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Report Title:

PROPOSED COMMERCIAL REDEVELOPMENT FLOOD CONSEQUENCE ASSESSMENT AND DRAINAGE STRATEGY

Project:

THE CO-OPERATIVE, HIGH STREET, COEDPOETH. LL11 3UF

Client:

WILLIAMS SOUTHERN LIMITED (CONSTRUCTION).

Report Ref:

1436 - C300

Date:

MAY 2018

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REVISION RECORD Report ref: 1436					
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A	Initial Issue	2nd May2018	MQ	SJM	SJM

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1 EXECUTIVE SUMMARY

1.1 Summary

TRUE Consulting Engineers were commissioned by Williams Southern Ltd. (Construction) to undertake the Flood Consequence Assessment (FCA) in support of, and to accompany the planning application for the redevelopment of the Co-Operative Fuel Filling Station and associated retail area.

The site is 1514m² (0.15Ha) in area and is located at National Grid Reference SJ 28090 51445. The post code for the site is LL11 3UF.

The site is currently a developed site occupied by an existing fuel filling station and retail unit. The site is to be extended, taking in the adjoining detached dwelling, and redeveloped with a larger retail unit and amendments to the forecourt area to provide additional parking etc.

An aerial view of the site can be seen below in Figure 1.

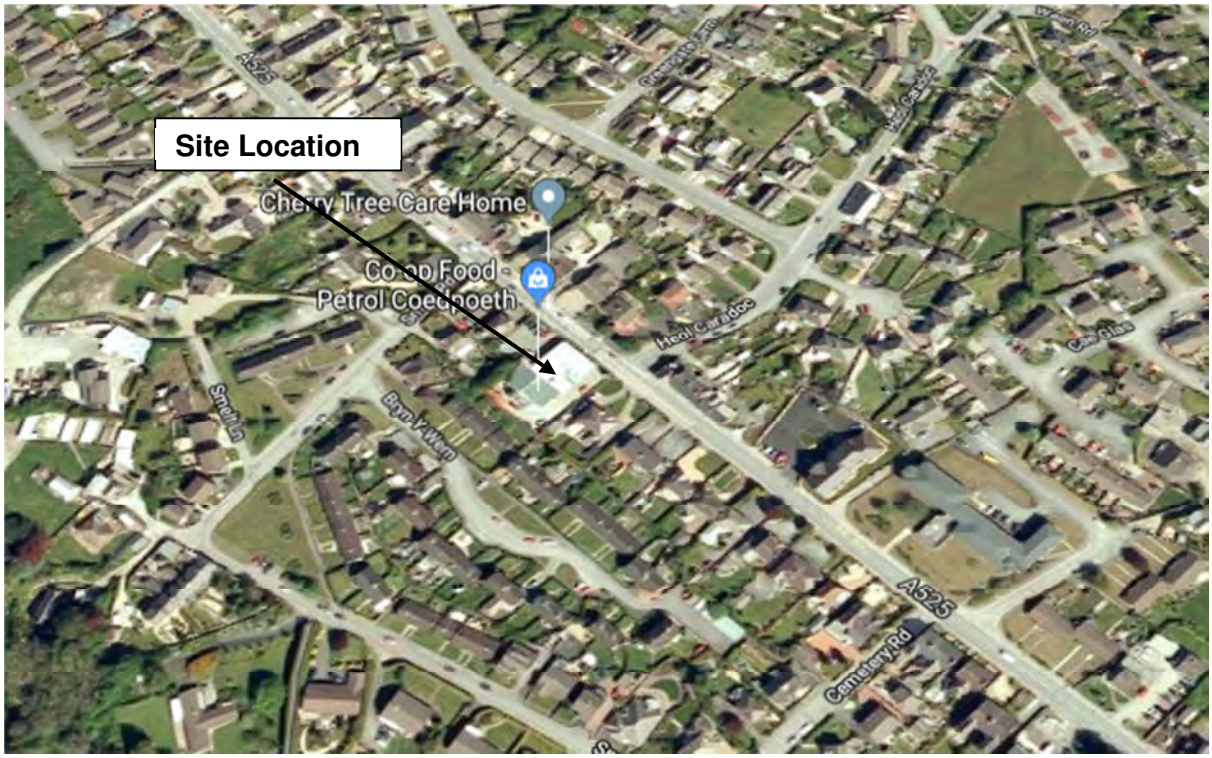

Figure 1: Aerial view of the site location

This report has been produced in accordance with, and addresses the relevant areas of the Welsh Government Planning Policy Wales and Technical Advice Note (TAN) 15.

Existing flood data produced by Natural Resources Wales, in the form of indicative flood risk maps, highlight areas potentially at risk of flooding for events of a 1% annual risk of flooding

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from rivers and 0.5% annual risk from tidal/coastal areas. Maps showing areas at risk of Surface Water flooding and Reservoir flooding are also available and have been used in this report assessment.

The report provides the principles for foul and surface water drainage management along with flood prevention.

Foul water drainage will discharge to the Welsh Water foul water sewer and Welsh Water have confirmed that there is adequate capacity within their network to take the discharge.

Storm water drainage from the site will be discharged to the local Welsh Water combined water sewer network at a controlled rate not exceeding 5L/s. These proposals have been accepted by Welsh Water.

1.2 The Requirements for a Flood Consequence Assessment

The purpose of this Flood Consequence Assessment and Drainage Philosophy is to examine any potential risks to the proposed development and to also establish if there will be any risks to existing flood defences and downstream flood areas. This report provides the principles for the foul and surface water drainage management along with flood prevention.

In the event that planning approval is granted, a detailed design of the surface and foul drainage systems will be undertaken. This document outlines the drainage strategy in dealing with surface water and foul water disposal from the proposed development. The layout is therefore subject to alteration during the detailed design stage, although once finalised, construction drawings will be submitted to the Local Drainage Authority for approval as required under any relevant planning conditions.

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2 SITE HISTORY

2.1 Introduction

The development site is a Brownfield site, which is currently occupied by an existing fuel filling station and retail unit.

2.2 Previous Report

No Flood Consequence Assessments are known to have been previously submitted in support of this proposed development.

2.3 Consultation

Pre-development discussions have taken place with Welsh Water and Natural Resources Wales in order to agree the principles for draining the proposed site.

Mapping of the Welsh Water sewer records has been obtained and discussions have taken place regarding the available spare capacity within their network locally.

Natural Resources Wales mapping showing areas at risk of flooding has also been obtained and is included within this report.

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3 EXISTING SITE CONDITIONS

3.1 Site Location

The site is located on the southern side of the A525 High Street, Coedpoeth, Wrexham.
The National Grid Reference for the site is SJ 28090 51445.
The post code for the site is LL11 3UF
The topographical survey of the existing site is shown at **Appendix A1**.

3.2 Existing Site Description

The site is currently 1514m² in area and is 97% impermeable.
Impermeable areas are made up of the forecourt, retail outlet, parking areas, the detached dwelling and its associated hard paved external areas.

The topographical survey of the existing site is attached at **Appendix A1.**

A drawing showing the Pre and Post development impermeable areas is shown in **Appendix A2.**

Onsite drainage investigations have identified that all storm water and foul water drainage from the site is discharged to the Welsh Water combined sewer network located to the northwest of the site, in the grounds of the detached dwelling which will be demolished to allow for the extension to the fuel refilling station and retail outlet.

A copy of the drainage records for the existing site is shown on the topographical survey attached at **Appendix A3.**

The site typically falls from the southwest to the northeast. High Street runs along the northern boundary of the site. Residential properties are located on all other sides of the development site.

3.3 Existing Geology/Hydrogeology

An intrusive Site Investigation was carried out by 'Subadra' in February 2017 in order to provide an understanding of the existing geology and hydrogeology of the site. Extracts from the Intrusive Site Investigation Report are attached at **Appendix B.**

The site was shown to consist of made ground to depths of 1.2m, overlaying Glacial Tilt from 1.2m to 2.5m below ground level. The Glacial Tilt was described as firm to stiff orange brown grey mottled clay with frequent fine gravel and this overlaid Pennine Lower Coal Measures, described as stiff to very stiff grey brown friable sandy clay or weak to moderately weak grey highly weathered Mudstone with occasional bands of black coal measures and sub angular grey gravel.

Groundwater strikes occurred between 1.7m and 4.0m below ground level in 3No of the bore holes. Resting groundwater was between 2.7m and 5.9m

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3.4 Hydrology

There are no watercourses in close proximity to the site. The nearest watercourses are the River Clywedog located approximately 230m to the west / southwest of the site, and a tributary of the River Gwenfro located approximately 400m to the north of the site.

3.5 Sources of Flooding

The Natural Resouces Wales flood maps shown in **Appendix C1** indicate the site lies within Flood Zone A and has a very low risk of flooding from either fluvial or tidal sources. This zone comprises of land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any one year (<0.1%).

The site is not considered to be at any risk of flooding from groundwater or public sewers and there is no known risk of flooding from reservoirs, mines, quarries or land drainage systems. Welsh Water have confirmed that they hold no records of sewer flooding on the site or in the vicinity of the site. Welsh Water correspondence is included in **Appendix E.**

The Lead Local Flood Authority have however provided historical records of flooding in the properties directly opposite the development site. This flooding is understood to be as a result of insufficient Highway Drainage. Details of this Flooding are included at **Appendix C2.**

Levels on the existing site are relatively level and tie in with the back of footway levels on High Street. High Street is constructed on a longitudinal curve with the crown of the vertical curve immediately outside the site. Levels therefore fall very nominally on High Street in both the northwest and southeast. Any exceedance event flood flows from the site would eventually flow onto High Street which would act as a conduit carrying flows within the highway to both the northwest and southeast directions. This route for exceedance flood flows will be retained in the detailed design for the proposed development.

3.6 Existing Flood Alleviation Measures

The site is not known to benefit from existing flood alleviation measures.

3.7 Existing Run Off

All storm water drainage from the site is discharged to the local sewer network at an uncontrolled rate.

3.8 Existing Run Off from Exceedance Events

The site is almost completely impermeable and positively drained. During exceedance events, any overland flood flows will be to the front of the site and out onto High Street.

High Street is a typical road construction with channel lines constructed using standard kerbs and road gullies. The road would act as a conduit carrying flood flows within the

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highway towards both the northwest and the south east as the forecourt is located on a crest in High Street.

4 FUTURE PROPOSAL AND FLOOD RISKS

4.1 Future Development Proposals

The current proposals are for the existing site to be redeveloped with a larger retail unit and amendments to the forecourt area to provide additional parking.

The site which is 1514m^2 in area is currently 97% impermeable with impermeable areas totalling 1465m^2. The new development will provide some small permeable landscaped areas resulting in the new developed site being 93% impermeable and therefore reducing the overall surface water drainage discharge from the site.

A drawing showing the existing and proposed impermeable areas for the site is attached at **Appendix A2**.

The proposed development will require a surface water drainage strategy that meets the approval of the Lead Local Flood Authority and, if required, Natural Resources Wales (in their capacity as a Consultee in the Planning Application process). We have reviewed options for achieving such a strategy as follows:

The Building Regulations 2010, Part H provides a hierarchal approach to the disposal of rainwater with the preferred options to discharge to an adequate soakaway or other infiltration system. If this is not possible, the next favoured option is to discharge to a watercourse. Only, if neither of these options is possible, should the site discharge to a sewer. We have briefly assessed each of these options as follows:-

4.2 Infiltration Drainage

BRE 365 Percolation testing was carried out on site on 5th April 2018

2No in-situ permeability tests were undertaken within trail pits, excavated to a depth of 2.5m, in order to establish the permeability of the sub soils. Neither of the percolation tests drained sufficiently to allow an infiltration rate to be calculated in accordance with BRE 365. Infiltration based drainage design is therefore not feasible on the site. A copy of the soakaway testing report is included in **Appendix D.**

No further testing could be carried out on the site due to there being insufficient room as a result of the proposed development and the adjoining properties and public highway.

