



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 CCF = 40%**

Using in-line restrictors
Return period = 100 yrs
Climate change factor = 40

PEAK hydrograph values printed
Storm duration = 180 mins
No offline storage

Mean rain intens. 24.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 94.08 mm/hr
Sample period = 90.0 secs.

Entry	SECT. :	MANHOLE :	PIPE :	RATE :	PIPE :	CHAMBER :	INVERT:	WATER :	GRND :	SURCHARGE :		EXCESS :	FLOODED :	DRAINED :	STATUS	
No.	No. :	REF :	CAPACITY :	FLOW :	SIZE :	:DIAM/LxW :	LEVEL :	LEVEL :	LEVEL :	:	:	FLOW :	VOL :	:AREA (m ²) :		
:	:	:	l/s :	l/s :	mm :	mm :	m :	m :	m :	fract.	Depth :	l/s :	m ³ :	:x FACTOR :		
1	I	1.01	S-MH-01	42.1	6.0	225	1200	43.85	43.90	44.80	0.14	0.05	0.00	0.000	527	OK
2	I	1.02	S-MH-02	77.8	17.9	300	1200	43.58	43.66	44.80	0.23	0.08	0.00	0.000	1579	OK
3	I	1.03	S-MH-03	78.4	23.9	300	1200	43.43	43.53	44.80	0.30	0.10	0.00	0.000	2106	OK
4	I	1.04	S-MH-04	78.0	23.9	300	1500	43.30	43.40	44.60	0.31	0.10	0.00	0.000	2106	OK
5	B	2.01	S-MH-09	184.0	12.1	450	1500	43.08	43.13	44.35	0.07	0.05	0.00	0.000	1065	OK
