Project:	Surface Water Drainage Strategy (SWDS)
Prepared for:	BB Partnership Ltd
Reference:	2918
Date:	December, 2016
Version:	Final v1.0

Document Issue Record

Project: Surface Water Drainage Strategy (SWDS)

Prepared for: BB Partnership Ltd

Reference: 2918

Site Location: 62 Avenue Road, Camden, London, NW8 6HT.

Proposed Development: It is understood that the development is for the erection of a two storey, single family dwelling house with basement and accommodation in the roof space, following the demolition of the existing main dwelling house.

Consultant		Date	Signature
Author	Jose Tenedor	02/12/2016	
Document Check	Thea Powell	06/12/2016	
Authorisation	Mark Naumann	06/12/2016	

Please Note:

This report has been prepared for the exclusive use of the commissioning party and may not be reproduced without prior written permission from AMBIENTAL Technical Solutions Limited. All work has been carried out within the terms of the brief using all reasonable skill, care and diligence. No liability is accepted by AMBIENTAL for the accuracy of data or opinions provided by others in the preparation of this report, or for any use of this report other than for the purpose for which it was produced.

Contact Us:

Ambiental Technical Solutions Ltd. Science Park Square Brighton, BN1 9SB <u>www.ambiental.co.uk</u> UK Office: +44 (0) 20 3857 8530 or +44 (0) 20 3857 8540



Contents

1.	Summary	4
2.	Introduction	9
[Development Proposal	9
	Need for Study	
3.	Development Description and Site Area	10
E	Existing Drainage Infrastructure	12
E	Existing Ground Conditions	12
ſ	Nearby Watercourses and Drainage	13
4.	Surface Water Drainage	14
I	Infiltration Potential	14
F	Runoff rates	14
I	Interception Storage	17
	Additional Volumes for Storage	
	Attenuation Storage	
	On Site Drainage and Storage Systems	
	SuDS Assessment	
	Drainage Strategy	
	Water Quality	
	Design Exceedance	
A	Adoption and Maintenance	26
5.	Conclusions	27
Арј	pendix 1 – Plans	28
Ар	pendix 2 – Site Geology Investigations	40
Ар	pendix 3 – Calculations	52
Ар	pendix 4 – Proposed Drainage Strategy	87
Арј	pendix 5 – Information	0
	Surface Water Runoff Calculation Method	0
Ар	pendix 6 – Surface Water Drainage Pro-forma for new developments	1

1. Summary

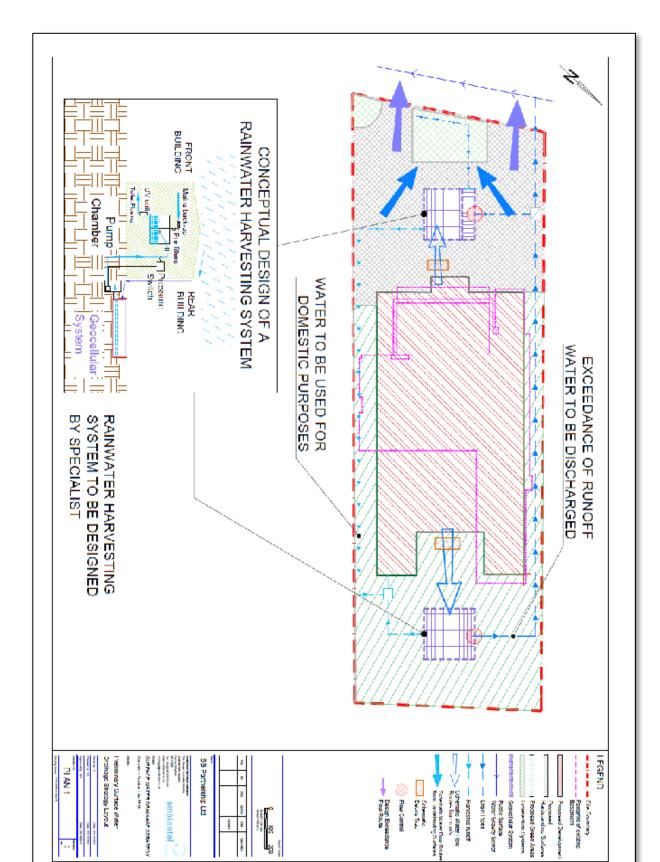
SITE DETAILS					
Site Name	Avenue Road, 62 Avenue	Avenue Road, 62 Avenue Road, Camden, London, NW8 6HT			
Total Site Area	0.11 ha				
Site Area which is positively drained	0.11 ha				
Open Space	0.00 ha				
Predevelopment Use	Site already developed fo	r residential purposes.			
	- Residential Site				
	- Groundwater Source Protection Zone:	Outer zone (Zone 2)	_		
Site Constraints	- Groundwater Vulnerability Zone:	N/A			
	- Poor Infiltration Soils				
	- Unknown Groundwater	Table			
IMPERMEABLE AREA					
	EXISTING	PROPOSED	DIFFERENCE (Proposed - Existing)		
Impermeable Area (Ha)	0.088 ha	0.074 ha	-0.014 ha		
Drainage Method (Infiltration/Sewer/Watercourse)	Sewer N/A				
PROPOSED TO DISCHARGE SURFAC	E WATER VIA				
	YES	NO	EVIDENCE		
Infiltration		X	Soils with Poor Infiltration Media.		
To Watercourse		x	No watercourse close to the site.		
To Surface water sewer	x		Use of the Existing Public Sewer Network.		
Combination of above		x			
PEAK DISCHARGE RATES		-			
	Greenfield Rates (I/s)	Development Pre- mitigation Rates (I/s)	Proposed Rates (I/s)		
Greenfield QBAR	0.48 l/s	N/A	-		
1 in 1	0.41 l/s	17.20 l/s	5.00 l/s		
1 in 20	-	30.70 l/s	5.00 l/s		
1 in 30	1.17 l/s	32.80 l/s	5.00 l/s		
1 in 100	1.52 l/s	34.60 l/s	5.00 l/s		
1 in 100 plus climate change	N/A	N/A	5.00 l/s		



DISCHARGE VO	LUMES (m³)			
Return Period	Greenfield Volume (m³)	Existing Volume (m ³)	Proposed Volume (m ³)	DIFFERENCE (m ³) (Proposed - Existing)
1 in 1	8.96	9.79	8.23	-1.56
1 in 30	20.78	40.04	33.67	-6.37
1 in 100	28.30	56.73	47.70	-9.02
1 in 100 + CC	39.62	79.42	66.78	-12.63
SITE STORAGE	VOLUME	1		
Source Control	Provided	Yes		
Interception Vo (Capture and re of the first 5 lit majority of all r	etention on site res of the	3.26 m ³		
Attenuation Sto (Storage – 1 in Volume to cont				
Storage Attenu (Flow rate cont meet greenfiel	rol) required to	52.9 m ³	Flow Control: 0.48 l/s	
Storage Attenu (Flow rate cont reduce rates by	rol) required to	21.00 m ³	Flow Control: 16.8 l/s	
Storage Attenu (Flow rate cont	ation volume crol) required to UN OFF RATE (as	28.20 m ³	Flow Control: 5.0 l/s	
Storage Attenu	rol) required to	14.60 m ³	Flow Control: 32.8 l/s (1:30)	
Percentage of a volume stored	attenuation	10.80%	3.04 m ³	Use of buried Geocellular System to be used as deposit for a Rainwater Harvesting System
Proposed Atter (Storage - 1 in 1 Volume to cont rate (5 l/s)		28.20 m³	0.03 m³/m²	Use of Geocellular System & Hydrobrake
Total site Stora	ge	31.5 m³		

INFILTRATION FEASIBILITY ANALYSIS			
Site's Geology	London Clay Formation Clay		
Infiltration Rates	< 1.08x10 ⁻⁶ m/s	This value must be confirmed through trial pit infiltration tests on site prior to the final detailed drainage design stage being carried out.	
Infiltration Rates Suitability	Unsuitable		
Ground Water Level	Higher than 3 mBGL		
Is the site within a known Source Protection Zones (SPZ)? Yes/No?	YES		
Is Infiltration feasible?	Infiltration is not feasible due to the low rate of infiltration of the soils's site.		
Site's Contamination	Site already developed, th petrochemical pollutants	us there is a potential contamination due to of the cars.	
Infiltration Feasibility	NO Infiltration is NOT feasible due to the poor permeability of the soils underlying the site.		
If Infiltration is not feasible, how is the Storage Requirements Approach?	OPTION 1. Simple Approach. Store both the additional volume and attenuation volume in order to make a final discharge from site at the greenfield run off rate.		

PROPOSED DRAINAGE COMPONENTS			
Bioretention Systems	Bioretention areas are shallow landscaped depressions which are typically under drained and rely on engineered soils, enhanced vegetation and filtration to remove pollution and reduce runoff downstream. They are aimed at managing and treating runoff from day-to-day rainfall events.		
Rainwater Harvesting System	Rainwater Harvesting (RWH) is the collection of rainwater runoff for use. Runoff can be collected from roofs and other impermeable areas, stored, treated (where required) and then used as a supply of water for domestic and commercial properties.		
Geocellular System	Geocellular systems can be used to control and manage rainwater surface water runoff as a storage tank. The modular/honeycomb nature of geocellular systems means that they can be tailored to suit the specific requirements of any site.		
Rills/Channels	Canals and rills are open surface water channels with hard edges. They are simply channels that water flows along whereby they can have a variety of cross sections to suit the urban landscape, including the use of planting to provide both enhanced visual appeal and water treatment.		
Flow Control (Hydrobrakes)	A self-activating device that provides improved hydraulic performance over conventional flow controls such as orifice plates and throttle pipes and reduced maintenance requirements.		
DESIGN CHECKS			
Drainage Systems Measures	Bioretention Systems + Ra Systems)	ainwater Harvesting System (using Geocellular	
How are rates being restricted	Use of Hydrobrakes & Ori	fices	
Key Drainage component	Geocellular System		
Drainage Systems Maintenance	Supplier must provide appropriate guidance for maintenance		
All SuDS storage located outside Q100 floodplain	Yes		
Provision for blockage / Design Exceedance	Yes Exceedance routes are provided		
Time taken for 50% of storage to drain down	1.0 hours		



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 8 of 97

2. Introduction

2.1 This Surface Water Drainage Strategy has been prepared by Ambiental Technical Solutions, in respect of a planning application for the development at 62 Avenue Road, Camden, London, NW8 6HT. Coordinates: X = 526938; Y = 183925. See Appendix 1, Plan 1 – Site Location and Figure 1 below.

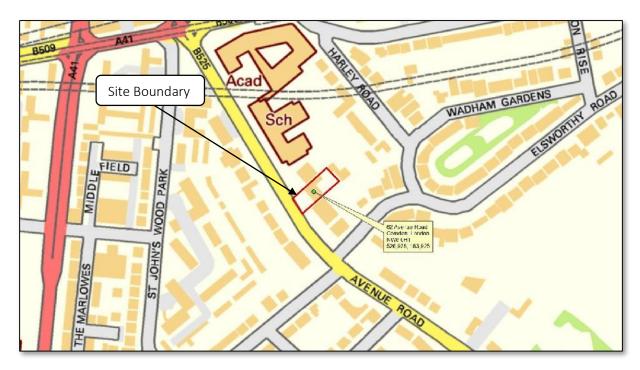


Figure 1 – Site Location. (Source: OS-Street View)

Development Proposal

- 2.2 It is understood that the development is for the erection of a two storey, single family dwelling house with basement and accommodation in the roof space, following the demolition of the existing main dwelling house.
- 2.3 This study is based on plans included on the Appendix 1 (see Plans 1 to 10 provided by the client, BB Partnership Ltd).

Need for Study

2.4 The purpose of this assessment is to demonstrate that the development proposal outlined above can be satisfactorily accommodated without worsening flood risk for the area and without placing the development itself at risk of flooding, as per National guidance provided within the National Planning Policy Framework (NPPF).

3. Development Description and Site Area

3.1 The site is located to the west of the London Borough of Camden. Specifically, it is to the east of Avenue Road, being bounded by this street to the west of the property and by other developments to the east, north and south. See Appendix 1, Plan 1 – Site Location and Plan 2 – Existing Site Plan & Topography as well as the Figures 1 & 2.



Figure 2 – Aerial View of Development Site (Source: ESRI).

3.2 It is understood that the development is for the erection of a 2 storey, single family dwelling house with basement and accommodation in the roof space, following the demolition of the existing main dwelling house. See Appendix 1, from Plans 4 to Plan 10 as well as an extract of the Plan 4 – Proposed Site on the Figure 3 below.

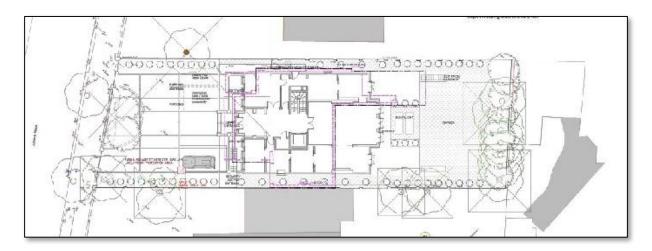


Figure 3 – Extract of Plan 4, Proposed Site Plan.

- 3.3 Based on the plans provided by the client, the total area of the site is approximately 1080 m² (0.108 Ha). As the existing site is developed, it is considered that there is an impervious surface of approximately 880 m² (0.09 Ha), thus the existing pervious surface is 200 m² (0.02 Ha). Following development, there will be a decrease of the impervious areas to 740 m² (approximately 0.074 Ha), hence the pervious areas will be increased to approximately 340 m² (0.034 Ha).
- 3.4 Based on the topographical survey provided by the client, the topography of the site ranges between approximately 48.73 mAOD¹ and 45.98 mAOD. Thus, it is considered there is likelihood of runoff to the west of the site (Avenue Road). See Appendix 1, (Appendix 1, Plan 2 – Existing Site Plan and Topography) and an extract of it on the Figure 4 below.

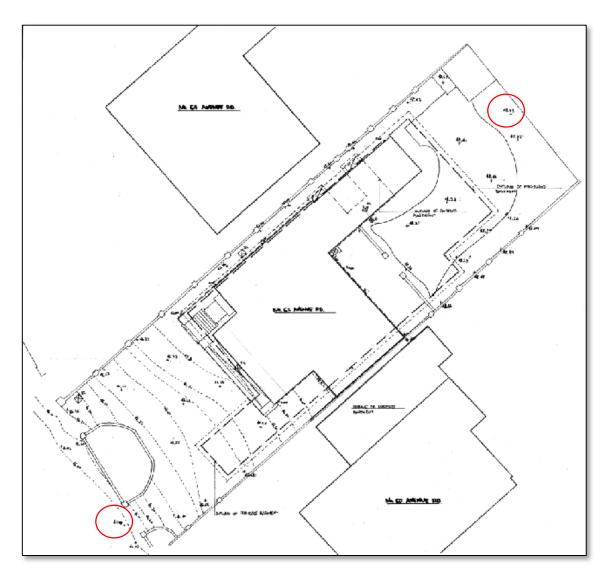


Figure 4 – Extract of the Appendix 1, Plan 2 – Existing Site Plan and Topography

¹ mAOD: Meters Above Ordnance Datum



Existing Drainage Infrastructure

- 3.5 No utilities sewers records were provided by the client.
- 3.6 The existing site is currently developed being used for residential purpose and, hence, partly impermeable. Therefore it is likely that there is existing drainage infrastructure within the site. This is confirmed on the Appendix 1, Plan 3 Summary of ABA understanding of Existing Statutory Services. Refer to Appendix 1, Plan 3 and an extract of it on the Figure 5 below. Any other existing drainage infrastructure or data on site has not been addressed by the client.

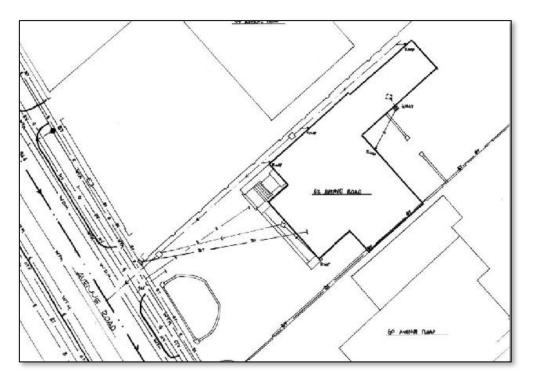


Figure 5 – Extract of the Appendix 1, Plan 3 – Summary of ABA understanding of Existing Statutory Services

3.7 This location and features of an existing drainage infrastructure must be confirmed by the client and the local water company.

Existing Ground Conditions

- 3.8 The client provided an extract of the 1987 British Geological Survey Map TQ27NE. Refer to Appendix 2, Plan 1 Local Geology and Ground Conditions. This plan indicates that the bedrock underlying the site is the London Clay Formation Clay and Silt. Sedimentary Bedrock formed approximately 34 to 56 million years ago in the Palaeogene Period. The local environment of the origin of these rocks was previously dominated by deep seas. These rocks were formed from infrequent slurries of shallow water sediments which were then redeposited as graded beds.
- 3.9 Besides that, a geological investigation of the site was carried out. According to the extracted data from the boreholes, it is concluded that the site is predominantly underlying by clayey soils. See Appendix 2, Plan 2 as well as the Figures from 1 to 6 within this appendix. Standard values from the specialized literature CIRIA 753 'The SUDS Manual' suggest the infiltration coefficient of these types of soils is less than 0.000108 m/h (3x10⁻⁸ m/s).



3.10 See Table 1 – Typical Infiltration Coefficients based on Soil Texture below. It is highly recommended that these values are checked through trial pit infiltration tests on site prior to the final detailed drainage design being carried out.

SOIL TYPE Typical infiltration Coefficients (m/h)			
Very Poor Infiltration media			
Clay < 0.00000108			
Table 1 – Typical Infiltration Coefficients based on Soil Texture			

- 3.11 The site lies in an aquifer in which flow is virtually all through fractures and other discontinuities and considered as *Rocks with essentially no groundwater* according to the BGS hydrogeological database (*see Appendix 2, Plan 3 Hydrogeology*). Based on the data of the geological investigation provided by the client, the groundwater level is higher than 3 metres below ground level.
- 3.12 The *Environmental Agency's Groundwater Source Protection Zone Map* confirms that the site lies within a Source Protection Zone (Outer zone, Zone 2). Nevertheless, the site does not lie within any area considered as a Groundwater Vulnerability Zone by the EA². See Appendix 2, Plan 4 Groundwater Source Protection Zones and Plan 5 Groundwater Vulnerability Zones.

Nearby Watercourses and Drainage

- 3.13 The Regent's Canal is located **750 metres** to the south-east from the site boundary.
- 3.14 Thus, it is considered that there is no watercourse close enough to the site to be used within the drainage scheme.

² EA: Environmental Agency



4. Surface Water Drainage

- 4.1 In order to mitigate flood risk posed by the proposed development adequate control measures are required to be considered. This will ensure that surface water runoff is dealt with at source and the flood risk off site is not increased.
- 4.2 The existing site is already developed, thus it is considered brownfield. In accordance with the provided plans for the proposed development, the proposed development will decrease the impermeable surface covers to the site by approximately 140 m², based on the plans provided. The runoff arising from the development will need to be managed in accordance with the National Planning Policy Framework (NPPF) policy which requires the use of SuDS³ to be prioritised where appropriate for new developments.

Infiltration Potential

- 4.3 British geological survey records indicate the site is predominantly underlain by clays which is unlikely to be suitable for infiltration drainage due to its extremely poor permeability as it was stated in the section 3.9.
- 4.4 Therefore it is proposed that surface water will be discharged post development via attenuation SuDS.

Runoff rates

- 4.5 The London Borough of Camden's 'Surface Water Drainage Pro-forma for new developments", Section 7, provides two approaches guidance for the rates of discharge in relation to the storage requirements and how to limit the rate of discharge:
 - Option 1 Simple

"Store both the additional volume and attenuation volume in order to make a final discharge from site at the **greenfield run off rate**. This is preferred if no infiltration can be made on site. This very simply satisfies the runoff rates and volume criteria.

Option 2 - Complex

"If some of the additional volume of water can be infiltrated back into the ground, the remainder can be discharged at a very low rate of 2 l/sec/hectare. A combined storage calculation using the partial permissible rate of 2 l/sec/hectare and the attenuation rate used to slow the runoff from site."

4.6 As Infiltration techniques are not viable and there is an existing drainage network on site, it is proposed that all the runoff above 1 in 1 year event will be released up to a maximum rate given by the flow based on the greenfield runoff rate (Q_{BAR}) as defined by *Option 1*.

³ SuDS: Sustainable Drainage Systems. SuDS mimic natural drainage processes through a series of features that collect and convey water at or near the surface.



- 4.7 Greenfield runoff rates have been calculated using the *Institute of Hydrology Report 124* (Marshall and Bayliss, 1994), as recommended in the *CIRIA 753 'The SUDS Manual'* (See calculations in *Appendix 3, Table 1 Greenfield Runoff Rates Calculation Summary*).
- 4.8 The Greenfield runoff rates for the several storm duration for various return periods have been calculated based on the following equation:

$QBAR_{rural} = 0.00108 * AREA^{0.89} * SAAR^{1.179} * SOIL^{2.17}$

Where,

Q_{BAR,rural}: Mean Annual Flood (m³/s).

AREA: Catchment Area (km²).

SAAR: Standard Average Annual Rainfall for the 1941 to 1970 (mm).

SOIL: Soil Index of the catchment from Wallingford Procedure Volume 3.

Equation 1 – IH 124 Mean Annual flood flow Rate Equation.

- 4.9 Preliminary calculations based on Equation 1 show that the *Greenfield Runoff Rate* (Q_{BAR,rural}) from 50Ha is 220.95 l/s, therefore the rate per hectare is 4.42 l/s/ha. According to the size area positively drained (0.11 ha), the *Greenfield Runoff Rate* from the area of the site is 0.48 l/s. Other results properly factored for each return period and area of the site are shown in *Appendix 3, Table 1 Greenfield Runoff Rates Calculation Summary*.
- 4.10 It is important to be highlighted the guidance given by the Sustainable Design and Construction SPG, Mayor of London:
 - "3.4.8 Most developments referred to the Mayor have been able to achieve at least 50% attenuation of the site's (prior to re-development) surface water runoff at peak times. This is the minimum expectation from development proposals.
 - 3.4.9 There may be situations where it is not appropriate to discharge at greenfield runoff rates. These include, for example, sites where the calculated greenfield runoff rate is extremely low and the final outfall of a piped system required to achieve this would be prone to blockage. An appropriate minimum discharge rate would be **5 litres** per second per outfall".
- 4.11 The section 2.10 of the *Advice Note on contents of a Surface Water Drainage Statement'* by the London Borough of Camden's specifies that the Camden Planning Guidance 3 (CPG3) requires developments to achieve greenfield runoff rates once SuDS have been installed. It is also indicated on this section, that a minimum 50% reduction in runoff rate is required if it is demonstrated that the greenfield runoff rate is not feasible.
- 4.12 In order to look into the existing runoff rates of the existing site, a storm sewer design simulation has been carried out using the industry standard software, Microdrainage v2016.1. The results for a variety of rainfall events are shown on the Appendix 3 – Calculations and a summary of them on the Table 2.



- 4.13 It is worthy to point out that *DEFRA* Report '*Rainfall runoff management for Developments*' recommends that the design principle is to limit the runoff for events of similar frequency of occurrence to the same peak rate of run as that which takes place from greenfield sites. However, there are two situations where the greenfield flow rate is not actually applied to define the limiting discharge rates (based on this literature as well):
 - a) The limit of discharges based on Q_{BAR} that are less than 1 l/s/ha for permeable sites as this is seen as being an unreasonable requirement (producing very large storage volumes). Q_{BAR} is then set to 1 l/s/ha;
 - b) Small sites would require impractically small controls to achieve the required flow rates where these are calculated to be less than 5 l/s and therefore in this case a **minimum flow of 5 l/s is used**.
- 4.14 Therefore, should it be concluded that due to the fact that the Greenfield Runoff Rate (Q_{BAR}) is 0.48 l/s, extremely low, the limiting discharge rate based on this value may be increased to 5 l/s to avoid any blockage in compliance with the Sustainable Design and Construction SPG by the Mayor of London and the DEFRA Report *Rainfall runoff management for Developments'*. Additionally, the proposed rate is lower than the 50% of the existing pre-development runoff rates as required by the Camden Planning Guidance 3 (CPG3).

SURFACE WATER DISCHARGE RATES SUMMARY						
Impermeable			Discharge Rates (I/s)			
	Area (m²)	Q _{BAR}	1 year	20 year	30 year	100 year
Greenfield Site	0	0.48	0.41	-	1.17	1.52
Proposed Discharge Rates for Greenfield Site	0	5.0	5.0	5.0	5.0	5.0
Existing Site (Using Microdrainage)	880	-	17.2	30.7	32.8	34.6
Reduction of 50% for the Existing Site	880	-	8.6	15.35	16.4	17.3
Limiting Discharge for Proposed Site	740	-	5.0 < 8.6	5.0 < 15.35	5.0 < 16.4	5.0 < 17.3
Designed Discharge for Proposed Site (from calculations in Appendix 3)	740	-	5.0	-	5.0	5.0

4.15 Hence, a limiting discharge of 5 l/s will be utilised as the design runoff rate. See Table 2 – Surface Water Discharge Rates Summary below.

Table 2 – Surface Water Discharge Rates Summary.

Interception Storage

- 4.16 Preliminary calculations have been carried out for a typical rainfall depth of 5 mm/m² to store the volume owing to these very frequent storms.
- 4.17 Urban Creep Factor (UCF) is defined as any increase in the impervious area that is drained to an existing drainage system without planning permission being required, such as the construction of patios, conservatories, small extensions, etc. Hence, an increase in paved surface area of 10% is often suggested by the *CIRIA 753 'The SUDS Manual'*. Also, a typical Runoff Percentage of 80% have been taken into account.
- 4.18 Based on the size of the whole area of the site, the UCF and the Runoff Percentage, the Interception Storage is 3.26 m^3 .

Additional Volumes for Storage

- 4.19 Due to the increase of hard surfaces, the amount of storm water that could go to the ground would be restricted. Hence, this potential increase of runoff volume needs to be controlled to avoid an increase of flood risk for downstream properties of the site.
- 4.20 As it is required on The London Borough of Camden's '*Surface Water Drainage Pro-forma for new developments*', these additional volumes for storage have been calculated for a range of several return periods that includes 1:1; 1:30; 1:100, 6 hours & 1:100, 6 hours plus climate change for the greenfield, existing and proposed site states.
- 4.21 The greenfield runoff volumes of the site have been obtained using the industry standard software, Microdrainage v2016.1. The results for a variety of rainfall events are shown on the Appendix 3 Calculations and a summary of them on the Table 3 Surface Water Discharge Rates Summary below.

4.22	See values for	each variable i	in the Table 3 below:

Greenfield Runoff Volumes			
AREA (ha)	0.11		
SOIL TYPE	4		
SPR	0.47		
Return Period	Greenfield Volume (m ³)		
1	8.96 m ³		
30	20.78 m ³		
100	28.30 m³		
100 + CC (40%)	39.62 m³		

Table 3 - Values for Long-Term Storage Volume Equation

4.23 As recommended in the *CIRIA 753 'The SUDS Manual'*, the Discharge Volumes for the existing and the proposed development has been calculated according to the following formula:



$$Vol_{XS} = 10 \cdot RD \cdot A \left[\frac{PIMP}{100} (0.8) \right]$$
Where,Vol_xs:Extra runoff volume (m³) of development runoff over Greenfield runoff.RD:Rainfall Depth for the 100 year, 6 hour event (mm).PIMP:Impermeable Area as a percentage of the Total Area.A:Area of the site (ha).SPR:"SPR" Index for the FSR SOIL type.

Equation 2 - Long-Term Volume Storage Equation.

4.24 See values for each variable of the Existing Discharge Volumes and Proposed Discharge Volumes in the Table 4 & 5 respectively:

EXISTING RUNOFF RATES CALCULATION SUMMARY					
PARAMETERS					
Area	1080.00 m²	0.11 ha			
Runoff Rate	80%				
PIMP	81.5%				
Return Period	Rainfall Depth (mm)				
1	13.91				
30	56.87				
100	80.58				
100 + CC	112.81				
Return Period	Existing Runoff Volume (m ³)				
1	9.79 m ³				
30	40.04 m ³				
100	100 56.73 m ³				
100 + CC	79.42 m ³				

Table 4 – Existing Discharge Volumes

PROPOSED RUNOFF RATES CALCULATION SUMMARY					
PARAMETERS					
Area 1080.00 m ² 0.11 ha					
		0.1111a			
Runoff Rate	80%				
PIMP	68.5%				
Return Period	Rainfall Depth (mm)				
1	13.91				
30	56.87				
100	80.58				
100 + CC	112.81				
Return Period	Proposed Runoff Volume (m ³)				
1	8.23				
30	33.67				
100	47.70				
100 + CC	66.78				

Table 5 – Proposed Discharge Volumes



4.25 While the Table 6 summarizes the difference between the Proposed and the Existing Discharge Volumes:

DIFFERENCE BETWEEN THE EXISTING AND PROPOSED DISCHARGE VOLUMES					
Impermeable Area	Discharge Volumes (m³)				
(m²)	1 year	30 year	30 year	100 year	
Existing Discharge Volume	9.79 m³	40.04 m ³	56.73 m³	79.42 m ³	
Proposed Discharge Volume	8.23 m³	33.67 m³	47.70 m ³	66.78 m³	
DIFFERENCE	-1.56 m³	-6.37 m³	-9.02 m³	-12.63 m³	

Table 6 – Difference between the Existing and Proposed Discharge Volumes

4.26 Hence, it is considered that there is no an additional discharge volume to be taken into account as the difference of volumes between the proposed and the existing site states are negative due to the fact that the impervious surfaces will be decreased.

Attenuation Storage

- 4.27 Attenuation storage is needed to temporarily store water during periods when the runoff rates from the development site exceed the allowable discharge rates from the site.
- 4.28 Rainfall depths for the 1 in 100 years Return Period plus 40% of climate change were produced using the *Microdrainage* software in order to estimate the largest volume, *critical storm*, for typical storm durations up to and including 48 hours for the proposed site limiting the discharge rate up the existing Q_{BAR} runoff rate, 5.0 l/s. In addition to this, the Urban Creep Factor, 10%, is applied for the impervious surface. See summary calculations in Appendix 3, Calculations.
- 4.29 Thus, it meets with the minimum standards required by the DEFRA Non-statutory technical standards for sustainable drainage systems (March 2015) to avoid the flood risk within the development in a 1 in 100 year rainfall event.
- 4.30 In terms of storage, for a 100 years storm event with an allowance for climate change, the Critical Durations is 60 minutes, being the largest volume per square metre of 0.0346 m³/m². Therefore, the Attenuation Storage Volume required for the whole site is 28.2 m³. See Appendix 3, Calculations.
- 4.31 As required by the London Borough of Camden's '*Surface Water Drainage Pro-forma for new developments*', other attenuation volumes depending on the flow rate control has been calculated. See Appendix 3, Calculations and a summary of them on the Table 7.

Attenuation Storage Calculation					
Criteria	Flow Rate Control (I/s)	Attenuation Volume (m ³)			
Storage Attenuation volume required to meet greenfield run off rates (m ³)	0.48 l/s	52.9 m ³			
Storage Attenuation volume required to reduce rates by 50% (m ³)	16.8 l/s	21.0 m ³			
Storage Attenuation volume required to meet OTHER RUN OFF RATE (as close to greenfield rate as possible (m ³)	5.0 l/s	28.2 m ³			
Storage Attenuation volume required to retain rates as existing (m ³)	32.6 l/s	14.6 m ³			

Table 7 – Summary of Attenuation Storage Volumes.

On Site Drainage and Storage Systems

- 4.32 Preliminary calculations indicate that approximately 28.2 m³ of storage will be to attenuate runoff from the 1:100 year +40% climate change events and with a 10% or Urban Creep Factor. 3.26 m³ of storage are required for the day-to-day rainfall as Interception Volume.
- 4.33 Thus a Total Storage of approximately 31.5 m³ is required to be managed through SuDS techniques.

SuDS Assessment

- 4.34 SuDS components have been designed to accommodate and dispose of runoff from storms up to and including the 1:100 year + 40% climate change event without flooding.
- 4.35 In accordance with the SuDS management train approach, the use of various SuDS measures to reduce and control surface water flows have been considered in details for the development following the hierarchy line according to *The London Plan 2011, Policy 5.13, Sustainable Drainage*:

"Development should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

- 1. Store rainwater for later use,
- 2. Use infiltration techniques, such as porous surfaces in non-clay areas,
- 3. Attenuate rainwater in ponds or open water features for gradual release,
- 4. Attenuate rainwater by storing in tanks or sealed water features for gradual release,
- 5. Discharge rainwater direct to a watercourse,
- 6. Discharge rainwater to a surface water sewer/drain,
- 7. Discharge rainwater to the combined sewer.

Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity and recreation".



4.36 At this stage the practicality and viability of certain SuDS options have been ruled out on the basis of ground conditions and constraints presented by the site layout.

4.37 Infiltrating SuDS

Infiltration components of SuDS, such as soakaways, are deemed **unsuitable** due to the poor rate of permeability of the underlying soils of the site.

4.38 Source Control Components

Permeable Pavement

Given the expected low permeability of the subsoils and the proposed layout of the site, the use of permeable paving is deemed **inappropriate**.

➢ Green Roofs

Options to attenuate at roof level have been considered and are useful to attenuate runoff due to storms up to a two-year return period event, also they are able to contribute to attenuation of flows from larger storms. However, options for this choice are **discounted** based on their limited ability to be applied on residential roofs.

> Rainwater Harvesting

Rainwater from roofs can be stored and used in and around properties. The collected water can be used potentially for a range of non-potable purposes. Given the nature of the proposed development, this option it is deemed appropriate for the proposed development. Moreover, this SuDS device is awarded with extra 0.5 points to achieve the Sustainability Rating given by the Code for Sustainable Homes using the Building Research Establishment's (BRE) EcoHomes Systems.

4.39 <u>Swales</u>

This type of SuDS technique is well considered to convey and treat water runoff. Nevertheless, there is insufficient space within the proposed layout to practically offer these features as viable SuDS option, and as such they are deemed **unsuitable**.

4.40 Rills and channels

This SuDS technique is an excellent choice as part of the SuDS train management to convey the runoff water into further SuDS features due to its appealing visual features in urban landscapes, amenity value and effectiveness to treat pollution in water, acting as pre-treatment to remove silt. Therefore this options is considered **suitable**.

4.41 Bioretention Systems

Runoff water from hardstanding surfaces and roofs can be intercepted or attenuated through this SuDS technique whereby the water is infiltrated or taken up the plants. Besides this, other



amenity benefits are included as space to relax and play and provide ecology benefits such as reduction in water, air and noise pollution. Given the proposed developed layout, this SuDS component is deemed to be **suitable** as long as the construction constraints (The Building Regulations 2000, Section 3.25) are taken into account and they are lined. See Appendix 4, Plan 1 – Preliminary Surface Water Drainage Strategy Layout.

4.42 Retention and Detention Components

Geocellular Systems

This SuDS option can be tailored to most places owing to its modular nature to store and it is able to attenuate the water runoff, being used either as a soakaway or as a storage tank. This could be considered **suitable** to be used as storage tank.

Retention Ponds and Detention Basins

They cannot be considered as a SuDS option for this site owing to the fact that they are appropriate to manage high volumes of surface water from bigger sites, such as a neighbourhood. As such they are deemed **unsuitable** for this development.

- 4.43 Consequently, several SuDS components are deemed appropriate to be used in the following SuDS management train. It is suggested the use of *Rainwater Harvesting System (RWH* from now on) using a Geocellular System as deposit, lined Bioretention Systems and Rills/Channels following the drainage hierarchy of the London Plan 2011. See Appendix 4, Plan 1 – Preliminary Surface Water Drainage Strategy Layout.
- 4.44 It is proposed to set up *Pumped RWH System* which is the most common type. In general terms, the runoff management layout of this type of *RWH* is to store water underground or at ground level and then pump it out for supply purposes.
 - Runoff from the roofs is collected and conveyed to an underground 'Storage Tank'.
 - From there the water is pumped to a 'Header Tank' at the top of the building to feed by gravity the domestic applications.
 - If no rainwater is left in the tank, the mains water back up will supply mains water into the tank.
 - If the tank is full, the exceeding volume of water is released to the existing sewer network.
 See Appendix 4, Figure 1 Preliminary Surface Water Drainage Strategy Layout.
 - Sediment Traps must be set up to remove any debris/silt in the pipes that collect the runoff to avoid any blockage or distribution to the proper functioning on the system. See Appendix 4, Figure 1 – Preliminary Surface Water Drainage Strategy Layout.

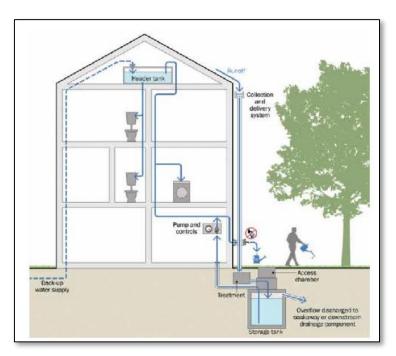


Figure 6 – A conceptual pumped Rainwater Harvesting System.

- 4.45 There are a number of options when it comes to the details of the RWH scheme, and these should be reviewed and analysed in greater detail to determine the most suitable option for the site.
- 4.46 Proper maintenance includes inspection and cleaning of collection systems, filters, throttles, vales and pumps. The supplier of the RWH system should provide guidance on maintenance.
- 4.47 It is suggested to install Bioretention Systems at the front of the site to collect and convey water runoff due to the day-to-day storms (Interception Volume) from these hardstanding surfaces. See conceptual design of this SuDS technique on Figure 7.

