



MasterDrain
SW

Muir Associates (UK) Limited

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Trinity Chambers,
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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 = Winter
Using FSR data

Peak rain intens. 135.00 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	8.5	225	1200	43.85	43.91	44.80	0.20	0.06	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	25.6	300	1200	43.58	43.69	44.80	0.33	0.11	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	34.1	300	1200	43.43	43.57	44.80	0.43	0.14	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	34.1	300	1500	43.30	43.44	44.60	0.44	0.14	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	17.2	450	1500	43.08	43.15	44.35	0.09	0.07	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	57.6	450	1500	42.99	43.15	44.35	0.31	0.16	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	57.6	450	1500	42.87	42.96	44.35	0.14	0.09	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	91.7	450	1500	42.79	42.99	44.42	0.40	0.19	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	8.5	225	1200	43.90	43.96	44.80	0.20	0.06	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	25.6	300	1200	43.70	43.80	44.80	0.27	0.10	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	34.1	300	1200	43.47	43.53	44.92	0.11	0.05	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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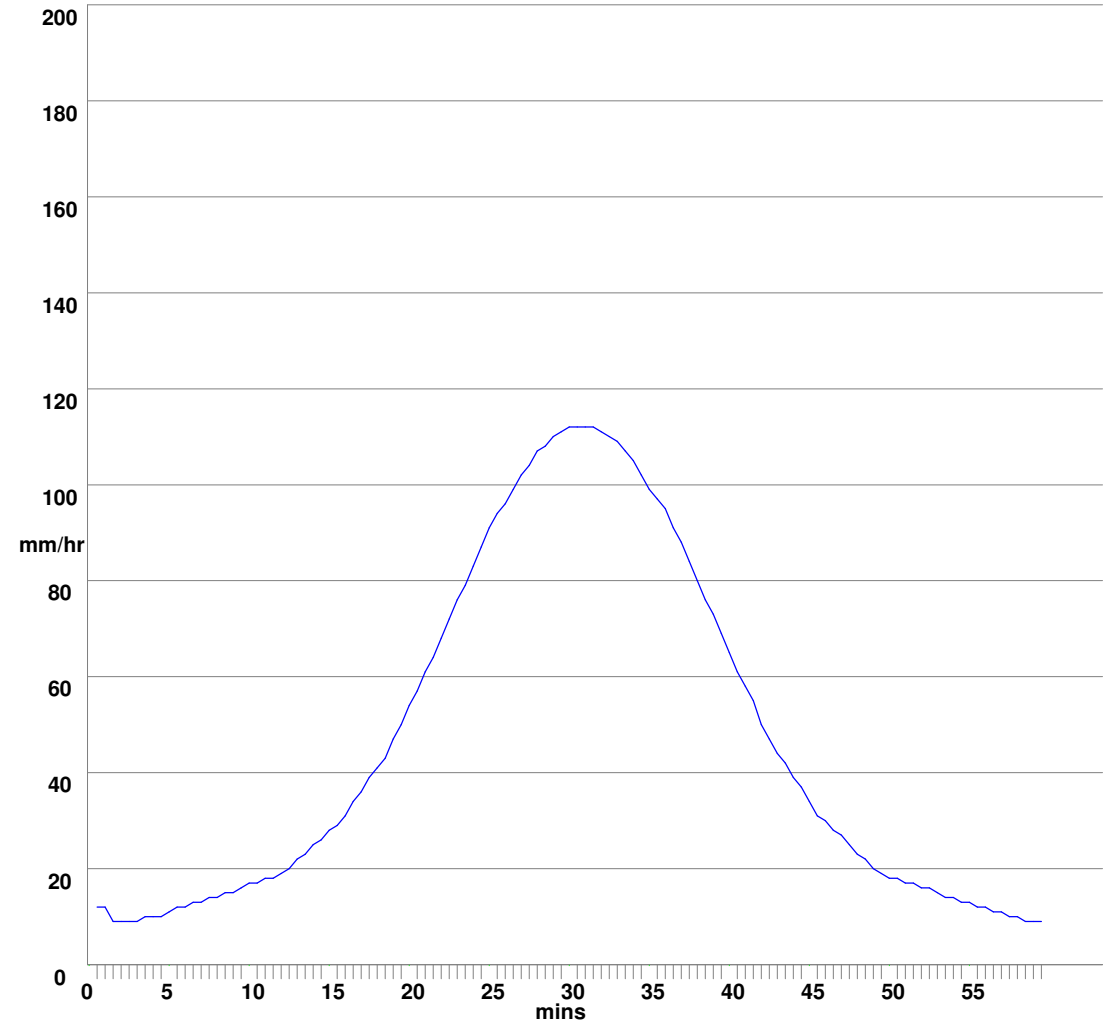
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:30	12.10	20:30	57.36	40:30	61.40
1:00	12.10	21:00	60.95	41:00	58.26
1:30	8.96	21:30	64.09	41:30	54.67
