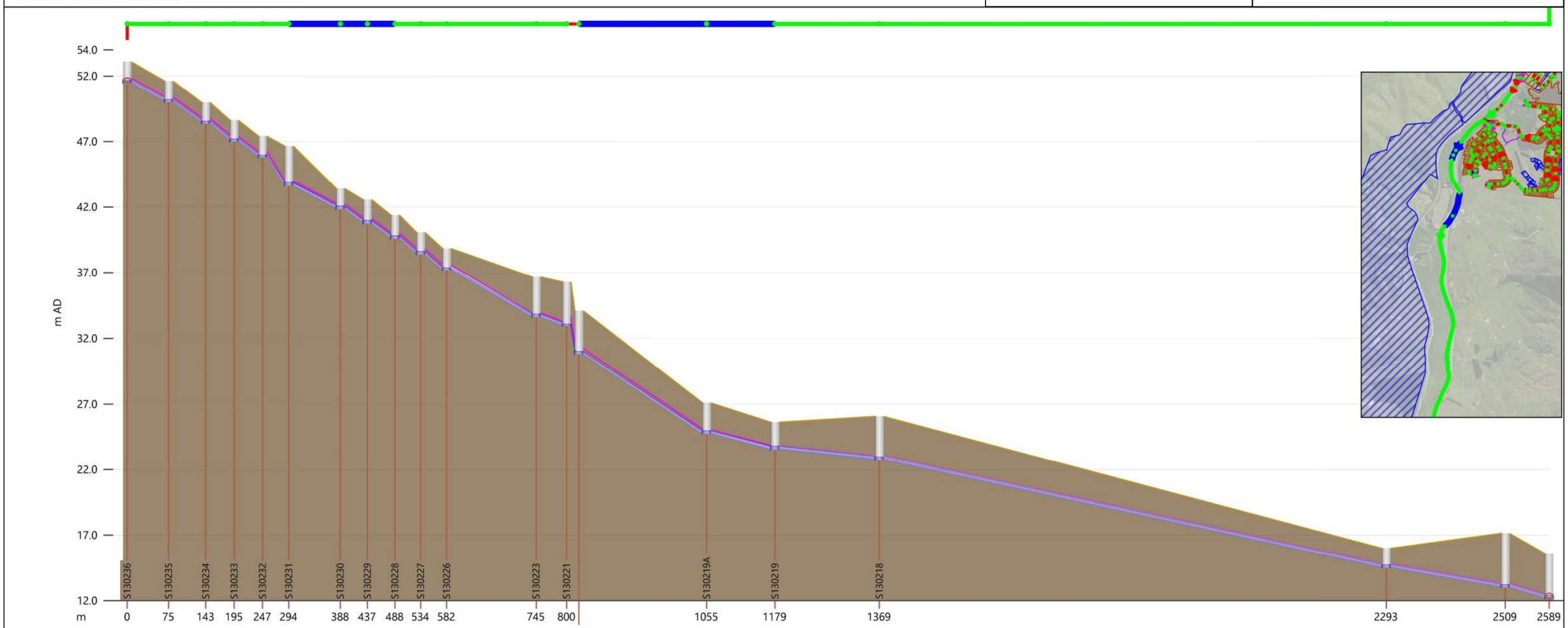
ENVELOPE

Network: SP ENV Clip 2018 Stages 8hrStrg (version 10) (Scenario Stage 01-25 Upgrd 02)
Simulation Name: ClipWWF-4D-v10>Stage 01-25 Upgrd 02 Live data
Simulation Time: maximum

Scenario: FULL DEVELOPMENT - BULK NETWORK UPGRADES AND PUMP STATION 1

Stage: 1-25
Proposed Number of Lots: 1449
Mt Welcome Storage Duration: 8 HR

Level of Service: WWF 2018 Population
Upgrades: PS1-0l/s | Grav: 40+2 l/s | Storage: 377 m³
+ Bulk Upgrades



Link	-	-	-	-	-	-	-	-	-	-	-	S130226.2	-	-	S130220.1	S130219A.1	S130219.2	S130218.1	S130217.1	-
width (mm)	300	300	300	300	300	250	250	250	250	250	350	300	-	250	315	375	375	375	375	
us inv (m AD)	51.470	50.000	-	-	-	43.630	-	-	-	-	37.200	-	-	30.800	24.730	23.520	22.750	14.500	13.000	
ds inv (m AD)	50.070	48.430	-	-	-	41.900	-	-	-	-	33.610	-	-	24.730	23.520	22.750	14.500	13.000	12.180	
Length (m)	75.5	67.6	51.8	51.7	47.7	93.9	49.2	50.3	46.7	47.2	163.2	55.5	-	232.7	124.5	190.0	923.2	216.4	80.1	
surc	0.60	0.56	0.55	0.57	0.76	0.94	0.83	0.82	0.77	0.76	0.64	0.70	-	0.88	0.80	0.66	0.56	0.56	0.51	
DS flow (m3/s)	-	-	-	-	-	0.08684	-	-	-	-	0.08683	-	-	0.08681	0.08681	0.08678	0.08675	0.08674	0.08674	
DS velocity (m/s)	1.961	2.135	-	-	-	1.866	-	-	-	-	1.341	-	-	1.893	1.297	1.314	1.367	1.378	1.516	

Node	-	-	-	-	-	-	-	-	-	-	S130226	S130223	-	S130220	S130219A	S130219	S130218	S130217	S130216	-
ground (m AD)	-	-	-	-	-	-	-	-	-	-	38.848	36.670	-	34.100	27.102	25.620	26.070	16.000	17.150	-
Flood level (m AD)	-	-	-	-	-	-	-	-	-	-	38.848	36.670	-	34.100	27.102	25.620	26.070	16.000	17.150	-
flood dep (m)	-	-	-	-	-	-	-	-	-	-	-1.490	-2.836	-	-3.097	-2.153	-1.849	-3.127	-1.291	-3.961	-
level (m AD)	-	-	-	-	-	-	-	-	-	-	37.358	33.834	-	31.003	24.949	23.771	22.943	14.709	13.189	-
vol.lost (m3)	-	0.000	-	-	-	0.000	0.000	-	-	-	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	-

Node [2114]
Node Types : node_type
Color/Symbol (abs)
Break
Connect 2D
Manhole
Outfall
Outfall 2D
Pond
Storage

flvol : sim.flvol (m3)
Color/Size/Circles
< 2
>= 2
>= 10
>= 500
Conduit [2076]

max_Surcharge : sim.max_Surcharge
Line Color/Line Width
< 0.5
>= 0.5
>= 0.8
>= 1
>= 2
Subcatchment [1682]
System Type : system_type
Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color/Line Width
#NOT
combined
foul
other

overland
sanitary
storm
Flap valve [5]
Orifice [4]
Pump [63]
Weir [1]
Polygon [1114]
category_id : category_id
Fill Visibility/Fill Color/Line Visibility/Line Color/Line Width
#NOT
Forecast ID Small Area

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER PROFILE: PROJECT
DISCHARGE TO PS13 (PUKERUA BAY)

