

Response to Panel Request – FTAA-2603-1181 - Mt Welcome, Pukerua Bay, Porirua

Additional Tiaki Wai Wastewater Modelling

Document

Title	FTAA-2603-1181 - Mt Welcome, Pukerua Bay, Porirua – Additional Wastewater Modelling
Location	Petone
Authors	Zeean Brydon, Consultant Peer Reviewer, Land Development Consenting
Status	Final
Version	1.0

1. During the Joint Witness Statement Engineering Conferencing Tiaki Wai offered to undertake additional wastewater modelling to assess the impact of the proposed development at Mt Welcome, Pukerua Bay on the receiving catchment.
2. Modelling was completed by Tiaki Wai's senior modeller Manu Ward using Tiaki Wai's strategic wastewater network model, updated May 2026. Whilst the System Performance Assessment documentation is still DRAFT (has not been released) the model is considered fit for purpose.
3. 6 scenarios have been modelled, being:

	MWA - Baseline	MWB – Mt Welcome
Muri Stage 1	82 Lots	82 Lots
Plim merton Farm Stage 1	880 Lots	880 Lots
Mt Welcome	0 Lots	200 Lots

	MWC - Baseline	MWD – Mt Welcome
Muri Stage 1	82 Lots	82 Lots
Plim merton Farm Stage 1	220 Lots	220 Lots
Mt Welcome	0 Lots	200 Lots

	MWE - Baseline	MWF – Mt Welcome
Muri Stage 1	0 Lots	0 Lots
Plim merton Farm Stage 1	220 Lots	220 Lots
Mt Welcome	0 Lots	200 Lots

4. While consent has been granted for 144 lots within Muri Stage 1, only 82 lots can be released concurrently with the delivery of the first 200 Lots at Mt Welcome as both developments rely on the same water infrastructure trigger.
5. Model runs A to D allow the 82 Muri Road Stage 1 lots to discharge by gravity to the network. In reality these anticipated to connect through PS30. The model is not currently set up to include addition connections upstream of PS30 and whilst the application states no impact downstream of PS30 due to no change in pump discharge rate but does not discuss the impact on pump frequency / duration.
6. Given time constraints a further model run was undertaken simply by removing the 82 Muri Road Stage 1 Lots. This approach assumes the increase in pump duration will not impact on the receiving catchment overflows – this assumption requires testing.
7. Consent has been granted for 880 Lots within Plim merton Farms Stage 1, and these connections are therefore accepted and included within the model. It is noted however that the growth scenarios within the model suggest 220 of these connections will be realized in the short term (2027), with the remaining 600 delivered by 2036. The 'short term / current' scenario has been tested with only 220 connections from Plim merton Farms.
8. The model allows the 220 Plim merton Farm to be connected via gravity without mitigation (as agreed for Stage 1).
9. Three critical locations are identified being:
 - The Engineered Overflow Point (EOP) upstream of PS13,
 - The Engineered Overflow Point (EOP) upstream of PS07,
 - The Pukerua Bay Trunk Main at S130219.
10. The results show for MWA to MWD (including 82 Lots within Muri Road Stage 1) increases in wastewater spill volume from both Engineered Overflows **and trunk network** in all modelled events (6-month, 1 year and 2-year ARI event).

11. The results for MWE and MWF (removing Muri Road Stage 1) show:
 - An increased spill of 74 m³ upstream of PS07 in the 6-month ARI event, increasing to 128 m³ in the 2-year event.
 - Increased spills of between 189 and 281 m³ upstream of PS13 for the 1 year and 2-year ARI events,
 - An increased spill of around 57 m³ from the trunk main in the 2-year ARI event.
12. All model runs show that connection of 200 Lots within the initial stages of the proposed Mt Welcome development will result in additional wastewater spill to the receiving environment.
13. The model summary and results are included in Attachment A.
14. Further to issue of V1 of this document, the applicant has asked Tiaki Wai to explain the basis for its preferred future scenario. The parameters used in the modelling are presented in Table 1 below:

Table 1 – Model Runoff and Infiltration Parameters

	Table 3 (Envelope 21 Nov 2025)	CUR-MED values (used by Envelope for the first 100 and 200 Lots)	M2L-LNG values	Model results 4 Sept 2026 (used by TW for the first 200 lots)	Model results 15 Sept 2026 (correct TW modelling)
Runoff parameters					
Runoff Area 1 (%)	0.2%	0.1%	0.2%	0.2%	0.2%
Runoff Area 2 (%)	0.2%	0.1%	0.2%	0.2%	0.2%
Runoff Area 3 (%)	2.0%	1.0%	2.0%	0.2%	2.0%
Runoff Area 4 (%)	20%	10%	20%	20%	20%
Ground infiltration parameters					
Soil depth (m)	1	1	1	1	1
Percolation coefficient (days)	0.8	0.5	0.5	0.5	0.5
Percolation threshold (%)	20	20	20	20	20
Percolation percentage infiltrating (%)	5	5	5	5	5
Baseflow coefficient (days)	0.01	0.01	0.01	0.01	0.01

15. When comparing the model parameters, it was noted that the Modelling results provided 04th September 2026 incorrectly used 0.2 % for Area 3, instead of 2%. The modelling results in Attachment A are updated to correct this error.

16. With regards to the question raised by the applicant regarding the use of the M2L-LNG runoff and infiltration values. Tiaki Wai considered that the use of the M2L-LNG parameters are appropriate for use in the initial modelling as these:
 - Already recognise that the system is new,
 - Are already conservatively low when compared to the Peak Wet Weather Flow that would be applied if assessed in accordance with the requirements of the Regional Standard for Water Services.
 - Reflect the infiltration scenario agreed with the applicant during the pre-application discussions, as reported in Section 3.3, Table 3 of the applicants R004v1-1753-02 Wastewater Hydraulic Model Report, Mt Welcome, prepared by Envelope Engineering Ltd, Dated 21 November 2025.
17. Tiaki Wai advise that the CUR-MED rate included is not used for assessment or design purposes and is not considered to be appropriate for the purposes of assessing the effect of the proposed development on the receiving environment.
18. Tiaki Wai's position remains that:
 - Neither Envelope or Tiaki Wai have tested the impact of adding 82 lots at Muri Road via PS30 – this requires testing.
 - Connection of 200 lots within Mt Welcome will result in increased wastewater spills to the receiving environment in the 6 mth, 1 year and 2-year events.

A. Tiaki Wai Wastewater Modelling Memo

Mt Welcome impact modelling

Database: SP.2024.POR.S

Network: Porirua 2026 OP MED

Manu Ward, Tiaki Wai, 15 Sept 2026

Model assumptions

- Porirua Strategic Model “MED” (2036 projection) adopted
- Muri Rd Stage 1 included at either 0 or 82 lots (2.32 PE/lot)
- Plimmerton Farms Stage 1 included at either 880 lots or 220 lots (2.10 PE/lot)
- Mt Welcome Farms impact tested for 200 lots (2.10 PE/lot)
- Greenfield wet-weather flow parameters adopted as per M2L/LNG scenarios (runoff area 1-4 at 0.2%,0.2%,2.0%,20% respectively)

Design event simulation spill result summary

Scenario ->		MWA	MWB	MWB-MWA (Difference)	MWC	MWD	MWD-MWC (Difference)	MWE	MWF	MWE-MWF (Difference)
Development		Assumed number of lots								
Muri Rd Stage 1		82	82		82	82		0	0	
Plimmerton Farms Stage 1		880	880		220	220		220	220	
Mount Welcome		0	200		0	200		0	200	
Selected event	Spill Location	Modelled spill volume (m³)								
~2yr ARI (13 May 2015)	PS13 Plimmerton Roundabout EOP	796	1,168	372	530	819	289	422	703	281
	PS07 Paremata Bridge EOP	2,877	2,910	33	2,700	2,786	87	2,628	2,755	128
	S130219 (Pukerua Bay Trunk Main MH)	11	102	91	12	101	89	3	60	57
~1yr ARI (13 Oct 2024)	PS13 Plimmerton Roundabout EOP	309	518	209	211	397	186	134	323	189
	PS07 Paremata Bridge EOP	1,632	1,692	60	1,477	1,544	66	1,447	1,516	70
	S130219 (Pukerua Bay Trunk Main MH)	0	10	10	0	10	10	0	0	0
~6m ARI (9 Dec 2014)	PS13 Plimmerton Roundabout EOP	100	240	140	9	119	111	0	72	72
	PS07 Paremata Bridge EOP	894	916	22	781	822	41	733	807	74
	S130219 (Pukerua Bay Trunk Main MH)	0	4	4	0	4	4	0	0	0

- The following figures summarise results for the 6x scenarios under each of the 3x selected events
 - Plan views with spill locations listed above annotated
 - Long-sections of Pukerua Bay trunk main to PS13

Subcatchment and Pump Station model flow summary tables

Development	Lots	ADWF (L/s)	PDWF (L/s)	PWWF (L/s)			Regional Standard Formula PWWF (L/s) (3.5 PE/lot, 0.1 Ha/lot, 0.8km/Ha, unknown groundwater table)
				~6m ARI (9 Dec 2014)	~1yr ARI (13 Oct 2024)	~2yr ARI (13 May 2015)	
21 Muri Rd Stage 1	82	0.5	1.0	4.5	4.2	10.4	8.4
Mount Welcome	200	1.1	2.2	10.6	10.0	23.4	19.2
Plimmerton Farms Stage 1	220	1.2	2.5	11.7	10.9	25.5	21.0
	880	4.9	9.8	45.5	43.3	95.4	77.2

Pump Station	Total capacity (L/s)	Model Average Dry Weather Flow (L/s)						Capacity / ADWF Ratio					
		MWA	MWB	MWC	MWD	MWE	MWF	MWA	MWB	MWC	MWD	MWE	MWF
PS13	68	13.3	14.4	9.7	10.8	9.2	10.3	5.1	4.7	7.0	6.3	7.4	6.6
PS07	120	23.7	24.8	20.1	21.2	19.6	20.7	5.1	4.8	6.0	5.7	6.1	5.8

MWA 2yr

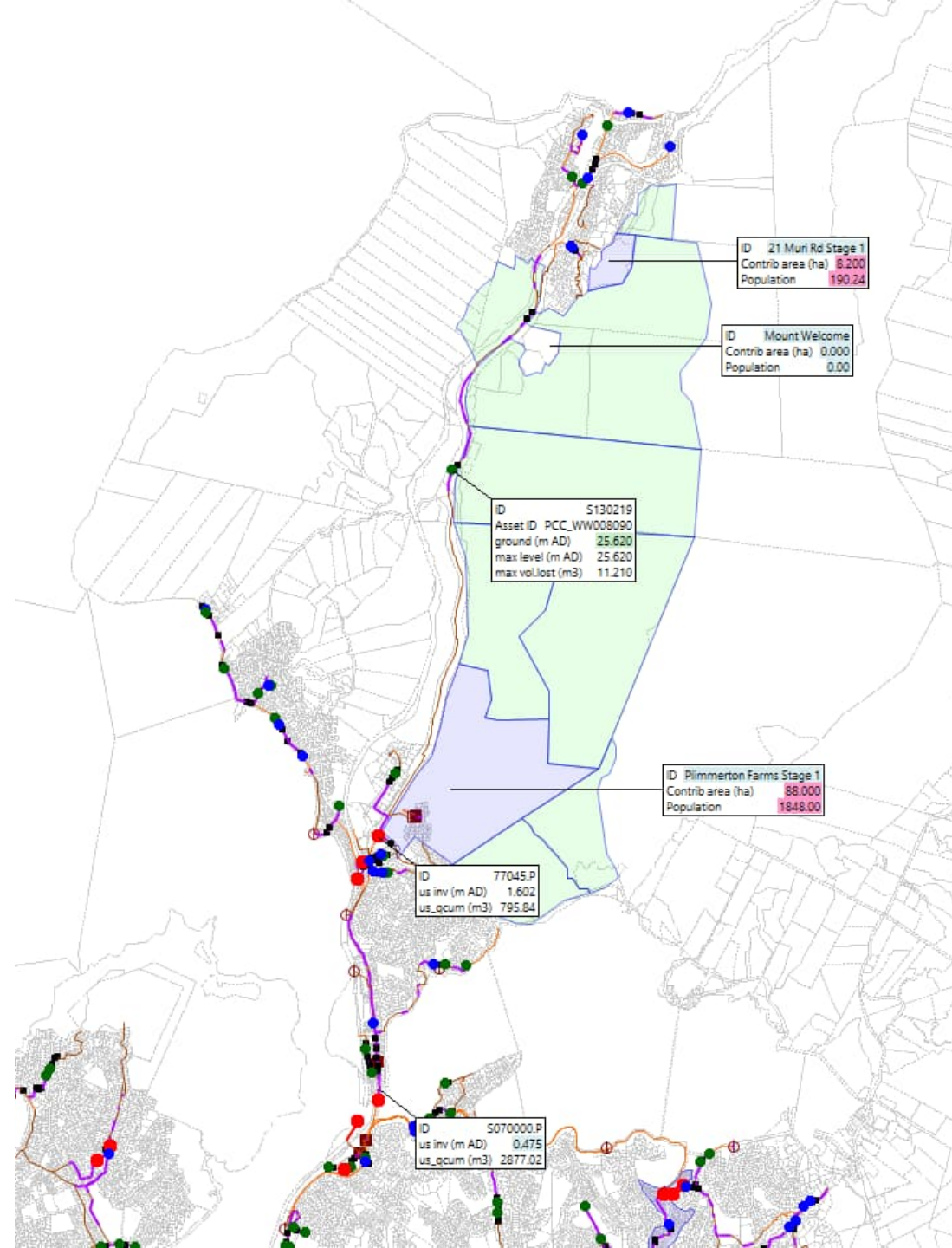
Spare Capacity
(80% Pipe Full Capacity
minus Peak WWF, L/s)

- < -5
- >= -5
- >= 1
- >= 5
- >= 10

Downstream depth
is within 0.2m of
the cover level

Manhole overflows (m³)

- >= 5
- >= 50
- >= 500
- >= 5000



MWB 2yr

Spare Capacity
(80% Pipe Full Capacity
minus Peak WWF, L/s)

— < -5

— >= -5

— >= 1

— >= 5

— >= 10

Downstream depth

■ is within 0.2m of
the cover level

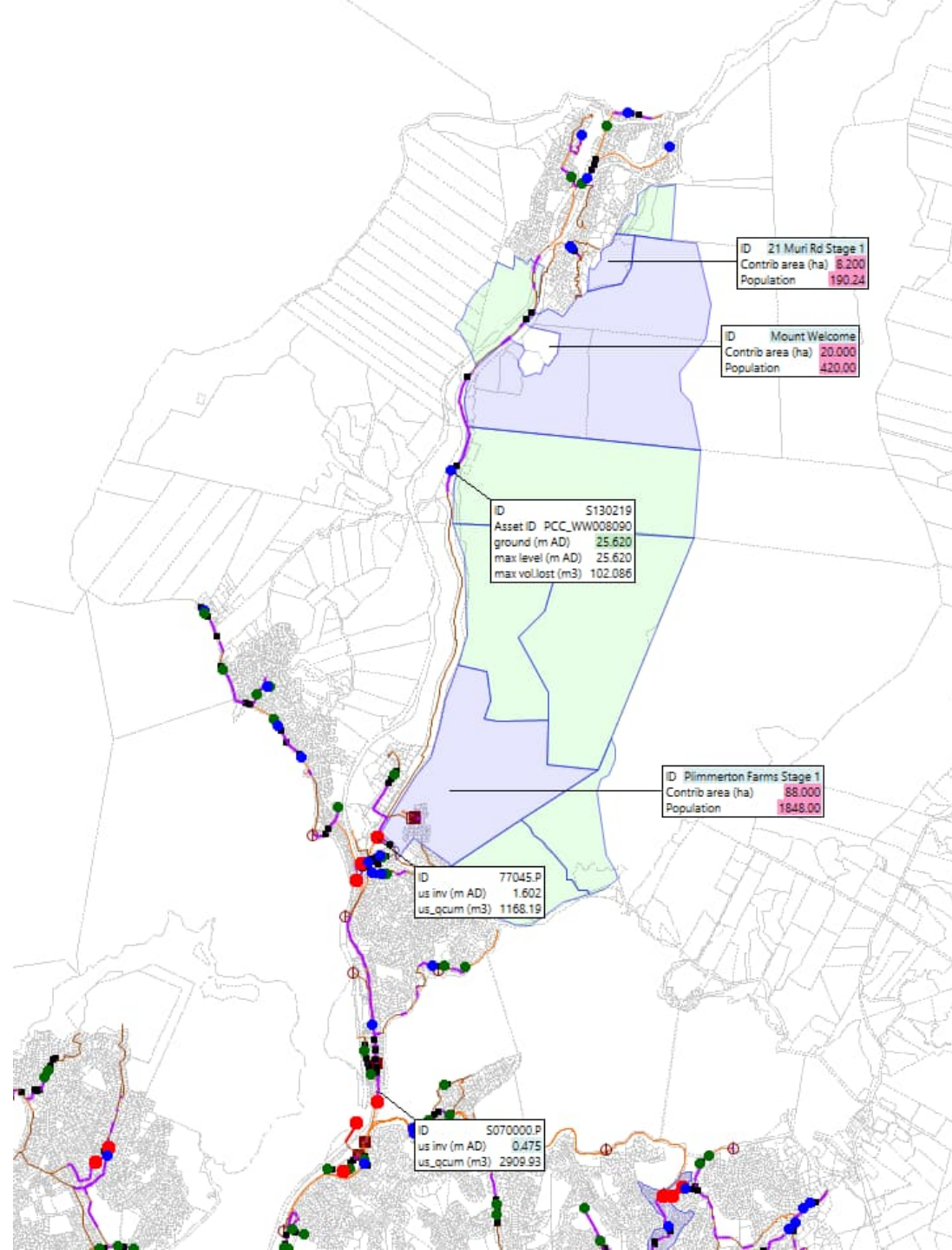
Manhole overflows (m³)

