

**Land at Penrhyn Road, Knowsley
Flood Risk Assessment and Drainage Strategy**

for

Graftongate

Ref: 21065-BGL-XX-XX-RP-D-00001

Version 3
03.02.2022

DOCUMENT CONTROL SHEET

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Project: Land at Penrhyn Road, Knowsley

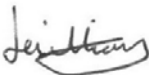
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Version Number:	3	Name	Signature
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Checked		Jack Williams, CEng, MICE – Civils Director	
Approved		Jack Williams, CEng, MICE – Civils Director	

Document Revision Record

Version Number	Date	Revision Details
1	29.10.2021	Draft for team comment
2	25.01.2022	Final
3	03.02.2022	For Planning

Burrows Graham Limited has prepared this report in accordance with the instructions of the above-named Client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.

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1.0 - PROJECT BACKGROUND

1.1 - Appointment

Burrows Graham Limited have been commissioned by Graftongate (hereafter referred to as the 'Applicant') to undertake a flood risk assessment and drainage strategy of suitable scope to support a planning application for a proposed commercial development on land at Land off Penrhyn Road, Knowsley.

1.2 - Aim of study

This FRA and Drainage Strategy has been developed in due cognisance of all relevant available policy information. It is anticipated that this report will satisfy the requirements of the National Planning Policy Framework (NPPF) and all relevant flood risk planning policies.

1.3 - Relevant policy and strategy documents

The following documents were reviewed as part of this Flood Risk Assessment:

- Defra Sustainable Drainage Systems Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015)
- Environment Agency Climate Change Guidance (February 2016)
- Flood and Water Management Act (April 2010)
- National Planning Policy Framework (Updated July 2021) and Planning Practice Guidance (March 2014)
- Sustainable Drainage Systems Written Statement HCWS161 (December 2014)
- Knowsley Metropolitan Borough Council Level 1 Strategic Flood Risk Assessment (2009)
- Knowsley Metropolitan Borough Council Preliminary Flood Risk Assessment (2011, reviewed in June 2017)
- Knowsley Metropolitan Borough Council Level 2 Strategic Flood Risk Assessment (October 2012)
- Knowsley Metropolitan Borough Council Local Flood Risk Management Strategy (October 2017)

1.4 - Proposed development

- Reference should be made to the 'Proposed Development Layout' included in Appendix A.
- The development proposals comprise the demolition of existing plant / buildings and erection of a B2/B8 warehouse unit with ancillary offices and associated external service yard and car parking.
- The development is classified as 'less vulnerable' in accordance with guidance set out on the 'gov.uk' website, namely 'Table 2: Flood vulnerability classification'.



Figure 1 – Proposed Development Layout

1.5 – Statutory consultation

Knowsley Metropolitan Borough Council (KMBC), United Utilities (UU) and the Environment Agency (EA) have been consulted prior to this submission. All relevant correspondence has been included in Appendix B of this report.

2.0 - SITE DETAILS

2.1 – Site description

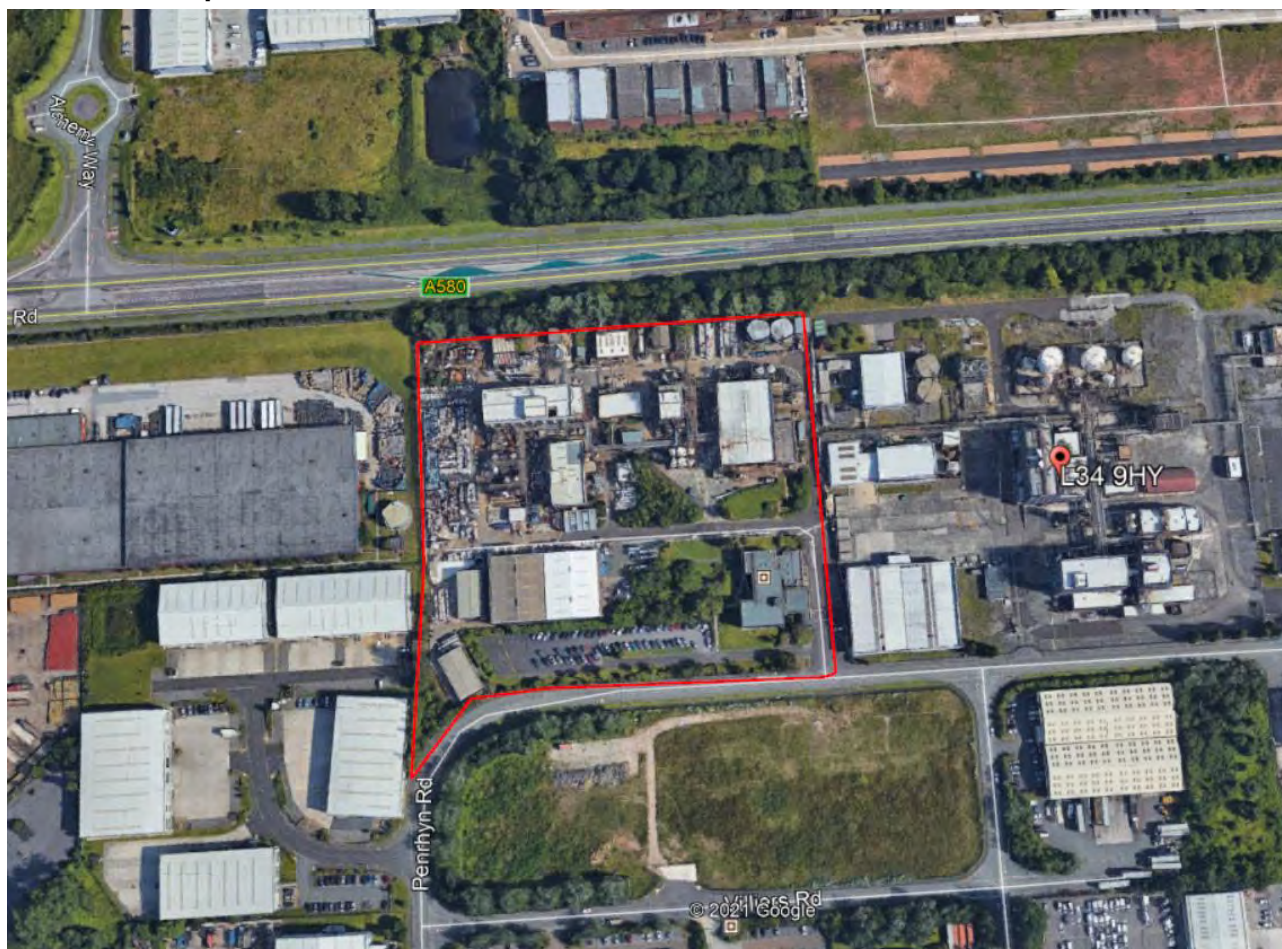


Figure 2 – Site Location Plan

Table 1 - Site characteristics

Site address	Land at Penrhyn Road, Knowsley Business Park, Knowsley
Grid reference	342955, 396715
Area (hectares)	The total site boundary has been measured to be 3.81 hectares.
Existing use	The site was previously developed and occupied a number of buildings and industrial plant. The buildings and plant have now been removed from the site.
Surroundings	South – the southern site boundary is delineated by Penrhyn Road, beyond which lies an undeveloped parcel of land. East – an industrial development comprising a number of buildings and plant forms the eastern site boundary. North – to the north, a densely vegetated strip of land separates the site from the A580. West – an industrial development forms the western site boundary.
Topography	A copy of the topographical survey has been included in Appendix C of this report. The average level to the north east of the site is around 30.5m. The average level to the south west of the site where levels are lowest is around 27.8m. There are existing stockpiles and a vegetated mound to the north of the site, that have levels circa. 2-3m above the maximum average level of 30.5m.

2.2 - Existing watercourses

The Knowsley Brook is classified as an EA Main River and traverses the north and west site boundary in culverted form. The culverted watercourse becomes an open water feature at Answorth Lane, circa 350 m from the western site boundary.



Figure 3 – EA Main River Map

The route of the culverted watercourse has been confirmed by the Environment Agency and additional records have been provided with manhole survey information and detailed fluvial data taken from the Knowsley Brook 2017 study (part of the Upper Alt Tributaries package).

The culverted watercourse will remain in place. The EA have confirmed that they are able to accept in principle a yard slab and fencing over the existing culvert. This is subject to further details being submitted via both by a planning permission application to the LPA and an Environmental Permit application with the EA. It is important to ensure that all manholes are accessible throughout the works and no damage to the culvert occurs during development. This should be evidenced through a CCTV survey of the culvert before and after the works on site.

2.3 - Existing drainage

Public sewers

The United Utilities Public Sewer Records, which have been included in Appendix D of this report, show there to be the following existing drainage infrastructure within the vicinity of the site:

- The head of a private sewer, highway drain or watercourse in the north west corner of the site, from where it traverses the western site boundary in a southerly direction. Note that it is anticipated that the run shown to traverse the western site boundary is the Knowsley Brook in its culverted form and that the public sewer records should be updated to reflect the EA Main River maps shown in figure 3.
- Watercourse or highway drain passing through the site in a south westerly direction, shown to connect into the run traversing the western site boundary.
- A 825mm / 900mm diameter surface water sewer in Penrhyn Road that passes through the south western corner of the site and connects into the Knowsley Brook.
- A 375mm diameter public foul sewer in Penrhyn Road passes the site in a westerly then southerly direction.



Figure 4 – Public Sewer Records

Existing private drainage within the site

Two separate drainage / utility surveys have been undertaken by Amethyst Surveys Limited and Survey Hub, both of which show the site to be drained by a network of surface water drainage infrastructure including downpipes, gullies and petrol interceptors.

There are three surface water outfalls from the existing site to the 825mm / 900mm public sewer in Penrhyn Road. Two outlets are shown to be 300mm diameter pipes and the other is shown to be a 375mm pipe.

There is also a private drain which crosses the centre of the site and connects into the EA culverted watercourse. This will be diverted around the site as part of the development proposals.

2.4 - Geology and hydrogeology

Reference should be made to the Site Investigation Interpretative Report (January 2022) by G&J Geoenvironmental Consultants Ltd, the key findings of which have been summarised below:

- Made Ground was encountered throughout the site to depths of between 0.4m and 3.0mbgl, but typically between 1.0m and 2.0mbgl.
- Although previous areas of hardstanding have been removed across most of the site, limited areas of tarmac or concrete hardstanding, underlain by hardcore, were locally still present.
- Due to the presence of contaminated soils and shallow groundwater, and the underlying Principal Aquifer it is considered that soakaway drainage will not be considered appropriate. Additionally, low permeability clay underlies much of the site, which would impede infiltration.

3.0 – FLOOD RISK STATEMENT

3.1 - Fluvial flood risk

The National Planning Policy Framework (NPPF) categorises flood risk as follows:

- Zone 1 (low probability) – Land assessed as having less than a 1 in 1,000 annual probability of river or sea flooding (<0.1%);
- Zone 2 (medium probability) – Land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year; and
- Zone 3a (high probability) - Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
- Zone 3b The Functional Floodplain - This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the EA. (Not separately distinguished from Zone 3a on the Flood Map).

