New Earth Solutions

Surface water management proposals related to the proposed extension to New Earth Solutions fully enclosed composting facility at Canford Poole Dorset

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Rev	Revision details	Date	Checked

Prepared by	Date	Checked by	Date
A C Dilke	March 2008		

GRAHAM GARNER & PARTNERS LTD

11 MARCH 2008

6358/ACD/CH/R01

CONTENTS

Appendices

Calculations

1.0 INTRODUCTION

1.1 New Earth Solutions Ltd have developed an enclosed composting facility at Canford, Poole, Dorset on land commonly referred to as the Site Control Centre (SCC). The SCC now accommodates; a New Earth composting facility; a construction and skip waste recycling facility; a power station generating electricity from methane gas collected and piped from the adjacent Whites Pit landfill site and a man made de-silting and stormwater lagoon (Lake B4) to balance surface water arising from the landfill site.

1.2 Landfilling of Whites Pit is nearing completion with a projected end date for infilling of 2010. Progressive capping and restoration has followed in areas of completed infilling and by Autumn 2007 in excess of 75% of the landfill had been capped and restored. It is understood that public access will be permitted when restoration has been completed.

1.3 The approved landfill restoration includes a perimeter drainage system in which it is intended to make the former landfill site self sufficient in terms of dealing with surface water run-off from the restored land, thus reducing the previous reliance on the stormwater lagoon (B4).

1.4 New Earth propose to construct an extension to the composting facility on land reclaimed from part of the lagoon. This report is to explain how surface water from the restored landfill and the SCC will be managed.

1.5 The construction of the lagoon was granted planning permission in 1985 and from 1989 has performed the dual role of balancing the flow of surface water and removing from that water suspended silts generated from landfill capping operations. Surface water discharges from the lagoon via a control pipe and weir to a ditch to the Knighton Stream.

1.6 A significant quantity and depth of silt has accumulated within the lagoon and periodically silt accumulations have been removed predominantly near the main spillways and weirs to maintain water flow. Recently access was facilitated to the main body of the lagoon to remove deeper accumulations of silt deposits.

1.7 Establishment of vegetation over restored areas has significantly reduced silt deposition. Silt retention during the remaining phases of restoration of the landfill site is being achieved via a series of ditches and ponds near the newly restored areas, referred to as Lagoons 1 and 2. With the silt interception function of the lagoon being redundant consideration can now be given as to the long term requirements for surface water management from the restored landfill and from the SCC.

1.8 The provision of a permanent balancing facility for the landfill within the restored areas makes that function of the B4 lagoon redundant. However the B4 lagoon has also been utilised to control surface water runoff from the New Earth Composting Facility and Power Station. A technical appraisal of the B4 lagoon should therefore determine how much of the lagoon remains necessary for drainage purposes and therefore how much land could be reclaimed and utilised for the development of an extension to the New Earth Composting Facility.

2.0 ISSUES TO BE ADDRESSED

2.1 Technical Design

The requirement for stormwater balancing will remain after completion of the restoration of the Landfill. The original design requirements for stormwater balancing and silt interception have changed as the establishment of vegetation over the landfill has reduced silt erosion and also the rate of run-off. In addition the original design of the B4 lagoon provided for sheet run-off from extensive areas of unvegetated recently capped landfill. The design parameters for surface

water management have now been updated in order to take account of both environmental and technical changes.

2.2 Safety and operational issues

Following the cessation of landfilling and completion of landscape restoration public access will be afforded to parts or all of the former landfill site.
The are clear risks associated with any open body of water in a remote area, but an area that is in close proximity to where the public are being attracted poses additional safety risks.

For the restored landfill area it has therefore been decided that the perimeter drainage system will be designed and managed on the principal of a dry type facility, i.e. watercourses and balancing ponds that retain very little or no water except during heavy or prolonged rainfall. This is the most favourable design solution not only in terms of public safety but also for bio-diversity as the 'dry' pond basin can be wetland with a richer aquatic flora and fauna than a simple pond. The approved restoration scheme for the landfill shows the future surface water management system denoted as areas for potential wetland restoration.

Operationally such a system facilitates closer water quality monitoring of the runoff from the restored landfill and reduces the risk of contamination of large volumes of standing water by incidental discharges.

In relation to B4 lagoon, this is enclosed within the security fence of the SCC which is a supervised area. Despite this enclosure children have been known to gain access to the lagoon. Removal of the silt deposits and reduction of the area of standing water will assist in reducing risk in the event of unauthorised access.

3.0 TECHNICAL SOLUTION FOR EXISTING LANDFILL

3.1 The size of a stormwater storage structure is the subject of routine technical design involving stormwater modelling for a range of storm intensities and durations. Current Planning Policy Guidance, PPG25, Development and Flood Risk, requires new developments to accommodate a critical storm of 1 in 100 year probability plus an allowance for global warming.

Derivation of design parameters requires consideration and judgement, particularly with regard to the likely percentage of stormwater runoff and time for stormwater to reach the facility. These parameters will change over time with significant decrease in runoff and increase in time to reach the pond expected as vegetation matures on the restored areas.

3.2 The discharge normally permitted from a flood balancing facility in accordance with Environment Agency guidance is that which would occur from the undeveloped site during a critical once in one year storm event. This data can be obtained for any specific catchment by flood modelling for the one year event. The inflow results providing a site-specific storm profile.

However for Lake B4 a discharge consent to the Knighton Stream of 4000 cubic metres per day or 47 litres per second over a full twenty four hour period has been specifically agreed with the Environment Agency. This control is currently delivered by a series of 150m diameter pipes in the outfall weir structure which allow 2 alternative water levels to be maintained in the lake. There is also provision for overflow.

Modelling the outflow controls indicates that the consented discharge would be exceeded for theoretical extreme storms. However for design purposes the consented discharge rate of 47 litres per second has been adopted for the new design.

3.3 Stormwater modelling using Micro Drainage Storage Design W.10.3 indicates that the storage volume required for the restored landfill is 4553m^3, with a maximum permitted outflow of 46.5 litres per second. The impermeable area was calculated as 30% of the total area of 32.23 Ha.

3.4 Allowance that should be made for global warming depends on the design life and type of the proposal. For infrastructure the Environment Agency recommends a 20% allowance. However for the period 2085 to 2115, a value of 30% is recommended. Since the landfill is a long term establishment, a value of 30% for global warming allowance has been adopted. With a 30% allowance the volume of storage required increases to 5868m^3.

4.0 SELECTION OF STORAGE FACILITY

4.1 The provision for the storage or balancing of the stormwater run-off can either be on-site or off-site. The historical reliance of the landfill site on the B4 lagoon is deemed an off site arrangement.

The B4 lagoon is not a lake made by damning an existing water course. It was constructed by excavating the original gravel down to the underlying Broadstone Clay which left a natural bank down to the clay on three sides. In order to form the lake an embankment was constructed along the fourth side and water was artificially introduced.

4.2 For the restored landfill the preferable storage facility would be located within its perimeter providing easy access for maintenance and with the provision for cut-offs should there be any unacceptable discharges from the landfill that could cause pollution of surface water downstream.

For flood routing purposes the facility would be sited as far down the stream or drainage line as possible, so that it is able to balance out as much of the run-off as possible.

Alternative options for storage have been considered, including:-

(1) Wet pond

(2) Dry pond

(3) Artificial chambers

(4) Over sizing of ditches with provision for attenuation at separate points via a weir structure.

A wet pond has a permanent depth of water within it. The stormwater flowing into it causes the level to rise with the outflow being controlled by a discharge device. Depending upon the amount of storage required this type of lake can be quite large as the storage accessible is all above the standing water level. This form of device is permanently full of water which can be undesirable for health and safety and environmental reasons as discussed below.

A dry pond is similar to a wet pond except that, as its name suggests, it only fills following rainfall. If there is no standing water in the pond, then there are more options for its shape and fewer Health and Safety, and Environment considerations. As these are generally dry, the maintenance of the pond is much easier.

Artificial chambers including RC tanks, large diameter pipes and other similar detention structures are possible solutions, but they are generally only used when space is at a premium. A closed tank system is also less suitable for long term maintenance and there is no opportunity to deal with unexpectedly large flows. Within a pond, there is generally the ability to allow for a limited surcharge without undue difficulty.

Oversizing of ditches and streams by weirs or other control devices is an acceptable way of controlling runoff. They are commonly used with deep ditch systems in very flat areas where the discharge water is held back in the stream by a control device. A ditch drainage system has been employed on the landfill site along the site perimeter. Retention and oversizing of this ditch is shown on

the approved restoration scheme, a copy of which is included in the Appendices, Robert Long Consultancy Ltd drawing BIF/WPL/RES/02.

4.3 Risk Analysis

As discussed above, a pond either dry or wet is considered to be the most appropriate technical solution for the balancing of stormwater run-off. A wet pond is permanently full of water and therefore as a body of standing water of some depth in a remote area poses a potential hazard. The landfill site in its restored form may be accessible to the public. There might therefore be the potential for unauthorised access to the pond. In October 2007 the owners and company responsible for maintaining a Preston reservoir were fined by Preston Crown Court for failing to ensure the site was secure and that there was no access to the reservoir after a nine year old child, playing with other children drowned in just four feet six inches of water. On this basis there is a strong preference for a dry pond design.

Should there be any discharge of pollutant in the run-off from the landfill, with a wet pond, there would be a larger amount of polluted water with the inherent difficulty of dealing with such a large amount.

For a dry pond, standing water will be intermittent and only associated with prolonged or heavy rainfall. The advantage of this is that it reduces the hazard to any unauthorised or accidental access to the pond. In addition as the standing water is intermittent, silt removal can be undertaken during dry weather without requiring the pond to be drained.

5.0 TECHNICAL SOLUTION FOR RESTORED LANDFILL

From the above discussion, it is clear that the best solution for the balancing of the stormwater from the landfill is a dry pond situated within the confines of the restored landfill perimeter fed by drainage ditches. Drawing 6358/SK12 shows

the south west corner of the landfill and the extent of the predicted 100 year storm event. A copy of the drawing is included in the Appendices.

