



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 = 1440 mins
No offline storage

Mean rain intens. 3.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 7.50 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		EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) :x FACTOR	STATUS	
										fract.	Depth					
1	I	1.01	S-MH-01	42.1	0.4	225	1200	43.85	43.86	44.80	0.01	0.01	0.00	0.000	527	OK
2	I	1.02	S-MH-02	77.8	1.2	300	1200	43.58	43.59	44.80	0.02	0.01	0.00	0.000	1579	OK
3	I	1.03	S-MH-03	78.4	1.6	300	1200	43.43	43.45	44.80	0.02	0.02	0.00	0.000	2106	OK
4	I	1.04	S-MH-04	78.0	1.6	300	1500	43.30	43.32	44.60	0.02	0.02	0.00	0.000	2106	OK
5	B	2.01	S-MH-09	184.0	0.8	450	1500	43.08	43.09	44.35	0.00	0.01	0.00	0.000	1065	OK
6	B	2.02	S-MH-10	184.9	2.8	450	1500	42.99	43.02	44.35	0.02	0.02	0.00	0.000	3560	OK
7	B	2.03	S-MH-12	398.2	2.8	450	1500	42.87	42.88	44.35	0.01	0.01	0.00	0.000	3560	OK
8	I	1.05	S-MH-05	227.8	4.4	450	1500	42.79	42.82	44.42	0.02	0.02	0.00	0.000	5666	OK
9	B	3.01	S-MH-13	42.1	0.4	225	1200	43.90	43.91	44.80	0.01	0.01	0.00	0.000	527	OK
10	B	3.02	S-MH-14	95.8	1.2	300	1200	43.70	43.71	44.80	0.01	0.01	0.00	0.000	1582	OK
11	B	3.03	S-MH-15	298.4	1.7	300	1200	43.47	43.48	44.92	0.01	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	