

MVV Environment Ltd

**MVV Energy from Waste
Combined Heat and Power
facility, Dundee**

Drainage Impact Assessment

245510/DA/0001

Issue | 14 December 2016

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 245510-16

Ove Arup & Partners Ltd
1 West Regent Street
Glasgow G2 1RW
United Kingdom
www.arup.com

ARUP

Document Verification

ARUP

Job title		MVV Energy from Waste Combined Heat and Power facility, Dundee		Job number	
				245510-16	
Document title		Drainage Impact Assessment		File reference	
Document ref		245510/DA/0001			
Revision	Date	Filename			
Draft 1		Description	First draft for 3 rd party approval		
			Prepared by	Checked by	Approved by
		Name	RF	JC	JC
		Signature			
Issue	14 Dec 2016	Filename	MVV Dundee Drainage Assessment Report Final ISSUE 141216.docx		
		Description			
			Prepared by	Checked by	Approved by
		Name	RF	JC	JC
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
Issue Document Verification with Document					
<input checked="" type="checkbox"/>					

Contents

	Page
1 Introduction	1
1.1 Aims of the Assessment	1
1.2 Scope of the Assessment	1
2 Planning Context	2
2.1 Scottish Planning Policy	2
2.2 PAN 51	3
2.3 PAN 61	3
2.4 PAN 69	3
2.5 PAN 79	3
2.6 Council Guidance	4
3 Existing Site Description	5
3.1 Location and Topography	5
3.2 Ground Conditions	5
3.3 Local Water Courses and Flood Risk	7
3.4 Existing Site Drainage	8
3.5 Existing Surface Water Runoff and Overland Flows	9
4 Data Collection	10
4.1 Correspondence	10
5 Proposed Development	12
5.1 Development Layout	12
5.2 Diversions	13
5.3 Drainage Strategy	13
5.4 Foul Water Drainage	14
5.5 Surface Water Drainage	14
5.6 Maintenance	18
6 Conclusions	19

Tables

Table 1 – Groundwater levels.

Table 2 - Greenfield Runoff Values for Area of EfW CHP Site Only

Table 3 – Greenfield Runoff Values for Area of EfW CHP Site plus Area of SuDS Basin

Table 4 – Record of Consultation

Table 5 – Greenfield Runoff Values to be used for Storage Calculations

Figures

Figure 1 – Site Location Plan

Figure 2 – Existing Site Plan

Figure 3 – Topographical Survey Extract

Figure 4 – Preliminary Foul System Layout Proposal

Figure 5 – Preliminary Surface Water SuDS System Layout Proposal

Appendices

Appendix A

Proposed Building Layout

Appendix B

Scottish Water Drawings

Appendix C

Existing Water Utilities Drawing

Appendix D

Preliminary Greenfield Runoff Calculations

Appendix E

Correspondence

Appendix F

SuDS Simple Index Tool

Appendix G

Preliminary Quick Storage Estimate Calculations

1 Introduction

Ove Arup and Partners (Scotland) Ltd (Arup) have been commissioned by MVV Environment (MVV) to undertake a Drainage Assessment in support of a planning application for a proposed Development at Baldovie Industrial Estate, Forties Road, Dundee.

The current proposals for the site are to construct a new Energy from Waste Combined Heat and Power (EfW CHP) facility. The primary purpose of the EfW CHP facility is to treat the residual waste from the Dundee and Angus area that has not been recycled, reused or composted. The facility will therefore primarily deal with household waste provided by Dundee and Angus Councils under the Dundee and Angus Residual Waste Treatment Contract. The remaining processing capacity will be used to process similar Commercial and Industrial waste from local businesses in the surrounding area. The proposed MVV Energy from Waste plant will take over the processing of commercial waste collections and house clearances carried out by Dundee City Council which are currently undertaken at the existing ATS plant.

The existing site is currently used for the processing and recycling of material recovered from highway construction and repairs. The new EfW CHP facility will share the existing DERL access road and trafficked areas for operational purposes, as well as share DERL's weigh-bridges, gatehouse and drainage. There will also be some connections to adjacent infrastructure.

1.1 Aims of the Assessment

The aims of this assessment are as follows:

- To investigate the drainage regime of the existing site and its surroundings;
- To review the current legislation that is applicable;
- To estimate the existing and proposed flows generated from the development;
- To review the existing sewerage provision in the proximity of the site and its suitability to serve the development;
- To define the necessary SuDS requirements to satisfy the statutory authorities and identify the options available.

1.2 Scope of the Assessment

The assessment has been prepared in relation to the proposed development within the red line boundary shown on [Figure 1](#).

2 Planning Context

2.1 Scottish Planning Policy

This Drainage Assessment has been compiled in compliance with the following policy documents:

- Scottish Planning Policy (SPP) (1), in tandem with the
- National Planning Framework (NPF) (2);
- The Flood Risk Management Scotland Act (3);
- The Water Environment (Controlled Activities) (Scotland) Regulations (4) (CAR);
- Planning Advice Note 51 (PAN51) (5);
- Planning Advice Note 61 (PAN61) (6);
- Planning Advice Note 69 (PAN69) (7);
- Planning Advice Note 79 (PAN79) (8);

The Scottish Planning Policy (SPP) (2014) (1) states that “the planning system should promote:

- A precautionary approach to flood risk from all sources, including coastal, water course (fluvial), surface water (pluvial), groundwater, reservoirs and drainages systems (sewers and culverts), taking account of the predicted effects of climate change;
- Flood avoidance: by safeguarding flood storage and conveying capacity, and locating development away from the functional flood plains and medium to high risk areas;
- Flood reduction: assessing flood risk and, where appropriate, undertaking natural and structural flood management measures, including flood protection, restoring natural features and characteristics, enhancing flood storage capacity, avoiding the construction of new culverts where possible; and
- Avoidance of increased surface water flooding through requirements for Sustainable Drainage Systems (SuDS) and minimising the area of impermeable surface.”

The National Planning Framework (NPF) sets the context for development planning in Scotland and provides a framework for the spatial development of Scotland as a whole. This includes the key planning outcomes for Scotland, which consider sustainability, reducing carbon emissions, and helping to protect and enhance Scotland’s natural assets and facilitate their sustainable use.

The Flood Risk Management (Scotland) Act 2009 (3) places a duty on Scottish Ministers, SEPA, Local Authorities, Scottish Water and other responsible authorities to exercise their legislative control with a view to managing and reducing flood risk and to promote sustainable flood risk management. Controlled Activities (Scotland) Regulations (CAR) 2011 (4) require all surface water from new development to be treated by a Sustainable Drainage System (SuDS) before it is discharged into the water environment, except for single houses or where the discharge will be into coastal water.

Sites identified as appropriate for development can sometimes be constrained by a lack of waste water infrastructure capacity. If a chosen site location is considered to have inadequate drainage infrastructure, stakeholders should work together to identify the best practicable option to accommodate the development. For large scale development proposals in areas where drainage is already constrained or otherwise problematic; or if there would be off-site effects, a comprehensive drainage assessment of the wider network will be required. Drainage assessments should cover both surface and foul water.

2.2 PAN 51

Planning Advice Note 51 (PAN51) (5) gives good practice advice for designers and planners for the development of sites in relation to the protection of the natural environment. In particular, its main purpose is to “*support the existing policy on the role of the planning system in relation to the environmental protection regimes as expressed within Scottish Planning Policy.*”

2.3 PAN 61

Planning Advice Note 61 (PAN61) (6) gives good practice advice for planners and the development industry complementing The CIRIA SuDS Manual C753 (5). Drainage of land is required to make it suitable for development, to protect existing and proposed development from the effects of flooding, and to deal with pollution arising from the interaction of rainwater and the development. Flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface water run-off from development sites through the use of sustainable drainage systems.

2.4 PAN 69

Planning Advice Note 69 (PAN69) (7) provides background information and best practice advice in support of Scottish Planning Policy. The note aims to prevent future development which would have a significant probability of being affected by flooding or which would increase the probability of flooding elsewhere.

2.5 PAN 79

Planning Advice Note 79 (PAN79) (8) gives advice on good practice in relation to the provision of water and drainage in a planning context. In particular, it encourages partnership working and the sharing of information in order to ensure a

common understanding of capacity constraints and agreement on the means to accommodate new development.

2.6 Council Guidance

Dundee City Council provide a Guidance Note for Sustainable Drainage Systems (SuDS) Design ([11](#)). This note provides the relevant materials to make reference to during the design, along with important criteria which must be considered.

3 Existing Site Description

3.1 Location and Topography

The site is located in Baldovie Industrial Estate, which consist of a single block of four industrial units. Baldovie Industrial Estate is situated off the Drumgeith Road on the North-East side of Dundee. It has access via the A90 to the North and via the A90 Kingsway West. The site sits approximately 100m north of the Dighty Water. The approximate National Grid Reference for this site is NO 44583 32855 and the site covers an area of approximately 0.848 hectares.

The **Site Location Plan** and **Existing Site Plan** are shown on **Figure 1** and **Figure 2** respectively.

The site is south of the existing DERL Energy from Waste facility. Between the DERL facility and the proposed site lies a road, which will become shared access to both sites. Directly south of the site lies a car breakers business and scrap car recycling yard. The access road to the site, Forties Road, lies adjacent to the west boundary of the site, and is followed by fields and generally landscaped areas of greenery. There are green fields with sparsely spaced trees and shrubbery to the east of the site.

The topography of the site is relatively flat, ranging between roughly 27.6m AOD and 28.5m AOD. The highest point of the site is 28.56m AOD and is located relatively central within the site. The lowest recorded point is 27.62m AOD, and again lies relatively central to the northern edge of the site. In general the site is relatively flat with higher ground in the centre of it. The site is currently an area of open compacted ground with some areas used for stockpiling of materials recovered from highway works. The ground surface mainly comprises of compacted granular material.

The **Topographical Survey Extract** can be viewed at **Figure 3**.

3.2 Ground Conditions

According to the *MVV Geotechnical and Geo-environmental Desk Study Report (12)*, the following ground conditions have been identified on the MVV EfW CHP site and surrounding areas.

The geological map sheet in the *MVV Geotechnical and Geo-environmental Desk Study Report (12)* indicates that the superficial deposits beneath the proposed EfW CHP site comprises of 'alluvium'. Beneath the northern section of the DERL site there is a drift geological boundary shown, whereby the superficial deposits are noted as 'glacial meltwater deposits' of 'moundy sand and gravel' to the north. No information on the thickness of the drift deposits is provided.

The solid geology beneath the proposed EfW CHP and existing DERL site consists of undifferentiated sedimentary units, mainly sandstone, of the Lower Old Red

Sandstone Group. Immediately north of the DERL site, an igneous intrusion is identified where the solid geology changes to ‘*tuff and agglomerate*’.

Below the southern site boundary an east to west trending geological fault is identified, with the downthrow shown to the south (no distance of downthrow is presented).

3.2.1 Site Investigation

According to the *Factual Report on Ground Investigation* by Geotechnical Engineering Ltd at Dundee Energy Recycling Ltd (13), the fieldwork was carried out during the period 16th August to 28th September 2016. The Geotechnical Engineering Ltd report includes an exploratory hole location plan. Arup have produced an Interpretative Report (14) based on the Geotechnical Engineering Ltd Report, and contains a summary of the ground conditions onsite.

The results of the ground investigation indicate that the majority of the site is underlain by variable alluvium overlying fluvioglacial deposits with bedrock at depth. Within the Interpretative Report (14), it explains the ground investigation is targeted in four separate areas:

- (1) Area A: Proposed EfW CHP site;
- (2) Area D: Proposed construction compound;
- (3) Area E: Existing DERL site; and
- (4) Route for the proposed pipeline.

The drainage impact assessment concentrates mainly on *Area A* and *Area D*, where the majority of the drainage infrastructure is to be designed.

For *Area A: Proposed EfW CHP site*, nine boreholes and eleven trial pits were drilled or excavated to depths between 1.35m and 41.40mbgl in the area of the proposed EfW CHP Site. The exploratory holes encountered made ground overlying thick alluvium deposits with the deep boreholes (BHR Series) encountering fluvioglacial deposits and bedrock at depth. The made ground was general described as light brown to dark brown gravelly sand or silt overlying a brown sandy gravel. Both materials were described as containing gravel consisting of brick, sandstone, mortar, tarmac and crystalline (rock). The bedrock is variable comprising interbedded sandstone, siltstone and mudstone in varying proportions, with strengths also varying between boreholes.

For *Area D: Proposed construction compound*, two windowless sample holes were sunk to depths between 4.20m and 5.75mbgl in the area of the proposed construction compound. Both encountered thin made ground overlying alluvium deposits. Made ground was encountered in both exploratory holes to depths of 0.70m and 0.80mbgl. The material was generally described as brown slightly sandy clayey brick and sandstone gravel.

3.2.2 Ground Water

The groundwater vulnerability map within the Envirocheck Report classifies the bedrock as a Highly Permeable Aquifer, and more accurately, is classed as ‘intermediate’ on the ‘Highly Permeable’ scale.

The flood water level for a 1:200 year return period design surrounding the site is currently 28.25m AOD, as stated by the Flood Risk Assessment (15). This value includes a consideration for climate change.

The Geotechnical Engineering Ltd *Factual Report on Ground Investigation* (13) provides information on groundwater levels in the relevant borehole and trial pit data. **Table 1** below provides water strike depths within the EfW CHP and construction compound site.

Table 1 – Groundwater levels.

Borehole Name	Water Strike depth (mbgl)	Trail Pit Name	Depth at which Groundwater Encountered
BHR01	3.40m	TP01	3.80m
BHR02	0.90m, 2.20m, 5.30m	TP02	Not encountered
BHR03	3.10m, 12.00m	TP03	Groundwater seepage at 4.30m
BHR04	5.00m	TP04	0.60m
BHR05	2.00m, 4.30m	TP05	1.90m
BHS09	4.50m	TP06	1.70m
BHS10	4.50m	TP07	Encountered at 1.20m, standing at 1.90m on completion.
BHS11	1.10m, 4.40m	TP08	Standing water encountered at 1.40m rising to 1.20m. Groundwater strike at 3.80m, standing at 3.90m on completion.
BHS12	2.50m	TPD01	Encountered at 1.50m, standing at 3.40m on completion.
BHS13	2.40m	TPD02	Groundwater seepage at 3.70m.
		TPD03	Groundwater seepage at 4.50m.

Note all the trial pits mentioned in **Table 1** are located on the proposed EfW CHP development site (*Area A*), apart from ‘BHS12’ and ‘BHS13’ which are located in the west construction compound (*Area D*).

3.3 Local Water Courses and Flood Risk

The Dighty Water is the main local watercourse, and is approximately 100m south of the site, and runs from west to east. The Dighty Water eventually discharges into the Firth of Tay to the east.

The Fithie Burn is located around 600m east of the development site, and leads into the Dighty Water.

The locations of the local watercourses are shown in the **Site Location Plan** in **Figure 1**.

The SEPA indicative flood extent map (16) indicates that the site is within a high fluvial flood risk zone, and so is at a high risk of flooding from the nearby watercourse, the Dighty Water. A Flood Risk Assessment (15) has been undertaken and explains in greater detail the levels of flood risk and the proposed mitigation measures. This report has found the flood water level surrounding the site for a 1:200 year return period to be 28.25m AOD. To mitigate this flood risk the proposed development will be raised above this level and flood compensatory storage will be provided on the opposite bank of the burn. The site will be raised to a level of 29m AOD, resulting in a freeboard value of 750mm.

3.4 Existing Site Drainage

Scottish Water record drawings have been obtained which show the existing public sewerage provision within the area of the site (see **Appendix B**). Arup have also created a drawing including all surrounding drainage utilities of the site, which can be viewed in **Appendix C**. No drainage currently exists within the proposed EfW CHP site, meaning an entirely new system is required for the site, along with relevant connections to the Scottish Water system. This will be required for the foul water and surface water system. Record drawings obtained for the surrounding areas provide layouts of the drainage network within the existing DERL site north of the EfW CHP site, along with Scottish Water foul and surface water connections which drain towards the Dighty Water south of the EfW CHP site.

3.4.1 Foul

There is a Scottish Water foul network running adjacent to both the north and west edges of the proposed development site. This follows Forties Road and bends to the east on Beryl Street, south of the development site. The foul network is led away from the site at the corner of Forties Road and Beryl Street, and continues south west.

3.4.2 Surface Water Drainage

There is currently no surface water drainage on the proposed EfW CHP site. There are, however, a number of surface water drains surrounding the site. The surface water layout surrounding the EfW CHP site lies similarly to the foul network, running adjacent to both the north and west edges of the proposed development site, and also running along Beryl Street south of the site. The surface water drains towards the Dighty Water, being led away at the south easterly corner of the scrap yard which is located south of the site.

3.4.3 Combined Drainage

There is no combined network surrounding or within the EfW CHP site currently. The nearest combined sewer lies south of the site and runs parallel to the Dighty Water. This is assumed to facilitate nearby industrial buildings and residential areas.

3.5 Existing Surface Water Runoff and Overland Flows

A Greenfield runoff rate was calculated for the entire site (see [Appendix D](#) for calculations), based on an approximate area of 0.848ha and applying FEH rainfall data. [Table 2](#) below shows the results for varying return periods.

Table 2 - Greenfield Runoff Values for Area of EfW CHP Site Only

Return Period (Years)	Greenfield Runoff (l/s)
2	3.1
30	6.3
200	9.4

The same calculation was carried out to include the area that will be occupied by the SuDS basin, which is 2627m² (0.263ha). This means the total site area will become 1.111 ha. [Table 3](#) below shows the results of Greenfield runoff calculations for these values.