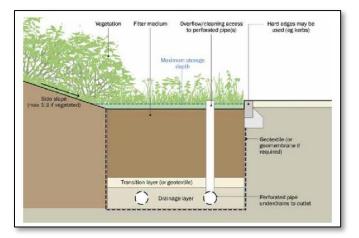


Figure 7 – Conceptual Design of the Components of a Bioretention System.

- 4.48 Sediment Traps should be installed on the storm drainage pipework at incoming connections to SuDS features to reduce the incidence of blockage or silting up.
- 4.49 Guidance about proper use, installation and maintenance of any proprietary system must be provided by the supplier and incorporated into the site proposals at detailed design stage.

4.50 Throttle devices such as a Hydrobrakes must be set up to control the flow rates up to a maximum rate of 5 l/s before being discharged to the sewer network. See Appendix 4, Plan 1 – Preliminary Surface Water Drainage Strategy Layout.

Drainage Strategy

4.51 In accordance with a SuDS management train approach, the use of various SuDS measures to reduce and control surface water flows have been considered in details for the development. Based on the hierarchy line provided by the specialized literature CIRIA 753 'The SUDS Manual', Section 3.2.3:

"The destination for surface water runoff that is not collected to be used must be prioritised in the following order:

- 1. Infiltration.
- 2. Discharge to surface waters.
- 3. Discharge to a surface water sewer, highway drain or another drainage system.
- 4. Discharge to a combined sewer.

Discharge to a foul sewer should not be considered as a possible option. (...)".

- 4.52 As it was stated in the sections 3.9 and 4.3, infiltration techniques are not feasible owing to the poor infiltration coefficient of the soils underlying the site.
- 4.53 Discharge to a surface water is also dismissed owing to the long distance to the nearest watercourse as it was stated in the sections 3.13 & 3.14.
- 4.54 Hence, it is proposed to discharge to the public sewer network owing to the fact that there is an existing drainage infrastructure within the site connected to the public sewer network as it was suggested in the section 3.6.
- 4.55 Permission to discharge to the local off site sewers maintained by Thames Water should be sought. In order to adequately manage the arising runoff, the site is divided in two zones: Front and Rear. See Appendix 4, Plan 1 – Preliminary Surface Water Drainage Strategy Layout.
- 4.56 External hard landscaping should be laid at the front of the site such that the arising runoff from these can be collected and managed by the proposed SuDS train. Besides this, Rills/Channels are suggested as an option to convey this runoff.
- 4.57 Water runoff from the front of the site will be conveyed by either appropriate landscaping or Rills/Channels to the Bioretention System. The excess of volume from this SuDS device is to be piped through orifices to a Geocellular System where it will be stored before being discharged to the sewer network. Debris/sediment traps must be installed in the outfalls of the Bioretention Systems and the Geocellular System to avoid any blockage. See Appendix 4, Plan 1 – Preliminary Surface Water Drainage Strategy Layout.
- 4.58 It is proposed to collect the water runoff from the roofs through down pipes to the buried Geocellular Systems located to the front and the rear of the development to be stored and conveniently used by the RWH. Debris traps must be installed in the down pipes to avoid any blockage. See Appendix 4, Plan 1 – Preliminary Surface Water Drainage Strategy Layout.

- 4.59 It is worth to point out that the Geocellular System to the front of the site must be split into two chambers in order to avoid mixing the water from the roofs and the Bioretention Systems.
- 4.60 The proposed surface water strategy will be able to manage the Interception and the Attenuation Volumes before discharging to the existing sewer network, therefore the capacity of the 'storage tanks' should be at least 31.5 m³. The discharge will be limited by a throttle device such as Hydrobrakes up to 5l/s.
- 4.61 In the case of a rainfall event that exceeds the storage capacity of these SuDS techniques, overland conveyance routes should be established that direct water away from property to landscaped areas or off site. Design of external ground levels will need to be undertaken at detailed design stage to finalise these routes but some indicative flow paths have been indicated on the outline strategy drawings. See Appendix 4, Plan 1 Preliminary Surface Water Drainage Strategy.
- 4.62 It may be necessary to update or alter the drainage strategy at detailed design stage following confirmation of site constraints or alterations to the overall layout. Calculations for, and the design of the SuDS devices, should be reviewed at detailed design stage to ensure a robust drainage strategy is maintained.

Water Quality

4.63 Adequate treatment must be delivered to the water runoff to remove pollutants through SuDS devices which are able to provide pollution mitigation. Pollution Hazards and the SuDS Mitigation have been indexed in the specialized literature CIRIA 753 'The SUDS Manual'. This is determined by the following restriction:

Total SuDS Mitigation Index \geq Pollution Hazard Index

4.64 The Pollution Hazard Indices are summarized in Table 8 – Summary of Pollution Hazard Indices for different Land Use below:

POLLUTION HAZARD INDICES FOR DIFFERENT LAND USE CLASSIFICATIONS				
LAND USE	Pollution Hazard Level	Total suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, home zones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4

Table 8 – Summary of Pollution Hazard Indices for different Land Use.

4.65 Runoff from roof areas is considered to be uncontaminated, being treated by *Sediments Traps* and through the proposed *Geocellular Systems*.

4.66 The Mitigation Indices of the proposed SuDS techniques are summarized in the Table 9 - Indicative SuDS Mitigation Indices below:

INDICATIVE SUDS MITIGATION INDICES FOR DISCHARGES TO SURFACE WATER					
SuDS Component	t Total suspended Solids (TSS) Metals Hydrocarbo				
Bioretention Systems	0.8	0.8	0.8		

Table 9 – Indicative SuDS Mitigation Indices

4.67 Table 10 – Pollution Treatment below, summarizes the water treatment:

POLLUTION HAZARD TREATMENT					
LAND USE	Treatment	Pollution Hazard Level	Total suspended Solids (TSS)	Metals	Hydrocarbons
Car Facilities / Pedestrian Accesses	Bioretention Systems	Low	0.8 > 0.5	0.8 > 0.4	0.8 > 0.4

Table 10 - Pollution Treatment

4.68 Thus, the water treatment provided by this SuDS train is enough to remove the pollutants.

Design Exceedance

- 4.69 In the event of drainage system failure under extreme rainfall events or blockage, flooding may occur within the site. In the event of the extension's drainage system failure, the runoff flow will be dictated as per the existing situation. This will not impact on the site or nearby dwellings.
- 4.70 It is advised that the finished floor level of the proposed building should be 300mm above surrounding finished ground levels to mitigate against any potential surface water flows. See plans on Appendix 4, Plan 1 Preliminary Surface Water Drainage Strategy Layout.

Adoption and Maintenance

4.71 All onsite SuDS and drainage systems will be privately maintained. A long term maintenance regime should be agreed with the site owners before adoption. In addition to a long term maintenance regime it is recommended that all drainage elements implemented on site should be inspected following the first rainfall event post construction and monthly for the first quarter following construction.

Proposed Schedule of Maintenance for Below Ground Drainage					
ltem	Visual Inspection	Cleanse / De-sludge	CCTV Survey	Comments	
Surface Water Drainage System (pipework, chambers etc.)	5 years	10 years	10 years	Cleansing to be carried as necessary	
Gullies/Channels	1 year	1 year	N/A	Cleansing to be carried as necessary	

Table 11 – Proposed Schedule of Maintenance for Below Ground Drainage.

5. Conclusions

- 5.1 This study has been undertaken in accordance with the principles set out in NPPF. We can conclude that providing the development adheres to the conditions advised in the conclusions of this report, the said development proposals can be accommodated without increasing flood risk within the locality in accordance with objectives set by Central Government and the EA.
- 5.2 The strategy for drainage of this site is to discharge to the public sewer network utilising a Rainwater Harvesting System using Geocellular Systems as 'storage tanks', Bioretention Systems and Rills/Channels with managed offsite flows controlled by hydrobrake, or similar flow control, as necessary up to 5 l/s.
- 5.3 Initial calculations indicate a storage requirement of approximately 31.5 m³, being properly managed by the proposed SuDS train.
- 5.4 The Treatment train of RWH Systems + Geocellular System and Bioretention is suitable to offer acceptable contamination treatment to runoff prior to being discharged to the local public sewer network.
- 5.5 The findings and recommendations of this report are for the use of the client who commissioned the assessment, and no responsibility or liability can be accepted for the use of the report or its findings by any other person or for any other purpose.

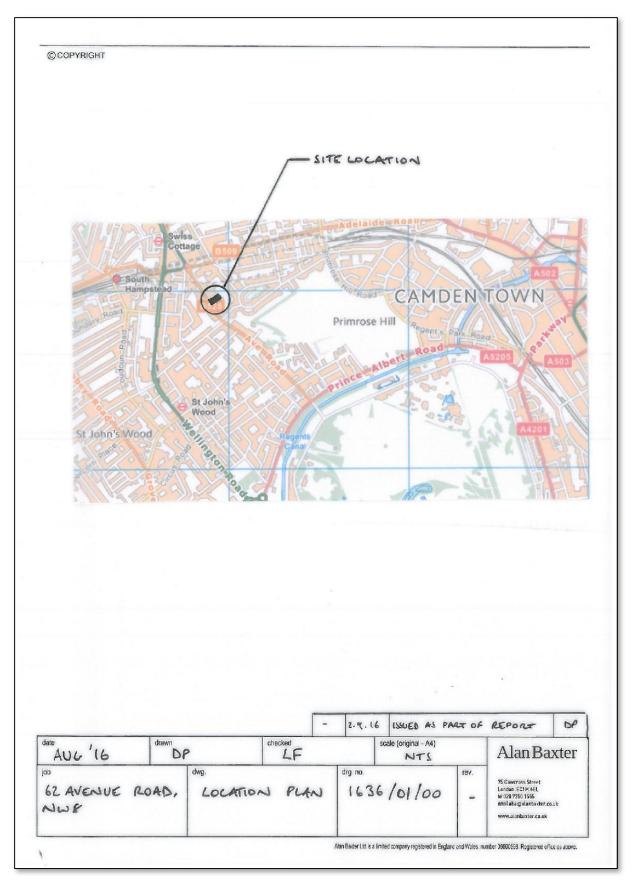
Dr. J. B. Butler B.Sc., M.Phil., PhD. Ambiental Technical Solutions Ltd.

December 2016

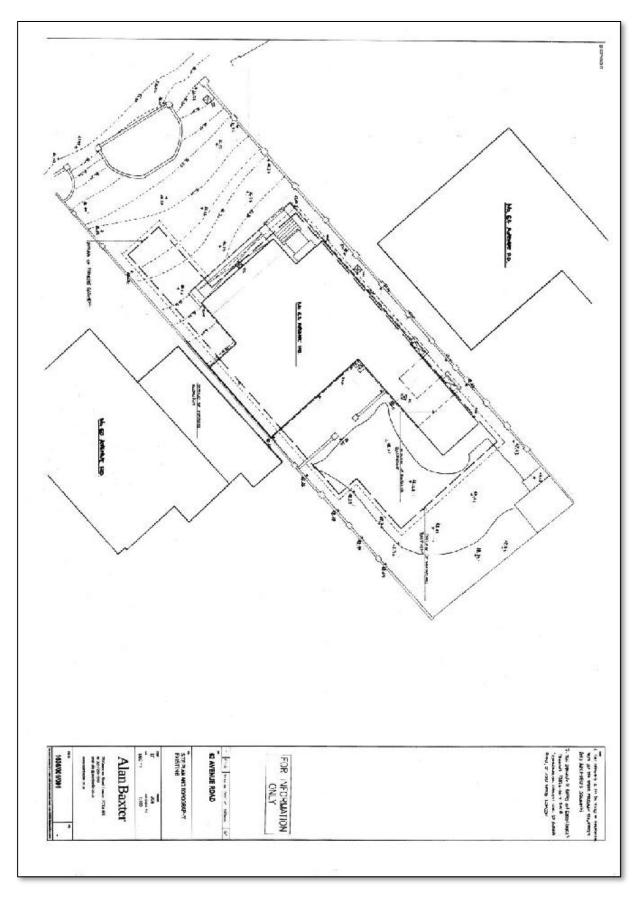
Appendix 1 – Plans

- Plan 1 Site Location
- Plan 2 Existing Site Plan and Topography
- Plan 3 Summary of ABA understanding of Existing Statutory Services
- Plan 4 Proposed Site Plan
- Plan 5 Proposed Ground Floor Plan
- Plan 6 Proposed Front Elevation
- Plan 7 Proposed Rear Elevation
- Plan 8.1 Proposed Side Elevation
- Plan 8.2 Proposed Side Elevation
- Plan 9 Proposed Section AA
- Plan 10 Proposed Section BB



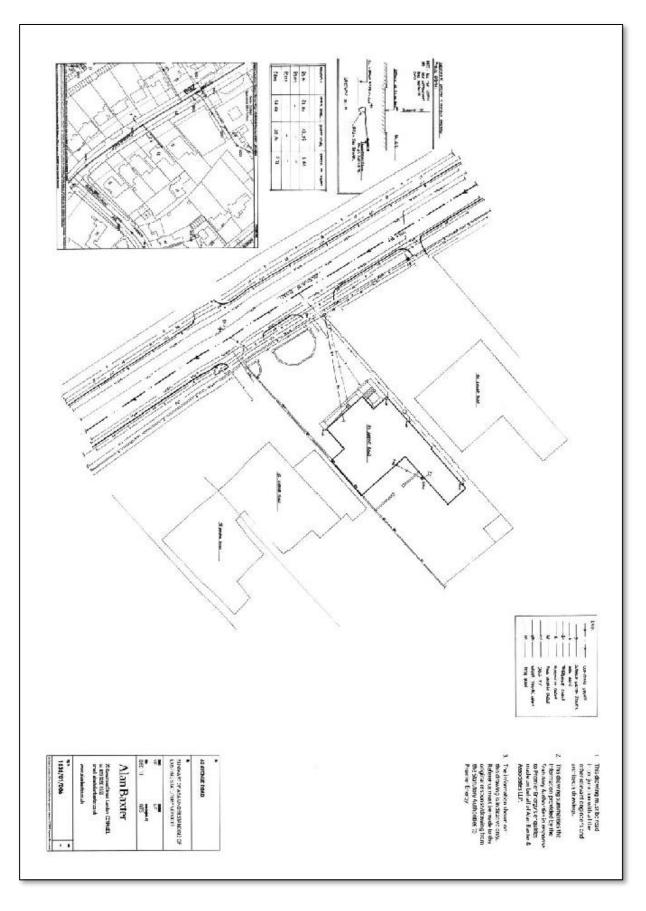


Appendix 1, Plan 1 – Site Location



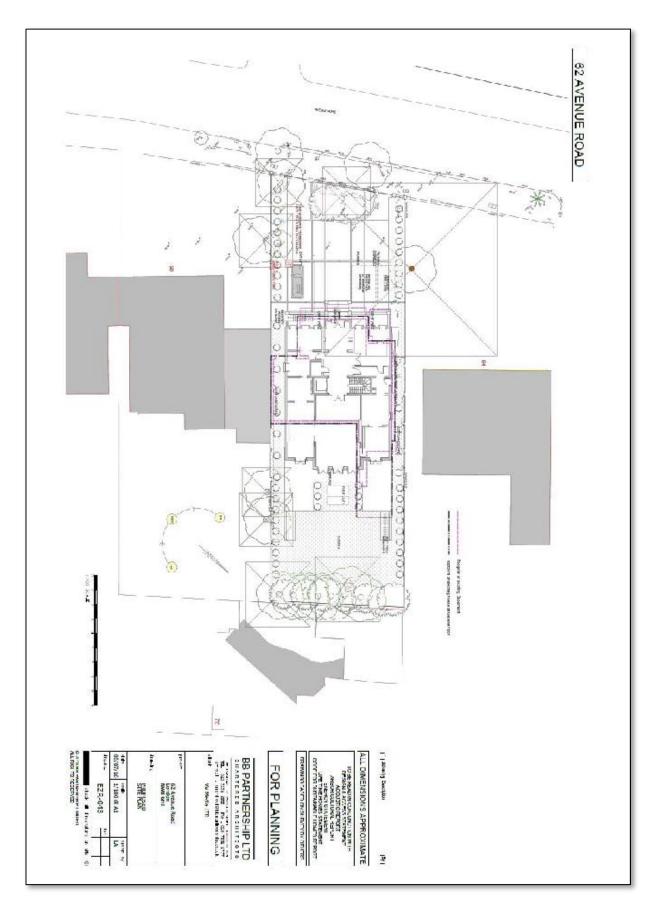
Appendix 1, Plan 2 – Existing Site Plan and Topography

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 30 of 97



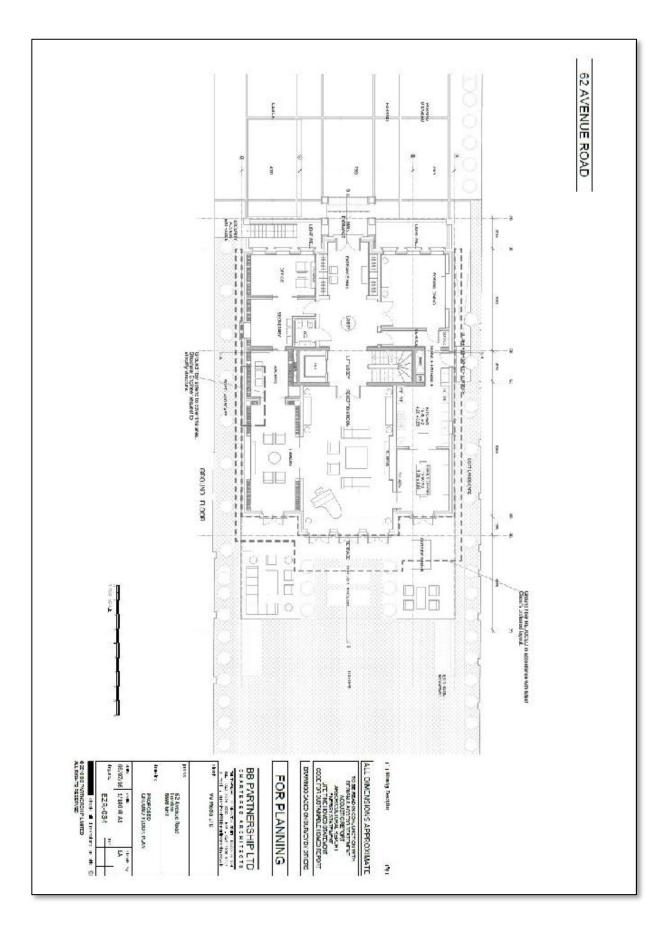
Appendix 1, Plan 3 – Summary of ABA understanding of Existing Statutory Services

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 31 of 97



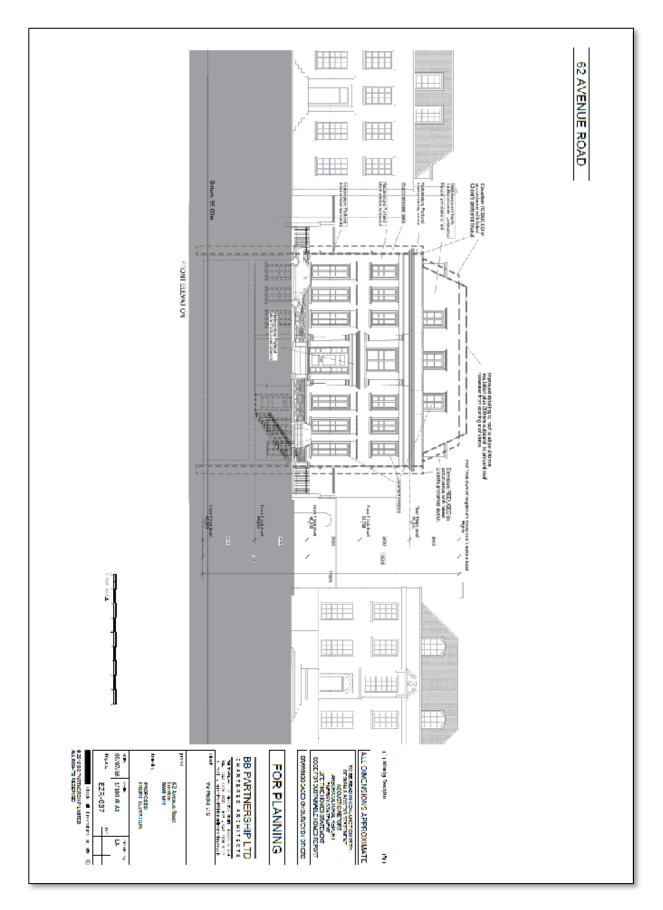
Appendix 1, Plan 4 – Proposed Site Plan

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 32 of 97

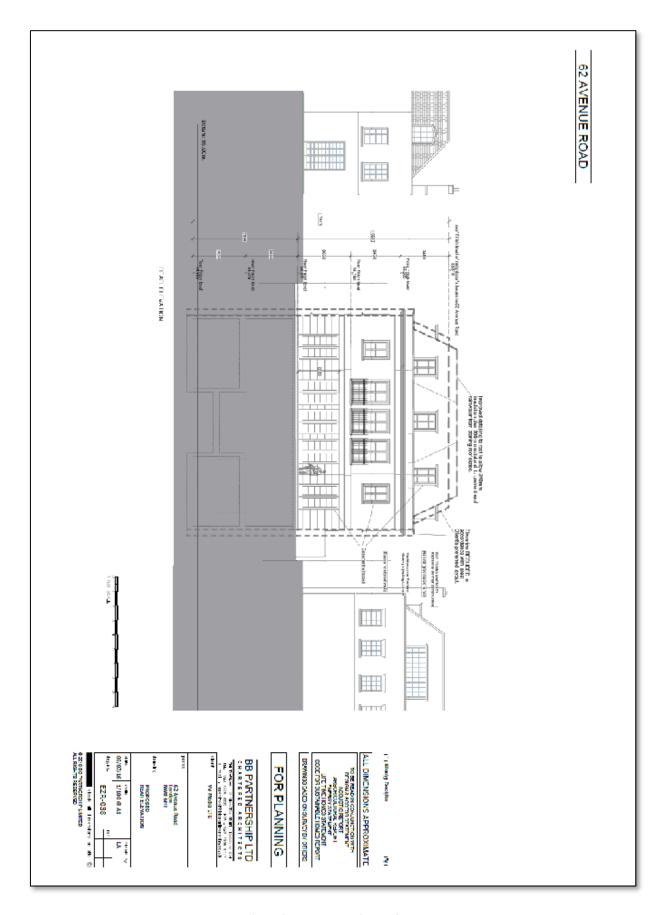


Appendix 1, Plan 5 – Proposed Ground Floor Plan

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 33 of 97

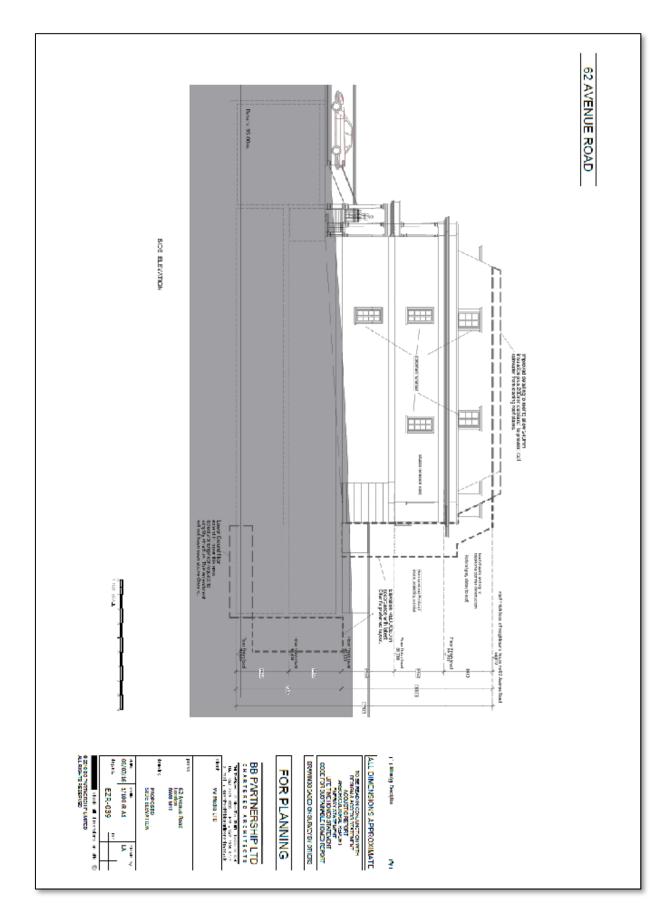


Appendix 1, Plan 6 – Proposed Front Elevation



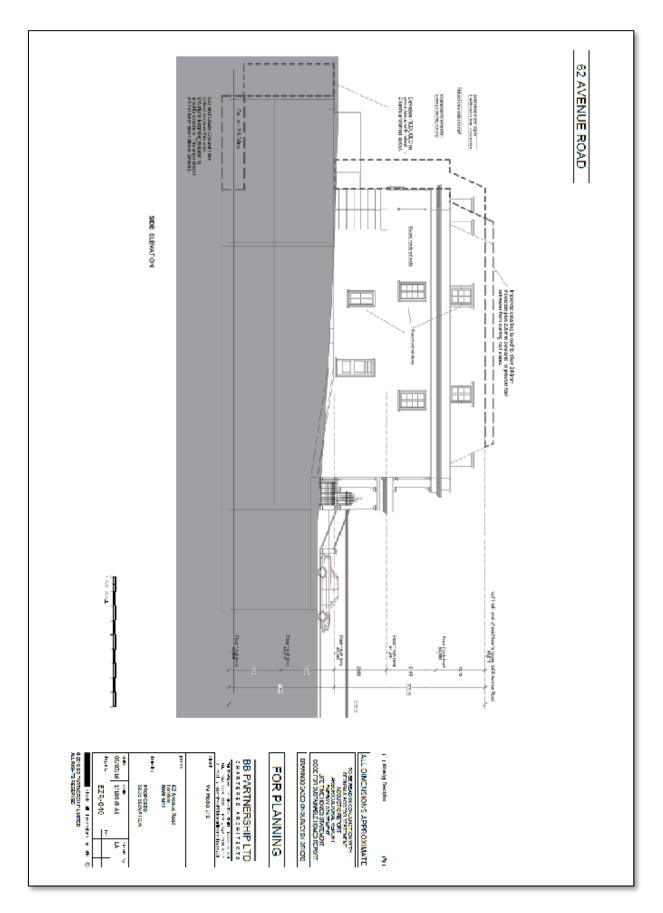
Appendix 1, Plan 7 – Proposed Rear Elevation

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 35 of 97



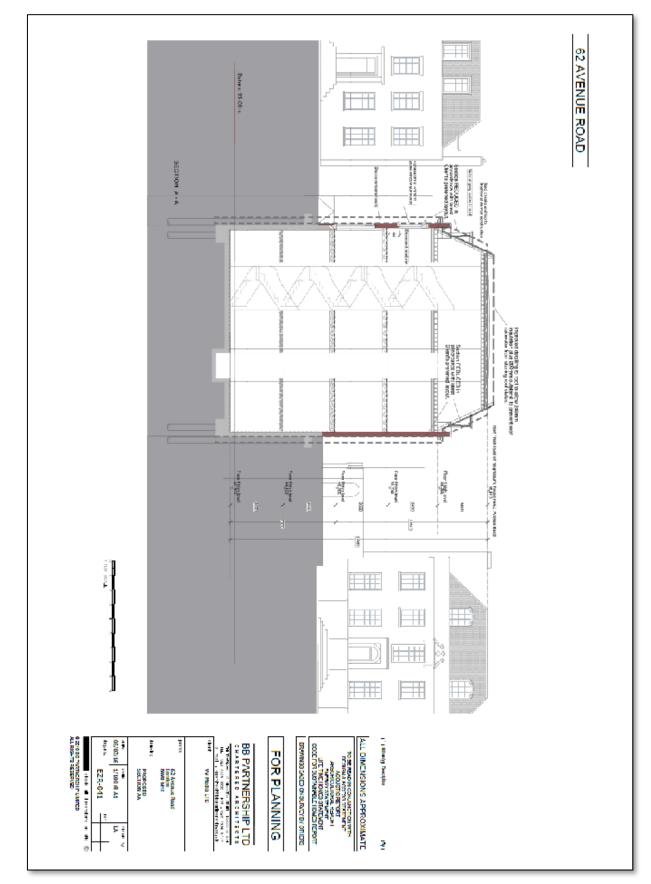
Appendix 1, Plan 8.1 – Proposed Side Elevation

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 36 of 97

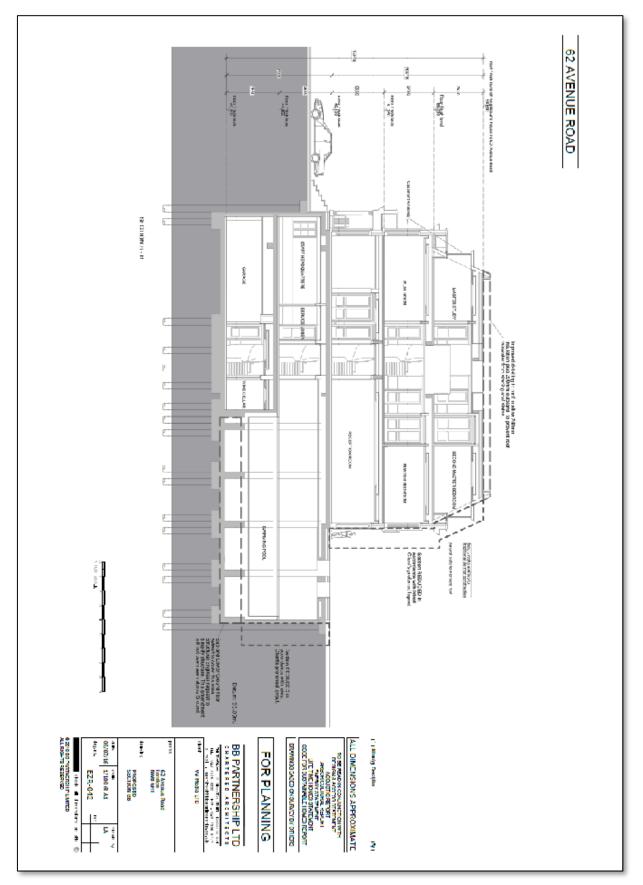


Appendix 1, Plan 8.2 – Proposed Side Elevation

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 37 of 97



Appendix 1, Plan 9 – Proposed Section AA



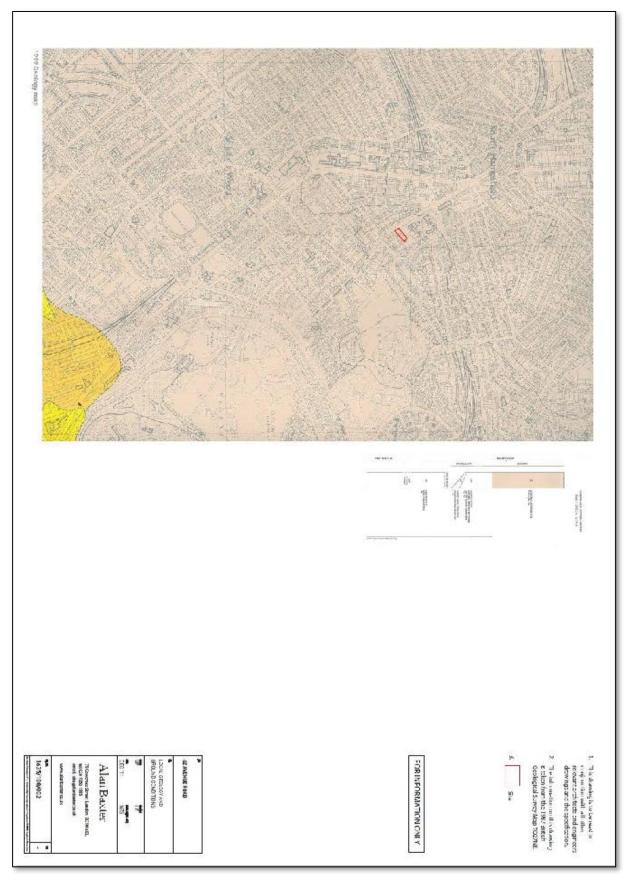
Appendix 1, Plan 10 – Proposed Section BB

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 39 of 97

Appendix 2 – Site Geology Investigations

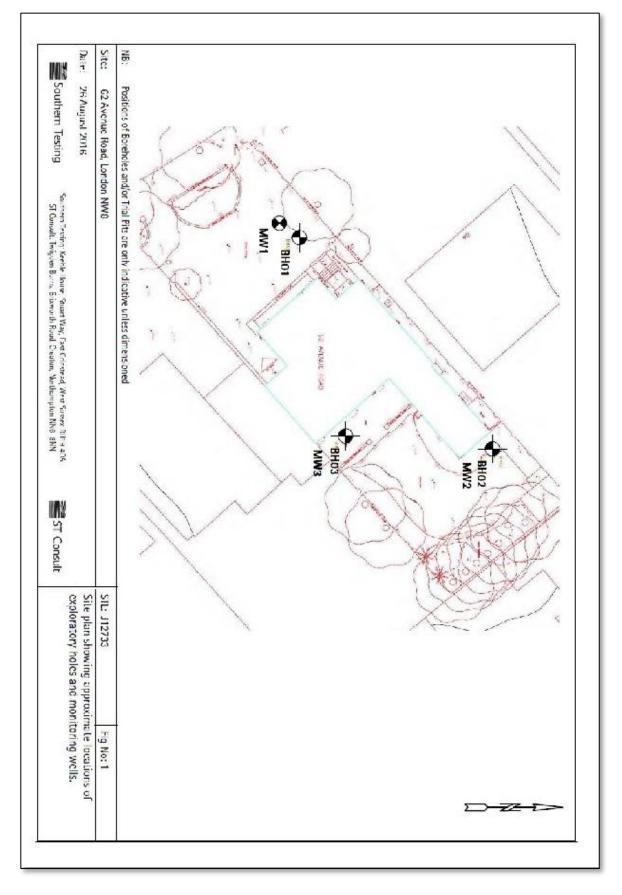
- Plan 1 Local Geology and Ground Conditions
- Plan 2 Site Boreholes Study
- Figure 1 Borehole No 1
- Figure 2 Borehole No 2
- Figure 3 Borehole No 3
- Figure 4 MW1
- Figure 5 MW2
- Figure 6 MW3
- Plan 3 Hydrogeology
- Plan 4 Groundwater Source Protection Zones
- Plan 5 Groundwater Vulnerability Zones





Appendix 2, Plan 1 – Local Geology and Ground Conditions

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 41 of 97



Appendix 2, Plan 2 – Site Boreholes Location

ambiental

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 42 of 97

		GZ Ave Regente	nue Park	Koa Holdi	d, Li age I	onde H	n NW	8	-	ðlart Úmir Legg		04/01/2012 11/16/ 11/16/ 11/16/ 11/16/ 11/16/	To 20 End dole Rendul core Engineer Paoc	05012213 05012213 151012013 DV 1 of 2
ī	T	wting	Sam	pies						91	tafa			
	1	ЬŪ	Dayt	5	Market		age d	ţ.				Sindle Treas	plices	
			030 050	D D	636 064	160.4		8.24			Lune of	and the second	actual gray and a spinol gray and a spinol 25/212, est	et aler
	150	921(9)(10)	1.00 1.30	0.0				0.00				d assessed role	in provincie Tradicio	CLAY with
			2.00 2.30	D D	150						-OBCIUS	- p		
		0.00	3.00	0										
	1.4	19(23)	3.48	Þ		21.22			a.a		La superior	sally method.	r still binde ban group siller plasta minute argebale	
	1.80	PT(2)	4.80	D.							Same and State		of alor none he	me He
		IF GIO	5.30	D U										
		Udli IPcsite	6.40	ъ	6.00									
		377(23)	7.50	D										
		89(99) 000	8.80 9.00	р Ц										
			1.30	ъ		21.13		9.30	ao		and all	a standard a A	y antif i takanja ila sel V. a kilo popularije ila	inanoi dari: A patalari d
		erico Breeg	10.50 10.50	D D							ri kan ka	ta printe.		
	11.80	IP(H)	11.60	D										
		89(00) 10(0)	12.00 12.40											
	11.80	9700	12.80	D										
	14.50	ing age	14.50	ю										
	15:00	0(99)	15.00	U			-28:22							
luie	Filme	rin s		lik/e	len St	like w		(Chiler	ll a	Ther	(in the second	al Remarks		
		uero o		107 Q.			inte Al Inte	1150 (11)	1	I I		els eased in S.	len Kölling saden e	

Appendix 2, Figure 1 – Borehole No 1

ambiental

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 43 of 97

Sile Sile	3) 1	Outh 62 Ave Repairs	onue Park	Roa Iloki	d, L age I	onda M	o NW	8	•	Stat Contr Logg		Reference 25/12/2011 119/33 TW 25:00	TQ 20 End date sondia avec Engineer Page	05012512
1		nding		i pies					-		tata			
And a second second	i de la	ы	a de	8	N 100	ş						Shelle Desaid	phone	
	100 532 100 533	9714 50 17(20) 197(20) 97(20) 97(20) 197(20) 197(20) 197(20)	4 m 6 m 1.00 1.00 2.00 2.00 2.00 5.00 1.00 5.00 1.00 5.00 1.00 5.00 1.00 5.00 1.00 5.00 1.00 5.00 1.00 5.00 1.		21.0	102.T					Carte de accorde Stage et la constant accorde	englå stal der nolly meditelly na glærbes off	sampy report by which we want	en i l A F, with
Harry Spectra	11.00 11.00 13.00	87.600 U(4) S77.54 IP-(0) 11(0)	11.00 11.60 13.00 14.00 14.00 14.00			m ro		Cline			Likes	di Prosenta ka ale award in 12 inde day daring	in in a star	sepiciae.

