



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 = 240 mins
No offline storage

Mean rain intens. 19.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 47.50 mm/hr
Sample period = 120.0 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	3.1	225	1200	43.85	43.88	44.80	0.07	0.03	0.00	0.000	527	OK
2	I	1.02	S-MH-02	77.8	9.1	300	1200	43.58	43.63	44.80	0.12	0.05	0.00	0.000	1579	OK
3	I	1.03	S-MH-03	78.4	12.2	300	1200	43.43	43.49	44.80	0.16	0.06	0.00	0.000	2106	OK
4	I	1.04	S-MH-04	78.0	12.2	300	1500	43.30	43.37	44.60	0.16	0.07	0.00	0.000	2106	OK
5	B	2.01	S-MH-09	184.0	6.2	450	1500	43.08	43.11	44.35	0.03	0.03	0.00	0.000	1065	OK
6	B	2.02	S-MH-10	184.9	20.6	450	1500	42.99	43.07	44.35	0.11	0.08	0.00	0.000	3560	OK
7	B	2.03	S-MH-12	398.2	20.6	450	1500	42.87	42.91	44.35	0.05	0.05	0.00	0.000	3560	OK
8	I	1.05	S-MH-05	227.8	32.8	450	1500	42.79	42.89	44.42	0.14	0.09	0.00	0.000	5666	OK
9	B	3.01	S-MH-13	42.1	3.1	225	1200	43.90	43.93	44.80	0.07	0.03	0.00	0.000	527	OK