Table 3 – Greenfield Runoff Values for Area of EfW CHP Site plus Area of SuDS Basin

Return Period (Years)	Greenfield Runoff (l/s)
2	4.0
5	5.3
30	8.3
200	12.4

The topography surrounding the site suggest that any overland flows are conveyed from the north to the south of Baldovie Industrial Estate, towards the Dighty Water.

4 Data Collection

This section of the report describes the data collected to inform this study.

Consultation was undertaken with Dundee City Council, SEPA and Scottish Water.

The following data sources were reviewed as part of this study:

- The SEPA Flood Maps (16);
- The Dundee City Council website;
- Topographical survey information.

4.1 Correspondence

As part of the data gathering exercise, consultation was undertaken with: SEPA; Dundee City Council and Scottish Water. The relevant email correspondence of each statutory authorities can be found in [Appendix E](#) of this report. A summary of correspondence is found in [Table 4](#) below.

Table 4 – Record of Consultation

Organisation	Comments
Dundee City Council Andrew Reid 16 th November 2016	Reply received 16 th November 2016 Dundee City Council will agree to allow compensatory storage elsewhere for the SuDS basin if SEPA allow and confirm this request. A request to Dundee City Council has been sent regarding connecting the surface water outlet directly to the Dighty Water. Awaiting response.
SEPA Andrew Jardine Richard Hamilton 15 th November 2016	Reply received 30 th November 2016 SEPA have confirmed that any lost storage due to the SuDS basin will have to be replaced by compensatory storage. SuDS basin has been approved by SEPA with accordance to these conditions. Note that a SEPA approval is subject to approval of the Flood Risk Assessment (15).
Scottish Water Steve Carson 24 th November	Reply received 25 th November 2016 Confirmation and responses of PDE application received. Scottish Water have confirmed there is sufficient capacity in the nearby treatment works to service the foul network development proposal. For the SuDS surface water outlet, flow rates must be attenuated to

	6.3l/s to the nearest watercourse with the approval of SEPA and the local authority.
--	--

5 Proposed Development

The proposed development is to consist of an Energy from Waste Combined Heat and Power (EfW CHP) facility, primarily used to treat the residual waste from the Dundee and Angus area that cannot be recycled, reused or composted. The facility will therefore mainly deal with household waste provided by the Dundee and Angus Councils, with the remaining processing capacity to be used to process similar commercial and industrial waste from local businesses in the surrounding area.

The waste will be combusted and the heat will be used to generate steam. The steam will drive a steam turbine and generate renewable electricity for use at the facility, to supply the Michelin tyre facility and for export to the grid. As steam will be extracted from the turbine and fed into the Michelin tyre factory steam network to be used for process and heating purposes the EfW CHP Facility will therefore incorporate Combined Heat and Power (CHP) technology.

5.1 Development Layout

The proposed development comprises of the following principal components:

- Tipping hall;
- Waste bunker hall;
- Turbine hall;
- Boiler house;
- Air Pollution Control system, including 90m high chimney;
- Bottom ash collection area;
- Air cooled condenser;
- Water treatment plant;
- Central control room;
- Administration block, including meeting rooms and visitor facilities;
- Electricity cables, switchgear rooms and steam and condensate pipework for connection to the relevant networks;
- Road access surrounding the site; and
- 15 parking spaces.

These components are shown in the proposed building layout ([Appendix A](#)).

5.2 Diversions

There are no proposals for the diversion of any sewers in the surrounding area to suit the proposed drainage.

5.3 Drainage Strategy

In accordance with current best practice in compliance with Sewers for Scotland 3rd Edition (17), the proposed development will require to be served by separate foul and surface water drainage systems.

The preferred approach for new developments is to incorporate SuDS within the development to provide a series of features forming a storm water management train throughout the site. The choice and feasibility of SuDS measures appropriate to any particular development is dependent on the topography of the site, the ground conditions, the development layout and the availability and sensitivity of any receiving watercourse.

In accordance with The CIRIA SuDS Manual C753 (10), each SuDS component is assigned a mitigation index which relates to the water quality. By applying a certain number of SuDS components to the site, this will result in a total sum of the mitigation indices. This total index value must be greater than the pollution hazard indices assigned to the particular type of site in which the SuDS are being applied. The indices are concerned with Total Suspended Solids (TSS), Metals and Hydrocarbons. This defines the type and amount of SuDS components which are to be used.

For the MVV EfW CHP site, the land use type is identified as a “*Waste handling/management/distribution site*”. This has a Hazard level of ‘*High*’ and the following *Pollution Hazard Index* values:

- Total Suspended Solids (TSS): 0.8
- Metals: 0.8
- Hydrocarbons: 0.9

Each SuDS component has a corresponding *Pollution Mitigation Index* for TSS, Metals and Hydrocarbons. By determining a range of SuDS components to suit the site, it is possible to create a Pollution Mitigation Index value for TSS, Metals and Hydrocarbons which will be equal or exceed the Pollution Hazard Index values.

A summary sheet of this matrix process and choices for the MVV EfW site which complies with the latest SuDS Manual can be viewed in [Appendix F](#).

It is proposed that the surface water is conveyed from the site and connected into the existing Scottish Water sewer located adjacent to the proposed development site. The rate of discharge is still to be agreed.

There will be no drainage modifications made to the existing DERL site and the existing connections will remain as they are.

5.4 Foul Water Drainage

The proposed foul drainage for the site will be conveyed to a single low point by gravity where it will be discharged into the existing Scottish Water foul sewer located to the west of the site. Scottish Water have informed Arup that there is sufficient capacity in the nearby treatment works to service the foul demands from this development.

See [Figure 4](#) for the **Preliminary Foul System Layout Proposal**.

5.5 Surface Water Drainage

The surface water drainage system will be designed in accordance with the principles of sustainable development, taking into account the local topography and ground conditions and other site-specific factors, and providing integrated facilities to control the rate and quality of runoff. As discussed in [Section 5.3](#), it will be necessary to treat the runoff by both source and site control. Due to the extensive 1:200 year flood event for the Dighty Water any SuDS features will be designed bearing this in mind. Bunding and lining of SuDS components are likely to be necessary.

5.5.1 Runoff and Storage

It is assumed that all surface water from the proposed development will be attenuated to the Greenfield runoff rate and discharged into the Scottish Water surface water sewer. As mentioned above, final approval, discussions and confirmation from Scottish Water are still required (see [Section 5.5.4](#)). The Greenfield runoff values for the total area including the SuDS basin are as follows:

Table 5 – Greenfield Runoff Values to be used for Storage Calculations

Return Period (Years)	Greenfield Runoff (l/s)
2	4.0
5	5.3
30	8.3
200	12.4

Refer to [Appendix D](#) for calculations.

To achieve these rates, storage will be required. Preliminary attenuation calculations were undertaken for the site to determine the volume of storage required for all the hardstanding areas drained to the system including the area of the SuDS basin itself.

The preliminary storage calculations for the proposed development were carried out using MicroDrainage Source Control software, and have been reproduced in [Appendix G](#). The SuDS for the site are to be designed to the 1:200 year flooding event, in accordance with Dundee City Council Guidance.

5.5.2 Access Roads, Car Parking, Roads and Roofs source control

It is proposed to introduce permeable paving to the parking spaces in the north of the site. The porous areas will be restricted to the parking bays only.

The construction of the porous parking bays will be porous block paving sealed with an impermeable membrane to prevent infiltration from any perched groundwater. The surface water will be temporarily stored within the sub-base and controlled by an orifice plate set in an inspection chamber, before discharging to the main surface water network. This design provides a pollution mitigation index value of 0.7, 0.4 and 0.7 for TSS, Metals and Hydrocarbons respectively. The Pollution Hazard Indices which must be met or exceeded are 0.8, 0.8 and 0.9 for TSS, Metals and Hydrocarbons respectively (as explained in [Section 5.3](#)).

The roofs and roads will be drained using various SuDS components which extend around almost the entire perimeter of the site. Filter drains are proposed along the east, south and west perimeter, along with a small strip adjacent to the parking spaces and the proposed building at the north-west of the site. They are shallow excavations filled with graded stone that create temporary subsurface storage for stormwater runoff. Filter drains are ideally suited to areas adjacent to small impermeable surface areas and enable them to receive lateral inflow, such as the hardstandings surrounding the EfW CHP Plant buildings. The filter drains will provide a level of treatment to the surface water at this point. The filter drains will include an impermeable membrane to keep groundwater out and ensure no leaching of contamination into the ground water.

The filter drains are proposed alongside the roads and hardstanding areas along the south, west and east edges of the site. These are adjacent to the main access roads on site used for deliveries and circulation of vehicles. Runoff is temporarily stored below the surface in a shallow trench filled with stone/gravel, providing attenuation, conveyance and treatment (via filtration). The SuDS Manual (10) also states that a perforated pipe should be provided near the base of the filter drain to collect and convey water to downstream drainage components. This is required for the runoff from adjacent road surfaces onsite. According to the new Simple Index Tool Method for designing SuDS components on a site, filter drains have Pollution Mitigation Index values of 0.4, 0.4 and 0.4 for Total Suspended Solids, Metals and Hydrocarbons respectively. This proves that the inclusion of filter drains around the majority of the site perimeter significantly contributes to the water treatment process onsite, noting the Pollution Hazard Indices to be met are 0.8, 0.8 and 0.9 for TSS, Metals and Hydrocarbons respectively.

It is proposed that the filter drains will connect into the surface water treatment train and pass through the additional storage area, outlined below, prior to connection into the Scottish Water surface water system.

All onsite SuDS components will be designed to a suitable level to prevent flood waters entering them. Bunds will be designed around the perimeter of the filter drains to prevent flood water in any storm event if they do not exceed the flood level and sufficient freeboard.

Figure 5 provides a **Preliminary Surface Water SuDS System Layout Proposal**.

5.5.3 End of line SuDS

To achieve the desired attenuation rates for discharge to the Scottish Water surface water network and provide a further level of treatment, an end of line storage system will be required.

Current proposals are for SuDS basins to be provided in the south section of the 'west' development site, currently proposed as the 'construction compound'.

At this preliminary stage, calculations indicate that a basin with a volume of up to 710m³ may be required, when considering a 1 in 200 year return period design plus 20% climate change. This storage calculation is for the entire site area, combining both the access roads and parking and roof and roads areas, which totals an area of 0.848ha. It also includes the basin area itself as this will be lined meaning no infiltration will be possible. The basin area considered as hardstanding will be the footprint of the basin which will contain the impermeable liner, which covers an area of 0.134ha, resulting in a total area of 0.982ha. The *Sewers for Scotland 3rd Edition* (17) guidance suggests a 1-in-2-year and 1-in-30-year value should be determined, along with any more extreme events in accordance with the criteria specified by the flooding authority. These results indicate storage volumes of 347m³ and 507m³ respectively. Dundee City Council Guidance states that the critical 1 in 30 year event should be attenuated to the 1 in 5 year Greenfield rate, which would result in a storage volume of up to 635m³ for a 30 year event. However, due to the high flood risk as indicated on the SEPA flood map, higher return periods of up to 1:200 plus climate change have been examined at this stage of design. This brings storage volume requirements up to 710m³. It is noted, however, that it is recognised this value of 710m³ is conservative, as it does not take into account the other proposed SuDS components for the roof and roads on site. As the Scottish Water sewer may be surcharged due to high water level in the Dighty Water the basin may be required to hold additional volume of runoff during these events. This will be calculated in the detailed design stages of the system, however due to the excess capacity in the basin this additional volume should be accommodated.

To comply with the new SuDS Manual 'Simple Index Tool' (10) method for designing for sufficient treatment of onsite surface water runoff, two basins have been proposed to provide additional and sufficient treatment. The required storage volume would be divided between the two basins, and all surface water would run through both basins before joining the Scottish Water surface water sewer. At this early stage of design, one large single basin with a central dividing structure is to be considered as there are constraints on buildable areas. This proposal would reduce the overall footprint of the SuDS basin, while still providing sufficient storage and treatment to the onsite surface water runoff. The theory of running the surface water through two treatment stages would still be the same, as if there were two separate basins.

The SuDS basin, proposed within the south rectangular section of the 'construction compound', must not be constructed on or above the existing Scottish Water sewers within the 'west' site. These Scottish Water sewers create the most northern boundary of the proposed SuDS basin location.

The basins will be designed to not hold permanent water. They may also require the installation of a liner to prevent ground water infiltrating into it. The total depth of the basin will be approximately 2.5m with a proposed water depth of 1.5m in a 1:200 year event along with a 20% climate change consideration, giving an approximately 1m of freeboard. The depth of the pond is determined by the level of the connection of the surface water pipe and not the required volume, this is why there is extra capacity which will not be used. The detailed design of the surface water system has not been undertaken so the depth of the basins are subject to change.

The basin will have a 3.5m access around the entire perimeter and 1:3 side slopes. A control manhole will be installed downstream of the basin before subsequent connection into the Scottish Water surface water system. This will contain a dual control with a Hydro-Brake® and a weir for larger storm events.

Due to restricted space the basins are located within the flood plain. This has been discussed with SEPA and Dundee City Council and they will accept this if flood compensatory storage is provided elsewhere. Refer to the Flood Risk Assessment (15) for details on how this is provided. As well as this, the basins themselves must be constructed with surrounding bunds to a height which meets or exceeds the maximum flood level of the area of 28.25m AOD plus an additional 600mm freeboard. These bunds will be designed with a 1:3 slope to coincide with the rest of the basin slopes, and will flatten at the top of the bund to achieve the 3.5m access perimeter. From there, the bund will slope back down at 1:3, back to the original ground level. The basins will be lined to prevent ground water using the storage volume, and will be designed to prevent any static uplift.

A check on exceedance flows from the basin will be undertaken at the detailed design stage. If the basin overflows in extreme conditions, the overflow volume from the basin will be diverted via an emergency overflow structure on the south side of the SuDS basin and directed towards the Dighty Water away from nearby properties. The emergency over flow will be a lowered area on the access track surrounding the basin.

The details explained in this section can be viewed in **Figure 5**, which provides a **Preliminary Surface Water SuDS System Layout Proposal**.

5.5.4 Discharge Point and Discharge Rates

The proposed surface water system assumes the outlet from the basin will connect into the existing Scottish Water surface water sewer within the west 'construction compound' site, located to the west of existing Forties Road. However in recent correspondence Scottish Water have requested the outlet is to be attenuated to 6.3l/s to the nearest watercourse with the approval of SEPA and the local authority. The rate of 6.3l/s was given in the Scottish Water PDE application and was the 1 in 30 year Greenfield runoff, calculated at the time, which has now been amended.

We have investigated the feasibility of a connection to the Dighty Water and found due to levels of the basin this will not be possible by gravity. There is also a large Scottish Water combined sewer which runs parallel to the Dighty Water which will also prevent a gravity solution by obstructing its path. Further discussion with

Scottish Water will be required to see if there is any possibility of discharging to the sewer. If this is not possible a surface water pumping station will be required for a discharge to the Dighty Water. A rate of discharge will have to be agreed, however as there is spare capacity within the ponds this rate could be reduced below the 1 in 30 year greenfield run off.

5.6 Maintenance

The maintenance of private, proposed drainage will be the responsibility of the property owner, or a party appointed on their behalf.

The drainage strategy suggested in this document will require new infrastructure within the site and a connection into the existing public surface water sewer. Surface water drainage and foul drainage facilities within the site will be private and under the ownership of the occupiers who will therefore assume all maintenance responsibilities.

6 Conclusions

Arup were commissioned by MVV Environment Ltd to undertake a Drainage Impact Assessment for the proposed development of the MVV EfW CHP Plant.

The assessment concluded the following:

- There is no existing drainage of any form on the proposed MVV EfW CHP site, and a completely new drainage design proposal must be made.
- Following correspondence with Scottish Water, it has been advised that the proposed foul system is to connect into the nearby Scottish Water foul sewer.
- The surface water system has been designed to connect into the Scottish Water surface water network. A connection to the Dighty Water will not be possible by gravity. Scottish Water will currently not accept the surface water into their system, and further discussions with them will be required.
- A SuDS system for the proposed development has been established to meet the storage and treatment requirements. This has been achieved by using a number of SuDS features including permeable paving, filter drains and additional storage in the form of two detention basins (or one large detention basin with a dividing structure).
- The detention basins are located in the flood plain, however they will be bunded to protect them from the 1:200 year return period (including climate change). Flood compensatory storage for this loss in flood plain has been included in the Flood Risk Assessment.

