



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 = 60 mins
No offline storage

Mean rain intens. 54.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 211.68 mm/hr
Sample period = 30.0 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	13.4	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	40.1	300	1200	43.58	43.73	44.80	0.51	0.15	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	53.4	300	1200	43.43	43.62	44.80	0.68	0.19	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	53.4	300	1500	43.30	43.50	44.60	0.69	0.20	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	27.0	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	90.3	450	1500	42.99	43.22	44.35	0.49	0.22	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	90.3	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	143.8	450	1500	42.79	43.07	44.42	0.63	0.27	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	13.4	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	40.1	300	1200	43.70	43.83	44.80	0.42	0.13	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	53.5	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

Flood volumes

Check that the upstream storage of the manhole is adequate to take the flood volume - see Upstrm Vol above.



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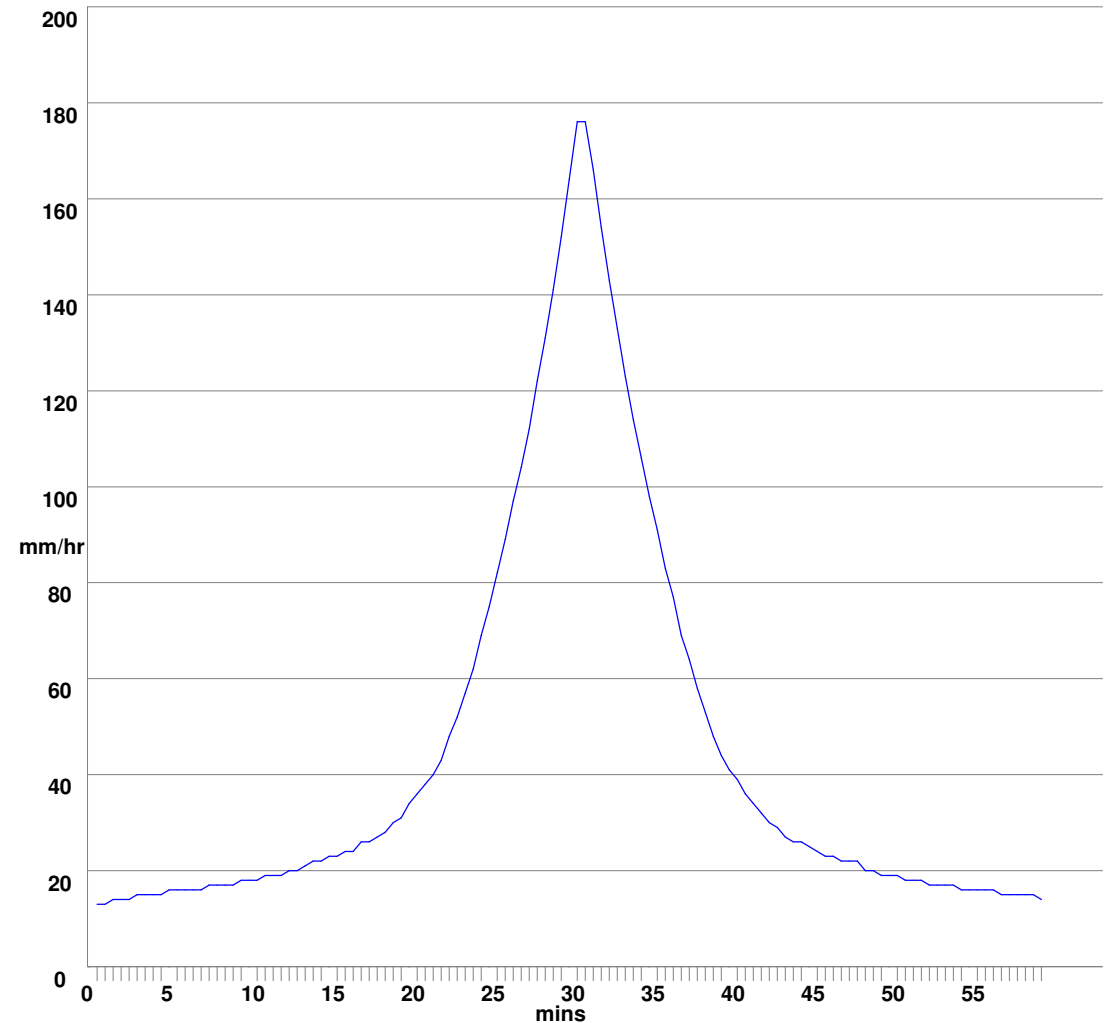
