



1 in 30 Year Access Road Soakaway Calculations
Burtons Yard, Birdwell, Barnsley
Oak Tree Developments
26th March 2018

REVISION SCHEDULE

Burtons Yard, Birdwell, Barnsley

Oak Tree Developments

Rev	Date	Details	Prepared By	Approved By
A	26.03.2018	First Issue	S. Griffiths	S. Griffiths

CONTRACT

The document describes work commissioned by Oak Tree Developments as outlined within fee proposal dated 20th February 2018.

PURPOSE

G30 Consulting were commissioned to attend site to observe trial excavations for soakaway testing at the site at Burton's Yard, Birdwell, Barnsley on Friday 16th March 2018. The infiltration rates used within this document are from observations made by G30 Consulting Ltd.

Infiltration testing in accordance with BRE 365 is beyond the scope of works commissioned by Oak Tree Developments and as such further testing by an approved ground investigation consultant should be undertaken to confirm the accuracy of the results.

Trial Pit Details	Units	Test 1	Test 2	Test 3
Pit Depth	m	1.400		
Pit Length	m	1.400		
Pit Width	m	0.900		
Depth of First Reading	m	0.220	0.220	0.220
Depth of Final Reading	m	0.000	0.000	0.000
Did soakaway test reach 25% of maximum fill depth	Y / N	Yes	Yes	Yes
Depth at 75% effective / fill depth	m	0.165	0.165	0.165
Depth at 25% effective / fill depth	m	0.055	0.055	0.055
Time at 75% effective / fill depth	mins	00:45	00:56	01:04
Time at 25% effective / fill depth	mins	02:15	02:49	03:11
V_{p75-25} (volume outflowing between 75% and 25% effective depth)	m ³	0.139	0.139	0.139
Mean surface area for outflow (50% effective / full depth)	m ²	1.766	1.766	1.766
t_{p75-25} (time for the water level to fall from 75% to 25% effective depth)	mins	01:30	01:53	02:07
Soil infiltration rate, $f =$	m/s	0.0008745	0.0006956	0.0006217
or	m/s	8.745E-04	6.956E-04	6.217E-04

Test Logs					
Test 1		Test 2		Test 3	
Time (min)	Depth (m)	Time (min)	Depth (m)	Time (min)	Depth (m)
00:00	0.220	00:00	0.220	00:00	0.220
03:00	0.000	03:45	0.000	04:15	0.000

Trial Pit Details	Units	Test 1	Test 2
Pit Depth	m	1.500	
Pit Length	m	1.700	
Pit Width	m	1.200	
Depth of First Reading	m	0.150	0.140
Depth of Final Reading	m	0.000	0.050
Did soakaway test reach 25% of maximum fill depth	Y / N	Yes	No
Depth at 75% effective / fill depth	m	0.113	0.118
Depth at 25% effective / fill depth	m	0.038	0.073
Time at 75% effective / fill depth	mins	13:05	01:30
Time at 25% effective / fill depth	mins	28:52	20:35
V _{p75-25} (volume outflowing between 75% and 25% effective depth)	m ³	0.153	0.092
Mean surface area for outflow (50% effective / full depth)	m ²	2.475	2.301
t _{p75-25} (time for the water level to fall from 75% to 25% effective depth)	mins	15:47	19:05
Soil infiltration rate, f =	m/s	0.0000653	0.0000349
or	m/s	6.529E-05	3.492E-05

Test Logs			
Test 1		Test 2	
Time (min)	Depth (m)	Time (min)	Depth (m)
00:00	0.150	00:00	0.140
09:00	0.130	02:30	0.110
18:30	0.100	05:30	0.100
28:30	0.040	12:00	0.085
36:00	0.000	25:00	0.050

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Unit 6 Neepsend Triangle Business 1 Burton Road Sheffield S3 8BW	Burttons Yard, Birdwell Access Road, Soakaway 1 in 30 Year Storms	
Date 26/03/2018	Designed by S. Griffiths	
File SOAKAWAY - ACCESS ROAD.SRCX	Checked by S. Griffiths	
XP Solutions	Source Control 2017.1	

Summary of Results for 30 year Return Period

Half Drain Time : 90 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	135.820	0.220	1.4	8.7	O K
30 min Summer	135.883	0.283	1.5	11.2	O K
60 min Summer	135.930	0.330	1.7	13.0	O K
120 min Summer	135.949	0.349	1.7	13.8	O K
180 min Summer	135.948	0.348	1.7	13.7	O K
240 min Summer	135.939	0.339	1.7	13.4	O K
360 min Summer	135.916	0.316	1.6	12.5	O K
480 min Summer	135.893	0.293	1.6	11.6	O K
600 min Summer	135.872	0.272	1.5	10.7	O K
720 min Summer	135.852	0.252	1.5	9.9	O K
960 min Summer	135.817	0.217	1.4	8.6	O K
1440 min Summer	135.763	0.163	1.2	6.4	O K
2160 min Summer	135.707	0.107	1.0	4.2	O K
2880 min Summer	135.672	0.072	0.9	2.8	O K
4320 min Summer	135.645	0.045	0.8	1.8	O K
5760 min Summer	135.636	0.036	0.6	1.4	O K
7200 min Summer	135.631	0.031	0.5	1.2	O K
8640 min Summer	135.627	0.027	0.5	1.1	O K
10080 min Summer	135.624	0.024	0.4	0.9	O K
15 min Winter	135.849	0.249	1.4	9.8	O K
30 min Winter	135.920	0.320	1.7	12.6	O K
60 min Winter	135.976	0.376	1.8	14.8	O K
120 min Winter	135.996	0.396	1.9	15.6	O K
180 min Winter	135.990	0.390	1.9	15.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	68.703	0.0	26
30 min Summer	45.783	0.0	37
60 min Summer	29.238	0.0	62
120 min Summer	18.130	0.0	96
180 min Summer	13.554	0.0	130
240 min Summer	10.972	0.0	164
360 min Summer	8.125	0.0	232
480 min Summer	6.562	0.0	300
600 min Summer	5.556	0.0	366
720 min Summer	4.848	0.0	430
960 min Summer	3.907	0.0	558
1440 min Summer	2.878	0.0	804
2160 min Summer	2.117	0.0	1160
2880 min Summer	1.701	0.0	1508
4320 min Summer	1.249	0.0	2204
5760 min Summer	1.002	0.0	2936
7200 min Summer	0.844	0.0	3672
8640 min Summer	0.734	0.0	4408
10080 min Summer	0.653	0.0	5112
15 min Winter	68.703	0.0	26
30 min Winter	45.783	0.0	38
60 min Winter	29.238	0.0	62
120 min Winter	18.130	0.0	100
180 min Winter	13.554	0.0	138

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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	135.976	0.376	1.8	14.8	O K
360 min Winter	135.940	0.340	1.7	13.4	O K
480 min Winter	135.906	0.306	1.6	12.0	O K
600 min Winter	135.874	0.274	1.5	10.8	O K
720 min Winter	135.846	0.246	1.4	9.7	O K
960 min Winter	135.798	0.198	1.3	7.8	O K
1440 min Winter	135.728	0.128	1.1	5.1	O K
2160 min Winter	135.664	0.064	0.9	2.5	O K
2880 min Winter	135.645	0.045	0.8	1.8	O K
4320 min Winter	135.633	0.033	0.6	1.3	O K
5760 min Winter	135.627	0.027	0.5	1.0	O K
7200 min Winter	135.622	0.022	0.4	0.9	O K
8640 min Winter	135.620	0.020	0.3	0.8	O K
10080 min Winter	135.617	0.017	0.3	0.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	10.972	0.0	176
360 min Winter	8.125	0.0	248
480 min Winter	6.562	0.0	320
600 min Winter	5.556	0.0	388
720 min Winter	4.848	0.0	454
960 min Winter	3.907	0.0	584
1440 min Winter	2.878	0.0	832
2160 min Winter	2.117	0.0	1172
2880 min Winter	1.701	0.0	1476
4320 min Winter	1.249	0.0	2204
5760 min Winter	1.002	0.0	2936
7200 min Winter	0.844	0.0	3680
8640 min Winter	0.734	0.0	4344
10080 min Winter	0.653	0.0	5144

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.348	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.078

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	From:	To:	From:	To:
(ha)	(ha)	(ha)	(ha)	(ha)	(ha)
0	5	5	10	10	15
0.026	0.026	0.026	0.026	0.026	0.026

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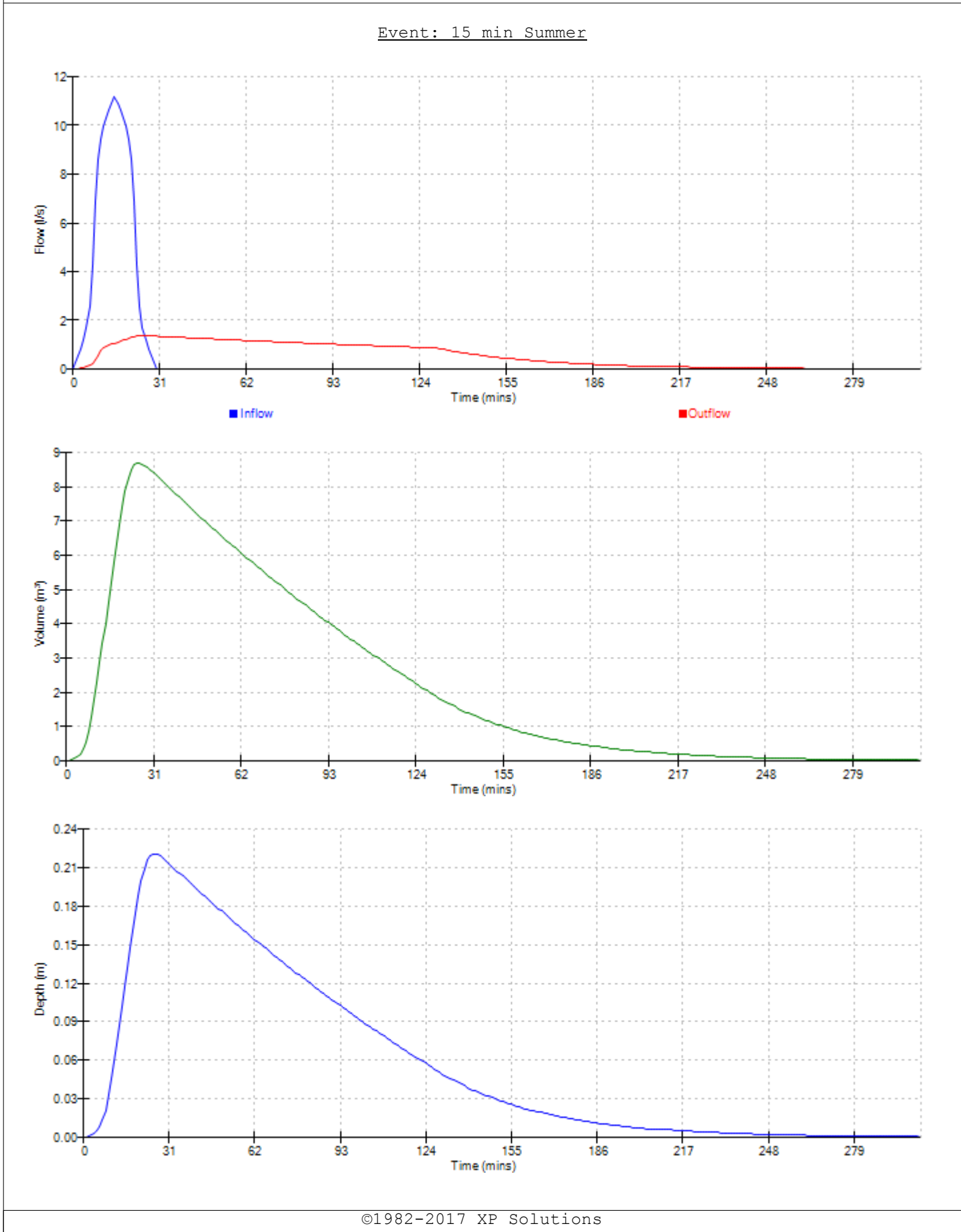
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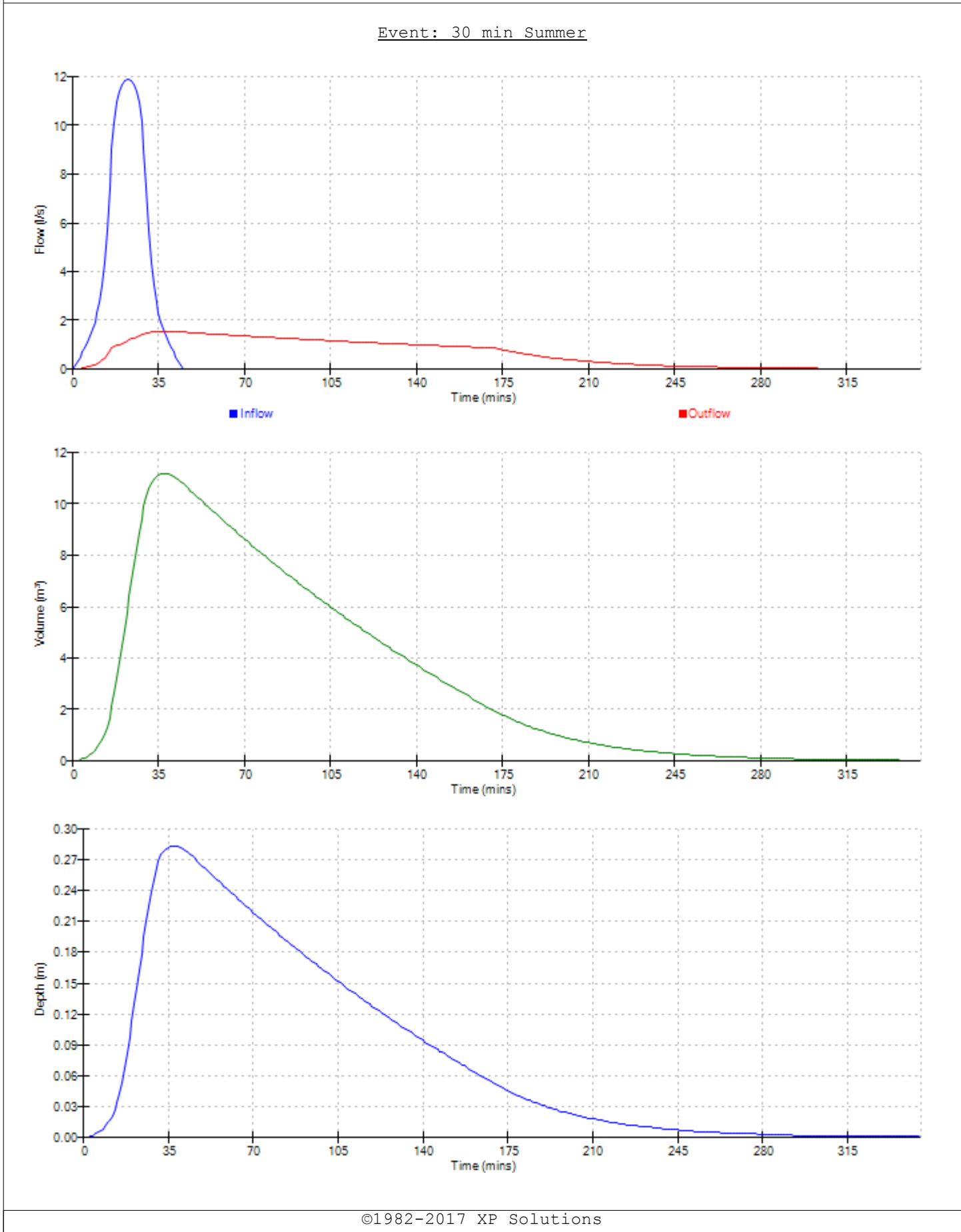
Storage is Online Cover Level (m) 136.750

Cellular Storage Structure

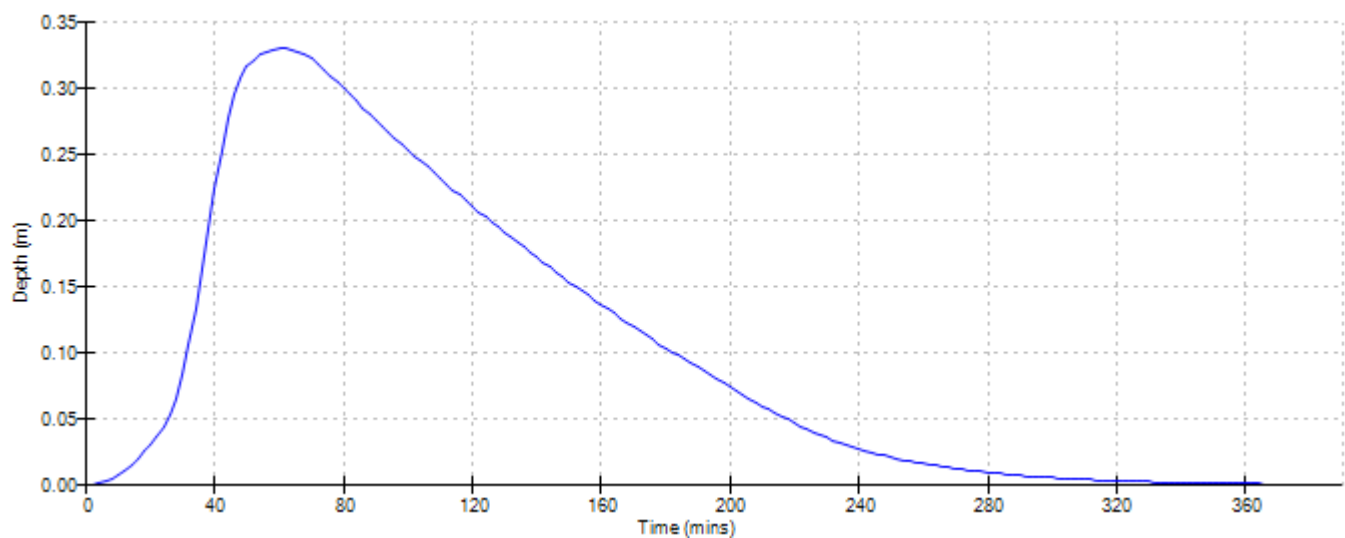
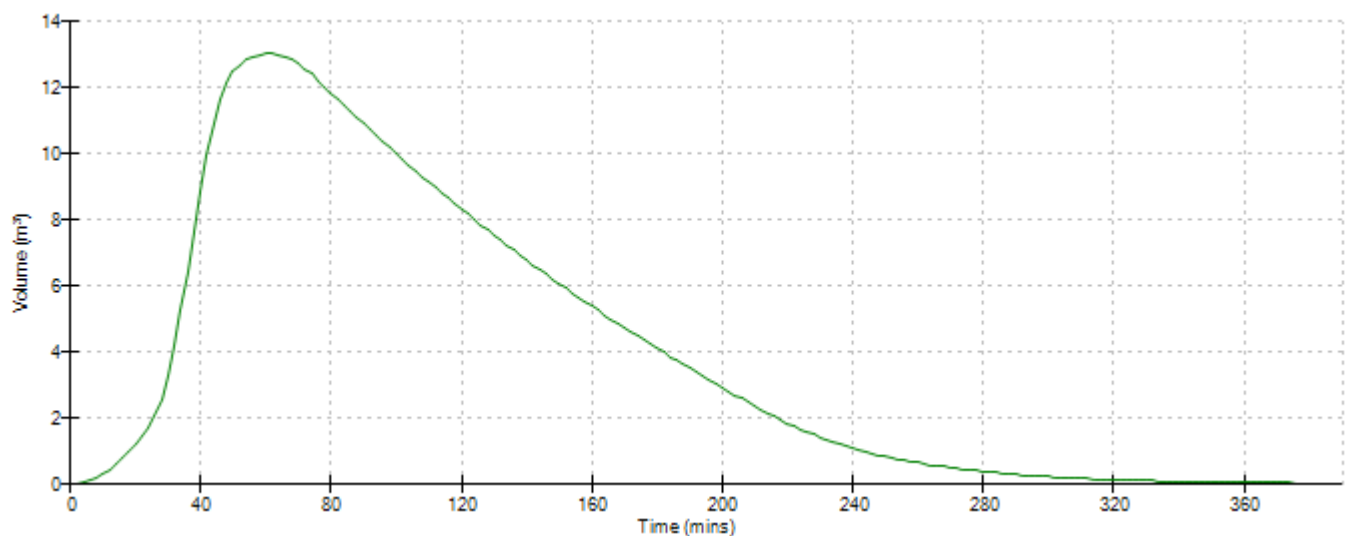
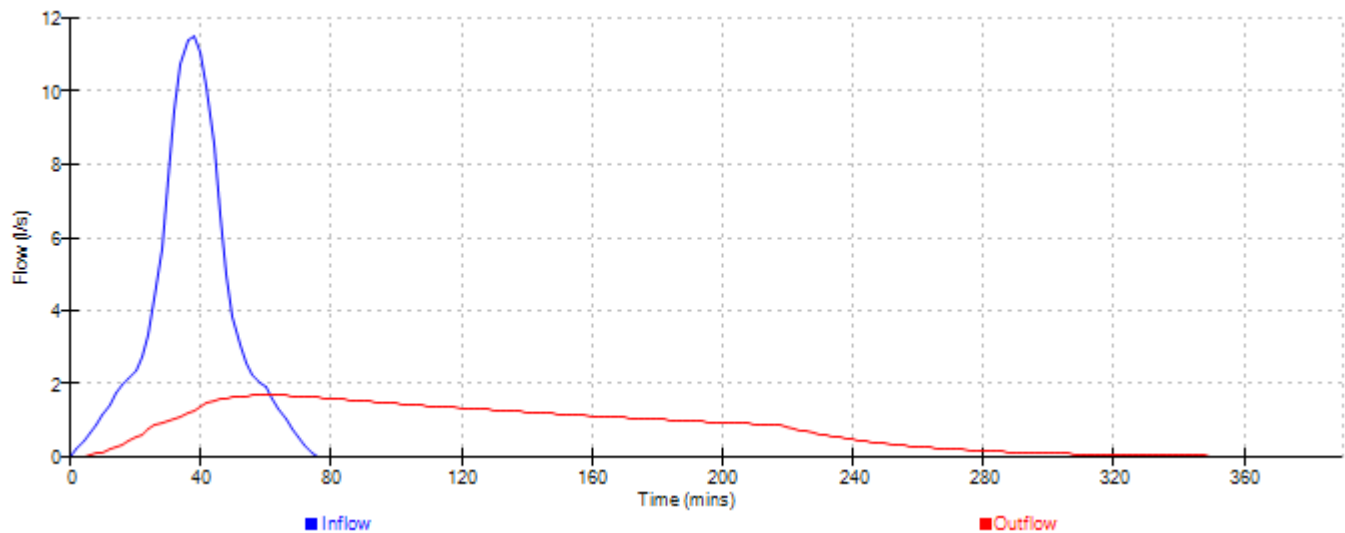
Invert Level (m) 135.600 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.12564 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.12564

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	41.5	41.5	0.400	41.5	107.9	0.401	0.0	108.0

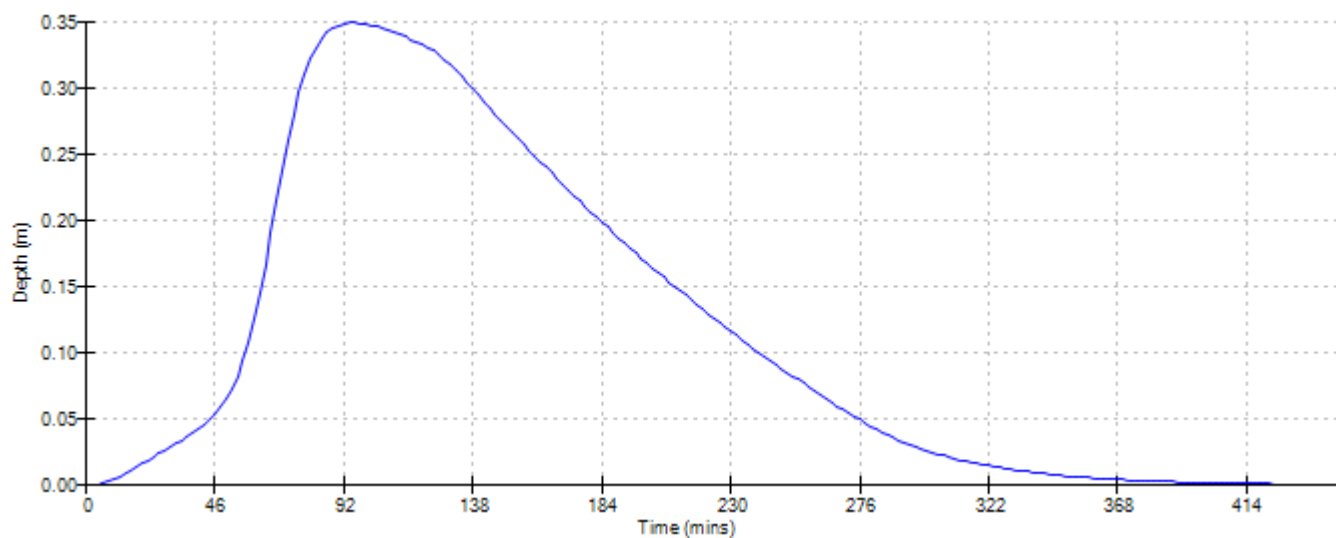
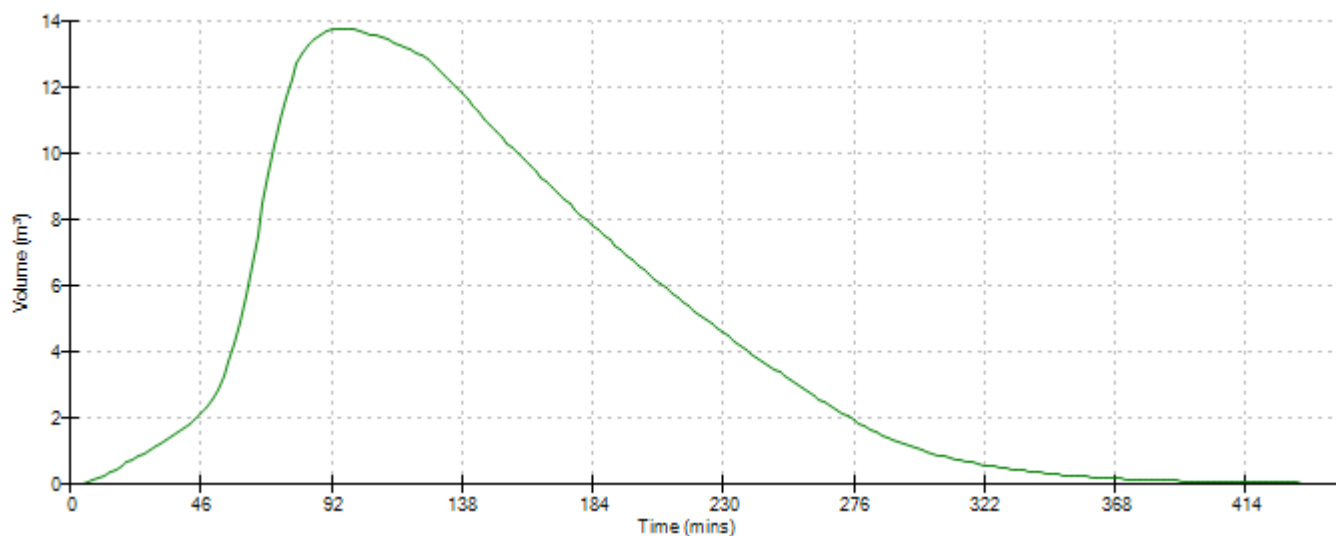
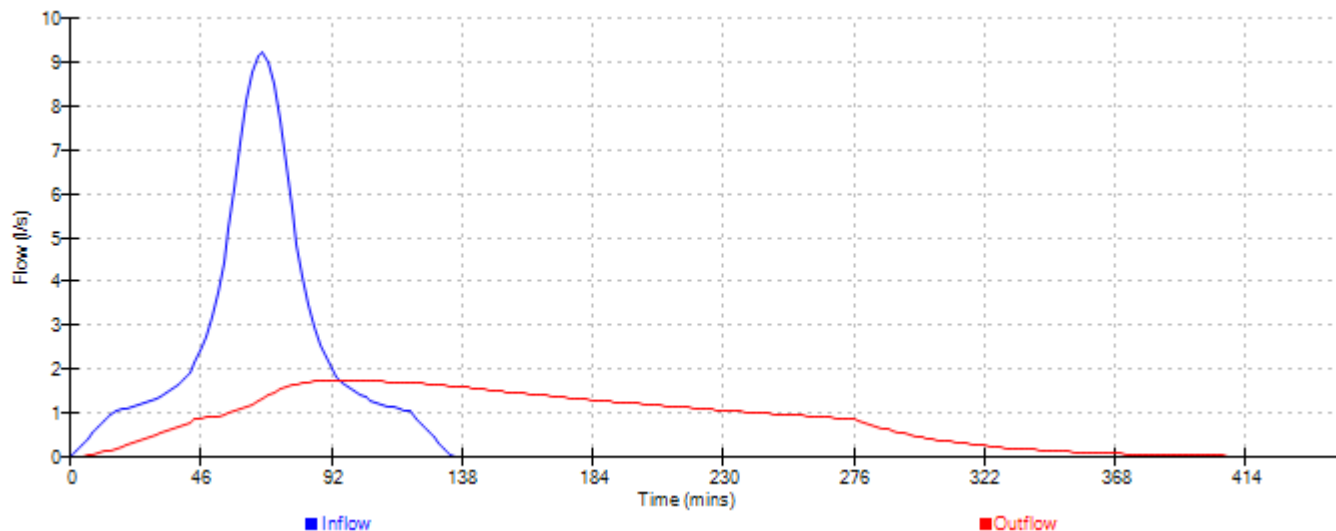




