



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 = 360 mins
No offline storage

Mean rain intens. 14.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 54.88 mm/hr
Sample period = 180.0 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	3.5	225	1200	43.85	43.89	44.80	0.08	0.03	0.00	0.000	527	OK
2	I	1.02	S-MH-02	77.8	10.4	300	1200	43.58	43.64	44.80	0.13	0.06	0.00	0.000	1579	OK
3	I	1.03	S-MH-03	78.4	13.9	300	1200	43.43	43.50	44.80	0.18	0.07	0.00	0.000	2106	OK
4	I	1.04	S-MH-04	78.0	13.9	300	1500	43.30	43.37	44.60	0.18	0.07	0.00	0.000	2106	OK
5	B	2.01	S-MH-09	184.0	7.0	450	1500	43.08	43.12	44.35	0.04	0.04	0.00	0.000	1065	OK
6	B	2.02	S-MH-10	184.9	23.4	450	1500	42.99	43.08	44.35	0.13	0.08	0.00	0.000	3560	OK
7	B	2.03	S-MH-12	398.2	23.4	450	1500	42.87	42.92	44.35	0.06	0.05	0.00	0.000	3560	OK
8	I	1.05	S-MH-05	227.8	37.3	450	1500	42.79	42.90	44.42	0.16	0.10	0.00	0.000	5666	OK
9	B	3.01	S-MH-13	42.1	3.5	225	1200	43.90	43.93	44.80	0.08	0.03	0.00	0.000	527	OK
10	B	3.02	S-MH-14	95.8	10.4	300	1200	43.70	43.75	44.80	0.11	0.05	0.00	0.000	1582	OK