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:30	12.55	20:30	35.85	40:30	38.54
1:00	12.55	21:00	38.09	41:00	36.30
1:30	14.34	21:30	40.33	41:30	34.06
2:00	14.34	22:00	43.47	42:00	31.82
2:30	14.34	22:30	47.50	42:30	30.47
3:00	14.79	23:00	52.43	43:00	28.68
3:30	14.79	23:30	56.92	43:30	27.34
4:00	15.24	24:00	61.85	44:00	26.44
4:30	15.24	24:30	68.57	44:30	25.54
5:00	15.69	25:00	75.29	45:00	25.10
5:30	15.69	25:30	82.01	45:30	23.75
6:00	15.69	26:00	89.18	46:00	22.86
6:30	16.13	26:30	96.80	46:30	22.86
7:00	16.13	27:00	103.97	47:00	22.41
7:30	17.03	27:30	112.04	47:30	21.96
8:00	17.03	28:00	121.90	48:00	21.51
8:30	17.03	28:30	131.31	48:30	20.17
9:00	17.48	29:00	141.17	49:00	19.72
9:30	17.93	29:30	152.37	49:30	19.27
10:00	18.37	30:00	164.02	50:00	19.27
10:30	18.37	30:30	175.68	50:30	18.82
11:00	18.82	31:00	175.68	51:00	18.37
11:30	18.82	31:30	166.27	51:30	18.37
12:00	19.27	32:00	154.17	52:00	17.93
