



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 = 720 mins
No offline storage

Mean rain intens. 4.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 10.00 mm/hr
Sample period = 360.0 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		EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) :x FACTOR	STATUS	
										fract.	Depth					
1	I	1.01	S-MH-01	42.1	0.7	225	1200	43.85	43.87	44.80	0.02	0.01	0.00	0.000	527	OK
2	I	1.02	S-MH-02	77.8	2.1	300	1200	43.58	43.60	44.80	0.03	0.02	0.00	0.000	1579	OK
3	I	1.03	S-MH-03	78.4	2.8	300	1200	43.43	43.45	44.80	0.04	0.02	0.00	0.000	2106	OK
4	I	1.04	S-MH-04	78.0	2.8	300	1500	43.30	43.32	44.60	0.04	0.02	0.00	0.000	2106	OK
5	B	2.01	S-MH-09	184.0	1.4	450	1500	43.08	43.09	44.35	0.01	0.01	0.00	0.000	1065	OK
6	B	2.02	S-MH-10	184.9	4.8	450	1500	42.99	43.02	44.35	0.03	0.03	0.00	0.000	3560	OK
7	B	2.03	S-MH-12	398.2	4.8	450	1500	42.87	42.88	44.35	0.01	0.02	0.00	0.000	3560	OK
8	I	1.05	S-MH-05	227.8	7.6	450	1500	42.79	42.83	44.42	0.03	0.03	0.00	0.000	5666	OK