6	B	2.02	S-MH-10	184.9	40.3	450	1500	42.99	43.12	44.35	0.22	0.12	0.00	0.000	3560	OK
7	B	2.03	S-MH-12	398.2	40.3	450	1500	42.87	42.94	44.35	0.10	0.07	0.00	0.000	3560	OK
8	I	1.05	S-MH-05	227.8	64.2	450	1500	42.79	42.94	44.42	0.28	0.15	0.00	0.000	5666	OK
9	B	3.01	S-MH-13	42.1	6.0	225	1200	43.90	43.95	44.80	0.14	0.05	0.00	0.000	527	OK
10	B	3.02	S-MH-14	95.8	17.9	300	1200	43.70	43.77	44.80	0.19	0.07	0.00	0.000	1582	OK
11	B	3.03	S-MH-15	298.4	23.9	300	1200	43.47	43.52	44.92	0.08	0.04	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	0.0	150	1200	42.65	42.66	44.35	0.00	0.00	0.00	0.000	0	OK
14	I	1.08	S-MH-08	18.6	0.0	150	1200	42.40	42.40	44.46	0.00	0.00	0.00	0.000	0	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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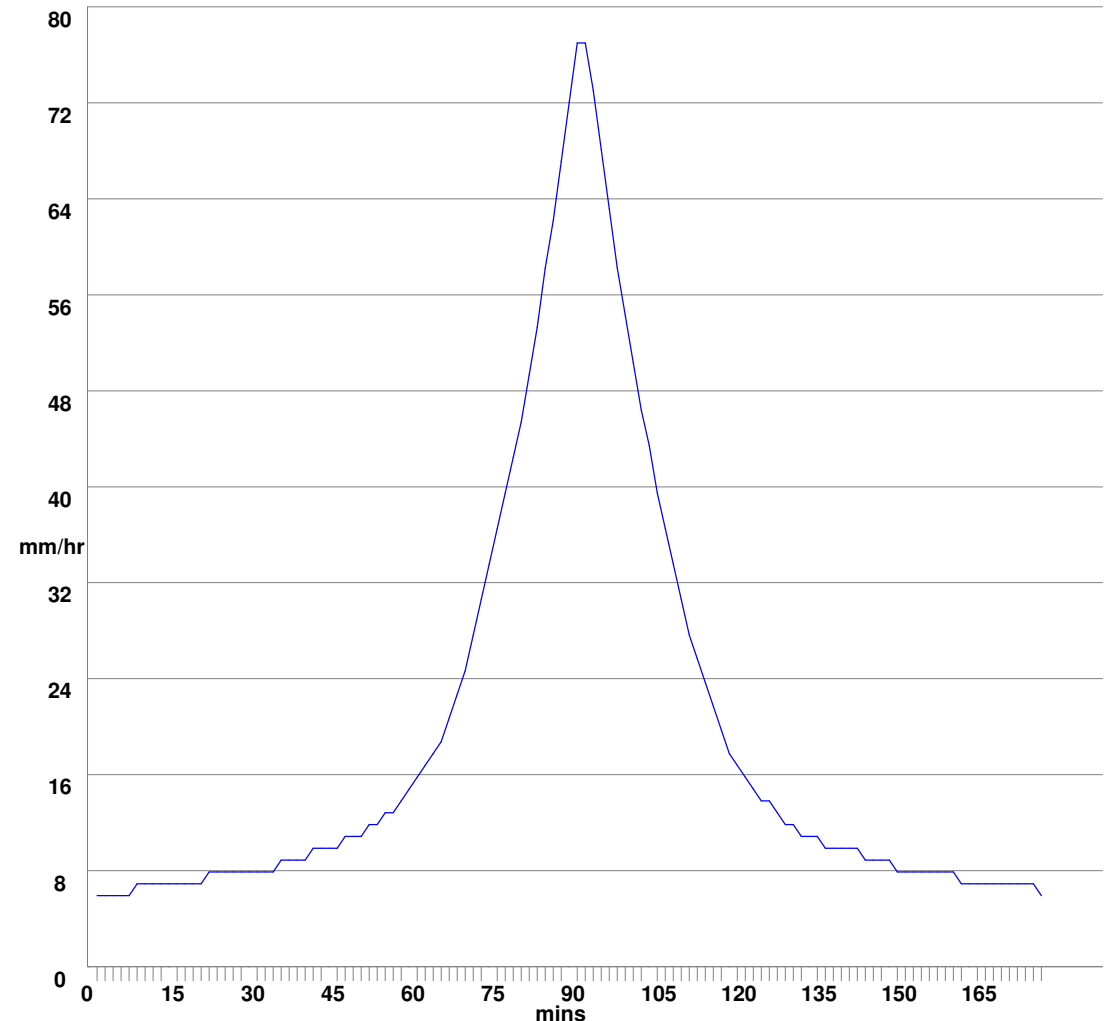
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
1:30	5.60	61:30	16.01	121:30	17.21
3:00	5.60	63:00	17.01	123:00	16.21
4:30	6.40	64:30	18.01	124:30	15.21
6:00	6.40	66:00	19.41	126:00	14.21
7:30	6.40	67:30	21.21	127:30	13.61