● >= 5

● >= 50

● >= 500

● >= 5000



MWC 2yr

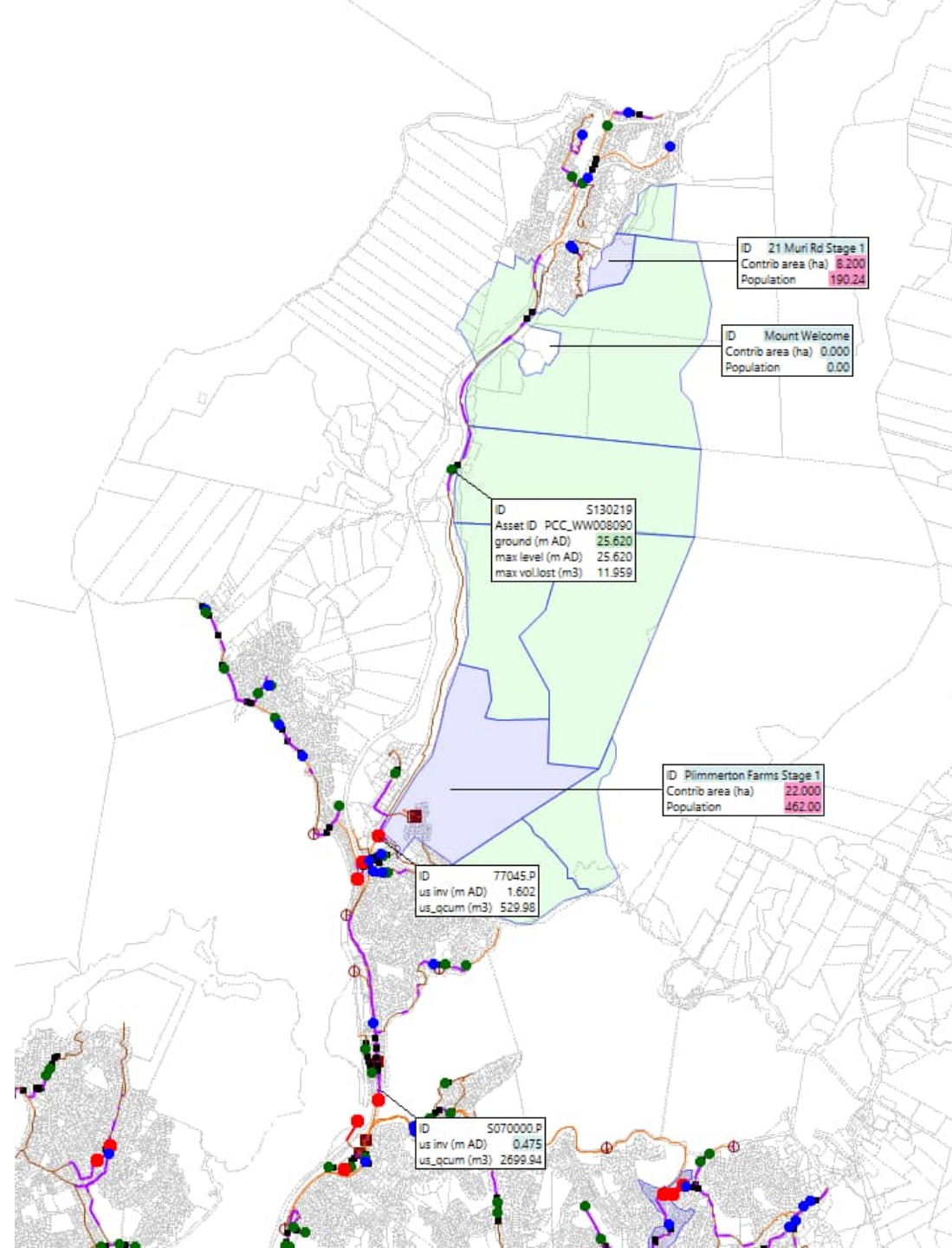
Spare Capacity
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- < -5
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- >= 1
- >= 5
- >= 10

Downstream depth
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Manhole overflows (m³)

- >= 5
- >= 50
- >= 500
- >= 5000



MWD 2yr

Spare Capacity
(80% Pipe Full Capacity
minus Peak WWF, L/s)

— < -5

— >= -5

— >= 1

— >= 5

— >= 10

Downstream depth
is within 0.2m of
the cover level

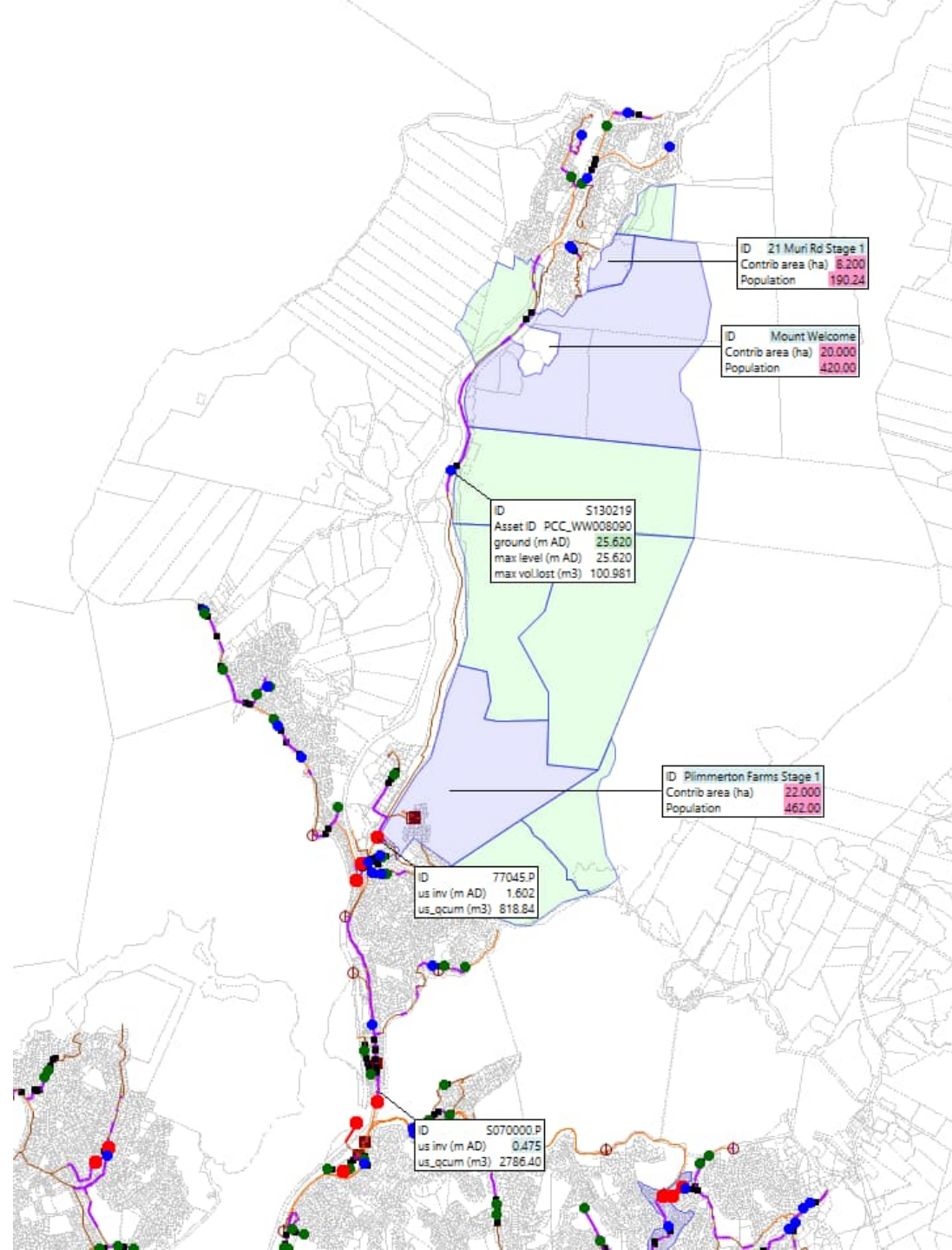
Manhole overflows (m³)

— >= 5

— >= 50

— >= 500

— >= 5000



MWE 2yr

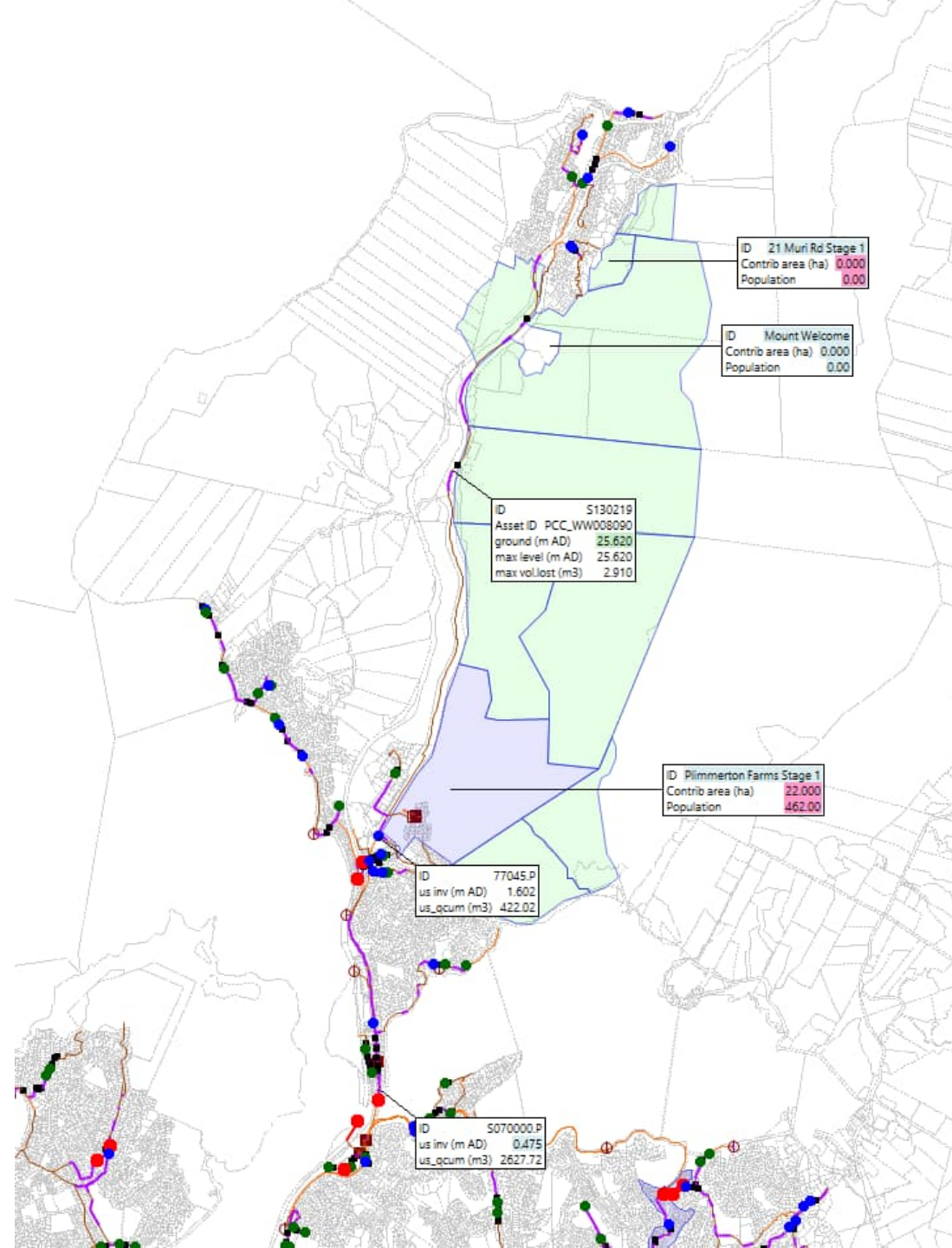
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MWF 2yr

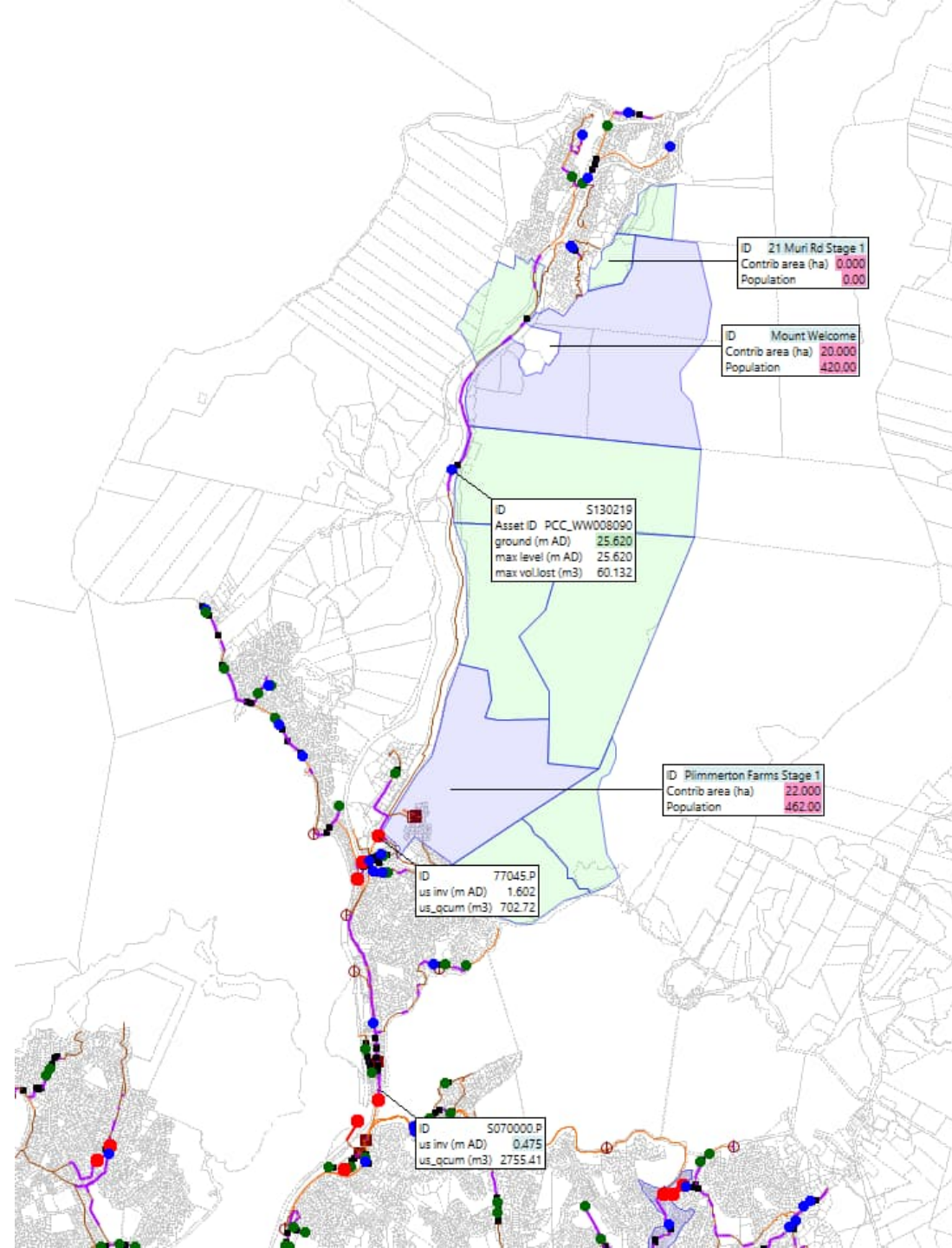
Spare Capacity
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- ≥ 10

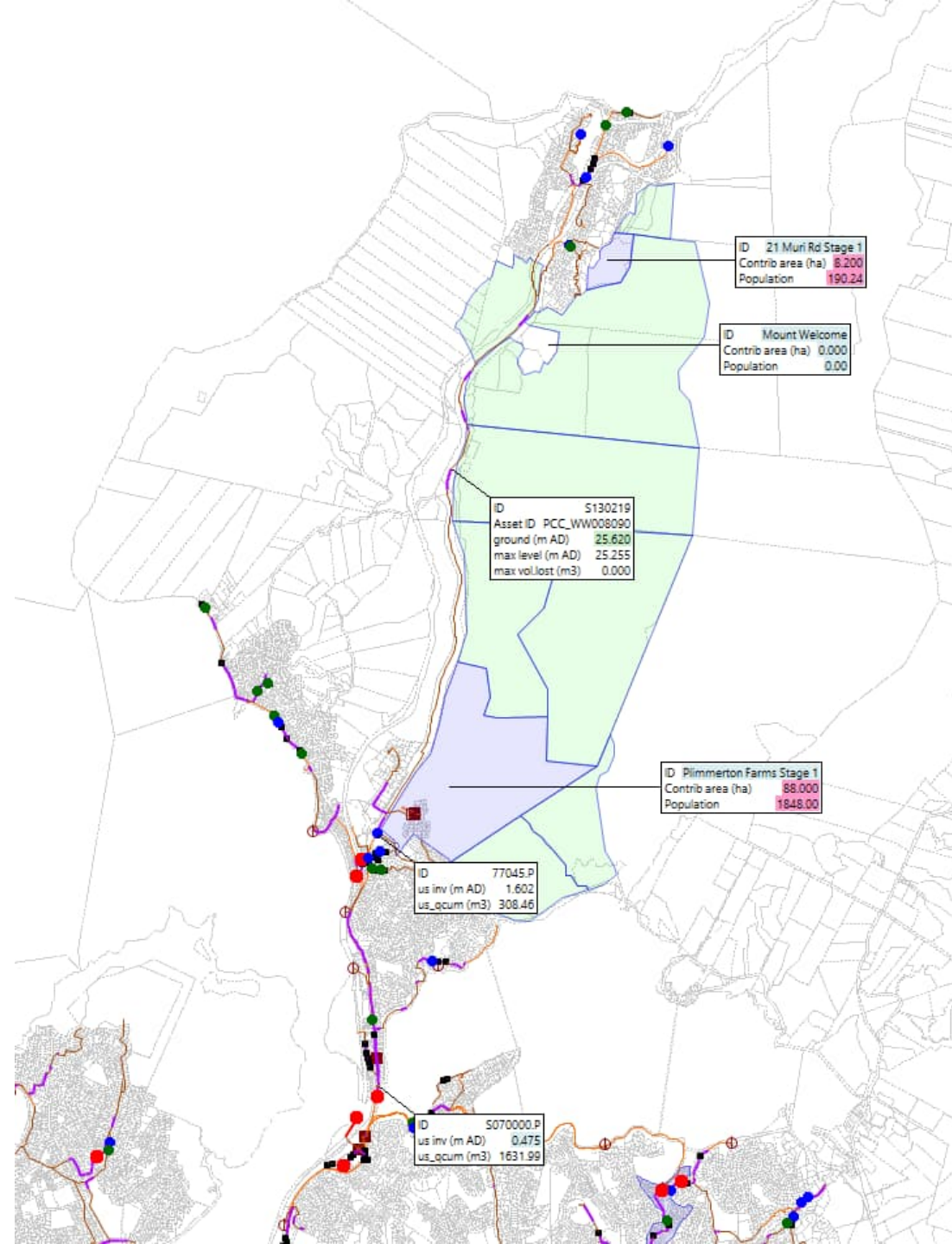
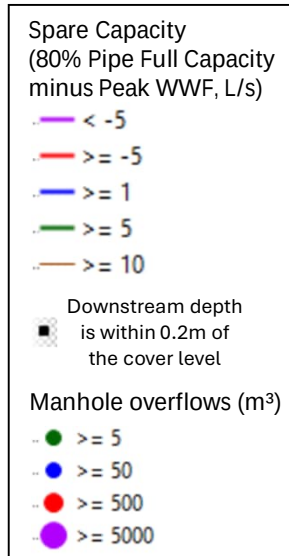
Downstream depth
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Manhole overflows (m³)