References

- [1] The Scottish Government. Scottish Planning Policy. © Crown Copyright 2014, June 2014. ISBN 978-1-78412-567-7.
- [2] National Planning Framework (NPF) (Government, National Planning Framework 3, June 2014).
- [3] The Scottish Government. Flood Risk Management (Scotland) Act 2009. The Stationery Office Limited, Crown Copyright, 2009. 2009 (asp 6).
- [4] SEPA. The Water Environment (Controlled Activities) (Scotland) Regulations 2011. SEPA, 2011. Scottish Statutory Instruments 2011 No. 209.
- [5] The Scottish Executive. Planning Advice Note 51 (PAN51) “Planning, Environmental Protection and Regulation”, Revised 2006.
- [6] The Scottish Government. Planning Advice Note 61 (PAN61) “Planning and Sustainable Urban Drainage Systems. Publications”, 2001.
- [7] The Scottish Government. Planning Advice Note 69 (PAN69) “Planning and Building Standards Advice on Flooding”, 2004.
- [8] The Scottish Government. Planning Advice Note 79 (PAN79) “Water and Drainage”, September 2006.
- [9] Dundee City Council Local Development Plan. December 2013.
<http://www.dundee.gov.uk/localdevplan>
- [10] Woods-Ballard, B., et al., The SuDS manual. London: CIRIA, London, 2015. CIRIA C753.
- [11] Dundee City Council Sustainable Drainage Systems (SuDS) Design, Criteria Guidance Note, December 2015.
- [12] Ove Arup & Partners Scotland Ltd. MVV Environmental Services Ltd Proposed Energy from Waste Plant, Dundee Geotechnical and Geo-environmental Desk Study Report. Edinburgh: SNE, 2016.
- [13] Geotechnical Engineering Ltd at Dundee Energy Recycling Ltd. Factual Report on Ground Investigation.
- [14] Ove Arup & Partners Scotland Ltd. Geotechnical & Geo-environmental Interpretative Report. Edinburgh: SNE, December 2016.
- [15] Ove Arup & Partners Scotland Ltd. Flood Risk Assessment. Glasgow: SNE, December 2016. SEPA.
- [16] Flood Maps. [Online] 2014. [Cited: 21 October 2016.]
<http://map.sepa.org.uk/floodmap/map.htm>.
- [17] Scottish Water and WRc plc. Sewers for Scotland 3rd Edition – A technical specification for the design and construction of sewerage infrastructure, April 2015.

Figures

Figure 1 – Site Location Plan

Figure 2 – Existing Site Plan

Figure 3 – Topographical Survey Extract

Figure 4 – Preliminary Foul System Layout Proposal

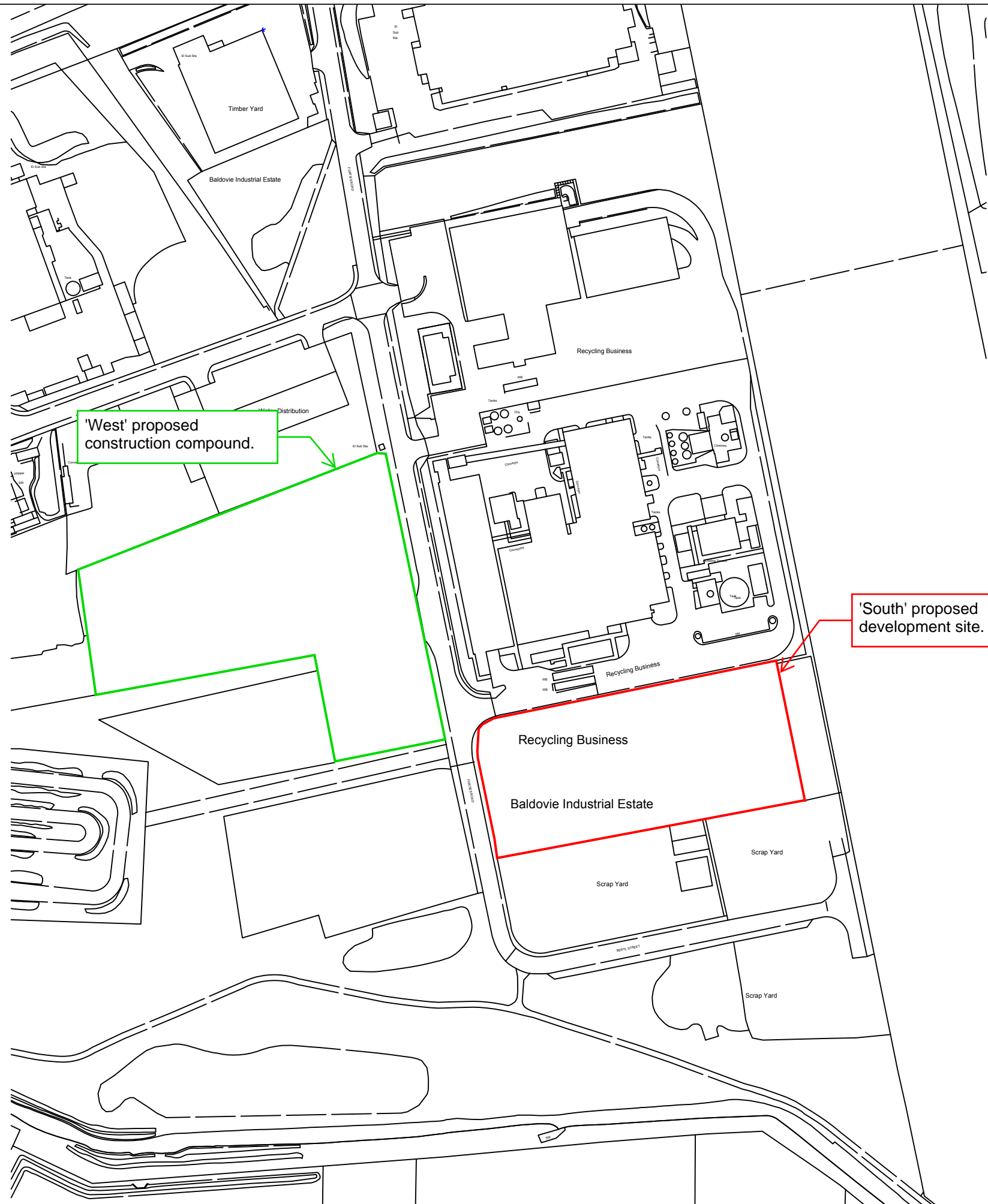
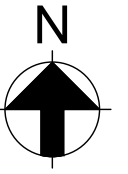
Figure 5 – Preliminary Surface Water SuDS System Layout Proposal



Site Location Plan

The material contained on this drawing has been based upon Bing Maps © 2016 Microsoft. Accessed 23rd November 2016.

Figure 1
Scale NTS @ A3



Existing Site Plan

Legend

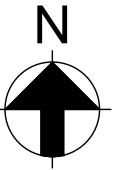
— Site Boundary Line

Figure 2

Scale 1:2000 @ A3

ARUP

© Arup



'West' proposed construction compound.

'South' proposed development site.

Inset

Topographical Survey Extract

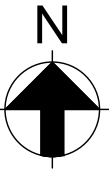
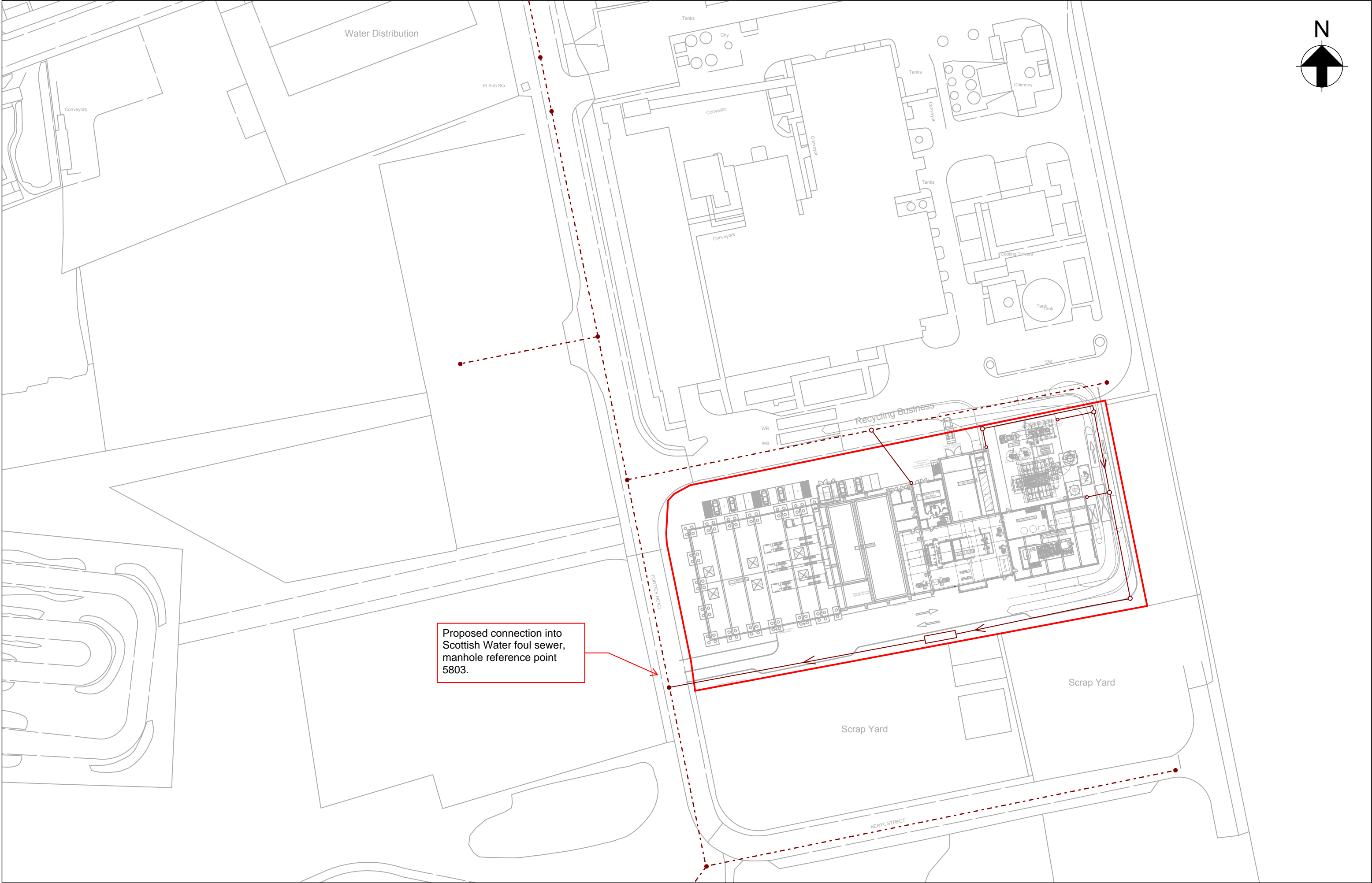
Legend

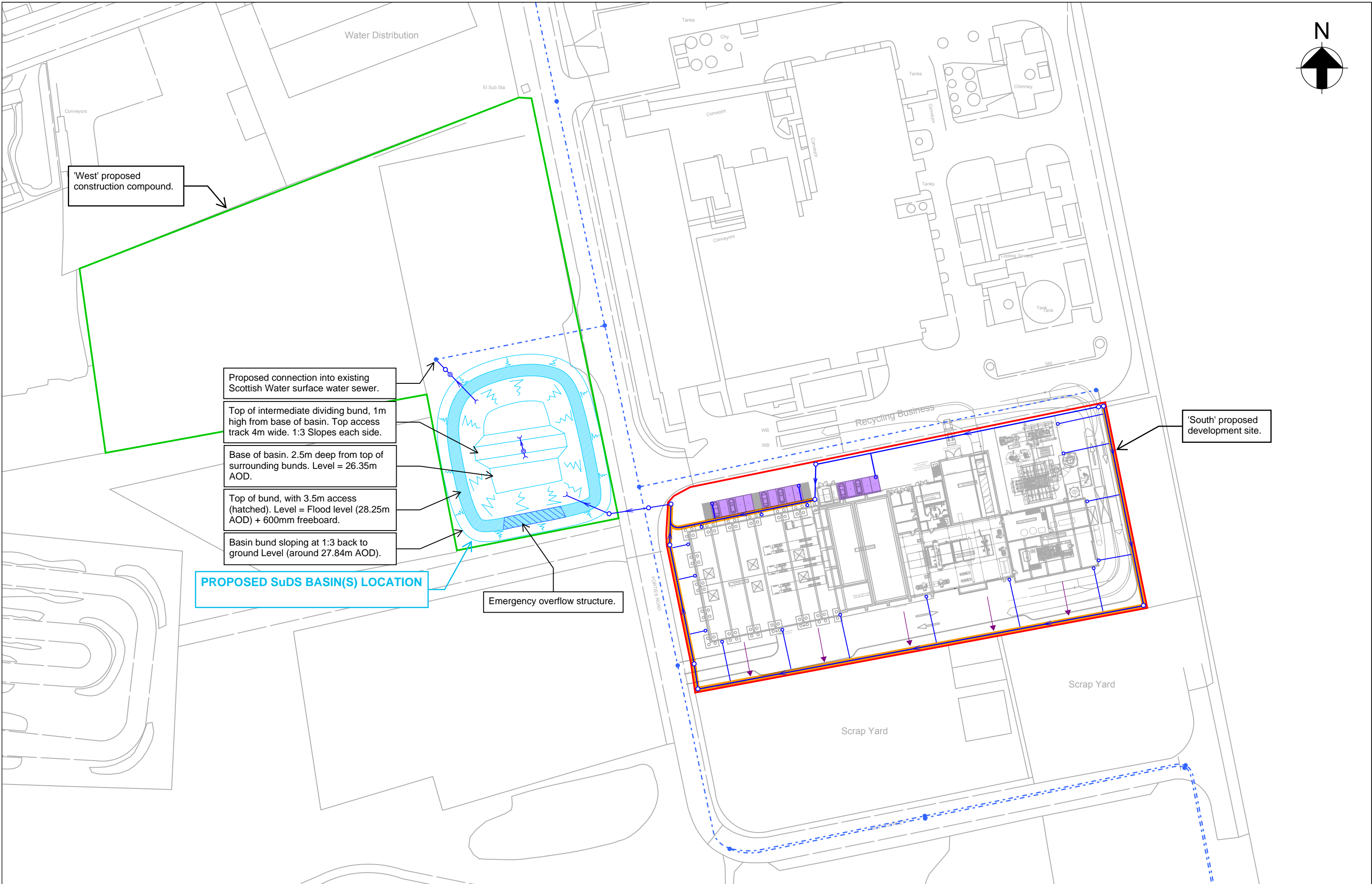
- Site Boundary Line
- Minor Contour (0.5m)

Figure 3
Scale 1:1000 @ A3

ARUP

© Arup





Preliminary Surface Water SuDS Proposal

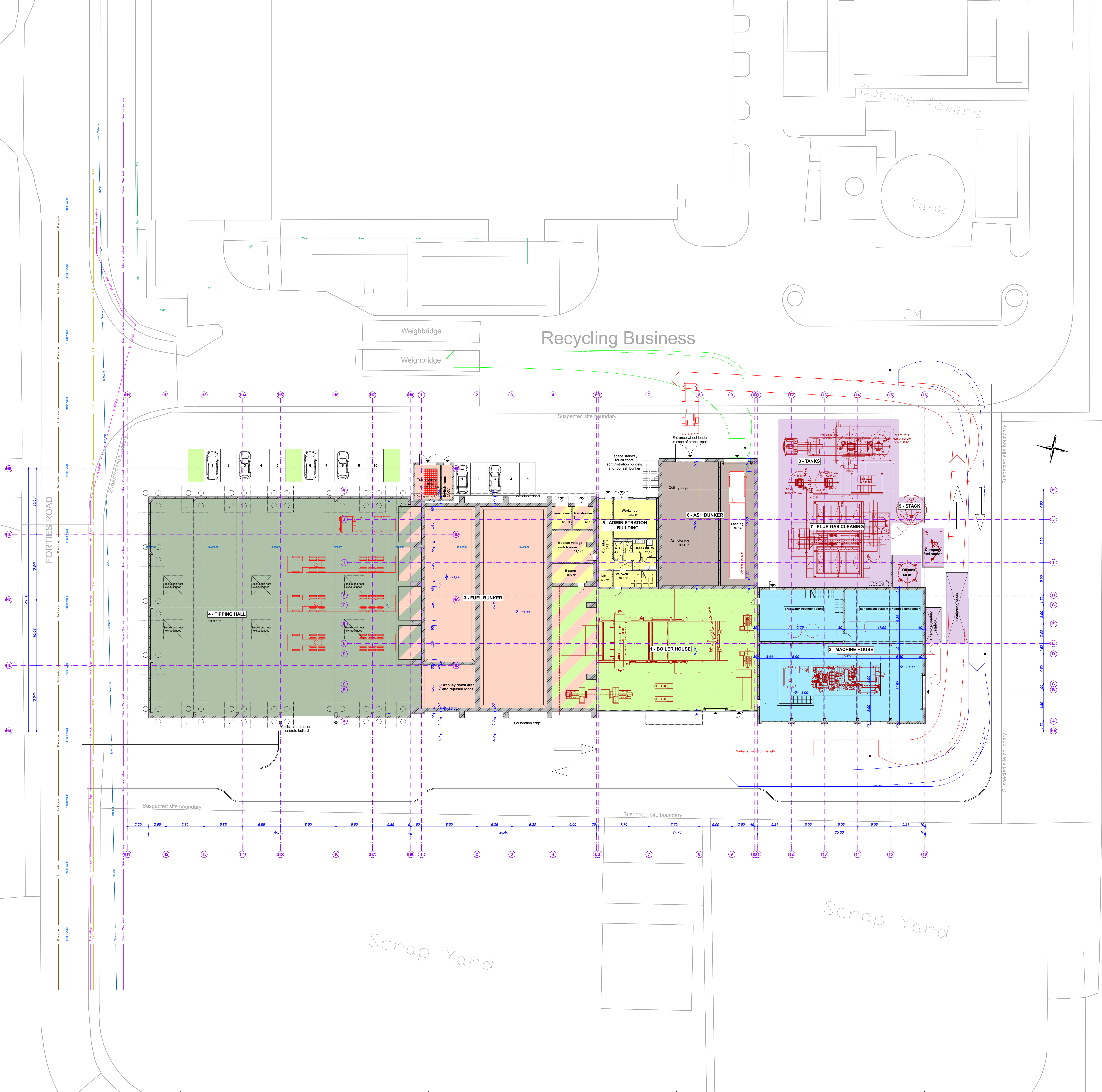
Figure 5
Scale 1:1000 @ A3

Legend

- Existing Scottish Water Surface Water Sewer
- Proposed Surface Water Courier Pipe (Dual Pipe)
- Red Line Site Boundary
- Proposed Permeable Parking
- Proposed Filter Drain
- Proposed Headwall
- Surface Water Overland Flow
- Flow Control