6.0 TECHNICAL SOLUTION FOR EXISTING LAKE B4

6.1 The preceding proposals to provide storm balancing for the restored landfill at a location within the landfill boundary negate the need for Lake B4 to serve this function. De-silting of part of the lake has been carried out and the de-silted area is no longer connected to the surface water drainage system for the landfill site.

There remains a requirement for surface water runoff management from the adjacent composting and recycling facilities. This runoff has been modelled to determine the extent of storage capacity required to be retained.

6.2 The implementation of the approved landfill restoration scheme with the surface water management scheme described above will significantly change the profile of water entering Lake B4. Further modelling using the specific output hydrograph (storm outfall) from the Landfill Dry Pond combined with the runoff from the Compost Facility (including proposed extension to the composting building) has therefore been carried out.

6.3 Flows from an impermeable area of 3.237 Ha representing the area of the lake, the proposed and existing compost halls and associated hardstanding have been combined with the Landfill outflow at Lake B4 and the outflow restricted to that permitted by the existing outflow controls. Examination of the outflow control reveals two 150mm diameter pipes, one set at 41.89m, the second set at 42.31m. Therefore separate analysis has been undertaken for only the lower orifice being open and for both being open.

6.4 The results of the above analysis for a 100 year return period event, for a single orifice outfall the critical storm duration is 5760 minutes, volume of storage is 4239m^3 at maximum depth of 1.00m and maximum outflow is 45.3 l/sec.

For dual orifice outflows the critical storm duration is 4320 minutes, volume of storage is 2867m^3 at maximum depth of 0.69m and maximum outflow is 58.3 l/sec.

6.5 It is apparent that should it be required to restrict the maximum outflow to that permitted by the Environment Agency discharge consent (47 litres/second) the corresponding volume of storage would be between 4239 and 2867m^3 with maximum depth between 1.00m and 0.69m.

6.6 In conclusion the reduced area of Lake B4 indicated on the Canford Composting Site Layout Plan, 6358/SK12 has sufficient capacity to accommodate flows from the proposed composting extension and the landfill outflows. The retained wet pond should be fully enclosed with a security fence and maintained by the SCC staff.

TALL HERB, DAMP GRASSLAND AND SCATTERED SCRUB

FILTRATION PONDS, MARSH AND WILLOW ALONG PERIMETER DITCH

PUBLIC ACCESS THROUGH STOATS WOOD TO LINK CANFORD PARK WITH LANDFILL SITE

EXISTING RESTORED AREA ENHANCED THROUGH MANAGEMENT

VIEWPOINT

RHODODENDRON CURRENTLY USED AS VISUAL SCREEN TO WEIGHBRIDGE TO BE REMOVED ON COMPLETION OF RESTORATION WORKS

1 2 3 4 5 6

Withy Bed
Spinney Cottage
Tumulus
Path (um)
Gravel Pit
Track
Canford Heath
New Cover

97200 N
97100 N
97000 N
96900 N
96800 N
96700 N
96600 N
96500 N
96400 N
96300 N

402500 E
402600 E
402700 E
402800 E
402900 E
403000 E
403100 E
403200 E
403300 E
403400 E
403500 E

N

KEY:

- PROPOSED SCRUBLAND
- PROPOSED HEATHLAND
- PROPOSED WOODLAND
- PROPOSED HEDGEROWS
- PINE AND BIRCH TREES
- POTENTIAL WETLAND RESTORATION
- MARSHY GRASSLAND
- ACID GRASSLAND
- RESTORED HEATH
- CANFORD HEATH SSSI
- EXISTING BRIDLEWAY NETWORK
- PROPOSED FOOTPATHS
- SINGLE TRACK FIRE/MAINTENANCE ACCESS; GRAVEL SURFACED
- EXISTING DITCH
- PROPOSED DITCH
- LIMIT OF OPERATIONAL AREA
- 5 RESTORATION PHASE No

Client: BIFFA WASTE SERVICES LTD

Project: WHITES PIT LANDFILL SITE
PROPOSED RESTORATION SCHEME

Scale: 1:2500
Drawn by: PAM
Checked by: MBA
Contract No:

Drg No: BIF/WPL/RES/02

Date: JANUARY 2004

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ROBERT LONG CONSULTANCY LIMITED

♦ Wastes Management ♦ Minerals ♦ Best Value ♦ Environment

Revision:			
Drawn by:	Requested by:	Checked by:	Date:

AREAS INDICATED IN HECTARES.

WHITES LANDFILL
CATCHMENT AREAS.
6358 / SK 11.

Notes		
①	Existing Composting Halls	9,393M²
②	Existing Processing Hall	4,506M²
③	Hardstinding Between Halls	3,446M²
④	New Composting Halls	11,130M²
		28,475M²
Pond 4B		3,892M²

revision suffix	Revision details	Date

Client: New Earth Solutions

Architect:

Job title: Canford Composting

Drawing title: Proposed Extension Site Layout

Graham Garner and Partners Limited

CONSULTING CIVIL, STRUCTURAL AND GEOTECHNICAL ENGINEERS

chk	date	scale	drawn
AM	11/3/08	1:2500.	

DRAWING No 6358/SK12

Summary of Results for 100 year Return Period

Storm Duration (mins)	Maximum Control (l/s)	Maximum Overflow (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Overflow Volume (m³)	Maximum Volume (m³)	Status
15 Summer	46.4	0.0	46.4	45.5173	0.5172	0.0	1356.5	O K
30 Summer	46.5	0.0	46.5	45.6973	0.6973	0.0	1882.7	O K
60 Summer	46.5	0.0	46.5	45.8868	0.8868	0.0	2468.3	O K
120 Summer	46.5	0.0	46.5	46.0718	1.0718	0.0	3071.2	O K
180 Summer	46.5	0.0	46.5	46.1658	1.1658	0.0	3389.0	O K
240 Summer	46.5	0.0	46.5	46.2208	1.2208	0.0	3578.1	O K
360 Summer	46.5	0.0	46.5	46.2828	1.2828	0.0	3796.9	O K
480 Summer	46.5	0.0	46.5	46.3148	1.3147	0.0	3909.1	O K
600 Summer	46.5	0.0	46.5	46.3273	1.3272	0.0	3954.1	O K
720 Summer	46.5	0.0	46.5	46.3278	1.3277	0.0	3956.7	O K
960 Summer	46.5	0.0	46.5	46.3168	1.3167	0.0	3917.5	O K
1440 Summer	46.5	0.0	46.5	46.2808	1.2808	0.0	3788.6	O K
2160 Summer	46.5	0.0	46.5	46.2093	1.2093	0.0	3539.0	O K
2880 Summer	46.5	0.0	46.5	46.1298	1.1298	0.0	3266.8	O K
4320 Summer	46.5	0.0	46.5	45.9683	0.9683	0.0	2730.1	O K
5760 Summer	46.5	0.0	46.5	45.8133	0.8133	0.0	2236.9	O K
7200 Summer	46.5	0.0	46.5	45.6763	0.6763	0.0	1819.1	O K
8640 Summer	46.5	0.0	46.5	45.5683	0.5683	0.0	1502.9	O K
10080 Summer	46.2	0.0	46.2	45.4887	0.4887	0.0	1275.2	O K
15 Winter	46.5	0.0	46.5	45.5808	0.5808	0.0	1538.5	O K
30 Winter	46.5	0.0	46.5	45.7808	0.7808	0.0	2136.4	O K
60 Winter	46.5	0.0	46.5	45.9888	0.9888	0.0	2796.3	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	89.02	129
30 Summer	59.85	138
60 Summer	38.41	156
120 Summer	23.81	196
180 Summer	17.74	248
240 Summer	14.29	298
360 Summer	10.50	398
480 Summer	8.44	506
600 Summer	7.12	616
720 Summer	6.19	724
960 Summer	4.96	836
1440 Summer	3.62	1090
2160 Summer	2.64	1500
2880 Summer	2.11	1904
4320 Summer	1.53	2696
5760 Summer	1.22	3440
7200 Summer	1.02	4136
8640 Summer	0.88	4800
10080 Summer	0.78	5464
15 Winter	89.02	130
30 Winter	59.85	139
60 Winter	38.41	158

Summary of Results for 100 year Return Period

Storm Duration (mins)	Maximum Control (l/s)	Maximum Overflow (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Overflow Volume (m³)	Maximum Volume (m³)	Status
120 Winter	46.5	0.0	46.5	46.1903	1.1903	0.0	3473.8	O K
180 Winter	46.5	0.0	46.5	46.2948	1.2947	0.0	3838.7	O K
240 Winter	46.5	0.0	46.5	46.3562	1.3562	0.0	4058.4	O K
360 Winter	46.5	0.0	46.5	46.4277	1.4277	0.0	4318.9	O K
480 Winter	46.5	0.0	46.5	46.4662	1.4662	0.0	4461.5	O K
600 Winter	46.5	0.0	46.5	46.4852	1.4852	0.0	4531.5	O K
720 Winter	46.5	0.0	46.5	46.4912	1.4912	0.0	4553.7	O K
960 Winter	46.5	0.0	46.5	46.4792	1.4792	0.0	4510.3	O K
1440 Winter	46.5	0.0	46.5	46.4292	1.4292	0.0	4325.0	O K
2160 Winter	46.5	0.0	46.5	46.3313	1.3312	0.0	3969.5	O K
2880 Winter	46.5	0.0	46.5	46.2173	1.2173	0.0	3566.2	O K
4320 Winter	46.5	0.0	46.5	45.9703	0.9703	0.0	2735.4	O K
5760 Winter	46.5	0.0	46.5	45.7288	0.7288	0.0	1978.0	O K
7200 Winter	46.5	0.0	46.5	45.5423	0.5422	0.0	1427.2	O K
8640 Winter	44.9	0.0	44.9	45.4287	0.4287	0.0	1107.4	O K
10080 Winter	41.8	0.0	41.8	45.3682	0.3682	0.0	941.2	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
120 Winter	23.81	198
180 Winter	17.74	248
240 Winter	14.29	300
360 Winter	10.50	404
480 Winter	8.44	508
600 Winter	7.12	614
720 Winter	6.19	722
960 Winter	4.96	928
1440 Winter	3.62	1166
2160 Winter	2.64	1624
2880 Winter	2.11	2068
4320 Winter	1.53	2900
5760 Winter	1.22	3608
7200 Winter	1.02	4224
8640 Winter	0.88	4832
10080 Winter	0.78	5464