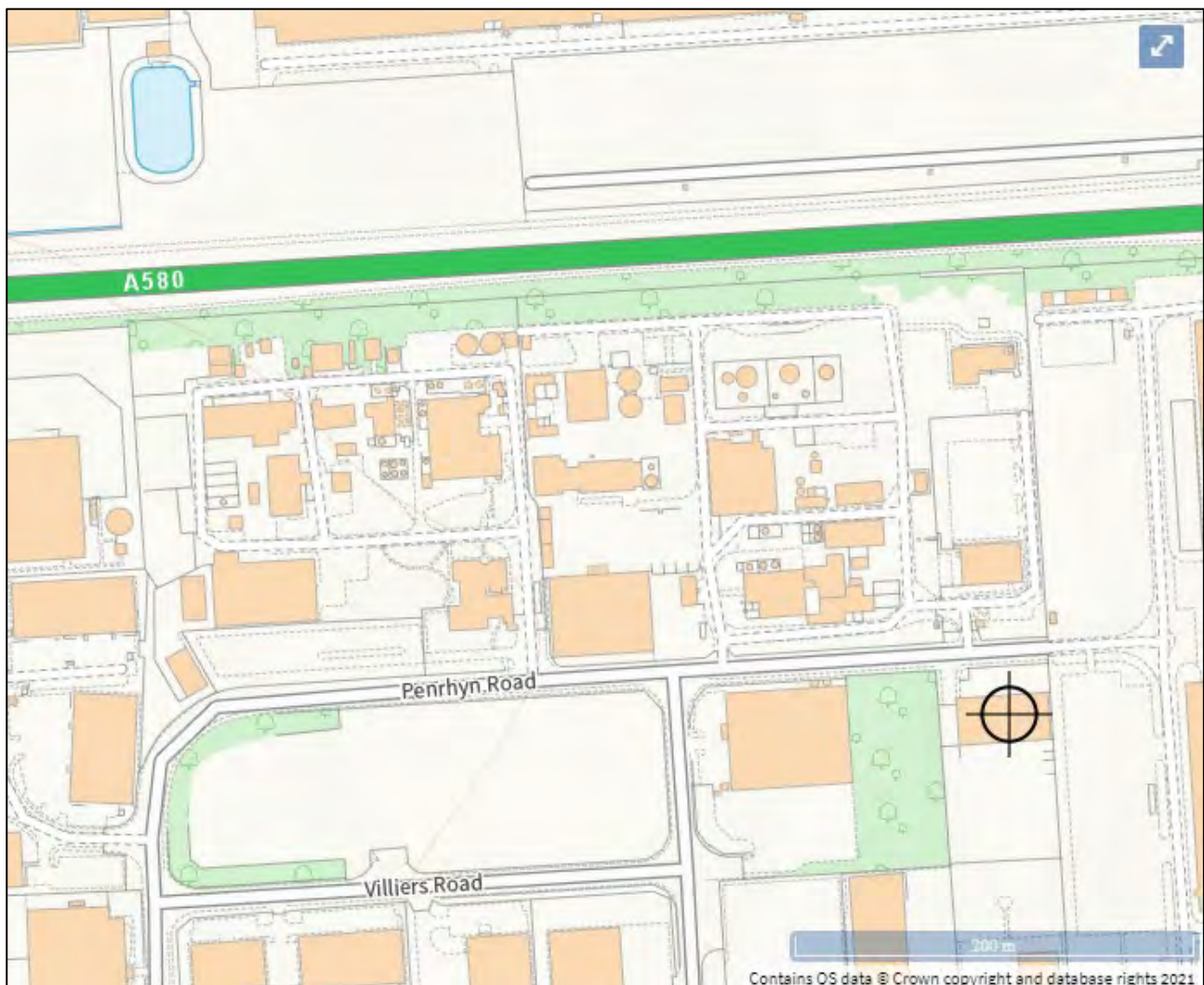


Figure 5 – EA Flood Map for Planning

As shown in Figure 2, the site is located within Flood zone 1 on the EA Flood Maps for Planning. Therefore, the risk of fluvial flooding is considered to be very low.

3.2 - Tidal flooding

The site is not located near to any tidal bodies of water and thus not at risk to tidal flooding.

3.3 - Surface water flooding

The EA descriptions for the High, Medium and Low risk scenarios for surface water flooding are as follows:

- High risk means that each year this area has a chance of flooding of greater than 3.3%.
- Medium risk means that each year this area has a chance of flooding of between 1% and 3.3%.
- Low risk means that each year this area has a chance of flooding of between 0.1% and 1%.
- Very Low risk means that each year this area has a chance of flooding of less than 0.1%.

The EA Map of long-term flood risk from surface water indicates that most of the site is at low risk from surface water, with some localised areas being at medium to high risk.

Any existing risk of flooding from surface water will be mitigated through the implementation of the drainage strategy set out in section 4 of this report.



Figure 6 – EA Flood Map for Surface Water

3.4 - Sewer flooding

United Utilities were contacted to confirm whether they had any historical flood records in the vicinity of the site.

United Utilities confirmed they have no record of flooding from the public sewers in the vicinity of the site.

Based on the above, the risk of sewer flooding is considered to be low.

3.5 - Groundwater flood risk

Groundwater flooding occurs when the water table, the level of water below the ground, rises above the ground surface or into cellars and basements. Groundwater flooding is most likely to occur in low lying areas underlain by permeable rocks (aquifers). These may be extensive, regional aquifers, such as chalk or sandstone, or may be localised sands or river gravels in valley bottoms underlain by less permeable rocks.

Due to the ground conditions and hydrogeology set out in section 2.4, groundwater flooding cannot be ruled out.

The KMBC Level 2 SFRA indicates 'the GEM dataset appears to reflect the findings of the Mersey and North Merseyside Water Resources study more closely, which gives some confidence with respect to its use to assess the source of groundwater flooding'.

The Level 1 SFRA presents in Appendix E DEFRA's Groundwater Emergence Map (GEM), which identifies areas where, in exceptionally wet winters, groundwater may be expected to rise to be close to or at the ground surface. It also indicates that the lower lying areas of the Alt floodplain extending into Kirkby Brook, Knowsley Brook and Croxteth Brook are at risk, as well as areas of the River Alt within Stockbridge Village extending southwards towards Huyton.

Given the site is not within the lower lying areas of the Alt floodplain that extend into Kirby Brook, it is unlikely the site is at risk of groundwater flooding. Furthermore, no basements are proposed as part of the development proposals and the finished floor level of the building has been set at a level above the average level across the site.

3.6 - Reservoir flooding

Based on the EA Flood Risk from Reservoirs Map, the site is not at risk of flooding from reservoirs.

4.0– NPPF SEQUENTIAL AND EXCEPTION TEST

4.1 – The Sequential Test

The Sequential Test, within the National Planning Policy Framework, aims to steer all new developments to areas at the lowest risk of flooding and to ensure that the development type proposed is appropriate by reference to the flood risk. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.

The site is situated in a flood zone 1. Therefore, the sequential test does not apply.

As set out in section 1.5, the development is classified as 'less vulnerable' and therefore an Exception Test is not required for this site.

5.0– SURFACE WATER DRAINAGE STRATEGY

5.1 – Disposal of surface water

The method for removal of surface water from the site has been selected in accordance with the hierarchy outlined in Building Regulations Part H as summarised below:

- Infiltration to the ground
- Discharge to a watercourse
- Connection to a surface water sewer
- Connection to a combined sewer

As indicated in section 2.4 and based on the G&J Geoenvironmental Site Investigation Interpretative Report (January 2022), it is considered that soakaway drainage will not be considered appropriate due to the presence of contaminated soils, shallow groundwater, low permeability clay underlying much of the site.

Therefore, surface water runoff generated from the development is proposed to discharge to the nearest watercourse, which is the Knowsley Brook that passes through the site.

5.2 – General strategy

For details of the outline drainage proposals for the site, reference should be made to drawing (ref: 21065-BGL-XX-XX-DR-S-00250), which has been included in Appendix E of this report.

The supporting hydraulic calculations have been included in Appendix F of this report.

5.3 – Sustainable Drainage Systems

Sustainable Drainage Systems (SuDS) will be utilised in line with The SuDS Manual (C753) guidance and aim to minimise the impact a development has on the runoff quantity and quality and maximise amenity and biodiversity opportunities.

The management train approach is a fundamental principle of SuDS, it aims to primarily reduce pollution, flow rates and volume of runoff from the site. The main objective is to treat the runoff as close to the source as possible and it is imperative that at least two of the following should be included within the drainage strategy.

- **Prevention** – The use of good site design and rainwater re-use measures to prevent runoff.
- **Source Control** – Controlling the runoff as close to source as possible by using; green roofs, porous pavements and soakaways.
- **Site Control** – Use of water management techniques within local area, i.e. detention basins and geo-cellular storage.
- **Regional Control** – Management of water from a number of sites in a specific location, i.e. balancing ponds and wetlands.

The drainage strategy for this development will incorporate prevention by using rainwater harvesting systems where possible and site control in the form of flow control and associated below ground attenuation tank. Filter drains will also be used, particularly around the site boundary, and proprietary treatment devices will provide the appropriate level of water quality treatment as set out in section 5.7. Due to spatial constraints and the presence shallow groundwater, ponds, swales and other open SuDS features have not been proposed.

5.4 – Total developable area and proposed impermeable areas

The total site area has been measured to be 3.81 hectares.

The total drained impermeable area of the proposed development has been measured to be 3.24 hectares.

5.5 – Discharge rates

The site is considered to be a brownfield development. Therefore, in line with the Knowsley Metropolitan Borough Council guidance and subsequent correspondence, a 50% reduction in the existing brownfield rates will apply.

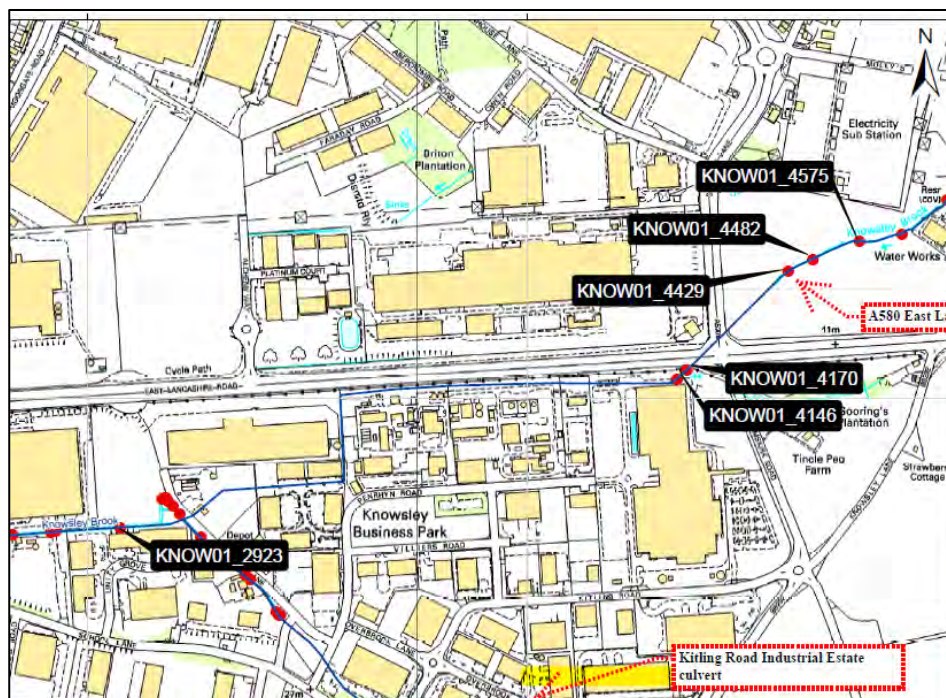
As described in section 2.3, the site is currently drained to the existing public surface water sewer in Penrhyn Road via three outfalls – 2 no. 300mm and 1 no. 375mm diameter.

Based on the Colebrook-White equation, the capacity of a 300mm diameter surface water drain with an assumed gradient of 1:300 is 63.6 l/s. Based on the Colebrook-White equation, the capacity of a 375mm diameter surface water drain with an assumed gradient of 1:300 is 114.7 l/s. Therefore, the existing discharge rate from the site is anticipated to be around 240 l/s.

Based on applying a 50% reduction to the existing discharge rate from the site, surface water runoff from the developed site should be restricted to 120 l/s.

The LLFA have been contacted and confirmed that this approach is acceptable, provided that evidence be presented showing such a discharge would not increase flood risk in and off site. The Knowsley Brook is a 2m diameter culvert with a gradient of around 1:95 as it traverses the western boundary of the site. This is expected to have a capacity of around 16,465 l/s based on the Colebrook-White equation. The impact of blockage was modelled for four structures in the vicinity of the site – see figure 7. Blockage runs were carried out for the following blockage proportions at each of these structures: 25%, 50%, and 75%. Blockage runs were carried out for the following event: 1% AEP (present day) and 1% AEP with climate change (+30%). A flow of 3960 l/s corresponds to the 50% blockage scenario with 30% climate change at the worst case node 2923 – see figure 8.

Based on the modelling carried out, the proposed flow of 120 l/s from the site is unlikely to have any impact on the capacity of Knowsley Brook and it provides 50% betterment on the existing scenario. Therefore, discharging a maximum of 120 l/s from the developed site to the Knowsley Brook is considered to not increase flood risk in and off site.



Flood Zone 3 shows the area that could be affected by flooding:
- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

ABDs (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.

Figure 7 – EA Fluvial Levels Map

Figure 8 – EA Fluvial Levels Data (extract)

KNOW01_2923	Knows2017_C25%BloB	100	21.88	3.96
KNOW01_2923	Knows2017_C50%BloA	100	21.88	3.96
KNOW01_2923	Knows2017_C50%BloB	100	21.88	3.96
KNOW01_2923	Knows2017_C75%BloA	100	21.87	3.92
KNOW01_2923	Knows2017_C75%BloB	100	21.87	3.91

* C50%BloA = 50% blockage at A580 East Lancashire Road culvert on Knowsley Brook with 30% climate change

5.6 – Attenuation storage

In order to achieve the restriction in peak rate of surface water runoff from the developed site as described above, on site surface water attenuation storage will be required in order to temporarily store the residual volume of surface water for rainfall events resulting in a peak runoff rate over and 120 l/s.