Appendix 2, Figure 2 - Borehole No 2

Site Tim	: : :	62 Ave	nue Park	Roa	aalea dy La age I	ond M		NWR	ł	•	Netto Stat Contr Logg	nal Gric Uala 11 Jona	Rolenence 21/12/2011 117.05 TW	Hole No TQ 20 End date sonda Aria Engineer Pres	22/12/2011
		eding .		plea				-		1	31	tata -			
ALC: NO DE COMPANY	and the g	j.ŭ	petropy.	8		3							Shelle Desa		
	1.92	271(S (D)	4 76 9 91 1 10 1 90 2 10		040 120	100				88		(bisk a	ntel, elaternel	A CLAY work the review to HE Count adjusted Jacobs for the DECLASSION	ы .
		2016 (10) 10:010	300 500 400	n D		967	- 10000000		9.80	az				in y land available	
	1.00	nită Buîză	335	0.00								w	and joint loss of	grigi aliy pirati adadin oʻgrigis	
	888 	628 	8 8 	В 0	-		1								
		000 27.20	120 200 200	D D											
	14.00	angrig Ingg	10.00	u.		921	• b		1820	ar		Very bi	through a	iT kisk keine Ab scathal pr	
	1000	547 (24)	18.50				ŀ					release	are cover. A	na seziona pa	C103 D1
	1100	IP (26) U@1	15.00												
			12.00	D			1111								
	1500	97 (2)	15.00	D											
Hinte Ngita	FOR			ww. awr ua	ka 195			Sandard	Citise Hall	10 10	The second		el Pressentes als ances la S		
		() () () () () () () () () () () () () ((**)	<u>1</u>	••••	(-)	×	64	•		2 Bard	tek dy data	géiling adore	completion.

Appendix 2, Figure 3 – Borehole No 3

			ST Consu			tert - End Date		dect ID:	Note Type:	MW
Project Name				And Andrew			Co-ordinates	1.040	MLS Level:	Sheet 24 Looper
	Landar		-		Roman 1. Second	ta: Dir diy upanas	ang lating.		l	9M
Terd.	ev Med						-			
			and Antice Sections		Tiskee	ingen				
tala	land (mile)	1	New Par	ţ.	10	And Page	LACTO	El relier	m Donarig tie n	
									erey (1.42 with the series, self-and re-	
	124	•					they be diffe	a second la	mer CA vis	
			PERMIT				10 10 10 10		_	
		1								
an a	11	4 E	100000			3 3 8				
a sa	11	* 1	in an				janu hana	contact rate	<u>ht</u> une)	
a ta da Aldara 1841 - Arabara 1845 - Arabara	1	1.0	швон							
a fa fa fa fa fa	1	-	100 Projekt					Dal of s	orina a Liter	
dia 14	-	our p			ntara pa la		and the second		www.growing	-
ayar (a aya	da (ana) De Sel	n proge	an load - taxe	(Map)	5 (M)	and the second s	inter and interest	6005	e 1006	Netters
5.00	-									

Appendix 2, Figure 4 – MW1

ambiental

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 46 of 97

South	hem Te	sting	ST Consu	t	5	ert-End Date		Project ID:	Note Type:	MW
		-		-		20/07/2015		30,000	WES	abort 14
hojost Kiam	e Si Arm	ur feis	1		Remark	la:	Co-ordin		Level	SM SM
and the s	Lendon	HWE			1 Bouch	on dry upor co	ompletie			
line.	ev Med	la Lienn	ed.							
ister Isla	See.		into beating Attacks	1	Nakasa M	Agent Agent		10mb	an Description	
	-				6.40				anty growing CLA odets, drawning m	
	-54					80169 ee	March,	Offers and M		
	150		saley) es				CLOS.		The word that the design	
						-54				
	100									
	150	÷.	ILLEN F.L.							
				1						
	150									
22	150	ÚP.	101(1/s) 125				6.3-	Sector designed at	r hora,	
					6.40	~~				
	104									
			NUMBER OF							
	120						M.C.	Sector colde	.	
	100	10°	10(0)-10							
	6.50 5.50							CAR MARKED SQUEE	w.,	
							ļ	Dal at	Loning a Little	
				1						
I I	l	I I		I	I	L	L			
ala shuka	ala Da (ana) Da	Constant Con	ene (neg	and a	n (and			NE NOT	2 Million	NAME OF TAXABLE PARTY.
1.00	9 48 200									
	20 70			1	1					

Appendix 2, Figure 5 – MW2

ambiental

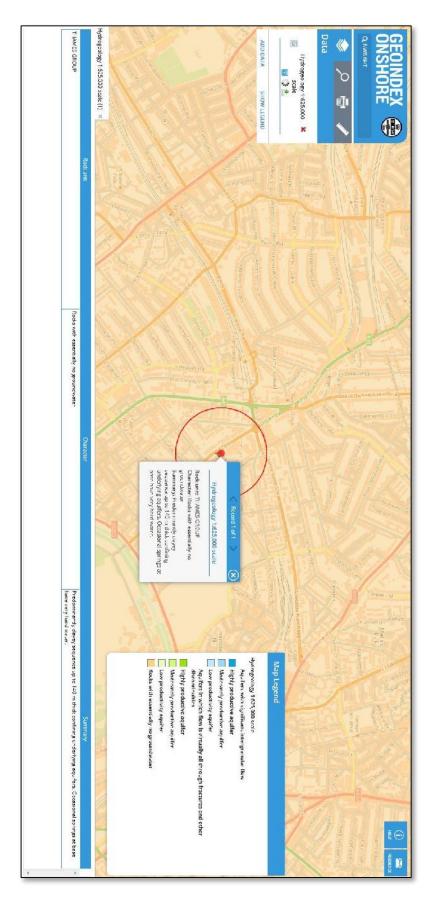
© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 47 of 97

Interview Co-ordinates: Level: Level: Level: Level: Level: Level: Level: State continue: Level: Level: Manaritz State State <t< th=""><th>Co-ordinates: Lense: Lense: Lense: Lense: section: Lense: No Section: No Section: Section:</th><th>Convertient Convertient Level Level Level Interview Interview Interview Soft Soft</th><th>South</th><th>em Te</th><th>sting</th><th>ST Consu</th><th>l 💷</th><th></th><th>kirt-Circ</th><th>Date</th><th></th><th>Project ID:</th><th>Hole Type:</th><th>MW</th></t<>	Co-ordinates: Lense: Lense: Lense: Lense: section: Lense: No Section: No Section:	Convertient Convertient Level Level Level Interview Interview Interview Soft	South	em Te	sting	ST Consu	l 💷		kirt-Circ	Date		Project ID:	Hole Type:	MW
Provide Line And Line And Instants	Prevention: In a construct to the second s	Presexuante: La versa HVL La ve			-		55 100		20/07/2					
Base: VY Mode Limited Base: VY Mode Limited Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same Same<	Serve: V/ Modia Lance 1000 Mark Lance	Cierci VI Micka Lained And Nice VI Micka Lained And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And Nice And And Nice And Nice And Nice And Nice And Nice And Nice And Nice And And And And And And And	Project Name	s S.Am	ue fea	C .							Leves	
More the backet set with backet 1/2 Takena 1/2 Market (ref) Brateria Description Additional temp Tem Market 1/2 1/2 Market 1/2	Market Market<	Mark Market Market Market Market Mark Tables Market Ma	acader:	Lendou	HWE			1 South	dir diyu	10 100	ang beiten.			
Autom Team Team <thteam< th=""> Team Team <th< td=""><td>Lasti Justice Description Integrate Section 10 Two Mexicu 13 Integrate Period Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate</td><td>Link Market Section (a) Tax Market (14) Apple (a) Market Pering/Date Image: section (a) Imag</td><td>client</td><td>w Med</td><td>la Lien</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<></thteam<>	Lasti Justice Description Integrate Section 10 Two Mexicu 13 Integrate Period Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate Integrate	Link Market Section (a) Tax Market (14) Apple (a) Market Pering/Date Image: section (a) Imag	client	w Med	la Lien									
1 1 <td>1 1<td>1 1<td></td><td></td><td></td><td></td><td>1</td><td></td><td>lagest</td><td>ŝ</td><td></td><td>Sinah</td><td>m Description</td><td></td></td></td>	1 1 <td>1 1<td></td><td></td><td></td><td></td><td>1</td><td></td><td>lagest</td><td>ŝ</td><td></td><td>Sinah</td><td>m Description</td><td></td></td>	1 1 <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td>lagest</td> <td>ŝ</td> <td></td> <td>Sinah</td> <td>m Description</td> <td></td>					1		lagest	ŝ		Sinah	m Description	
	1 1 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>5-30</td> <td></td> <td>0.00</td> <td>Graphic course i fragment course i course co</td> <td>brown to bro AND (Develor brochick) and brown, sandy as fire to cose o, chair grand D) prolycients, fi as fire providents, fi as fire providents, fi as fire providents, fi</td> <td>Incorporate (MADE proveing CASE of a proveing CASE of a minimum and whether for minimum and whether for</td> <td>toreant pround), real (LL, provider Liveton</td>							5-30		0.00	Graphic course i fragment course i course co	brown to bro AND (Develor brochick) and brown, sandy as fire to cose o, chair grand D) prolycients, fi as fire providents, fi as fire providents, fi as fire providents, fi	Incorporate (MADE proveing CASE of a proveing CASE of a minimum and whether for minimum and whether for	toreant pround), real (LL, provider Liveton
				3	-	#54A)+8				6.01		Date	artuk e Litim	

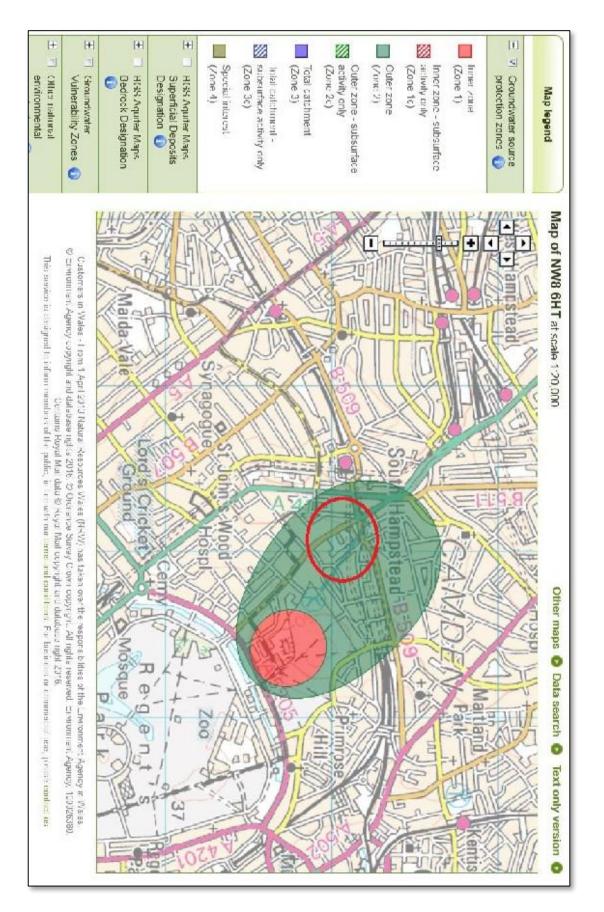
Appendix 2, Figure 6 – MW3

ambiental

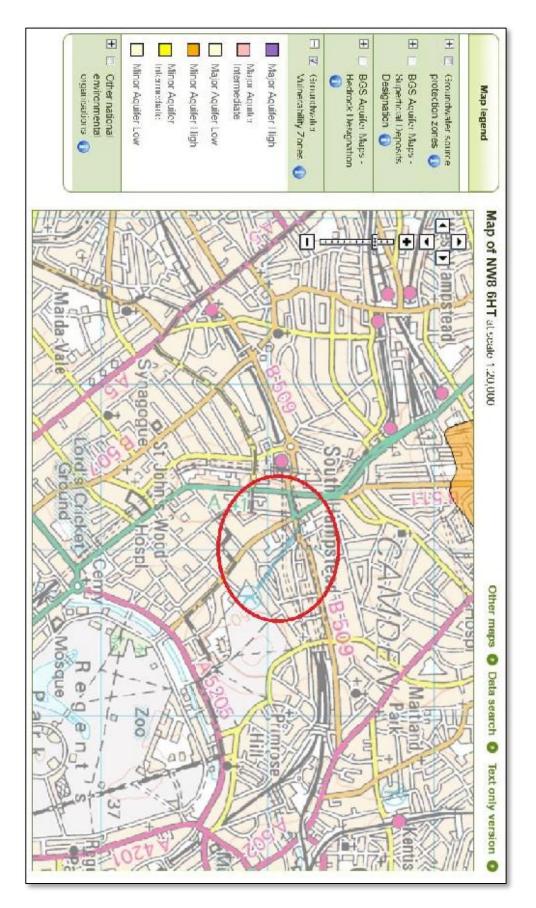
© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 48 of 97



Appendix 2, Plan 3 – Hydrogeology



Appendix 2, Plan 4 – Groundwater Source Protection Zones



Appendix 2, Plan 5 – Groundwater Vulnerability Zones

Appendix 3 – Calculations

- Table 1 Greenfield Runoff Rates Calculation Summary
- Design Simulation of the Existing Storm Sewer
- Greenfield Runoff Volume for 1 year Return Period
- Greenfield Runoff Volume for 30 year Return Period
- Greenfield Runoff Volume for 100 year Return Period
- Summary of Attenuation Volume Results for 100 year Return Period (+40%); Flow Control to Greenfield Runoff Rate (0.48 l/s)
- Summary of Attenuation Volume Results for 100 year Return Period (+40%); Flow Control to 50% of Existing Rate (16.8 l/s)
- Summary of Attenuation Volume Results for 100 year Return Period (+40%); Flow Control to Existing Rate (32.6 l/s)
- Summary of Attenuation Volume Results for 1 year Return Period (+40%); Flow Control to 5 l/s
- Summary of Attenuation Volume Results for 30 year Return Period (+40%); Flow Control to 5 l/s
- Summary of Attenuation Volume Results for 100 year Return Period (+40%); Flow Control to 5 I/s

GREENFIELD RUNO	FF RATES CALCULATION SUMMARY	
	PARAMETERS	
Catchment Area	1080.00 m²	0.11 ha
Open Public Space	0.00 m²	0.00 ha
Area Positively Drained	1080.00 m²	0.11 ha
SAAR (mm)	649 mm	
SOIL	4	
SPR	0.47	
QBAR,rural (I/s) for 50 Ha	220.95 l/s	
Hydrological Region	6	
Growth Curve Factor 1 year	0.85	
Growth Curve Factor 30 year	2.46	
Growth Curve Factor 100 year	3.19	
Return Period	Greenfield Runoff per Hectare (l/s/	′ha)
Qbar	4.42	
1	3.76	
30	10.87	
100	14.1	
Return Period	Greenfield Runoff (l/s)	
QBAR	0.48	
1	0.41	
30	1.17	
100	1.52	

Appendix 3, Table 1 - Greenfield Runoff Rates Calculation Summary



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 54 of 97

righton 52 Evenue Doad, Canden NI 988 Controot No 2318 ate 02/12/2016 14:07 Designed by Jose Tenedor Tile Eviating Runoff RatesF2 Checked by Mark Naumann	Ambiental		Page 2	
<pre>h 1 988 at 0 02/12/2016 14-07 the Evidence Bates#2 between the Wark Nammann Ketuck 2116.1 Wetwork Design Table for Storn The Ketuck Design Table for Storn to) (a) (1.2) the (units) Elev (1/a) (as 3200 to 100 Hips/Concent Concerns the Wark Nammann Ketuck 2116.1 Wetwork Design Table for Storn (a) (a) (1.2) the (units) Elev (1/a) (as 3200 to 100 Hips/Concent Concerns the Wark Nammann Ketuck 2116.1 The Read Table for Storn Type Anto (b) (a) (1.2) the (units) Elev (1/a) (as 3200 to 100 Hips/Concent Concerns the Wark Nammann Concerns the Wark Namma</pre>	Science Park Square	Existing Storm Sewer Design		
<pre>ate 02/12/20_0 f 14:07 iis Evisting Ernst* RatesP Usaigned by Jose Tenedor Checked by Mark Narmann Network 2016.1 Net</pre>	Brighton		Ly	
<pre>Bite Evisting Runn#* RatesF2 Checked by Mark Naumann Network 2016.1 Network Descent Table for Store Bite Control of the store of the store</pre>	ENT 988		Micro	
<pre>Solutions Network 2016.1 Network Design Table for Storn Network Design Table for Storn Network Design Table for Storn Network Design Store 5 for the store Type Auto Design Design Design Design Table for the store for the store for the store type Auto Design Design Table for the store for the store for the store type Auto Network Design Design Design Design Table for the store for the st</pre>			Drainage	
N Length Fall Singer Lives T.E. Rese & NTL DTL Section Type Butters (a) (a) (1.2) (ba) (airs) Flow (1/s) (ba) Flow (ba) (ba) Flow (ba) (ba) Flow (ba) (ba) (ba) (ba) (ba) (ba) (ba) (ba)	X= Solutions	-		
 (a) (a) (12) (b) (mins) Flow (1/s) (no) FICT (no) Design (b) (12) (b) (mins) Flow (1/s) (no) FICT (no) Design (c) (c) (c) (c) (c) (c) (c) (c) (c) (c)	Network D	Design Table for Storm		
Product could table P1 Rain V.S. Bold B.L.Res B.Bass Vol Add The Val Cap Flow couldn's manel (x) V010000 ALO				
Finan V.C. US/IL DILARES DESERVITED Add Flow Val Kap Flow (m/s) (m/s) (m) (m) (m) (m) (m) (m/s) (m/	S1001.000 60.000 0.750 80.0 0.000	4.00 0.00.600 o 100 Pipe/0	Concuit 🧬	
tem/hr) tennet (h) Flow (1/s) (1/s) (1/s) (1/s) (1/s) S100.000 ML00 S. 5. 5. 5. 5. 400 0.000 0.000 0.000 S. 6. 0.000 S. 6. 0.000 0.000 Dutfall Outfall Out	<u>Netw</u>	ork Keaults Teble		
Free Flowing Outfail Details for Storm Outfail Outfail C. Level T. Level Min 5.5 % Fipe Number Name (n) (n) T. Level (nm) (nm) 0100 0 8 17.500 18.125 0.000 0 0 0 Free Flowing Dutfail Details for Storm Dutfail Outfail Outfail Details for Storm Outfail Outfail Outfail Details for Storm Outfail Outfail Outfail Details for Storm Outfail Outfail Outfail Outfail Outfail Outfail Outfail Outfail Outfail Outfail Outfail Storm <td cols<="" td=""><td></td><td></td><td></td></td>	<td></td> <td></td> <td></td>			
Outfell Outfell C. Level T. Level Min 9,5 9 Hips Number Name (m) 1. Level (m) SICCO.000 S 17.500 18.125 0.000 0 Dutfell Dutfell C. Level T. Level (m) (m) 0 0 Dutfell Dutfell C. Level T. Level Min 9,5 9 0 0 Dutfell Dutfell C. Level T. Level Min 9,5 9 0 Dutfell Dutfell C. Level T. Level Min 9,5 9 0 Dutfell Dutfell C. Level T. Level Min 9,5 9 0 SICCI.000 S 46.30 0 SICCI.000 S 46.30 0 0 Marssi F Reduction Nation Science 100 Support Science 1000 0 0 Marssi F Reduction Nation Science 100 Support Science 1000 0 0 Marssi F Reduction Nation 1000 Store Science Science Science 1000 0 Marssi F Reduction Nation 1000 Store Science Science Science 1000 0			5.8 H.3	
Figs Number Name (m) (m) <td></td> <td></td> <td></td>				
Electron Dutfall Details for Storm Dutfall Autfall C. Level T. Level Min 5.5 % Prime Mundee Name (m) (n) T. Devel (mm) (m) (n) Yelden Name (m) (n) T. Devel (mm) (m) (n) SIGELOO S 46.320 38.650 0.000 0 0 Mundee Matter Of Oriteria for Storm Volumetric Remoti Coeri 0.451 Additional flow (or fotal Flow 5.600 Addition Controls 0 Sumber of storage structures 0 Sumber of Unline Controls 0 Sumber of Keal Fine Controls 0 Equition flow (or for for 0.500 Sumber of Cfiling Controls 0 Sumber of Keal Fine Controls 0 Sumber of Cfiling Controls 0 Sumber of Keal Fine Controls 0		(m) (m) Σ , Level (mm) (mm)		
Dutfall Dutfall C. fevel T. fevel Min D.5 W Pipe Number Name (m) (m) 1. Sevel (am) (am) SIC1.000 S 45.320 35.650 0.000 0 Min SiC1.000 S 45.320 35.650 0.000 0 SIC1.000 S 45.320 35.650 0.000 0 0 Min Sic Sic Sic Sic 500 0 0 Min Sic Sic Sic Sic Sic 0.000 0 0 Min Sic Sic Sic Sic Sic Sic 0 0 0 Min Sic Sic Sic Sic Sic Sic 0 0 Min Sic Sic Sic Sic <t< td=""><td>s1010.000 s</td><td>17,500 18,125 G.000 D 0</td><td></td></t<>	s1010.000 s	17,500 18,125 G.000 D 0		
Pipe Number Name (m) I. Sevel (am) (m) SICCLOOD SICCLOOD SICCLOOD O Volumetric Kunoff Ocenf 0./01 Additional flow (or Fotal Flow 0.000 Areast Reduction Mactor 1.000 SILED Mactor 7 10m*/hs Storage 2.000 Areast Reduction Mactor 1.000 SILED Mactor 7 10m*/hs Storage 2.000 Areast result O Interval (on 0.000 Sin Start (mins) O Interval (on 0.000 Sin Start (wains) O Interval (on 0.000 Sin Start (wains) O.000 Sun Time (on inst) 1 Machoe Headlows Covell (Standord on Number of storage structures 0 Sumber of offilia Controls 0 Bumber of Keal Time Controls 0 Sumber of cofflic Controls 0 Bumber of Keal Time Controls 0 Sumber of coffilia Controls 0 Bumber of Keal Time Controls 0 Synthetic Saturtall Details ID Cv (Summer 0.750 Perior Ren	Free Flowing	Dutfall Details for Storn		
Similation Critevia for Storn Volumetric Remotif Coeff 0./51 Additional flow f of fotal Flow 5.000 Areal Reduction Matter00 Ratter Storr * Hum/As Storage 2.000 Hot start (ains) 0 Inlet Coefficient 0.000 St. Start Devel (an) 0 Stor ber Person per Day (1/ser/day) 0.000 Kanhole Headlows Coeff (21.4.1) 0.500 Run Thus (mins) 0 Full Semage per bectars (1/s) 0.000 Output Interval (mins) 1 Mumber of Imput hydrogriphs 0 number of storage attructures 0 Sumber of coffling Controls 0 number of time/Area diagtorn 0 1 Mumber of Coffling Controls 0 number of Real Fine Controls 0 Sumber of coffling Controls 0 number of Real Fine Controls 0 1 Eaintell Model JSE Frotile Type Commer effecting (years) 1 Period Real and Males CV (Ninter) 0.843 0.843 MS=50 (ma) 21.000 Stora Duration (mins) 30		(m) (m) I. Level (mm) (mm)		
<pre>Volumetric Remoti Coeff 0./61 Additional flow (of Fotal Flow 5.000 Arts1 Reduction Mactor 1.001 Ratio Factor 7 10m*/hs storage 2.000 Hot start (mins) 0 inlet Coefficienter (0.000 Sol Start Level (mb) 0 Flow per Person per Day (1/ver/day) 0.000 Ranhole Headlows Coeff (31.01.01) 0.500 Run Time (mins) 60 Foul Remarks per bectare (1/s) 0.000 Output Interval (mins) 1 Hotser of unput sydragraphs 0 number of storage Firstettires 0 Mumber of unput sydragraphs 0 number of storage Firstettires 0 Mumber of coefficient Output of Real First Coefficient 0 Fundation of Coefficient Output of Real First Coefficient 0 Fundation of Coefficient Output of Real First Coefficient 0 Fundation of Coefficient Output of Real First Coefficient 0 Fundation of Coefficient Output of Real First Coefficient 0 Fundation of Coefficient Output of Real First Coefficient 0 Fundation of Coefficient Output Output of Real First Coefficient 0 Fundation of Coefficient Output Output</pre>	\$1001.000 s	46.320 38.650 C.000 D 0		
Areal Reduction Mactor 1.000 RAED Factor * 100*/hs Storage 2.000 Not start (mins) D Inter Coefficient 0.800 Souther Store Level (mo) D Slow per Person per Day (1/set/day) 0.000 Raminole Beadloss Coeff (Slokal) 0.500 Run Time (mins) 60 Full Remark per bectare (1/s) 0.000 Output Interval (mins) 1 sumber of imput hydrographs 0 number of storage structures 0 Number of Unline Controls 0 number of storage structures 0 Number of Unline Controls 0 number of Real Time Controls 0 Sumber of Cffline Controls 0 number of Real Time Controls 0 <u>Synthetic Baintall Details</u> Baintal Model / JSE Profile Type Cummer Period (years) I JOC CV (Number) 0.860 MS=50 (ma) 21.000 Stora Duration (mins) 30	<u>3:milati</u>	on Criteria for Storn		
Number of Unline Controls 0 Bunder of Vine/Area Liagrams 0 Fumber of Offline Controls 0 Bunder of Real Time Controls 0 <u>Synthetic Baintall Details</u> Baintall Model 738 Profile Type Cummer Actumn Action (years) 1300 CV (Summer: 0.753 Peedon Regland and Males CV (Summer: 0.843 M5=50 (may 21.000 Stears Duration (min.) 30	Areal Reduction Fictor Hot start (rins) No. Start Level (nu) Kanhole Beadloss Coeff (Slobal)	<pre>000 MADD Factor * 10m*/hs Stors 0let Coefficient 0 Slow Dar Person per Day (1/1er/da 0.500 Ron Time (min</pre>	ge 2.000 nt 0.800 y: 0.000 e: 60	
Bainisil Model JJR Frotile Type Current Acturn setiod (years) 100 CV (Surver) 0.750 Peedon England and Males CV (Ninter) 0.840 M5=50 (not) 21.000 Steam Duration (min.) 30	Sumber of Unline Cont	trols 0 Number of Vime/Area Hiagrams 0		
Actumn seried (years) 100 CV (Summer) 0.750 Pequie: England and Males CV (Ninter) 0.840 M5=50 (non) 21.000 Stern Duration (min.) 30	Synthet	tic Baintall Details		
	Peturn Period (years) Pequio: Engls M5=50 (non)	and and Males Cv (Number) 0.1 21.000 Storm Duration (min.)	150 140	
01982-2015 XF Solutiona	01982	=2016 VD Solutions		

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 55 of 97

Ambiental			Page 3
Science Park Square Prighton R&I 983 Hare OF/12/00/6 14-07 Tile Priating Dinnes XE Salutions	57 Aver Unnt-57 Designs Designs	ng itoma sewer Desin nor Thad. Comden it ha 2018 d hy Jose Tenerko I hy Mark Marmann - 2016.1	m Micro Drainage
1 year Return Ferlys	Submary of Critic		iux Culficy (Back
Hert : The Hert Ranhole Headloss Cov Foul Gewage per he Humber of Number of	Tart (alos) 0 Terest (art) 1 bt (Sloka,) 0.0.1 Fio Stare (1/s) 0.0.1 Emput Sydroursche 0 D f oplije Controle 0 D	Crimeria difficual Flow - 1 of 1 VARD Pactor + 10a/J Talet Do W per Persch per Day - mean of Storage Scout mixes of Storage Scout mixes of Time/Area Elag of - of Stal Time Ord	is Storage 2,000 Principat 5,000 Principat 1,000 Lines 0 Lines 0
		111 Dersits 15H Latio	0
M-ry n Fo	Smaly is Times	n) 300.5 DCD two sep: Dise Coertis Coet sep: Us	
	izo, i (pears)	13, 120, 180, 210, 361 83, 1440, 2140, 2840, 7200,	
129/MT EN Nalas SLora	Return Climate F Period Change Se		First (D) Overflow Overflow Act.
9:001.000 31 15 91. 9:001.000 37 300 81-		15 Slaver 109/15 Simme	
Vati US/MF Lev PM Nome (m		Plos / Overflow Plos	Level Status Receeded
11000.500 51 46.4 21000.500 52 35.4	12 =0.055 0.000 00 =0.105 0.000		
	01983-2015 XP	Solutiona	

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 56 of 97

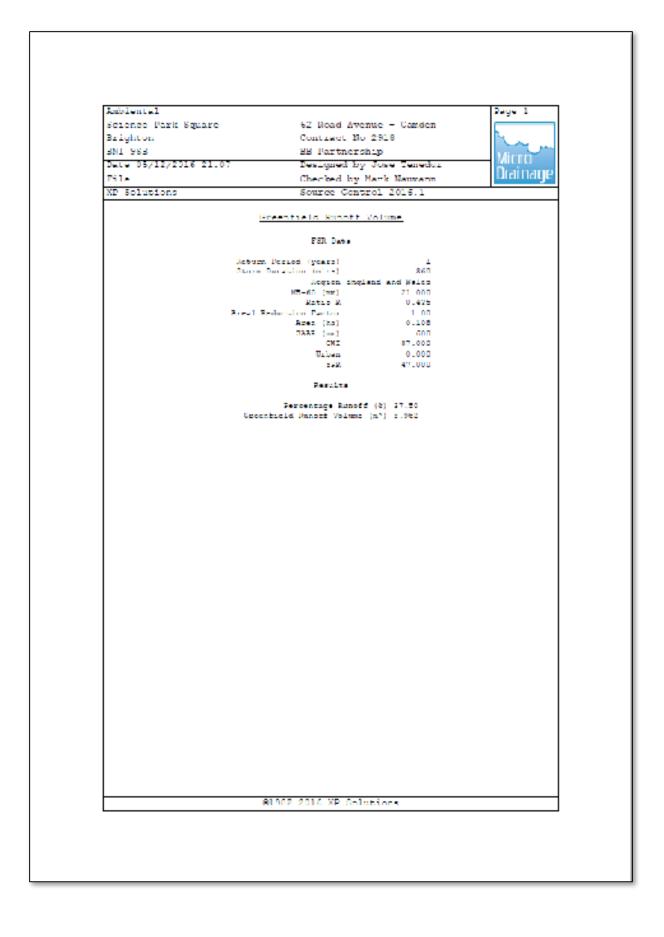
mbiental			Page C
Science Park Square Prighton R&I 988 Date 02/12/2016 14-07 File Eviating Proof® Ref. X= Golutions	52 Avenue Unntrodt N Usargred b	y Jose Tenedor Mary Marmann	Micro Drainage
20 year Return Seriod S	mmery of Critical <u>11 Far Gray</u>		un Culflow (Rank
Hot 2-Ar Tr- Start-Sw Ramhole Henicos Coet: Poul Jeways per hesta Husber of Inpu Numbur of op	(Slokal) 0.5.3 Flow pe	ienal flow - 1 of T ADD Person + 1007/A Tolet Coel I Person per Day -1 I of Storage Structu I of Storage Structu	storeje 2.000 tikojeni 2.000 per/dzy/ 1.000 res 0
	digethetic tarnet) Nocal (1) Agion anguine and Agio (m) (21.00	R Latio	
Margan For Ra	en, Risk Verning (nn) Snalytis Tinssrap 270 Diatus	Pice Toertis Statu	
Profi Duration (a) Reformation (a) Filmste Char	120, 983. (eacs)	120, 180, 210, 361, 1410, 2140, 2340, 4 7200, 8 1, 2	
	Return Climate First Period Change Surch	1315 CONTRACTOR	First (I) Overflow Overflow Act.
81051.005 21 15 841501 81051.005 27 300 Winter		laner (65/15 Auron)	
09/MR Lawel	nbacged Placed Depth Volces Flow (m) (m ²) Cep.		
#1600.000 51 67.256 51001.000 52 39.400	1.6.6 0.000 1.5 -1.100 0.000 0.5	1 30.7 FL C 0.6	4 NILL ROOM
	01983-2015 XE Su	.u.lona	

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 57 of 97

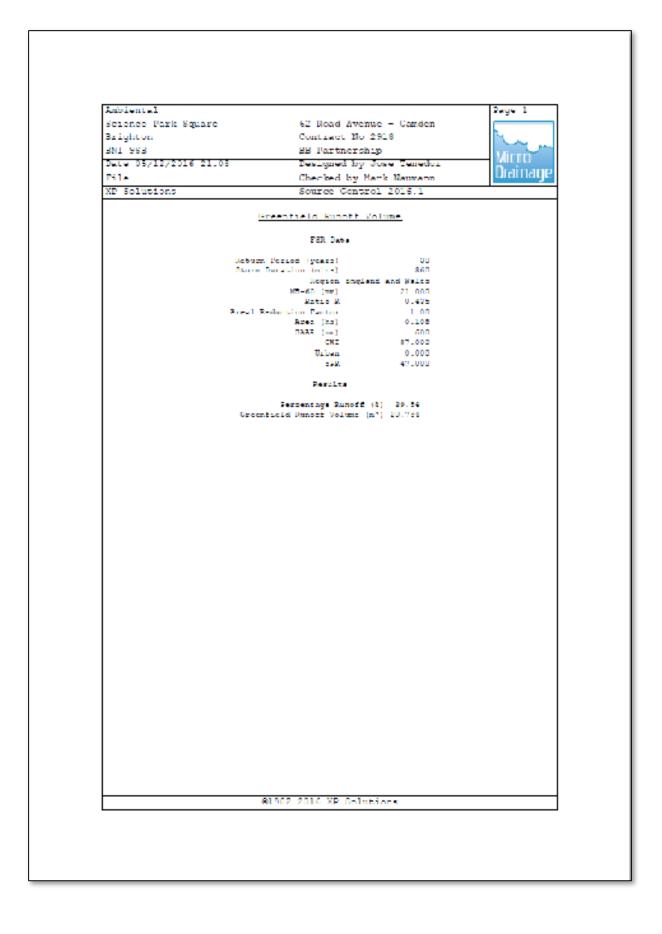
mbiental								age S
Science im Prighton Phi 988 Late 02/12 File Pylat XF Nolutio	29016 (ng P	14-07	tas#2	52 Jay Contro Dearg Check	nue load sat ka 23 red by ue	is se Tenedor « Manmanr	an	viinn Viainage
3C_year_R	etr.a	Period.	Summery		lcal Resu Atorm	Lis by Max.	ուս Եւևն	.ov (Rank
	e llead Dewagt Buo N	Hot 200 Star- 7 icas Coet: - per hect 	on Fector ort Joins) erel (ort) (Sloba_) care (1/s) put sydrog Opling Com	1.000 0 0.513 F 0.013 rathe 0 crois 0	vann r Low per Per Dunker of 1 Dunker of 1	Flow - 1 of Totar + 100*/ Totar - 00 Sch per Day - Florage Finuet Time/Aras Totar Ford fire from	he Storaje etti-clear i/per/day) uses 0 juste 0	5 000 5 000
			Nocal Region on	mistic at		Lid Latio L 1.3 (aunoer) 1.7 (Winter) 1.3	50	
	M- 1	rg n fir I		reis Tim		is 2 dVd tart sitted		
Bi	el de Ca	Pro aration(s) Perloi(s) Inmere Cha	(gears)			180, 210, 36. 2160, 2840, 7200,		, , 0
	my Mil Nalas	Stora			First (3) Surcharge	First (V) Flood	First (I Overflow) Dverflow Act.
81651,065 81651,065		15 Million 360 Winter		+14 5 424	1715 Burgers	160/15 Ayun	E)	
मार	09,949 Name	t Lovel		Volcee	Flor / Ove	2:pa n'Cos Flow 1/s) (1/s)		Level Extended
#1600.000 51001.000	1. 11	47.410 39.450	2,760 -1,100	5.000 5.000	1,72 0.110		NOCU BISS	4
			01983	-2015	CP Soluli	atia		

umbiental				Pag	6 6
Science Perk Sq Prighton Phi 983 Date 07/12/200 F File Priating P X= Nolutions		52 Avenue lu Ubnirozi ka	2118 Jose Tenedor Mars Maymenr	Mi	anoge
101 year Better	Period Summary	of Critical P 11 Car Gram	esulis by Maxi	mun Ootiio	s_(Rauk
Fanhoie Beas Foci Gewage Hun N	al Reduction Ficture Hot Start (olos) - Shart Termi (olos) icas Oreb: (Sicka.) : per hectare (1/s) ber of Input Aydrogr unhar of Online Cont aler of CTTT - Cont	0 yat 1 0.513 Flow per 0.013 raphe 0 Durket of rachs 0 Durket of	nal flow - 1 of 1 D Pactor + 1007/h Tale= Com Person per Say -1 of Storage Struct of Time/Arus Clay	e Storaje : Ptiecies: Pjet/dzy: cres 0 rsza 0	000 1100
	Paintall Nocel Region in			0	
и.,	og n for Kinn, Risk Snæly		ice Toertis frati		
Refige	Profile(s) matium(s) (mine) Peri(x. (genes) (mare Charge (5)		U, 190, 210, 361 40, 2040, 2940, 7200,		
EN Nalas		imate First () hange Surchard	D 0.000 (0.000 (0.000 (0.000))	First (T) (Overflow	Devertion Act.
	15 Million 109 100 Million 109		ner: 160/15 Ayuna.		
US, Phi Ma	Water Surcharge ME Level Depth me (m) (m)	Wolume Flow	Pips / Overflow Flox (1/s) (1/s)		
s1000.500 \$1000.500	s1 67,502 0.85 s2 35,400 -0.10	7 1.636 1.8 5 3.000 7.0		80028 90	*
	01983	-2015 XP Solu	Liptia		

