



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 = 1440 mins
No offline storage

Mean rain intens. 5.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 19.60 mm/hr
Sample period = 720.0 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	1.2	225	1200	43.85	43.87	44.80	0.03	0.01	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	3.5	300	1200	43.58	43.61	44.80	0.04	0.03	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	4.6	300	1200	43.43	43.46	44.80	0.06	0.03	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	4.6	300	1500	43.30	43.33	44.60	0.06	0.03	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	2.3	450	1500	43.08	43.10	44.35	0.01	0.02	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	7.8	450	1500	42.99	43.03	44.35	0.04	0.04	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	7.8	450	1500	42.87	42.89	44.35	0.02	0.02	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	12.4	450	1500	42.79	42.84	44.42	0.05	0.05	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	1.2	225	1200	43.90	43.91	44.80	0.03	0.01	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	3.5	300	1200	43.70	43.72	44.80	0.04	0.02	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	4.6	300	1200	43.47	43.49	44.92	0.02	0.01	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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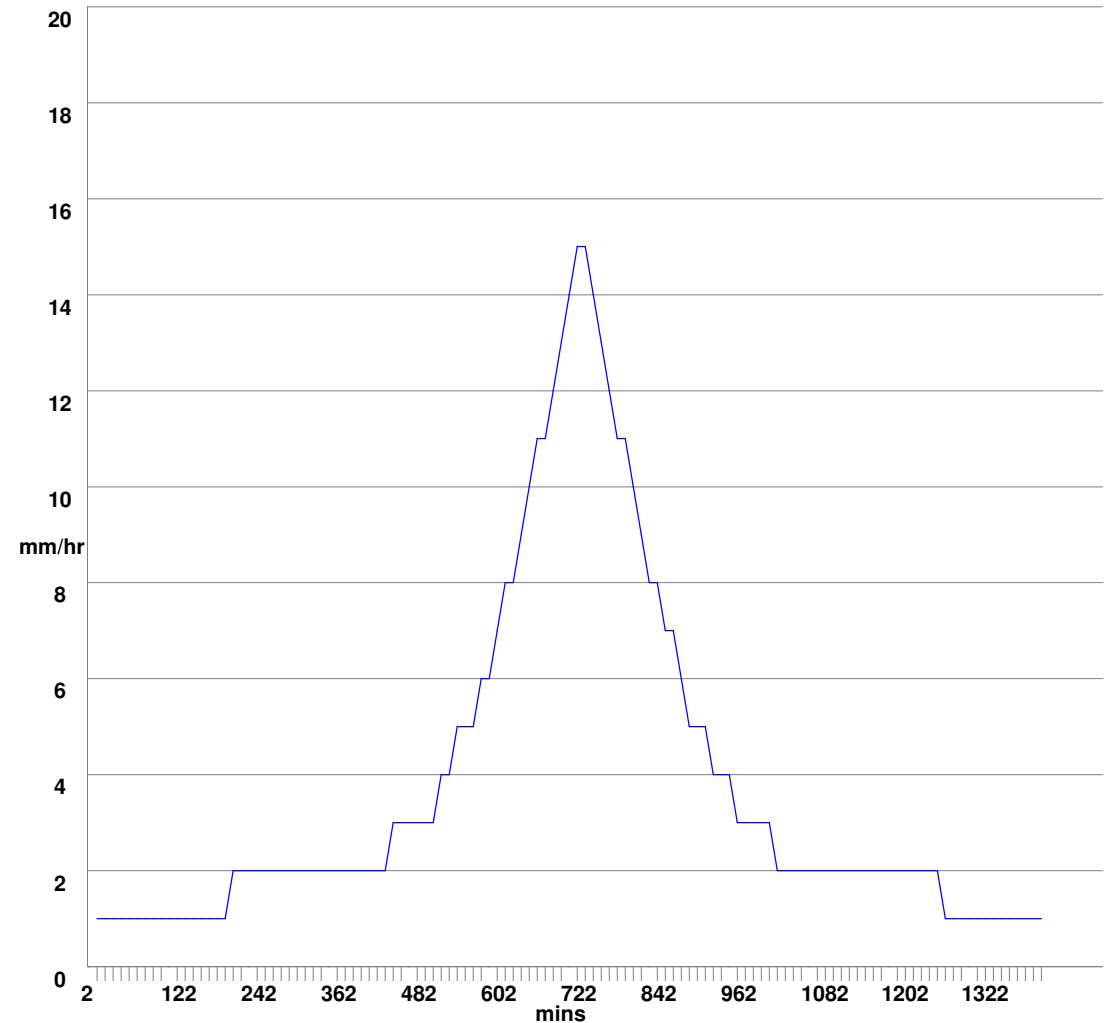
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
12:00	1.08	492:00	3.09	972:00	3.33
24:00	1.08	504:00	3.29	984:00	3.13