Attenuation will be provided in the form of below ground attenuation tanks.

The attenuation storage will be designed to ensure that there is no surface water flooding on site for rainfall events up to and including the 1 in 30 year storm event. The attenuation storage will be designed to ensure that surface water runoff for storm events up to and including the 100 year storm plus a 40% allowance will not cause a risk of flooding to properties or increase the flood risk outside of the site.

The supporting hydraulic calculations have been included in Appendix F of this report.

5.7 – Water quality

Water quality has been considered and the following measures have been included within the surface water drainage proposals:

- All drainage from car park areas, which are considered low risk, will pass through a Class 1 by-pass separator prior to leaving the site, or the water will be treated as it passes through a porous sub-base filter material (in any areas where a direct infiltration solution is feasible).

- All drainage from service yards, which are considered high risk, will pass through a Class 1 full retention separator prior to leaving the site.
- Silt will be prevented from entering the system by the use of channels with silt traps and catch pits where required.

5.8 – Maintenance

Reference should be made to the Drainage Inspection and Maintenance Schedule in Appendix G, which includes required actions and typical frequencies for all drainage infrastructure serving the development.

The drainage will be managed and maintained by an appointed Management Company.

6.0 – FOUL WATER DRAINAGE STRATEGY

For details of the outline drainage proposals for the site, reference should be made to drawing (ref: 21065-BGL-XX-XX-DR-S-00250), which has been included in Appendix E of this report.

United Utilities were contacted and confirmed that foul flow from this site will be allowed to drain into the public foul water/combined sewer system and that the preferred point of discharge would be to the 375mm diameter public foul water sewer within Penrhyn Road located to the south of your proposed development at an unrestricted rate.

Any new connections (including the re-use of existing connections) to the public sewerage system will require a Section 106 agreement.

7.0- MITIGATION / MANAGEMENT OF FLOOD RISK

7.1 – Access and egress

Access to and egress from the site will be provided via Penrhyn Road which is situated in flood zone 1. Therefore, a safe means of access / egress is available to the site for storms up to and including the 1 in 1000 year fluvial event.

7.2 - Drainage & exceedance flow routes

The proposed surface water drainage system will be designed in accordance with the drainage strategy set out in section 5 of this report. This will ensure that there is no increase in flood risk to the site or elsewhere in the local catchment for all storm events up to and including the 100 year storm plus 40% climate change.

It should be noted that if storm events in excess of the 100 year storm plus 40% climate change or blockages occur, this will result in flood water arising from the site drainage system. If the site drainage system were to flood, it is considered that any surface water arising from the site drainage system would be contained within the area of dock levellers which are below ground, before flooding the car park area and running off into Penrhyn Road.

7.3 - Conclusion

This Flood Risk Assessment and Drainage Strategy has concluded that the development is appropriate and can be occupied safely subject to implementation of any flood risk mitigation described in this report being carried out.

APPENDIX A – SITE LAYOUT

A580 - E Lancashire Road



- Dimensions are in millimeters, unless stated otherwise.
- Scaling of this drawing is not recommended.
- It is the recipient's responsibility to print this document to the correct scale.
- All relevant drawings and specifications should be read in conjunction with this drawing.

- Layout to be confirmed
- C1** - Revision reference
- Plot Boundary**
- C** Car Charging Spaces
5% active EV charging spaces to be provided location tbc.
- Knowsley Brook Easement**
(6m wide)

SCHEDULE OF ACCOMMODATION
(Gross Internal Area)

Unit 100			
Warehouse Area	-	184,700 ft²	(17,159 m²)
Office	-	9,720 ft²	(903 m²)
(Incl. GF core)			
Transport Office	-	5,000 ft²	(465 m²)
Gatehouse	-	300 ft²	(28 m²)
Total Area	-	199,720 ft²	(18,554 m²)
Planning Boundary	-	9.38 Acres	(3.79 Hectares)
Site Density	-	49.14%	
Car Parking Spaces	-	232 No.	
Level Access Doors	-	3 No.	
Dock Loading Doors	-	18 No.	
Cycle Spaces	-	56 No.	
HGV Spaces	-	11 No.	
Motorcycle Spaces	-	19 No.	



rev amendments by ckd date

Penrhyn Road, Knowsley Business Park, Merseyside

Site Layout

GRAFTONGATE



Drawing Status:	Planning
Drawn / Checked:	RF / LF
Date:	12/01/2022
Scale:	1:500 A1
Drawing no:	Revision:
21002 P0102	D

PLANNING
THIS DRAWING IS FOR PLANNING CONSIDERATION ONLY
AND SHOULD NOT BE USED FOR ANY OTHER PURPOSE

APPENDIX B – STATUTORY CONSULTATIONS

From: [CMBLNC Info Requests](#)
To: [Jordan McGlacken](#)
Cc: [Rooke, Karen](#); [Mark Graham](#); [CMBLNC Info Requests](#)
Subject: CL220819KR: Updated response - penrhyn road - knowsley [Filed 29 Sep 2021 15:27]
Date: 29 September 2021 15:12:51
Attachments: [image001.png](#)

Good Afternoon Jordan

I have the following update for you from the team.

After reviewing the proposed information, we would be able to accept in principle a yard slab and fencing over the existing culvert. This is subject to further details being submitted via both by a planning permission application to the LPA and an Environmental Permit application with the EA. It is important to ensure that all manholes are accessible throughout the works and no damage to the culvert occurs during development. This could be evidenced through a CCTV survey of the culvert before and after the works on site.

Please come back to me if you have any further questions.

Kind regards

Mark

Mark Goucher | Customers and Engagement Officer
Customers and Engagement Team | Cumbria and Lancashire
External: 020 302 50821

From: Jordan McGlacken [mailto:jordanmcglacken@burrowsgraham.com]
Sent: 27 September 2021 07:28
To: CMBLNC Info Requests <Inforequests.cmbInc@environment-agency.gov.uk>
Cc: Rooke, Karen <Karen.Rooke@environment-agency.gov.uk>; Mark Graham <markgraham@burrowsgraham.com>
Subject: RE: CL220819KR: penrhyn road - knowsley
Importance: High

Good morning Karen,

Did you ever receive a response from the relevant team on the below - initial enquiry sent on 20/08/21?

We are really getting pressured for answers on this from the client team, which is understandable given its importance to the viability of the scheme. Any update from the EA on this matter would be greatly appreciated, noting we have a design team meeting scheduled on Friday.

Kind regards,

Jordan McGlacken **MEng (Hons)**
Civil Engineer

Burrows Graham

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From: CMBLNC Info Requests <Inforequests.cmbInc@environment-agency.gov.uk>

Sent: 15 September 2021 13:22

To: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>

Subject: CL220819KR: penrhyn road - knowsley

Good Afternoon Jordan

Thanks you for your email. I have forwarded a chase to the relevant team, please accept our apologies and I will get back to you as soon as I hear back from them.

Regards Karen

Karen Rooke

Customers and Engagement Officer, Cumbria and Lancashire

Environment Agency | Ghyll Mount, Gillan Way, Penrith 40 Business Park, Penrith, Cumbria, CA11 9BP

karen.rooke@environment-agency.gov.uk



From: Jordan McGlacken [<mailto:jordanmcglacken@burrowsgraham.com>]

Sent: 15 September 2021 12:29

To: CMBLNC Info Requests <Inforequests.cmbInc@environment-agency.gov.uk>

Cc: Mark Graham <markgraham@burrowsgraham.com>; Enquiries, Unit <enquiries@environment-agency.gov.uk>

Subject: RE: CL220819KR: penrhyn road - knowsley

Importance: High

Good morning,

We sent an enquiry on 20 August 2021 and yet to hear back from the EA – see below.

Can I check the email was forwarded to the relevant team and ask when we might be able to expect a response?

This is an urgent matter in respect to the viability of the scheme itself so we're really looking to receive a response asap and more than happy to pay any charges that may help speed up this process – please advise.

KR,

Jordan McGlacken **MEng (Hons)**
Civil Engineer

Burrows Graham

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From: Jordan McGlacken
Sent: 03 September 2021 07:49
To: CMBLNC Info Requests <Inforequests.cmbInc@environment-agency.gov.uk>
Cc: Mark Graham <markgraham@burrowsgraham.com>
Subject: RE: CL220819KR: penrhyn road - knowsley [Filed 03 Sep 2021 07:49]

Good Morning Karen,

Can I check the below was forwarded to the relevant team and ask when we might be able to expect a response?

Kind regards,

Jordan McGlacken **MEng (Hons)**
Civil Engineer

Burrows Graham

Arden Hall, 66 Brooklands Road, Sale, Cheshire M33 3SJ

E: jordanmcglacken@burrowsgraham.com

T: +44 (0)161 804 8046

www.burrowsgraham.com



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From: CMBLNC Info Requests <Inforequests.cmbInc@environment-agency.gov.uk>

Sent: 20 August 2021 15:10

To: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>

Subject: RE: CL220819KR: penrhyn road - knowsley

Good Afternoon

Thank you for your email. I will forward this to the appropriate team that provided your response and get back to you as soon as I can.

Regards Karen

From: Jordan McGlacken [<mailto:jordanmcglacken@burrowsgraham.com>]

Sent: 20 August 2021 15:01

To: CMBLNC Info Requests <Inforequests.cmbInc@environment-agency.gov.uk>

Cc: Mark Graham <markgraham@burrowsgraham.com>

Subject: RE: CL220819KR: penrhyn road - knowsley

Good afternoon,

Thanks a lot for providing the below response / information.

We have just been on a call with the design team and client discussing the requirement for '*no development over or within 8m of the culverted watercourse measured from the outside edge of the culvert. Development includes buildings, fencing, lamp posts, benches bins etc*' – as outlined in your previous email. As you'll note from the below image, this requirement would have significant impacts on the viability of the scheme.

The light blue line indicates the line of the culverted watercourse (as per coordinates provided by EA). You'll note that on the adjacent site to the west, existing buildings, structures etc. all encroach on the 8m no development zone you have stipulated. It is also worth mentioning that there are existing fences and structures within the site that are situated on / near the culverted watercourse. We are not proposing to make the existing situation any worse but do require a yard slab and fencing to be built over the culverted watercourse.



Please can the EA confirm whether the above would be acceptable and if the EA's requirement for no development with 8m of the edge of the culverted watercourse can be amended slightly to allow for yard slabs and fencing?

We are keen to have this matter resolved asap and happy to pay any charges that may help speed up this process – please advise.

If any further information is required from our end, please do get in touch.

Kind regards,

Jordan McGlacken **MEng (Hons)**

Civil Engineer

Burrows Graham

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E: jordanmcglacken@burrowsgraham.com

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From: CMBLNC Info Requests <Inforequests.cmblnc@environment-agency.gov.uk>
Sent: 16 August 2021 10:33
To: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>
Subject: CL220819KR: penrhyn road - knowsley [Filed 16 Aug 2021 10:38]

Dear Jordan

Enquiry regarding Penrhyn Road – Knowsley.

Thank you for your enquiry received on 16 July 2021.

We respond under the Freedom of Information Act 2000 and Environment Information Regulations 2004.

- The fluvial data in the attached PDF has been taken from the Knowsley Brook 2017 study (part of the Upper Alt Tributaries package). Climate change allowances provided as part of this study include a 30%, 35% and 70% increase in river flows. However, please be aware that climate change guidance and allowances have recently been updated. For further information on the latest climate change allowances, please visit: www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances.

Simulation of various structure blockage scenarios to assess the implications of culvert blockage on local flood risk have been run as part of the study.

The impact of blockage was modelled along four structures, two of which are located near to the site of interest. These two sites can be found labelled on page 2 of the attached PDF: A580 East Lancashire Road Culvert on Knowsley Brook and Kitling Road Industrial Estate Culvert on Mill Brook.