12:30	19.72	32:30	143.41	52:30	17.48
13:00	20.17	33:00	133.10	53:00	17.48
13:30	21.06	33:30	123.24	53:30	17.03
14:00	21.96	34:00	114.28	54:00	17.03
14:30	22.41	34:30	105.76	54:30	16.13
15:00	22.86	35:00	98.15	55:00	16.13
15:30	22.86	35:30	90.53	55:30	15.69
16:00	23.75	36:00	82.91	56:00	15.69
16:30	24.20	36:30	76.63	56:30	15.69
17:00	25.54	37:00	69.46	57:00	15.24
17:30	26.44	37:30	63.64	57:30	15.24
18:00	27.34	38:00	57.81	58:00	14.79
18:30	28.23	38:30	52.88	58:30	14.79
19:00	30.03	39:00	48.40	59:00	14.79
19:30	31.37	39:30	43.92	59:30	14.34
20:00	33.61	40:00	40.78	60:00	14.34

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 60 mins Profile - summer





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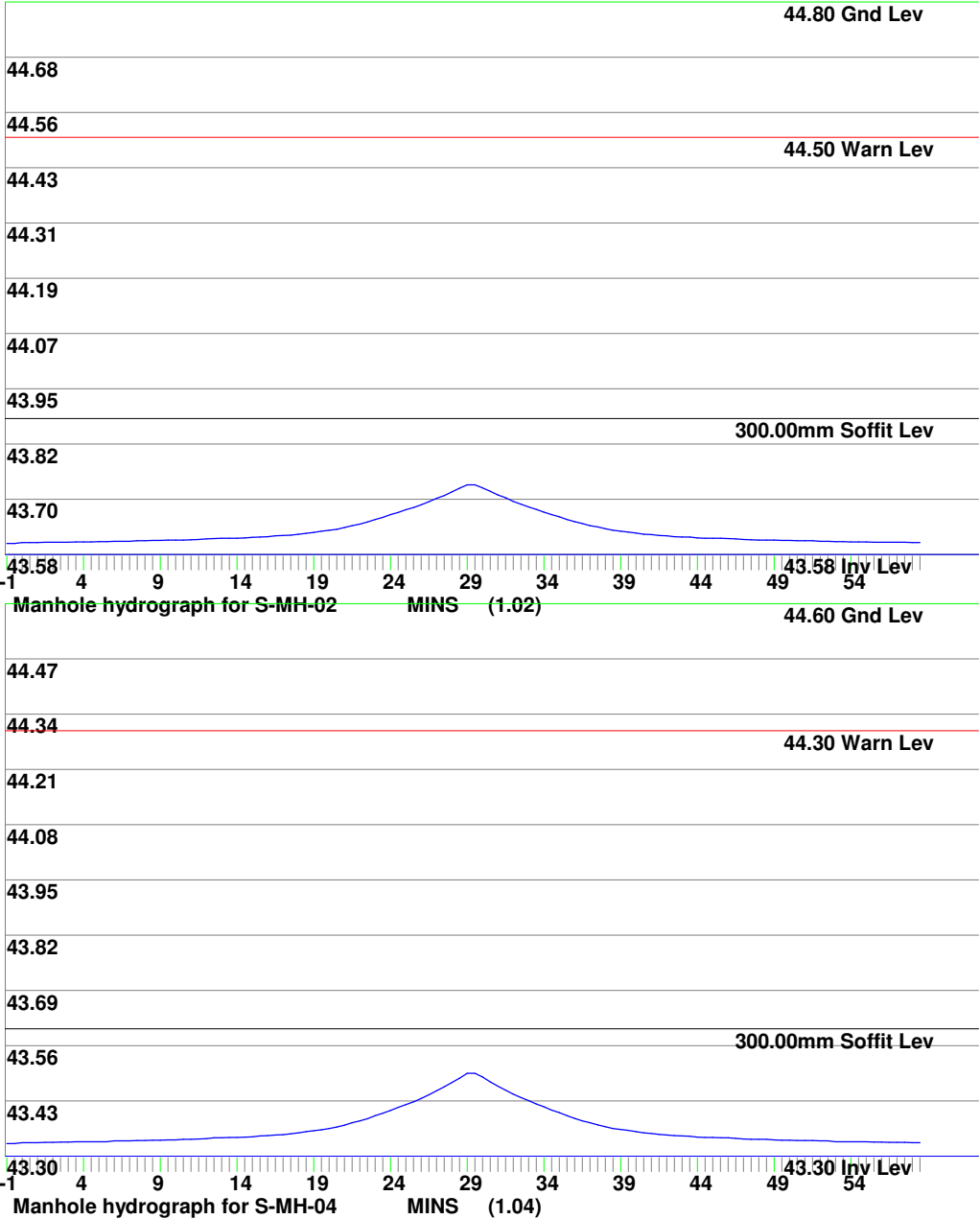
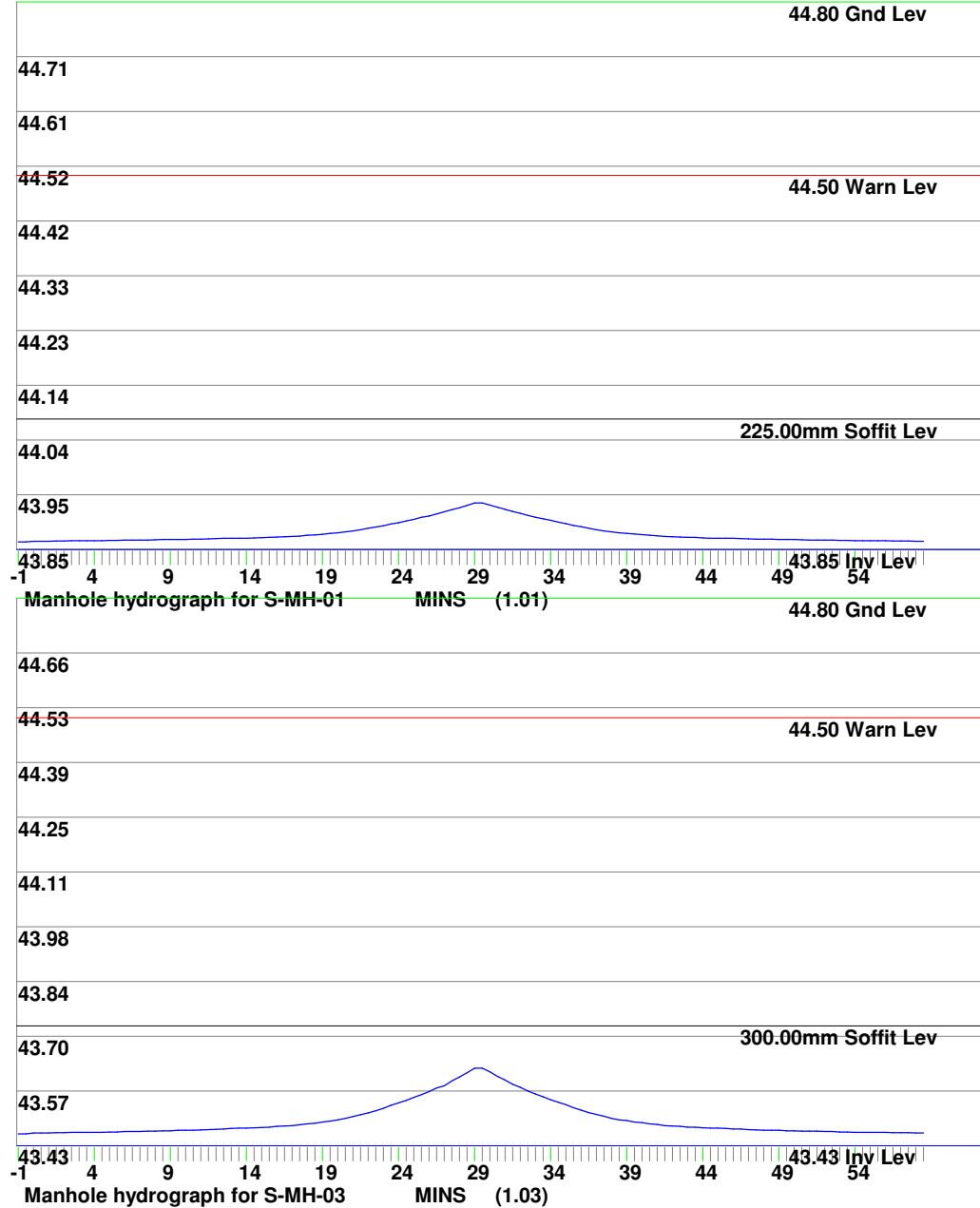
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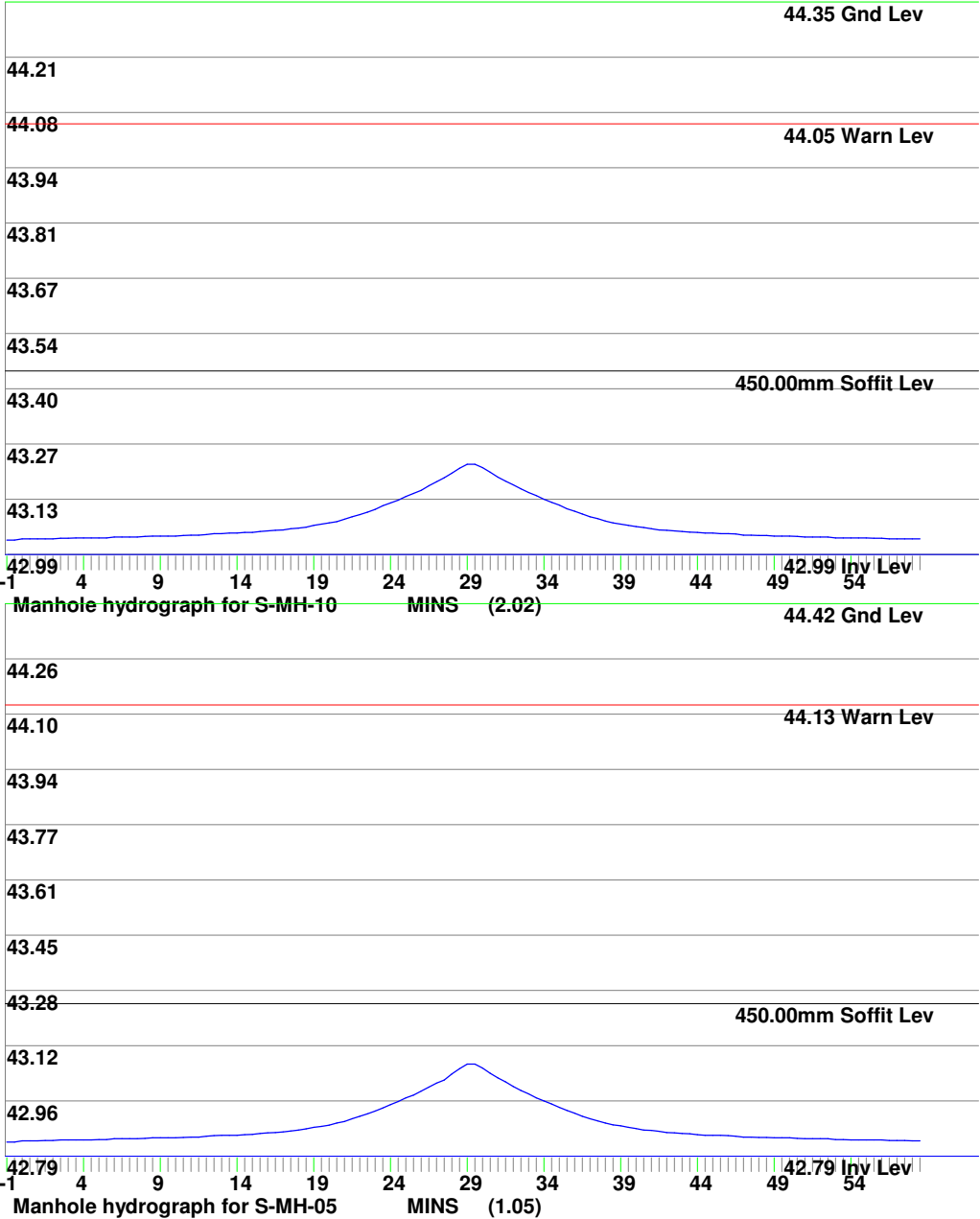
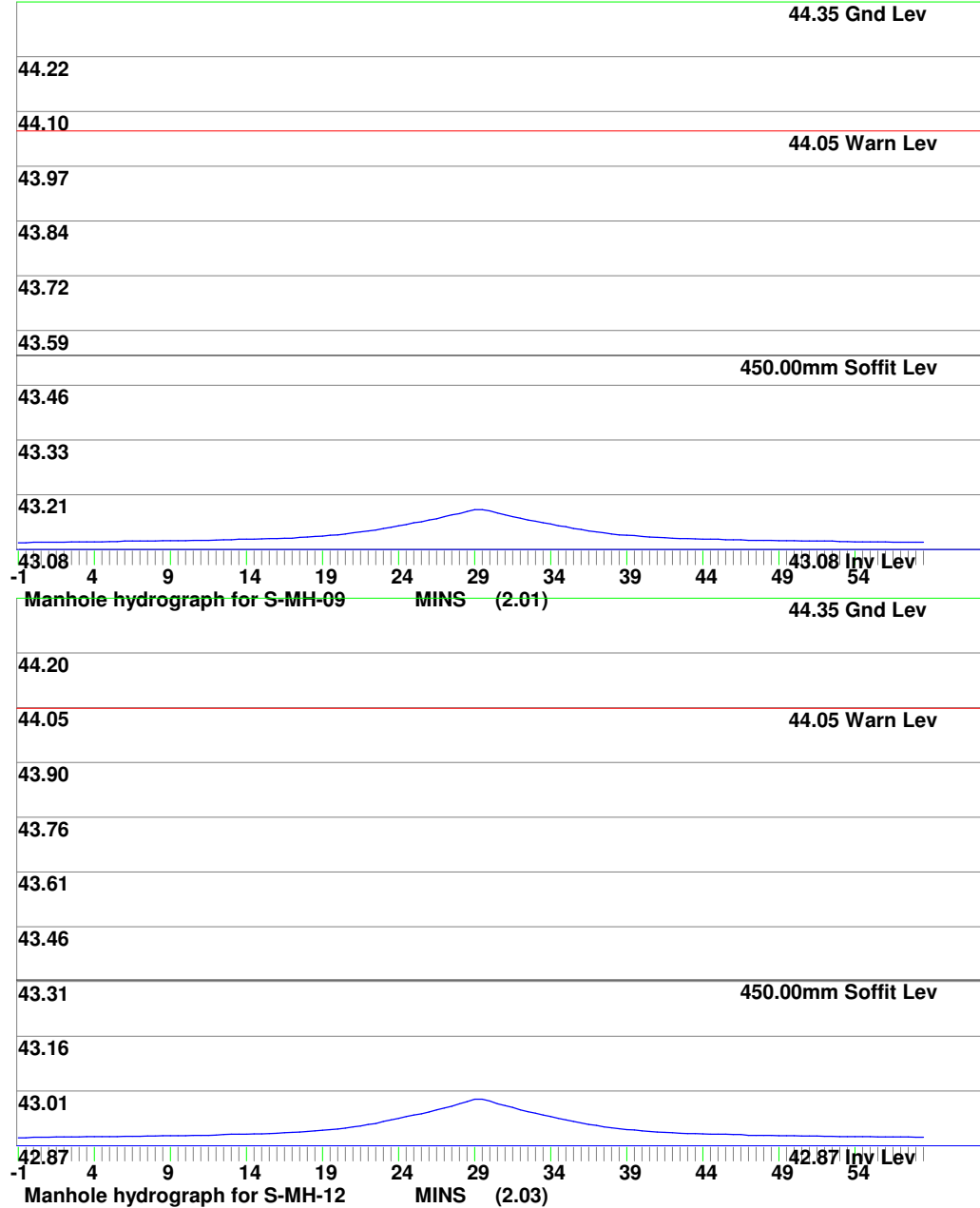