Appendix A



Proposed Building Layout

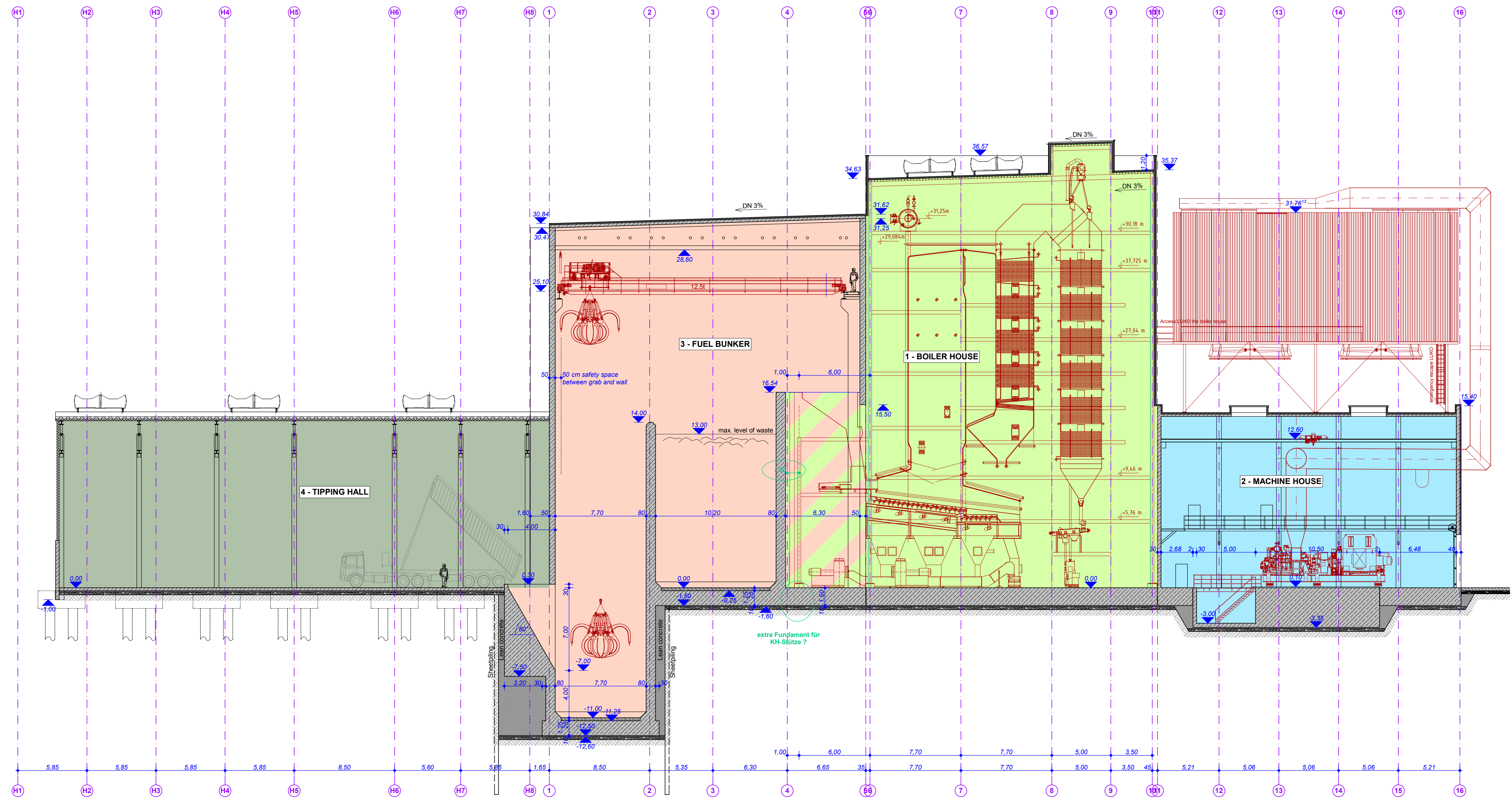


- Legend:**
- 1-BOILER HOUSE
 - 2-MACHINE HOUSE
 - 3-FUEL BUNKER
 - 4-TIPPING HALL
 - 5-ADMINISTRATION BUILDING
 - 6-ASH BUNKER
 - 7-FLUE GAS CLEANING
 - 8-TANKS
 - 9-STACK

- Fresh water
- Scottish water (Frost)
- Low voltage
- 11 kV
- Medium voltage
- Gas
- Steam
- Scottish water (Frost)
- 11 kV
- Medium voltage
- Steam
- Scottish water (Frost)

PRELIMINARY

5	VARUATION:	DATE:	PROCESSOR:
4			
3			
2			
1			
CLIENT:	INGENIEURBÜRO NEUBAU / SANIERUNG SCHNEIDER GmbH	KÖNIGZASSE 23 07318 SAALEFELD TELEFON: 03671/33020 FAX: 03671/520418	SIGNATURE OF PLANNER: 
CONTRACTOR:	Fa. Oschatz GmbH Westendhof 10-12 45143 Essen		SIGNATURE OF CLIENT:
PLANNING STAGE:	building permit	DATE:	24-09-2016
DEMONSTRATION:	AXIS PLAN	SCALE:	M 1 : 200
		PLAN NUMBER:	300-00-100



PRELIMINARY

Legend:






































































- 1 - BOILER HOUSE
- 2 - MACHINE HOUSE
- 3 - FUEL BUNKER
- 4 - TIPPING HALL
- 5 - ADMINISTRATION BUILDING
- 6 - ASH BUNKER
- 7 - FLUE GAS CLEANING
- 8 - TANKS
- 9 - STACK

VARIATION:		DATE:	PROCESSOR:
5			
4			
3			
2			
1			
INGENIEURBÜRO NEUBAU / SANIERUNG SCHNEIDER GmbH		KÖDITZGASSE 23 07318 SAALFELD TELEFON : 03671/33020 FAX : 03671/520416	SIGNATURE OF PLANNER:
CLIENT: Fa. Oschatz GmbH Westendhof 10-12 45143 Essen			SIGNATURE OF CLIENT:
CONTRACTOR: Projekt DUNDEE		PROJECT NUMBER OSCHATZ: PU15-741	PROJECT NUMBER INS: 300-15
PLANNING STAGE: building permit		DATE: 24-09-2016	MASSABOLITION: M 1 : 200
DENOMINATION: section A-A		PLAN NUMBER: 300-00-120	

Appendix B

Scottish Water Drawings

SMALL WORLD GIS WATER LEGEND

	Trunk Main (in use)		Tapping		Bulk Meter		Water Treatment Works
	Distribution Main		Field trough		Revenue Meter		Pressure Reducing Valve
	Raw Water Main		Other fitting		Meter Cable		Pressure Sustaining Valve
	Mains (abandoned)		Orifice Plate		Meter Display Unit		Reflux (Non-Return) Valve
	Mains (proposed)		Meter Point		Pumping Station		
	Mains (isolated)		Cleansing Cock		Booster Station		
	Communication Pipe		Coupling		Pump Symbol		Washout (Scour) Valve
	Supply Pipe		Flow Restrictor		River Intake		Control Valve
	Tunnel		Taper		Spring Intake		Pressure Relief Valve
	Open Course		Change Collar		Borehole Intake		Altitude Valve
	Aqueduct		End Cap		Other Company Intake		Valve - Other
	Logical Service Link		Stopcock		Clear Water Tank		BC WSZ Valve
	Duct		Sample Point		Service Reservoir		BC DMA Valve
	Air Valve Double		Service Point		Impounding Reservoir		BC WOA Valve
	Air Valve Single		Hatchbox		Pumped Storage Reservoir		BC PRA Valve
	Anode		Chemical Dosing Point		Storage Tank		BC PCC Valve
	Hydrant : Terminal		Break Pressure Tank		Storage - Other		BC PSA Valve
	Hydrant : Fire				Balancing Tank - Current		Pipebridge
	Dialysis Patient						

SMALLWORLD GIS – WASTEWATER LEGEND



Pipework

	Combined (red)
	Foul (brown)
	Surface Water (blue)
	Natural Water (light blue)
	CSO (dark blue)
	Trade Effluent (brown)
	Treated Effluent (black)
	Abandoned (grey)
	Water Course (dark green)
	PFI sewer (bright green)
	Rising Main (red)
	Proposed sewers (foul, combined and surface water)
	Syphon
	Chamber (same colour as pipework)
	Dual Chamber (same colour as pipework)
	Surface Water Chamber



Collapse/Choke (not visible by default)



Combined Storm Overflow



Connection (not visible)



Duct



Ghost Node (not visible by default)



Hatchbox



Hydraulic Control Chamber



Lamphole



Change of Attributes



Outfall



Inlet



Pumping Station



Wash Out



Bifurcation Chamber



Balancing Pond



Rodding Eye



Septic Tank



Sewer Junction



Sewer Structure



Sewerage Air Valve



Sewerage Pipe Bridge



Sluice Valve



Storm Tank



Unknown End



Treatment Plant



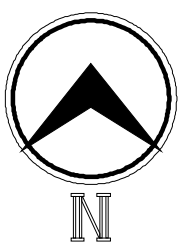
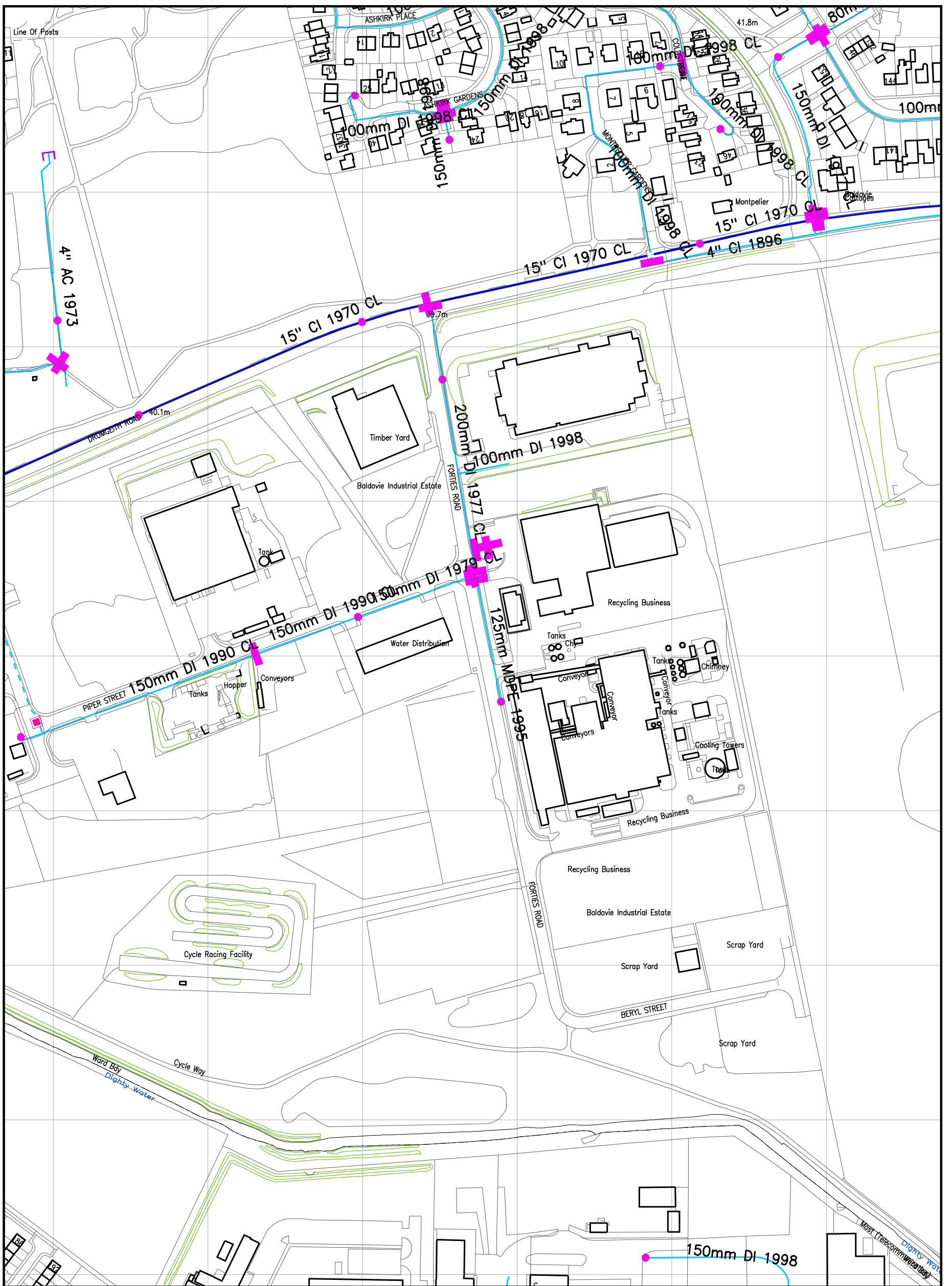
Vent Column



Buchan Trap



Capped End (same colour as pipework)



0 170 metres

The representation of physical assets and the boundaries of areas in which Scottish Water and others have an interest does not necessarily imply their true positions. For further details contact the appropriate District Office.

Date Plotted: 12/05/2016

18101DM – At Drumgeith Road

Fresh Water

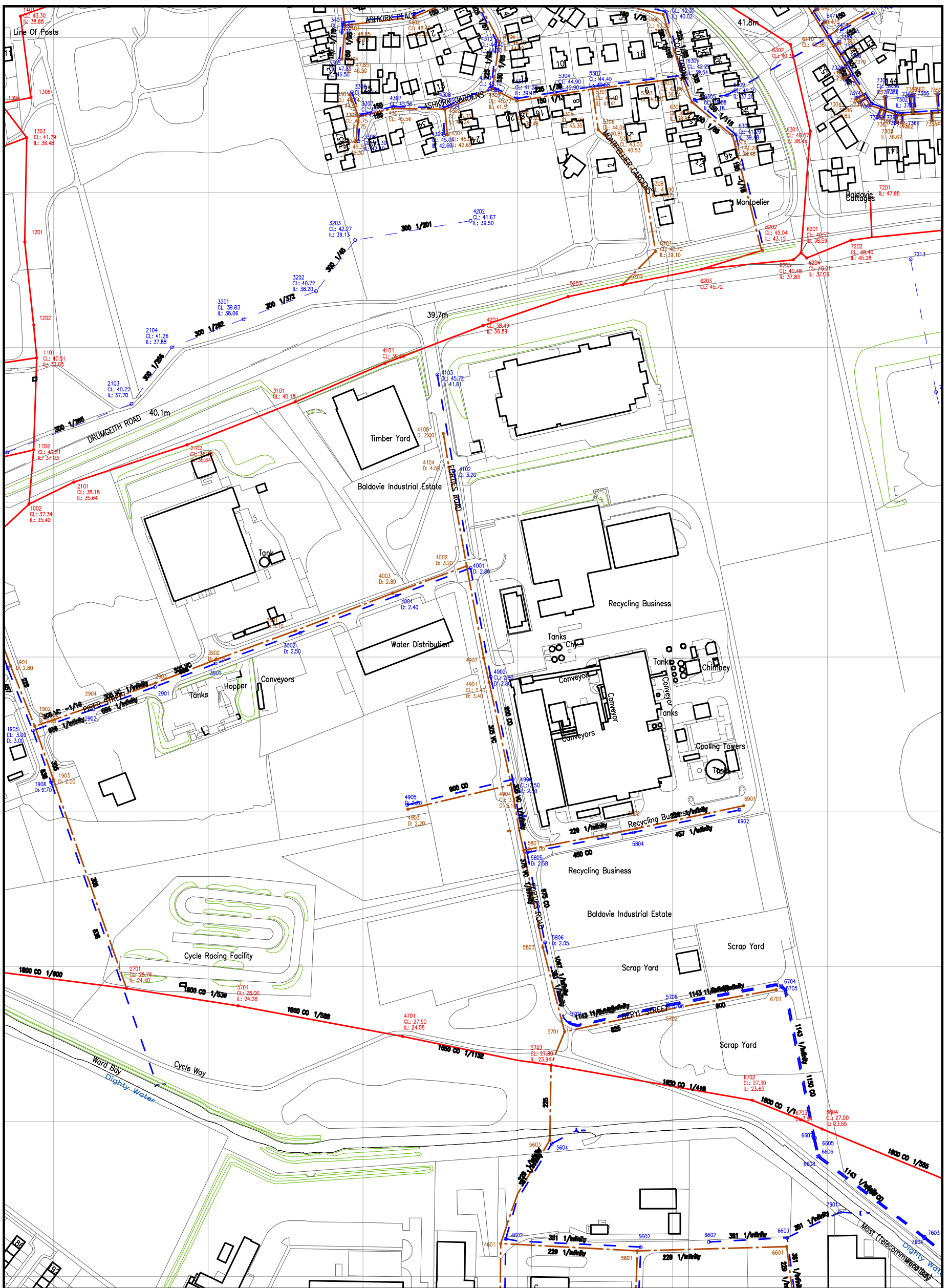
Scale: 1:2500

(c) Crown copyright and database rights 2016 Ordnance Survey 100023460. You are permitted to use this data solely to enable you to respond to, or interact with, the organisation that provided you with the data. You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form.
Plotted By: SHWR02



Castle House,
6 Castle Drive,
Dunfermline,
KY11 8GG

Tel No: 0845 601 8855



0 170 metres

The representation of physical assets and the boundaries of areas in which Scottish Water and others have an interest does not necessarily imply their true positions. For further details contact the appropriate District Office.

