



MasterDrain
SW

Muir Associates (UK) Limited

www.muir-associates.co.uk

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 = 360 mins
No offline storage

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

Peak rain intens. 35.00 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	2.2	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	6.6	300	1200	43.58	43.62	44.80	0.09	0.04	0.00	0.000	1579	OK
3	I	1.03	S-MH-03	78.4	8.8	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	8.8	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	4.5	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	14.9	450	1500	42.99	43.06	44.35	0.08	0.06	0.00	0.000	3560	OK
7	B	2.03	S-MH-12	398.2	14.9	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	23.8	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	2.2	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	6.6	300	1200	43.70	43.74	44.80	0.07	0.04	0.00	0.000	1582	OK
11	B	3.03	S-MH-15	298.4	8.9	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	4.7	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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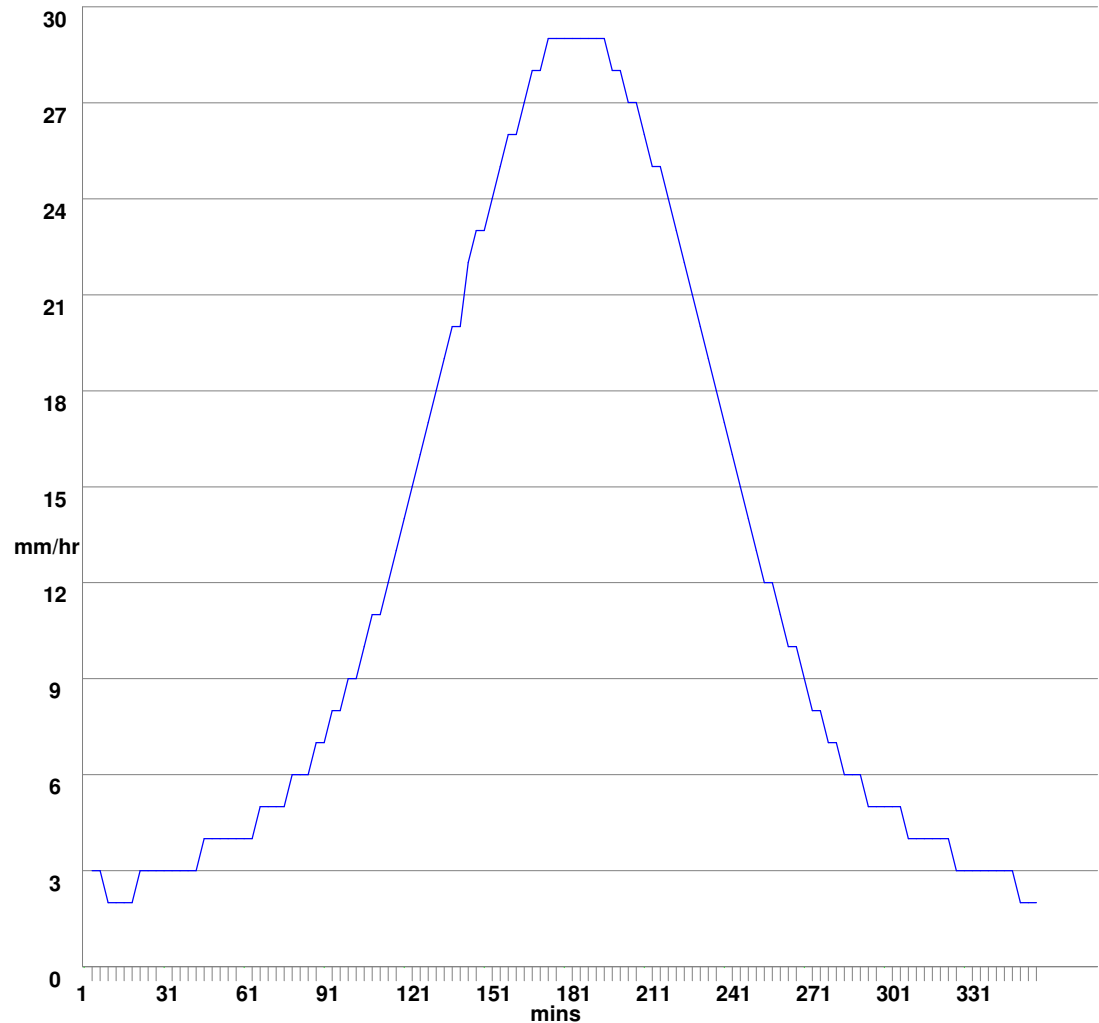
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
3:00	3.14	123:00	14.88	243:00	15.93
6:00	3.14	126:00	15.81	246:00	15.12
9:00	2.33	129:00	16.63	249:00	14.19
12:00	2.33	132:00	17.68	252:00	13.02
15:00	2.33	135:00	18.72	255:00	12.21
18:00	2.33	138:00	19.65	258:00	11.51