- ≥ 5
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MWA 1yr



MWB 1yr

Spare Capacity
(80% Pipe Full Capacity
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— < -5

— >= -5

— >= 1

— >= 5

— >= 10

Downstream depth

■ is within 0.2m of
the cover level

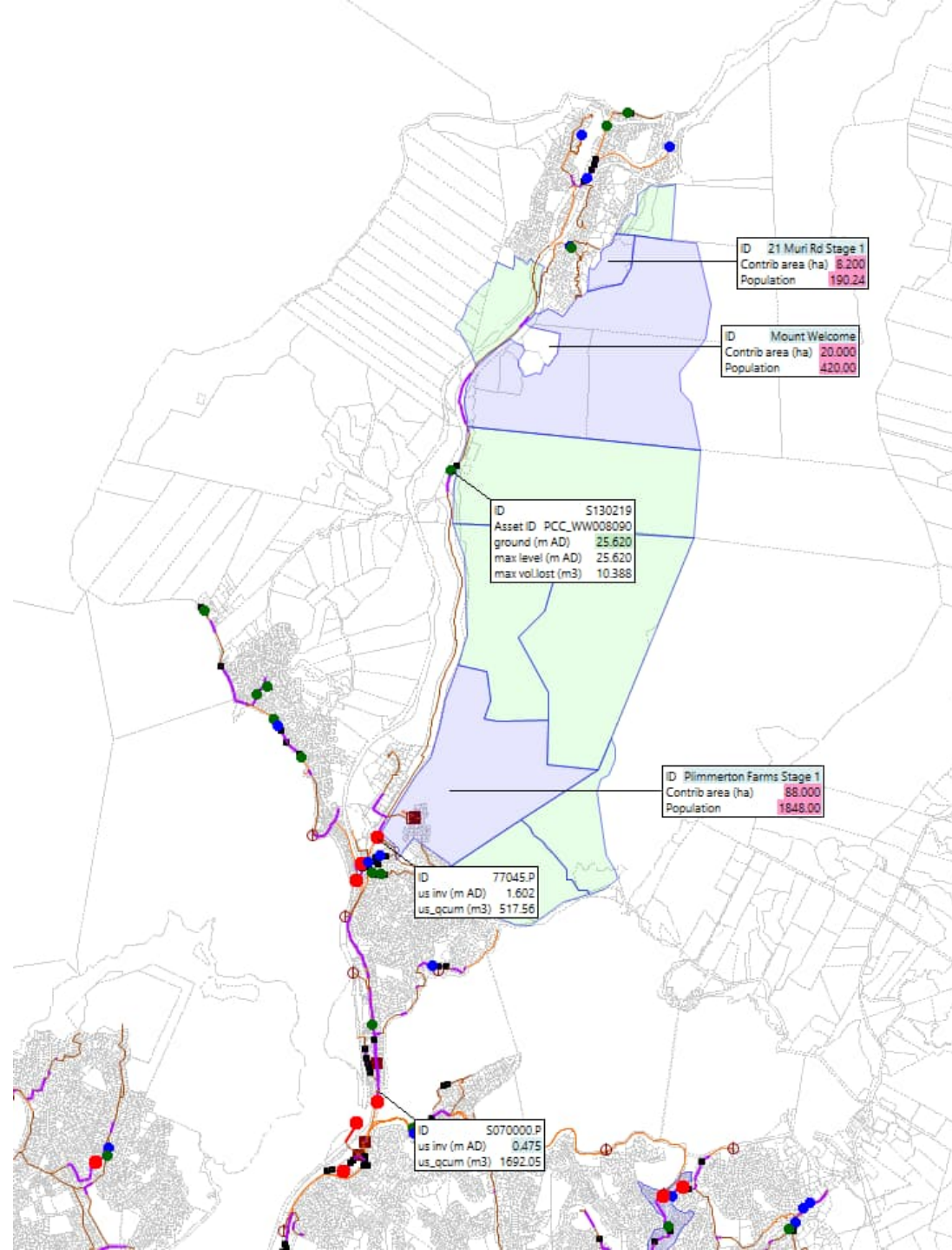
Manhole overflows (m³)

● >= 5

● >= 50

● >= 500

● >= 5000



MWC 1yr

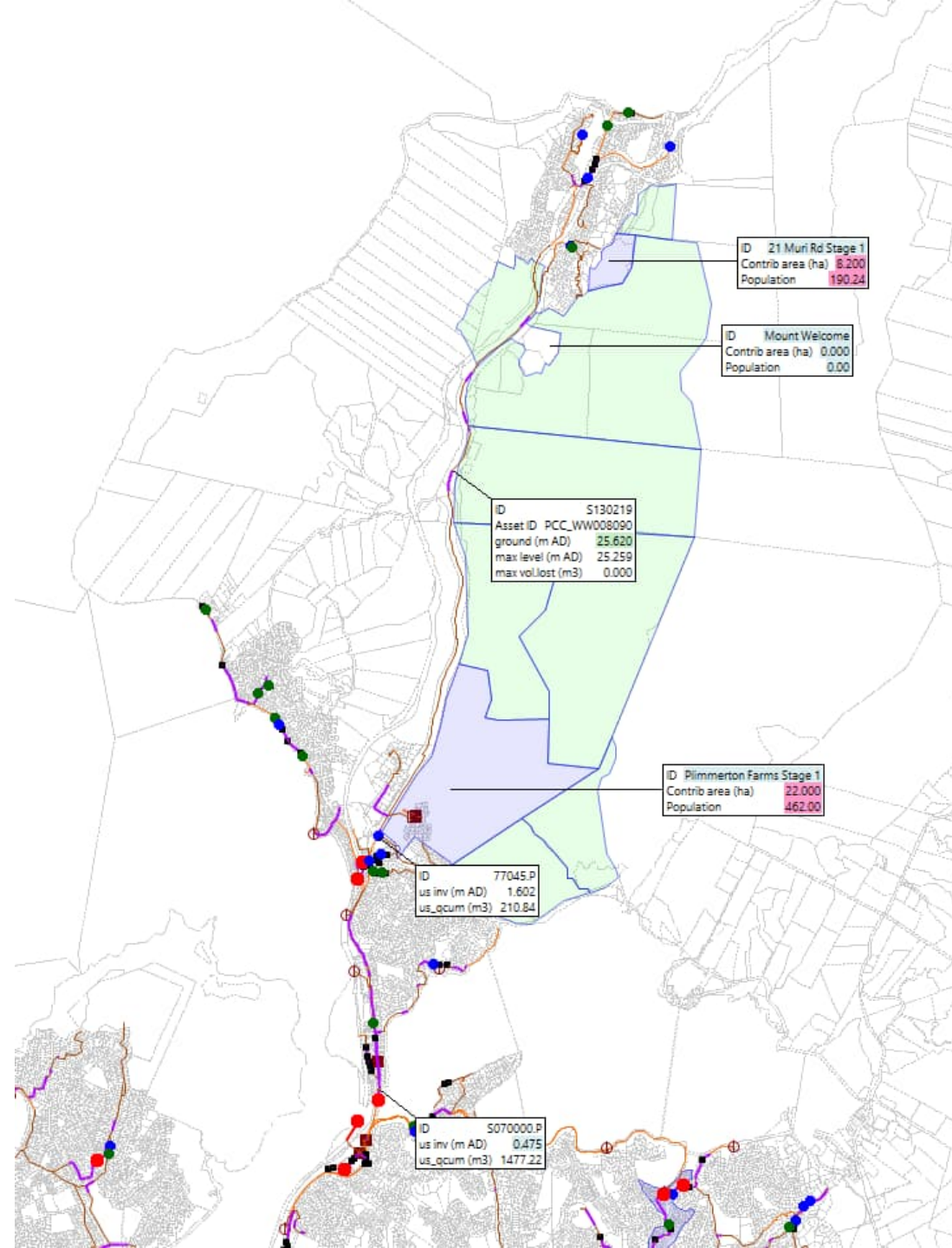
Spare Capacity
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Manhole overflows (m³)

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MWD 1yr

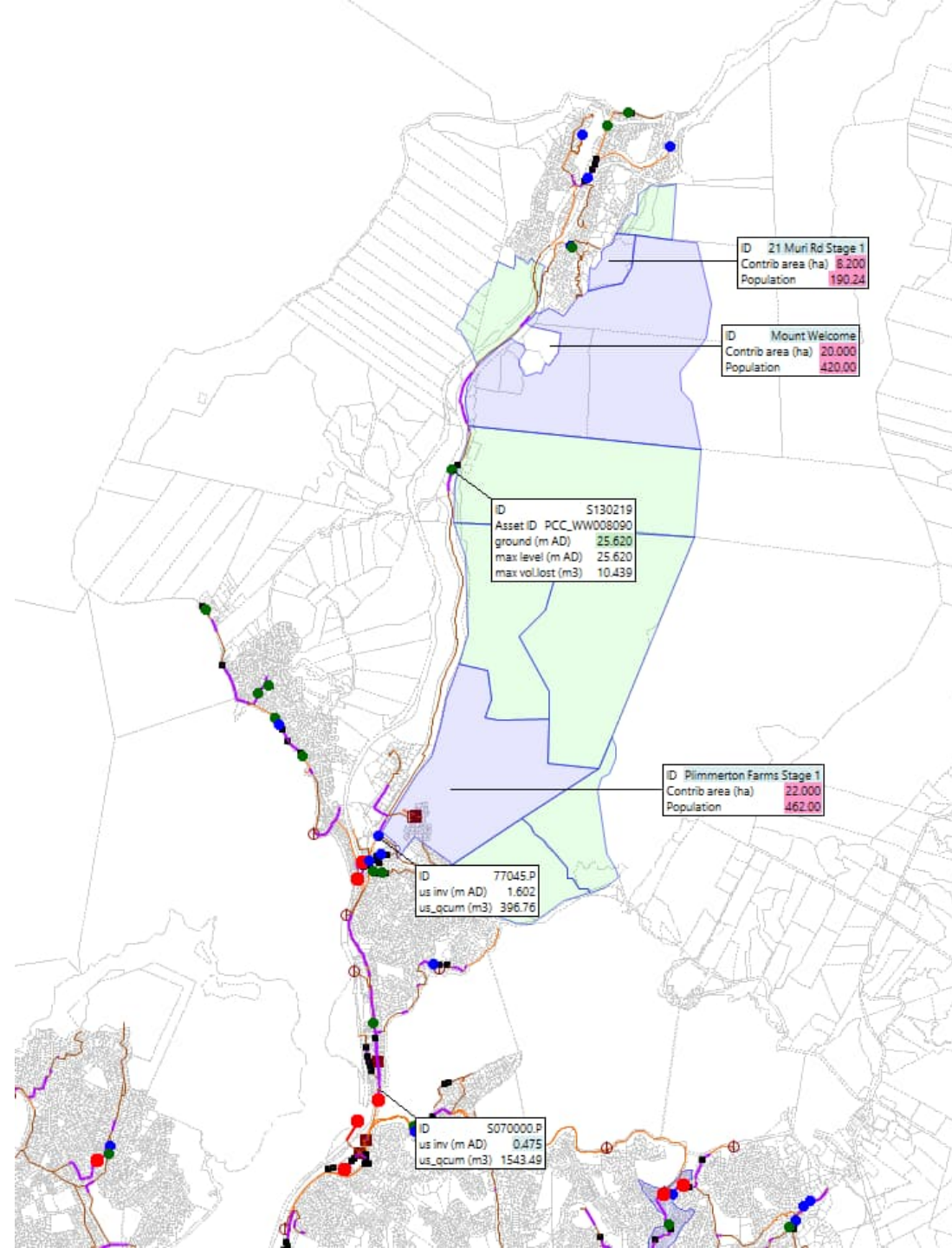
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Manhole overflows (m³)

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MWE 1yr

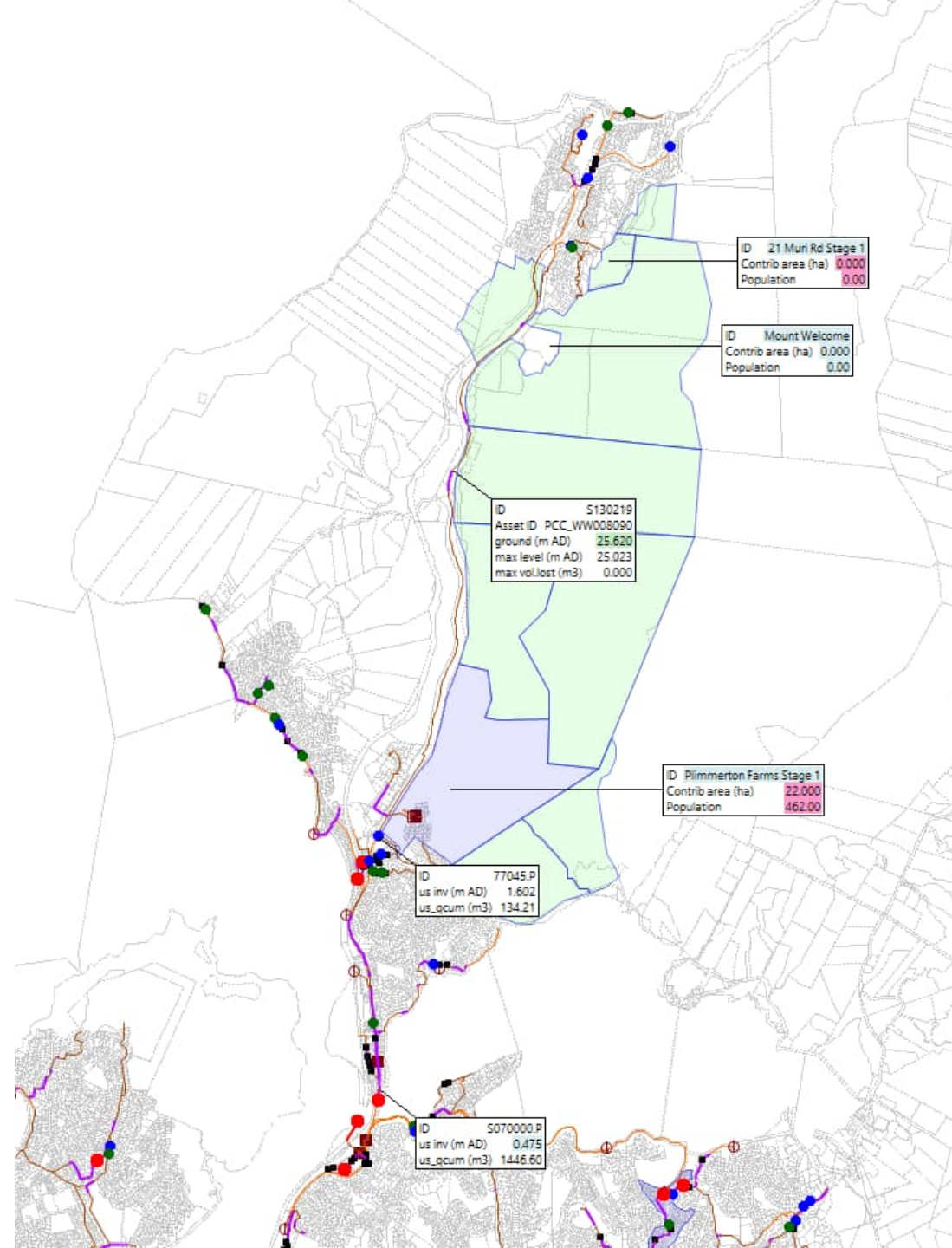
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Manhole overflows (m³)