Date Plotted: 12/05/2016

18101DM – At Drumgeith Road

Waste Water

Scale: 1:2500

(c) Crown copyright and database rights 2016 Ordnance Survey 100023460. You are permitted to use this data solely to enable you to respond to, or interact with, the organisation that provided you with the data. You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form

Plotted By: SHVR02



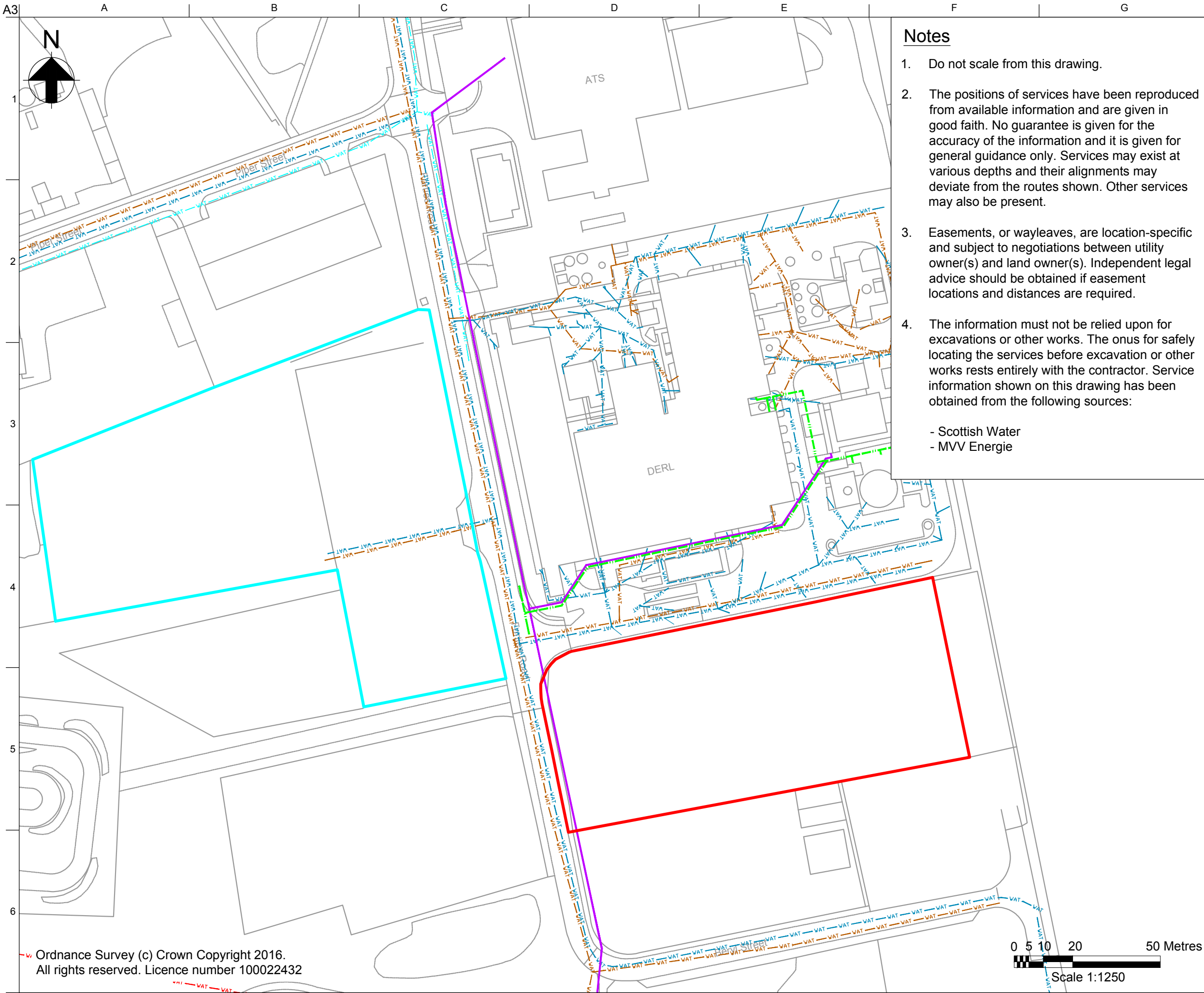
Always serving Scotland

Castle House,
6 Castle Drive,
Dunfermline,
KY11 8GG

Tel No: 0845 601 8855

Appendix C

Existing Water Utilities Drawing



Notes

- 1. Do not scale from this drawing.
- 2. The positions of services have been reproduced from available information and are given in good faith. No guarantee is given for the accuracy of the information and it is given for general guidance only. Services may exist at various depths and their alignments may deviate from the routes shown. Other services may also be present.
- 3. Easements, or wayleaves, are location-specific and subject to negotiations between utility owner(s) and land owner(s). Independent legal advice should be obtained if easement locations and distances are required.
- 4. The information must not be relied upon for excavations or other works. The onus for safely locating the services before excavation or other works rests entirely with the contractor. Service information shown on this drawing has been obtained from the following sources:

- Scottish Water
- MVV Energie

Legend

- South Boundary
- West Boundary
- Scottish Water (Fresh)
- Scottish Water (Surface)
- Scottish Water (Foul)
- Scottish Water (Combined)
- DERL Abstraction Pipe
- DERL Water Supply (Other)

I2	07/06/16	DM	NM	GLD
Boundary, Notes & Legend Revised Following Client Comments.				
I1	25/05/16	DM	NM	GLD
Issued for Information				
Rev	Date	By	Chkd	Appd

ARUP

Scotstoun House, South Queensferry
West Lothian, EH30 9SE
T +44(0)131 331 1999
www.arup.com

Client
MVV Environment Services Ltd

Project Title
MVV, Dundee

Drawing Title
South & West Boundary -
Water Utilities

Scale at A3 1:1250

Role Consultancy

Suitability For Information

Arup Job No 245510-00	Rev I2
--------------------------	-----------

Name
SK-SW-003

Ordnance Survey (c) Crown Copyright 2016.
All rights reserved. Licence number 100022432


0 5 10 20 50 Metres
Scale 1:1250

Appendix D

Preliminary Greenfield Runoff Calculations

Part (i)

Greenfield Runoff Calculations
for Area of EfW Site Only

Ove Arup & Partners International Ltd		Page 1
The Arup Campus Blyth Gate Solihull B90 8AE		
Date 22/11/2016 15:03 File	Designed by Rhea.Forsyth Checked by	
XP Solutions Source Control 2015.1		

ICP SUDS Mean Annual Flood


Input

Return Period (years)	2	Soil	0.400
Area (ha)	0.848	Urban	0.000
SAAR (mm)	797	Region Number	Region 1

Results 1/s

QBAR Rural	3.4
QBAR Urban	3.4
Q2 years	3.1
Q1 year	2.9
Q30 years	6.3
Q100 years	8.3

©1982-2015 XP Solutions

Ove Arup & Partners International Ltd		Page 1
The Arup Campus Blyth Gate Solihull B90 8AE		
Date 22/11/2016 15:05 File	Designed by Rhea.Forsyth Checked by	
XP Solutions Source Control 2015.1		

ICP SUDS Mean Annual Flood


Input

Return Period (years)	30	Soil	0.400
Area (ha)	0.848	Urban	0.000
SAAR (mm)	797	Region Number	Region 1

Results 1/s

QBAR Rural	3.4
QBAR Urban	3.4
Q30 years	6.3
Q1 year	2.9
Q30 years	6.3
Q100 years	8.3

©1982-2015 XP Solutions

Ove Arup & Partners International Ltd		Page 1
The Arup Campus Blyth Gate Solihull B90 8AE		
Date 22/11/2016 15:06 File	Designed by Rhea.Forsyth Checked by	
XP Solutions Source Control 2015.1		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	200	Soil	0.400
Area (ha)	0.848	Urban	0.000
SAAR (mm)	797	Region Number	Region 1


Results 1/s

QBAR Rural	3.4
QBAR Urban	3.4
Q200 years	9.4
Q1 year	2.9
Q30 years	6.3
Q100 years	8.3

©1982-2015 XP Solutions

Part (ii)

Greenfield Runoff Calculations
for Area of EfW Site and Area
of Detention Basin

Ove Arup & Partners International Ltd		Page 1
The Arup Campus Blyth Gate Solihull B90 8AE		
Date 12/12/2016 13:58 File	Designed by Rhea.Forsyth Checked by	
XP Solutions Source Control 2015.1		

ICP SUDS Mean Annual Flood


Input

Return Period (years)	2	Soil	0.400
Area (ha)	1.111	Urban	0.000
SAAR (mm)	797	Region Number	Region 1

Results l/s

QBAR Rural	4.4
QBAR Urban	4.4
Q2 years	4.0
Q1 year	3.7
Q30 years	8.3
Q100 years	10.9

©1982-2015 XP Solutions

Ove Arup & Partners International Ltd		Page 1
The Arup Campus Blyth Gate Solihull B90 8AE		
Date 12/12/2016 13:59 File	Designed by Rhea.Forsyth Checked by	
XP Solutions Source Control 2015.1		

ICP SUDS Mean Annual Flood


Input

Return Period (years)	5	Soil	0.400
Area (ha)	1.111	Urban	0.000
SAAR (mm)	797	Region Number	Region 1

Results l/s

QBAR Rural	4.4
QBAR Urban	4.4
Q5 years	5.3
Q1 year	3.7
Q30 years	8.3
Q100 years	10.9

©1982-2015 XP Solutions

Ove Arup & Partners International Ltd		Page 1
The Arup Campus Blyth Gate Solihull B90 8AE		
Date 12/12/2016 14:00 File	Designed by Rhea.Forsyth Checked by	
XP Solutions Source Control 2015.1		

ICP SUDS Mean Annual Flood


Input

Return Period (years)	30	Soil	0.400
Area (ha)	1.111	Urban	0.000
SAAR (mm)	797	Region Number	Region 1

Results l/s

QBAR Rural	4.4
QBAR Urban	4.4
Q30 years	8.3
Q1 year	3.7
Q30 years	8.3
Q100 years	10.9

©1982-2015 XP Solutions

Ove Arup & Partners International Ltd		Page 1
The Arup Campus Blyth Gate Solihull B90 8AE		
Date 12/12/2016 14:00 File	Designed by Rhea.Forsyth Checked by	
XP Solutions Source Control 2015.1		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	200	Soil	0.400
Area (ha)	1.111	Urban	0.000
SAAR (mm)	797	Region Number	Region 1

Results l/s

QBAR Rural	4.4
QBAR Urban	4.4
Q200 years	12.4
Q1 year	3.7
Q30 years	8.3
Q100 years	10.9

©1982-2015 XP Solutions

Appendix E

Correspondence

(i) **Correspondence**
Dundee City Council

From: Rhea Forsyth
Sent: 06 December 2016 16:40
To: 'andrew.reid@dundeecity.gov.uk'
Cc: Joanna Corrigan; Miguel Piedra
Subject: MVV EfW Plant Dundee - PDE Response: Discharge Location
Attachments: 737814_Rhea Forsyth_AX3 ND Capacity Available_F&P or DIA required_Applic....pdf

Hello Andrew,

I am writing to ask for your guidance on the potential location of the SuDS outlet for the MVV EfW Plant in Dundee. On our meeting on the 14th November concerning the MVV SuDS design, it was discussed that our existing SuDS proposal to connect to the nearest Scottish Water surface water sewer may be rejected and Scottish Water may advise to connect to the nearest watercourse. I have received a response to our Pre-Development Enquiry form and this has turned out to be the case, which you can see in the attachment. We are now looking at discharging the surface water into the Dighty Water, upon the authorisation of SEPA and Dundee City Council.

The outlet is required to attenuate to the correct greenfield rate of 6.3l/s. If SEPA accept this request, would Dundee City Council also approve of the proposal to discharge into the Dighty Water at this discharge rate? It should be noted that the correct storage volume will be catered for, along with conditions to prevent any backing up of water into the system.

At this stage of design it is likely the point of discharge will be south of the site, but the exact location is not known. It would be helpful to discuss this with you in greater detail in due course.

If you could let me know your thoughts on this condition I would be grateful.

Kind regards,

Rhea Forsyth
Graduate Civil Engineer | Infrastructure

Arup
1 West Regent Street Glasgow G2 1RW United Kingdom
Tel: +44 141 332 8534

www.arup.com

Connect with Arup on [LinkedIn](#)
Follow [@ArupGroup](#)

From: andrew.reid@dundeecity.gov.uk
Sent: 16 November 2016 11:41
To: Miguel Piedra
Cc: Bruce Braithwaite; Rhea Forsyth;
sharon.dorward@dundeecity.gov.uk
Subject: RE: AW: AW: Dundee - flood mitigation and drainage

Miguel,

Below are a some notes from our meeting on 14/11/16 and also some subsequent thoughts I have had:

1. SUDS are required which must control the surface water discharge from the development site to greenfield runoff. The SUDS must be constructed at an early stage of the development.
2. It is not normal to locate SUDS features within the functional flood plain. However if SEPA are satisfied with this location and your proposal to protect the SUDS basins from Dighty water entering them then DCC would have no objection, subject to consideration being given to how maintenance access would be provided to the SUDS features and groundwater levels being monitored to determine any measures required to ensure the basin's impermeable liner is not affected by hydrostatic uplift.
3. Consideration to be given to any protection required to stop Dighty water entering the proposed filter drain with dual piping around the development. There may be a risk of Dighty water entering the filter trench and filling the SUDS basins and therefore reducing the storage available in the surface water drainage system (ie. the protection around the SUDS basins is providing no benefit if Dighty water can enter the SUDS basins through the surface water drainage system?).
4. If the protected SUDS basins are to be located in the functional flood plain, additional compensatory storage would have to be provided elsewhere in the Dighty flood plain to offset the reduced volume of functional flood plain available adjacent to the site. This should be incorporated into the modelling and be agreed with SEPA.
5. Having checked Scottish Water's plant records for the area I see that the surface water pipe which the new surface water drainage system is to connect to discharges to the Dighty. Therefore consideration must be given to the scenario when no outflow will be possible from the basins to the Dighty when the Dighty water level is above the invert of the outlet pipe (and indeed above the invert level of the basins). Checks must also be made to ensure there is adequate capacity in the existing surface water pipe downstream of the proposed SUDS basin connection to accept the additional flow.

regards,
Andy

-----Miguel Piedra <Miguel.Piedra@arup.com> wrote: -----

To: "<andrew.reid@dundeecity.gov.uk>" <andrew.reid@dundeecity.gov.uk>

From: Miguel Piedra <Miguel.Piedra@arup.com>

Date: 14/11/2016 11:14AM

Cc: "<swen.grossgebauer@mvv.de>" <swen.grossgebauer@mvv.de>, John Wade <john.Wade@mvvuk.co.uk>, "<o.kautz@mvv.de>" <o.kautz@mvv.de>, Debbie Harper <Debbie.Harper@arup.com>, Bruce Braithwaite <Bruce.Braithwaite@mvvuk.co.uk>, Rhea Forsyth <Rhea.Forsyth@arup.com>

Subject: RE: AW: AW: Dundee - flood mitigation and drainage

Dear Andrew,

Many thanks for agreeing to meet with us later this afternoon. In anticipation of the meeting, please see attached a few sketches to illustrate the situation with the location of the SUDS ponds.

Regards,

Miguel

Miguel M Piedra

Senior Engineer | Water Environment and Flood Risk

Civil Engineer MSc PhD CWEM MCIWEM

Arup

1 West Regent Street, Glasgow G2 1RW United Kingdom

t: +44 141 332 8534

www.arup.com

(ii) **Correspondence**
SEPA

From: Miguel Piedra
Sent: 30 November 2016 11:15
To: Bruce Braithwaite
Cc: Debbie Harper; Rhea Forsyth; Joanna Corrigan
Subject: FW: MVV Dundee EfW - Consultation on SUDS pond location

Hello,

As mentioned, please see response from SEPA

Regards

Miguel

Miguel M Piedra
Senior Engineer | Water Environment and Flood Risk
Civil Engineer MSc PhD CWEM MCIWEM

Arup
1 West Regent Street, Glasgow G2 1RW United Kingdom
t: +44 141 332 8534
www.arup.com

From: Flood Risk South East [<mailto:SEFloodRiskRequest@SEPA.org.uk>]
Sent: 30 November 2016 11:10
To: Miguel Piedra
Cc: Planning South East; Currie, Tracey; Jardine, Andrew
Subject: RE: MVV Dundee EfW - Consultation on SUDS pond location

Good morning,

As discussed, any lost storage will have to be replaced by compensatory storage and supporting information to show that the compensatory storage will have a neutral impact on flood risk to comply with Scottish Planning Policy. Further guidance on landrasing and compensatory storage can be found within our "*Technical Flood Risk Guidance for Stakeholders*" <http://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/>

Generally we are not supportive of locating SUDS on the floodplain, but acknowledge that in this instance you have no alternative due to the high risk of flooding.