Blockage runs were carried out for the following blockage proportions at each of these structures: 25%, 50%, and 75%. Blockage runs were carried out for the following event: 1% AEP (present day) and 1% AEP with climate change (+30%). **Please find a link to the Knowsley Brook Study (Upper Alt Tributaries) report in the Sharefile link below for further detailed information.**

To identify the scenarios in the attribute table (pages 3-5 in the attached PDF) please find an explanation regarding the coding below;

ND = No Defences exist

30% CC = 30% Climate Change

35% CC = 35% Climate Change

70% CC = 70% Climate Change

25%BloA = 25% blockage at A580 culvert on Knowsley Brook

25%BloB = 25% blockage at Kitling Road Industrial Estate culvert on Mill Brook

50%BloA = 50% blockage at A580 culvert on Knowsley Brook

50%BloB = 50% blockage at Kitling Road Industrial Estate culvert on Mill Brook

75%BloA = 75% blockage at A580 culvert on Knowsley Brook

75%BloB = 75% blockage at Kitling Road Industrial Estate culvert on Mill Brook

C25%BloA = 25% blockage at A580 East Lancashire Road culvert on Knowsley Brook with 30% climate change

C25%BloB = 25% blockage at Kitling Road Industrial Estate culvert on Mill Brook with 30% climate change

C50%BloA = 50% blockage at A580 East Lancashire Road culvert on Knowsley Brook with 30% climate change

C50%BloB = 50% blockage at Kitling Road Industrial Estate culvert on Mill Brook with 30% climate change

C75%BloA = 75% blockage at A580 East Lancashire Road culvert on Knowsley Brook with 30% climate change

C75%BloB = 75% blockage at Kitling Road Industrial Estate culvert on Mill Brook with 30% climate change

- The Environment Agency does not hold any records of historic flooding in this area. Please be aware, however, that this does not necessarily mean that flooding has not occurred in the past.
- Please see link to the Mapedit data and 2017 Knowsley Study report (**please note that this link expires on 06/09/2021. Please download the data on receipt**):
<https://ea.sharefile.com/d-seb227d3110874ff4891a3d8d0f6eb8c8>

A new connection would need a flood risk activity permit. The surface water discharge approach including discharge rate is within the remit of the Lead Local Flood Authority, and therefore we would advise discussing this with them.

I would also like to add that there should be no development over or within 8m of the culverted watercourse measured from the outside edge of the culvert. Development includes buildings, fencing, lamp posts, benches bins etc.

Please refer to the Open Government Licence which explains the permitted use for this information.

Please get in touch if you have any further queries.

Kind regards.

Helen Reynolds
Customer Engagement officer
Cumbria and Lancashire

From: Jordan McGlacken [<mailto:jordanmcglacken@burrowsgraham.com>]
Sent: 11 August 2021 12:58
To: CMBLNC Info Requests <Inforequests.cmbinc@environment-agency.gov.uk>
Cc: Mark Graham <markgraham@burrowsgraham.com>
Subject: RE: CL220819KR: penrhyn road - knowsley
Importance: High

Dear EA,

Please can you advise on when we might be able to expect a response to the below query?
Appreciate there is a back log of queries across the board, but an update would be appreciated so that we can let our client know.

Kind regards,

Jordan McGlacken **MEng (Hons)**
Civil Engineer

Burrows Graham
Arden Hall, 66 Brooklands Road, Sale, Cheshire M33 3SJ
E: jordanmcglacken@burrowsgraham.com
T: +44 (0)161 804 8046
www.burrowsgraham.com



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From: Jordan McGlacken

Sent: 16 July 2021 13:55

To: CMBLNC Info Requests <Inforequests.cmbInc@environment-agency.gov.uk>

Cc: Mark Graham <markgraham@burrowsgraham.com>

Subject: RE: CL220819KR: penrhyn road - knowsley [Filed 16 Jul 2021 13:55]

Good afternoon,

Thank you for your response and setting out the activities that require a permit.

Given the asset will be owned by the landowner that the culvert runs beneath, I wanted to confirm whether the EA have any requirements / constraints in terms of what can be built over or near the culverted watercourse, and if so, what are they?

With regards to the surface water drainage strategy for the site, where possible, surface water generated from the site will be drained by means of infiltration. Where this is not possible, we'll be looking to discharge surface water runoff to the nearest watercourse, which is the Knowsley Brook in its culverted form. Given the site is brownfield, it is proposed to discharge runoff at a rate that provides a 50% betterment to existing rates, in line with the KMBC Level 2 SFRA. We contacted the Knowsley LFFA to confirm whether this approach is acceptable and received the attached response, in which it is stated *'this is subject to provision of the results of the watercourse hydraulic modelling of the Knowsley Brook. The existing flood risk under the 100y + 40% Climate Change and 50% culvert blockage scenario should demonstrate that the brook has sufficient capacity for additional discharge'*.

Do the EA have any modelling information available for the Knowsley Brook to confirm its flood risk during the 1 in 100-year storm plus 40% climate change with a 50% culvert blockage scenario?

Kind regards,

Jordan McGlacken **MEng (Hons)**

Civil Engineer

Burrows Graham

Arden Hall, 66 Brooklands Road, Sale, Cheshire M33 3SJ

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From: CMBLNC Info Requests <Inforequests.cmblnc@environment-agency.gov.uk>

Sent: 06 July 2021 09:09

To: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>

Subject: CL220819KR: penrhyn road - knowsley [Filed 06 Jul 2021 09:20]

Dear Jordan

Enquiry regarding Penrhyn Road, Knowsley.

Thank you for your enquiry received on 9 June 2021.

We respond under the Freedom of Information Act 2000 and Environment Information Regulations 2004.

The watercourse has been diverted into a culvert, this was last surveyed by the Environment Agency in October 2018 and was deemed to be in fair condition with no major issues identified. See the below map of the culvert route and find attached the map/manhole cards as evidence showing the approx. culvert route and manhole locations from the contractor who carried out the culvert survey for the EA.



The owner of the asset will be the landowner that the culvert runs underneath.

Regarding works on the main river, under Environmental Permitting (England and Wales) Regulations 2016, a permit must be obtained for any activities which will take place:

- on or within 8 metres of a main river (16 metres if tidal)
- on or within 8 metres of a flood defence structure or culvert (16 metres if tidal)
- on or within 16 metres of a sea defence
- involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert
- In a floodplain more than 8 metres from the river bank, culvert or flood defence structure (16 metres if it's a tidal main river) and you don't already have planning permission.

You can find information on environmental permits here: <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

If your work fits into the categories above, your work is classed as a 'flood risk activity'. Some flood risk activities are excluded from needing an environmental permit however you must operate within the description and conditions of the exclusion. You can find more information about exclusions [here](#)

Additionally, some activities are exempt and you can carry out the work without a permit if you register an exemption, which is free. You can read about Flood Risk Exemptions [here](#)

We recommend looking at the different flood risk exclusions and exemptions online first to see if you can fit within the guidelines of one. If you are confident you fit the guidelines of the exemption, you can apply for free online: <https://register-flood-risk-exemption.service.gov.uk/> You don't need to complete any further steps if the work complies with an exclusion

If you believe you are not covered by an exclusion or exemption, a permit is needed. You can apply for a [Standard Rule permit](#) or a [Bespoke permit](#), each one varies in their cost and level of information required depending on the risk associated with the work.

Please send any application for a Standard Rule or Bespoke permit to CMBLNC-PSO@environment-agency.gov.uk.

The Environment Agency no longer comment on surface water drainage proposals as this is now the responsibility of the Lead Local Flood Authority. We recommend you contact the Local Authority to discuss options for surface water disposal.

Please refer to the Open Government Licence which explains their permitted use for this information.

Please get in touch if you have any further queries.

Kind regards,

Helen Reynolds
Customer Engagement officer
Cumbria and Lancashire

From: Jordan McGlacken [<mailto:jordanmcglacken@burrowsgraham.com>]
Sent: 16 June 2021 13:49
To: CMBLNC Info Requests <Inforequests.cmbInc@environment-agency.gov.uk>
Subject: RE: CL220819KR: penrhyn road - knowsley

Good afternoon,

Are you able to provide an update on when we might be able to expect a response to the below query?

Kind regards,

Jordan McGlacken **MEng (Hons)**
Civil Engineer
ACE Emerging Professionals Regional Chair

Burrows Graham
Arden Hall, 66 Brooklands Road, Sale, Cheshire M33 3SJ
E: jordanmcglacken@burrowsgraham.com
T: +44 (0)161 804 8046
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From: CMBLNC Info Requests <inforequests.cmblnc@environment-agency.gov.uk>

Sent: 09 June 2021 09:36

To: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>

Subject: CL220819KR: penrhyn road - knowsley

Dear Jordan

Thank you for contacting the Environment Agency regarding Penrhyn, Knowsley.

As your request for information falls under either the Freedom of Information Act or Environmental Information Regulations we must respond to you within 20 working days.

I have sent your request to the relevant team to answer and will be in touch with you in due course.

In the meantime you may wish to look at www.data.gov.uk to see if the data you have requested is available for you online.

For further information on what you can expect from us and our full service commitment to you, please click this link; <https://www.gov.uk/government/publications/environment-agency-customer-service-commitment>

If you need to contact me in the meantime, please do not hesitate to do so using the details below and quoting reference number CL220819KR.

Thanks

Karen

Karen Rooke

Customers and Engagement Officer, Cumbria and Lancashire

Environment Agency | Ghyll Mount, Gillan Way, Penrith 40 Business Park, Penrith, Cumbria, CA11 9BP

inforequests.cmblnc@environment-agency.gov.uk



From: Jordan McGlacken [<mailto:jordanmcglacken@burrowsgraham.com>]

Sent: 08 June 2021 16:15

To: CMBLNC Info Requests <inforequests.cmblnc@environment-agency.gov.uk>

Cc: Wilson, Leanne <Leanne.Wilson@environment-agency.gov.uk>

Subject: RE: penrhyn road - knowsley

Dear Environment Agency,

Hopefully, I'm now sending this to the correct email to have my query answered. We have been

commissioned to undertake a drainage strategy for a proposed commercial development in Knowsley – see site location plan attached.

Site address:

Penrhyn Road
Knowsley Business Park
Knowsley
L34 9HY

The site is located within flood zone 1. The surface water flood maps show some areas of the site to be at low to medium risk of surface water flooding and there are some small areas which are shown to be at high risk of surface water flooding.

The site has previously been developed. Where possible, surface water generated from the site will be drained by means of infiltration. Where this is not possible, we'll be looking to discharge surface water runoff to the nearest watercourse at a rate that provides a 50% betterment to existing rates, in line with the KMBC SFRA. The EA Main River map shows a statutory main river traversing the northern and western boundary of the site. However, it is understood that this is not visible on site and is therefore suspected to have been diverted as a culvert. See attached public sewer records extract, which shows this to be the case.

Please can the EA advise on the following:

- Confirm whether the watercourse mentioned above has been diverted and provide any information / records of the diverted watercourse route.
- Confirm the owner of the asset (diverted watercourse).
- Confirm whether the above approach to the disposal of surface water runoff is acceptable.
- Highlight any permits / approvals that are needed to discharge to a statutory main river.

If you need any further information from our end, please do not hesitate to get in touch.

Kind regards,

Jordan McGlacken **MEng (Hons)**
Civil Engineer
ACE Emerging Professionals Regional Chair

Burrows Graham

Arden Hall, 66 Brooklands Road, Sale, Cheshire M33 3SJ

E: jordanmcglacken@burrowsgraham.com

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From: Wilson, Leanne <Leanne.Wilson@environment-agency.gov.uk>
Sent: 08 June 2021 16:10
To: Gaskell, Ian <ian.gaskell@environment-agency.gov.uk>; Jordan McGlacken <jordanmcglacken@burrowsgraham.com>
Subject: RE: penrhyn road - knowsley

Hi Jordan

If you are requesting data/information about existing assets, please email:
Inforequests.cmbInc@environment-agency.gov.uk

If you need advice regarding permitting, please contact:
CMBLNC-PSO@environment-agency.gov.uk
Advice can also be found here:
<https://www.gov.uk/guidance/check-if-you-need-an-environmental-permit>

Thanks
Leanne

From: Gaskell, Ian
Sent: 08 June 2021 12:57
To: Wilson, Leanne <Leanne.Wilson@environment-agency.gov.uk>
Subject: FW: penrhyn road - knowsley

Hello Leanne

I have just spoken to Jordan (details below) regarding a site on Penrhyn Road, Knowsley, believing it to be a water quality enquiry. However, upon speaking with Jordan, he is seeking to find out information re culverted Knowsley Brook, EA assets, requirement for LD consent etc – I'm not sure of which officer would deal with this, but please could you re-direct, as appropriate ?

Many thanks

Ian

From: Jordan McGlacken [<mailto:jordanmcglacken@burrowsgraham.com>]
Sent: 08 June 2021 11:59
To: Gaskell, Ian <ian.gaskell@environment-agency.gov.uk>
Subject: RE: penrhyn road - knowsley

Hi Ian,

If you can call me on 07988047401 that'd be fab.