DESIGNED: MH
DATE: 21/11/2025
PROJECT No: 1753-02
DRAWING No: 01

SCALE: 1:2000

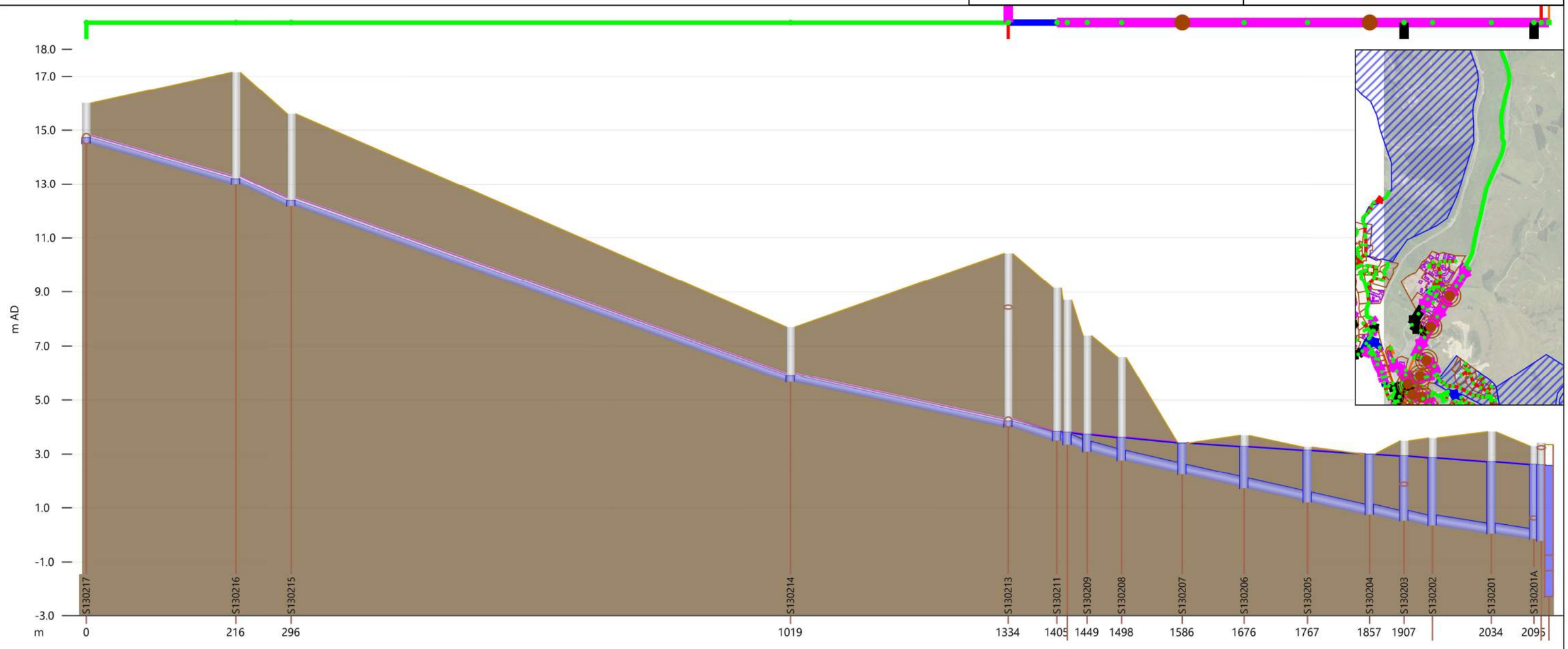
ENVELOPE

Network: SP ENV Clip 2018 Stages 8hrStrg (version 10) (Scenario Stage 01-25 Upgrd 02)
Simulation Name: ClipWWF-4D-v10>Stage 01-25 Upgrd 02 Live data
Simulation Time: maximum

Scenario: FULL DEVELOPMENT - BULK NETWORK UPGRADES AND PUMP STATION 1

Stage: 1-25
Proposed Number of Lots: 1449
Mt Welcome Storage Duration: 8 HR

Level of Service: WWF 2018 Population
Upgrades: PS1-0l/s | Grav: 40+2 l/s | Storage: 377 m³
+ Bulk Upgrades



Link		S130217.1	-	S130215.1	S130214.1	-	-	-	S130208.1	S130207.1	S130206.1	S130205.1	-	-	S130202.1	-
width (mm)		375	375	375	375	375	-	375	375	375	375	375	375	375	375	375
us inv (m AD)		14.500	13.000	12.180	5.680	4.000	-	3.090	2.760	2.240	1.720	1.200	0.750	-	0.350	0.050
ds inv (m AD)		13.000	12.180	5.680	4.000	3.500	-	2.830	2.310	1.790	1.270	0.750	0.525	-	0.050	-0.150
Length (m)		216.4	80.1	722.8	314.9	70.5	-	49.9	87.6	89.7	91.7	89.9	49.7	41.2	85.3	61.6
surc		0.56	0.51	0.61	0.60	0.89	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DS flow (m3/s)		0.08674	0.08674	0.08671	0.08669	0.08669	-	-	0.08605	0.08165	0.07540	0.07430	-	-	0.08049	-
DS velocity (m/s)		1.378	1.516	1.226	1.309	1.390	-	1.313	1.309	1.284	1.243	1.094	1.038	-	0.986	1.227

Node	S130217	S130216	S130215	S130214	S130213	-	-	-	S130207	S130206	S130205	-	-	-	-	-
ground (m AD)	16.000	17.150	15.600	7.700	10.423	-	-	6.597	3.400	3.690	3.260	2.990	-	3.591	3.827	-
Flood level (m AD)	16.000	17.150	15.600	7.700	10.423	-	-	6.597	3.400	3.690	3.260	2.990	-	3.591	3.827	-
flood dep (m)	-1.291	-3.961	-3.227	-1.791	-6.206	-	-	-2.988	0.000	-0.412	-0.123	0.000	-	-	-1.107	-
level (m AD)	14.709	13.189	12.373	5.909	4.217	-	-	3.608	3.400	3.278	3.137	2.990	-	2.863	2.720	-
vol.lost (m3)	0.000	0.000	0.000	0.000	0.000	-	-	0.000	41.904	0.000	0.000	33.313	-	0.000	0.000	-

Node [2114]
Node Types : node_type
Color/Symbol (abs)
Break
Connect 2D
Manhole
Outfall
Outfall 2D
Pond
Storage

flvol : sim.flvol (m3)
Color/Size/Circles
< 2
>= 2
>= 10
>= 500
Conduit [2076]

max_Surcharge : sim.max_Surcharge
Line Color/Line Width
< 0.5
>= 0.5
>= 0.8
>= 1
>= 2
Subcatchment [1682]
System Type : system_type
Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color/Line Width
#NOT
combined
foul
other

overland
sanitary
storm
Flap valve [5]
Orifice [4]
Pump [63]
Weir [1]
Polygon [1114]
category_id : category_id
Fill Visibility/Fill Color/Line Visibility/Line Color/Line Width
#NOT
Forecast ID Small Area

PROJECT: PUKERUA HOLDING LTD
MT WELCOME, PUKERUA BAY
WASTEWATER PROFILE: PROJECT
DISCHARGE TO PS13 (PLIMMERTON)

DESIGNED: MH
DATE: 21/11/2025
PROJECT No: 1753-02
DRAWING No: 02

SCALE: 1:2000

0 2 km

ENVELOPE

APPENDIX 5
WWL CORRESPONDENCE

Cc: Nadia Nitsche <Nadia.Nitsche@wellingtonwater.co.nz>; Alistair Osborne <Alistair.Osborne@wellingtonwater.co.nz>
Subject: RE: Mt Welcome – Wastewater Main Upgrade Options Pre App

Hi Miguel

Base flow:

Good spotting! Yes, we would normally assume 0.1 L/Ha for greenfield areas (based on "contributing area", which is usually assumed to be 0.1 Ha/Lot up to the maximum total area). So for example, if Plimmerton Farms Stage 1 covers 60 Ha, the baseflow is assumed to be 0.6 L/s. Please include this assumption in Mt Welcome / Muri Rd subcatchments.

Pump rates:

Yes, I recently confirmed the situation here, and thanks for asking for clarification.

The current configuration at PS13 is an alternating duty/standby arrangement. Each individual pump runs at around 90 L/s set point. This supersedes previous assumptions which had a duty/assist arrangement of 30+71 L/s (total 101 L/s).