10	B	3.02	S-MH-14	95.8	9.2	300	1200	43.70	43.75	44.80	0.10	0.05	0.00	0.000	1582	OK
11	B	3.03	S-MH-15	298.4	12.2	300	1200	43.47	43.50	44.92	0.04	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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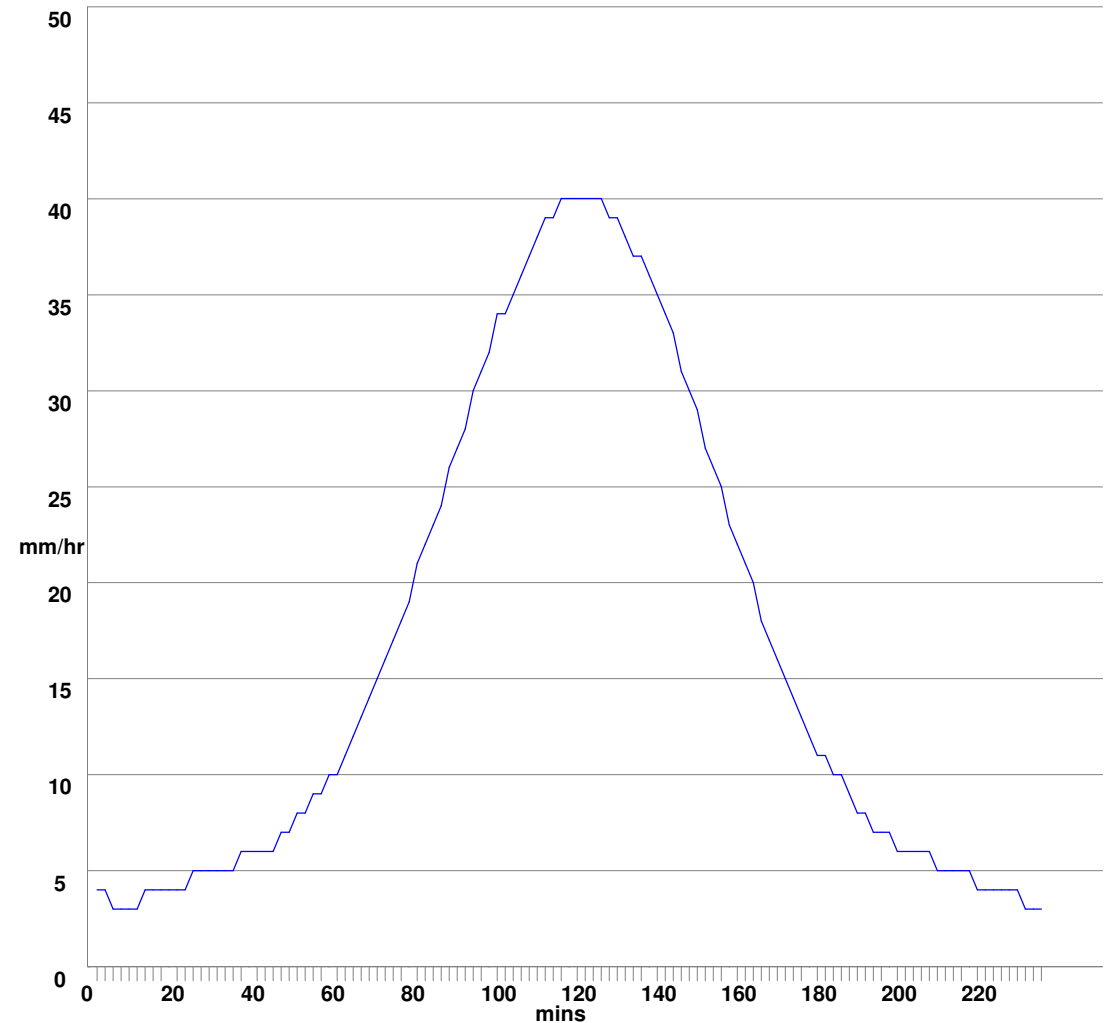
Project

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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
2:00	4.33	82:00	20.51	162:00	21.95
4:00	4.33	84:00	21.79	164:00	20.83
6:00	3.20	86:00	22.91	166:00	19.54