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4.3 Discharge to a Watercourse

There are no watercourses in close proximity to the site and so this option has not been considered any further.

4.4 Discharge to Existing Surface Water Sewer or Highway Storm water drain

There are no Welsh Water storm water sewers in the vicinity of the site and therefore this option cannot be considered any further.

Enquiries were made to establish the location and possible available capacity of any local Highway storm water drains. Despite best endeavours, no information could be obtained from the Highways Dept. However, the LLFA were able to provide evidence of storm water flooding which was as a result of insufficient highway drainage in the area. This option has therefore not been considered any further. **See Appendix C2.**

4.5 Discharge to the Combined Sewer Network.

A drainage survey of the existing developed site demonstrates that all storm water drainage is currently discharged to the local Welsh Water Combined sewer network. **See Appendix A3.**

A copy of the Welsh Water sewer records and correspondence is attached in **Appendix E**.

4.6 Proposals

We fully support the role of Sustainable Drainage Systems in new developments.

Due to very low permeability of the sub soils and the proposed development being a very small infill site located in an existing built up area, an infiltration based drainage solution is not feasible. There are no open watercourses into which a storm water drainage discharge can be made. There are no local storm water sewers and the local Highway storm water drainage network has been shown to already be flooding as a result of insufficient capacity. The only option left available is to continue to positively drain the site to the Welsh Water combined sewer network.

Protracted discussions were held with Welsh Water who eventually confirmed that a continued discharge of storm water drainage from the site would be acceptable to them into their combined sewer network at a rate not exceeding 5L/s. This will offer significant betterment to the receiving sewer network. A copy of the Welsh Water correspondence is attached at **Appendix E**

These proposals were then discussed with the Lead Local Flood Authority and having looked at the site and considered the site restraints, they confirmed that the proposals would be acceptable in principle.

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It is therefore proposed to provide the new development with separate on site foul and storm water drainage networks, which will then combine at the site boundary and discharge to the Welsh Water combined sewer network.

Storm water drainage will be attenuated on site and flows off site restricted to a rate not exceeding 5L/s. A Quick Storage estimate has been carried out in Micro Drainage to establish the size of the attenuation volume required. A copy of these calculations is attached at **Appendix F**.

The intention will be to achieve the required attenuation and an offsite gravity discharge, but if necessary, the discharge may need to be pumped due to the level site. The calculations show that an attenuation tank constructed of crates with 95% voids would need to be 14m x 4m x 0.8m deep. This tank could be located below the car parking spaces located to the front of the retail unit.

The controlled discharge off site to the combined sewer will provide betterment to the receiving sewer network.

The demolition of the adjoining property will require the extinguishment of 3No adopted Welsh Water manholes and 2No lengths of combined sewer. A new drainage spur from the site will be constructed to connect to the remaining combined sewer network.

4.7 Exceedance

The proposed layout and detailed design will take into consideration the risk of exceedance events and overland sheet flow resulting from the failure of the storm water drainage network. The site will be engineered to accommodate overland flow routes to ensure that extreme event flood flows are conveyed through the site and directed away from buildings. As with the site pre development, the site is relatively level, but any overland flood flows will eventually fall out onto High Street. The road would act as a conduit carrying flood flows within the highway towards the northwest and southeast. There will be no additional risk to people or property as a result of this development as the new development will have a reduced impermeable area.

4.8 Vulnerability

Paragraph 5 within TAN 15, requires that all developments are located within their appropriate risk zones.

As a fuel filling station and retail outlet, this development is classified as a ‘Less Vulnerable Development’ located in Flood Zone A. This development meets with the requirements of the Guidance and therefore the Justification Test is not applicable.

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5 CLIMATE CHANGE

In accordance with Lead Local Flood Authority requirements, the drainage network for the proposed commercial development will be based on a 1 in 100 year Design Storm event + 30% in peak rainfall intensities to allow for climate change.

6 ACCESS AND EGRESS

The development site is located within Flood Zone A and is not at any identifiable risk of flooding. Access and Egress to the site is therefore not considered to be an issue.

7 SURFACE WATER MANAGEMENT

7.1 General Surface Water Management Plan

The proposed drainage strategy is to not increase the rate and volume of existing surface water runoff, in order to not increase the downstream flood risk. As discussed previously there will be betterment due to the reduction in impermeable areas and the restricted off site discharge to the combined sewer.

Surface water from the proposed development will be collected by rain water pipes from roofs, and gulley's with silt traps from the parking areas.

Trapped Gullies: Sediment sumps are to be installed on all rainwater down pipes; these will reduce flow velocities and allow larger particles to settle out, by gravitational separation.

Trapped Road Gullies: Sediment sumps are to be installed on all road gullies; these will reduce flow velocities and allow larger particles to settle out, by gravitational separation.

7.2 Construction Flood Risk Issues

To prevent flooding off site during the construction phase, it is proposed to investigate the excavation of catch pits and ditches in strategic locations. These will collect water and suspended sediments and allow the sediments to settle before the water is collected and transferred to a suitable point of discharge.

All facilities for storage of oils, fuels and other chemicals will be need to be stored within bunded areas that will have sufficient capacity of at least 10% greater than the maximum storage capacity.

Care will be taken when storing excavated materials from the construction site to prevent the possibility of pollution of watercourses, or silting of the sewer networks.

Prior to commencement of the works, the contractor will produce a method statement and agree it with the Planning Authority and Lead Local Flood Authority as required.

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7.3 Maintenance of the Proposed System

The new on site drainage network will remain private. It will remain the responsibility of the developer who will ensure the long term maintenance of the network, up to the point of connection with the Welsh Water sewer network.

In order to ensure that the drainage systems can operate throughout the lifetime of the development, it is important that there is regular maintenance of the system. This prevents issues such as blockages and ensures that the system continues to operate as designed.

The operation and maintenance requirements for an attenuation tank are attached at **Appendix G.** The flow control type and its maintenance requirements will be decided in the detailed design.

7.4 Residual Flood Risk Issues

The proposed drainage system will require maintenance, and a failure to have in place a programme of maintenance work could lead to a failure of the system. Guttering, RWPs, gulley's etc. should be routinely inspected and cleared when required to ensure efficient operation. Extreme storm events are beyond what it is reasonably practicable to design for. As such, this is a residual risk that cannot be designed out.

8 FOUL DRAINAGE

Foul water drainage from the proposed development will discharge via gravity to the Welsh Water foul water sewer.

Welsh Water have confirmed their existing foul sewer has sufficient capacity to accommodate the anticipated foul flows from the proposed development. See **Appendix E** for Welsh Water correspondence.

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9 CONCLUSIONS AND RECOMMENDATIONS

The site is within Flood Zone A, and has no identifiable risk of flooding.

This Flood Consequence Assessment (FCA) for the proposed development has been assessed in line with Planning Policy Wales and TAN 15. It is concluded that the development can be undertaken in a sustainable manner, without increasing the flood risk to existing properties.

Overland flood flow routes have been considered and it is not considered that the proposed development will put any additional risk onto third parties. Should there be an exceedance storm event or failure in the storm water drainage network, the site will be designed to ensure that water is carried away from the proposed building whilst ensuring that surrounding buildings are also not put at additional risk.

This Flood Consequence Assessment has shown that the proposed development would not create any increase in flood risk to the local area or downstream or indeed to the proposed development. The reduction in impermeable areas and controlled surface water drainage discharge to the combined sewer network will reduce the run off from the site and provide betterment to the receiving sewer network.

It is proposed that further detailed drawings will be produced once the main principals which underpin the strategy have been agreed by relevant stakeholders.

In conclusion, the development should not lead to an increased risk of either on site or offsite flooding, provided that development proceeds in line with the recommended mitigation measures within this report.

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APPENDIX A

Drawings

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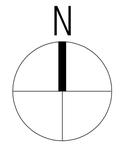
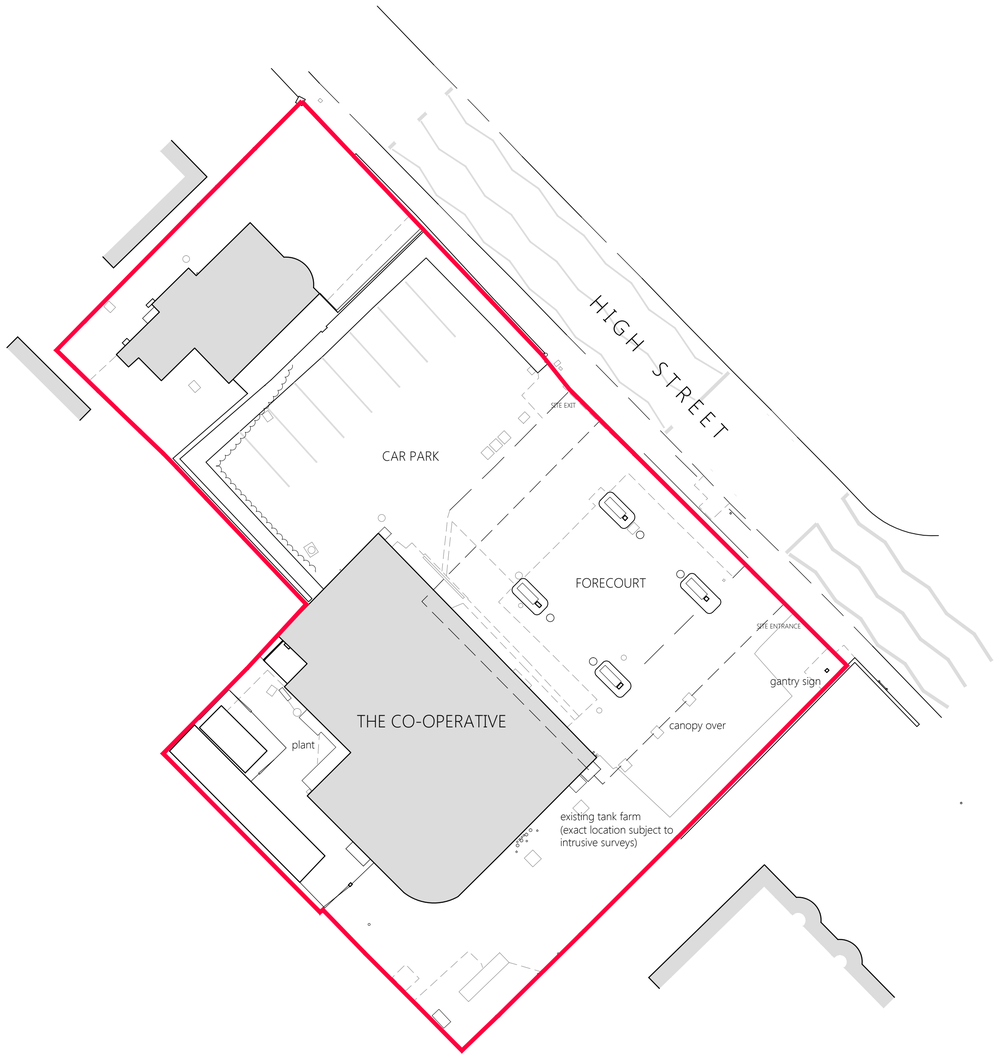
APPENDIX A1

EXISTING SITE
And
PROPOSED SITE





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Project
THE CO-OPERATIVE, HIGH STREET
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Drawing title
PLANNING APPLICATION -
EXISTING SITE PLAN

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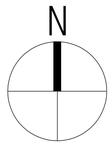