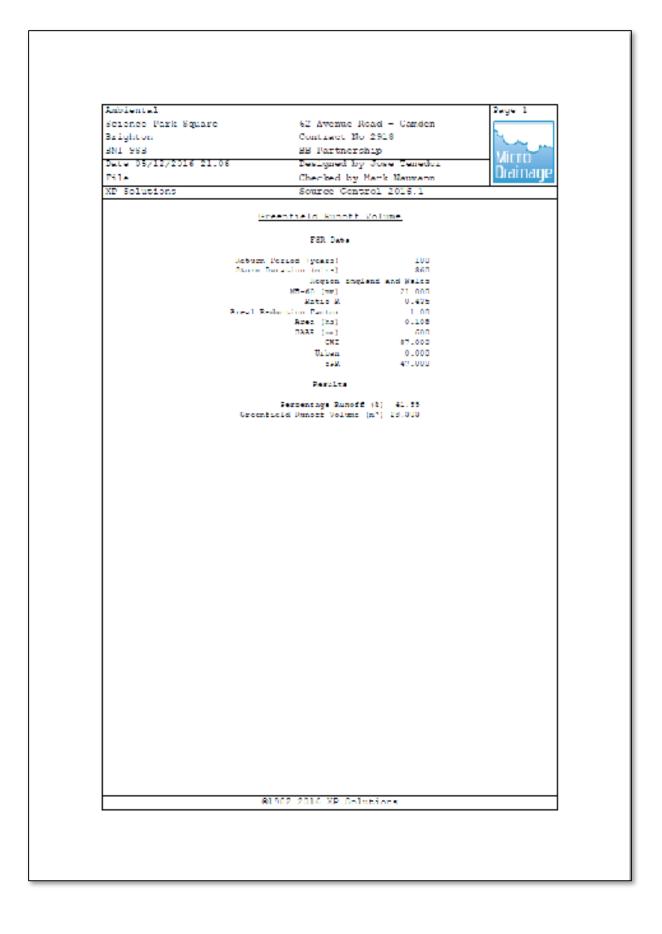
© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 59 of 97



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 60 of 97



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 61 of 97



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 62 of 97

Appron Avenue Read, Conden A MARINE Read, Conden Entrate Ka 2018 Bestgrad By Marke Reades Exercise Structure Reades A MARINE REAd, Condent Exercise Structure Reades A MARINE REAdes Exercise Structure A MARINE REAdes Exerci	Ambiental						Page 1
1.984 Instruct AS 2018 Using the set of the set o	Science Park Square					eerfield	
the OS/12/2016 10:22 1. APTENDATY (NUMICAL)_117 Subset by Jose Tenedor Decked by Mark Naturans Subre Control /015.1 Subre Control /015.1	Brighton						Try m
<u>14 AVTENUATION CRUCTURE 1197 (Precised by Mark Bauman Suurce Control 2014.1</u> CONTROL ATTENDED 1197 (Precised Explore Automatication Control 2014.1 CONTROL AND CRUCTURE CONTROL 2014.1 CONTROL New King Mark Mark Status Form New Depth Control Volume Control (4008) 15 min Summer 47,705 0.448 0.44 21.4 C mark Status 16 min Summer 47,705 0.448 0.44 21.4 C m 15 min Summer 47,705 0.448 0.44 21.4 C m 15 min Summer 47,705 0.448 0.44 21.4 C m 15 min Summer 47,105 0.468 0.4 21.4 Food Bash 16 min Summer 48,115 0.480 0.5 41.4 Food Bash 16 min Summer 48,115 0.480 0.4 21.4 Food Bash 16 min Summer 48,115 0.480 0.4 21.7 C m 16 min Summer 48,115 0.480 0.4 21.7 C m 17 min Summer 47,115 0.480 0.4 21.7 C m 18 min Summer 47,115 0.460 0.4 21.7 C m 19 min Winterr 47,115 0.460 0.4 21.4 C m 19 min Winterr 47,115 0.460 0.4 21.4 C m 19 min Winterr 10,195 0.461 0.4 21.4 D m 19 min Winterr 10,195 0.461 0.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4						ada -	Micro
Bointeent Source Control 2014.1 Source Control 2014. Source Control 2014.1 Source Control 2014. Source Control 2014.00 Source Control 2014.00 Nor 2014.00 Nor 2014.00 Source 2014.00			-	-			Drainage
Serrer Benet New (n) 15 min Sumark (1) (1)	X= Solutions						
FormLocalDepthFour LocalPolarization15min Summer(7.16)0.480.40.21.00.515min Summer(7.16)0.480.40.21.00.515min Summer(7.16)0.560.4.40.21.00.5120min Summer(7.16)0.560.5.542.7.9Fund 31a1140min Summer(8.113)0.660.5.542.7.9Fund 31a1140min Summer(8.113)0.660.5.542.7.9Fund 31a1140min Summer(8.113)0.680.5.542.7.9Fund 31a1140min Summer(8.113)0.680.5.542.7.9Fund 31a1140min Summer(8.113)0.680.5.542.7.9Fund 31a1140min Summer(8.113)0.680.5.542.7.9Fund 31a1140min Summer(8.113)0.680.5.542.7.9Fund 31a1140min Summer(8.123)0.7.7.60.4.422.1.00.6.8130min Summer(7.65)0.3.7.60.4.422.1.00.6.8130min Summer(7.65)0.3.7.60.4.422.1.00.6.8130min Summer(7.65)0.3.7.60.4.422.1.00.6.8130min Minter(7.122)0.5020.4.422.1.00.6.8130min Minter(7.122)0.5020.4.422.1.00.6.8130<	Simary of Results	for 1	00 year	Retu	21. Pe	(\$02+) boics	
FormLocalDepthFour LocalPolarization15min Summer(7.16)0.480.40.21.00.515min Summer(7.16)0.480.40.21.00.515min Summer(7.16)0.560.4.40.21.00.5120min Summer(7.16)0.560.5.542.7.9Fund 31a1140min Summer(8.113)0.660.5.542.7.9Fund 31a1140min Summer(8.113)0.660.5.542.7.9Fund 31a1140min Summer(8.113)0.680.5.542.7.9Fund 31a1140min Summer(8.113)0.680.5.542.7.9Fund 31a1140min Summer(8.113)0.680.5.542.7.9Fund 31a1140min Summer(8.113)0.680.5.542.7.9Fund 31a1140min Summer(8.113)0.680.5.542.7.9Fund 31a1140min Summer(8.123)0.7.7.60.4.422.1.00.6.8130min Summer(7.65)0.3.7.60.4.422.1.00.6.8130min Summer(7.65)0.3.7.60.4.422.1.00.6.8130min Summer(7.65)0.3.7.60.4.422.1.00.6.8130min Minter(7.122)0.5020.4.422.1.00.6.8130min Minter(7.122)0.5020.4.422.1.00.6.8130<	Storm	Max 1	Var M	T	Mare	Status	
$\frac{30 \text{ min Summar 47, 523 0.575}}{500 3.607} 0.4 22.8 C m}{50 \text{ min Summar 48, 175 1.859}} 0.5 45.4 Flood Shah} 0.5 122 min Summar 48, 175 1.859 0.5 45.4 Flood Shah} 0.5 0.5 min Summar 48, 175 1.859 0.5 45.7 Flood Shah} 0.5 0.5 min Summar 48, 175 1.859 0.5 45.7 Flood Shah} 0.5 0.5 min Summar 48, 175 1.859 0.5 45.7 Flood Shah} 0.5 0.5 min Summar 48, 175 1.859 0.5 45.9 Flood Shah} 0.5 0.5 min Summar 48, 175 1.859 0.5 45.9 Flood Shah} 0.5 0.5 min Summar 48, 175 1.850 0.5 45.9 Flood Shah} 0.5 0.5 min Summar 48, 175 1.850 0.5 45.9 Flood Shah} 0.5 0.5 min Summar 48, 175 1.850 0.5 45.9 Flood Shah} 0.5 0.5 min Summar 48, 175 1.857 0.5 51.4 Flood Shah} 0.5 0.5 0.5 min Summar 48, 175 1.857 0.5 51.4 Flood Shah} 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5$		Level D	epth Con-	rol V	blume		
60 min Summer 47,003 0.688 0.4 54.0 C m 120 min Summer 48.155 1.887 0.5 45.4 Fixed State 320 min Summer 48.155 1.887 0.5 45.3 Fixed State 320 min Summer 48.155 1.887 0.5 45.4 Fixed State 320 min Summer 48.123 0.922 0.5 45.1 Fixed State 420 min Summer 48.123 0.922 0.5 45.1 Fixed State 420 min Summer 48.123 0.922 0.5 45.1 Fixed State 420 min Summer 48.123 0.920 0.5 45.1 Fixed State 420 min Summer 48.125 0.807 0.4 35.6 C E 420 min Summer 48.125 0.403 0.5 41.8 Fixed State 420 min Summer 48.125 0.403 0.5 41.8 Fixed State 420 min Summer 47.951 0.465 0.4 25.9 C E 420 min Summer 47.951 0.465 0.4 25.9 C E 420 min Summer 47.951 0.465 0.4 25.9 C E 420 min Summer 47.951 0.465 0.4 25.4 C E 420 min Summer 47.951 0.465 0.4 25.4 27 100000 min Gummer 47.951							
320 min Summer 44.117 0.807 0.5 41.4 Flood Stall 360 min Summer 44.115 0.886 0.5 44.3 Flood Stall 360 min Summer 48.223 0.922 0.5 44.3 Flood Stall 360 min Summer 48.223 0.922 0.5 44.3 Flood Stall 680 min Summer 48.223 0.922 0.5 44.3 Flood Stall 690 min Summer 48.227 0.907 0.5 44.3 Flood Stall 951 min Summer 48.227 0.907 0.4 34.4 Flood Stall 940 min Summer 48.227 0.907 0.4 35.6 0.6 940 min Summer 48.227 0.908 0.4 35.6 0.6 940 min Summer 47.913 0.428 0.4 35.6 0.6 940 min Summer 47.913 0.738 0.4 35.7 0.6 6 940 min Summer 47.913 0.738 0.3 35.7 0.6 6 940 min Summer 47.913 0.738 0.4 25.7 0.6 6 940 min Summer 47.913 0.708 0.3 15.7 0.8							
940 min Summer 40.185 0.984 0.5 44.3 Tined Dink 360 min Summer 48.124 0.964 0.5 45.7 Ficod Sink 600 min Summer 48.125 0.982 0.5 45.4 Ficod Sink 720 min Summer 48.127 0.907 0.5 45.4 Ficod Sink 720 min Summer 48.127 0.907 0.5 45.4 Ficod Sink 940 min Summer 48.127 0.907 0.5 45.4 Ficod Sink 940 min Summer 48.127 0.907 0.5 45.4 Ficod Sink 940 min Summer 48.127 0.76 0.4 25.5 0.8 940 min Summer 47.152 0.753 0.4 25.7 0.8 940 min Summer 47.152 0.753 0.4 25.7 0.8 0.8 940 min Summer 47.152 0.753 0.4 25.7 0.8 0.8 940 min Summer 47.152 0.753 0.4 25.7 0.8 0.8 940 min Summer 47.152 0.765 0.4 25.1 0.8 0.8 940 min Summer 47.152 0.766 0.4 25.1 0.8 0.8 940 min Summer 47.199 0.700 0.4 25.1 0.8 940 min Summer 47.199 0.700 0.4 25.1 0.8 940 min Summer 47.199 0.700 0.4 25.1 0.8 940 min Summer 47.199 0.700	120 min Summar 4	8.107 D	.807	0.5	40.4	Flood Risk	
360 min summer 48.124 0.9.4 0.5 45.1 Flood sink 480 min summer 48.125 0.922 0.5 45.1 Flood sink 720 min summar 48.125 0.907 0.5 45.4 Flood sink 721 min summar 48.127 0.907 0.5 45.4 Flood sink 722 min summar 48.127 0.907 0.5 45.4 Flood sink 725 min summar 48.127 0.937 0.5 45.4 Flood sink 726 min summar 48.123 0.928 0.5 45.4 Flood sink 726 min summar 48.123 0.928 0.1 25.8 0.8 726 min summar 48.123 0.928 0.1 25.8 0.8 726 min summar 47.512 0.936 0.1 25.9 0.8 7265 min summar 47.512 0.936 0.1 35.7 0.8 7265 min summar 47.512 0.936 0.1 35.7 0.8 7265 min summar 47.512 0.936 0.1 35.7 0.8 7260 min Winter 47.512 0.936 0.1 25.3 0.8 72705 min Winter 47.512 0.906 0.1 25.3 0.8 728 min Winter 47.512 0.906 0.1 25.3 0.8 728 min Summer 49.520 0.90 0.0 28.4 1.8 739 min Win	180 min Summer 4 240 min Summer 4	8.158 D 8.188 D	.859 .886	0.5	42.9	Flood Rist Flood Risk	
603 min Summer 48.207 0.907 0.5 41.9 Flood Sisk 723 min Summer 48.207 0.907 0.5 41.4 Flood Sisk 1440 min Summer 48.137 0.837 0.5 41.8 Flood Sisk 2460 min Summer 48.022 0.716 0.4 35.8 0.5 2483 min Summer 48.022 0.716 0.4 35.8 0.8 32283 min Summer 47.761 0.461 0.4 35.8 0.8 3230 min Summer 47.761 0.461 0.4 25.9 0.8 5763 min Summer 47.651 0.461 0.4 25.1 0.8 7205 min Summer 47.651 0.466 0.4 25.1 0.8 10000 min Summer 47.651 0.466 0.4 25.1 0.8 10000 min Summer 47.651 0.466 0.4 25.1 0.8 30 min Winter 47.022 J.002 0.4 25.1 0.8 31 min Winter 47.023 J.666 0.4 25.3 0.8 10000 min Summer 150.036 0.0 20.4 27 32 min Summer 150.036 0.0 22.4 27 12 min Summer 150.036 0.0 22.4 27 12 min Summer 150.036 0.0 20.1 70 10000 min Summ	360 min summer 4	8.214 0	924	0.5	45.7	Flood Mink	
723 min Summar 48.127 0.807 0.5 41.4 Eloci Rish 965 min Summar 48.137 0.837 0.5 41.2 Eloci Rish 2160 min Summar 48.137 0.837 0.4 31.6 0.8 2160 min Summar 48.137 0.75 0.4 31.6 0.8 2160 min Summar 47.152 0.756 0.4 31.6 0.8 2160 min Summar 47.152 0.458 0.4 31.6 0.8 21705 min Summar 47.152 0.458 0.4 21.7 0.8 2100 min Summar 47.152 0.451 0.4 21.7 0.8 2100 min Summar 47.152 0.356 0.4 22.7 0.8 2100 min Summar 47.152 0.356 0.4 22.7 0.8 2100 min Summar 47.152 0.502 0.4 22.1 0.8 2100 min Minter 47.102 0.502 0.4 22.1 0.8 2101 min							
1440 min Summer 48.033 0.837 0.5 41.8 Fined Bink 2160 min Summer 48.013 0.773 0.4 32.6 0.5 2885 min Summer 47.013 0.638 0.4 32.9 0.8 3120 min Summer 47.013 0.638 0.4 22.9 0.8 5760 min Summer 47.051 0.461 0.4 22.7 0.8 5760 min Summer 47.051 0.3461 0.4 22.1 0.8 8640 min Summer 47.052 0.3050 0.3 0.7 0.8 10000 min Summer 47.052 0.3050 0.4 22.1 0.8 10000 min Summer 47.052 0.3050 0.4 22.1 0.8 11000 min Summer 47.052 0.3050 0.4 22.1 0.8 12001 min Minter 47.052 0.302 0.4 21.1 0.8 130 min Minter 47.052 0.056 0.0 22.4 27 15 min Summer 150.056 0.0 26.1 70 120 min Summer 25.069 0.0 26.1 70 122 min Summer 25.060 0.0 26.1 70 122 min Summer 10.012 20.388 0.0 50.4 246 355 min Summer 10.012 0.388 0.0 50.4	720 min Summer 4	8.207 D	.907	0.5	41.4	Flood Rist	
2260 min Summer 48.025 J.*73 0.4 92.5 0.8 2880 min Summer 47.025 J.*16 0.4 22.9 0.8 4320 min Summer 47.825 J.*55 0.4 22.9 0.8 7000 min Summer 47.655 J.*55 0.40 22.7 0.8 8640 min Summer 47.655 J.*55 0.40 22.1 0.8 7000 min Summer 47.655 J.*56 0.3 15.7 0.8 10000 min Summer 47.655 J.*562 0.4 22.1 0.8 10000 min Summer 47.655 J.*562 0.4 22.1 0.8 10000 min Summer 47.055 J.*562 0.4 22.1 0.8 11000 min Summer 47.055 J.*562 0.4 22.1 0.8 12 min Minter 47.955 J.*56 0.4 22.4 0.8 12 min Summer 150.036 0.0 22.4 27 12 min Summer 25.056 0.0 20.1 70 12 min Summer 25.366 0.0 24.1 70 12 min Summer 25.376 0.0 24.1 70 12 min Summer 25.376 0.0 24.1 70 12 min Summer 26.373 0.0 54.1 300 10							
4320 min Summer 47, 815 0.418 0.4 25.9 0.8 5760 min Summer 47, 625 0.355 0.4 25.7 0.8 72005 min Summer 47, 655 0.366 0.3 15.8 0.8 8640 min Summer 47, 655 0.356 0.3 15.8 0.8 10000 min Summer 47, 655 0.356 0.3 15.7 0.8 1000 min Summer 47, 605 0.305 0.4 25.1 0.8 1000 min Summer 47, 605 0.466 0.4 25.3 0.8 1000 min Summer 47, 605 0.466 0.4 25.3 0.8 11 min Minter 47, 905 0.466 0.4 25.3 0.8 12 min Summer 100, 0.36 1.0 22.4 27 13 min Summer 100, 0.36 0.0 28.2 41 60 min Summer 100, 0.36 0.0 22.4 27 12 min Summer 120, 0.36 0.0 22.4 27 12 min Summer 120, 0.376 0.0 22.4 27 12.2 min Summer 120, 0.398 0.0 24.1 70 12.2 min Summer 120, 0.376 0.0 42.8 100	2160 min Summer 4	8.073 3	. 773	0.4	38.6	CE	
5760 min Summer 47.523 0.335 0.4 22.7 0.6 7205 min Summer 47.565 0.3366 0.3 15.8 0.6 10000 min Summer 47.505 0.3355 0.3 15.8 0.6 10000 min Summer 47.505 0.3355 0.3 15.7 0.6 15 min Winter 47.002 0.400 0.4 25.1 0.6 30 min Winter 47.002 0.400 0.4 25.3 0.6 30 min Winter 47.002 0.400 Volume Volume Value 0.6 0.5 15 min Summer 10.006 C.0 22.4 27 15 min Summer 55.006 0.0 36.2 41 60 min Summer 55.006 0.0 36.2 41 10 min Summer 55.006 0.0 36.2 41 10 min Summer 55.006 0.0 36.2 41 10 min Summer 15.006 0.0 42.8 130 10 min Summer 55.006 0.0 36.2 41 20 min Summer 10.717 0.0 54.4 48 360 min Summer 10.717 0.0 54.4 48 360 min Summer 10.717 0.0 54.4 48 360 min Summer 10.716							
10000 min General 47 502 0.705 0.0 15.7 0 H 15 min Minter 47.002 J.502 0.4 21.1 0 H 3J min Minter 47.002 J.646 0.4 21.3 0 H Blaces Rain Finaded Hardenge Time-Peak Solume Values Freent Jam/h1 Volues Volues Value (min) 12 min Summar 150.036 C.0 22.4 27 32 min Summar 97.000 C.0 30.1 70 12 min Summar 97.000 C.0 20.2 41 60 min Summer 97.000 C.0 30.2 41 61 min Summar 150.036 C.0 42.8 130 101 min Summer 25.060 C.0 42.8 130 102 min Summer 25.070 C.0 63.4 364 103 min Summer 14.717 C.0 23.4 364 102 min Summer 13.644 C.0 54.7 602 103 min Summer 4.701 C.0 54.4 483 104 min Summer 2.0.398 C.0 64.7 602 105 min Summer 3.91 C.0 64.7 602 <td< td=""><td>5760 min Sunner 4</td><td>7.833 0</td><td>. 535</td><td>0.4</td><td>28.7</td><td>CK</td><td></td></td<>	5760 min Sunner 4	7.833 0	. 535	0.4	28.7	CK	
10000 min General 47 502 0.705 0.0 15.7 0 H 15 min Minter 47.002 J.502 0.4 21.1 0 H 3J min Minter 47.002 J.646 0.4 21.3 0 H Blaces Rain Finaded Hardenge Time-Peak Solume Values Freent Jam/h1 Volues Volues Value (min) 12 min Summar 150.036 C.0 22.4 27 32 min Summar 97.000 C.0 30.1 70 12 min Summar 97.000 C.0 20.2 41 60 min Summer 97.000 C.0 30.2 41 61 min Summar 150.036 C.0 42.8 130 101 min Summer 25.060 C.0 42.8 130 102 min Summer 25.070 C.0 63.4 364 103 min Summer 14.717 C.0 23.4 364 102 min Summer 13.644 C.0 54.7 602 103 min Summer 4.701 C.0 54.4 483 104 min Summer 2.0.398 C.0 64.7 602 105 min Summer 3.91 C.0 64.7 602 <td< td=""><td>7200 min Summer 4 8640 min Summer 4</td><td>7.761 D 7.695 D</td><td>. 461 . 396</td><td>0.4</td><td>22.1</td><td>CE</td><td></td></td<>	7200 min Summer 4 8640 min Summer 4	7.761 D 7.695 D	. 461 . 396	0.4	22.1	CE	
30 min Winter (7.993 J.646 0.4 25.3 C K $\frac{S.mm}{Fvent} \frac{Rain}{(an')} \frac{Finoled}{Volume} \frac{Findlarge}{Volume} \frac{Time-Feak}{(ains)}$ 15 min Simter 150.336 0.0 22.4 27 30 min Simter 150.336 0.0 22.4 27 30 min Simter 97.300 0.0 30.1 70 122 min Simter 95.306 0.0 30.1 70 122 min Simter 25.717 0.0 40.7 100 201 min Simter 25.717 0.0 34.4 364 360 min Simter 11.544 0.0 54.4 462 602 min Simter 11.544 0.0 54.4 462 603 min Simter 11.544 0.0 54.4 462 604 min Simter 11.544 0.0 54.4 462 605 min Simter 1.547 0.0 54.6 1004 244 min Simter 1.546 0.0 62.7 1004 144 min Simter 3.511 0.0 10.6 106 605 min Simter 1.547 0.0 54.8 1054 266 min Simter 1.547 0.0 54.3 3572 700 70 n Simter 1.547 0.0 54.4 4026 656 0.0 Simter 1.546 0.0 54.3 3572 700 70 n Simter 1.547 0.0 54.4 4026 656 0.0 Simter 1.546 0.0 54.3 3572 700 70 n Simter 1.557 0.0 54.6 4026 657 0.0 Simter 1.546 0.0 54.8 1054 256 min Simter 1.554 0.0 54.8 1054 256 0.0 Simter 1.554 0.0 54.8 1054 256 0.0 Simter 1.554 0.0 54.8 1054 256 0.0 Simter 1.556 0.0 31.6 4026 664 0.0 Simter 1.557 0.0 54.8 1054 155 min simter 1.557 0.0 54.8 1054 155 min simter 1.550 356 0.0 35.0 26 35 min simter 1.550 356 0.0 35.0 26 35 min sinter 97.300 0.0 0.0 35.0 26	10000 min Summer 4	7:520-0	.335	0.3	15.7	CE	
Event(nat/h1)VolumeVolume(nat/h)12min Summer150.0360.022.42732min Summer97.0000.088.24162min Summer95.0060.030.170122min Summer55.0060.042.8170100min Summer25.7170.060.710022.1min Summer25.7170.064.4482360min Summer14.7170.054.4364600min Summer11.6640.054.4482600min Summer11.6940.054.7602720min Summer0.3920.050.7602721min Summer0.3920.050.6700444min Summer4.7010.051.81054246min Summer4.9220.064.4482266min Summer1.9230.010.41076266min Summer1.9230.064.33572700min Summer1.9270.044.4506664.4min Summer1.9270.044.4506664.4min Summer1.9270.044.4506664.4min Summer1.9270.044.4506664.4min Summer1.9490.074.85086767min Summer1.9270.024.8506664.4m							
Event(nat/h1)VolumeVolume(nat/h)12min Summer150.0360.022.42732min Summer97.0000.088.24162min Summer95.0060.030.170122min Summer55.0060.042.8170100min Summer25.7170.060.710022.1min Summer25.7170.064.4482360min Summer14.7170.054.4364600min Summer11.6640.054.4482600min Summer11.6940.054.7602720min Summer0.3920.050.7602721min Summer0.3920.050.6700444min Summer4.7010.051.81054246min Summer4.9220.064.4482266min Summer1.9230.010.41076266min Summer1.9230.064.33572700min Summer1.9270.044.4506664.4min Summer1.9270.044.4506664.4min Summer1.9270.044.4506664.4min Summer1.9270.044.4506664.4min Summer1.9490.074.85086767min Summer1.9270.024.8506664.4m							
$\begin{array}{c} (m^3) & (m^3) \\ \hline \\ 15 \ \text{min Summar 150.336} & 1.0 & 22.4 & 27 \\ 30 \ \text{min Summar 97.300} & 1.0 & 28.2 & 41 \\ 60 \ \text{min Summar 97.300} & 1.0 & 26.2 & 41 \\ 61 \ \text{min Summar 25.717} & 1.0 & 61.1 & 70 \\ 320 \ \text{min Summar 25.717} & 1.0 & 61.7 & 100 \\ 321 \ \text{min Summar 25.717} & 1.0 & 61.7 & 100 \\ 322 \ \text{min Summar 25.717} & 1.0 & 61.7 & 100 \\ 322 \ \text{min Summar 25.717} & 1.0 & 61.7 & 100 \\ 322 \ \text{min Summar 11.717} & 1.0 & 61.7 & 100 \\ 323 \ \text{min Summar 11.717} & 1.0 & 51.4 & 364 \\ 610 \ \text{min Summar 11.717} & 1.0 & 53.7 & 602 \\ 725 \ \text{min Summar 11.716} & 1.0 & 51.7 & 602 \\ 725 \ \text{min Summar 11.716} & 1.0 & 52.7 & 004 \\ 960 \ \text{min Summar 11.716} & 1.0 & 52.7 & 004 \\ 1441 \ \text{min Summar 11.716} & 1.0 & 51.6 & 1054 \\ 2560 \ \text{min Summar 1.923} & 0.0 & 33.9 & 2638 \\ 5767 \ \text{min Summar 1.923} & 0.0 & 58.3 & 35.2 \\ 7207 \ \text{min Summar 1.927} & 0.0 & 74.4 & 5126 \\ 664 \ \text{min Summar 1.927} & 0.0 & 74.4 & 5126 \\ 664 \ \text{min Summar 1.923} & 0.0 & 74.4 & 5126 \\ 664 \ \text{min Summar 1.923} & 0.0 & 74.4 & 5126 \\ 664 \ \text{min Summar 1.929} & 0.0 & 74.4 & 5126 \\ 664 \ \text{min Summar 1.949} & 0.0 & 76.8 & 5156 \\ 15 \ \text{min Winter 1.50.356} & 6.0 & 55.0 & 26 \\ 35 \ \text{min winter 1.710} & 0.0 & 0.0 & 39.8 & 4.1 \\ \end{array}$							
30 min Sincer 97.000 0.0 28.2 41 60 min Sincer 55.008 0.0 30.1 70 320 min Sincer 25.008 0.0 30.1 70 320 min Sincer 25.008 0.0 42.8 130 100 min Sincer 25.017 0.0 61.7 100 221 min Sincer 25.017 0.0 51.4 246 360 min Sincer 14.717 0.0 51.4 364 605 min Sincer 1.1.864 0.0 51.4 364 605 min Sincer 9.733 0.0 51.7 602 720 min Sincer 9.733 0.0 51.7 602 721 min Sincer 9.733 0.0 51.7 602 722 min Sincer 9.733 0.0 51.8 1054 265 min Sincer 9.735 0.0 51.8 1054 266 min Sincer 1.925 0.0 51.8 1054 268 min Sincer 1.923 0.0 51.8 1054 268 min Sincer 1.925 0.0 31.8 1876 268 min Sincer 1.925 0.0 31.8 1876 268 min Sincer 1.925 0.0 18.9 268	2.760	pano				(acces)	
60 min Summer 59.509 0.0 30.1 70 120 min Summer 25.306 0.0 42.8 130 100 min Summer 25.477 0.0 64.7 100 220 min Summer 20.398 0.0 93.4 246 360 min Summer 10.398 0.0 93.4 364 600 min Summer 11.717 0.0 53.4 364 600 min Summer 11.6717 0.0 53.4 364 600 min Summer 11.717 0.0 53.4 364 600 min Summer 10.725 0.0 60.6 700 946 win Summer 6.1716 0.0 52.7 000 946 win Summer 6.1716 0.0 52.7 000 1441 min Summer 3.401 0.0 52.7 004 145 min Summer 3.401 0.0 1.87 1054 2680 min Summer 3.401 0.0 1.89 2688 5766 min Summer 1.514 0.0 53.3 3512 7207 min Summer 1.514 0.0 53.3 3512 7207 min Summer 1.177 0.0 14.4 3126 10005 min Summer 1.177 0.0 2.6 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>							
120 min Summer 95.366 0.0 42.8 130 100 min Summer 25.71° 0.0 66.7° 100 240 min Summer 20.388 0.0 99.4 246 360 min Summer 14.717 0.0 53.4 364 480 min Summer 11.364 0.0 54.4 492 600 min Summer 9.793 0.0 56.7 602 722 min Summer 9.793 0.0 56.7 602 722 min Summer 6.176 0.0 56.7 602 722 min Summer 6.176 0.0 56.7 100 46.0 min Summer 6.700 56.7 100 164 min Summer 6.701 0.0 51.8 1004 164 min Summer 6.701 0.0 61.8 1004 2660 min Summer 1.923 0.0 83.9 2600 5766 min Summer 1.514 0.0 63.3 $35^{\circ}2$ 7007 min Summer 1.577 0.0 51.6 4320 664.4 min Summer 1.257 0.0 51.6 4320 664.4 min Summer 1.257 0.0 51.6 4326 664.4 min Summer 1.257 0.0 51.6 4326 15 min Winter 10.49 1.0 26.8 2660 15 min winter 10.49 0.0 26.8 2660							
22.1 min Simmer 20.388 0.0 99.4 246 360 min Simmer 14.717 0.0 53.4 364 400 min Simmer 14.717 0.0 53.4 364 400 min Simmer 9.793 0.0 53.7 602 725 min Simmer 6.704 0.0 52.7 004 1441 min Dimmer 4.701 0.0 51.8 1054 2560 min Simmer 3.630 0.0 73.4 1076 4322 min Simmer 1.923 0.0 73.8 354 5766 min Simmer 1.514 0.0 53.8 354 7207 min Simmer 1.257 0.0 24.4 304 16005 min Simmer 1.257 0.0 24.4 304 16005 min Simmer 1.257 0.0 24.8	120 min Simmer	35.366	C.0		\$2.8		
360 mim Simper 14.717 0.0 23.4 364 460 mim Simper 11.864 0.0 56.4 462 600 mim Simper 9.793 0.0 56.7 602 725 mim Simper 4.174 0.0 52.7 804 460 mim Simper 4.174 0.0 52.7 804 460 mim Simper 4.174 0.0 52.7 804 1441 mim Simper 4.174 0.0 52.7 804 1441 mim Simper 4.174 0.0 52.7 804 1441 mim Simper 4.174 0.0 51.8 1054 260 mim Simper 4.170 0.0 61.4 1076 260 mim Simper 1.923 0.0 83.9 260m 5560 mim Simper 1.927 0.0 51.6 4120 6541 mim Simper 1.927 0.0 61.6 4120 6542 mim Simper 1.977 0.0 51.6 4120 6544 mim Simper 1.979 0.0 94.4 5056 6544 mim Simper 1.979 0.0 94.4 5056 6545 mim Simper 1.979 0.0 24.4 5056 6566 0.0 25.0 26 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>							
60.0 mim Summer 9.733 0.0 58.7 602 72.5 mim Summer 0.355 0.0 60.6 700 96.5 mim Summer 0.575 0.0 60.7 700 96.5 mim Summer 0.575 0.0 51.8 1054 96.5 mim Summer 0.576 0.0 1.8 1054 2580 mim Summer 0.530 0.0 70.4 1876 2580 mim Summer 0.530 0.0 70.4 1876 2580 mim Summer 1.923 0.0 70.4 1876 2580 mim Summer 1.925 0.0 71.6 4320 5767 mim Summer 1.975 0.0 71.6 4320 600.4 mim Summer 1.979 0.0 74.4 5094 1000.5 mim Summer 1.949 0.0 70.8 504 15 mim Winter 1.50.356 0.0 25.0 26 30 mim Winter 97.300 0.0 29.8 <td>360 min Summer</td> <td>14.717</td> <td>5.0</td> <td></td> <td>13.4</td> <td>361</td> <td></td>	360 min Summer	14.717	5.0		13.4	361	
720 wim Sources 0.382 0.0 60.6 700 960 wim Sources 6.016 0.0 62.7 006 1461 wim Sources 4.701 0.0 51.8 1054 2461 wim Sources 4.701 0.0 51.8 1054 2461 wim Sources 4.901 0.0 51.8 1054 2680 wim Sources 2.890 0.0 73.4 1876 4320 mim Sources 2.890 0.0 83.9 2600 5760 mim Sources 1.514 0.0 53.9 2600 5760 mim Sources 1.514 0.0 53.9 2600 5760 mim Sources 1.577 0.0 54.6 4320 9644 mim Sources 1.577 0.0 54.6 4320 9656 mim Sources 1.577 0.0 54.6 5956 9660 mim Sources 1.049 0.0 26.8 5056 960 mim Sources 1.049 0.0 26.8 5056 970 mim Sources 97.300 0.0 19.8 4.1							
1441 min Summer 4.701 0.0 51.8 1054 2461 min Summer 3.01 0.0 73.5 1468 2600 min Summer 2.830 0.0 78.4 1876 4320 min Summer 1.923 0.0 78.4 1876 5767 min Summer 1.923 0.0 68.3 3512 5767 min Summer 1.925 0.0 74.4 3126 5767 min Summer 1.257 0.0 71.6 4320 6644 min Summer 1.257 0.0 74.4 5126 665.41 min Summer 1.079 0.0 74.4 5126 10005. min Summer 0.499 0.0 76.8 5054 15 min Winter 1.049 0.0 76.8 5054 15 min Winter 197.300 0.0 25.9 41	725 min Summer	0.392	C.0		50.6	700	
216: min Simper 3.91: 0.0 73.5 146% 260: min Simper 2.630 0.0 13.4 16% 4320 min Simper 1.923 0.0 13.9 2688 576: m. Simper 1.924 0.0 63.3 35'2 720: min Simper 1.257 0.0 51.6 4320 864: min Simper 1.257 0.0 51.6 4320 864: min Simper 1.277 0.0 54.4 50% 866: min Simper 1.779 0.0 54.4 50% 86: min Simper 1.799 0.0 55.0 26 1000: min Simper 150.356 0.0 25.0 26 30: min Winter 97.300 0.0 39.8 4_1							
4320 min Sinner 1.923 0.0 83.9 260m 5766 min Sinner 1.514 0.0 63.3 3512 7907 min Sinner 1.277 0.0 51.6 4320 664.1 min Sinner 1.277 0.0 51.6 4320 664.1 min Sinner 1.277 0.0 51.6 4320 664.1 min Sinner 1.279 0.0 51.6 4320 1000.1 min Sinner 1.279 0.0 51.8 5056 15 min Winter 1.50.356 0.0 25.0 26 30 min Winter 97.300 0.0 19.8 4.1	216. min Summer	3.91.	C.0		(1, 5)	T16%	
S760 m m Summer 1.514 0.0 50.3 3512 7207 min Summer 1.257 0.0 51.6 4320 8644 min Summer 1.257 0.0 54.4 5096 8664 min Summer 1.379 0.0 54.4 5096 10005 min Summer 0.356 0.0 25.0 26 15 min Winter 97.300 0.0 29.8 41							
H641 min Former 1.172 0.11 24.4 5026 10005. min Former 0.049 0.10 26.8 5056 15 min Winter 150.356 0.0 25.0 26 30 min Winter 97.300 0.0 19.8 4_1	5760 r.n.Surner	1.514	C.0		8.8	3512	
10006. Tim Former 0.1499 0.0 20.8 A856 15 min Winter 150.356 0.0 25.0 26 30 min Winter 97.300 0.0 39.8 41							
30 min winter 97.000 C.0 59.0 41	10080 mini Sommeri	0.149	5.0		16.8	5856	
01982-2015 XF Solutiona							

mbiental					Page 2
Science Park Square	100000000			reenfield	5
Prighton PNI 983	100000000	= Rdad,			2 mm
H61 965 Late 05/12/20/E 30-22		nost ka 2 Intel by u		and a	Micro
File APTEMENTCREDICALS ITY	- DXC 0.7	ed by Ma			Drainage
XF Solutions		- Contro			-h-
	- 44			1.	2
Sinnary of Results	151_13	o vear Re	LULI, P	et133 [+608]	
	la e - fra		Ma at	51.4 1118	
	nel Dep m) (r	th Conceed ((1/#)	(z ²)		
60 min Winter 48. 220 min Winter 48.			34.2 45.5	Flood Risk	
180 min Willer 48.	171 0.8	0.6	45.5	Figol Right	
240 min Minier 48. 360 min Minier 48.				Flood Sish Flood Sish	
480 min Witter 48.	351 1.0	65 0.5	52.8	Findd Gink	
SOD min Firter 48. 722 min Witter 48.				FLOOD HIDE	
960 min Winter 48	321 1.0	25 0.5	51.2	FLOOD MIGK	
1440 min Willer 48 2160 min Willer 48				Flood Risk Flood Risk	
2880 min Miccor 48.	154 0.8	04 0.5	41.2	Fluod Bisk	
4320 min Minter 47. 5760 min Minter 47.			21.2		
7200 min Winder (7.	142 5.4	42 0.4	2251	G K	
8640 min Winter 47 10080 min Winter 44			19.3 11.1		
Event : 67 s.m Fisteri 127 sin Fister	55.505	Veluce 9 (m ⁴) E.0 E.0	(m ⁴) 46.4 (8.0	(aics) ~70 12€	
180 min winter 240 min Winter	25.717	E.0	12.3	184 242	
360 min Winter	14.717	C 0	19.7	358	
485 s.m. Winter 661 s.m. Winter		0.1	52.9	472 594	
27. w.m.#3ntev	721.0	U = U	B.C. 0	(+ 94	
951 min Winter 144. min Winter	6.130	C.U C.U	56.1 65.1	900 11.4	
2161 min Winter	3,411	π.0	83.5	1580	
2000 min Winder 4327 min Winder	2.590	C.0 C.0	37.8	2024	
576° win Winter	1.714	F-1.0	÷0. 8	7752	
USA yin Minter USA, min Minter	1.297	17.10 17.10	1122.10	94-109 0-9-9-0	
1908. min Winter	9.939	2.0	1.9.4	±U40	
01983	-2015	XP SOLUL.	100324-1		