However, there are changes here based on the works currently underway to balance the use of PS13 and PS8 rising mains in order to reduce a known uncontrolled spill on Mana Esplanade. New peak pump rates are estimated to be:

- PS13 (to pump main 13): 68 L/s (when all PS8 pumps are also running at the peak of the storm).
- PS8: 62 L/s (to pump main 8) + 37 L/s (to pump main 13, when PS13 pumps are also running)

Note also the update in the cross-connection at the bifurcation at node S070205.

See the extracts below from the design report for the configuration:

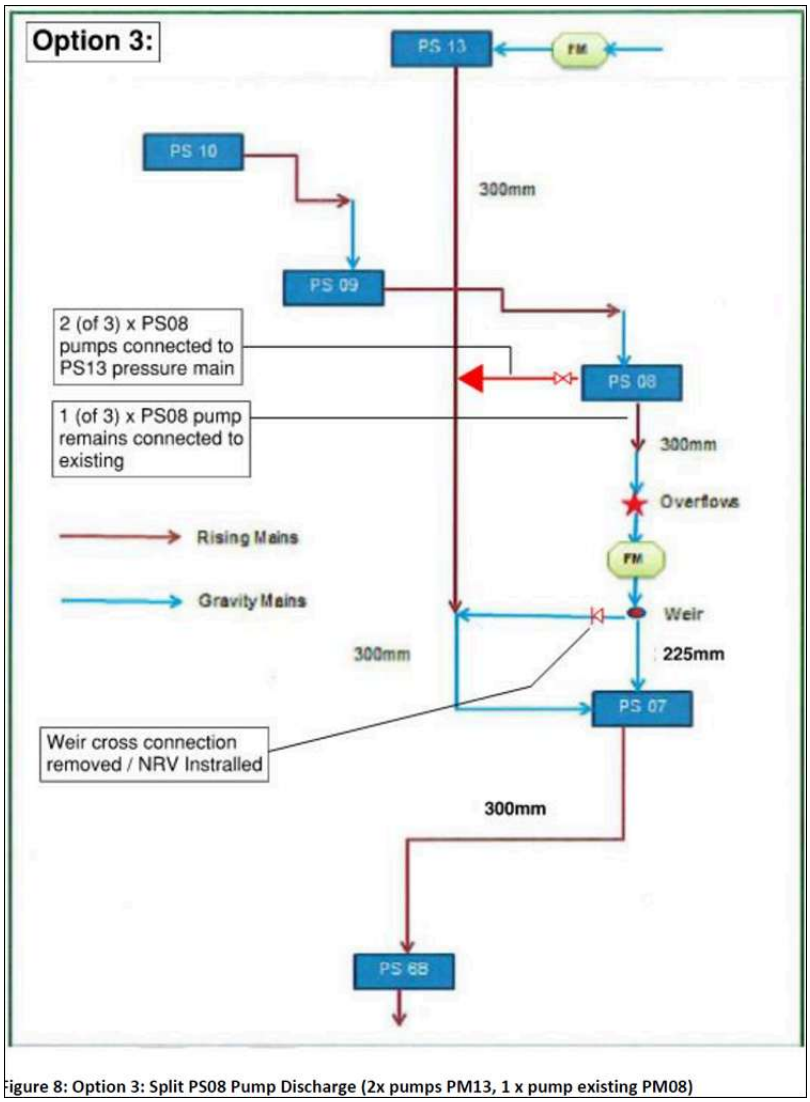


Figure 8: Option 3: Split PS08 Pump Discharge (2x pumps PM13, 1 x pump existing PM08)

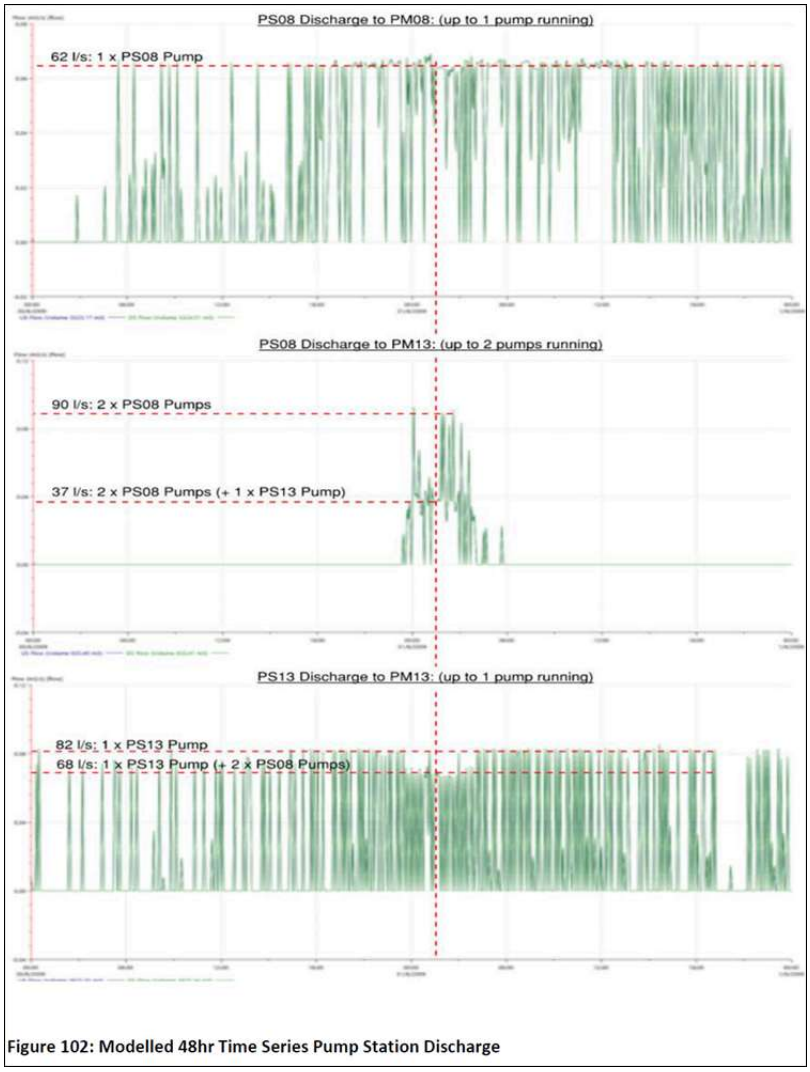


Figure 102: Modelled 48hr Time Series Pump Station Discharge

Although for some periods of a storm all pumps may not be operating simultaneously (e.g. before and after the peak), it would be non-conservative to assume PS13 can still achieve 90L/s with the PS8 works in place.

This reduction in PS13 capacity reduces risk to public health at the Mana Esplanade uncontrolled overflow location. This is the limitation we need to work with.

Let me know if you have any other questions.

Best regards

Manu

Manu Ward (he, him)

Senior Modeller – Wastewater (seconded)

Wellington Water

Tel 04 912 4400 **Mob** 022 681 5980

Private Bag 39804, Wellington Mail Centre 5045
Level 4, 25 Victoria Street, Petone, Lower Hutt

www.wellingtonwater.co.nz

From: Miguel Hernandez <Miguel.Hernandez@envelope-eng.co.nz>
Sent: Monday, 6 October 2025 12:50 pm
To: Manu Ward <Manu.Ward@wellingtonwater.co.nz>; Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Cc: Nadia Nitsche <Nadia.Nitsche@wellingtonwater.co.nz>; Alistair Osborne <Alistair.Osborne@wellingtonwater.co.nz>
Subject: Re: Mt Welcome – Wastewater Main Upgrade Options Pre App

Hi Manu.

Thanks for your comments and provided files, I could open them without any problems.