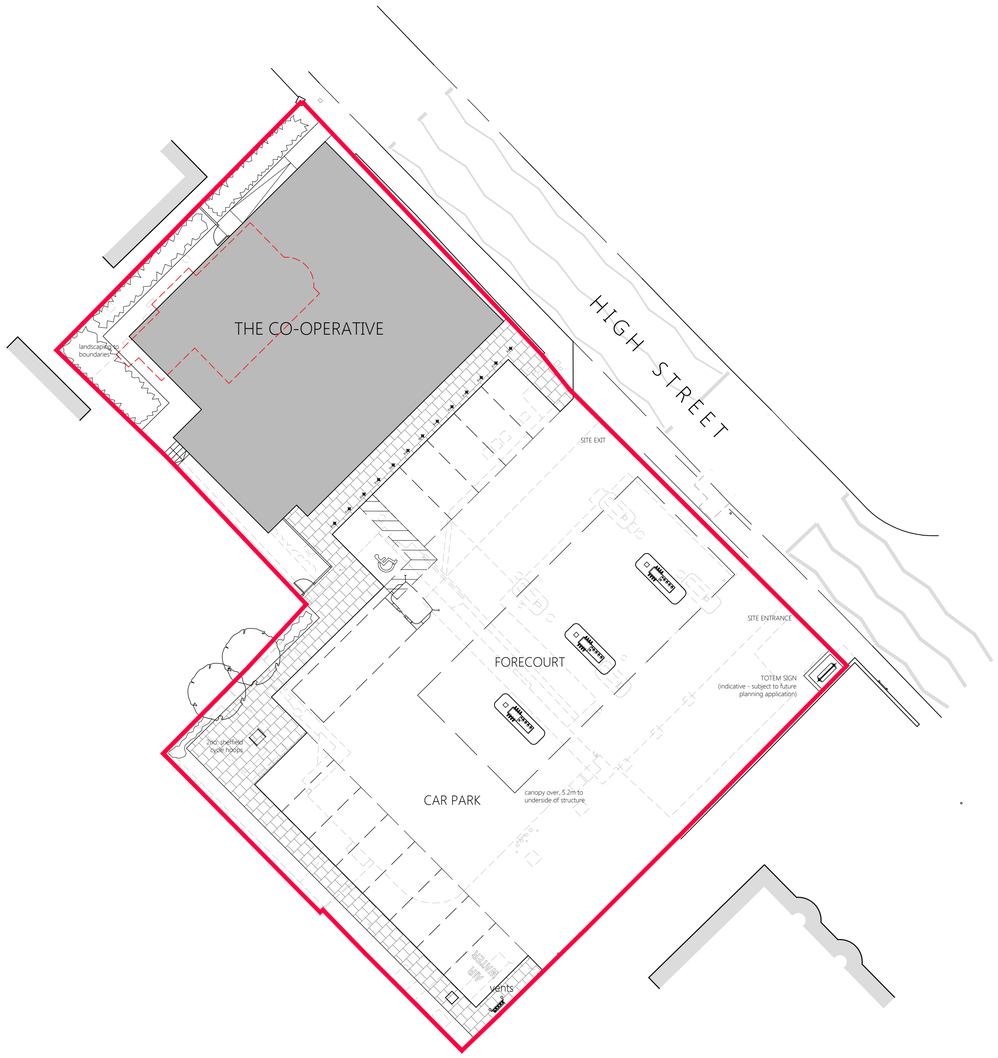

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Client **THE CO-OPERATIVE ESTATES**	Drawing title PLANNING APPLICATION - PROPOSED SITE PLAN DRAFT	Scale 1:200@A1	Drawn BP Checked PJH
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APPENDIX A2

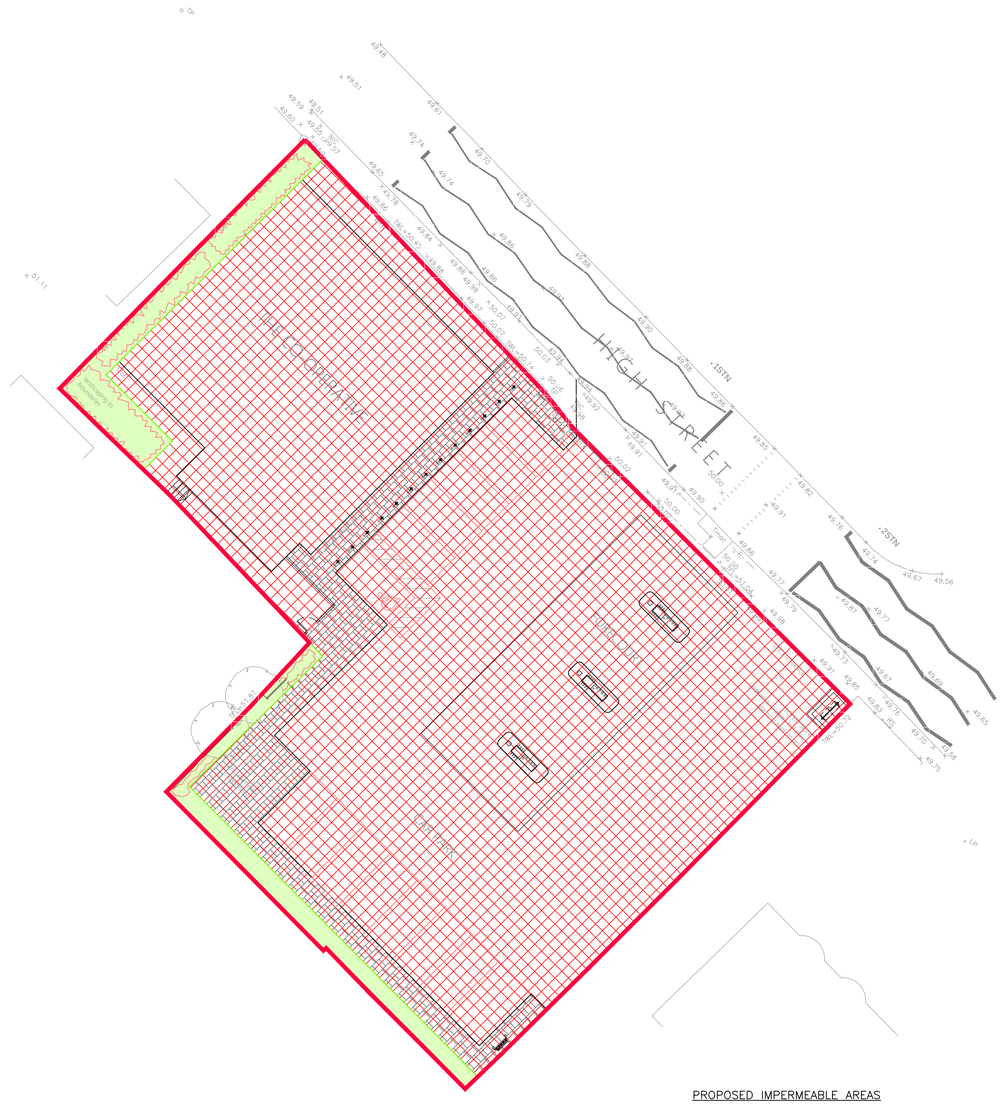
PRE AND POST DEVELOPMENT IMPERMEABLE AREAS

EXISTING IMPERMEABLE AREAS

TOTAL SITE AREA = 1514m²

EXISTING IMPERMEABLE AREAS = 1465m² (97%)

PROPOSED PERMEABLE AREAS = 49m² (3%)



PROPOSED IMPERMEABLE AREAS

TOTAL SITE AREA = 1514m²

PROPOSED IMPERMEABLE AREAS = 1412m² (93%)

PROPOSED PERMEABLE AREAS = 102m² (7%)

PRELIMINARY ISSUE

NOTES

- All rights described in chapter IV of the copyright, designs and patents act 1988 have been generally asserted
- Where any drawing is to be read in conjunction with another, including specialists, the two drawings shall be cross-checked and any descrepancies reported to the structural engineer before the work is put in hand
- This drawing is to read in conjunction with all relevant architects ,M&E services and engineers drawings and specifications
- All dimensions are in millimeters, all levels are in metres, unless shown otherwise
- Any discrepancies in dimensions or details on or between these drawings/specifications should be drawn to the attention of the structural engineer in writing for clarification
- Drawing prepared solely for the use of client, as detailed in text box, and is not to be copied, lent or used by any third party without written permission

SETTING OUT TO ARCHITECT'S DRAWINGS.

DO NOT SCALE FROM THIS DRAWING. ALL DETAILS AND DIMENSIONS ARE TO BE CHECKED BY THE CONTRACTOR/FABRICATOR PRIOR TO COMMENCEMENT OF CONSTRUCTION/FABRICATION. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER.

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

THE CONTRACTOR IS TO MAINTAIN STABILITY OF ALL EXCAVATIONS, DETAIL, SUPPLY AND FIX ALL TEMPORARY SUPPORTS TO MAINTAIN VERTICAL AND HORIZONTAL STABILITY OF THE EXCAVATION AND ADJACENT STRUCTURES FOR THE DURATION OF THE WORKS

Mark	Date	By	Chk'd	Revision Notes
P1	04/04/18	JAT	DJS	PRELIMINARY ISSUE

Client
WILLIAM SOUTHERN LTD

Project Title
CO-OP COEDPOETH

Drawing Title
EXISTING AND PROPOSED IMPERMEABLE AREAS

Ringslade House
Broadway Road
Newton Abbot
TQ12 3EH
Tel: 01626 572 672
admin@trueconsultant.co.uk
www.trueconsultant.co.uk
TRUE Consulting Engineers
Specialist advisors in innovative solutions

Scales 1:200 at A1
Drn. JAT | Chkd. DJS | Appd. SJM | Date. APRIL-2018

Job No. 1436 | Drawing No. C-GA-105 | Rev. P1

TRUE-SHEET A1 09.15

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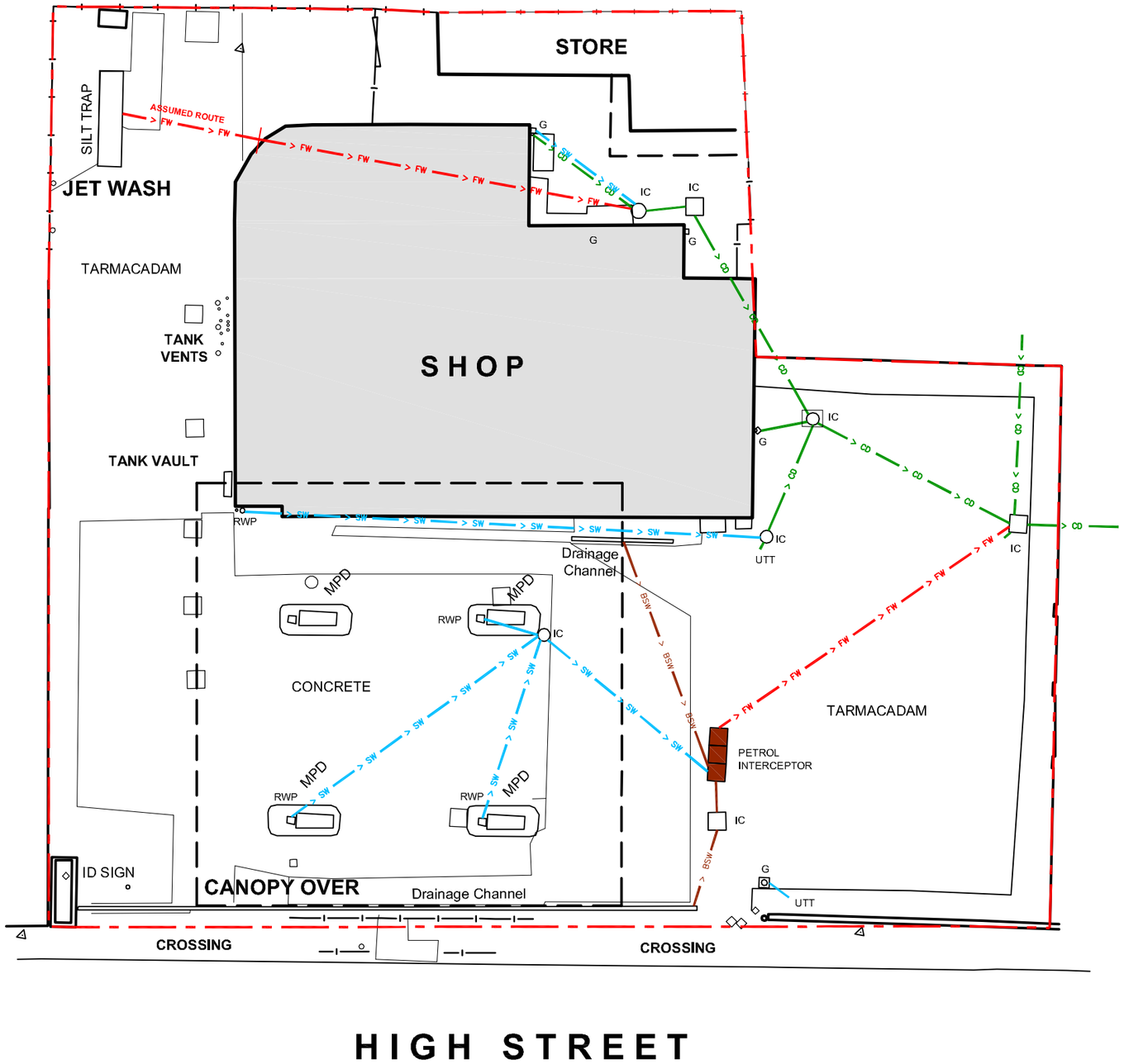
APPENDIX A3

EXISTING SITE DRAINAGE



GENERAL NOTES

Do not scale off this drawing.

