



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 = 120 mins
No offline storage

Mean rain intens. 33.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 129.36 mm/hr
Sample period = 60.0 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	8.1	225	1200	43.85	43.91	44.80	0.19	0.06	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	24.3	300	1200	43.58	43.69	44.80	0.31	0.11	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	32.4	300	1200	43.43	43.56	44.80	0.41	0.13	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	32.4	300	1500	43.30	43.43	44.60	0.42	0.13	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	16.4	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	54.7	450	1500	42.99	43.15	44.35	0.30	0.15	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	54.7	450	1500	42.87	42.95	44.35	0.14	0.09	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	87.1	450	1500	42.79	42.98	44.42	0.38	0.18	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	8.1	225	1200	43.90	43.96	44.80	0.19	0.06	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	24.3	300	1200	43.70	43.79	44.80	0.25	0.09	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	32.4	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

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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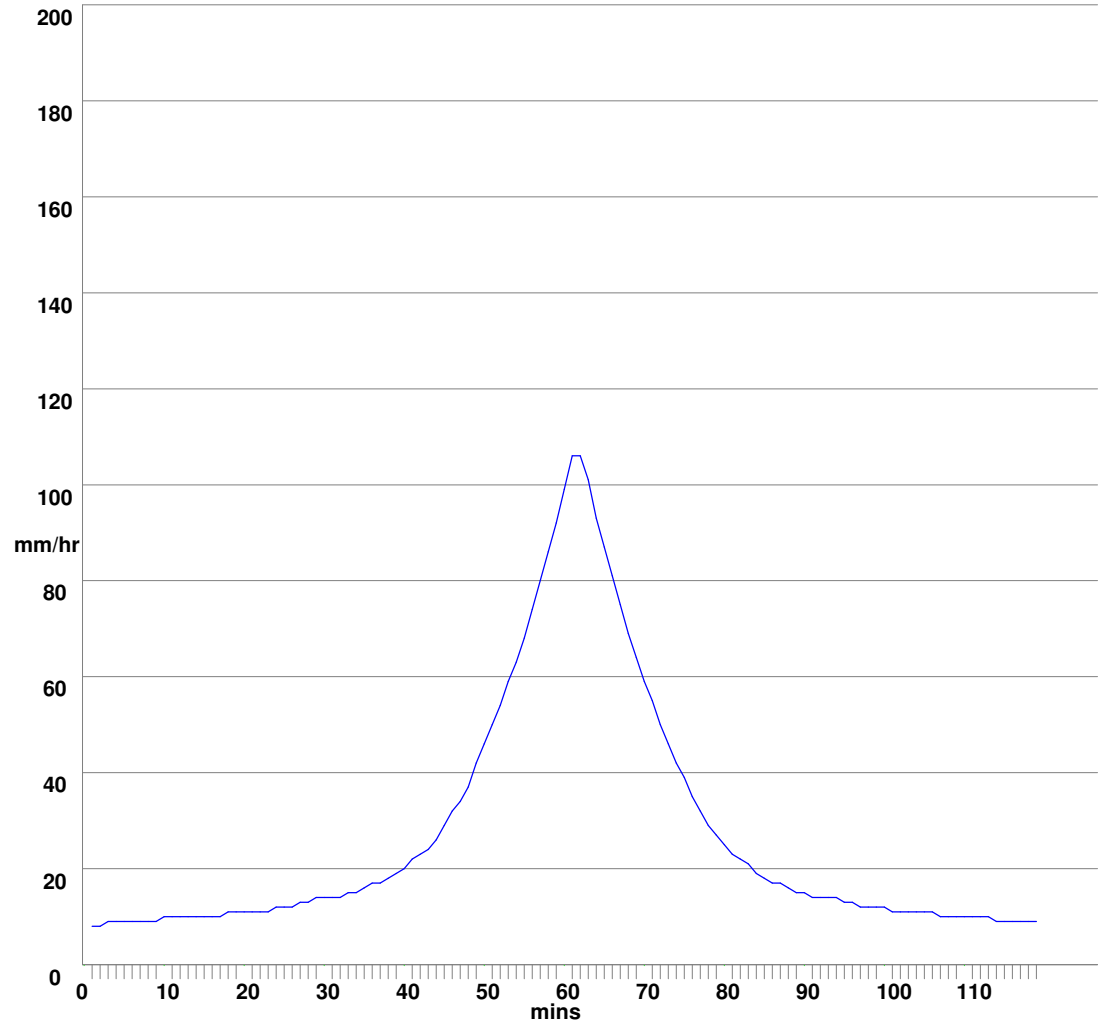
