



MasterDrain
SW

Muir Associates (UK) Limited

www.muir-associates.co.uk

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Job No. 1132-22		
Sheet no. 1		
Date 21/11/22		
By MJ	Checked	Reviewed

Project

Title **Surcharge calcs (Sized at 30 yrs storm) for SURFACE WATER DESIGN.SW**

Using in-line restrictors
Return period = 30 yrs
Climate change factor = 0

PEAK hydrograph values printed
Storm duration = 45 mins
No offline storage

Mean rain intens. 36.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 90.00 mm/hr
Sample period = 22.5 secs.

Entry	SECT.:	MANHOLE	PIPE	RATE	PIPE	CHAMBER	INVERT:	WATER	GRND	SURCHARGE		EXCESS	FLOODED	DRAINED	STATUS	
No.	No.	REF	CAPACITY	FLOW	SIZE	:DIAM/LxW	LEVEL	LEVEL	LEVEL	:	:	FLOW	VOL	:AREA (m ²):		
:	:	:	l/s	l/s	mm	: mm	m	m	m	:	fract.	Depth	l/s	m ³	:x FACTOR:	
1	I	1.01	S-MH-01	42.1	5.7	225	1200	43.85	43.90	44.80	0.13	0.04	0.00	0.000	527	OK
2	I	1.02	S-MH-02	77.8	17.0	300	1200	43.58	43.66	44.80	0.22	0.08	0.00	0.000	1579	OK
3	I	1.03	S-MH-03	78.4	22.6	300	1200	43.43	43.53	44.80	0.29	0.10	0.00	0.000	2106	OK
4	I	1.04	S-MH-04	78.0	22.6	300	1500	43.30	43.40	44.60	0.29	0.10	0.00	0.000	2106	OK
5	B	2.01	S-MH-09	184.0	11.4	450	1500	43.08	43.13	44.35	0.06	0.05	0.00	0.000	1065	OK
6	B	2.02	S-MH-10	184.9	38.3	450	1500	42.99	43.11	44.35	0.21	0.12	0.00	0.000	3560	OK
7	B	2.03	S-MH-12	398.2	38.3	450	1500	42.87	42.93	44.35	0.10	0.07	0.00	0.000	3560	OK
8	I	1.05	S-MH-05	227.8	60.9	450	1500	42.79	42.94	44.42	0.27	0.14	0.00	0.000	5666	OK
9	B	3.01	S-MH-13	42.1	5.7	225	1200	43.90	43.94	44.80	0.13	0.04	0.00	0.000	527	OK
10	B	3.02	S-MH-14	95.8	17.0	300	1200	43.70	43.77	44.80	0.18	0.07	0.00	0.000	1582	OK
11	B	3.03	S-MH-15	298.4	22.7	300	1200	43.47	43.51	44.92	0.08	0.04	0.00	0.000	2109	OK
12	I	1.06	S-MH-06†	14.6	4.8	150	1500	42.72	42.77	44.75	0.33	0.05	0.00	0.000	7775	OK
13	I	1.07	S-MH-07	14.6	0.0	150	1200	42.65	42.66	44.35	0.00	0.00	0.00	0.000	0	OK
14	I	1.08	S-MH-08	18.6	0.0	150	1200	42.40	42.40	44.46	0.00	0.00	0.00	0.000	0	OK



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Job No.
1132-22

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2

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Notes

Printout headings

- | | | |
|---|---|--|
| 1) Entry no - position in file | 2) Section no - pipe identifier | 3) Manhole ref - Manhole identifier |
| 4) Pipe cap - full bore capacity of that pipe | 5) Rate of flow - calculated flow rate (l/s) ‡ = flow restrictor. | 6) Pipe diam - outlet pipe diameter (mm) |
| 7) Chamber diam - chamber diam. at base of MH | 8) Invert level - invert level of manhole | 9) Water level - calculated peak water level. |
| 10) Grnd level - ground / cover level | 11) Surch. fract - calc.flow/pipe capacity | 12) Surch. depth - surcharge level above soffit |
| 13) Overflow - surcharged flow rate (l/s) | 14) Flooded vol - volume of water above cover | 15) Upstrm Vol - upstream pipe vol to previous manhole(s) |
| 16) Status - OK - outlet not surcharged | 17) Status - Surcharged - outlet surcharged | 18) Status - Warning - water level within 299mm of cover level |
| 19) Status - Flooded - cover over-topped | 20) § against diameter indicates throttle pipe used. | |

Title box

Hydrograph data

- | | | |
|---|--------------------------------------|--|
| 1) Ret. period - that used to calculate profile | 2) Duration - length of storm (mins) | 3) Profile - either Winter (75%) or Summer (50%) |
|---|--------------------------------------|--|

