



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 = 180 mins
No offline storage

Mean rain intens. 13.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 50.96 mm/hr
Sample period = 90.0 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	3.3	225	1200	43.85	43.88	44.80	0.08	0.03	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	9.7	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	13.0	300	1200	43.43	43.50	44.80	0.17	0.07	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	13.0	300	1500	43.30	43.37	44.60	0.17	0.07	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	6.6	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	22.0	450	1500	42.99	43.08	44.35	0.12	0.08	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	22.0	450	1500	42.87	42.91	44.35	0.06	0.05	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	34.9	450	1500	42.79	42.89	44.42	0.15	0.10	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	3.3	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	9.8	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	13.0	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	4.8	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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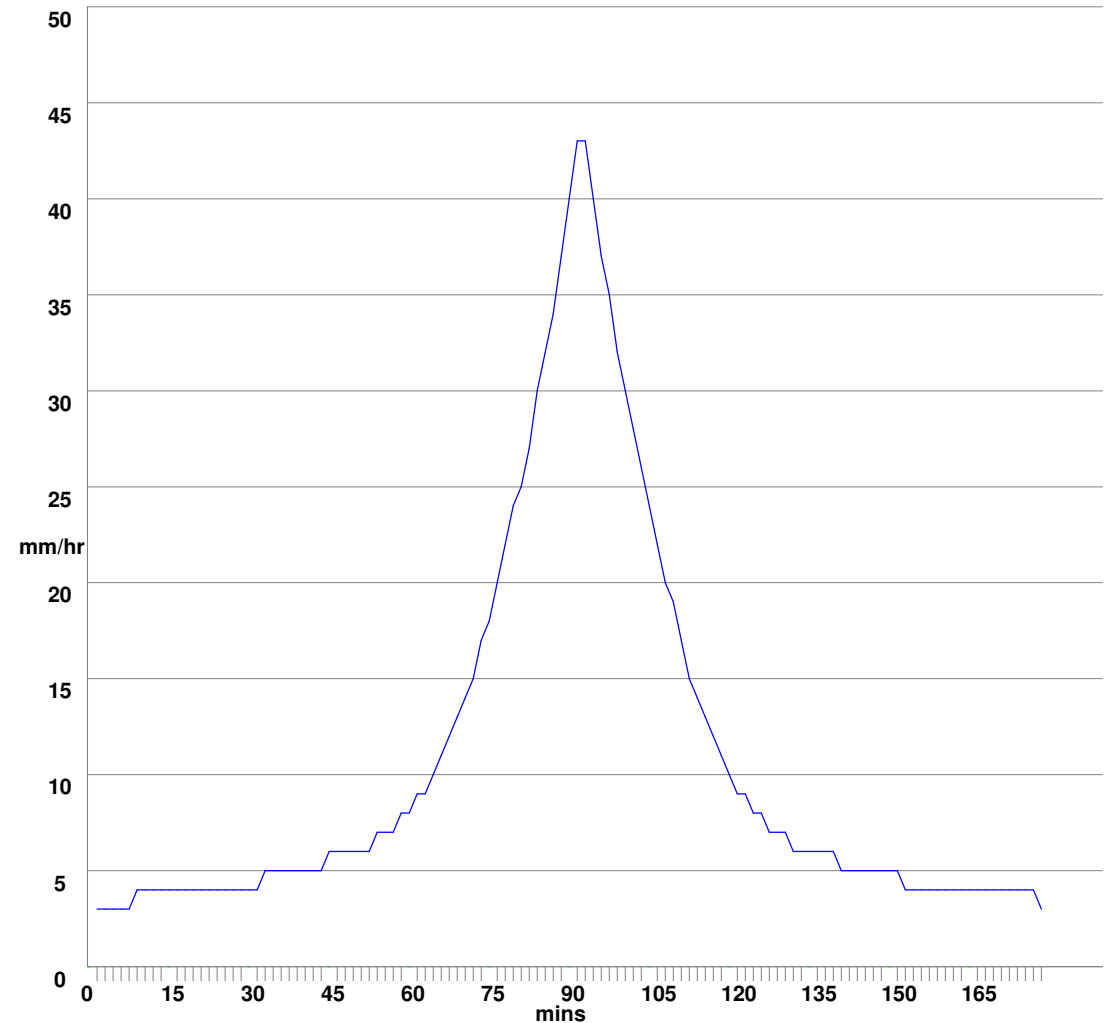
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
1:30	3.05	61:30	8.71	121:30	9.37
3:00	3.05	63:00	9.26	123:00	8.82
4:30	3.49	64:30	9.80	124:30	8.28