9:00	6.60	69:00	23.41	129:00	12.81
10:30	6.60	70:30	25.41	130:30	12.21
12:00	6.80	72:00	27.61	132:00	11.81
13:30	6.80	73:30	30.62	133:30	11.41
15:00	7.00	75:00	33.62	135:00	11.21
16:30	7.00	76:30	36.62	136:30	10.61
18:00	7.00	78:00	39.82	138:00	10.21
19:30	7.20	79:30	43.22	139:30	10.21
21:00	7.20	81:00	46.42	141:00	10.00
22:30	7.60	82:30	50.02	142:30	9.80
24:00	7.60	84:00	54.43	144:00	9.60
25:30	7.60	85:30	58.63	145:30	9.00
27:00	7.80	87:00	63.03	147:00	8.80
28:30	8.00	88:30	68.03	148:30	8.60
30:00	8.20	90:00	73.24	150:00	8.60
31:30	8.20	91:30	78.44	151:30	8.40
33:00	8.40	93:00	78.44	153:00	8.20
34:30	8.40	94:30	74.24	154:30	8.20
36:00	8.60	96:00	68.83	156:00	8.00
37:30	8.80	97:30	64.03	157:30	7.80
39:00	9.00	99:00	59.43	159:00	7.80
40:30	9.40	100:30	55.03	160:30	7.60
42:00	9.80	102:00	51.03	162:00	7.60
43:30	10.00	103:30	47.22	163:30	7.20
45:00	10.21	105:00	43.82	165:00	7.20
46:30	10.21	106:30	40.42	166:30	7.00
48:00	10.61	108:00	37.02	168:00	7.00
49:30	10.81	109:30	34.22	169:30	7.00
51:00	11.41	111:00	31.02	171:00	6.80
52:30	11.81	112:30	28.41	172:30	6.80