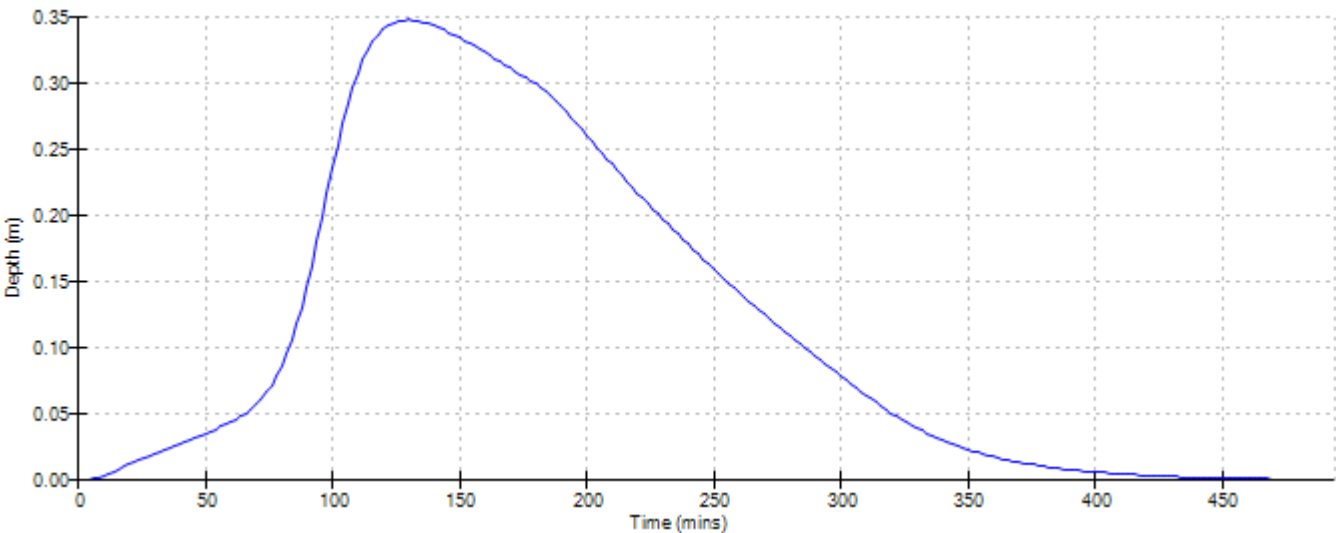
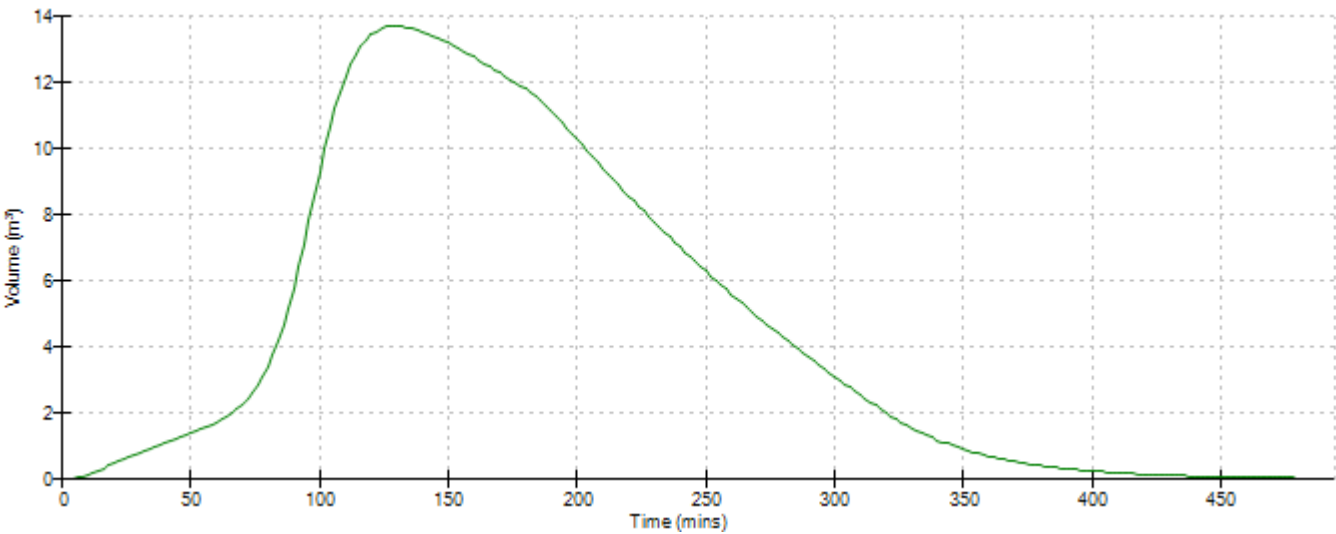
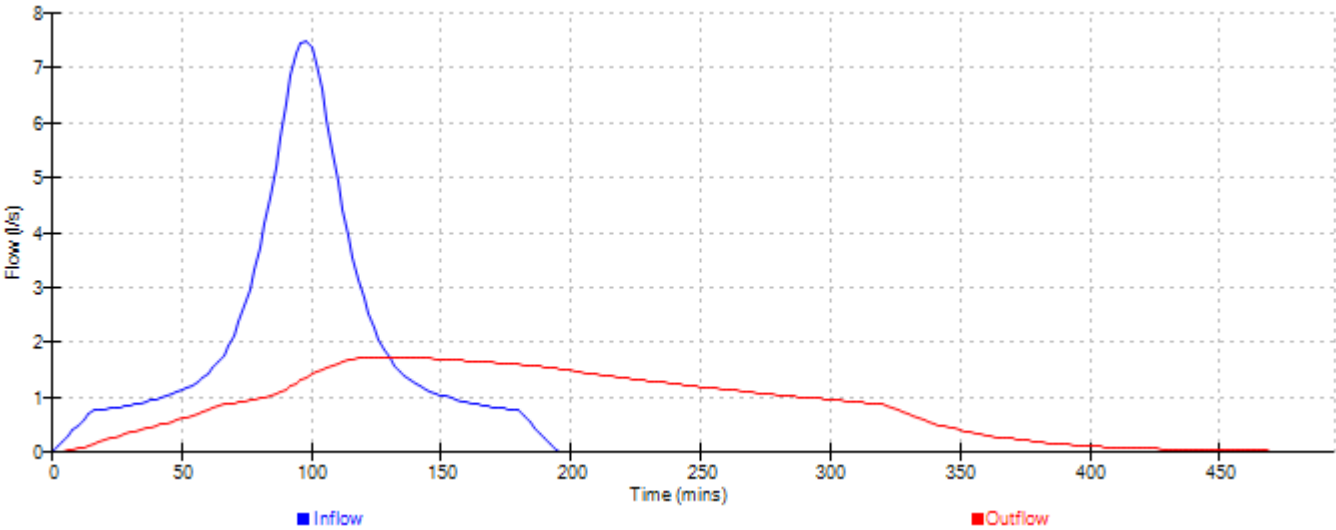
Event: 60 min Summer



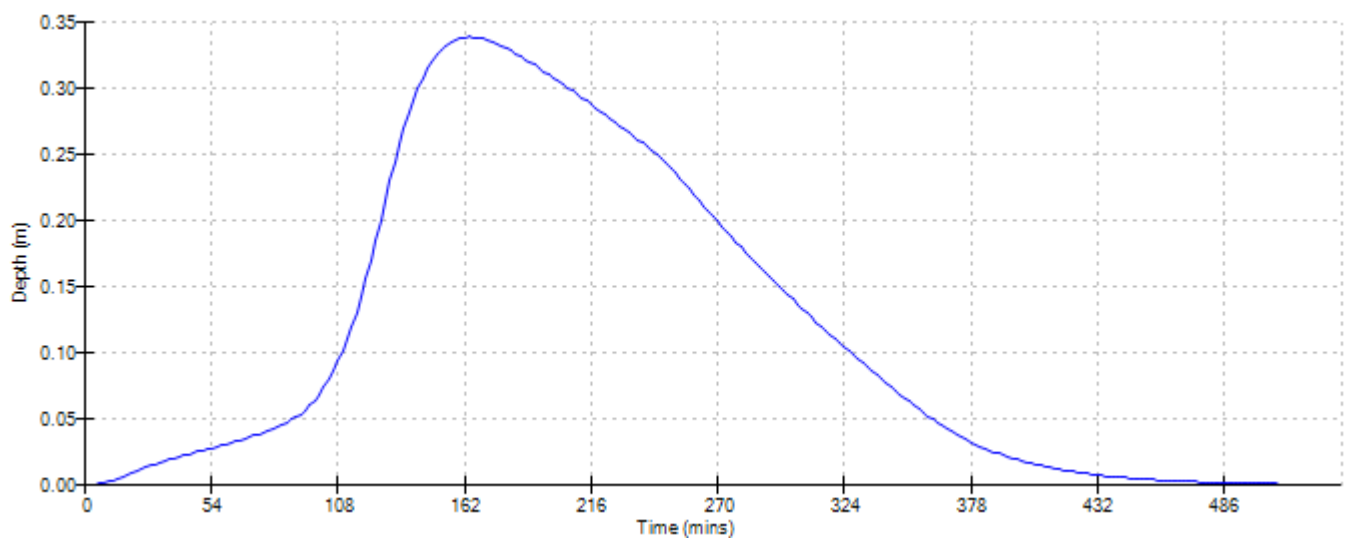
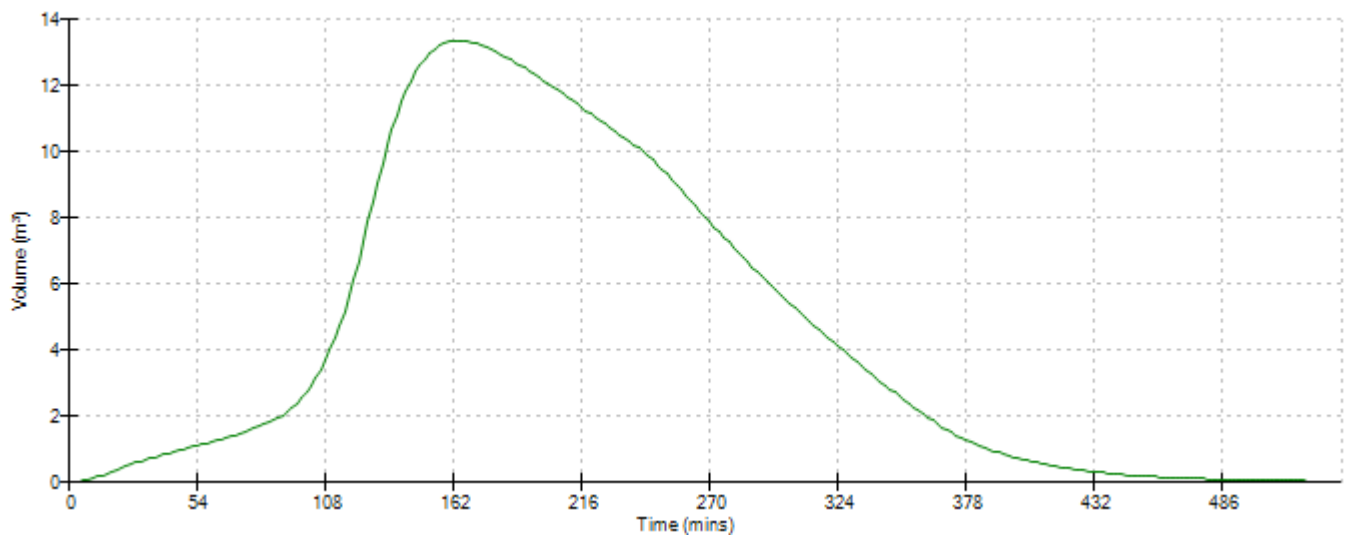
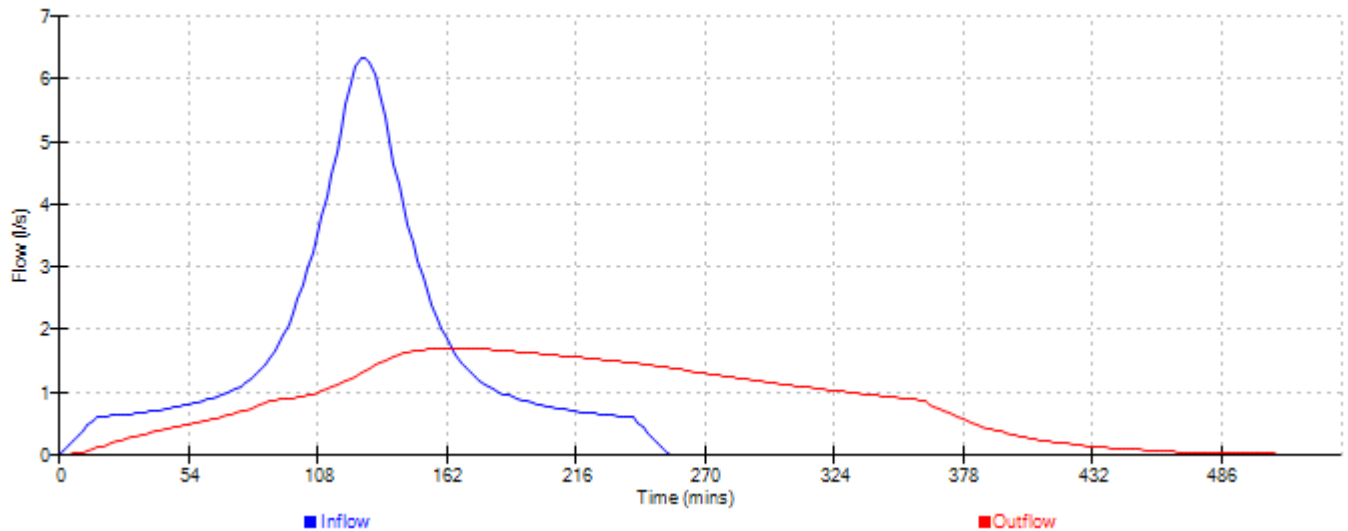
Event: 120 min Summer



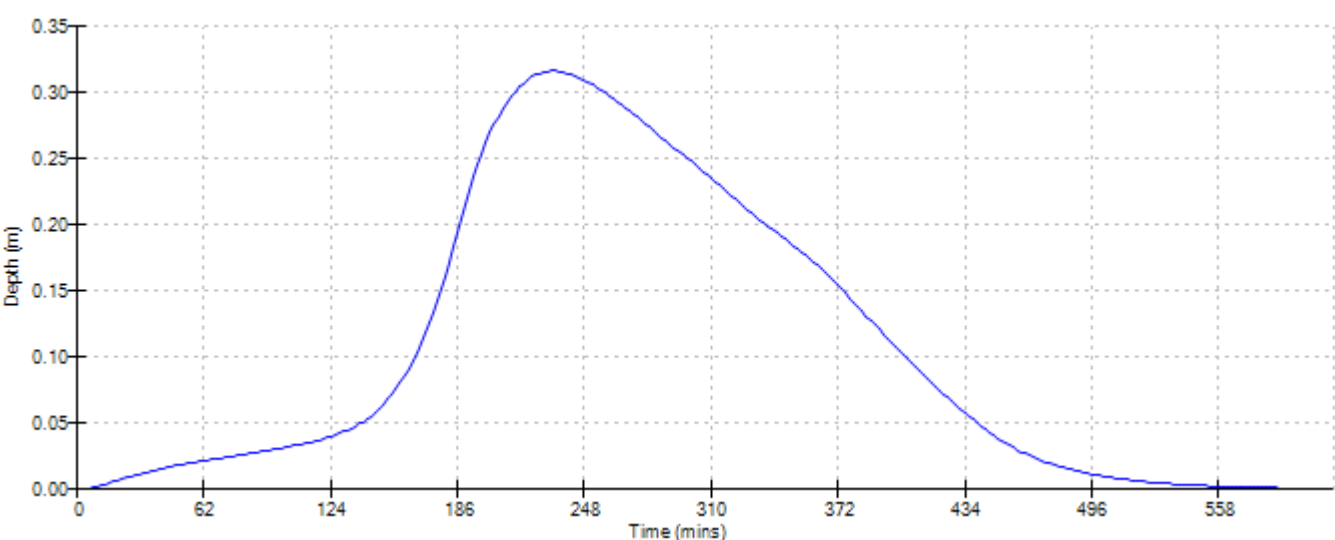
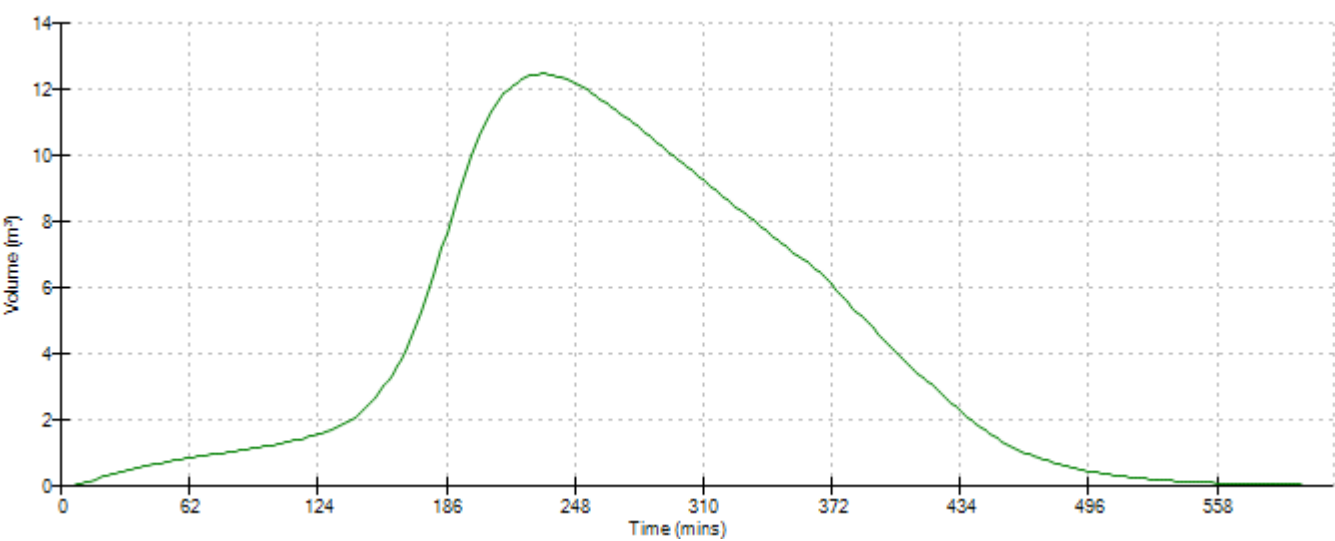
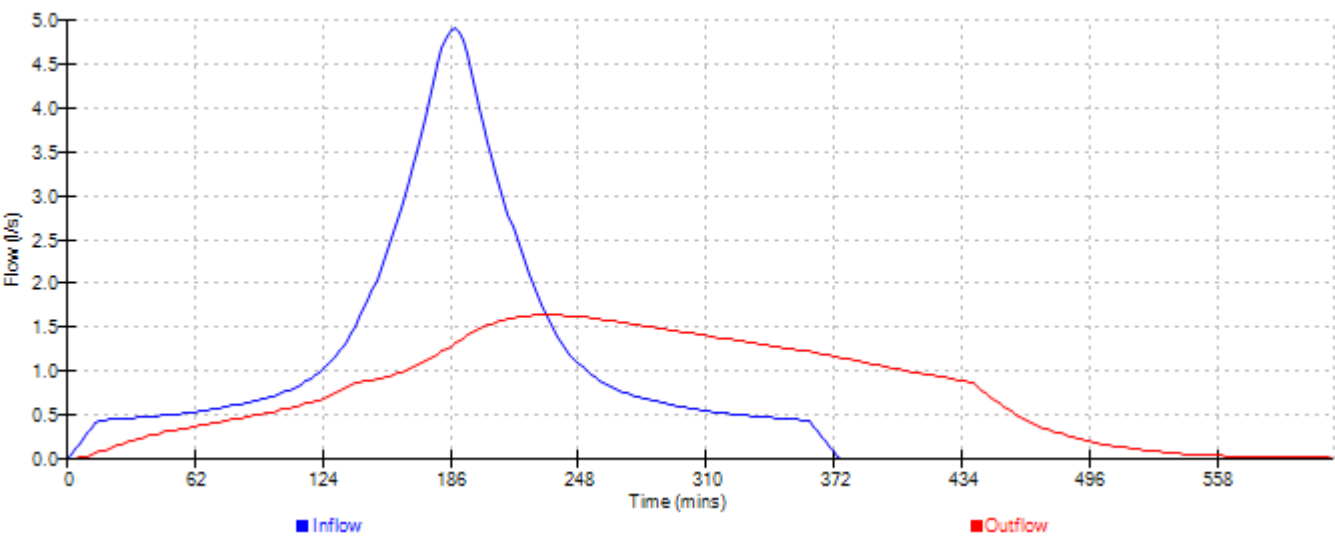
Event: 180 min Summer



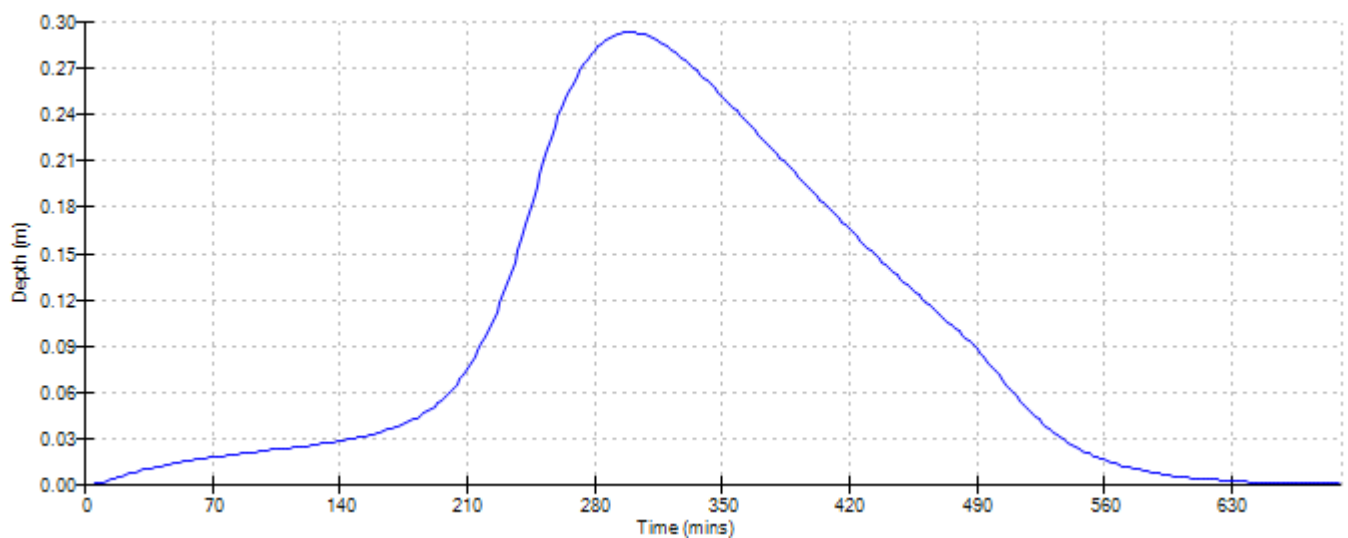
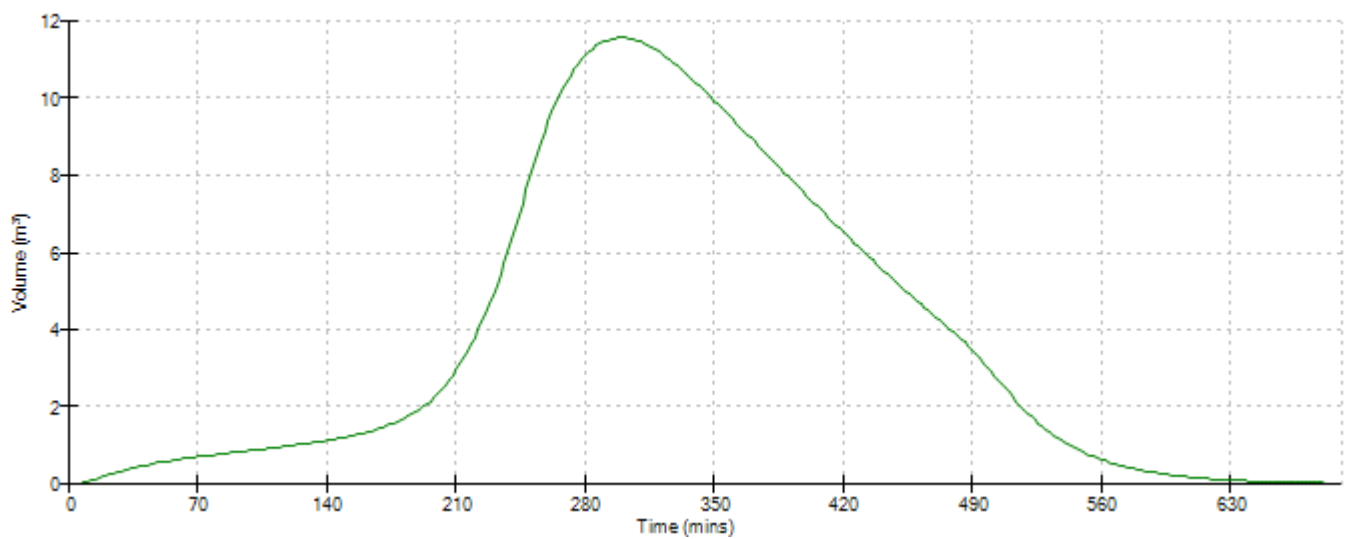
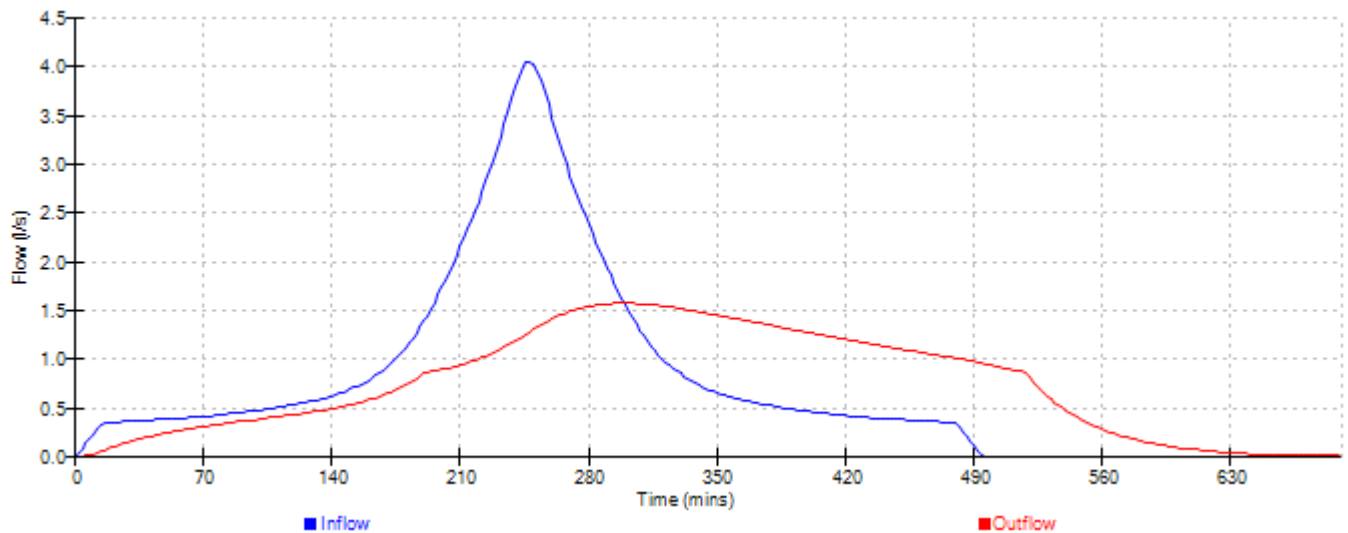
Event: 240 min Summer



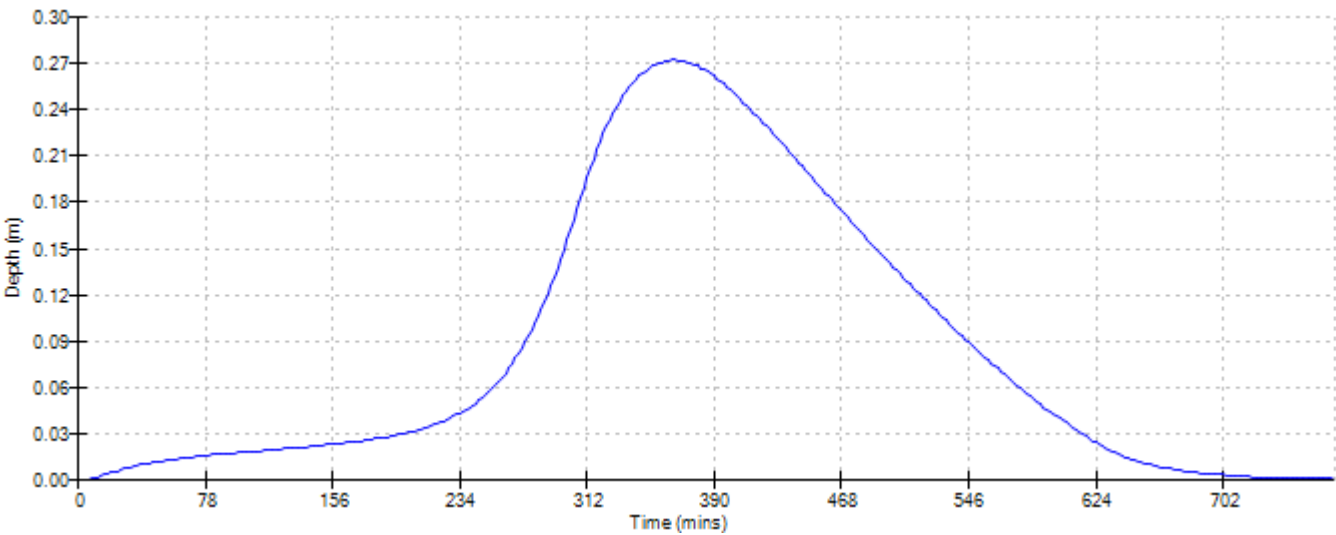
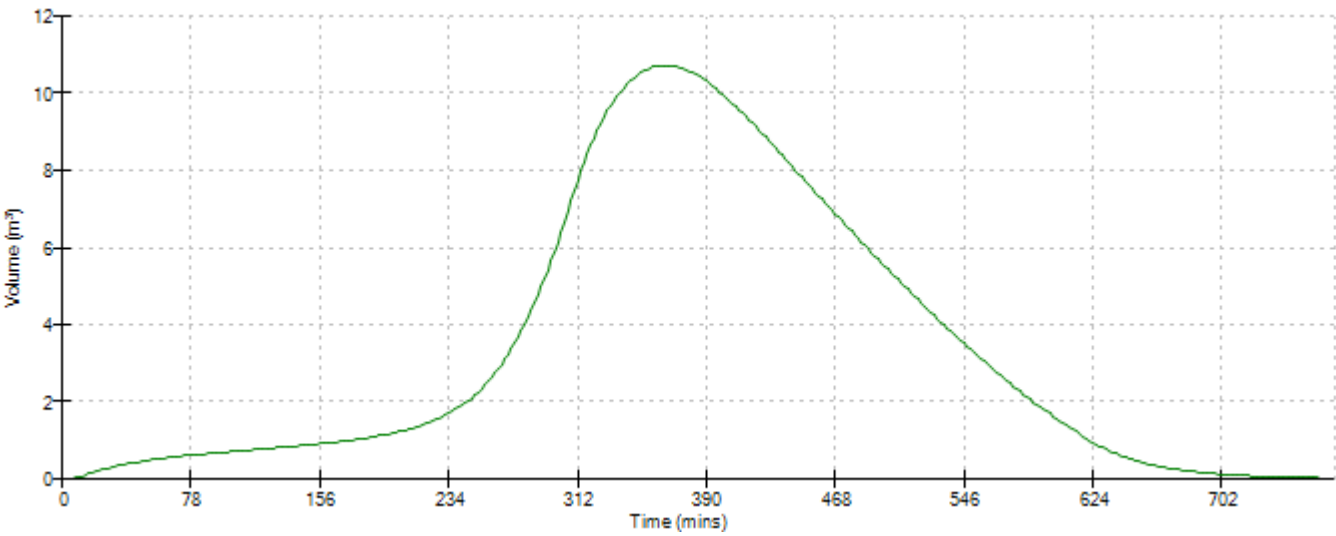
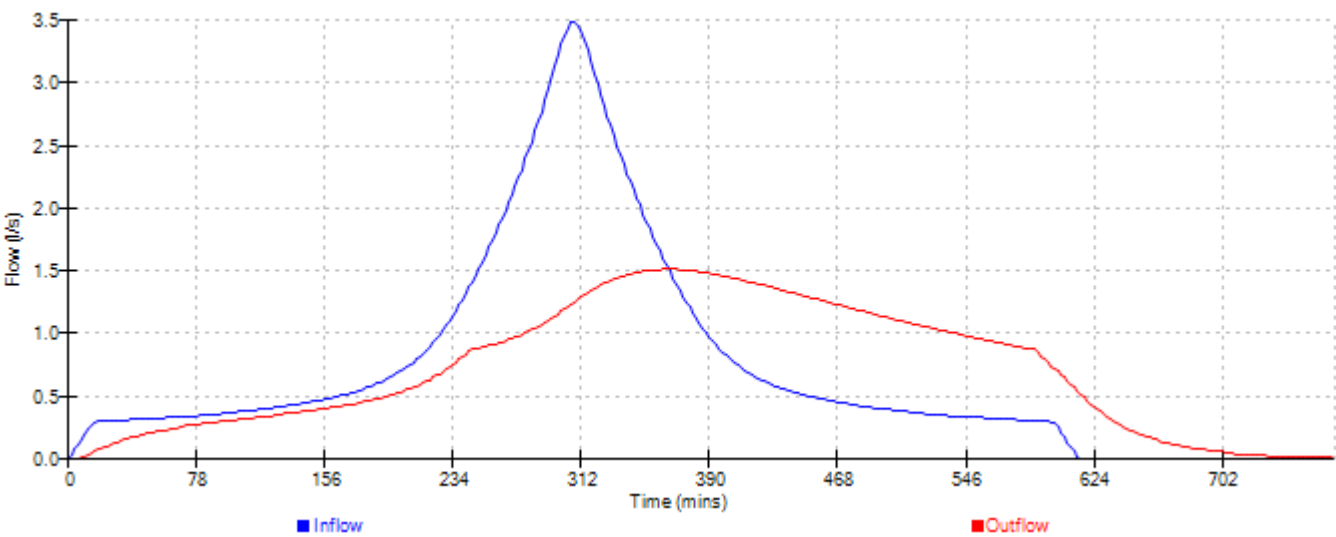
Event: 360 min Summer