11	B	3.03	S-MH-15	298.4	13.9	300	1200	43.47	43.50	44.92	0.05	0.03	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

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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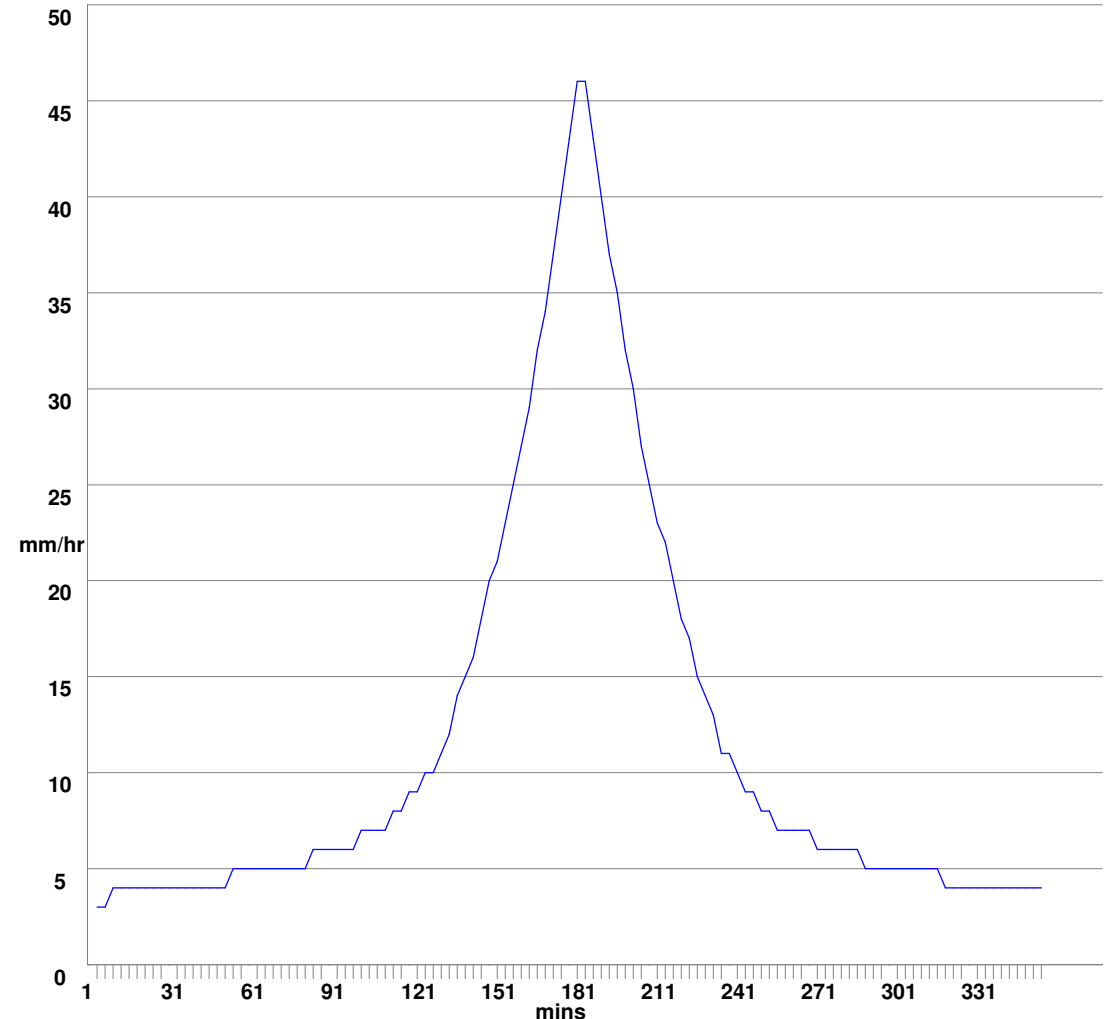
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
3:00	3.26	123:00	9.30	243:00	10.00
6:00	3.26	126:00	9.88	246:00	9.42
9:00	3.72	129:00	10.47	249:00	8.84
12:00	3.72	132:00	11.28	252:00	8.26
15:00	3.72	135:00	12.33	255:00	7.91
18:00	3.84	138:00	13.61	258:00	7.44
21:00	3.84	141:00	14.77	261:00	7.09
24:00	3.95	144:00	16.05	264:00	6.86