I have two questions:

Base flow: From your model, I noticed a base flow in the Plimmerton Farms sub catchments. Apparently equal to Pop/2400 (l/s). Do you suggest using the same approach for the Mt Welcome proposed sub catchments?

Pump Rates: The model version that I have uses fixed existing rates of 30l/s and 71/l/s for the PS13 and 50l/s, 25l/s and 37l/s for the PS08. Your version uses 68l/s for the PS13 and 62l/s, 20l/s and 17l/s for the PS08. These are lower than my version. Can you confirm these values?. Mainly PS13 can affect the performance in our scope.

Thank you

MIGUEL HERNANDEZ

SENIOR HYDRAULIC ENGINEER

M +64 21 056 7640

A 31B Drake Street (inside Victoria Park Market)
Auckland Central 1010

10 YEARS ENVELOPE

TOITŪ CARBON REDUCE ISO 14064-1 ORGANISATION

AMOTAI REGISTERED

From: Manu Ward <Manu.Ward@wellingtonwater.co.nz>
Sent: Friday, October 3, 2025 5:23 PM
To: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Cc: Nadia Nitsche <Nadia.Nitsche@wellingtonwater.co.nz>; Miguel Hernandez <Miguel.Hernandez@envelope-eng.co.nz>; Alistair Osborne <Alistair.Osborne@wellingtonwater.co.nz>
Subject: RE: Mt Welcome – Wastewater Main Upgrade Options Pre App

Hi Kyle.

Inflow and infiltration parameters

I have found some work that Hywel was doing to review the Plimmerton Farms tank.

He has noted the following regarding inflow and infiltration parameters for Greenfield assumptions in this area.

The "typical" values are used for sizing long-term options, whilst the "adopted" values could be justified for near-term scenarios (when the asset is new and less RDII can be expected).

3.1.2 Greenfield Hydrology

The default greenfield hydrology parameters for groundwater infiltration were updated as shown in Table 2 Greenfield Hydrology Update below; the initial parameters were considered to be conservative for a newly constructed network with modern materials.

paramater	typical	adopted	units
runoff area 1 - road	0.4	0.2	percentage of contributing area
runoff area 2 - pavement	0.4	0.2	percentage of contributing area
runoff area 3 - permeable	4	2	percentage of contributing area
runoff area 4 - GWI	40	20	dummy surface to replicate inflow and infiltration from the soil and ground stores
soil depth (m)	1	1	An estimate of the soil depth
percolation coefficient	0.8	0.8	A time coefficient, determined by calibration from existing data. It is recommended that the value should be between 0.1 and 10
percolation threshold	20	20	The percentage saturation level of the soil at which water starts to percolate downwards
percolation percentage infiltrating	15	5	The percentage of percolation flow that infiltrates directly into the drainage network.
porosity of soil	30	30	A coefficient representing the porosity of the soil (upper storage reservoir)
baseflow coefficient	0.01	0.01	A time coefficient, determined by calibration from existing data. It is recommended that the value should be between 100 and 10000

Domestic profile.

Please find attached the modelling specification which includes the standard dry-weather profile.

I double checked previous work in the Hutt Valley, and the assumption adopted there was 200 L/Pe/day for new developments, to be consistent with the Regional Standard. Let's use 200 (instead of alternatives 185 or 250 L/Pe/day).

Simplified model

You can download a transportable database of the simplified "Northern Growth Area" model here (ICM v2024.5).

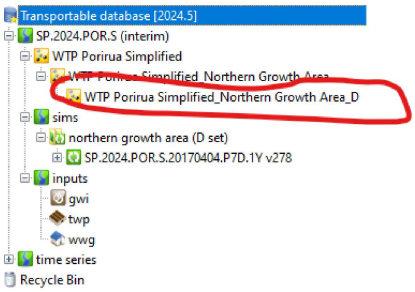
https://we.tl/t-iPgxGdTrNY

The relevant scenarios are in the network "WTP Porirua Simplified_Northern Growth Area_D":

- CUR AAA: do nothing 2018 scenario
- DEC: MED growth (2028) scenario, with committed projects – Plimmerton Farms including tank with RTC, PS8 works (which is expected to impact PS8 and PS13 peak capacity). 93 Grays Rd is also included, but this should probably not be considered in this horizon.
- DED: L2M growth (2058) scenario, with all greenfield catchments fully developed, but no additional upgrades above DEC.

This is not a final model, but these may be helpful as reference when considering the assumptions that impact Mt Welcome and Muri Rd. I would update your PS8 and PS13 capacity to be consistent with this model.

Wider review and updates of the strategic/simplified model is ongoing as part of the Porirua Containment Standard and Northern Growth Area Wastewater Servicing project (expected completion June 2026).



Let me know if you have any questions.

Best regards

Manu

From: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Sent: Thursday, 2 October 2025 2:56 pm
To: Manu Ward <Manu.Ward@wellingtonwater.co.nz>
Cc: Nadia Nitsche <Nadia.Nitsche@wellingtonwater.co.nz>; Miguel Hernandez <Miguel.Hernandez@envelope-eng.co.nz>
Subject: RE: Mt Welcome – Wastewater Main Upgrade Options Pre App

Caution: This is an external email. Please take care when clicking links or opening attachments.

Hi Manu,

Thanks for your time today. Some rough notes below.

1. Population 2018, 2038 or 2068?

R:/ Will use 2018 base with the developed site. This will assess the effects of the development only. Model to be sent, including the added Plimmerton tank.

2. Impervious

The runoff inflows in the NGA model are based on the land use distribution (see below) for different projected scenarios.

Should we consider a future impervious of 2013 or 2068? OR a combination?

R: Adopt 2018 scenario. 0.4 / 0.4 / 4 / 40.

3. Ground infiltration is the same for the projected scenarios, following the figure parameters. Assuming the same for the new project?

R: Manu to double check, likely RUNOFF (greenfield).

4. Wet Weather Flow

Considering a design storm based on specifications OR the provided historical rain data from 2017/04/04 to 2017/04/08?

R: Calibrated flows to be used. Envelope to compare vs design flows.

5. Should we consider the impervious parameters based on 2068 scenario or the 2013 scenario?

R: Related to question 2. For future scenario, also consider the 2018 parameters.

6. Domestic profile

The model uses a daily wastewater profile (purely foul flow) in the area, called Porirua FM4_S130201A_PLIMMERTON, with a daily peak of 1.52. This was used in the calibrated model.

Because of this methodology, together with the run-off model, the results may vary from the calculated flows in the design (WWF peak factors based on areas and pipe lengths).

Should we consider a design storm based on specifications OR the provided historical rain data from 2014/04/04 to 2014/04/08?

R: Manu to send WWL Modelling Specification (June 2020). Standard profile = 185 L; specification = 250 L. To be confirmed with Nadia.

Cheers.

KYLE DIRSE

DIRECTOR

M +64 27 228 1287

A 2/21 Joll Road
Havelock North 4130

From: Manu Ward <Manu.Ward@wellingtonwater.co.nz>
Sent: Wednesday, 1 October 2025 3:35 pm
To: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Cc: Nadia Nitsche <Nadia.Nitsche@wellingtonwater.co.nz>
Subject: RE: Mt Welcome – Wastewater Main Upgrade Options Pre App

Hi Kyle

Sorry for the slow response here. Would you be available between 9am-1pm Thursday or Friday or any time Monday to discuss this?

Cheers

Manu

From: Nadia Nitsche <Nadia.Nitsche@wellingtonwater.co.nz>
Sent: Wednesday, 1 October 2025 8:47 am
To: Manu Ward <Manu.Ward@wellingtonwater.co.nz>
Subject: Fwd: Mt Welcome – Wastewater Main Upgrade Options Pre App

Hi Manu

Would you be able to help out?