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
1:00	7.61	41:00	21.73	81:00	23.36
2:00	7.61	42:00	23.09	82:00	22.00
3:00	8.69	43:00	24.45	83:00	20.64
4:00	8.69	44:00	26.35	84:00	19.29
5:00	8.69	45:00	28.79	85:00	18.47
6:00	8.96	46:00	31.78	86:00	17.38
7:00	8.96	47:00	34.50	87:00	16.57
8:00	9.24	48:00	37.48	88:00	16.03
9:00	9.24	49:00	41.56	89:00	15.48
10:00	9.51	50:00	45.63	90:00	15.21
11:00	9.51	51:00	49.71	91:00	14.40
12:00	9.51	52:00	54.05	92:00	13.85
13:00	9.78	53:00	58.67	93:00	13.85
14:00	9.78	54:00	63.02	94:00	13.58
15:00	10.32	55:00	67.91	95:00	13.31
16:00	10.32	56:00	73.88	96:00	13.04
17:00	10.32	57:00	79.59	97:00	12.22
18:00	10.59	58:00	85.56	98:00	11.95
19:00	10.87	59:00	92.35	99:00	11.68
20:00	11.14	60:00	99.42	100:00	11.68
21:00	11.14	61:00	106.48	101:00	11.41
22:00	11.41	62:00	106.48	102:00	11.14
23:00	11.41	63:00	100.77	103:00	11.14
24:00	11.68	64:00	93.44	104:00	10.87
25:00	11.95	65:00	86.92	105:00	10.59
