



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**

Using in-line restrictors
Return period = 30 yrs
Climate change factor = 0

PEAK hydrograph values printed
Storm duration = 180 mins
No offline storage

Mean rain intens. 13.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 32.50 mm/hr
Sample period = 90.0 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	2.1	225	1200	43.85	43.88	44.80	0.05	0.02	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	6.2	300	1200	43.58	43.62	44.80	0.08	0.04	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	8.3	300	1200	43.43	43.48	44.80	0.11	0.05	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	8.3	300	1500	43.30	43.35	44.60	0.11	0.05	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	4.2	450	1500	43.08	43.11	44.35	0.02	0.03	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	14.0	450	1500	42.99	43.05	44.35	0.08	0.06	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	14.0	450	1500	42.87	42.90	44.35	0.04	0.04	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	22.3	450	1500	42.79	42.87	44.42	0.10	0.07	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	2.1	225	1200	43.90	43.92	44.80	0.05	0.02	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	6.2	300	1200	43.70	43.74	44.80	0.06	0.04	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	8.3	300	1200	43.47	43.50	44.92	0.03	0.02	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	4.8	150	1200	42.65	42.71	44.35	0.33	0.05	0.00	0.000	7775	OK
14	I	1.08 S-MH-08	18.6	4.8	150	1200	42.40	42.45	44.46	0.26	0.05	0.00	0.000	7775	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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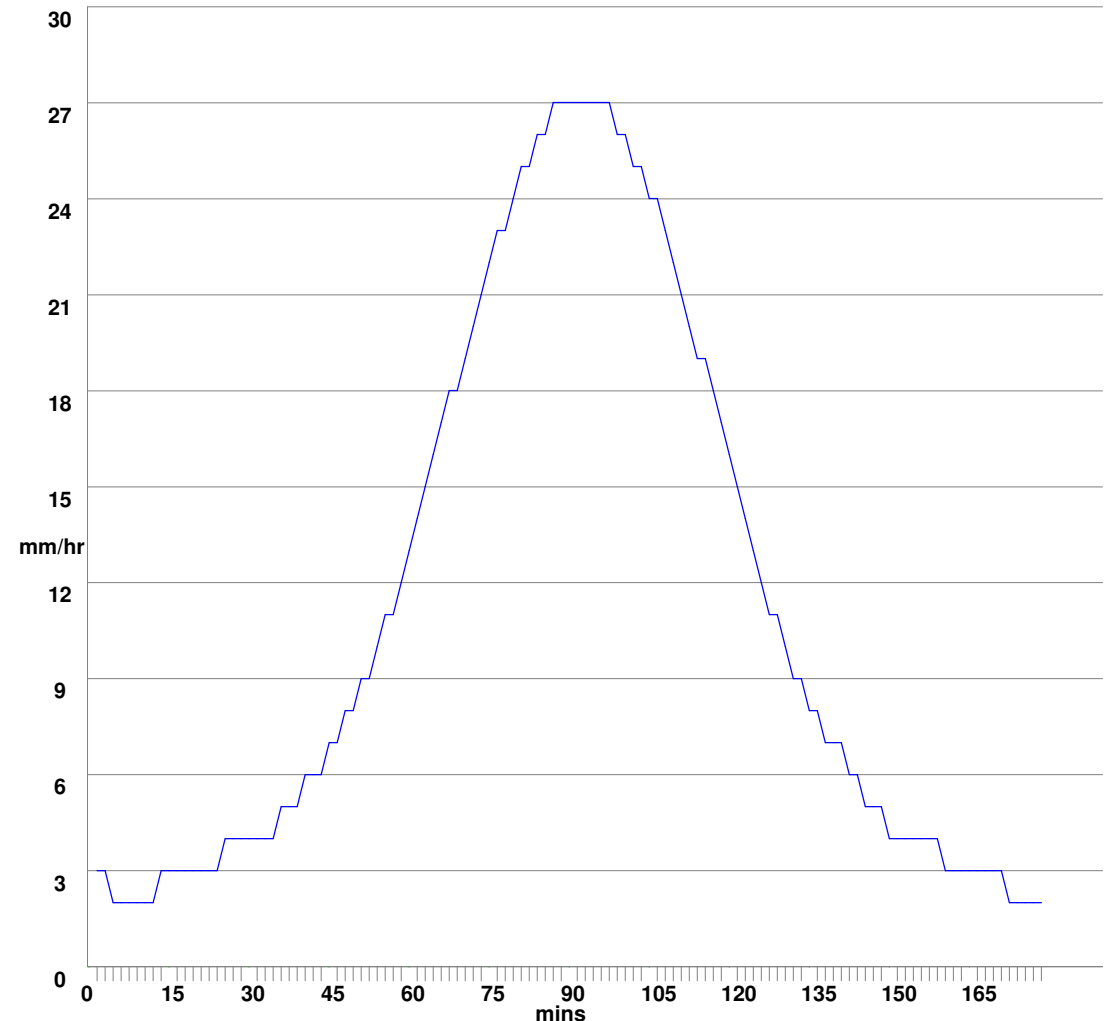