27:00	3.95	147:00	17.79	267:00	6.63
30:00	4.07	150:00	19.54	270:00	6.51
33:00	4.07	153:00	21.28	273:00	6.16
36:00	4.07	156:00	23.14	276:00	5.93
39:00	4.19	159:00	25.12	279:00	5.93
42:00	4.19	162:00	26.98	282:00	5.81
45:00	4.42	165:00	29.07	285:00	5.70
48:00	4.42	168:00	31.63	288:00	5.58
51:00	4.42	171:00	34.07	291:00	5.23
54:00	4.54	174:00	36.63	294:00	5.12
57:00	4.65	177:00	39.54	297:00	5.00
60:00	4.77	180:00	42.56	300:00	5.00
63:00	4.77	183:00	45.58	303:00	4.88
66:00	4.88	186:00	45.58	306:00	4.77
69:00	4.88	189:00	43.14	309:00	4.77
72:00	5.00	192:00	40.00	312:00	4.65
75:00	5.12	195:00	37.21	315:00	4.54
78:00	5.23	198:00	34.54	318:00	4.54
81:00	5.47	201:00	31.98	321:00	4.42
84:00	5.70	204:00	29.65	324:00	4.42
87:00	5.81	207:00	27.44	327:00	4.19
90:00	5.93	210:00	25.47	330:00	4.19
93:00	5.93	213:00	23.49	333:00	4.07
96:00	6.16	216:00	21.51	336:00	4.07
99:00	6.28	219:00	19.88	339:00	4.07
102:00	6.63	222:00	18.02	342:00	3.95
105:00	6.86	225:00	16.51	345:00	3.95
108:00	7.09	228:00	15.00	348:00	3.84
111:00	7.33	231:00	13.72	351:00	3.84
114:00	7.79	234:00	12.56	354:00	3.84