4.8	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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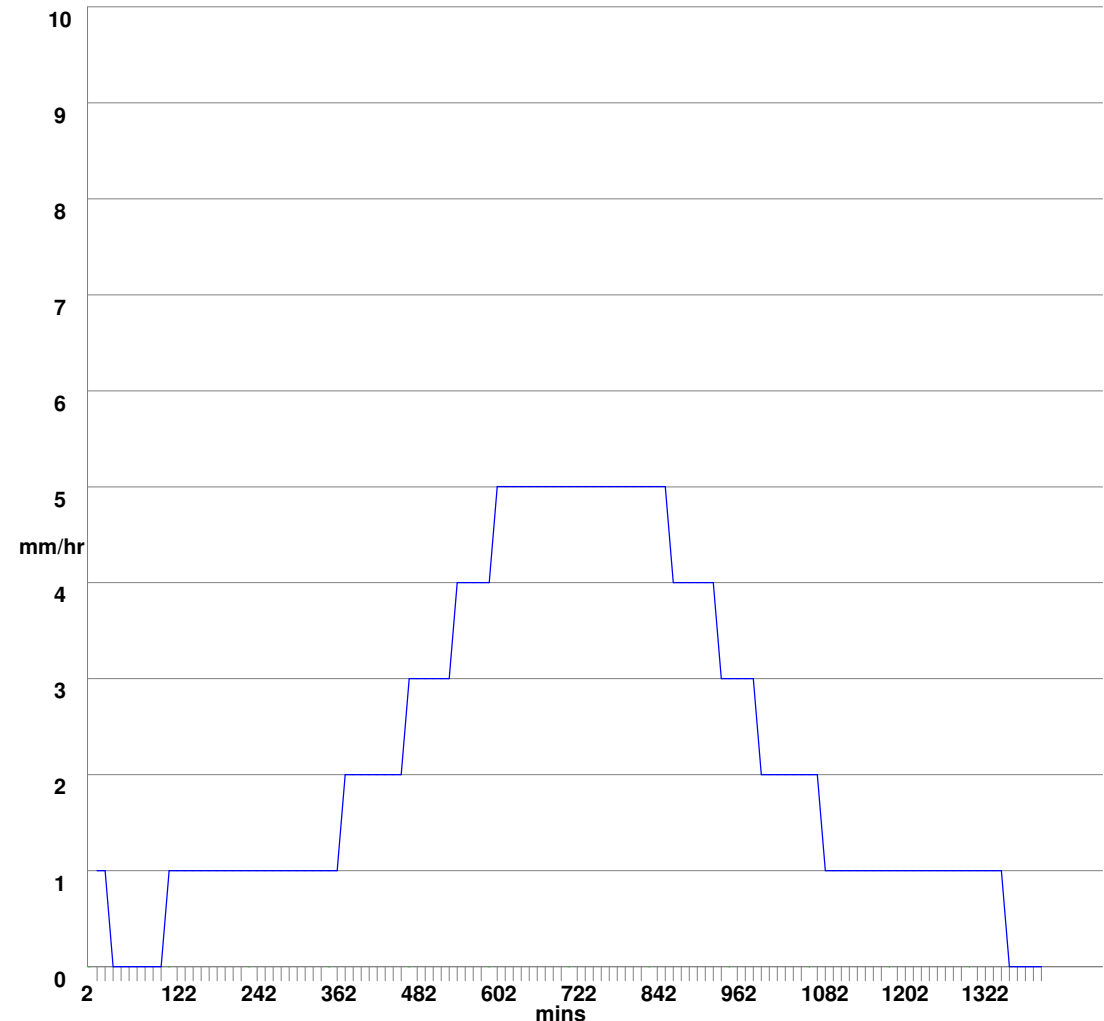
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Title **Surcharge calcs (Sized at 30 yrs storm) for SURFACE WATER DESIGN.SW**

Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
12:00	0.59	492:00	2.78	972:00	2.97
24:00	0.59	504:00	2.95	984:00	2.82
36:00	0.43	516:00	3.10	996:00	2.65
48:00	0.43	528:00	3.30	1008:00	2.43
60:00	0.43	540:00	3.49	1020:00	2.28
72:00	0.43	552:00	3.66	1032:00	2.15
84:00	0.48	564:00	3.82	1044:00	2.02
96:00	0.48	576:00	4.01	1056:00	1.89