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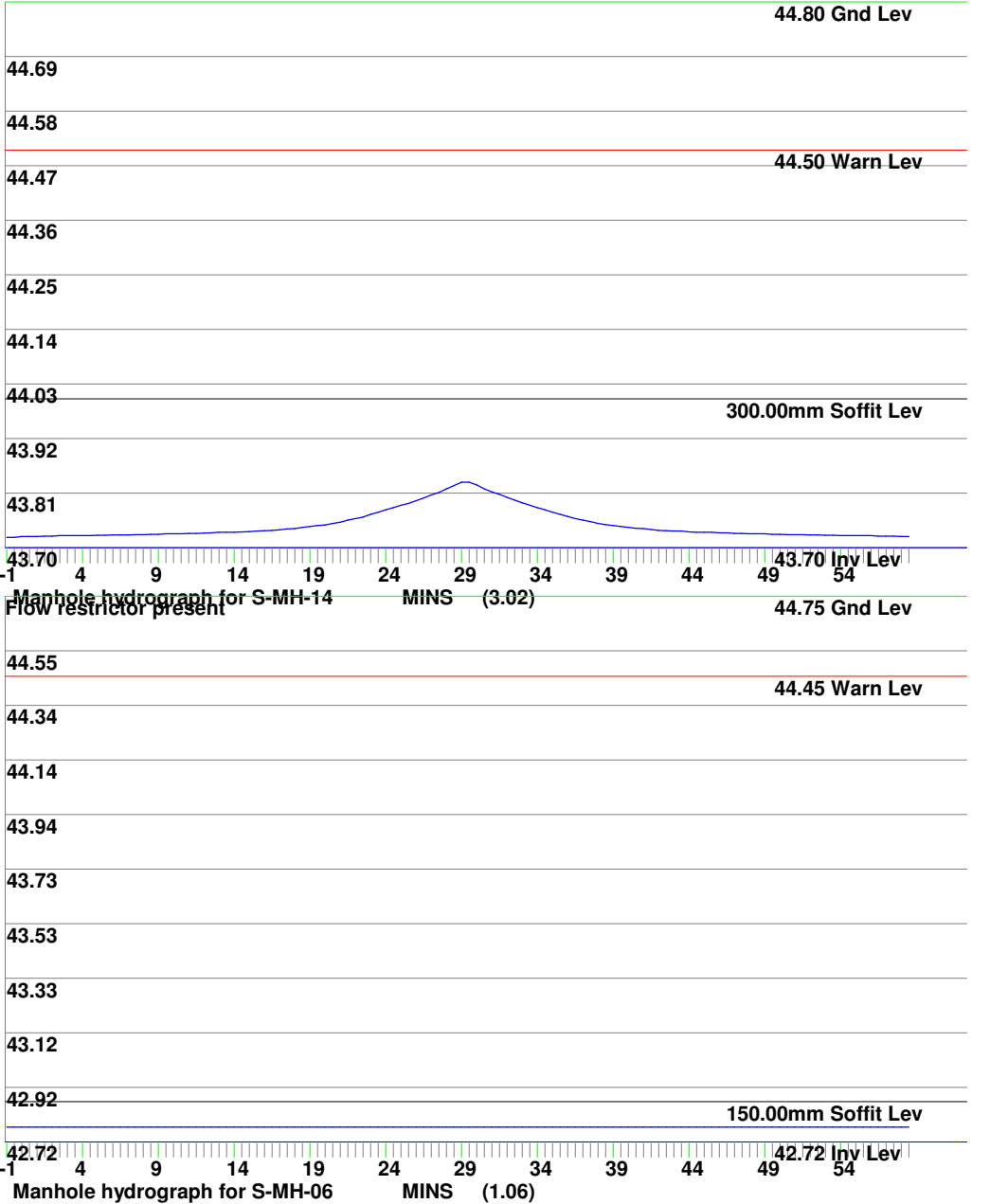
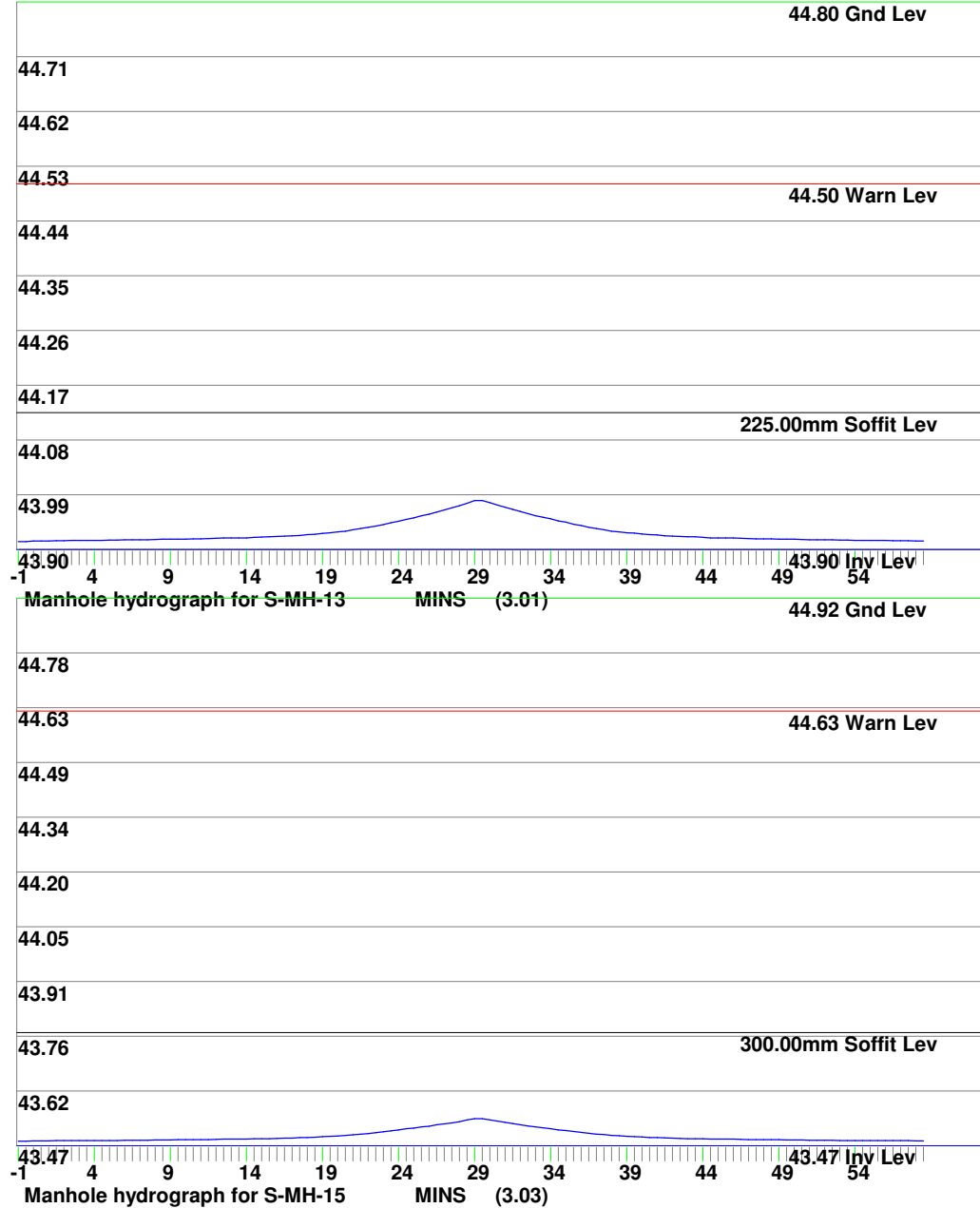
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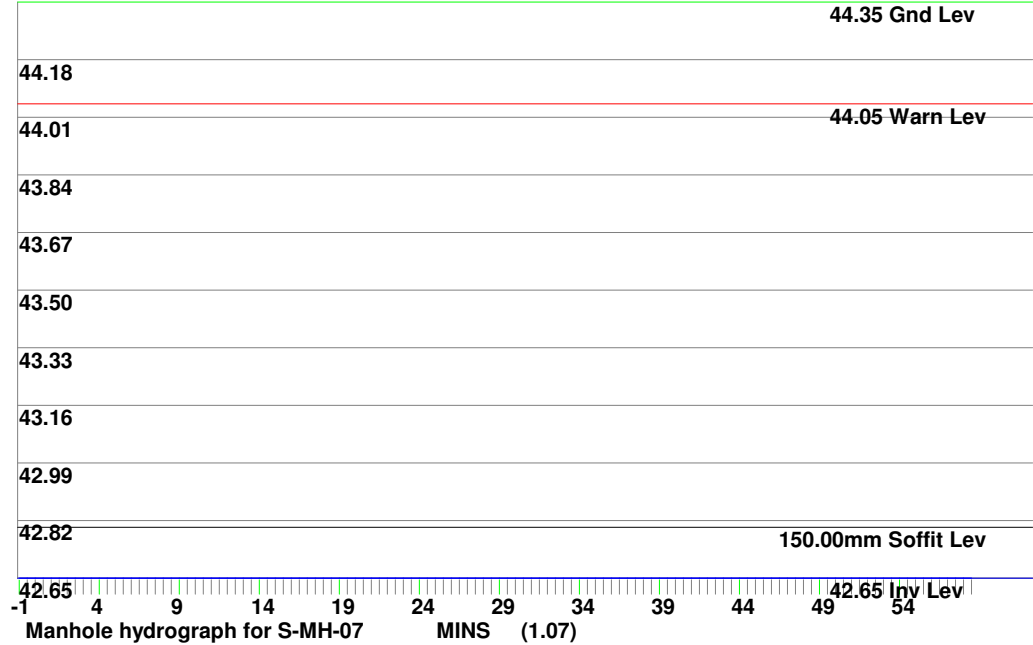
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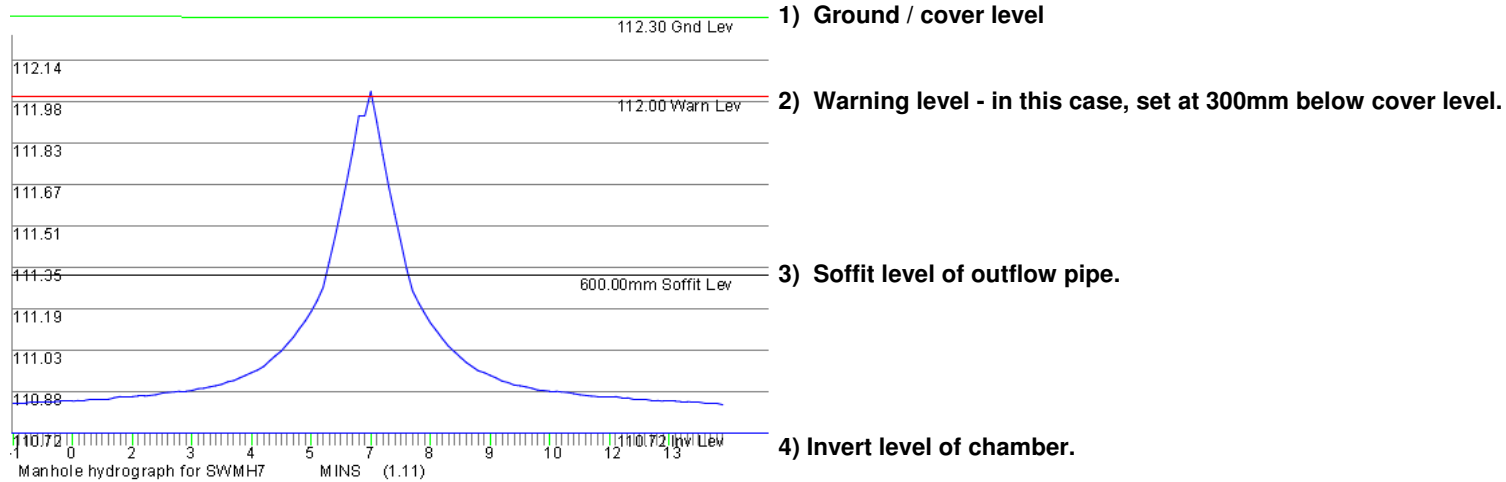
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Notes

- 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.