Rainfall Details

Region	ENG+WAL	Cv (Winter)	0.840
Return Period (years)	100	Shortest Storm (mins)	15
M5-60 (mm)	19.000	Longest Storm (mins)	10080
Ratio-R	0.350	Summer Storms	Yes
Cv (Summer)	0.750	Winter Storms	Yes

Time / Area Diagram

Total Area (ha) = 9.670

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	44	48	0.262	88	92	0.000
4	8	0.495	48	52	0.262	92	96	0.164
8	12	0.495	52	56	0.368	96	100	0.164
12	16	0.469	56	60	0.368	100	104	0.164
16	20	0.469	60	64	0.384	104	108	0.164
20	24	0.608	64	68	0.384	108	112	0.098
24	28	0.608	68	72	0.523	112	116	0.098
28	32	0.500	72	76	0.523	116	120	0.078
32	36	0.500	76	80	0.434	120	124	0.078
36	40	0.288	80	84	0.434			
40	44	0.288	84	88	0.000			

Tank/Pond Details

Invert Level (m) 45.000 Ground Level (m) 47.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.00	2400.0	2.40	4224.0	4.80	4224.0	7.20	4224.0	9.60	4224.0
0.40	2741.8	2.80	4224.0	5.20	4224.0	7.60	4224.0	10.00	4224.0
0.80	3095.0	3.20	4224.0	5.60	4224.0	8.00	4224.0		
1.20	3459.8	3.60	4224.0	6.00	4224.0	8.40	4224.0		
1.60	3836.2	4.00	4224.0	6.40	4224.0	8.80	4224.0		
2.00	4224.0	4.40	4224.0	6.80	4224.0	9.20	4224.0		

Hydro-Brake Outflow Control

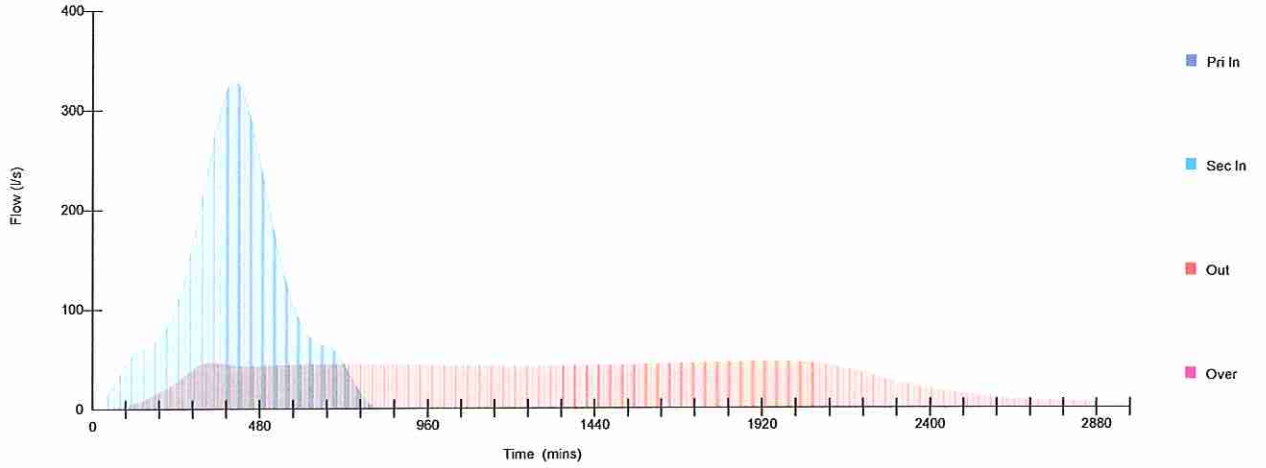
Design Head (m) 1.700 Hydro-Brake Type MD6 Invert Level (m) 45.000
Design Flow (l/s) 47.0 Diameter (mm) 249

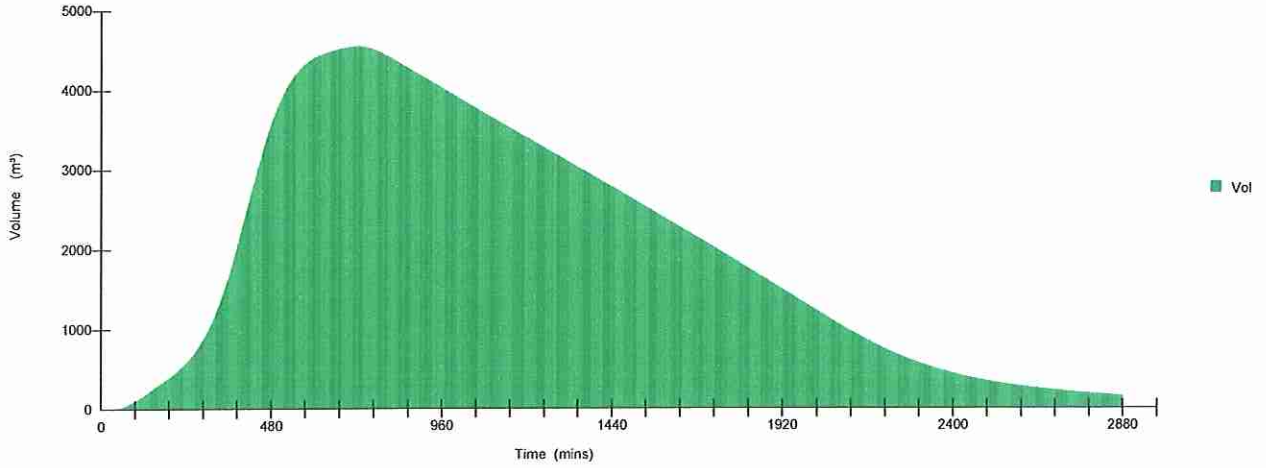
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.10	8.2	0.80	44.6	2.00	50.4	4.00	70.7	7.00	93.5
0.20	22.7	1.00	43.0	2.20	52.6	4.50	75.0	7.50	96.8
0.30	36.2	1.20	43.0	2.40	54.9	5.00	79.0	8.00	100.0
0.40	44.3	1.40	44.2	2.60	57.1	5.50	82.9	8.50	103.1
0.50	46.4	1.60	46.0	3.00	61.2	6.00	86.6	9.00	106.1
0.60	46.5	1.80	48.1	3.50	66.1	6.50	90.1	9.50	109.0

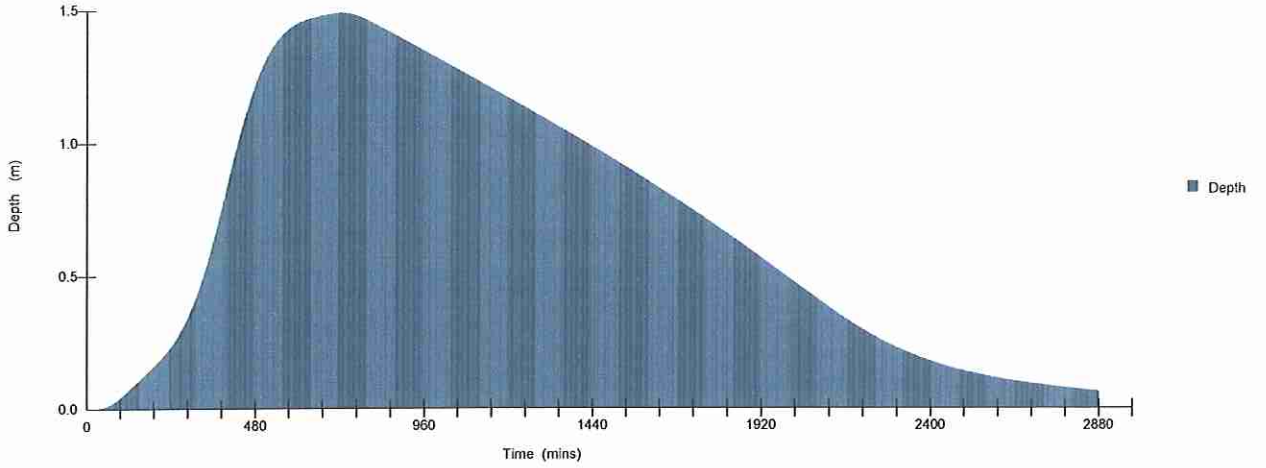
Weir / Flume Overflow Control

Discharge Coef 0.544 Width (m) 2.000 Crest Level (m) 47.000

Storm Duration 720 Mins (Winter)