36:00	1.24	516:00	3.48	996:00	2.94
48:00	1.24	528:00	3.75	1008:00	2.75
60:00	1.24	540:00	4.10	1020:00	2.63
72:00	1.28	552:00	4.52	1032:00	2.47
84:00	1.28	564:00	4.91	1044:00	2.36
96:00	1.31	576:00	5.34	1056:00	2.28
108:00	1.31	588:00	5.92	1068:00	2.20
120:00	1.35	600:00	6.50	1080:00	2.17
132:00	1.35	612:00	7.08	1092:00	2.05
144:00	1.35	624:00	7.70	1104:00	1.97
156:00	1.39	636:00	8.35	1116:00	1.97
168:00	1.39	648:00	8.97	1128:00	1.93
180:00	1.47	660:00	9.67	1140:00	1.89
192:00	1.47	672:00	10.52	1152:00	1.86
204:00	1.47	684:00	11.33	1164:00	1.74
216:00	1.51	696:00	12.18	1176:00	1.70
228:00	1.55	708:00	13.15	1188:00	1.66
240:00	1.59	720:00	14.15	1200:00	1.66
252:00	1.59	732:00	15.16	1212:00	1.62
264:00	1.62	744:00	15.16	1224:00	1.59
276:00	1.62	756:00	14.35	1236:00	1.59
288:00	1.66	768:00	13.30	1248:00	1.55
300:00	1.70	780:00	12.37	1260:00	1.51
312:00	1.74	792:00	11.48	1272:00	1.51
324:00	1.82	804:00	10.63	1284:00	1.47
336:00	1.89	816:00	9.86	1296:00	1.47
348:00	1.93	828:00	9.13	1308:00	1.39
360:00	1.97	840:00	8.47	1320:00	1.39