Flow restrictors

Manhole reference - S-MH-06

Restrictor flowrate - 4.83 l/s



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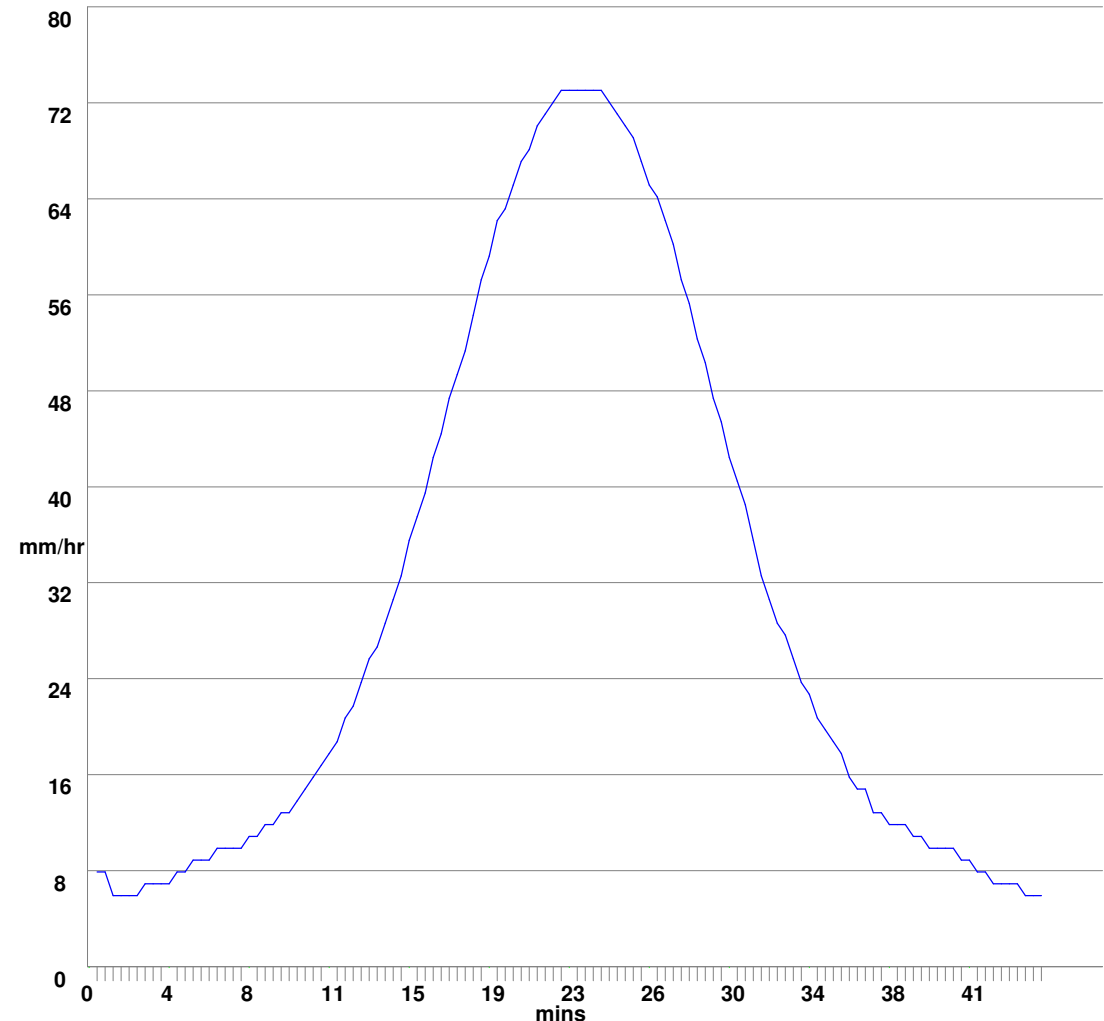
Project