Layout has been prepared from Met Geo Environmental topographical & subscan survey 13016-150 dated November 2015.

LEGEND

> SW > SW	Surface Water Drain
> SW	Surface Water Sewer
> BSW > BSW	Brown Surface Water Drain
> FW > FW	Foul Water Drain
> FW	Foul Water Sewer
> CD	Combined Sewer

SITE DRAINAGE

The site has a combined gravity outfall, outfalling through the neighbouring private property.

There is also a combined drain entering the property from the south west.

Rev	Date	Comments
STATUS		RECORD DRAWING
SITE LOCATION		CO-OP PFS COEDPOETH High Street, Wrexham Clwyd, LL11 3UF
TITLE		POLLUTION PREVENTION GUIDELINES INCIDENT RESPONSE PLANNING - PPG21

The co-operative

JENNINGS DESIGN LIMITED
York House, Valley Court, Canal Road,
Bradford, West Yorkshire, BD1 4SP.
TEL. No. 01274 395422
FAX. No. 01274 395427
E-mail office@jen305.com

Drawn by:	MB	Checked by:	PS
Date:	December '15	Scales:	1:200 @ A3
PLAN NO.	151210-PPG21		

0 5 10
SCALE - METRES

A3
ORIGINAL PLOT SIZE

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APPENDIX B

Intrusive Site Investigation Report Extracts

SUBADRA

Environmental - Geotechnical - Laboratory - Foundations

Unit 13, Triangle Business Park
Wendover Road, Stoke Mandeville
Bucks HP22 5BL
Tel. 01296 739400
Fax. 01296 739401
e-mail: consultants@subadra.com
www.subadra.com

ENVIRONMENTAL ASSESSMENT REPORT

Petrol Coedpoeth,
High Street, Coedpoeth, Wrexham

Report No: CP17129 CL 001

March 2017

Client: The Co-Operative Group Ltd

Report Prepared By:

Greg Ross

Report Reviewed By:

James Skinner

Environmental Investigation – Summary			
Sitework Completed			
Date investigation completed:	6th – 7th February 2017	No. boreholes constructed / maximum depth drilled	5 / 7.2m
Date of groundwater monitoring visit:	14th February 2017	No. monitoring wells installed / maximum depth	3 / 7.2m
Site Sensitivity (based on desk-top information)			
Geology and Hydrogeology	No superficial deposits identified		
	Pennine Lower Coal Measures	Secondary (Class A) Aquifer	
Source Protection Zone:	No	Nearest Surface Water:	River Clywedog 230m SW

Encountered Hydrogeology/Geology				
Groundwater	Strike between 1.7 and 4.0m / Resting between 2.7 and 5.9m. Not continuous across site - groundwater encountered in three boreholes only.			
Soil Stratigraphy	Geological Unit	From	To	Description
	Made Ground	0.0	~1.2	SOFT to FIRM dark brown or black gravelly CLAY OR MEDIUM DENSE brown clayey GRAVEL with occasional large brick fragments.
	Glacial Till	~1.2	~2.5	FIRM to STIFF orange brown grey mottled CLAY with frequent fine gravel
	Pennine Lower Coal Measures	~2.5	>6.0	STIFF to VERY STIFF grey brown friable sandy CLAY OR WEAK to MODERATELY WEAK grey highly weathered MUDSTONE with occasional bands of black coal measures and sub-angular grey gravel.

Results of Environmental Investigation	
Environmental Assessment – Summary of Conclusions:	➢ We have identified low concentrations of petrol range hydrocarbons in shallow Made Ground and underlying shallow soils in BH3. Low concentrations of waste oil range hydrocarbons were identified in a single soil sample from BH4. We detected trace concentrations of various PAH compounds in soil samples obtained from BH2 and BH4. ➢ Elevated concentrations of lead were identified in underlying shallow Made Ground recovered from BH1, BH2, BH4 and BH5. Elevated concentrations of zinc were also reported from BH2 and BH4. ➢ Elevated concentrations of hydrocarbons, generally consistent with waste oil and possibly weathered diesel, were identified in the groundwater sample collected from BH4. No detectable hydrocarbons were identified in the other groundwater samples obtained (BH5 and MW1). ➢ The results of our Generic Quantitative Risk Assessment indicates that the concentrations of hydrocarbons identified in underlying soils and groundwater do not pose a potential long-term risk to future commercial site users. We do not consider offsite residential or environmental receptors to be at significant risk as we have not identified an active migration pathway from the site. On this basis, we consider the site to be suitable for continued commercial use.

Please refer to our report for our conclusions and recommendations in full.
Your attention is drawn to the Notice to Interested Parties included as Attachment One.

Site Investigation - Summary of Recommendations for Redevelopment Works		
Temporary works - slope stability	Foundation excavations likely to be formed within:	Granular Made Ground / Glacial Till (clay) / Coal Measures (clay / mudstone)
	Likely to remain stable for short periods without support or being battered back	Yes
	Note: We recommend that a detailed inspection of the side slopes be carried out in order to assess fully any support measures required.	
	We encountered weathered bedrock (Lower Pennine Coal Measures units) from around between 0.9m and 2.5m depths under the site. We were able to construct a borehole to a maximum depth of 7.2m using direct-push drilling methods. We consider driven sheet piles are likely to penetrate the underlying soils to sufficient depth to form a support measure for the tank farm excavation, although localised mudstone horizons could be present. Consideration of alternative support measures is recommended.	
Temporary works - De-watering	Anticipated depth to standing groundwater	Variable - ~2.5m - ~5m. Not continuous across site.
	Anticipated permeability	Low
	Dewatering likely to be required?	Possible - below ~3m
	Waste water likely to be impacted with hydrocarbons?	Possibly - impacted groundwater in BH4 only.
Disposal of Excavated Spoil	Soil / leachate samples analysed for compounds within Subadra Waste Acceptance Criteria Suite?	No
	Excavated soils from the site are likely to be classified as?	Non-Haz to Hazardous
	Note: We recommend that we classify all potentially impacted soils prior to disposal. All waste soils and fill must be disposed of at an appropriately licensed disposal site. We have not completed a detailed assessment of underlying Made Ground for the presence of asbestos containing materials although we have not identified detectable asbestos the samples we have submitted for asbestos screening.	
Additional Comments/Recommendations		
Additional comments regarding re-development works:	As with any petrol filling station, additional areas of hydrocarbon impacted soil may be encountered during redevelopment works. In particular these include areas we have been unable to investigate due to the restrictions of working on an operational filling station (i.e. site buildings, petroleum installation and services). We therefore recommend that verification sampling of excavations be undertaken during the site demolition and decommissioning works to confirm no additional contamination is present. The site has been a filling station and garage for several decades. It is therefore The site has been a garage / petrol station since at least the 1960s and we understand that the current petroleum installation dates from before 1988. Given the age of the site we consider it is possible that there could be further abandoned tanks remaining under the forecourt.	
Please refer to our report for our recommendations in full. Your attention is drawn to the Notice to Interested Parties included as Attachment One.		

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APPENDIX C1

Natural Resources Wales - Flood Maps

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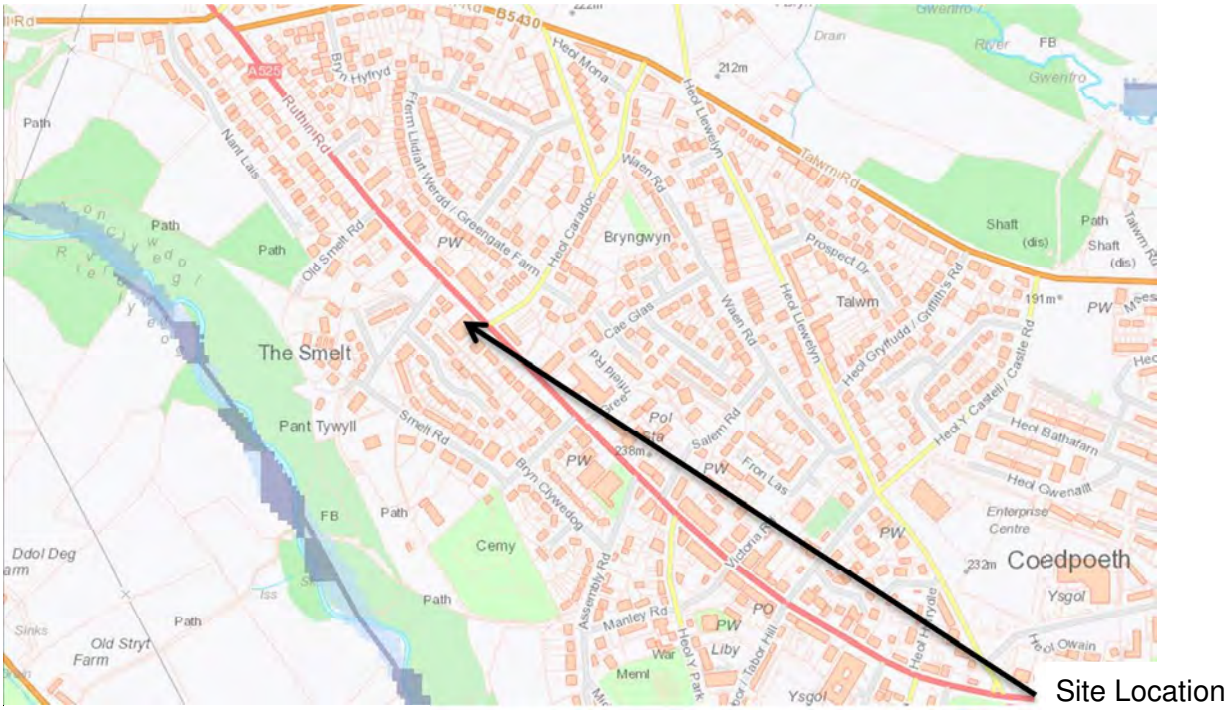
APPENDIX C1 (Maps Obtained 20/03/18)