Project

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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
1:30	2.94	61:30	13.94	121:30	14.92
3:00	2.94	63:00	14.81	123:00	14.16
4:30	2.18	64:30	15.57	124:30	13.29
6:00	2.18	66:00	16.56	126:00	12.20
7:30	2.18	67:30	17.54	127:30	11.44
9:00	2.18	69:00	18.41	129:00	10.78
10:30	2.40	70:30	19.17	130:30	10.13
12:00	2.40	72:00	20.15	132:00	9.48
13:30	2.51	73:30	21.24	133:30	8.93
15:00	2.72	75:00	22.00	135:00	8.28
16:30	2.83	76:30	22.87	136:30	7.62
18:00	2.94	78:00	23.42	138:00	7.19
19:30	3.16	79:30	24.07	139:30	6.86
21:00	3.27	81:00	24.72	141:00	6.53
22:30	3.38	82:30	25.27	142:30	5.99
24:00	3.49	84:00	25.92	144:00	5.66
25:30	3.59	85:30	26.36	145:30	5.34
27:00	3.70	87:00	26.79	147:00	4.90
28:30	3.81	88:30	27.01	148:30	4.57
30:00	4.03	90:00	27.12	150:00	4.47
31:30	4.14	91:30	27.23	151:30	4.36
33:00	4.36	93:00	27.23	153:00	4.25
34:30	4.36	94:30	27.12	154:30	4.03
36:00	4.57	96:00	27.01	156:00	3.92
37:30	4.90	97:30	26.79	157:30	3.81
39:00	5.23	99:00	26.47	159:00	3.59
40:30	5.55	100:30	26.03	160:30	3.49