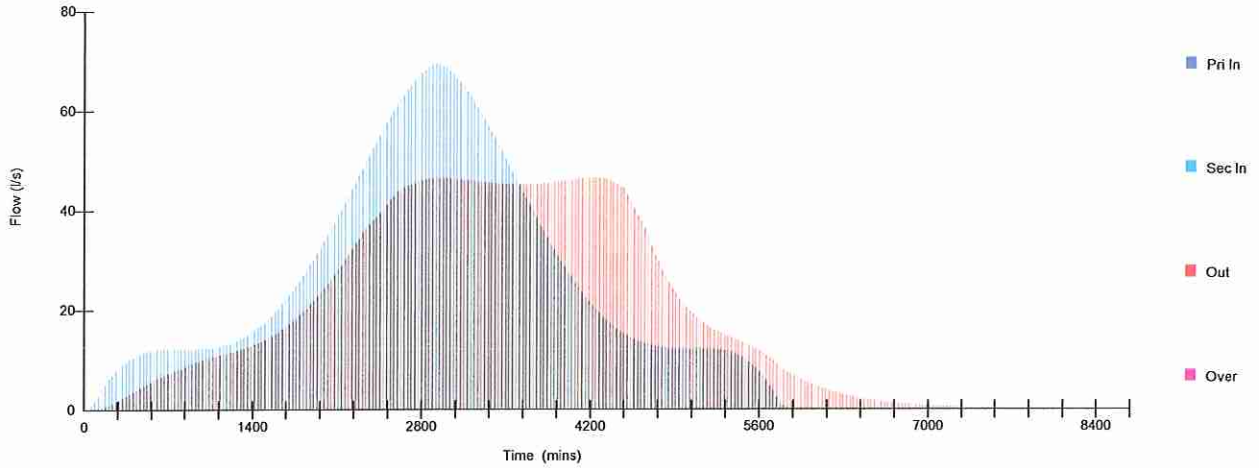


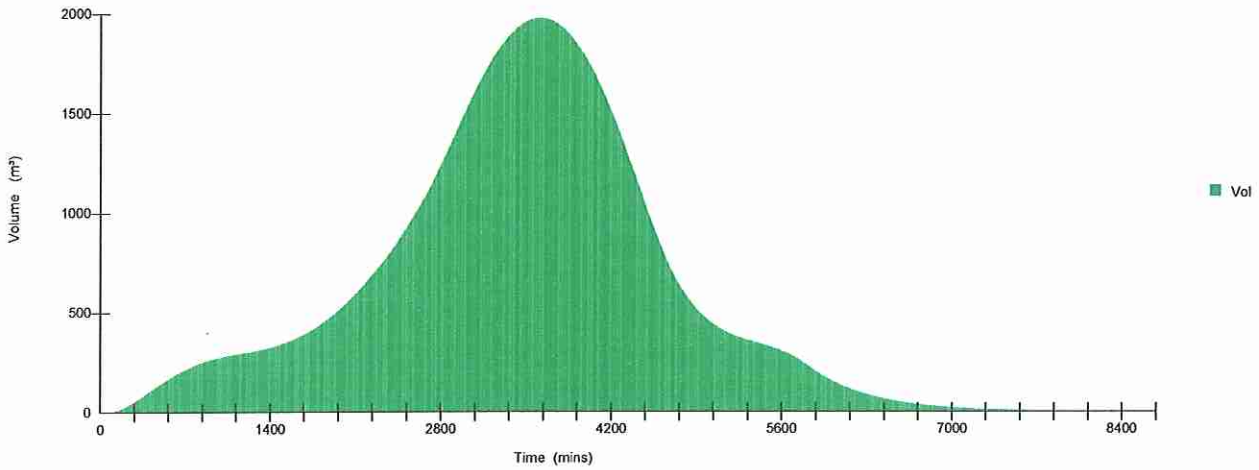


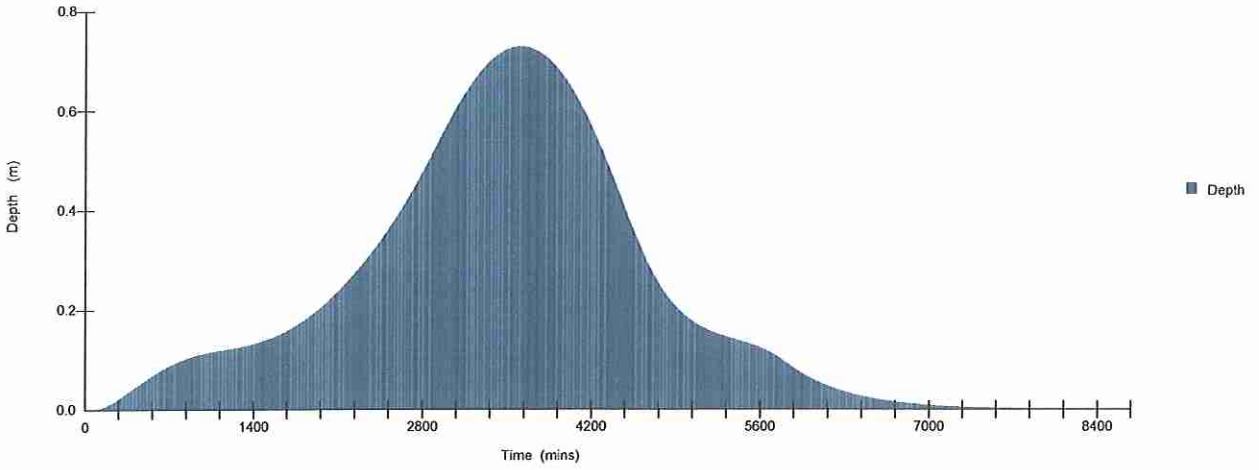


Graham Garner And Partners	
10 Station Approach Broadstone Dorset BH18 8AX	
Date 19 February 2008 10:36	Designed By Tony
File 6358-100year3.SRC	Checked By
CADS	Storage Design W.10.3

Storm Duration 5760 Mins (Winter)







Summary of Results for 100 year Return Period

Storm Duration (mins)	Maximum Control (l/s)	Maximum Overflow (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Overflow Volume (m³)	Maximum Volume (m³)	Status
15 Summer	46.5	0.0	46.5	45.6928	0.6928	0.0	1868.5	O K
30 Summer	46.5	0.0	46.5	45.9188	0.9188	0.0	2569.2	O K
60 Summer	46.5	0.0	46.5	46.1368	1.1368	0.0	3290.4	O K
120 Summer	46.5	0.0	46.5	46.3283	1.3282	0.0	3957.5	O K
180 Summer	46.5	0.0	46.5	46.4312	1.4312	0.0	4331.1	O K
240 Summer	46.5	0.0	46.5	46.4962	1.4962	0.0	4573.5	O K
360 Summer	46.5	0.0	46.5	46.5732	1.5732	0.0	4864.4	O K
480 Summer	46.5	0.0	46.5	46.6137	1.6137	0.0	5018.3	O K
600 Summer	46.5	0.0	46.5	46.6332	1.6332	0.0	5093.1	O K
720 Summer	46.5	0.0	46.5	46.6392	1.6392	0.0	5116.3	O K
960 Summer	46.5	0.0	46.5	46.6282	1.6282	0.0	5073.6	O K
1440 Summer	46.5	0.0	46.5	46.5882	1.5882	0.0	4920.6	O K
2160 Summer	46.5	0.0	46.5	46.5152	1.5152	0.0	4644.2	O K
2880 Summer	46.5	0.0	46.5	46.4367	1.4367	0.0	4351.4	O K
4320 Summer	46.5	0.0	46.5	46.2843	1.2843	0.0	3801.8	O K
5760 Summer	46.5	0.0	46.5	46.1348	1.1348	0.0	3282.2	O K
7200 Summer	46.5	0.0	46.5	45.9893	0.9893	0.0	2797.1	O K
8640 Summer	46.5	0.0	46.5	45.8498	0.8498	0.0	2351.3	O K
10080 Summer	46.5	0.0	46.5	45.7258	0.7258	0.0	1968.7	O K
15 Winter	46.5	0.0	46.5	45.7758	0.7758	0.0	2120.8	O K
30 Winter	46.5	0.0	46.5	46.0233	1.0233	0.0	2909.7	O K
60 Winter	46.5	0.0	46.5	46.2603	1.2603	0.0	3717.7	O K
120 Winter	46.5	0.0	46.5	46.4672	1.4672	0.0	4465.0	O K
180 Winter	46.5	0.0	46.5	46.5807	1.5807	0.0	4892.8	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	118.60	131
30 Summer	79.11	140
60 Summer	49.90	158
120 Summer	30.06	200
180 Summer	22.19	252
240 Summer	17.85	304
360 Summer	13.10	408
480 Summer	10.50	514
600 Summer	8.83	624
720 Summer	7.66	734
960 Summer	6.12	906
1440 Summer	4.45	1148
2160 Summer	3.23	1544
2880 Summer	2.57	1956
4320 Summer	1.86	2776
5760 Summer	1.48	3568
7200 Summer	1.25	4328
8640 Summer	1.08	5032
10080 Summer	0.96	5712
15 Winter	118.60	131
30 Winter	79.11	140
60 Winter	49.90	160
120 Winter	30.06	202
180 Winter	22.19	252

Summary of Results for 100 year Return Period

Storm Duration (mins)	Maximum Control (l/s)	Maximum Overflow (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Overflow Volume (m^3)	Maximum Volume (m^3)	Status
240 Winter	46.6	0.0	46.6	46.6542	1.6542	0.0	5174.5	O K
360 Winter	47.5	0.0	47.5	46.7422	1.7422	0.0	5520.7	O K
480 Winter	48.0	0.0	48.0	46.7902	1.7902	0.0	5713.2	O K
600 Winter	48.3	0.0	48.3	46.8167	1.8167	0.0	5819.1	FLOOD RISK
720 Winter	48.4	0.0	48.4	46.8287	1.8287	0.0	5867.7	FLOOD RISK
960 Winter	48.4	0.0	48.4	46.8257	1.8257	0.0	5856.8	FLOOD RISK
1440 Winter	47.8	0.0	47.8	46.7737	1.7737	0.0	5646.9	O K
2160 Winter	46.9	0.0	46.9	46.6822	1.6822	0.0	5283.8	O K
2880 Winter	46.5	0.0	46.5	46.5742	1.5742	0.0	4867.9	O K
4320 Winter	46.5	0.0	46.5	46.3528	1.3527	0.0	4046.4	O K
5760 Winter	46.5	0.0	46.5	46.1238	1.1238	0.0	3245.7	O K
7200 Winter	46.5	0.0	46.5	45.8903	0.8903	0.0	2479.1	O K
8640 Winter	46.5	0.0	46.5	45.6788	0.6788	0.0	1826.7	O K
10080 Winter	46.4	0.0	46.4	45.5263	0.5262	0.0	1381.5	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
240 Winter	17.85	304
360 Winter	13.10	410
480 Winter	10.50	514
600 Winter	8.83	622
720 Winter	7.66	730
960 Winter	6.12	948
1440 Winter	4.45	1214
2160 Winter	3.23	1664
2880 Winter	2.57	2120
4320 Winter	1.86	3004
5760 Winter	1.48	3824
7200 Winter	1.25	4560
8640 Winter	1.08	5192
10080 Winter	0.96	5760

Rainfall Details

Region	ENG+WAL	Cv (Winter)	0.840
Return Period (years)	100	Shortest Storm (mins)	15
M5-60 (mm)	24.700	Longest Storm (mins)	10080
Ratio-R	0.350	Summer Storms	Yes
Cv (Summer)	0.750	Winter Storms	Yes