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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:22	8.04	15:22	38.11	30:22	40.79
0:45	8.04	15:45	40.49	30:45	38.70
1:08	5.95	16:08	42.57	31:08	36.32
1:30	5.95	16:30	45.25	31:30	33.34
1:52	5.95	16:52	47.93	31:52	31.26
2:15	5.95	17:15	50.31	32:15	29.47
2:38	6.55	17:38	52.40	32:38	27.69
3:00	6.55	18:00	55.08	33:00	25.90
3:22	6.85	18:22	58.05	33:22	24.41
3:45	7.44	18:45	60.14	33:45	22.63
4:08	7.74	19:08	62.52	34:08	20.84
4:30	8.04	19:30	64.01	34:30	19.65
4:52	8.63	19:52	65.79	34:52	18.76
5:15	8.93	20:15	67.58	35:15	17.86
5:38	9.23	20:38	69.07	35:38	16.37
6:00	9.53	21:00	70.86	36:00	15.48
6:22	9.82	21:22	72.05	36:22	14.59
6:45	10.12	21:45	73.24	36:45	13.40
7:08	10.42	22:08	73.83	37:08	12.50
7:30	11.02	22:30	74.13	37:30	12.21
7:52	11.31	22:52	74.43	37:52	11.91
8:15	11.91	23:15	74.43	38:15	11.61
8:38	11.91	23:38	74.13	38:38	11.02
9:00	12.50	24:00	73.83	39:00	10.72
9:22	13.40	24:22	73.24	39:22	10.42
9:45	14.29	24:45	72.34	39:45	9.82
10:08	15.18	25:08	71.15	40:08	9.53
10:30	16.37	25:30	69.66	40:30	9.53
10:52	17.27	25:52	67.88	40:52	8.93
11:15	18.46	26:15	66.09	41:15	8.63
11:38	19.35	26:38	64.60	41:38	8.04
12:00	20.84	27:00	62.82	42:00	7.74
12:22	22.33	27:22	60.73	42:22	7.44
12:45	23.82	27:45	58.35	42:45	7.15
13:08	25.60	28:08	55.67	43:08	6.55
13:30	27.39	28:30	52.99	43:30	6.55
13:52	28.88	28:52	50.61	43:52	6.25
14:15	30.96	29:15	48.23	44:15	5.95
14:38	33.05	29:38	46.15	44:38	5.95
15:00	35.73	30:00	43.17	45:00	5.95