117:00	8.14	237:00	11.40	357:00	3.72
120:00	8.72	240:00	10.58	360:00	3.72

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 360 mins Profile - summer





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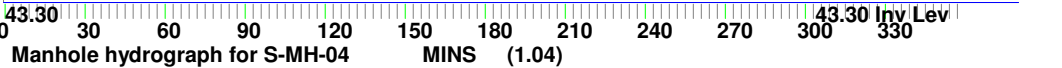
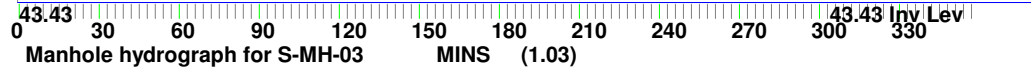
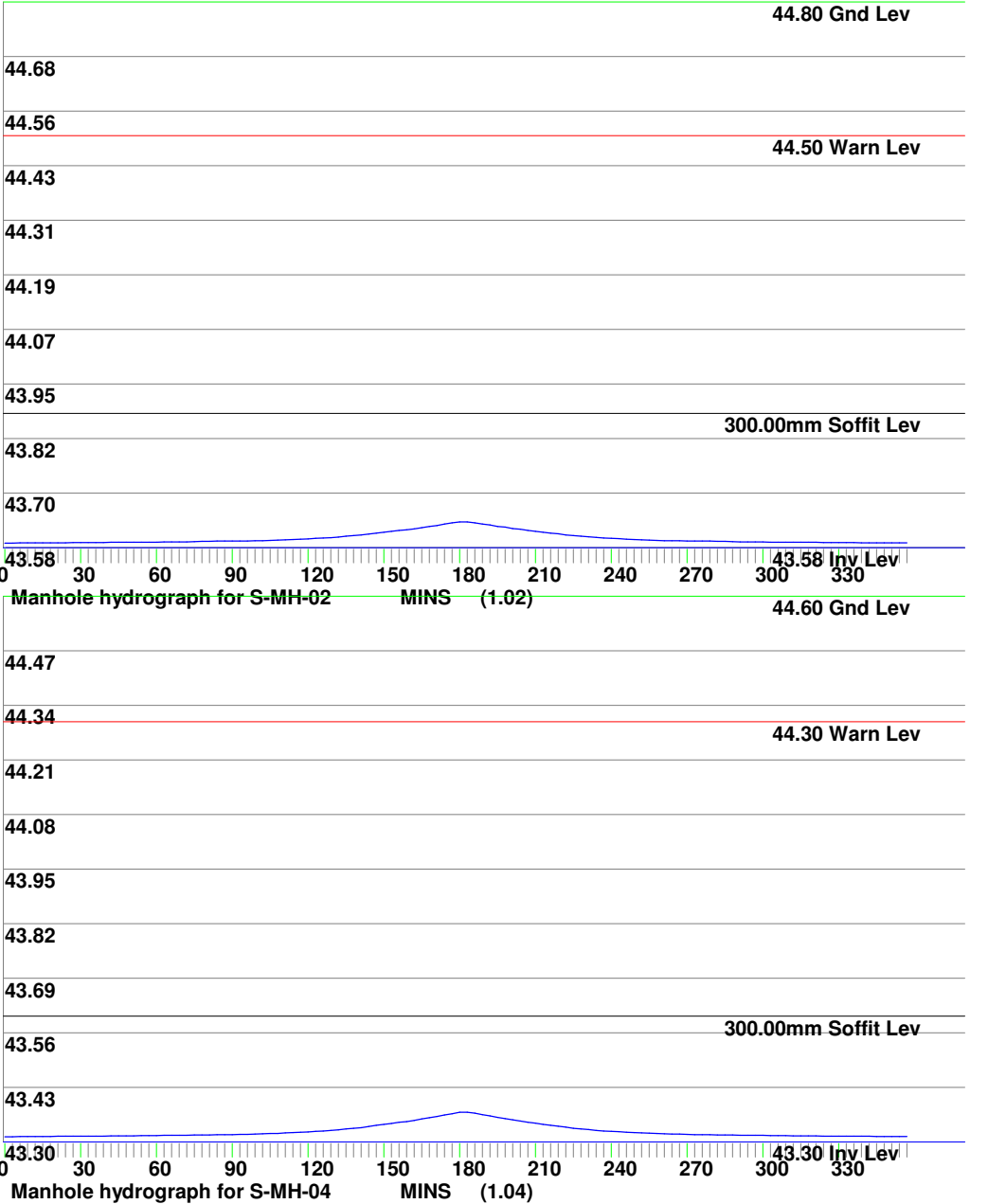
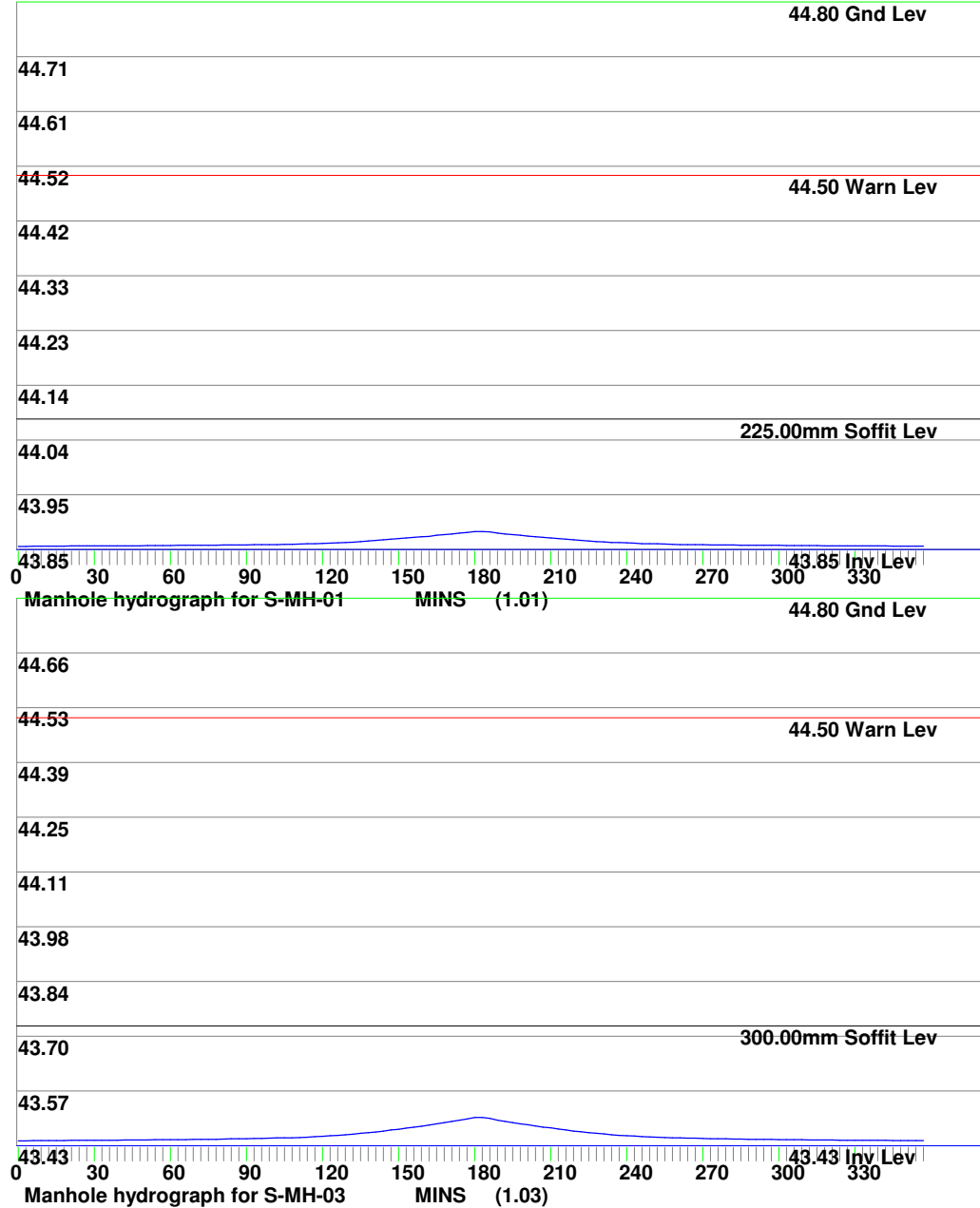
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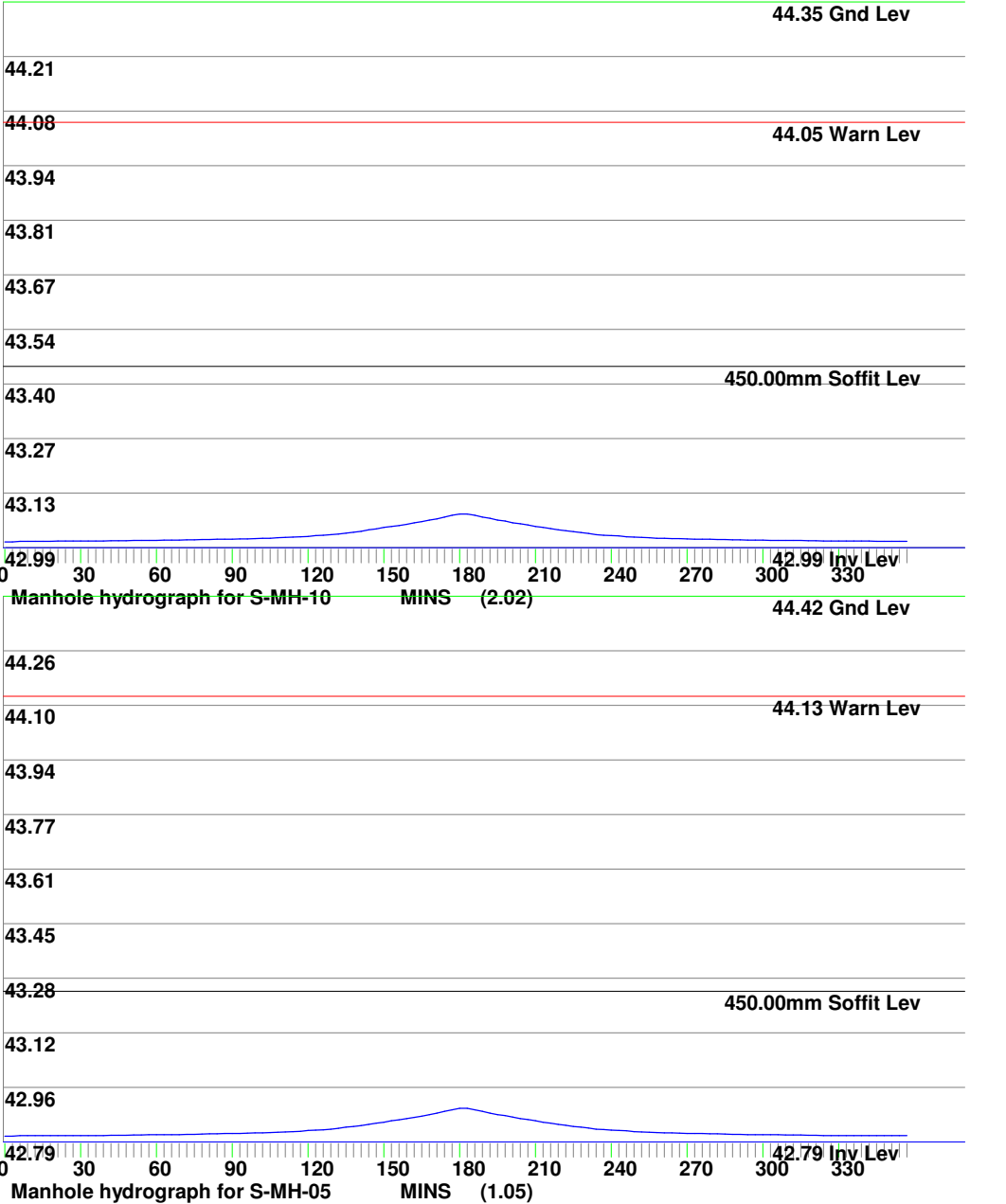
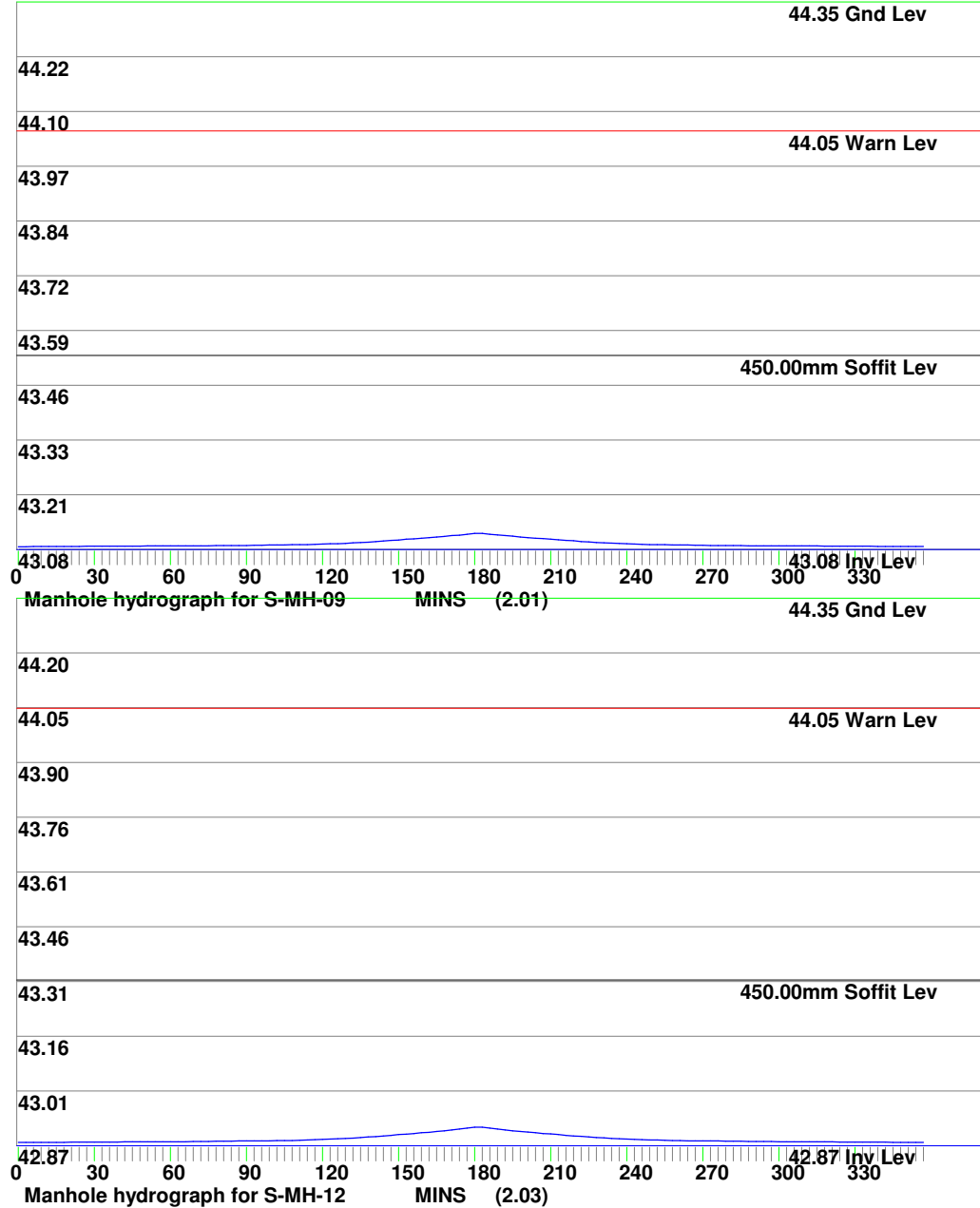
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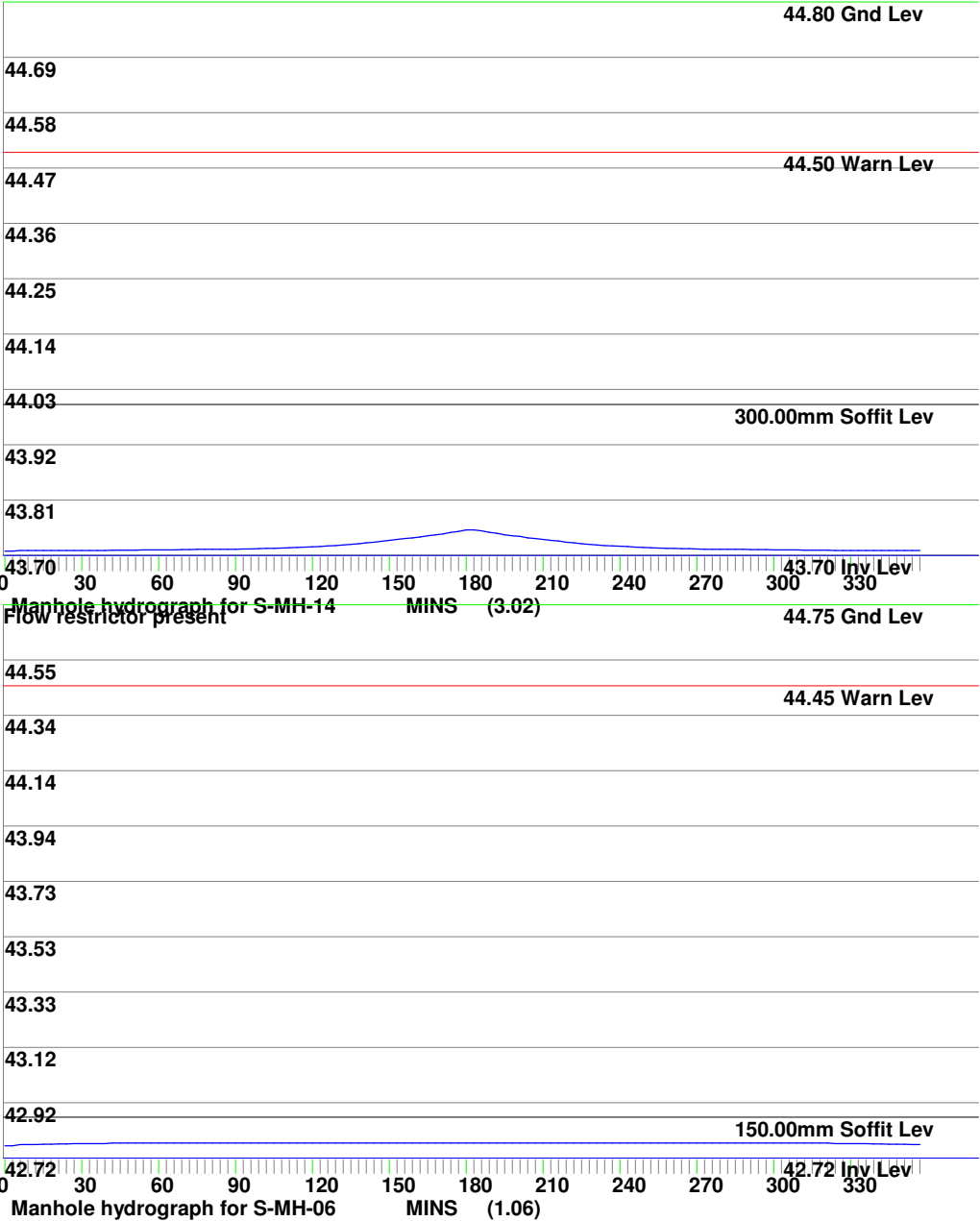