108:00	0.50	588:00	4.23	1068:00	1.78
120:00	0.54	600:00	4.38	1080:00	1.65
132:00	0.56	612:00	4.55	1092:00	1.52
144:00	0.59	624:00	4.66	1104:00	1.43
156:00	0.63	636:00	4.79	1116:00	1.37
168:00	0.65	648:00	4.92	1128:00	1.30
180:00	0.67	660:00	5.03	1140:00	1.19
192:00	0.69	672:00	5.16	1152:00	1.13
204:00	0.72	684:00	5.25	1164:00	1.06
216:00	0.74	696:00	5.33	1176:00	0.98
228:00	0.76	708:00	5.38	1188:00	0.91
240:00	0.80	720:00	5.40	1200:00	0.89
252:00	0.82	732:00	5.42	1212:00	0.87
264:00	0.87	744:00	5.42	1224:00	0.85
276:00	0.87	756:00	5.40	1236:00	0.80
288:00	0.91	768:00	5.38	1248:00	0.78
300:00	0.98	780:00	5.33	1260:00	0.76
312:00	1.04	792:00	5.27	1272:00	0.72
324:00	1.11	804:00	5.18	1284:00	0.69
336:00	1.19	816:00	5.07	1296:00	0.69
348:00	1.26	828:00	4.94	1308:00	0.65
360:00	1.34	840:00	4.81	1320:00	0.63
372:00	1.41	852:00	4.71	1332:00	0.59
384:00	1.52	864:00	4.57	1344:00	0.56
396:00	1.63	876:00	4.42	1356:00	0.54
408:00	1.73	888:00	4.25	1368:00	0.52
420:00	1.86	900:00	4.05	1380:00	0.48
432:00	1.99	912:00	3.86	1392:00	0.48
444:00	2.10	924:00	3.69	1404:00	0.46
456:00	2.25	936:00	3.51	1416:00	0.43
468:00	2.41	948:00	3.36	1428:00	0.43
480:00	2.60	960:00	3.14	1440:00	0.43

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 1440 mins Profile - winter