26:00	12.22	66:00	80.67	106:00	10.59
27:00	12.77	67:00	74.70	107:00	10.32
28:00	13.31	68:00	69.26	108:00	10.32
29:00	13.58	69:00	64.10	109:00	9.78
30:00	13.85	70:00	59.49	110:00	9.78
31:00	13.85	71:00	54.87	111:00	9.51
32:00	14.40	72:00	50.25	112:00	9.51
33:00	14.67	73:00	46.45	113:00	9.51
34:00	15.48	74:00	42.10	114:00	9.24
35:00	16.03	75:00	38.57	115:00	9.24
36:00	16.57	76:00	35.04	116:00	8.96
37:00	17.11	77:00	32.05	117:00	8.96
38:00	18.20	78:00	29.34	118:00	8.96
39:00	19.01	79:00	26.62	119:00	8.69
40:00	20.37	80:00	24.72	120:00	8.69

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 120 mins Profile - summer





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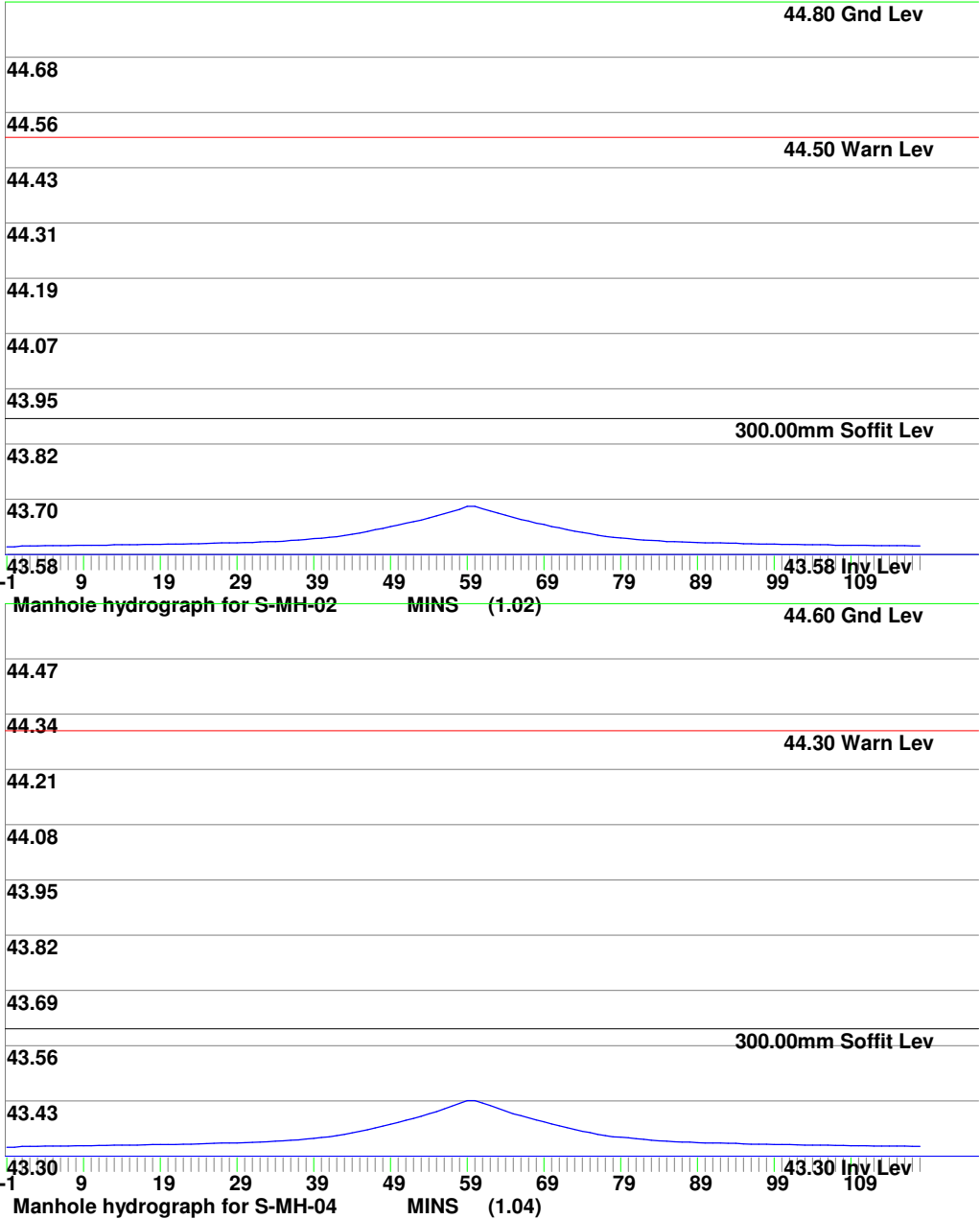
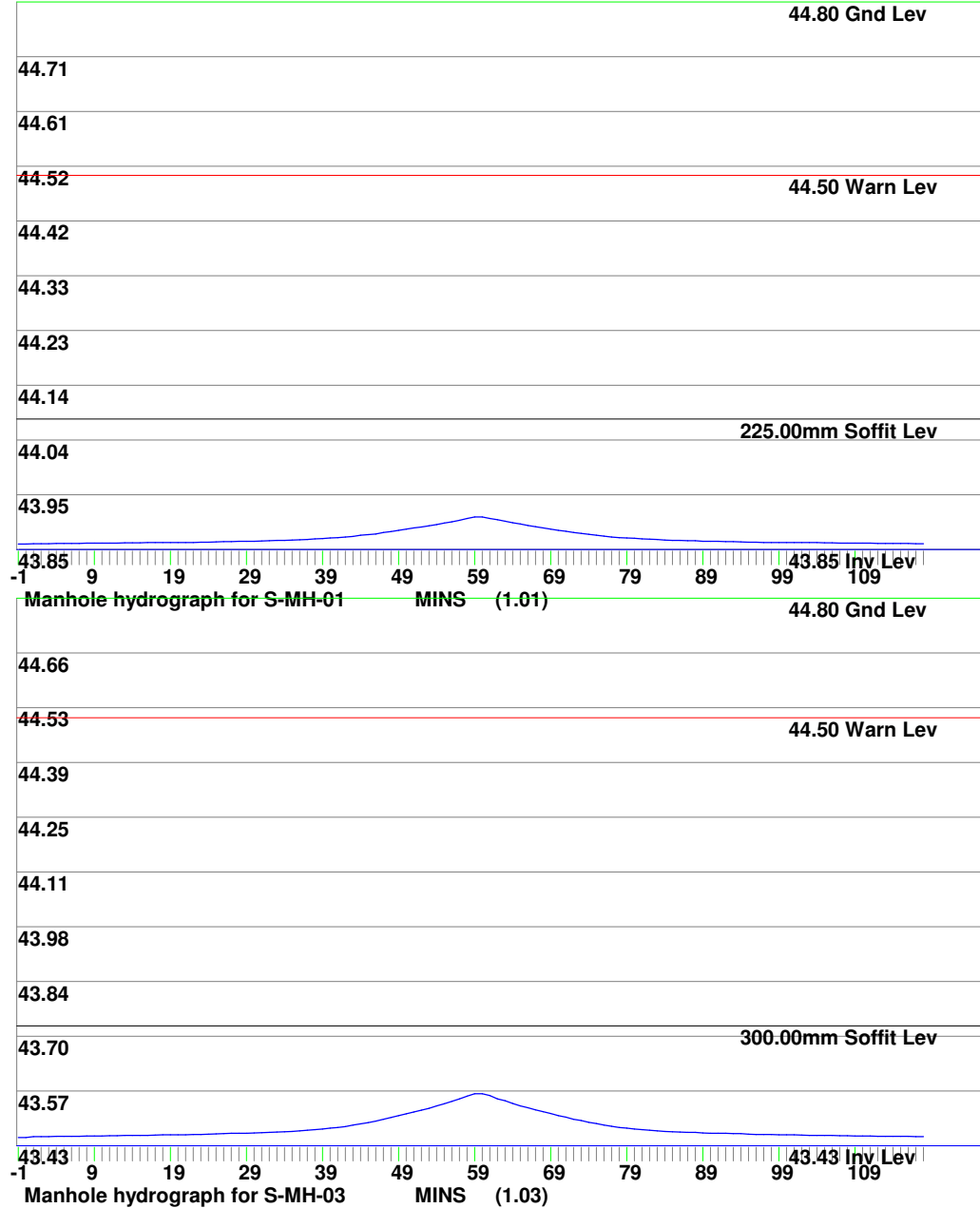
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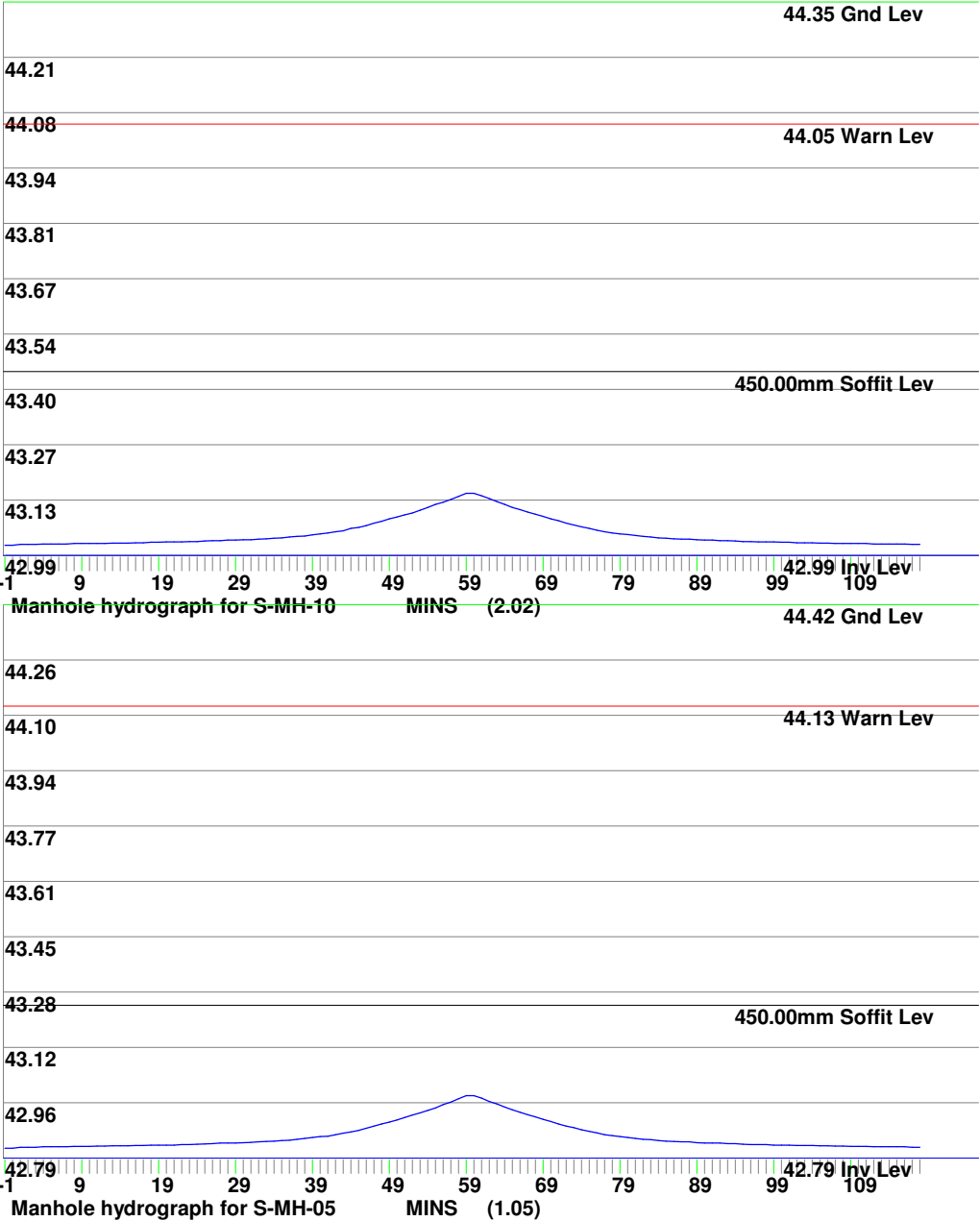
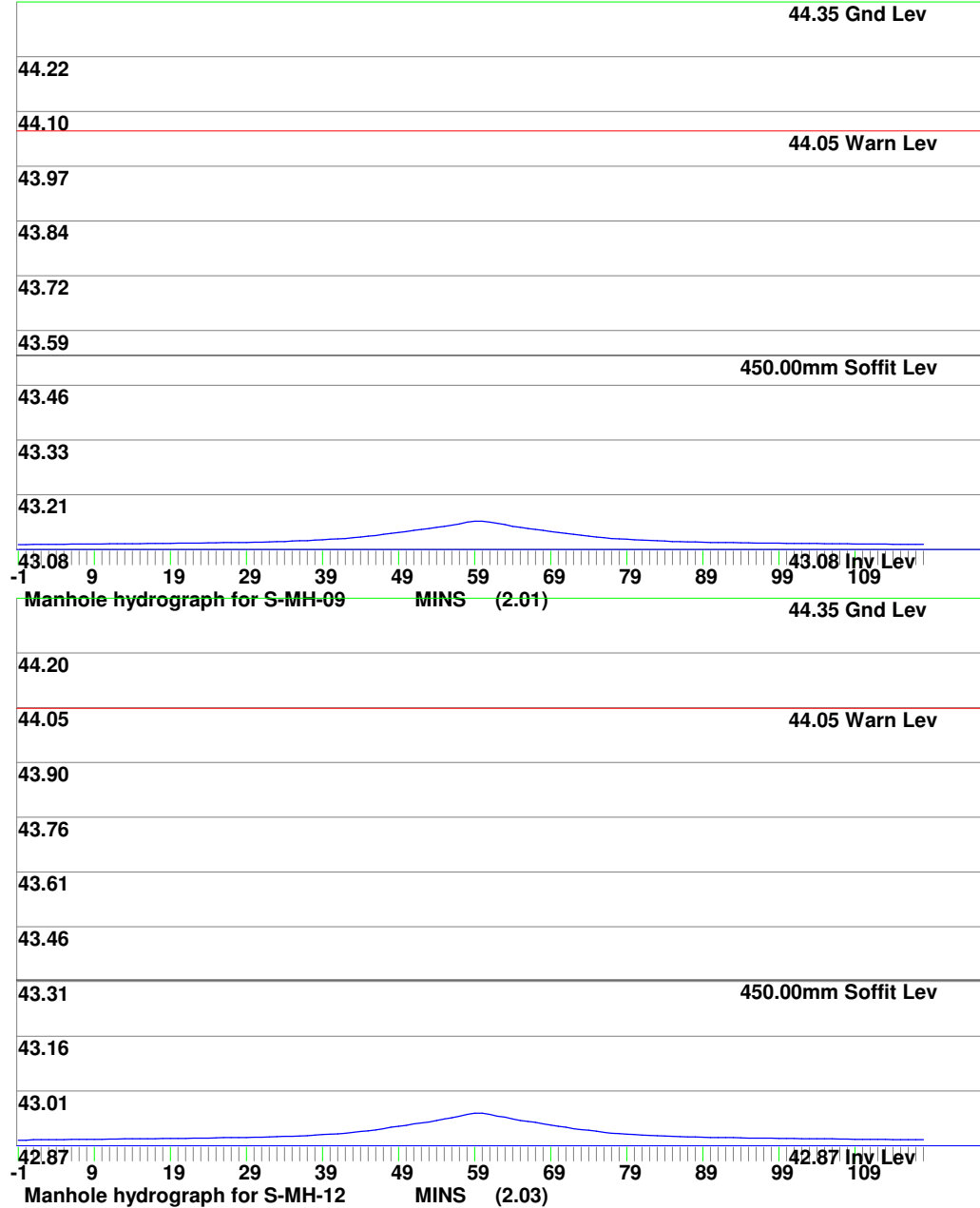