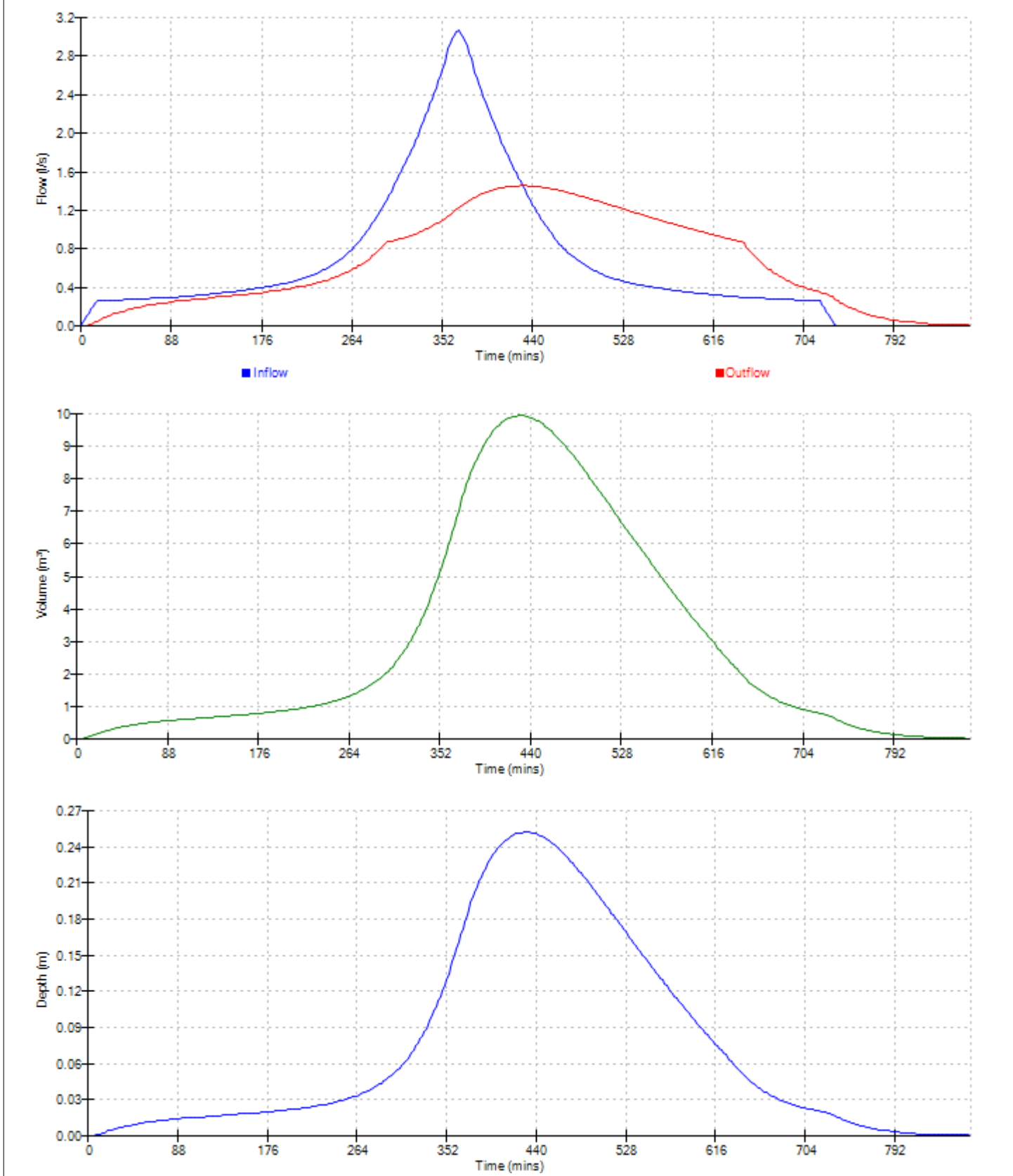
Event: 480 min Summer



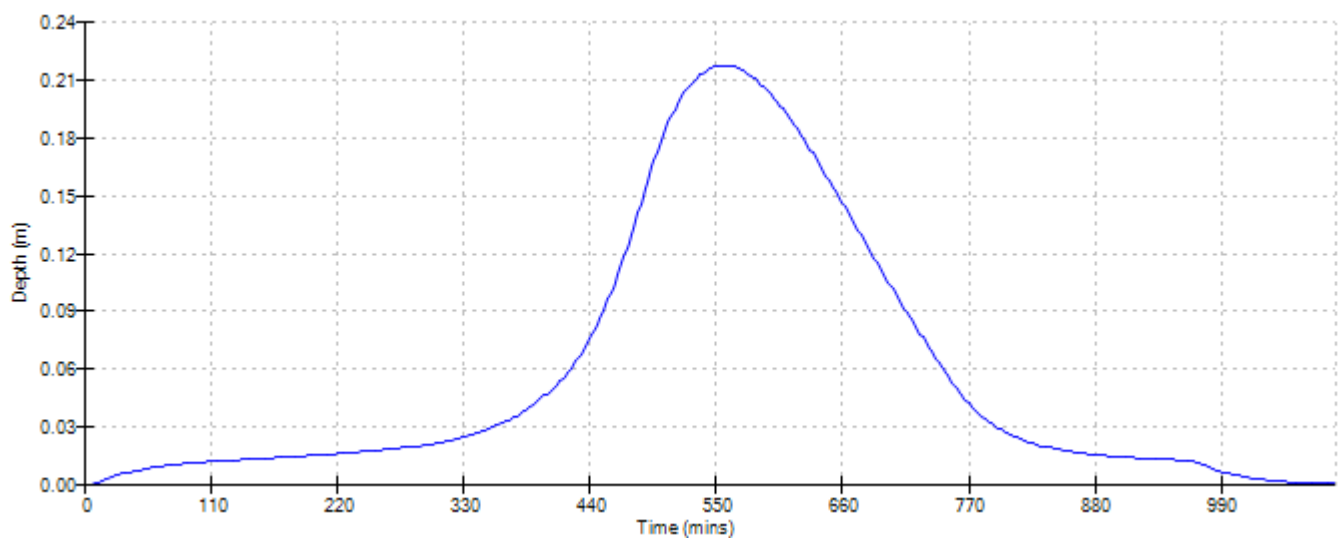
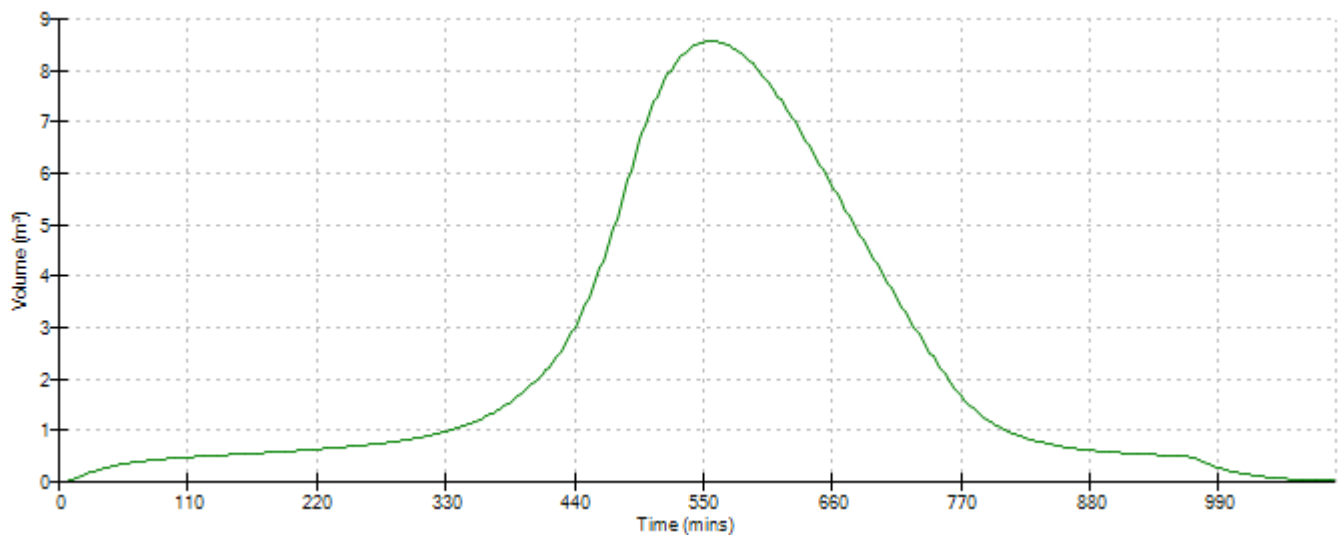
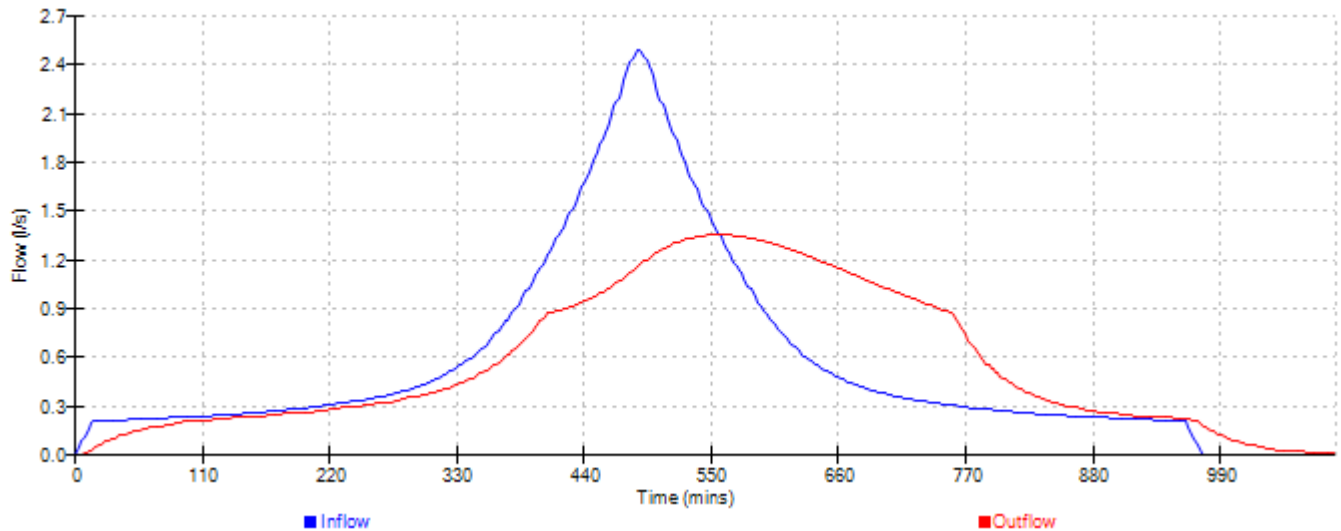
Event: 600 min Summer



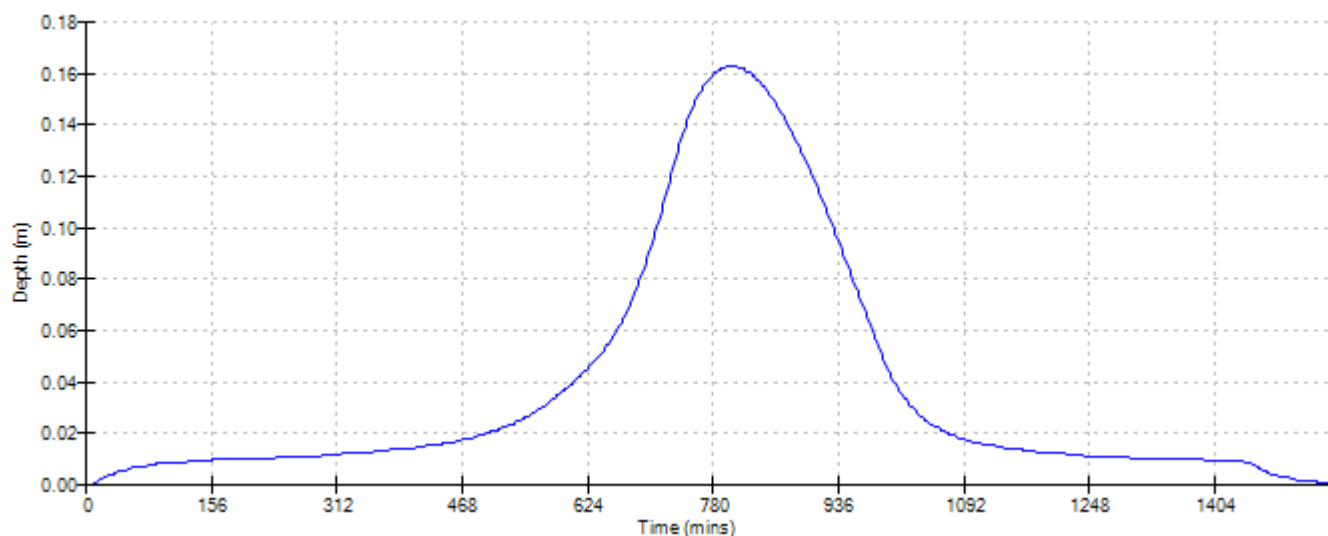
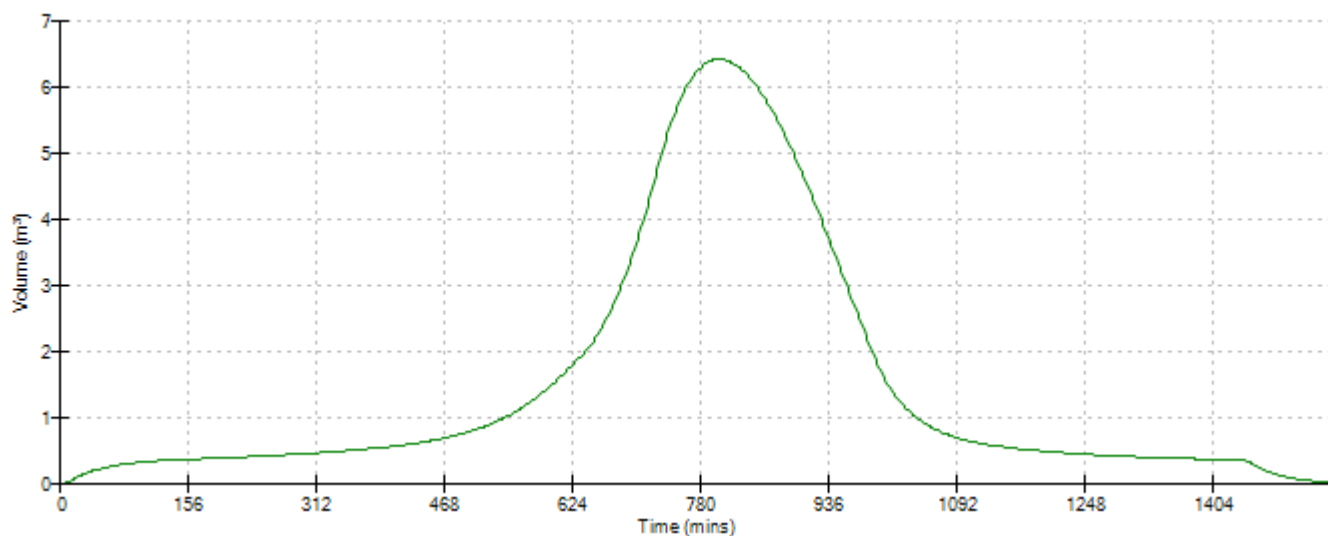
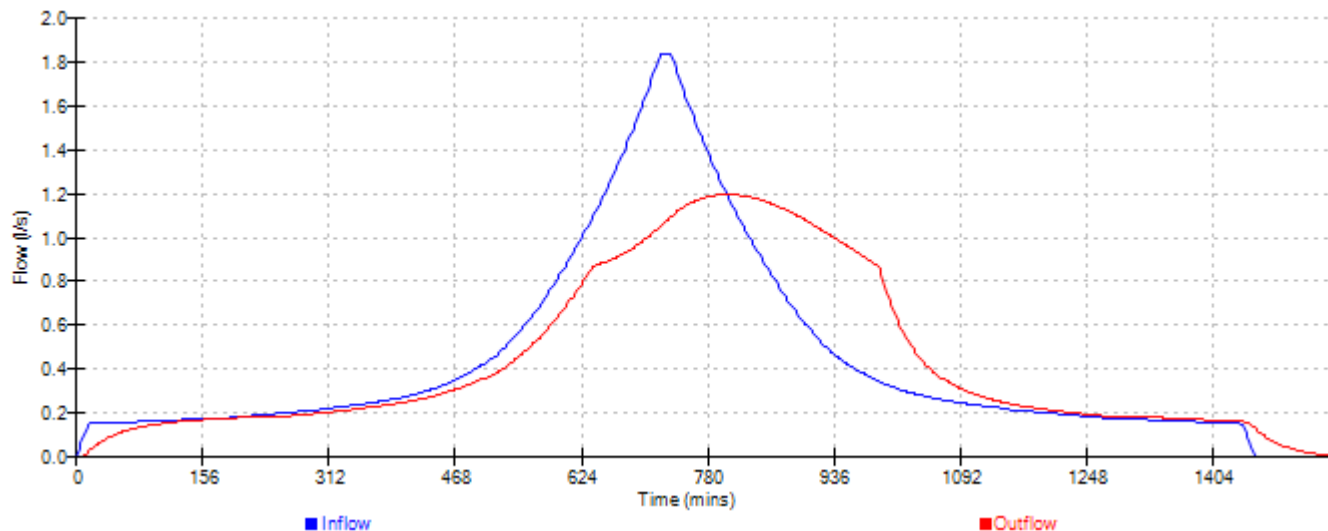
Event: 720 min Summer



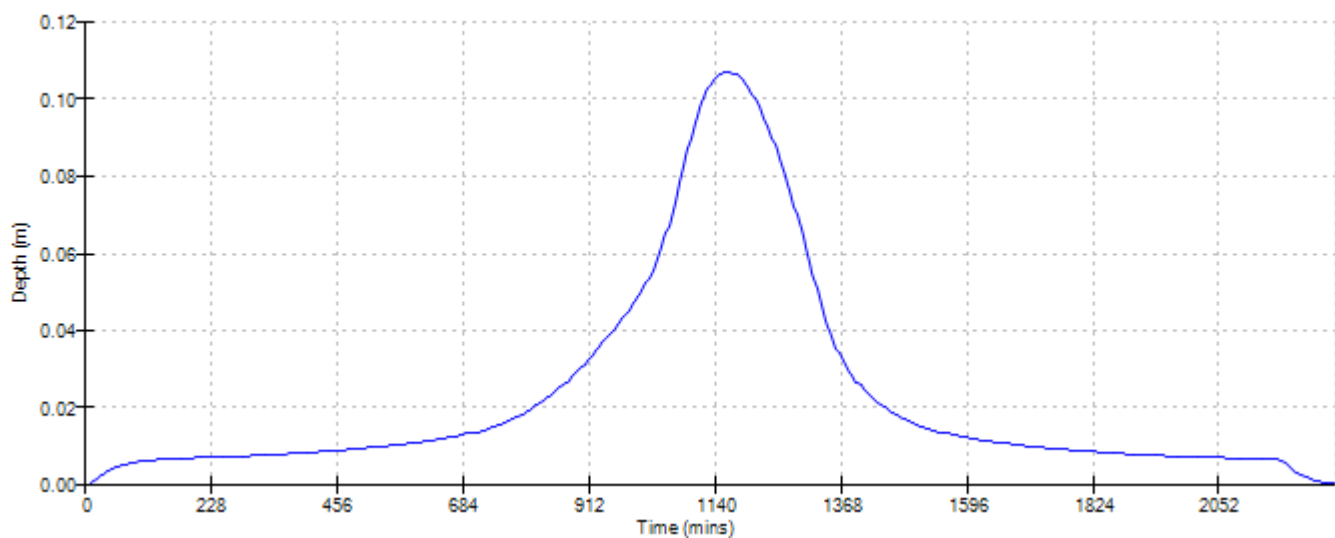
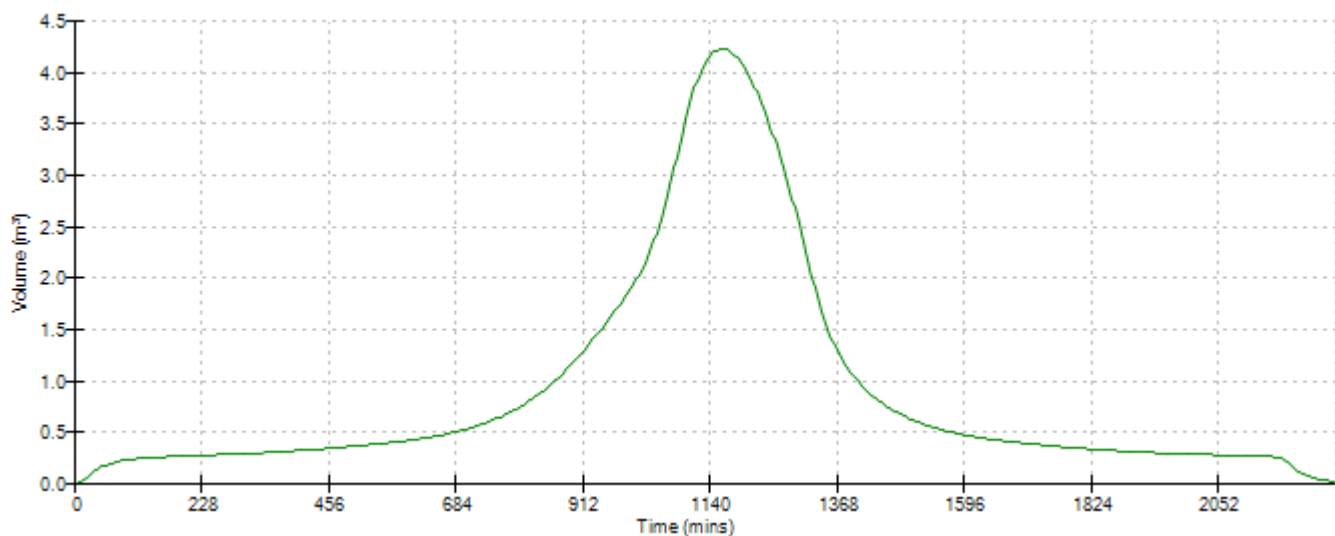
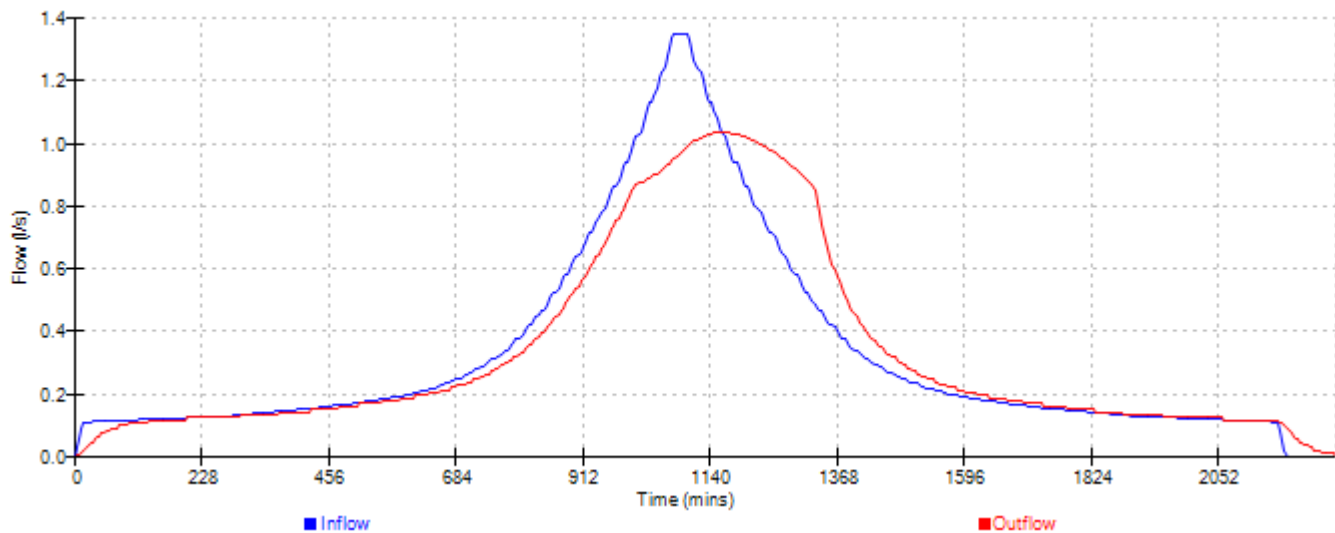
Event: 960 min Summer