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MWF 1yr

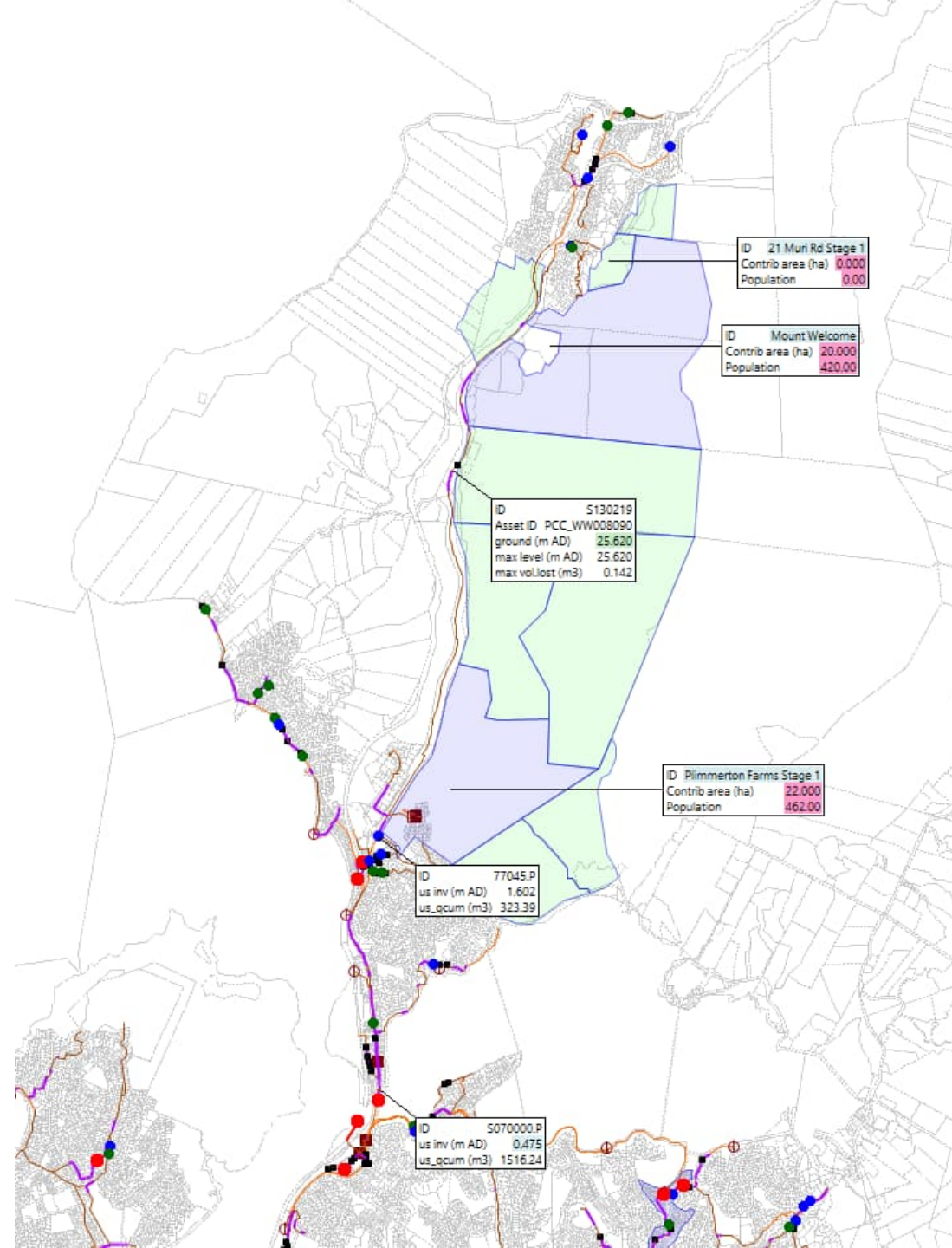
Spare Capacity
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- < -5
- >= -5
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- >= 5
- >= 10

Downstream depth
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Manhole overflows (m³)

- >= 5
- >= 50
- >= 500
- >= 5000



MWA 6m

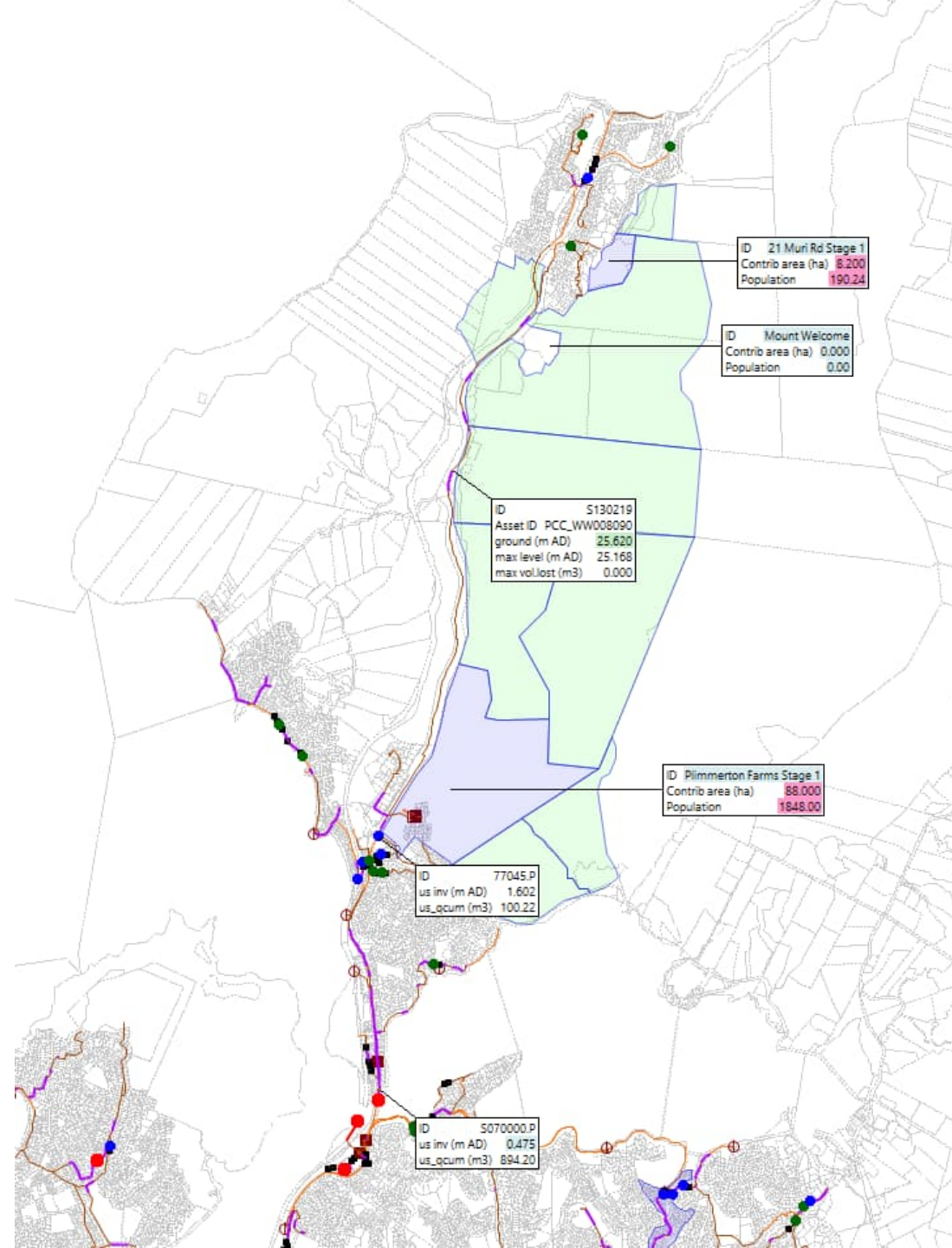
Spare Capacity
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Downstream depth
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Manhole overflows (m³)

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MWB 6m

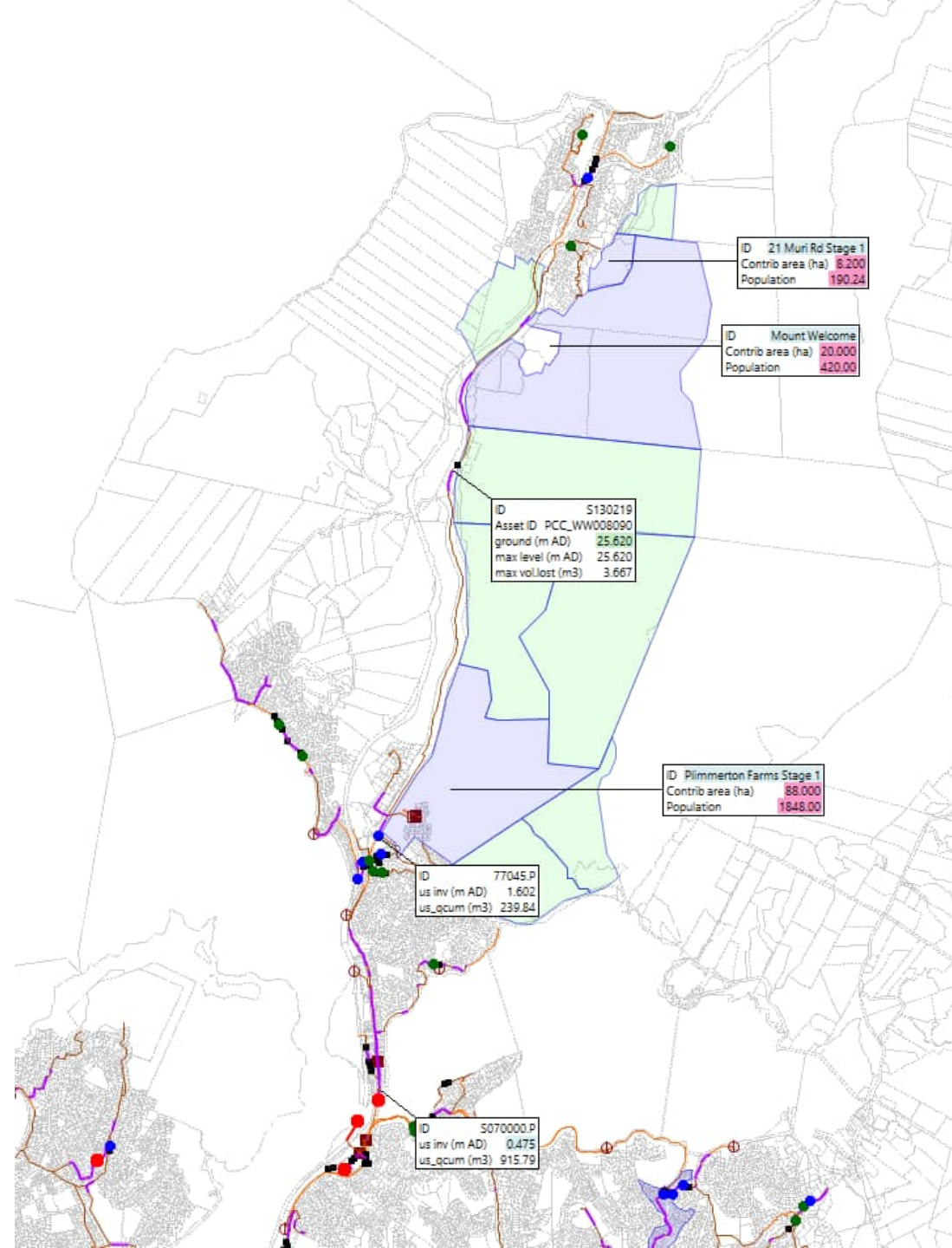
Spare Capacity
(80% Pipe Full Capacity
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- < -5
- ≥ -5
- ≥ 1
- ≥ 5
- ≥ 10

Downstream depth
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Manhole overflows (m³)

- ≥ 5
- ≥ 50
- ≥ 500
- ≥ 5000



MWC 6m

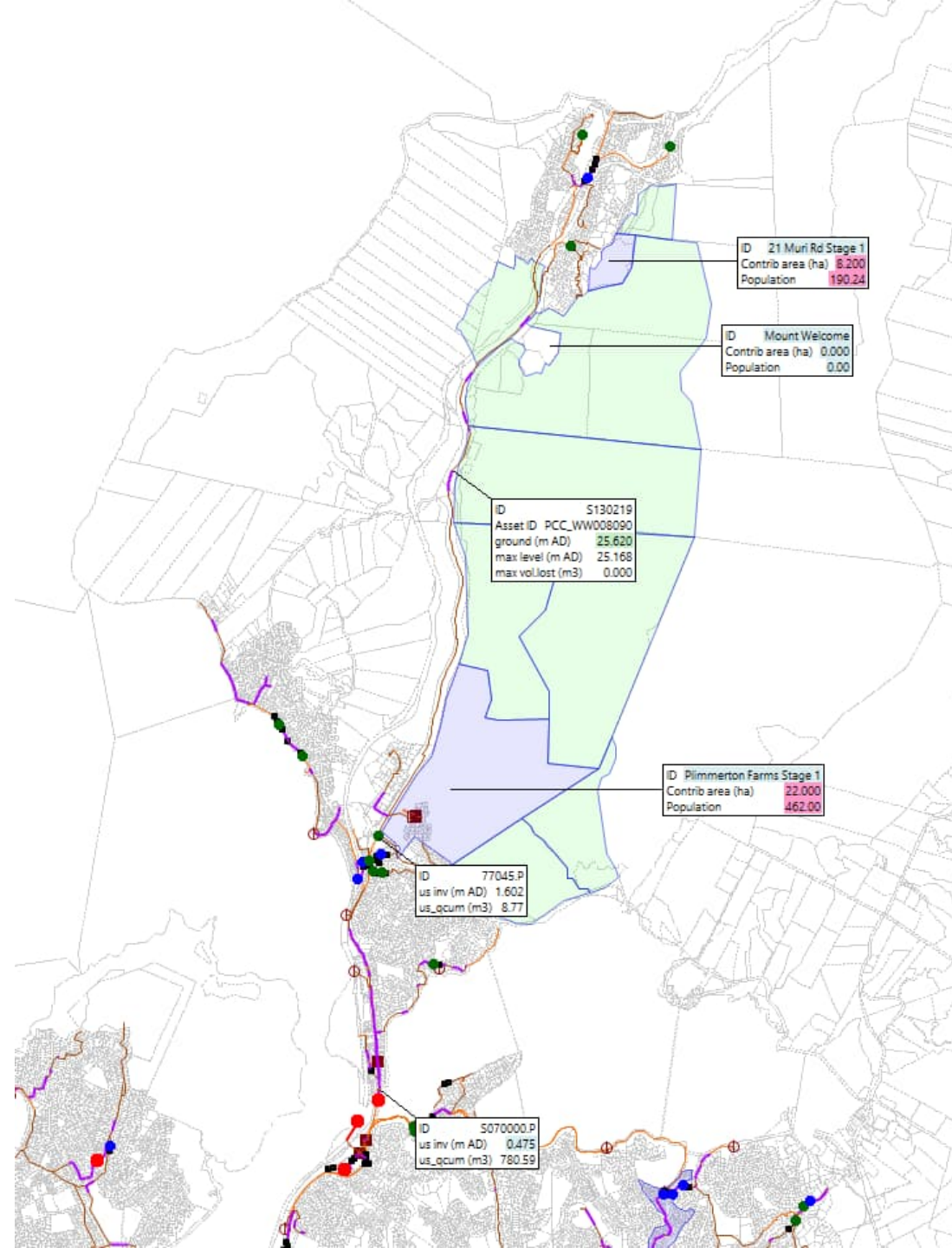
Spare Capacity
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- < -5
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- ≥ 5
- ≥ 10

Downstream depth
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Manhole overflows (m³)

- ≥ 5
- ≥ 50
- ≥ 500
- ≥ 5000



MWD 6m

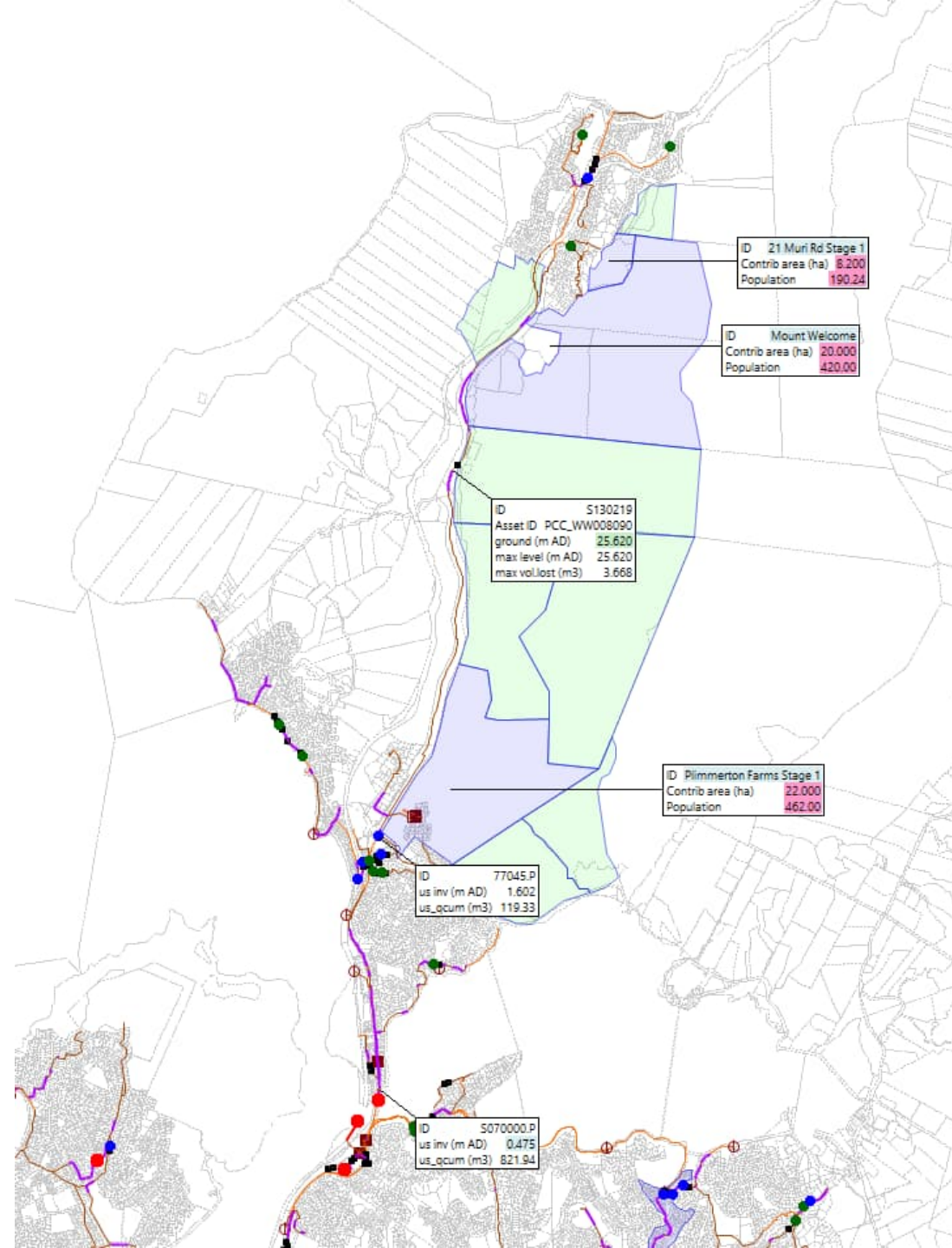
Spare Capacity
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- < -5
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- >= 5
- >= 10