Thank you

Nadia

Sent from my iPhone

Begin forwarded message:

From: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Date: 1 October 2025 at 8:29:16 AM NZDT
To: Nadia Nitsche <Nadia.Nitsche@wellingtonwater.co.nz>
Subject: RE: Mt Welcome – Wastewater Main Upgrade Options Pre App

Caution: This is an external email. Please take care when clicking links or opening attachments.

Hi Nadia,

Any update on this?

A quick 30-minute Teams session would be really helpful to ensure we're working with the correct scenarios.

Regards,

KYLE DIRSE

DIRECTOR

M +64 27 228 1287

A 2/21 Joll Road
Havelock North 4130

From: Nadia Nitsche <Nadia.Nitsche@wellingtonwater.co.nz>
Sent: Tuesday, 23 September 2025 7:16 am
To: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Subject: Re: Mt Welcome – Wastewater Main Upgrade Options Pre App

Hi Kyle

Thank you for the email. Our wastewater modeller is on leave this week but will look into it next week when back.

Thanks

Nadia

> On 22/09/2025, at 7:24 PM, Kyle Dirse <kyle.dirse@envelope-eng.co.nz> wrote:
>
> **Caution:** This is an external email. Please take care when clicking links or opening attachments.
>
> Hi Nadia,
>
> Hope all is well.
>
> I'm wondering if you can provide us with some guidance on the email below.
>
> The Mt Welcome development (south of Pukerua Bay) is currently in the design phase.
>
> We are assessing the constraint areas of the SH59 trunk main and identifying what mitigation will be required for the development.
>
> Could you please connect me with a WWL modeller to discuss the ICM assumptions?
>
> Regards,
>
> **KYLE DIRSE**
>
> DIRECTOR
>
> **M** +64 27 228 1287
>
> **A** 2/21 Joll Road
> Havelock North 4130

From: Kyle Dirse
Sent: Wednesday, 17 September 2025 3:39 pm
To: 'Alister O'Callaghan' <alister.ocallaghan@e2environmental.com>
Cc: Mohammed.Hassan@wellingtonwater.co.nz; Phil.Garrity@wellingtonwater.co.nz; Andrew Maraura <andrew.maraura@wellingtonwater.co.nz>; Mathew Baily <mathew.baily@poriruacity.govt.nz>; Nancy Gomez <nancy.gomez@wellingtonwater.co.nz>
Subject: RE: Mt Welcome – Wastewater Main Upgrade Options Pre App

Hi Alister,

Can we book in a team's meetings with the WWL modelling team? We just want to confirm some of the ICM model assumptions.

Some high level queries below.

1. Population 2013, 2038 or 2068?.
2. Impervious: The runoff inflows in the NGA model are based on the land use distribution (see below) to the different projected scenarios. Should we consider a future impervious of 2013 or 2068? OR a combination?

   <image006.png>

3. Ground infiltration is the same for the projected scenarios, following the figure parameters. Assuming the same for the new project?

<image007.png>

4. Wet Weather Flow. Considering a design storm based on specifications OR the provided historical rain data from 2014/04/04 to 2014/04/08?

Muri Road Development Assumption:

1. Should we consider the proposed upgrades in PS30?. PS30 upgrade from 8l/s to 18l/s

Mt Welcome Design:

1. Should we consider the impervious parameters based on 2068 scenario or the 2013 scenario?
2. Domestic profile: The model uses a daily wastewater profile (this is purely foul flow, see below) in the area, this is called 'Porirua FM4_S130201A_PLIMMERTON' with a daily peak of 1.52 and this was used in the calibrated model. Because of this methodology, together with the run-off model, the model results may vary from the calculated flows in the design (WWF peak factors based on areas and pipe lengths). Should we consider a design storm based on specifications OR the provided historical rain data from 2014/04/04 to 2014/04/08?

<image008.png>

KYLE DIRSE

DIRECTOR

M +64 27 228 1287

A 2/21 Joll Road
Havelock North 4130

From: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>
Sent: Friday, 8 August 2025 3:17 pm
To: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Cc: Mohammed.Hassan@wellingtonwater.co.nz; Phil.Garrity@wellingtonwater.co.nz; Andrew Maraura <andrew.maraura@wellingtonwater.co.nz>; Mathew Baily <mathew.baily@poriruacity.govt.nz>; Nancy Gomez <nancy.gomez@wellingtonwater.co.nz>
Subject: Mt Welcome – Wastewater Main Upgrade Options Pre App

Greetings Kyle

Mt Welcome – Wastewater Main Upgrade Options Pre App

Discussion to date suggest council will be interested in working with you on this.

Your option 4 looks complex to administer but most likely will provide the best outcome for council with pushing off the funding requirements and least delays for your developer with a staged approach as demand increases.

Once you have bit of a plan showing the developments 10-year timeline, likely development trigger points and upgrades linked to the trigger points then we can begin the stakeholder discussion to flesh out what actions are required by the stakeholders to facilitate your timeline or roadblocks that need to be addressed.

Kind regards

Subject: [EXTERNAL] Mt Welcome Wastewater Upgrades.

Hi Alister,

Following up on our meeting from last week, in specific Mt Welcome wastewater.

We're keen to know if you have any information on the planned SH59 gravity sewer capacity upgrade between Pukerua and Plimmerton.

This project is included in the 2024 Porirua DCP as a planned upgrade, partially funded by development contributions from the NGA.

We've explored several options using preliminary modelling based on the 2018 calibrated ICM WW model.

A summary of key options and findings is provided below.

Option 1: Council Facilitated Upgrade

This option involves on-site design using gravity-based systems wherever possible, with pump stations used only where necessary.

On-site storage at pump stations would meet the minimum WWRS requirements, potentially causing downstream issues and overflows during heavy rain.

Wellington Water would need to upgrade infrastructure, partially funded by development contributions.

Option 2: Developer Facilitated Upgrade

Similar to Option 1 but delivered as a developer-led upgrade with partial funding from the council.

Option 3: On-site Detention

This method assumes full site development without downstream upgrades. Storage calculations, based on the 2018 Calibrated Infoworks ICM model require significantly more storage than WWRS standards to retain a three-day wet weather event.

WWRS requires 20 hours of ADWF storage for public pump stations, ensuring localized capacity but not addressing downstream limitations.

High-velocity discharges can worsen these issues. Without upgrades, mitigating the fully developed NGA would require 9,450 m³ of wet well storage

---

Option 4: Combined

This staged approach targets critical network areas, allowing development to begin with minimal upfront costs or delays.

Modelling shows up to 24% of the yield can connect via gravity without surcharging the existing network, assuming no pump stations are used. (applies to all options above)

An additional 11% can be supported by upgrading 204m of pipe. Beyond that, a 400 m³ pump station at Mt Welcome or further bulk network upgrades (as in Option 1) would be required.

Note these are high level options based on preliminary modelling. But keen for a steer from WWL on expectations or planned upgrades. Potentially a catch up with your modelling team after as well.

Regards,

KYLE DIRSE

Kind regards

Alister O'Callaghan | Senior Engineer

On Behalf of the Wellington Water Land Development Team.

<image001.jpg>

Mobile 0224 074 330

Email alister.ocallaghan@e2environmental.com

Zoom meeting request to alister.ocallaghan@e2environmental.com

WhatsApp +64 224074330 (Install WhatsApp and call for free)

Messenger https://www.facebook.com/alister.ocallaghan

e2Environmental Ltd

Office 03 358 4955

46/1 Acheron Drive, Christchurch, 8041
www.e2Envronmental.com

From: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Sent: Friday, 8 August 2025 2:15 pm
To: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>; Rory Smeaton <Rory.Smeaton@poriruacity.govt.nz>
Cc: Dan Smyth <dan.smyth@classicdevelopments.co.nz>; William Dorset <william.dorset@classicdevelopments.co.nz>
Subject: RE: Mt Welcome - 3 Waters infrastructure pre-app advice

Hi Alister,

Just following up on this again.