FLUVIAL FLOODING – NO RISK

PLUVIAL FLOODING – NO RISK

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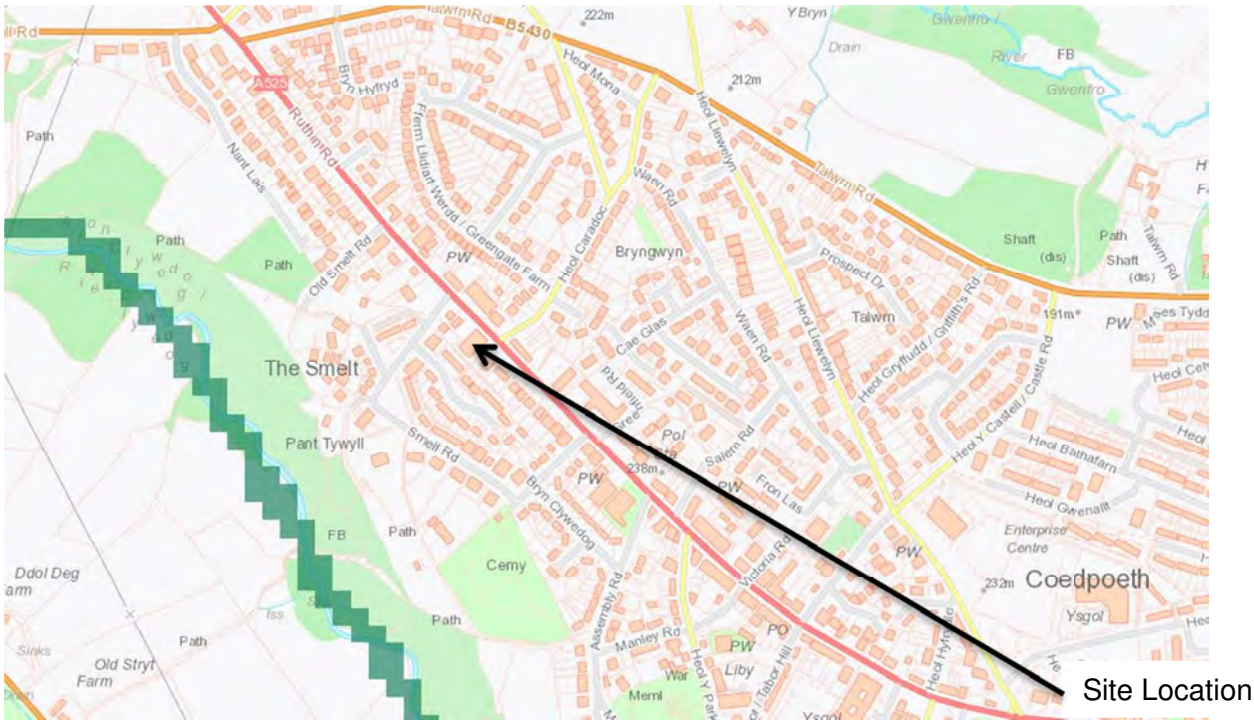
APPENDIX C1 Cont. (Maps Obtained 20/03/18)



RESERVOIR FLOODING – NO RISK

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APPENDIX C2

LLFA – History of Flooding

Mike Quigley

From: Mike Quigley <mike.quigley@trueconsultant.co.uk>
Sent: Thursday, April 19, 2018 12:33 PM
To: steve.morrell@trueconsultant.co.uk; ben.miller@williamsbuild.com
Subject: FW: Proposed forecourt redevelopment - CO-OP High Street Coedpoeth
Attachments: Garage High Street Coedpoeth.pdf

From: Carole Wright [mailto:Carole.Wright@wrexham.gov.uk]
Sent: Thursday, April 19, 2018 12:19 PM
To: Mike Quigley
Subject: RE: Proposed forecourt redevelopment - CO-OP High Street Coedpoeth

Hi Mike

As discussed, please find attached a map of the Co-op site on High Street. I hope this helps. The flooded properties in question are indicated with the stars and were reported in Feb 2016, however I am certain that there has been more recent incidents. With regard to the email below, I will speak with Kevin when I next see him.

Kind regards

Carole Wright

Carole Wright - BA MBCS
Technical Flood Support Officer - Swyddog Technegol Cefnogi Llifogydd

01978 729735
Wrexham County Borough Council, Environment and Planning Department Abbey Road South Wrexham Industrial Estate Wrexham LL13 9PW
Cyngor Bwrdeistref Sirol Wrecsam, Amgylchedd a Chynllunio De Ffordd yr Abaty Ystâd Ddiwydiannol Wrecsam Wrecsam LL13 9PW
wrexham.gov.uk | wrecsam.gov.uk
twitter.com/wrexhamcbc | twitter.com/cbswrecsam
facebook.com/wrexhamcouncil | facebook.com/cyngorwrecsam

From: Mike Quigley [mailto:mike.quigley@trueconsultant.co.uk]
Sent: 13 April 2018 10:33
To: Carole Wright; Kevin Edwards
Cc: steve.morrell@trueconsultant.co.uk; ben.miller@williamsbuild.com
Subject: FW: Proposed forecourt redevelopment - CO-OP High Street Coedpoeth
Importance: High

Carole / Kevin

I have recently been in correspondence with Neil regarding the above mentioned forecourt and retail outlet redevelopment.
I have just received a long term out of office response with your details provided.
I would be grateful if you could review the e-mail below and provide the necessary contact.

Many Thanks

Regards,
Mike

From: Mike Quigley [mailto:mike.quigley@trueconsultant.co.uk]
Sent: Friday, April 13, 2018 10:03 AM
To: 'neil.taunt@wrexham.gov.uk'
Cc: steve.morrell@trueconsultant.co.uk; ben.miller@williamsbuild.com
Subject: Proposed forecourt redevelopment - CO-OP High Street Coedpoeth
Importance: High

Neil,

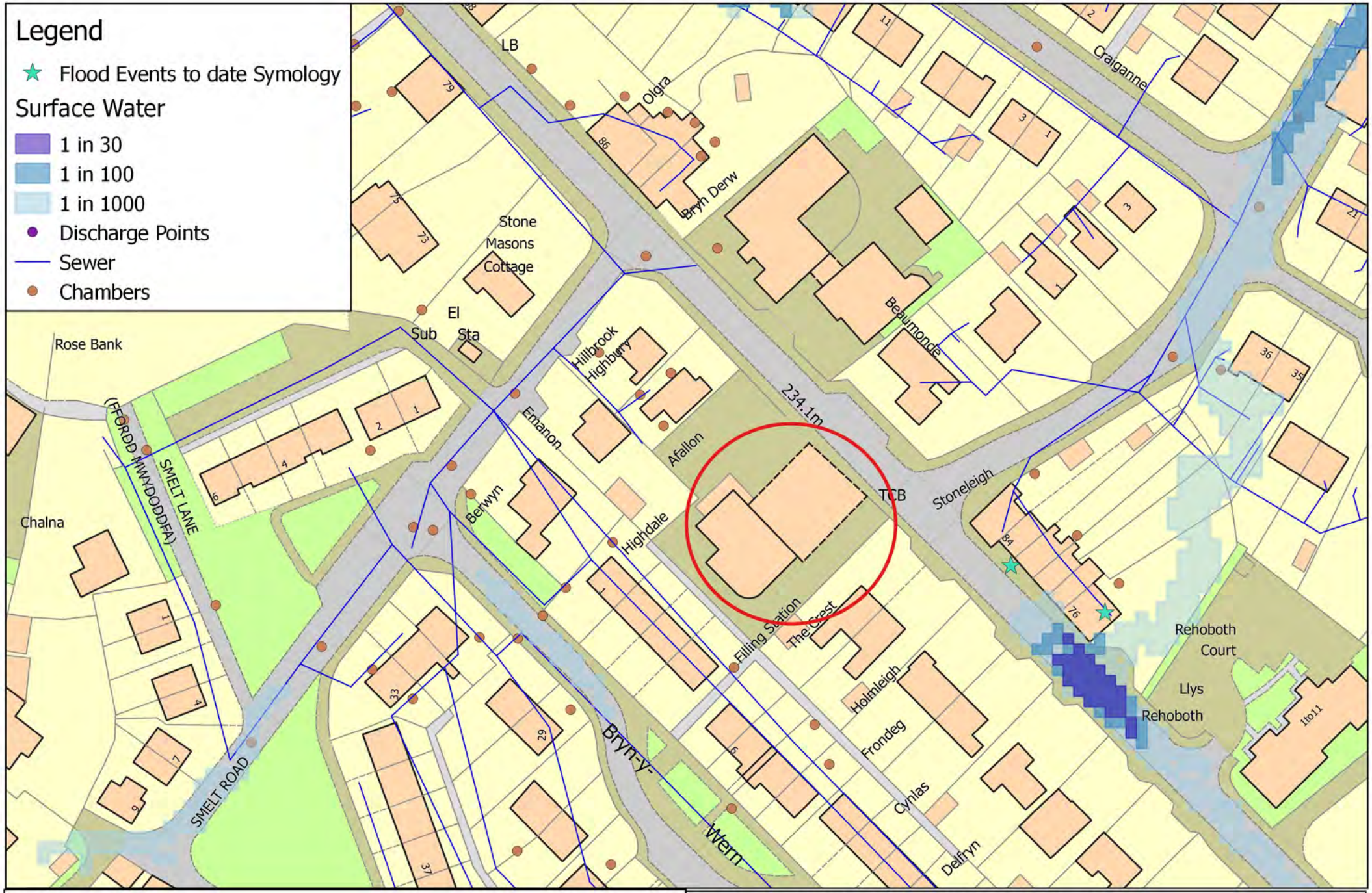
We spoke recently regarding the proposed development of the forecourt and retail unit at the above site
As discussed the existing site discharges all storm water and foul water drainage to the Welsh Water Combined sewer network.
Infiltration tests on site showed that the ground is impermeable and the water level did not drop. Therefore infiltration based drainage techniques on site will not be feasible.
There are no storm water sewers in the area and no local watercourses.
In seeking a consent to discharge the storm water drainage from the new site, Welsh Water have responded stating that we must exhaust all other options before they will allow a discharge to their sewer, and have asked us to consider discharging to a highway drain. Evidence must be obtained and submitted to Welsh Water to demonstrate we have exhausted all other options.

We are in Devon and have no local contacts.
Our experience of other Highway Authorities is that their drainage records are very poor and it is extremely unlikely that they will ever accept private storm water drainage discharges into their network.
We are hopeful that this will not be the case in Wrexham.
Can you please advise who would be the best person to speak with in your local Highways Dept. who would have access to highway drainage records and with whom we could discuss the possible connection of our site to their network.

Your earliest attention would be greatly appreciated.

Regards,
Mike

Mike Quigley
Drainage Highway Engineer



High Street Coedpoeth

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APPENDIX D

Percolation Testing Report

SUBADRA
Environmental - Geotechnical - Laboratory - Foundations
13 Triangle Business Park, Stoke Mandeville, HP22 5BL
Tel: 01296 739400 Email: consultants@subadra.com

Matthew Easterbrook
Williams Southern Ltd
Southern House
Eagle Close
Plymouth
PL7 5HZ

Ref: CP17129 CL 002
Date: 16th April 2018

Dear Matthew

Soakaway Test Report - Petrol Coedpoeth, Coedpoeth

You recently instructed us to undertake soakaway testing at Petrol Coedpoeth in Coedpoeth. This letter documents the works we undertook and the results from our testing.

Soakaway Details and Test Methodology

We attended site on 5th April 2018 to complete soakaway testing.You were responsible for identifying below ground services and locating suitable locations for excavating test pits based on the proposed test pit location plan issued by yourself prior to our attending site.

The two test pits you requested were excavated as close to your proposed locations as possible, however we were unable to gain machinery access to the rear of the property. Subsequently both test pits were located at the front of the property. A test pit location plan is provided as Attachment Two.

Your operatives excavated two test pits (denoted TP1 to TP2) to 2.5m deep using an 8 tonne excavator. No groundwater was encountered in either of the test pits.

We filled the test pits with water and began monitoring the water levels. We recorded water levels within the pit until they reached a depth equivalent to less than 25% of the original effective storage volume, or the end of the working day (whichever came soonest). Tests are required to be completed three times to be compliant with Building Research Establishment 365 however based on the low infiltration rates we observed on the first day, you instructed us to abandon testing before the first fills had been completed.

Test Pit Geological Summary:

The geology we encountered in each test pit was logged in accordance with British Standard 5930. Full test pit logs are included in Attachment Two and are summarised in the following table

	Layer	Unit	Description
Geology Encountered	Layer I	Made Ground	Tarmac hardstanding overlying soft to firm light brown sandy (reworked) clay.
	Layer II	Glacial Till	Firm to stiff light brown becoming dark brown sandy clay.