I would highlight, that without a FRA, we are unable to comment upon the accuracy/suitability of the flood outlines provided within your earlier email.

Kind regards

Richard

From: Miguel Piedra [<mailto:Miguel.Piedra@arup.com>]
Sent: 30 November 2016 10:59
To: Flood Risk South East
Cc: Planning South East; Currie, Tracey; Jardine, Andrew
Subject: RE: MVV Dundee EfW - Consultation on SUDS pond location

Hello Richard,

Thanks for your email. Please note that a FRA report has not been submitted yet because the assessment of the compensatory storage volume requirements and the configuration of the storage area depend on the total volume needed, which is directly related to our query about the SUDS basins.

Thus, the FRA cannot be concluded until we confirm with SEPA the suitability of our proposals. I hope this makes sense.

Regards,

Miguel

Miguel M Piedra
Senior Engineer | Water Environment and Flood Risk
Civil Engineer MSc PhD CWEM MCIWEM

Arup
1 West Regent Street, Glasgow G2 1RW United Kingdom
t: +44 141 332 8534
www.arup.com

From: Flood Risk South East [<mailto:SEFloodRiskRequest@SEPA.org.uk>]
Sent: 30 November 2016 10:45
To: Flood Risk South East; Miguel Piedra
Cc: Planning South East; Currie, Tracey; Jardine, Andrew
Subject: RE: MVV Dundee EfW - Consultation on SUDS pond location

Good morning,

Sorry there was a typo within my earlier email. I have updated and the change is shown below in red

Kind regards

Richard

From: Flood Risk South East
Sent: 30 November 2016 10:21
To: 'Miguel.Piedra@arup.com'
Cc: Planning South East; Currie, Tracey; Jardine, Andrew
Subject: RE: MVV Dundee EfW - Consultation on SUDS pond location

Good morning Miguel,

Based upon a quick review of the information, there **doesn't** appear to be an accompany flood risk assessment (FRA) and therefore we cannot review the supporting information used to estimate the flood outlines and ensure it complies with our "*Technical Flood Risk Guidance for Stakeholders*". This document provides generic requirements for undertaking Flood Risk Assessments and can be downloaded from <http://www.sepa.org.uk/environment/land/planning/guidance-and-advice-notes/>

Is a FRA available?

Kind regards

Richard

Richard Hamilton
Hydrologist (Flood Risk)
Scottish Environment Protection Agency
Strathern House
Broxden Business Park
Lamberkine Drive
Perth PH1 1RX
tel: 01738 627989
fax: 01738 630997
email: richard.hamilton@sepa.org.uk

The information contained in this email is confidential and is intended solely for the use of the named addressee. Access, copying or re-use of the information in it by any other is not authorised. If you are not the intended recipient please notify us immediately by return email to postmaster@sepa.org.uk. SEPA registered office: Strathallan House, Castle Business Park, Stirling, FK9 4TZ. Under the Regulation of Investigatory Powers Act 2000, the email system at SEPA may be subject to monitoring from time to time

From: Jardine, Andrew
Sent: 30 November 2016 09:57
To: Flood Risk South East
Cc: Planning South East; Currie, Tracey
Subject: FW: MVV Dundee EfW - Consultation on SUDS pond location

Hi Flood Risk

Please see the email below for information regarding the DERL site.

Tracy – Arup are desperate for a response to figure out if they're modelling is ok, if the plan needs to be modified they'll need to run the model again.

Kind regards

Andrew Jardine
Environment Protection Officer
SEPA Arbroath Office
62 Highstreet
Arbroath
DD11 1AW

Tel: 01241 874370
Fax: 01241 430695

Get connected & further reading:

Private foul drainage (building control): [Scottish Government building standards Technical Handbook \(Drainage\)](#),
Sustainable Drainage Guidance: [SuDS Drain](#), [CIRIA](#), [SEPA SuDS](#),
Water Environment Guidance [SEPA website](#), [Env good practice](#)
Oil Care guidance: [Reduce the Environmental Impact of Oil](#);
Agriculture: [Scotland's Environmental and Rural Services](#) and [Farming and Water Scotland](#) and [rural payments](#) websites;
Environment data: [Scotlands Environment data](#). Need data like rainfall, historic river flow data or information about a site?
Can't find it on [Scotland's Environment Web](#). Check out SEPA's [Access to information](#) or email: datarequests@sepa.org.uk

Flooding:

Be prepared for flooding: see [floodline](#), – Scotlands Flooding roles & responsibilities explained: [Flooding roles and responsibilities, know who to contact](#).

You are the first line of defence against flooding. It is your responsibility to manage your own flood risk and protect yourself, your family, property and business. Being prepared by knowing what to do and [who to contact](#) if flooding happens, can help you reduce the damage and disruption flooding can have on your life. Please see SEPA's [flood map](#) to see if your property or land is at risk of flooding.

Does your business have 20 or more employees? Are you enthusiastic for change and improvement? Would you like to receive free external assistance in waste, water and/or energy efficiency? Then simply send an email including your **name, position, company name and address, and type of business** to zerowaste@sepa.org.uk. Your details will be passed on to Zero Waste Scotland, the new programme created by the Scottish Government to support its Zero Waste Plan, who will contact you to discuss your requirements.

The small print:

The information contained in this email and any attachments may be confidential and is intended solely for the use of the intended recipients. Access, copying or re-use of the information in it by any other is not authorised. If you are not the intended recipient please notify us immediately by return email to postmaster@sepa.org.uk postmaster@sepa.org.uk SEPA registered office: Erskine Court, Castle Business Park, Stirling, FK9 4TR. Under the Regulation of Investigatory Powers Act 2000, the email system at SEPA may be subject to monitoring from time to time.

From: Miguel Piedra [<mailto:Miguel.Piedra@arup.com>]
Sent: 30 November 2016 09:46
To: Planning South East
Cc: Jardine, Andrew; Debbie Harper; Bruce Braithwaite
Subject: RE: MVV Dundee EfW - Consultation on SUDS pond location

Hello Diarmuid,

Thanks for your email.

Please note that our query is a pre-planning discussion on the approach and concept of the SUDS location. It is not as a result of a planning condition.

The basin location and subsequent impact on flood volumes affects not only the drainage strategy but the configuration of the flood compensatory storage area outlined for the development site itself, which would need to be increased if further storage volume was to be required.

A prompt response would be very much appreciated.

Many thanks

Miguel

Miguel M Piedra

Senior Engineer | Water Environment and Flood Risk
Civil Engineer MSc PhD CWEM MCIWEM

Arup

1 West Regent Street, Glasgow G2 1RW United Kingdom

t: +44 141 332 8534

www.arup.com

From: Planning South East [<mailto:Planning.SE@SEPA.org.uk>]

Sent: 25 November 2016 10:05

To: Miguel Piedra

Subject: RE: MVV Dundee EfW - Consultation on SUDS pond location

Miguel

Could you please outline the original planning application number for this proposal, is the SUDS outlined below and the application you refer to an application to discharge a planning condition?

If you can provide this information we will be able to link the request to the relevant file.

Regards

Diarmuid

From: Flood Risk South East

Sent: 25 November 2016 09:45

To: Planning South East

Subject: FW: MVV Dundee EfW - Consultation on SUDS pond location

Please load onto PCS.

Cheers,

Sara

From: Jardine, Andrew

Sent: 23 November 2016 12:32

To: Flood Risk South East; 'Miguel Piedra'

Cc: 'Bruce Braithwaite'; 'Debbie Harper'; 'Rhea Forsyth'; 'Joanna Corrigan'; Currie, Tracey

Subject: FW: MVV Dundee EfW - Consultation on SUDS pond location

Hi Flood Risk South East

MVV Dundee EfW - Consultation on SUDS pond location

Can someone assess the proposals for SuDS built in the flood zone for the development and get back to Miguel and copy me in?

Kind regards

Andrew Jardine

Environment Protection Officer
SEPA Arbroath Office
62 Highstreet
Arbroath
DD11 1AW

Tel: 01241 874370
Fax: 01241 430695

Get connected & further reading:

Private foul drainage (building control): [Scottish Government building standards Technical Handbook \(Drainage\)](#),
Sustainable Drainage Guidance: [SuDS Drain](#), [CIRIA](#), [SEPA SuDS](#),
Water Environment Guidance [SEPA website](#); [Env good practice](#)
Oil Care guidance: [Reduce the Environmental Impact of Oil](#);
Agriculture: [Scotland's Environmental and Rural Services](#) and [Farming and Water Scotland](#) and [rural payments](#) websites;
Environment data: [Scotlands Environment data](#). Need data like rainfall, historic river flow data or information about a site?
Can't find it on [Scotland's Environment Web](#), Check out SEPA's [Access to information](#) or email: datarequests@sepa.org.uk

Flooding:

Be prepared for flooding: see [floodline](#), – **Scotlands Flooding roles & responsibilities explained:** [Flooding roles and responsibilities, know who to contact](#).

You are the first line of defence against flooding. It is your responsibility to manage your own flood risk and protect yourself, your family, property and business. Being prepared by knowing what to do and [who to contact](#) if flooding happens, can help you reduce the damage and disruption flooding can have on your life. Please see SEPA's [flood map](#) to see if your property or land is at risk of flooding.

Does your business have 20 or more employees? Are you enthusiastic for change and improvement? Would you like to receive **free** external assistance in waste, water and/or energy efficiency? Then simply send an email including your **name, position, company name and address, and type of business** to zerowaste@sepa.org.uk. Your details will be passed on to Zero Waste Scotland, the new programme created by the Scottish Government to support its Zero Waste Plan, who will contact you to discuss your requirements.

The small print:

The information contained in this email and any attachments may be confidential and is intended solely for the use of the intended recipients. Access, copying or re-use of the information in it by any other is not authorised. If you are not the intended recipient please notify us immediately by return email to mailto:postmaster@sepa.org.uk postmaster@sepa.org.uk SEPA registered office: Erskine Court, Castle Business Park, Stirling, FK9 4TR. Under the Regulation of Investigatory Powers Act 2000, the email system at SEPA may be subject to monitoring from time to time.

From: Jardine, Andrew
Sent: 16 November 2016 15:28
To: 'Miguel Piedra'; Flood Risk South East
Cc: Bruce Braithwaite; Debbie Harper; Rhea Forsyth; Joanna Corrigan; Currie, Tracey
Subject: FW: MVV Dundee EfW - Consultation on SUDS pond location

Hi Migule

MVV Dundee EfW - Consultation on SUDS pond location

Thanks for the information, I was on site meetings yesterday. I've assessed the water quality treatment from the proposed SuDS. The proposed SuDS (**permeable pavement** (for car park) **filter drain** (for roof/ access flow) and 2 x **detention basins** (for all new site water) appear to surpass the simple index approach for SuDS design laid out in CIRIA C753. Obviously once detailed design commences SEPA's Regulatory Services department would like to discuss the permeable pavement, filter drain and detention basins in more detail. Please note section 8.8 of CIRIA C753 covers SuDS on floodplains – the design considerations in section 8.8.2 should be accounted into the design where possible.

I will have to ask SEPA's Evidence and Flooding hydrology department located in Perth for their representation regarding the development and thoughts on constructing compensatory storage. **Flood risk South East** can someone provide the email chain provisional thoughts on this proposal to provide compensatory storage for the new EfW plant development in Dundee, site NGR NO 44579 32851? The developers design engineer is on a tight timescale so a timely response would be appreciated. I'm happy to discuss should you require any further information?

Miguel I hope this information helps, happy to discuss should you require any further information.

Kind regards

Andrew Jardine
Environment Protection Officer
SEPA Arbroath Office
62 Highstreet
Arbroath
DD11 1AW

Tel: 01241 874370
Fax: 01241 430695

Get connected & further reading:

Private foul drainage (building control): [Scottish Government building standards Technical Handbook \(Drainage\)](#).
Sustainable Drainage Guidance: [SuDS Drain](#), [CIRIA](#), [SEPA SuDS](#).
Water Environment Guidance [SEPA website](#); [Env good practice](#)
Oil Care guidance: [Reduce the Environmental Impact of Oil](#);
Agriculture: [Scotland's Environmental and Rural Services](#) and [Farming and Water Scotland](#) and [rural payments](#) websites;
Environment data: [Scotlands Environment data](#). Need data like rainfall, historic river flow data or information about a site?
Can't find it on [Scotland's Environment Web](#), Check out SEPA's [Access to information](#) or email: datarequests@sepa.org.uk

Flooding:

Be prepared for flooding: see [floodline](#), – Scotlands Flooding roles & responsibilities explained: [Flooding roles and responsibilities, know who to contact](#).

You are the first line of defence against flooding. It is your responsibility to manage your own flood risk and protect yourself, your family, property and business. Being prepared by knowing what to do and [who to contact](#) if flooding happens, can help you reduce the damage and disruption flooding can have on your life. Please see SEPA's [flood map](#) to see if your property or land is at risk of flooding.

Does your business have 20 or more employees? Are you enthusiastic for change and improvement? Would you like to receive **free** external assistance in waste, water and/or energy efficiency? Then simply send an email including your **name, position, company name and address, and type of business** to zerowaste@sepa.org.uk. Your details will be passed on to Zero Waste Scotland, the new programme created by the Scottish Government to support its Zero Waste Plan, who will contact you to discuss your requirements.

The small print:

The information contained in this email and any attachments may be confidential and is intended solely for the use of the intended recipients. Access, copying or re-use of the information in it by any other is not authorised. If you are not the intended recipient please notify us immediately by return email to postmaster@sepa.org.uk postmaster@sepa.org.uk SEPA registered office: Erskine Court, Castle Business Park, Stirling, FK9 4TR. Under the Regulation of Investigatory Powers Act 2000, the email system at SEPA may be subject to monitoring from time to time.

From: Miguel Piedra [<mailto:Miguel.Piedra@arup.com>]

Sent: 15 November 2016 11:01

To: Jardine, Andrew

Cc: Bruce Braithwaite; Debbie Harper; Rhea Forsyth; Joanna Corrigan

Subject: MVV Dundee EfW - Consultation on SUDS pond location

Dear Andrew,

I believe you are familiar with this Energy from Waste plant proposals in Dundee.

Arup is doing the flood risk assessment and the drainage strategy. We are in the latter stages of both studies and we would like to have your advice on a matter of location of the SUDS basins and the implications for flood risk assessment.

The attached sketches show the extents (water levels and depths) of the 1 in 200yr event pre and post development. The other two files show the intended location of the SUDS basins on the west plot. As you can see, the basins are over the functional flood plain. The basins are at the optimum location from a land ownership, runoff collection and runoff discharge points of view. Unfortunately, the entire area is at risk of flooding, so there are no real alternatives for the basin location. We anticipate the basins to have a perimeter embankment high enough to prevent flood waters from entering the ponds, which would be lined for water proofing.

We would like confirmation from SEPA that the proposed location of the SUDS basins is acceptable and whether provision of compensatory storage for the displaced flood volume is required. Arup have worked in a different development in Elgin where the SUDS basins were part of the raised land for the development, with their volume added to the compensatory storage.

If the location of the basins is acceptable to SEPA and compensatory storage was needed, we propose expanding the storage area already identified on the right bank of the Dighty Water, south west of the site, with the required volume of the basins and the perimeter embankment.

I would very much appreciate a prompt response to my query, as the planning application is awaiting our final proposals.

If you have any queries please do not hesitate to contact me.

Many thanks for your help.

Miguel

Miguel M Piedra

Senior Engineer | Water Environment and Flood Risk
Civil Engineer MSc PhD CWEM MCIWEM

Arup

1 West Regent Street, Glasgow G2 1RW United Kingdom

t: +44 141 332 8534

www.arup.com

(iii) **Correspondence**
Scottish Water

From: Rhea Forsyth
Sent: 24 November 2016 16:02
To: 'DevelopmentOperations@scottishwater.co.uk'
Subject: Pre-Development Enquiry Form Application - MVV Energy from Waste Plant, Dundee
Attachments: MVV EfW Plant, Dundee PDE Application 241116.pdf

Dear Sir/Madam,

Please find attached the Pre-Development Enquiry Form Application with relevant attachments for the proposed Energy from Waste Development in Baldovie Industrial Estate, Dundee.

Any queries please don't hesitate to contact myself.

Kind regards,

[Rhea Forsyth](#)

Graduate Civil Engineer | Infrastructure

Arup

1 West Regent Street Glasgow G2 1RW United Kingdom

Tel: +44 141 332 8534

www.arup.com

Connect with Arup on [LinkedIn](#)

Follow [@ArupGroup](#)

Your ref
Our ref 245510-00
File ref

ARUP

Scottish Water
Retail Connections
Buchanan Gate Business Park
Cumbernauld Road
Glasgow
G33 6FB

1 West Regent Street
Glasgow
G2 1RW
United Kingdom
t +44 141 332 8534

rhea.forsyth@arup.com
www.arup.com

24th November 2016

Dear Sir/Madam

MVV Energy From Waste Plant, Dundee – PDE Application

Please find enclosed a Pre Development Enquiry application for the MVV Energy from Waste Plant Development of Baldovie Industrial Estate, Dundee.

The proposed development is situated within Baldovie Industrial Estate, just south of an existing recycling plant, DERL. It is proposed to construct the new energy from waste plant along with access roads, parking and both onsite and offsite SuDS components.

An increase in water demand and foul discharge from the site is requested, along with permission to connect to the nearby surface water and foul sewer systems. Post-development attenuated surface water flows will remain at the pre-development greenfield rate. All flows are proposed to discharge to the neighbouring surface water and foul sewers as at present.

