



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 CCF = 40%**

Using in-line restrictors
Return period = 100 yrs
Climate change factor = 40

PEAK hydrograph values printed
Storm duration = 30 mins
No offline storage

Mean rain intens. 86.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 215.00 mm/hr
Sample period = 15.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) x FACTOR	STATUS
1	I	1.01 S-MH-01	42.1	13.6	225	1200	43.85	43.94	44.80	0.32	0.08	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	40.8	300	1200	43.58	43.74	44.80	0.52	0.16	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	54.4	300	1200	43.43	43.63	44.80	0.69	0.20	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	54.4	300	1500	43.30	43.50	44.60	0.70	0.20	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	27.5	450	1500	43.08	43.17	44.35	0.15	0.09	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	91.9	450	1500	42.99	43.22	44.35	0.50	0.22	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	91.9	450	1500	42.87	42.99	44.35	0.23	0.13	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	146.3	450	1500	42.79	43.07	44.42	0.64	0.28	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	13.6	225	1200	43.90	43.98	44.80	0.32	0.08	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	40.9	300	1200	43.70	43.83	44.80	0.43	0.13	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	54.5	300	1200	43.47	43.55	44.92	0.18	0.07	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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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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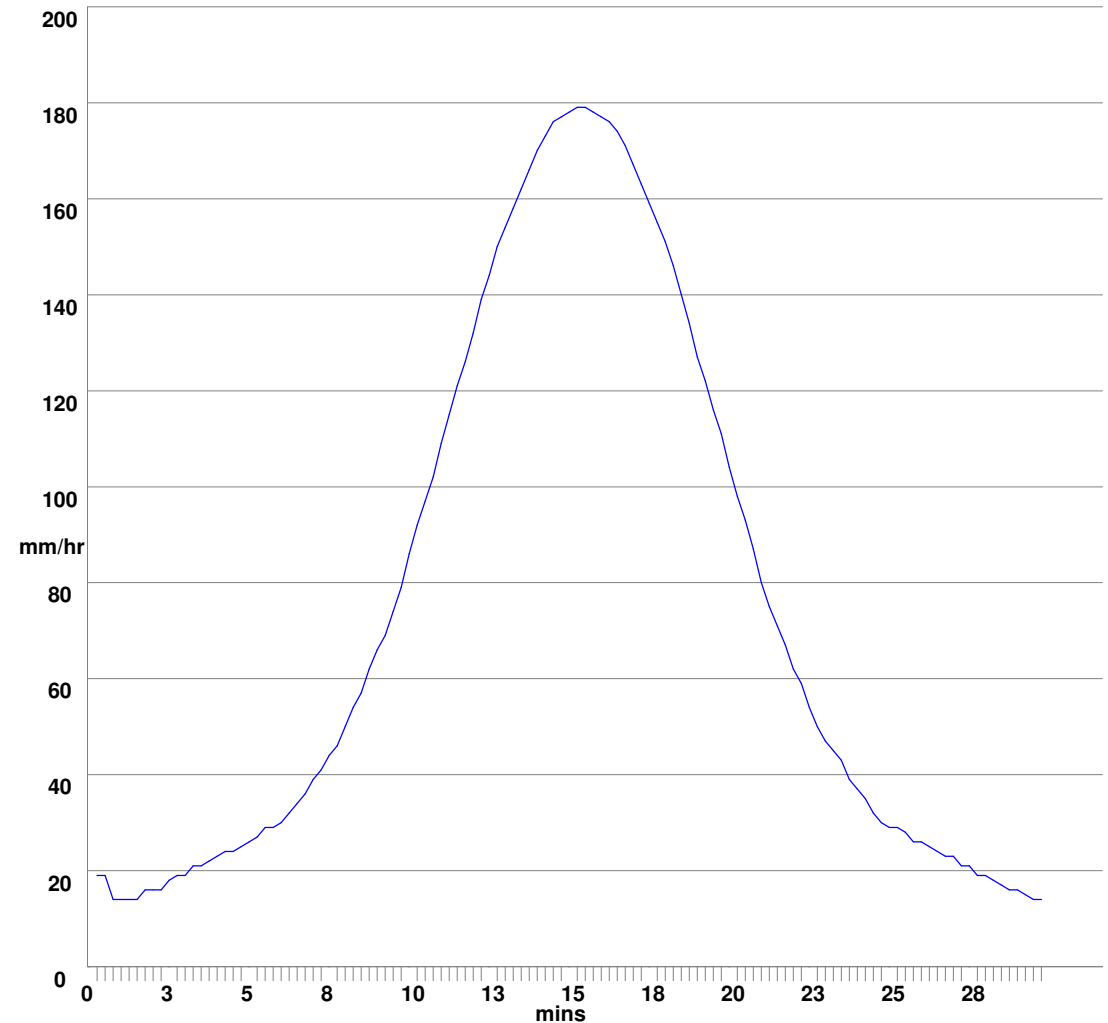
Project

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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:15	19.31	10:15	91.55	20:15	97.98
0:30	19.31	10:30	97.27	20:30	92.98
0:45	14.30	10:45	102.28	20:45	87.26
1:00	14.30	11:00	108.71	21:00	80.10
1:15	14.30	11:15	115.15	21:15	75.10
1:30	14.30	11:30	120.87	21:30	70.81