9	B	3.01	S-MH-13	42.1	0.7	225	1200	43.90	43.91	44.80	0.02	0.01	0.00	0.000	527	OK
10	B	3.02	S-MH-14	95.8	2.1	300	1200	43.70	43.72	44.80	0.02	0.02	0.00	0.000	1582	OK
11	B	3.03	S-MH-15	298.4	2.8	300	1200	43.47	43.48	44.92	0.01	0.01	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	4.7	150	1200	42.65	42.71	44.35	0.32	0.05	0.00	0.000	7775	OK
14	I	1.08	S-MH-08	18.6	4.7	150	1200	42.40	42.45	44.46	0.25	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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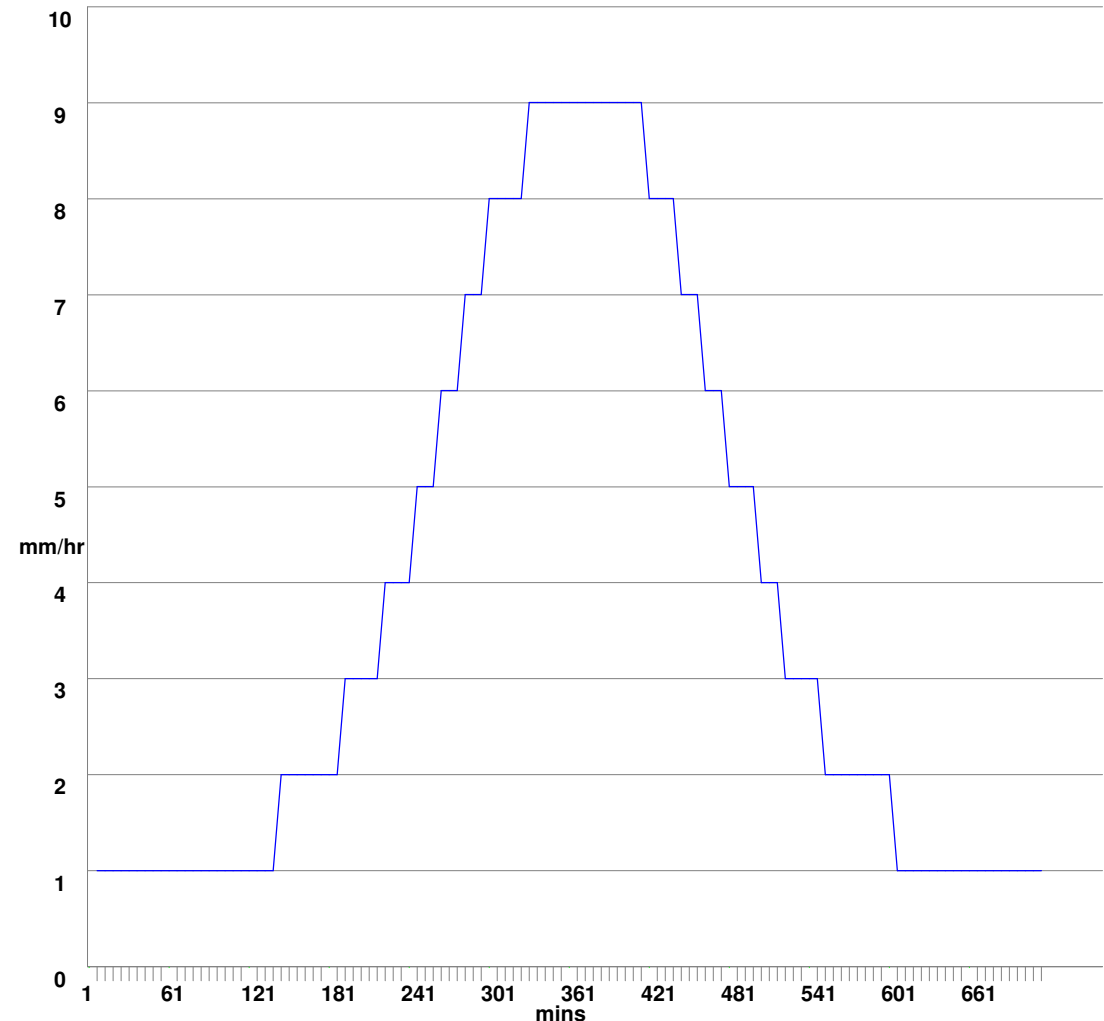
Project

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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
6:00	1.01	246:00	4.77	486:00	5.11
12:00	1.01	252:00	5.07	492:00	4.85
18:00	0.75	258:00	5.33	498:00	4.55
24:00	0.75	264:00	5.67	504:00	4.18
30:00	0.75	270:00	6.00	510:00	3.92
36:00	0.75	276:00	6.30	516:00	3.69
42:00	0.82	282:00	6.56	522:00	3.47
48:00	0.82	288:00	6.90	528:00	3.24