2:00	8.96	22:00	68.12	42:00	50.19
2:30	8.96	22:30	72.15	42:30	47.06
3:00	8.96	23:00	75.74	43:00	44.37
3:30	9.86	23:30	78.88	43:30	41.68
4:00	9.86	24:00	82.91	44:00	38.99
4:30	10.31	24:30	87.39	44:30	36.75
5:00	11.20	25:00	90.53	45:00	34.06
5:30	11.65	25:30	94.11	45:30	31.37
6:00	12.10	26:00	96.35	46:00	29.58
6:30	13.00	26:30	99.04	46:30	28.23
7:00	13.44	27:00	101.73	47:00	26.89
7:30	13.89	27:30	103.97	47:30	24.65
8:00	14.34	28:00	106.66	48:00	23.30
8:30	14.79	28:30	108.45	48:30	21.96
9:00	15.24	29:00	110.25	49:00	20.17
9:30	15.69	29:30	111.14	49:30	18.82
10:00	16.58	30:00	111.59	50:00	18.37
10:30	17.03	30:30	112.04	50:30	17.93
11:00	17.93	31:00	112.04	51:00	17.48
11:30	17.93	31:30	111.59	51:30	16.58
12:00	18.82	32:00	111.14	52:00	16.13
12:30	20.17	32:30	110.25	52:30	15.69
13:00	21.51	33:00	108.90	53:00	14.79
13:30	22.86	33:30	107.11	53:30	14.34
14:00	24.65	34:00	104.87	54:00	14.34
14:30	25.99	34:30	102.18	54:30	13.44
15:00	27.79	35:00	99.49	55:00	13.00
15:30	29.13	35:30	97.25	55:30	12.10
16:00	31.37	36:00	94.56	56:00	11.65
16:30	33.61	36:30	91.42	56:30	11.20