Downstream depth
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Manhole overflows (m³)

- >= 5
- >= 50
- >= 500
- >= 5000



MWE 6m

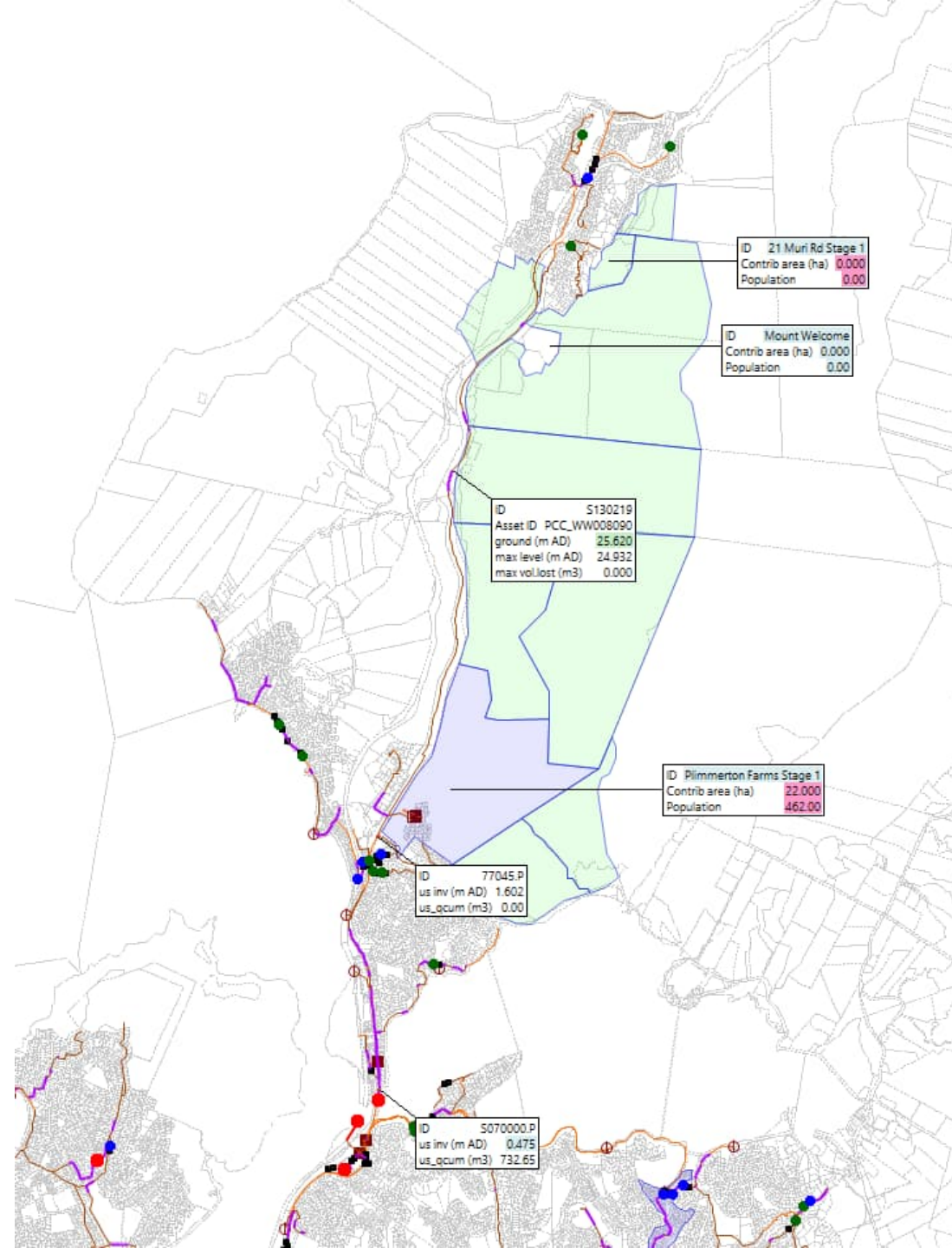
Spare Capacity
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- ≥ 5
- ≥ 10

Downstream depth
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Manhole overflows (m³)

- ≥ 5
- ≥ 50
- ≥ 500
- ≥ 5000



MWF 6m

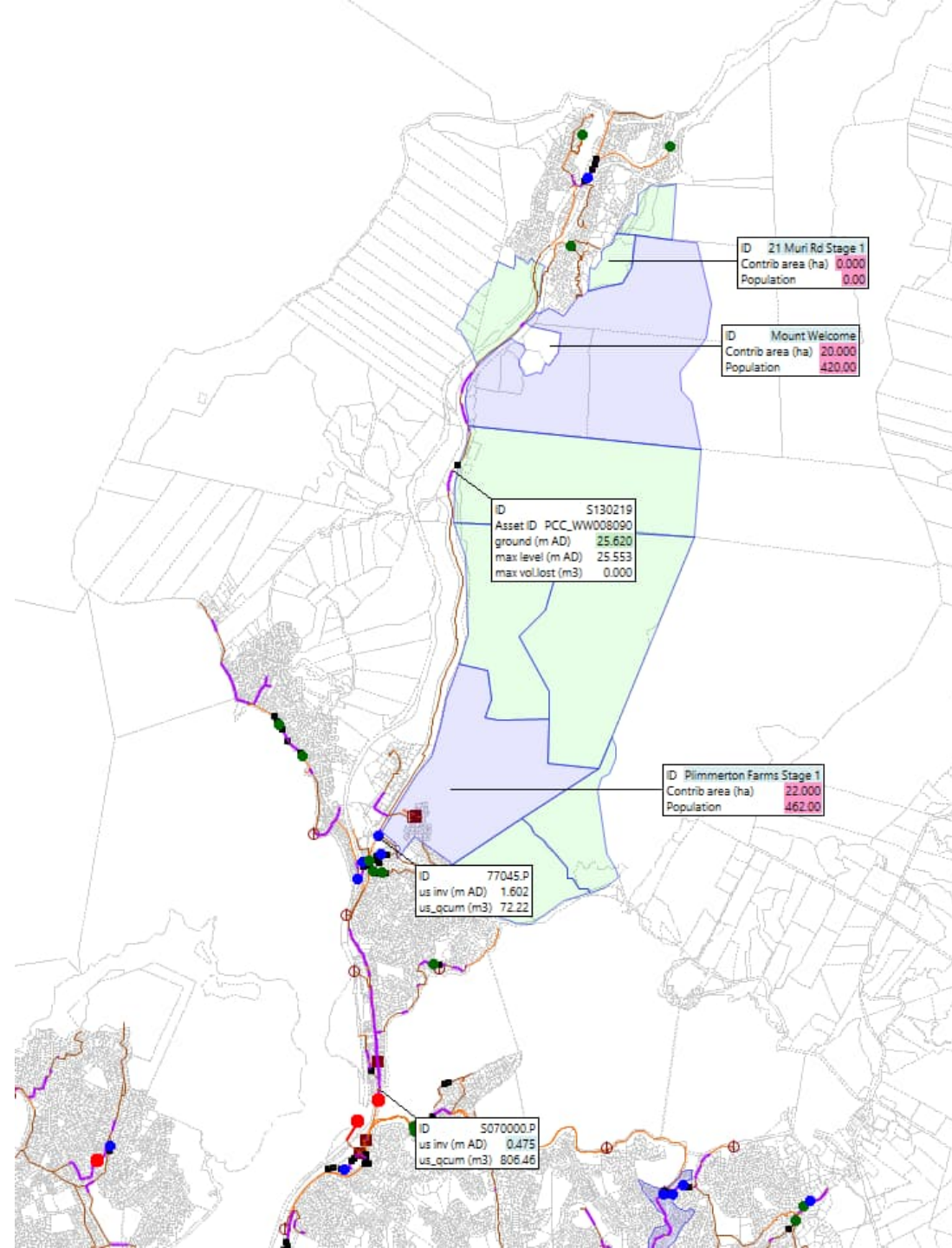
Spare Capacity
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- ≥ -5
- ≥ 1
- ≥ 5
- ≥ 10

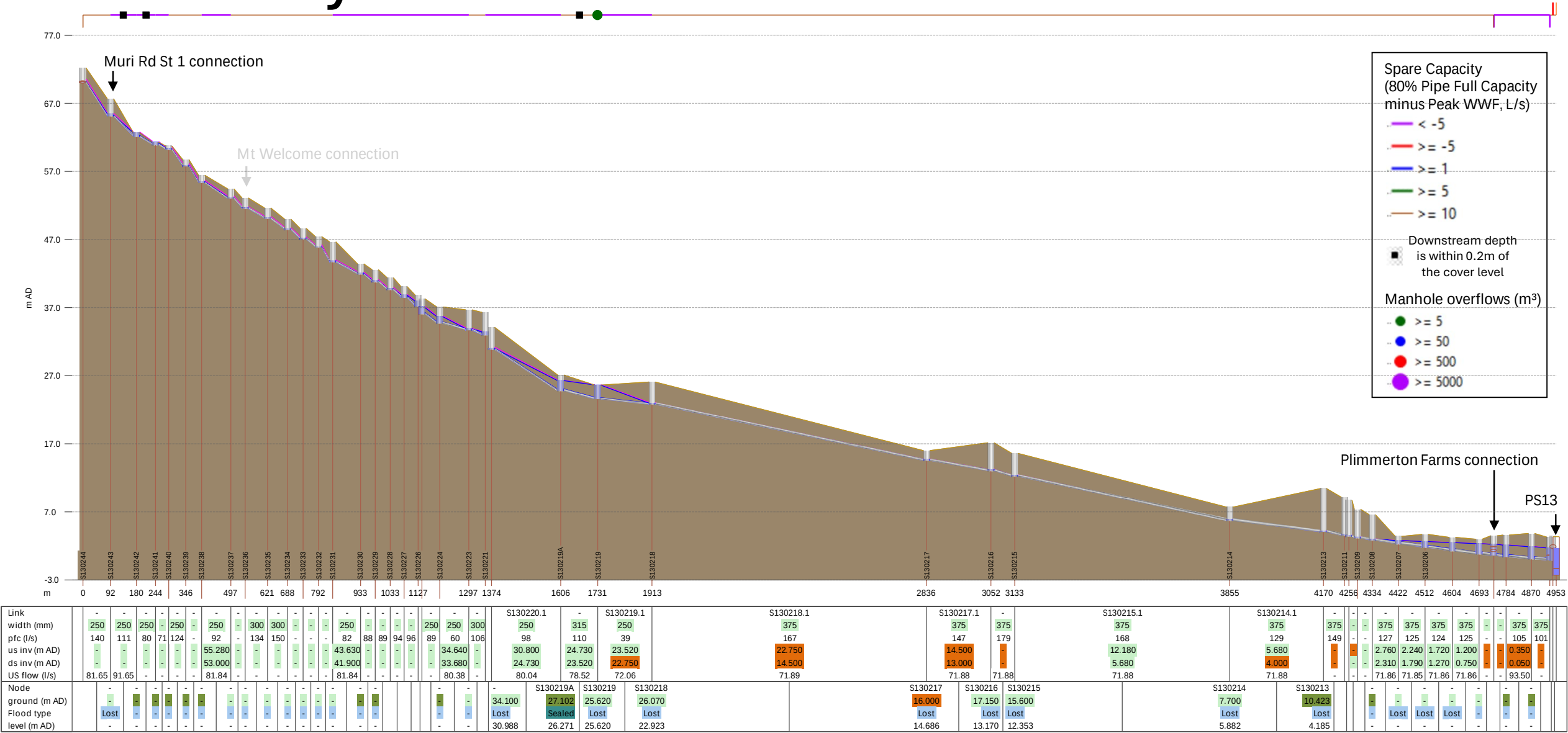
Downstream depth
is within 0.2m of
the cover level

Manhole overflows (m³)

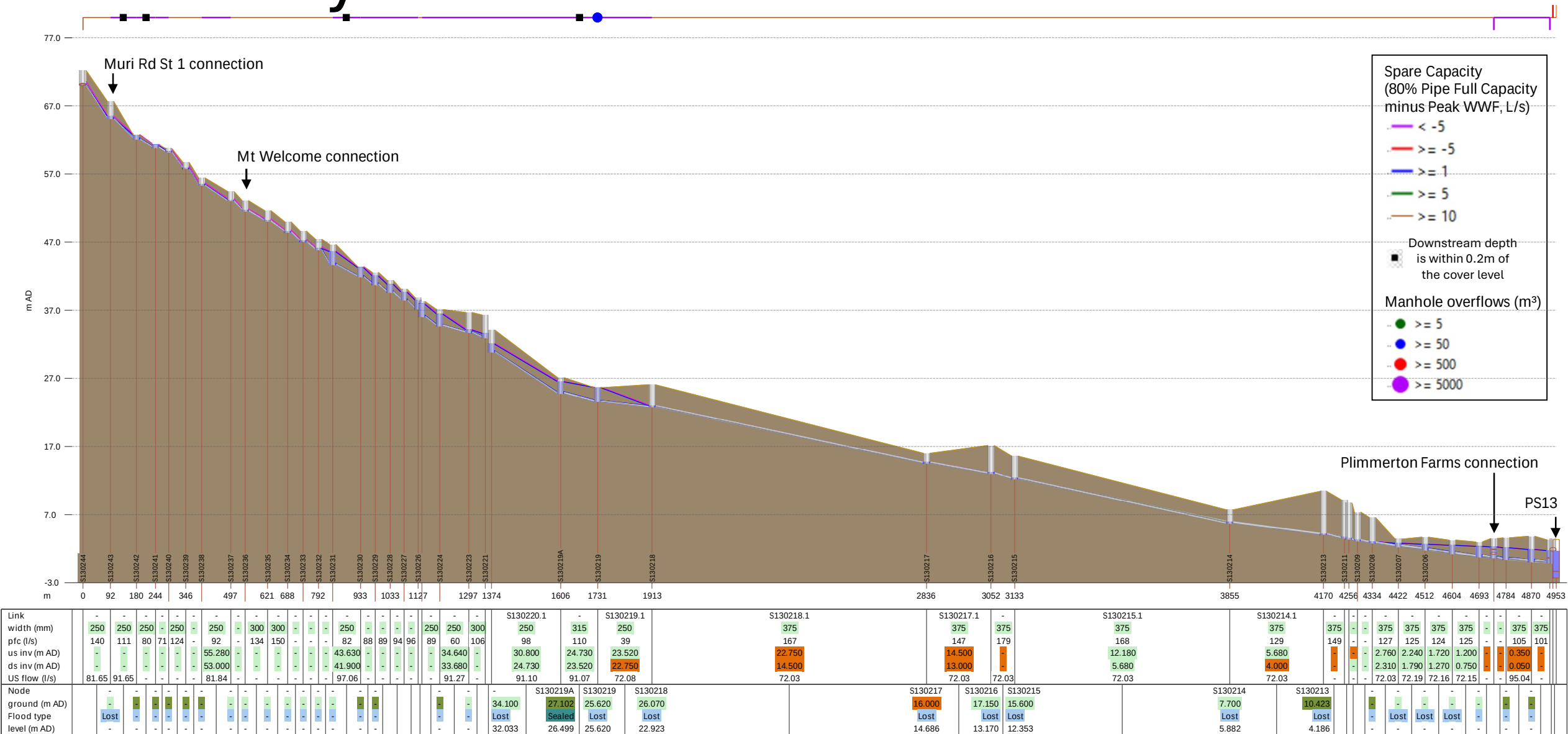
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- ≥ 5000