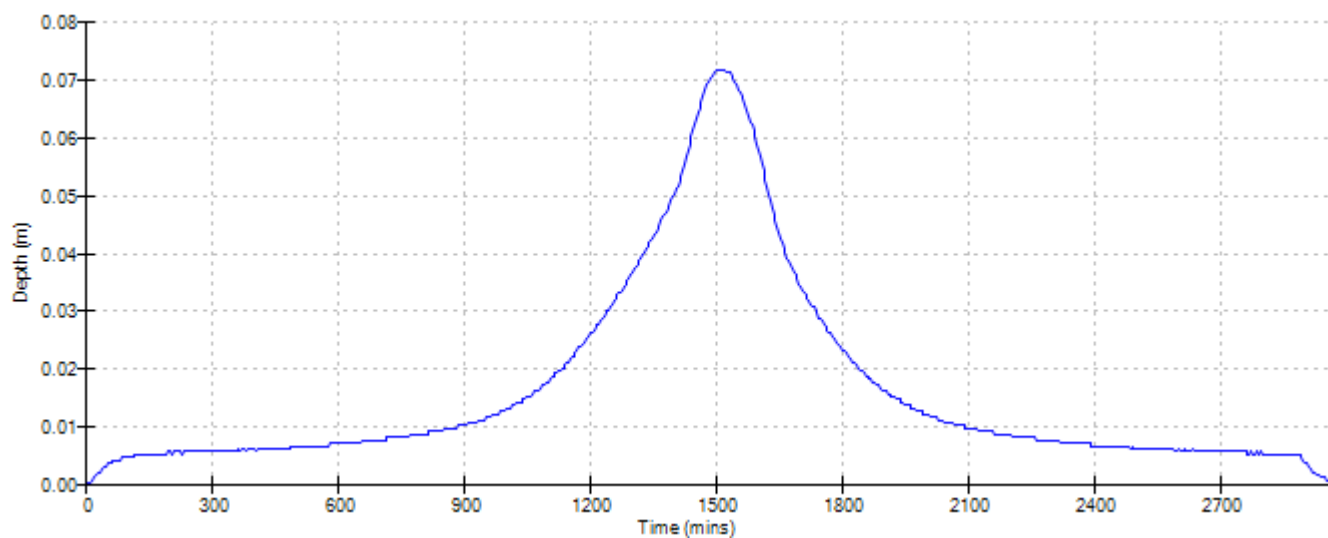
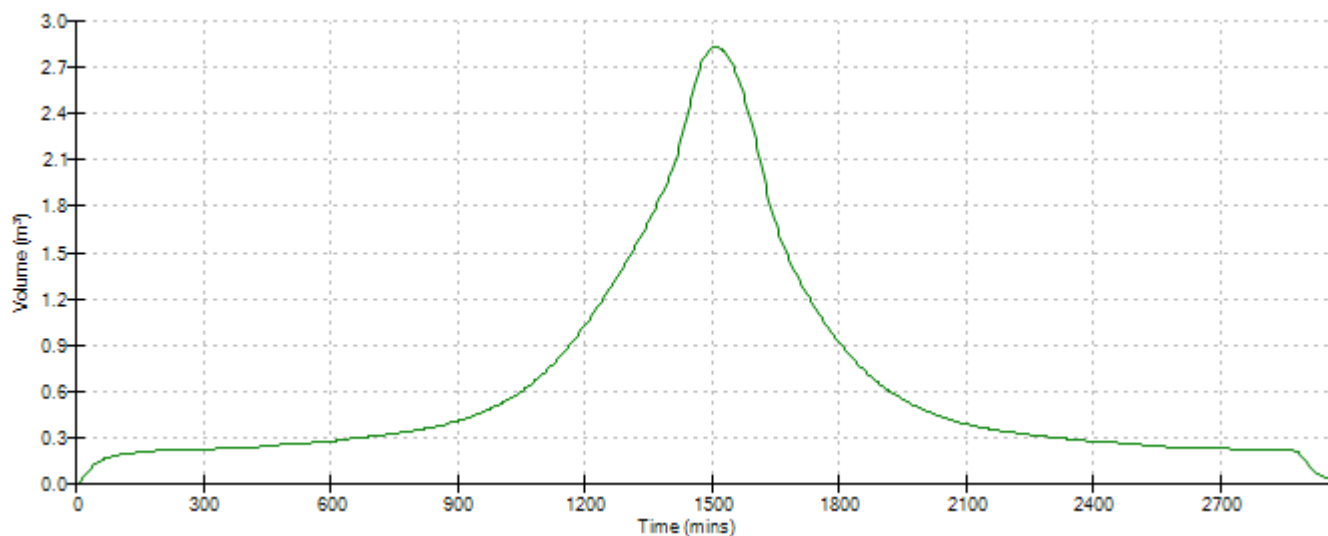
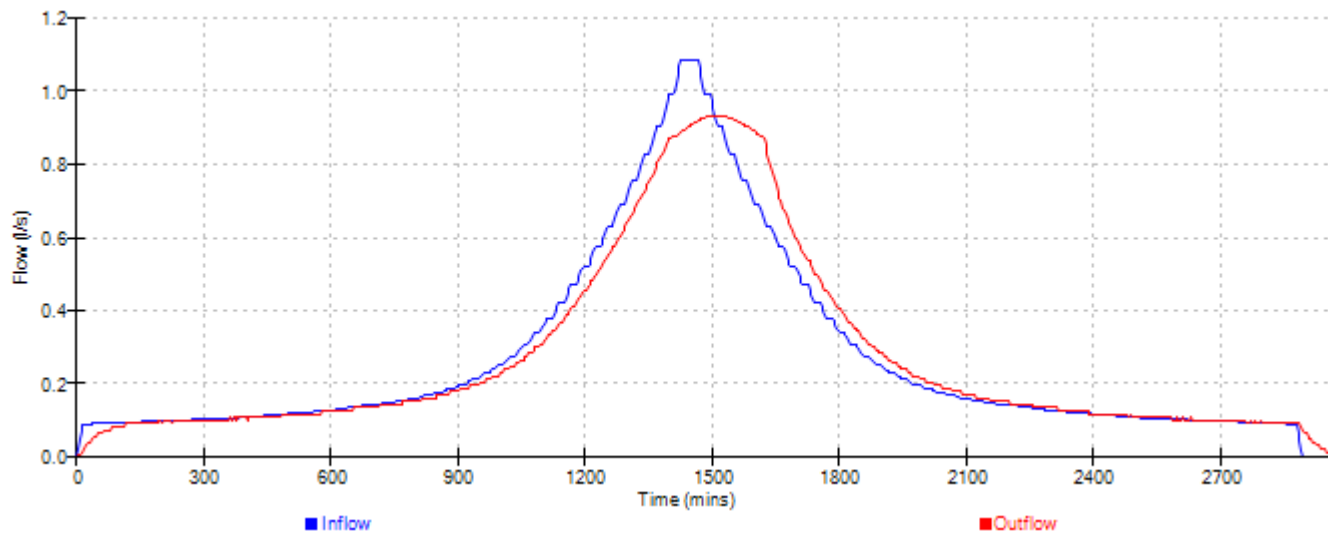
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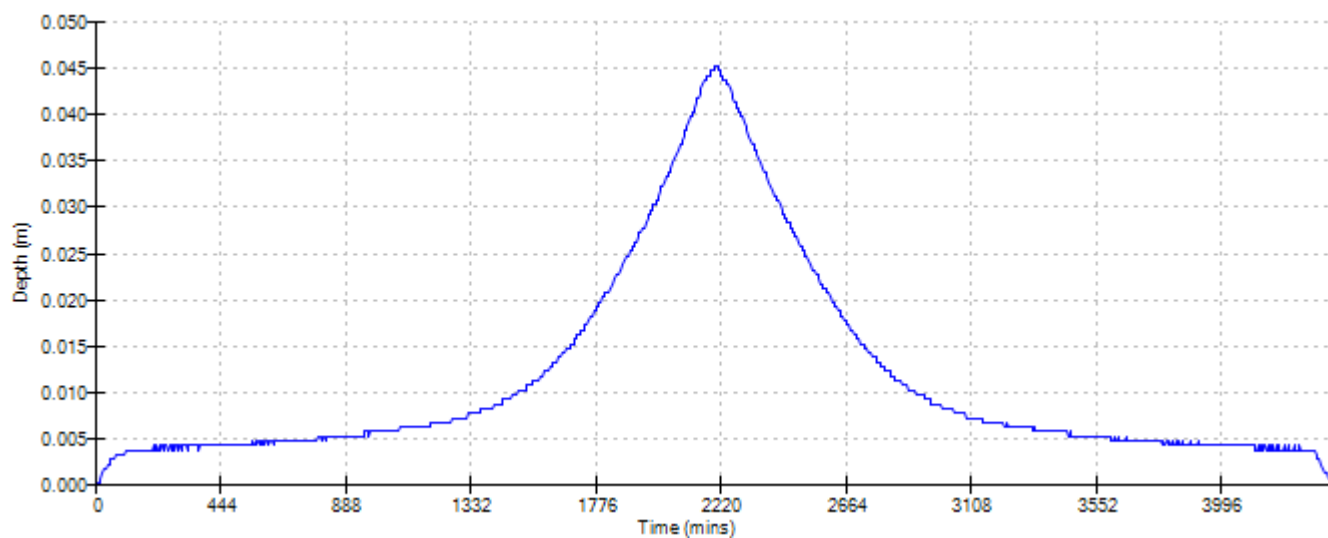
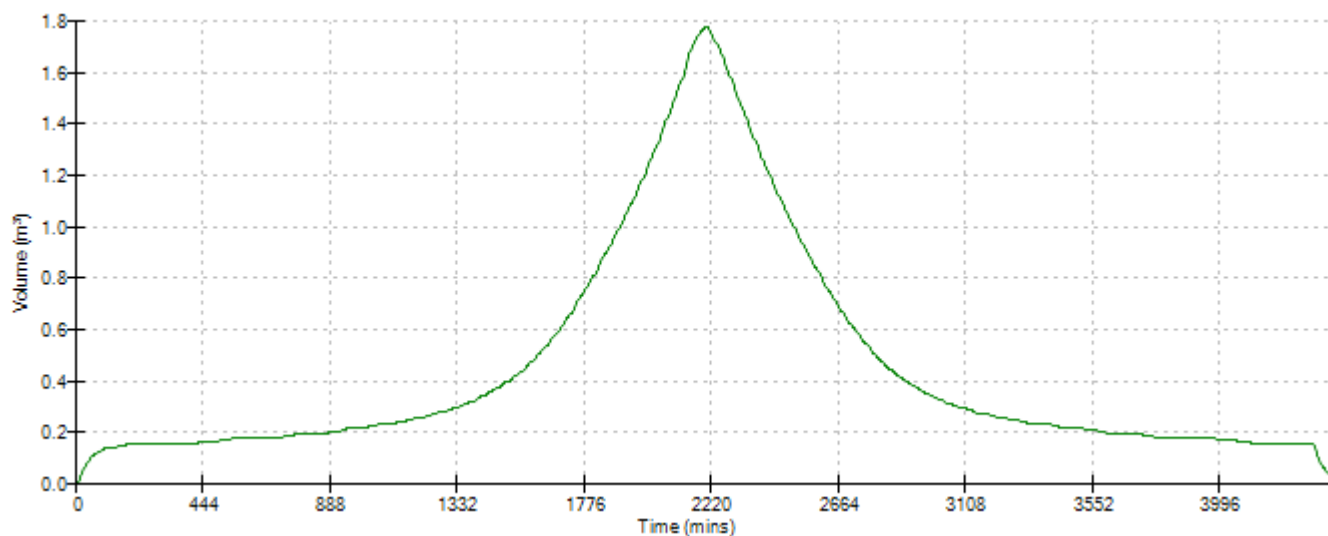
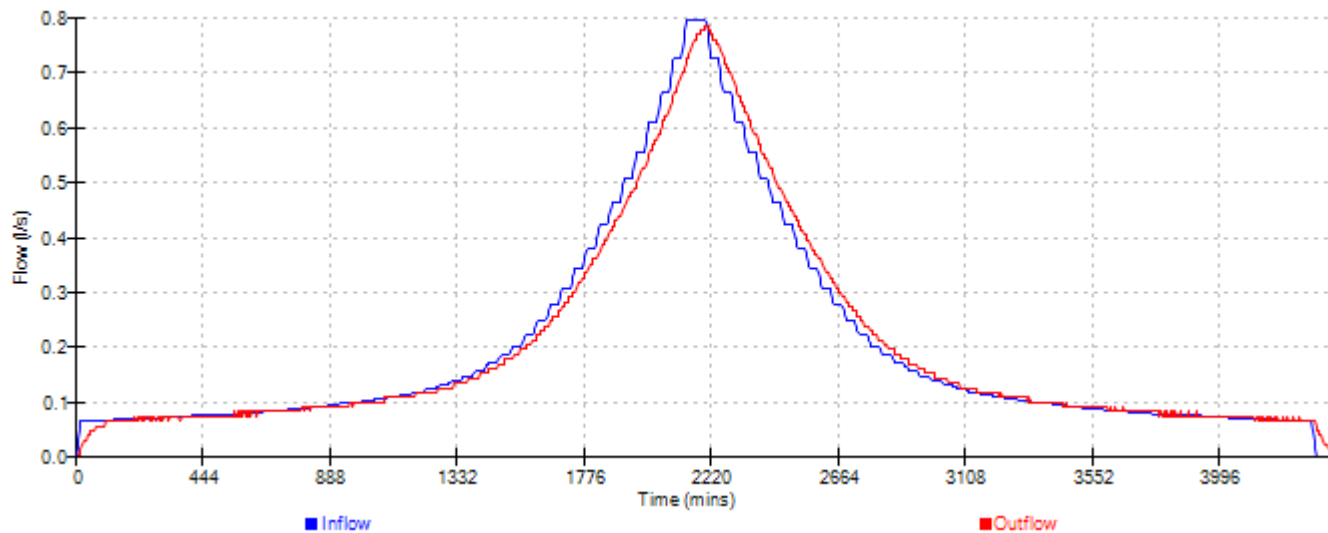
Event: 2160 min Summer



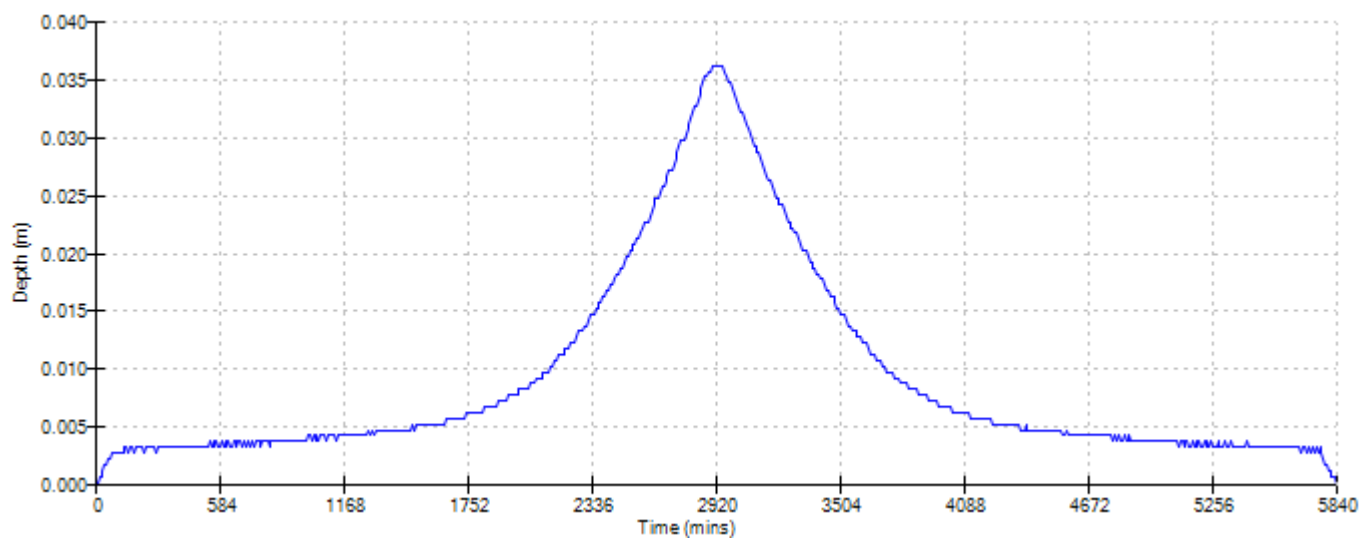
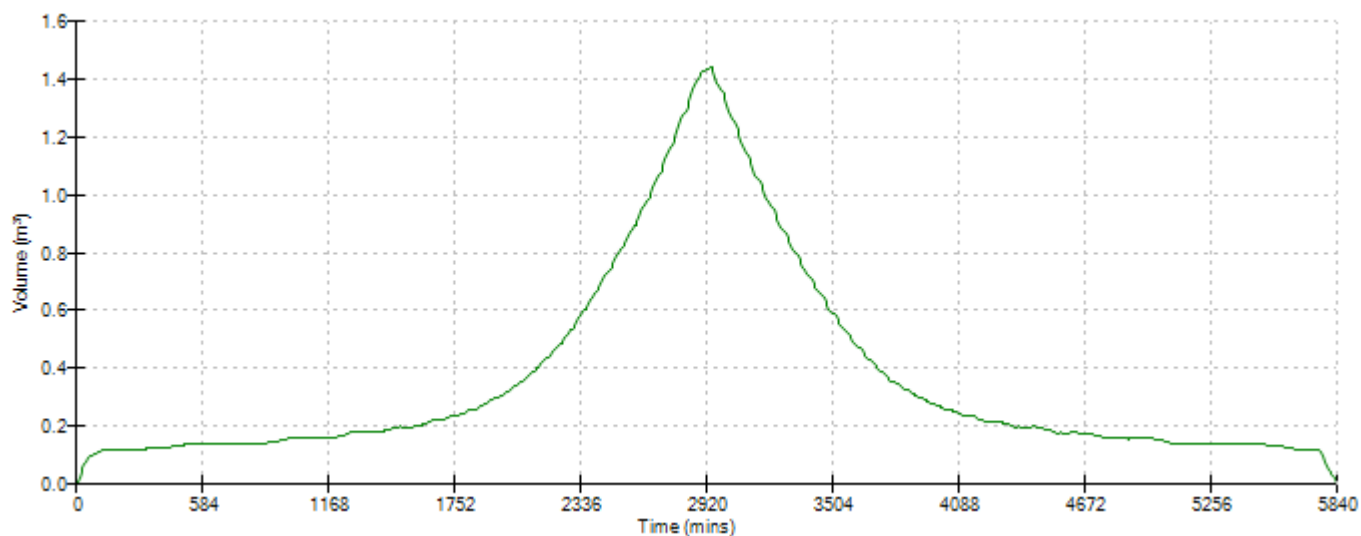
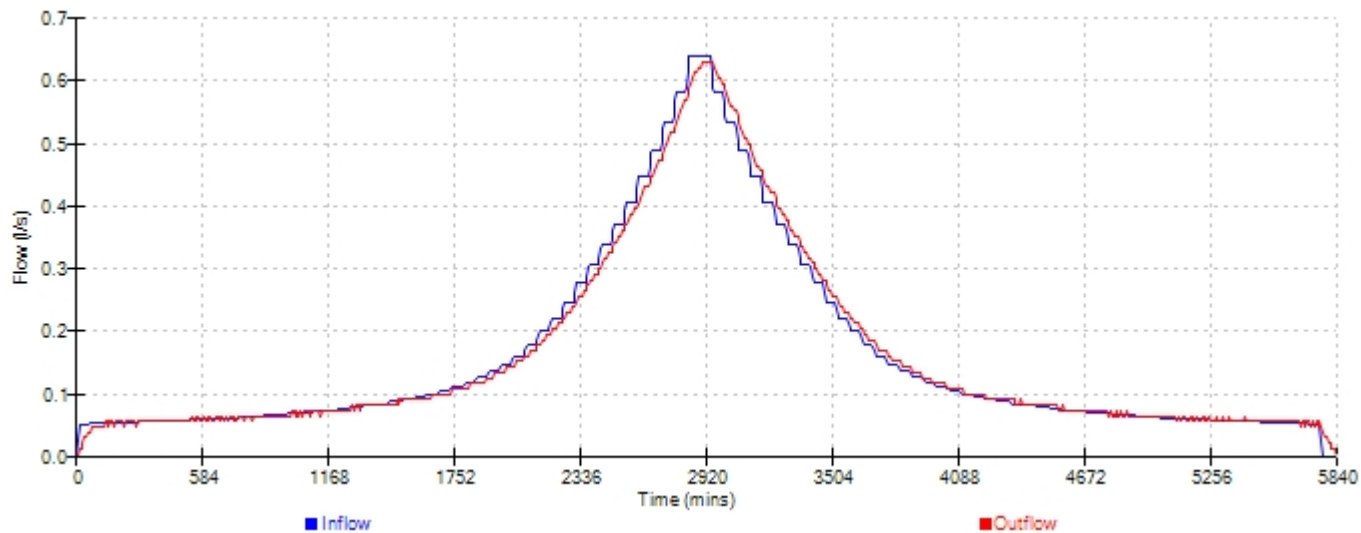
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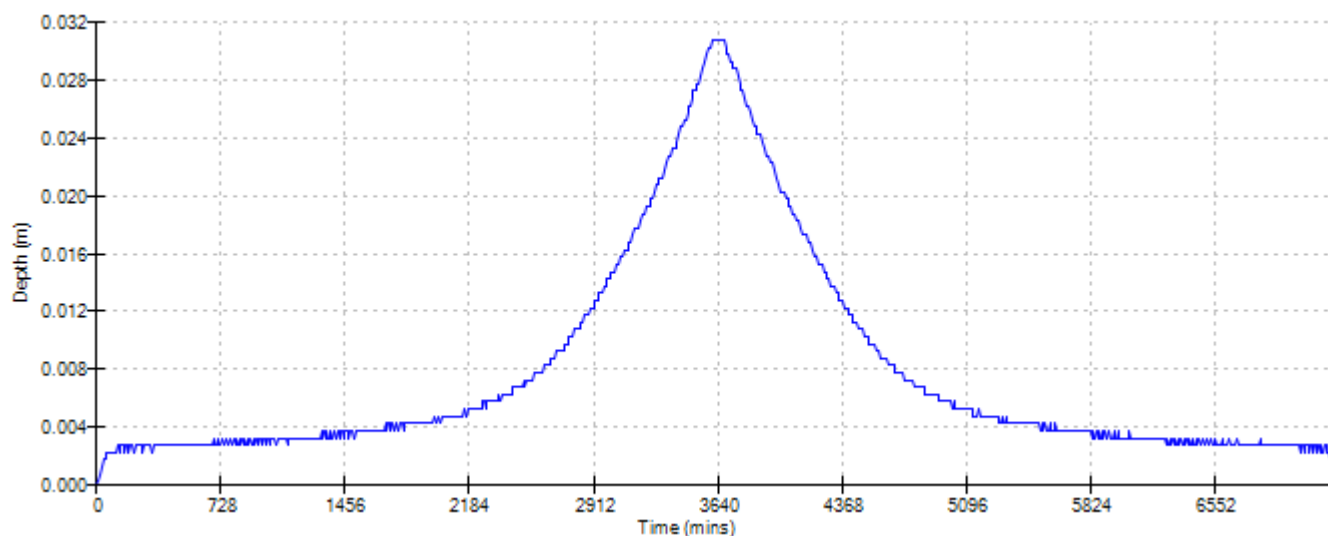
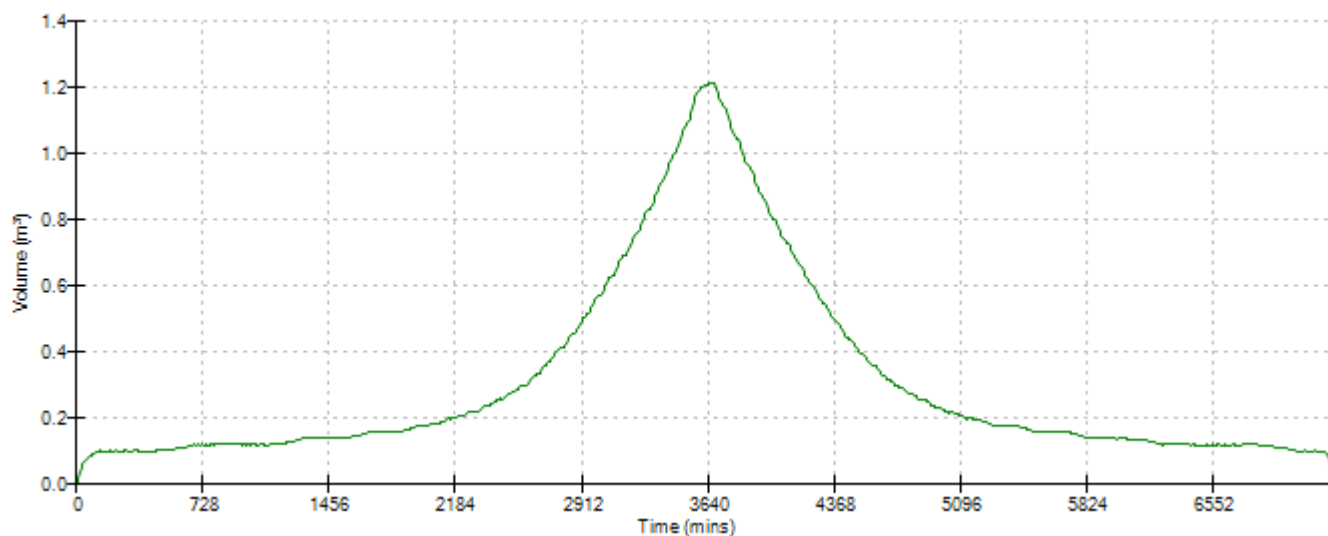
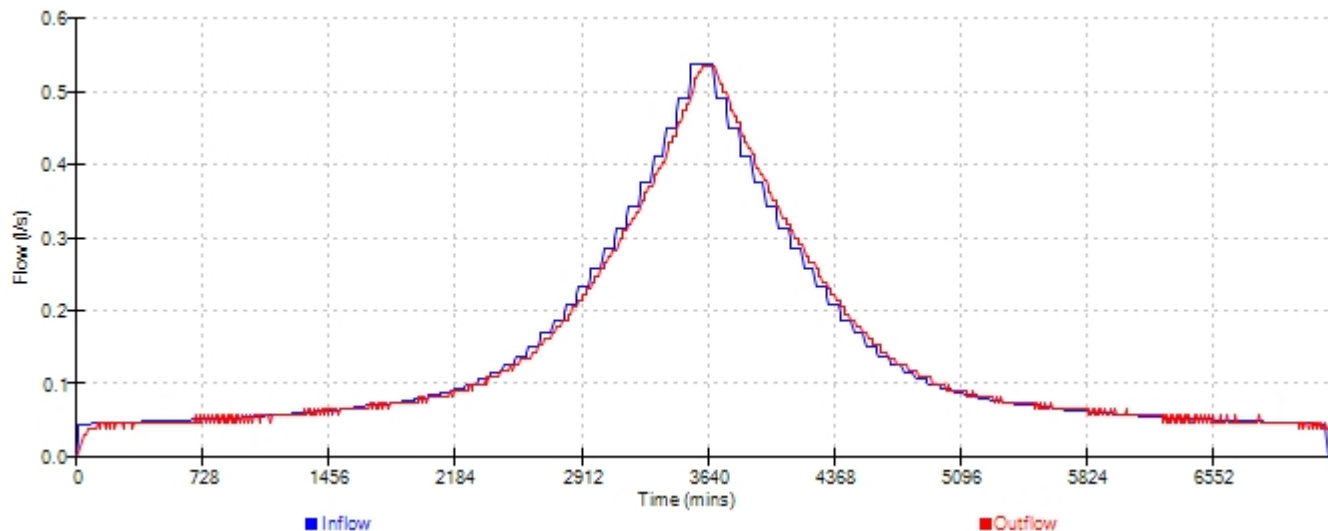
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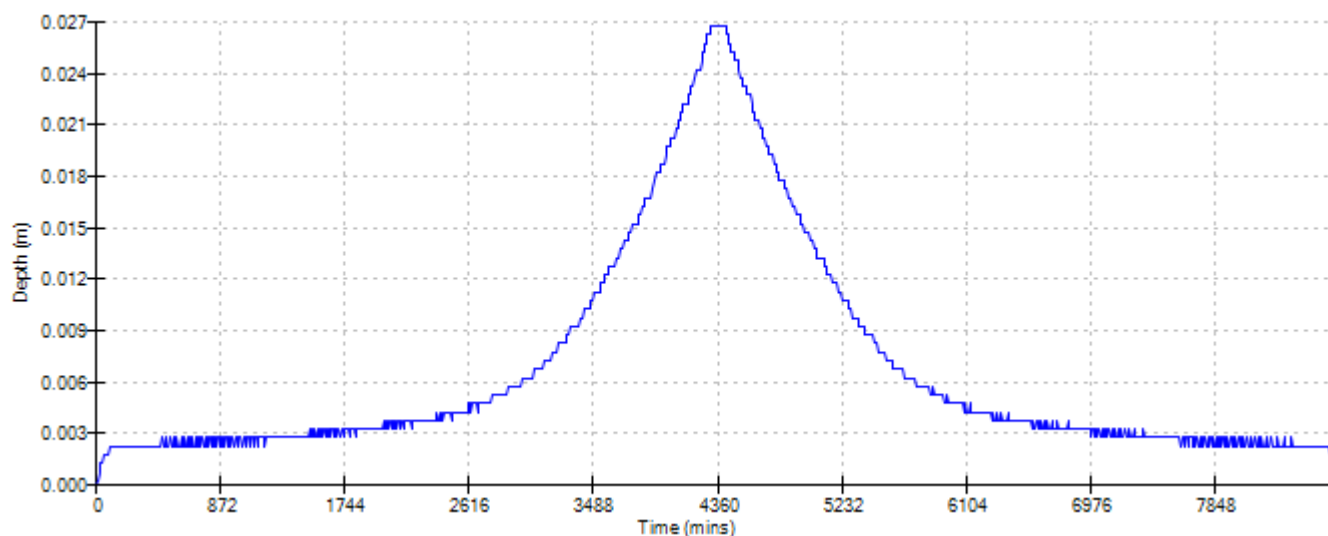
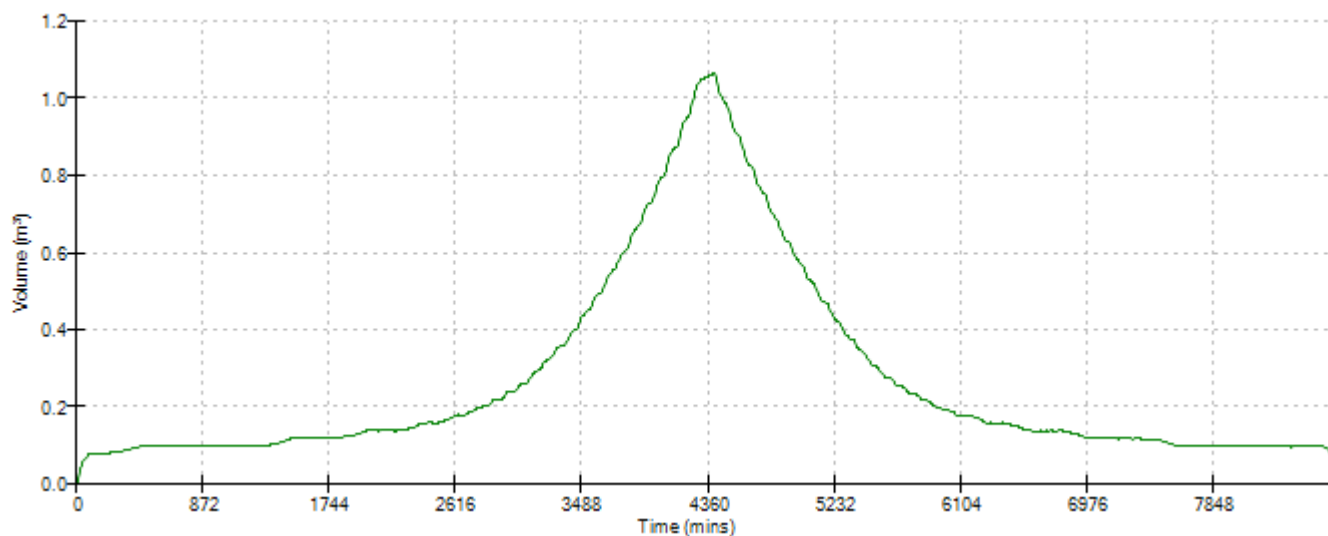
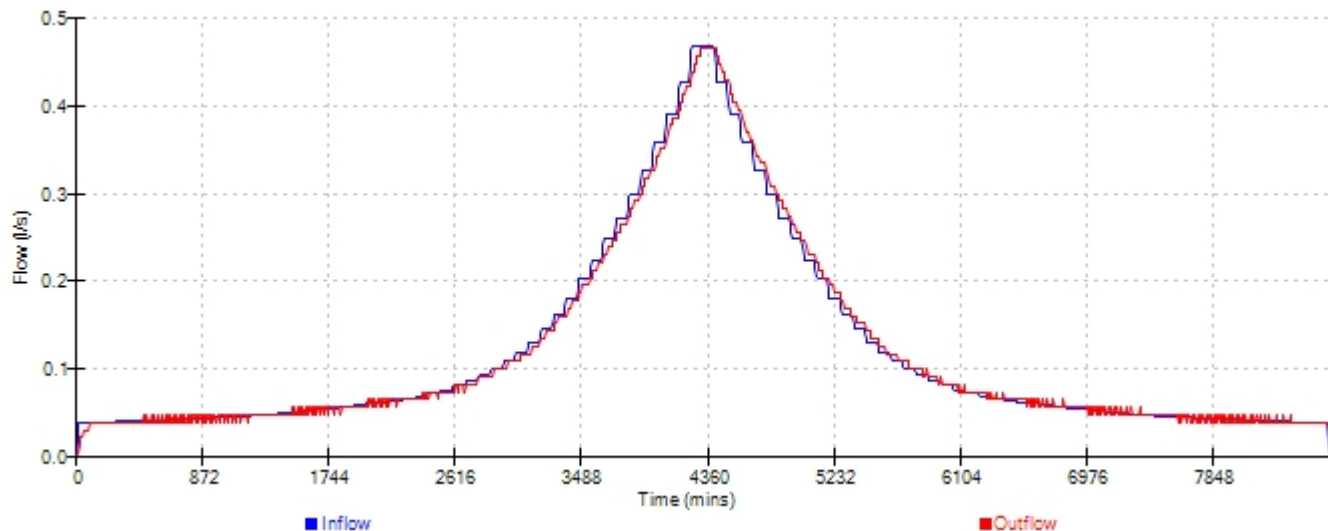
Event: 5760 min Summer