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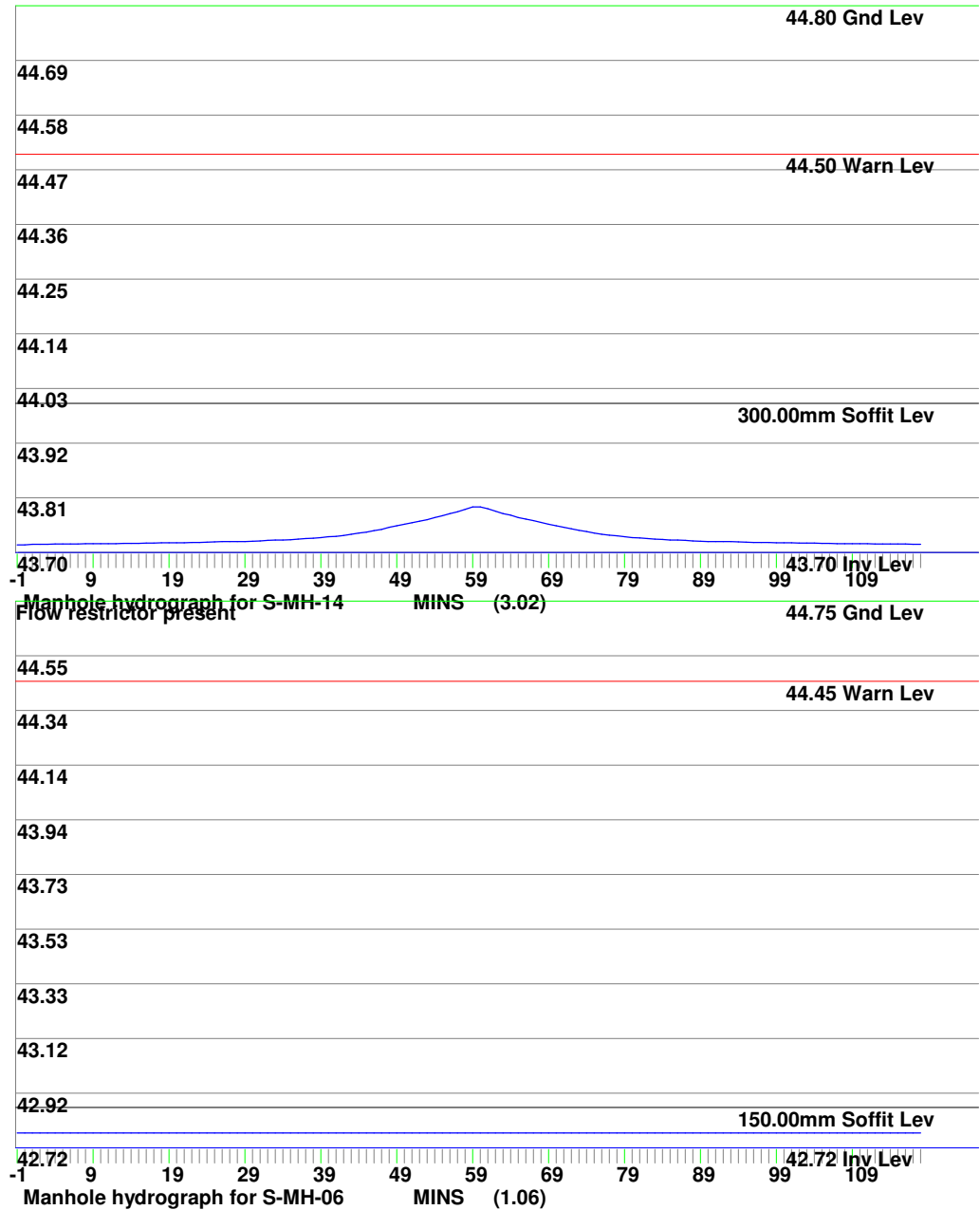


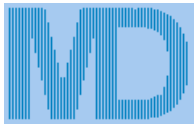
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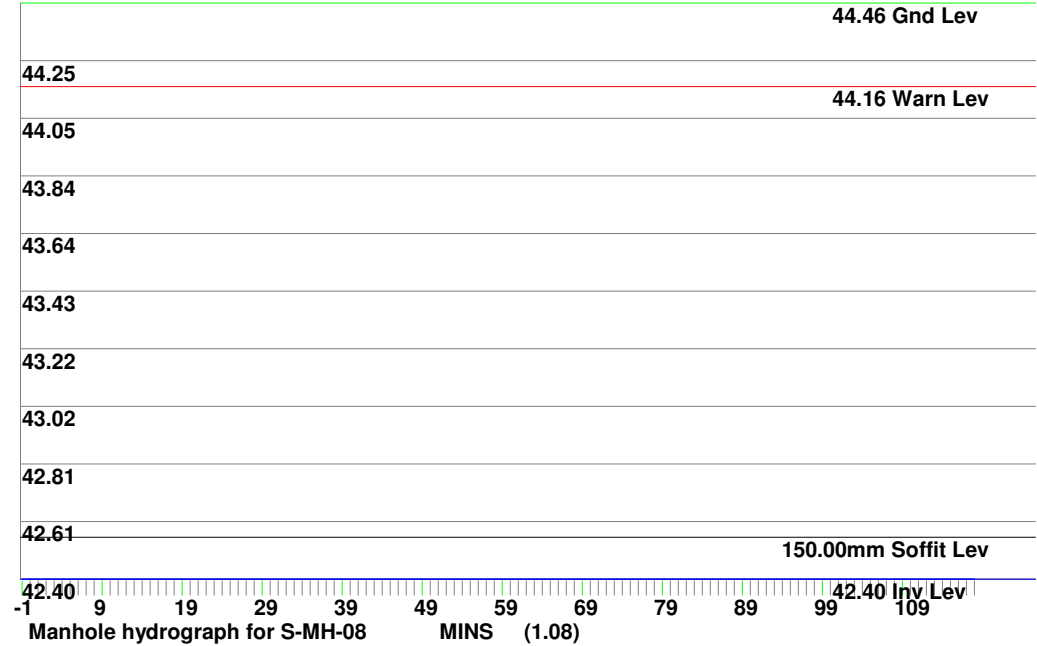
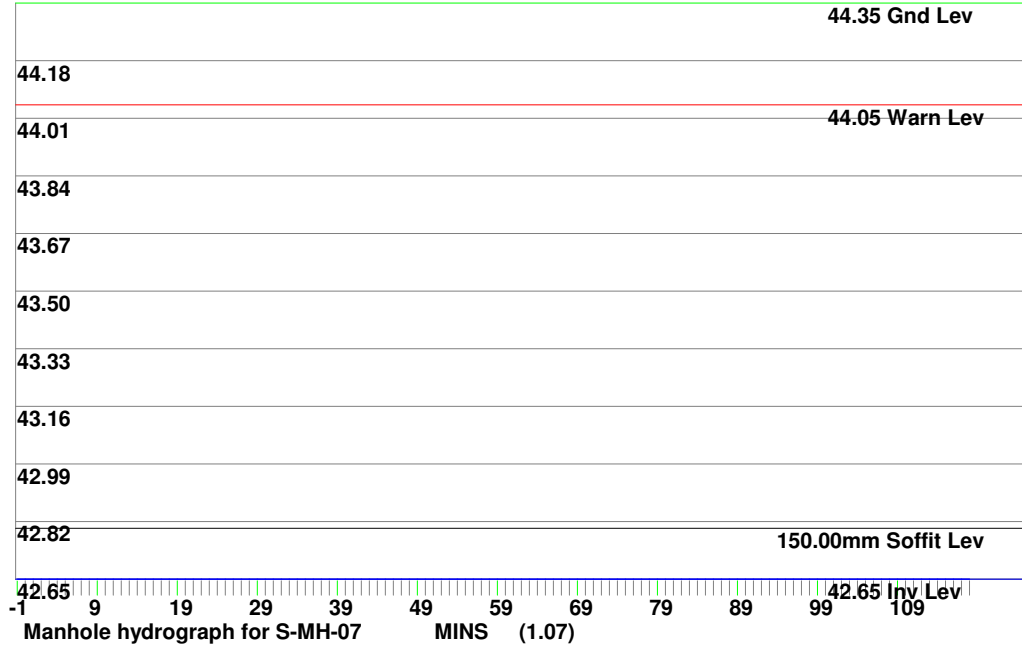
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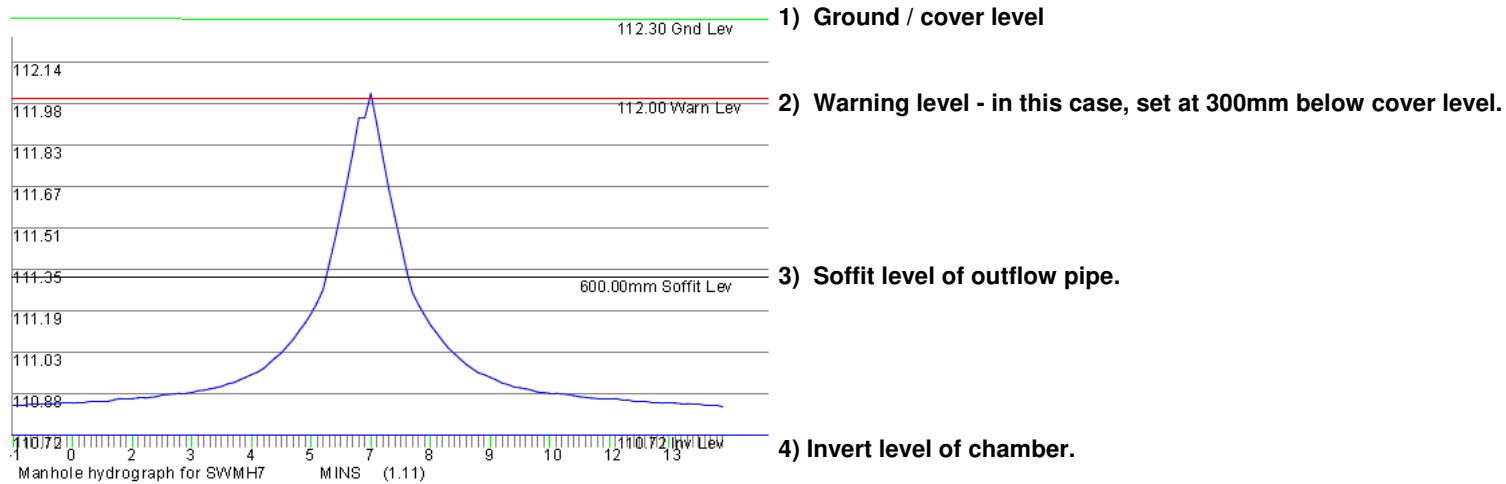
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Notes

- 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.