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 64 of 97



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 65 of 97



_	Ambiental							Page 1
BAL 983 Unit vinit, An 2018 Unit vinit, An 2018 Unit vinit, An 2018 File Attendet or Va Cale_lin Unit vinit, An 2018 Unit vinit, An 2018 Unit vinit, An 2018 Set out tors Surrer Control 2016.1 Unit vinit, An 2018 Unit vinit, An 2018 Set out tors Surrer Control 2016.1 Unit vinit, An 2018 Unit vinit, An 2018 Set out tors Surrer New Max Max Maxman Surrer Surrer Surrer Set out surrer Control 2016.1 Value Value Value Surrer 13 min surrer 41.222 0.331 10.3 18.6 0 136 min surrer 41.228 0.223 1.0 18.6 0 137 min surrer 41.238 0.233 1.0 0.1 1.2 0.1 136 min surrer 41.330 0.333 0.0 1.3 1.2 <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>off Rate</td> <td></td>	-						off Rate	
Late 03/12/2016 10:24 Usaigned by Jose Tenedor Checked by Mark Nauman Saures Control 2014.1 Lis Artemustication Saures Control 2014.1 Saures Control 2014.1 Lis Artemustication Saures Control 2014.1 Saures Contr								The m
THE Actemustication Cale_linit Checked by Mark Nauman Surrester X* Solution Surrest Control 2015.1 Surest Control 2015.1							le ::	Micro
Simple for 100 year Return, Parind (+408). Now New Year Status Year Status Year Status Year Status Simple for 1,210 0.311 Year Status Year Status Year Status Simple for 1,210 0.311 Year Status Simple for 1,320 0.221 Simple for 1,320 0.221 <td></td> <td>in'</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Urainage</td>		in'						Urainage
StrrNorNorNorNorNorNorNorNorNor n_{11} n_{12} n_{12} n_{12} n_{12} n_{12} n_{12} n_{12} 14nin s anne47.5720.33310.515.60.6715nin s anne47.5720.33310.510.60.6716nin s anne47.5220.33310.510.60.67125nin s anne47.5230.2568.813.40.67126nin s anne47.5230.1555.70.60.66126nin s anne47.5320.1335.95.70.6126nin s anne47.5330.0511.13.70.6126nin s anne47.5330.0511.13.70.6126nin s anne47.5330.0511.13.70.6126nin s anne47.5330.0511.13.70.6126nin s anne47.5330.0511.13.70.6126nin s anne47.5330.0511.01.00.6126nin s anne47.5330.0511.01.00.6126nin s anne47.5330.0511.01.00.6126nin s anne47.5330.0511.01.00.6126nin s anne47.5330.0511.01.00.6126nin s anne47.5350.2520.6 </td <td>XP Solutions</td> <td></td> <td>Sour</td> <td>nce Cont</td> <td>trol 2</td> <td>015.1</td> <td></td> <td></td>	XP Solutions		Sour	nce Cont	trol 2	015.1		
Kvent Law M Depth Curu M Values 12 min samme 71.672 0.333 9.5 15.6 0.8 13 min samme 71.672 0.337 10.3 18.6 0.8 15 min samme 71.672 0.373 10.3 18.6 0.8 150 min samme 47.672 0.373 10.3 18.6 0.8 150 min samme 47.678 0.276 8.8 13.4 0.8 160 min samme 47.130 0.126 5.2 5.1 0.8 120 min samme 47.130 0.012 5.2 5.1 0.8 122 samme 47.130 0.025 1.1.8 2.27 0.8 1244 samme 47.130 0.025 1.0.8 2.1 0.8 1246 samme 47.130 0.025 1.0.9 2.1 0.8	Simary of Re	silts i	(or 1)	00 year	Retur	n Peri	(\$04+) bci	
15 min simmer 47.672 0.335 9.5 15.9 0.8 30 min simmer 47.672 0.337 10.3 18.6 0.8 120 min simmer 47.672 0.337 10.3 18.6 0.8 120 min simmer 47.672 0.327 10.3 18.6 0.8 120 min simmer 47.672 0.327 10.3 18.6 0.8 130 min simmer 47.455 0.155 7.7 7.8 0.6 600 min simmer 47.429 0.122 6.8 6.4 0.8 140 min simmer 47.430 0.122 5.2 5.1 0.8 1500 min simmer 47.439 0.065 1.8 2.7 0.8 1420 min simmer 47.639 0.061 2.3 3.0 0.8 12100 min simmer 47.330 0.032 0.5 1.8 2.7 0.8 1280 min simmer 47.330 0.032 0.6 1.8 0.8 0.8 <							Status	
3.3 min 5 minue 47.672 0.373 10.3 18.6 0 K 6.6 min 5 minue 47.672 0.373 10.3 18.6 0 K 122 minu 5 minue 47.680 0.327 10.3 18.6 0 K 135 minue 47.680 0.327 8.8 13.4 0 K 136 minue 1000000 61.53 7.7 7.8 0 K 360 minue 1000000 61.55 7.7 7.8 0 K 360 minue 1000000 61.59 5.7 0 K 360 minue 1000000000 61.59 5.7 0 K 360 minue 1000000000000000000000000000000000000			(32)	(=)	(1/8)	4=.51		
60 min Summer 47,672 0.372 10.3 10.6 0 K 120 min Summer 47,622 0.323 9.6 16.0 0 K 121 min Summer 47,623 0.274 8.3 13.4 0 K 240 min Summer 47,629 0.125 6.8 8.3 13.4 0 K 240 min Summer 47,629 0.125 6.8 6.4 0 K 250 min Summer 47,143 0.133 5.9 5.7 0 K 250 min Summer 47,143 0.013 5.9 5.7 0 K 250 min Summer 47,139 0.005 4.2 4.4 0 K 2160 min Summer 47,139 0.005 1.3 3.7 0 K 2160 min Summer 47,139 0.005 1.8 2.7 0 K 2160 min Summer 47,139 0.005 1.8 0 K 1.8 0 K 2160 min Summer 47,139 0.005 0.91 1.8 0 K 1.9 2160 min Summer 47,133 0.003 0.7 1.6 0 K 1.900 K 10950 min Summer 47,133 0.003 0.7 1.6 0 K 1.900 K 10950 min Summer 47,133 0.003 0.7 1.6 0 K 1.900 K 1.900 K 10950 min Summer 47,133 0.003 0.7 1.6								
120 min 3 mores 47.621 0.221 9.6 16.0 0 K 180 min 3 mores 47.628 0.224 8.8 13.4 0 K 380 min 2 mores 47.628 0.224 8.1 11.2 0 K 380 min 2 mores 47.432 0.123 5.9 5.7 0 K 620 min 2 mores 47.403 0.123 5.9 5.7 0 K 620 min 2 mores 47.409 0.025 1.2 5.1 0 K 620 min 2 mores 47.409 0.025 1.2 5.1 0 K 950 min 2 mores 47.409 0.025 1.2 5.1 0 K 2440 min 2 mores 47.433 0.055 1.8 2.7 0 K 2480 min 2 mores 47.433 0.055 1.8 2.7 0 K 2580 min 2 mores 47.233 0.052 0.9 1.9 2.0 0 K 10260 min 2 mores 47.233 0.052 0.9 1.8 0 K 1 10360 min 2 mores 47.233 0.021 10.1 10.0 K 10390 min 2 mores </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
240 min Summer 47.233 0.224 0.1 11.2 0.8 380 min summer 47.456 0.155 7.7 7.8 0.8 0.8 650 min Summer 47.413 0.113 5.9 5.7 0.8 722 min Summer 47.413 0.113 5.9 5.7 0.8 722 min Summer 47.430 0.005 4.2 4.4 0.8 960 min Summer 47.431 0.013 1.1 3.7 0.8 1440 min Summer 47.431 0.014 1.3 2.7 0.8 2560 min Summer 47.533 0.025 1.8 2.7 0.8 4330 min Summer 47.333 0.025 1.3 2.0 0.8 4520 min Summer 47.333 0.025 0.7 1.6 0.8 10000 min Summer 47.337 0.023 0.7 1.6 0.8 10000 min Summer 47.437 0.023 0.6 1.5 0.8 10000 min Summer 47.437 0.023 0.7 1.6 0.8 110 min Number 47.439 0.22 10.1 10.0 0.8 12 min Summer 7.500 0.2 10.1 10.0 0.8 12 min Summer 7.500 0.2 0.3 3.6 10 12 min Summer 7.500	120 min 8	Elliner 4	7.621	0.321	9.6	16.0	0 10	
380 min summer 47.456 0.165 7.7 7.8 0.6 080 min summer 47.429 0.125 6.8 5.6 0.6 170 min Summer 47.400 0.125 5.2 5.1 0.8 180 min Summer 47.400 0.112 5.2 5.1 0.8 1440 min Summer 47.473 0.173 1.1 3.7 0.8 2160 min Summer 47.481 0.011 2.3 3.0 0.8 2260 min Summer 47.481 0.011 1.8 2.7 0.8 45320 min Summer 47.333 0.055 1.8 2.7 0.8 45320 min Summer 47.333 0.051 1.8 2.7 0.8 45320 min Summer 47.333 0.052 1.8 2.7 0.8 72020 min Summer 47.333 0.032 0.7 1.6 0.8 100900 min Summer 47.333 0.032 0.7 1.6 0.8 100900 min Summer 47.933 0.032 0.7 1.6 0.8 100900 min Summer 47.919 0.412 10.9 21.0 0.8 112 min Number 47.919 0.412 10.9 21.0 0.8								
SCC min Summer 47.413 0.123 5.9 5.7 0.8 72C min Summer 47.402 0.102 5.2 5.1 0.8 960 min Summer 47.273 0.033 3.1 3.7 0.8 1440 min Summer 47.273 0.033 3.1 3.7 0.8 2160 min Summer 47.273 0.033 3.1 3.7 0.8 2160 min Summer 47.233 0.041 1.3 2.2 0.8 35760 min Summer 47.233 0.033 0.7 1.6 0.8 7200 min Summer 47.233 0.033 0.7 1.6 0.8 10090 min Summer 47.233 0.033 0.7 1.6 0.8 11 min Number 47.233 0.033 0.7 1.6 0.8 12 min Number 47.233 0.033 0.7 1.6 0.8 13 min Number 47.200 0.2 10.1 10.0 0.8 14 min Number 47.200 0.2 10.1 10.0 0.8 15 min Summer 597.000 0.0 22.8 21 15 min Summer 50.046 0.0 22.9 78 100 min Summer 25.717 0.0 <td>380 min a</td> <td>unner 4</td> <td>1.456</td> <td>0.155</td> <td>7.7</td> <td>7.8</td> <td>U 15</td> <td></td>	380 min a	unner 4	1.456	0.155	7.7	7.8	U 15	
T2C min Summer 47.402 0.102 5.2 5.1 0.8 960 min Summer 47.260 0.065 4.2 4.4 0.8 1440 min Summer 47.261 0.061 2.3 3.0 0.8 2180 min Summer 47.261 0.061 2.3 3.0 0.8 2180 min Summer 47.261 0.061 2.3 3.0 0.8 2180 min Summer 47.261 0.063 1.8 2.7 0.8 4520 min Summer 47.230 0.025 1.8 2.7 0.8 5760 min Summer 47.233 0.03 0.7 1.6 0.8 7200 min Summer 47.231 0.33 0.6 1.5 0.8 10390 min Summer 47.233 0.33 0.6 1.5 0.8 11 min Ninter 47.230 0.30 0.7 1.6 0.8 46 min Ninter 47.233 0.33 0.6 1.5 0.8 12 min Summer 47.230 0.36 1.9 0.8 1.0 12 min Summer 47.230 0.30 0.7 1.6 0.8 12 min Summer 47.230 0.30 0.6 1.5 0.8 12 min Su						5.7		
144C min Summer 47.273 0.033 3.1 3.7 0.8 216C min Summer 47.261 0.061 2.3 3.0 0.8 2860 min Summer 47.263 0.063 1.8 2.7 0.8 576C min Summer 47.233 0.025 1.3 2.0 0.8 7260 min Summer 47.233 0.025 0.3 1.6 0.8 7260 min Summer 47.233 0.025 0.7 1.6 0.8 10000 min Summer 47.233 0.025 10.7 1.6 0.8 10000 min Summer 47.233 0.025 10.1 10.0 0.8 11 min Ninter 47.260 0.725 10.1 10.0 0.8 12 min Ninter 47.219 0.212 10.9 21.0 0.8 15 min Summer 150.036 0.0 22.8 21 16 min Summer 150.036 0.0 22.8 21 17 min Summer 150.036 0.0 22.8 21 18 min Summer 150.036 0.0 22.9 78 19 min Summer 120.777 0.0 24.6 120 20 min Summer 25.306 0.0 25.5 140 20 min Summ	720 min 8	Summer 4	7.402	0.102	5.2	5.1		
2880 min Summer 47.253 0.053 1.8 2.7 0 K 4522 min Summer 47.234 0.044 1.3 2.2 0 K 5760 min Summer 47.333 0.033 0.038 1.8 0 K 6640 min Summer 47.333 0.033 0.7 1.6 0 K 10090 min Summer 47.333 0.033 0.7 1.6 0 K 10090 min Summer 47.331 0.033 0.7 1.6 0 K 10090 min Summer 47.331 0.023 0.7 1.6 0 K 10090 min Summer 47.331 0.021 10.1 10.0 0 K 20 min Summer 47.339 0.021 10.1 10.0 0 K 30 min Summer 14.209 Volume Volume Volume (mins) 0 K 40 min Summer 150.036 C.0 22.8 21 15 min Summer 150.036 C.0 22.4 10 16 min Summer 25.009 C.0 23.4 10 22 min Summer 25.009 C.0 26.2 10 22 min Summer 25.009 C.0 26.9 10 24 min Summer 25.009 C.0 26.9 10 25 min Summer 24.017 C.0 26.9 10								
4320 min Summer 47.239 0.044 1.3 2.2 0 K 5760 min Summer 47.239 0.025 1.0 2.0 0 K 7200 min Summer 47.233 0.025 0.6 1.8 0 K 10990 min Summer 47.233 0.025 0.7 1.6 0 K 10990 min Summer 47.233 0.025 10.1 10.0 0 K 11 min Number 47.200 0.051 10.1 10.0 0 K 30 min Number 47.200 0.051 10.1 10.0 0 K 45 min Number 47.200 Volume Volume Value Volume Value Volume Value 31 min Summer 150.036 0.0 22.8 21 12 min Summer 150.036 0.0 22.4 30 61 min Summer 25.700 0.0 22.4 30 62 min Summer 25.700 0.0 22.4 30 10 min Summer 25.707 0.0 6.1.8 100 24 min Summer 25.717 0.0 6.1.9 100 25 min Summer 13.766 0.0 35.7 18 10 min Summer 25.717 0.0 54.7 198 10 min Summer 14.								
7200 min Summer 47.235 0.021 0.8 1.8 0.8 10090 min Summer 47.233 0.021 0.7 1.6 0.8 10090 min Summer 47.233 0.021 0.1 10.0 0.8 1.5 0.8 11 min Number 47.233 0.021 10.1 10.0 0.8 1.5 0.8 20 min Number 47.239 0.021 10.1 10.0 0.8 3.6 1.5 0.8 20 min Number 47.219 0.419 0.419 10.9 21.0 0.8 3.6 3.6 20 min Number 47.219 0.419 0.419 10.9 21.0 0.8 3.6 3.6 21 min Number 47.219 0.419 Volume (mins) Volume (mins) (mins) 3.6 3								
0640 min Summer 47.333 0 023 0.7 1.6 0.8 10990 min Summer 47.331 0 023 0.6 1.5 0.8 11 min Winter 47.301 0 020 10.1 10.0 0.8 40 min Winter 47.309 0.419 10.9 21.0 0.8 8 term fmin Winter 47.309 0.419 10.9 21.0 0.8 8 term fmin Winter 47.319 0.419 10.9 21.0 0.8 8 term fmin Winter 47.319 0.419 10.9 21.0 0.8 11 min Winter 47.319 0.419 10.9 21.0 0.8 12 min Summer 150.356 0.0 22.8 21 13 min Summer 150.356 0.0 22.8 21 14 min Summer 150.356 0.0 22.8 21 15 min Summer 15.366 0.0 22.9 38 100 min Summer 25.366 0.0 22.9 38 100 min Summer 24.377 0.0 61.8 100 24. min Summer 11.364 0.0 24.7 236 605 min Summer 11.364 0.0 24.7 236 605 min Summer 11.364								
1: min Ninter 4.100 0.001 10.1 10.0 0 K 3: min Ninter 4019 0.019 10.9 21.0 0 K Stars Rain [mache] Yoluse Yolume (mins) First [mache] Yoluse Yolume (mins) 10: min Summer 150.036 0.0 22.8 21 10: min Summer 150.036 0.0 22.8 21 10: min Summer 150.036 0.0 22.8 21 10: min Summer 15.000 0.0 22.9 16 10: min Summer 25.000 0.0 23.4 10 22. min Summer 25.000 0.0 25.5 10 36: min Summer 25.000 0.0 23.6 198 10: min Summer 11.054 0.0 25.7 256 23: min Summer 11.054 0.0 53.1 32.4 72: min Summer 0.030 0.0 53.1 32.4 72: min Summer 4.014 0.0 0.5.4 736 360 min Summer 3.010 0.0 54.4 736 216.1 0.00 54.4 736 216.1 0.00 74.6 1100 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
At min Number 47.719 0.41910.921.00 KStarm EventRain (ma)Finoded Volume (m ²)Finances Volume (m ²)Time-Peak 								
Event (max/hc) Volume Volume (mins) 15 min Summer 150.336 0.0 22.8 21 30 min Summer 97.300 0.0 29.4 30 60 min Summer 55.608 0.0 22.8 21 31 min Summer 55.608 0.0 22.2 46 120 min Summer 55.608 0.0 22.2 46 121 min Summer 55.608 0.0 22.2 46 122 min Summer 55.608 0.0 22.2 46 120 min Summer 55.706 0.0 42.9 46 100 min Summer 55.717 0.0 60.8 100 24.1 min Summer 14.717 0.0 56.7 296 600 min Summer 14.717 0.0 58.1 314 725 win Summer 14.74 0.0 58.4 736 600 min Summer 0.302 0.0 54.4 736 746 win Summer 4.74 0.0								
Event [maybe] Volume (m ²) Volume (m ²) (mins) 12 min Summer 150.036 0.0 22.8 21 32 min Summer 97.000 0.0 29.4 30 60 min Summer 95.060 0.0 22.9 46 322 min Summer 95.060 0.0 22.9 78 100 min Summer 25.717 0.0 60.8 110 22.4 min Summer 25.717 0.0 60.8 110 24.4 min Summer 14.717 0.0 60.8 110 360 min Summer 14.717 0.0 64.7 236 603 min Summer 14.717 0.0 64.7 236 603 min Summer 14.362 0.0 53.1 314 722 min Summer 0.362 0.0 64.7 236 610 min Summer 3.91 0.0 53.4 736 721 min Summer 3.91 0.0 53.4 736 726 min Summer 3.91 0.0 <	8		Rain	Flooded	Disch	inge Tir	na-Paak	
30 min Suscer 97.000 0.0 29.4 30 60 min Suscer 95.009 0.0 30.2 46 120 min Suscer 25.717 0.0 42.9 78 100 min Suscer 25.717 0.0 45.5 140 360 min Suscer 10.358 0.0 95.5 140 360 min Suscer 11.354 0.0 55.5 140 360 min Suscer 11.354 0.0 55.7 236 60 min Suscer 11.354 0.0 56.7 236 60 min Suscer 11.354 0.0 56.7 236 60 min Suscer 11.354 0.0 54.7 236 610 min Suscer 3.733 0.0 59.1 314 720 min Suscer 3.76 0.160 51.4 100 465 min Suscer 3.914 0.0 53.4 736 316. min Suscer 3.911 0.0 53.4 736 3260 min Suscer 3.911 0.0 74.6 1100 3860 min Suscer 3.912 0.0 74.6 1400 3860 min Suscer 1.923 0.0 74.6 1400 3860 min Suscer 1.923 0.0 74.8 1455 <td>Event</td> <td></td> <td></td> <td>Volume</td> <td>Volu</td> <td>me (</td> <td></td> <td></td>	Event			Volume	Volu	me (
60 x1m Summer 59,509 0.0 30.2 46 120 x1m Summer 35,366 0.0 42,9 78 100 x1m Summer 25,477 0.0 63,6 110 221 x1m Summer 20,358 0.0 95,5 140 360 x1m Summer 11,564 0.0 53,6 198 600 x1m Summer 11,564 0.0 53,1 354 725 x1m Summer 9,783 0.0 53,1 354 725 x1m Summer 9,783 0.0 53,1 354 725 x1m Summer 0.362 0.0 61,2 376 464 x1m Summer 6,714 0.0 53,4 736 2161 x1m Summer 3,911 0.0 53,4 736 2161 x1m Summer 3,911 0.0 74,6 1100 2600 x1m Summer 2,630 0.0 74,4 1455 4320 x1m Summer 1,514 0.0 73,4 2454								
120 min Summer 05.066 0.0 42.9 78 100 min Summer 25.717 0.0 60.8 100 241 min Summer 20.477 0.0 95.6 140 365 min Summer 11.544 0.0 53.6 198 480 min Summer 11.544 0.0 53.7 256 605 min Summer 9.733 0.0 53.1 31.4 725 min Summer 0.134 0.0 54.5 494 1441 min Summer 6.174 0.0 53.4 736 2161 min Summer 6.174 0.0 53.4 736 2161 min Summer 6.174 0.0 53.4 736 2161 min Summer 3.91 0.0 74.6 1100 2600 min Summer 3.920 0.0 74.6 1100 2600 min Summer 1.923 0.0 94.4 1452 4325 min Summer 1.930 0.0 84.1 1200 2600 min Summer 1.931 0.0 74.8 1452								
24.1 min Summer 20.398 0.0 19.5 140 360 min Summer 10.717 0.0 53.6 198 460 min Summer 11.537 0.0 54.7 256 500 min Summer 9.753 0.0 54.1 354 725 win Summer 0.362 0.0 61.2 376 966 win Summer 6.764 0.0 53.4 736 966 win Summer 6.764 0.0 53.4 736 2161 min Summer 3.911 0.0 73.6 1100 2660 min Summer 2.630 0.0 74.6 140 2161 min Summer 2.630 0.0 73.4 1455 4320 min Summer 1.614 0.0 78.4 1455 4320 min Summer 1.614 0.0 78.3 2004	120 min S	inner - 1	35.366	C.0		2.9		
360 min Summer 11.3544 0.0 03.6 198 600 min Summer 11.3544 0.0 05.7 236 601 min Summer 9.733 0.0 59.1 3.14 725 win Summer 0.392 0.0 61.2 376 960 win Summer 6.1746 0.0 04.5 494 144. min Summer 6.1746 0.0 04.5 494 144. min Summer 7 0.01 0.4.5 494 216. min Summer 7 0.01 0.0 145. 100 3667 min Summer 7 0.630 0.0 18.4 145. 4320 min Summer 7 0.630 0.0 78.4 145. 4320 min Summer 7 0.630 0.0 78.4 145.								
605 min Summer 9.733 0.0 53.1 314 725 min Summer 0.1365 0.0 61.2 176 965 min Summer 0.1365 0.0 61.5 494 144 min Summer 4.71 0.0 53.4 736 2161 min Summer 3.91 0.0 74.6 1100 2660 min Summer 3.91 0.0 74.6 1100 2660 min Summer 3.930 0.0 74.4 1455 4322 min Summer 1.923 0.0 74.3 2200 5767 min Summer 1.514 0.0 78.3 2904	360 min 8	inner :	14.717	5.0		3.6	198	
725 win Sommer 0.385 0.0 61.2 376 465 win Sommer 6.104 0.0 54.5 494 144. min Sommer 6.701 0.0 54.4 736 216. min Sommer 6.701 0.0 54.4 736 216. min Sommer 3.611 0.0 54.4 100 3660 min Sommer 3.630 0.0 78.4 1453 4320 min Sommer 1.632 0.0 64.1 200 5767 m Sommer 1.614 0.0 68.3 2604								
144. min Dummer 4.701 0.0 55.4 736 216. min Summer 3.91. 0.0 74.6 1100 2600 min Summer 2.630 0.0 38.4 1452 4320 min Summer 1.923 0.0 84.1 2200 5760 m Summer 1.514 0.0 88.3 2304	72.5 min 5	conner	0.392	C.0	1	51.2	376	
216. min Summer 3.91. 0.0 74.6 1100 2005 min Summer 2.930 0.0 784 1455 4320 min Summer 1.923 0.0 84.1 2200 5767 m Summer 1.514 0.0 88.3 2904								
4320 min Summer 1.923 C.O 84.1 2200 5760 m Summer 1.514 C.O 88.3 2904	2160 min S	TEROT	$\beta = 2.1 \dots$	0.0		1.6	L100	
5760 n n Summer 1,514 C.O 58.3 2304								
2200 min Sommer 1.257 S.H. 21.6 3622	5760 m m s	unner	1.514	C.0		8.3	2904	
H64. min Sommer 1.1779 5.10 94.4 4400								
10005 min Sommer 0.049 5.0 76.8 5056	1008. m·m 1	CONTRACT.	0.049	6.0		/c.8	5856	
15 min winter 150.356 0.0 15.5 21 30 min winter 97.300 0.0 53.0 31	lt min w							
01982-2015 XF Solutiona								

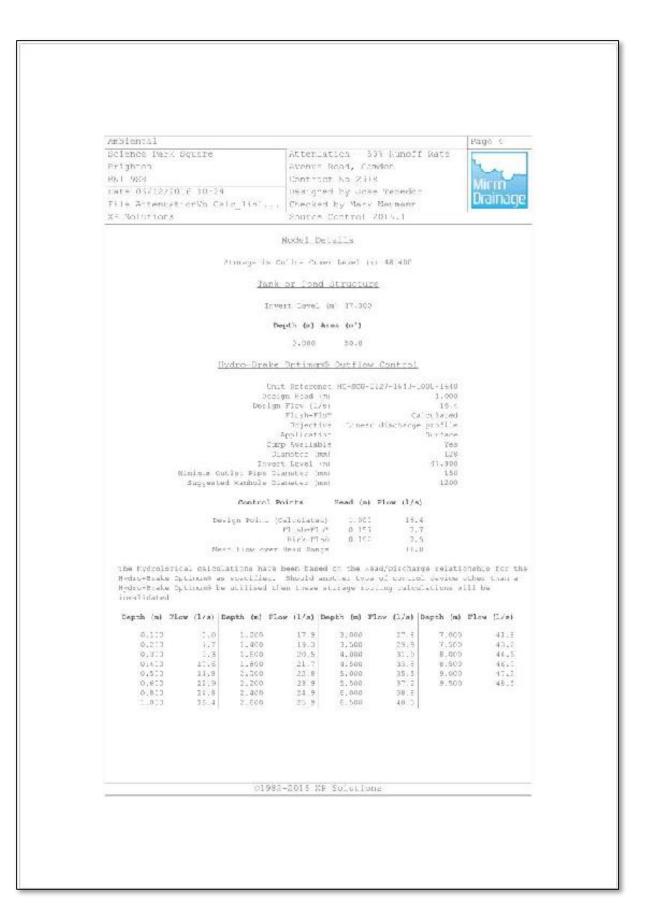
© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 67 of 97