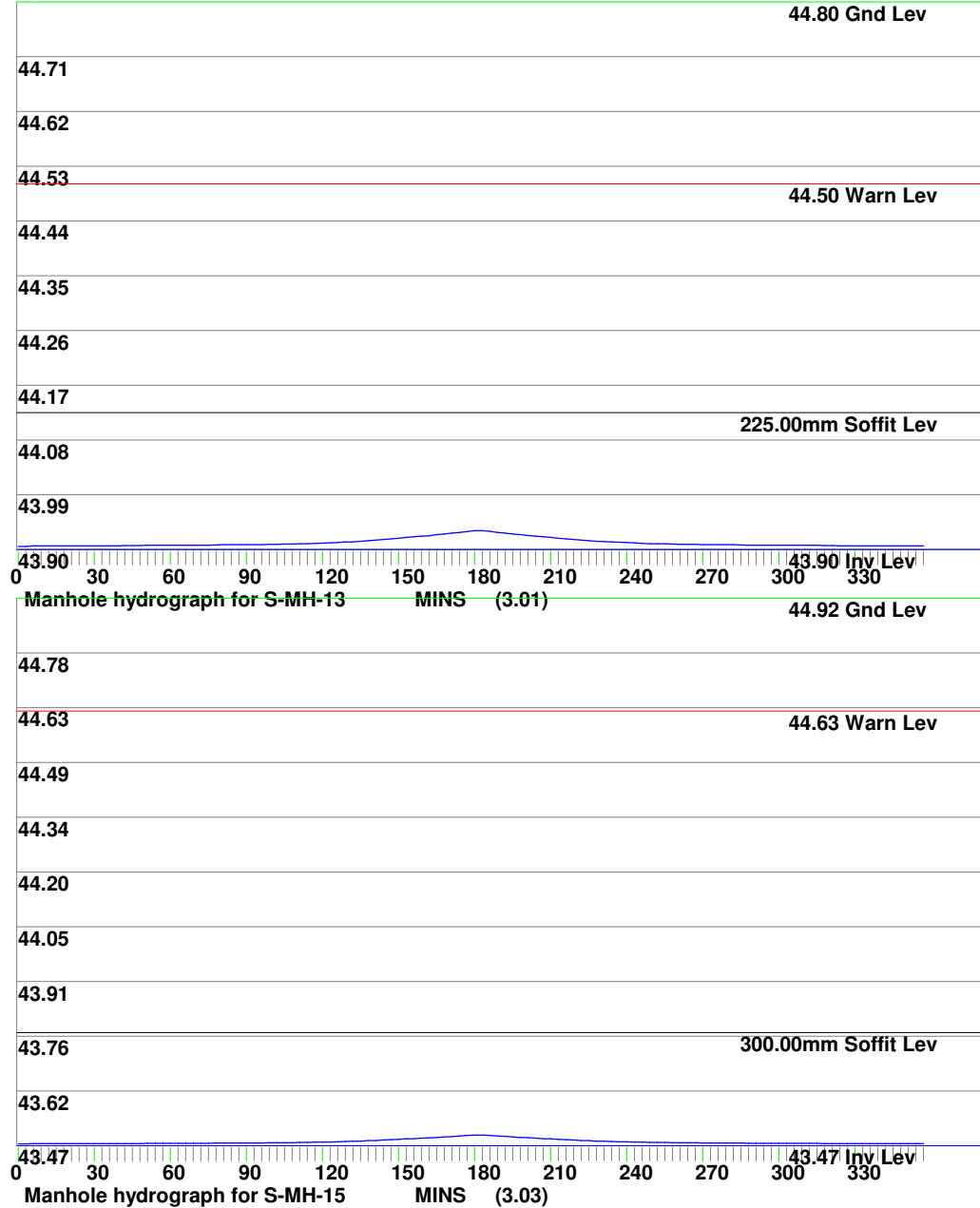
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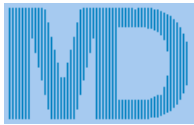
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Manhole hydrograph for S-MH-06 MINS (1.06)



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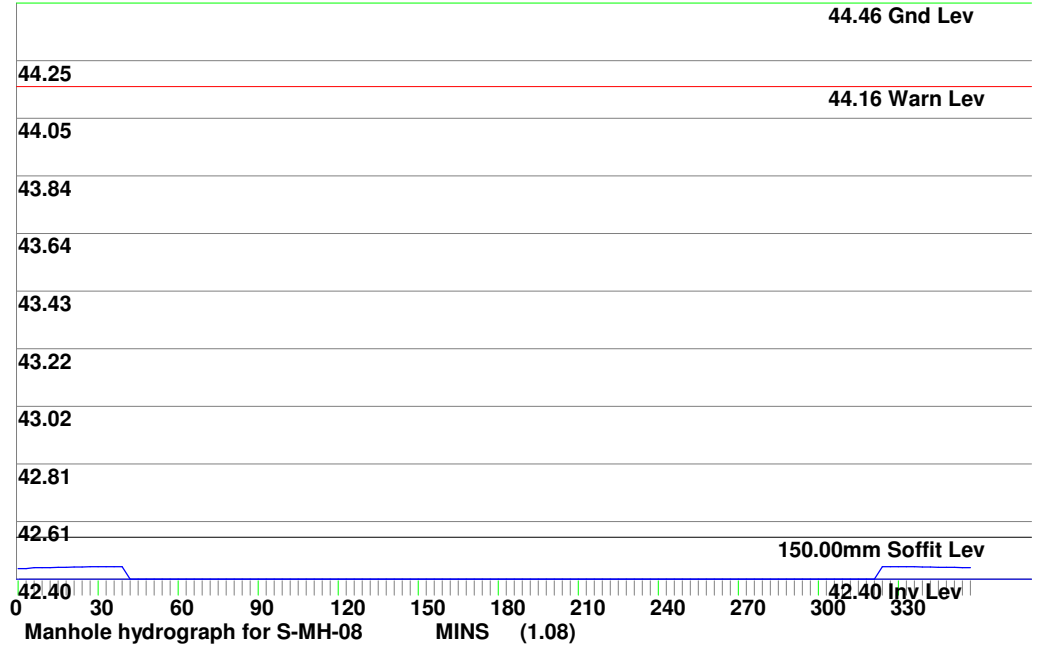
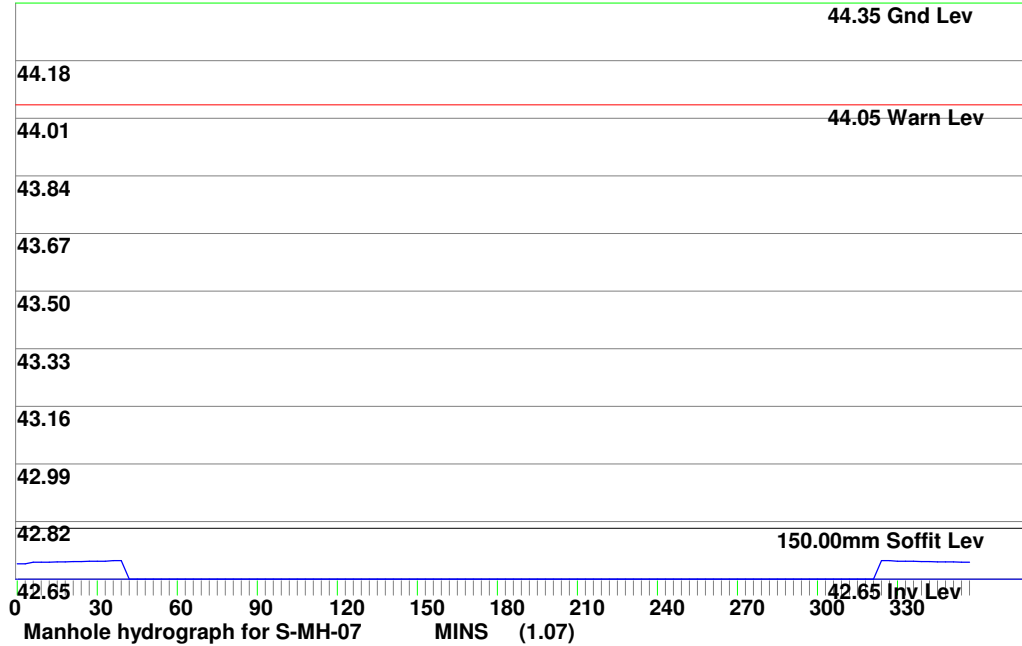
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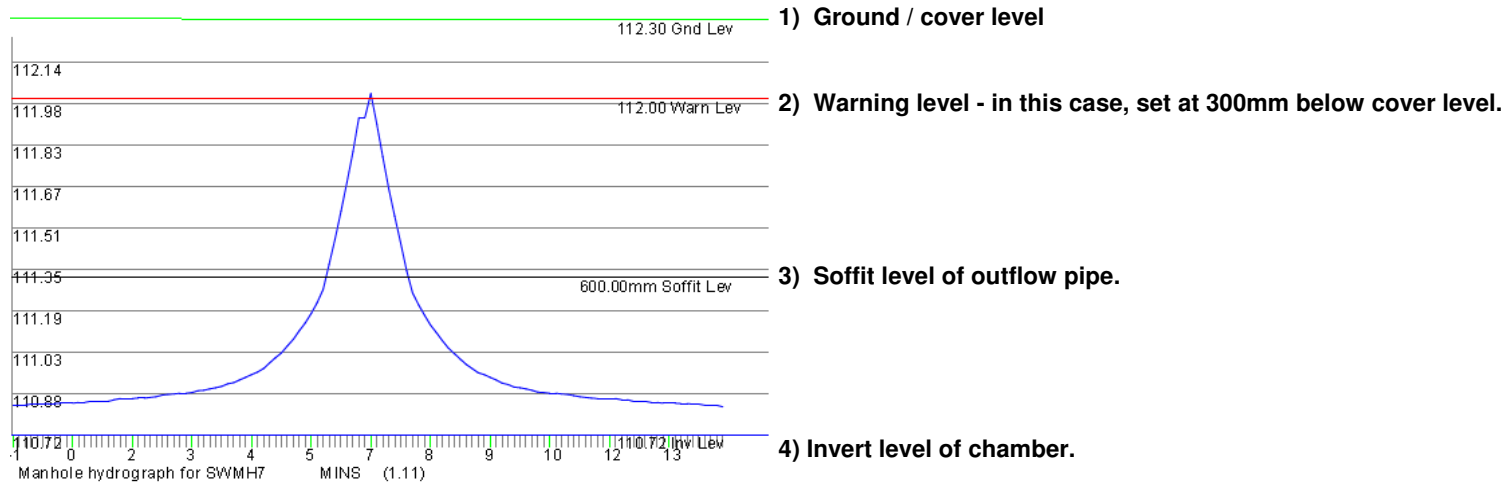
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- Notes**
- a) Lower section of the graph shows the water depth filling the channel. Channel is assumed to be a full pipe diameter in depth.
 - b) Upper section of the graph shows the water depth filling the chamber. Chamber has a greater width/diameter than the channel, so increases in depth are proportionally less.
 - c) The top of the graph clips the warning level and would be marked thus on the printout.
 - d) 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.
 - e) The diagram above is a general one and is not part of the current calculation.