8:00	3.20	88:00	24.35	168:00	17.94
10:00	3.20	90:00	25.79	170:00	16.82
12:00	3.20	92:00	27.07	172:00	15.86
14:00	3.52	94:00	28.20	174:00	14.90
16:00	3.52	96:00	29.64	176:00	13.94
18:00	3.68	98:00	31.24	178:00	13.14
20:00	4.00	100:00	32.36	180:00	12.18
22:00	4.17	102:00	33.64	182:00	11.21
24:00	4.33	104:00	34.44	184:00	10.57
26:00	4.65	106:00	35.40	186:00	10.09
28:00	4.81	108:00	36.37	188:00	9.61
30:00	4.97	110:00	37.17	190:00	8.81
32:00	5.13	112:00	38.13	192:00	8.33
34:00	5.29	114:00	38.77	194:00	7.85
36:00	5.45	116:00	39.41	196:00	7.21
38:00	5.61	118:00	39.73	198:00	6.73
40:00	5.93	120:00	39.89	200:00	6.57
42:00	6.09	122:00	40.05	202:00	6.41
44:00	6.41	124:00	40.05	204:00	6.25
46:00	6.41	126:00	39.89	206:00	5.93
48:00	6.73	128:00	39.73	208:00	5.77
50:00	7.21	130:00	39.41	210:00	5.61
52:00	7.69	132:00	38.93	212:00	5.29
54:00	8.17	134:00	38.29	214:00	5.13
56:00	8.81	136:00	37.49	216:00	5.13
58:00	9.29	138:00	36.53	218:00	4.81
60:00	9.93	140:00	35.56	220:00	4.65