File AttenuationVo Cald_lini Checked by Mark Naumann Millin Drainage	Ambiental						Page 2
Ph.1 Unit vent to 5/2318 Unit vent to 5/2318 Used greed by Jess Treneder Tile Attendation Vol Cale [1:1] Crecked by Jess Treneder Diversition Vol Cale (1:1] X2 Builtier Summer Control 2014.1 Control 100 year Return Period (4408) Control 100 year Return Period (4409) Control 100						off Rate	
Tate 0.07/12/2016 10:24 Usaged by Jose Tenedor Checked by Mark Natman Surves Control 2014.1 Status Surves Control 2014.1 Status Status Status Status<	-						Ly _
THE Attenuet of Volum Source Control 2015.1 Source Control 2015.1 Checked by Mark Maumant Source Control 2015.1 Checked by Mark Maumant Source Control 2015.1 Store Control 2015.1 <t< td=""><td></td><td></td><td></td><td></td><td></td><td>dan</td><td>Micro</td></t<>						dan	Micro
X2 Bolntiors Source Control 2014.1 Storr North For brack For brack <th< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th>Drainage</th></th<>							Drainage
$ \frac{Starr}{Vent} \frac{Max}{Va} \frac{Max}{Va} \frac{Max}{Va} \frac{Max}{Va} \frac{Max}{Va} \frac{Max}{Va} \frac{Starus}{Va} $				-			
$ \frac{Starn}{Veent} \frac{Nax}{v_0} \frac{Nax}{v_$	Surperv of Results	for 1	10 sea	r Belu	- Per-	(s03+) from	
Event Early L Depth Control Volume Volume 60 min Nintee 41,200 0.601 10.7 20.4 0.8 120 airs Nintee 41,250 0.221 8.5 12.5 0.8 120 airs Nintee 41,480 0.116 5.7 5.4 0.8 240 airs Nintee 41,480 0.117 5.7 5.4 0.8 240 airs Nintee 41,487 0.117 5.7 5.3 0.8 240 airs Nintee 41,487 0.117 5.7 5.3 0.8 240 airs Nintee 41,487 0.117 5.7 5.3 0.8 2100 airs Nintee 41,487 0.013 1.3 3.7 0.8 2100 airs Nintee 41,320 0.021 1.6 2.5 0.8 2100 airs Nintee 41,320 0.022 0.65 1.5 0.8 2100 airs Nintee 41,323							
60 min Winter 41.000 0.400 10.7 20.4 0.8 120 min Winter 41.550 0.223 9.7 16.3 0.8 120 min Winter 41.427 0.171 6.7 6.3 0.8 320 min Winter 41.294 0.024 4.8 4.7 0.6 320 min Winter 41.294 0.024 4.8 4.7 0.6 320 min Winter 41.330 0.061 2.3 3.1 0.8 32166 min Winter 41.330 0.061 1.3 2.2 0.8 32166 min Winter 41.330 0.023 0.6 1.5 0.8 32166 min Winter 41.330 0.025 0.5 1.4 0.8 32160 min Winter		Level	Depth	Control	Volume		
122 min Winter 47.250 0.326 9.7 16.3 0 K 186 min Winter 47.251 0.221 8.5 12.5 0 K 366 min Winter 47.468 0.163 6.7 6.3 0 K 366 min Winter 47.468 0.163 6.7 6.3 0 K 366 min Winter 47.469 0.064 4.6 4.7 0 K 366 min Winter 47.260 0.064 4.6 4.7 0 K 366 min Winter 47.261 0.061 2.3 3.1 0 K 2166 min Winter 47.261 0.061 2.3 3.1 0 K 2166 min Winter 47.261 0.061 1.3 2.2 0 K 4336 min Winter 47.230 0.32 0.61 1.5 0 K 4336 min Winter 47.230 0.022 0.6 1.5 0 K 5766 min Winter 47.230 0.022 0.5 1.4 0 K 10590 min Winter 47.230 0.022 0.5 1.3 0 K 10590 min Winter 47.230 0.022 0.5 1.4 0 K 10590 min Winter 47.226 0.026 0.5 1.3 0 K 10590 min Winter 120.3							
$\frac{160}{240} \min Vinter 47.551 0.251 8.6 12.5 0 K 144 min Vinter 47.488 0.185 7.7 3.4 0 K 145 min Vinter 47.487 0.171 6.7 5.3 0 K 145 min Vinter 47.490 0.064 4.6 4.7 0 K 145 min Vinter 47.385 0.068 4.0 1.3 0 K 144 min Vinter 47.385 0.068 4.0 1.3 0 K 144 min Vinter 47.385 0.061 2.3 3.1 0 K 144 min Vinter 47.385 0.061 2.3 3.1 0 K 144 min Vinter 47.385 0.061 2.3 3.1 0 K 144 min Vinter 47.385 0.061 1.3 2.2 0 K 145 min Vinter 47.385 0.063 0.7 1.6 2.5 0 K 145 min Vinter 47.380 0.033 0.7 1.6 0 K 145 min Vinter 47.380 0.033 0.7 1.6 0 K 145 min Vinter 47.380 0.033 0.7 1.6 0 K 157 min Vinter 47.380 0.033 0.7 1.6 0 K 109 min Vinter 47.380 0.035 0.7 1.6 0 K 109 min Vinter 47.380 0.035 0.7 1.6 0 K 109 min Vinter 47.380 0.025 0.5 1.3 0 K 109 min Vinter 47.380 0.025 0.5 1.4 0 K 109 min Vinter 47.380 0.025 0.5 1.3 0 K 109 min Vinter 47.288 0.025 0.5 1.3 0 K 109 min Vinter 20.388 0.02 0.5 1.3 0 K 109 min Vinter 20.388 0.0 81.1 82 120 min Vinter 20.388 0.0 140.1 138 480 min Vinter 20.388 0.0 140 1.1 148 480 min Vinter 20.388 0.0 140 1.1 148 480 min Vinter 20.388 0.0 15.5 1.16 360 min Vinter 11.664 0.0 53.5 256 600 min Vinter 11.664 0.0 53.5 1080 245 min Vinter 1.1564 0.0 53.5 1080 245 min Vinter 1.1574 0.0 50.8 0.944 576 min Vinter 1.1577 0.0 50.4 0.944 576 min Vinter 1.1577 0.0 50.4 0.944 576 min Vinter 1.1577 0.0 50.4 0.944 576 min Vinter 1.277 0.0 10.5 7 4424$							
360 min Winter 47.407 0.127 6.7 6.3 0 H 480 min Winter 47.406 0.105 5.4 5.3 0 H 520 min Winter 47.304 0.064 4.6 4.7 0 F 720 min Winter 47.374 0.074 3.1 3.7 0 K 960 min Winter 47.361 0.061 2.3 3.1 0 F 2160 min Winter 47.361 0.061 1.3 2.7 0 K 2160 min Winter 47.337 0.031 0.9 1.9 0 F 2160 min Winter 47.337 0.031 0.9 1.9 0 F 4320 min Winter 47.337 0.033 0.9 1.9 0 F 5760 min Winter 47.330 0.032 0.6 1.5 0 K 8640 min Winter 47.328 0.025 0.5 1.4 0 K 10090 min Winter 47.328 0.025 0.5 1.3 0 K 10090 min Winter 47.328 0.025 0.5 1.4 0 K 10090 min Winter 47.320 0.025 0.5 1.3 0 K 10090 min Winter 47.320 0.025 1.5 1.4 0 K 10090 min Winter 47.320 0.025 1.5 1.4 1.2 10090				8.5	12.5		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	240 min Winter	47.488	0.168	7.7	9.4	0.10	
SCC min winner 47.284 0.064 4.6 4.7 0 F TCC min winner 47.285 0.085 4.0 1.3 0 F DEC min Winner 47.281 0.061 2.3 3.1 0 F 1440 min Winner 47.281 0.061 2.3 3.1 0 F 2260 min Winner 47.285 0.061 1.3 2.2 0 F 2360 min Winner 47.237 0.033 0.9 1.9 0 F 4330 min Winner 47.233 0.020 0.6 1.5 0 K 5760 min Winner 47.233 0.020 0.5 1.4 0 K 7500 min Winner 47.236 0.020 0.5 1.4 0 K 10590 min Winner 47.236 0.020 0.5 1.4 0 K 10590 min Winner 59.609 C.0 40.5 48 10590 min Winner 25.717 C.0 62.5 116 2120 min Winner 25.717 C.0 50.5 146 360 min Winner 14.717 C.0 60.1 198 2120 min Winner 14.717 C.0 50.5 146 360 min Winner 14.717 C.0 50.5 746 360 min							
960 min Winter 47.374 0.074 3.1 3.7 0 K 1440 min Winter 47.351 0.061 2.3 3.1 0 K 2160 min Winter 47.353 0.021 1.6 2.5 0 K 2380 min Winter 47.333 0.023 0.9 1.9 0 K 5760 min Winter 47.333 0.025 0.7 1.6 0 K 5760 min Winter 47.333 0.025 0.5 1.4 0 K 8640 min Winter 47.328 0.025 0.5 1.4 0 K 10990 min Winter 47.328 0.025 0.5 1.3 0 K 10990 min Winter 47.328 0.025 0.5 1.4 0 K 10990 min Winter 47.328 0.025 0.5 1.3 0 K 10990 min Winter 47.328 0.025 0.5 1.4 0 K 10990 min Winter 47.328 0.025 0.5 1.3 0 K 10990 min Winter 47.328 0.025 0.5 1.4 0 K 10990 min Winter 59.509 0.0 1.5 1.4 0 K 120 min Winter 20.338 0.0 2.5 1.6 200 min Winter 16.717 0	SSC min winter	47.394	0.054	4.6	4.7	U 16	
1440 min Winter 47.361 0.063 2.3 3.1 0.8 2160 min Winter 47.351 0.021 1.6 2.5 0.8 2280 min Winter 47.353 0.040 1.3 2.2 0.8 4320 min Winter 47.333 0.033 0.9 1.9 0.8 5760 min Winter 47.333 0.032 0.6 1.5 0.8 7250 min Winter 47.333 0.022 0.6 1.4 0.8 8640 min Winter 47.328 0.025 0.5 1.4 0.8 10090 min Winter 47.326 0.025 0.5 1.3 0.8 10090 min Winter 59.509 0.0 4.0 8 10090 min Winter 59.509 0.0 4.1 82 120 min Winter 10.332 20.388 0.0 21.5 146 120 min Winter 14.717 0.0 51.5 146 365 146 120 min Winter 1.674 0.0 51.5 146 365 146 365 146 365 146 <							
2880 min Nintes 47.345 0.040 1.3 2.2 0.8 4320 min Nintes 47.337 0.033 0.9 1.9 0.8 5760 min Nintes 47.333 0.033 0.7 1.6 0.8 7700 min Nintes 47.333 0.023 0.7 1.6 0.8 8640 min Nintes 47.328 0.023 0.5 1.4 0.8 10090 min Nintes 47.326 0.025 0.5 1.3 0.8 10090 min Nintes 47.326 0.025 0.5 1.3 0.8 10090 min Nintes 59.609 0.0 40.5 48 120 min Wintes 59.609 0.0 40.5 48 120 min Wintes 59.517 0.0 6.1 82 160 min Nintes 14.717 0.0 51.5 146 160 min Nintes 11.664 0.0 53.5 256 600 min Nintes 11.664 0.0 53.5 256 600 min Nintes 11.664 0.0 53.5 256 600 min Nintes 11.664 0.0	1440 min Winter	47.361	0.061	2.3	3.1	0 K	
5760 min winter 47.533 0.025 0.7 1.6 0 min vinter 47.330 0.025 0.6 1.5 0 Ninter 47.330 0.025 0.6 1.5 0 Ninter 47.326 0.025 0.5 1.4 0 Ninter 47.326 0.025 0.5 1.4 0 Ninter 47.326 0.025 0.5 1.3 0 Ninter 47.326 0.025 0.5 1.4 0 Ninter 47.326 0.025 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 1.4 0.5 0.5 0.5 1.4 0.5 0.5 0.5 1.4 0.5 0.5 0.5 0.5 1.4 0.5 0.5 0.5 0.5 1.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5							
Seed min Winter 47.328 0.028 0.5 1.4 0.8 10090 min Winter 47.326 0.026 0.5 1.3 0.8 Event Imm/nrl Volume Volume Time-Feak Event Imm/nrl Volume Volume Time-Feak 60 min Winter 59.609 0.0 40.5 48 120 min Winter 35.366 0.0 68.1 82 180 min winter 25.717 0.0 62.5 116 210 min Winter 26.338 0.0 53.5 126 210 min Winter 11.664 0.0 53.5 256 600 min Winter 11.664 0.0 53.5 256 600 min Winter 11.664 0.0 53.5 256 600 min Winter 30.12 0.0 50.5 376 960 min Winter 30.12 0.0 57.5 164 2165 min Winter 30.12 0.0 57.5 167 220 min Winter 30.12 0.0 57.5 167 221 min Winter 30.12 </td <td>4320 min Winter</td> <td>47.337</td> <td>0.035</td> <td>0.9</td> <td>1.9</td> <td>O R</td> <td></td>	4320 min Winter	47.337	0.035	0.9	1.9	O R	
Seed min Winter 47.328 0.028 0.5 1.4 0.8 10090 min Winter 47.326 0.026 0.5 1.3 0.8 Event Imm/nrl Volume Volume Time-Feak Event Imm/nrl Volume Volume Time-Feak 60 min Winter 59.609 0.0 40.5 48 120 min Winter 35.366 0.0 68.1 82 180 min winter 25.717 0.0 62.5 116 210 min Winter 26.338 0.0 53.5 126 210 min Winter 11.664 0.0 53.5 256 600 min Winter 11.664 0.0 53.5 256 600 min Winter 11.664 0.0 53.5 256 600 min Winter 30.12 0.0 50.5 376 960 min Winter 30.12 0.0 57.5 164 2165 min Winter 30.12 0.0 57.5 167 220 min Winter 30.12 0.0 57.5 167 221 min Winter 30.12 </td <td>5760 min winter 2250 min Winter</td> <td>47.333</td> <td>0.035</td> <td>0.7</td> <td>1.6</td> <td>0 K 0 K</td> <td></td>	5760 min winter 2250 min Winter	47.333	0.035	0.7	1.6	0 K 0 K	
Stears Hain Flooded Discharge Time-Peak Event Jam/nz Volume Volume Volume Jam/nz 60 Nin Winter 59.500 C.0 40.5 48 120 Winter 35.366 C.0 40.5 48 120 Winter 25.71 C.0 82.5 116 240 Nin Winter 25.71 C.0 82.5 116 240 Nin Winter 12.571 C.0 85.5 146 240 Nin Winter 14.71 C.0 85.5 146 240 Nin Winter 14.71 C.0 53.5 256 600 Nin Winter 14.73 C.0 53.5 256 600 Nin Winter 8.733 C.0 50.5 776 960 Nin Winter 3.210 C.0 3.77 740 2160 Nin Winter 3.201 C.0 83.2 1080 2240	854C min Winter	47.328	0.025	0.5	1.4	0 K	
$(n^2) (n^2)$ 60 xin Winter 59.509 0.0 40.5 48 120 xin Winter 35.366 0.0 48.1 82 180 xin Winter 25.717 0.0 82.5 116 240 xin Winter 20.335 146 340 xin Winter 14.717 0.0 85.5 146 340 xin Winter 14.717 0.0 53.5 256 600 xin Winter 9.733 0.0 50.5 376 700 xin Winter 9.132 0.0 50.5 776 960 xin Winter 6.136 0.0 32.2 498 1441 xin Winter 2.690 0.0 87.8 1472 4562 xin Winter 1.823 0.0 84.2 2164 9766 vin Winter 1.823 0.0 84.2 2164 9766 vin Winter 1.874 0.0 84.2 2164 9766 vin Winter 1.823 0.0 84.2 2164 9766 vin Winter 1.824							
120 min Winter 35.366 0.0 68.1 82 180 min Winter 25.717 0.0 82.5 116 240 min Winter 20.358 0.0 85.5 146 360 min Winter 20.357 0.0 85.5 146 360 min Winter 11.664 0.0 53.5 256 600 min Winter 11.664 0.0 53.5 256 700 min Winter 11.664 0.0 50.2 316 720 min Winter 0.1323 0.0 50.5 776 960 min Winter 0.132 0.0 77.7 740 2166 min Winter 0.761 0.0 77.7 740 21660 min Winter 0.761 0.0 77.7 740 21660 min Winter 0.763 0.0 87.8 1472 4320 min Winter 1.823 0.0 84.2 2164 5760 min Winter 1.823 0.0 84.2 2164 5760 min Winter 1.823 0.0 84.2 2164 5760 min Winter 1.823 0.0 10.8<							
180 min winter 25.717 5.0 32.5 116 260 min Winter 20.358 5.0 55.5 146 360 min Winter 14.717 5.0 50.5 146 480 min Winter 11.664 5.0 53.5 256 600 min Winter 5.733 5.0 55.2 316 720 min Winter 5.733 5.0 56.2 316 720 min Winter 6.116 5.0 52.2 490 144 min Winter 6.116 5.0 52.2 490 144 min Winter 6.116 5.0 52.7 740 2166 min Winter 5.471 5.0 57.7 740 2166 min Winter 5.300 5.0 87.8 1473 4525 min Winter 1.823 6.0 94.2 2164 5566 min Winter 1.544 6.0 94.2 2164 5566 min Winter 1.547 6.0 10.2 72 8641 min Winter 1.547 5.0 10.72 1672 8641 min Winter 1.579 5.0 105.7							
240 min Winter 20.368 5.0 95.5 146 360 min Winter 14.717 5.0 80.1 198 480 min Winter 11.664 5.0 55.5 256 600 min Winter 11.664 5.0 55.5 256 600 min Winter 11.664 5.0 50.5 256 720 min Winter 0.332 0.0 50.5 376 960 min Winter 0.136 5.0 7.2 490 1442 min Winter 0.106 5.0 7.7 740 2160 min Winter 0.3011 5.0 83.5 1080 2460 min Winter 1.923 6.0 87.8 1472 4526 min Winter 1.923 6.0 94.2 2164 5766 min Winter 1.923 6.0 9.4 20.4 5766 min Winter 1.277 6.0 172.6 36.72 9641 min Winter 1.279 5.0 172.6 36.72							
480 xim Wintex 11.664 0.0 53.5 256 600 xim Wintex 9.733 0.0 56.2 316 720 xim Wintex 0.322 0.0 56.5 376 960 xim Wintex 0.322 0.0 56.5 376 160 xim Wintex 0.126 0.0 72.2 690 161 xim Wintex 0.476 0.0 77.7 740 2166 xim Wintex 0.011 0.0 83.5 1080 2660 xim Wintex 0.893 0.0 87.8 1473 4520 xim Wintex 1.893 0.0 94.2 2164 5766 xim Wintex 1.754 0.0 127.6 76 9061 xim Wintex 1.757 0.0 127.6 76	2:0 min Winter	20.398			15.5	146	
600 min Winter 9.733 0.0 50.2 316 720 min Winter 0.132 0.0 50.5 376 360 min Winter 0.132 0.0 50.5 376 160 min Winter 0.132 0.0 50.5 376 160 min Winter 0.160 0.0 7.7 740 2160 min Winter 3.911 0.0 83.5 1080 2680 min Winter 1.823 0.0 87.8 1473 4520 min Winter 1.514 0.0 94.2 2164 5766 min Winter 1.514 0.0 9.9 944 7200 min Winter 1.257 0.0 122.6 3672 8661 min Winter 1.379 5.0 125.7 5424							
720 min Winter 0.322 0.0 50.5 976 960 min Winter 6.136 0.0 52.2 890 1640 min Winter 6.761 0.0 57.7 740 2460 min Winter 3.011 0.0 83.5 1080 2600 min Winter 3.011 0.0 87.6 1473 4526 min Winter 1.923 0.0 84.2 2164 5766 min Winter 1.514 0.0 9.0 944 7207 min Winter 1.577 0.0 122.6 3672 9661 min Winter 1.379 0.0 125.7 5424	600 min Winter	9.733	с. С.	0	56.2	316	
1480 min Winterr 0.761 0.0 77.7 740 2160 min Winterr 0.011 0.0 60.5 1080 2660 min Winterr 2.690 0.0 67.6 1472 4500 min Winterr 1.923 0.0 67.6 1472 5000 min Winterr 1.514 0.0 60.8 944 7000 min Winterr 1.257 0.0 102.6 1672 8061 min Winterr 1.379 0.0 105.7 5424			e c.	0	58.5		
2660 min Window 2,690 C.0 87.8 1473 4520 min Window 1,823 C.0 84.2 2164 5760 wim Window 1,514 C.0 80.0 9944 7200 wim Window 1,257 C.0 1,524 3672 8661 min Window 1,279 C.0 1,577 5424	1000 min Winter						
4520 min Winters 1,923 0,0 94.2 2164 5760 wim Winters 1,514 0,0 90.8 9944 7200 wim Winters 1,277 0,0 102.6 2672 8661 min Winters 1,379 0,0 125.7 2424	2160 min Winter	3.911	Ξ.	0	53.5	1080	
5765 vin Winter 1.514 C.O. 50.8 2944 7205 vin Winter 1.257 C.O. 102.6 3672 0661 vin Winter 1.379 C.O. 105.7 5424							
064. min Winter 1.379 0.0 125.7 4424	5760 win Winter	1.514	с.	0	50.8	2944	
01982-2015 XP Solutions	0198	2-201	S XP S:	Julion	12		

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 68 of 97



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 69 of 97



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 70 of 97

Science Fark Square Frighton Hi 988 Tate 05/12/10.6 10-25 Tile ArtenueltorVo Calc_lin' Source Control /016.1 Same Keent Science Keent Science Control /016.1 Science Control /016.1 Same Keent Science Control /016.1	Science Park Square							Page 1
BAL 988 Chart 05/12/50.5 [10:23] Chart 05/12/50.5 [10:23] Chart not x Chart not x <thc< th=""><th></th><th></th><th>Atte</th><th>enuatio</th><th>n 38</th><th>dating</th><th>Late</th><th></th></thc<>			Atte	enuatio	n 38	dating	Late	
Note: Designed by Jose Tenedor Checked by Mark Natmann Source Control 2014.1 Store Source Control 2014.1 Store Source Control 2014.1 Store New Mark Natmann Source Control 2014.1 Store New Mark Natmann Source Source 30.000 Store New Mark Natmann Source 2014.1 Store Store Store Store Store Store Store Store Store Store Store Store Store								Ly m
Title Attenuation/Cale_lin' Checked by Wark Narman X* Nointer Control 2014.1 Concern Source Control 2014.1 Surrer of Results for 100 year Return Pariod (4408). Simmer Newed Revel Depth Control Volume (1) New Revel (1) Simmer Newed Revel (1) New Revel (1) Simmer Newed (1) New Revel (1) Nevel (1) New Revel (1)							la in	Micro
X= Bolintions Source Control 2015.1 Sterr Nove New Depth Control 2015.1 Xeent New Depth Control Volue New Status Reent New Depth Control Volue New Status 13 min symmer 41.230 0.263 18.1 11.5 0.8 22 min Summer 41.237 0.253 18.1 11.9 0.8 122 min Summer 41.237 0.253 18.1 11.9 0.8 24 min Summer 41.237 0.253 18.1 11.9 0.8 122 min Summer 41.237 0.151 13.8 7.7 0.8 244 min Summer 41.237 0.153 13.8 7.7 0.8 252 min Summer 41.235 0.163 1.3 2.8 0.8 252 min Summer 41.220 0.123 3.8 0.8 18.2 18.2 0.8 2146 min Summer 41.235 0.053 1.3 2.0 18.2 0.8 18.3 19.3 2146 min Summer 41.235 0.053 1.3 2.0 18.3 19.3 11.3 2.4		le lin'		-	-			Drainage
$ \frac{Storr}{Freed} New (respective) New (respec$		_		-				
Event Event (x) Factor (x) Papeth (x) Control Volume (x) 15 min summer 7.531 0.251 10.1 11.5 0 15 min summer 7.133 0.255 10.1 11.5 0 0 120 min summer 7.133 0.155 10.1 11.0 0 0 121 min summer 7.1431 0.155 10.2 0.8 0.7 0 0 122 min summer 7.1431 0.155 0.18 0.0 0.15	Simary o	Results	for 1	00 year	Retu	n. Peri	\$04+) bci).
$(x) (x) (x) (x/v) (x^{-1})$ 15 min signature 47.581 0.231 18.1 11.5 0.6 K 36 min signature 47.581 0.263 18.1 13.0 0.5 K 36 min signature 47.583 0.265 18.1 13.0 0.5 K 120 min signature 47.483 0.184 16.6 9.2 0.5 K 120 min signature 47.483 0.184 16.6 9.2 0.5 K 120 min signature 47.495 0.157 13.8 7.7 0.6 K 121 min signature 47.495 0.153 13.5 11.6 0.5 K 126 min signature 47.495 0.153 13.5 11.6 0.5 K 126 min signature 47.495 0.165 4.1 4.6 0.5 K 126 min signature 47.392 0.065 4.1 4.6 0.5 K 126 min signature 47.393 0.065 1.1 3.2 0.6 K 126 min signature 47.393 0.065 1.1 3.2 0.6 K 126 min signature 47.393 0.065 1.1 3.2 0.5 K 126 min signature 47.393 0.065 1.1 3.2 0.5 K 126 min signature 47.393 0.005 1.3 1.7 0.5 K 1260 min signature 47.393 0.005 1.3 1.6 0.5 K 1260 min signature 47.393 0.002 1.3 2.0 0.5 K 1260 min signature 47.392 0.002 0.6 1.4 0.5 K 1260 min signature 47.392 0.002 0.6 1.4 0.5 K 1260 min signature 47.392 0.002 0.6 1.6 0.5 K 12 min Number 41.200 0.021 0.6 1.4 0.5 K 13 min Number 41.202 0.25 118.5 11.6 0.5 K 15 min Number 41.202 0.25 118.5 11.6 0.5 K 15 min Number 41.203 0.002 0.6 2.2 4 12 15 min Number 41.203 0.003 0.6 2.2 4 12 15 min Number 41.204 0.204 10.1 13.2 0.5 K 15 min Number 41.204 0.205 10.5 12.2 15 K 15 min Number 41.204 0.205 10.5 12.2 15 K 15 min Number 41.204 0.20 10.5 12.2 15 K 15 min Number 41.204 0.5 K 15 min Number 41.204 0.5 K 15 min Number 41.205 0.5 K 15 min Num							Status	
32 min finzer 47.260 0.263 18.1 13.0 0 N 60 min finzer 47.453 0.235 18.1 11.0 0 N 120 min finzer 47.453 0.153 13.8 7.7 0 N 240 min finzer 47.453 0.153 13.8 7.7 0 N 240 min finzer 47.433 0.133 13.8 7.7 0 N 240 min finzer 47.443 0.1133 1.6 6.8 0 N 350 min finzer 47.433 0.163 7.1 4.6 0 N 250 min finzer 47.433 0.063 7.1 3 8 0 N 260 min finzer 47.433 0.043 1.8 2.4 0 N 2160 min finzer 47.433 0.043 1.8 2.4 0 N 2160 min finzer 47.333 0.023 0.1 1.4 0 N 2160 min finzer 47.434 0.043 1.8 2.4 0 N 2160 min finzer								
60 min Summer 47.837 0.223 18.1 11.0 0 0 120 min Summer 47.435 0.153 13.8 7.7 0 0 130 min Summer 47.435 0.153 13.8 7.7 0 0 130 min Summer 47.435 0.153 11.6 6.8 0 0 360 min Summer 47.430 0.163 7.3 5.1 0 0 600 min Summer 47.430 0.065 5.3 4.3 0 0 610 min Summer 47.830 0.065 5.3 4.3 0 0 620 min Summer 47.830 0.063 3.1 3.8 0 0 1240 min Summer 47.830 0.063 3.1 3.2.6 0 0 2580 min Summer 47.830 0.032 1.3 2.0 0 0 1.3 2580 min Summer 47.830 0.032 1.3 2.6 0 0 1.3 2620 min Summer 47.320 0.023 1.3 1.6 0 0 0 2000 min Summer 47.320 0.224 19.3 1.6 0 0 0								
180 min 2 mores 47.455 0.155 13.8 7.7 0.8 240 min 2 mores 47.435 0.133 11.6 6.8 0.8 680 min 2 mores 47.435 0.163 7.3 5.1 0.8 680 min 2 mores 47.432 0.052 6.1 4.6 0.8 620 min 2 mores 47.875 0.075 4.3 3.8 0.8 960 min 2 mores 47.875 0.075 4.3 3.8 0.8 960 min 2 mores 47.875 0.075 4.3 3.8 0.8 960 min 2 mores 47.875 0.065 2.3 2.6 0.8 2160 min 2 mores 47.870 0.047 1.8 2.4 0.8 2160 min 2 mores 47.830 0.052 1.3 1.7 0.8 2160 min 2 mores 47.830 0.022 1.3 1.7 0.8 7200 min 2 mores 47.320 0.022 0.6 1.6 0.8 10090 min 2 more 47.320 0.022 0.7 1.5 0.8 11 min Ninter 4.104 0.22.8 </td <td>60</td> <td>nin tunner</td> <td>47.537</td> <td>0.237</td> <td></td> <td></td> <td></td> <td></td>	60	nin tunner	47.537	0.237				
$\frac{340}{360} \min 3 (2000) = 47.437 \ 0.133 \ 11.6 \ 5.8 \ 0.8 \ 0.8 \ 0.000000000000000000000$								
160 min Summer 47.402 0.103 7.3 5.1 0 m 500 min Summer 47.992 0.085 6.1 4.6 0 K 720 min Summer 47.975 0.070 4.3 3.8 0 K 960 min Summer 47.975 0.070 4.3 3.8 0 K 2160 min Summer 47.975 0.065 3.1 3.2 0 K 2160 min Summer 47.930 0.055 1.23 2.6 0 K 4320 min Summer 47.930 0.045 1.23 2.6 0 K 4320 min Summer 47.930 0.045 1.3 2.0 0 K 4320 min Summer 47.930 0.025 1.7 1.7 0 K 4320 min Summer 47.930 0.025 0.7 1.5 0 K 100900 min Summer 47.920 0.26 10.1 13.2 0 K 100900 min Summer 47.920 0.26 10.1 13.2 0 K 110 min Number 41.920 0.26 10.1 13.2 0 K 30 min Number 150.036 0.0 22.8 13 14 7 12 min Number 150.036 0.0 22.8 13.5 13.6 15	240	min Summer	41.437	0.137		6.8		
Size min Summer 47.392 0.053 6.1 4.6 0 0 722 min Summer 47.353 0.065 5.3 4.3 0 0 966 min Summer 47.353 0.065 1.1 3.2 0 0 2160 min Summer 47.353 0.065 1.1 3.2 0 0 2180 min Summer 47.353 0.045 1.8 2.4 0 0 2286 min Summer 47.333 0.045 1.8 2.4 0 0 4320 min Summer 47.333 0.045 1.3 2.0 0 0 0 5766 min Summer 47.332 0.025 0.8 1.6 0 0 0 0.6 1.4 0 0 10090 min Summer 47.329 0.224 0.1 1.3.2 0 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>								
T2C min 2 manes 47.285 0.065 5.3 4.3 0.8 960 min 2 manes 47.285 0.065 4.3 3.8 0.8 1440 min 2 manes 47.253 0.065 1.1 3.2 0.8 2180 min 2 manes 47.253 0.093 2.3 2.6 0.8 2180 min 2 manes 47.253 0.093 1.3 2.0 0.8 4325 min 2 manes 47.235 0.023 1.3 1.7 0.8 7200 min 2 manes 47.232 0.023 0.6 1.6 0.8 90900 min 2 manes 47.232 0.023 0.6 1.4 0.8 10990 min 2 manes 47.232 0.024 10.1 13.2 0.8 12 min Number 47.202 0.25 18.3 11.6 0.8 12 min Number 47.204 0.264 10.1 13.2 0.8 14 min Ninter 47.205 0.264 10.1 13.2 0.8 15 min Summer 50.036 0.0 22.8 19 12 15 min Summer 50.036 0.0								
1440 min Summer 47.363 0.063 1.1 3.2 0.8 2160 min Summer 47.363 0.083 2.3 2.6 0.8 2580 min Summer 47.363 0.085 2.3 2.6 0.8 2580 min Summer 47.363 0.045 1.8 2.4 0.8 5760 min Summer 47.323 0.025 1.0 1.7 0.8 7200 min Summer 47.323 0.025 0.8 1.6 0.8 0040 min Summer 47.323 0.025 0.6 1.4 0.8 10090 min Summer 47.320 0.025 0.6 1.4 0.8 110090 min Summer 47.320 0.025 10.6 1.4 0.8 12 min Ninter 47.320 0.25 18.5 13.6 0.8 40 min Ninter 47.320 0.25 18.5 13.6 0.8 12 min Summer 57.000 0.0 23.4 27 6 23.6 9 13 min Summer 25.008 0.0 22.8 19 72 10 10.6 102 22.4 min Summer 25.019 0.0 22.8 12 12 13.6 102 22.4 min Summer 25	720	nin Bunner	47.385	0.065				
2580 min Summer 47.347 0.043 1.8 2.4 0.8 4532 min Summer 47.340 0.040 1.3 2.0 0.8 5760 min Summer 47.333 0.025 1.0 1.7 0.8 7200 min Summer 47.333 0.025 0.8 1.6 0.8 86640 min Summer 47.329 0.025 0.7 1.5 0.8 10000 min Summer 47.329 0.025 0.7 1.5 0.8 110 min Summer 47.329 0.026 0.6 1.4 0.8 12 min Number 47.329 0.264 10.1 13.2 0.8 14 min Number 47.392 0.264 10.1 13.2 0.8 15 min Summer 10.204 70.204 10.1 13.2 0.8 15 min Summer 150.036 0.0 22.8 19 22 min Summer 25.000 0.0 23.4 27 10 min Summer 25.019 0.0 23.4 27 10 min Summer 25.019 0.0 23.4 27 10 min Summer 25.019 0.0 24.9 72 10 min Summer 25.019 0.0 24.9 72 10 mi								
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	2160	min Summer	47.353	0.055	2.3	2.6	0 11	
STEC min Summer 47.235 0.025 1.0 1.7 0 K "2000 min Summer 47.232 0.025 0.8 1.6 0 K 0640 min Summer 47.230 0.021 0.6 1.4 0 K 10090 min Summer 47.230 0.264 10.1 13.2 0 K 12 min Number 47.230 0.264 10.1 13.2 0 K 40 min Number 47.230 0.264 10.1 13.2 0 K 40 min Number 47.230 0.264 10.1 13.2 0 K 40 min Number 47.230 0.265 18.3 11.6 0 K 40 min Number 47.230 0.255 18.3 11.6 0 K 40 min Number 47.230 0.255 18.3 11.6 0 K 40 min Number 47.230 0.255 18.3 11.6 0 K 41 min Summer 59.056 0.0 22.8 19 19 32 min Summer 59.506 0.0 36.2 9 72 100 min Summer 25.717 0.0 61.8 102 22.7 min Summer 25.717 0.0 61.6 132 360 min Summer 11.717								
8640 min Summer 47.229 0.028 0.7 1.5 0.8 10990 min Summer 47.220 0.021 0.6 1.4 0.8 14 min Ninter 47.220 0.025 0.6 1.4 0.8 30 min Ninter 47.220 0.25 10.1 13.2 0.8 30 min Ninter 47.220 0.25 10.3 11.6 0.8 30 min Ninter 47.220 0.25 10.3 11.6 0.8 30 min Ninter 47.220 0.25 10.3 11.6 0.8 31 min Summer 100.25 Volume Volume (mins) (mins) 11 min Summer 150.356 0.0 22.8 19 32 min Summer 25.058 0.0 23.4 27 61 min Summer 25.717 0.0 62.2 12 10 min Summer 25.717 0.0 62.8 102 22.2 min Summer 25.717 0.0 62.8 102 22.2 min Summer 25.717 0.0 63.6 132 360 min Summer 11.644 0.0 24.7 253 605 min Summer 11.644 0.0 24.7 253 605 min Summer 9.733 0.0 53.1 312 725 min Summer 9.733 0.0	5.7EC	min Summer	47.335	0.025	1.0	17	0 K	
10000 min Summer 47.220 0 023 0.6 1.4 0.8 11 min Ninter 41.104 0.204 10.1 13.2 0.8 30 min Ninter 41.104 0.204 10.24 10.1 13.2 0.8 30 min Ninter 41.104 0.205 18.3 13.6 0.8 Steam Rain Finched Discharge Time-Peak Frent (ma/hc) Volume (mins) 11 min Summer 150.036 0.0 22.8 19 30 min Summer 97.000 0.0 29.4 27 61 min Summer 95.056 0.0 20.2 9 72 100 min Summer 25.717 0.0 61.8 102 22.2 min Summer 25.717 0.0 61.8 102 22.2 min Summer 11.717 0.0 61.8 102 22.2 min Summer 11.364 0.0 25.7 253 600 min Summer 1.32 0.0 59.1 312 20.5 win Summer 1.32 0.0 59.1 312 20.5 win Summer 1.32 0.0 59.1 312 20								
AC min Number 4392 0.251 18.3 11.6 0 K Stars Rain [mar/bi] Finaded Volume (m ²) Time-Peak Volume (m ²) 15 min Summer (m ²) 50.056 0.0 22.8 19 00 min Summer (m ²) 50.056 0.0 23.4 27 01 min Summer (m ²) 50.056 0.0 22.9 19 02 min Summer 100 min Summer 20.056 0.0 62.9 72 100 min Summer 20.058 0.0 53.6 102 220 min Summer 11.604 0.0 53.1 312 360 min Summer 9.733 0.0 53.1 312 020 min Summer 11.604 0.0 53.4 304 140 min Summer 14.701 0.0 54.5 304 </td <td>10000</td> <td>nin Samer</td> <td>47.220</td> <td>0.025</td> <td>0.5</td> <td>1.4</td> <td>0.8</td> <td></td>	10000	nin Samer	47.220	0.025	0.5	1.4	0.8	
Event (num/hc) Wolume Wolume (num/hc) 10 min Summer 150.036 0.0 22.8 19 00 min Summer 97.000 0.0 23.4 27 01 min Summer 97.000 0.0 23.4 27 02 min Summer 97.000 0.0 23.4 27 12 min Summer 95.006 0.0 22.9 72 100 min Summer 25.717 0.0 60.8 102 24.1 min Summer 25.717 0.0 61.8 102 25.2 min Summer 14.717 0.0 61.8 102 26.0 min Summer 14.717 0.0 53.1 312 360 min Summer 1.793 0.0 53.1 312 360 min Summer 9.793 0.0 53.1 312 360 min Summer 0.797 0.0 53.1 312 360 min Summer 0.797 0.0 53.4 394 460 min Summer 6.701 0.0 59.4 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
Event (nu/bi) Volume Volume (ni/s) 11 min Simper 150.036 0.0 22.8 19 20 min Simper 150.036 0.0 23.4 27 61 min Simper 97.000 0.0 23.4 27 61 min Simper 95.058 0.0 42.9 72 100 min Simper 25.717 0.0 42.9 72 101 min Simper 25.717 0.0 61.8 102 20.1 min Simper 14.717 0.0 54.5 132 360 min Simper 11.454 0.0 24.7 253 603 min Simper 11.594 0.0 53.1 312 725 min Simper 11.594 0.0 53.1 312 603 min Simper 4.793 0.0 53.1 312 725 min Simper 4.794 5.0 54.4 736								
10 min Summer 150.036 0.0 22.8 19 30 min Summer 59.508 0.0 20.4 27 60 min Summer 59.508 0.0 20.2 42 120 min Summer 59.506 0.0 42.9 72 100 min Summer 25.717 0.0 61.8 102 240 min Summer 25.717 0.0 61.8 102 240 min Summer 14.717 0.0 23.6 192 360 min Summer 9.733 0.0 53.1 312 600 min Summer 9.733 0.0 53.1 312 722 min Summer 9.733 0.0 53.1 312 725 min Summer 0.734 0.0 53.1 312 725 min Summer 0.735 0.0 53.1 312 725 min Summer 0.735 0.0 53.1 312 726 min Summer 0.735 0.0 53.1 312 726 min Summer 0.735 0.0 53.1 312 726 min Summer 0.736 0.0 54.5 494 1441 min Summer 4.701 0.0 59.4 736				Volume	Volu	me (
30 min Sunser 97.000 0.0 29.4 27 61 min Sunser 55.008 0.0 36.2 42 32.2 min Sunser 25.008 0.0 42.9 72 101 min Sunser 25.008 0.0 42.9 72 101 min Sunser 25.008 0.0 42.9 72 20.2 min Sunser 20.398 0.0 61.8 102 20.4 min Sunser 11.604 0.0 51.5 132 360 min Sunser 11.604 0.0 51.1 312 60.2 min Sunser 9.733 0.0 53.1 312 720 min Sunser 0.395 0.0 53.1 312 720 min Sunser 0.195 0.0 63.7 253 60.2 min Sunser 0.195 0.0 53.1 312 720 min Sunser 0.195 0.0 63.5 494 1441 min Sunser 4.701 0.0 53.4 736								
120 min Summer 05.366 0.0 42.9 72 100 min Summer 25.717 0.0 61.8 102 240 min Summer 25.717 0.0 61.8 102 240 min Summer 10.388 0.0 95.5 132 360 min Summer 10.717 0.0 23.6 192 480 min Summer 11.864 0.0 56.7 253 600 min Summer 9.793 0.0 53.1 512 722 min Summer 9.395 0.0 53.1 512 460 min Summer 9.793 0.0 53.1 512 422 min Summer 0.392 0.0 53.1 512 424 min Summer 6.174 0.0 54.5 494 1441 min Summer 4.701 0.0 53.4 736								
100 min Summer 25.717 0.0 60.8 102 240 min Summer 20.988 0.0 93.5 132 360 min Summer 14.717 0.0 53.6 192 400 min Summer 14.717 0.0 53.7 253 600 min Summer 9.733 0.0 53.1 312 720 min Summer 9.733 0.0 53.1 312 720 min Summer 0.1962 0.0 53.5 494 1441 min Summer 4.701 0.0 53.4 736	60 0	cin Sixwer	59.509	0.0		36.2		
24.4 min Summer 20.388 0.0 19.5 132 360 min Summer 14.717 0.0 23.6 192 400 min Summer 11.664 0.0 24.7 253 600 min Summer 9.793 0.0 59.1 312 72.5 min Summer 0.382 0.0 61.2 172 960 min Summer 6.176 0.0 64.5 494 1441 min Summer 4.701 0.0 59.4 736								
(60 mlm Summer 11.564 0.0 56.7 253 60.5 mlm Summer 9.733 0.0 59.1 312 72.5 mlm Summer 0.735 0.0 59.1 312 72.5 mlm Summer 0.755 0.0 59.1 312 72.5 mlm Summer 0.755 0.0 59.1 312 74.6 mlm Summer 0.756 0.0 54.5 494 144.1 mlm Summer 4.761 0.0 59.4 736	240 a	an Summer	20.398	0.0		19.5	132	
605 min Summer 9.783 0.0 59.1 312 725 min Summer 0.382 0.0 0.1.2 172 965 min Summer 0.182 0.0 01.2 172 965 min Summer 6.170 0.0 0.4.5 494 1441 min Summer 4.701 0.0 59.4 736								
965 min Summer 6.200 5.0 54.5 494 1441 min Summer 4.701 5.0 55.4 736		nin Summer	9.733	C.0		59.1	31.2	
1441 min Dumber - 4.701 - 6.0 - 55.4 - 736								
216. min Summer 3.91. 0.0 /1.6 1104	72.5 1	nin Sumper	4.751	G.0		55.4	736	
2000 min Summer 2,000 C.O 70.4 1460	725 - 465 - 1461 -						1448	
4320 min Simper 1,923 C.O 84.1 2184	725 - 465 - 1461 - 2160 -	tin Summer		C.0		14.1	2184	
5760 min Summer 1.514 C.O. 88.3 2936 7201 min Summer 1.257 C.O. 91.6 3504	725 - 1461 - 1464 - 2166 - 2660 - 4620 - 4620 -	an Sumer		C.0				
H641 min Sommer 1.379 S.B. 94.4 4352	723 - 465 - 144 - 244 - 245 - 246 - 246 - 246 - 462 - 462 - 576 -	iin Simber In Simber	1.514					
1008. min Sommer 1.349 5.0 70.8 5128 15 min winter 150.356 5.0 19.5 19	723 - 446 - 2484 - 2486 - 2886 - 4686 - 4686 - 5766 - 726 - 1664 -	nin Sunder Fin Sunder Fin Sunder Fin Sunder	1.257	C.0 C.0		24.4		
30 min winter 97.300 0.0 53.0 28	723 - 946 - 146 - 2160 - 2600 - 4320 - 5767 - 7207 - 1000 - 1000 -	nim Summer Fin Summer Fin Summer Fin Summer	1 - 257 1 - 379 0 - 949	C.0 C.0 C.0		24.4 V6.8	5128	
01982-2015 XF Solutions	725 - 465 - 245 - 215 - 216 - 256 - 452 - 576 - 720 - 100 - 100 - 100 - 100 - 100 - 100 - 100 -	nin Sinner In Sonner In Sonner In Sonner In Sonner An Winter	1.257 1.079 0.949 .50.056	C.0 C.0 C.0 C.0		94.4 96.8 25.5	a128 _9	

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 71 of 97

mbiontal						Shuddela	Page 2
cience Park s	quire	3224283	eristic			g kate	
1r1gh⊐on 4⊾1 983		10000	nice Rea troat h				2 m
cate 05/12/90	F 10-23		gred b			de t	MICTO
	erVo Cale_list	102000	eked by				Drainage
salutions.		250	ere Cor	tral	01.5+1		
je je	mary of Results	for 1	10 year	. Relu	I. Pes	10d (+60%	1
	2.555	32.53	022070	1210511	32574770	2010 - 2010 - 2010 20 <u>1</u> 0 - 2010 - 2010	
	Storn Event	Naw Level	Max Depth: C	Max Centrol		Stetus	
		(8.)	(=)	(1/#)	(#*1		
	EC min Ainter						
	120 min Winter 180 min Winter			11.8	5.8	OK	
	540 min Winter AFC min Winter	47,419	0.111	9.4	5.0	C R	
	4BC min Ninter	41.387	0.0E7	5.5	4.3	0 R	
	S23 min sinter 120 min sinter	41.378	0.031	4.6	3.9	1: B	
	960 min Minter	47.268	0.064	3.2	3.2	0.5	
	1446 min Winter 2160 min Winter					0 F	
	25HC min Winter 4520 min Winter						
	4520 min Minter 5760 min Minter	47.233	0.035	0.5	1.7	C R U L	
	5160 min Ainter 7250 min Minter	11.327	0.027	0.6	1.3	0.16	
	8640 min Winter 10090 min Winter						
			12.00	90 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -		a	
	Event		Velumo			no (reak (ains)	
			(\mathbf{n}^{i})				
	67 ann Minnei			0	44.5	-4.4	
	121 min Winter 181 min Winter			ti 17	(H.I. 5215	102	
	245 min Winter	20,398	E+	0	15.5	132	
	361 min Winter 481 min Winter	11.004	1 E -	Π	50.1	192	
	601 x.m Wirler 221 x.m Wirler	3.733	÷.	Ú.	5C.Z	3.4	
	951 min Winter	0.197	E.	U	12.2	374	
	144. min Winter	6.16.	6.	U	12.5	116	
	2161 min Winder 2000 min Winder	3,411			5315 57,8	1104	
	4305 min Winser	1.923	((B)	n	84.7	2204	
	576° vin Winter 728 vin Winter	1.514			20. ž. 12. ř.	2424	
	064. min Wanter	1.303	5.	u z	.5.1	1120	
	1008, min Winter	0.939	20	0 1	18.4	2080	
	21.02	2-201	XP Su	0.110-4	64.2		
	2/1/3/0	na magos s	0. DE 20	-01100	e'.		