I hope you find all the information you require to review this application but should you have any queries please do not hesitate to contact myself on the details provided.

Yours sincerely



Rhea Forsyth
Graduate Engineer

Pre-Development Enquiry Form

This application form is to be used to assess if we are able to provide your development with water and/or drainage services for a planned development. It is expected that this is submitted by customers or their consultants, for the majority of developments, prior to submission of formal designs and connection applications for water and waste water infrastructure and connections. We appreciate that at early planning stages of development, you may possess limited information and therefore our mandatory information fields are limited. The more detailed information which can be included on this application form, will ensure that we can provide you with a more accurate response to confirm our ability to serve your development with water or manage waste water discharge from your development.

This form is for domestic and non-domestic site connection enquiries, however any subsequent applications for non-domestic developments must be submitted via a Licensed Provider. Details of the current Licensed Providers can be found at www.scotlandontap.gov.uk

Other Customer Connection applications available are:

Guidance section Pre-development enquiry form application

When completing this form please refer to the guidance section for assistance.



For more information on Scottish Water, call our Customer Helpline on 0845 601 8855 or visit our website at:

www.scottishwater.co.uk



Scottish Water
Always serving Scotland

Pre-Development Enquiry Form

PDE

For official use only

Date received:

All fields marked with an asterix (*) are mandatory.

1. Application Details

Please quote any Scottish Water reference previously given that relates to your site.

1.1 Scottish Water Reference Number: _____

1.2 Applicant Details:

Contact Name: * RHEA FORSYTH

Company Name (if applicable): OVE ARUP & PARTNERS SCOTLAND

Address: * 1 WEST REGENT STREET
GLASGOW

Postcode: * G2 1RW

Phone: * 0141 332 8534

Mobile: _____

Email: rhea.forsyth@arup.com

1.3 Developer Details (if different from above)

Contact Name: _____

Company Name (if applicable): MVV ENVIRONMENTAL SERVICES LTD

Address: 1 WOOD ST.
LONDON

Postcode: * EC2V 7WS

Phone: _____

Mobile: _____

Email: _____

1.4 Please indicate whether it is the Applicant or the Developer who should receive future correspondence and communication in relation to the enquiry:

Applicant



Developer



Guidance section

Pre-Development Enquiry form



1 Application Details

- 1.1 Please include any Scottish Water reference number you may have had previously relating to this development.
- 1.2 The applicant will be the designated point of contact and will receive all correspondence from Scottish Water relating to this enquiry unless otherwise stated in section 1.4.
- 1.3 Please only complete the developer section where the applicant is not the developer.
- 1.4 We will address our correspondence to the person detailed in this section. If left blank we will automatically default to the applicant.

Pre-Development Enquiry Form

PDE

2. Development Details

2.1 Site address: * FORTIES ROAD
BALDOVIE INDUSTRIAL ESTATE
DUNDEE
DD4

2.2 Ordnance Survey Ref (12 Fig): N 04458232854

2.3 Total area of your development: ~0.848 Hectares (1 hectare = 10,000m²)

2.4 Local Authority Area: DUNDEE CITY

2.5 Is the development included in the current local plan? Yes ☐ No ☒

2.6 Has outline planning permission been granted? Yes ☐ No ☒

2.7 Has detailed planning permission been granted? Yes ☐ No ☒

If you have answered 'yes' to 2.6 or 2.7
please provide your planning reference number: _____

2.8 Please indicate the type of development by ticking the appropriate box below:

Domestic

If Domestic, please go to section 2.9

Non-Domestic

If Non-Domestic, please go to section 2.10

Mixed

If Mixed, please complete both sections 2.9 and 2.10

2.9 Domestic

Total number of dwellings:

Maximum number of storeys:

Phase number:	1	2	3	4	5	6
Estimated dwellings per phase:						
Estimated start date:						

2 Development Details

The more detail you provide at this stage the quicker we can determine if your proposed development can be adequately served by public water and/or wastewater infrastructure.

2.1 If you do not have a full postal address please provide as much location information as possible e.g. nearest postcode or name of an adjacent road.

2.2 If available please include a 12 digit Ordnance Survey reference number.

2.3 Please provide the area of your development in hectares (1 hectare = 10,000m²)

2.4 Please name the local authority that is or will be dealing with the planning application for your proposed development.

2.5 Please refer to the Local Authority or Planning Officer for this information (this also applies to 2.6 & 2.7)

2.8 Domestic developments are dwelling houses, flats or student accommodation.

Non-domestic developments are mainly commercial, industrial and business properties such as offices, factories, schools, residential care homes, hotels, shops etc.

If you are unsure whether your development is classed as domestic or non-domestic please discuss this with the Customer Connections Department.

2.9 The phasing of your development will help us determine how and when we can best provide your development with public water and/or wastewater services, therefore please provide your construction programme in the phasing table provided.

To assist with the completion of this section the following table has been populated by way of an example:

Pre-Development Enquiry Form

PDE

2.10 Non-Domestic

Number of non-domestic units: N/A Maximum number of storeys:

Business type and description: e.g. hospital, hotels, schools, office, warehouse etc	Office	School	Hotel	N/A	N/A
	ENERGY FROM WASTE PLANT				
Number of units:					
Estimated start date:					

3. Servicing Details

The following information is required to allow us to determine if your development can be served by public water and/or waste water infrastructure.

3.1 What is the land type for this development:

Greenfield

please proceed to section 3.6

Brownfield

please complete pre development details

Pre-development Details

3.2 Previous use of site: AUTOBREAKERS / SCRAPYARD.

3.3 Date previous building was last occupied: N/A

3.4 Water demand

Pre-development peak water demand: 0 litres/sec

Pre-development average water demand: 0 litres/sec

3.5 Foul discharge

Pre-development peak water demand: 0 litres/sec

Pre-development average water demand: 0 litres/sec

3.6 Surface water discharge

Pre-development surface water discharge: 6.3 litres/sec

Please indicate where the surface water is currently discharging to:

Surface water sewers ☐

Combined Sewer ☐

Soakaway ☐

Direct to watercourse ☒

please specify: DIGHTY WATER

Other ☐

please specify:

2.9 Domestic

Number of domestic dwellings: 205

Maximum number of storeys: 3

Phase number:	1	2	3	4	5	6
Estimated dwellings per phase:	50	50	75	30	n/a	n/a
Estimated start date:	Jan 12	Feb 13	Jun 14	May 15	n/a	n/a

2.10 Non-Domestic

Number of non-domestic units: 6

Maximum number of storeys: 2

Business type and description: e.g. hospital, hotels, schools, etc	Office	School	Hotel	N/A	N/A
Number of units:	4	1	1	N/A	N/A
Estimated start date:	Dec 11	Jan 13	May 13	N/A	N/A

3 Servicing details

The information you provide in this section will be used to determine the impact this development will have on our existing water and waste water assets. We will provide a response detailing any conditions to enable the development to be served. It is therefore important you supply as much information as possible and provide calculations in support of the figures provided.

3.1 Greenfield land is defined as land that has never previously been developed

Brownfield land is defined as land which has been previously developed this includes housing, factories, car parks, waste disposal sites etc.

Pre-Development Enquiry Form

PDE

Post-development Details

3.7 Water demand

Post-development peak water demand: litres/sec

Post-development average water demand: litres/sec

3.8 What is the level of the highest water fitting on the proposed site (AOD):

metres

3.9 Foul discharge

Post-development peak foul discharge: litres/sec

Post-development average foul discharge: litres/sec

3.10 Surface water discharge

Post-development pre attenuated surface water discharge: litres/sec

Post-development attenuated surface water discharge: litres/sec

3.11 Where do you propose to discharge surface water to?

Surface water sewers ☒

Combined Sewer ☐

Soakaway ☐

Direct to watercourse ☐

please specify: _____

Other ☐

please specify: _____

(GREENFIELD RUNOFF FOR 30 YEAR RETURN PERIOD)

3.12 Surface water design

What SUDS (Sustainable Urban Drainage System) measures are being used to manage surface water, if any:

Detention Pond ☐

Detention Basin ☒

Underground Storage ☐

Infiltration Trench ☒

Other ☒

please specify: FILTER DRAIN, PERMEABLE PAVING

3.13 Development Levels

What is the lowest ground level on site? (AOD): metres

What is the lowest road level on site? (AOD): metres

What is the lowest floor level on site? (AOD): metres

3.4 Water Demand — Domestic

Peak Rate is defined as the maximum rate of consumption from a water main in litres per second. This is usually between 7am and 9am in the morning and between 4pm and 7pm in the evening.

Average Rate can be defined as the average daily consumption rate over a 24 hour period. Based on the current average population per household this can be calculated as follows:-

1 household = 500 litres per day
(Averaging 2.5 people per property)

To obtain litres per second divide by 86400 i.e. 24hrs/60mins/60secs

Water Demand — Non-Domestic

All water consumption rates are site specific and will vary greatly from industrial, schools, hotels, public houses, amenity sites, hospitals and residential care homes. For further information please refer to the current edition of Water for Scotland.

3.5 Foul discharge — Domestic

Peak Rate is defined as the maximum discharge rate to a sewer in litres per second. This is usually between 7am and 9am in the morning and between 4pm and 7pm in the evening.

Average Rate can be defined as the average daily discharge over a 24 hour period. Based on the current average population per household this can be calculated as follows:

1 house in litres per second
= 400 litres per day
(Averaging 2.5 people per property)

To obtain litres per second divide by 86400 i.e. 24hrs/60mins/60secs

Foul discharge — Non-Domestic

All wastewater discharge rates are site specific and will vary greatly from industrial, schools, hotels, public houses, amenity sites, hospitals and residential care homes. For further information please refer to the current edition of Sewers for Scotland.

Pre-Development Enquiry Form

PDE

3.14 Trade Effluent

If non-domestic, is there trade effluent?

Yes ☐

No ☒

If **yes**, please provide the details, if known at this time:

1. Description of the Nature of the Proposed Discharge

2. Proposed Maximum Daily Discharge Volume

3. Proposed Maximum Discharge Rate

4. Proposed Period/s of Discharge

5. Proposed Effluent Treatment given at site:

4. Checklist

Please ensure you provide the following information:

Location plan



Calculations



3.6 Surface water is the water resulting from the run-off of rain, melted snow or hail.

3.7 Please refer to guidance note 3.4

3.8 The highest water fitting could be an upstairs tap, water cistern or shower. This information may not be available at this early stage in your development. If you are unable to provide this information we may request it at a later date to progress your application. Please provide in meters above ordnance datum (AOD) i.e. above sea level.

3.9 Please refer to guidance note 3.5

3.10 Attenuation refers to the reduction of the peak rate flow via a flow restriction system i.e. control manhole, storage or SUDS measure to allow a controlled volume of flow to discharge over a longer duration.

3.12 SUDS — Sustainable Urban Drainage Systems are a sequence of management practices and control structures designed to drain surface water in a manner that will provide a more sustainable approach than what has been the conventional practice of routing run-off through a pipe to a watercourse.

3.13 Although the ground, floor and road levels may not be available at this early stage in your development, these would assist us in our process. If you are unable to provide this information we may request it at a later date to progress your application

5. Declaration

I/We hereby make application to Scottish Water for a supply of water as detailed above

I/We abide by the terms and conditions of current Scottish Water Byelaws on date of application

I/We understand that any alterations made to this application must be declared to Scottish Water

I/We have filled in all the mandatory sections of this form.

The details I/we have given with this application are accurate

I/We have read and understood the guidance notes

I/We have enclosed all the necessary supporting documentation

Your details

Signature: * 

Date: * _____

Your full name (in capitals): * RHEA FORSYTH

Company name: OVE ARUP & PARTNERS SCOTLAND

Please note: in consideration of the environment, we seek to correspond with customers via email. If you wish to receive correspondence via email, please tick this box and complete your email details in section 1.2: ☒

3.14 Trade effluent details

Please note that a trade effluent consent maybe required from Scottish Water if the proposed development is intending on discharging industrial / chemical waste into the public sewer network. Potential developments which may require a trade effluent consent include Abattoirs, Hospitals, Garages, Industrial food factories, Distribution Centres etc. If you wish to discuss whether your development may require a trade effluent consent please contact Scottish Water for further detail.



4 Checklist

Please use the checklist to make sure you have included all the information we require

Location plan

Please provide a suitably scaled location plan which clearly highlights the proposed development boundaries as well as noting adjacent street names. Please ensure the plan is clear and suitable to assist us when reviewing your site.

Calculations

Please provide your working examples for the Pre and Post Development Flow Rates.



5 Declaration

Please ensure that you have read, understood and signed the declaration before returning your form.

6. Charges

There is no charge for this enquiry. If it is identified that a more detailed investigation is required to determine the impact your development may have on the existing infrastructure please indicate by ticking the box if you wish Scottish Water to provide a quotation for this investigation work. ☐



6 Charges

We may not be able to determine the impact of your development without further studies, if this is the case it is likely that we will need a selection of the following: DIA (Drainage Impact Assessment (DIA), Water Impact Assessment (WIA) or a flow and pressure test. We can either arrange this for you or you can obtain from an independent consultant.

Please return pages 2 – 8 of this application to:

Customer Connections
Scottish Water
The Bridge
Buchanan Gate Business Park
Cumbernauld Road
Stepps
G33 6FB

Alternative formats of this form can be made available free of charge.

For information on Braille, large print, audio and a variety of languages, please call our Customer Helpline.

If you have a disability, medical condition or other reason where you will need special assistance from Scottish Water then please contact us and we can add your name, address and special requirements to our confidential Additional Support Register.

We record all calls for quality and training purposes.

SW PDE 01/13

Subject PDE Technical Note

Date 24th November 2016

Job No/Ref 245510-16/RF

Technical Note for PDE Application

The following information is in support of the PDE application submitted to Scottish Water on 24th November 2016 with regards to the development of the MVV Energy from Waste Plant, Dundee. The site is currently unused, and adjacent to an existing recycling plant.

Please also see **Figure 1 - Location Plan** and **Figure 2 – Site Plan** which supports the application.

Pre-development Flows

Existing flows have been estimated based on the current site usage. Note that these figures are only applicable for the area to be developed, not any of the surrounding areas of the site.

Water Demand

Due to the site currently being unoccupied with no development, both peak and average pre-development water demand is **0 l/s**.

Foul Discharge

Due to the site currently being unoccupied with no development, both peak and average pre-development foul discharge is **0 l/s**.

Subject PDE Technical Note

Date 24th November 2016

Job No/Ref 245510-16/RF

Post-development Flows

Values for water demand and foul discharge are for the development area only. They do not take account of existing flows surrounding this site area on Baldovie Industrial Estate.

The post-development flows have been received from MVV Environmental Services Ltd., and so the following values have been provided with no calculation.

Water Demand

The average post-development water demand is **1 l/s**.

The peak post-development water demand is **5 l/s**.

Foul Discharge

The average post-development water demand is **1 l/s**.

The peak post-development water demand is **5 l/s**.

Subject PDE Technical Note

Date 24th November 2016

Job No/Ref 245510-16/RF

Pre-development Surface Water Discharge

Due to the site being unused at the present time, with no existing developments, the pre-development surface water discharge is assumed to be equal to the Greenfield runoff value for a 30 year return period. This was calculated using MicroDrainage©, and the calculation sheet from this software can be found in **Appendix A** at the end of this Note.

The pre-development surface water discharge rate is therefore **6.3 l/s**.

Post-development Pre-attenuated Surface Water Discharge

The rational formula has been used:

$Q_p = 2.78 * C_v * C_r * i * A$, where:

$C_v = 0.75$ (assumed)

$C_r = 1.30$ (assumed)

$i = 50$ mm/hr (assumed)

$A = 0.848$ ha

$Q_p = 2.78 * 0.75 * 1.30 * 50 * 0.848$

$Q_p = \mathbf{114.93 \text{ l/s}}$.

Post-development Attenuated Surface Water Discharge

The surface water attenuated discharge will remain as existing.

Due to the site being unused at the present time, with no existing developments, the pre-development surface water discharge is assumed to be equal to the Greenfield runoff value for a 30 year return period. This was calculated using MicroDrainage©, and the calculation sheet from this software can be found in **Appendix A** at the end of this Note.

The pre-development surface water discharge rate is therefore **6.3 l/s**.