6:00	3.49	66:00	10.56	126:00	7.73
7:30	3.49	67:30	11.54	127:30	7.41
9:00	3.59	69:00	12.74	129:00	6.97
10:30	3.59	70:30	13.83	130:30	6.64
12:00	3.70	72:00	15.03	132:00	6.43
13:30	3.70	73:30	16.66	133:30	6.21
15:00	3.81	75:00	18.30	135:00	6.10
16:30	3.81	76:30	19.93	136:30	5.77
18:00	3.81	78:00	21.67	138:00	5.55
19:30	3.92	79:30	23.53	139:30	5.55
21:00	3.92	81:00	25.27	141:00	5.45
22:30	4.14	82:30	27.23	142:30	5.34
24:00	4.14	84:00	29.62	144:00	5.23
25:30	4.14	85:30	31.91	145:30	4.90
27:00	4.25	87:00	34.31	147:00	4.79
28:30	4.36	88:30	37.03	148:30	4.68
30:00	4.47	90:00	39.86	150:00	4.68
31:30	4.47	91:30	42.69	151:30	4.57
33:00	4.57	93:00	42.69	153:00	4.47
34:30	4.57	94:30	40.41	154:30	4.47
36:00	4.68	96:00	37.47	156:00	4.36
37:30	4.79	97:30	34.85	157:30	4.25
39:00	4.90	99:00	32.35	159:00	4.25
40:30	5.12	100:30	29.95	160:30	4.14
42:00	5.34	102:00	27.77	162:00	4.14
43:30	5.45	103:30	25.70	163:30	3.92
45:00	5.55	105:00	23.85	165:00	3.92