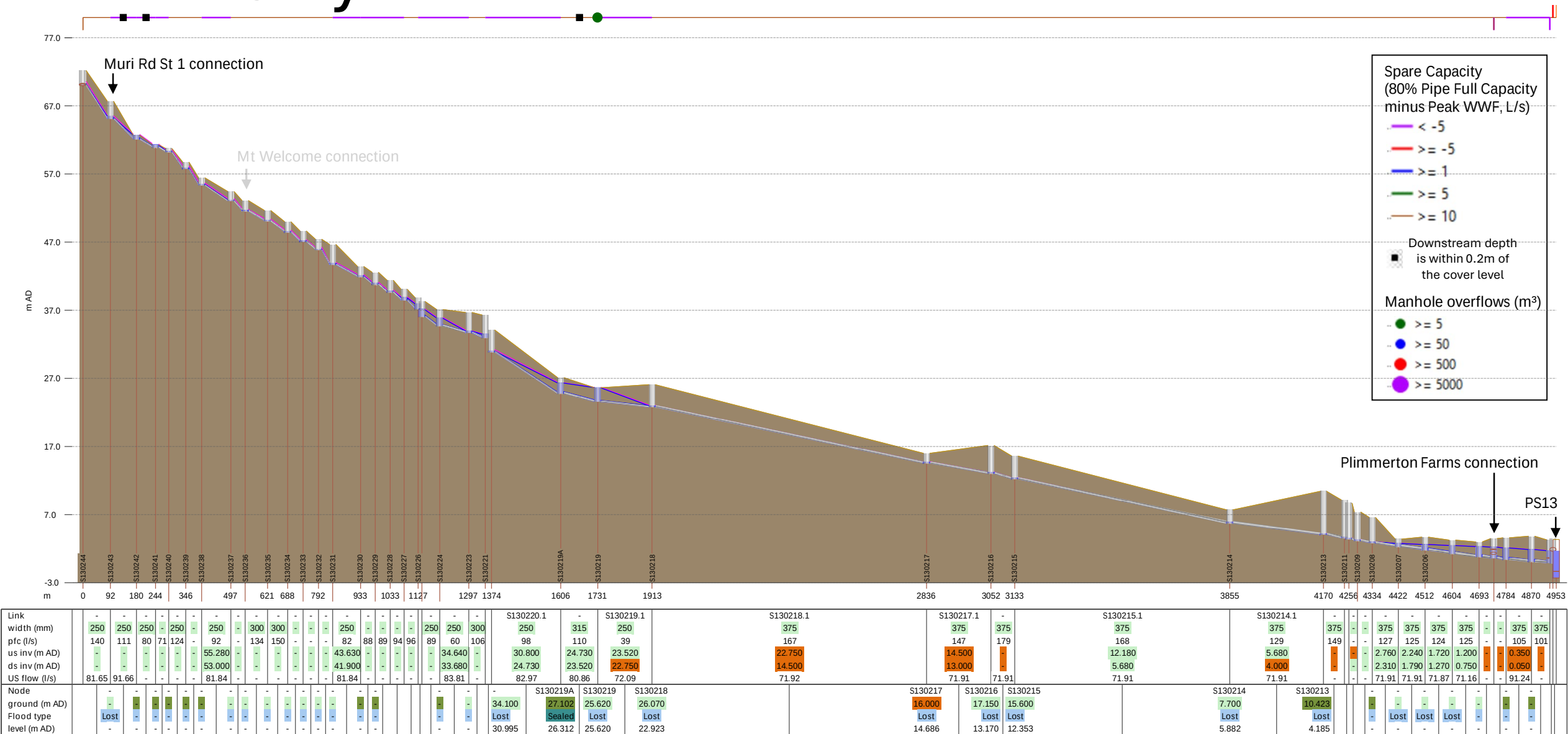
MWA 2y



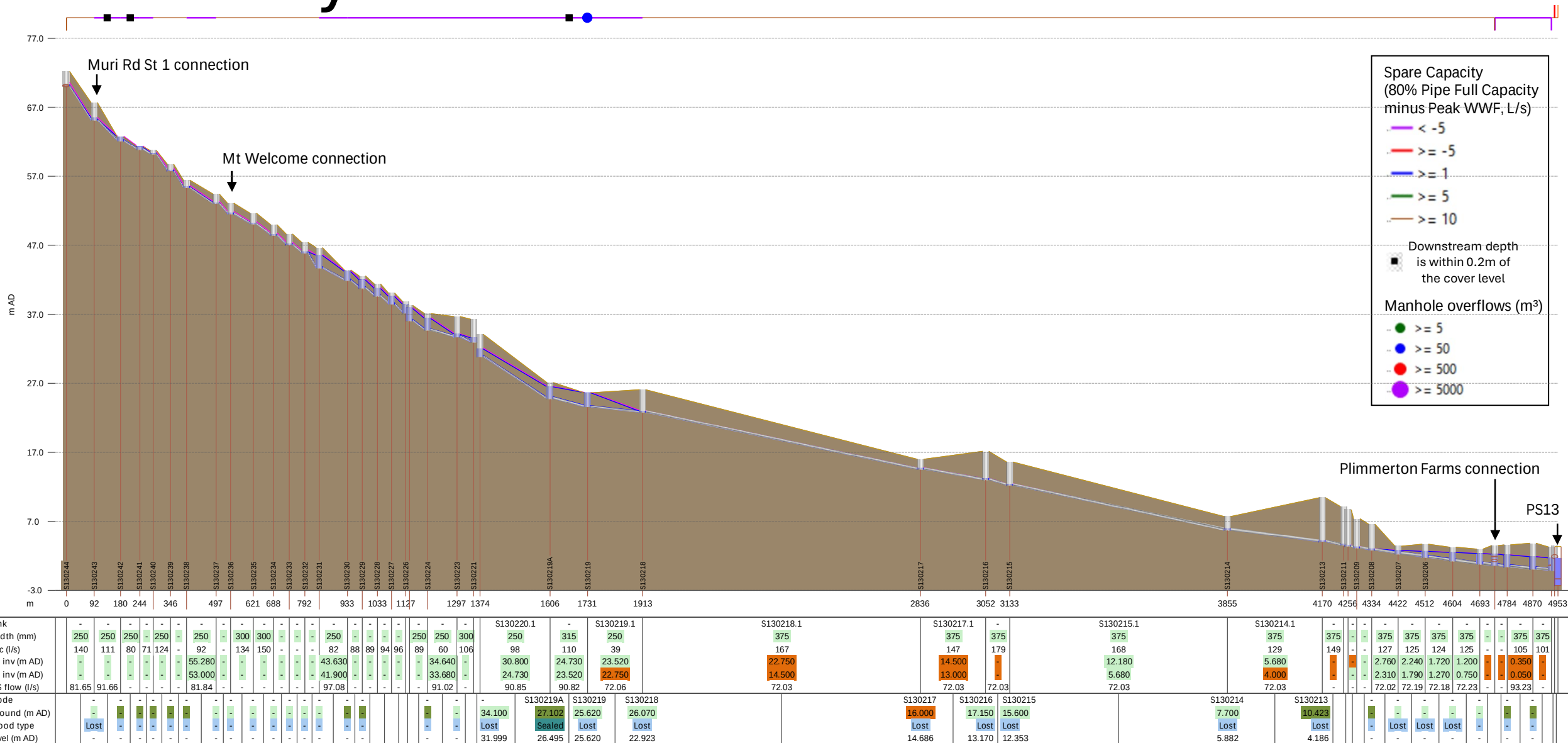
MWB 2y



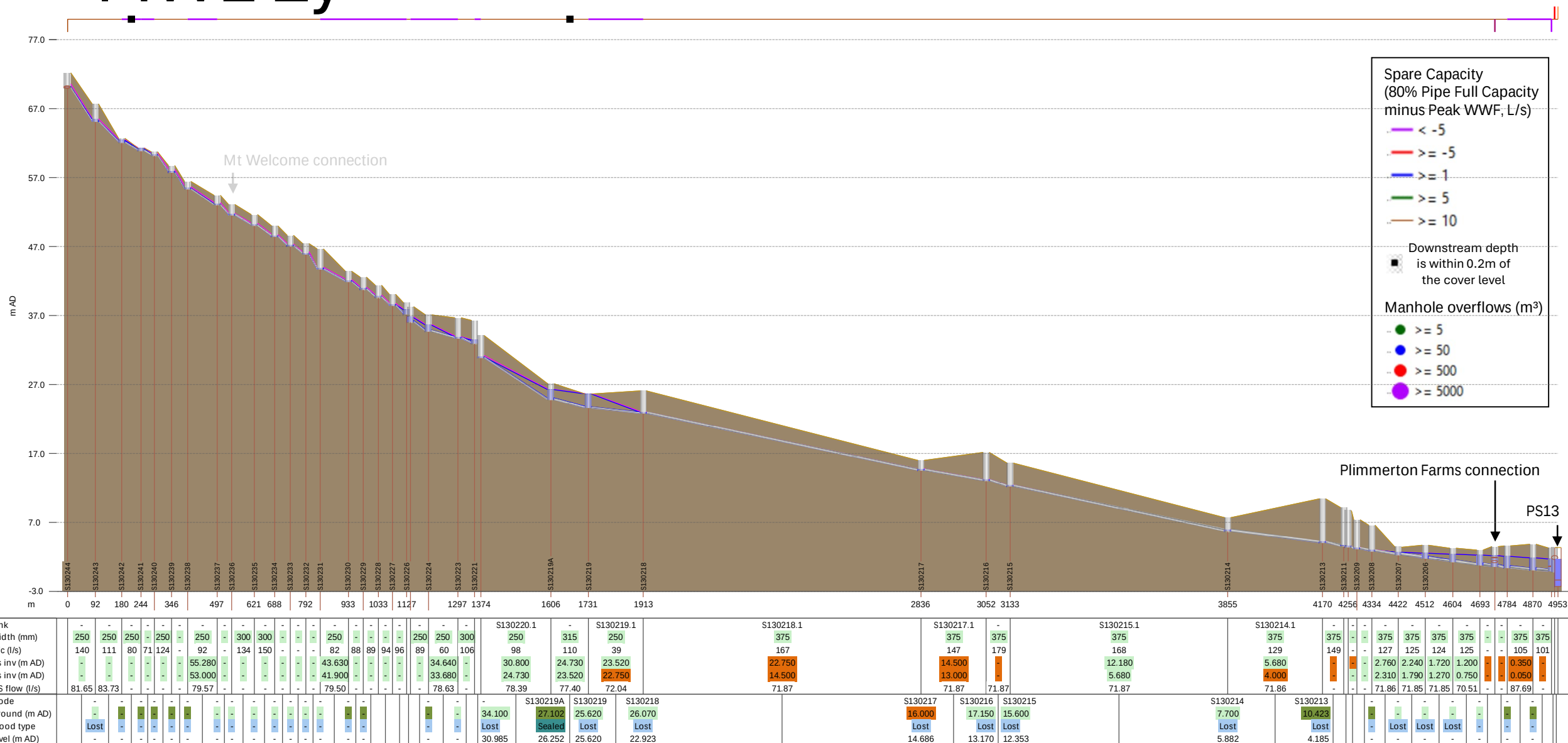
MWC 2y



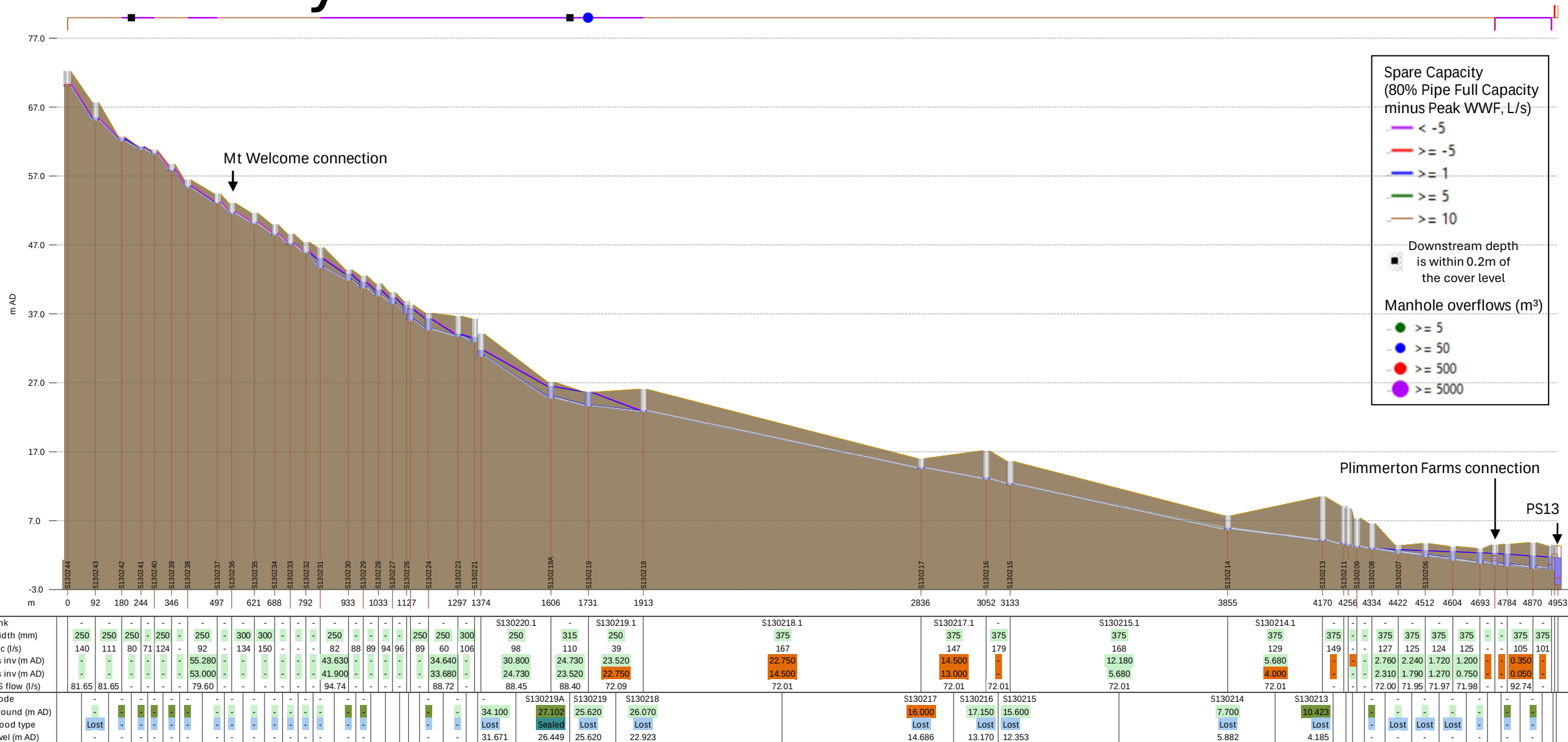
MWD 2y



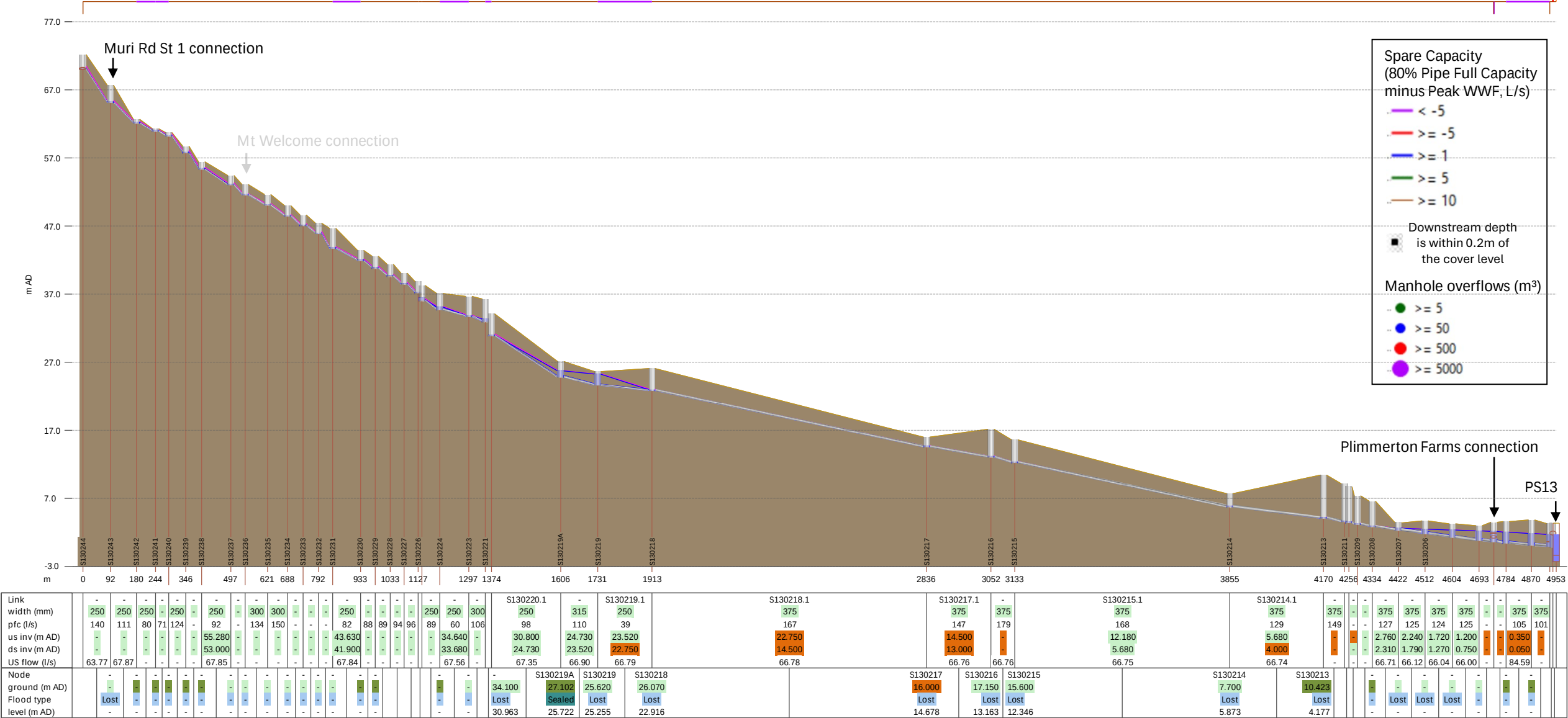
MWE 2y