372:00	1.97	852:00	7.81	1332:00	1.35
384:00	2.05	864:00	7.15	1344:00	1.35
396:00	2.09	876:00	6.61	1356:00	1.35
408:00	2.20	888:00	5.99	1368:00	1.31
420:00	2.28	900:00	5.49	1380:00	1.31
432:00	2.36	912:00	4.99	1392:00	1.28
444:00	2.44	924:00	4.56	1404:00	1.28
456:00	2.59	936:00	4.18	1416:00	1.28
468:00	2.71	948:00	3.79	1428:00	1.24
480:00	2.90	960:00	3.52	1440:00	1.24

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 1440 mins Profile - summer





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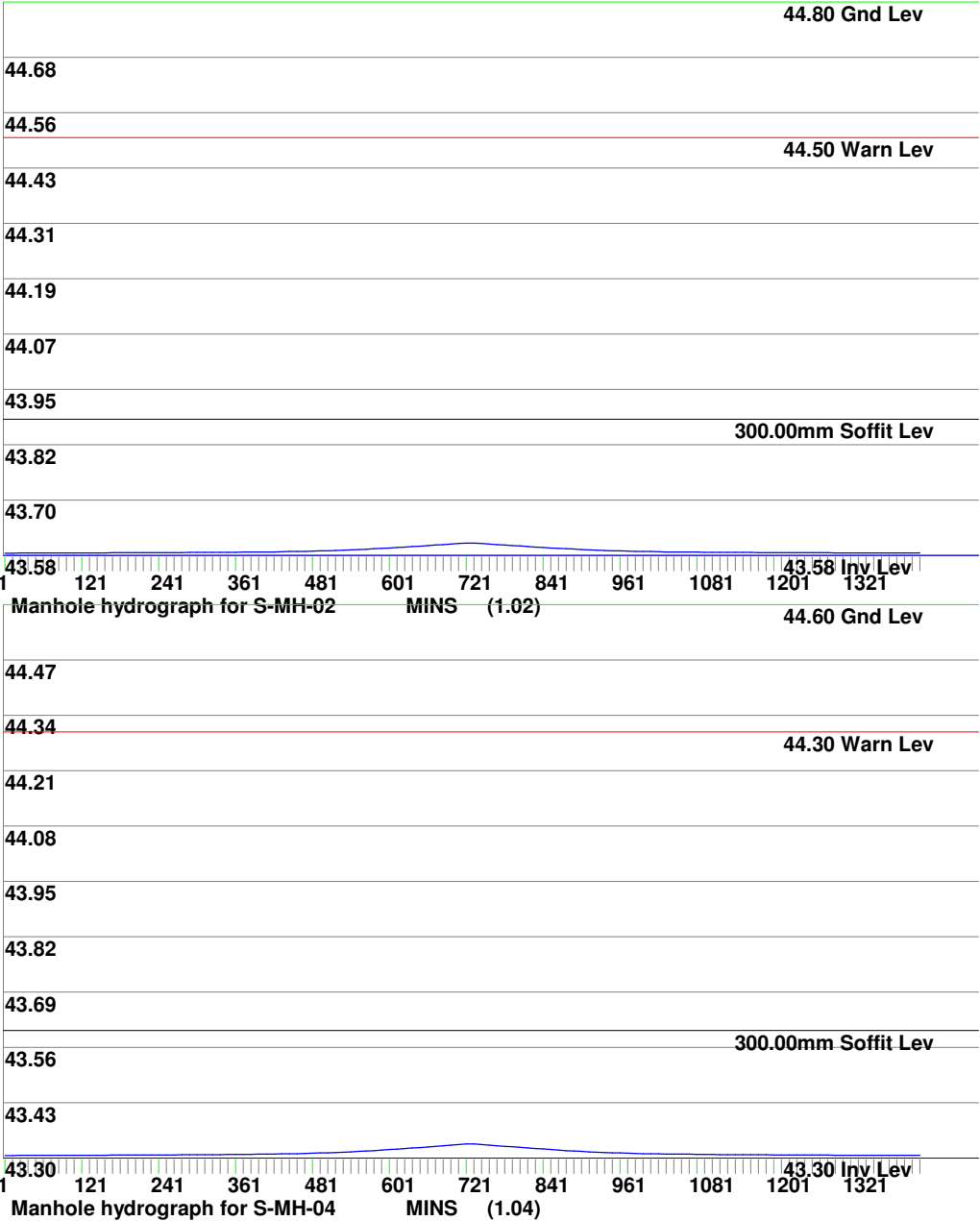
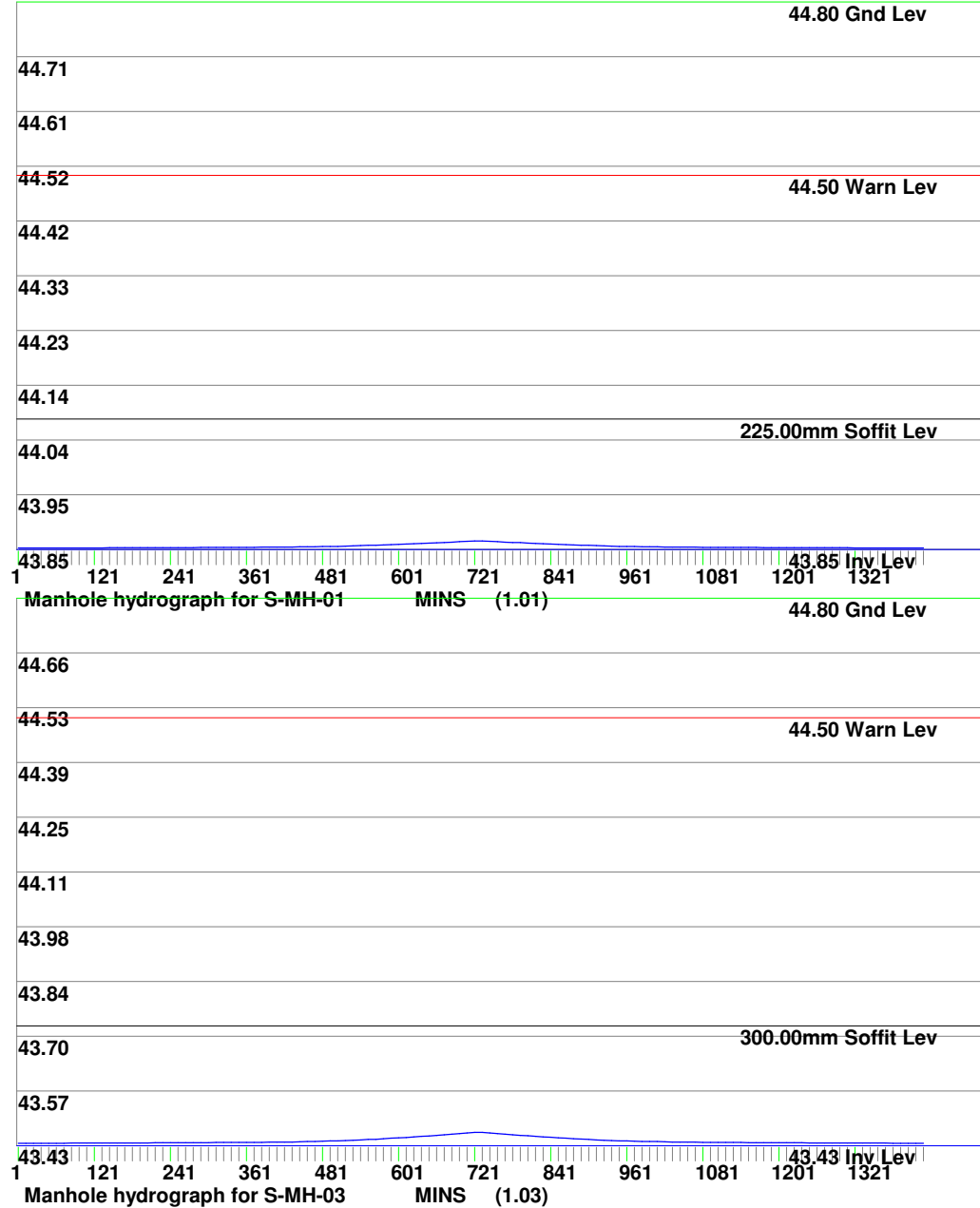
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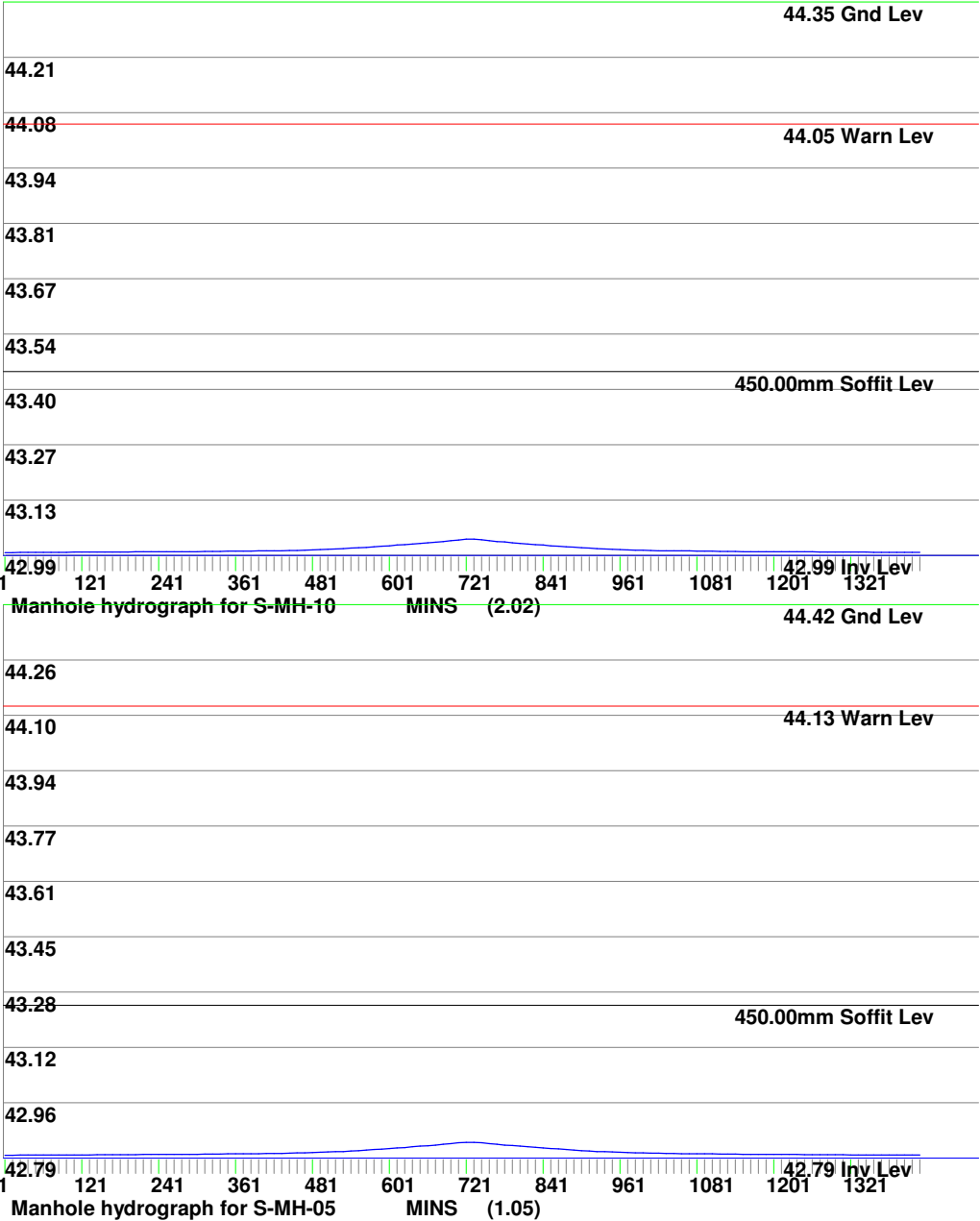
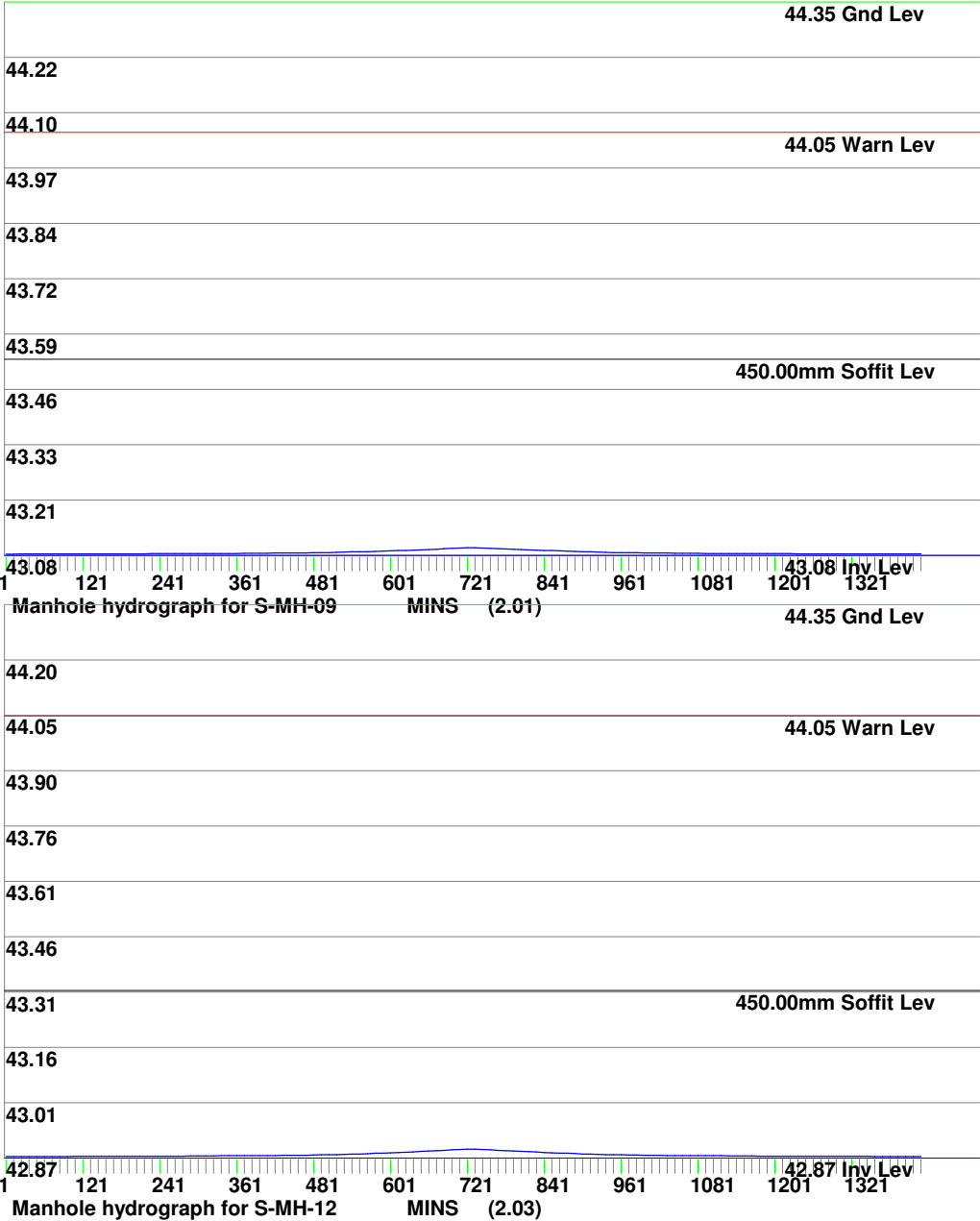
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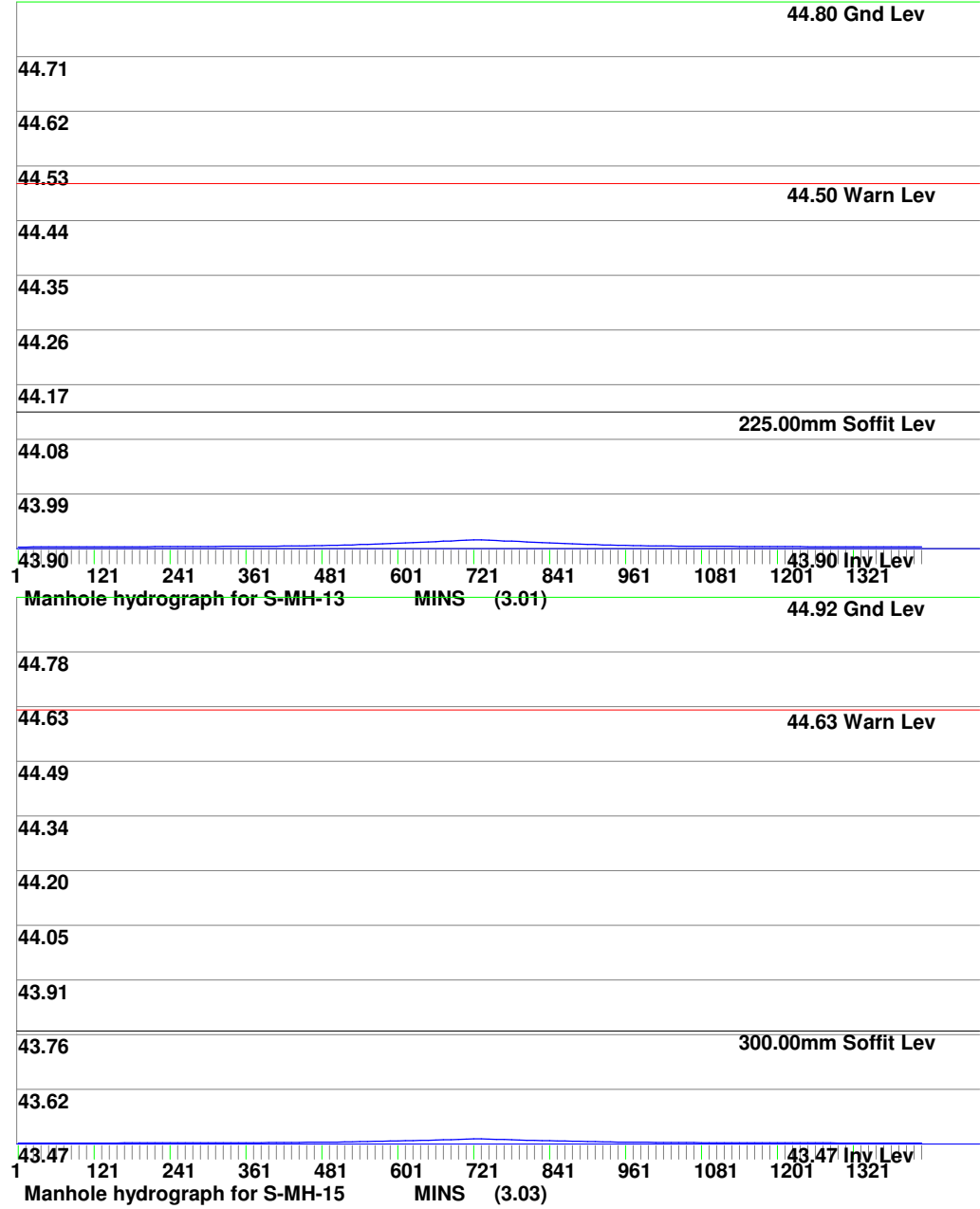
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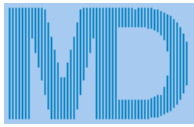
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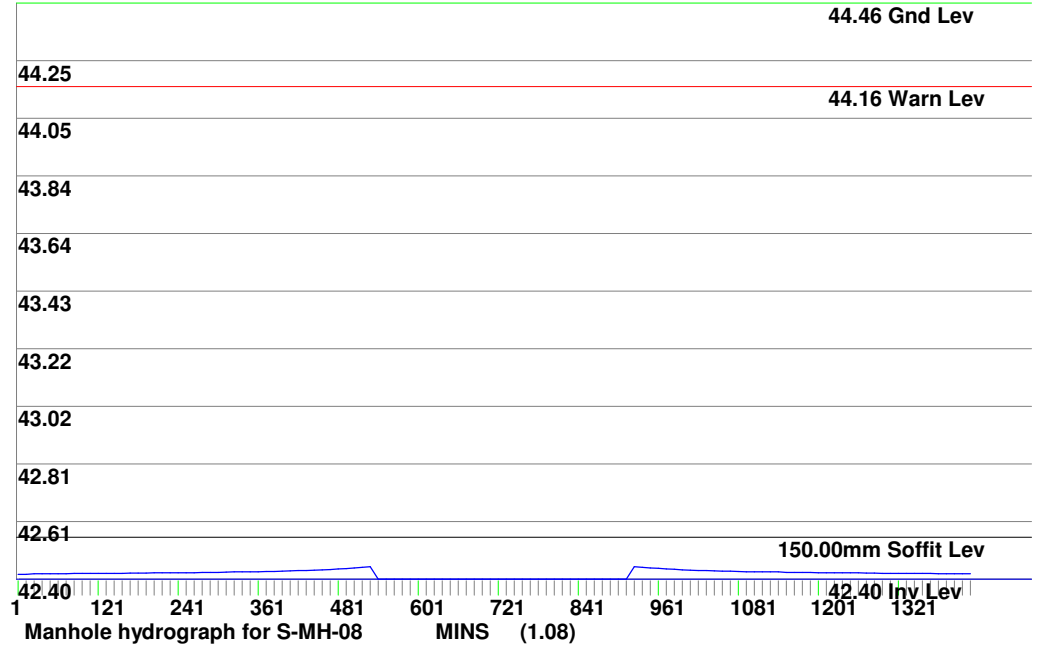