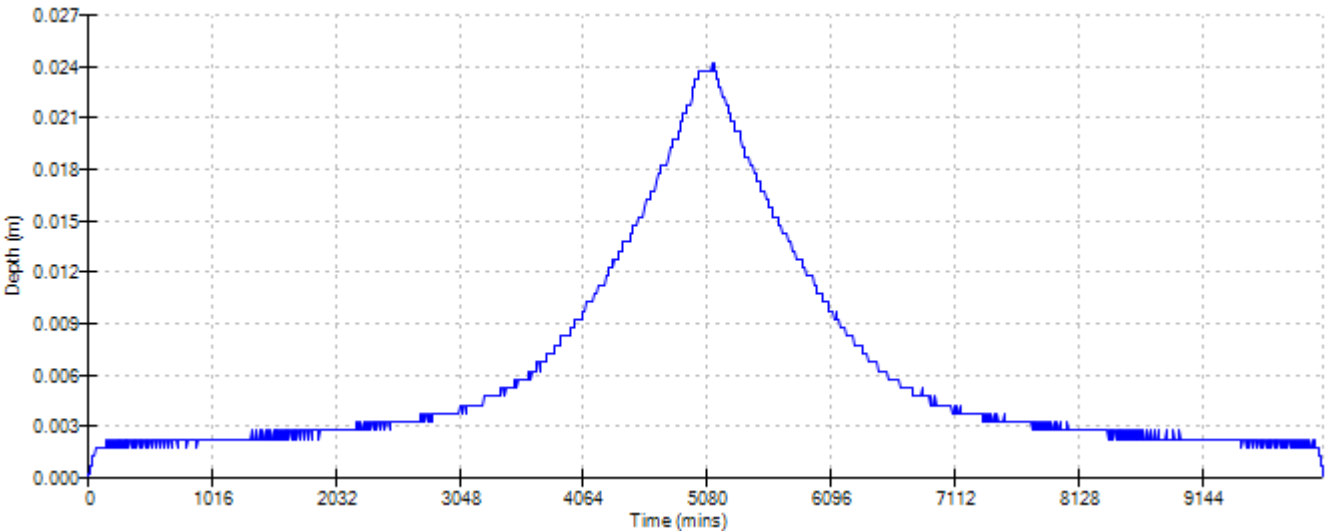
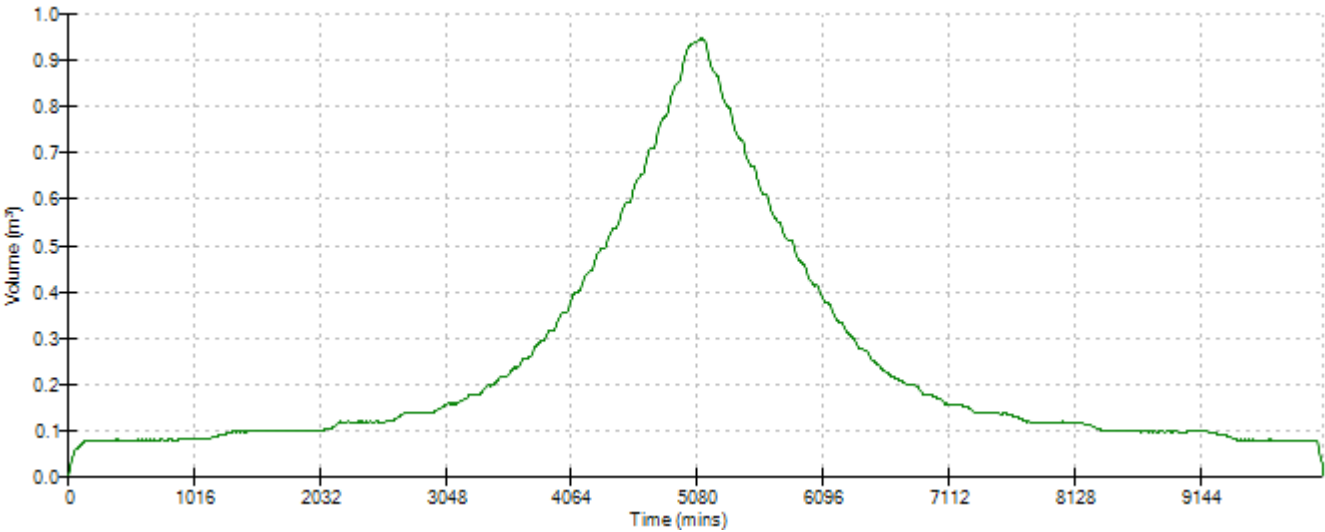
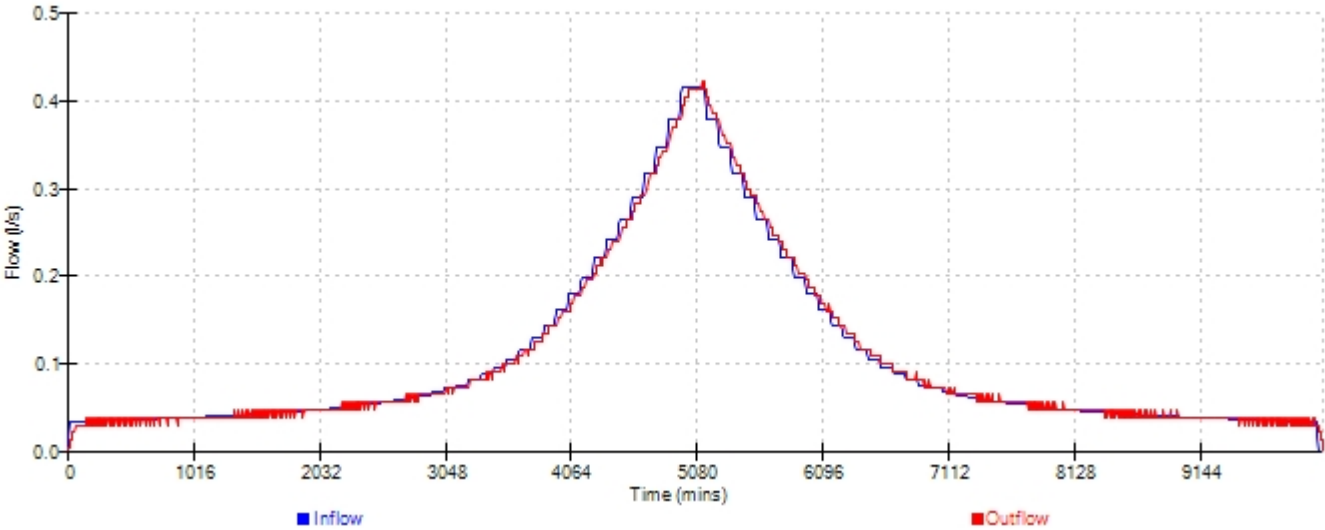
Event: 7200 min Summer



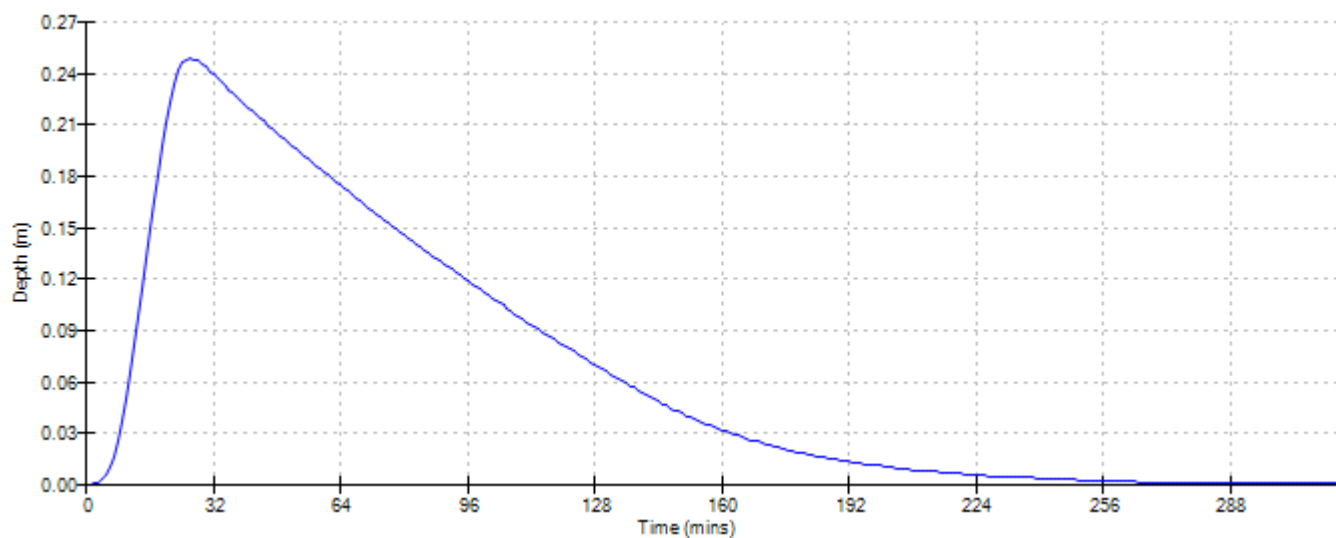
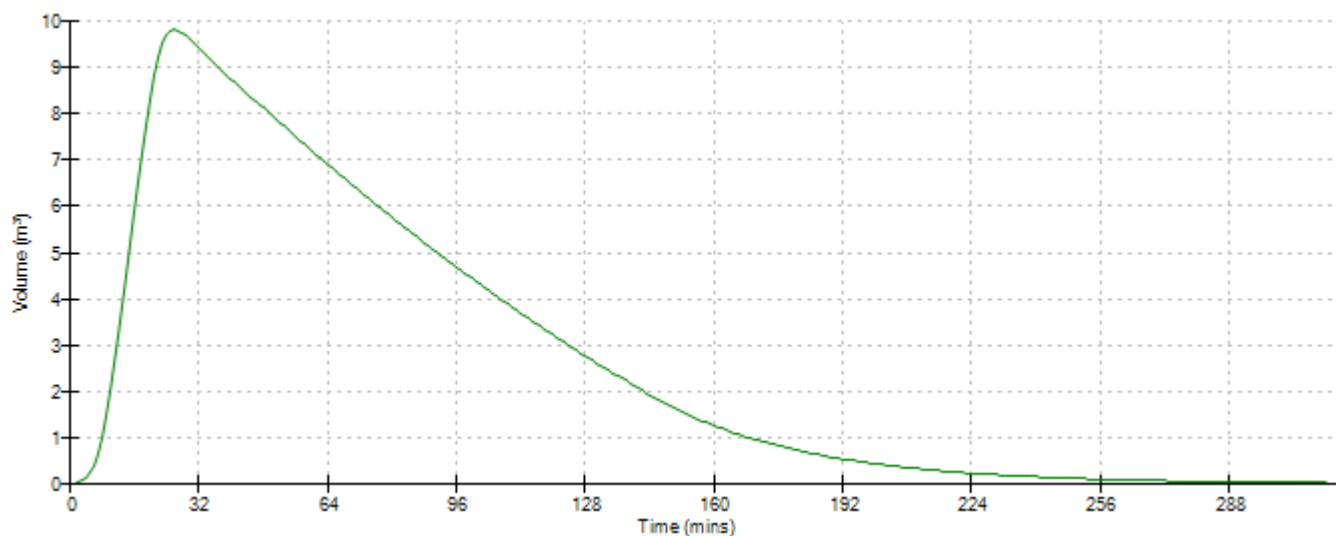
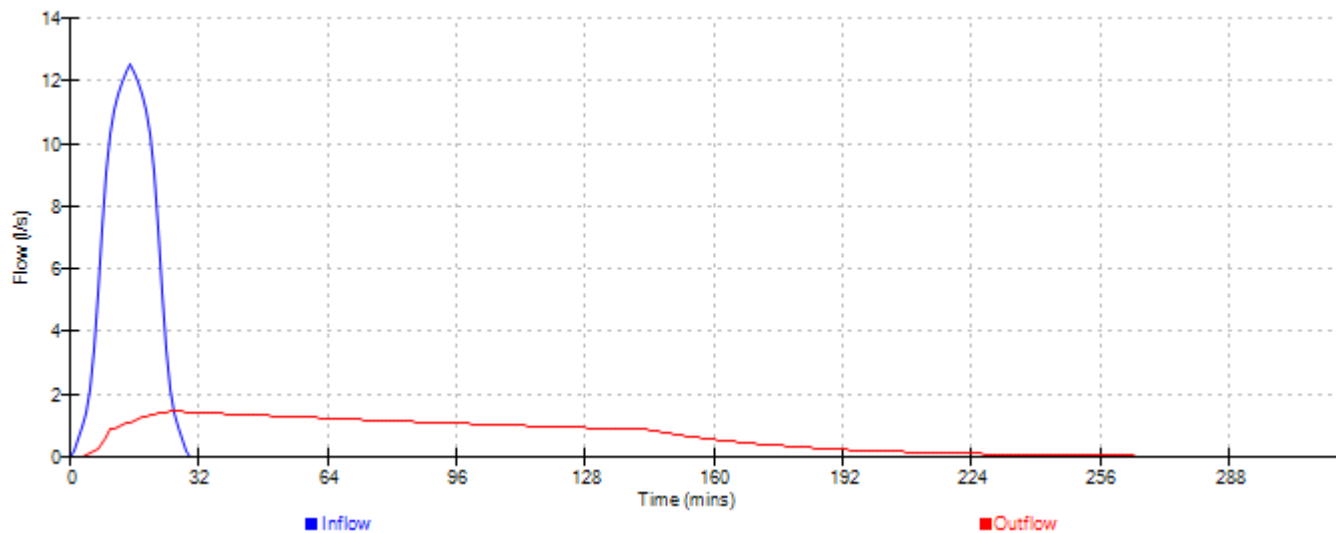
Event: 8640 min Summer



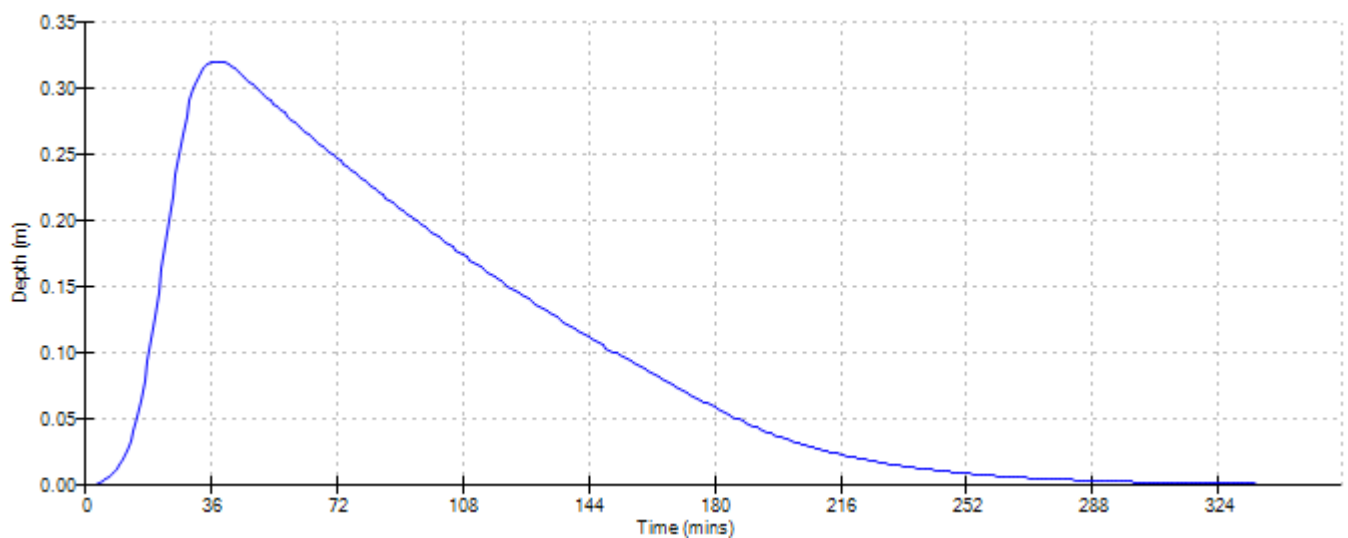
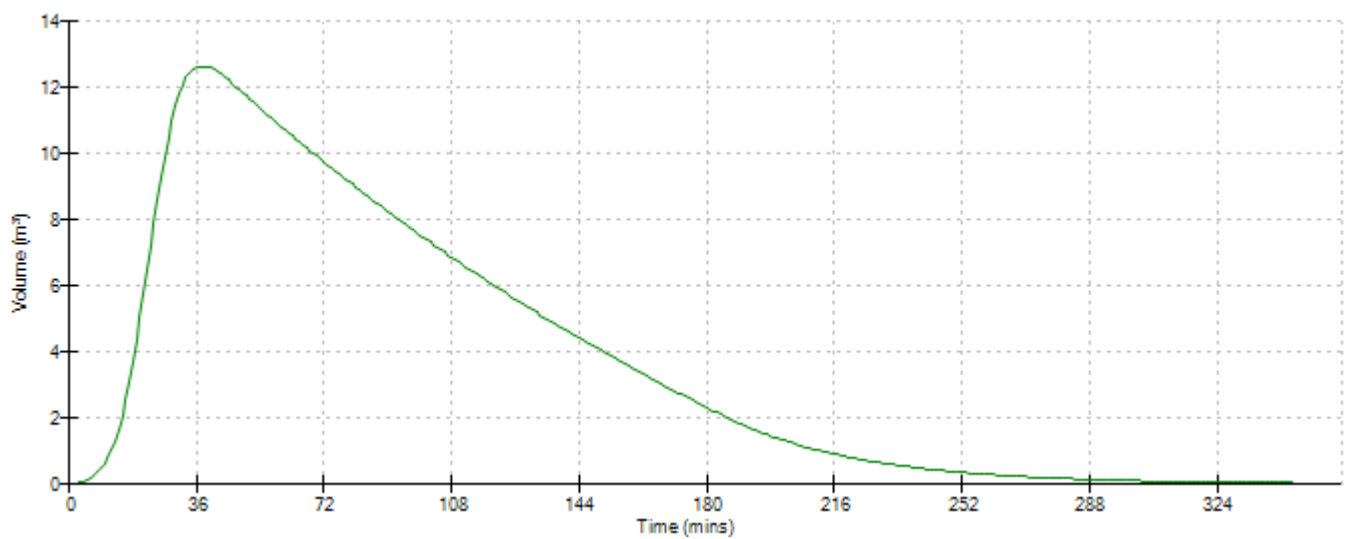
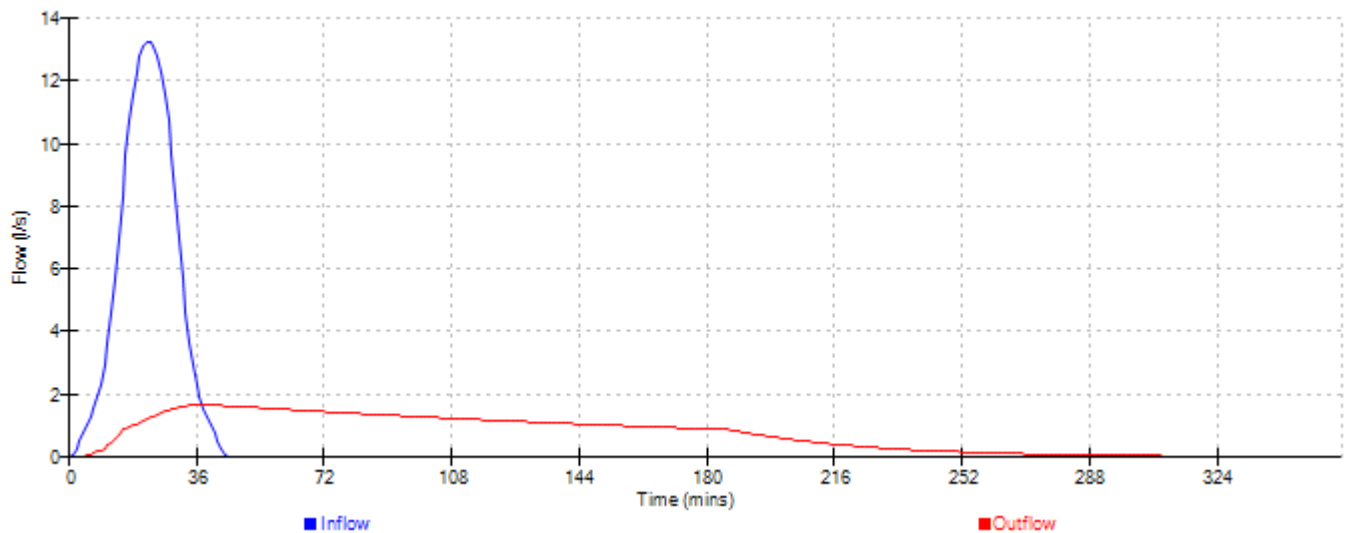
Event: 10080 min Summer

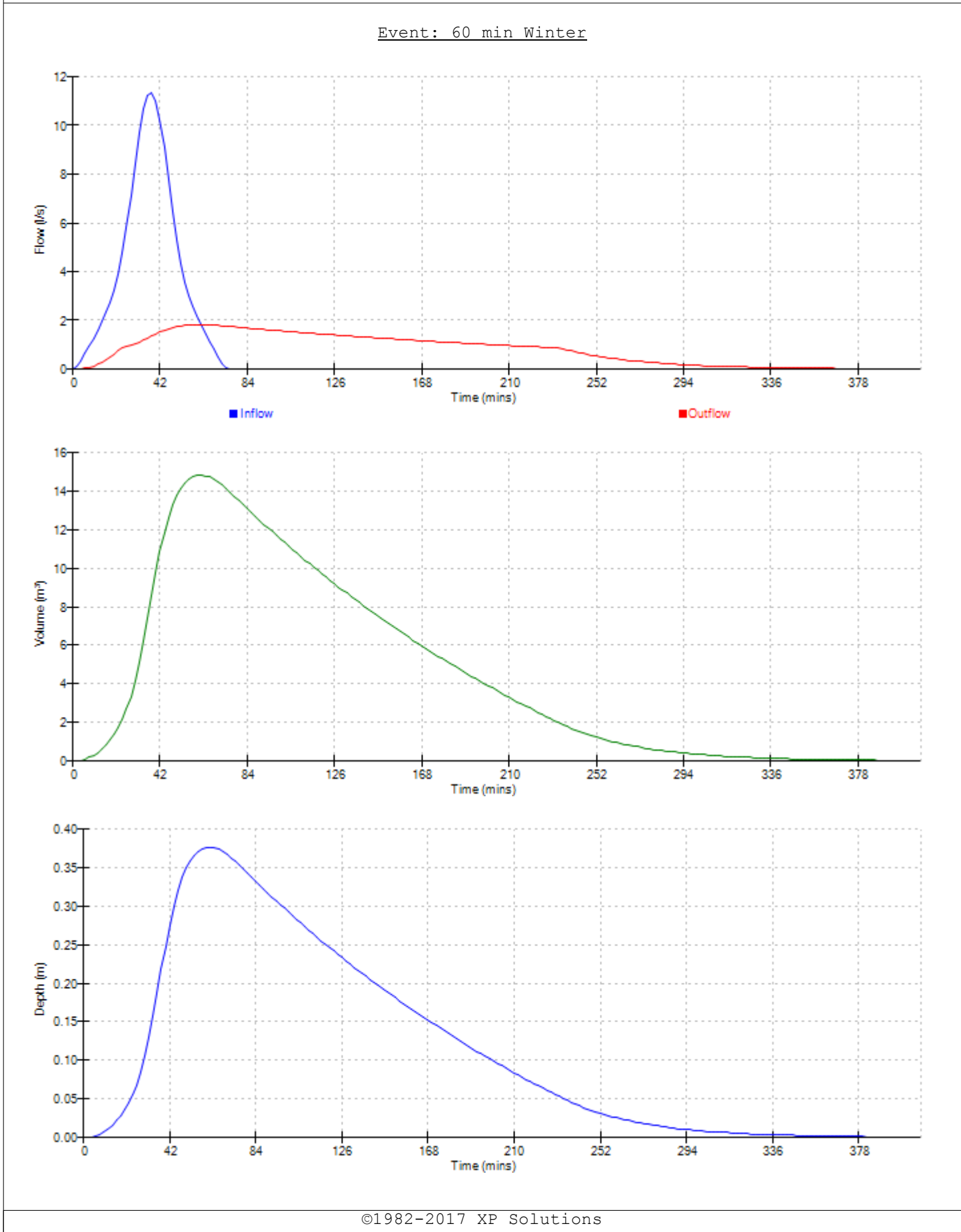


Event: 15 min Winter

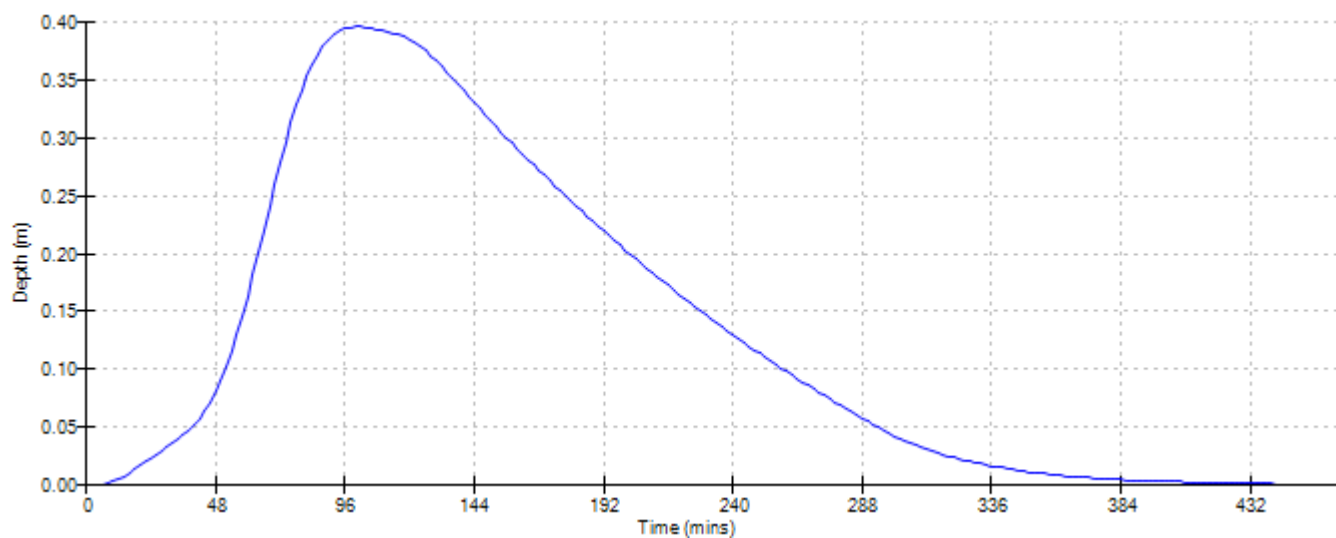
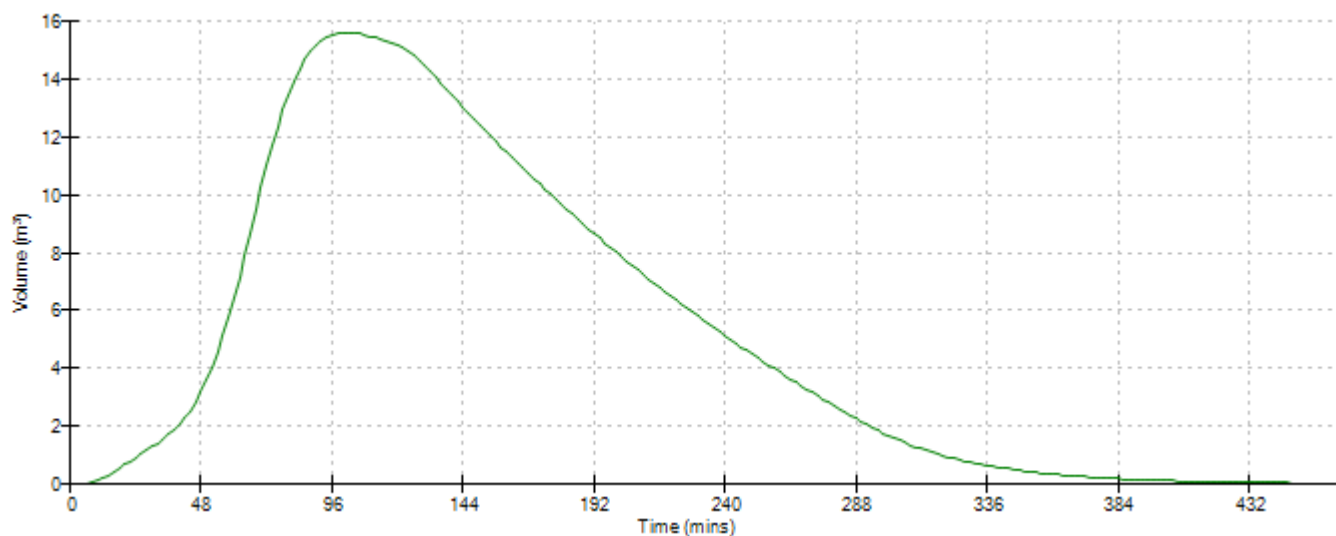
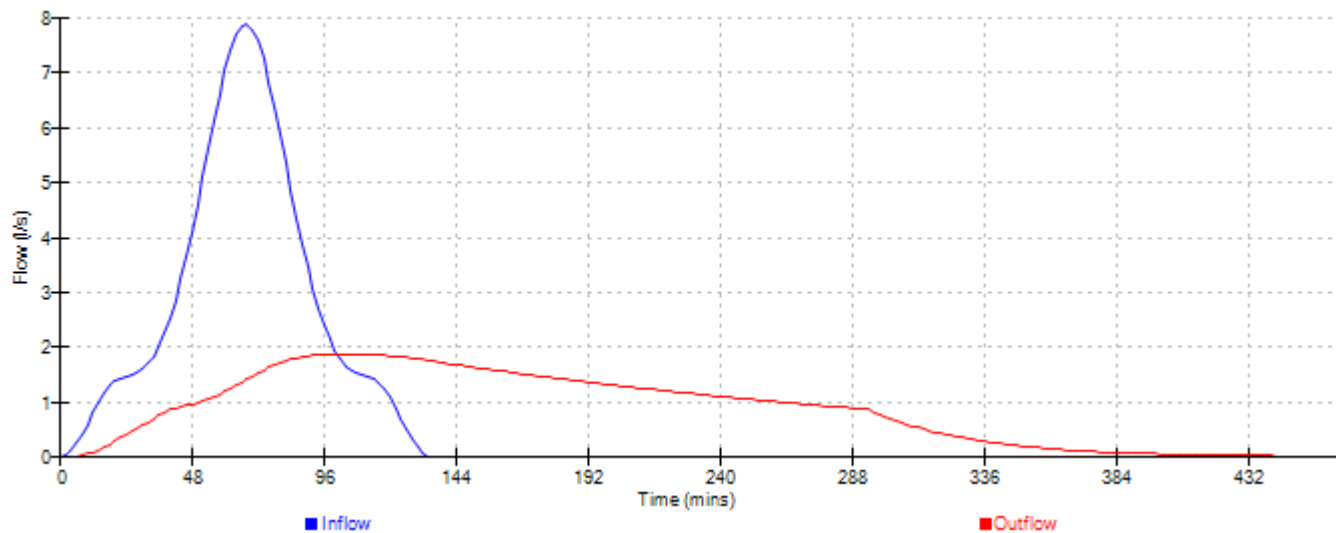