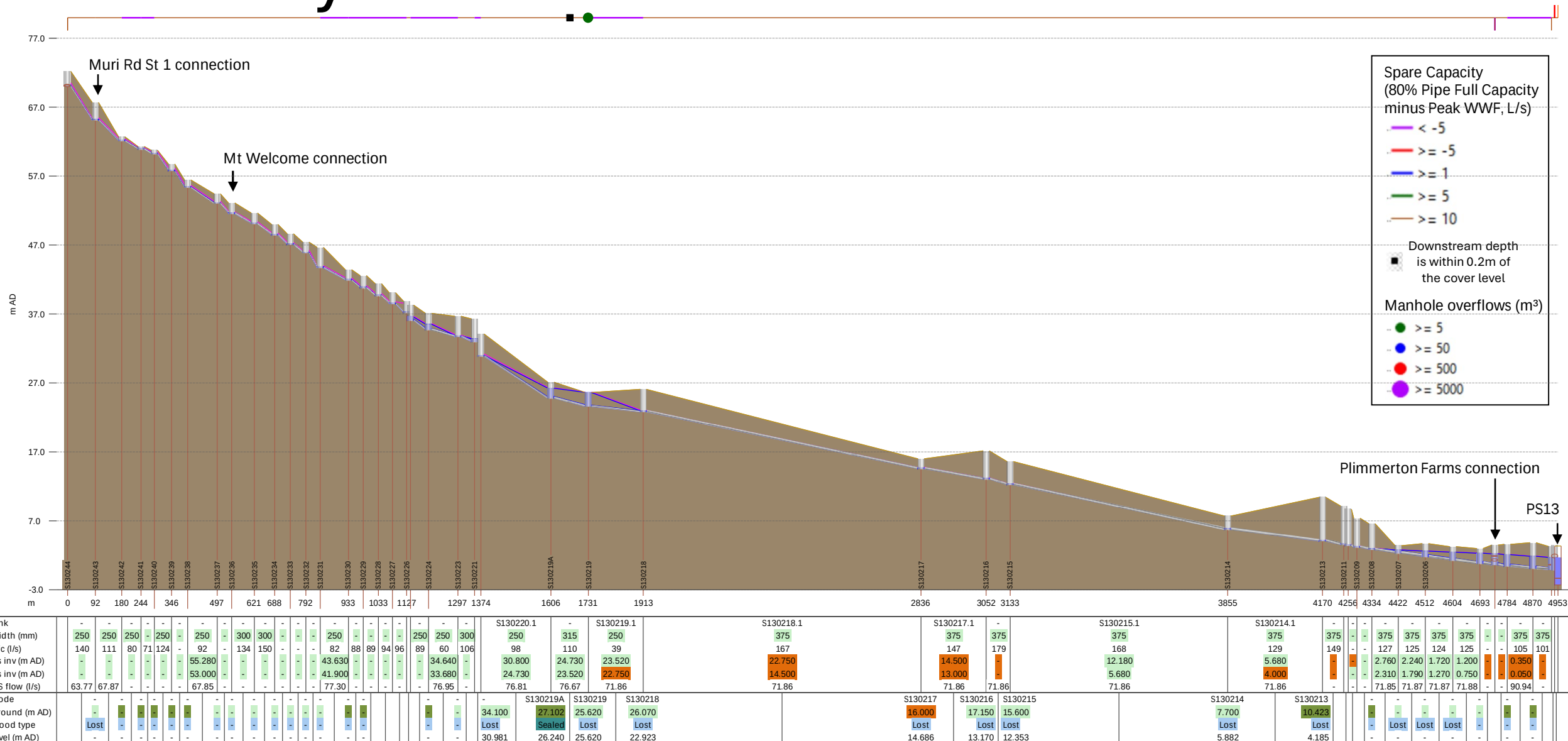
MWFF 2y



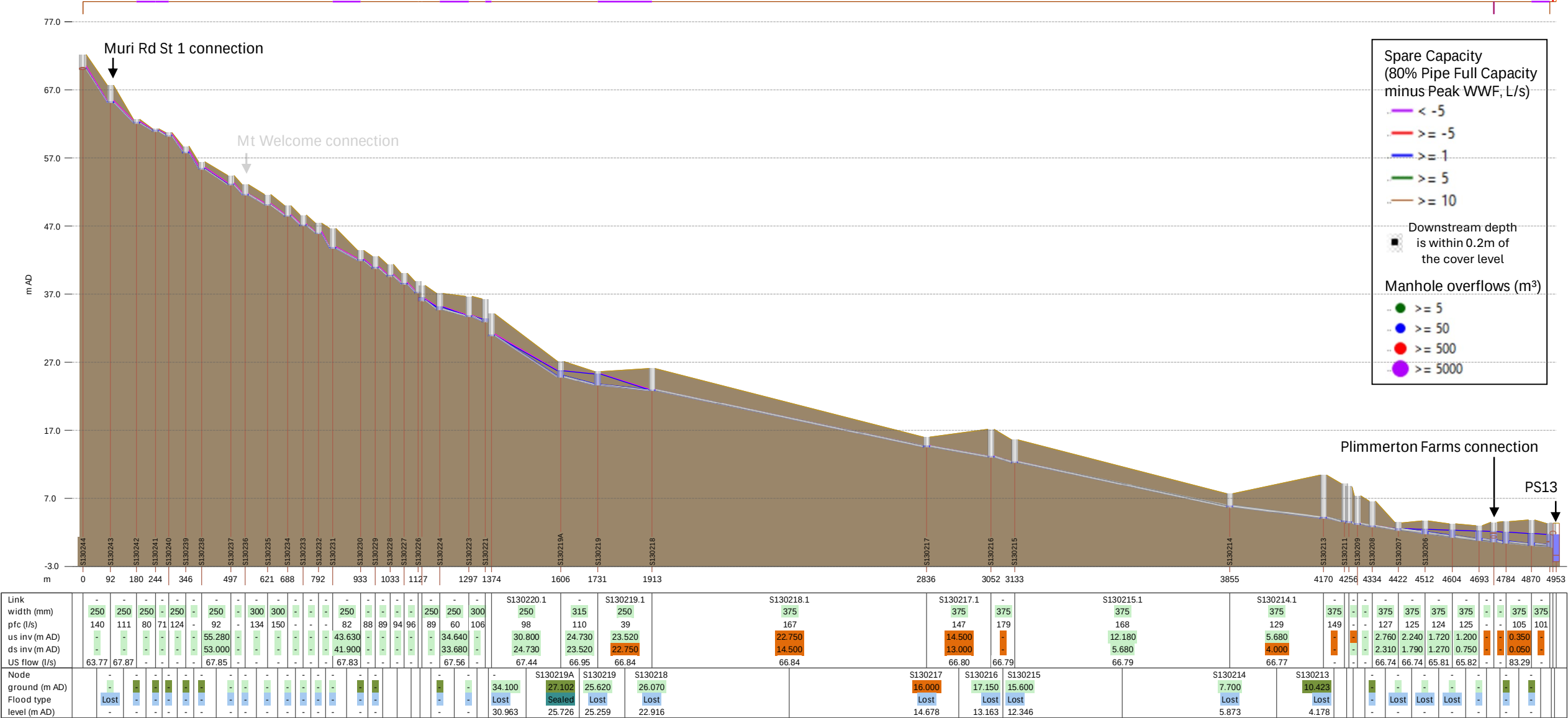
MWA 1y



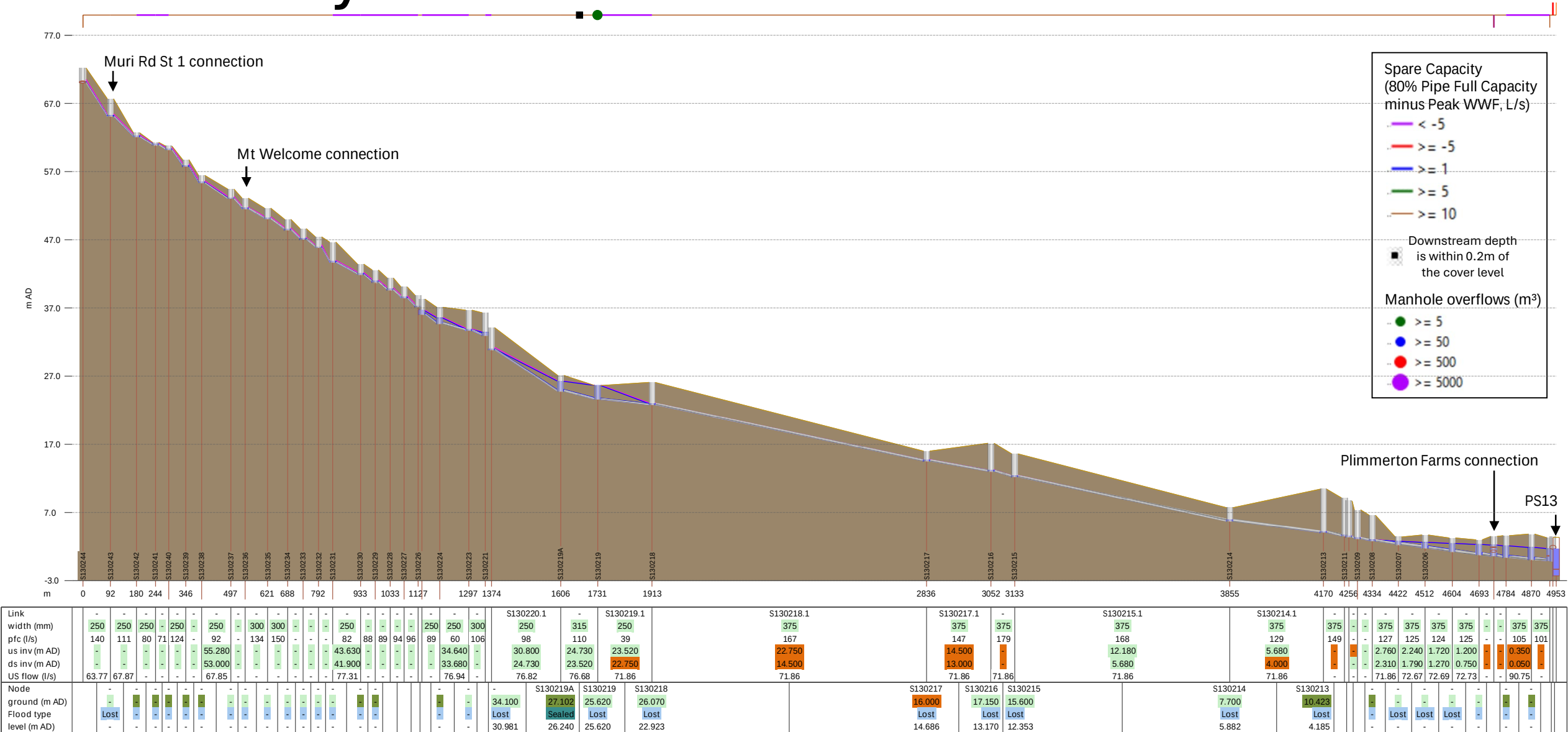
MWVB 1y



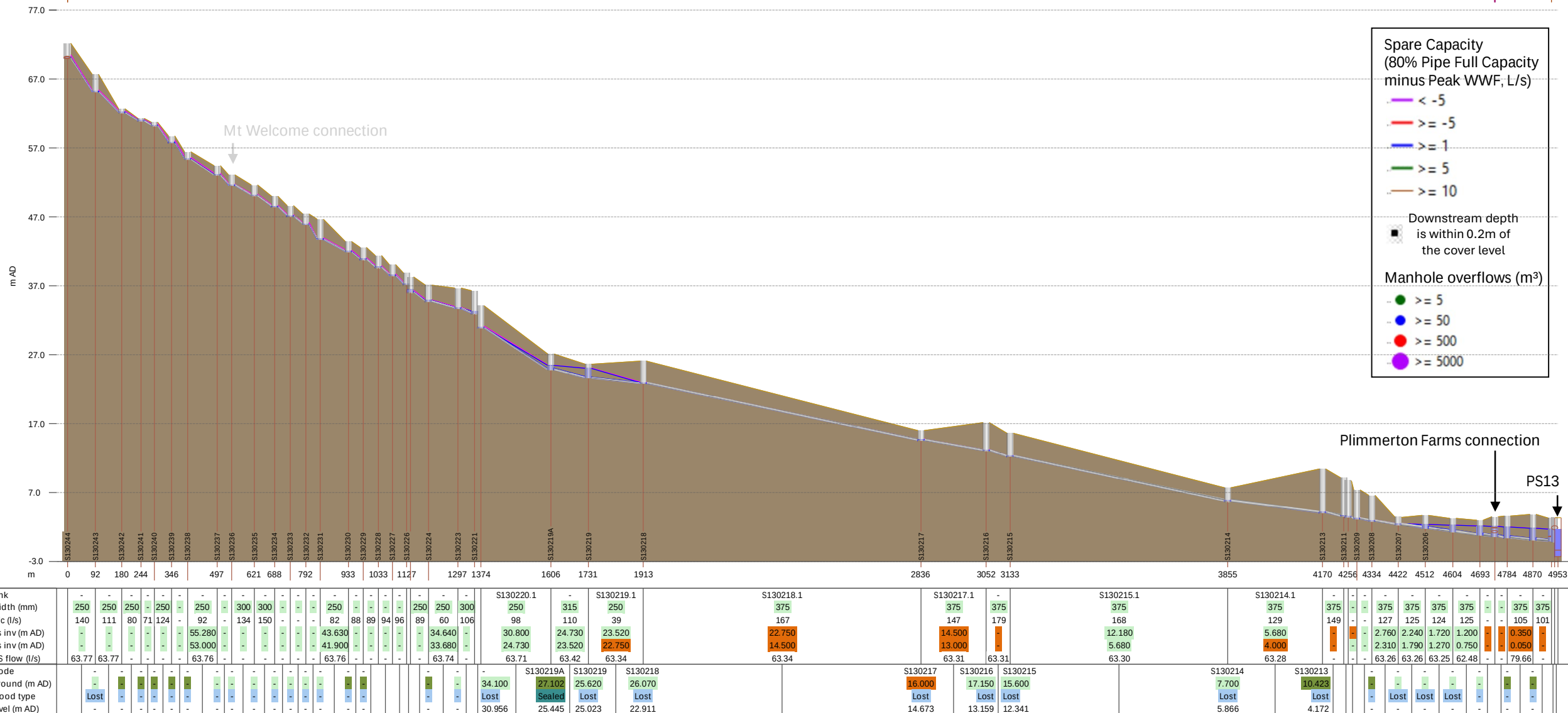
MWC 1y



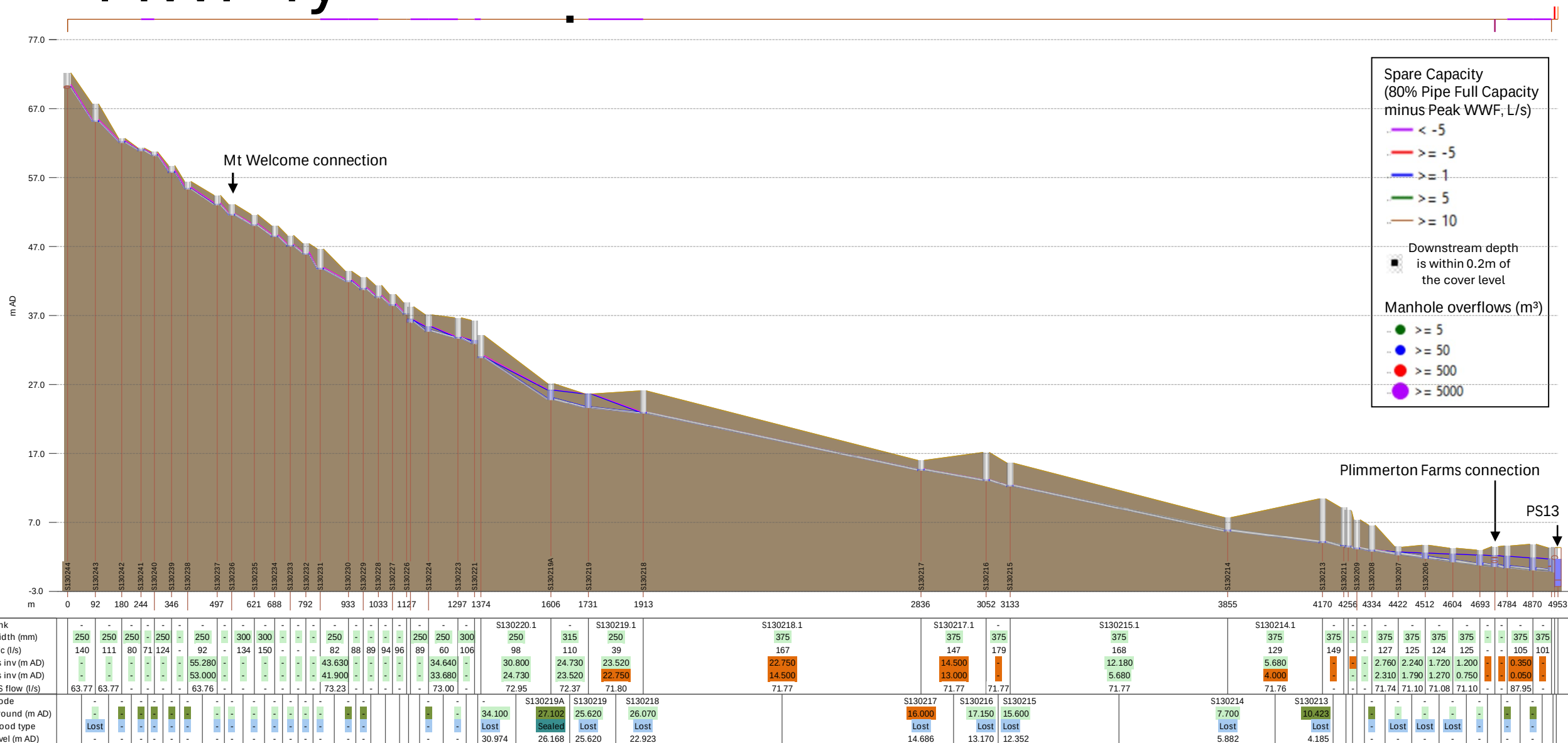
MWD 1y