1:45	15.73	11:45	125.88	21:45	66.51
2:00	15.73	12:00	132.31	22:00	62.22
2:15	16.45	12:15	139.47	22:15	58.65
2:30	17.88	12:30	144.47	22:30	54.36
2:45	18.60	12:45	150.19	22:45	50.06
3:00	19.31	13:00	153.77	23:00	47.20
3:15	20.74	13:15	158.06	23:15	45.06
3:30	21.46	13:30	162.35	23:30	42.91
3:45	22.17	13:45	165.93	23:45	39.34
4:00	22.89	14:00	170.22	24:00	37.19
4:15	23.60	14:15	173.08	24:15	35.05
4:30	24.32	14:30	175.94	24:30	32.18
4:45	25.03	14:45	177.37	24:45	30.04
5:00	26.46	15:00	178.09	25:00	29.32
5:15	27.18	15:15	178.80	25:15	28.61
5:30	28.61	15:30	178.80	25:30	27.89
5:45	28.61	15:45	178.09	25:45	26.46
6:00	30.04	16:00	177.37	26:00	25.75
6:15	32.18	16:15	175.94	26:15	25.03
6:30	34.33	16:30	173.80	26:30	23.60
6:45	36.48	16:45	170.94	26:45	22.89
7:00	39.34	17:00	167.36	27:00	22.89
7:15	41.48	17:15	163.07	27:15	21.46
7:30	44.34	17:30	158.78	27:30	20.74
7:45	46.49	17:45	155.20	27:45	19.31
8:00	50.06	18:00	150.91	28:00	18.60
8:15	53.64	18:15	145.90	28:15	17.88