46:30	5.55	106:30	22.00	166:30	3.81
48:00	5.77	108:00	20.15	168:00	3.81
49:30	5.88	109:30	18.62	169:30	3.81
51:00	6.21	111:00	16.88	171:00	3.70
52:30	6.43	112:30	15.47	172:30	3.70
54:00	6.64	114:00	14.05	174:00	3.59
55:30	6.86	115:30	12.85	175:30	3.59
57:00	7.30	117:00	11.76	177:00	3.59
58:30	7.62	118:30	10.67	178:30	3.49
60:00	8.17	120:00	9.91	180:00	3.49

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 180 mins Profile - summer





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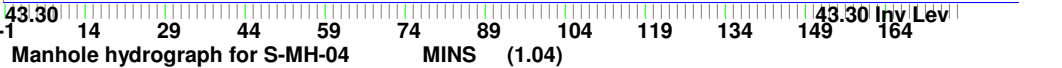
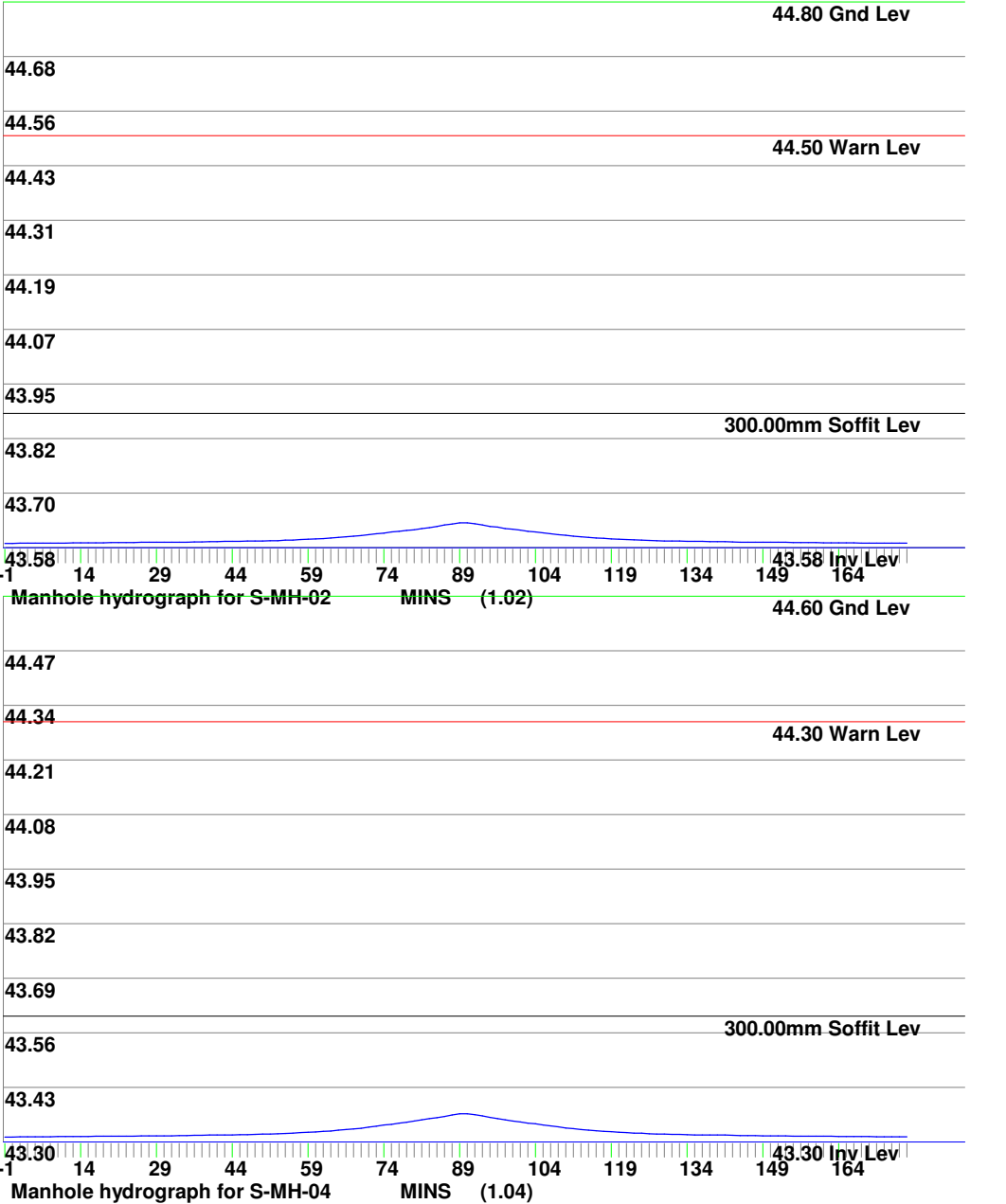
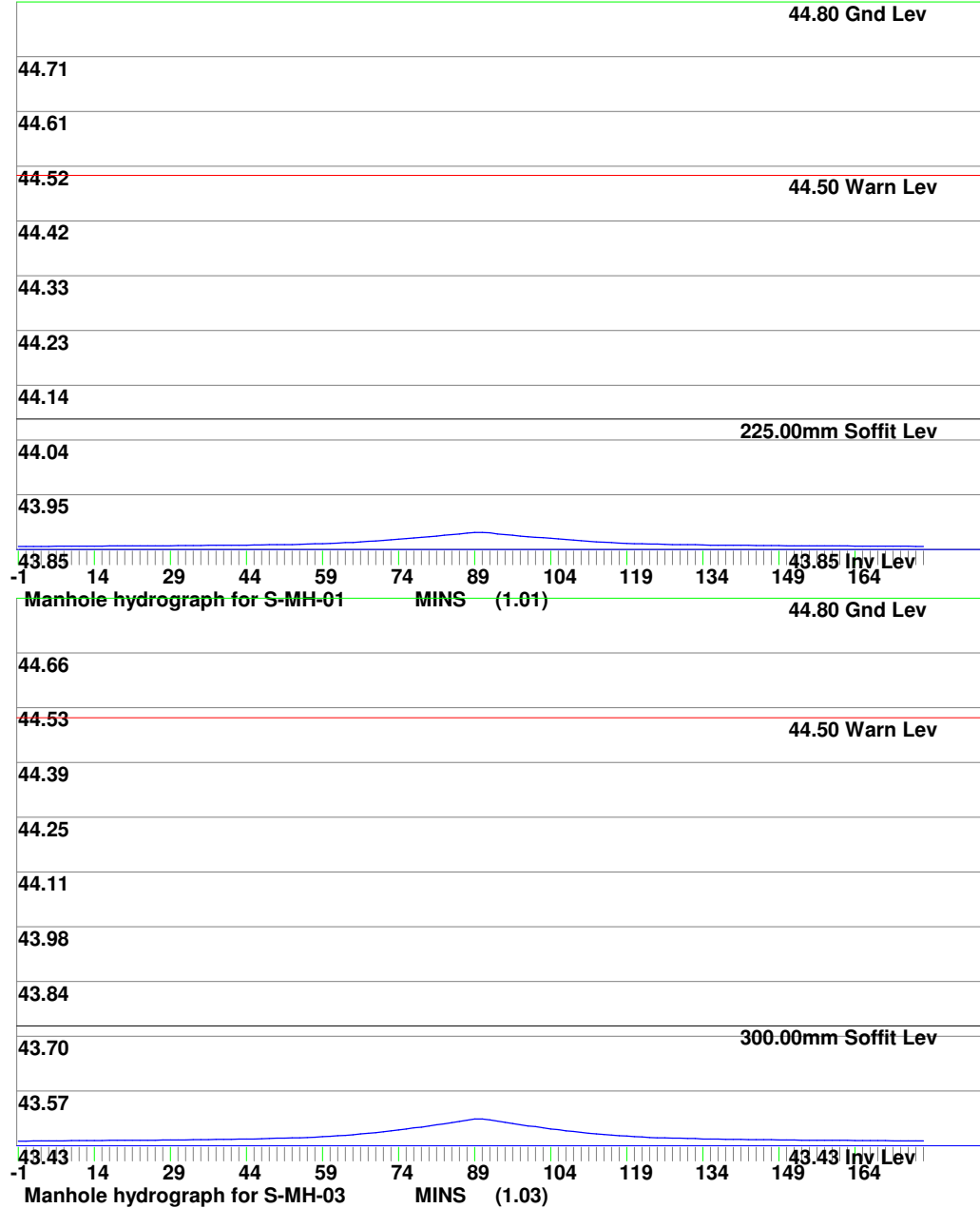
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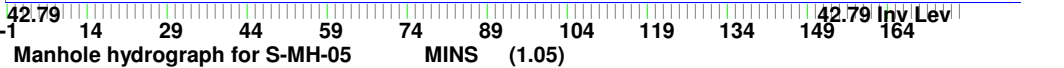
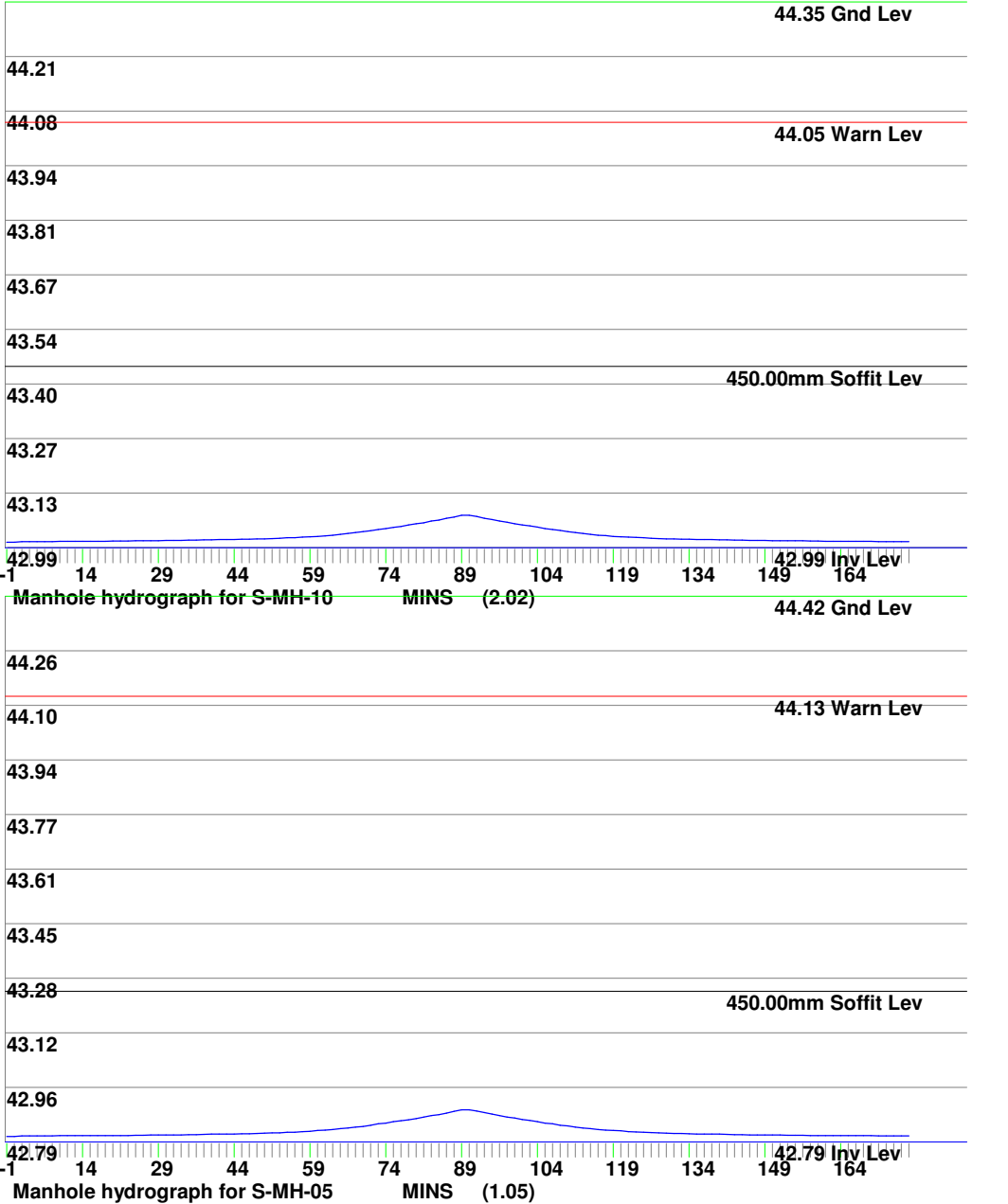
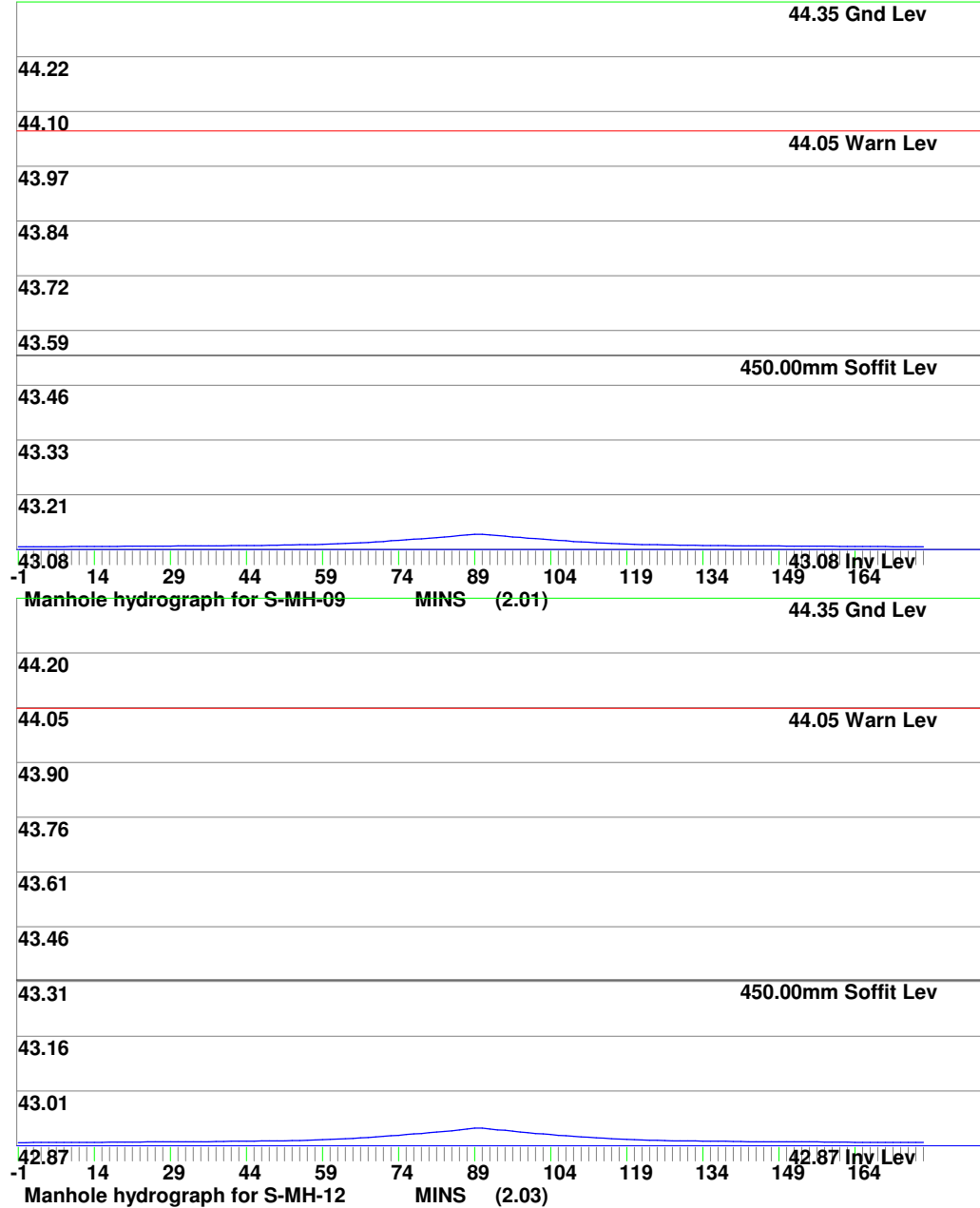
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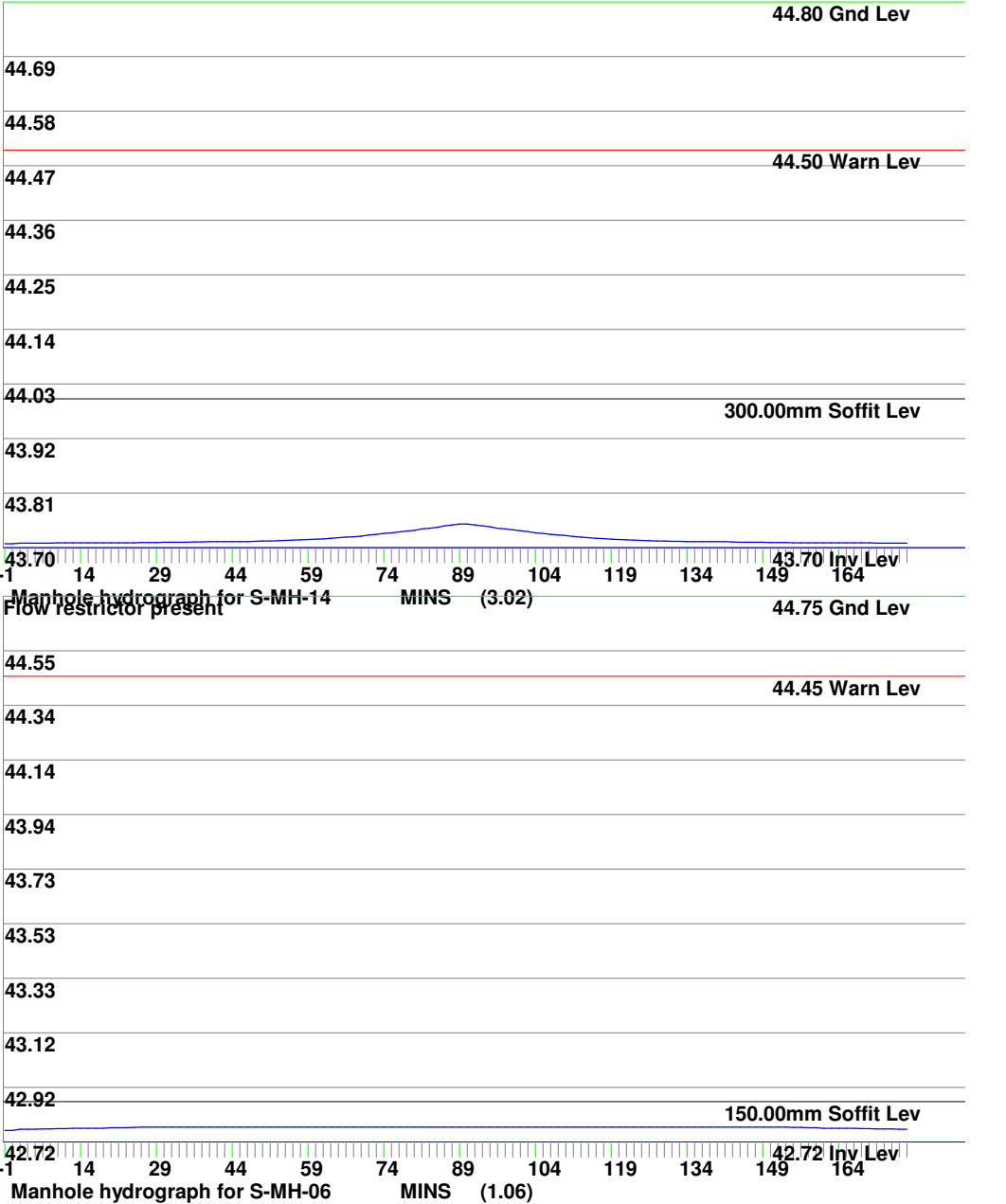
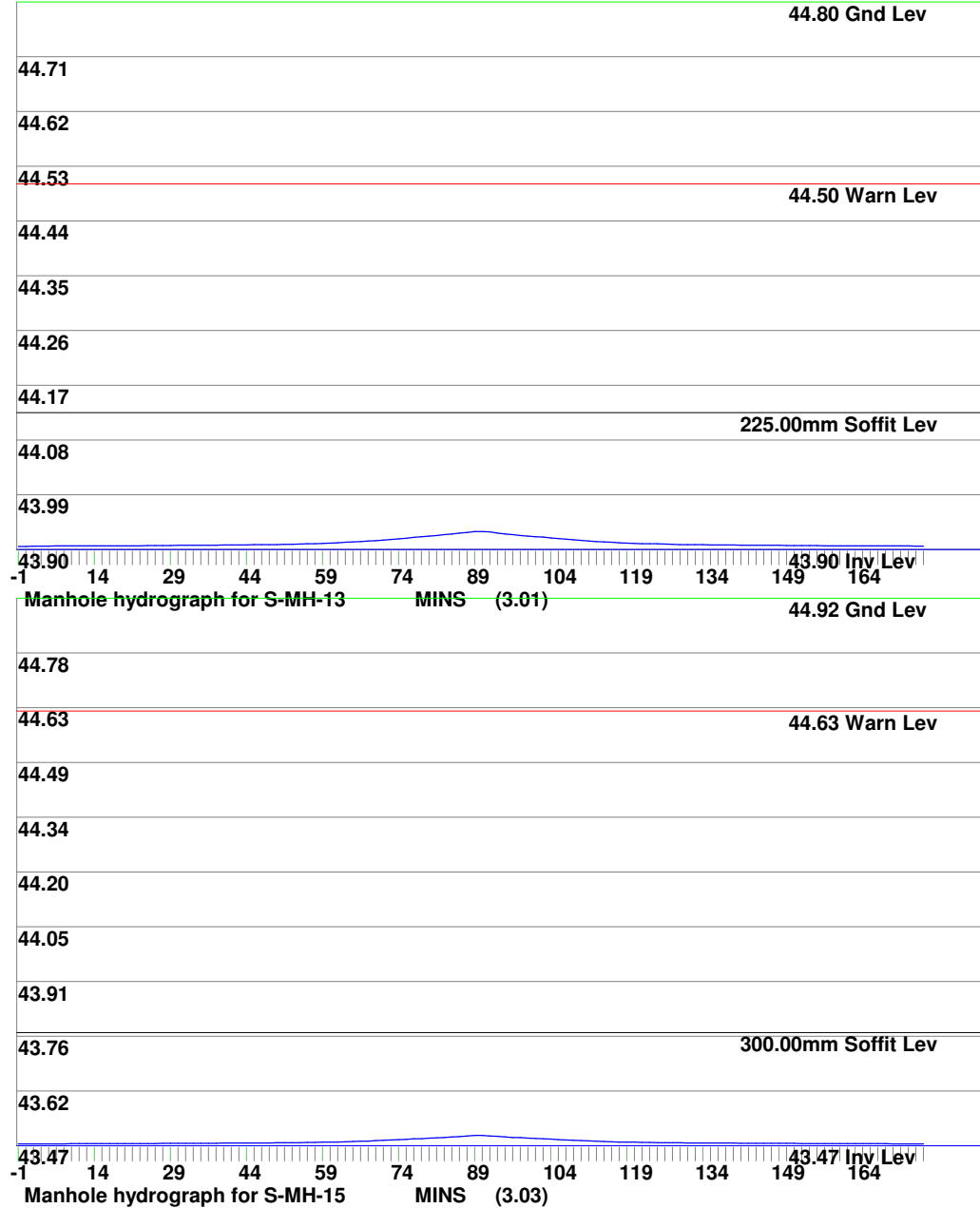