21:00	2.56	141:00	20.47	261:00	10.81
24:00	2.56	144:00	21.51	264:00	10.12
27:00	2.67	147:00	22.68	267:00	9.54
30:00	2.91	150:00	23.49	270:00	8.84
33:00	3.02	153:00	24.42	273:00	8.14
36:00	3.14	156:00	25.00	276:00	7.67
39:00	3.37	159:00	25.70	279:00	7.33
42:00	3.49	162:00	26.40	282:00	6.98
45:00	3.60	165:00	26.98	285:00	6.40
48:00	3.72	168:00	27.68	288:00	6.05
51:00	3.84	171:00	28.14	291:00	5.70
54:00	3.95	174:00	28.61	294:00	5.23
57:00	4.07	177:00	28.84	297:00	4.88
60:00	4.30	180:00	28.95	300:00	4.77
63:00	4.42	183:00	29.07	303:00	4.65
66:00	4.65	186:00	29.07	306:00	4.54
69:00	4.65	189:00	28.95	309:00	4.30
72:00	4.88	192:00	28.84	312:00	4.19
75:00	5.23	195:00	28.61	315:00	4.07
78:00	5.58	198:00	28.26	318:00	3.84
81:00	5.93	201:00	27.79	321:00	3.72
84:00	6.40	204:00	27.21	324:00	3.72
87:00	6.74	207:00	26.51	327:00	3.49
90:00	7.21	210:00	25.81	330:00	3.37
93:00	7.56	213:00	25.23	333:00	3.14
96:00	8.14	216:00	24.54	336:00	3.02