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 72 of 97





Ambiental								Page 1
Science Park Sque	re		Pro	pesed	SIDS			
Brighton			Sve.	nte Re	ad, Can	mden		Ly
ENT 988					No. 291			Micro
pate 02/12/2016 1				-	by Jes			Drainage
File AttenuationV	a Cal	e_11m			у Мани стани		nr	Brannage
XP Solutions			800	nce us	ntrol	691.9+1		
S LIE ME	ary o	f Result	s for	1 year	Relur	n Peri	od (+¢0%)	
	.51	torn	Mare	Hax	Max	Кат	Status	
	E.	vent.	Level (m)	Depth (n)	Control (1/s)	Volume (m°)		
		in sumer			3.8		0 K	
		in Sunner in Sunner			4.3	5.8 5.9		
	120 m	in Suuve	47.610	0.110	4.1	5.5	0 R	
		in Surner in Summer				5.0		
		an summer				4.6		
	680 m	in Summer	47.871	0.071	2.3	3.6	0.5	
		in Summer in Summer			2.1	3.3		
	960 m	in Succes	47.155	0.050	1.5	2.8	OK	
		in Summer in Summer				2.4		
	2880 m	in Surner	47.836	0.035	0.7	1.8	0.5	
		in summer in summer			0.5	1.5		
		án Sumer			0.4			
		din Sunner			0.3			
		in Sunner in Winter			0.3			
	30 m	in Ninter	47.826	0.125	4.7	6.3	O R	
		ar n			ed Disch	-		
	Ev	ent	(om/hz)	Volum (m ³)			(mins)	
		n Summer			0	7.1 9.2	20 28	
	$6 \le \infty$	n Sinner	18.334	ι ο.	.0	11.5	44	
	122×122	in Sinner	11.565	s c.	.0	14.0	76 106	
		in Sumper In Sumper	0.122 6.992			15.7	106 136	
	360 m.	n Summer	5.160	3 E.	. 0	18.8	196	
		n Sinner	<pre><.151 3.514</pre>			20.2	258 31.A	
	725×10^{-1}	n Sunner	0.063	e	.0	22.3	178	
		n Sonner n Sumper				2014 2014	498 740	
	2160 m.	in Summer	1.333	ғ с.	.0	29.2	1104	
		n Summer n Summer	1.071			11.4 14.6	1472 2200	
		n Sumer	0.632	к. С.		39.0	2200	
	720° m	n Sommer	0.534	о c.	. 0	14.3	3624	
		n Sommern n Sommern				41.1 42.7	4408	
	15 83	in winter	46.042	8 6,	. 0	7.9	20	
	30 ¥.	in winter	30.335	» ۵.	. 0	10.3	29	
		0.2.00	00.001	C 120 C	olution			

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 75 of 97

unbiental							Page 2
science Park :	Squire	100000	pesed .				
Pr1gh−on Aki 983		1.000		ad, Can Na 2111			Lac-
Late 02/12/20	F 18-22			by ucas		de T	MICTO
File Artenist	erVa Cale_list		Contraction of the second s	y Mary			Drainage
s= solutions		250	ere Co	stral)	01.5-1		
	Samary of Result	s for	Iver	Require	Peri	od 1460%1	
	Storn	Mare Former	Max .	Mar Control		St.s +118	
	T-#10	(2.)	(2)	(1/=)	(= 1		
	NG min Ainter	47,825	0.123	8.5	6.2	V.E	
	120 stin Winter	41.607	0.107	4.5	5.4	OK	
	180 min Winter 540 min Winter	47.083	0.0£3 0.0E3	3.5	4.7	C R	
	AFC unio Miniber	41.171	0.071	2.3	3.5	$C \in \mathbb{R}$	
	4BC min Minter S01 min Minter					0 E 5 E	
	720 min winter	47,853	0.051	245	2.7	Q . 15	
	960 min Minter 1440 min Minter				2.4	O K O R	
	2100 min Wintwa	41.134	0.024	0.6	17	0 E	
	25HC min Winter 4520 min Winter	41.130	0.033	0.5	1.5	C E	
	5760 min ainter	17,1323	0.023	0.2	1.2	UL	
	7200 min Winter	11.121	0.021	0.43	1.1	C K	
	8640 min Minter 10090 min Minter						
	Ctors			d Black		no ceak	
	Event	loun/nz)	Velue (n ²)	e Velu		(mins)	
	67 ann Minner	18,834	. n.	0	12.9	46	
	121 win Winter	11.565	TI.	ti	15.7	20	
	181 min winter 201 min Winter	6,993		0	17.6	108	
	361 min Winter	5,163	0.000		1.1	200	
	485 alla Windex 685 alla Windex			0	22.6 :1.4	260 32.0	
	601 k.n Wirtex 121 kiw Wirter	3.901	5 F.			782	
	961 min Winter 100. min Winter				16.8	502 /44	
	2161 min Winter	1.338			12.8	1092	
	2000 min Winder	1.371	ΰ.	0	15.2	1180	
	4327 r.n.Winter 5767 r.n.Winter	0,797 0,1138			59. K (1. 7	22.22	
	128 Vin Micher	$\Omega_{\rm eff} \propto P$	t De	10	14.0	16.009	
	1008, min Winter 1008, min Winter	0.979			57.8	44.52 01.34	
		0.001	t top of	1.110	10		
	0198	-102-201	A AP 20	ululion	40		

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 76 of 97



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 77 of 97



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 78 of 97

Erighton Avenue Read, Comden ENI 988 Controot No 2018 Date 02/12/2016 18:21 Designed by Work Maumann Drainage	Ambiental							Page 1
HAT 998 ChitYant Ka 2011 Late of 2/12/20_0 f 18:21 ChitYant Ka 2018 Tia Anterster erVs Cale_11:31: Discipted by Josés Tenedet: Core de Mark Markana Zamos Control 2014.1 Summer Control 2014.1 Summer Control 2014.1	Science Park Square		Pros	pesed 2	IDS			
Late 02/12/20_0 6 18:21 The Artenest or NO (010_1110) Late tenest or NO (010_1110)	Brighton							Ly
Fils Attenuet or Vo Cale_1163 Note: Entrol 2015.1 Checked by VarY Nature Number Entrol 2015.1 Concept Fils Attenue Store C Results for 50 year Return Period (400) Store Vol Cale Vol Volume (a) (a) (A) (a) (a) Store Vol Cale Volume (a) (b) (A) (a) (b) (b) (b) Store Volume (c) (b) (c) (c) (c) (c) (c) (c) (c) (c) Store Volume (c) (c) (c) (c) (c) (c) (c) (c) (c) (c) Store Volume (c) (c) (c) (c) (c) (c) (c) (c) (c) (c)							a	Micro
X= Nature Norme Control 2014.1 Source Control 2014.1 Second Depth Control Volume (x) Normal Depth Control Volume (x) Normal Results Second Depth Control Volume (x) Normal Part (x) Normal Results 15 min summer 41.323 0.2265 5.0 15.1 0.8 16 min summer 41.323 0.325 5.0 16.1 0.8 180 min summer 41.323 0.325 5.0 16.6 0.8 180 min Summer 41.323 0.325 5.0 16.6 0.8 180 min Summer 41.323 0.325 5.0 16.6 0.8 180 min Summer 41.320 0.325 5.0 16.6 0.8 180 min Summer 41.320 0.325 5.0 11.4 0.8 180 min Summer 41.430 0.125 4.9 8.5 0.8 180 min Summer 41.430 0.125 4.9 8.5 0.8 180 min Summer 41.430 0.126 1.9 0.8 0.8 0.8 180 min Summer 41.430 0.126 1.9 0.8 0.8 0.8 <td></td> <td></td> <td></td> <td>-</td> <td>-</td> <td></td> <td></td> <td>Drainage</td>				-	-			Drainage
$\frac{5 \text{ Kmart Cf Results for 50 year Return Period (+404)}{(20) 200 200 200 200 200 200 200 200 200 $	XP Solutions	src_1163		-				
Front Face Form Form Form Form Form 15 min singer 41.282 0.283 5.3 1.6.1 0.8 15 min singer 41.282 0.233 5.3 1.6.1 0.8 16 min singer 41.397 0.233 5.3 1.6.1 0.8 16 min singer 41.397 0.265 5.3 1.3.3 0.8 16 min singer 41.291 0.113 4.4.3 0.8 0.8 0.8 0.8 26 min singer 41.291 0.113 4.4.3 0.8 <t< th=""><th></th><th>of Resilts</th><th></th><th></th><th></th><th></th><th>iad (+40%)</th><th></th></t<>		of Resilts					iad (+40%)	
$\frac{15 \text{ min summer } 41.368 0.266}{21 \text{ min summer } 41.323 0.233} 5.5 1 3.4 0.7 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.328 0.333}{3233} 5.5 1 5.8 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.376 0.325}{3233} 5.5 1 5.8 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.376 0.225}{3233} 5.5 1 11.4 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.270}{323} 0.225} 5.5 1 11.4 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.270}{323} 0.225} 5.5 1 11.4 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.270}{323} 0.125 4.9 8.5 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.210}{323} 0.125 4.3 8.5 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.210}{323} 0.125 4.3 8.5 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.210}{323} 0.124 4.3 5.8 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.210 0.124 4.3 8.5 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.210 0.124 4.3 8.5 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.210 0.013 4.4 3 8.5 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.210 0.013 4.1 4.3 5.8 0.0 \text{ K}} \\ \frac{32 \text{ min summer } 41.210 0.013 4.1 4.2 3 8.6 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.230 0.025 1 1.4 0.0 \text{ K}} \\ \frac{32 \text{ min summer } 41.230 0.025 1 1.4 0.0 \text{ K}} \\ \frac{32 \text{ min summer } 41.230 0.025 1 1.6 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.230 0.025 0.055 1 1.6 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.330 0.023 0.05 1 1.5 0 \text{ C} \text{ K}} \\ \frac{32 \text{ min summer } 41.320 0.033 0.03 1 0.5 1 5.0 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.320 0.033 0.03 1 0.5 1 5.0 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.320 0.033 0.03 1 0.5 1 5.0 0 \text{ K}} \\ \frac{32 \text{ min summer } 41.320 0.035 0.5 1 1.5 0 \text{ C} \text{ K}} \\ \frac{32 \text{ min summer } 13.302 0 0.0 0 0 0.0 0 0.0 \text{ K}} \\ \frac{32 \text{ min summer } 13.302 0 0 0 0 0 0.0 0 0 0 0 \text{ K}} \\ \frac{32 \text{ min summer } 13.302 0 0 0 0 0 0 0 0 0 0 0 \text{ K}} \\ \frac{32 \text{ min summer } 13.302 0 0 0 0 0 0 0 0 0 0 0 \text{ K}} \\ \frac{32 \text{ min summer } 13.302 0 0 0 0 0 0 0 0 0 0 0 \text{ K}} \\ \frac{32 \text{ min summer } 13.302 0 0 0 0 0 0 0 0 0 0 0 0 \text{ K}} \\ \frac{32 \text{ min summer } 13.302 0 0 0 0 0 0 0 0 0 0 0 0 0 \text{ K}} \\ \frac{32 \text{ min summer } 13.302 0 0 0 0 0 0 0 0 0 0 0 0 0 \text{ K}} \\ \frac{32 \text{ min summer } 13.302 0 0 0 0 0 0 0 0 0 0 0 0 0 0 \text{ K} \\ \frac{32 \text{ min summer } 1.330 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0$				Depth C	catrol	Volume		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			(22)	[=)	(1/8)	(=.°]		
$ \begin{array}{c cccc} 60 & min & 2 minse & 41.877 & 0.363 & 5.0 & 15.6 & 0 & 0 \\ 120 & min & 2 minse & 41.267 & 0.363 & 5.0 & 13.3 & 0 & 0 \\ 124 & min & 2 minse & 41.267 & 0.265 & 5.0 & 13.3 & 0 & 0 \\ 0.24 & min & 2 minse & 41.272 & 0.225 & 5.0 & 11.4 & 0 & 0 \\ 0.26 & min & 2 minse & 41.283 & 0.133 & 4.7 & 6.7 & 0 & 0 \\ 0.25 & min & 2 minse & 41.283 & 0.134 & 4.7 & 6.7 & 0 & 0 \\ 0.25 & min & 2 minse & 41.283 & 0.135 & 4.3 & 5.6 & 0 & 0 \\ 0.25 & min & 2 minse & 41.283 & 0.163 & 0.25 & 5.2 & 0 & 0 \\ 0.25 & min & 2 minse & 41.283 & 0.065 & 0.25 & 5.2 & 0 & 0 \\ 0.26 & min & 2 minse & 41.283 & 0.065 & 0.28 & 0.4 & 0 & 0 \\ 0.26 & min & 2 minse & 41.283 & 0.065 & 0.28 & 0.8 \\ 0.244 & min & 2 minse & 41.283 & 0.065 & 0.28 & 0.8 \\ 0.246 & min & 2 minse & 41.233 & 0.033 & 0.65 & 1.9 & 0 & 0 \\ 0.265 & min & 2 minse & 41.233 & 0.033 & 0.65 & 1.6 & 0 & 0 \\ 0.265 & min & 2 minse & 41.233 & 0.033 & 0.65 & 1.6 & 0 & 0 \\ 0.260 & min & 2 minse & 41.233 & 0.033 & 0.6 & 1.6 & 0 & 0 \\ 0.260 & min & 2 minse & 41.233 & 0.033 & 0.6 & 1.6 & 0 & 0 \\ 0.260 & min & 2 minse & 41.233 & 0.033 & 0.6 & 1.6 & 0 & 0 \\ 0.260 & min & Ninter & 41.200 & 0.365 & 5.9 & 15.7 & 0 & 0 \\ 10.090 & min & Ninter & 41.200 & 0.365 & 5.9 & 15.7 & 0 & 0 \\ 10 & min & Ninter & 41.200 & 0.365 & 5.9 & 15.7 & 0 & 0 \\ 12 & min & Ninter & 41.200 & 0.365 & 5.9 & 15.7 & 50 \\ 12 & min & Summer & 115.362 & 0.0 & 27.5 & 500 \\ 12 & min & Summer & 115.460 & 0.0 & 0.27.5 & 500 \\ 12 & min & Summer & 15.460 & 0.0 & 0.27.5 & 500 \\ 12 & min & Summer & 15.460 & 0.0 & 0.27.7 & 0.44 \\ 100 & min & Summer & 15.460 & 0.0 & 0.27.7 & 0.44 \\ 100 & min & Summer & 15.460 & 0.0 & 0.27.7 & 0.44 \\ 100 & min & Summer & 15.460 & 0.0 & 0.27.7 & 0.44 \\ 100 & min & Summer & 15.460 & 0.0 & 0.27.7 & 0.44 \\ 100 & min & Summer & 15.460 & 0.0 & 0.27.7 & 0.44 \\ 100 & min & Summer & 15.460 & 0.0 & 0.27.7 & 0.44 \\ 100 & min & Summer & 15.460 & 0.0 & 0.27.7 & 0.44 \\ 100 & min & Summer & 15.474 & 0.0 & 0.27.7 & 0.44 \\ 100 & min & Summer & 1.274 & 0.0 & 0.71.4 & 2000 \\ 100 & 2.80 & min & Summer & 1.274 & 0.0 & 0.71.4 &$								
$ \frac{122}{12} \min 3 \min 4 \min 4 1, 207 0.363 5.0 13.4 0.0 13 180 010 3 \min 4 1, 228 0.225 5.0 13.4 0.0 13 240 min 2 mmer 41.230 0.125 5.0 13.4 0.0 13 240 min 2 mmer 41.230 0.125 5.0 0.1 1.4 0.0 13 240 min 2 mmer 41.230 0.126 4.3 5.0 0.0 1 250 min 3 mmer 41.218 0.126 4.3 5.0 0.0 1 250 min 3 mmer 41.230 0.126 3.3 5.0 0.0 1 250 min 3 mmer 41.230 0.126 3.3 5.0 0.0 1 2440 min 3 mmer 41.230 0.053 1.4 3.6 0.0 12 2480 min 2 mmer 41.230 0.053 1.4 3.6 0.0 12 2480 min 2 mmer 41.230 0.053 1.4 3.6 0.0 12 2480 min 2 mmer 41.230 0.053 1.4 0.0 10 12 2480 min 2 mmer 41.230 0.051 1.4 0.0 10 12 2480 min 2 mmer 41.230 0.051 1.4 0.0 10 2480 min 2 mmer 41.230 0.051 1.4 0.0 10 2480 min 2 mmer 41.230 0.051 1.5 0.8 1.9 0.0 1 2580 min 2 mmer 41.230 0.051 0.5 1.5 0.0 1 2000 min 2 mmer 41.230 0.051 0.5 1.5 0.0 1 10000 min 2 mmer 41.230 0.051 0.5 0.5 0.8 1 10000 min 2 mmer 41.230 0.051 0.5 0.5 0.8 1 10000 min 2 mmer 41.230 0.051 0.5 0.5 0.8 1 10000 min 2 mmer 41.230 0.051 0.5 0.5 0.8 1 10000 min 2 mmer 41.230 0.050 0.5 0.5 0.0 1 10000 min 2 mmer 41.230 0.050 0.5 0.5 0.5 0.8 1 10000 min 2 mmer 41.230 0.050 0.5 0.5 0.5 0.8 1 10000 min 2 mmer 41.230 0.050 0.5 0.5 0.5 1.5 0.0 1 10000 min 2 mmer 41.230 0.050 0.27.5 0.0 1 1000 min 2 mmer 41.230 0.051 0.5 0.5 0.8 1 1000 min 2 mmer 41.230 0.050 0.27.5 0.0 1 12 min Ninter 41.200 0.30 0.0 27.5 0.0 1 12 min 5 mmer 10.5 0 mmer 25.80 0.0 0.27.7 1.84 10 10 min 5 mmer 10.5 0 mmer 26.80 0.0 0.27.7 1.84 10 10 min 5 mmer 10.5 0 mmer 10.4 0.0 10.0 1.0 1.4 2000 0.22 min 5 mmer 40.20 0.0 1.0 1.0 1.4 2000 0.0 1.0 0.0 1.0 0.0 1.4 0.0 1.0 0.0 1.0 0.0 1.0 0.0 1.0 0.0 1.0 0.0 1.0 0.0 1.0 0.0 1.0 0.0 1.0 0.0 1.0 0.0 1.0 0.0 0$								
340 min Current 47.720 0.223 5.0 11.4 0 N 360 min current 47.270 0.135 4.0 8.5 0 N 600 min current 47.210 0.124 4.3 5.8 0 N 600 min current 47.200 0.124 3.5 5.0 N 720 min current 47.200 0.005 3.2 4.4 0.8 1440 current function 0.005 1.2 3.6 0.8 2160 current 47.250 0.005 1.4 3.6 0.8 2260 min current 47.250 0.005 1.4 3.6 0.8 4520 current 47.233 0.025 0.6 1.6 0.8 0.8 7200 current 47.337 0.035 0.5 1.5 0.8 0.8 10900 current 47.370 0.0372 b.3 18.5 0.8 11 current	120	nin Sunwe	47.807	0.307	5.0	15.4	0 10	
380 min simmer 47.270 0.173 4.0 8.5 0 f 680 min simmer 47.204 0.124 4.7 6.7 6.7 6.7 720 min simmer 47.204 0.124 3.9 5.2 0 F 720 min simmer 47.204 0.124 3.9 5.2 0 F 720 min simmer 47.208 0.005 3.2 4.4 0 F 1440 min simmer 47.260 0.105 1.8 3.0 0 F 2860 min simmer 47.360 0.053 1.4 3.6 0 F 2860 min simmer 47.360 0.053 1.4 3.6 0 F 2860 min simmer 47.360 0.053 0.8 1.9 0 K 5160 min simmer 47.350 0.033 0.6 1.6 0 K 10990 min simmer 47.350 0.033 0.6 1.6 0 K 10990 min simmer 47.350 0.332 0.3 1.5 0 K 10990 min simmer 47.380 0.352 5.3 15.0 K 110 min Ninter 41.800 0.352 5.3 15.0 K 12 min Ninter 41.870 0.352 0 27.5 50 12 min Sinner 7.384 0.0 2								
SCC min Summer 47.216 0.118 4.3 5.8 0.8 TCC min Summer 47.208 0.065 3.2 4.4 0.8 1440 min Summer 47.173 0.073 2.4 3.6 0.8 2480 min Summer 47.253 0.085 1.6 2.6 0.8 2480 min Summer 47.253 0.023 1.6 2.6 0.8 3526 min Summer 47.253 0.023 0.7 1.8 0.8 1.9 0.8 5566 min Summer 47.235 0.023 0.7 1.8 0.8 1.9 0.8 10090 min Summer 47.233 0.031 0.5 1.5 0.8 1.9 0.8 110090 min Number 47.273 0.021 0.5 1.9 0.8 12 min Number 47.290 0.302 5.0 15.0 0.8 12 min Number 47.273 0.023 0.5 1.9 1.8 0.8 13 min Number 47.290 0.302 5.0 15.5 0.8 <td< td=""><td>360</td><td>min summer</td><td>41.170</td><td>0.170</td><td>4.9</td><td>8.5</td><td>0.15</td><td></td></td<>	360	min summer	41.170	0.170	4.9	8.5	0.15	
122 min Summer 47.504 0.124 3.9 5.2 0.8 960 min Summer 47.509 0.065 3.2 4.4 0.8 1244 min Summer 47.560 0.065 1.8 3.0 0.8 1260 min Summer 47.560 0.065 1.8 3.0 0.8 1262 min Summer 47.534 0.033 0.6 1.9 0.8 1526 min Summer 47.535 0.023 0.5 1.9 0.8 7020 min Summer 47.537 0.033 0.6 1.6 0.8 10090 min Summer 47.537 0.033 0.6 1.6 0.8 10090 min Summer 47.537 0.031 0.5 1.9 0.8 10090 min Summer 47.537 0.032 5.9 18.5 0.8 10090 min Summer 47.537 0.032 5.9 18.5 0.8 11 min Number 47.970 0.372 5.9 18.5 0.8 12 min Summer 115.302 0.0 17.5 21 22 min Summer 115.302 0.0 17.5 21 12 min Summer 135.00 1.0 2.8 126 12 min Summer 135.00 1.0 2.4 32								
$ \frac{1.440 \text{ min } 6 \text{ momer } 47.173 \ 0.073 \\ 2180 \text{ min } 2180 \text{ min } 6 min $	720	min Summer	47.604	0.104	3.9	5.2	0.10	
2880 min summer 47.853 0.063 1.4 2.6 0 s 4330 min summer 47.233 0.023 0.35 1.9 0 s 7200 min summer 47.233 0.023 0.7 1.8 0 s 7200 min summer 47.233 0.023 0.7 1.8 0 s 8640 min summer 47.233 0.023 0.7 1.8 0 s 11 min Ninter 47.200 0.355 5.3 15.3 0 s 12 min Ninter 47.200 0.355 5.3 18.5 0 s 80 min Ninter 47.200 0.355 5.3 18.5 0 s 13 min Summer 135.800 Volume (mis) (mis) (m ²) (m ³) 1.5 21 14 min Summer 135.800 70.802 0.0 22.4 32 15 min Summer 145.320 0.0 12.7 84 10 min Summer 15.502 0.0 12.7 84 10 min Summer 15.502 0.0 14.4 206 12 min Summer 15.5030 0.0 14.4 206 12 min Summer 15.5030 0.0 14.6 365 12 min Summer 15.5040 0.0 14.6 365 22 min Summer 15.505 0								
4320 min Summer 47.543 0.044 1.0 2.2 0.8 3760 min Summer 47.233 0.025 0.5 1.8 0.8 7200 min Summer 47.233 0.023 0.6 1.6 0.8 10090 min Summer 47.233 0.023 0.6 1.6 0.8 10090 min Summer 47.233 0.023 0.6 1.6 0.8 11 min Ninter 47.400 0.302 5.3 15.3 0.8 36 min Ninter 47.2970 0.302 5.3 18.5 0.8 31 min Summer 47.3970 0.302 5.3 18.5 0.8 32 min Summer 47.3970 0.302 5.3 18.5 0.8 33 min Summer 47.3970 0.302 0.0 27.4 32 34 min Summer 47.3970 0.302 0.0 27.5 50 35 min Summer 13.500 0.0 27.5 50 <td>2160</td> <td>min Summer</td> <td>47.560</td> <td>0.060</td> <td></td> <td></td> <td></td> <td></td>	2160	min Summer	47.560	0.060				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$								
864C min Summer 47,133 0.073 0.6 1.6 0.6 1.6 0.8 1099C min Summer 47,130 0.03 0.5 1.5 0.8 15 min Number 41,270 0.30 5.5 15.0 0.8 30 min Number 41,270 0.30 5.5 18.5 0.8 Summ Rain Finades Einscharge Time-Feak Frent: (ma/hc) Wolume Wolume (mins) 12 min Summer 115.362 0.0 17.5 21 30 min Summer 125.362 0.0 17.5 21 30 min Summer 125.362 0.0 17.5 21 30 min Summer 125.362 0.0 27.5 50 312 min Summer 135.500 0.0 15.8 16 40 min Summer 135.500 0.0 15.8 16 202 min Summer 135.500 0.0 14.4 206 360 min Summer 14.540 0.0 24.9 146	5760	min Summer	47.139	0.029	0.5	1.9	0 K	
10000 min Simmer 47.131 0 013 0.5 1.5 0.8 11 min Winter 47.100 0.005 5.0 15.3 0.8 30 min Winter 47.100 0.005 5.0 18.5 0.8 31 min Winter 47.100 0.30 5.0 18.5 0.8 32 min Winter 47.100 Wolume Yolume Time-Peak Event [mm/hc] Wolume Yolume (mins) 15 min Summer 115.302 0.0 17.5 21 31 min Summer 73.922 0.0 27.5 50 120 min Summer 18.500 0.0 27.5 50 120 min Summer 18.559 0.0 28.0 146 100 min Summer 18.559 0.0 146 26 220 min Summer 18.559 0.0 146 266 360 min Summer 1.356 0.0 14 206 360 min Summer 1.551 0.0 43.9 243 360 min Summer 1.551 0.0 43.9 243 360 min Summer 3.74 0.0 14.4 206								
StarsRain [nm/bc]Finded Volume (m ²)Eacharge Volume (m ²)Time-Peak (min)10min Summer (m ²)15.3020.017.52115min Summer (m ²)0.027.55012min Summer (min)15.3020.027.55012min Summer (min)15.3060.027.764100min Summer (min)15.3060.014.6201min Summer (min)11.3360.014.4202min Summer (min)1.3560.014.4203min Summer (min)5.550.014.4204min Summer (min)0.00.44.90144min Dummer (min)0.00.44.90144min Summer (min)2.700.01100266min Summer (min)2.700.014.4203min Summer (min)2.700.014.4204min Summer (min)2.700.014.4205min Summer (min)2.700.01100266min Summer (min)2.700.014.4266min Summer (min)2.700.014.4205min Summer (min)0.00.44.90144min Summer (min)0.014.20.641550.00.014.20.64164min Summer (min)0.00.1.20.64165	10000	min Sommer	47.531	0.031	0.5	1.5	0.8	
Event [mm/h1] Volume (m ²) Volume (m ²) Volume (m ²) (mins) 15 min Summer 115.302 0.0 17.5 21 35 min Summer 135.302 0.0 22.4 32 65 min Summer 26.330 0.0 27.5 50 122 min Summer 19.500 0.0 25.8 116 22.4 min Summer 19.500 0.0 28.0 146 360 min Summer 19.500 0.0 38.0 146 360 min Summer 11.336 0.0 13.9 262 603 min Summer 7.561 0.0 43.9 31A 720 win Summer 7.561 0.0 43.4 496 144 min Summer 3.11 0.0 43.6 730 216 min Summer 1.51 0.0 67.4 2900 216 min Summer 1.51 0.0 67.4 2200 216 min Summer 1.51 0.0 67.4 2200 216 min Summer 1.510								
Event [mm/h1] Volume (m ²) Volume (m ²) Volume (m ²) (mins) 15 min Summer 115.302 0.0 17.5 21 35 min Summer 135.302 0.0 22.4 32 65 min Summer 26.330 0.0 27.5 50 122 min Summer 19.500 0.0 25.8 116 22.4 min Summer 19.500 0.0 28.0 146 360 min Summer 19.500 0.0 38.0 146 360 min Summer 11.336 0.0 13.9 262 603 min Summer 7.561 0.0 43.9 31A 720 win Summer 7.561 0.0 43.4 496 144 min Summer 3.11 0.0 43.6 730 216 min Summer 1.51 0.0 67.4 2900 216 min Summer 1.51 0.0 67.4 2200 216 min Summer 1.51 0.0 67.4 2200 216 min Summer 1.510								
(m ³) (m ³) 15 min Summer 115.362 0.0 17.5 21 30 min Summer 73.382 0.0 22.4 32 60 min Summer 26.374 0.0 27.5 50 120 min Summer 26.374 0.0 27.5 50 120 min Summer 18.559 0.0 1.6 116 24. min Summer 19.550 0.0 1.4 206 360 min Summer 11.356 0.0 43.9 146 360 min Summer 11.356 0.0 43.9 34.0 600 min Summer 0.575 0.0 47.6 978 466 min Summer 0.575 0.0 47.6 978 727 min Summer 0.174 0.0 4.6 730 216 min Summer 2.701 0.0 24.0 1100 216 min Summer 2.701 0.0 24.0 100 216 min Summer 1.270 0.0 11.1 2800 5767 min Summer 1.270 0.0 11.1 2800 5767 min Summer 1.271 0.0 14.2 3640 1004 min Summer 1.270 0.0 14.2 3640 1027 1.1						-		
30 min Sincer 73.882 0.0 22.4 32 60 min Sincer 45.330 0.0 27.5 50 120 min Sincer 13.500 0.0 27.7 84 100 min Sincer 13.500 0.0 5.8 116 22.4 min Sincer 13.500 0.0 5.8 116 22.4 min Sincer 13.356 0.0 146 360 min Sincer 9.334 0.0 13.9 263 603 min Sincer 7.561 0.0 45.9 31A 725 win Sincer 7.561 0.0 45.9 31A 725 win Sincer 7.561 0.0 45.9 31A 725 win Sincer 3.446 0.0 4.99 4.99 1.441 min Sincer 3.4746 0.0 4.4 4.99 1.441 min Sincer 3.411 0.0 62.4 4.44 4326 min Sincer 3.411 0.0 62.4 1.44 4326 min Sincer 1.511 0.0 62.4 1.44 4326 min Sincer 1.511 0.0 62.4 1.44 4326 min Sincer 1.511 0.0 62.4 1.44 4327 min Sincer 1.511 0.0 7.4 2.200				(m^2)	(m^2)			
60 min Succes 45.320 0.0 27.5 50 120 min Succes 26.334 0.0 12.7 84 100 min Succes 18.659 0.0 12.7 84 100 min Succes 18.659 0.0 18.0 146 360 min Succes 11.356 0.0 11.4 206 400 min Succes 1.561 0.0 43.9 31.4 720 min Succes 7.561 0.0 45.9 31.4 720 min Succes 5.355 0.0 47.6 378 460 min Succes 3.410 0.0 0.4 360 720 min Succes 3.746 0.0 0.4 360 144 min Succes 3.746 0.0 0.4 360 144 min Succes 3.746 0.0 0.4 360 2161 min Succes 3.740 0.0 0.4 360 2162 min Succes 3.10 0.0 0.4 340 3260 min Succes 3.10 0.0 0.4 340 3260 min Succes 3.10 0.0 0.4 344								
100 min Summer 19.500 0.0 15.60 11.6 22. min Summer 15.559 0.0 89.0 146 360 min Summer 11.357 0.0 13.9 260 400 min Summer 9.334 0.0 13.9 262 600 min Summer 7.561 0.0 45.9 31.4 720 min Summer 6.375 0.0 47.6 378 960 min Summer 6.375 0.0 47.6 378 960 min Summer 6.375 0.0 47.6 378 960 min Summer 5.100 14.4 490 144. min Summer 2.740 0.0 14.4 2160 min Summer 1.311 0.0 67.4 2200 3760 min Summer 1.311 0.0 67.4 2200 5760 min Summer 1.310 0.0 14.2 3640 720 min Summer 1.310 0.0 14.2 3640 164 min Summer 1.774 0.0 60.9 31.2 15 min winter 1.532 0.0 19.6 22	60	min Simper	45.320	0.0		7.5	50	
24.1 min Summer 15.859 0.0 s8.0 146 360 min Summer 11.336 0.0 (1.4 206 (60 min Summer 7.561 0.0 (1.9 243 60 min Summer 7.561 0.0 45.9 31A 722 win Summer 6.575 0.0 47.6 378 466 win Summer 7.561 0.0 47.6 378 466 win Summer 7.575 0.0 47.6 378 466 win Summer 7.576 0.0 47.6 378 466 win Summer 7.576 0.0 47.6 370 216. min Summer 7.776 0.0 47.6 730 216. min Summer 7.701 0.0 25.0 1100 2860 min Summer 7.576 0.0 67.4 1440 4322 min Summer 7.570 0.0 71.1 2880 7207 win Summer 7.570 0.0 71.1 2880 7207 win Summer 7.570 0.0 74.2 3640 864 win Summer 7.570 0.0 74.2 3640 7207 win Summer 7.570 0.0 74.2 3640 864 win Summer 7.774 0.0 60.9 32<								
100 min Summer 9.034 0.0 13.9 243 600 min Summer 0.561 0.0 45.9 31A 725 win Summer 0.561 0.0 45.9 37A 746 win Summer 0.14 480 144. min Summer 3.746 0.0 24.6 730 216. min Summer 3.746 0.0 24.6 730 216. min Summer 2.70 0.0 5.0 1100 2660 min Summer 1.511 0.0 24.4 444 4320 min Summer 1.511 0.0 67.4 2200 5765 min Summer 1.511 0.0 64.4 364 4320 min Summer 1.511 0.0 64.4 364 4320 min Summer 1.511 0.0 74.2 3644 400 min formmer 1.714 0.0 34.9 364 404 1000 1.7 4144 36.4 400 min formmer 0.774 0.0 36.9 31.2 15 min winteet 15.362 0.0 19.6 32			15.659	0.0		9.0		
605 min Summer 7.561 0.0 45.9 31A 725 min Summer 6.575 0.0 47.6 378 965 min Summer 5.116 0.0 47.6 378 965 min Summer 5.116 0.0 43.6 730 144. min Summer 3.746 0.0 54.6 730 216. min Summer 3.131 0.0 55.0 1100 2660 min Summer 1.531 0.0 67.4 2200 5765 min Summer 1.531 0.0 67.4 2200 5765 min Summer 1.310 0.0 54.2 3640 7207 min Summer 1.310 0.0 54.2 3640 1644 1000 1.77 3144 3640 165 min Summer 1.774 0.0 61.9 51.2 15 min winter 1.532 0.0 19.6 22								
960 win Summer 5.109 0.0 50.4 490 144. min Dummer 3.746 0.0 54.6 730 2160 min Summer 2.701 0.0 59.0 1100 2660 min Summer 2.131 0.0 82.4 1446 4320 min Summer 1.541 0.0 87.4 1446 4320 min Summer 1.541 0.0 87.4 2200 5760 min Summer 1.541 0.0 87.4 2400 5760 min Summer 1.310 0.0 74.2 3640 9544 1000 min Former 1.310 0.0 74.2 3640 9545 1.0 5.77 4.344 300 31.2 16000 min Summer 1.774 0.0 81.9 31.2 15 min Winter 15.392 0.0 19.6 22	600	nin Sinder	7.561	C.0	1 1	5.9	31.8	
1.44. min Summer 0.746 0.0 24.6 730 2.16. min Summer 2.70 0.0 59.0 1100 2.660 min Summer 1.511 0.0 69.4 1448 4.320 min Summer 1.511 0.0 69.4 2200 57.60 min Summer 1.511 0.0 71.1 2880 72.01 min Summer 1.716 0.0 74.2 3640 86.4 min Summer 1.716 0.0 74.2 3640 86.4 min Summer 1.716 0.0 74.7 3640 86.4 min Summer 1.774 0.0 80.9 51.2 15 min Winter 1.532 0.0 19.6 22								
2667 min Summer 2.131 0.0 82.4 1.440 4320 min Summer 1.531 0.0 82.4 1.440 5767 min Summer 1.520 0.0 11.1 2880 7207 min Summer 1.310 0.0 14.2 3640 864 min Summer 1.310 0.0 54.2 3640 864 min Summer 1.77 0.0 64.9 3640 864 min Summer 0.177 0.0 64.9 3640 10000 min Summer 0.777 0.0 64.9 31.2 15 min Winter 115.302 0.0 19.6 22	_44	min Sumper	0.746	0.0		9.6	730	
4320 min Summer 1.541 0.0 87.4 2200 5767 min Summer 1.220 0.0 11.1 2880 7207 min Summer 1.310 0.0 14.2 3640 864 min Summer 0.177 0.0 14.2 3640 864 min Summer 0.177 0.0 14.2 3640 864 min Summer 0.177 0.0 14.2 3144 10000 min Summer 0.774 0.0 30.9 31.2 15 min Winder 115.392 0.0 19.6 22								
7201 win former 1.310 0.0 54.2 3640 064 win former 0.177 0.10 677 4344 0600 win former 0.774 0.10 61.9 5142 16000 win former 0.774 0.10 61.9 51.2 15 min winter 115.302 0.0 19.6 22	4320	min Sumper	1.541	C.0		57.4	2200	
1054 π/m Sommer 12.177 0.10 (6.7 4344 10005 π/m Sommer 12.774 0.10 (0.9 51.2 15 min winter 115.362 0.0 19.6 22								
15 min winter _15.362		tin Sommer.	0.177	0.4		67	4344	
			0.774					
	1008 -		15 202				66	
01982-2015 XP Solutiona	- 448 - 1000 - 15	min winter						