54:00	12.21	114:00	25.81	174:00	6.60
55:30	12.61	115:30	23.61	175:30	6.60
57:00	13.41	117:00	21.61	177:00	6.60
58:30	14.01	118:30	19.61	178:30	6.40
60:00	15.01	120:00	18.21	180:00	6.40

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 180 mins Profile - summer

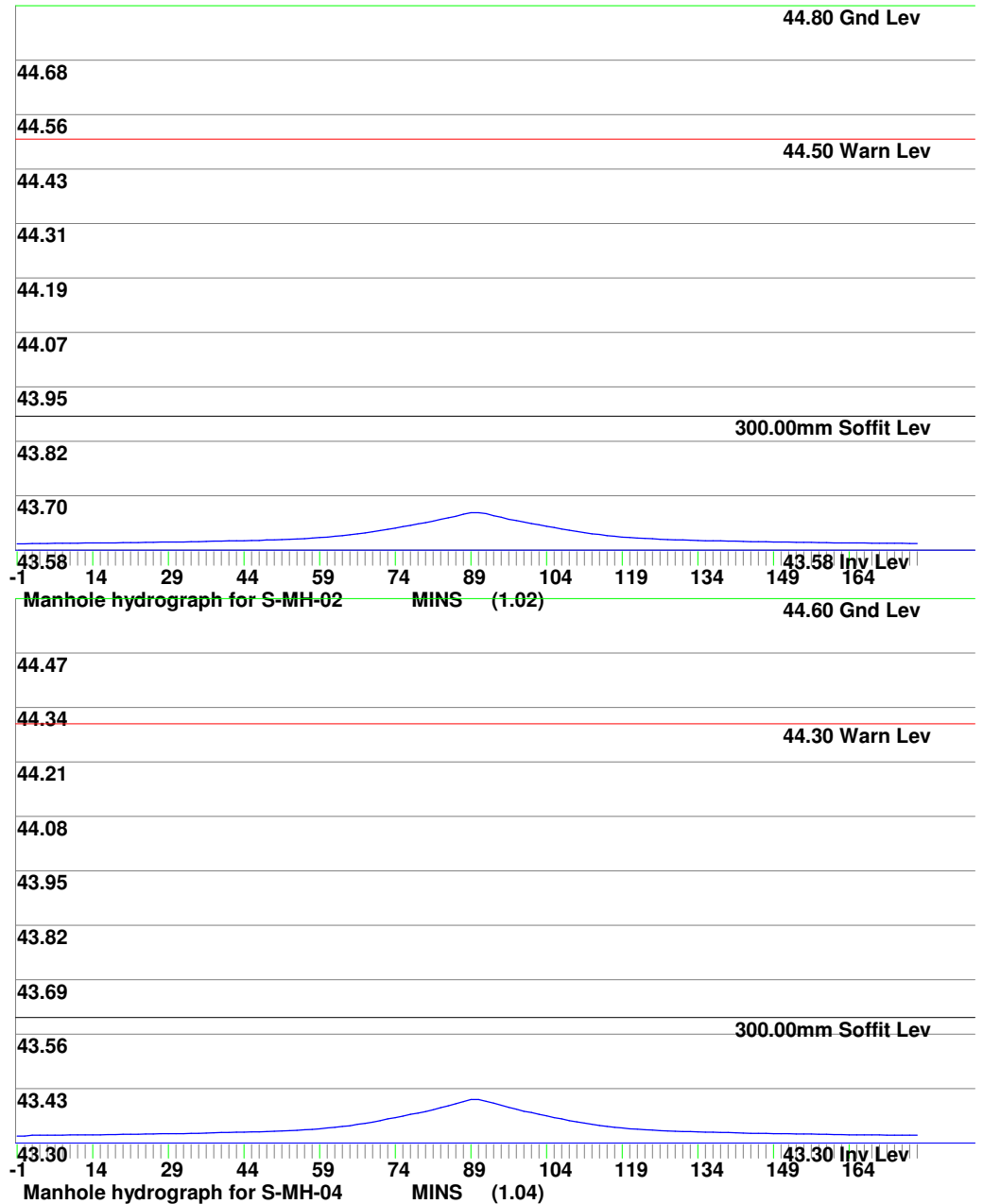




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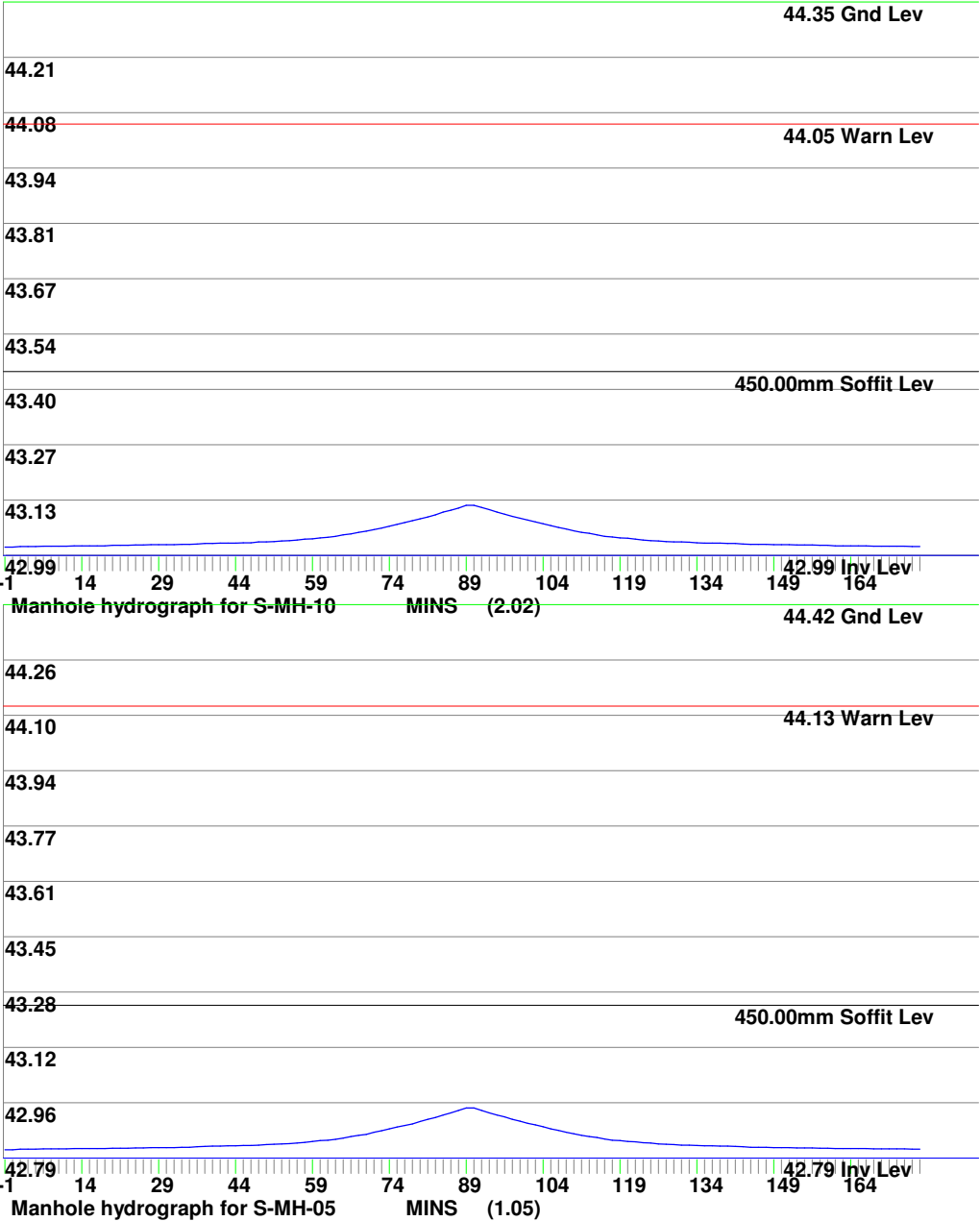
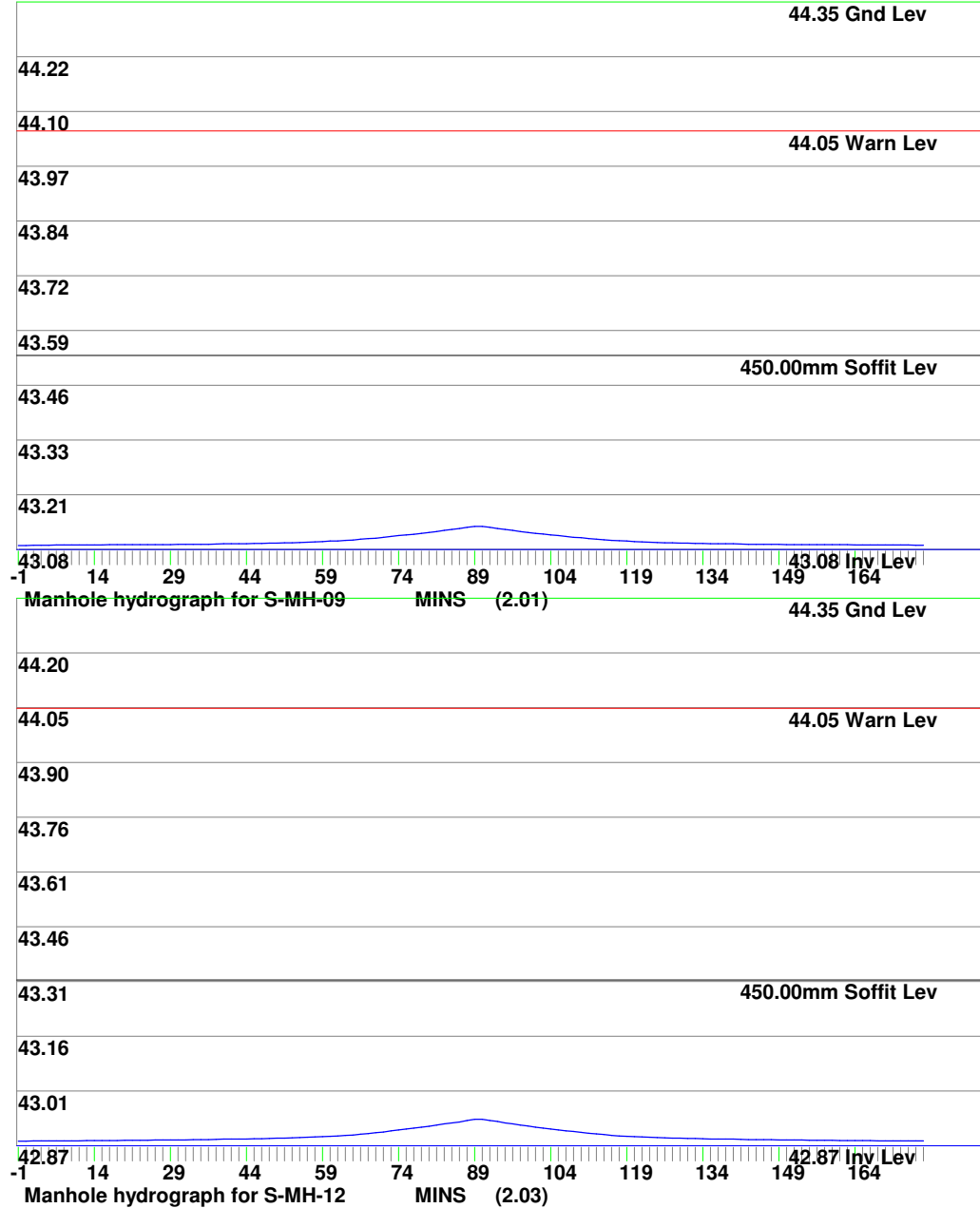
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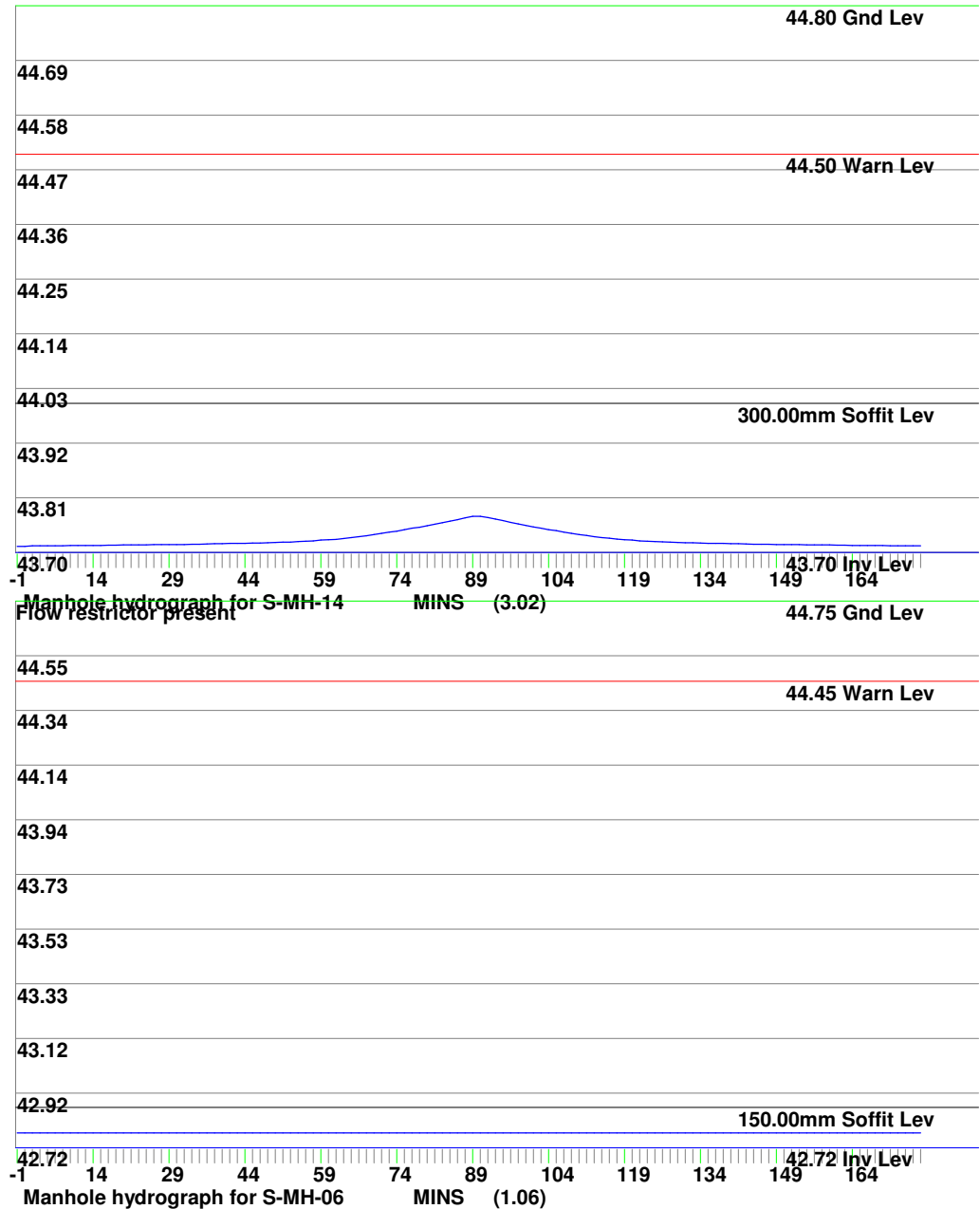