There is some urgency to understanding network constraints and developer led upgrade options to help inform our design.

Regards,

KYLE DIRSE

DIRECTOR

M +64 27 228 1287

A 2/21 Joll Road
Havelock North 4130

From: Kyle Dirse
Sent: Tuesday, 29 July 2025 10:14 am
To: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>; Rory Smeaton <Rory.Smeaton@poriruacity.govt.nz>
Cc: Dan Smyth <dan.smyth@classicdevelopments.co.nz>; William Dorset <william.dorset@classicdevelopments.co.nz>
Subject: RE: Mt Welcome - 3 Waters infrastructure pre-app advice

Hi Alister,

Has there been any further discussions on your end?

At the first instance, it might be good to have a meeting the WWL Growth Team or modellers.

Just to discuss model parameters, downstream constraints, etc.

Regards,

KYLE DIRSE

DIRECTOR

M +64 27 228 1287

A 2/21 Joll Road
Havelock North 4130

_ _

From: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>
Sent: Tuesday, 22 July 2025 3:46 pm
To: Rory Smeaton <Rory.Smeaton@poriruacity.govt.nz>; Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Cc: Dan Smyth <dan.smyth@classicdevelopments.co.nz>; William Dorset <william.dorset@classicdevelopments.co.nz>
Subject: RE: Mt Welcome - 3 Waters infrastructure pre-app advice

Greetings Rory and Kyle

2025-07-22 WWL Pre-App – Mt Welcome 3 Water Infrastructure (Trunk Wastewater)

Thanks for the more detailed options than I was able to provide.

The 9400m^3 (4 Olympic swimming pools 50mx25mx2m or 2.5 times the 3.7Ml water reservoirs) of WW detention is Hugh. Thats 10m^3 per lot.

I am sure the Wellington Water Growth Team and PCC will be keen to discuss partnership options to generate a "win win" solution to enable the Mt Welcome growth. I will pass on your query to the internal stakeholders and see if we can get some dialogue in this space.

Kind regards

Alister O'Callaghan | Senior Engineer

On Behalf of the Wellington Water Land Development Team.

<image001.jpg>

Mobile 0224 074 330

Email alister.ocallaghan@e2environmental.com

Zoom meeting request to alister.ocallaghan@e2environmental.com

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Messenger https://www.facebook.com/alister.ocallaghan

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www.e2Envronmental.com

From: Rory Smeaton <Rory.Smeaton@poriruacity.govt.nz>
Sent: Tuesday, 22 July 2025 1:10 pm
To: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Cc: Dan Smyth <dan.smyth@classicdevelopments.co.nz>; William Dorset <william.dorset@classicdevelopments.co.nz>; Alister O'Callaghan <alister.ocallaghan@e2environmental.com>
Subject: Mt Welcome - 3 Waters infrastructure pre-app advice

Kia ora koutou,

Alister provided the **attached** advice on Friday and asked me to pass it on. Apologies for the delay.

Ngā mihi,

Rory

Rory Smeaton MNZPI

Principal Policy Planner

Kaihanga Mahere Kaupapahere Matua

Mob: 021 195 2071

Phn: 04 237 1504

<image005.png>

poriruacity.govt.nz

From: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Sent: Tuesday, 22 July 2025 12:32 pm
To: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>
Cc: Rory Smeaton <Rory.Smeaton@poriruacity.govt.nz>; Dan Smyth <dan.smyth@classicdevelopments.co.nz>; William Dorset <william.dorset@classicdevelopments.co.nz>
Subject: [EXTERNAL] Mt Welcome Wastewater Upgrades.

Hi Alister,

Following up on our meeting from last week, in specific Mt Welcome wastewater.

We're keen to know if you have any information on the planned SH59 gravity sewer capacity upgrade between Pukerua and Plimmerton.

This project is included in the 2024 Porirua DCP as a planned upgrade, partially funded by development contributions from the NGA.

We've explored several options using preliminary modelling based on the 2018 calibrated ICM WW model.

A summary of key options and findings is provided below.

Option 1: Council Facilitated Upgrade

This option involves on-site design using gravity-based systems wherever possible, with pump stations used only where necessary.

On-site storage at pump stations would meet the minimum WWRS requirements, potentially causing downstream issues and overflows during heavy rain.

Wellington Water would need to upgrade infrastructure, partially funded by development contributions.

Option 2: Developer Facilitated Upgrade

Similar to Option 1 but delivered as a developer-led upgrade with partial funding from the council.

Option 3: On-site Detention

This method assumes full site development without downstream upgrades. Storage calculations, based on the 2018 Calibrated Infoworks ICM model require significantly more storage than WWRS standards to retain a three-day wet weather event.

WWRS requires 20 hours of ADWF storage for public pump stations, ensuring localized capacity but not addressing downstream limitations.

High-velocity discharges can worsen these issues. Without upgrades, mitigating the fully developed NGA would require 9,450 m³ of wet well storage

---

Option 4: Combined

This staged approach targets critical network areas, allowing development to begin with minimal upfront costs or delays.

Modelling shows up to 24% of the yield can connect via gravity without surcharging the existing network, assuming no pump stations are used. (applies to all options above)

An additional 11% can be supported by upgrading 204m of pipe. Beyond that, a 400 m³ pump station at Mt Welcome or further bulk network upgrades (as in Option 1) would be required.

Note these are high level options based on preliminary modelling. But keen for a steer from WWL on expectations or planned upgrades. Potentially a catch up with your modelling team after as well.

Regards,

KYLE DIRSE

DIRECTOR

M +64 27 228 1287

A 2/21 Joll Road
Havelock North 4130

Outlook

FW: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

From Dave Munro <dave.munro@envelope-eng.co.nz>
Date Wed 12/03/2025 12:48 PM
To Kyle Dirse <kyle.dirse@envelope-eng.co.nz>; Miguel Hernandez <Miguel.Hernandez@envelope-eng.co.nz>

2 attachments (7 MB)
Scada_MuriRd_Flow_1min_28092024-28102024.xlsx; Scada_MuriRd_Pumpdata_1min_28092024-28102024.xlsx;

Ditto??

DAVE MUNRO
PROJECT LEAD / SENIOR ENGINEER
M +64 21 390 307
A James Smith Building - Level 1, 65 Cuba Street
Te Aro, Wellington 6011

ENVELOPE

From: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>
Sent: Wednesday, 12 March 2025 12:36 pm
To: Dave Munro <dave.munro@envelope-eng.co.nz>
Subject: FW: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

Alister O'Callaghan | Senior Engineer
On Behalf of the Wellington Water Land Development Team.
e2environmental CONSULTING CIVIL ENGINEERS
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Email alister.ocallaghan@e2environmental.com
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Messenger https://www.facebook.com/alister.ocallaghan
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Office 03 358 4955
46/1 Acheron Drive, Christchurch, 8041
www.e2Envronmental.com

From: Alister O'Callaghan
Sent: Tuesday, 5 November 2024 4:32 pm
To: Kyle Dirse Envelope (kyle.dirse@envelope-eng.co.nz) <kyle.dirse@envelope-eng.co.nz>
Subject: FW: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

Greetings Kyle.

Some more information re PS30 in Muri Road.