54:00	0.86	294:00	7.27	534:00	3.06
60:00	0.93	300:00	7.53	540:00	2.83
66:00	0.97	306:00	7.83	546:00	2.61
72:00	1.01	312:00	8.02	552:00	2.46
78:00	1.08	318:00	8.24	558:00	2.35
84:00	1.12	324:00	8.47	564:00	2.24
90:00	1.16	330:00	8.65	570:00	2.05
96:00	1.19	336:00	8.88	576:00	1.94
102:00	1.23	342:00	9.03	582:00	1.83
108:00	1.27	348:00	9.17	588:00	1.68
114:00	1.31	354:00	9.25	594:00	1.57
120:00	1.38	360:00	9.29	600:00	1.53
126:00	1.42	366:00	9.32	606:00	1.49
132:00	1.49	372:00	9.32	612:00	1.45
138:00	1.49	378:00	9.29	618:00	1.38
144:00	1.57	384:00	9.25	624:00	1.34
150:00	1.68	390:00	9.17	630:00	1.31
156:00	1.79	396:00	9.06	636:00	1.23
162:00	1.90	402:00	8.91	642:00	1.19
168:00	2.05	408:00	8.73	648:00	1.19
174:00	2.16	414:00	8.50	654:00	1.12
180:00	2.31	420:00	8.28	660:00	1.08
186:00	2.42	426:00	8.09	666:00	1.01
192:00	2.61	432:00	7.87	672:00	0.97
198:00	2.80	438:00	7.61	678:00	0.93
204:00	2.98	444:00	7.31	684:00	0.90
210:00	3.21	450:00	6.97	690:00	0.82