99:00	8.72	219:00	23.72	339:00	2.91
102:00	9.30	222:00	22.79	342:00	2.79
105:00	10.00	225:00	21.75	345:00	2.56
108:00	10.70	228:00	20.70	348:00	2.56
111:00	11.28	231:00	19.77	351:00	2.44
114:00	12.09	234:00	18.84	354:00	2.33
117:00	12.91	237:00	18.02	357:00	2.33
120:00	13.95	240:00	16.86	360:00	2.33

Hydrograph profile derived from data in the Flood Studies Report

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





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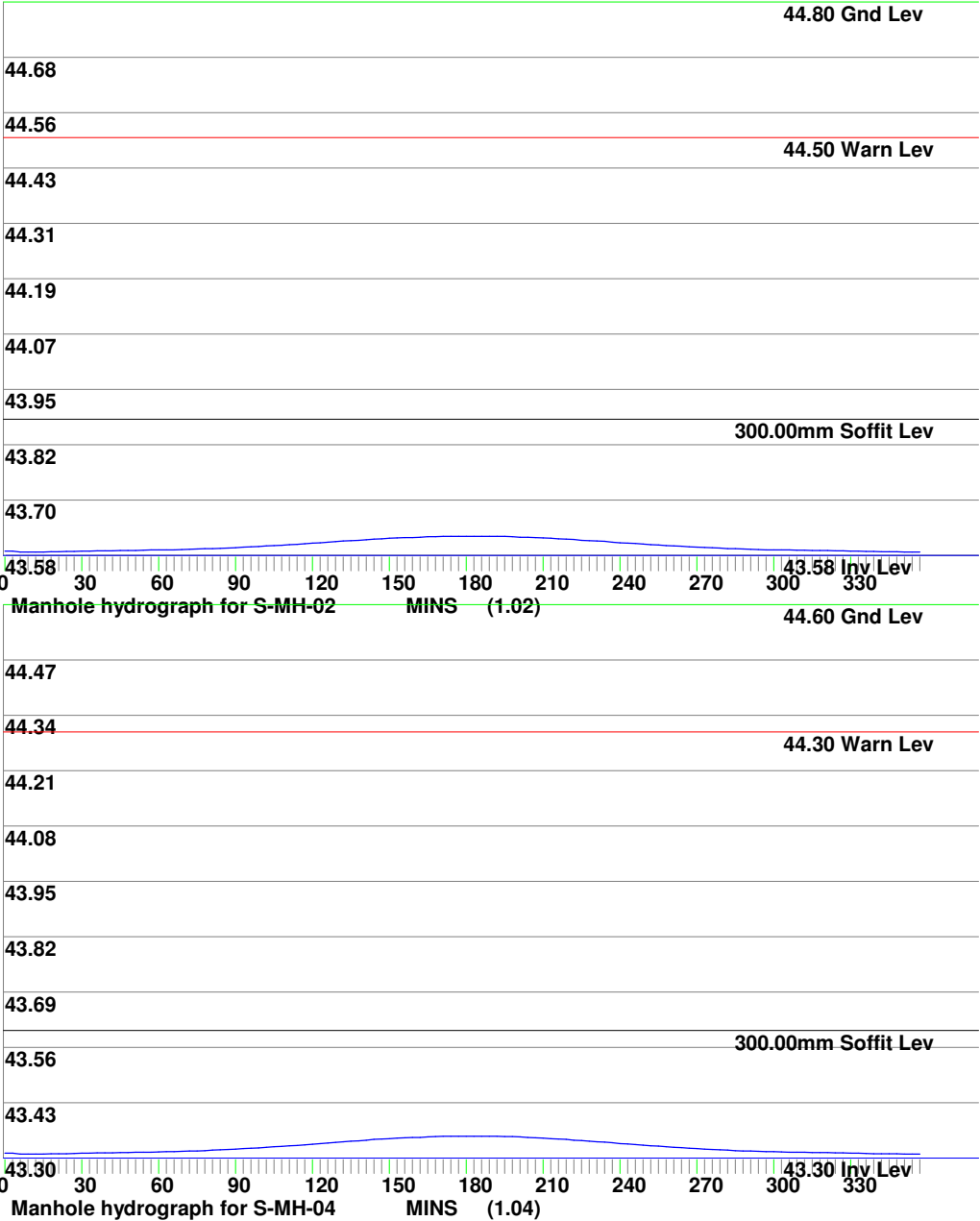
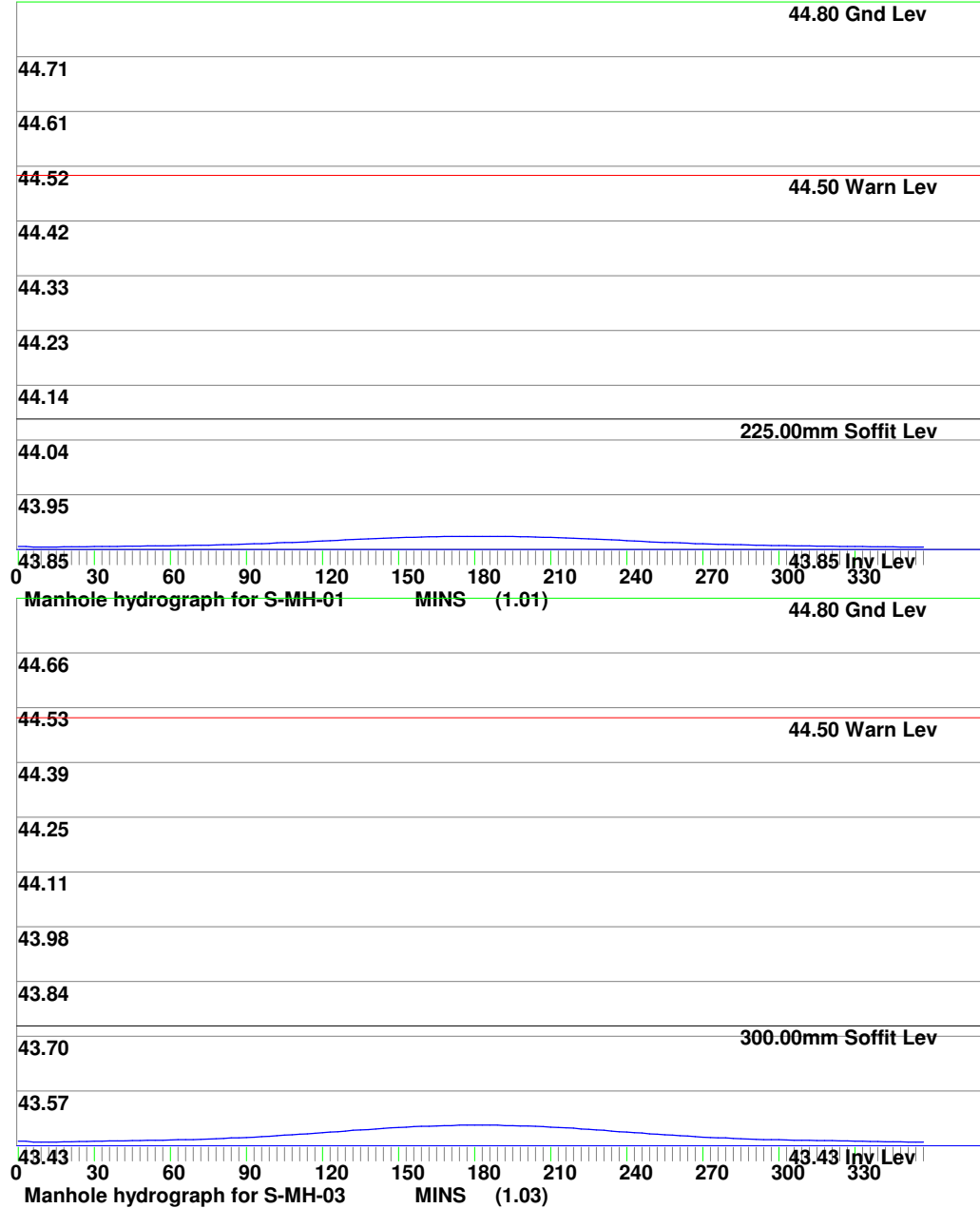
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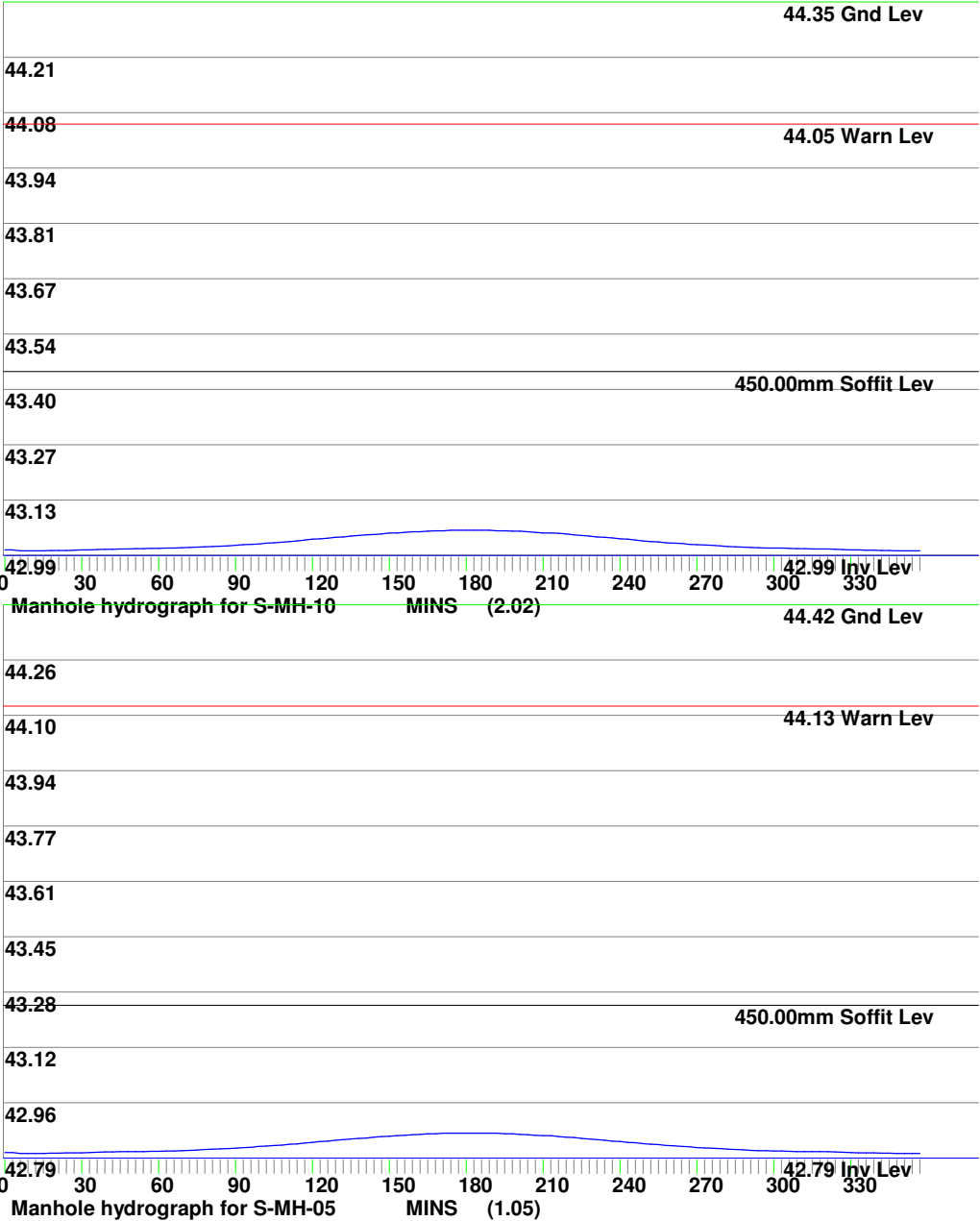
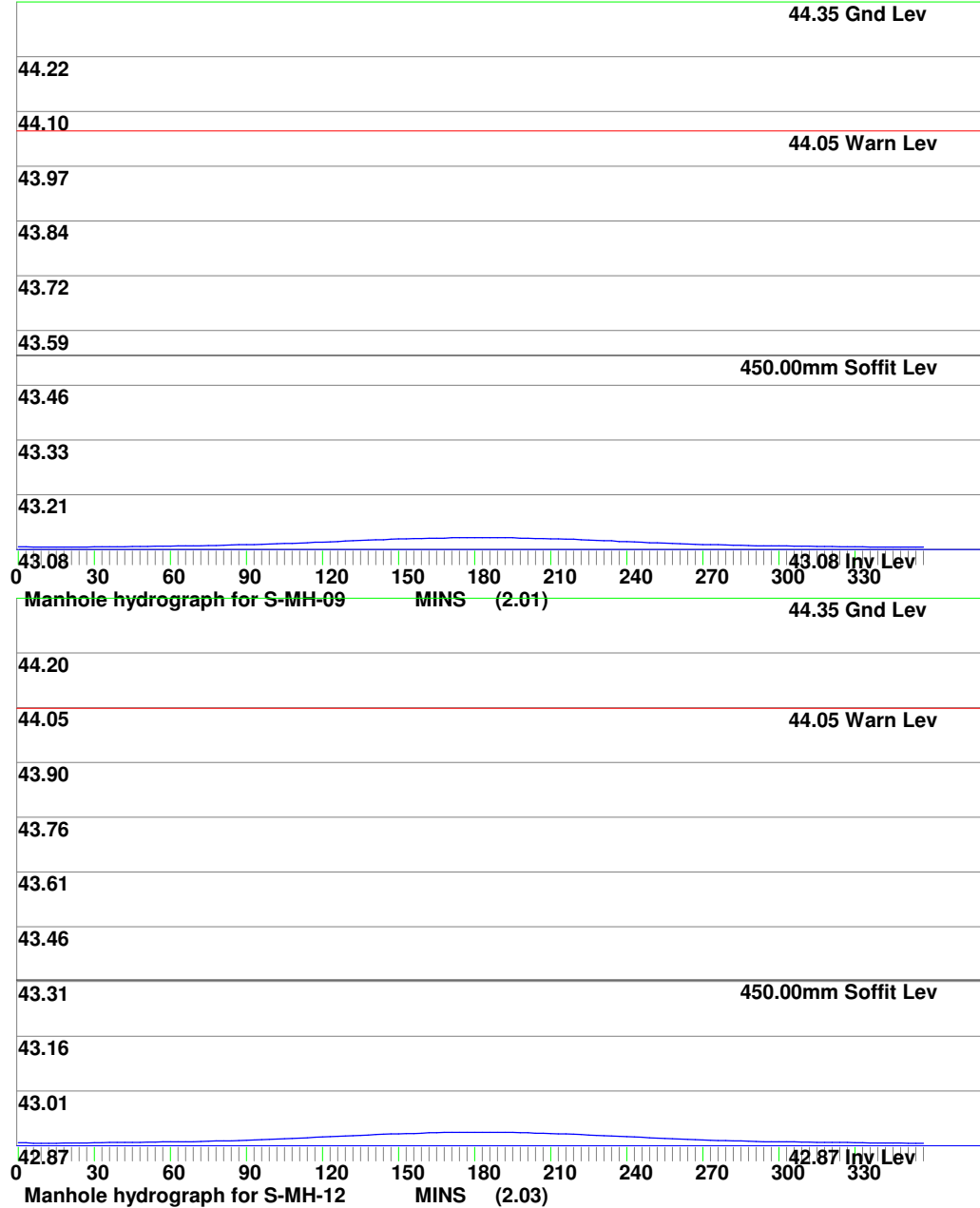
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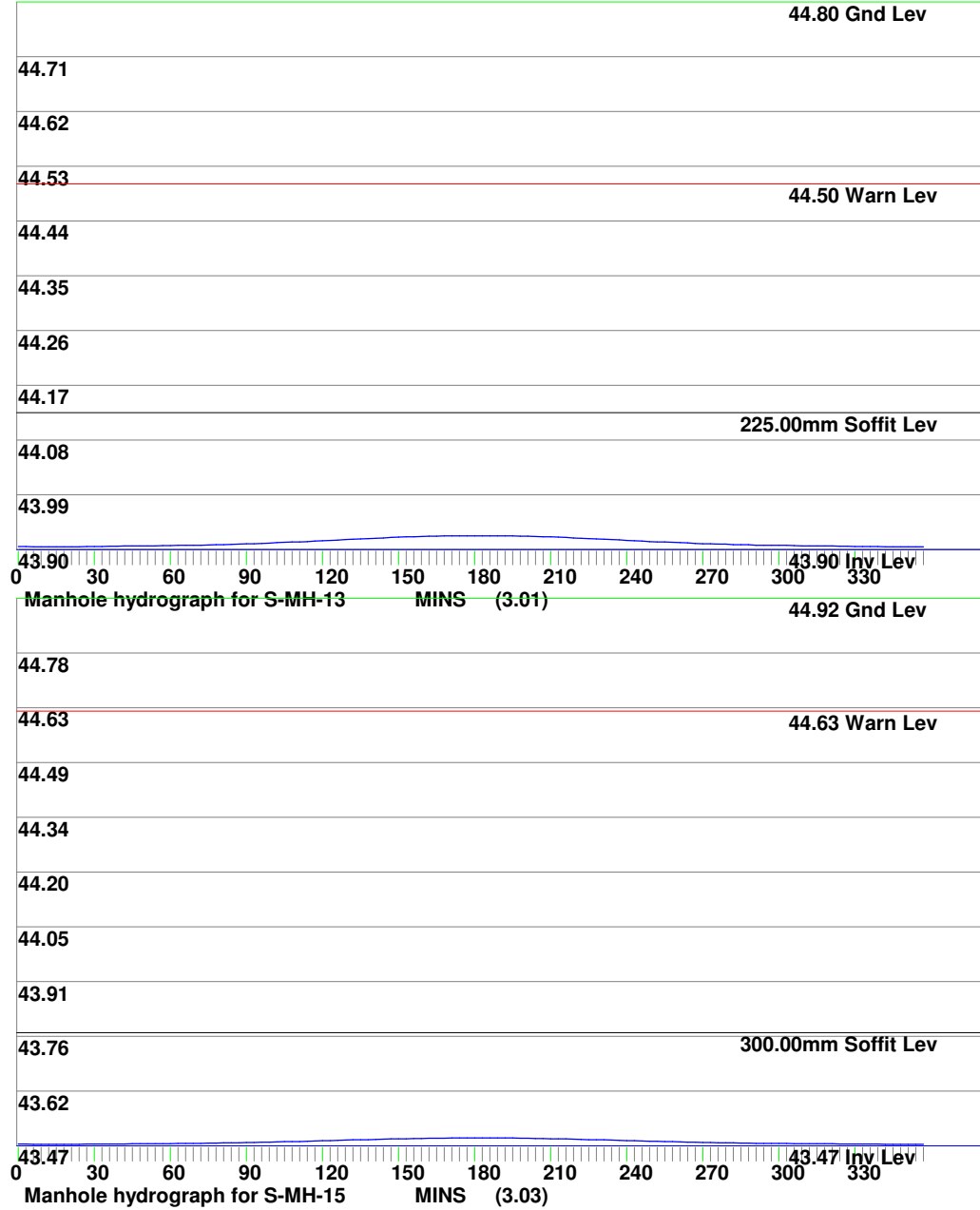
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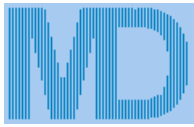
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Manhole hydrograph for S-MH-06 MINS (1.06)