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 45 mins Profile - winter





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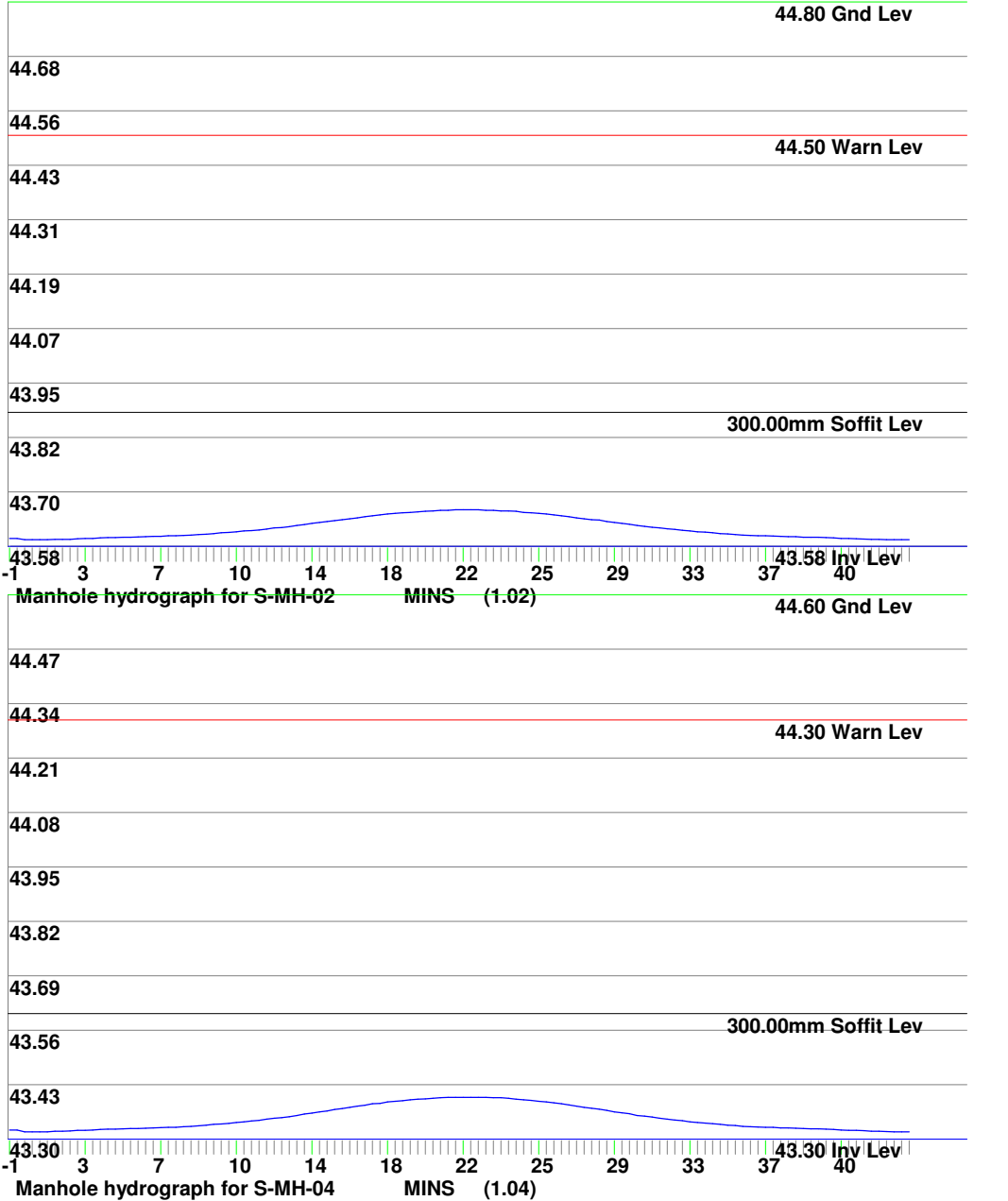
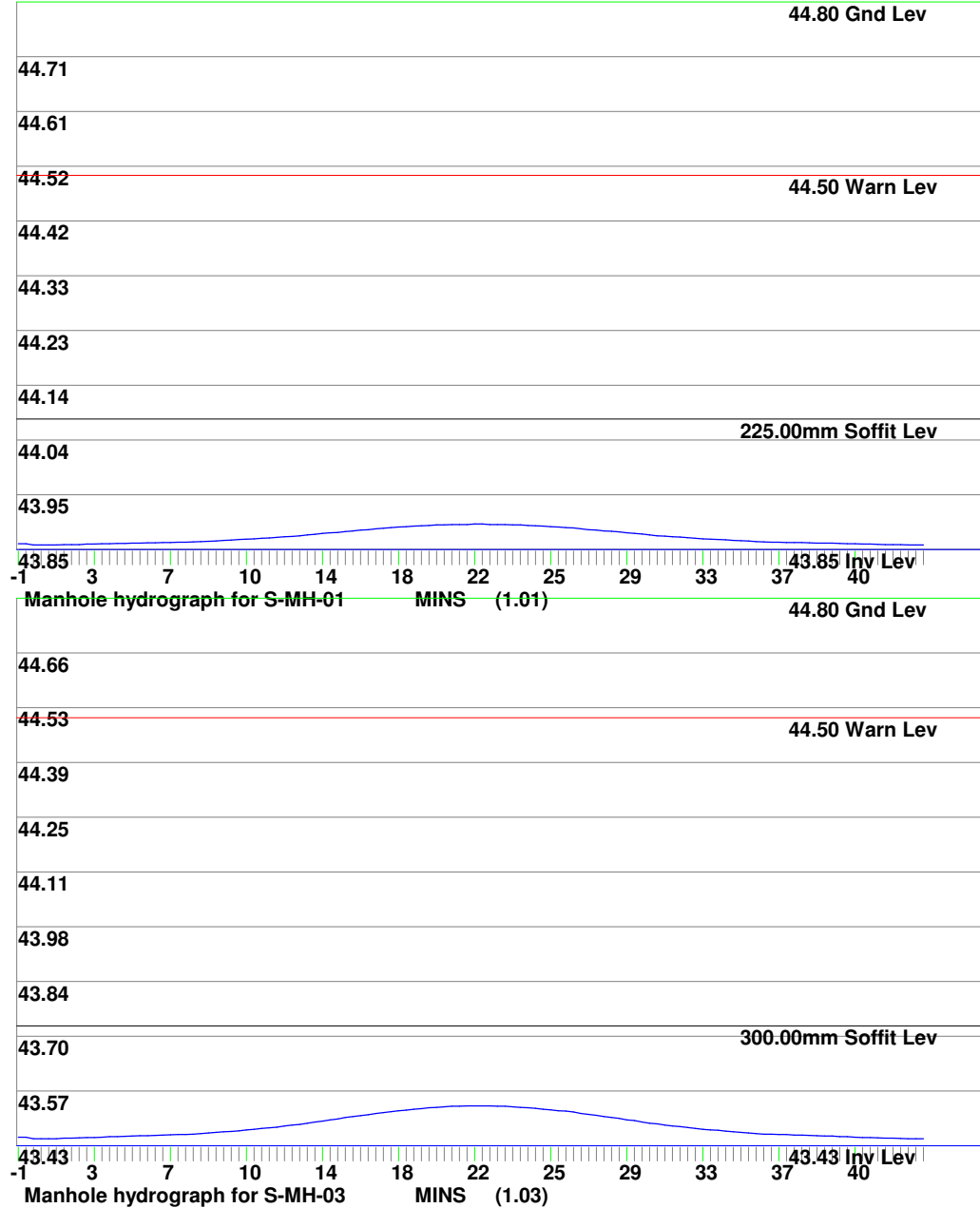
