



MasterDrain
SW

Muir Associates (UK) Limited

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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 = 240 mins
No offline storage

Mean rain intens. 10.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 39.20 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 fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) x FACTOR	STATUS
1	I	1.01 S-MH-01	42.1	2.6	225	1200	43.85	43.88	44.80	0.06	0.03	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	7.8	300	1200	43.58	43.63	44.80	0.10	0.05	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	10.4	300	1200	43.43	43.49	44.80	0.13	0.06	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	10.4	300	1500	43.30	43.36	44.60	0.13	0.06	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	5.3	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	17.6	450	1500	42.99	43.06	44.35	0.10	0.07	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	17.6	450	1500	42.87	42.91	44.35	0.04	0.04	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	28.1	450	1500	42.79	42.88	44.42	0.12	0.08	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	2.6	225	1200	43.90	43.93	44.80	0.06	0.03	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	7.8	300	1200	43.70	43.74	44.80	0.08	0.04	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	10.4	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

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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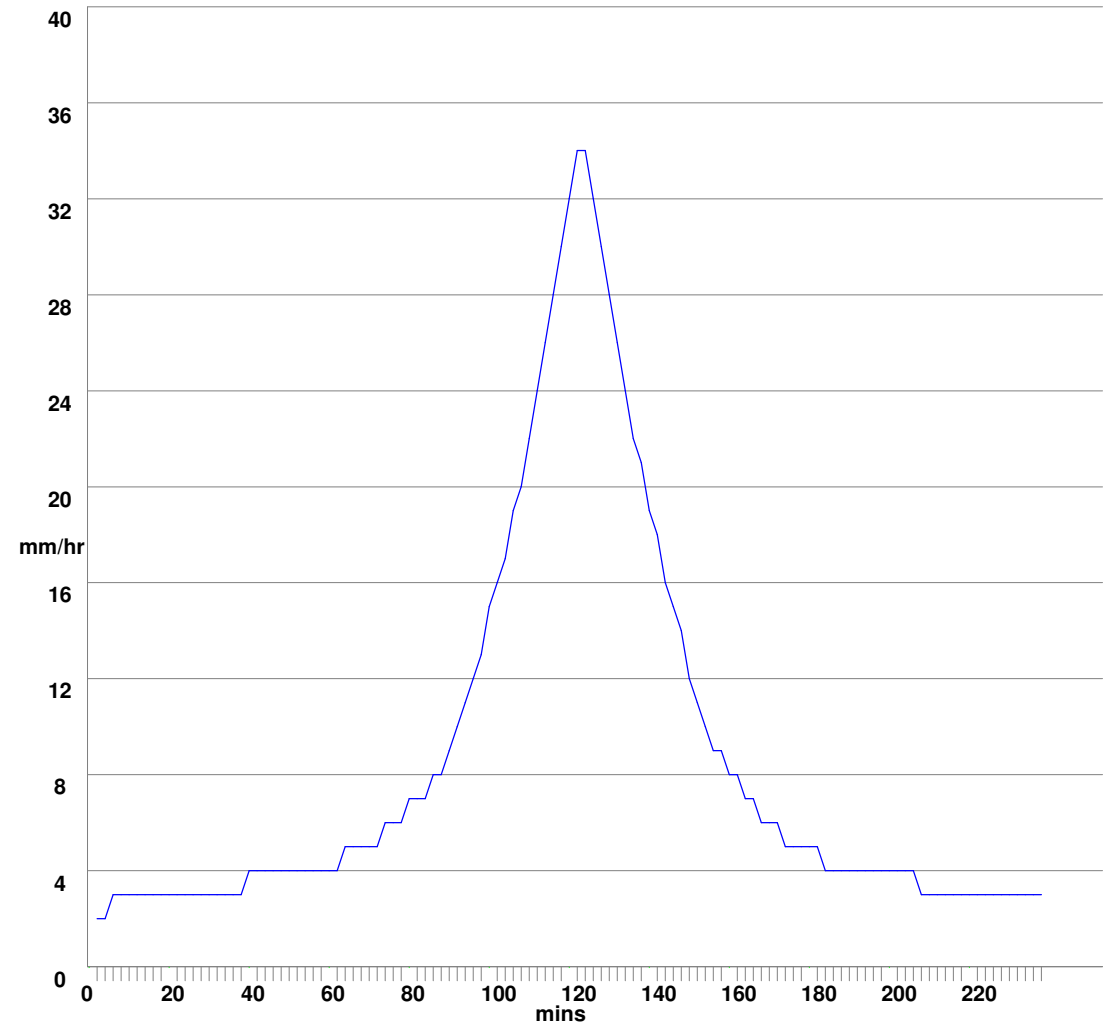