Kind regards,

Jordan McGlacken ***MEng (Hons)***
Civil Engineer
ACE Emerging Professionals Regional Chair

Burrows Graham
Arden Hall, 66 Brooklands Road, Sale, Cheshire M33 3SJ

E: jordanmcglacken@burrowsgraham.com

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From: Gaskell, Ian <ian.gaskell@environment-agency.gov.uk>

Sent: 08 June 2021 11:53

To: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>

Subject: penrhyn road - knowsley

Hello Jordan

Please send me a contact phone number and I will call you to discuss.

Regards

Ian

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From: [Tayefi, Vahid](#)
To: [Jordan McGlacken](#)
Cc: [Quinn, Mark](#); [Mark Graham](#); [Jack Williams](#); [Barry, Maria](#); [McNally, Rebekah](#); [Kilroe, Alan](#)
Subject: RE: External Mail: RE: Penrhyn Road - Knowsley Business Park - 21/00013/PREAPP [Filed 06 Sep 2021 07:20]
Date: 05 September 2021 18:10:15
Attachments: [image004.png](#)
[image005.png](#)
[image007.png](#)

Hi Jordan,

I believe the LLFA has already clarified its position with regards to the key elements of this proposal; I will however reiterate our position with regards to any new drainage proposal we receive for this site.

- It is claimed the site is brownfield, therefore a full explanation of the existing surface water management is required.
- With regards to the overall drainage strategy the applicant is required to provide evidence and justification that in selecting drainage features for post-development situation the surface water drainage discharge hierarchy has been followed. As requested by [National Planning Practice Guidance](#) applications should aim to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable:
 - into the ground (infiltration);
 - to a surface water body;
 - to a surface water sewer, highway drain, or another drainage system; and
 - to a combined sewer.To assess the feasibility of infiltration techniques as part of the proposed drainage strategy, evidence must be provided to show that a suitable number of soakaway tests have been completed across the whole site within different geology and to a suitable depth (i.e. a similar depth to the proposed infiltration devices). The tests should be completed according to the BRE 365 method and their results should be submitted with the full application.
- If turned out the infiltration methods are not feasible, then the LLFA considers the discharge to the culverted watercourse provided that evidence be presented showing such a discharge would not increase flood risk in and off site. As agreed before, the 100y + 40% CC (as agreed interpolation between 35 and 70% CC would be acceptable) and 50% blockage scenario at a node representing the proposed site is acceptable. Be aware the node mentioned in your email (i.e. Knowsley-4429) is not a representation of the water level at the proposed site. In addition, the effect of the sharp angles along the culverted section at north west and south west of the site should be considered on culvert capacity/water levels in your assessment.
- In designing the drainage strategy, the proposed SuDS should aim to minimise the impacts from a proposed development on water quantity and quality and maximise amenity and biodiversity. In designing an appropriate set of SuDS techniques for a development site, the LLFA will therefore be expecting above ground, green SuDS to be prioritised to promote water quality, amenity and biodiversity. The proposed drainage strategy should be able to demonstrate how water quality, amenity and biodiversity have been promoted.
- Sufficient information on the correct number of treatment stages in the surface water management train are also required, for further information see the [CIRIA SuDS Manual \(C753\)](#). Demonstrating that adequate water quality of the off-site surface water flows (draining into a sewer, watercourse and ground) in accordance with the Simplified Index Approach as set out within Section 26 of the SUDS Manual (C753) can be achieved during all phases of the development.
- Evidence that exceedance flows and runoff in excess of design criteria have been considered - calculations and plans should be provided to show where above ground flooding might occur and where this would pool and flow. The LLFA requires cross sections of the flood routing for the larger exceedance volumes, to ensure the kerb heights and surrounding topography do not allow flood flows to impose risk to properties, and other assets. as indicated.
- A temporary surface water management plan will be required to ensure that the surface water runoff, debris and muds are appropriately managed during construction phase to protect the surrounding sites and land drain.
- No indication of groundwater level has been provided. As a result, an assessment of groundwater level across the site will be required.

- The proposed impenetrable surfaces generated runoff from virtually all rainfall events leading to changes in runoff characteristics. These changes can have a negative impact on the morphology and ecology of receiving water bodies. The National Standards tends to direct developments towards more sustainable drainage systems by introducing the concept of interception. Interception aims to mimic greenfield runoff conditions. There are a range of interception methods including Green roofs, Rainwater harvesting, Soakaways/infiltration systems, permeable surfaces, Swales, Infiltration trenches, detention/attenuation basins. None of these methods have been used and, more importantly, no justification/explanation as to why they have not been integrated into the design has been provided.
- An evaluation of impact of potential failure of the proposed drainage system is required. Where the probability and consequence of such failure modes are considered unacceptable, then the drainage proposal should be modified or, the site layout changed, or topography altered. Failure mechanisms include blockage of pipes, blockage of outlet structures, failure of pumps and risk of impediments across planned flood routing paths.

Kind regards
Vahid

Dr Vahid Tayefi, BSc MSc PhD MCIWEM
Flood Risk and Drainage Specialist

Mob: 07766 500208

E-mail: vahid.tayefi@knowsley.gov.uk

Knowsley Council | Yorkon Building | PO Box 24 | Archway Road | Huyton | Merseyside L36 9YU



KNOWSLEY

From: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>

Sent: 03 September 2021 12:29

To: Tayefi, Vahid <Vahid.Tayefi@knowsley.gov.uk>

Cc: Quinn, Mark <mark.quinn@knowsley.gov.uk>; Mark Graham <markgraham@burrowsgraham.com>; Jack Williams <jackwilliams@burrowsgraham.com>; Barry, Maria <Maria.Barry@knowsley.gov.uk>

Subject: RE: External Mail: RE: Penrhyn Road - Knowsley Business Park

Good afternoon Vahid,

Following on from my previous email, the culverted watercourse passing through our site is 2000mm diameter and not 900mm as initially indicated. This means there is even more capacity in the culvert than initially assessed (which demonstrated there is capacity in the system to take flows from the development based on the 1 in 100 yr + 40% CC 50% blockage scenario and a 50% betterment to existing rates of runoff).

We are currently undertaking the Flood Risk Assessment and Drainage Strategy and would like to propose a surface water drainage strategy that the LLFA has agreed with in principle, prior to submission for planning next month.

Please can you indicate when we can expect to receive a response from the LLFA as to whether

the approach to discharging surface water runoff outlined in my previous email is acceptable?

If there's anything you need from our end, please do not hesitate to get in touch.

Kind regards,

Jordan McGlacken **MEng (Hons)**

Civil Engineer

Burrows Graham

Arden Hall, 66 Brooklands Road, Sale, Cheshire M33 3SJ

E: jordanmcglacken@burrowsgraham.com

T: +44 (0)161 804 8046

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From: Tayefi, Vahid <Vahid.Tayefi@knowsley.gov.uk>

Sent: 16 August 2021 16:56

To: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>

Cc: Quinn, Mark <mark.quinn@knowsley.gov.uk>; Mark Graham <markgraham@burrowsgraham.com>; Jack Williams <jackwilliams@burrowsgraham.com>; Barry, Maria <Maria.Barry@knowsley.gov.uk>

Subject: RE: External Mail: RE: Penrhyn Road - Knowsley Business Park [Filed 16 Aug 2021 16:57]

Ho Jordan,

In terms of climate change percentage, an interpolation of 35 and 70% instead of 40% is acceptable. In terms of betterment percentage and capacity of the culverted section on the site, the LLFA will respond after reconsidering the culvert/site characteristics and proposed development in due time.

Kind Regards

Vahid

Dr Vahid Tayefi, BSc MSc PhD MCIWEM

Flood Risk and Drainage Specialist

Mob: 07766 500208

E-mail: vahid.tayefi@knowsley.gov.uk



KNOWSLEY

From: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>

Sent: 16 August 2021 14:54

To: Tayefi, Vahid <Vahid.Tayefi@knowsley.gov.uk>

Cc: Quinn, Mark <mark.quinn@knowsley.gov.uk>; Mark Graham <markgraham@burrowsgraham.com>; Jack Williams <jackwilliams@burrowsgraham.com>

Subject: External Mail: RE: Penrhyn Road - Knowsley Business Park

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Good afternoon Vahid,

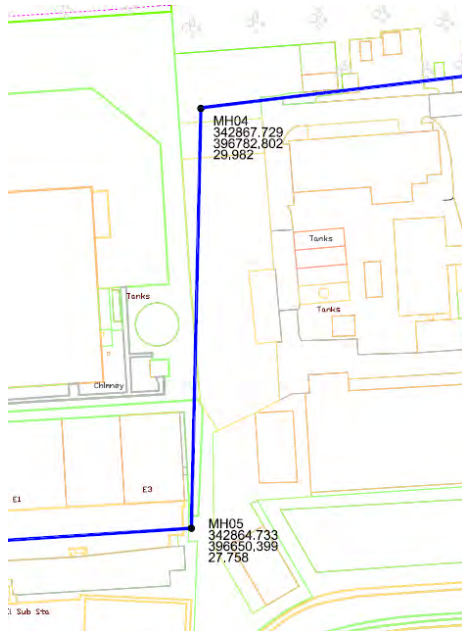
I hope you are well.

Following on from the email below in connection to discharge rates for surface water into the culverted watercourse within the site, the EA have provided fluvial data taken from the Knowsley Brook 2017 study (part of the Upper Alt Tributaries package). Climate change allowances provided as part of this study include a 30%, 35% and 70% increase in river flows. Simulation of various structure blockage scenarios to assess the implications of culvert blockage on local flood risk have been run as part of the study.

The impact of blockage was modelled for four structures in the vicinity of the site, including the A580 East Lancashire Road Culvert, which is the nearest. This corresponds to node ref: KNOW01_4429. Blockage runs were carried out for the following blockage proportions at each of these structures: 25%, 50%, and 75%. Blockage runs were carried out for the following event: 1% AEP (present day) and 1% AEP with climate change (+30%).

In your response below, you stipulated the 50% blockage and 1 in 100 plus 40% climate change scenario be used to assess the culverts capacity. Given data for the 40% scenario has not been provided, the 40% climate change scenario has been interpolated based on the 35% and 70% scenarios and corresponds to a flow of 1.31 m³/s or 1310 l/s.

The EA has also provided levels for manholes within the site – see extract below. The gradient of the culvert between MH04 and MH05 can be calculated to be 1:60. Based on the Colebrook-white equation, the capacity for a 900mm diameter pipe at 1:60 gradient is 2570 l/s. Therefore, the culvert has almost half its capacity remaining (circa. 1250 l/s spare capacity).



We are looking to provide a 50% betterment to existing runoff rates prior to discharging to the culverted watercourse. Based on the rational method and assuming a 50 mm / hour rainfall intensity and the site being 65% impermeable (to be confirmed once topographical survey is received), a 50% betterment to existing rates would correspond to 172 l/s.

Subject to confirmation of the actual measured impermeable area of the site and infiltration not being feasible, please can you confirm the approach set out above is acceptable to the LLFA?

I've attached correspondence with EA to date and the information they have provided. If any further information is required from our end, please do let me know.

Kind regards,

Jordan McGlacken **MEng (Hons)**
Civil Engineer

Burrows Graham

Arden Hall, 66 Brooklands Road, Sale, Cheshire M33 3SJ

E: jordanmcglacken@burrowsgraham.com

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From: Tayefi, Vahid <Vahid.Tayefi@knowsley.gov.uk>
Sent: 09 July 2021 12:41
To: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>
Cc: Quinn, Mark <mark.quinn@knowsley.gov.uk>
Subject: Penrhyn Road - Knowsley Business Park [Filed 09 Jul 2021 12:42]

Hi Jordan,

With regards to your enquiries please see below the LLFA comments:

The site has previously been developed. The EA Main River map shows the Knowsley Brook to traverse the northern and western boundary of the site, whereas the public sewer records (attached) show the Knowsley Brook to be culverted through the site.

LLFA: Knowsley Brook is categorised as a Main River and the EA is in charge for the maintenance. The EA should therefore be consulted on the actual route of the watercourse.

Where possible, surface water generated from the site will be drained by means of infiltration. Where this is not possible, we'll be looking to discharge surface water runoff to the nearest watercourse, which is the Knowsley Brook in its culverted form. It is proposed to discharge runoff at a rate that provides a 50% betterment to existing rates, in line with the KMBC Level 2 SFRA.

LLFA: The first option for surface water disposal is through infiltration systems. To make sure the infiltration approach is appropriate, site inspection, infiltration tests using the BRE 365 method, trial pits, water levels and boreholes investigation should be undertaken. In addition, the issues of ground instability due to frequent discharge of water into ground, soil integrity /weakening due to saturation, risk of pollution/contamination to groundwater or receiving water bodies and groundwater flooding should appropriately investigated.