42:00	5.99	102:00	25.49	162:00	3.49
43:30	6.32	103:30	24.83	163:30	3.27
45:00	6.75	105:00	24.18	165:00	3.16
46:30	7.08	106:30	23.63	166:30	2.94
48:00	7.62	108:00	22.98	168:00	2.83
49:30	8.17	109:30	22.22	169:30	2.72
51:00	8.71	111:00	21.35	171:00	2.61
52:30	9.37	112:30	20.37	172:30	2.40
54:00	10.02	114:00	19.39	174:00	2.40
55:30	10.56	115:30	18.52	175:30	2.29
57:00	11.33	117:00	17.64	177:00	2.18
58:30	12.09	118:30	16.88	178:30	2.18
60:00	13.07	120:00	15.79	180:00	2.18

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 180 mins Profile - winter





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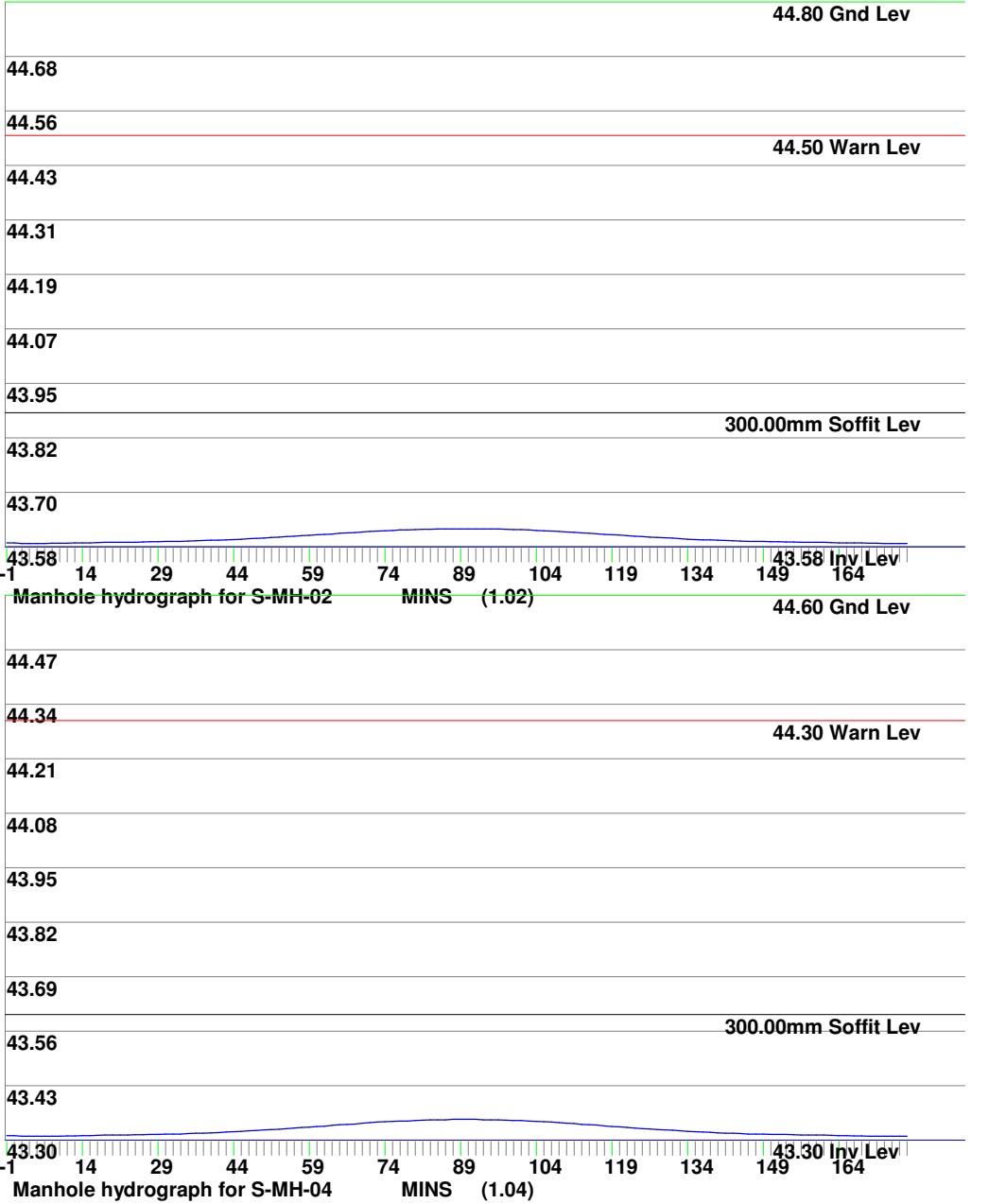
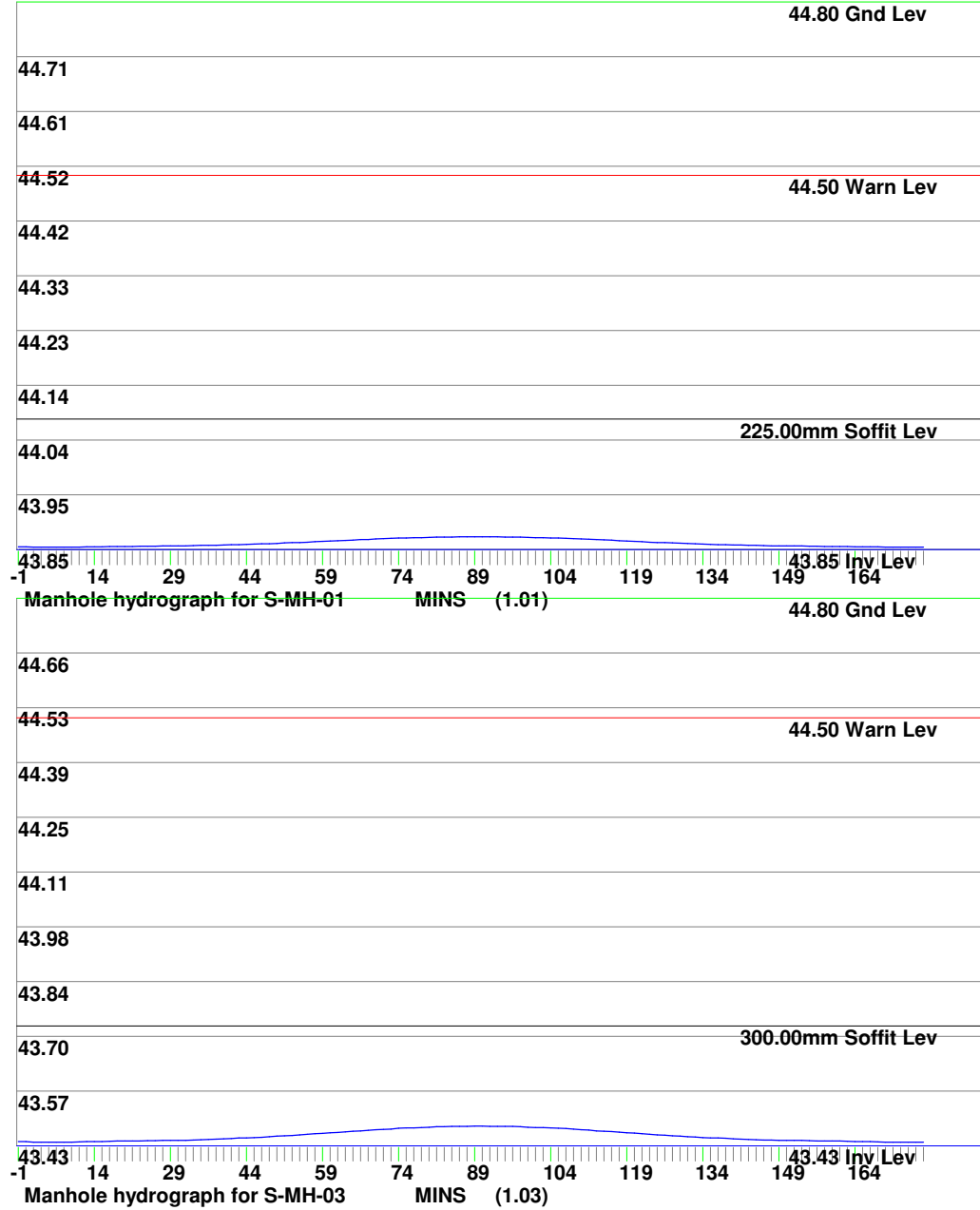
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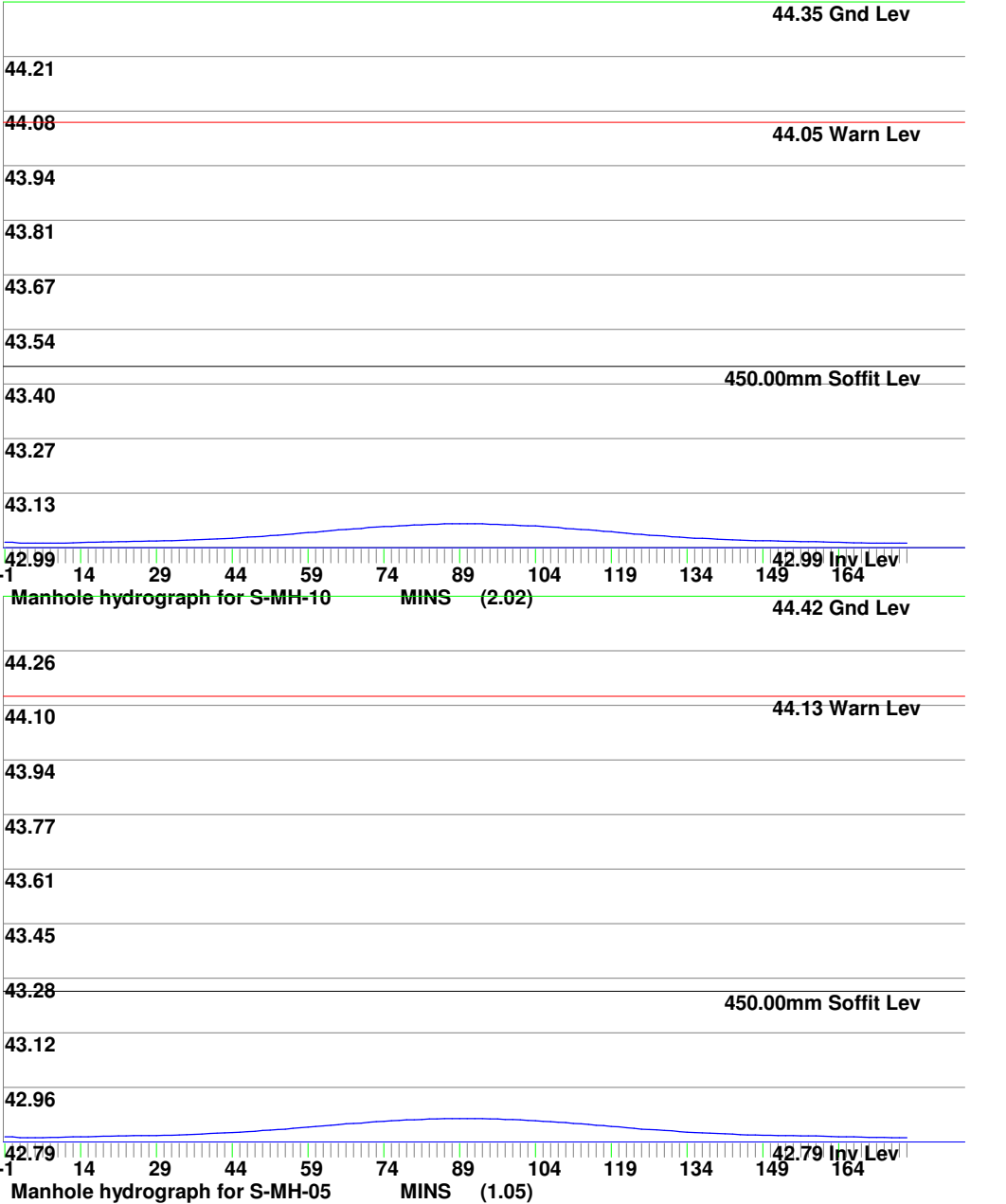
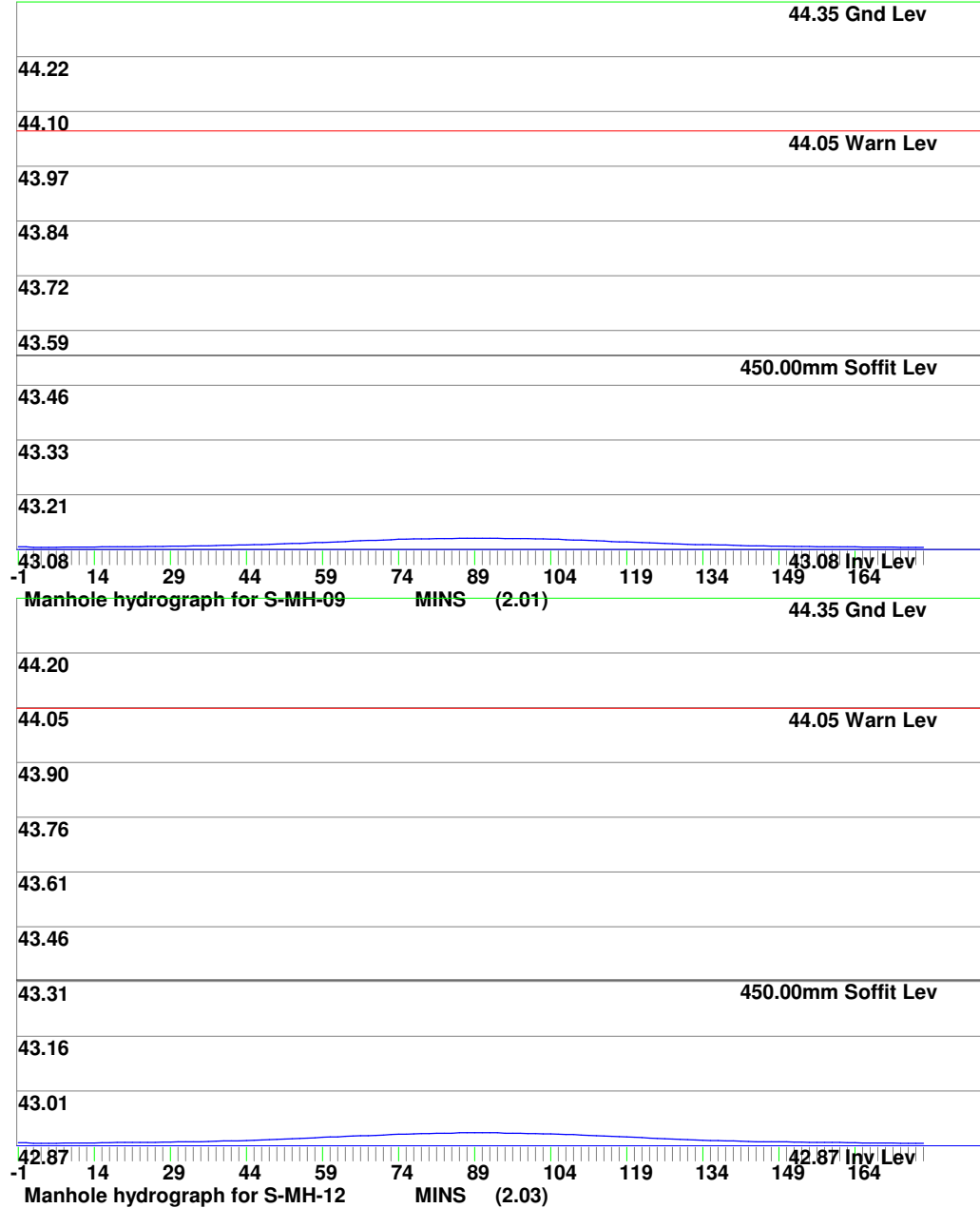
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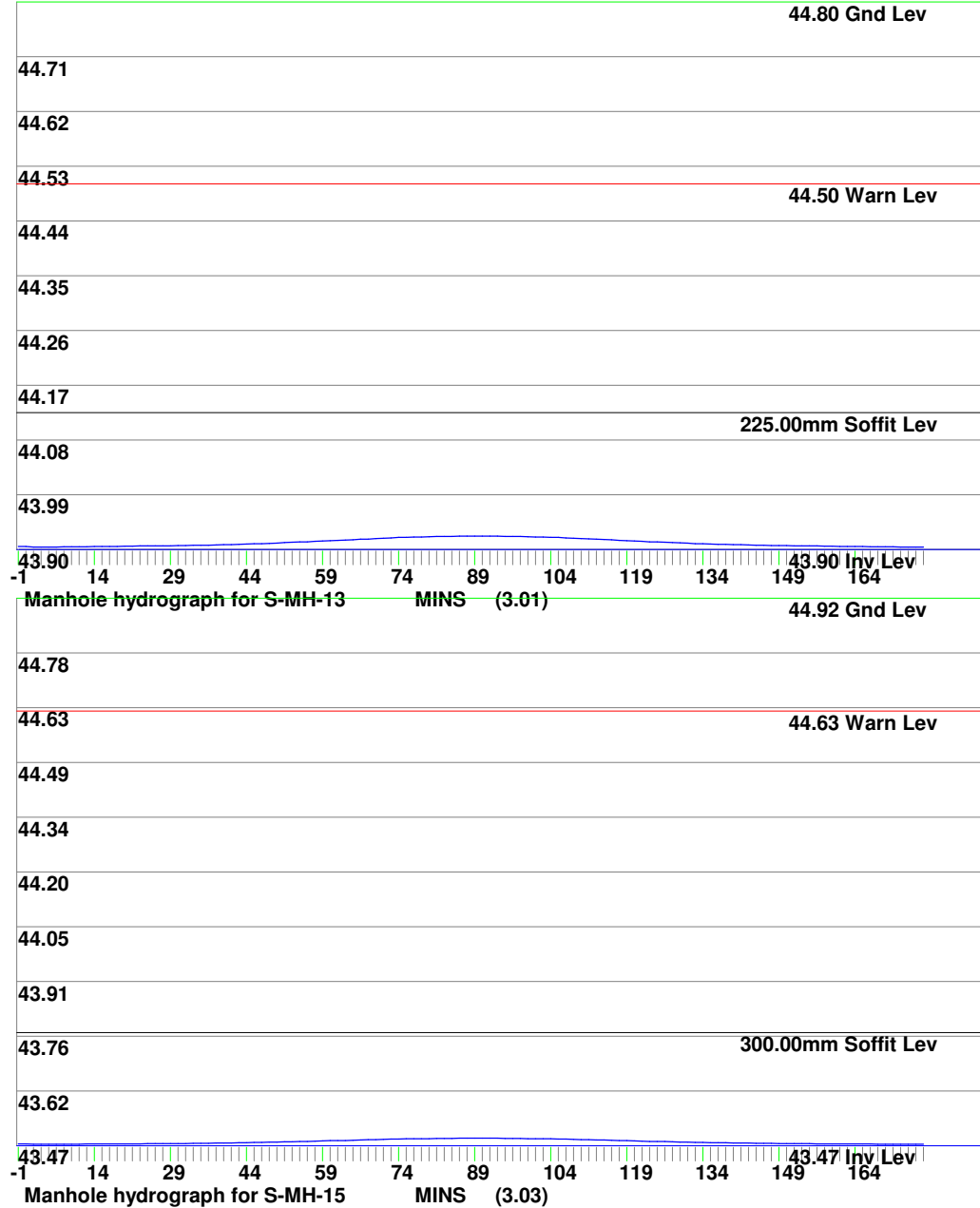
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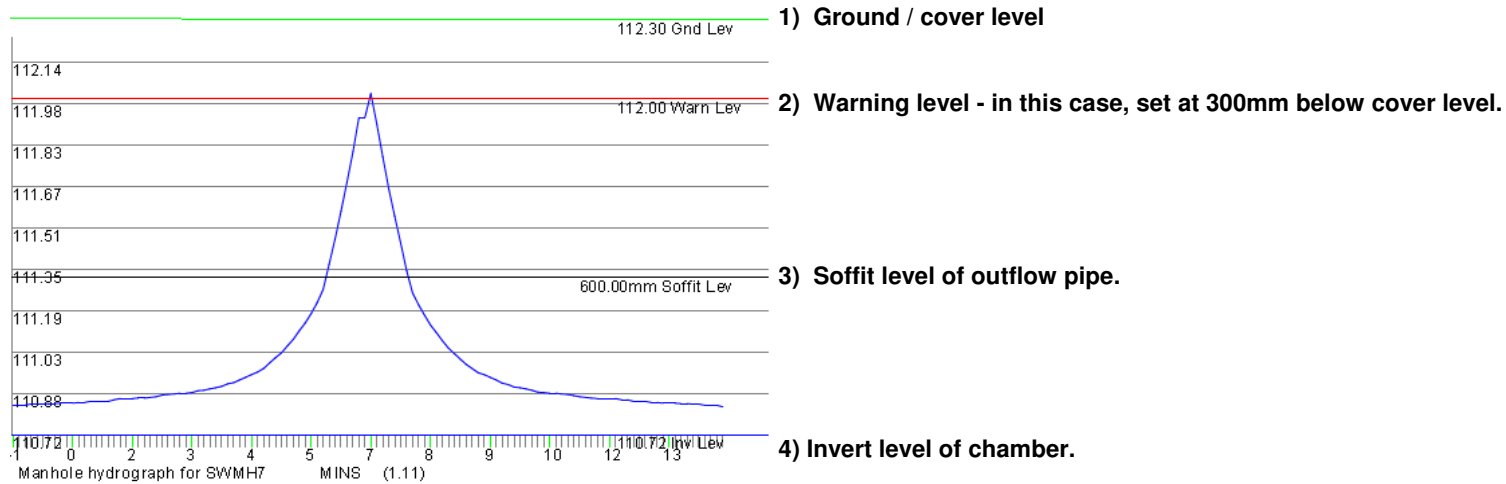
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Notes

- 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.