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Manhole hydrograph for S-MH-06

MINS (1.06)



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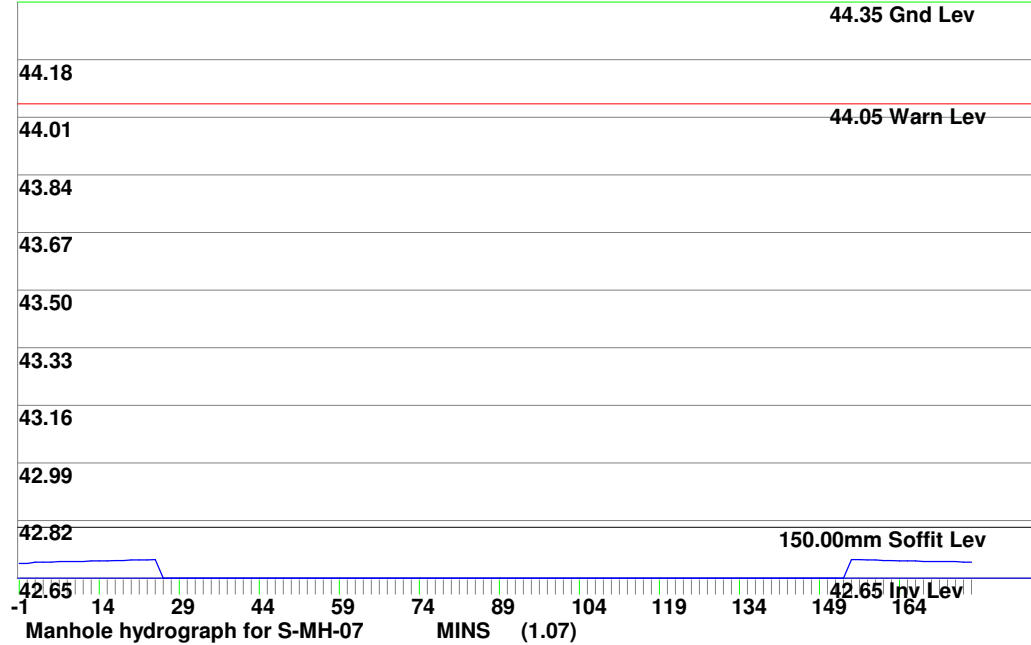
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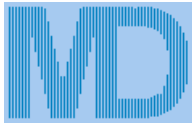
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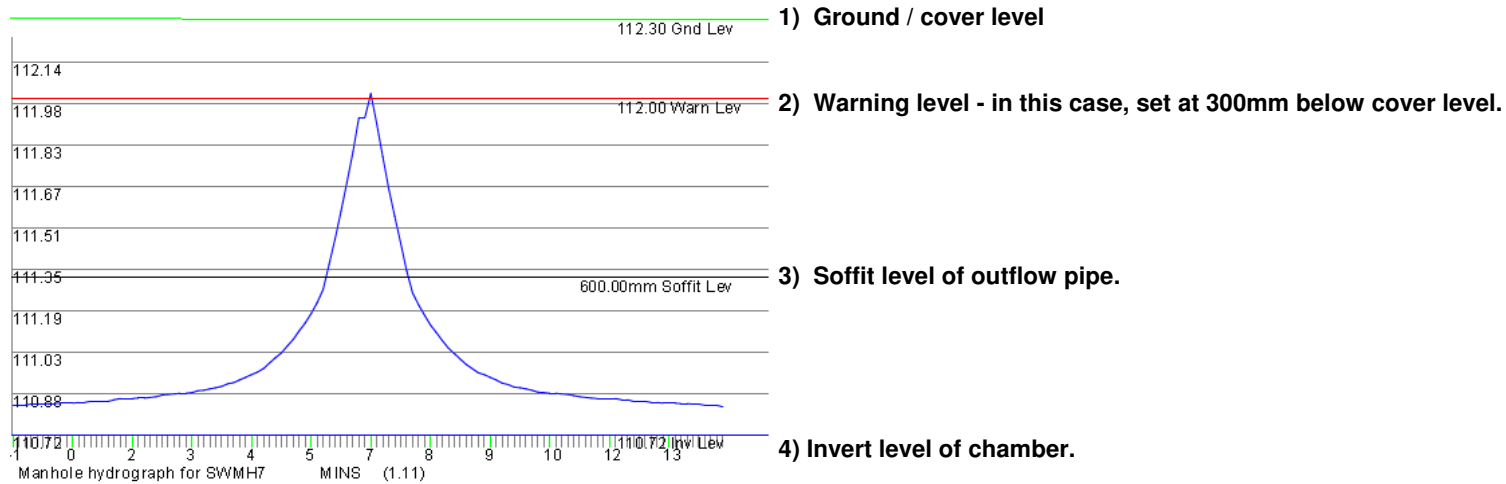
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Notes

- 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.