Continued on the following page

Continued from the previous page

Geology Encountered	Depth to Base of Layer		
		TP1	TP2
	Layer I	0.8	0.8
	Layer II	>2.5	>2.5
Groundwater Strike?		None encountered	None encountered

All dimensions in meters below ground level

Table One: Soil Lithology

The results of our soakaway testing is summarised in Table Two below.

Location	Test Pit Dimension L x W x D (m)	Soil Infiltration Rate (m/sec)		
		First Fill	Second Fill	Third Fill
TP1	2.0 x 0.6 x 2.5	$<10^{-7}$	-	-
TP2	2.0 x 0.6 x 2.5	$<10^{-7}$	-	-

Table Two: Soakaway Test Results

We recorded very little fall in the water level across all the test pits over a three hour period. Although we have insufficient data to extrapolate reliably, our data indicates the permeability is likely to be less than 10^{-7}m/sec.

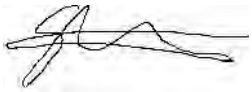
Discussion:

We have carried out two soakaway tests. The test pits were constructed in the Glacial Till and no groundwater was encountered. We observed only limited discharge from the test pits over a three hour period, with water levels dropping by a maximum of 7mm. In agreement with yourselves, we abandoned further testing.

We obtained insufficient data to allow us to reliably extrapolate a permeability value for soakaway design purposes. However we consider it likely that the permeability rate will be less than 10^{-7}m/sec for all test locations. The use of standard soakaways is unlikely to be a viable drainage solution for this site at the depths tested.

If you have any questions or require any further information, please contact me directly.

Yours sincerely

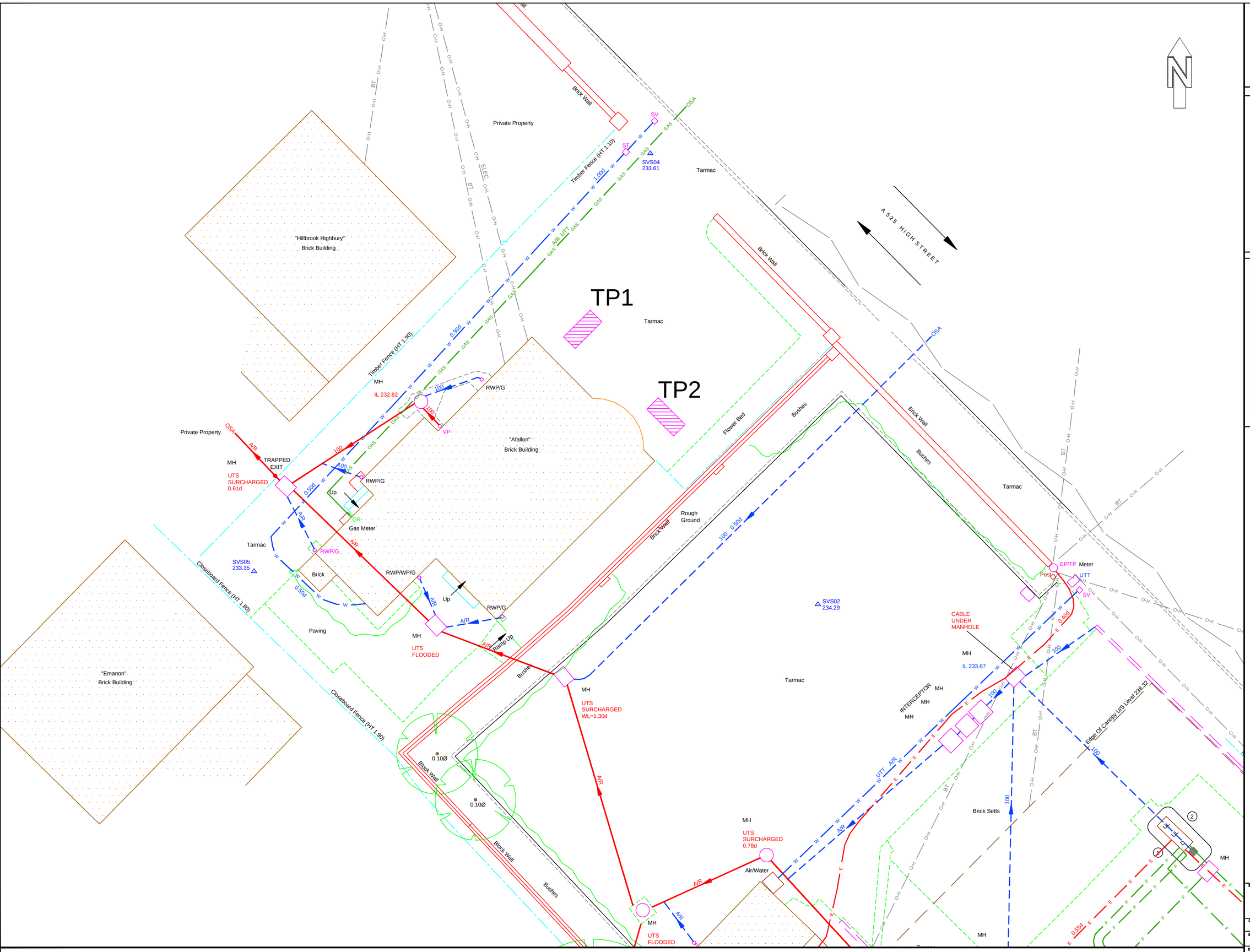


Steven Partridge

Subadra Consulting Ltd

Attachments:

Attachment One: Notice to Interested Parties
Attachment Two: Test Pit Logs and Location Plan



SUBADRA

Unit 13, Triangle Business Park
Stoke Mandeville, Bucks HP22 5BL
Tel. 01296 739400 Fax. 01296 739401

LEGEND

- Foul Drainage
- Surface Drainage
- Combined Drainage
- Electricity
- Electricity High Voltage
- Traffic Signals
- Gas
- Water
- Cable Television
- Close Circuit Television
- Communication
- British Telecom
- Compressed Air
- Offset Fill-Line
- Oil Pipe
- Pipe
- Ventilation
- Fuel Line
- Vapour Recovery
- Gauge Line
- Telemetry
- Fibre Optics
- Unknown
- Overhead Line
- Historical by Layer
- End Of Trace

T TANK - W= Water U=Unknown F=Foam P=Product C=Concrete

Test Pit Location — STANTION — PUMP ISLAND

legend

A/R	ASSUMED ROUTE	OSBM	ORDNANCE SURVEY BENCH MARK
BOLL	BOLLARD	PR	PIPE RISER
ILLU BOLL	ILLUMINOUS BOLLARD	P&R FENCE	POST & RAIL FENCE
BH	BOREHOLE	RET WALL	RETAINING WALL
BTIC	BRITISH TELECOM COVER	RE	RODDING EYE
C/BOX	CONTROL BOX	RS	ROAD SIGN
C/B FENCE	CLOSEBOARD FENCE	RWP	RAIN WATER PIPE
CR	CABLE RISER	S/A	SOAK AWAY
CTV	CABLE TV	SAP	SAPLING
CP	CATCHPIT	S/C	SOUND CONNECTED
CONC	CONCRETE	SEC FENCE	SECURITY FENCE
CL	COVER LEVEL	SL	SPOT LIGHT
D	DEPTH / DEEP	SP	SOIL PIPE
D/CHAN	DRAINAGE CHANNEL	ST	STOP TAP
DP	DOWN PIPE	STN	STATION (DATUM POINT)
EIC	ELECTRICITY COVER	SV	STOP VALVE
EM	EARTH ROD	SVP	SOIL VENT PIPE
EP	ELECTRICITY POLE	TBM	TEMPORARY BENCH MARK
EOT	END OF TRACE	TCL	TREE CANOPY LEVEL
FFL	FINISHED FLOOR LEVEL	TOW	TOP OF WALL LEVEL
F/BED	FLOWER BED	TPR	TAKEN FROM RECORDS
FH	FIRE HYDRANT	THL	THRESHOLD LEVEL
FS	FIRE SWITCH	TL	TRAFFIC LIGHT
GV	GAS VALVE	TP	TELEGRAPH POLE
G	GULLY	TP&R	TIMBER POST & RAIL
G-RUN	GULLY RUN	U/L	UNABLE TO LOCATE
HT	HEIGHT	U/R	UNABLE TO RAISE
IC	INSPECTION COVER	U/S	UNABLE TO SURVEY
IL	INVERT LEVEL	U/T	UNABLE TO TRACE
LP	LAMP POST	VR	VAPOUR RECOVERY
MH	MANHOLE	VP	VENT PIPE
MKR	MARKER	WM	WATER METER
M/R	METER	WO	WASH OUT
MW	MONITORING WELL	WFC	WATER FILLED CHAMBER
OH	OVERHEAD	WP	WASTE PIPE
OL/G	OFFLET GULLY	U/S	UNDERSIDE
OSA	OFF SURVEY AREA	ø	DIAMETER

SITE LOCATION:
CO-OP PFS COEDPOETH
HIGH STREET
WREXHAM
LL11 3UF

DRAWING TITLE:
TEST PIT LOCATION PLAN

SURVEYED BY:	DRAWN BY:	APPROVED BY:
SVS LTD	MS/AW	PC

DRAWING NO:	SURVEY DATE:
CP17129 DR 002	24-04-2018
	SHEET NO: 1 OF 2

DISCLAIMER: The location of under ground services shown on this drawing has been determined using electro-magnetic (and/or ground probing radar, where requested) techniques and visual observations. the limitations of this drawing should be realised and no guarantee can be given that all services have been identified. This drawing may not include the location of all public services that may cross the site and therefore the relevant service drawings should be obtained from the appropriate utility company and used in conjunction with this drawing. Additional services, structures or other below ground obstructions not indicated on this drawing may be present on site. reference should be made to historical plans and as built drawings. Excavations in the vicinity of services should be carried out with due diligence ref: HSG47 document "avoiding dangers from underground services". Location accuracy is determined by refering to manufacturers guidelines for the systems deployed. Reference should be made to the latest version of SVS Ltd site procedures document for utility location surveys.

Borehole Log
TP001

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Stoke Mandeville, Bucks HP22 5BL
Tel. 01296 739400 Email: consultants@subadra.com

Project Name	CP17129 Petrol Coedpoeth	Coordinates	
Date	5th April 2018	Ground Level	
Site Engineer	Byron McGuone	Drilling Method	Excavator

Depth (m)	Well	Water Level	Log	Sample	Laboratory Analysis	Headspace (ppm)	SPT 'N' or Su (kPa)	Description
								0.00m - 0.20m Made Ground Tarmac.
								0.20m - 0.80m Made Ground SOFT to FIRM light brown sandy CLAY (reworked).
1								0.80m - 2.50m Till FIRM TO STIFF light brown becoming dark brown sandy CLAY.
2								
								Borehole terminated at 2.50m
3								
4								
5								
6								
7								
8								
9								
10								

Well Diameter		Depth of Borehole	2.50m
Well Casing Length		Depth to Groundwater	Dry
Well Screen Length		Page	One of One

Prism.NET
www.prismerp.co.uk

Borehole Log
TP002

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Stoke Mandeville, Bucks HP22 5BL
Tel. 01296 739400 Email: consultants@subadra.com

Project Name	CP17129 Petrol Coedpoeth	Coordinates	
Date	5th April 2018	Ground Level	
Site Engineer	Byron McGuone	Drilling Method	Excavator

Depth (m)	Well	Water Level	Log	Sample	Laboratory Analysis	Headspace (ppm)	SPT 'N' or Su (kPa)	Description
								0.00m - 0.20m Made Ground Tarmac.
								0.20m - 0.80m Made Ground SOFT to FIRM light brown sandy CLAY (reworked).
1								0.80m - 2.50m Till FIRM TO STIFF light brown becoming dark brown sandy CLAY.
2								
								Borehole terminated at 2.50m
3								
4								
5								
6								
7								
8								
9								
10								