8:30	57.22	18:30	140.18	28:30	17.17
8:45	61.51	18:45	133.74	28:45	15.73
9:00	65.80	19:00	127.31	29:00	15.73
9:15	69.38	19:15	121.59	29:15	15.02
9:30	74.38	19:30	115.86	29:30	14.30
9:45	79.39	19:45	110.86	29:45	14.30
10:00	85.83	20:00	103.71	30:00	14.30

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 30 mins Profile - winter





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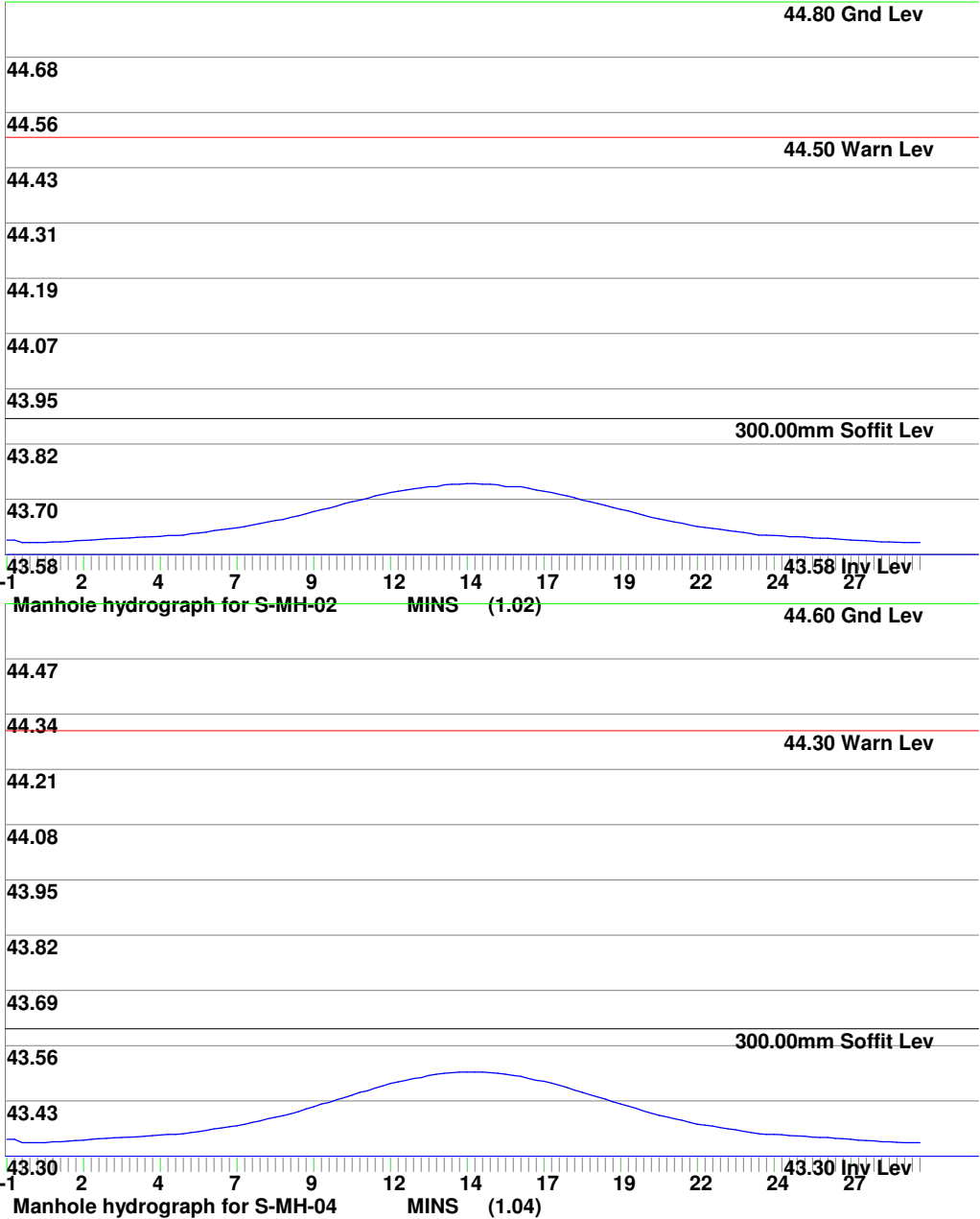
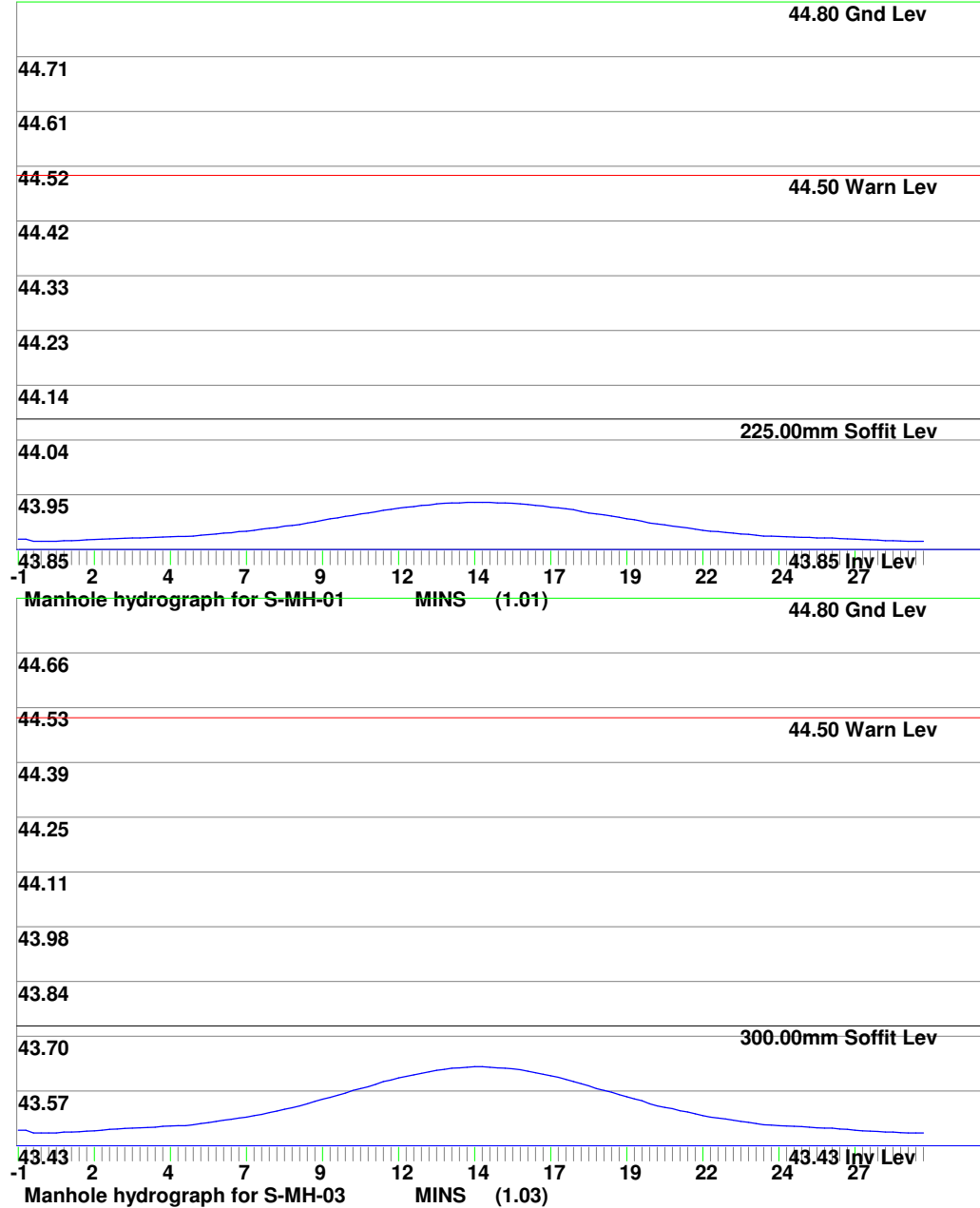