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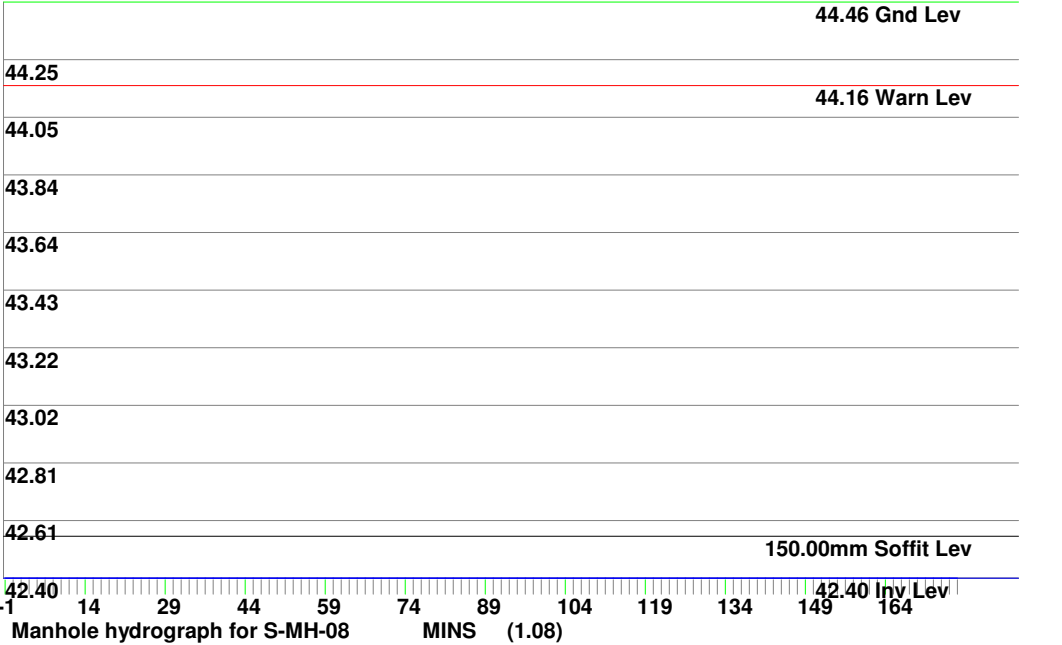
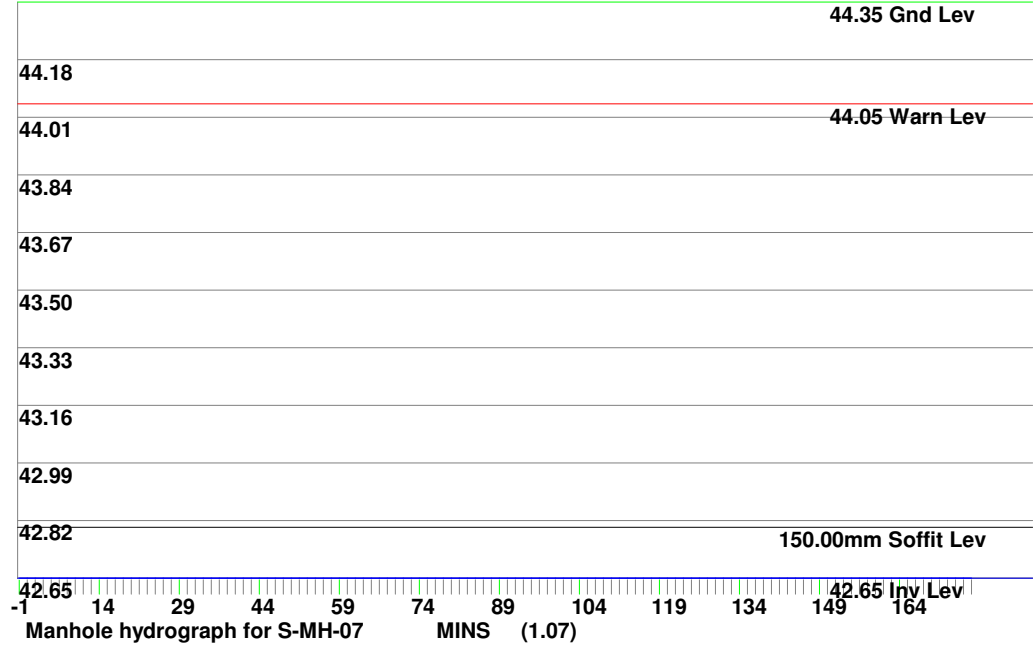
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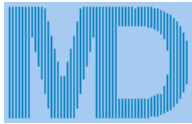
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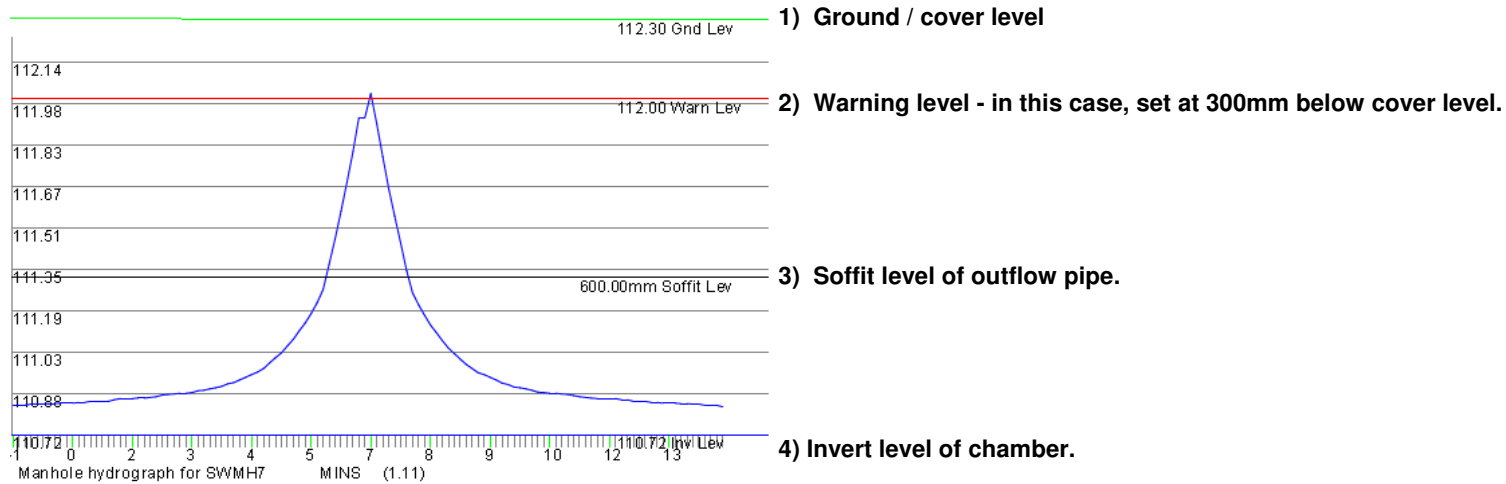
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Job No.	1132-22		
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Notes

- 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.