



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 = 45 mins
No offline storage

Mean rain intens. 66.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 165.00 mm/hr
Sample period = 22.5 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	10.4	225	1200	43.85	43.92	44.80	0.25	0.07	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	31.2	300	1200	43.58	43.71	44.80	0.40	0.13	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	41.6	300	1200	43.43	43.59	44.80	0.53	0.16	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	41.6	300	1500	43.30	43.46	44.60	0.53	0.16	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	21.0	450	1500	43.08	43.16	44.35	0.11	0.08	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	70.3	450	1500	42.99	43.18	44.35	0.38	0.18	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	70.3	450	1500	42.87	42.97	44.35	0.18	0.11	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	111.8	450	1500	42.79	43.02	44.42	0.49	0.22	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	10.4	225	1200	43.90	43.97	44.80	0.25	0.07	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	31.2	300	1200	43.70	43.81	44.80	0.33	0.11	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	41.6	300	1200	43.47	43.53	44.92	0.14	0.06	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

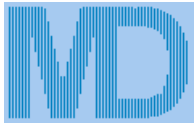
Hydrograph data

- | | | |
|---|--------------------------------------|--|
| 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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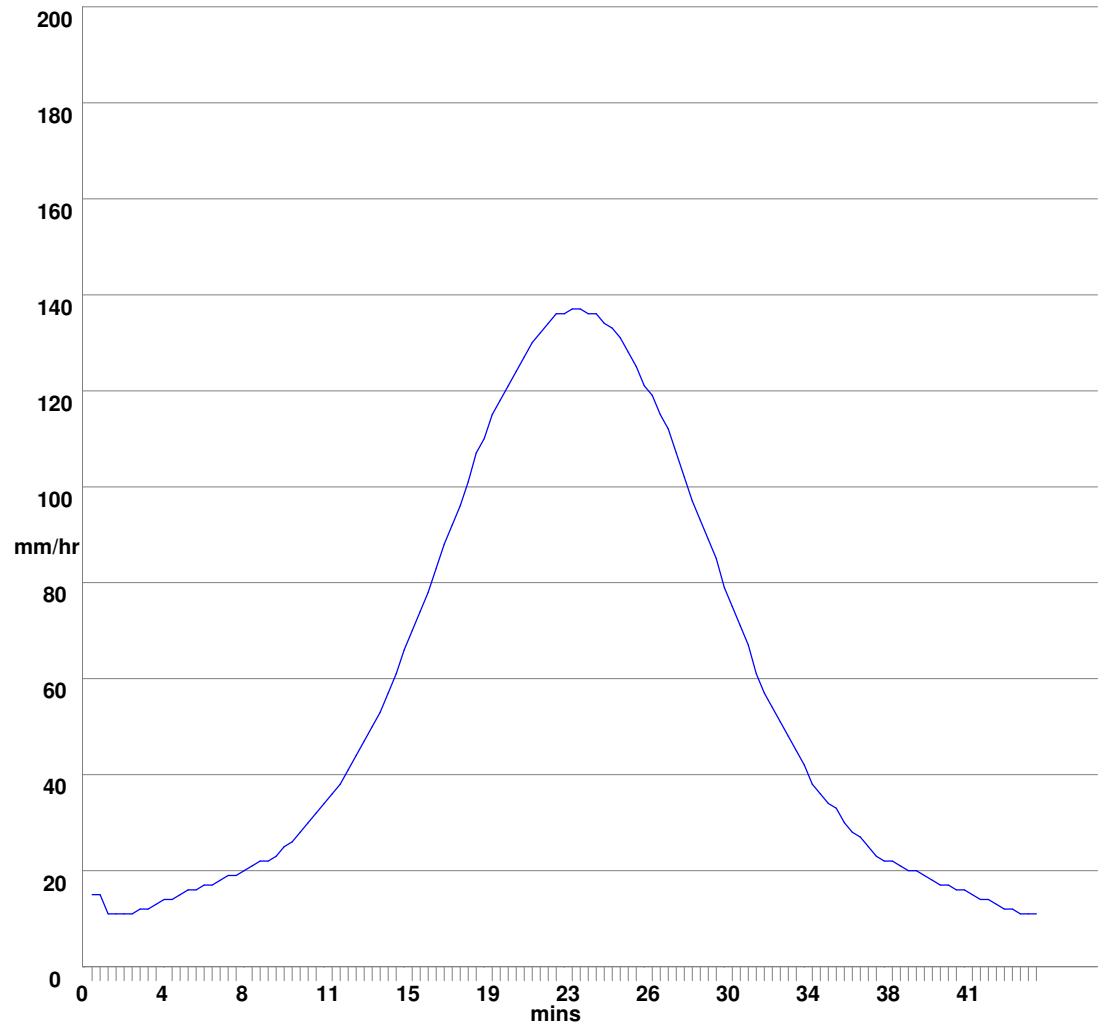
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:22	14.76	15:22	69.97	30:22	74.89
0:45	14.76	15:45	74.34	30:45	71.06