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 79 of 97

Surres Control 2015.1 Checked by data can main Surres Control 2015.1 Surres Control 2015.1 Storr Basel Depth Control Volume (x. [x]) (1/x) (x*) Storr Storns Storr Storns Storns (x. [x]) (1/x) (x*) Storns Storns Storn Vinter 47,433 0.323 S.3 19.1 0.4 Storn Winter 47,433 0.325 S.3 16.6 0.8 Storn Winter 47,433 0.325 S.3 16.6 0.8 Storn Winter 47,433 0.325 S.3 16.6 0.8 Storn Winter 47,536 0.155 S.4.7 3.8 0.8 Storn Winter 47,536 0.155 S.4.7 3.8 0.8 Storn Winter 47,539 0.015 S.5 0.7 5.5 0.7 Storn Winter 47,595 0.001 S.5 3.1 1.3 0.5	nage
Abil 983 Controlst Na 2448 ate 02/12/00 F 38-21 Controlst Na 2448 File Antenuation's Calc_list Checked by Gose Tenedar File Antenuation's Calc_list Checked by Gose Tenedar Summary of Results for 30 year Return Period (+403) Storn Event Event Event Event For 30 year Return Period (+403) If all Ninter 11,983 0.365 5.3 If all Ninter 11,990 0.105 4.7 If all Ninter 11,990 0.105 4.1 If all Ninter 11,990 0.115 4.1 If all Ninter 11,990 0.115 4.1 If all Ninter 11,990 0.15 1.5 If all Ninter 11,590 0.065 1.5	nage
The Of/12/2000 F 38-21 File Antenuettore Calc_ling File Antenuettore Calc_ling Summary of Results for 50 year Peturn Period (+40%) Storm Nav Max Max Mar Storms Event Event Depth Control Volume (a) (2/4) (4/4) Storm Ninter 41.587 0.365 5.3 19.4 0.4 121 alm Winter 41.587 0.365 5.3 19.4 0.8 122 alm Winter 41.587 0.365 5.3 19.4 0.8 124 alm Winter 41.587 0.365 5.3 19.4 0.8 125 alm Winter 41.587 0.365 5.3 19.4 0.8 126 alm Winter 41.597 0.365 5.3 19.4 0.8 126 alm Winter 41.590 0.155 4.7 5.8 0.8 127 alm Winter 41.595 0.065 1.5 1.5 0.7 128 alm Winter 41.595 0.065 1.5 1.5 0.7 129 alm Winter 41.595 0.065 1.5 1.5 0.7	nage
Tile ArtemustionVo Calc_lin3 Checked by Mary Manmann XE Solutions Control 2015.1 Summary of Results for 50 year Peturn Period (+40%) Storn New Max Mar Mar Sterns Event Event Depth Control Volume (R) (2/8) (2/8) (18) 122 alm Winter 47.983 0.365 5.0 18.4 or 122 alm Winter 47.976 0.267 5.5 18.4 or 164 min Winter 47.976 0.175 4.7 3.8 0 R 360 min Winter 47.990 0.175 4.7 3.8 0 R 457 min Winter 47.990 0.175 4.7 3.8 0 R 457 min Winter 47.990 0.175 4.7 5.8 0 R 457 min Winter 47.990 0.15 4.1 5.5 0 R 363 min Winter 47.990 0.16 3.1 1.3 0 5	nage
X= Solutions Summery of Results for 50 year Return Period (+40%) Summery of Results for 50 year Return Period (+40%) Storn New New New New Storus Event Level Depth Control Volume (x) (x) (x) (2/x) (x*) 121 all Minter #1.983 0.355 5.0 10.6 0 x 122 all Winter #1.983 0.355 5.0 10.6 0 x 135 all Winter #1.977 0.267 5.5 13.4 0 x 340 all Winter #1.970 0.217 5.5 13.4 0 x 347 all Winter #1.970 0.175 4.7 0.8 0 R (57 all Winter #1.990 0.175 4.1 5.5 0 R 535 all Store #1.585 0.065 3.1 1.3 0 x	
Storn Max Max Max Max Max Max Max Max Starns Event Event Event Depth Control Volume (x) (x) (x) (x*) (x*) Volume 100 min winter 17,383 0.325 5.0 19-1 0.4 120 min winter 47,383 0.325 5.0 16.6 0.8 180 min winter 47,393 0.257 5.0 16.6 0.8 187 min winter 47,596 0.257 5.0 16.6 0.8 197 min winter 47,710 6.217 5.0 10.5 0.8 197 min winter 47,536 175 4.7 3.8 0.8 197 min winter 47,536 175 4.7 3.8 0.8 197 min winter 47,539 0.175 4.1 5.5 0.8 197 min winter 47,595 0.065 3.1 1.3 0.8	
Storr Nax Has Max Max Max Max Max Max Starr Event Event Event Depth Control Volume (x) (x) (x) (x*) Volume 10 min Sinter 47,483 0.383 5.0 19-1 0.4 122 alm Winter 47,483 0.383 5.0 16.6 0 162 alm Winter 47,536 0.267 5.5 13.4 0.8 162 alm Winter 47,710 6.212 5.0 10.5 0 162 alm Winter 47,536 0.155 4.7 3.8 0 164 alm Winter 47,519 0.155 4.7 3.8 0 165 alm Winter 47,519 0.155 4.7 3.8 0 165 alm Winter 47,519 0.155 4.7 5.5 0 165 alm Winter 47,519 0.155 4.1 5.5 0 172 alm Winter 47,519 0.051 3.4 1.3 0	
Howat Hervel Depth Control Volume (x) (x) (x) (x) (x) (x) 120 min Ninter 1,383 0.365 5.3 19.1 0.4 122 min Ninter 47,433 0.365 5.3 19.1 0.4 122 min Ninter 47,577 0.267 5.5 13.4 0.8 134 min Ninter 47,576 0.267 5.3 10.5 0.8 147 min Ninter 47,576 0.267 5.3 10.5 0.8 147 min Ninter 47,576 0.267 5.5 13.4 0.8 147 min Ninter 47,576 0.267 5.5 10.5 0.8 147 min Ninter 47,579 0.175 4.7 3.8 0.8 147 min Ninter 47,599 0.155 4.7 5.5 0.7 132 min Ninter 47,595 0.065 3.1 1.3	
10 min Winter #7,983 0.365 5,3 19.1 0 4 123 aim Winter #7,883 0.353 5.9 16.6 0 K 162 aim Winter #7,883 0.253 5.9 16.6 0 K 162 aim Winter #7,710 0.267 5.5 13.4 0 K 142 aim Winter #7,710 0.212 5.5 10.5 0 K 145 aim Winter #7,730 0.125 4.7 3.8 0 K 145 aim Winter #7,536 0.155 4.7 4.8 0 K 145 aim Winter #7,539 0.155 4.7 4.8 0 K 155 aim Winter #7,599 0.053 1.5 4.7 4.8 125 aim Winter #7,580 0.053 1.5 4.7 4.8	
121 ath Winter 47,833 0.323 5.9 16.6 0 F 167 ath Winter 41,767 0.367 5.5 18.4 0 F 544 ath Winter 47,710 6.211 5.5 10.5 0 F 365 ath Winter 47,736 0.175 4.7 5.8 0 F 475 ath Winter 47,736 0.175 4.7 5.5 0 F 865 ath Winter 47,599 0.051 1.5 4.7 L F 865 ath Winter 47,599 0.051 1.5 4.7 L F	
180 min Winter 47,767 0.267 5.5 13.4 0 K 540 min Winter 47,710 0.217 5.5 10.5 0 K 347 min Winter 47,716 0.217 5.5 10.5 0 K 347 min Winter 47,716 0.217 5.5 10.5 0 K 347 min Winter 47,716 0.217 4.1 5.5 0 K 357 min Winter 47,516 0.217 4.1 5.5 0 K 351 min Winter 47,516 0.217 4.1 5.5 0 K 372 min Winter 47,516 0.217 4.1 5.5 0 K 321 min Winter 47,516 0.217 4.1 5.5 0 K	
140 min Win teen 47,710 0.211 5.5 10.5 0.8 160 min Win teen 47,536 0.155 4.7 3.8 0.8 487 min Win teen 47,536 0.101 4.1 5.5 0.8 487 min Win teen 47,536 0.101 4.1 5.5 0.8 517 min Win teen 47,536 0.053 1.5 4.7 0.8 730 min Win teen 47,536 0.053 1.1 1.3 0.8	
(B) min Winter 47,580 0.100 4.1 5.5 0 H S01 min Winter 47,595 0.005 3.5 4.7 0 H 720 min Winter 47,585 0.065 3.1 1.3 0 H	
501 min Winter 47.595 0.005 3.5 4.7 c.s. 720 min Winter 47.585 0.065 3.1 1.3 c.s.	
960 min Minter 47.573 0.075 2.6 3.7 0 K	
1440 min Winter 47,260 0 061 1.8 3 0 6 M	
2163 min Winter 47,150 0.051 1.3 2.5 0 F 2585 min Winter 47,144 0.044 1.5 2.2 0 F	
4520 min Winter 41.537 0.023 0.17 1.8 0 E	
5760 min winter 47.533 0.055 0.6 1.6 0.5	
7255 min Winter 47,330 0.025 0.45 1.5 C K 8640 min Winter 47,527 0.027 0.4 I.4 C K	
10397 min Winter 47,526 0.025 0.4 1.2 C.M	
Utors Hain Floored Dischinge Time Coak	
Event instal Volume Volume (mind) (m ²) (m ²)	
67 alm Winton 45,320 7.0 30.8 54	
121 min Winter 26.334 - 2.0 - 36.6 - 90 161 min Winter 19.550 - 2.0 - 56.1 - 124	
241 min Winter 15.659 5.0 12.6 154	
360 min Winter 11,306 5,0 46,3 208 405 min Winter 9,034 5,0 49,1 262	
601 min Wintex 7.565 0.0 31/4 322	
77 xiw Winter 6 51% U.O. 17.3 700 961 min Winter 5.109 U.O. 16.5 502	
142. min Winter 3.716 0.0 61.1 742	
2161 rin Winter 3.701 5.0 69.1 1108	
2000 min Winder 2,131 0,0 09,9 1450 4301 min Winder 1,541 0,0 19,5 2200	
576° win Winter 1,220 C.0 73.7 2404	
720 Winner 1.000 T.0 T.1 77M- 864. min Winter 8.377 5.0 55.9 4468	
1008. min Winter 0.774 0.0 ±8.4 blJe	
01983-2015 XP Solutiona	



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 81 of 97



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 82 of 97

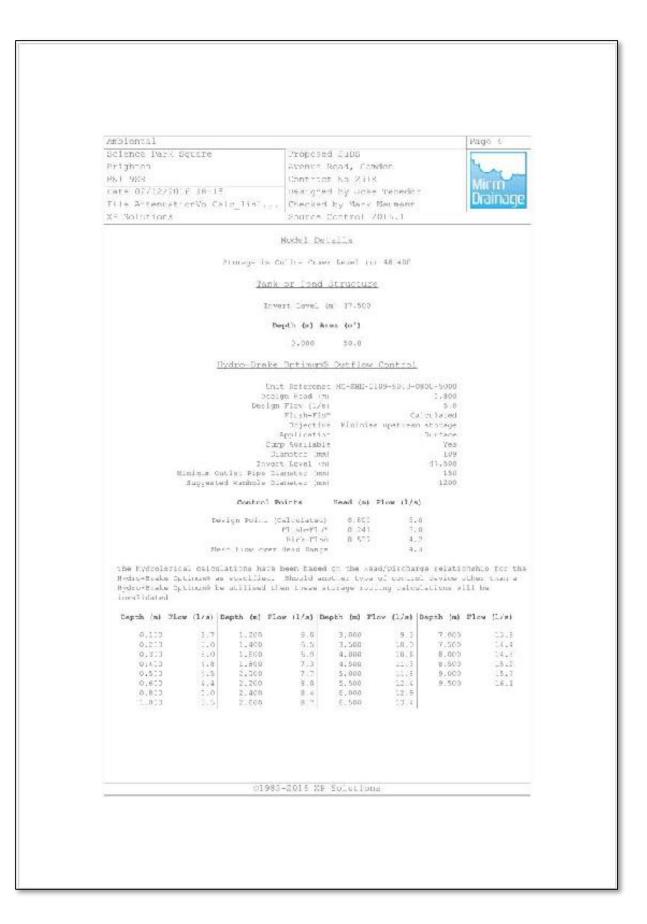
Ambiental							Page 1
Science Park Square		Drog	pesed 2	IDS			
Brighton			nte Rea				Ly m
ENI 988 Date 02/12/2016 18:5	=		thost N			de u	Micro
File AttenuationVo (igned b sked by	-			Drainage
XP Bolutions			nce Cor				
Vience 2	of Results	for 1	00 year	r Retu	n. Per	\$04+) boi	1.
	Storn Event	Mare	Max Depth 6	Mar		Status	
	Logic	(2)	(n)	(1/8)	(= °]		
	5 min summer 5 min Summer			5.0	18.3 22.5	a U A O	
E	Code Sunser	47.283	0.485	5.0	24.2	ŏκ	
	inin Suuver Inin Surner				22.6 20.1		
24	i min Summer	47.851	0.351	5.0	17.6	0 K	
	0 min zummer 0 min Summer				13.3		
60	i min Summer	47.661	0.161	4.9	8.0	0.16	
	inin Sunner Inin Sunner				6.7 5.4		
	C min Summer				4.3		
	i min Summer Sain Summer				3.5		
	0 min Summer 0 min Summer				3.0		
	o min Summer			1.0	2.2	O K	
	č min Sunner C min Sunner				2.0		
1000	inin Summer	47,534	0.034	0.5	1.7	0 K	
	i min Ninter I min Ninter						
	8	Rain	Floode	d Tisch	acces Ti	ma-Peak	
	Event		Volume (m^2)		me	(mins)	
	min Summer				22.7	22	
	min Sinver min Sinver				29.4 36.2	34 56	
12	min Summer	35.306	С.	0	42.9	88	
	min Sumper-				6C.8 15.5	120 152	
36	min Summer	14.717	Ξ.	0	3.6	214	
	min Simper min Simper	11.864			16.7 59.1	272 328	
72	rin Sommer	0.397	с.	0	61.1	382	
	nin Somer min Sumper	6.004 4.701			54.5 55.4	730	
216	min Summer	3.91.	. G.,	0	/1.6	L104	
	min Simper min Simper	2.890			18.4 11.0	1468	
	r n Sumer	1.514	С.	0	14.0	2200	
	min Sommer min Sommer	1.257			91.46 94.4	3640 4400	
	Tin Corner Tin Corner	0.049			24.4 VC.8	5104	
	min winter min winter				25.5 33.0	23 35	
-						44	
		32-2016					

umbiental							Page 2
iciande Park s	QUITE	100000	pesed				5
Prighton		1.000		ad, Car			Lar_
ANT 988 Cate 02/12/201	C 10-12			Na 211			Micru
	erVo Cale lint			by Jos y Mary			Drainage
X= Solutions	enterrette install	1.		tral		in the second se	And a second second
						en letteraar	
ji ji	mary of Results	for 1	30 yea	rs Reiu	in Peri	\$02+) Ect	1
	Store	Max	Max	Max	Мат	St.s+118	
	Event	Level	Depth	Control.	Volume		
		(8.)	(=)	(1/4)	(#*1		
	El min Minter						
	120 min Winter 180 min Winter						
	540 min Winter	41,855	0.351	5.5	17 7	C R	
	AFC of a Ninter ABC min Minter						
	sil min winter	47.0019	0.111	4.6	5.0	1. B	
	730 min winter 960 min Winter	41.600	0.101	3.0	5.2	0 5 0 X	
	1440 min Winter					0 8	
	2100 min Wintwa 2000 min Wintwa						
	4520 min Winter	411342	0.042	0.0	2.1	C E	
	5160 min winter	17.537	0.037	0	1.8	UL	
	7200 min Minter 8640 min Minter	47.531	0.021	0.5	I 5	O K	
	10095 mln Winter						
	Event		Floods	ed Bisch		na Joak (ains)	
	Lydite	Then your	(n ²)			TRALLO /	
	60 Co Wittlet			.0.	\$0.5	60	
	121 min Winter	35.388	E	. 11	(H.1	96	
	161 min winter 241 min Winter	20.358		.0	15.5	151	
	361 min Winter	14.717	5	0	50.1	224	
	601 min Wirter	3.733	1	. 0 . 0	53.9 50.2	276 324	
	361 min Winter 481 min Winter 601 min Winter 77 min Winter	0.397	ч (р.	11	50.5	20.5	
	961 min Winter 144. min Winter	Sec. 1	i de	. 0	12.2	500- 742	
	2161 min Winter	3,411	1	. 0	5.315	1104	
	2000 min Winder 4327 min Winder	2.590			17.# 24.1	1349	
	576° vin Wirter	1.714	r r	.0	Ξ.Q. :R	29.245	
	"CR win Winner	1 - 25			2.1	16.7.d.	
	1008, min Winter 1008, min Winter	1.375			.8.4	516W	
					2011		
	0198	3-201	2 KE S	oferiat	Rel of		

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 84 of 97



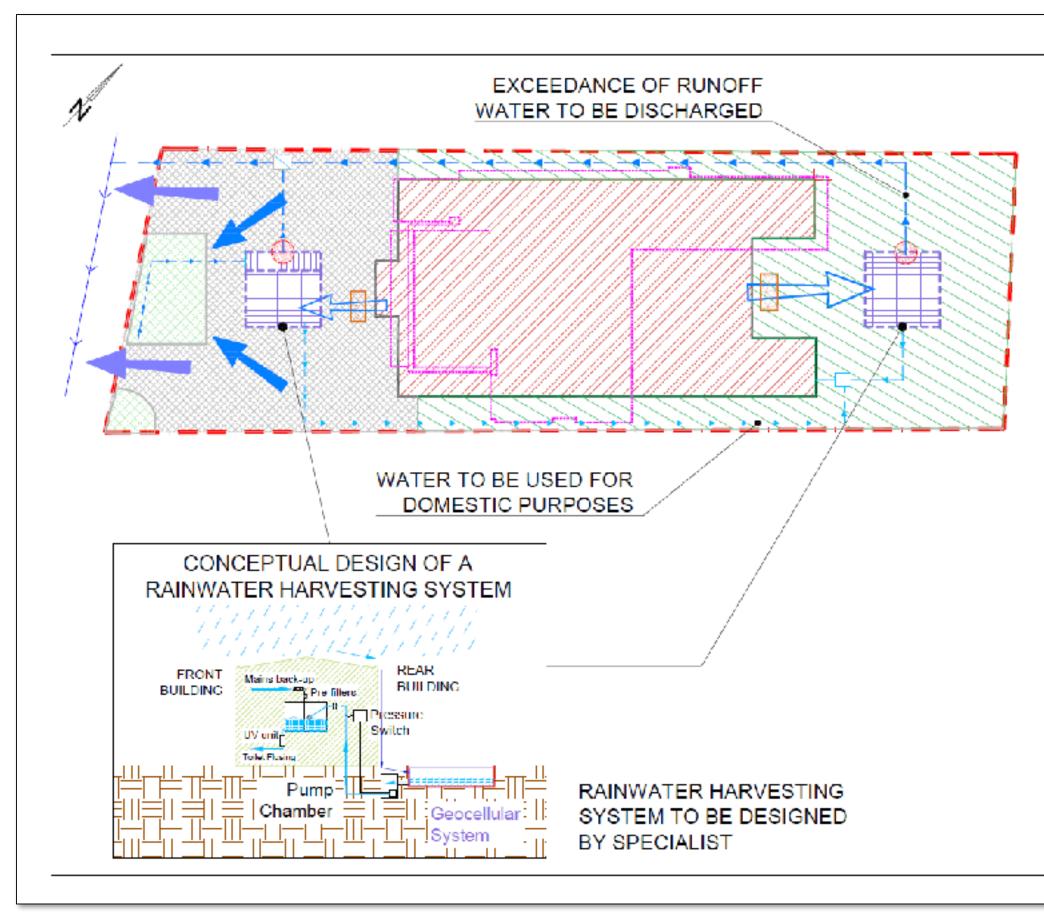
© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 85 of 97



© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 86 of 97

Appendix 4 – Proposed Drainage Strategy

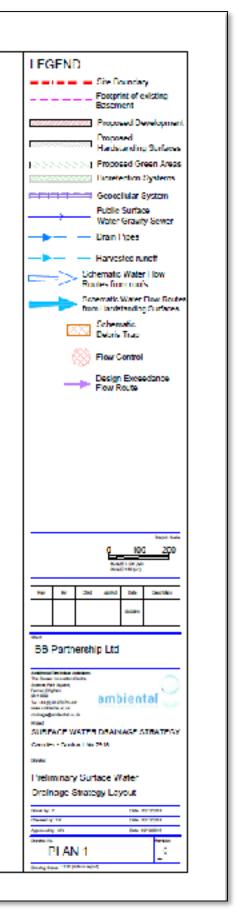
Plan 1 – Preliminary Surface Water Drainage Strategy Layout



Appendix 4, Plan 1 – Preliminary Surface Water Drainage Strategy Layout

ambiental

© Ambiental Technical Solutions Ltd. 2016



Appendix 5 – Information

Surface Water Runoff Calculation Method

Rainfall data has been extracted from the FEH CD-ROM for several storm duration events for a number of return periods, including 1:1.01 year, 1:10 year and 1:100 year storm events. These return periods are industry standard, however it is important to be aware that return periods less than 1:2 years are not considered reliable and should not be used in detailed design calculations.

The 1:100 year with an allowance for climate change has been based on a 40% increase to the 1:100 year rainfall intensity and not the rainfall depth. This is to provide the most conservative runoff rates for the site possible.

Greenfield runoff rates have been calculated using The Institute of Hydrology Report 124 Marshall and Bayliss, 1994 method, as recommended in the SuDS Manual CIRIA (C753). In keeping with standard practice, the calculations are based on calculating the Greenfield runoff rates for a 50 Ha site and then factored to account for the actual site size.

Impermeable runoff rates have been calculated using the Modified Rational Method for the impermeable surfaces on site only.

Throughout the calculations a weighted co-efficient has been used, allowing different materials of surface covering on site to be taken into account.

These runoff rates have then been combined to provide the most accurate runoff rate possible for both the existing and proposed site.

Appendix 6 – Surface Water Drainage Pro-forma for new developments

ambiental

© Ambiental Technical Solutions Ltd. 2016 Commercial In Confidence Page 1 of 97

Surface Water Drainage Pro-forma for new developments Barray Autors on a companies on a nature where company investigation documents is information as supported by the providence of an industry induced on supported by the providence on a nature where company and the industry induced on the nature where company and the industry induced on the nature where company and the company and the industry induced on the nature of the nater of the nature of the nature of the nature of the n

	Exds	Existing	Proposed Difference	Notes for developers
		5		
Impermeable area (ha)	0.0	388	0.088 0.074 -0.014	If the proposed amount of impermentia surface is greater, then ruroff rates and volumes will increase Section 6 much be field in (Frequesci (Ingermential)) is entation (ass than consistent then exercise for such as skinned and section 7 filed in
Drainage Method (nfillration/szwa/waits course)		Sewer	Sewer NA	If different from the setting, phase ill in section 3. If calsing the negative to indication and the proposed is not deatenge volumes negligences as -10 in section 6.
	2.2		Evidences during the to successful a	المراسم المحمد المحمد
	Yes	No	Yes No Evidence that this is possible	Notes for developers
Existing and proposed MicroDrainage calculations	×			Hease provide MitroDatinage calculations of existing and proposed run-off rates and volumes in accordance with a recognised methodology or the results of a full infinitiation test (see their bishord) finitification is accorded)
nfiltration		×	Solis with Poor Infilmation Media.	a.g. soakage fests. Section 6 (infimetion) must be filled in if infimation is proposed.
To watercourse		×	There is not a variatiou we close enough to the site.	a.g. is there a varier course meanly?
To surface water sewer	×		Use of the Existing Public Server Network.	Confirmation from server provider that sufficient capacity exists for this connection.
Combination of above		×		e.g. pertimilitation part decharge to sever or watercourse. Provide evidence above,
Has the drainage proposal had regard to the SuDS hierarchy?	×			Evidence must be provided to demonstrate that the proposed Sustainable Chainage strategy has had regard to the SuUS hierarchy as outlined in Section 2.5 above.
Layout plan showing where the sustainable drainage infrastructure will be located on site.	×		See Ambiental SWDS Ref2918 - Appendix 4, Plan 1 - Preliminary Surface Water Drainage Strategy Layout	Flaase provide plan reference numbers showing the details of the site layout showing where the sustainable drainage immastructure will be located on the ster. If the development is to be constructed in phases this should be shown on a separate plan and confirmation should be provided that the sustainable experiments are drainage proposal for each phase can be constructed and can operate independently and is not reliant on any later phase of ferwidoment development.

Reference: 2918

		Existing Rates (I/s)	Proposed Pates (I/s)	Difference (I/s) (Proposed- Existing)	 ½ Difference (difference iextering x 	Existing Proposed Difference (I/s) % Difference Notes for developers Rates (I/s) Rates (I/s) (Proposed- (difference Notes for developers
				;	100)	
diffeent 4 to 4	GITERITIERO MIERANO 4 to 4	CA8	- VN-	- SN	M'A	vieword s approxim in z storm event. Provide ins in becaun b (weiword) is proposed. Biocondi Ambrona erter with advertant structured size to be contracted to monofedd actor
11.90		07.1		121-		ri operato desente generate (winningenion) e nome ann its de sopratente opratente presentation. For all contractoridine sion coverts. As a minimum, track discharge ta as must be reduced
101100		22.00		6 17 P	6 10 2 10	by 50% from the existing sites for all conresponding rainfal events.
1 in 100 plus climate chan	1 in 100 plus climate change	MA	e S	A/A	N/A	The proposed 1 in 100 +00 peak discharge rate (with mitigation) should aim to be equivalent to greenheid rates. As a minimum, proposed 1 im 100 +00 peak discharge rate must be neutrical by 40% from the avisition 1 in 100 numbrit are stres.
	Greanfield runoff volu (m ³)	вш	Existing Volume (m ³)	Proposed Volume (m ³)	Difference (m*) (Proposed Existing)	
1 in 1		3 50	8/18	628	41.66	Proposed discharge volumes (with mitgation) should be constrained to a value as close as is
1 in 30		2074	40.04	23.67	4.4	reasonably practicable to the greenfield runoff volume wherever practicable and as a
1im 100 đ hour		28.3	56.73	47.7	-9.02	minimum should be no greater than existing volumes for all consisponding scorm events. Any Increase in volume increases ficod risk elsewhere. Where volumes are increased section 6 must be filled.
1 in 100 6 hour plus climete change	39.62		79.42	60.76	-12.63	The proposed 1 in 100 +OC discharge volume should be constrained to a value as close as is responsibly predicable to the greentied month volume whenever predicable. As a minimum, to mitigate for eliments change the proposed 1 in 100 +OC volume discharge from elimeration or present than the setsing 1 in 100 storm event. If not flood risk increases undor dimate change.
					UNCL	UNCLASSIFIED

6. Calculate attenuation storage – Attenuation storage is provided to enable the rate of runoff from the site into the receiving watercourse to be limited to an acceptable rate to protect against erosion and flooding downstream. The attenuation storage volume is a function of the degree of development relative to the greenfield discharge rate.	Notes for developers	Volume of water to attenuate on site if discharging at a greatifield run off rare. Can't be used where discharge volumes are instreasing	Volume of water to attenuate on site if discharging at a 50% reduction from existing rates. Can't be used where discharge volumes are increasing	Volume of water to alternate on site 1 discharging at a rate different frum the above – phase state in 1 th column what rate. His volume consegonds, s. On previously developed sites, runoff rates should not be more than three times th calculated greentied rate. Can't be used where discharge volumes are	Increasing Volume of water to afterhade on site if cischarging at existing rates. Can't be used where afterhade volumes are increasing	
ge is provided to enable t sion and flocding downstr arge rate.		52.9	21	29.2	14.6	10.795% Bioretention
 Calculate attenuation storage – Attenuation storage is provide limited to an acceptable rate to protect against erosion and fidegree of development relative to the greenfield discharge rate. 		Storage Attenuation volume (Flow rate control) required to meet greenfield run off rates (m)	Storage Attenuation volume (Row rate control) required to reduce rates by 50% (m ¹)	Storage Alternation volume (How rate control) required to meet [OTHER RUN OFF RATE (as close to greenfield rate as possible] (m ³)	Storage Attenuation volume (How rate control) required to retain rates as existing (m ⁵)	Percentage of attenuation volume stored above ground,

e d

n
100
2
100
ō
-
2
2
~
≃.
in.
b
÷.
1
.00
≤.
-
Ε.
0
æ
w2
вñ.
>
2
<u> </u>
T.
~

attenuation storage and long term storage. The idea is that the additional volume does not get into the watercourses, or if it does it is at an exceptionally low rate. You can either infiltrate the stored water back to ground, or if this isn't possible hold it back with on site storage. Firstly, can infiltration work on site? Storage is required for the additional volume from site but also for holding back water to slow down the rate from the site. This is known as

Multiplication State the Star's Geology and known Source Avoid Inflicting in mode ground infliction rates are highly variable. Inflictation Protection Zones (SPZ) avoid protection zones (SPZ) and moles to Environment Agency website to identify and source protection zones (SPZ) Are inflictation rates suitable? w. inflictation rates should be no lower than 1x10. ⁶ m/s State the distance between a proposed inflictation w. inflictation rates for invoket or than 1x10. ⁶ m/s State the distance between a proposed inflictation Higher than 3 mBGL table conducted for inflicting or defeet a transition of the state of the infliction of the state of the infliction rates and the ground water (GW) level				Notes for developers
University for the state of the		State the Site's Geology and known Source		Avoid infiltrating in mode ground, infittation rates are highly variable.
Higher than 3 mBGL	militration	Protection Zones (SPZ)	Lorden Gap Streader + C-eg; Cales Zone (Dore 3)	and refer to Environment Agency website to identify and somee
Higher than 3 mBGL				protection zones (S ⁻ Z)
Higher than 3 mBGL		Are infiltration rates suitable?	N2	Infiltration rates should be no lower than 1x10 ⁿ m/s
		State the distance between a proposed infiltration		Need 1m (min) between the base of the infiltration device & the water
Inditration devices. Avoid infination where this tent possi		device base and the ground water (GW) level	Higher than 3 mBGL	table to protect Groundwater quality & ensure GW doesn't enter
				Inditration devices. Avoid Inditiation where this lant possible.

UNCLASSIFIED

	Is the site contaminated? If yes, consider advice from others on whether infiltration can happen.	She already deve oper, thus there is a octed al contamination one to petrochemical politikerts of the conta	Advice on contartingted Land in Camber can be found on our supporting documents wetchers. Water should not be infiltrated provide begins that is concaminated. The Environment Agency may provide begins advice advice in planning consultations for concaminated sites that should be considered.
In light of the above, is inhibration teasible?	Yes/No? If the answer is No, please identify how the storm water will be stored prior to release	NO. The storm water will be stored in site cellular storage and bioretention	If infiltration is not feasible how will the additional volume be storad?. The applicant should then consider the following options in the next section.
ption 1 Simp Trate. This is	Option 1 Simple – Store both the additional volume and alteruation volume in order to make a final discharge from site at the off rate. This is preferred if no infiltration can be made on site. This very simply satisfies the runoff rates and volume criteria.	a unation volume in order to r 1. This very simply satisfies t	Option 1 Simple – Store both the additional volume and attenuation volume in order to make a final discharge from site at the greenfield run off rate. This is preferred if no infiltration can be made on site. This very simply satisfies the runoff rates and volume criteria.
otion 2 Com ry low rate o od lo słow Ib	Option 2 Complex – If some of the additional volume of wate very low rate of 2 l/sec/hectare. A combined storage calculations used to stow the runolf from site.	er can be infiltrated back int ion using the partial permiss	Option 2 Complex – If some of the additional volume of water can be infittrated back into the ground, the remainder can be discharged at a very low rate of 2 l/sec/hectare. A combined storage calculation using the partial permissible rate of 2 l/sec/hectare and the attenuation rate used to slow the number from site.
Please confirm what option stored on site.	has been chosen and how much	Simple	Notes for developers The developer at this scage should have an idea of the ste characteristics and be adden to explain what the storage requirements are on site and how it will be achieved.

ambiental

8. Please confirm

		Motion for densed service
		NOUSE FOIL DRAVEID REFER
Which Drainage Systems measures have been used, including preen roofs?	life proceed to use solution decage and Beencedian Gydams	SULS can be addition for most studions or where initiation is if feasible or ginportneatheli instabilisations SUDS davices alove treatment bur not infiltration. See CIRIA SUDS Manual CG97.
	Yes	This a requirement for severs for adoption & is good practice even where drainage system is not adopted.
Will the drainage system contain the 1 in 100 +CC storm event? If no please demonstrate how buildings and utility plants will be protected.	Yes.	Mational standards require that the drainage system is designed so that flooding does not occur during a 1 in 100 year raintal event in any cast of a building (including a basement); or in any ubby plant
Any flooding between the 1 in 30 & 1 in 100 plus climate	Yat	suscepticie to varier (e.g. pur trang station of executiny succession) within the development. Sefety and causing property floading or posing a hazard to site
	3	users the non-peeper men process for the procession of the second values must clean away reaction 6 rates. Chatring rates can be used where trundf volumes are not increased
How will exceedance events be catered on site without increasing flood risks (both on site and outside the development)?	Exceedance flow routes have been provided.	Safety: not ceusing property flooding or posing a hazard to site users Le. no deeper than 300mm on roads/footpaths. Flood vaters must drain away at section 6 rates. Existing rates can be used where runoff volumes are not increased.
		Exceedance events are defined as those larger than the 1 in 102 +CC event.
where are rates being restricted (vortex control, orifica etc)	Orifices and Hydrobrakes.	Detail of how the flow control systems have been designed to avoid pipe blockages and ease of maintenance should be provided
Please confirm the owners's dopters of the entire drainage systems throughout the development. Please list all the owners.	Processly owner will be responsible for whithmanoe	If Blase are multiple owners then a drawing ituatizing exactly what features will be within each owner's ramit must be submitted with the Protoma.
How is the entire drainage system to be maintained?	Details of maintenance are provided within the attached documentation. Also, suppliers	If the features are to be maintained directly by the owners as stated in answer to the above question please answer yes to this question and submit the relevant maintee schedule for each feature. If it is to be maintained by others than above please give details of each feature and the maintenance as month.
	must provide appropriate maintenance documentation.	Clear details of the maintainenee proposals of all elements of the proposed drainage system must be provided. Details must demonstrate their maintainence and operation requirements are demonstrate front instantainenee Pandy maintained drainage can lead to inviscead fronding problems in the future.

Pro-forma Section	Document reference where defails guoted above are taken from	Page Number
	Surface Witter Datamas She and Struct Sector 3 - Development Development Sile & ea. Falance 13.3	<u></u>
	Euftwei Mawer Dinitate Blankertz Renord - Ersteine Stratkertz	24
Section 4	Eurlace Abaier Druthage Shawagu Report : Section 4 - Fundir Ranas, Aggenetic 3 - Cala, Inticna	5G GL 01 61.
Section 5	Luitee Water Danneee Stanson (sport - Section 4 - Apdracha) Veimmes for Sociates Zapendax 3. Calculations	17 to 19:60 to 62
Section 6	Eurlace Assor Drivage Shapey Report Seabon 4. Attain ator Storage Appendix 2. Calaulations	19 to 20: 53 to 89
Section 7	Curtace March Distrate Strandy Report, Cection 4 - Dranege Ottsbegy Appendix 4, Fish 1.	24 to 25: 88
Section 8	Eurfase Water Dial nage Shanegy Rispert . Seerlen 4 - Drahage Earlingy vependix 4. Plan 1.	24 ID 25; 88
s form is complet nage strategy or	This form is completed using factual information from the Flood Risk Assessment and Site Plans and can be used as a summary of the surface viater drainage strategy on this site.	a summary of the surface wate
draimage strategy on this site. I orm Completed Lly 249442000 Qualification of person respo	draimage strategy on this site. I orm Completed By wetterson Pressioner. Qualification of person responsible for signing of this pro-formal and	×
Company. Anbental On behalf of (Client' Date vision	Company, Anthendal On behalf of (Olient's details) BEatmodifield Date: #12004	