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
2:00	2.45	82:00	7.00	162:00	7.52
4:00	2.45	84:00	7.43	164:00	7.08
6:00	2.80	86:00	7.87	166:00	6.65
8:00	2.80	88:00	8.48	168:00	6.21
10:00	2.80	90:00	9.27	170:00	5.95
12:00	2.89	92:00	10.23	172:00	5.60
14:00	2.89	94:00	11.11	174:00	5.33
16:00	2.97	96:00	12.07	176:00	5.16
18:00	2.97	98:00	13.38	178:00	4.99
20:00	3.06	100:00	14.69	180:00	4.90
22:00	3.06	102:00	16.00	182:00	4.64
24:00	3.06	104:00	17.40	184:00	4.46
26:00	3.15	106:00	18.89	186:00	4.46
28:00	3.15	108:00	20.29	188:00	4.37
30:00	3.32	110:00	21.86	190:00	4.29
32:00	3.32	112:00	23.79	192:00	4.20
34:00	3.32	114:00	25.63	194:00	3.94
36:00	3.41	116:00	27.55	196:00	3.85
38:00	3.50	118:00	29.74	198:00	3.76
40:00	3.59	120:00	32.01	200:00	3.76
42:00	3.59	122:00	34.28	202:00	3.67
44:00	3.67	124:00	34.28	204:00	3.59
46:00	3.67	126:00	32.45	206:00	3.59
48:00	3.76	128:00	30.09	208:00	3.50
50:00	3.85	130:00	27.99	210:00	3.41
52:00	3.94	132:00	25.98	212:00	3.41