216:00	3.43	456:00	6.64	696:00	0.82
222:00	3.62	462:00	6.34	702:00	0.78
228:00	3.88	468:00	6.04	708:00	0.75
234:00	4.14	474:00	5.78	714:00	0.75
240:00	4.48	480:00	5.41	720:00	0.75

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 720 mins Profile - winter





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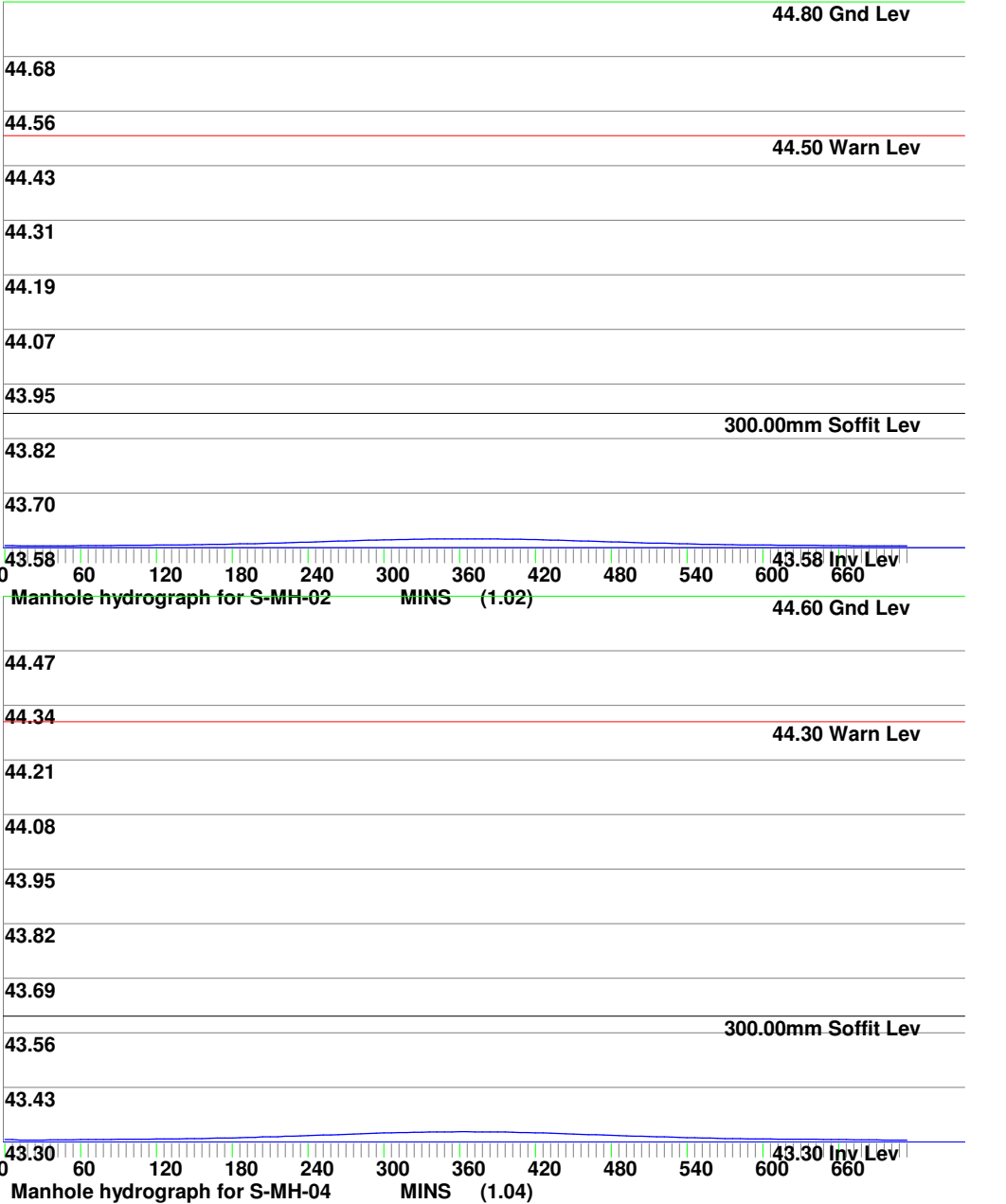
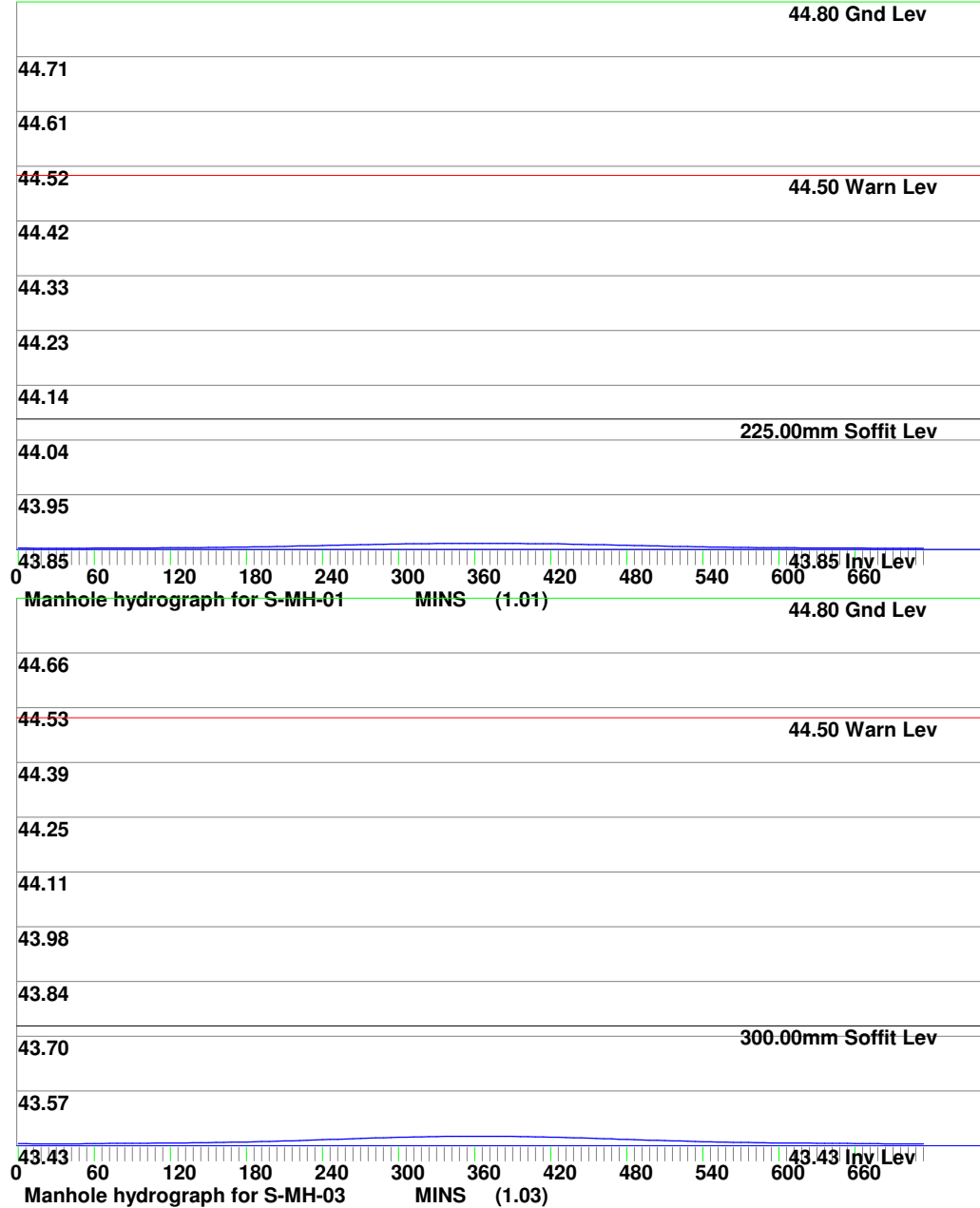
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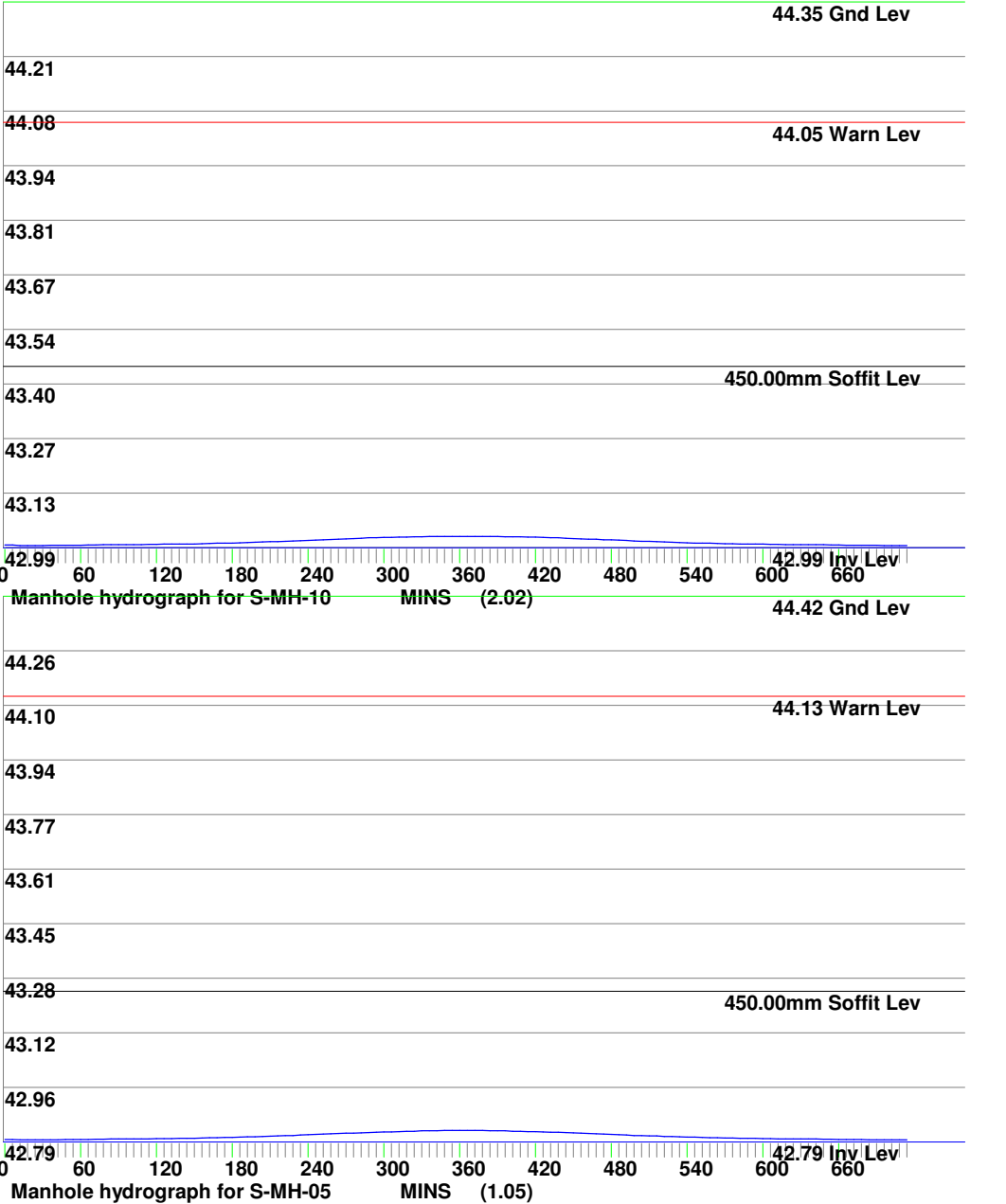