Well Diameter		Depth of Borehole	2.50m
Well Casing Length		Depth to Groundwater	Dry
Well Screen Length		Page	One of One

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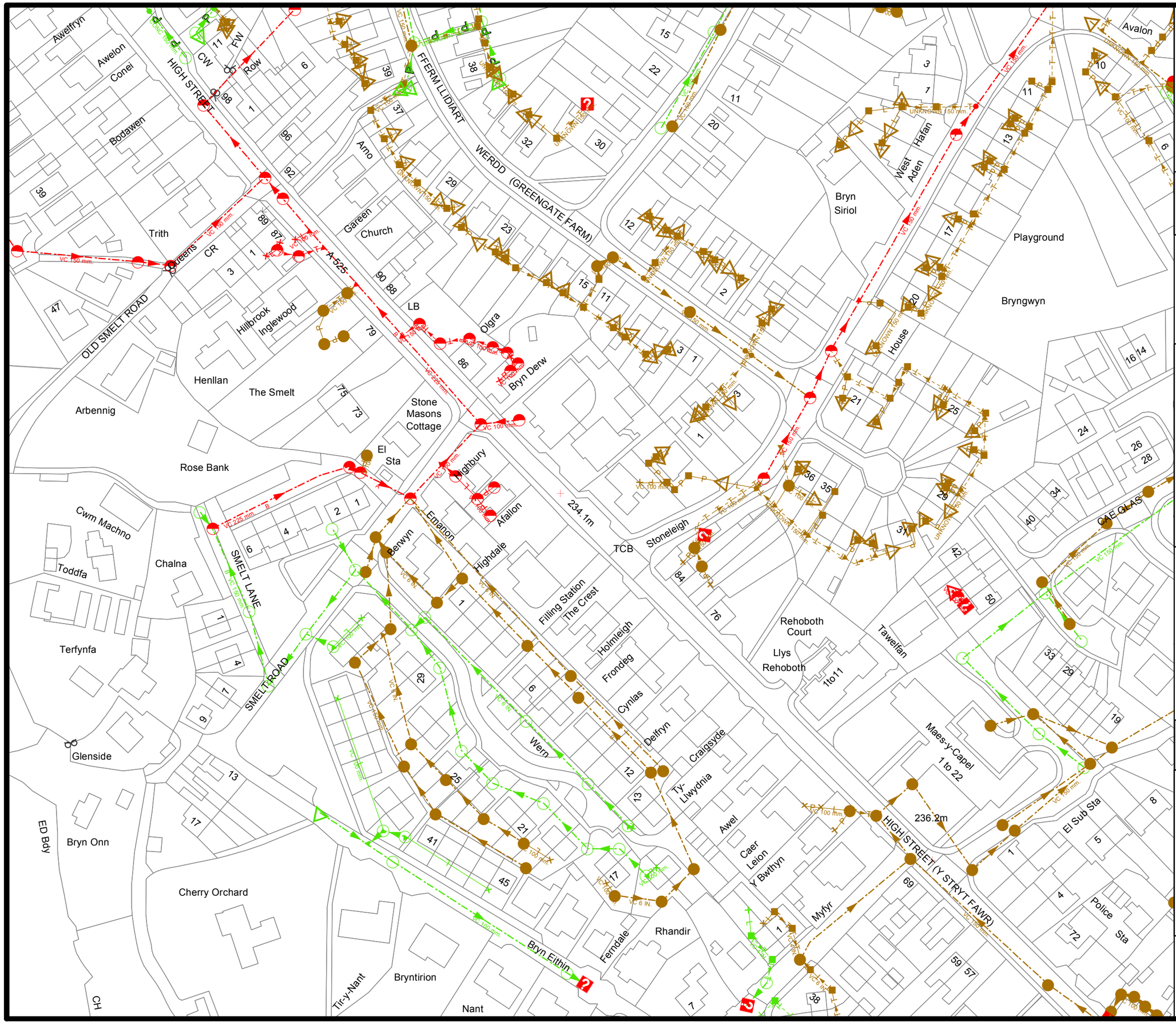
APPENDIX E

Welsh Water Sewer Records and Correspondence



Dŵr Cymru
Welsh Water

The Co-Operative, High Street, Coedpoeth

N
W E
S

LEGEND(Representative of most common features)

Waste network:

	Foul chamber		Outfall
	Surface water chamber	LH	Lamphole
	Combined chamber		Storm Overflow
C O	Combined sewer overflow		Rising main
SPC	Special purpose chamber		Gravity sewer
	Treatment works		Private sewer
	Pumping station	S 104	Private sewer subject to Sect. 104 adoption agreement
NB: Sewer symbol colour indicates the type.			Private Sewer Transfer
RED - Combined			Lateral Drain
GREEN - Surface Water			Inspection Chamber
BROWN - Foul			
Purple - Former S24 sewers (for indicative purposes only)			

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF) . It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

Dŵr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus. The onus of locating apparatus before carrying out any excavations rests entirely on you. The information which is supplied by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 which is based upon the best information available and, in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus laid before 1 September 1989, or, if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

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Map Ref:	328098,351461
Map scale:	1:1250
Printed by:	Parker Amanda
Printed on:	14 Mar 2018

Mike Quigley

From: Mike Quigley <mike.quigley@trueconsultant.co.uk>
Sent: Wednesday, May 2, 2018 11:54 AM
To: 'Jones Alaw'
Cc: ben.miller@williamsbuild.com; steve.morrell@trueconsultant.co.uk; James Large (james.large@williamsbuild.com)
Subject: Surface Water Drainage Discharge - Co-op petrol station-High Street- Coedpoeth

Alaw

Thank you for your response and agreement to allow us to make a storm water drainage discharge to the combined sewer network.
We have not yet looked at detailed design for the development, but are confident we will be able to reduce discharge to the combined sewer to a rate not exceeding 5L/s

Thank you for sorting this matter out for us.

Regards,
Mike

From: Jones Alaw [mailto:Alaw.Jones@dwrcymru.com]
Sent: Wednesday, May 2, 2018 8:36 AM
To: Mike Quigley
Subject: RE: Redevelopment of the Existing Co-op petrol station-High Street- Coedpoeth

Dear Mike,

Thank you for your e-mail.

In order for us to agree in principle to allow a surface water connection from the above development into the combined public sewer, we would seek for the surface water to be attenuated and discharged into the combined public sewer at a rate not exceeding 5l/s. If this is not possible, we would be grateful to receive evidence to demonstrate why this cannot be incorporated into the proposed development and clarification as to what would be the lowest viable discharge rate possible.

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

Kind regards,
Alaw

Alaw Jones
Development Control Officer | Developer Services | Wholesale Business Services | Services Dwr Cymru Welsh Water
Kinmel Park | Bodelwyddan | LL18 5TQ | T: 0800 917 2652| www.dwrcymru.com

Developer Services have an on-line service at www.dwrcymru.com. Here you can find all the services available, complete application forms and also make payments. If you have a quotation you can pay for this on-line or alternatively by telephoning 0800 917 2652 using a credit/debit card.

*We will respond to your email as soon as possible but you should allow up to **10 working days** to receive a response. For most of the services we offer we set out the timescales that we work to on our Developer Services section of our*

website. Just follow this link http://www.dwrcymru.com/en/Developer-Services.aspx and select the service you require where you will find more information and guidance notes which should assist you. If you cannot find the information you are looking for then please call us on 0800 917 2652 as we can normally deal with any questions you have during the call.

If we've gone the extra mile to provide you with excellent service, let us know. You can nominate an individual or team for a Diolch award through our website.

From: Mike Quigley [mailto:mike.quigley@trueconsultant.co.uk]
Sent: 02 May 2018 08:34
To: Jones Alaw <Alaw.Jones@dwrcymru.com>
Cc: steve.morrell@trueconsultant.co.uk; ben.miller@williamsbuild.com
Subject: RE: Redevelopment of the Existing Co-op petrol station-High Street- Coedpoeth
Importance: High

******** External Mail ********
Alaw

When we spoke last week you advised that you were having a meeting with your manager on Monday 30th April to discuss the storm water drainage discharge from our proposed development and would respond to us after the meeting.
We do not appear to have received a response to date.
Could you please confirm that a storm water drainage discharge to the combined sewer is acceptable as we need to make the Planning Application submission.
We look forward to hearing from you by return.

Regards,
Mike

From: Mike Quigley [mailto:mike.quigley@trueconsultant.co.uk]
Sent: Thursday, April 19, 2018 12:48 PM
To: 'Jones Alaw'
Cc: steve.morrell@trueconsultant.co.uk; ben.miller@williamsbuild.com
Subject: RE: Redevelopment of the Existing Co-op petrol station-High Street- Coedpoeth

Alaw

With reference to our above mentioned proposed development and your response below, we have been trying to establish if there is a highway drain that we could discharge storm water drainage into.
To date, we have been unsuccessful in identifying anyone within the Wrexham Highways Dept who can confirm the locations of their assets and whether or not a storm water drainage discharge would be feasible.

However, our discussions have led back to the Wrexham LLFA and we received the attached information from them.
You will note that the properties opposite the site have recently flooded to what we believe to be a significant depth in their basement.
Welsh Water have confirmed to us in writing that they have no records of flooding from their apparatus in the area.
The flood records provided by the LLFA indicate that the flooding is as a result of highway run off from Stoneleigh.

Given the local highway flooding issues, it would not be appropriate to make a discharge to any local highway drainage network.
As advised previously, there is no infiltration feasible on site due to the very low permeability of the sub soils, there is no local water course and there are no storm water sewers in the area.

Based on all the information now available, could you please confirm that Welsh Water will now allow the storm water drainage discharge to be maintained from the site into their combined sewer network.

Your earliest attention would be greatly appreciated.
Should you have any further questions please do not hesitate to contact me.

Regards,
Mike

From: Jones Alaw [mailto:Alaw.Jones@dwrcymru.com]
Sent: Thursday, April 12, 2018 8:54 AM
To: Mike Quigley
Subject: RE: Redevelopment of the Existing Co-op petrol station-High Street- Coedpoeth

Dear Mike,

Thank you for your e-mail in relation to the above redevelopment at the Co-op Petrol Station, High Street, Coedpoeth.

Having reviewed the information contained within your e-mail we would offer the following comments:

Foul

We note that there will be a reduction in foul flows as a result of the proposed redevelopment therefore it is considered that foul flows from the proposed development can be accommodated within the public sewerage system.

Surface Water

With reference to the surface water flows from the proposed development, due to the sensitivity of allowing surface water to enter the public sewerage system, you are required to fully exhaust all technical options outlined under Sections 3.2 and 3.4 of Part H of the publication 'Building Regulations 2000. We note that you have explored utilising soakaways and a connection to surface water public sewers. Have you considered discharging surface water into a highway drain? Evidence will be required to demonstrate that all the priority levels have been fully exhausted. Discharge of surface water to the public sewer is only to be made as a last resort.

Advisory

It would appear that the site is crossed by private combined sewers as is shown on the public sewer extract plan attached to your e-mail.

You may need to apply to Dwr Cymru / Welsh Water for any connection to the public sewer under S106 of the Water industry Act 1991. If the connection to the public sewer network is either via a lateral drain (i.e. a drain which extends beyond the connecting property boundary) or via a new sewer (i.e. serves more than one property), it is now a mandatory requirement to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991). The design of the sewers and lateral drains must also conform to the Welsh Ministers Standards for Gravity Foul Sewers and Lateral Drains, and conform with the publication "Sewers for Adoption"- 7th Edition. Further information can be obtained via the Developer Services pages of www.dwrcymru.com

You are also advised that some public sewers and lateral drains may not be recorded on our maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The presence of such assets may affect the proposal. In order to assist us in dealing with the proposal you may contact Dwr Cymru Welsh Water. Under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

If the development will give rise to a new discharge (or alter an existing discharge) of trade effluent, directly or indirectly to the public sewerage system, then a Discharge Consent under Section 118 of the Water Industry Act 1991 is required from Dwr Cymru / Welsh Water. Please note that the issuing of a Discharge Consent is independent of the planning process and a consent may be refused although planning permission is granted.