54:00	4.11	134:00	24.05	214:00	3.32
56:00	4.29	136:00	22.30	216:00	3.32
58:00	4.37	138:00	20.64	218:00	3.15
60:00	4.46	140:00	19.15	220:00	3.15
62:00	4.46	142:00	17.67	222:00	3.06
64:00	4.64	144:00	16.18	224:00	3.06
66:00	4.72	146:00	14.96	226:00	3.06
68:00	4.99	148:00	13.56	228:00	2.97
70:00	5.16	150:00	12.42	230:00	2.97
72:00	5.33	152:00	11.28	232:00	2.89
74:00	5.51	154:00	10.32	234:00	2.89
76:00	5.86	156:00	9.45	236:00	2.89
78:00	6.12	158:00	8.57	238:00	2.80
80:00	6.56	160:00	7.96	240:00	2.80

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 240 mins Profile - summer





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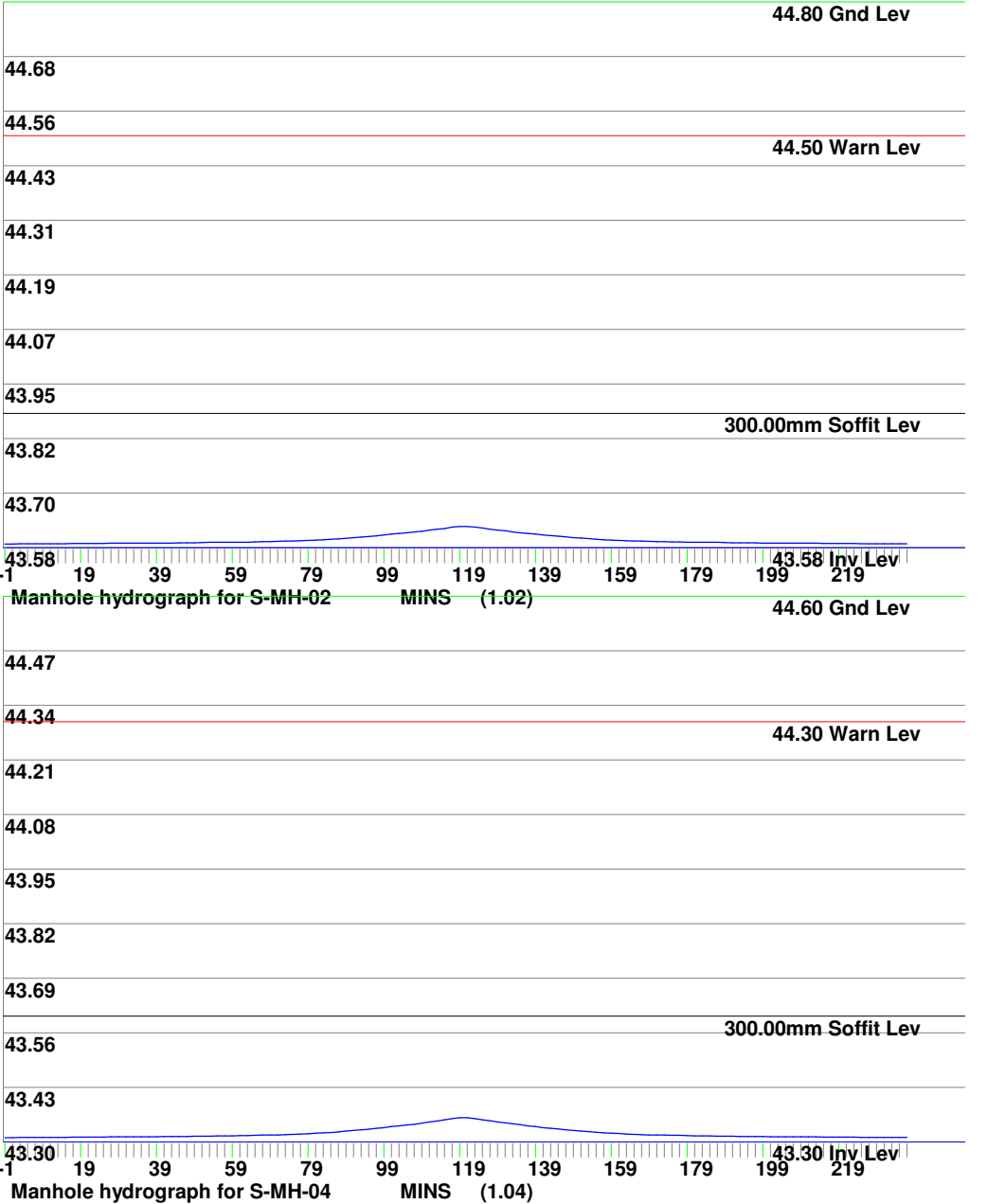
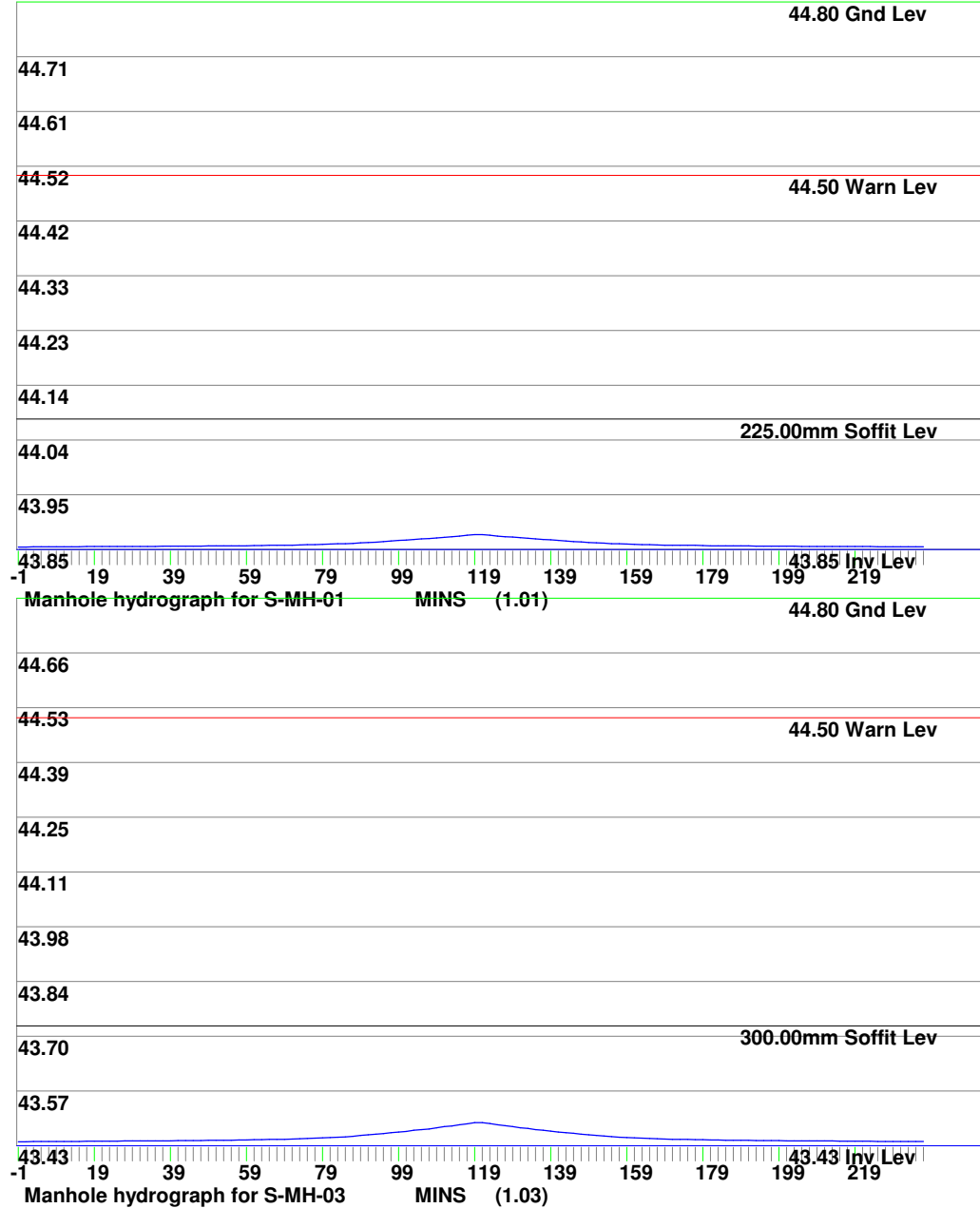
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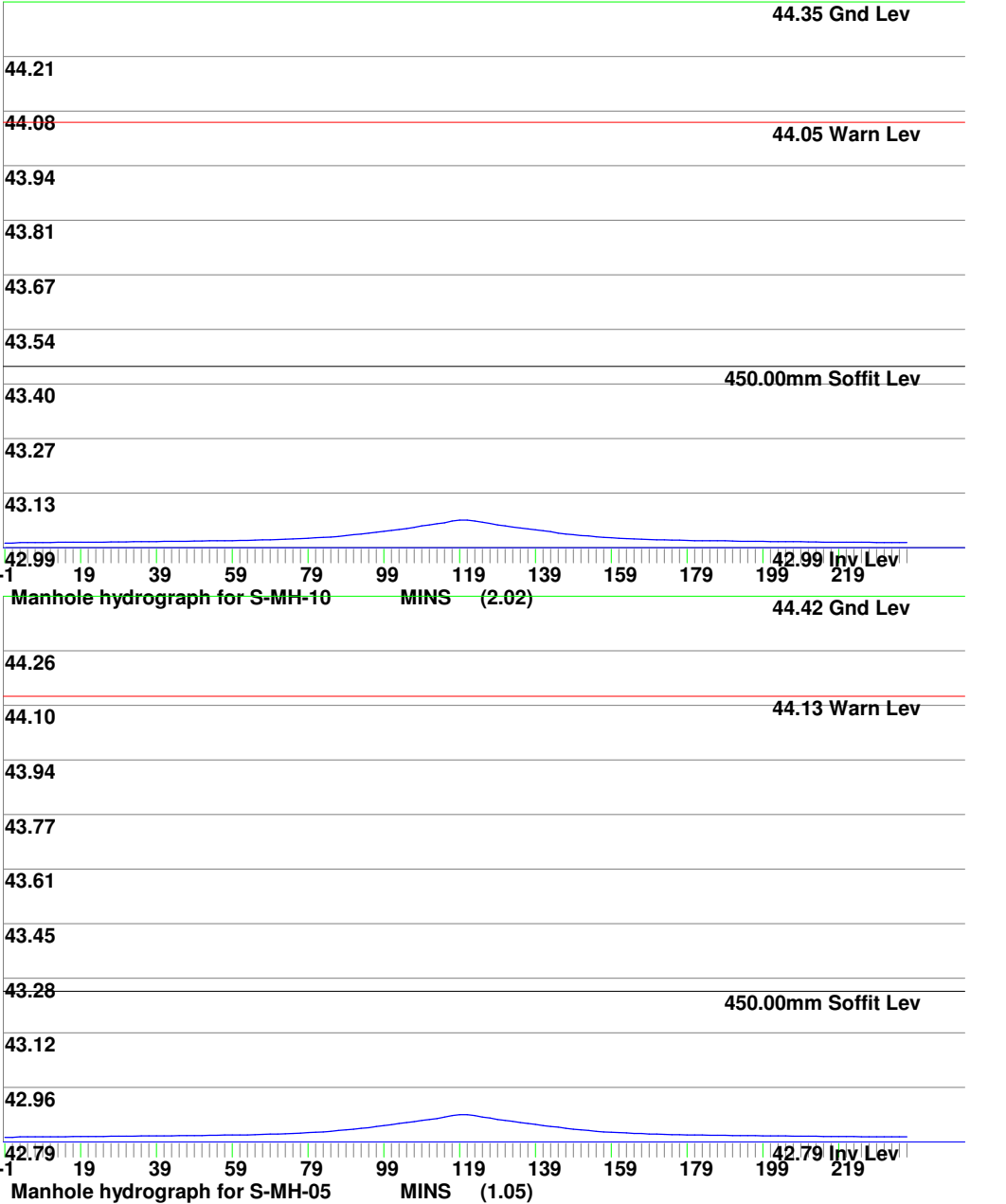
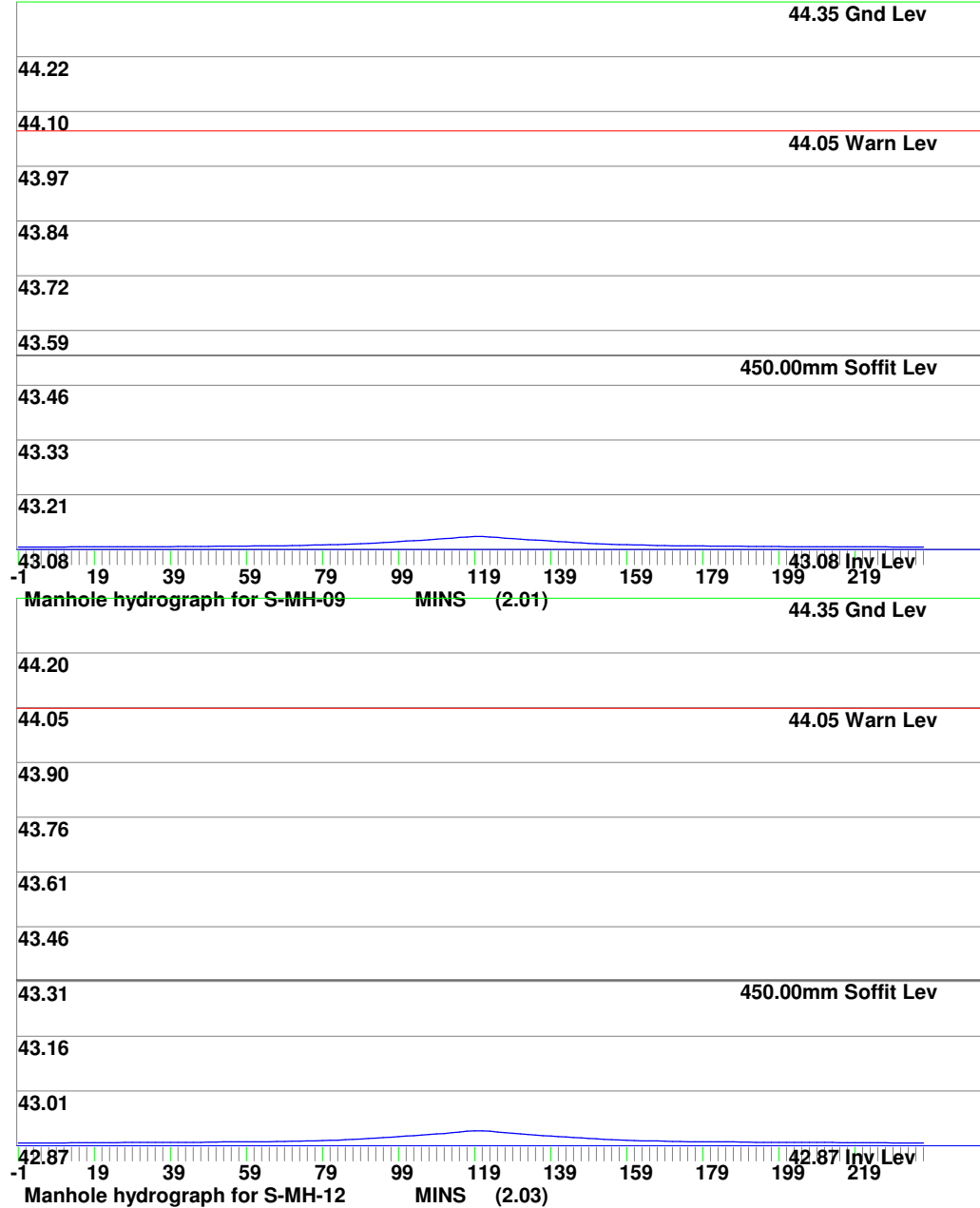
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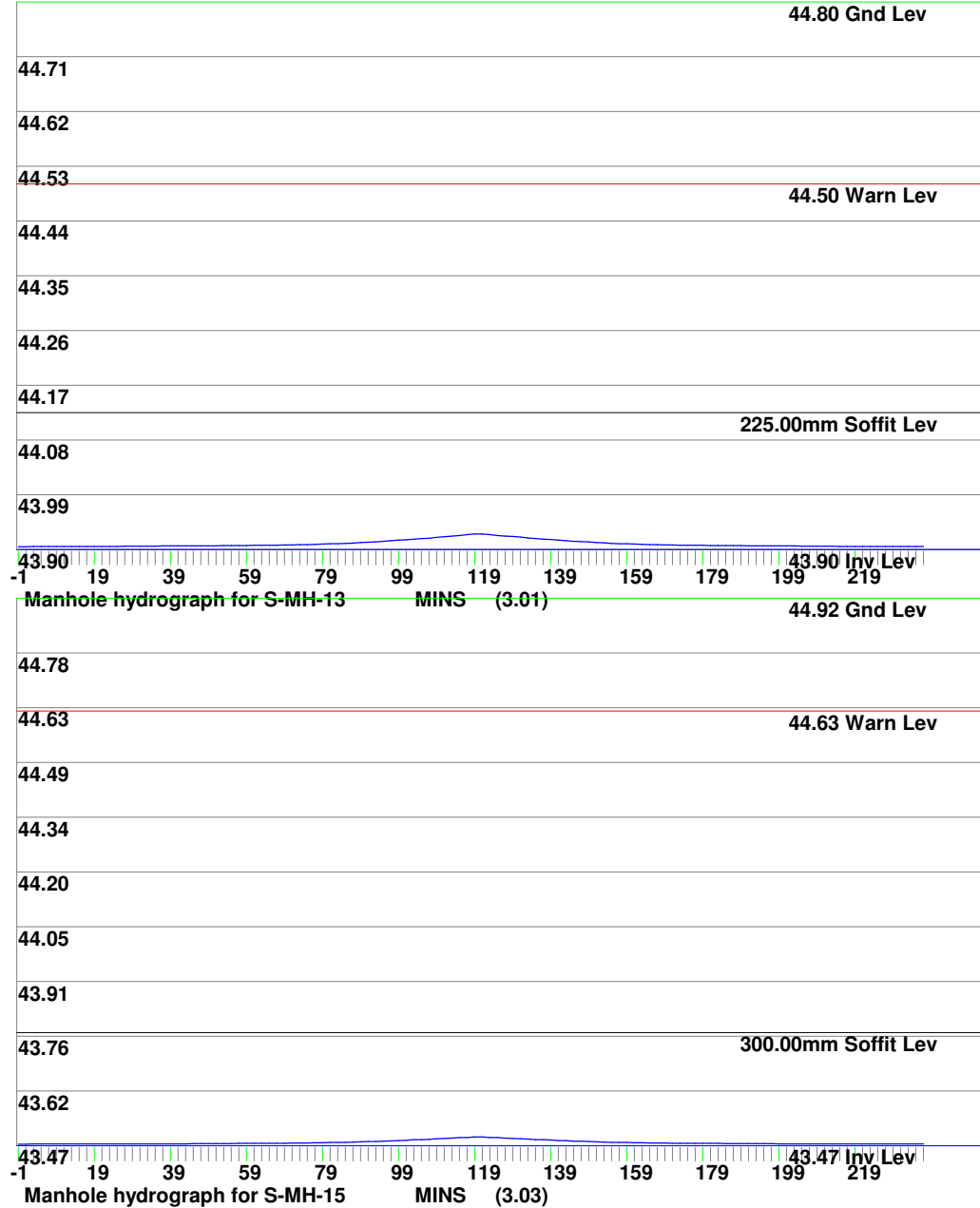