1:08	10.93	16:08	78.17	31:08	66.69
1:30	10.93	16:30	83.09	31:30	61.23
1:52	10.93	16:52	88.01	31:52	57.40
2:15	10.93	17:15	92.38	32:15	54.12
2:38	12.03	17:38	96.21	32:38	50.84
3:00	12.03	18:00	101.13	33:00	47.56
3:22	12.57	18:22	106.60	33:22	44.83
3:45	13.67	18:45	110.42	33:45	41.55
4:08	14.21	19:08	114.80	34:08	38.27
4:30	14.76	19:30	117.53	34:30	36.08
4:52	15.85	19:52	120.81	34:52	34.44
5:15	16.40	20:15	124.09	35:15	32.80
5:38	16.95	20:38	126.82	35:38	30.07
6:00	17.49	21:00	130.10	36:00	28.43
6:22	18.04	21:22	132.29	36:22	26.79
6:45	18.59	21:45	134.48	36:45	24.60
7:08	19.13	22:08	135.57	37:08	22.96
7:30	20.23	22:30	136.12	37:30	22.41
7:52	20.77	22:52	136.66	37:52	21.87
8:15	21.87	23:15	136.66	38:15	21.32
8:38	21.87	23:38	136.12	38:38	20.23
9:00	22.96	24:00	135.57	39:00	19.68
9:22	24.60	24:22	134.48	39:22	19.13
9:45	26.24	24:45	132.84	39:45	18.04
10:08	27.88	25:08	130.65	40:08	17.49
10:30	30.07	25:30	127.92	40:30	17.49
10:52	31.71	25:52	124.64	40:52	16.40
11:15	33.89	26:15	121.36	41:15	15.85
11:38	35.53	26:38	118.62	41:38	14.76
12:00	38.27	27:00	115.34	42:00	14.21
12:22	41.00	27:22	111.52	42:22	13.67