Time / Area Diagram

Total Area (ha) = 9.670

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	0.000	44	48	0.262	88	92	0.000
4	8	0.495	48	52	0.262	92	96	0.164
8	12	0.495	52	56	0.368	96	100	0.164
12	16	0.469	56	60	0.368	100	104	0.164
16	20	0.469	60	64	0.384	104	108	0.164
20	24	0.608	64	68	0.384	108	112	0.098
24	28	0.608	68	72	0.523	112	116	0.098
28	32	0.500	72	76	0.523	116	120	0.078
32	36	0.500	76	80	0.434	120	124	0.078
36	40	0.288	80	84	0.434			
40	44	0.288	84	88	0.000			

Tank/Pond Details

Invert Level (m) 45.000 Ground Level (m) 47.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.00	2400.0	2.40	4224.0	4.80	4224.0	7.20	4224.0	9.60	4224.0
0.40	2741.8	2.80	4224.0	5.20	4224.0	7.60	4224.0	10.00	4224.0
0.80	3095.0	3.20	4224.0	5.60	4224.0	8.00	4224.0		
1.20	3459.8	3.60	4224.0	6.00	4224.0	8.40	4224.0		
1.60	3836.2	4.00	4224.0	6.40	4224.0	8.80	4224.0		
2.00	4224.0	4.40	4224.0	6.80	4224.0	9.20	4224.0		

Hydro-Brake Outflow Control

Design Head (m) 1.700 Hydro-Brake Type MD6 Invert Level (m) 45.000
Design Flow (l/s) 47.0 Diameter (mm) 249

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.10	8.2	0.80	44.6	2.00	50.4	4.00	70.7	7.00	93.5
0.20	22.7	1.00	43.0	2.20	52.6	4.50	75.0	7.50	96.8
0.30	36.2	1.20	43.0	2.40	54.9	5.00	79.0	8.00	100.0
0.40	44.3	1.40	44.2	2.60	57.1	5.50	82.9	8.50	103.1
0.50	46.4	1.60	46.0	3.00	61.2	6.00	86.6	9.00	106.1
0.60	46.5	1.80	48.1	3.50	66.1	6.50	90.1	9.50	109.0

Weir / Flume Overflow Control

Discharge Coef 0.544 Width (m) 2.000 Crest Level (m) 47.000

Summary of Results for 100 year Return Period

Critical storm not identified, please run longer storm durations.

Storm Duration (mins)	Maximum Control (l/s)	Maximum Overflow (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Overflow Volume (m^3)	Maximum Volume (m^3)	Status
5760 Summer	44.4	0.0	44.4	42.8603	0.9703	0.0	4084.4	O K
5760 Winter	45.3	0.0	45.3	42.8938	1.0038	0.0	4239.7	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
5760 Summer	1.22	4560
5760 Winter	1.22	4560

Rainfall Details

Region	ENG+WAL	Cv (Winter)	0.840
Return Period (years)	100	Shortest Storm (mins)	5760
M5-60 (mm)	19.000	Longest Storm (mins)	5760
Ratio-R	0.350	Summer Storms	Yes
Cv (Summer)	0.750	Winter Storms	Yes

Time / Area Diagram

Total Area (ha) = 3.237

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	1.147	4	8	1.045	8	12	1.045

Tank/Pond Details

Invert Level (m) 41.890 Ground Level (m) 45.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.00	3890.0	1.20	4624.0	2.40	4624.0	3.60	4624.0	4.80	4624.0
0.20	3944.0	1.40	4624.0	2.60	4624.0	3.80	4624.0	5.00	4624.0
0.40	4147.0	1.60	4624.0	2.80	4624.0	4.00	4624.0		
0.60	4303.0	1.80	4624.0	3.00	4624.0	4.20	4624.0		
0.80	4462.0	2.00	4624.0	3.20	4624.0	4.40	4624.0		
1.00	4624.0	2.20	4624.0	3.40	4624.0	4.60	4624.0		

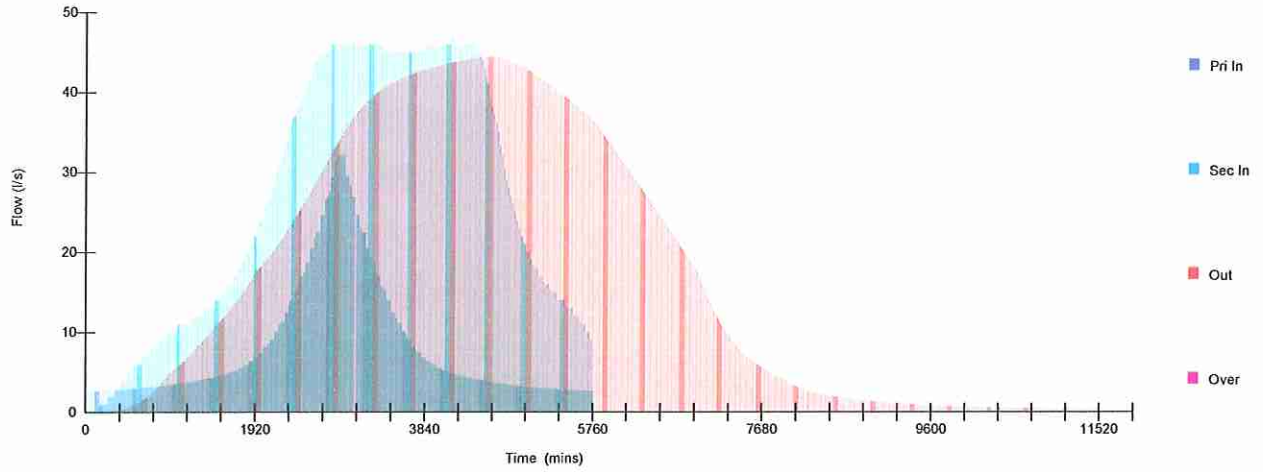
Orifice Outflow Control

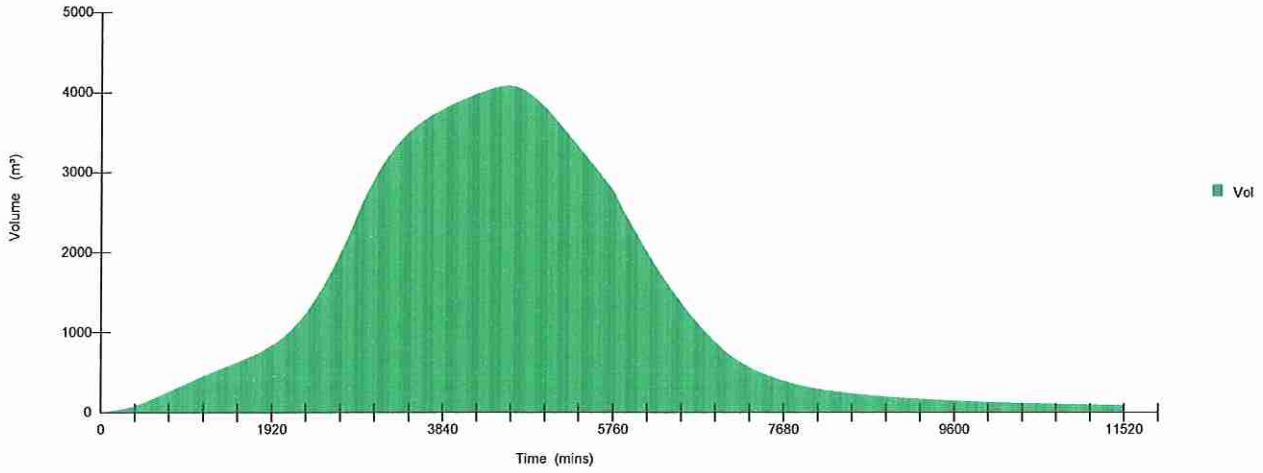
Diameter (m) 0.150 Invert Level (m) 41.890
Discharge Coefficient 0.600

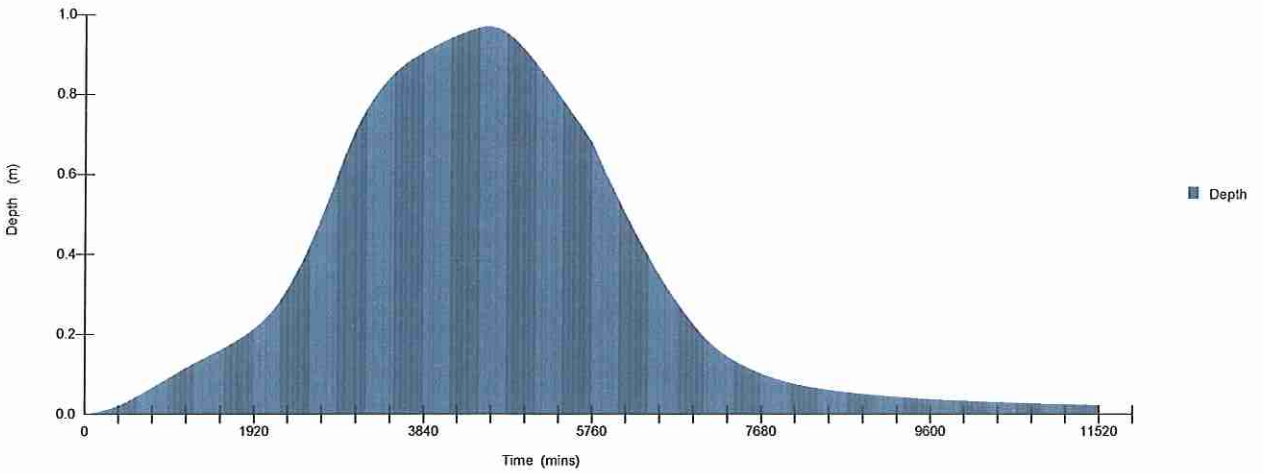
Weir / Flume Overflow Control

Discharge Coef 0.544 Width (m) 1.000 Crest Level (m) 43.000

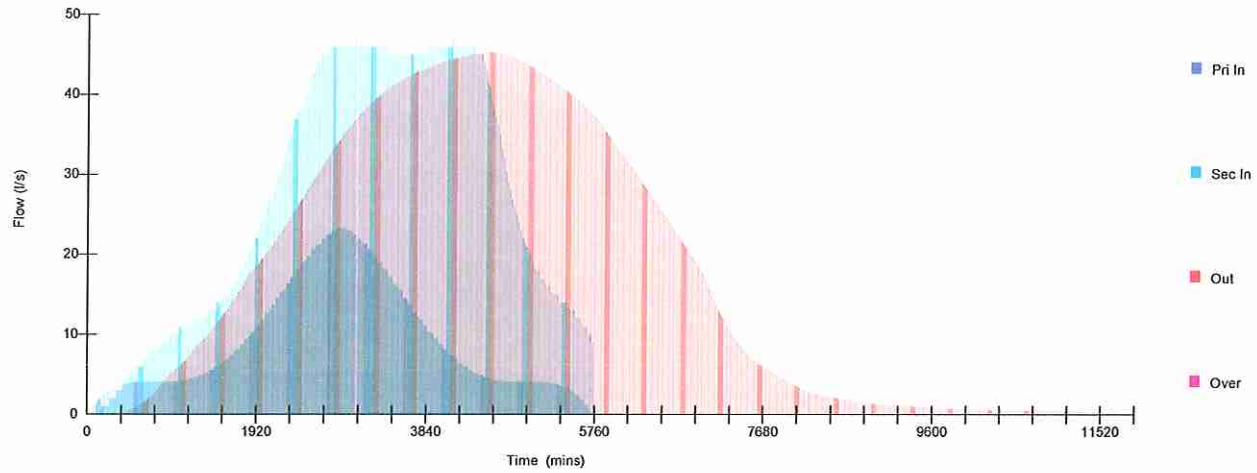
Storm Duration 5760 Mins (Summer)