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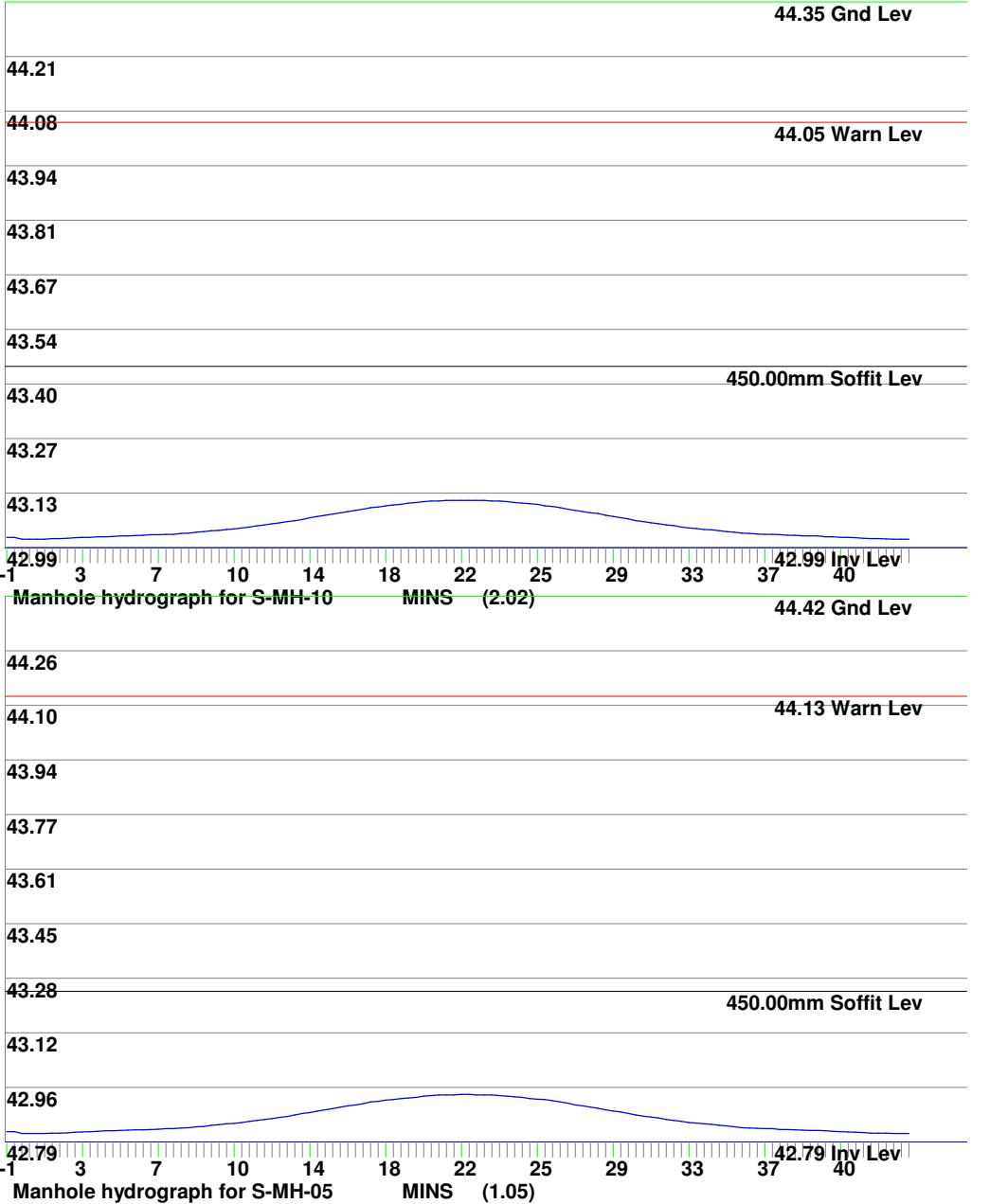
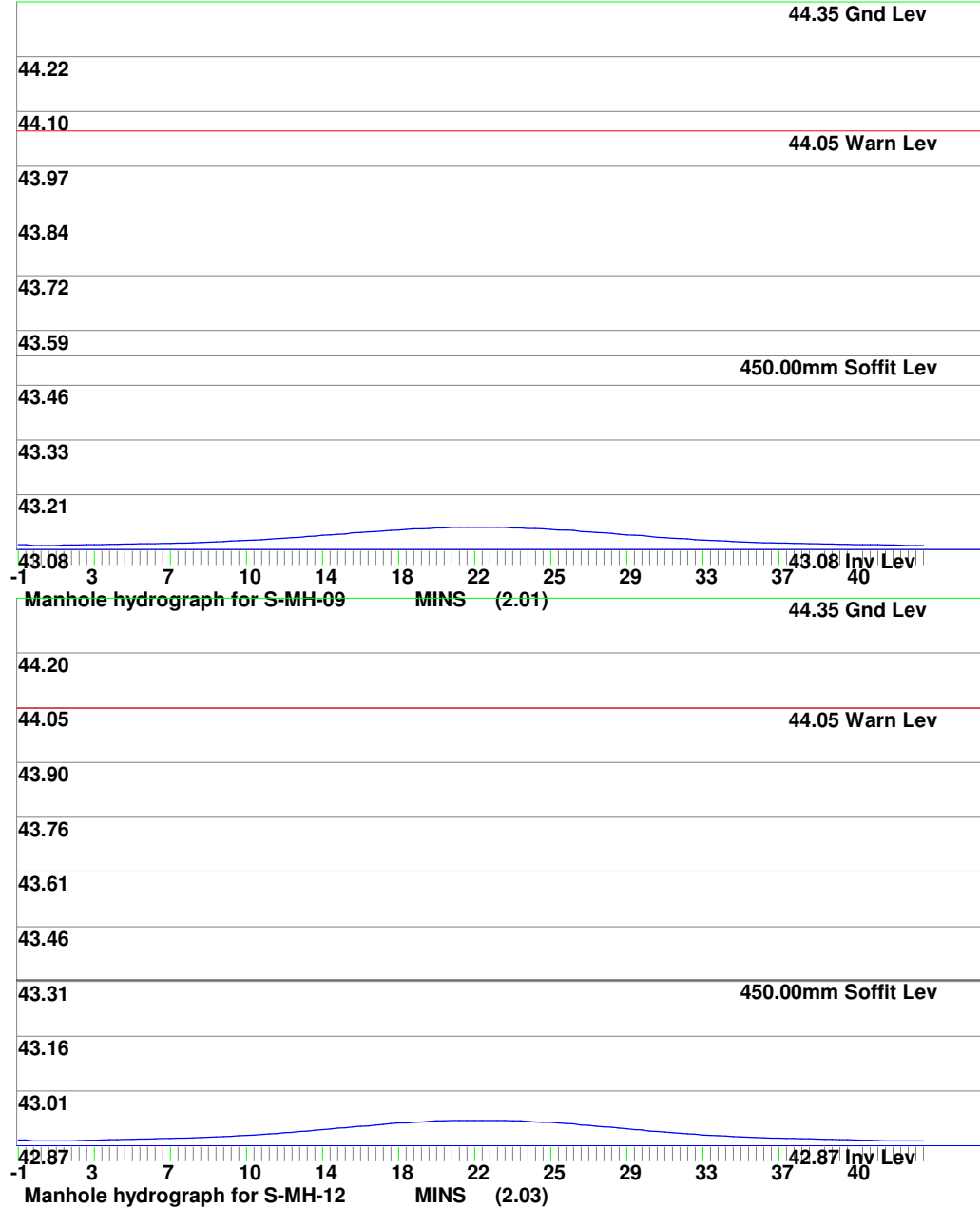