Discharge in post development situation will generally be determined considering the discharge method at pre development condition. Discharge to the main rivers should be permitted by the EA. This is subject to provision of the results of the watercourse hydraulic modelling of the Knowsley Brook. The existing flood risk under the 100y + 40% Climate Change and 50% culvert blockage scenario should demonstrate that the brook has sufficient capacity for additional discharge.

%50 betterment would be acceptable provided that the discharge method, capability of the site in infiltration and storage and available capacity of receiving waterbody or sewer system. Where there is no restriction in term of discharge rate, 50% betterment is acceptable.

Please can the LLFA confirm whether any of the drainage / watercourse features within the site are within your ownership / responsibility and whether the above approach to discharging surface water is acceptable? Any additional drainage / flood related information you deem relevant to site (e.g., historic flood records etc.) is welcomed.

LLFA: The EA owns the watercourse and has responsibility in its maintenance. At this stage and as long as we do not have details of the site characteristics the LLFA cannot determine the feasibility and acceptability of the proposed approach.

Hope the above is useful.

Regards
Vahid

Dear Knowsley Flood Team,

We are currently devising a drainage strategy for a proposed 3.8-hectare commercial development in Knowsley – refer to the site location plan attached.

Site address:
Penrhyn Road
Knowsley Business Park
Knowsley
L34 9HY

The site is located within flood zone 1. The surface water flood maps show some areas of the site to be at low to medium risk of surface water flooding and there are some small areas which are shown to be at high risk of surface water flooding.

The site has previously been developed. The EA Main River map shows the Knowsley Brook to traverse the northern and western boundary of the site, whereas the public sewer records (attached) show the Knowsley Brook to be culverted through the site. Where possible, surface water generated from the site will be drained by means of infiltration. Where this is not possible, we'll be looking to discharge surface water runoff to the nearest watercourse, which is the Knowsley Brook in its culverted form. It is proposed to discharge runoff at a rate that provides a 50% betterment to existing rates, in line with the KMBC Level 2 SFRA.

Please can the LLFA confirm whether any of the drainage / watercourse features within the site are within your ownership / responsibility and whether the above approach to discharging surface water is acceptable? Any additional drainage / flood related information you deem relevant to site (e.g., historic flood records etc.) is welcomed.

If you need any further information from our end, please do not hesitate to get in touch.

Kind regards,

Jordan McGlacken **MEng (Hons)**
Civil Engineer
ACE Emerging Professionals Regional Chair

Burrows Graham
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Graham**

Dr Vahid Tayefi, BSc MSc PhD MCIWEM
Flood Risk and Drainage Specialist

Tel: 0151 443-2704

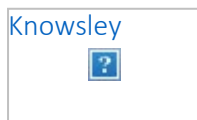
Mob: 07766 500208

E-mail: vahid.tayefi@knowsley.gov.uk

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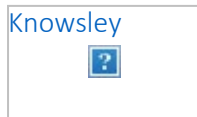
KNOWSLEY



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E: jordanmcglacken@burrowsgraham.com

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From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Sent: 15 September 2021 08:43

To: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>

Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: RE: PRE DEVELOPMENT APPLICATION AT Penrhyn Road, Knowsley Bus Park, Knowsley, L34 9HY - UU Ref – 4200040970 [Filed 15 Sep 2021 09:12]

Jordan,

I have checked our records and we have no record of flooding from the public sewers in the vicinity of the site. Please note as the culverted watercourse which crosses your site is not a public sewer we do not have any information regarding if the culvert floods.

Kind Regards,



Alistair Graham

Wastewater Developer Engineer
Developer Services & Metering
Customer Services
M: 07765941555
unitedutilities.com

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Coronavirus

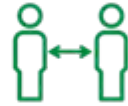
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hands



Disinfect
common surfaces



Practise social
distancing



FEVER +
COUGH

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have symptoms

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From: Jordan McGlacken [<mailto:jordanmcglacken@burrowsgraham.com>]

Sent: 03 September 2021 14:06

To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Cc: Mark Graham <markgraham@burrowsgraham.com>

Subject: PRE DEVELOPMENT APPLICATION AT Penrhyn Road, Knowsley Bus Park, Knowsley, L34 9HY - UU Ref – 4200040970

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Good afternoon,

Thank you for your wastewater pre-development response.

Please can you confirm whether you have any historical flood records of any sewers within the vicinity of the site?

Kind regards,

Jordan McGlacken MEng (Hons)

Civil Engineer

Burrows Graham

Arden Hall, 66 Brooklands Road, Sale, Cheshire M33 3SJ

E: jordanmcglacken@burrowsgraham.com

T: +44 (0)161 804 8046

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From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Sent: 18 June 2021 13:17
To: Jordan McGlacken <jordanmcglacken@burrowsgraham.com>
Subject: FW: PRE DEVELOPMENT APPLICATION AT Penrhyn Road, Knowsley Bus Park, Knowsley, L34 9HY - UU Ref – 4200040970

Hi Jordon

I have attached Wastewater Pre dev

Many thanks

-

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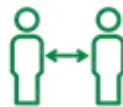
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COUGH

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Sharon Hitch

Developer Services Assistant
Developer Services & Metering
Customer Services
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fill in the survey below. This will be much appreciated



Visit: <https://unitedutilities.thewowawards.co.uk/nominate>

From: Wastewater Developer Services

Sent: 18 June 2021 13:16

To: 'jordanmcglacken@burrowsgraham.com' <jordanmcglacken@burrowsgraham.com>

Subject: PRE DEVELOPMENT APPLICATION AT Penrhyn Road, Knowsley Bus Park, Knowsley, L34 9HY - UU Ref – 4200040970

Dear Jordon ,

PRE DEVELOPMENT APPLICATION AT Penrhyn Road, Knowsley Bus Park, Knowsley, L34 9HY - UU Ref – 4200040970

Please accept this email as receipt of your application received on 18/06/2021 for the above development. This has now been logged on our system and the job reference is **4200040970**, we would ask that you quote this reference in all future correspondence.

I have reviewed your application (and attachments) and can confirm this is **not** suitable to start technical assessment. The application checklist details the required information for technical assessment; however, for an Engineer to start assessing your application, please provide the following:

- Application form

In the meantime, if I can be of any further help, please let me know.

Kind regards

-

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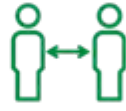
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Developer Services & Metering
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From: WaterMains

Sent: 18 June 2021 11:42

To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: FW: Penrhyn Road - Knowsley

Hiya,

Just booking this on as a clean water PDE but the below email has lots of info about foul and surface water.

Is this something Waste can help with?

If not please let me know ☺

Kind regards,



Eireann Thompson

Customer Advisor Advanced
Developer Services & Metering
Customer Services

T: 0345 072 6067
unitedutilities.com

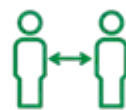
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common surfaces



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From: DeveloperServicesWater
Sent: 18 June 2021 11:39
To: WaterMains <WaterMains@uuplc.co.uk>
Subject: FW: Penrhyn Road - Knowsley

Please see below

Alisha

From: Jordan McGlacken [<mailto:jordanmcglacken@burrowsgraham.com>]
Sent: 18 June 2021 11:33
To: DeveloperServicesWater <DeveloperServicesWater@uuplc.co.uk>
Subject: Penrhyn Road - Knowsley

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Dear United Utilities,

Please find attached completed pre-development enquiry application for a proposed 3.8-hectare commercial development in Knowsley – refer to the site location plan attached.

Site address:
Penrhyn Road
Knowsley Business Park
Knowsley
L34 9HY

Surface water

The site has previously been developed. The EA Main River map shows the Knowsley Brook to traverse the northern and western boundary of the site. However, the public sewer records (attached) show the Knowsley Brook to be culverted through the site. The records also show there to be a head of a surface water sewer within the site. During a site walk over, what appeared to be this manhole on site, showed flows coming from a northerly direction in dry conditions.

Where possible, surface water generated from the site will be drained by means of infiltration. Where this is not possible, we'll be looking to discharge surface water runoff to the nearest watercourse, which is the Knowsley Brook in its culverted form. It is proposed to discharge runoff at a rate that provides a 50% betterment to existing rates, in line with the KMBC SFRA.

Please can UU clarify its ownership of the drainage systems within the site and whether the above approach to discharging surface water is acceptable?

Foul water

It is proposed to discharge foul water generated from the development to the 375mm diameter foul sewer in Penrhyn Road. Please can UU confirm this approach is acceptable and if the 375mm foul sewer has capacity to take the foul flows set out in the developer enquiry form, which have been calculated using the formula below:

$$6DWF = 6PG + I + 3E$$

Where:

6DWF = foul drainage design flow (l/d)

P = population = 30 litres per person per day

G = water consumption = 30 l/person/day

I = dry weather infiltration = 10%

E = trade effluent = 0.2 l/s/ha

If you need any further information from our end, please do not hesitate to get in touch.

Kind regards,

Jordan McGlacken MEng (Hons)

Civil Engineer

ACE Emerging Professionals Regional Chair

Burrows Graham

Arden Hall, 66 Brooklands Road, Sale, Cheshire M33 3SJ

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T: +44 (0)161 804 8046

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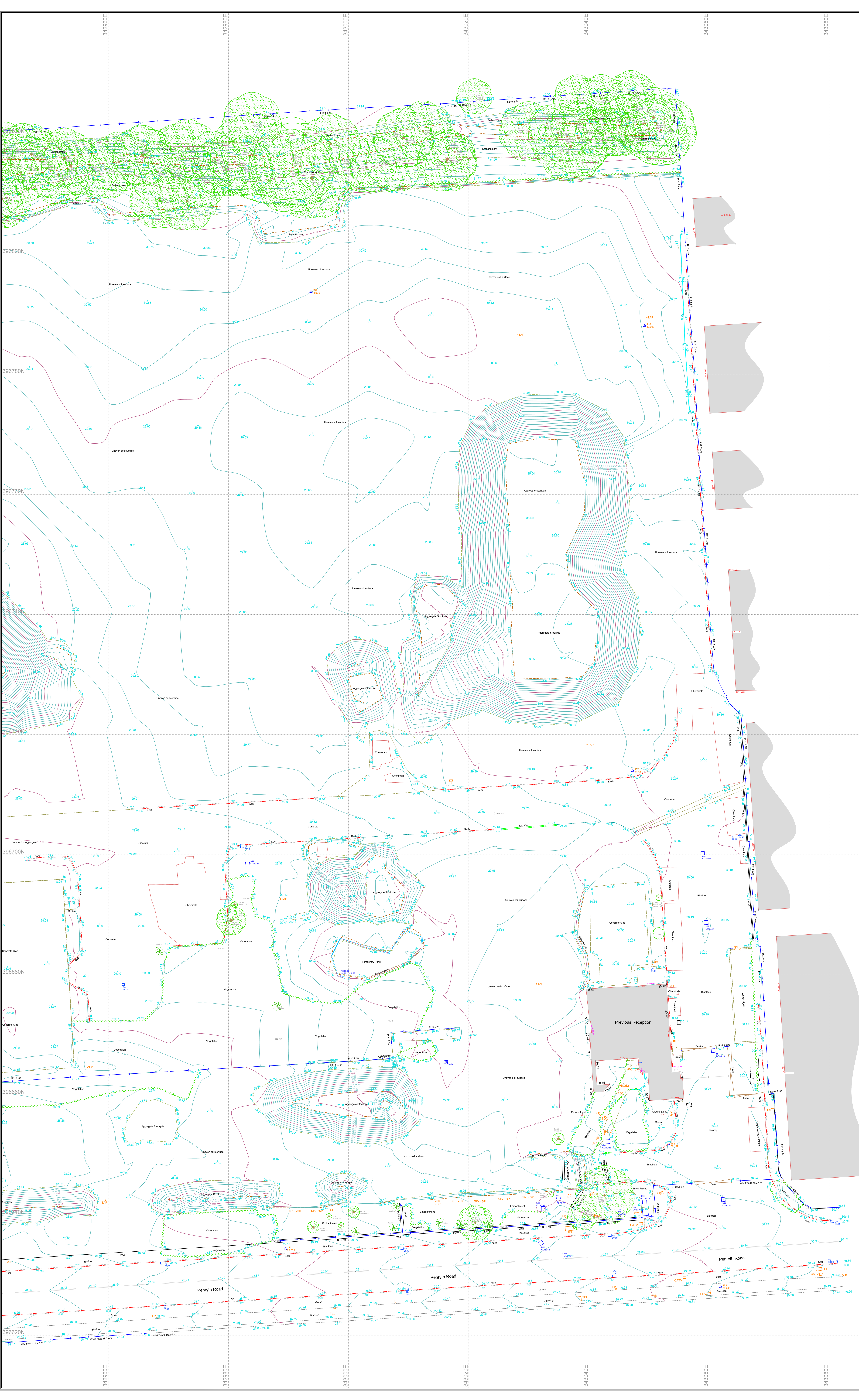
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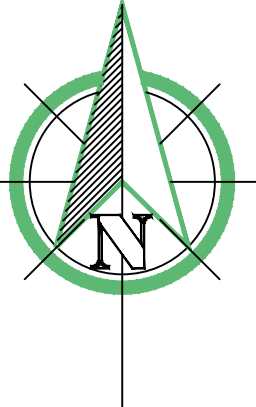
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APPENDIX C – TOPOGRAPHICAL SURVEY





KEY:

Red line	ADU	Any Controlling Unit	LS	Life Protection
Green line	ADU	Any	LS	Life Protection
Blue line	ADU	Any	LS	Life Protection
Yellow line	ADU	Any	LS	Life Protection
Orange line	ADU	Any	LS	Life Protection
Purple line	ADU	Any	LS	Life Protection
Grey line	ADU	Any	LS	Life Protection
Black line	ADU	Any	LS	Life Protection
White line	ADU	Any	LS	Life Protection
...	...	...	...	...