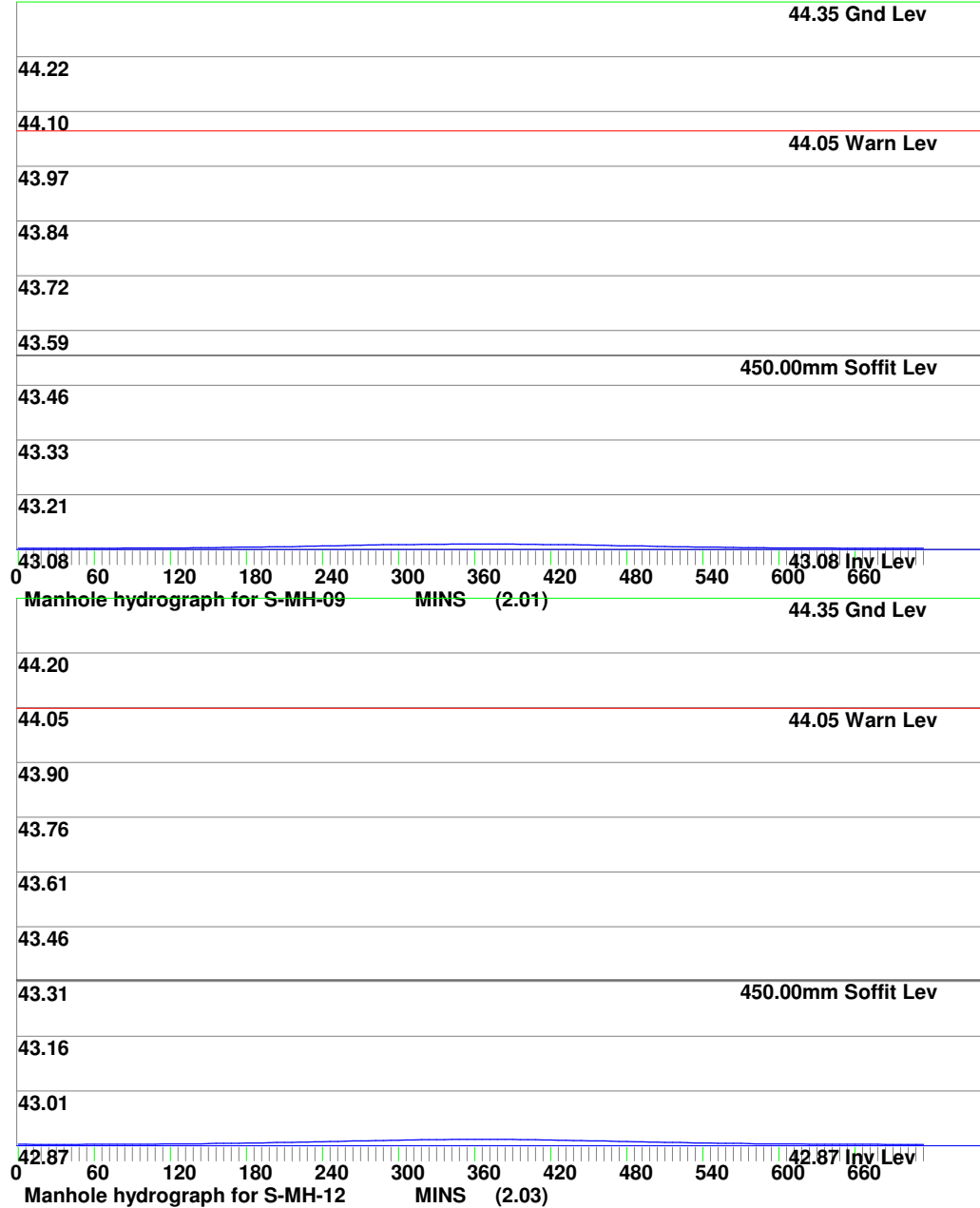
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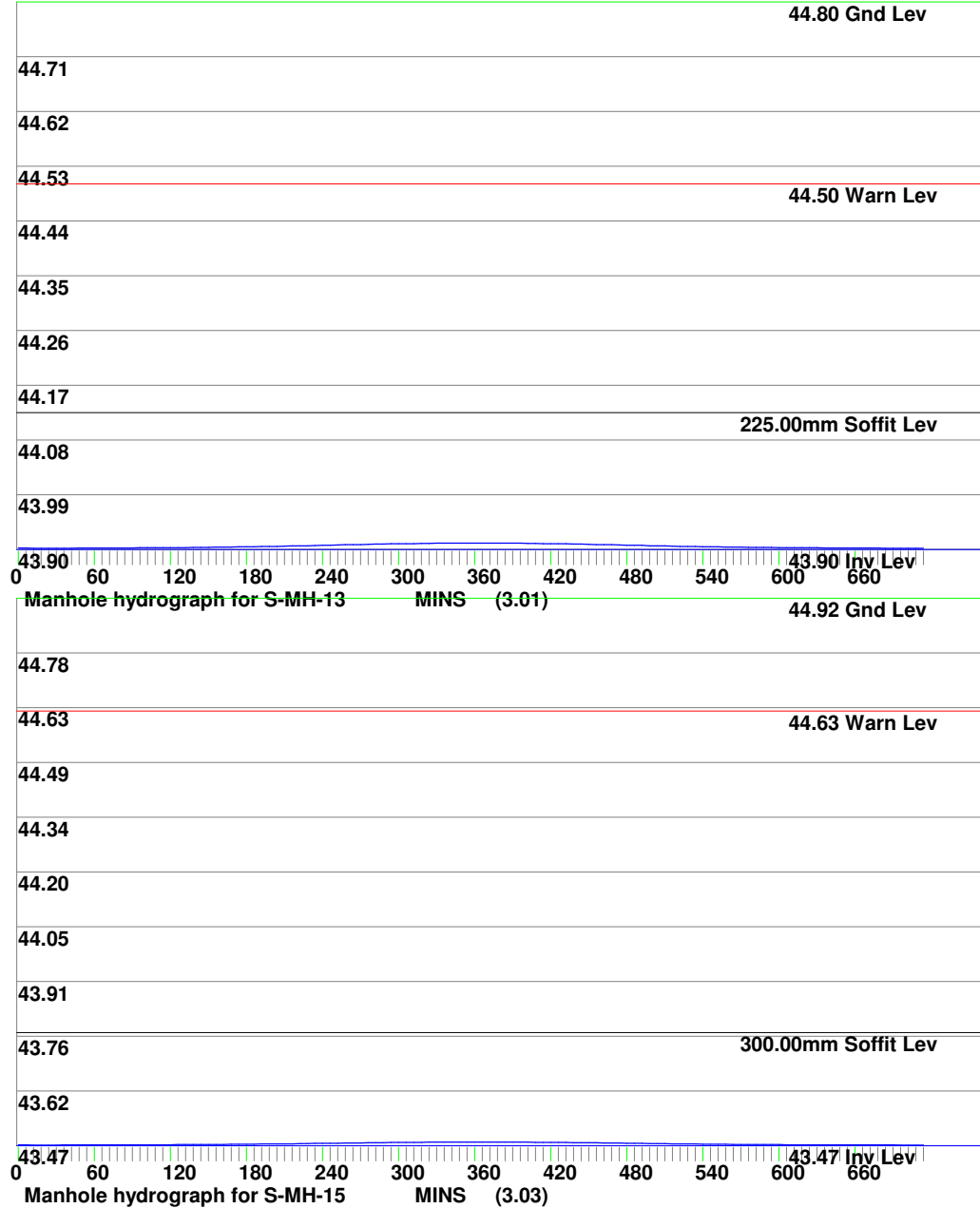
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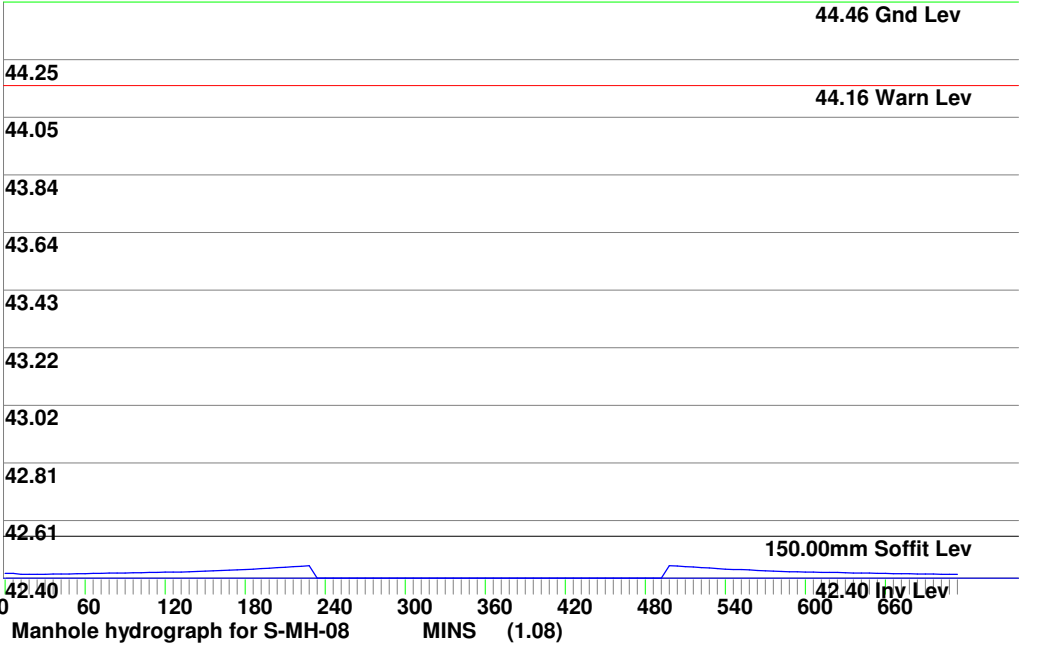
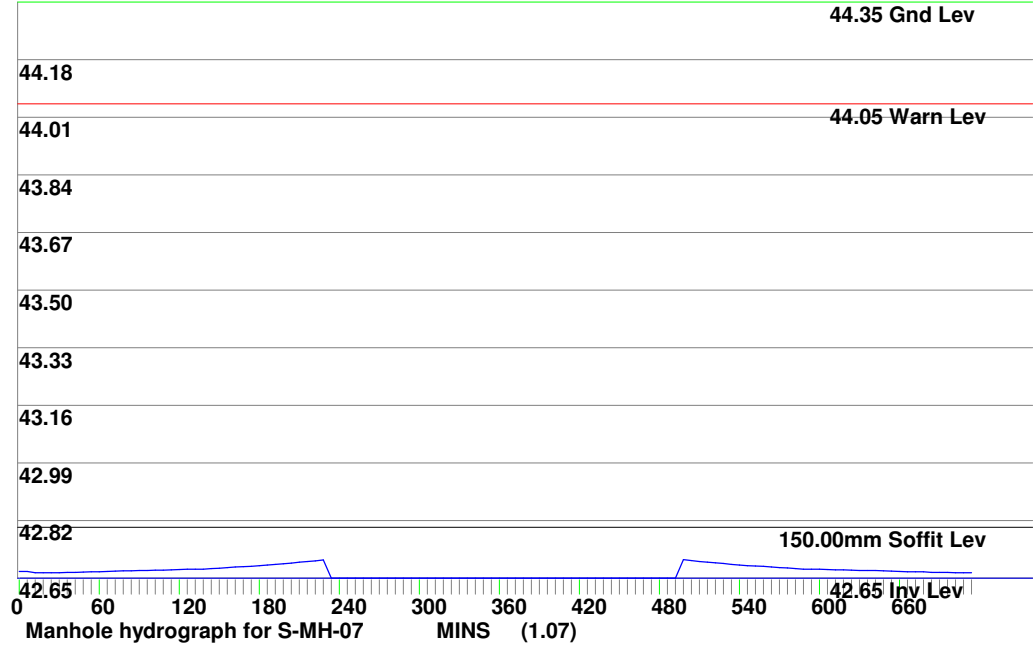
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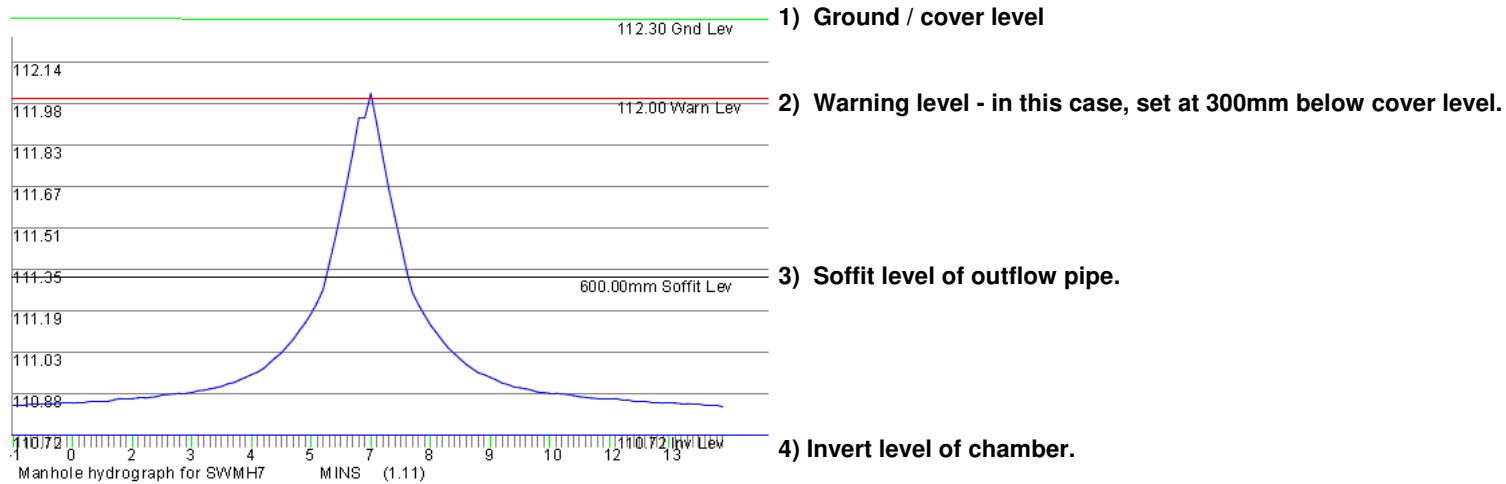
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Notes

- 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.