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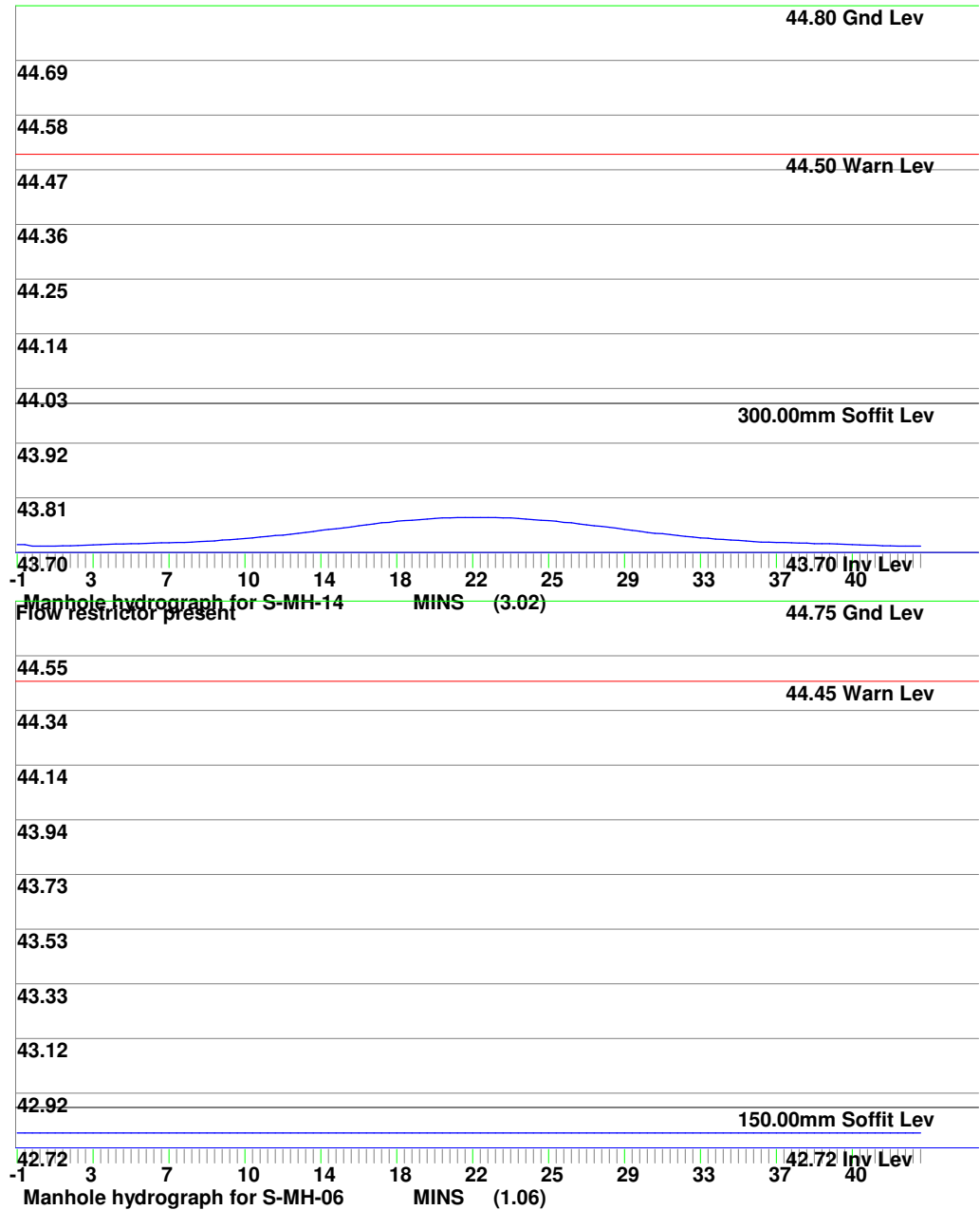