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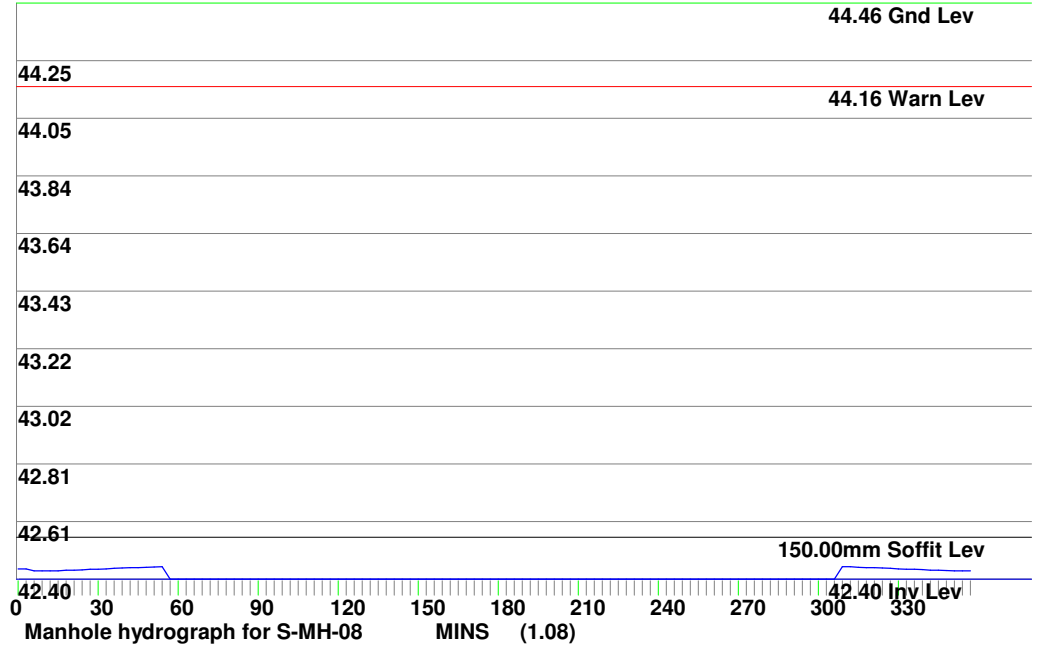
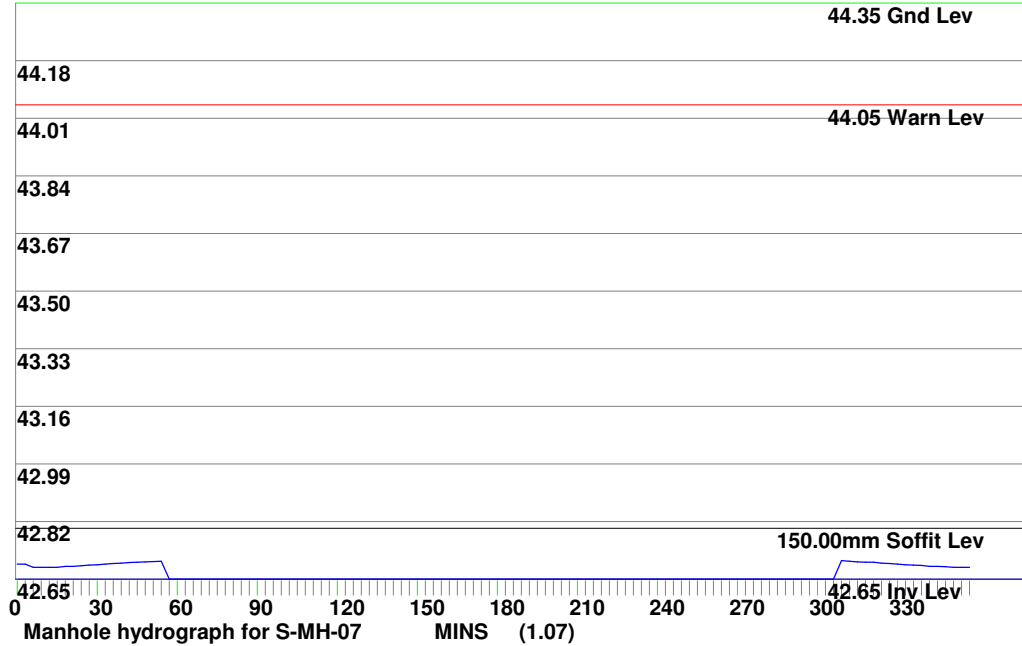
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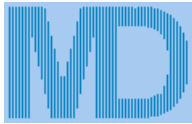
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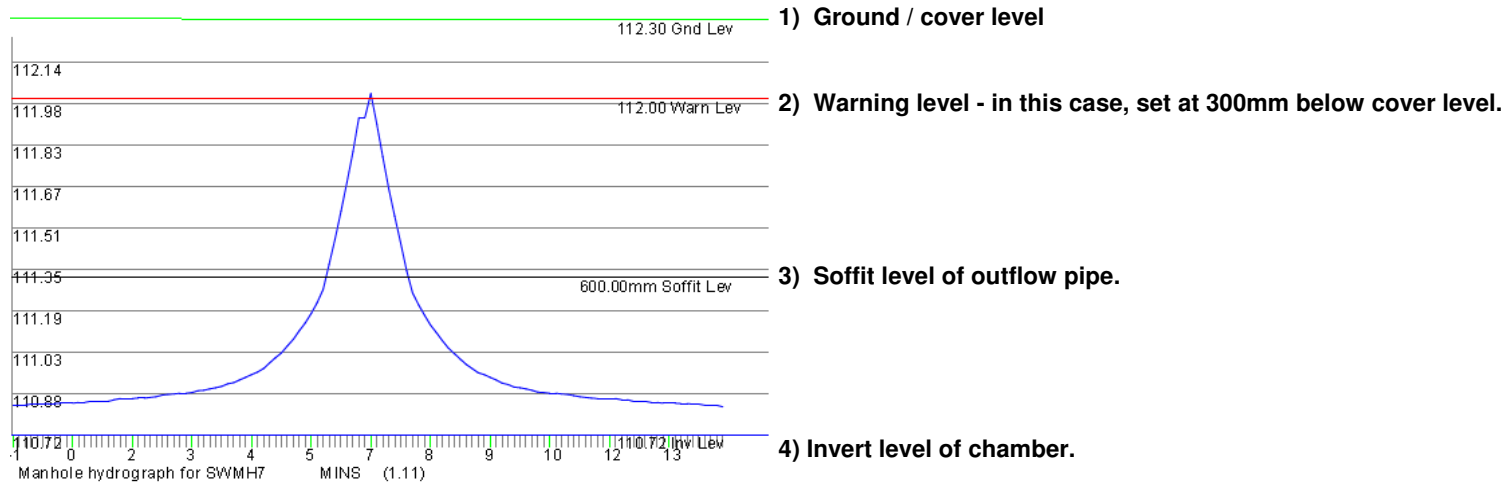
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Notes

- 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.