62:00	10.41	142:00	34.76	222:00	4.33
64:00	11.21	144:00	33.80	224:00	4.17
66:00	12.01	146:00	32.68	226:00	4.00
68:00	12.82	148:00	31.40	228:00	3.84
70:00	13.78	150:00	29.96	230:00	3.52
72:00	14.74	152:00	28.52	232:00	3.52
74:00	15.54	154:00	27.23	234:00	3.36
76:00	16.66	156:00	25.95	236:00	3.20
78:00	17.78	158:00	24.83	238:00	3.20
80:00	19.22	160:00	23.23	240:00	3.20

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 240 mins Profile - winter





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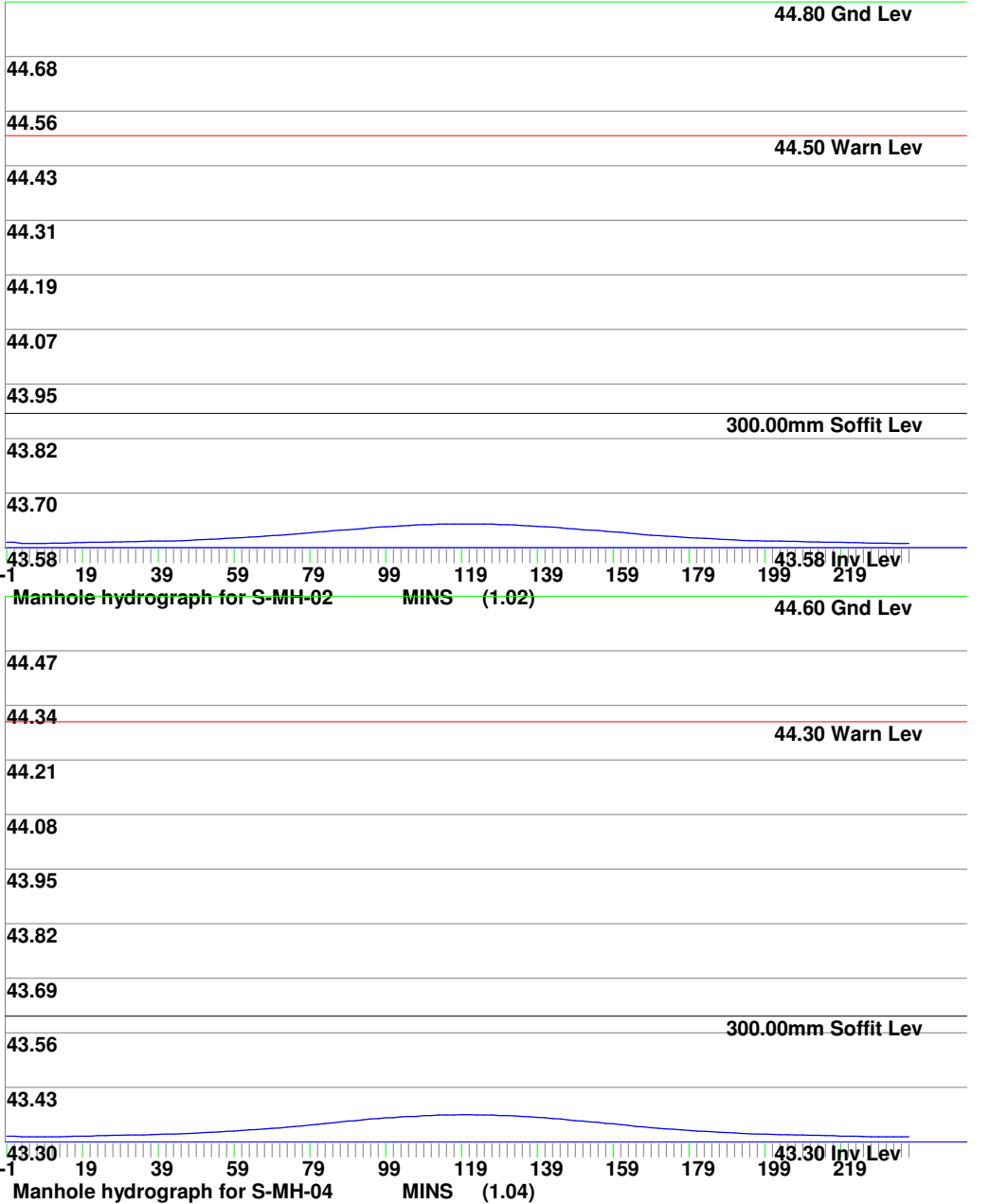