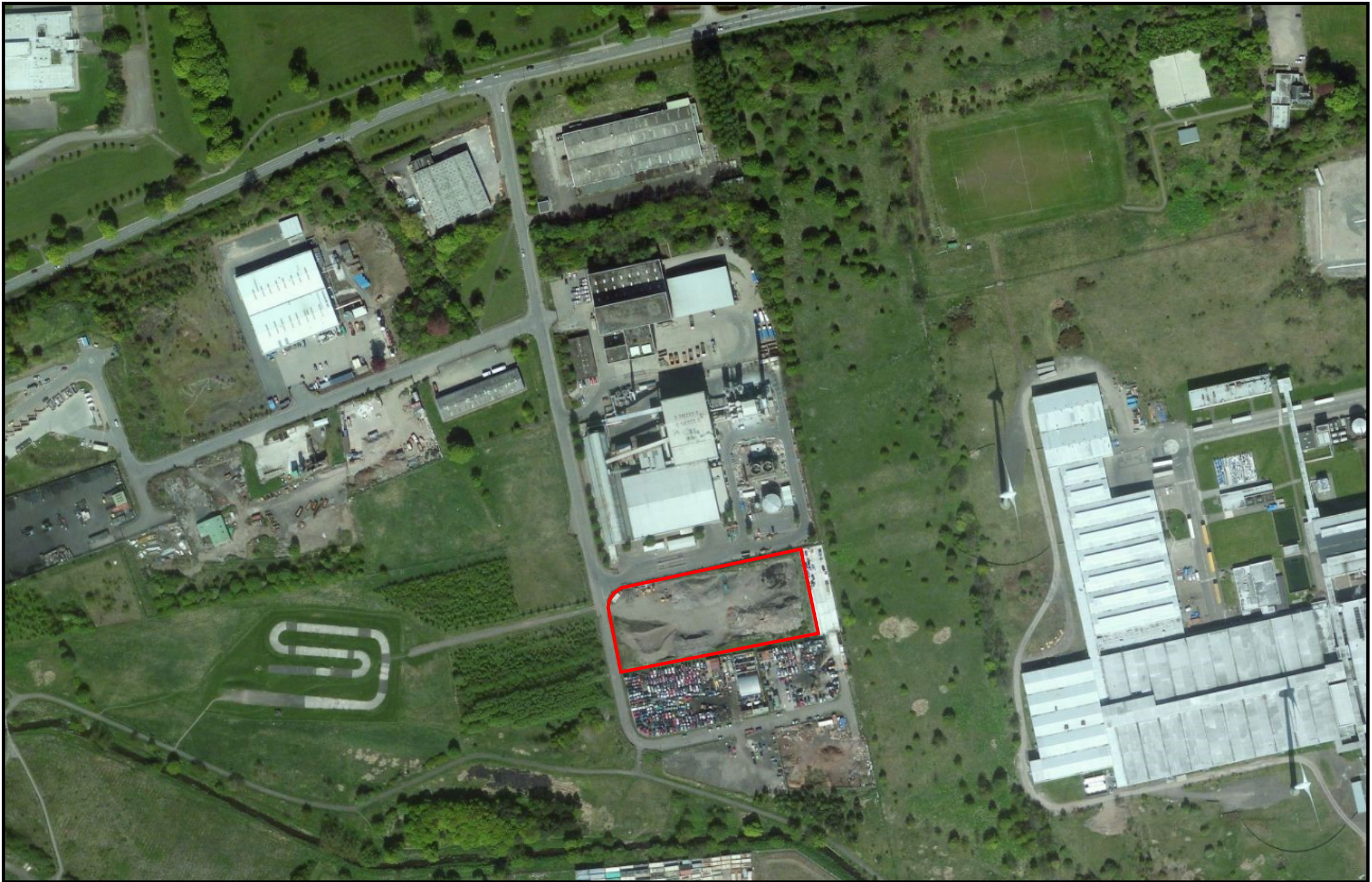


Location Plan

Figure 1
Not to Scale

Legend

Red Line Boundary



Location Site Plan


Figure 2
Not to Scale

Legend

————— Red Line Boundary

Appendix A

Preliminary Greenfield Runoff Calculation for 1-in-30 Year Return Period.

Ove Arup & Partners International Ltd		Page 1
The Arup Campus Blyth Gate Solihull B90 8AE		
Date 22/11/2016 10:10 File	Designed by Rhea.Forsyth Checked by	
XP Solutions Source Control 2015.1		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	30	Soil	0.400
Area (ha)	0.848	Urban	0.000
SAAR (mm)	797	Region Number	Region 1

Results 1/s

QBAR Rural	3.4
QBAR Urban	3.4
Q30 years	6.3
Q1 year	2.9
Q30 years	6.3
Q100 years	8.3

©1982-2015 XP Solutions

From: DevelopmentOperations
<DevelopmentOperations@scottishwater.co.uk>
Sent: 24 November 2016 16:02
To: Rhea Forsyth
Subject: RE: Pre-Development Enquiry Form Application - MVV Energy from Waste Plant, Dundee

Thank you for contacting Scottish Water, Development Operations.

We have received your e-mail, and will assess this and action accordingly. If we have any further questions, we will contact you directly.

Please send any written correspondence to the following address:

Scottish Water
Development Operations
The Bridge
Buchanan Gate Business Park
Cumbernauld Road
Stepps
Glasgow
G33 6FB

Central contact number: 0800 389 0379

Web: www.scottishwater.co.uk/connections

Privileged/Confidential information may be contained in this Email and any files transmitted with it. If you are not the intended recipient you should not retain, copy or use this Email for any purpose or disclose all or part of its contents to any person. If you have received this Email in error please notify the sender immediately and delete this Email from your system.

Opinions, conclusions and other information in this message that do not relate to the official business of Scottish Water ("SW"), Scottish Water Horizons Ltd ("SWH"), Scottish Water International Ltd ("SWI") or Scottish Water Solutions 2 Ltd ("SWS2") shall be understood as neither given nor endorsed by them. The contents of Emails sent and received by SW, SWH, SWI and SWS2 are monitored.

WARNING: Although SW, SWH, SWI and SWS2 have taken reasonable precautions to ensure no viruses or other malicious software are present, SW, SWH, SWI and SWS2 cannot accept responsibility for any loss or damage arising from the use of this Email or attachments however caused. The recipient should therefore check this Email and any attachments for the presence of viruses or other malicious software.

Scottish Water

www.scottishwater.co.uk

From: Steven.Carson@SCOTTISHWATER.CO.UK
Sent: 25 November 2016 10:06
To: Rhea Forsyth
Subject: 737814 - DD4 Dundee Forties Road Site At Baldovie Endus est
Attachments: 737814_Rhea Forsyth_B3 DOM Acknowledgement Letter WC
Standard_Applicant_09-57-46.pdf

Good Morning,

Please find attached your letter regarding your pre development enquiry application.

Kind Regards,
Steven Carson

Privileged/Confidential information may be contained in this Email and any files transmitted with it. If you are not the intended recipient you should not retain, copy or use this Email for any purpose or disclose all or part of its contents to any person. If you have received this Email in error please notify the sender immediately and delete this Email from your system.

Opinions, conclusions and other information in this message that do not relate to the official business of Scottish Water ("SW"), Scottish Water Horizons Ltd ("SWH"), Scottish Water International Ltd ("SWI") or Scottish Water Solutions 2 Ltd ("SWS2") shall be understood as neither given nor endorsed by them. The contents of Emails sent and received by SW, SWH, SWI and SWS2 are monitored.

WARNING: Although SW, SWH, SWI and SWS2 have taken reasonable precautions to ensure no viruses or other malicious software are present, SW, SWH, SWI and SWS2 cannot accept responsibility for any loss or damage arising from the use of this Email or attachments however caused. The recipient should therefore check this Email and any attachments for the presence of viruses or other malicious software.

Scottish Water

www.scottishwater.co.uk

25th November 2016

Ove Arup & Partners Scotland
1 West Regent Street
Glasgow
G2 1RW



SCOTTISH WATER

Development Operations
The Bridge
Buchanan Gate Business Park
Cumbernauld Road
Stepps
Glasgow
G33 6FB

Development Operations
Freephone Number - 0800 3890379
E-Mail – developmentoperations@scottishwater.co.uk
www.scottishwater.co.uk

Dear Ms Forsyth

**DD4 Dundee Forties Road Site At Baldovie Endus est
Pre Development Enquiry Application
Our Ref: 737814**

Please quote our reference in all future correspondence

Thank you for your application. This has now been logged on our system and allocated the above reference number. Please quote this reference number in all future correspondence.

What happens next?

A member of our team will be assigned to review your application and will be in touch with you in the next 14 days.

This review will include a capacity check and an assessment of your proposal. **If no further information is required you will then receive a formal technical audit and quotation.**

If you have any queries please contact us using the above details or visit our website www.scottishwater.co.uk/Business/Connections

Yours sincerely

Steven Carson
Administrator
Development Operations

From: Amy.Methven@SCOTTISHWATER.CO.UK
Sent: 05 December 2016 12:47
To: Rhea Forsyth
Subject: 737814 Dundee Forties Road Site At Baldovie Endus est
Attachments: 737814_Rhea Forsyth_AX3 ND Capacity Available_F&P or DIA required_Applicant_12-39-44.pdf

Afternoon,

Please see attached capacity response.

Kind Regards

Amy Methven

Privileged/Confidential information may be contained in this Email and any files transmitted with it. If you are not the intended recipient you should not retain, copy or use this Email for any purpose or disclose all or part of its contents to any person. If you have received this Email in error please notify the sender immediately and delete this Email from your system.

Opinions, conclusions and other information in this message that do not relate to the official business of Scottish Water ("SW"), Scottish Water Horizons Ltd ("SWH"), Scottish Water International Ltd ("SWI") or Scottish Water Solutions 2 Ltd ("SWS2") shall be understood as neither given nor endorsed by them. The contents of Emails sent and received by SW, SWH, SWI and SWS2 are monitored.

WARNING: Although SW, SWH, SWI and SWS2 have taken reasonable precautions to ensure no viruses or other malicious software are present, SW, SWH, SWI and SWS2 cannot accept responsibility for any loss or damage arising from the use of this Email or attachments however caused. The recipient should therefore check this Email and any attachments for the presence of viruses or other malicious software.

Scottish Water

www.scottishwater.co.uk

5th December 2016

Ove Arup & Partners Scotland
1 West Regent Street
Glasgow
G2 1RW



SCOTTISH WATER

Development Operations
The Bridge
Buchanan Gate Business Park
Cumbernauld Road
Stepps
Glasgow
G33 6FB

Department: 0800 389 0379
Department Mailbox:
developmentoperations@scottishwater.co.uk

www.scottishwater.co.uk

Dear Rhea Forsyth

**DD4 Dundee Forties Road Site At Baldovie Endus est
Development Enquiry Application
Our Ref: 737814**

Please quote our reference in all future correspondence

Thank you for your application regarding the above proposed development.

Following an assessment of our assets I can now confirm that at this time:

Water: There is currently sufficient capacity in the **Clatto Water Treatment Works** to service the demands from your development.

However, a flow and pressure test is required to be able to assess if this development can be served without causing a detriment to existing Scottish Water customers.

Wastewater: There is sufficient capacity in the **Hatton Waste Water Treatment Works** to service the demands from your development.

The above waste water assessment is based on foul only connection; surface water should be managed onsite. If a SUDS outlet is necessary then this must be attenuated to 6.3 l/s to the nearest watercourse with the approval of SEPA and the local authority. Due to on-going issues within the exiting surface water sewer and Surface water policy Scottish Water cannot accept surface water discharge to our infrastructure.

Scottish Water is committed to assisting development in Scotland and has funding under our current investment period to upgrade our water and waste water treatment works however our regulations from the Scottish Executive for our current investment programme (2006-2014) state that should your development require Scottish Water networks to be upgraded this cost will have to be met by the developer.

If you wish Scottish Water to undertake Flow & Pressure testing, a quotation for these works can be provided on request.

It is important to note that Scottish Water is unable to reserve capacity and connections to the water & wastewater networks can only be granted on a first come first served basis. For this reason we may have to review our ability to serve the development on receipt of an application to connect.

I trust that the above is acceptable. If you have any questions, please do not hesitate to contact me directly to discuss._

Yours sincerely

Amy Methven
Technical Analyst
Tel: **07484085808/0800 389 0379**
Amy.Methven@scottishwater.co.uk

Appendix F

SUDS Simple Index Tool

Summary Table 1: Surface Water Runoff which goes to filter drain as first point of treatment

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type Pollution Hazard Level Pollution Hazard Indices TSS Metals Hydrocarbons	Waste handling/management/distribution site High 0.8 0.8 0.9	These indices should only be used if considered appropriate by the required risk assessment and where approved by the regulator. If they are not considered appropriate, the risk assessment should use alternative measures of pollution hazard for the site.	In Scotland and Northern Ireland, the environmental regulator should be consulted as part of the licensing process required for High Risk sites. In England and Wales, the environmental regulator should be consulted prior to design (for pre-permitting advice) to determine the most appropriate design approach and requirements for risk assessment.		
SuDS components proposed					
Component 1	Filter drain (where the trench is not designed as an infiltration component)	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Filter drains should be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events		
Component 2	Detention basin	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
Component 3	Detention basin	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
SuDS Pollution Mitigation Indices TSS Metals Hydrocarbons	 0.9 0.9 >0.95	 0.9 0.9			
Groundwater protection type Groundwater protection Pollution Mitigation Indices TSS Metals Hydrocarbons	None 0 0 0				
Combined Pollution Mitigation Indices TSS Metals Hydrocarbons Acceptability of Pollution Mitigation TSS Metals Hydrocarbons	 >0.95 Sufficient Sufficient Sufficient	0.9 Reference to local planning documents should also be made to 0.9 identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			


Summary Table 2: Surface Water Runoff which goes to Pervious Pavement as first point of treatment

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type Pollution Hazard Level Pollution Hazard Indices TSS Metals Hydrocarbons	Waste handling/management/distribution site High 0.8 0.8 0.9	These indices should only be used if considered appropriate by the required risk assessment and where approved by the regulator. If they are not considered appropriate, the risk assessment should use alternative measures of pollution hazard for the site.	In Scotland and Northern Ireland, the environmental regulator should be consulted as part of the licensing process required for High Risk sites. In England and Wales, the environmental regulator should be consulted prior to design (for pre-permitting advice) to determine the most appropriate design approach and requirements for risk assessment.		
SuDS components proposed					
Component 1	Pervious pavement (where the pavement is not designed as an infiltration component)	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
Component 2	Filter drain (where the trench is not designed as an infiltration component)	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Filter drains should be preceded by upstream component(s) that trap(s) silt, or designed specifically to retain sediment in a separate zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events		
Component 3	Detention basin	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
SuDS Pollution Mitigation Indices TSS Metals Hydrocarbons	>0.95 >0.95 >0.95				
Groundwater protection type Groundwater protection Pollution Mitigation Indices TSS Metals Hydrocarbons	None 0 0 0				
Combined Pollution Mitigation Indices TSS Metals Hydrocarbons Acceptability of Pollution Mitigation TSS Metals Hydrocarbons	>0.95 >0.95 >0.95 Sufficient Sufficient Sufficient	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			

Appendix G

Preliminary Quick Storage Estimate Calculations

1-in-2 Year Return Period

 Quick Storage Estimate

Variables

FEH Rainfall Cv (Summer)

Return Period (years) Cv (Winter)

Site Location Impermable Area (ha)

Maximum Allowable Discharge (l/s)

C (1km) D3 (1km)


D1 (1km) E (1km) Infiltration Coefficient (m/hr)

D2 (1km) F (1km) Safety Factor

Climate Change (%)

Analyse OK Cancel Help

Enter Area between 0.000 and 999.999

 Quick Storage Estimate

Results

Global Variables require approximate storage of between 159 m³ and 347 m³.

These values are estimates only and should not be used for design purposes.

Variables

Results

Design

Overview 2D

Overview 3D

Vt

Analyse OK Cancel Help

Enter Area between 0.000 and 999.999

1-in-5 Year Return Period

Quick Storage Estimate

Micro Drainage

Variables

FEH Rainfall

Return Period (years) 5

Site Location GB 344650 732750 NO 44650 3275

Cv (Summer) 0.750

Cv (Winter) 0.840

Impervious Area (ha) 0.982

Maximum Allowable Discharge (l/s) 5.3

C (1km) -0.015 D3 (1km) 0.279

D1 (1km) 0.473 E (1km) 0.245

D2 (1km) 0.426 F (1km) 2.112

Infiltration Coefficient (m/hr) 0.00000

Safety Factor 2.0

Climate Change (%) 20

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 173 m³ and 375 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0

1-in-30 Year Return Period (Discharge Rate = 5 Year Greenfield Runoff Rate)

Quick Storage Estimate

Micro Drainage

Variables

FEH Rainfall

Return Period (years)

Site Location
GB 344650 732750 NO 44650 327E

Cv (Summer)

Cv (Winter)

Impervious Area (ha)

Maximum Allowable Discharge (l/s)

C (1km) D3 (1km)

D1 (1km) E (1km)

D2 (1km) F (1km)

Infiltration Coefficient (m/hr)

Safety Factor

Climate Change (%)

Analyse OK Cancel Help

Enter Return Period between 1 and 1000

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 324 m³ and 635 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Safety Factor between 1.0 and 50.0

1-in-30 Year Return Period (Discharge Rate = 30 Year Greenfield Runoff Rate)

Quick Storage Estimate

Micro Drainage

Variables

FEH Rainfall

Return Period (years) 30

Site Location GB 344650 732750 NO 44650 327E

Cv (Summer) 0.750

Cv (Winter) 0.840

Impervious Area (ha) 0.982

Maximum Allowable Discharge (l/s) 8.3

C (1km) -0.015 D3 (1km) 0.279

D1 (1km) 0.473 E (1km) 0.245

D2 (1km) 0.426 F (1km) 2.112

Infiltration Coefficient (m/hr) 0.00000

Safety Factor 2.0

Climate Change (%) 20

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 246 m³ and 507 m³.


These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0

1-in-200 Year Return Period

Quick Storage Estimate



Variables

FEH Rainfall Cv (Summer)

Return Period (years) Cv (Winter)

Site Location Impervious Area (ha)

Maximum Allowable Discharge (l/s)

C (1km) D3 (1km)

D1 (1km) E (1km) Infiltration Coefficient (m/hr)


D2 (1km) F (1km) Safety Factor

Climate Change (%)

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0

Quick Storage Estimate



Results

Global Variables require approximate storage of between 366 m³ and 710 m³.

These values are estimates only and should not be used for design purposes.

Variables

Results

Design

Overview 2D

Overview 3D

Vt

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0