17:00	35.85	37:00	87.84	57:00	10.76
17:30	38.54	37:30	83.80	57:30	9.86
18:00	41.23	38:00	79.77	58:00	9.86
18:30	43.47	38:30	76.19	58:30	9.41
19:00	46.61	39:00	72.60	59:00	8.96
19:30	49.75	39:30	69.46	59:30	8.96
20:00	53.78	40:00	64.98	60:00	8.96

Hydrograph profile derived from data in the Flood Studies Report

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

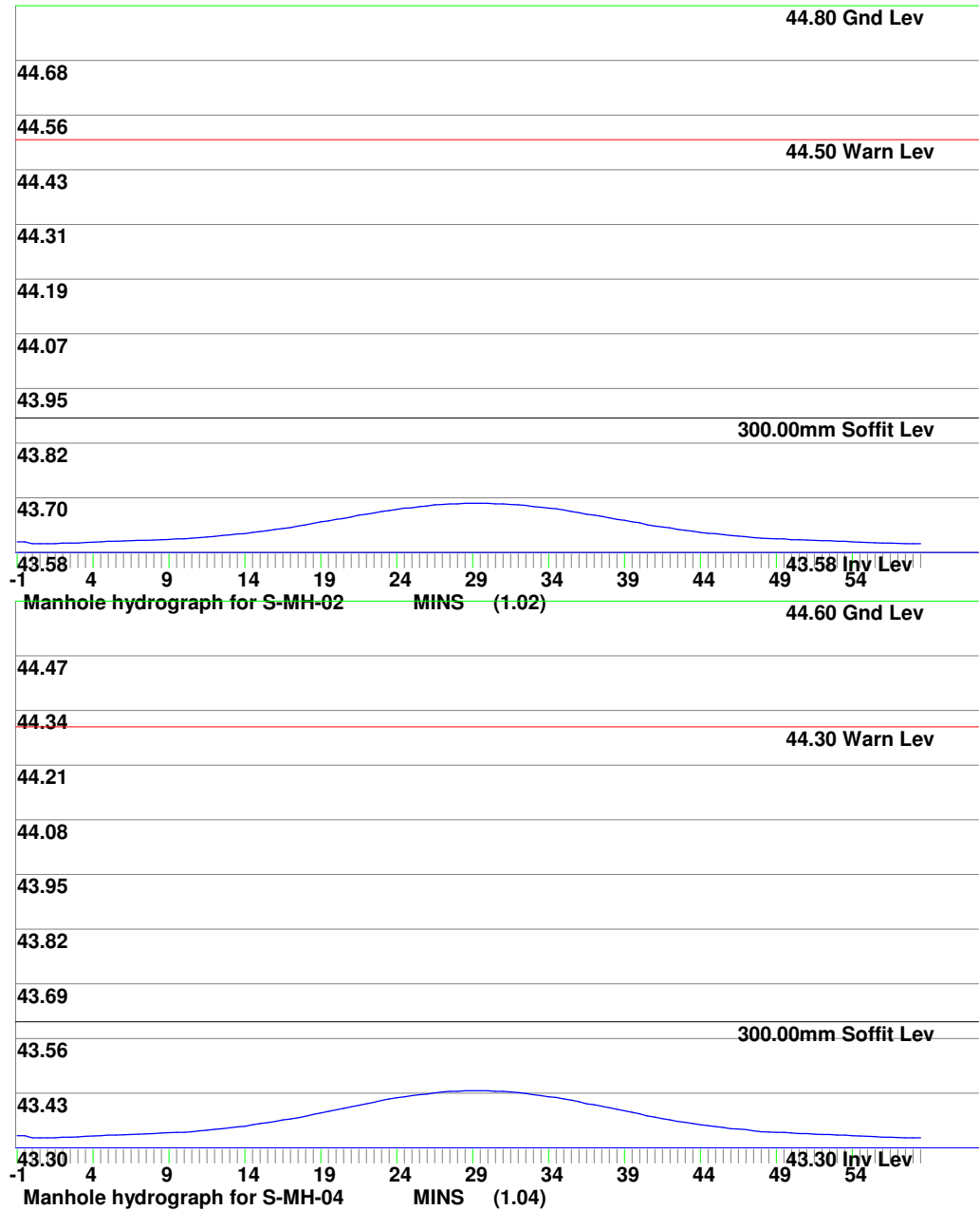




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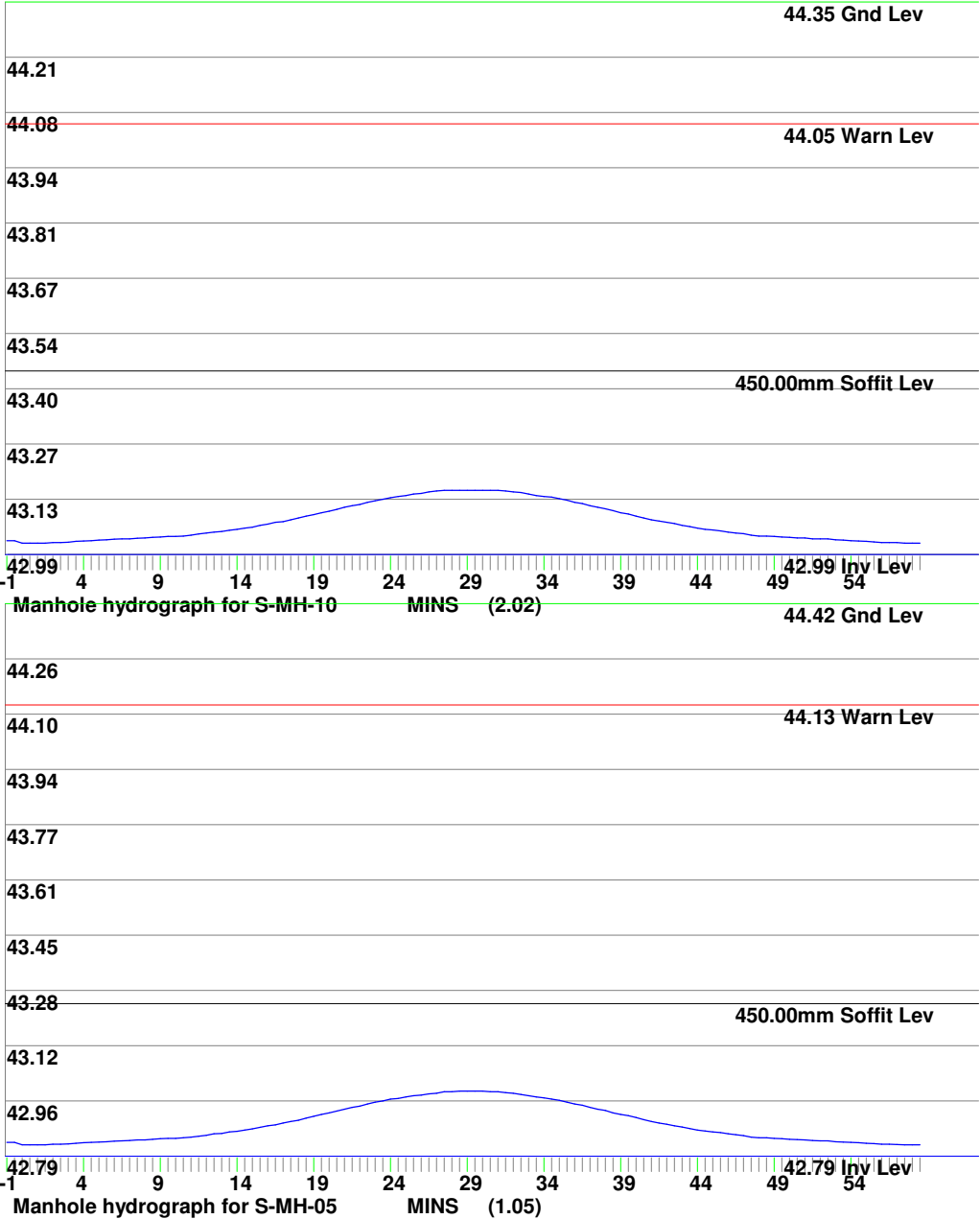
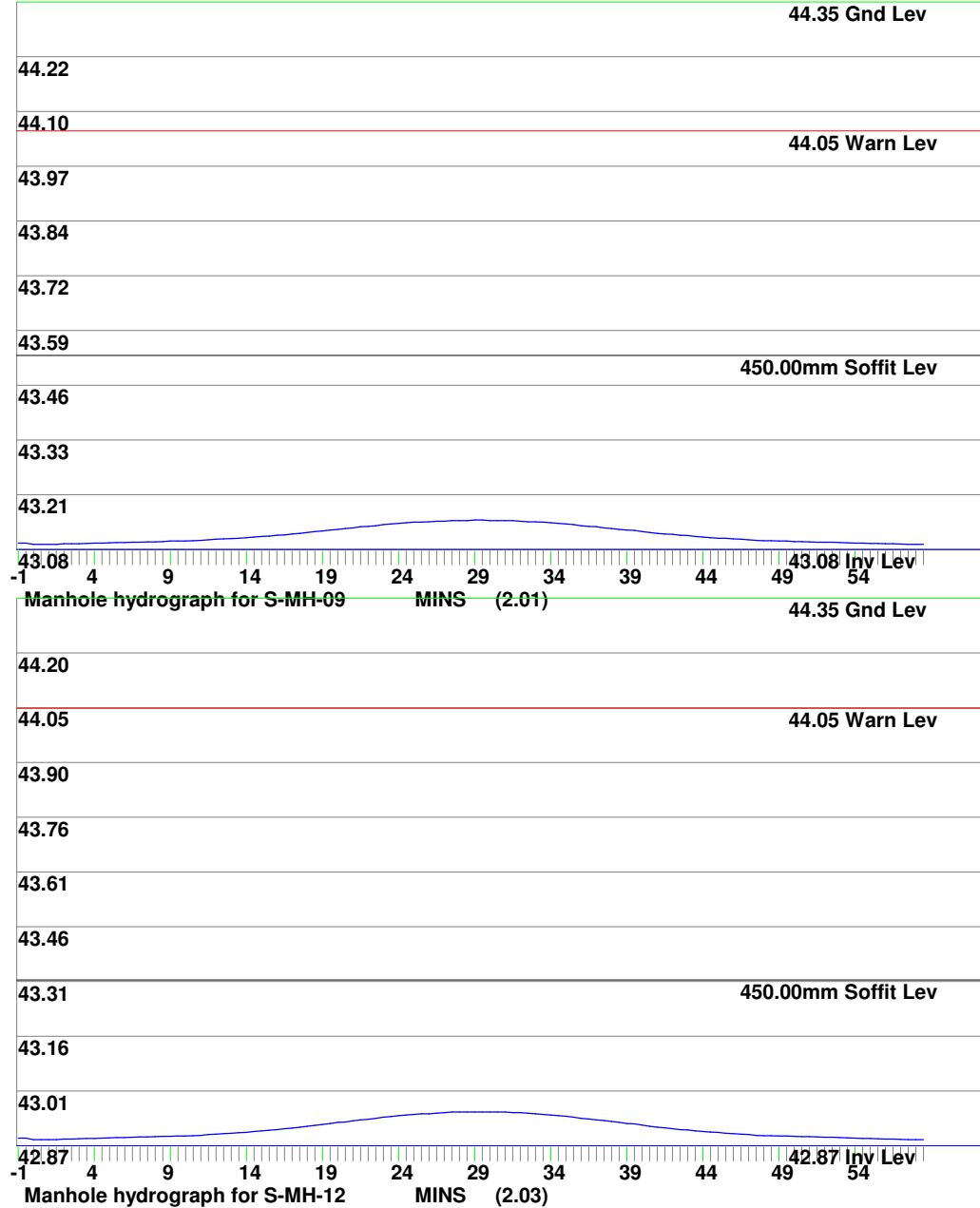