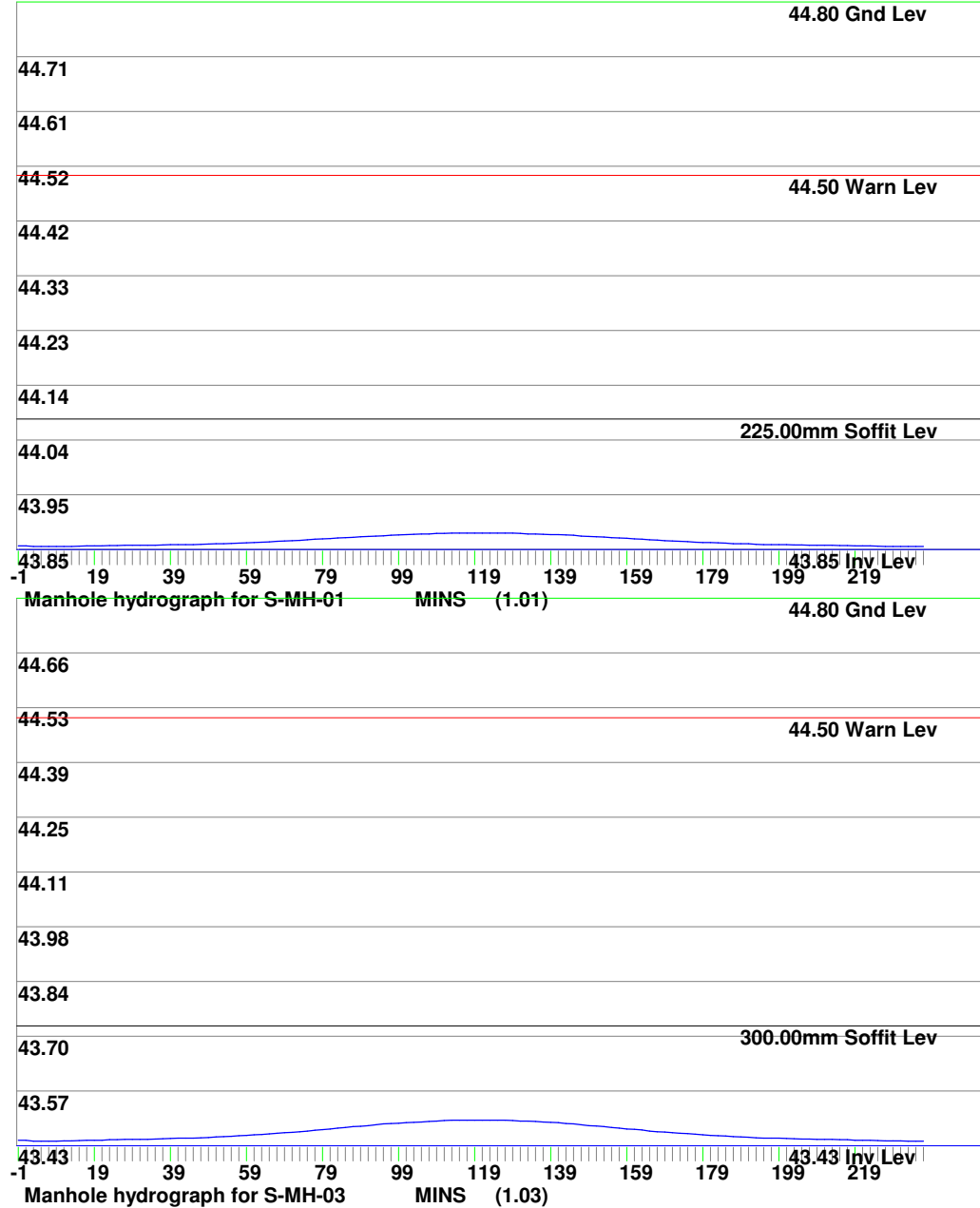
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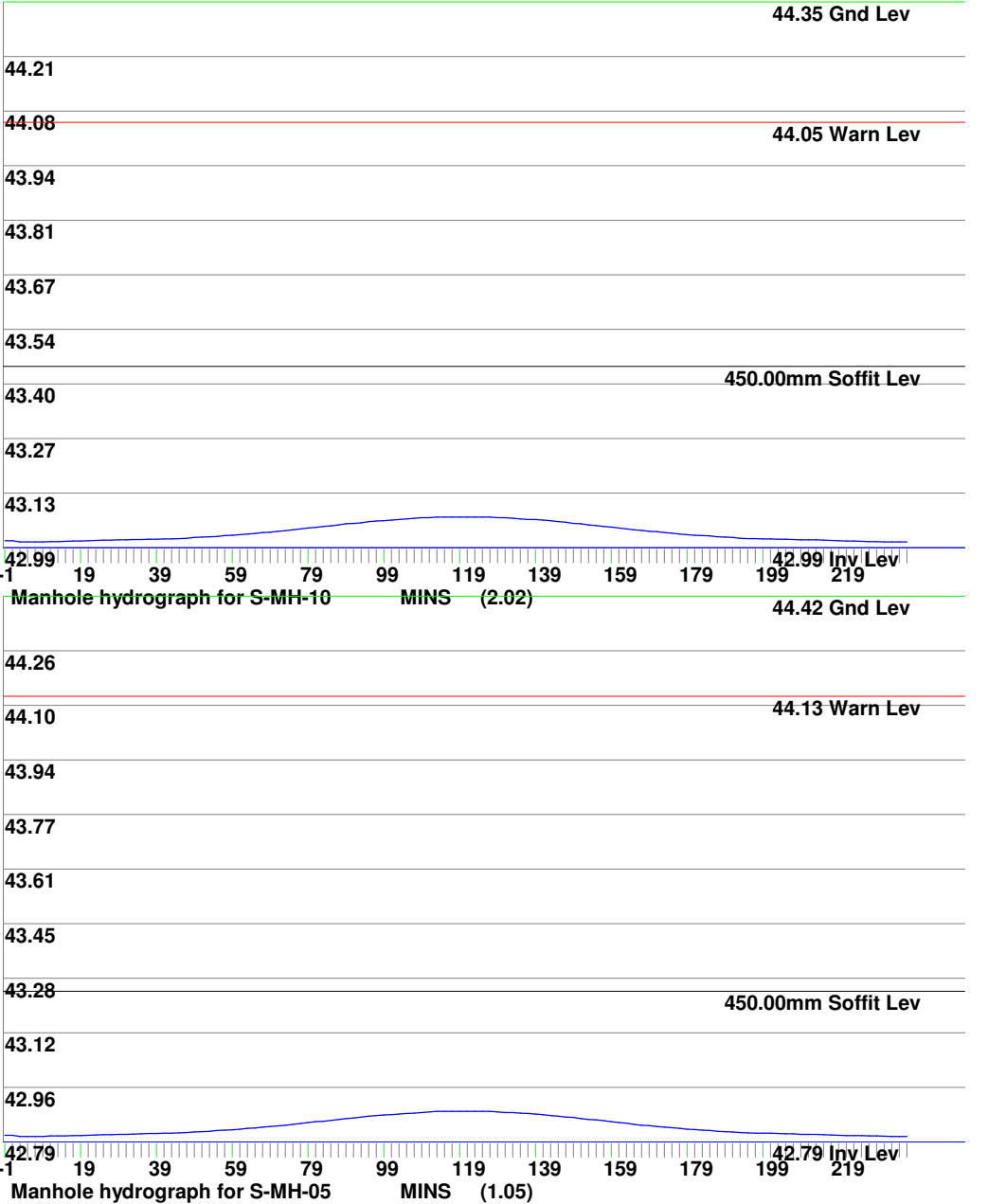
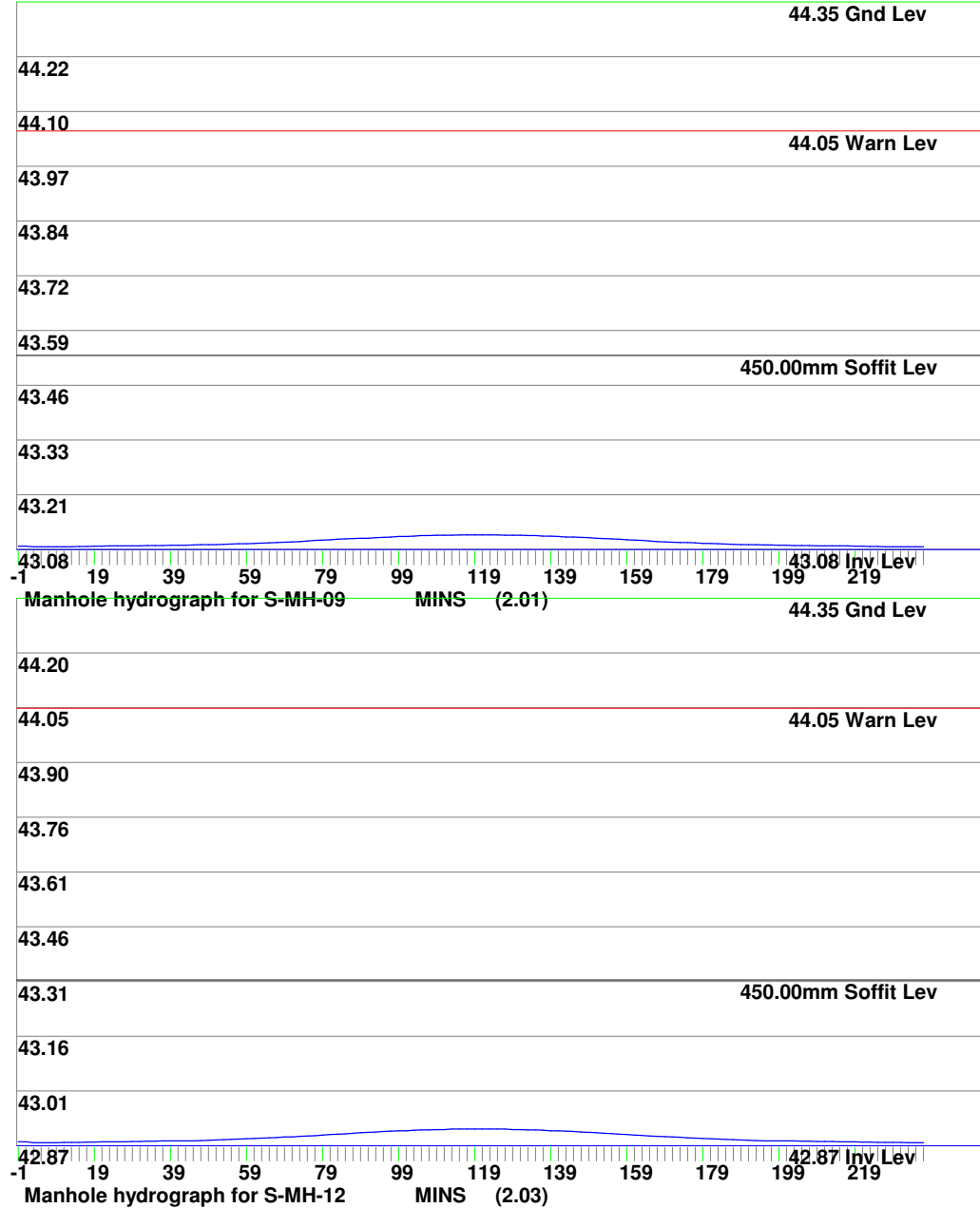
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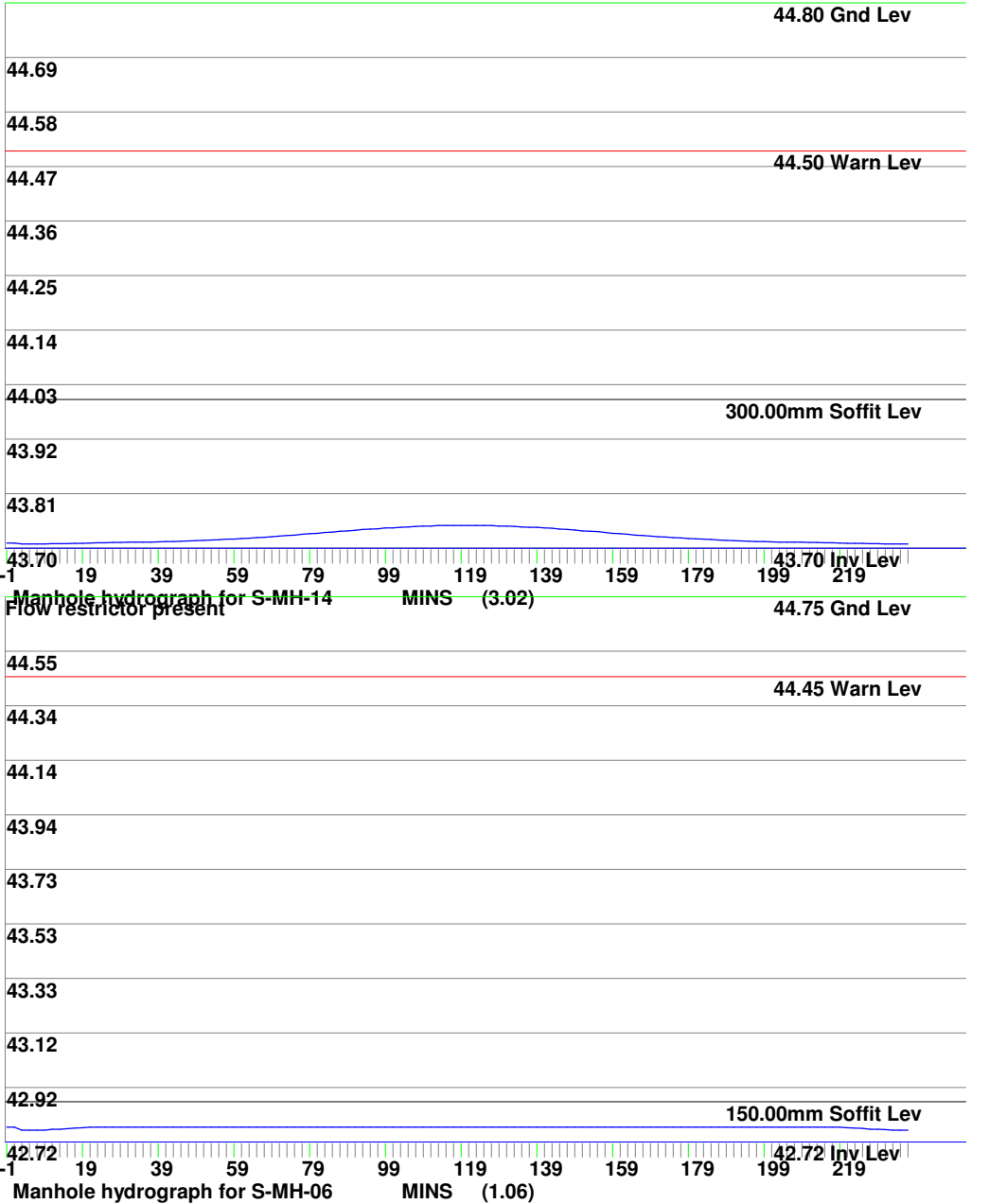
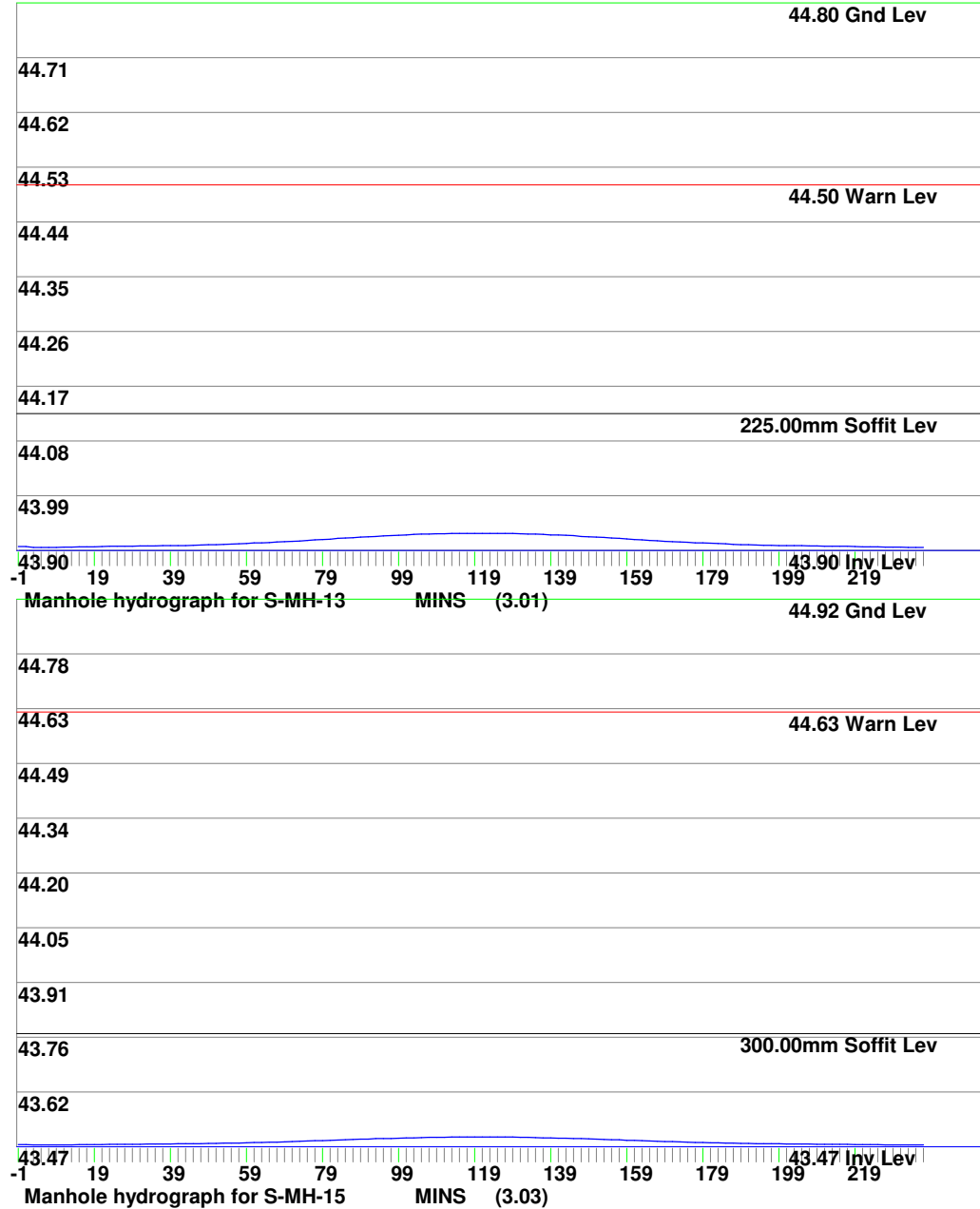
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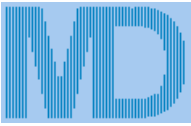
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Manhole hydrograph for S-MH-06