Event: 30 min Winter

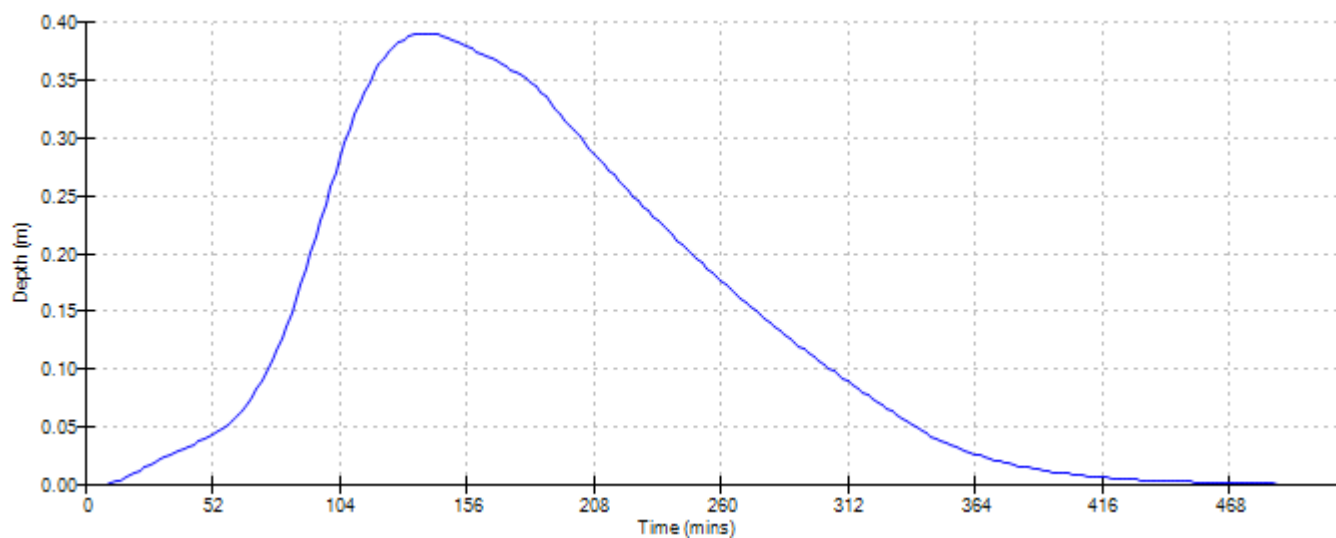
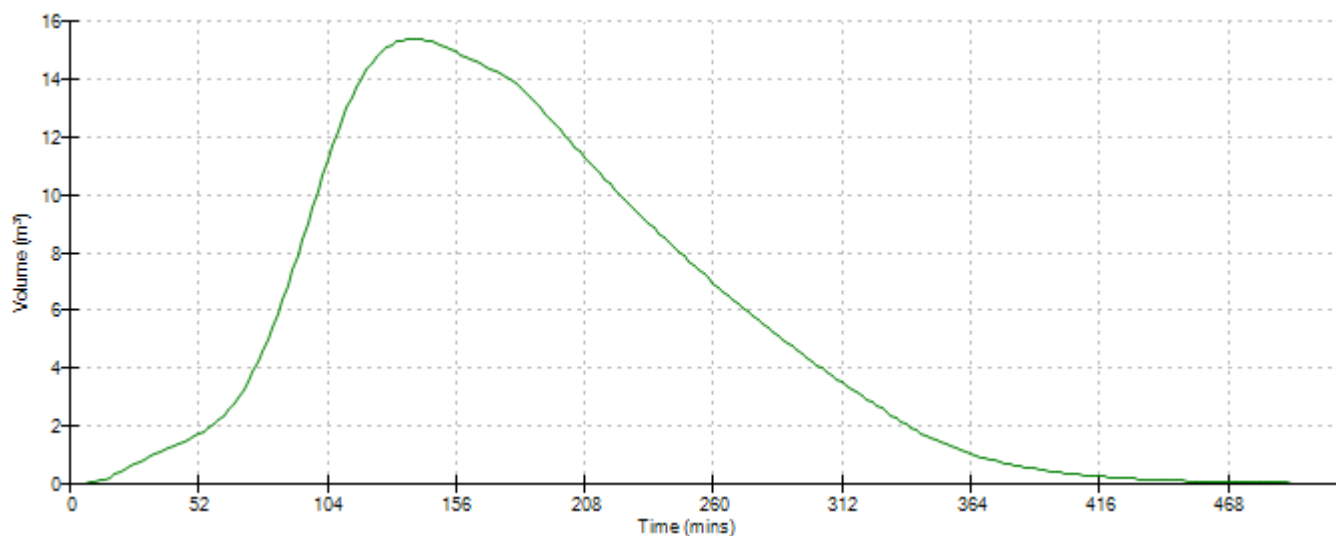
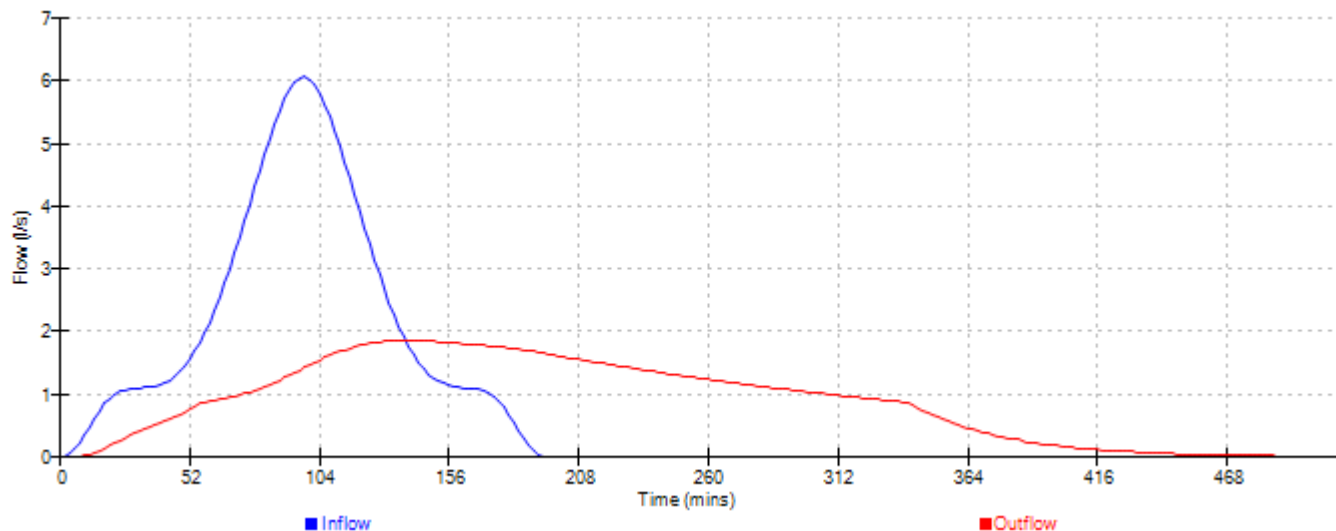




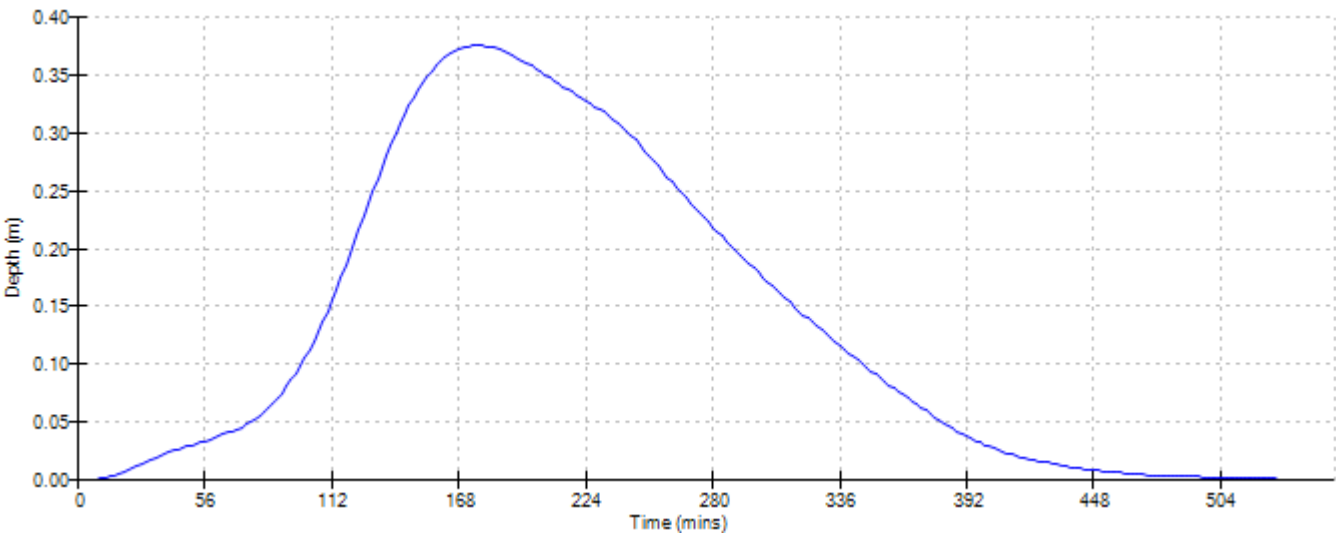
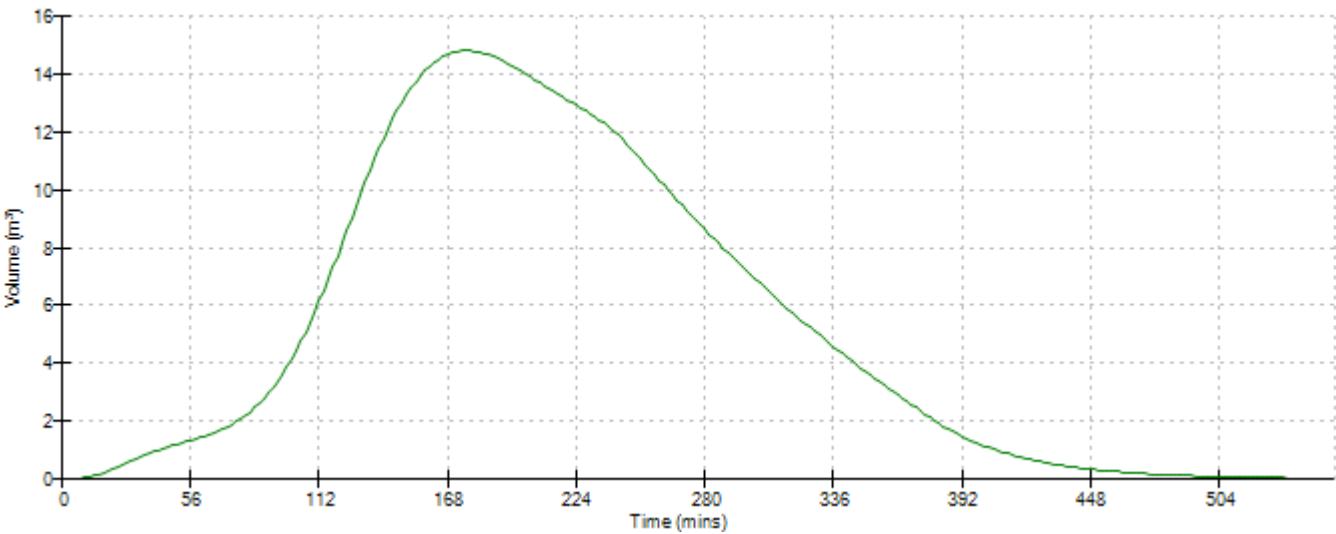
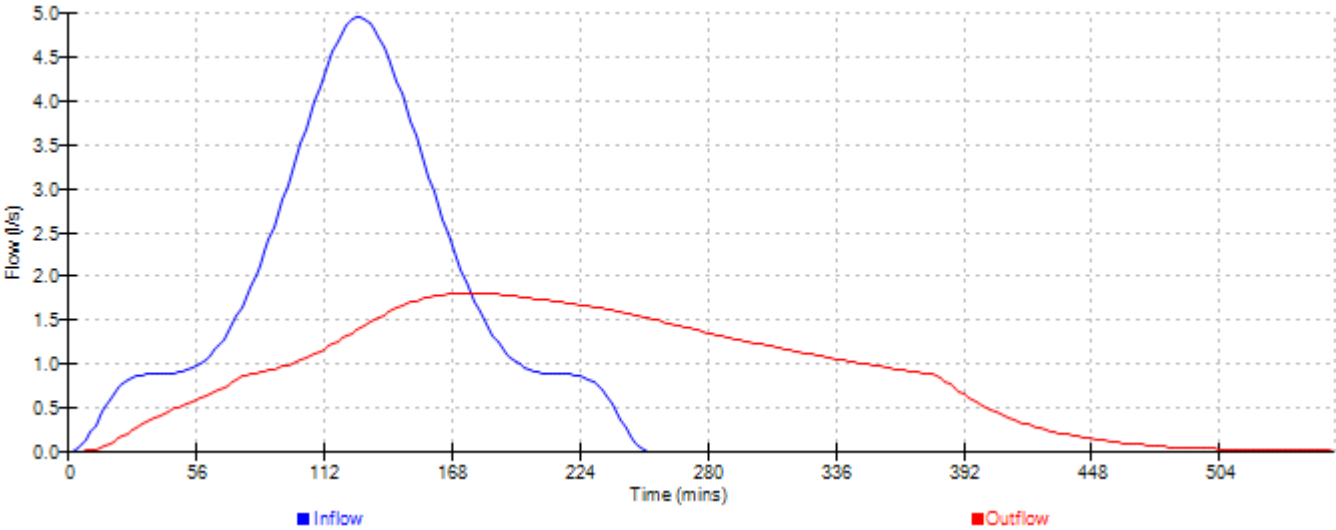
Event: 120 min Winter



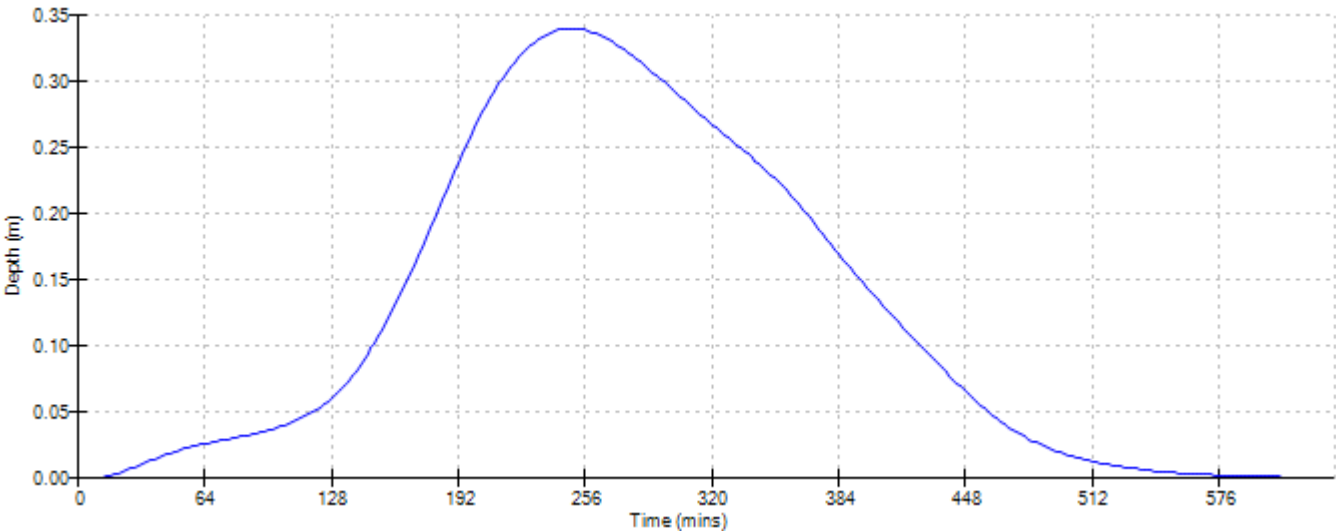
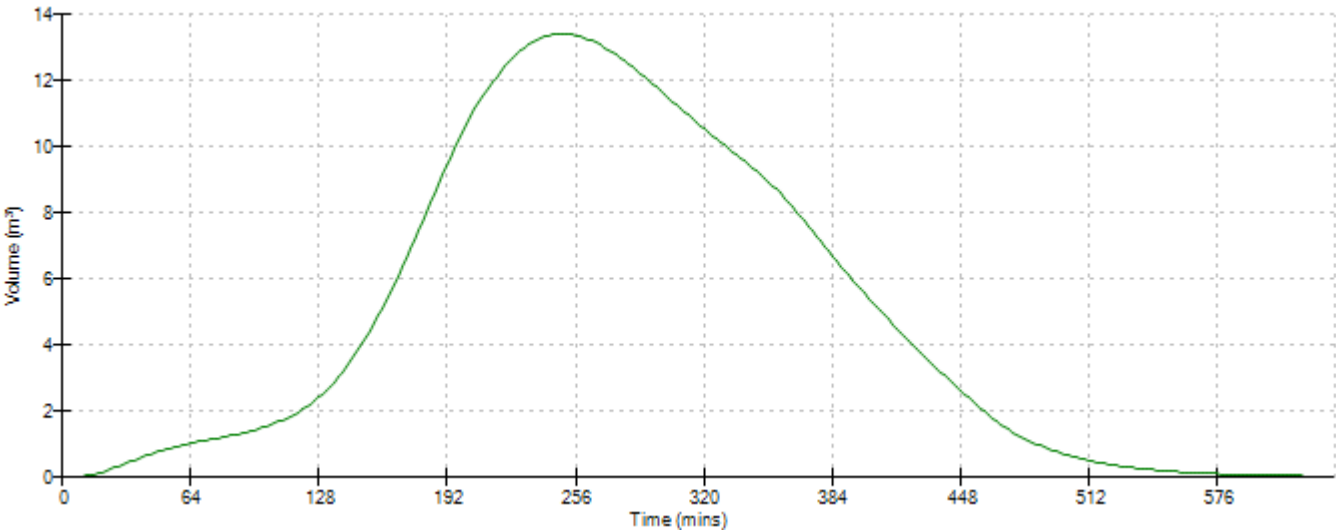
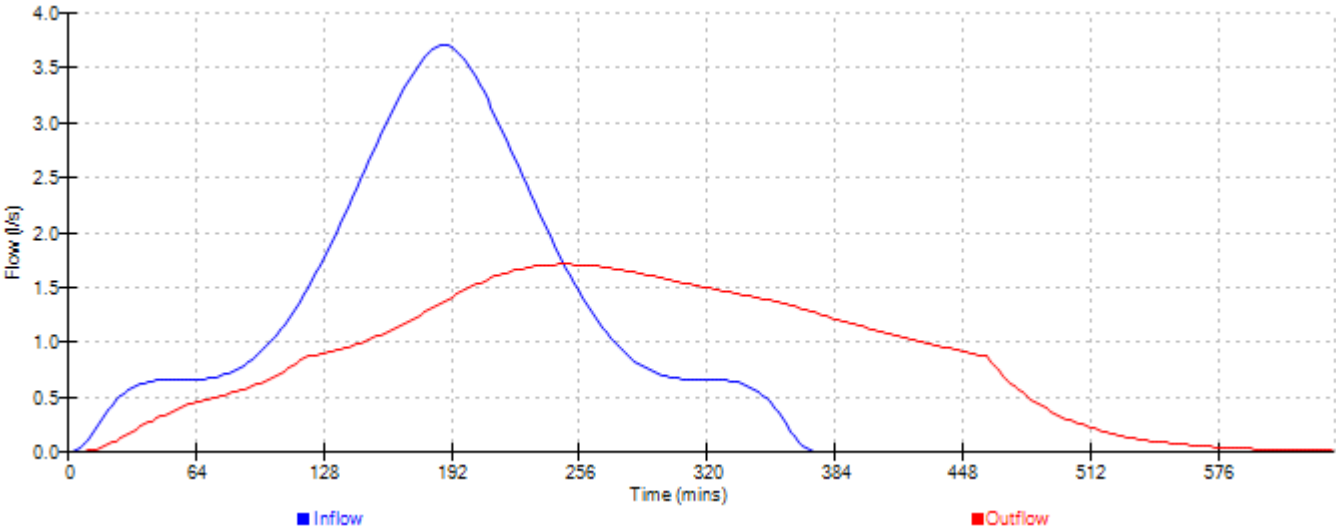
Event: 180 min Winter



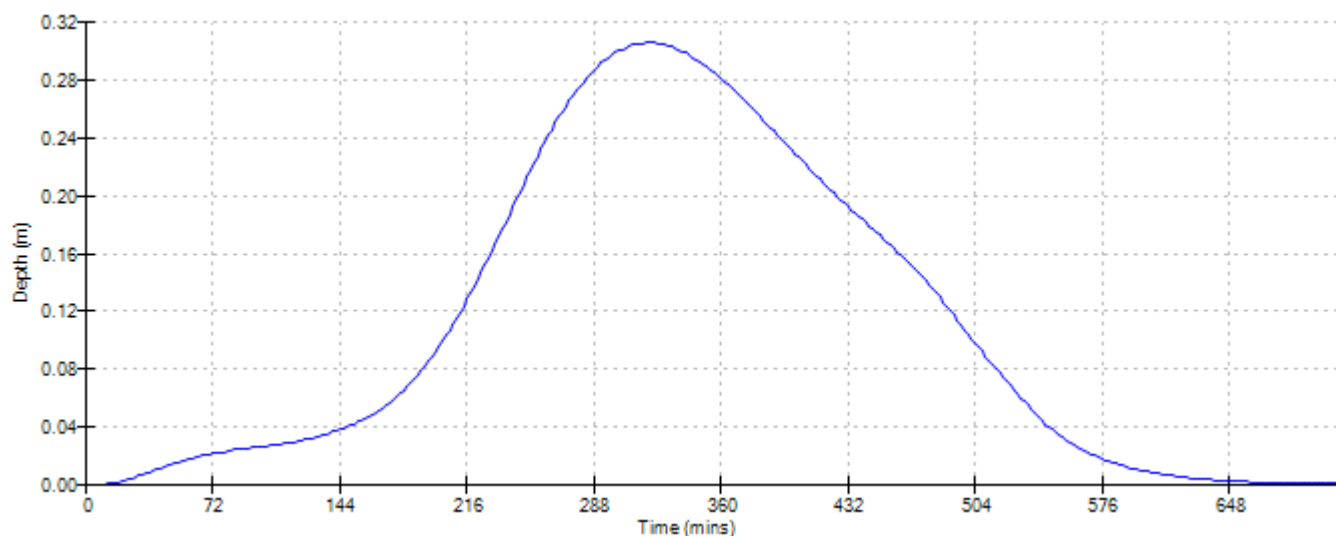
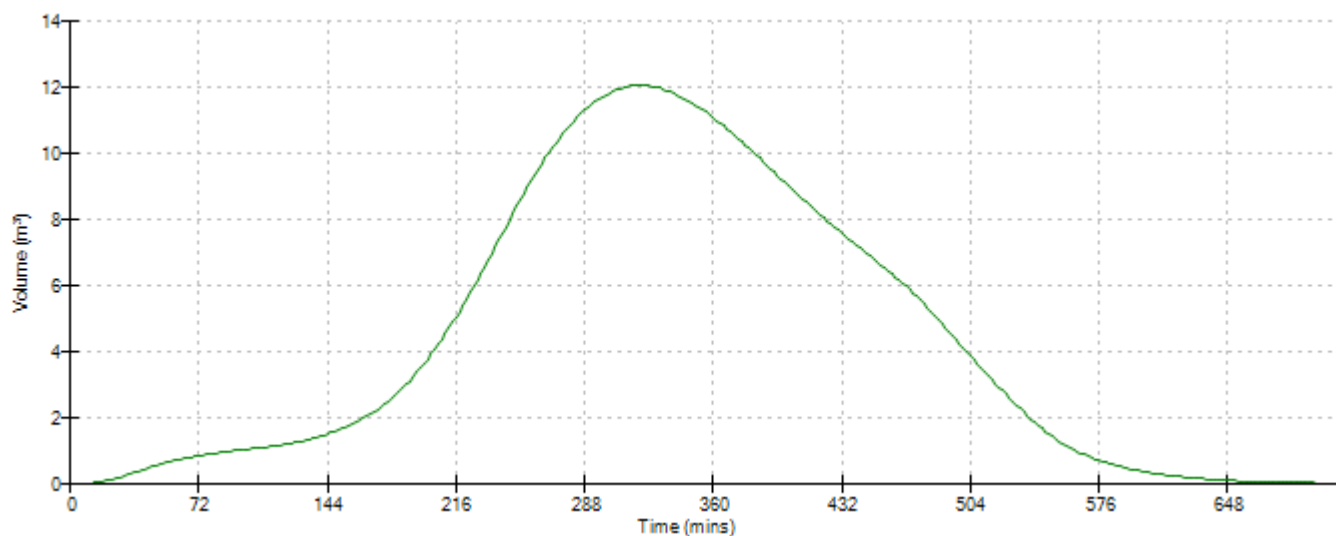
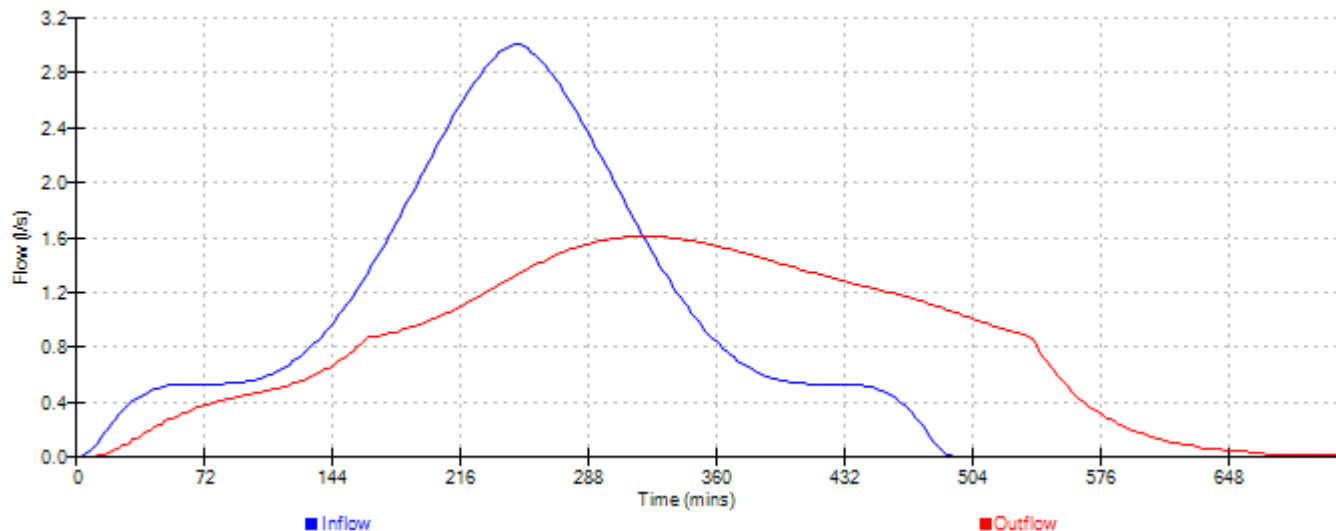
Event: 240 min Winter



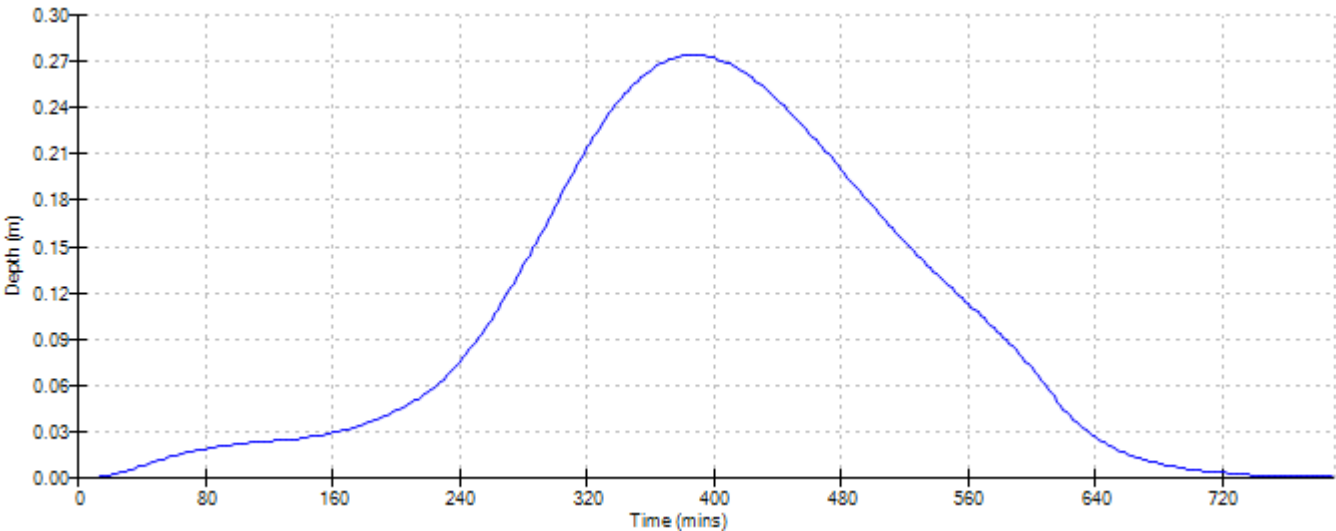
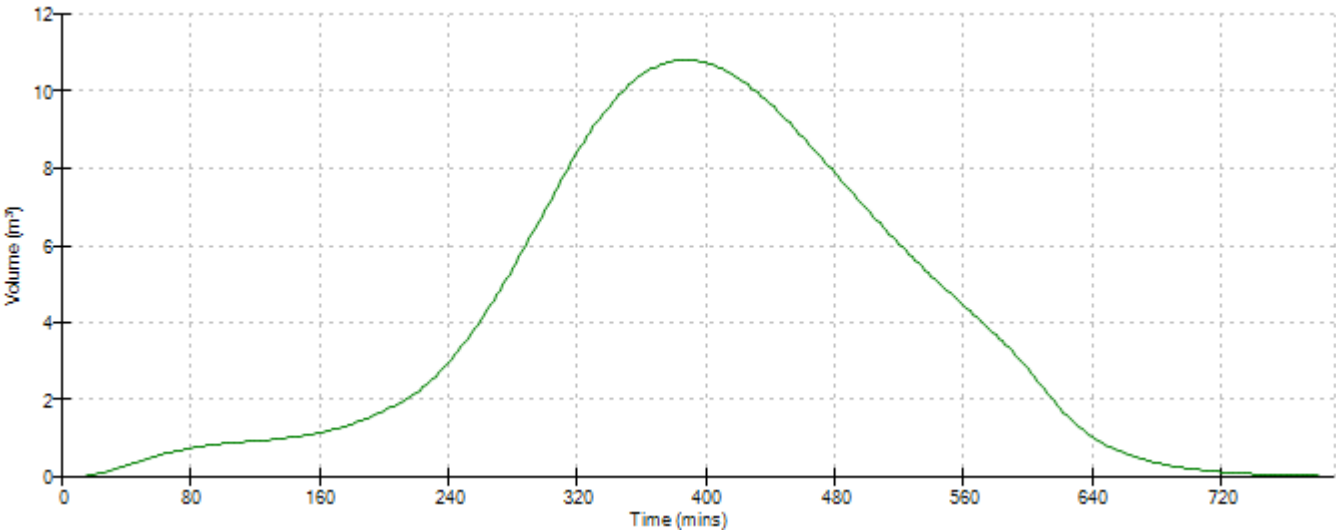
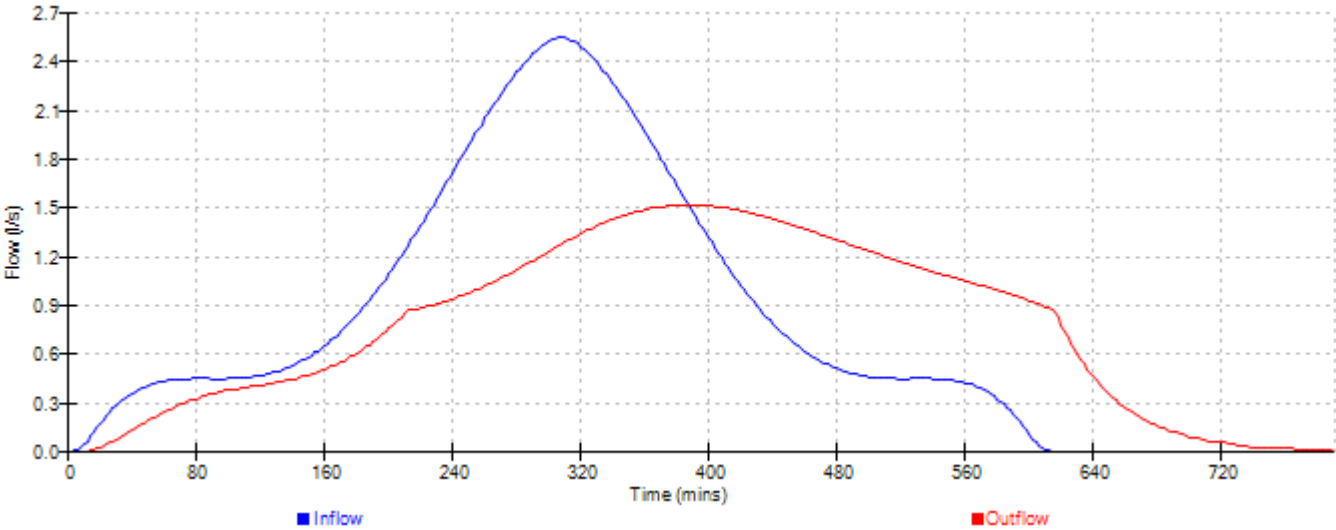
Event: 360 min Winter