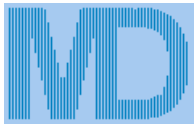


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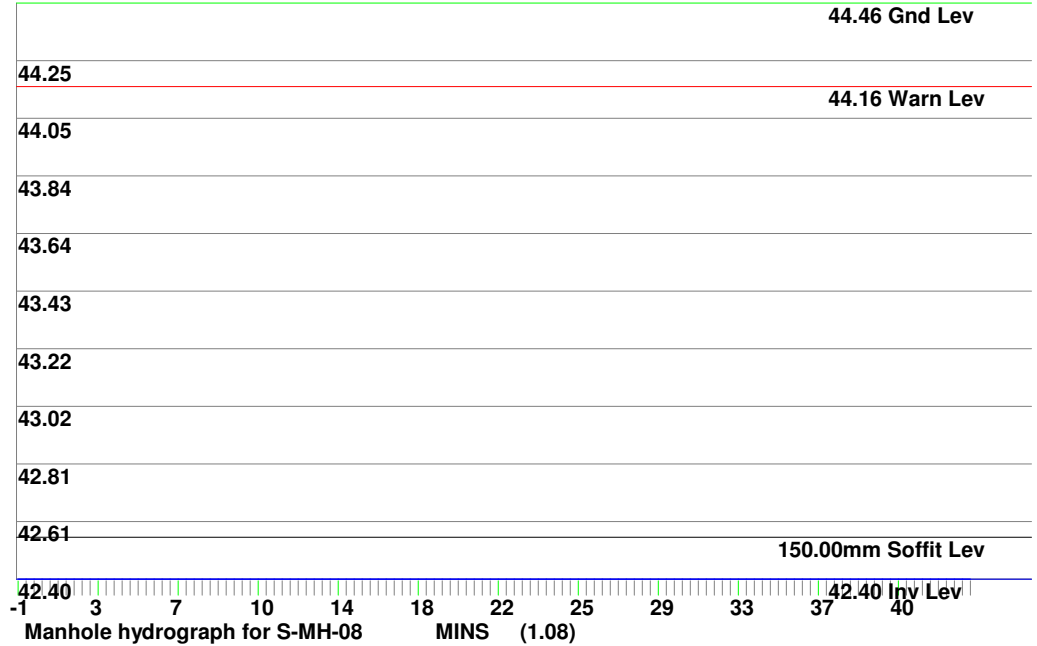
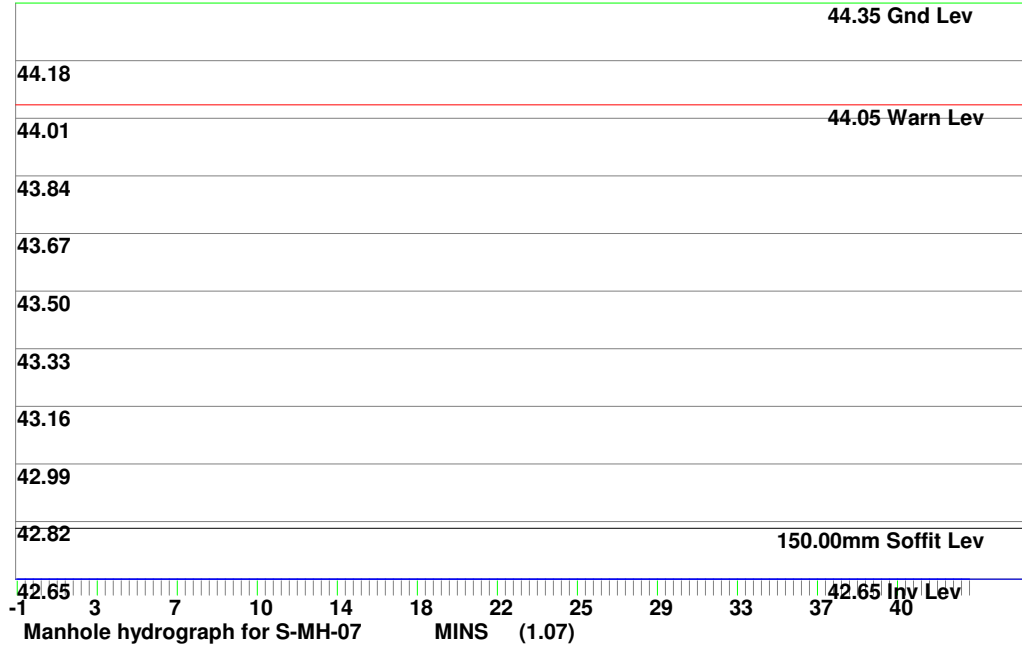
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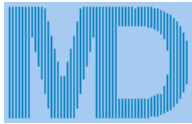
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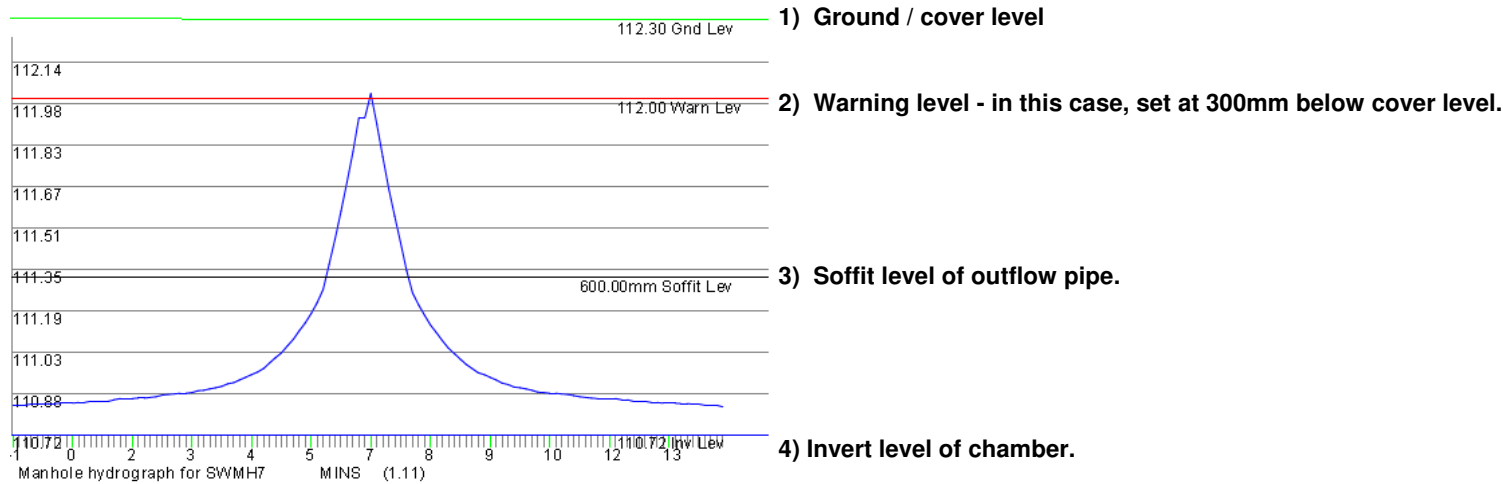
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Notes

- Lower section of the graph shows the water depth filling the channel. Channel is assumed to be a full pipe diameter in depth.
- Upper section of the graph shows the water depth filling the chamber. Chamber has a greater width/diameter than the channel, so increases in depth are proportionally less.
- The top of the graph clips the warning level and would be marked thus on the printout.
- In many cases the invert of the offline storage is required to enter at the channel soffit level, meaning that the pipe will still surcharge but flooding risk reduced.
- The diagram above is a general one and is not part of the current calculation.