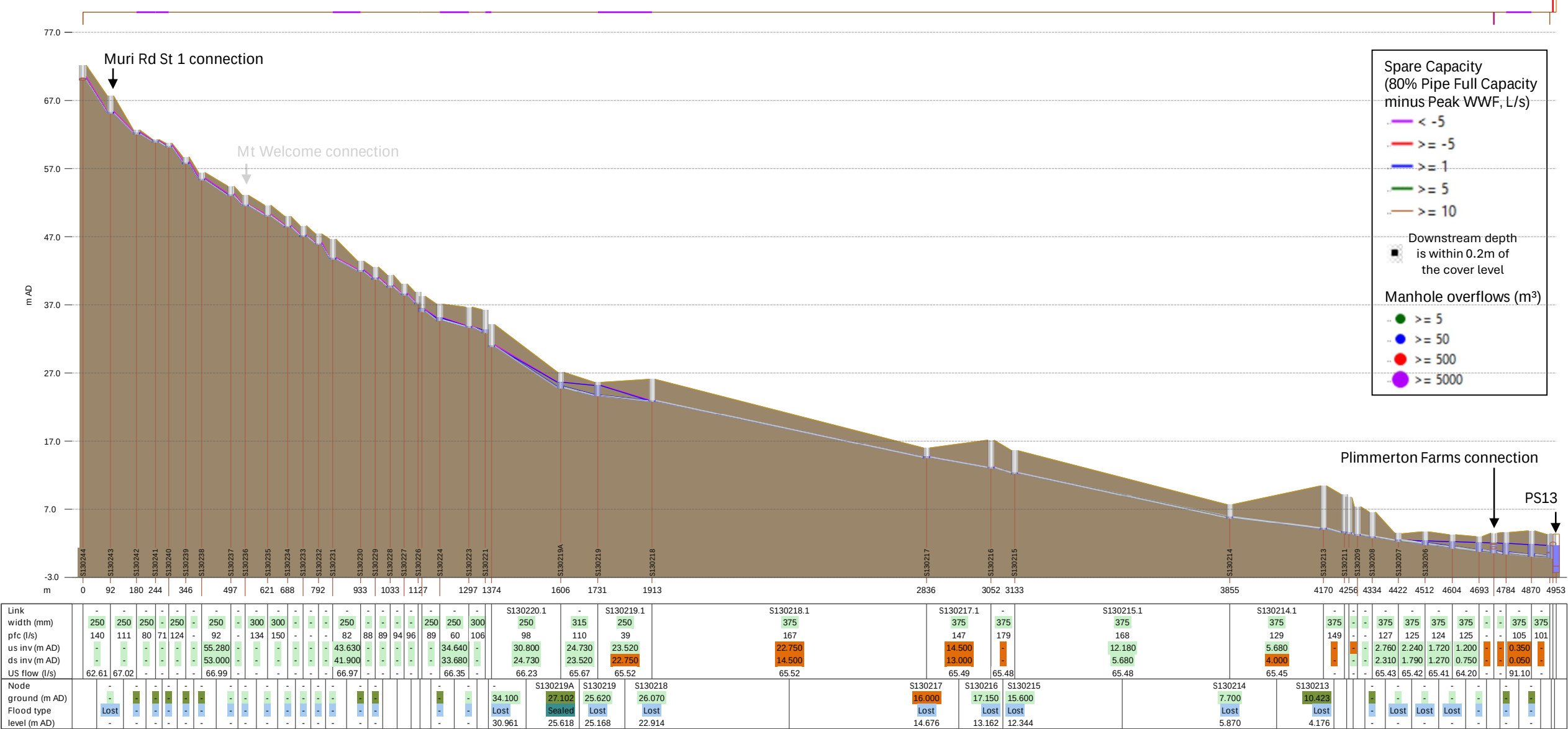
MWE 1y



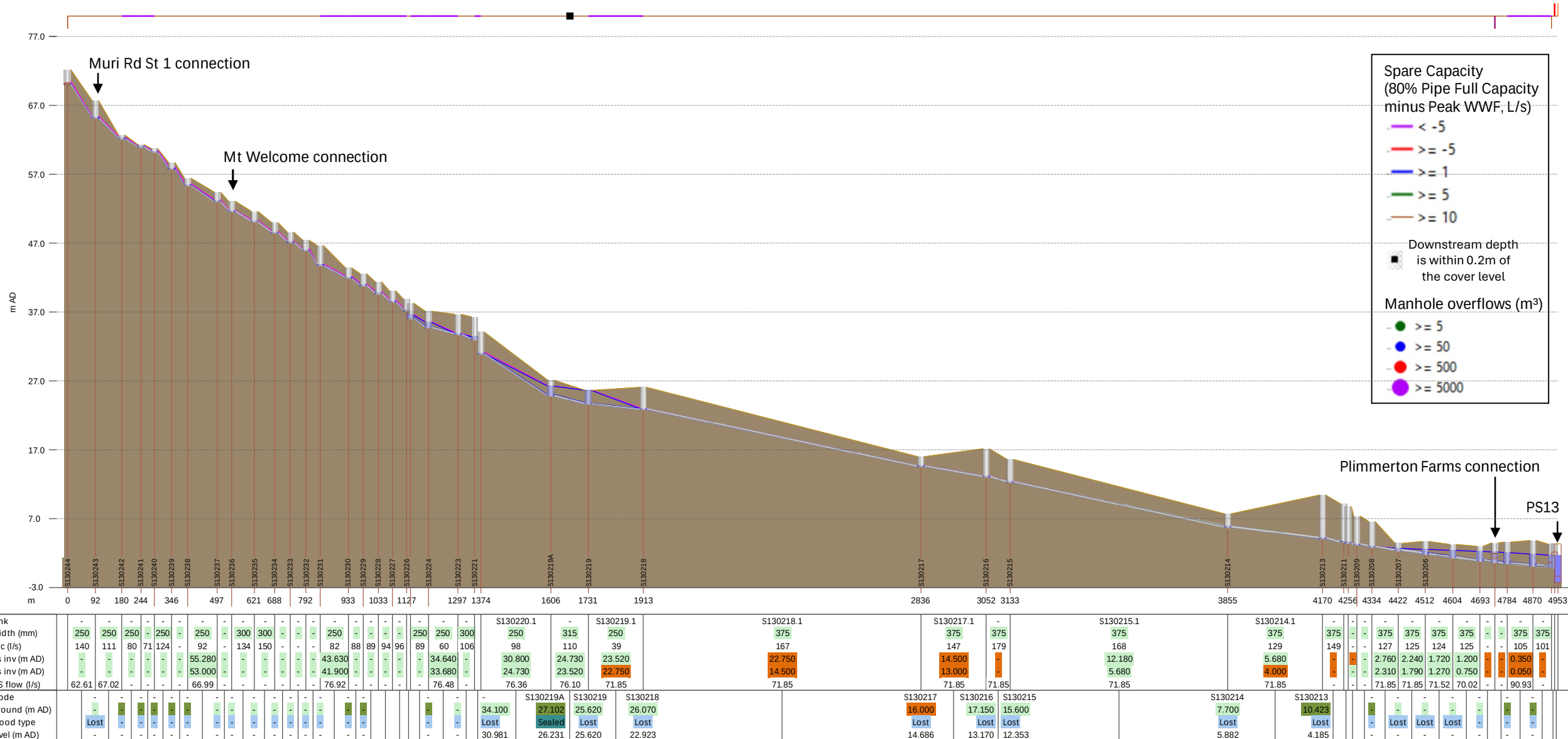
MWFF 1y



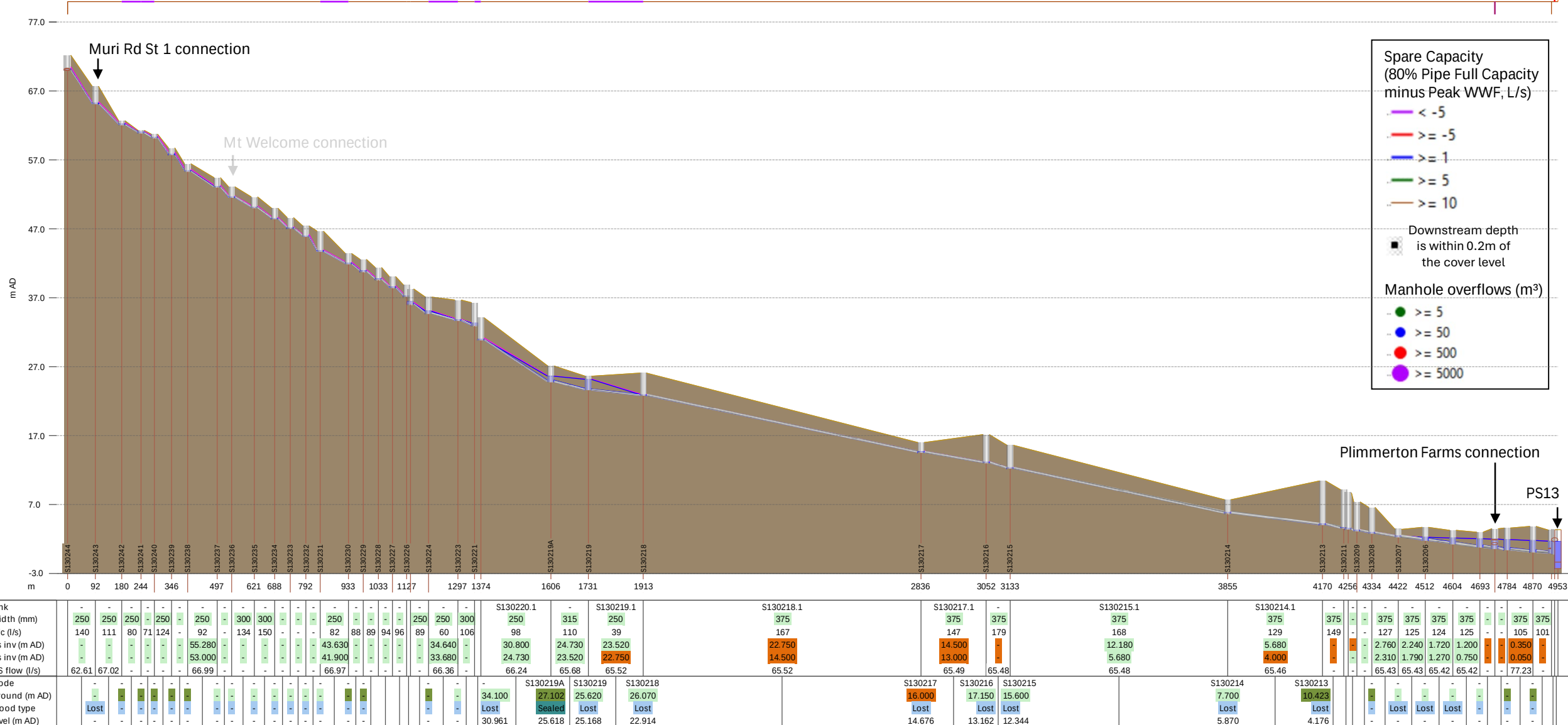
MWA 6m



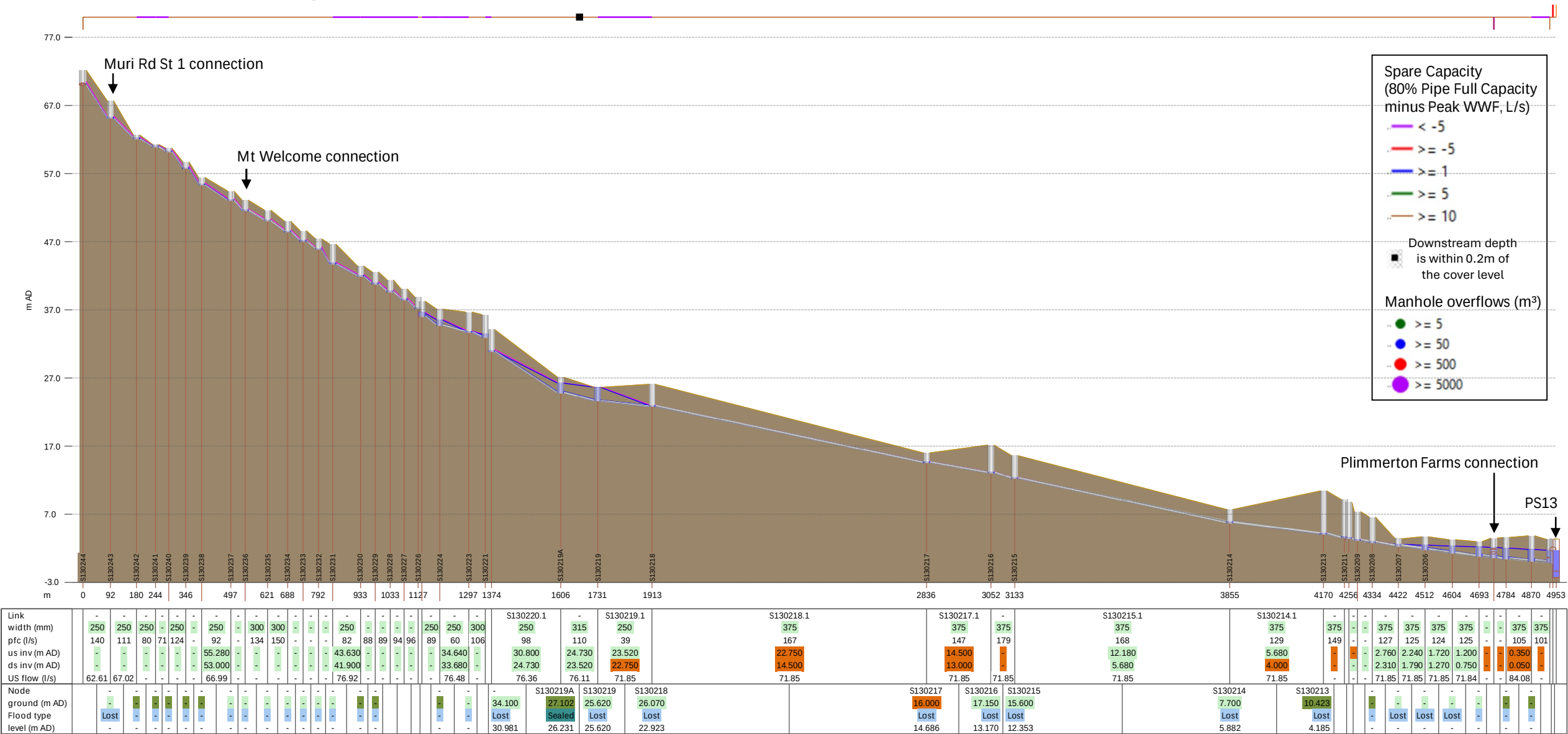
MWB 6m



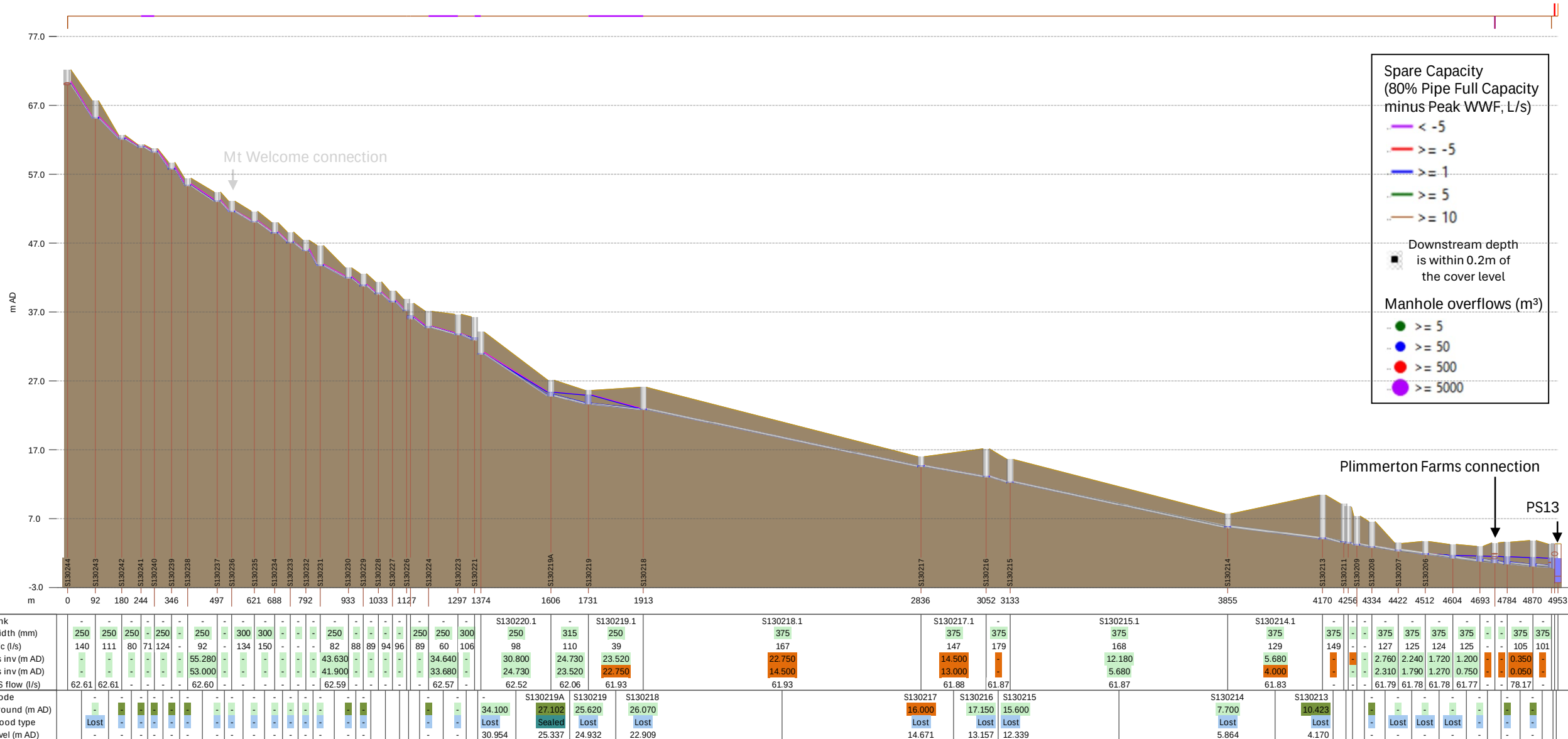
MWC 6m



MWD 6m



MWE 6m



MWFF 6m