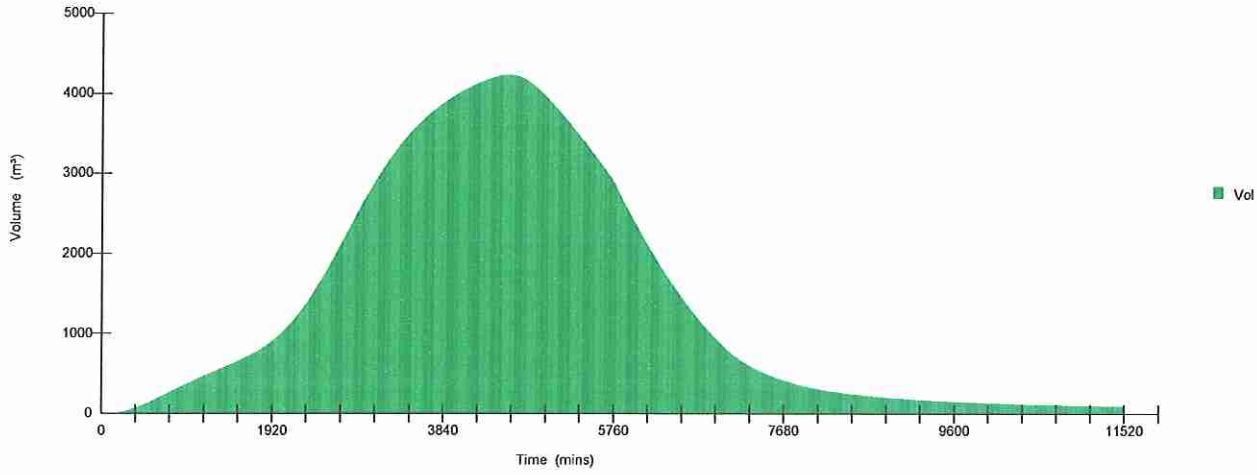


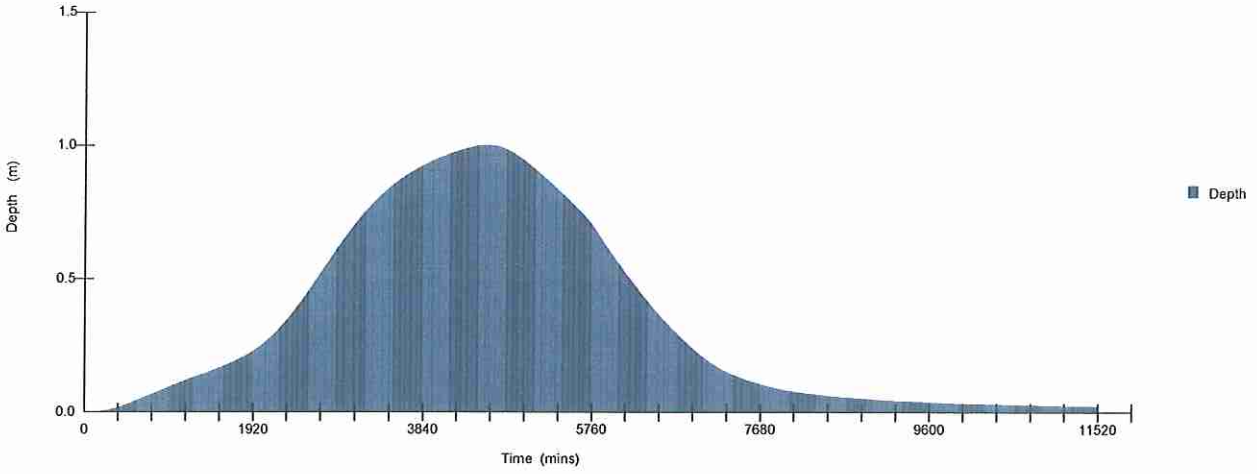




Storm Duration 5760 Mins (Winter)







Additional Hydrograph Details - 1

Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)
4	0	240	1	476	5	712	7	948	10
8	0	244	1	480	5	716	7	952	10
12	0	248	1	484	5	720	7	956	10
16	0	252	2	488	5	724	7	960	10
20	0	256	2	492	5	728	7	964	10
24	0	260	2	496	5	732	8	968	10
28	0	264	2	500	5	736	8	972	10
32	0	268	2	504	5	740	8	976	10
36	0	272	2	508	5	744	8	980	10
40	0	276	2	512	5	748	8	984	10
44	0	280	2	516	5	752	8	988	10
48	0	284	2	520	5	756	8	992	10
52	0	288	2	524	5	760	8	996	10
56	0	292	2	528	5	764	8	1000	10
60	0	296	2	532	5	768	8	1004	10
64	0	300	2	536	5	772	8	1008	10
68	0	304	2	540	5	776	8	1012	10
72	0	308	2	544	5	780	8	1016	10
76	0	312	2	548	6	784	8	1020	10
80	0	316	2	552	6	788	8	1024	10
84	0	320	2	556	6	792	8	1028	10
88	0	324	2	560	6	796	8	1032	10
92	0	328	2	564	6	800	8	1036	10
96	0	332	3	568	6	804	8	1040	10
100	0	336	3	572	6	808	8	1044	11
104	0	340	3	576	6	812	8	1048	11
108	0	344	3	580	6	816	8	1052	11
112	0	348	3	584	6	820	8	1056	11
116	0	352	3	588	6	824	8	1060	11
120	0	356	3	592	6	828	8	1064	11
124	0	360	3	596	6	832	8	1068	11
128	0	364	3	600	6	836	9	1072	11
132	0	368	3	604	6	840	9	1076	11
136	0	372	3	608	6	844	9	1080	11
140	0	376	3	612	6	848	9	1084	11
144	0	380	3	616	6	852	9	1088	11
148	0	384	3	620	6	856	9	1092	11
152	0	388	3	624	6	860	9	1096	11
156	1	392	3	628	6	864	9	1100	11
160	1	396	3	632	6	868	9	1104	11
164	1	400	3	636	7	872	9	1108	11
168	1	404	4	640	7	876	9	1112	11
172	1	408	4	644	7	880	9	1116	11
176	1	412	4	648	7	884	9	1120	11
180	1	416	4	652	7	888	9	1124	11
184	1	420	4	656	7	892	9	1128	11
188	1	424	4	660	7	896	9	1132	11
192	1	428	4	664	7	900	9	1136	11
196	1	432	4	668	7	904	9	1140	11
200	1	436	4	672	7	908	9	1144	11
204	1	440	4	676	7	912	9	1148	11
208	1	444	4	680	7	916	9	1152	11
212	1	448	4	684	7	920	9	1156	11
216	1	452	4	688	7	924	10	1160	11
220	1	456	4	692	7	928	10	1164	11
224	1	460	4	696	7	932	10	1168	11
228	1	464	4	700	7	936	10	1172	11
232	1	468	4	704	7	940	10	1176	11
236	1	472	4	708	7	944	10	1180	11