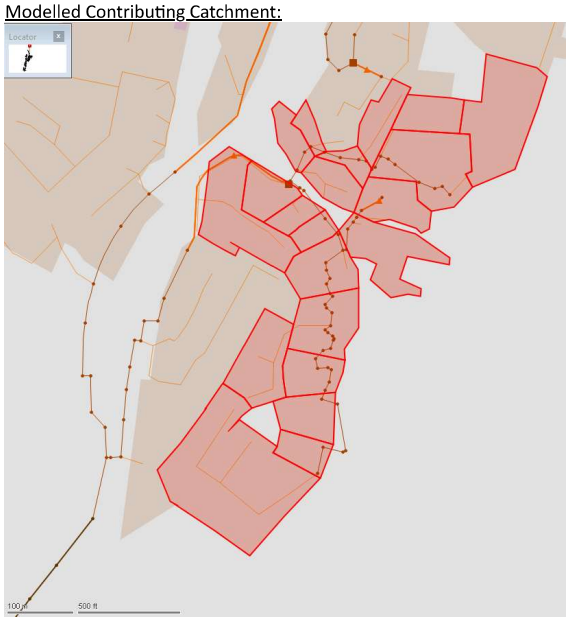
Alister O'Callaghan | Senior Engineer
On Behalf of the Wellington Water Land Development Team.
e2environmental CONSULTING CIVIL ENGINEERS
Mobile 0224 074 330
Email alister.ocallaghan@e2environmental.com
Zoom meeting request to alister.ocallaghan@e2environmental.com
WhatsApp +64 224074330 (Install WhatsApp and call for free)
Messenger https://www.facebook.com/alister.ocallaghan
e2Environmental Ltd
Office 03 358 4955
46/1 Acheron Drive, Christchurch, 8041
www.e2Envronmental.com

From: Manu Ward <Manu.Ward@wellingtonwater.co.nz>
Sent: Tuesday, 5 November 2024 12:46 pm
To: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>
Cc: Alistair Osborne <Alistair.Osborne@wellingtonwater.co.nz>; Kara Beveridge <Kara.Beveridge@wellingtonwater.co.nz>; Phil Garrity <Phil.Garrity@wellingtonwater.co.nz>
Subject: RE: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

You don't often get email from manu.ward@wellingtonwater.co.nz. Learn why this is important
Hi Alister

As promised in our phone conversation last week, here is some information I can find regarding Muri Road pump station.

Modelled Contributing Catchment:



Area: 15.4 Ha
Population (2018): 252
Average baseflow: 0.46 L/s

Regional Standard static formula for flow:
ADWF: 0.6 L/s (assuming 200 L/pe/day)
PWWF: 12.3 L/s (assuming 0.8 km/ha pipe length, and "average" groundwater conditions).

Approximate 1-year ARI Event modelled PWWF: 13.5 L/s

Pump Data
The Porirua model is set up with a total pump capacity of 8 L/s, though I can't confirm where this figure comes from.
The 3 Waters Mechanical Inspection Report (2016) indicates a capacity of 13.5 (single pump) or 17 (dual pumps) L/s.

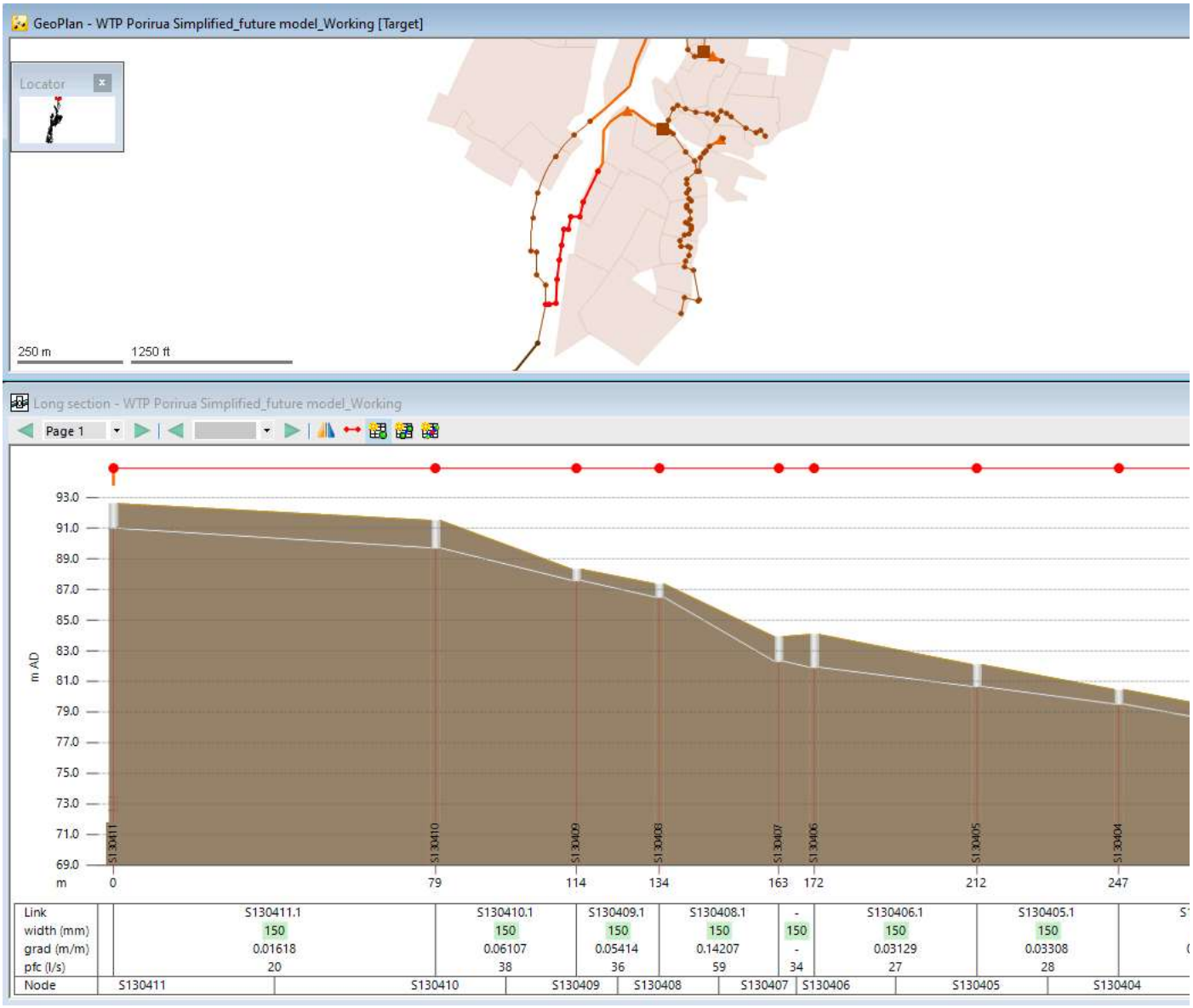
Phil Garrity in the Network Engineering team (cc'd to this email) indicates that the pumps were apparently replaced with the Flygt NP3127.185 SH in around 2016/17.
Other relevant data is shown below (from a database last updated in 2020), which indicates a capacity of 10.8 L/s. It is unclear if the stated designed duty point is for a single or dual pump – this should be checked with the pump and system curves.

Pump Information **Renewal and Condition Inform**

							Designed Duty		**Measured Duty**		**Electrical**		**Magflow**		**Pipework**	
Site Unit ID	Name	No. of Pumps	Manufacturer	Pump Model	Rated Output	Total Installed	Pump Capacity	System Head	ADWF	Pump Capacity	Last overhaul	Condition grade	Installed	Magflow location	Last overhaul	Condit grad
					(kW)	(kW)	(L/s)	(mWC)	(L/s)	(L/s)						
PS230	Muri Road	3	FLYGT	NP 3127 SH 248 185	7.40	22.2	10.80	22.80			2007					

The attached spreadsheets show the previous month of SCADA records for the pump. It is difficult to confirm the total pump capacity from the instantaneous flow records, but the pump starts and run time data may be useful to verify the assessment of the 3 Waters Mechanical Inspection Report.