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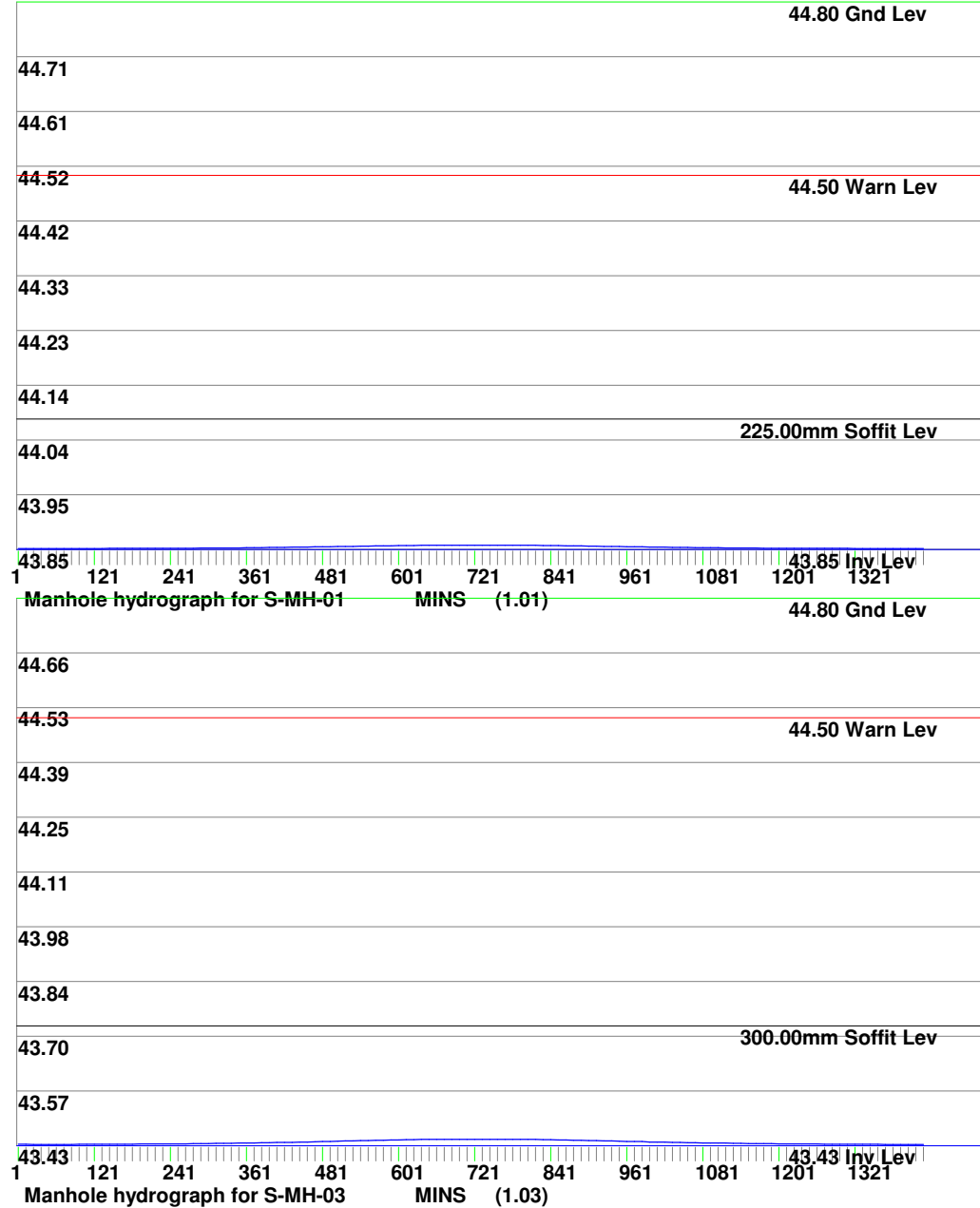
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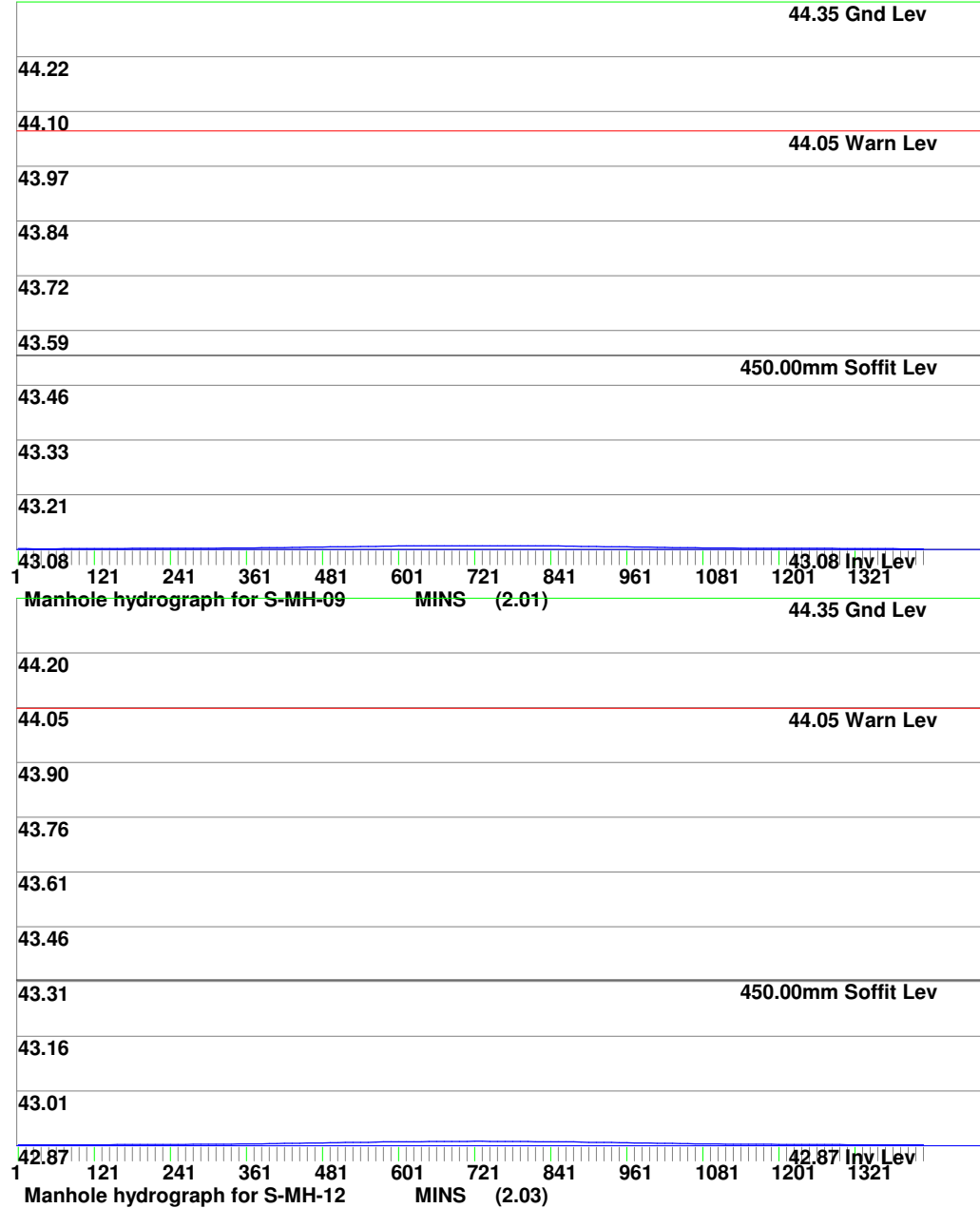
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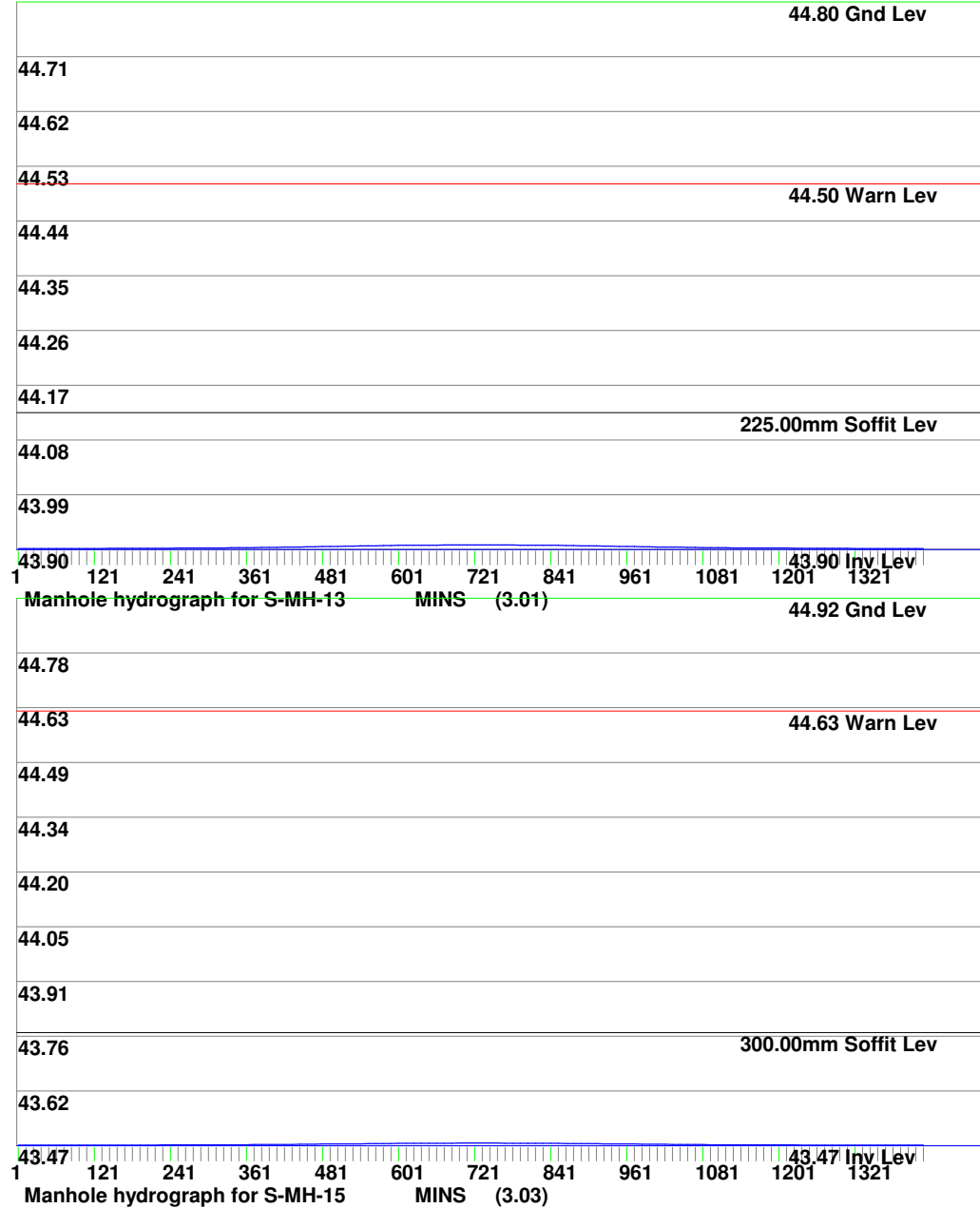
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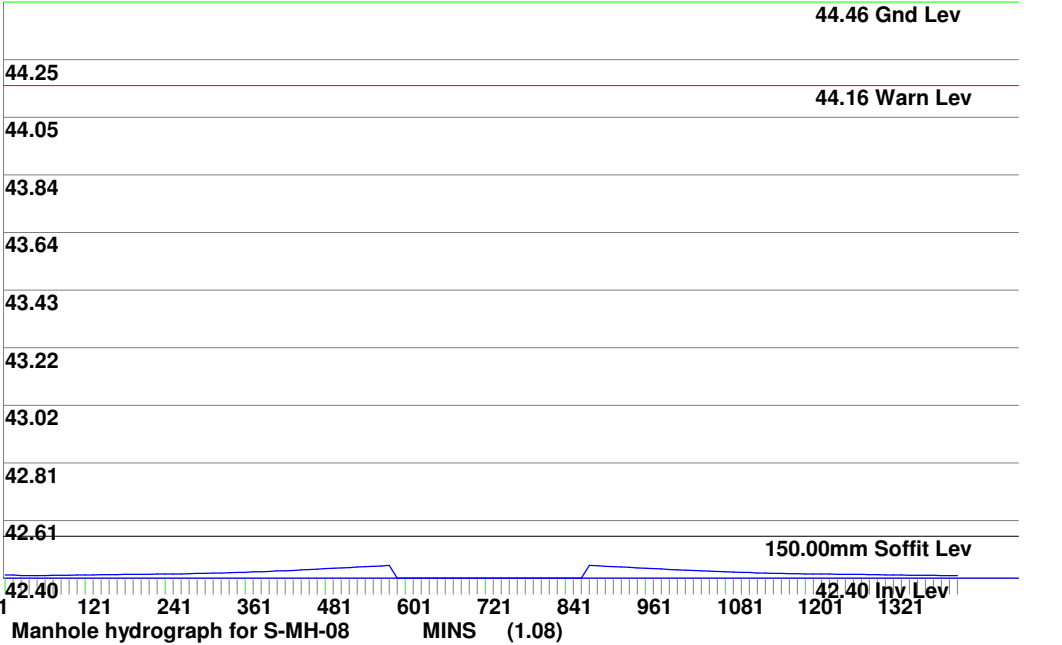
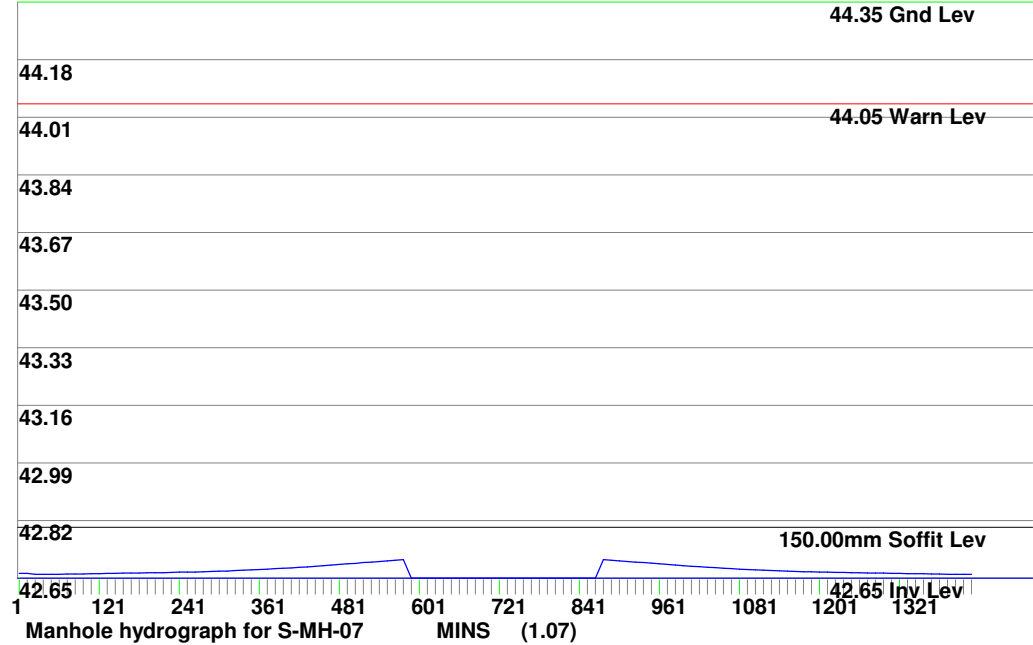
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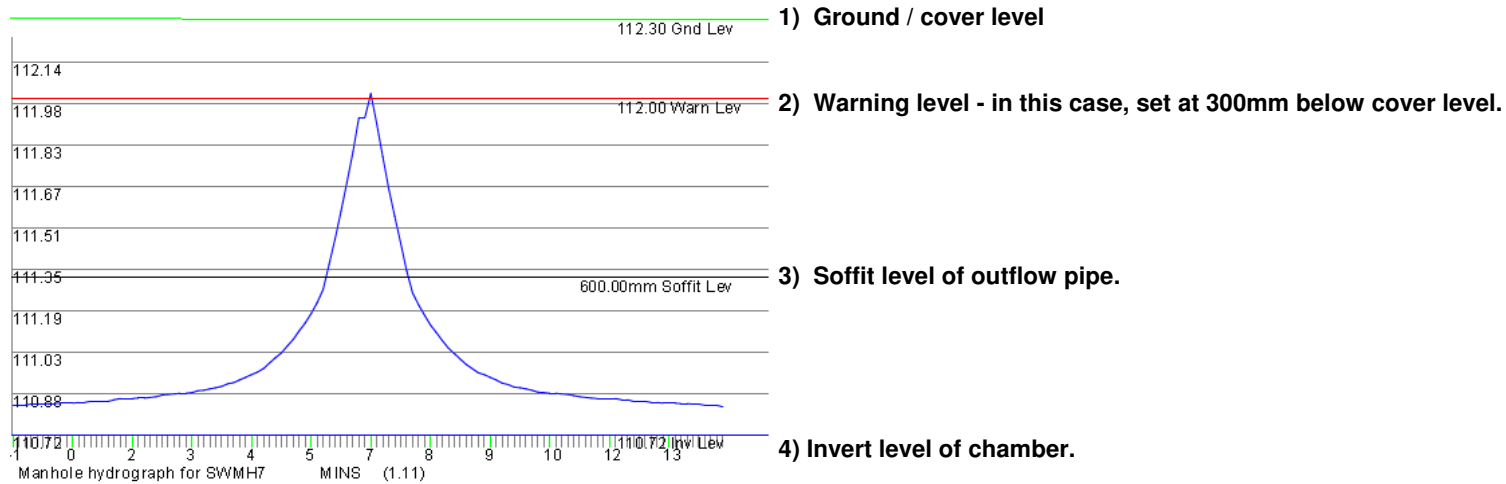
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Notes

- 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.