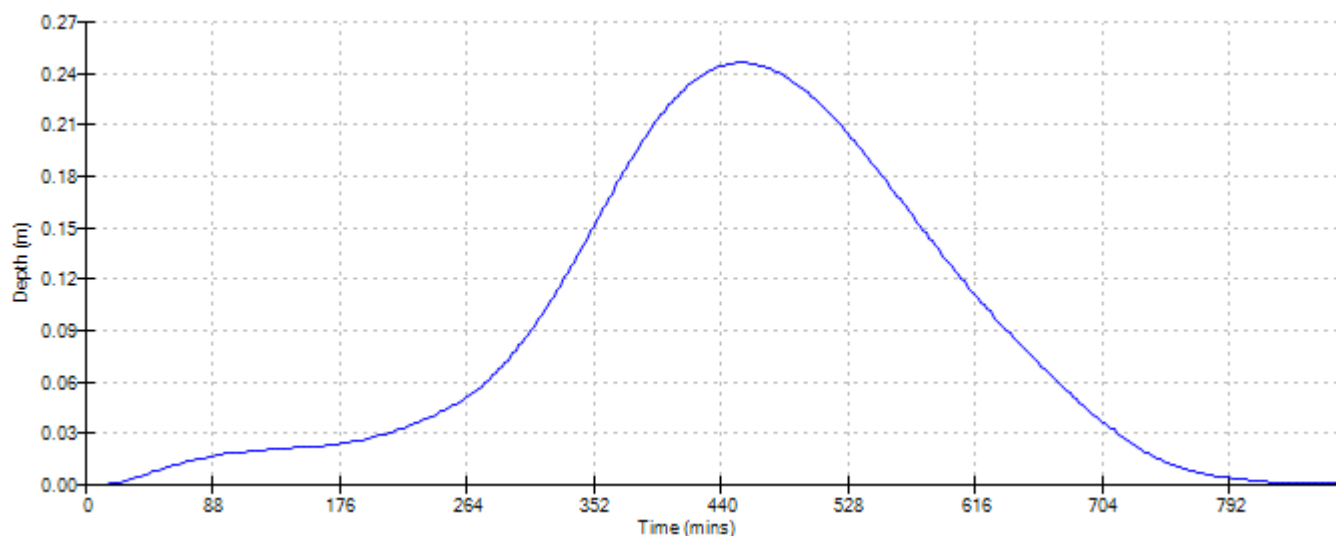
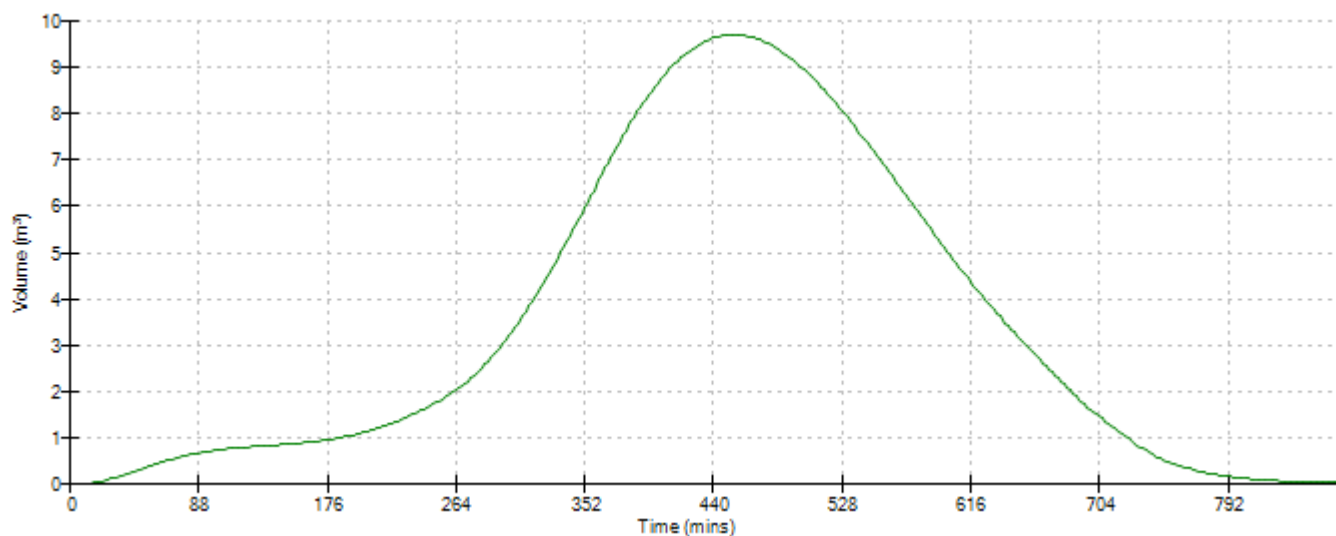
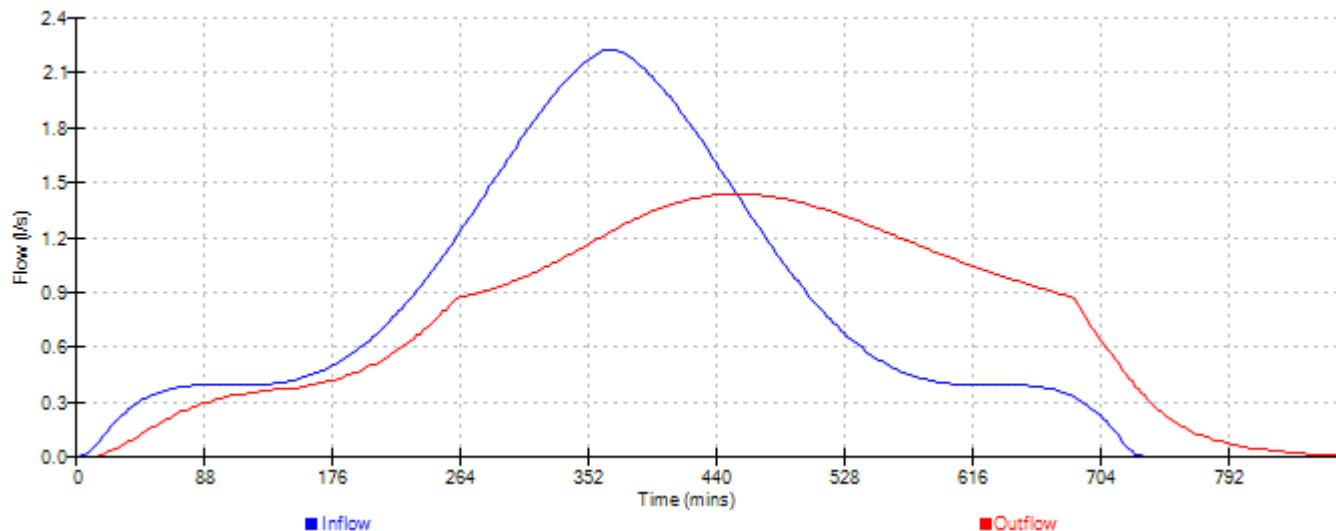
Event: 480 min Winter



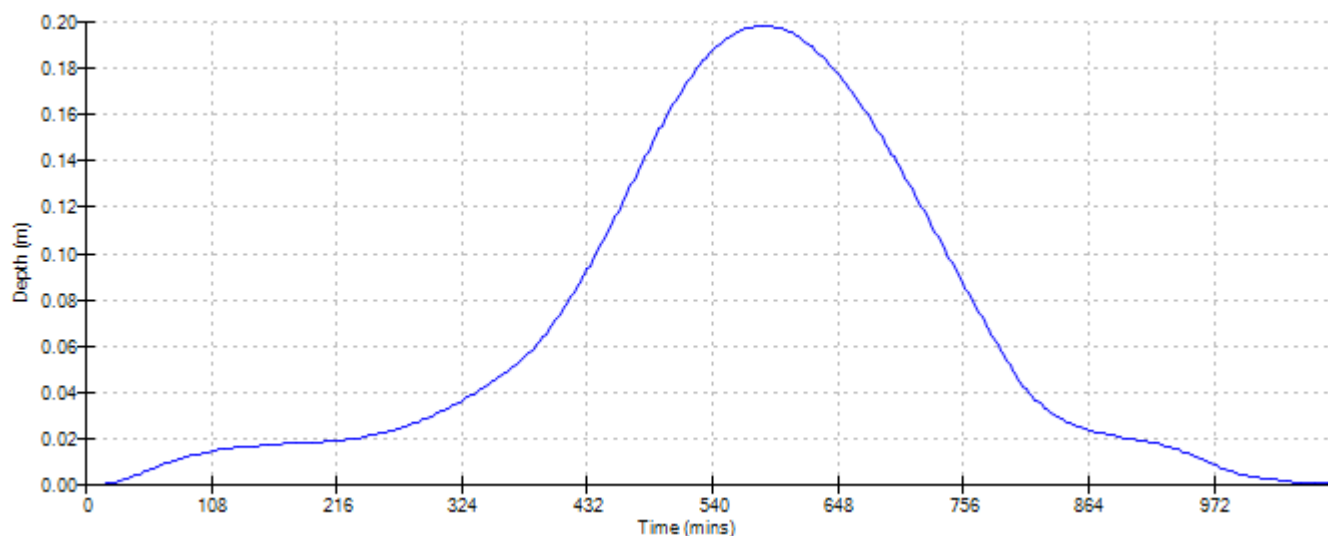
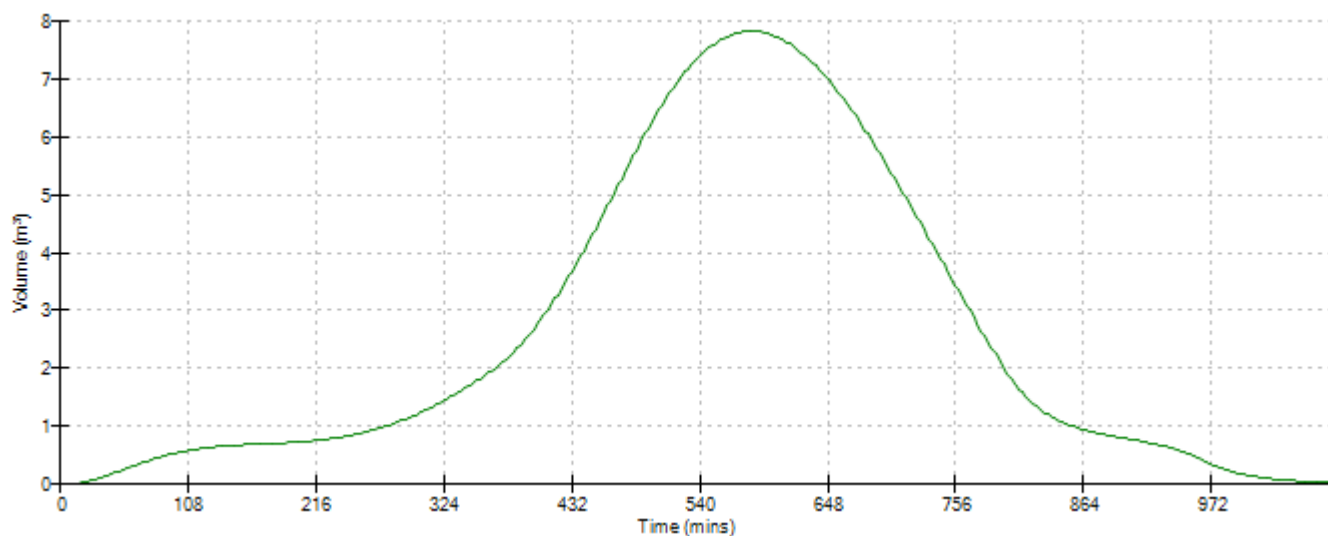
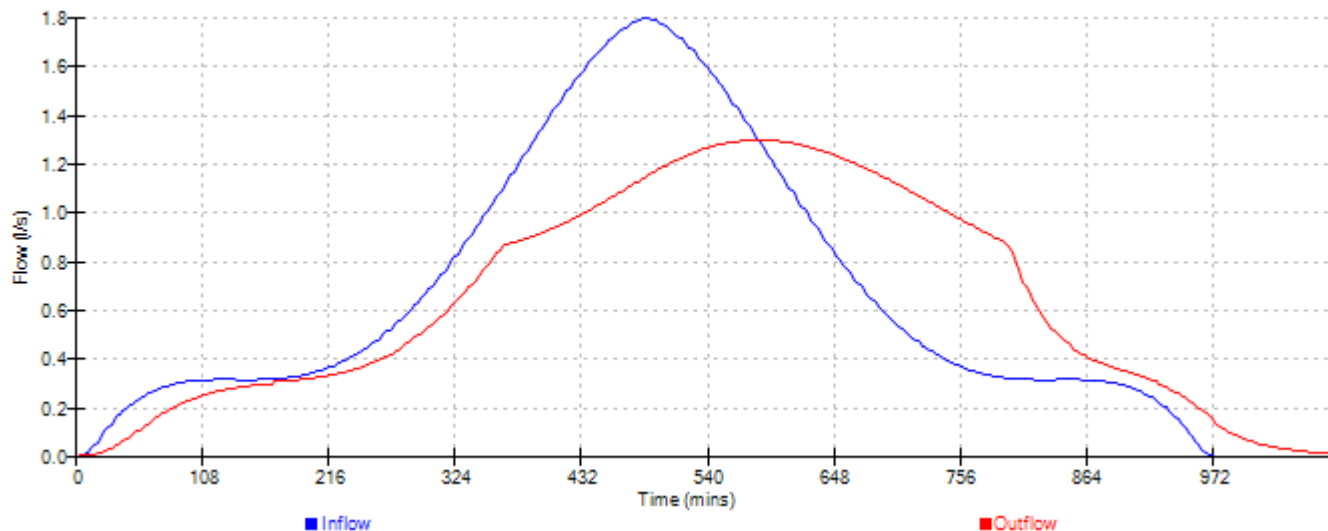
Event: 600 min Winter



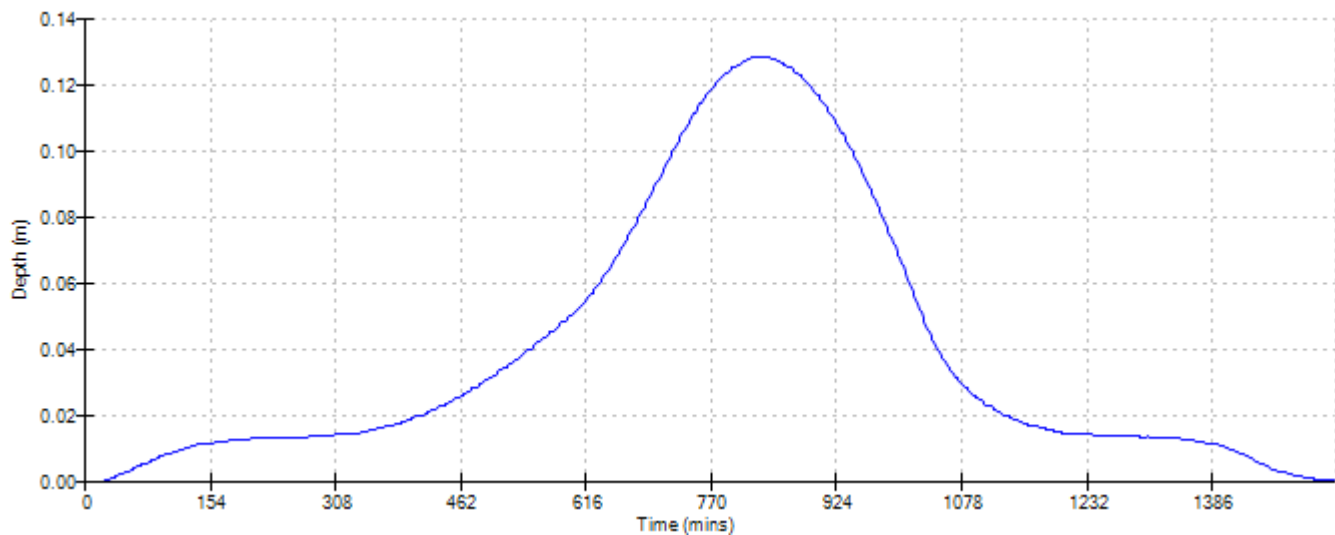
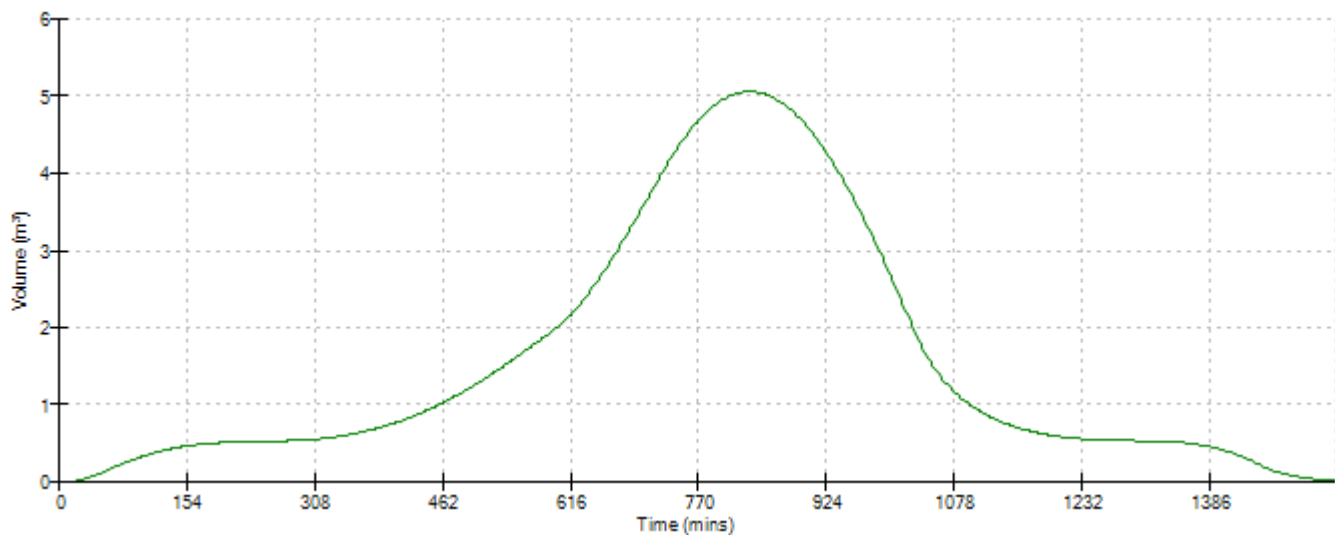
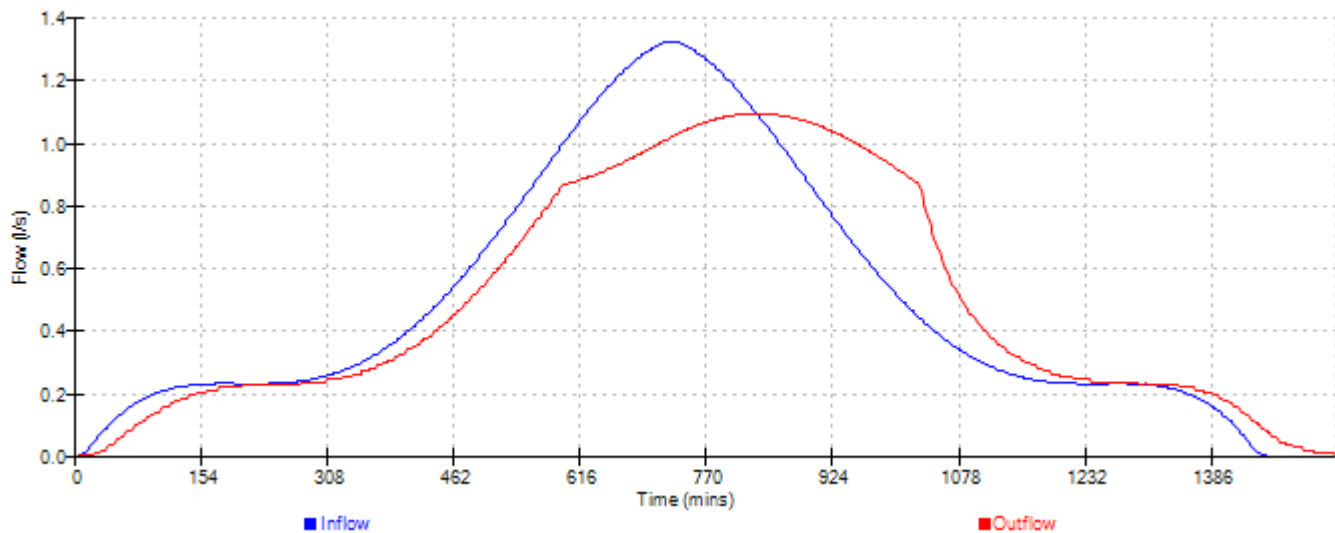
Event: 720 min Winter



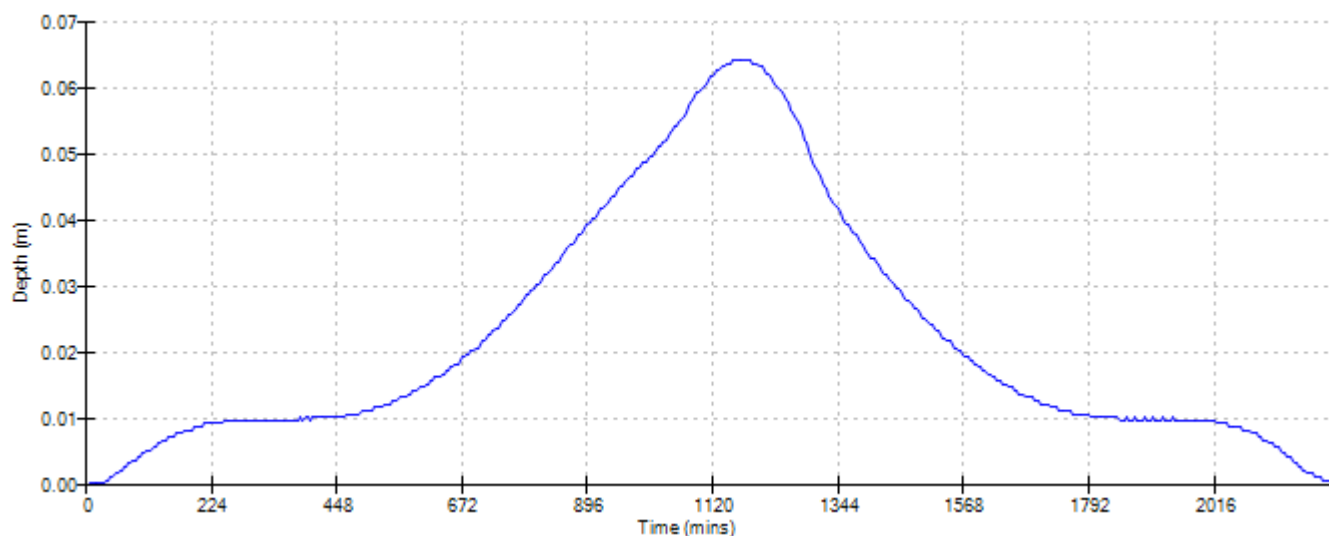
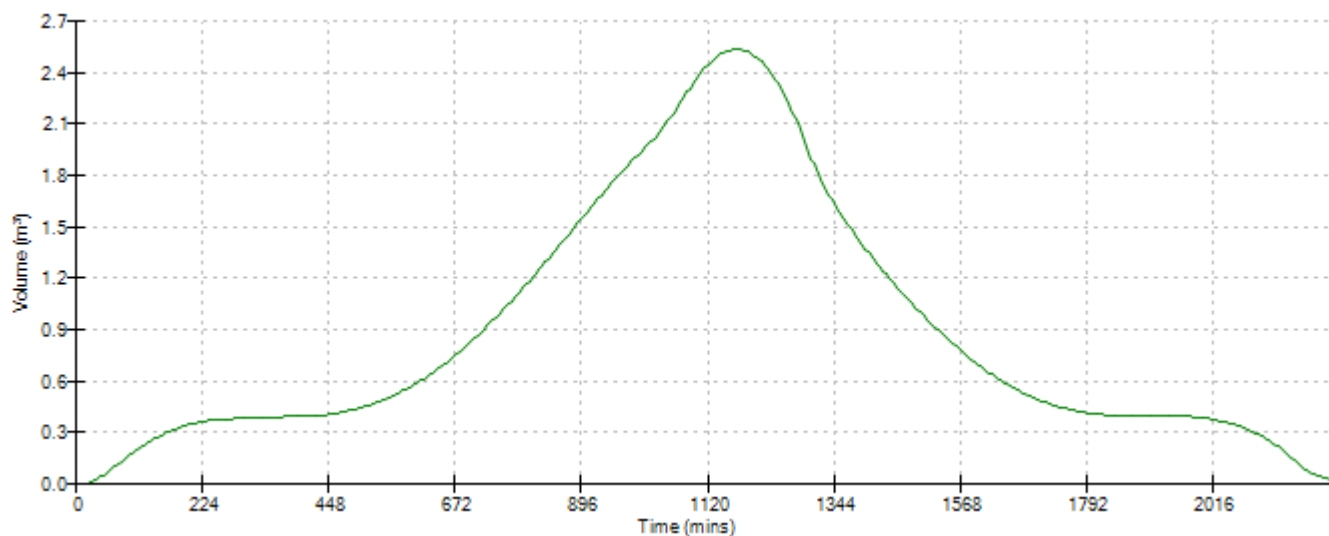
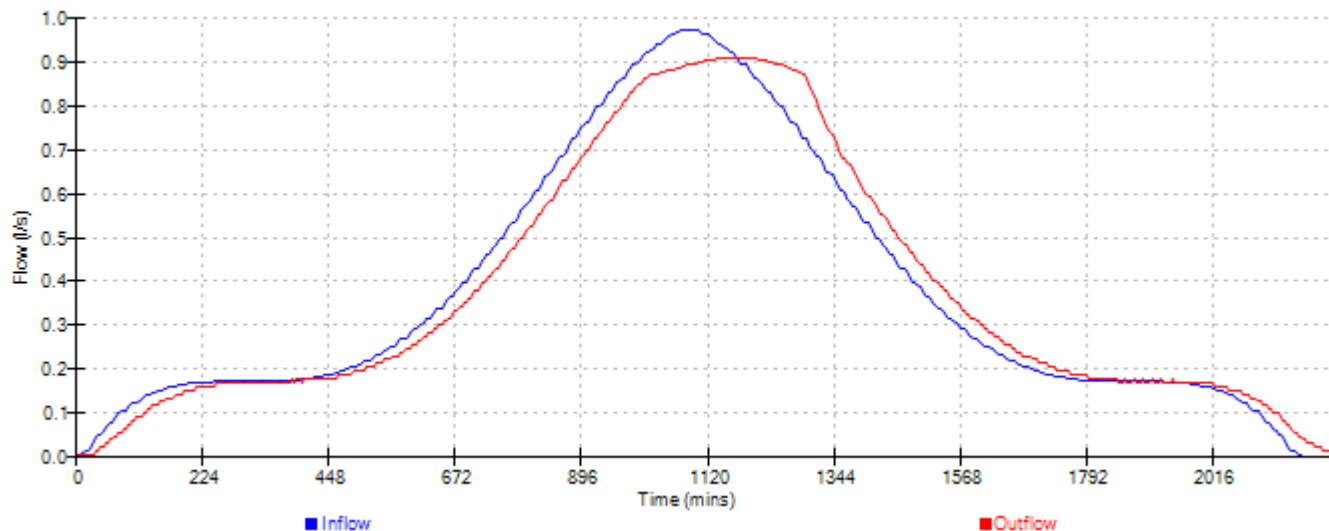
Event: 960 min Winter