12:45	43.73	27:45	107.14	42:45	13.12
13:08	47.01	28:08	102.22	43:08	12.03
13:30	50.29	28:30	97.30	43:30	12.03
13:52	53.03	28:52	92.93	43:52	11.48
14:15	56.85	29:15	88.56	44:15	10.93
14:38	60.68	29:38	84.73	44:38	10.93
15:00	65.60	30:00	79.26	45:00	10.93

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 45 mins Profile - winter





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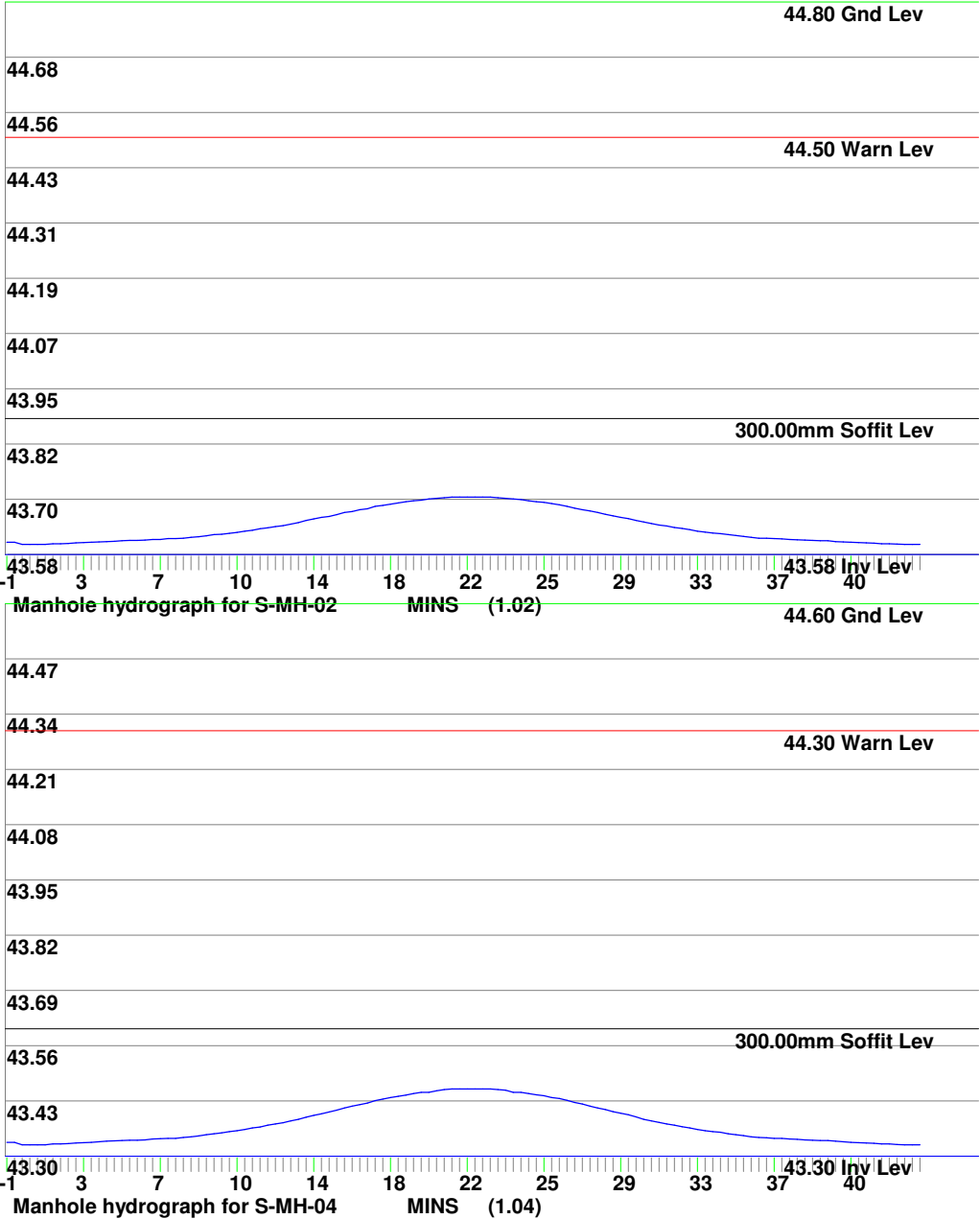
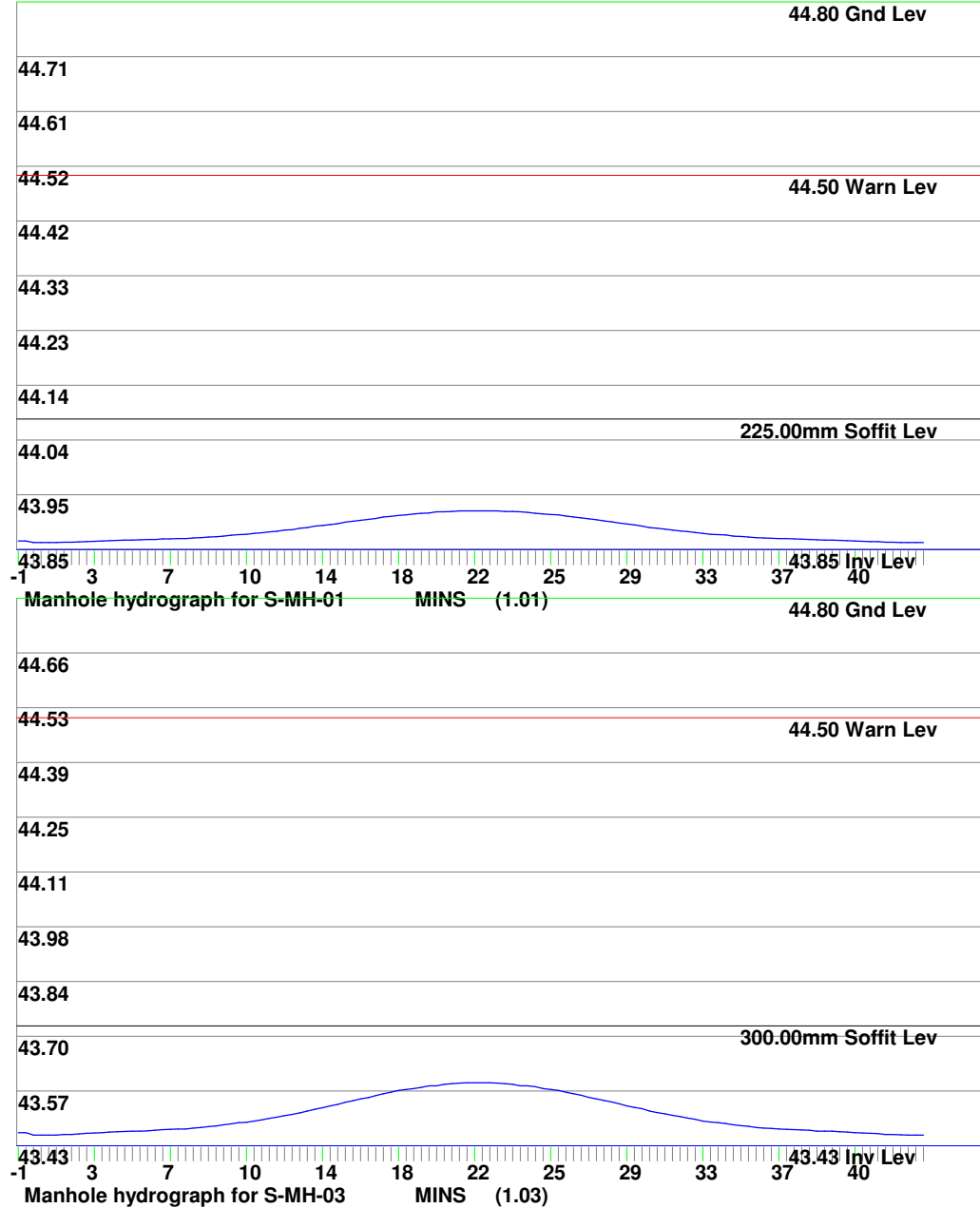
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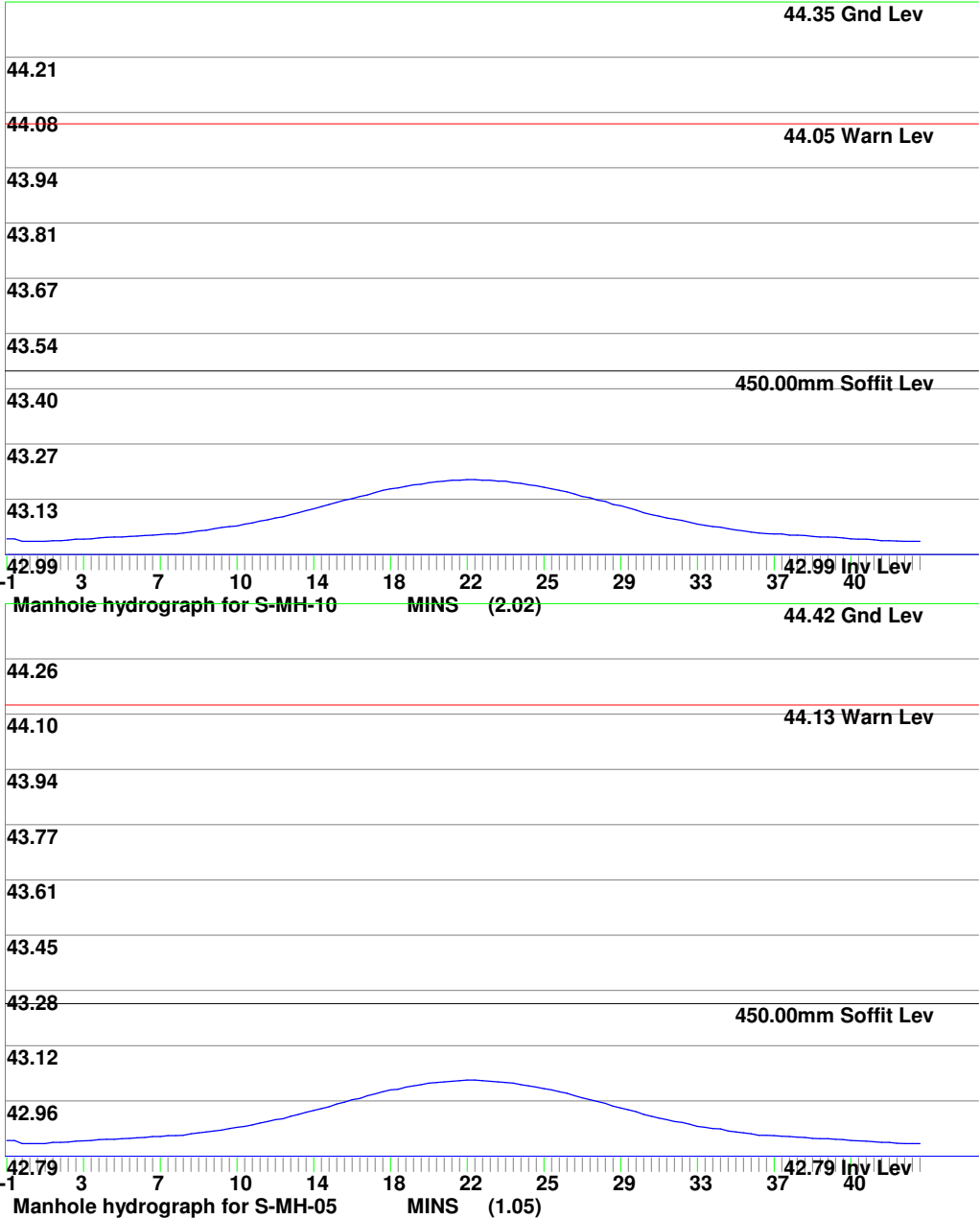