Downstream pipe data
The following image shows the modelled long-section profile of the downstream pipe data until it connects to the 250mm pipe on the western side of SH59. (The profile is for the pipes selected in red in the plan view).
Note that additional catchments of about 2.7 Ha area and population of 63 also contribute to this pipe between Muri Road PS and SH59. (Modelled 1yr PWWF 3.5 L/s).
This implies that pipe upgrades would likely be required to contain the pump discharge if it exceeds the existing pipe-full capacity of about 20 L/s.



Let me know if you have any queries.
Best regards
Manu

Manu Ward (he, him)
Senior Modeller – Wastewater (seconded)
Wellington Water
Tel 04 912 4400 Mob 022 681 5980
Private Bag 39804, Wellington Mail Centre 5045
Level 4, 25 Victoria Street, Petone, Lower Hutt
www.wellingtonwater.co.nz

From: Alistair Osborne <Alistair.Osborne@wellingtonwater.co.nz>
Sent: Friday, October 25, 2024 1:45 PM
To: Manu Ward <Manu.Ward@wellingtonwater.co.nz>
Subject: FW: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

Hi Manu,

Any chance you could have a look at the request below. Let me know if I can provide additional info, and Kara can help find the right model if needed.

cheers

Alistair Osborne (he, him) Drainage Modelling – Team Lead

Wellington Water

Tel 04 912 4400 Mob 021 365 961

Private Bag 39804, Wellington Mail Centre 5045

Level 4, 25 Victoria Street, Petone, Lower Hutt

From: Kara Beveridge <Kara.Beveridge@wellingtonwater.co.nz> **On Behalf Of** Modelling Team
Sent: Friday, October 25, 2024 1:39 PM
To: Alistair Osborne <Alistair.Osborne@wellingtonwater.co.nz>
Subject: FW: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

Hi Ali,

Could this query go to Manu? Not entirely sure what information they need though.

Cheers,

Kara Beveridge Graduate Modeller

Wellington Water

Tel 04 912 4400 Mob 021 247 9164

Private Bag 39804, Wellington Mail Centre 5045

Level 4, 25 Victoria Street, Petone, Lower Hutt

www.wellingtonwater.co.nz

From: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>
Sent: Thursday, October 24, 2024 8:36 AM
To: Modelling Team <Modelling.Team@wellingtonwater.co.nz>
Cc: Kyle Dirse Envelope (kyle.dirse@envelope-eng.co.nz) <kyle.dirse@envelope-eng.co.nz>
Subject: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

Greetings Ahmed

Is there any additional information you can provide Kyle from (Envelope) as he is tasked with designing the PS230 wastewater pumping station (located in Muri Road Pukerua Bay) upgrade to service the 34 Muri Road, 152 lot subdivision?

Kind regards

Alister O'Callaghan | Senior Engineer
On Behalf of the Wellington Water Land Development Team.
e2environmental CONSULTING CIVIL ENGINEERS
Mobile 0224 074 330
Email alister.ocallaghan@e2environmental.com
Zoom meeting request to alister.ocallaghan@e2environmental.com
WhatsApp +64 224074330 (Install WhatsApp and call for free)
Messenger https://www.facebook.com/alister.ocallaghan
e2Environmental Ltd
Office 03 358 4955
46/1 Acheron Drive, Christchurch, 8041
www.e2Envronmental.com

From: Alister O'Callaghan
Sent: Tuesday, 22 October 2024 3:27 pm
To: Ben.Hemara@wellingtonwater.co.nz
Cc: Land.Development@wellingtonwater.co.nz; Phil.Garrity@wellingtonwater.co.nz
Subject: 2024-10-22 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

Greetings Ben

Can anyone from your team provide up to date information for this wastewater pumping station Muri Road Pukerua Bay?

The resource consent requires upgrades as the development is over doubling the number of houses being connected.

Kyle from Envelope will be doing the design, so if you have any aspirations for this area now is a great time to let us know so we can hopefully get them included in the engineering plan approval for this development.

Kind regards

Alister O'Callaghan | Senior Engineer
On Behalf of the Wellington Water Land Development Team.
Mobile 0224 074 330
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From: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Sent: Tuesday, 22 October 2024 3:15 pm
To: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>
Cc: Paul Winstanley <Paul.Winstanley@wellingtonwater.co.nz>; Land.Development@wellingtonwater.co.nz; Dave Munro <dave.munro@envelope-eng.co.nz>; Andrew Horsley <andrew.horsley@envelope-eng.co.nz>
Subject: RE: 2023-02-16 As-built and O&M INFORMATION re Wastewater PS230

Hi Alister,

Revisiting WWPS (PS30) at SeaVista Drive as part of the Muri Road Development.

We have the 2016 inspection report with recommendations that you provided, but nothing current.
Can we send us current operational information for this pump station? Were the proposed upgrades constructed?

The ICM wastewater provided does show some backflow effects from PS30 without the future development scenario.
Just trying to understand current capacity and potential upgrade requirements.

Regards,

KYLE DIRSE
DIRECTOR - CIVIL / SENIOR CIVIL ENGINEER
M +64 27 228 1287
A 26A Tawa Street
Mount Maunganui 3116

From: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>
Sent: Thursday, 16 February 2023 12:19 pm
To: Alan Blyde <alan.blyde@envelope-eng.co.nz>
Cc: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>; Paul Winstanley <Paul.Winstanley@wellingtonwater.co.nz>; Land.Development@wellingtonwater.co.nz
Subject: 2023-02-16 As-built and O&M INFORMATION re Wastewater PS230

Greetings Alan

2023-02-16 As-built and O&M INFORMATION re Wastewater PS230

Please find attached as-built plans as discussed.
I am waiting on Paul Winstanley re current operation and maintenance information for the pumping station.

Kind regards

Alister O'Callaghan | Senior Engineer
On Behalf of the Wellington Water Land Development Team.
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From: Wade Gosper <Wade.Gosper@wellingtonwater.co.nz>
Sent: Thursday, 16 February 2023 11:47 a.m.
To: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>

Cc: Paul Winstanley <Paul.Winstanley@wellingtonwater.co.nz>
Subject: RE: 2023-02-16 As-built and O&M GIS INFORMATION REQUEST Wastewater PS230

Hi Alister,

Please find attached the historic as built plans (See Page 13 of Pukerua Bay Water and Wastewater) and a Mechanical Inspection from 2016.

Any equipment changes or upgrades since this as built plan was printed in 1978 have not been captured in as built form , but may be covered in the Mechanical Inspection document.

If you need more technical information such as any current known capacity issues, you will need to talk to Paul Winstanley.

Ngā mihi nui | Kind Regards,
Wade Gosper (He/Him)
Senior Analyst – Data Quality (Asset Data Management)
Wellington Water

Tel 04 912 4400 DDI 04 912 4570 Mob 021 306 934
Private Bag 39804, Wellington Mail Centre 5045
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From: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>
Sent: Thursday, 16 February 2023 11:09 am
To: Wade Gosper <Wade.Gosper@wellingtonwater.co.nz>
Subject: 2023-02-16 As-built and O&M GIS INFORMATION REQUEST Wastewater PS230

Greetings Wade

2023-02-16 As-built and O&M GIS INFORMATION REQUEST Wastewater PS230

I have a large development (157 new lots) wanting to discharge wastewater into WW PS230 located at the intersection of Muri Road Sea Vista Drive in Pukerua Bay.

I need to know the as-built details and existing surplus operational capacity at this pumping station so the developers' engineers (Alan Blyde and Kyle Dirse Envelope Engineering) can undertake design to mitigate peak wastewater flows from the new lots.

Can your team provide the as-built information or call me 0224 074 330 to discuss how I can secure the information needed?

Much appreciated

Alister O'Callaghan | Senior Engineer
On Behalf of the Wellington Water Land Development Team.
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