Additional Hydrograph Details - 1

Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)
1184	11	1420	13	1656	16	1892	22	2128	29
1188	11	1424	13	1660	16	1896	22	2132	29
1192	11	1428	13	1664	16	1900	22	2136	29
1196	11	1432	13	1668	17	1904	22	2140	29
1200	11	1436	13	1672	17	1908	22	2144	29
1204	11	1440	13	1676	17	1912	22	2148	29
1208	11	1444	13	1680	17	1916	22	2152	29
1212	12	1448	13	1684	17	1920	22	2156	30
1216	12	1452	13	1688	17	1924	22	2160	30
1220	12	1456	13	1692	17	1928	22	2164	30
1224	12	1460	14	1696	17	1932	23	2168	30
1228	12	1464	14	1700	17	1936	23	2172	30
1232	12	1468	14	1704	17	1940	23	2176	30
1236	12	1472	14	1708	17	1944	23	2180	31
1240	12	1476	14	1712	17	1948	23	2184	31
1244	12	1480	14	1716	17	1952	23	2188	31
1248	12	1484	14	1720	17	1956	23	2192	31
1252	12	1488	14	1724	18	1960	23	2196	31
1256	12	1492	14	1728	18	1964	24	2200	31
1260	12	1496	14	1732	18	1968	24	2204	31
1264	12	1500	14	1736	18	1972	24	2208	31
1268	12	1504	14	1740	18	1976	24	2212	32
1272	12	1508	14	1744	18	1980	24	2216	32
1276	12	1512	14	1748	18	1984	24	2220	32
1280	12	1516	14	1752	18	1988	24	2224	32
1284	12	1520	14	1756	18	1992	24	2228	32
1288	12	1524	14	1760	18	1996	25	2232	32
1292	12	1528	14	1764	18	2000	25	2236	33
1296	12	1532	14	1768	18	2004	25	2240	33
1300	12	1536	14	1772	19	2008	25	2244	33
1304	12	1540	15	1776	19	2012	25	2248	33
1308	12	1544	15	1780	19	2016	25	2252	33
1312	12	1548	15	1784	19	2020	25	2256	33
1316	12	1552	15	1788	19	2024	25	2260	34
1320	12	1556	15	1792	19	2028	25	2264	34
1324	12	1560	15	1796	19	2032	25	2268	34
1328	12	1564	15	1800	19	2036	26	2272	34
1332	12	1568	15	1804	19	2040	26	2276	34
1336	12	1572	15	1808	19	2044	26	2280	34
1340	12	1576	15	1812	20	2048	26	2284	34
1344	12	1580	15	1816	20	2052	26	2288	34
1348	12	1584	15	1820	20	2056	26	2292	35
1352	12	1588	15	1824	20	2060	27	2296	35
1356	13	1592	15	1828	20	2064	27	2300	35
1360	13	1596	15	1832	20	2068	27	2304	35
1364	13	1600	15	1836	20	2072	27	2308	35
1368	13	1604	15	1840	20	2076	27	2312	35
1372	13	1608	15	1844	20	2080	27	2316	36
1376	13	1612	16	1848	20	2084	27	2320	36
1380	13	1616	16	1852	21	2088	27	2324	36
1384	13	1620	16	1856	21	2092	28	2328	36
1388	13	1624	16	1860	21	2096	28	2332	36
1392	13	1628	16	1864	21	2100	28	2336	36
1396	13	1632	16	1868	21	2104	28	2340	37
1400	13	1636	16	1872	21	2108	28	2344	37
1404	13	1640	16	1876	21	2112	28	2348	37
1408	13	1644	16	1880	21	2116	28	2352	37
1412	13	1648	16	1884	21	2120	28	2356	37
1416	13	1652	16	1888	21	2124	29	2360	37

Additional Hydrograph Details - 1

Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)
2364	37	2600	44	2836	46	3072	46	3308	46
2368	37	2604	44	2840	46	3076	46	3312	46
2372	37	2608	44	2844	46	3080	46	3316	46
2376	37	2612	44	2848	46	3084	46	3320	46
2380	38	2616	44	2852	46	3088	46	3324	46
2384	38	2620	44	2856	46	3092	46	3328	46
2388	38	2624	44	2860	46	3096	46	3332	46
2392	38	2628	44	2864	46	3100	46	3336	46
2396	38	2632	44	2868	46	3104	46	3340	46
2400	38	2636	45	2872	46	3108	46	3344	46
2404	38	2640	45	2876	46	3112	46	3348	46
2408	38	2644	45	2880	46	3116	46	3352	46
2412	38	2648	45	2884	46	3120	46	3356	46
2416	38	2652	45	2888	46	3124	46	3360	46
2420	39	2656	45	2892	46	3128	46	3364	46
2424	39	2660	45	2896	46	3132	46	3368	46
2428	39	2664	45	2900	46	3136	46	3372	46
2432	39	2668	45	2904	46	3140	46	3376	46
2436	39	2672	45	2908	46	3144	46	3380	46
2440	39	2676	45	2912	46	3148	46	3384	45
2444	39	2680	45	2916	46	3152	46	3388	45
2448	39	2684	45	2920	46	3156	46	3392	45
2452	39	2688	45	2924	46	3160	46	3396	45
2456	39	2692	45	2928	46	3164	46	3400	45
2460	40	2696	45	2932	46	3168	46	3404	45
2464	40	2700	45	2936	46	3172	46	3408	45
2468	40	2704	45	2940	46	3176	46	3412	45
2472	40	2708	45	2944	46	3180	46	3416	45
2476	40	2712	45	2948	46	3184	46	3420	45
2480	40	2716	45	2952	46	3188	46	3424	45
2484	40	2720	45	2956	46	3192	46	3428	45
2488	40	2724	45	2960	46	3196	46	3432	45
2492	41	2728	45	2964	46	3200	46	3436	45
2496	41	2732	45	2968	46	3204	46	3440	45
2500	41	2736	45	2972	46	3208	46	3444	45
2504	41	2740	45	2976	46	3212	46	3448	45
2508	41	2744	45	2980	46	3216	46	3452	45
2512	41	2748	45	2984	46	3220	46	3456	45
2516	41	2752	45	2988	46	3224	46	3460	45
2520	41	2756	46	2992	46	3228	46	3464	45
2524	42	2760	46	2996	46	3232	46	3468	45
2528	42	2764	46	3000	46	3236	46	3472	45
2532	42	2768	46	3004	46	3240	46	3476	45
2536	42	2772	46	3008	46	3244	46	3480	45
2540	42	2776	46	3012	46	3248	46	3484	45
2544	42	2780	46	3016	46	3252	46	3488	45
2548	42	2784	46	3020	46	3256	46	3492	45
2552	42	2788	46	3024	46	3260	46	3496	45
2556	43	2792	46	3028	47	3264	46	3500	45
2560	43	2796	46	3032	47	3268	46	3504	45
2564	43	2800	46	3036	47	3272	46	3508	45
2568	43	2804	46	3040	47	3276	46	3512	45
2572	43	2808	46	3044	47	3280	46	3516	45
2576	43	2812	46	3048	47	3284	46	3520	45
2580	43	2816	46	3052	47	3288	46	3524	45
2584	43	2820	46	3056	47	3292	46	3528	45
2588	43	2824	46	3060	47	3296	46	3532	45
2592	43	2828	46	3064	47	3300	46	3536	45
2596	44	2832	46	3068	47	3304	46	3540	45

Additional Hydrograph Details - 1

Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)
3544	45	3780	45	4016	46	4252	46	4488	44
3548	45	3784	45	4020	46	4256	46	4492	44
3552	45	3788	45	4024	46	4260	46	4496	44
3556	45	3792	45	4028	46	4264	46	4500	44
3560	45	3796	45	4032	46	4268	46	4504	43
3564	45	3800	45	4036	46	4272	46	4508	43
3568	45	3804	45	4040	46	4276	46	4512	43
3572	45	3808	45	4044	46	4280	46	4516	43
3576	45	3812	45	4048	46	4284	46	4520	43
3580	45	3816	45	4052	46	4288	46	4524	43
3584	45	3820	45	4056	46	4292	46	4528	42
3588	45	3824	45	4060	46	4296	46	4532	42
3592	45	3828	45	4064	46	4300	46	4536	42
3596	45	3832	45	4068	46	4304	46	4540	42
3600	45	3836	46	4072	46	4308	46	4544	41
3604	45	3840	46	4076	46	4312	46	4548	41
3608	45	3844	46	4080	46	4316	46	4552	41
3612	45	3848	46	4084	46	4320	46	4556	41
3616	45	3852	46	4088	46	4324	46	4560	41
3620	45	3856	46	4092	46	4328	46	4564	41
3624	45	3860	46	4096	46	4332	46	4568	40
3628	45	3864	46	4100	46	4336	46	4572	40
3632	45	3868	46	4104	46	4340	46	4576	40
3636	45	3872	46	4108	46	4344	46	4580	40
3640	45	3876	46	4112	46	4348	46	4584	39
3644	45	3880	46	4116	46	4352	46	4588	39
3648	45	3884	46	4120	46	4356	46	4592	39
3652	45	3888	46	4124	46	4360	46	4596	39
3656	45	3892	46	4128	46	4364	46	4600	39
3660	45	3896	46	4132	47	4368	46	4604	39
3664	45	3900	46	4136	47	4372	46	4608	38
3668	45	3904	46	4140	47	4376	46	4612	38
3672	45	3908	46	4144	47	4380	46	4616	38
3676	45	3912	46	4148	47	4384	46	4620	38
3680	45	3916	46	4152	47	4388	46	4624	38
3684	45	3920	46	4156	47	4392	46	4628	38
3688	45	3924	46	4160	47	4396	46	4632	37
3692	45	3928	46	4164	47	4400	45	4636	37
3696	45	3932	46	4168	47	4404	45	4640	37
3700	45	3936	46	4172	47	4408	45	4644	37
3704	45	3940	46	4176	46	4412	45	4648	37
3708	45	3944	46	4180	46	4416	45	4652	37
3712	45	3948	46	4184	46	4420	45	4656	36
3716	45	3952	46	4188	46	4424	45	4660	36
3720	45	3956	46	4192	46	4428	45	4664	36
3724	45	3960	46	4196	46	4432	45	4668	36
3728	45	3964	46	4200	46	4436	45	4672	35
3732	45	3968	46	4204	46	4440	45	4676	35
3736	45	3972	46	4208	46	4444	45	4680	35
3740	45	3976	46	4212	46	4448	45	4684	35
3744	45	3980	46	4216	46	4452	45	4688	34
3748	45	3984	46	4220	46	4456	45	4692	34
3752	45	3988	46	4224	46	4460	45	4696	34
3756	45	3992	46	4228	46	4464	45	4700	34
3760	45	3996	46	4232	46	4468	45	4704	33
3764	45	4000	46	4236	46	4472	45	4708	33
3768	45	4004	46	4240	46	4476	45	4712	33
3772	45	4008	46	4244	46	4480	44	4716	33
3776	45	4012	46	4248	46	4484	44	4720	32