Station	Easting (m)	Northing (m)	Level (m)
JS1	34286.003	39658.077	28.063
JS2	34289.952	39625.338	28.237
JS3	34285.475	39654.352	28.035
JS4	34301.905	39628.049	30.245
JS5	34303.320	39651.662	30.169
JS6	34303.787	39684.436	30.130
JS7	34304.312	39673.970	30.180
JS8	34304.305	39678.091	30.683
JS9	34293.745	39673.739	30.532
JS10	34293.664	39675.945	30.145
JS11	34297.725	39671.510	29.639
JS12	34287.910	39673.744	28.816
JS13	34283.788	39672.705	28.591
JS14	34285.103	39637.156	28.010

Levels

Please note that the levels shown on this drawing are as follows:

- Arbitrary
- Related to an Ordnance Survey Bench Mark
- Related to the Ordnance Survey National GPS Network

Survey Coordinates and Grid

Please note that the grid shown on this drawing is as follows:

- Arbitrary
- Related to an Ordnance Survey Digital Sheet
- Related to the Ordnance Survey National GPS Network

NOTES

All critical measurements should be checked on site prior to design.
No liability will be taken for the use of the data on this drawing.
Some measurements may be omitted in areas of parked vehicles and vegetation.

Survey Hub

Nottingham | Manchester | London
Head Office: 0135 7141123
www.surveyhub.co.uk

Client: Knowsley Redevelopments Ltd

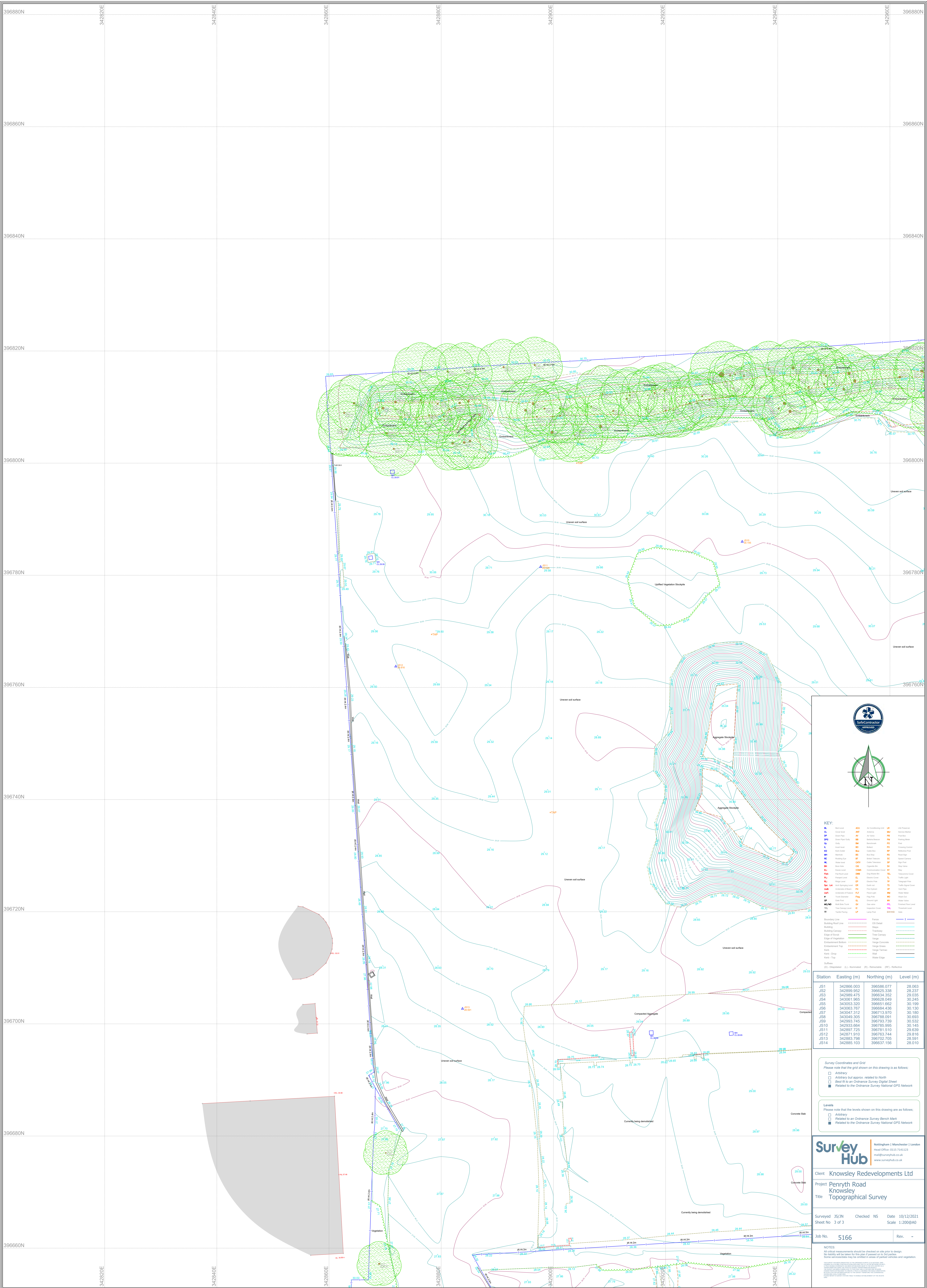
Project: Penryth Road Knowsley

Title: Topographical Survey

Surveyed: JS/3N Checked: NS Date: 10/12/2021

Sheet No: 2 of 3 Scale: 1:200@A0

Job No. 5166 Rev. -



APPENDIX D – PUBLIC SEWER RECORDS AND DRAINAGE SURVEY INFORMATION

Jordan McGlacken

Arden Hall
66 Brooklands Road,
Cheshire,
M33 3SJ

FAO:

How to contact us:

**United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP**

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

**Your Ref: Graftongate
Our Ref: UUPS-ORD-290040
Date: 01/06/2021**

Dear Sirs

Location: ALFRED PRICE & SONS LTD PENRHYN ROAD, KNOWSLEY BUSINESS PARK, PRESCOT, L34 9HY

I acknowledge with thanks your request dated 25/05/2021 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

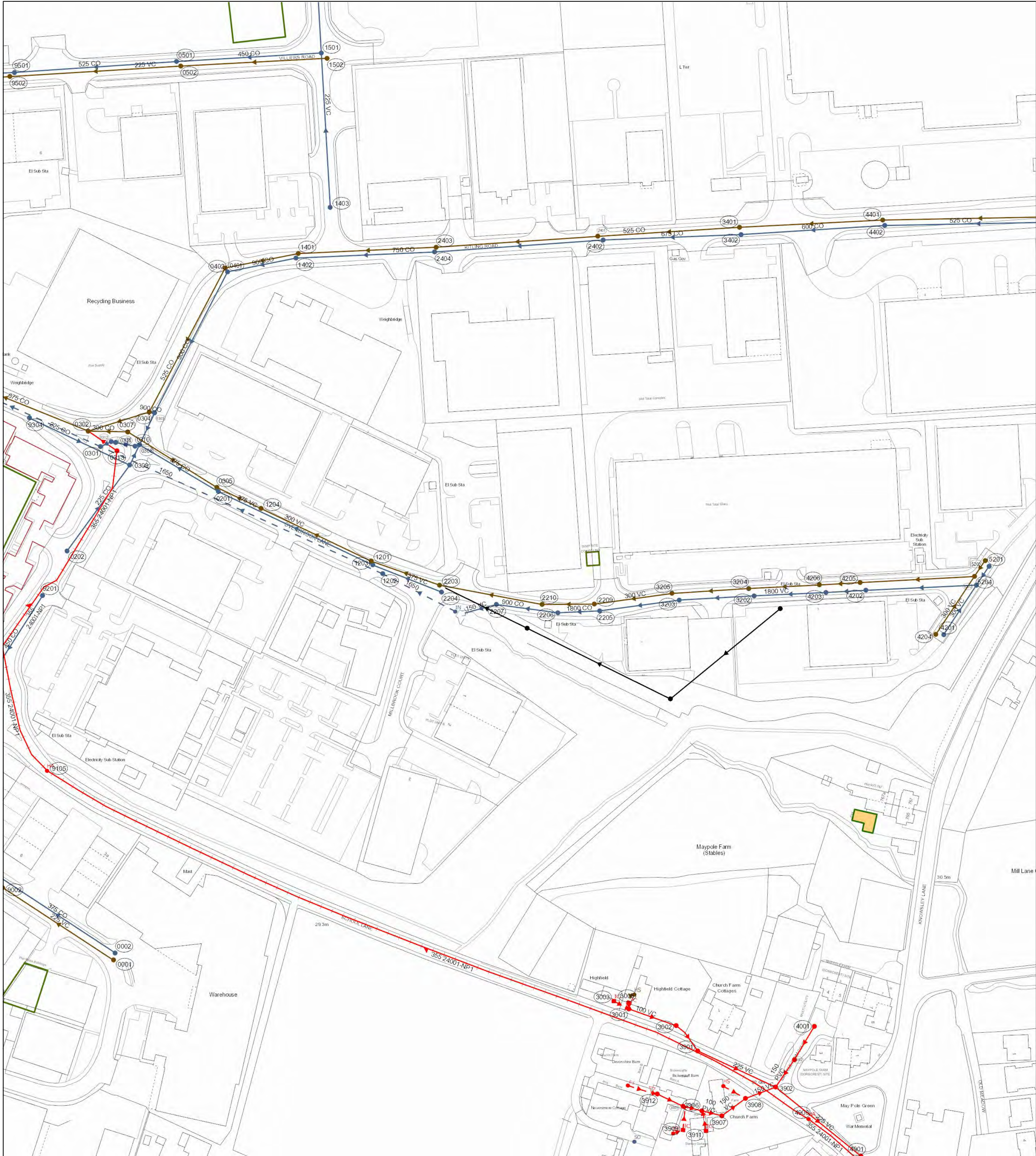
TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