MINS (1.06)



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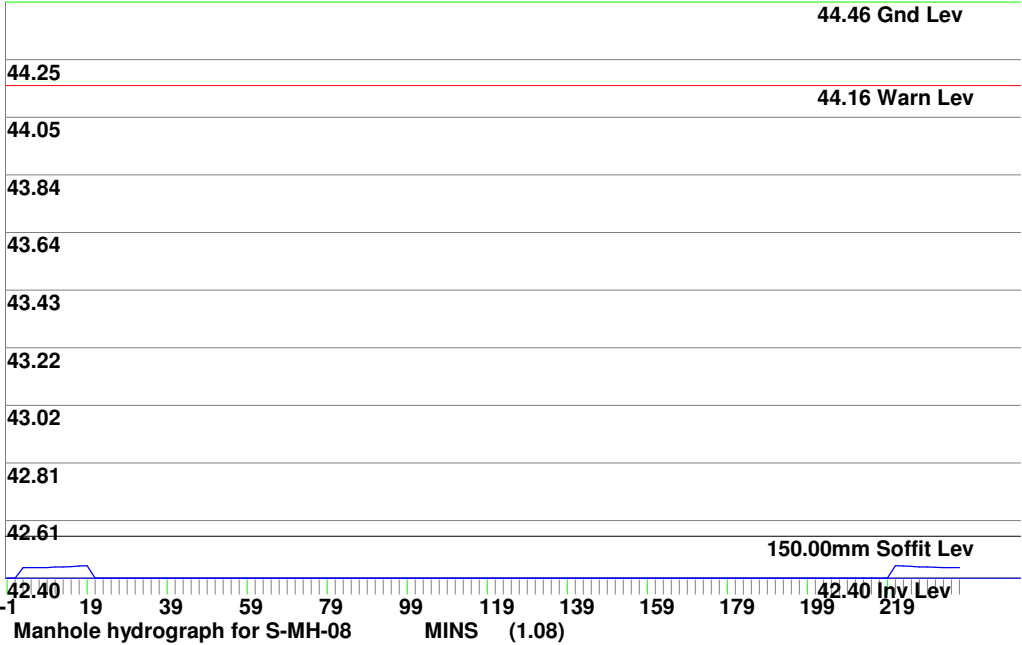
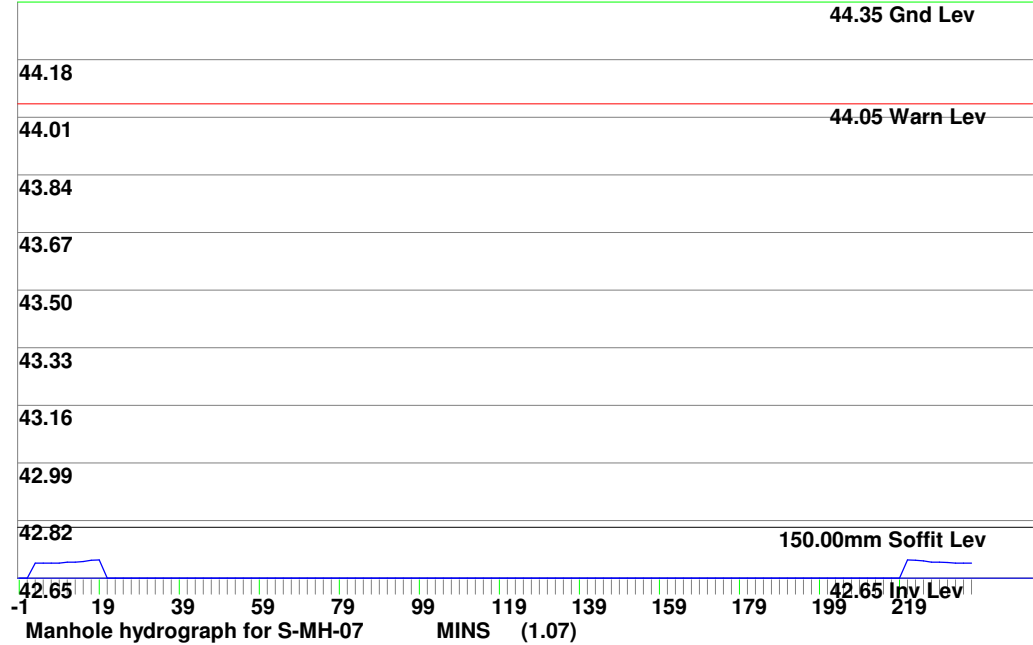
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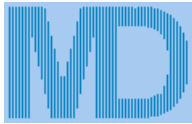
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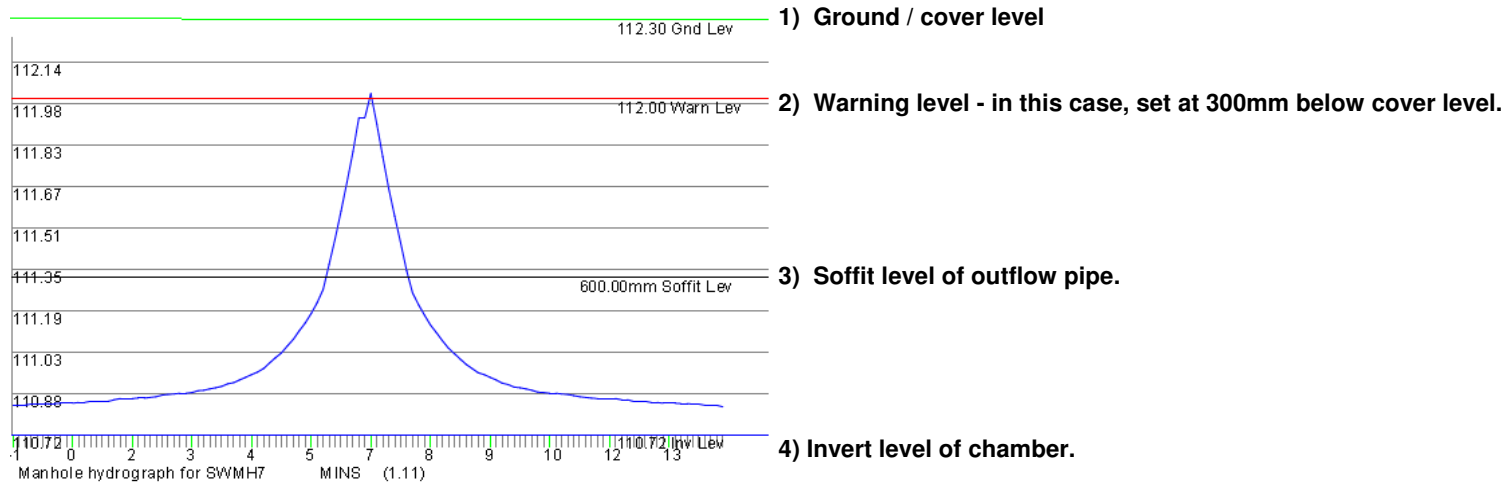
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Notes

- 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.