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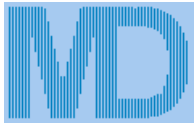
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Manhole hydrograph for S-MH-06 MINS (1.06)



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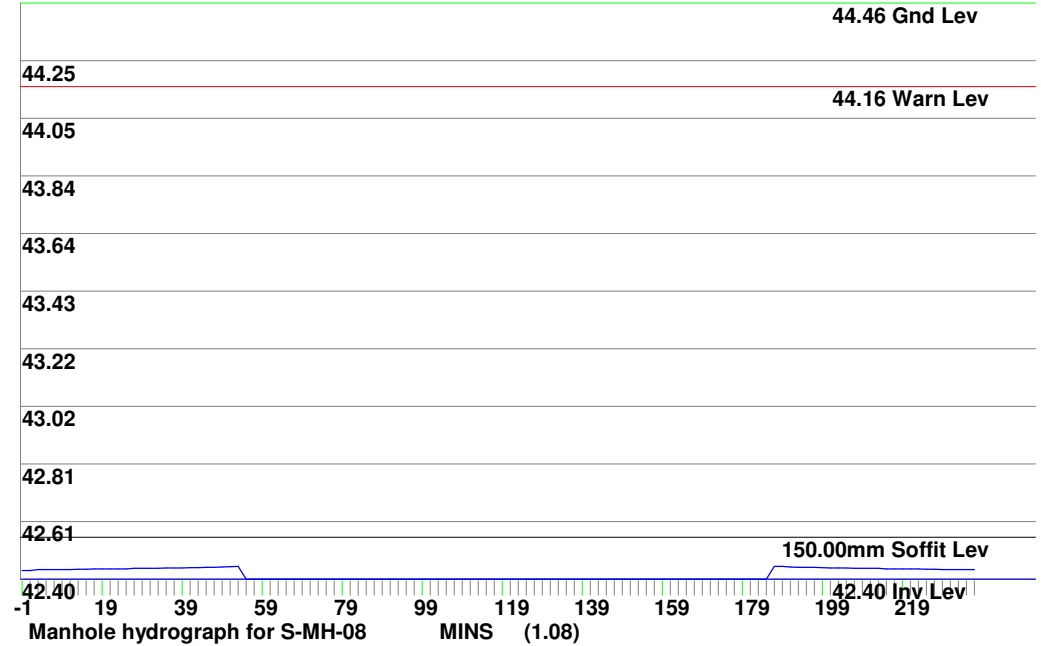
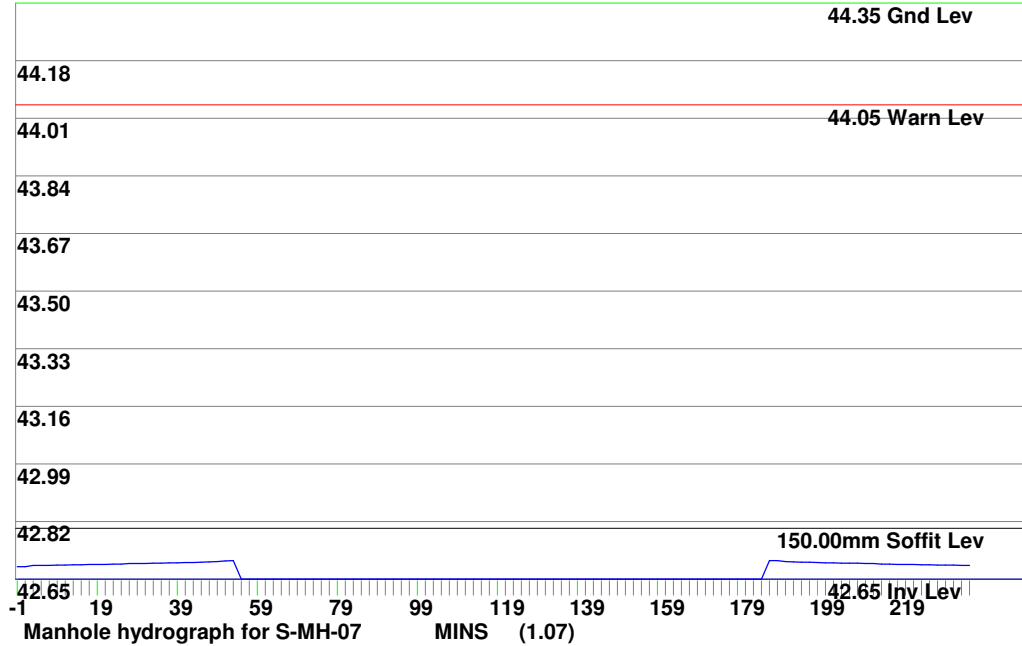
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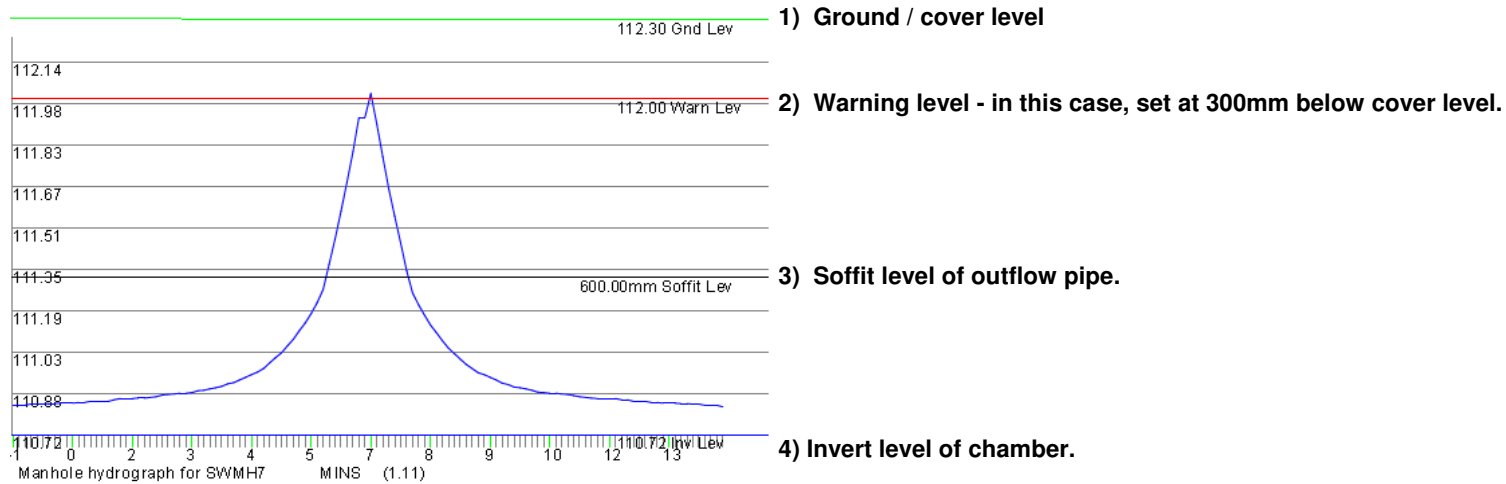
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Notes

- 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.