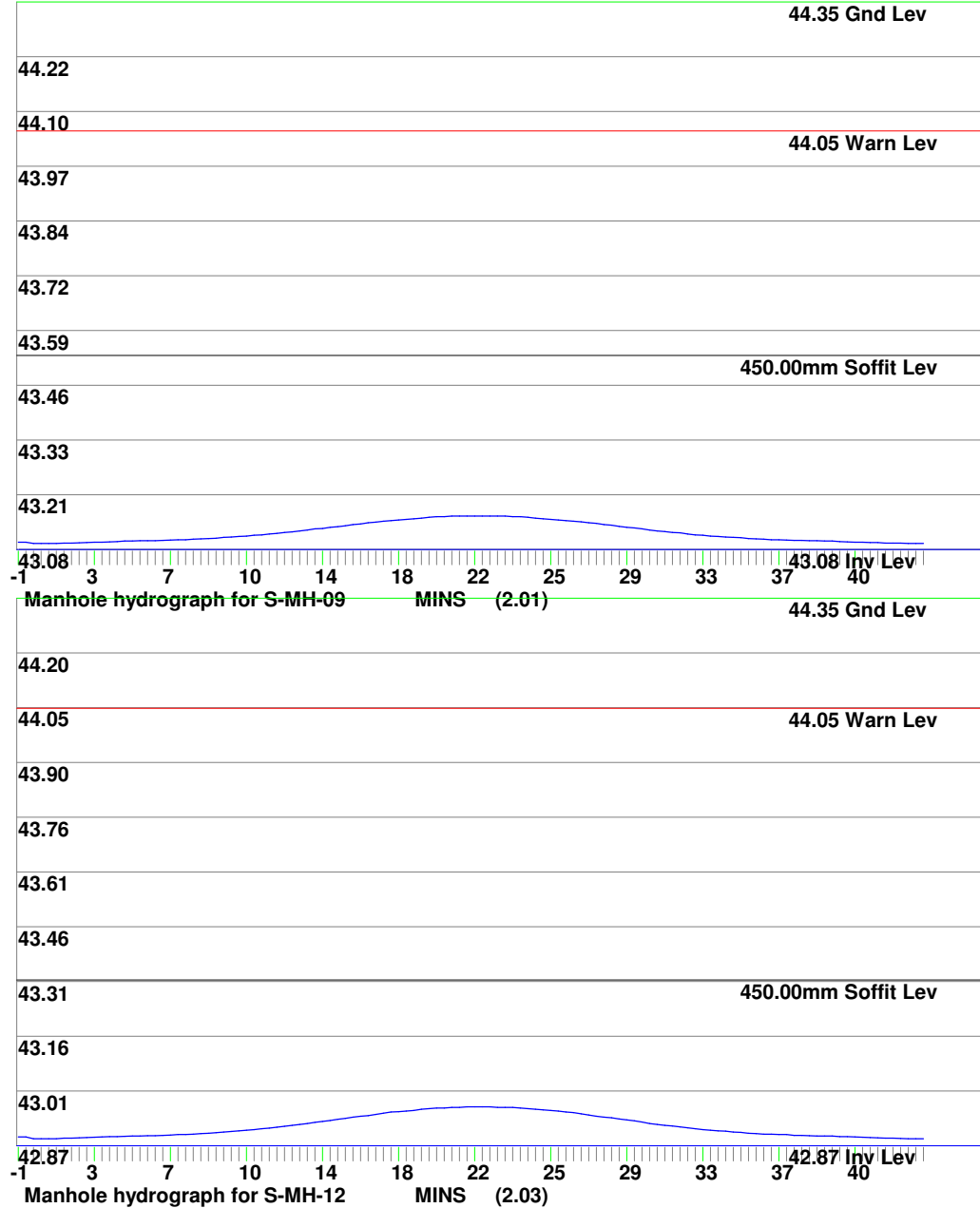
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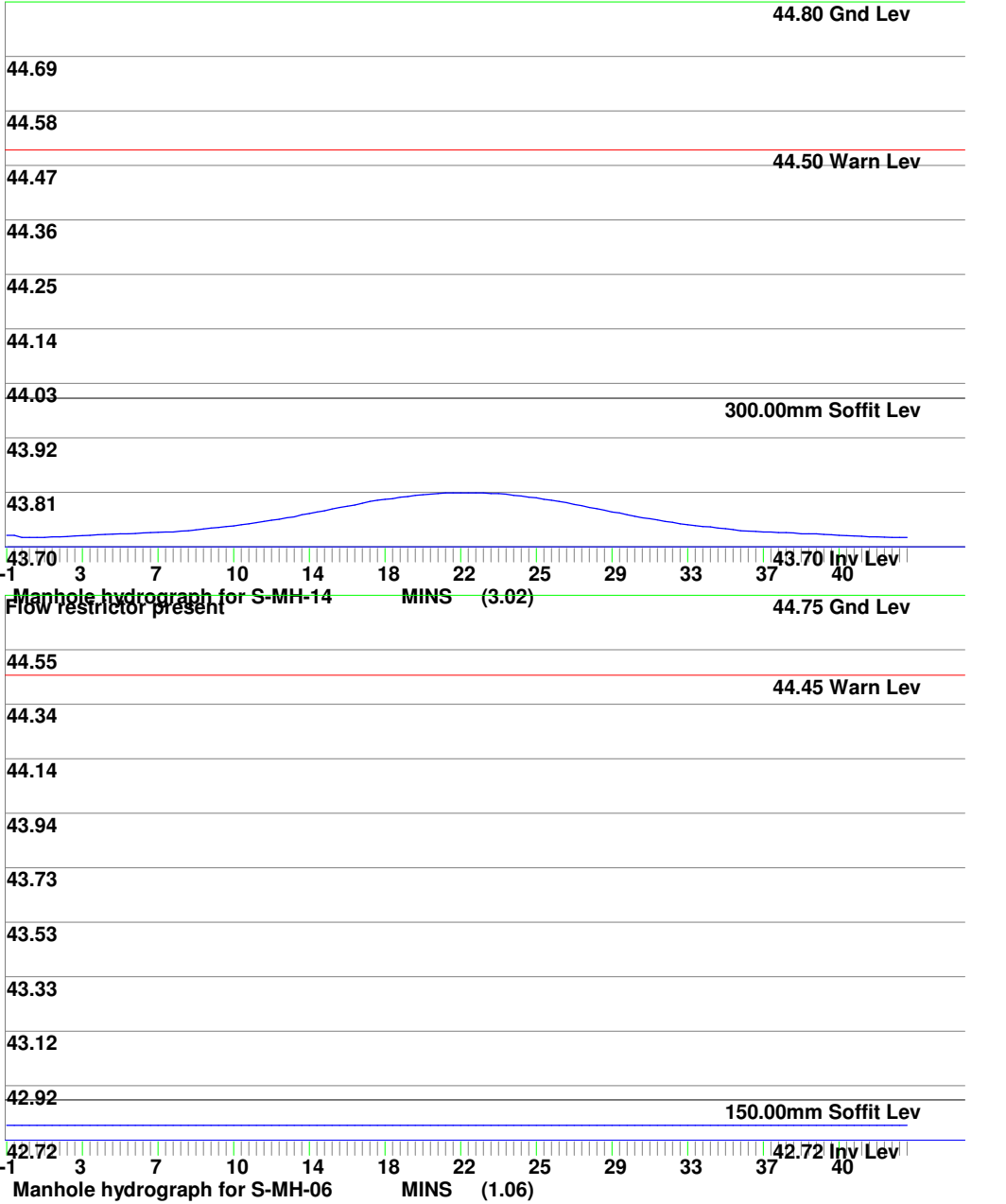
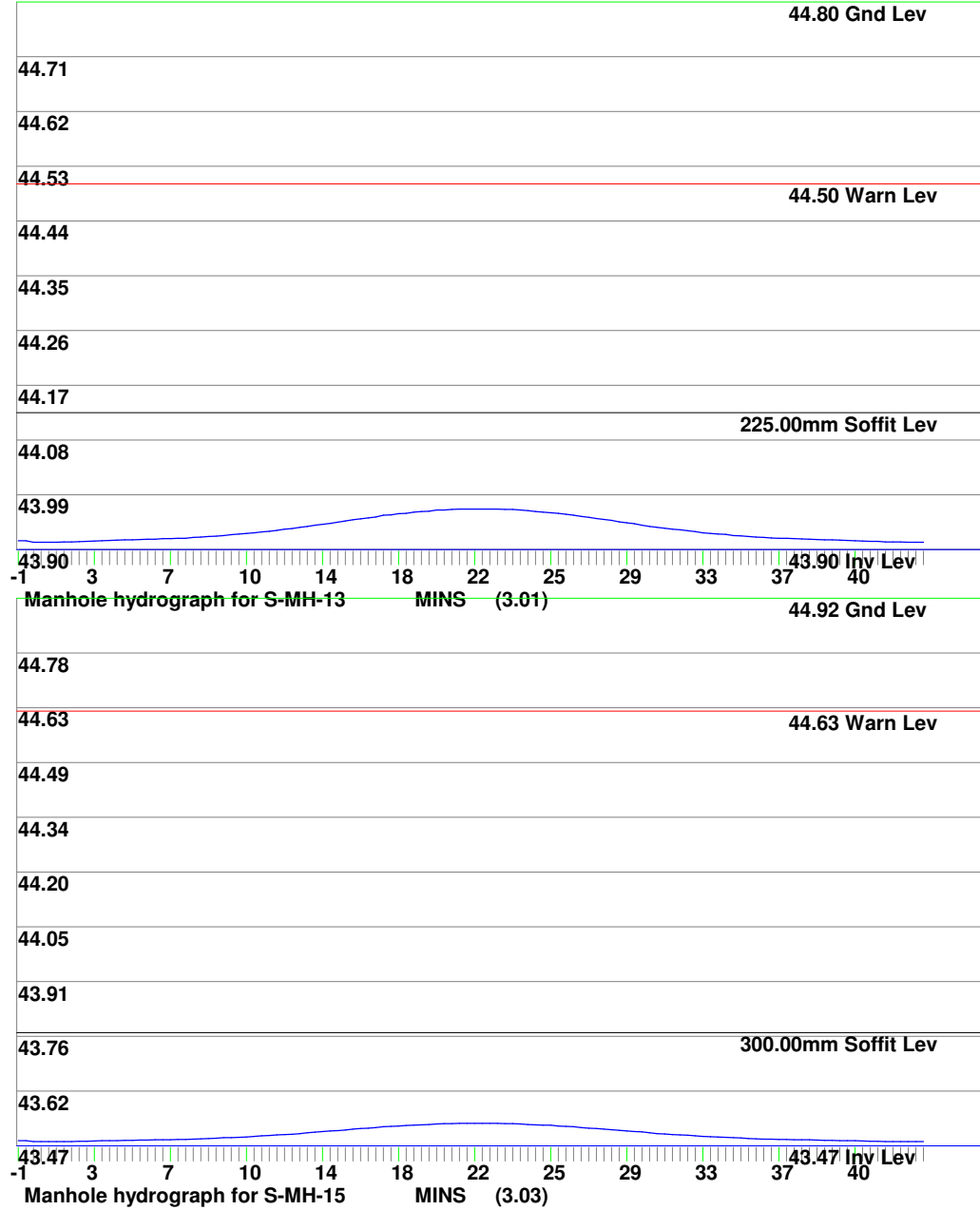
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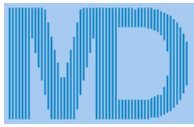
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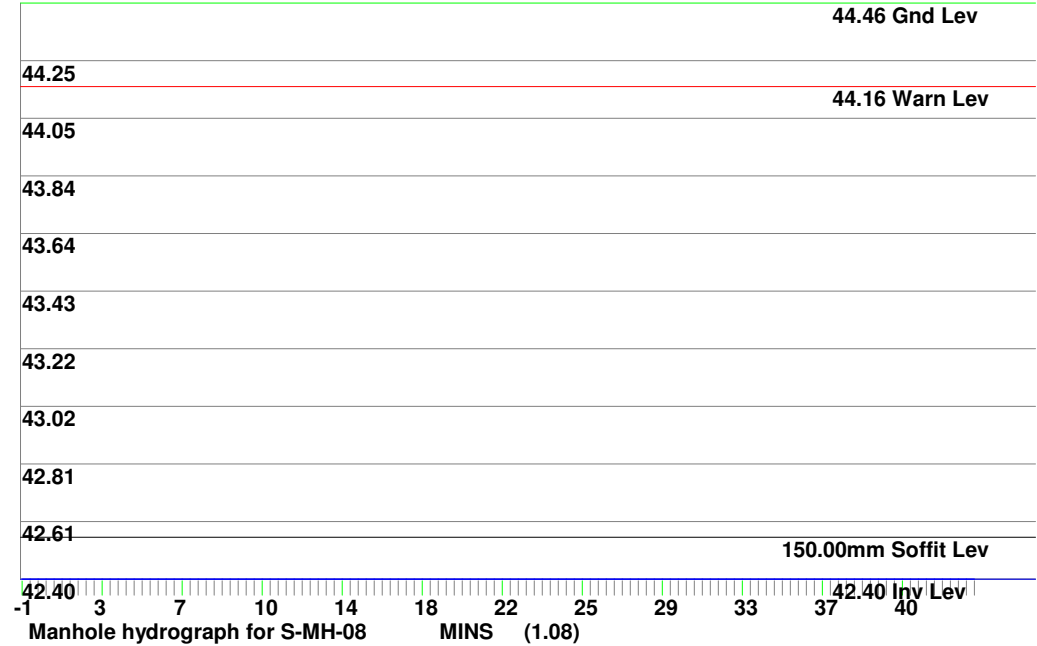
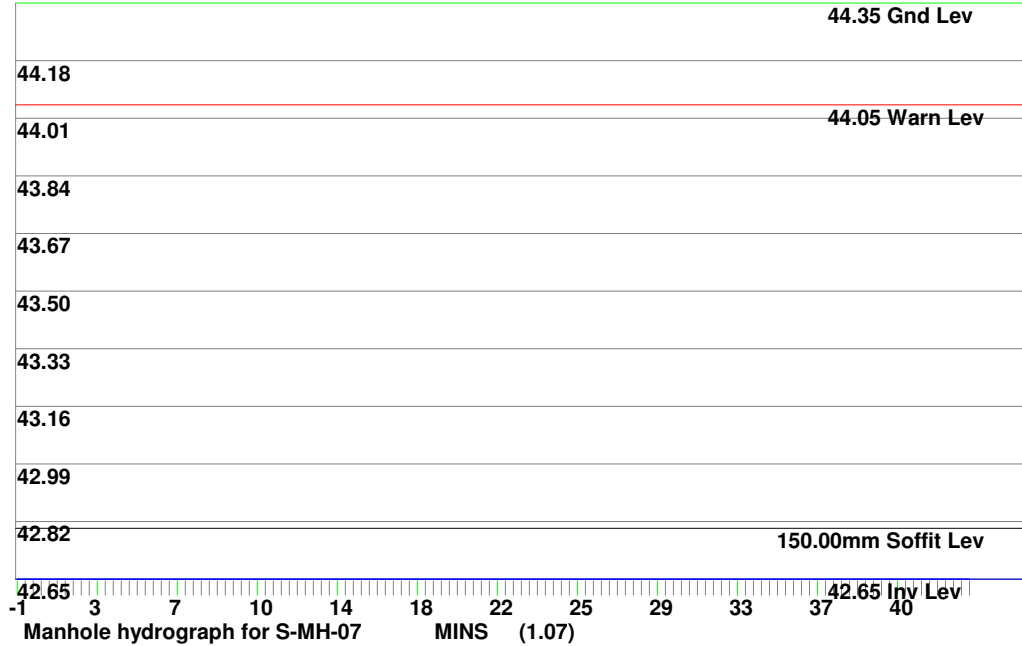
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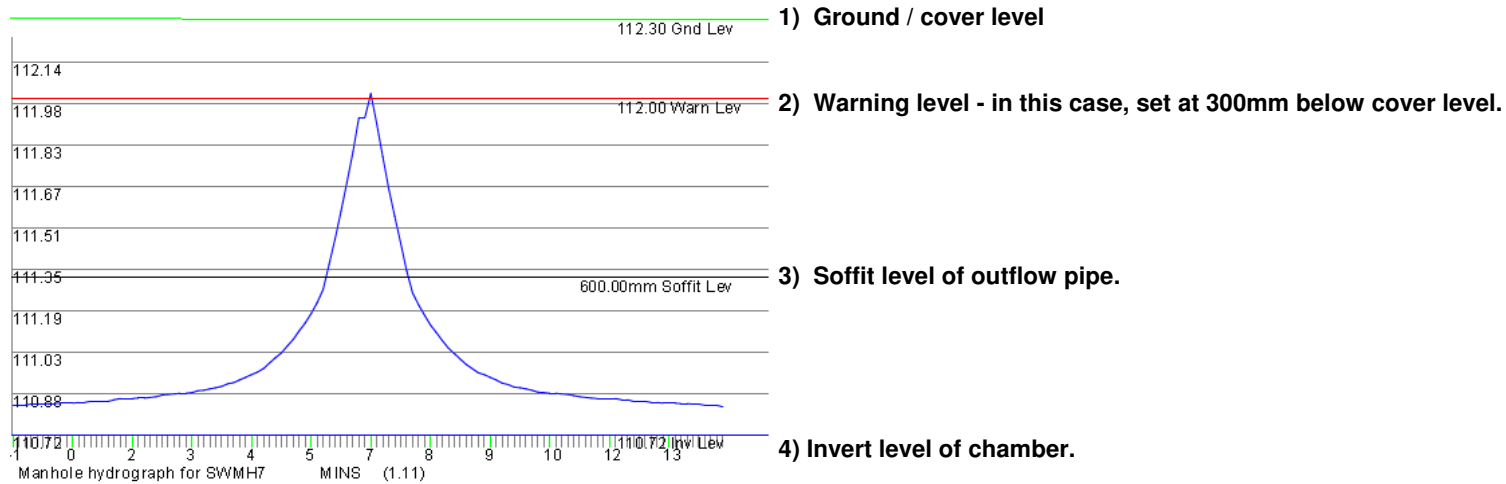
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- ### Notes
- a) Lower section of the graph shows the water depth filling the channel. Channel is assumed to be a full pipe diameter in depth.
 - b) Upper section of the graph shows the water depth filling the chamber. Chamber has a greater width/diameter than the channel, so increases in depth are proportionally less.
 - c) The top of the graph clips the warning level and would be marked thus on the printout.
 - d) 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.
 - e) The diagram above is a general one and is not part of the current calculation.