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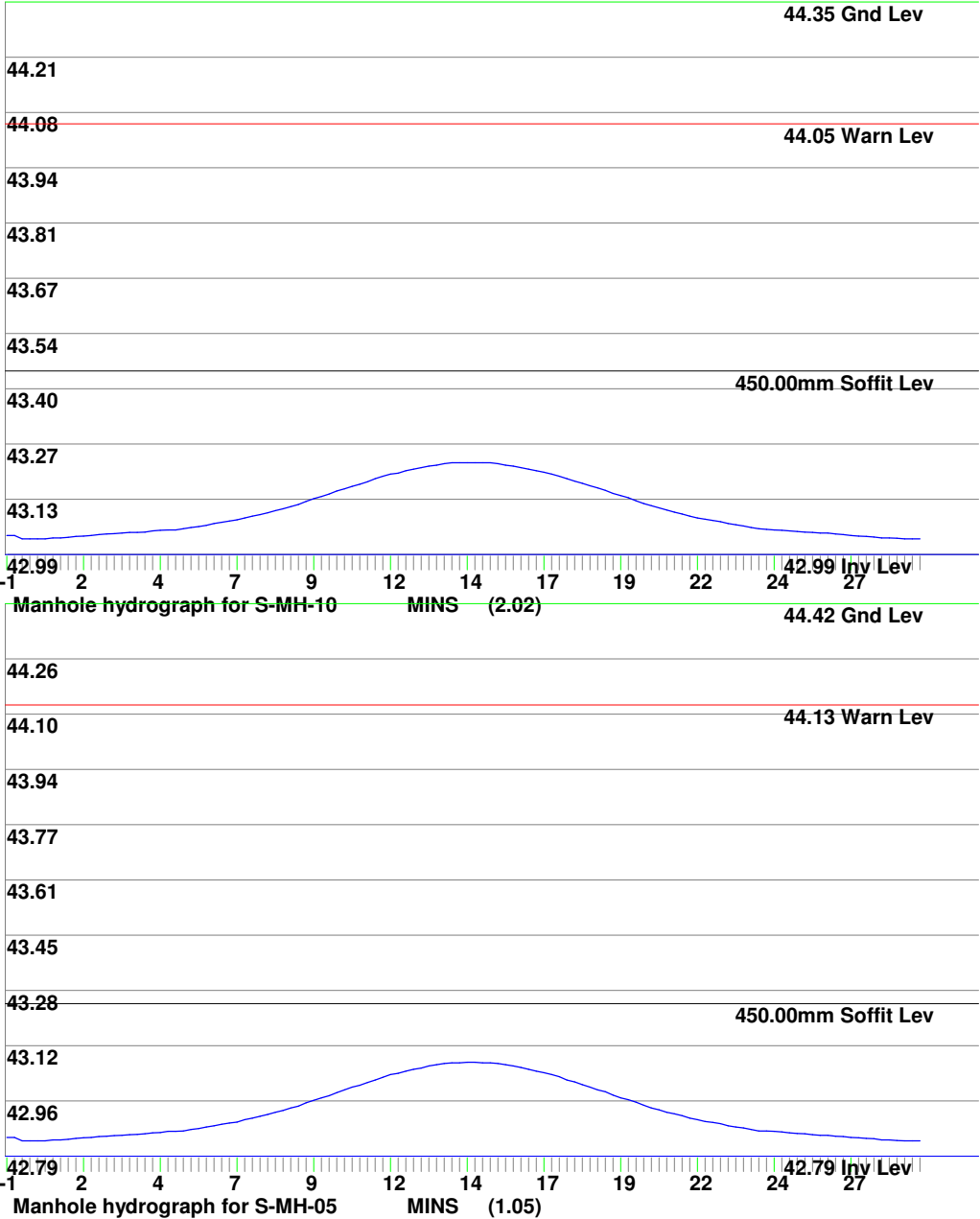
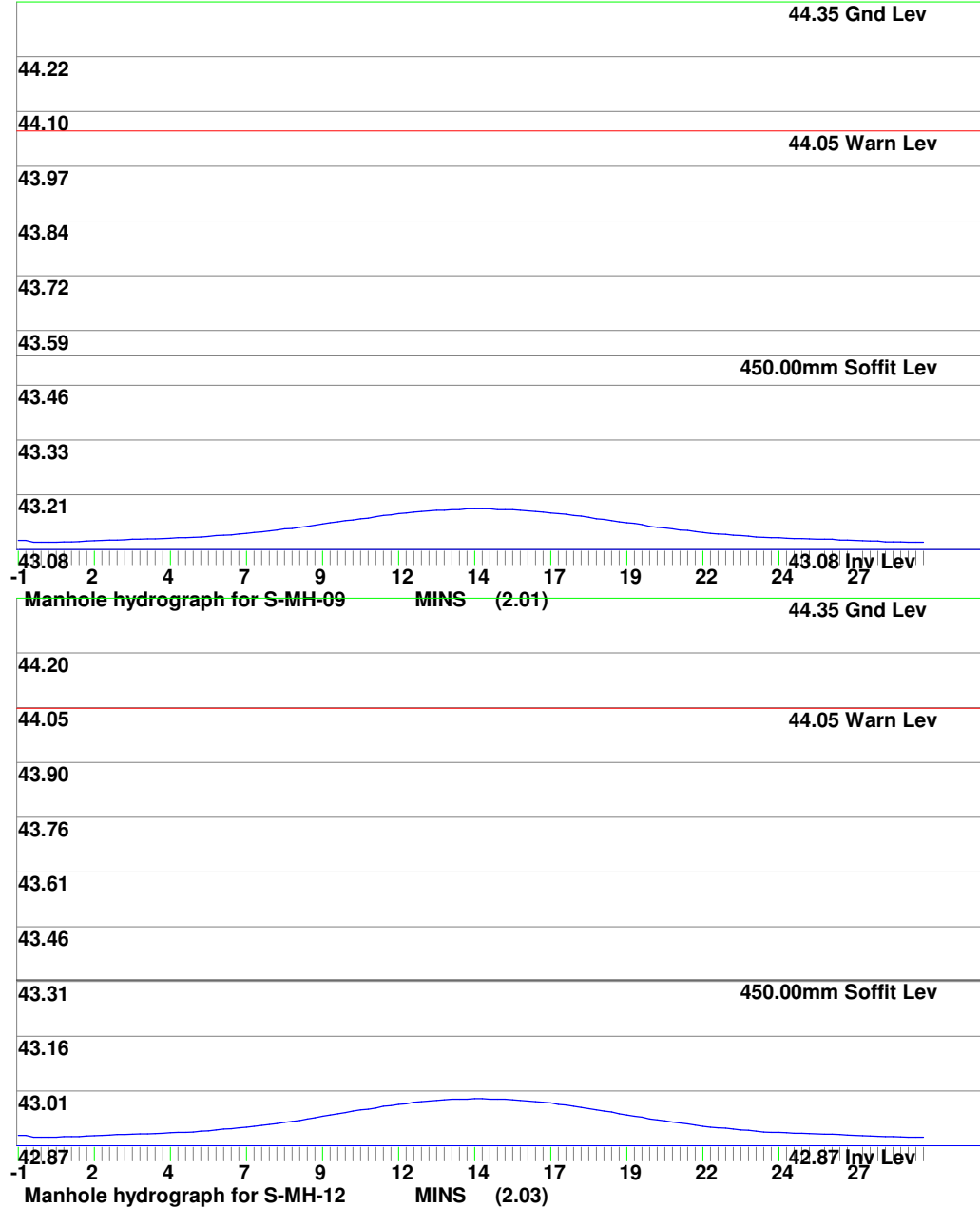
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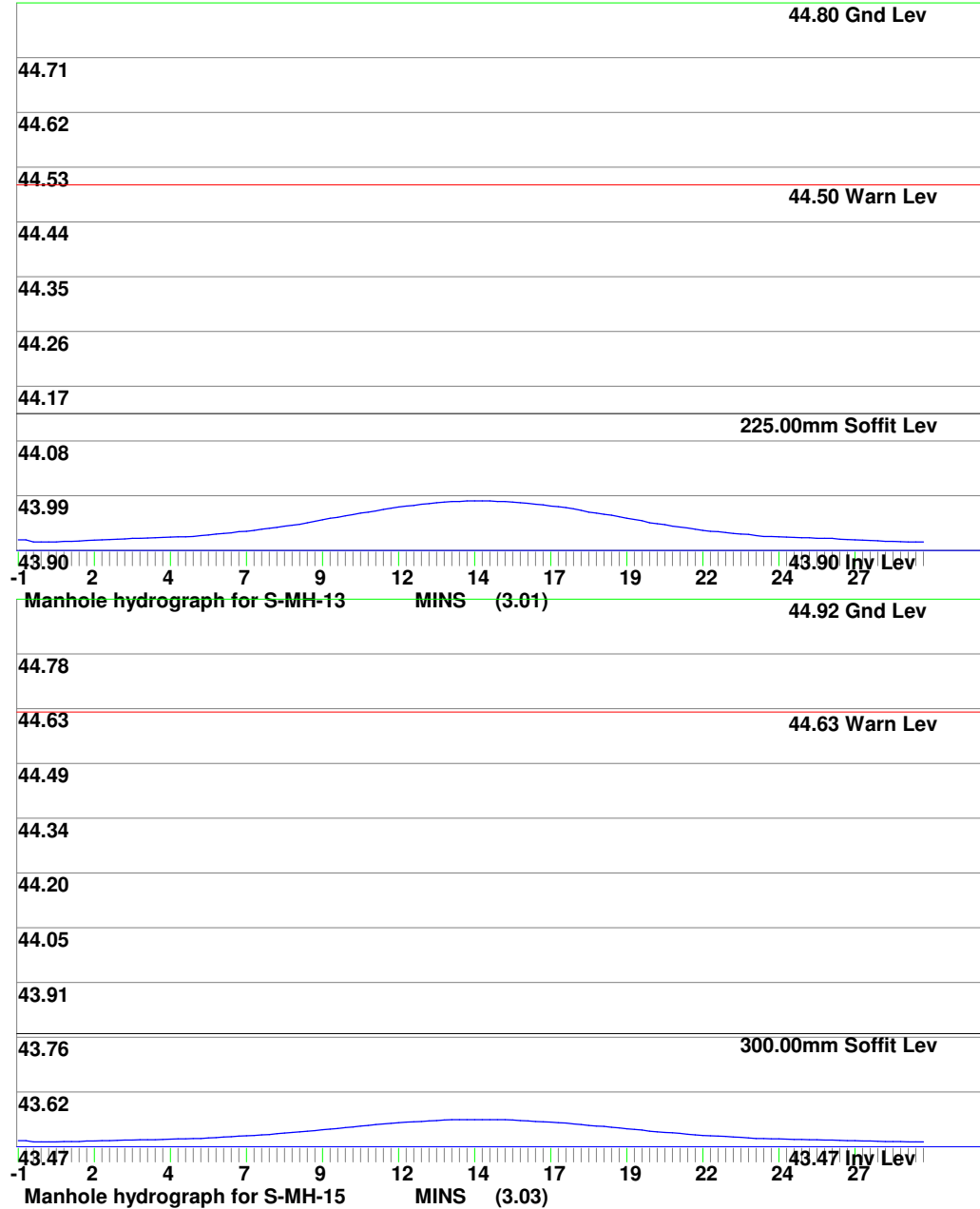
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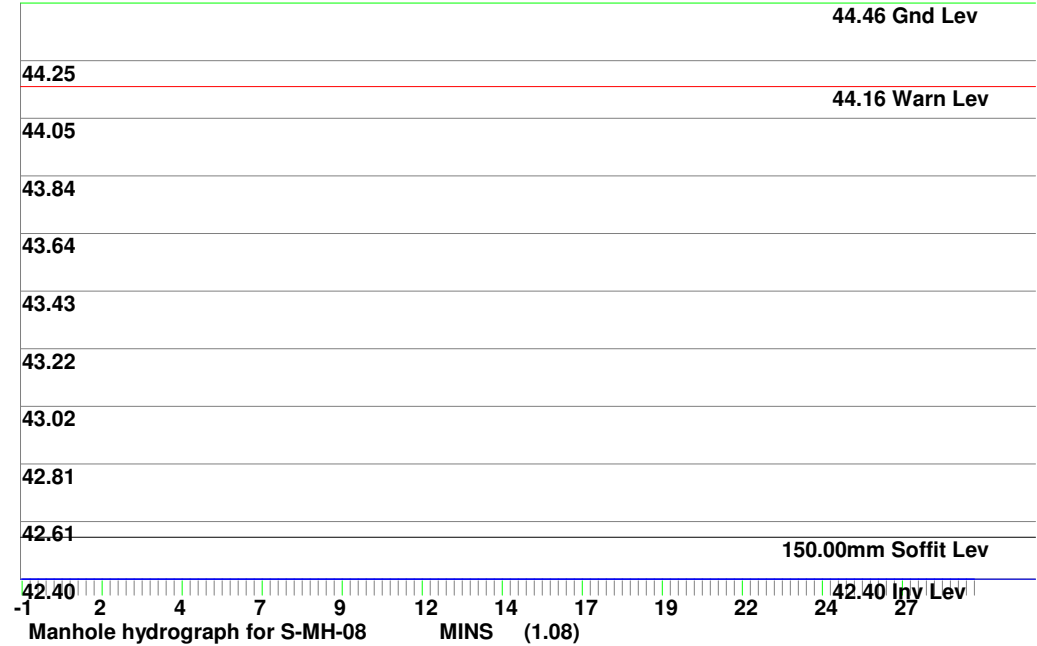
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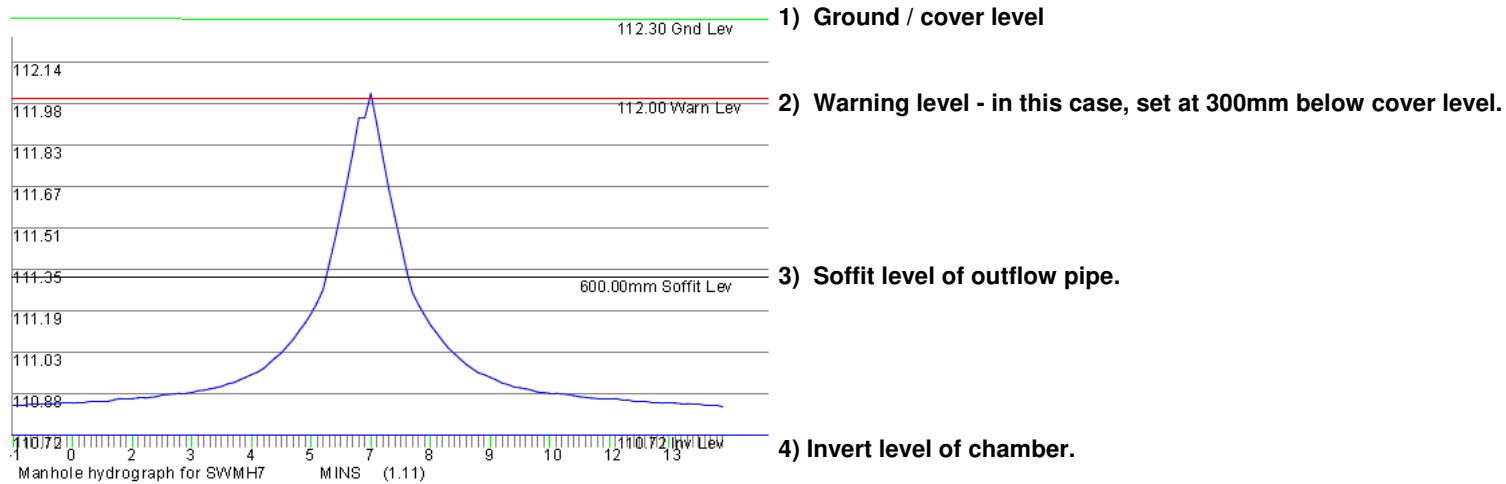
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Notes

- 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.