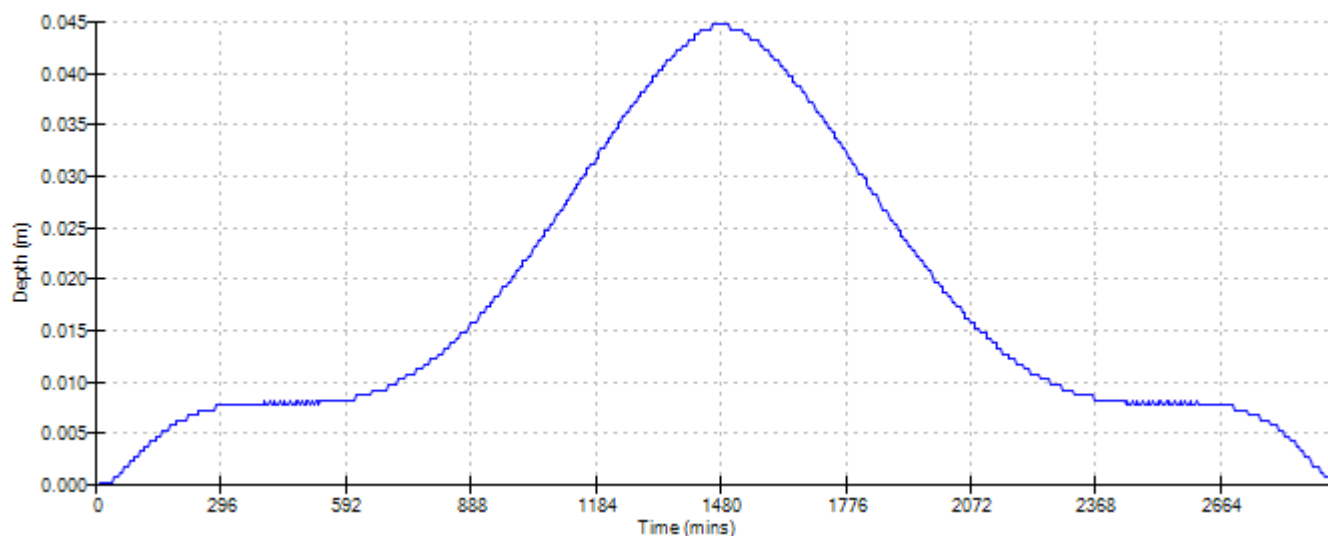
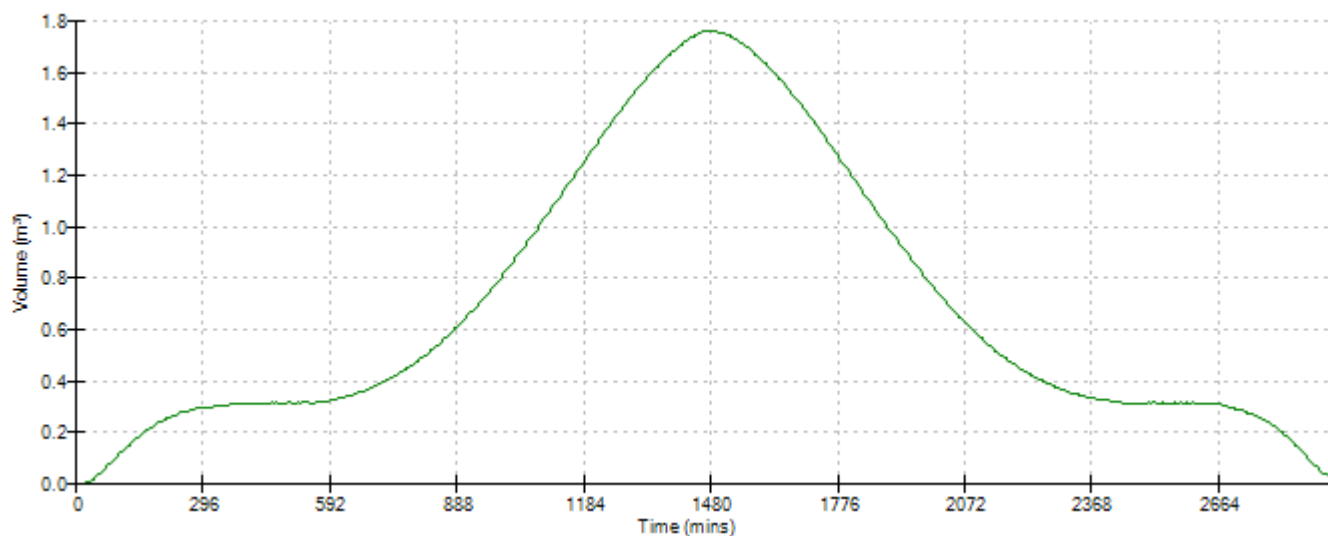
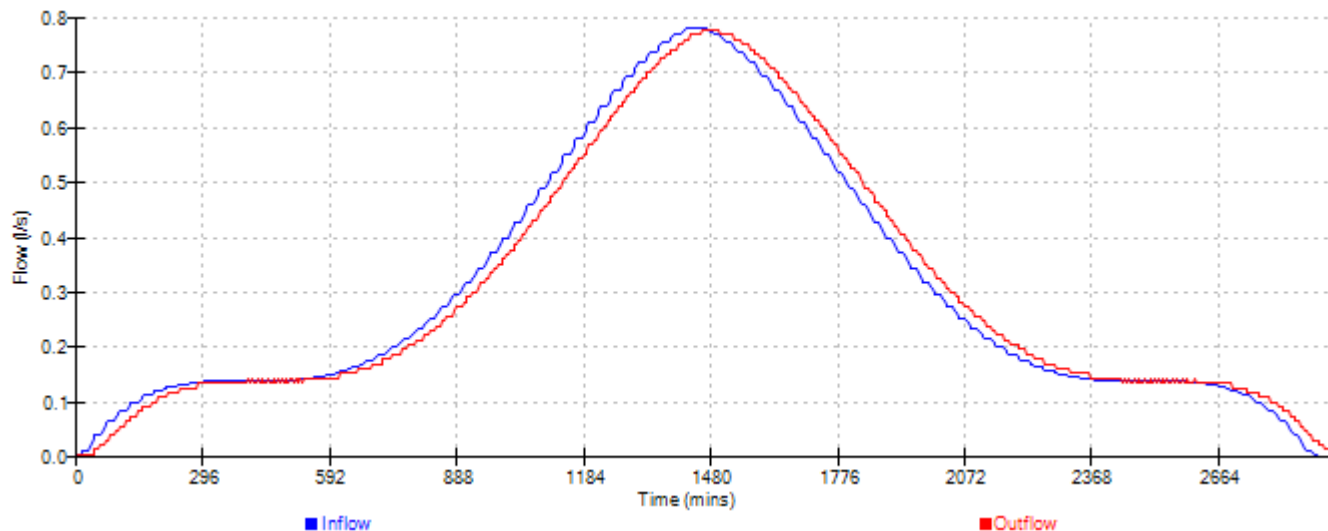
Event: 1440 min Winter



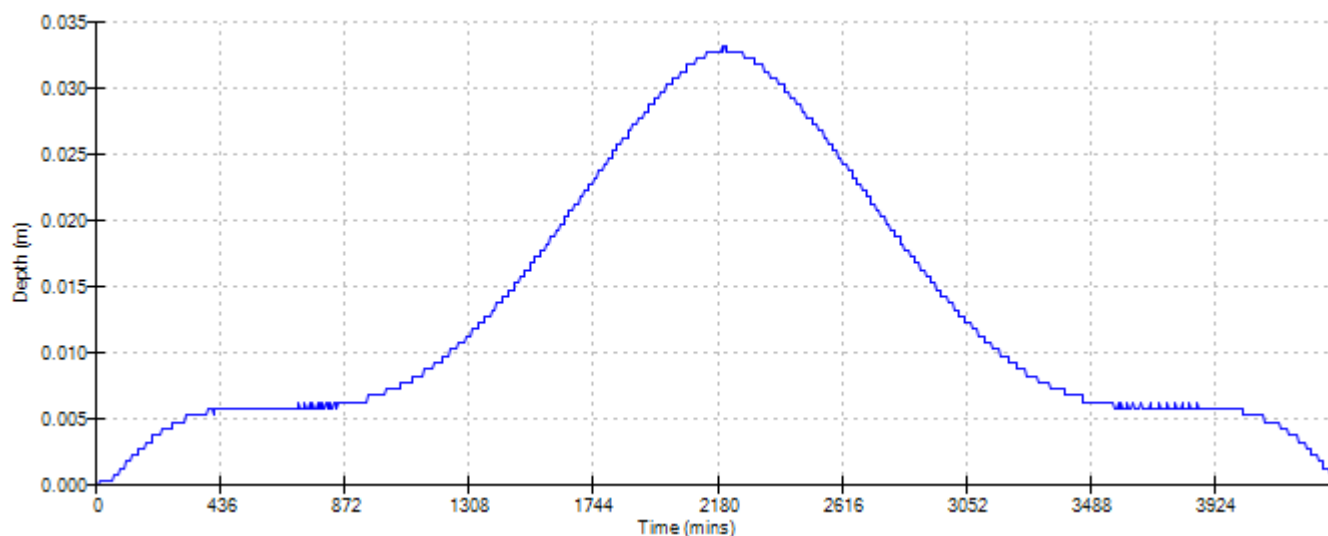
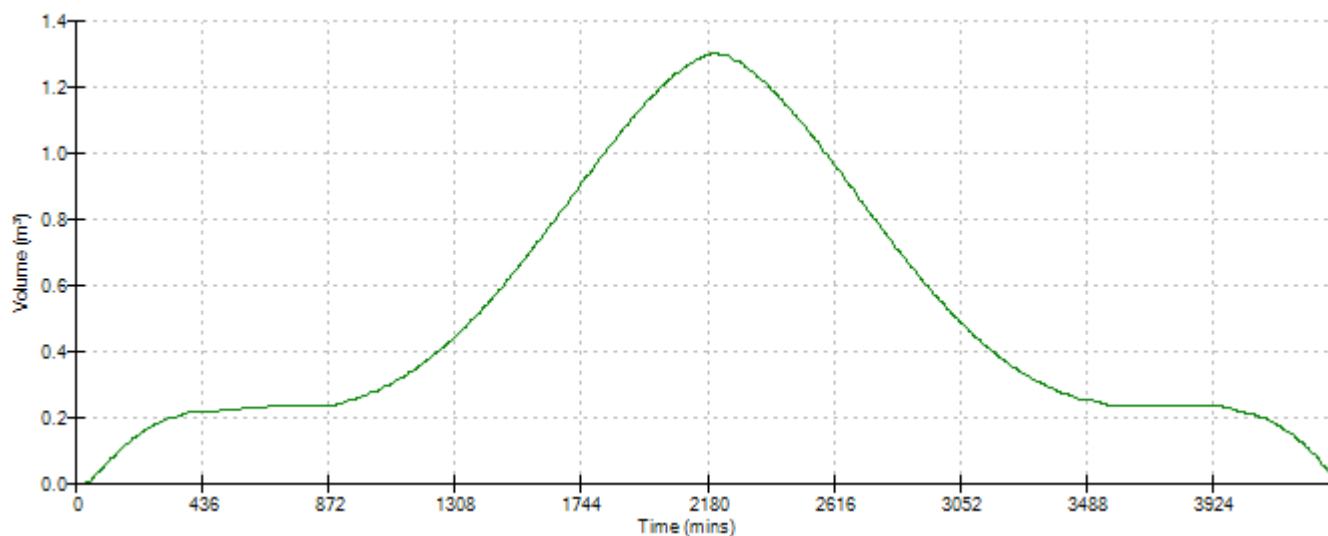
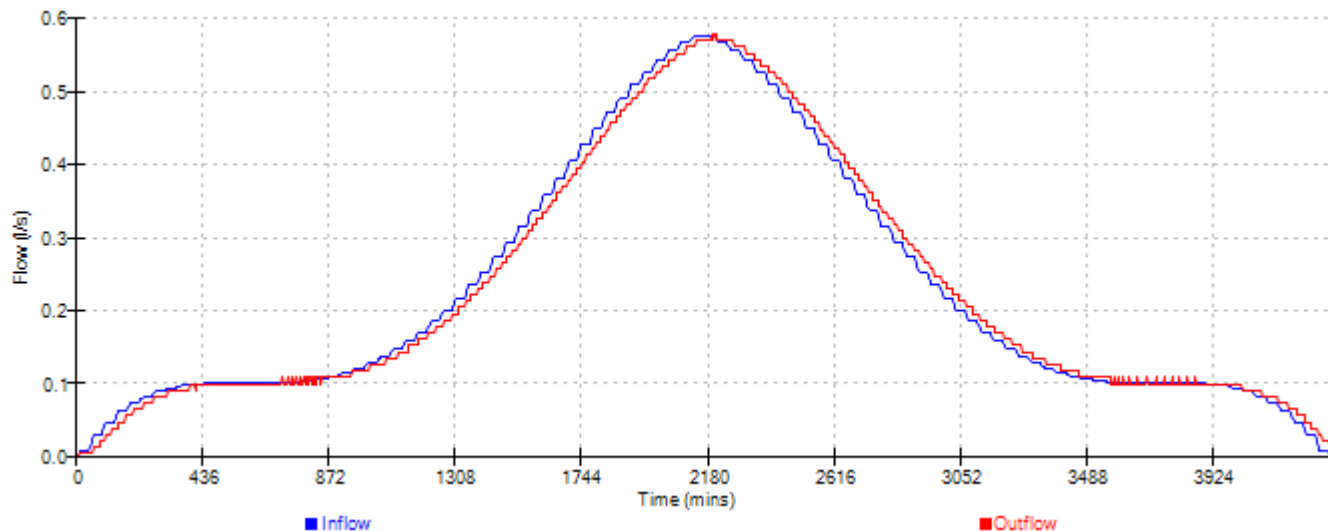
Event: 2160 min Winter



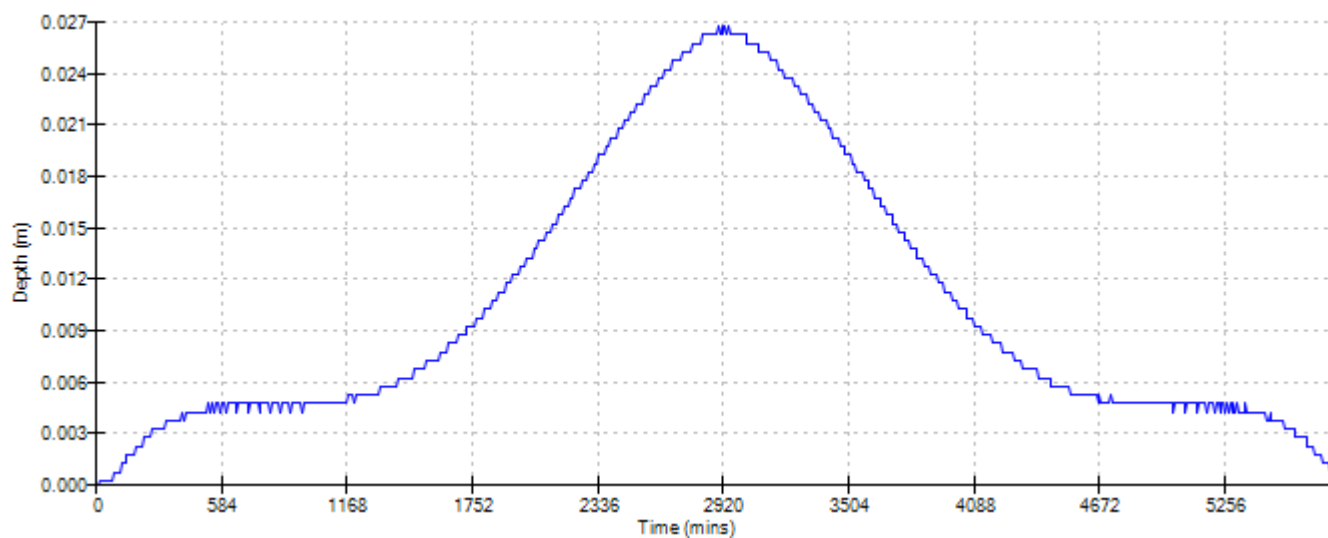
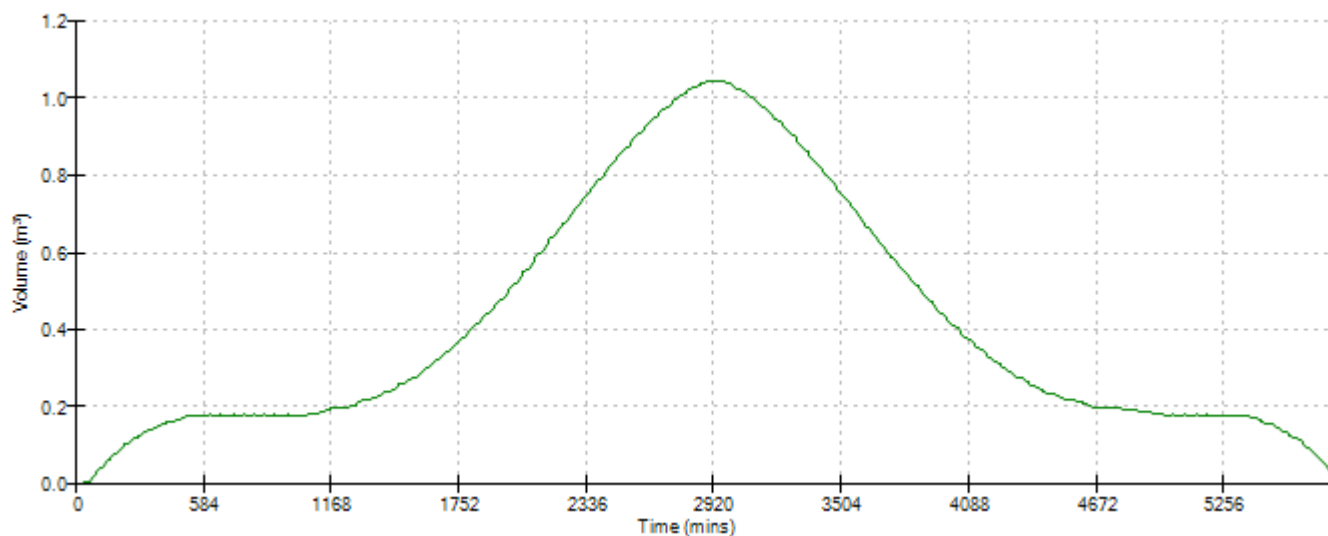
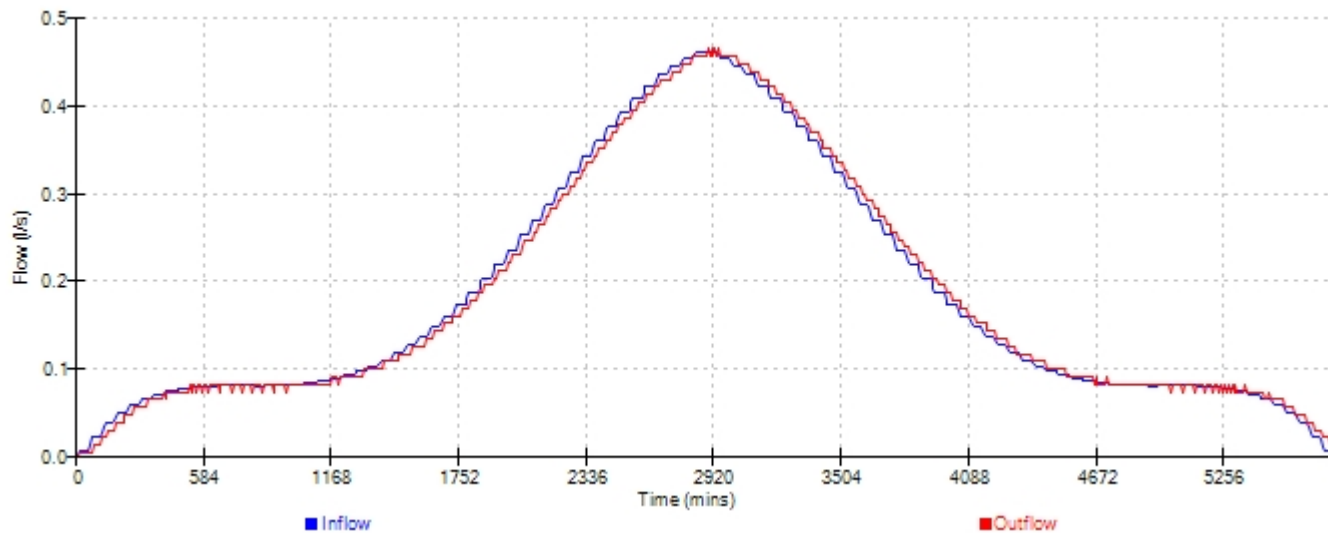
Event: 2880 min Winter



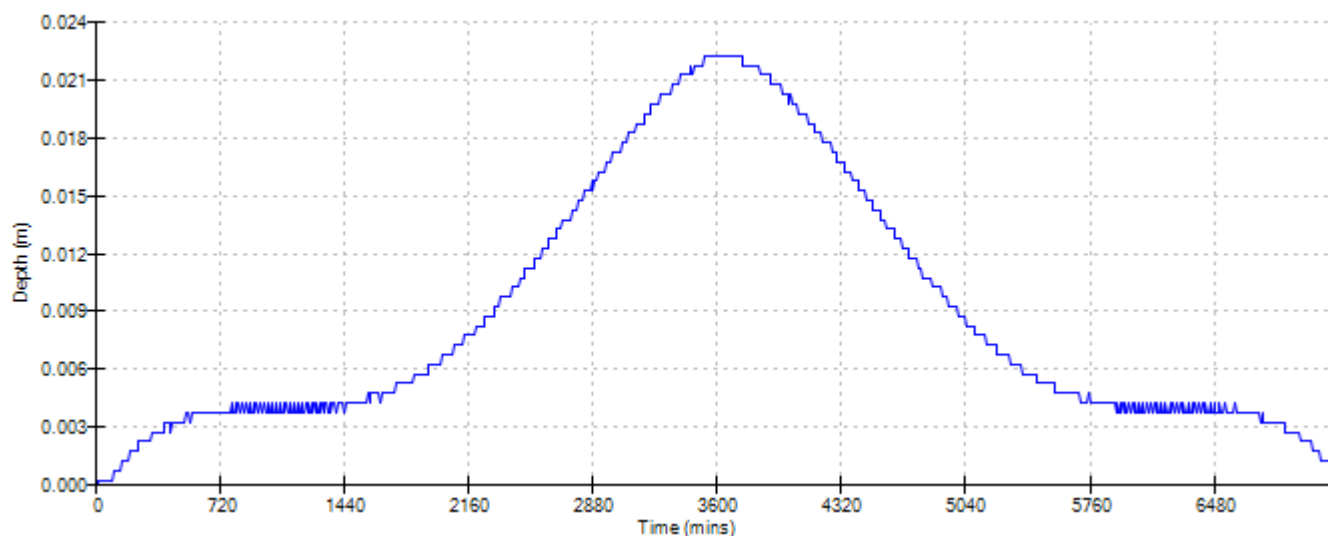
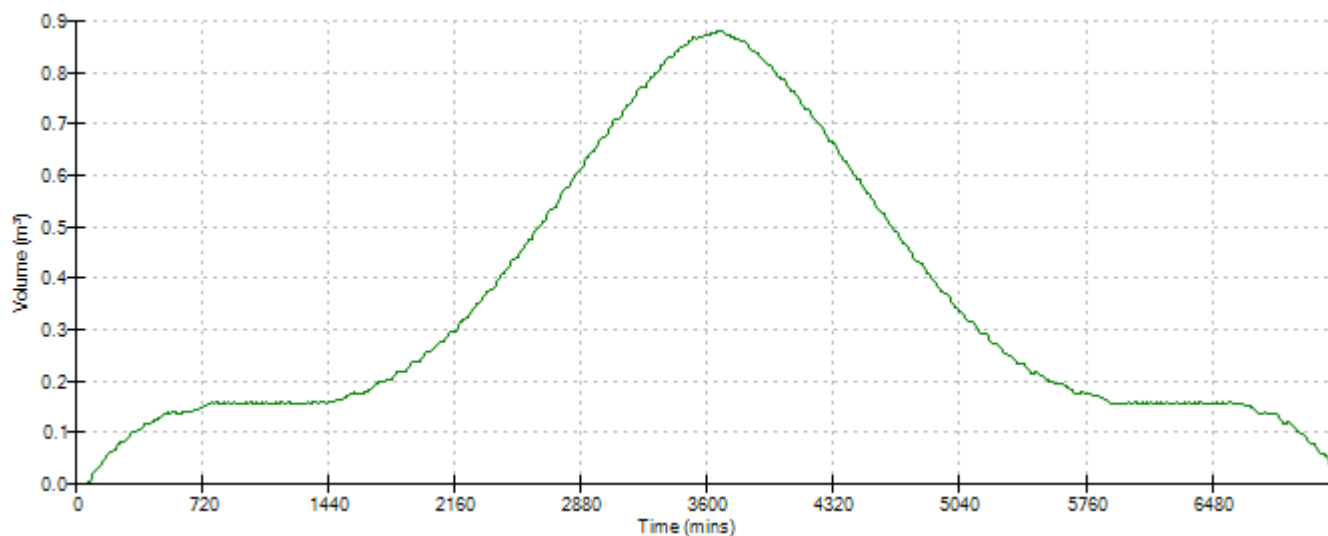
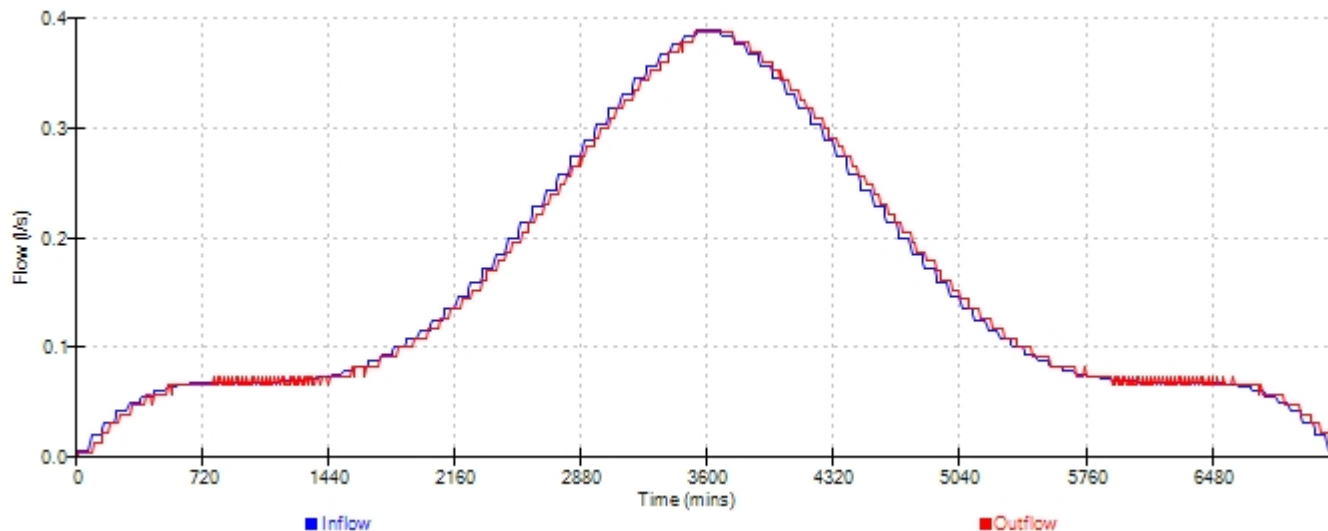
Event: 4320 min Winter



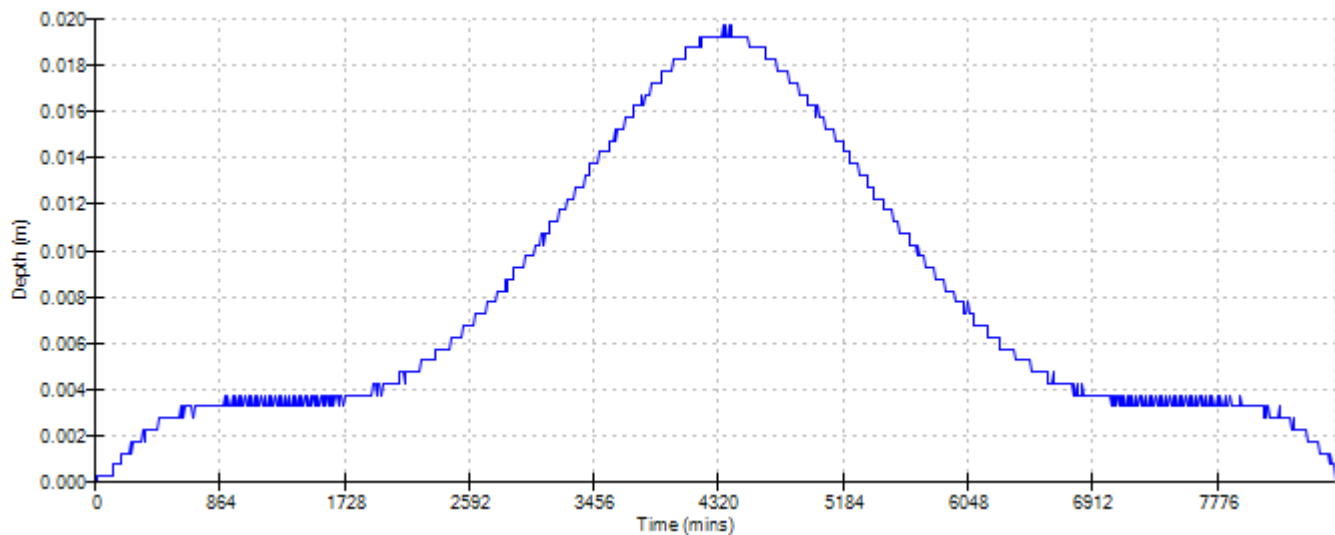
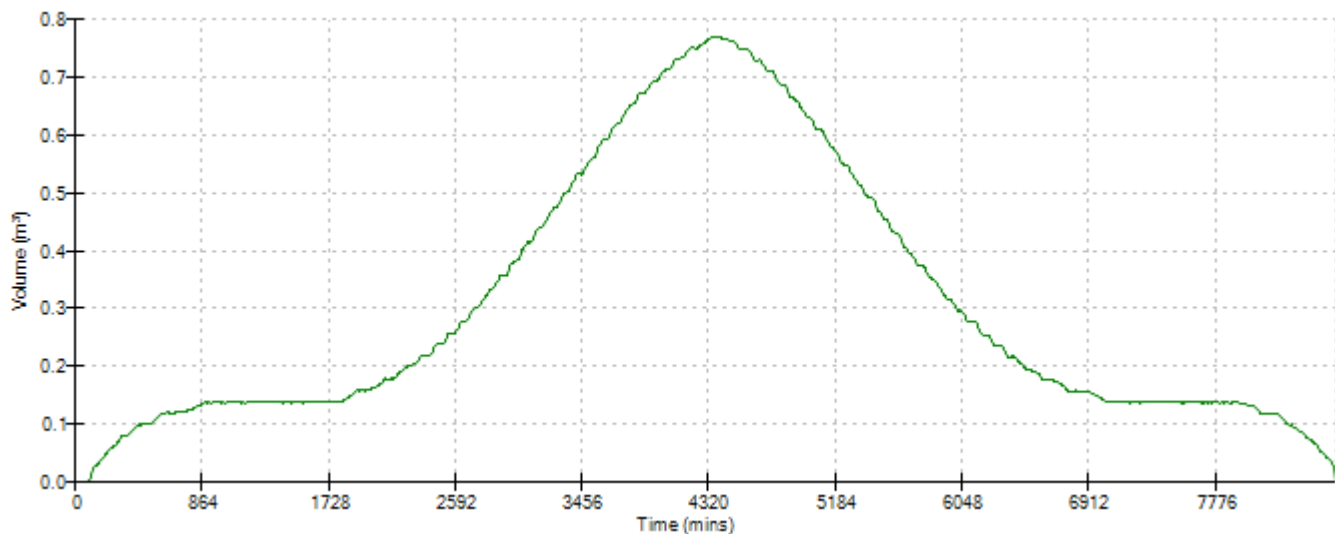
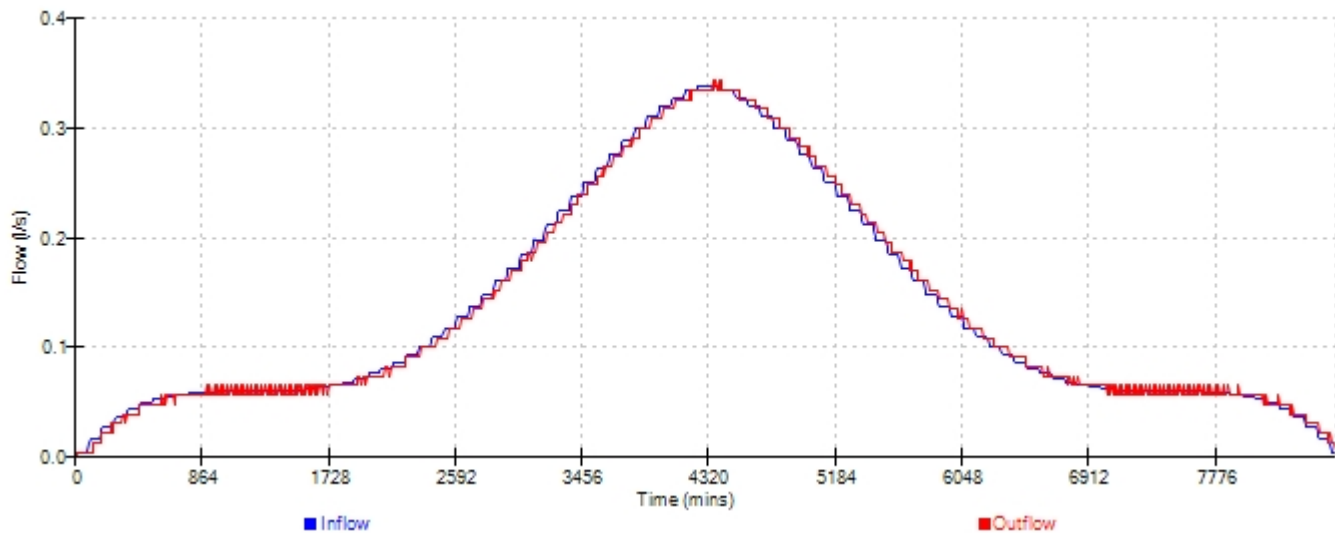
Event: 5760 min Winter



Event: 7200 min Winter



Event: 8640 min Winter



Event: 10080 min Winter