I hope the above is of assistance, but should you require any further information please do not hesitate to contact me.

Kind regards,
Alaw

Alaw Jones
Development Control Officer | Developer Services | Wholesale Business Services | Services Dwr Cymru Welsh Water
Kinmel Park | Bodelwyddan | LL18 5TQ | T: 0800 917 2652| www.dwrcymru.com

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If we've gone the extra mile to provide you with excellent service, let us know. You can nominate an individual or team for a Diolch award through our website.

From: Mike Quigley [mailto:mike.quigley@trueconsultant.co.uk]
Sent: 27 March 2018 10:39
To: Jones Alaw <Alaw.Jones@dwrcymru.com>
Cc: steve.morrell@trueconsultant.co.uk
Subject: Redevelopment of the Existing Co-op petrol station-High Street- Coedpoeth

******** External Mail ********
Dear Alaw,

Thank you for replying last week, sorry I was not available to talk to you.
Attached is the proposed redevelopment of the existing convenience store at the CO-OP, 84 High Street, Coedpoeth, LL11 3UF (SJ280514).

The client has purchased the adjacent property (Afallon) and intends to build a new convenience store to serve the local demand. Currently the impermeable area for both the CO-OP and the adjacent property is =1465m^2. The existing drainage survey demonstrates that both sites have an uncontrolled surface water discharge to the foul sewer (combined).
In accordance with current guidance we have investigated the use of soakaways as a means to drain the site's surface water via an infiltration system. Unfortunately the results provided by Subadra Geotechnical

have concluded that the near surface material consist of clay with very low permeability, and ground water levels are within 1.8m of existing ground. It will therefore not be feasible to use soakaways to drain the surface water.

We have obtained your record drawings and note there are no dedicated surface water sewers with the vicinity as they combine with the foul in Smelt Road.
We have reviewed the current infrastructure within the ground associated with the forecourt, and the factors noted above, and would like to propose the following strategy for your approval.

FOUL:

The proposed site will have reduced foul flows due the removal of the property. The convenience store will maintain its foul connection for the use of public and private WCs. The forecourt water will maintain its current status and go through an interceptor prior to connecting with the foul sewer.
Can you confirm there is adequate capacity to take the flows from the proposed development?

SURFACE WATER:

We have investigated the use of soakaways, which unfortunately are not viable.
We have considered whether the surface water from the proposed development could be attenuated before connecting with combined sewer. The infrastructure that serves the forecourt precludes the use of below ground storage as there is insufficient space available. The connection points within the curtilage of the adjacent property (Afallon) are likely to be head manholes and will be shallow, thereby requiring pumping of any proposed surface water storage.

We therefore propose an uncontrolled discharge for the surfaces water, with a reduction of impermeable area as betterment; the proposed impermeable area =1412m^2.

Can you confirm there is adequate capacity to take the flows from the proposed development?

Should you need to discuss any aspect please do not hesitate in contacting me.

Kind regards,

Mike Quigley
Drainage Highway Engineer

TRUE Consulting Engineers
Specialist advisors in innovative solutions
Ringslade House
Broadway Road

Mike Quigley

From: Humphreys Rachel <Rachel.Humphreys@dwrcymru.com>
Sent: Thursday, March 29, 2018 5:47 PM
To: mike.quigley@trueconsultant.co.uk
Cc: Sewerage Services
Subject: History of sewer flooding

Dear Mike

I write further to my telephone conversation with your colleague Steve Morrell earlier today.

I confirm that there is no history of flooding due to sewer overloading in the following area and there are no properties at risk of sewer flooding:

The Co-operative
High Street
Coedpoeth
LL11 3UF

I am making enquiries as to whether there is any other history of flooding and will update you accordingly.

Yours sincerely

Rachel Humphreys
Chartered Legal Executive

Tel: 01443 452383

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_____
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APPENDIX F

Micro Drainage Calculations for Attenuation Volume Requirements

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 70 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	48.206	0.406	0.0	5.0	5.0	21.6	O K
30 min Summer	48.329	0.529	0.0	5.0	5.0	28.1	O K
60 min Summer	48.426	0.626	0.0	5.0	5.0	33.3	O K
120 min Summer	48.474	0.674	0.0	5.0	5.0	35.9	O K
180 min Summer	48.465	0.665	0.0	5.0	5.0	35.4	O K
240 min Summer	48.434	0.634	0.0	5.0	5.0	33.7	O K
360 min Summer	48.363	0.563	0.0	5.0	5.0	29.9	O K
480 min Summer	48.292	0.492	0.0	5.0	5.0	26.2	O K
600 min Summer	48.226	0.426	0.0	5.0	5.0	22.7	O K
720 min Summer	48.168	0.368	0.0	5.0	5.0	19.6	O K
960 min Summer	48.076	0.276	0.0	4.9	4.9	14.7	O K
1440 min Summer	47.969	0.169	0.0	4.6	4.6	9.0	O K
2160 min Summer	47.913	0.113	0.0	3.9	3.9	6.0	O K
2880 min Summer	47.893	0.093	0.0	3.2	3.2	5.0	O K
4320 min Summer	47.875	0.075	0.0	2.4	2.4	4.0	O K
5760 min Summer	47.865	0.065	0.0	1.9	1.9	3.4	O K
7200 min Summer	47.859	0.059	0.0	1.6	1.6	3.1	O K
8640 min Summer	47.854	0.054	0.0	1.4	1.4	2.9	O K
10080 min Summer	47.851	0.051	0.0	1.3	1.3	2.7	O K
15 min Winter	48.260	0.460	0.0	5.0	5.0	24.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	94.367	0.0	24.9	17
30 min Summer	65.497	0.0	34.6	31
60 min Summer	43.553	0.0	46.0	58
120 min Summer	27.971	0.0	59.1	92
180 min Summer	21.230	0.0	67.3	126
240 min Summer	17.302	0.0	73.2	160
360 min Summer	12.936	0.0	82.0	226
480 min Summer	10.513	0.0	88.9	290
600 min Summer	8.942	0.0	94.5	352
720 min Summer	7.829	0.0	99.3	412
960 min Summer	6.339	0.0	107.2	530
1440 min Summer	4.697	0.0	119.1	752
2160 min Summer	3.469	0.0	132.0	1104
2880 min Summer	2.793	0.0	141.8	1468
4320 min Summer	2.053	0.0	156.3	2200
5760 min Summer	1.653	0.0	167.8	2936
7200 min Summer	1.397	0.0	177.3	3616
8640 min Summer	1.218	0.0	185.5	4352
10080 min Summer	1.085	0.0	192.8	5136
15 min Winter	94.367	0.0	27.9	17

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Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	48.406	0.606	0.0	5.0	5.0	32.2	O K
60 min Winter	48.533	0.733	0.0	5.0	5.0	39.0	O K
120 min Winter	48.586	0.786	0.0	5.0	5.0	41.8	O K
180 min Winter	48.567	0.767	0.0	5.0	5.0	40.8	O K
240 min Winter	48.513	0.713	0.0	5.0	5.0	37.9	O K
360 min Winter	48.388	0.588	0.0	5.0	5.0	31.3	O K
480 min Winter	48.273	0.473	0.0	5.0	5.0	25.2	O K
600 min Winter	48.173	0.373	0.0	5.0	5.0	19.8	O K
720 min Winter	48.093	0.293	0.0	5.0	5.0	15.6	O K
960 min Winter	47.988	0.188	0.0	4.7	4.7	10.0	O K
1440 min Winter	47.913	0.113	0.0	3.9	3.9	6.0	O K
2160 min Winter	47.886	0.086	0.0	2.9	2.9	4.6	O K
2880 min Winter	47.874	0.074	0.0	2.3	2.3	3.9	O K
4320 min Winter	47.861	0.061	0.0	1.7	1.7	3.2	O K
5760 min Winter	47.854	0.054	0.0	1.4	1.4	2.8	O K
7200 min Winter	47.849	0.049	0.0	1.2	1.2	2.6	O K
8640 min Winter	47.845	0.045	0.0	1.0	1.0	2.4	O K
10080 min Winter	47.842	0.042	0.0	0.9	0.9	2.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	65.497	0.0	38.7	31
60 min Winter	43.553	0.0	51.6	60
120 min Winter	27.971	0.0	66.2	104
180 min Winter	21.230	0.0	75.4	140
240 min Winter	17.302	0.0	81.9	176
360 min Winter	12.936	0.0	91.9	246
480 min Winter	10.513	0.0	99.6	310
600 min Winter	8.942	0.0	105.9	370
720 min Winter	7.829	0.0	111.2	426
960 min Winter	6.339	0.0	120.1	536
1440 min Winter	4.697	0.0	133.5	748
2160 min Winter	3.469	0.0	147.9	1100
2880 min Winter	2.793	0.0	158.8	1464
4320 min Winter	2.053	0.0	175.0	2200
5760 min Winter	1.653	0.0	187.9	2920
7200 min Winter	1.397	0.0	198.6	3664
8640 min Winter	1.218	0.0	207.8	4376
10080 min Winter	1.085	0.0	215.9	5128

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Shortest Storm (mins)	15
Ratio R	0.291	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.141

Time (mins) From:	To:	Area (ha)
0	4	0.141

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Model Details

Storage is Online Cover Level (m) 50.200

Cellular Storage Structure

Invert Level (m) 47.800 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	56.0	0.0	1.300	0.0	0.0
0.100	56.0	0.0	1.400	0.0	0.0
0.200	56.0	0.0	1.500	0.0	0.0
0.300	56.0	0.0	1.600	0.0	0.0
0.400	56.0	0.0	1.700	0.0	0.0
0.500	56.0	0.0	1.800	0.0	0.0
0.600	56.0	0.0	1.900	0.0	0.0
0.700	56.0	0.0	2.000	0.0	0.0
0.800	56.0	0.0	2.100	0.0	0.0
0.801	0.0	0.0	2.200	0.0	0.0
1.000	0.0	0.0	2.300	0.0	0.0
1.100	0.0	0.0	2.400	0.0	0.0
1.200	0.0	0.0	2.500	0.0	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0103-5000-1200-5000
Design Head (m)	1.200
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	103
Invert Level (m)	47.800
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	5.0
Flush-Flo™	0.354	5.0
Kick-Flo®	0.745	4.0
Mean Flow over Head Range	-	4.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

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Hydro-Brake® Optimum Outflow Control

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.4	1.200	5.0	3.000	7.7	7.000	11.5
0.200	4.7	1.400	5.4	3.500	8.3	7.500	11.8
0.300	5.0	1.600	5.7	4.000	8.8	8.000	12.2
0.400	5.0	1.800	6.0	4.500	9.3	8.500	12.6
0.500	4.9	2.000	6.3	5.000	9.8	9.000	12.9
0.600	4.7	2.200	6.6	5.500	10.2	9.500	13.3
0.800	4.1	2.400	6.9	6.000	10.7		
1.000	4.6	2.600	7.2	6.500	11.1		

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APPENDIX G

Maintenance Schedule for SuDS System

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21.13 OPERATION AND MAINTENANCE REQUIREMENTS

Regular inspection and maintenance is required to ensure the effective long-term operation of below-ground storage systems. Maintenance responsibility for systems should be placed with a responsible organisation. **Table 21.3** provides guidance on the type of operational and maintenance requirements that may be appropriate. The list of actions is not exhaustive and some actions may not always be required.

Maintenance Plans and schedules should be developed during the design phase, and will be specific to the type of tank that is adopted. Specific maintenance needs of the system should be monitored, and maintenance schedules adjusted to suit requirements. Further detail on the preparation of maintenance specifications and schedules of work is given in **Chapter 32**.

CDM 2015 requires designers to ensure that all maintenance risks have been identified, eliminated, reduced and/or controlled where appropriate. This information will be required as part of the health and safety file.

- Generic health and safety guidance is provided in **Chapter 36**.

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required