Additional Hydrograph Details - 1

Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)	Time (mins)	Inflow (l/s)
4724	32	4932	23	5140	17	5348	15	5556	12
4728	32	4936	22	5144	17	5352	15	5560	12
4732	32	4940	22	5148	17	5356	15	5564	12
4736	31	4944	22	5152	17	5360	14	5568	12
4740	31	4948	22	5156	17	5364	14	5572	12
4744	31	4952	22	5160	17	5368	14	5576	12
4748	31	4956	22	5164	17	5372	14	5580	12
4752	30	4960	22	5168	17	5376	14	5584	12
4756	30	4964	22	5172	17	5380	14	5588	12
4760	30	4968	21	5176	17	5384	14	5592	12
4764	30	4972	21	5180	17	5388	14	5596	12
4768	29	4976	21	5184	17	5392	14	5600	12
4772	29	4980	21	5188	17	5396	14	5604	12
4776	29	4984	21	5192	17	5400	14	5608	12
4780	29	4988	21	5196	17	5404	14	5612	12
4784	29	4992	21	5200	16	5408	14	5616	12
4788	29	4996	21	5204	16	5412	14	5620	12
4792	28	5000	20	5208	16	5416	14	5624	11
4796	28	5004	20	5212	16	5420	14	5628	11
4800	28	5008	20	5216	16	5424	14	5632	11
4804	28	5012	20	5220	16	5428	14	5636	11
4808	27	5016	20	5224	16	5432	14	5640	11
4812	27	5020	20	5228	16	5436	14	5644	11
4816	27	5024	20	5232	16	5440	14	5648	11
4820	27	5028	20	5236	16	5444	14	5652	11
4824	27	5032	20	5240	16	5448	14	5656	11
4828	27	5036	20	5244	16	5452	14	5660	11
4832	26	5040	19	5248	16	5456	13	5664	11
4836	26	5044	19	5252	16	5460	13	5668	11
4840	26	5048	19	5256	16	5464	13	5672	11
4844	26	5052	19	5260	16	5468	13	5676	11
4848	26	5056	19	5264	16	5472	13	5680	10
4852	26	5060	19	5268	16	5476	13	5684	10
4856	25	5064	19	5272	15	5480	13	5688	10
4860	25	5068	19	5276	15	5484	13	5692	10
4864	25	5072	19	5280	15	5488	13	5696	10
4868	25	5076	19	5284	15	5492	13	5700	10
4872	25	5080	18	5288	15	5496	13	5704	10
4876	25	5084	18	5292	15	5500	13	5708	10
4880	24	5088	18	5296	15	5504	13	5712	10
4884	24	5092	18	5300	15	5508	13	5716	10
4888	24	5096	18	5304	15	5512	13	5720	10
4892	24	5100	18	5308	15	5516	13	5724	10
4896	24	5104	18	5312	15	5520	13	5728	9
4900	24	5108	18	5316	15	5524	13	5732	9
4904	24	5112	18	5320	15	5528	13	5736	9
4908	24	5116	18	5324	15	5532	13	5740	9
4912	23	5120	18	5328	15	5536	13	5744	9
4916	23	5124	18	5332	15	5540	13	5748	9
4920	23	5128	18	5336	15	5544	13	5752	9
4924	23	5132	18	5340	15	5548	13	5756	9
4928	23	5136	17	5344	15	5552	12	5760	9

Summary of Results for 100 year Return Period

Critical storm not identified, please run longer storm durations.

Storm Duration (mins)	Maximum Control (l/s)	Maximum Overflow (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Overflow Volume (m³)	Maximum Volume (m³)	Status
4320 Summer	36.8	20.7	57.6	42.5798	0.6898	2562.5	2828.0	O K
4320 Winter	37.1	21.2	58.3	42.5888	0.6988	2721.3	2867.4	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
4320 Summer	1.53	2672
4320 Winter	1.53	2816

Rainfall Details

Region	ENG+WAL	Cv (Winter)	0.840
Return Period (years)	100	Shortest Storm (mins)	4320
M5-60 (mm)	19.000	Longest Storm (mins)	4320
Ratio-R	0.350	Summer Storms	Yes
Cv (Summer)	0.750	Winter Storms	Yes

Time / Area Diagram

Total Area (ha) = 3.237

Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)	Time from:	(mins) to:	Area (ha)
0	4	1.147	4	8	1.045	8	12	1.045

Tank/Pond Details

Invert Level (m) 41.890 Ground Level (m) 45.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.00	3890.0	1.20	4624.0	2.40	4624.0	3.60	4624.0	4.80	4624.0
0.20	3944.0	1.40	4624.0	2.60	4624.0	3.80	4624.0	5.00	4624.0
0.40	4147.0	1.60	4624.0	2.80	4624.0	4.00	4624.0		
0.60	4303.0	1.80	4624.0	3.00	4624.0	4.20	4624.0		
0.80	4462.0	2.00	4624.0	3.20	4624.0	4.40	4624.0		
1.00	4624.0	2.20	4624.0	3.40	4624.0	4.60	4624.0		

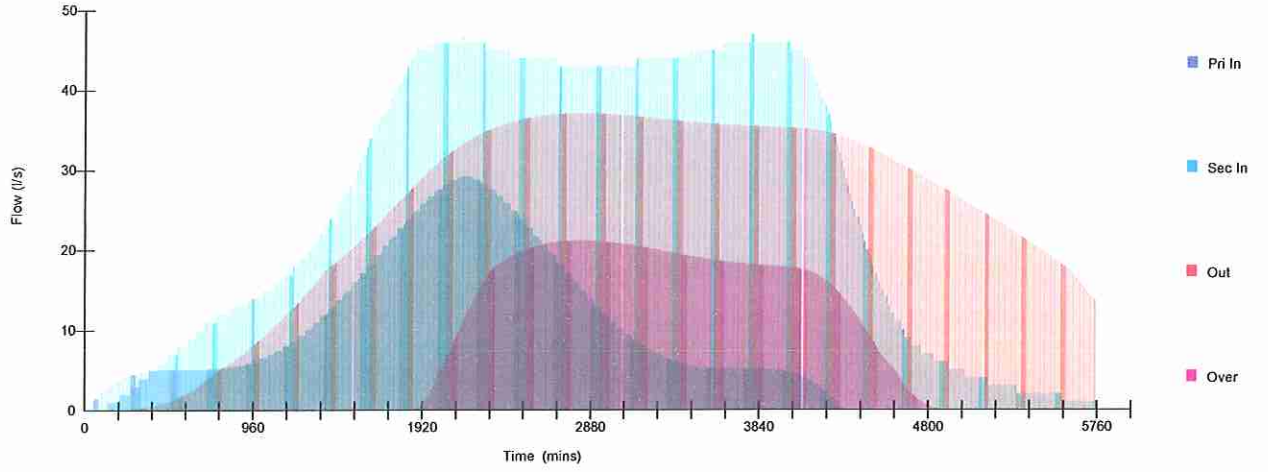
Orifice Outflow Control

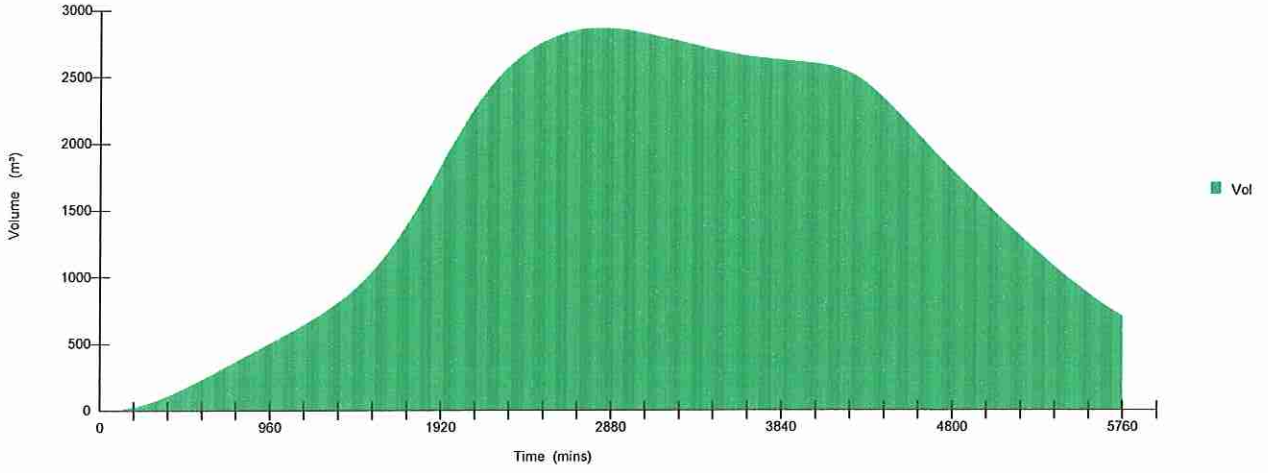
Diameter (m) 0.150 Invert Level (m) 41.890
Discharge Coefficient 0.600

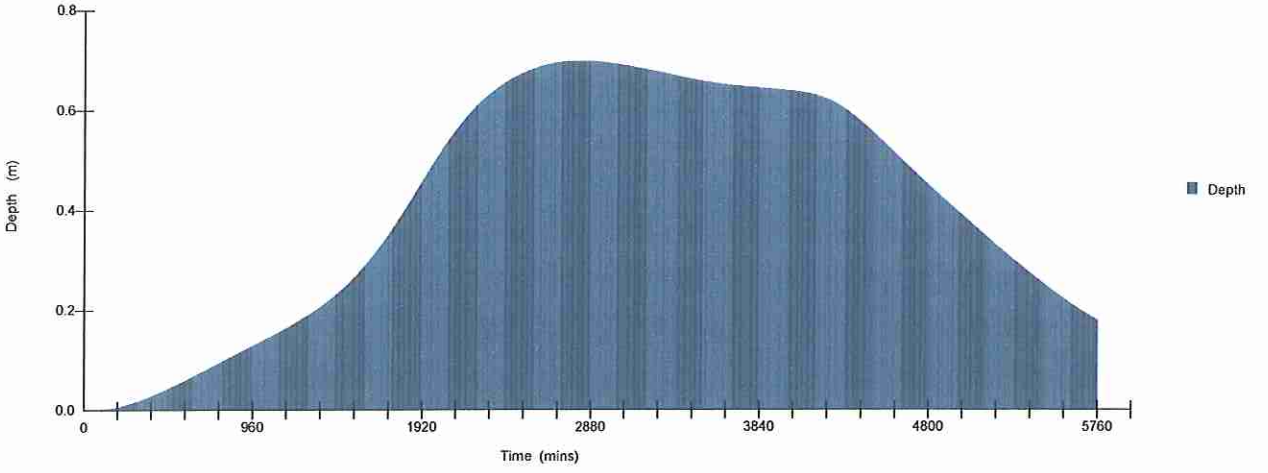
Orifice Overflow Control

Diameter (m) 0.150 Discharge Coef 0.600 Invert Level (m) 42.310

Storm Duration 4320 Mins (Winter)







Storm Duration 4320 Mins (Summer)