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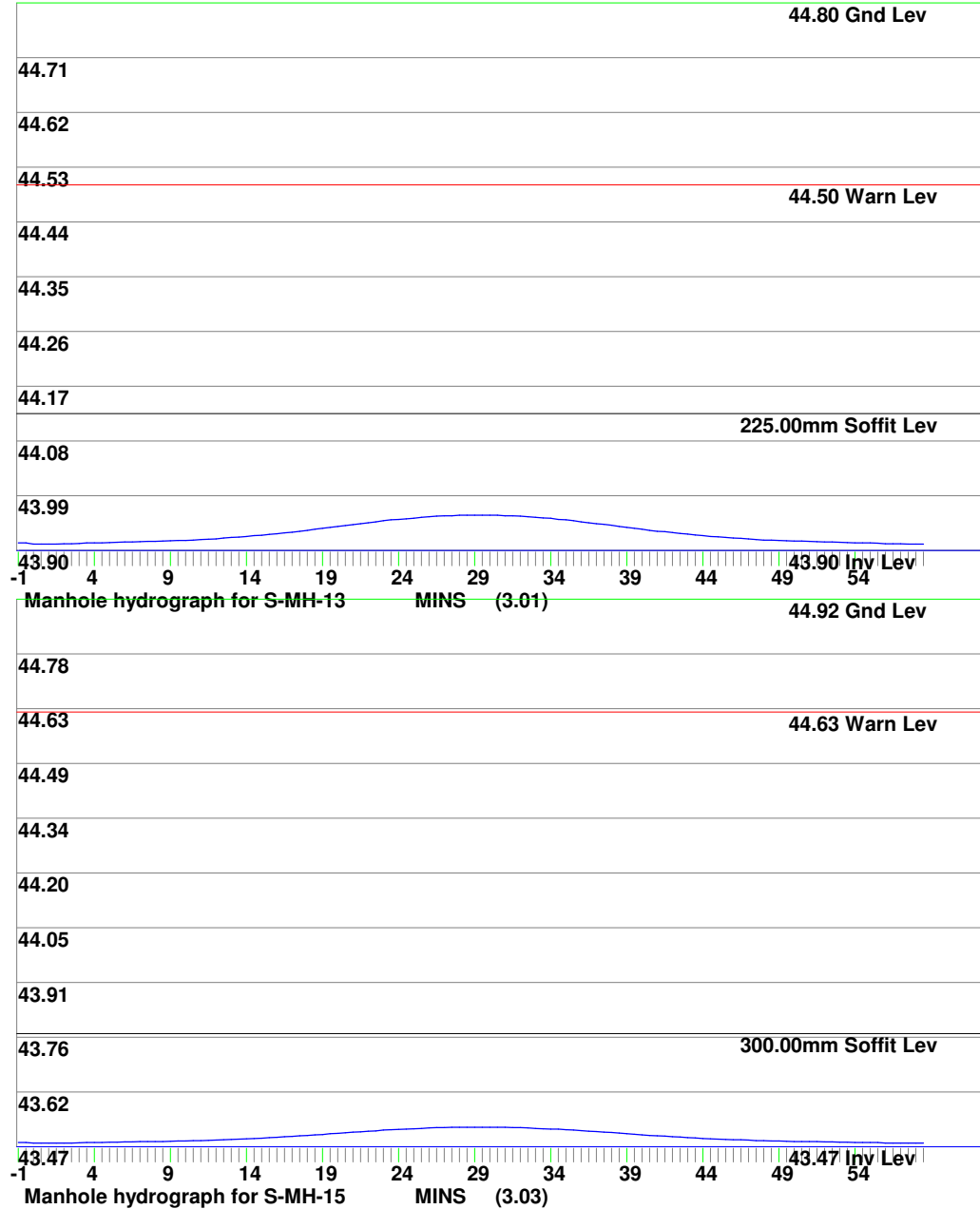
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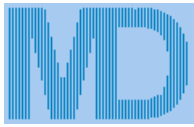
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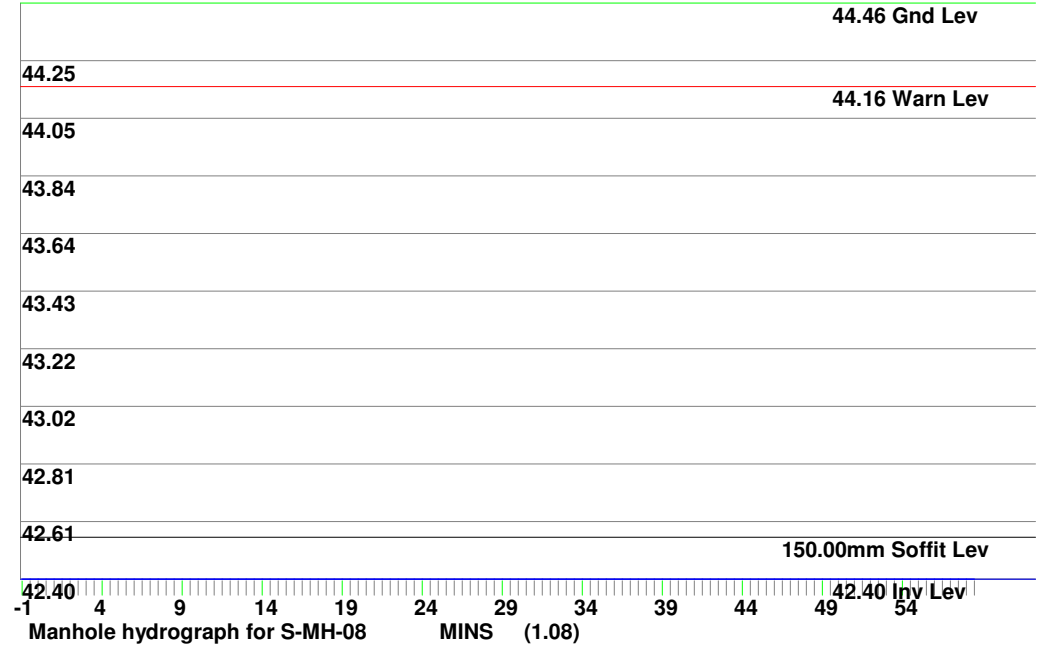
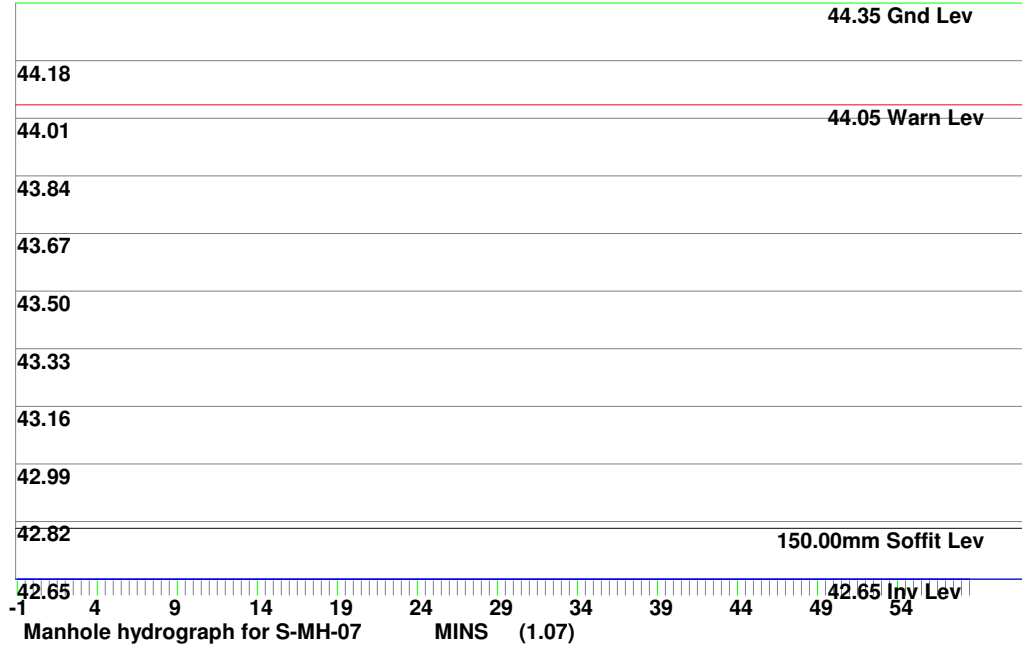
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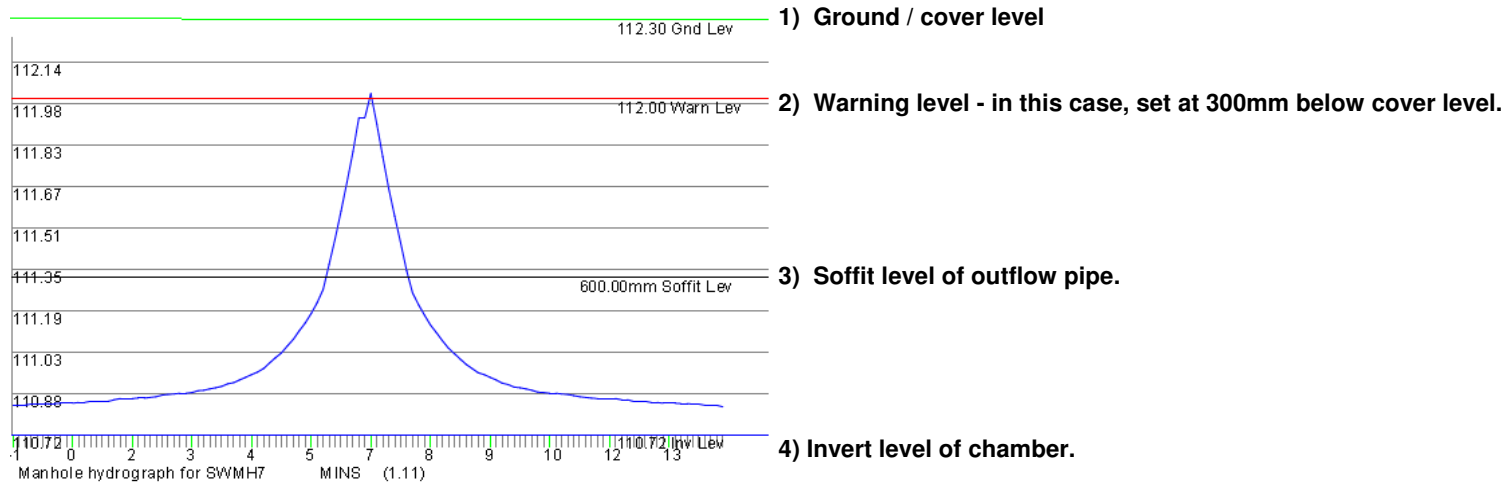
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Notes

- 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.