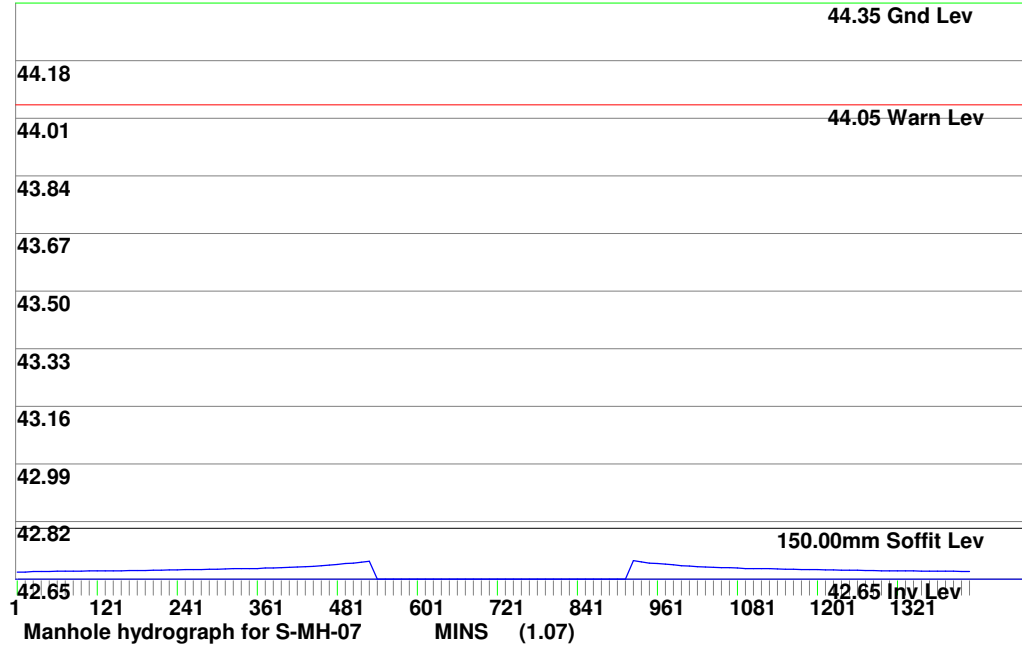
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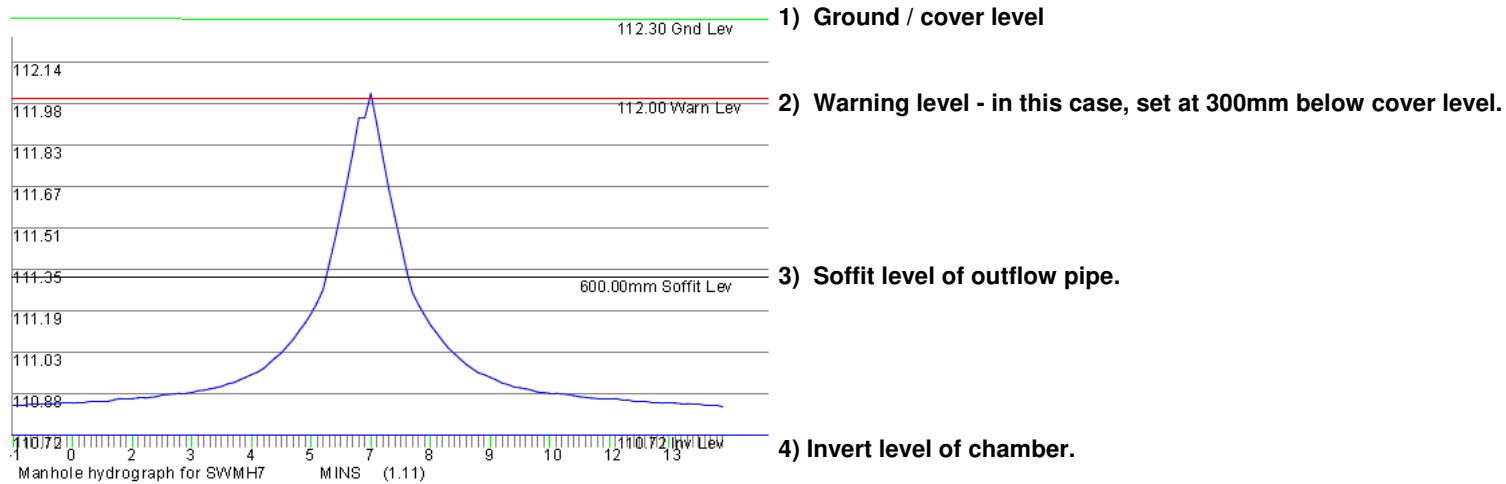
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- Notes**
- a) Lower section of the graph shows the water depth filling the channel. Channel is assumed to be a full pipe diameter in depth.
 - b) Upper section of the graph shows the water depth filling the chamber. Chamber has a greater width/diameter 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.