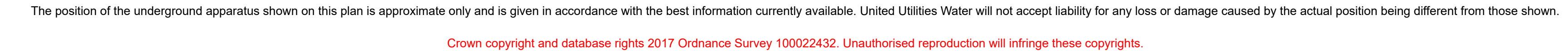
Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
8101	27	SW	24.61	300			VC	8.062258	1 in 805
8204	26.91	SW	24.61	900			VC	8.062258	1 in 403
9002		FO	0	225			VC	78.84399	
8002		FO	0	225			VC	78.84399	
6110	26.48	SW	25.07	450			CO	17.26268	
5103	25.08	SW	24.23	600			VC	54.81812	
7001		SW	25.07	525			CO	51.34272	1 in 175
5105	25.88	SW	24.46	600			VC	36.61424	1 in 112
5107	26.15	FO	25	225			VC	39.08654	
0001		FO	0	225			VC	72.94518	
9501	29.26	SW	26.65	525			CO	101.7492	1 in 75
9501	29.26	SW	26.65	525			CO	101.7492	1 in 75
9501	29.26	SW	26.65	525			CO	101.7492	1 in 75
9501	29.26	SW	26.65	525			CO	101.7492	1 in 75
8303	28.27	FO	0	675			CO	24.98977	
7403	25.98	FO	0	675			CO	82.0975	
7403	25.98	FO	0	675			CO	82.0975	
6104	26.2	SW	24.81	450			CO	162.7882	1 in 271
7005		SW	25.1	525			CO	42.71496	
8304		FO	0	675			CO	63.51378	
4402		SW	0	450			VC	49.36588	
4402		SW	0	450			VC	49.36588	
0313		CO	28.75	450			CO	19.17859	
0313		CO	28.75	450			VC	19.17859	
4206		SW	0	300			VC	17.26268	
8201	27.11	SW	24.75	800			CO	60.20787	
4102	75.47	SW	73.73	600			CO	30.59412	1 in 96
9304	30.17	SW	0	225			CO	61.20587	
7201	26.91	FO	25.57	300			CO	100.1224	
6108	26.28	SW	25.07	450			CO	34.71311	1 in 145
9303	28.74	SW	26.13	675			CO	71.36219	
0002	28.32	SW	26.18	375			CO	76.55064	1 in 174
7301	27.13	SW	25.98	300			CO	76.55064	1 in 174
0002	28.32	SW	26.18	375			VC	84.69994	1 in 250
1202		SW	1650				VC	170.3362	
7006		FO	0	150			VC	40.00307	
8503	27.64	FO	0	450			VC	59.69713	
9101	27.41	FO	26.98	750			CO	77.10385	1 in 355
6102		SW	0	300			VC	17.46425	
8306		FO	0	300			VC	22.84732	
9001	27.73	SW	26.71	450			CO	74.86658	1 in 187
6501	25.15	FO	0	675			CO	86.27862	
6501	25.15	FO	0	675			CO	86.27862	
0304	30.4	FO	26.39	525			CO	35.22092	1 in 48
9502	29.24	FO	26.13	225			VC	94.56497	1 in 53
9502	29.24	FO	26.13	225			VC	94.56497	1 in 53
9502	29.24	FO	26.13	225			VC	94.56497	1 in 53
9502	29.24	FO	26.13	225			VC	94.56497	1 in 53
7103	26.63	SW	25.27	375			VC	35.90265	1 in 199
7003		FO	0	225			VC	82.0253	
8312		FO	0	300			VC	8.062258	
8401	27.62	FO	0	450			VC	48.01041	
8401	27.62	FO	0	450			VC	48.01041	
8103	27.4	FO	26.77	300			VC	85.96999	1 in 660
5102	25.03	FO	23.99	225			VC	64.13268	
8504	27.91	SW	0	675			VC	17.05183	
8504	27.91	SW	0	675			VC	17.05183	
5109	25.84	FO	24.22	225			VC	40.29015	1 in 183
8302	28.32	FO	0	150			VC	26.40076	
6201	26.95	FO	25.21	225			VC	14.76482	
5504		SW	22.19	525			CO	36.61424	
5504		SW	22.19	525			CO	36.61424	
5504		SW	22.19	525			CO	36.61424	
5504		SW	22.19	525			CO	36.61424	
8001	26.89	SW	24.14	525			CO	9.280141	
8002		FO	0	225			VC	49.36588	1 in 466
8104	27.39	FO	26.85	750			VC	60.63627	
0502	30.37	FO	27.12	225			VC	94.39835	1 in 95
0502	30.37	FO	27.12	225			VC	94.39835	1 in 95
0307	29.93	FO	24.87	300			CO	21.70387	1 in 241
0307	29.93	FO	24.87	300			CO	21.70387	1 in 241
0312		SW	0	900			VC	6.546992	
0312		SW	0	900			VC	6.546992	
9201		FO	0	450			VC	68.7968	
9201		FO	0	450			VC	68.7968	
7303	27.08	FO	26.57	225			VC	83.67798	1 in 220
5108	26.1	FO	24.65	225			VC	31.06496	1 in 62
7006		SW	0	525			VC	15.96242	
8203	26.91	SW	24.83	900			VC	5.385165	1 in 269
5110	26.15	SW	25.3	450			CO	40.4485	1 in 270
8505	27.86	FO	0	675			CO	52.85331	
8505	27.86	FO	0	675			CO	52.85331	
6101		FO	0	225			VC	14.14214	
9102		FO	0	225			VC	82.92768	
7203	26.84	SW	25.51	375			VC	31.7806	1 in 144
6106	26.04	SW	24.58	675			CO	15.29706	1 in 306
7012		FO	0	150			VC	16.5803	
5201		FO	0	150			VC	14.59022	
8506	27.89	FO	0	450			CO	38.32424	
8506	27.89	FO	0	450			CO	38.32424	
5506	24.62	SW	22.51	525			CO	13.6944	1 in 196
5506	24.62	SW	22.51	525			CO	13.6944	1 in 196
7202	26.78	FO	25.19	225			VC	62.36987	1 in 567
0301		SW	1650				VC	107.3013	
8402	28.03	SW	0	525			CO	56.0803	
8402	28.03	SW	0	525			CO	56.0803	
6105	26.96	SW	25.98	300			VC	17.26268	1 in 34
8307		FO	0	300			VC	28.01795	
4101		FO	0	225			VC	79.62411	
6107	26.28	FO	24.82	225			VC	50.01	
0305	29.38	FO	25.31	300			VC	57.80425	1 in 131
9104		SW	0	450			VC	64.63745	
8403	28.24	FO	0	450			CO	59.9333	
8403	28.24	FO	0	450			CO	59.9333	
7010		SW	150				VC	14.60847	
5104	25.93	FO	24.22	225			VC	7.56387	1 in 34
7007		SW	150				VC	35.40482	
8202	27.1	FO	23.67	300			VC	62.43396	1 in 624
5505	24.62	SW	22.44	525			CO	32.03445	1 in 128
5505	24.62	SW	22.44	525			CO	32.03445	1 in 128
5507	24.58	SW	23.16	150			VC	30.41381	1 in 58
5507	24.58	SW	23.16	150			VC	30.41381	1 in 58
5111	26.1	SW	25.15	450			CO	29.61902	1 in 296
6109	26.53	FO	25.94	225			VC	11.16034	1 in 51
0302	29.72	FO	24.4	675			VC	98.97717	1 in 202
0302	29.72	FO	24.4	675			VC	98.97717	1 in 202
0501	30.32	SW	27.62	525			CO	89.70023	1 in 62
0501	30.32	SW	27.62	525			CO	89.70023	1 in 62
5401	24.87	SW	22.64	450			CO	22.45727	1 in 173
5401	24.87	SW	22.64	450			CO	22.45727	1 in 173
6102		SW	0	225			VC	42.43816	
6202	26.96	SW	25.6	300			VC	19.41648	1 in 647
4205		FO	0	225			VC	14	
7302	26.91	SW	25.97	225			VC	22.56103	1 in 564
0202	30.17	SW	0	225			CO	58.76852	
0202	30.17	SW	0	225			CO	58.76852	
8003		FO	0	225			VC	31.62278	
7004		SW	525				CO	4.273756	
7402	26.54	FO	0	675			CO	77.62087	
5112	26	SW	24.53	600			CO	9.61521	1 in 192
0311		SW	0	900			CO	2.386017	
0311		SW	0	900			CO	2.386017	
8205	26.63	SW	24.83	900			CO	96.64885	
9302		SW	1650				VC	179.4413	
0310		SW	900				CO	10.78387	
9103		SW	0	450			CO	12.16553	
8308		SW	900				CO	11.6619	

Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
8101	27	SW	24.61	300			VC	8.062258	1 in 805
8204	26.91	SW	24.61	900			VC	8.062258	1 in 403
9002		FO	0	225			VC	78.84399	
8002		FO	0	225			VC	78.84399	
6110	26.48	SW	25.07	450			CO	17.26268	
5103	25.08	SW	24.23	600			VC	54.81812	
7001		SW	25.07	525			CO	51.34272	1 in 175
5105	25.88	SW	24.46	600			VC	36.61424	1 in 112
5107	26.15	FO	25	225			VC	39.08654	
0001		FO	0	225			VC	72.94518	
9501	29.26	SW	26.65	525			CO	101.7492	1 in 75
9501	29.26	SW	26.65	525			CO	101.7492	1 in 75
9501	29.26	SW	26.65	525			CO	101.7492	1 in 75
9501	29.26	SW	26.65	525			CO	101.7492	1 in 75
8303	28.27	FO	0	675			CO	24.98977	
7403	25.98	FO	0	675			CO	82.0975	
7403	25.98	FO	0	675			CO	82.0975	
6104	26.2	SW	24.81	450			CO	162.7882	1 in 271
7005		SW	25.1	525			CO	42.71496	
8304		FO	0	675			CO	63.51378	
4402		SW	0	450			VC	49.36588	



Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
5201	33.26	SW	30.68	300		VC	12.42345	1 in 4	
4201	32.8	SW	29.5	300		VC	32.74879	1 in 17	
2205	30.28	SW	27.35	1800		CO	23.01705	1 in 1151	
9002		FO	0	225		VC	76.84399		
9002		FO	0	225		VC	76.84399		
4204	32.81	FO	28.6	300		VC	38.42133	1 in 213	
5202	33.14	SW	27.56	1800		VC	61.07722	1 in 1018	
4202	32.31	SW	27.5	1800		VC	22.09162	1 in 736	
2204	29.26	SW	27.78	375		VC	40.77466	1 in 127	
0502	30.37	FO	27.12	225		VC	94.39835	1 in 85	
0502	30.37	FO	27.12	225		VC	94.39835	1 in 85	
3402	34	SW	30.35	675		CO	76.05919	1 in 82	
3402	34	SW	30.35	675		CO	76.05919	1 in 82	
3002		CO	0	100		VC	18.30024		
4902		CO	0	100		VC	18.30024		
0307	29.93	FO	24.87	300		PVC	18.24101		
0307	29.93	FO	24.87	300		PVC	21.70387	1 in 241	
0312		SW	0	900		CO	6.548992	1 in 241	
0312		SW	0	900		CO	6.548992		
9201		SW	0	450		CO	68.7968		
9201		SW	0	450		CO	68.7968		
2207	29.4	SW	26.37	150		CO	18.02735	1 in 49	
3203	30.84	SW	27.4	1800		VC	44.19337	1 in 884	
0001		FO	0	225		VC	72.94518		
0001		FO	0	225		VC	72.94518		
4203	32.01	SW	27.47	1800		VC	39.45291	1 in 1315	
9501	29.26	SW	26.65	525		CO	101.7462	1 in 75	
9501	29.26	SW	26.65	525		CO	101.7462	1 in 75	
9501	29.26	SW	26.65	525		CO	101.7462	1 in 75	
9501	29.26	SW	26.65	525		CO	101.7462	1 in 75	
3401	33.97	FO	30.41	525		CO	78.1601	1 in 82	
3401	33.97	FO	30.41	525		CO	78.1601	1 in 82	
4205		VC	22.2599	300		VC	22.2599		
1204	32.27	FO	29.06	300		VC	27.12157	1 in 223	
2203	29.16	FO	26.32	300		VC	40.05208	1 in 118	
0401	30.53		0	525		CO	89.78237		
0303	30.24	SW	25.52	900		CO	59.59299	1 in 136	
1203	29.92	FO	27.48	375		VC	94.1675		
0309	30.17	SW	0	225		CO	12.45991		
0309	30.17	SW	0	225		CO	39.1512	1 in 218	
0313	31.96	CO	28.75	450		CO	19.17859		
0313		CO	28.75	450		CO	19.17859		
4204	33.15	FO	29.42	300		VC	63.19396	1 in 175	
0402	30.48	SW	0	900		CO	87.49032		
3607		FO	0	150		VC	16.09037		
3204	31.41	FO	28.78	300		VC	42.26207	1 in 222	
3601		FO	0	100		VC	27.07722		
9304	30.17	SW	0	225		CO	61.20567		
9304	30.17	SW	0	225		CO	61.20567		
2401	32.47	FO	29.37	525		CO	89.2491	1 in 124	
0002	28.32	SW	26.18	375		VC	76.55064	1 in 174	
0002	28.32	SW	26.18	375		VC	76.55064	1 in 174	
3205	30.82	FO	26.59	300		VC	43.26692	1 in 228	
1202		SW	28.97	750		CO	170.5382		
2402	32.53	SW	28.97	750		CO	93.16821	1 in 114	
0303	30.24	SW	0	900		CO	3.040559	1 in 114	
1502	31.45	FO	28.13	225		VC	80.86464	1 in 80	
1502	31.45	FO	28.13	225		VC	80.86464	1 in 80	
0301		SW	1650			CO	107.3913		
0301		SW	1650			CO	107.3913		
0201	29.16	SW	26.77	375		VC	50.58563	1 in 126	
3908		CO	150			VC	17.75389		
3902	32.26	CO	29.83	225		VC	86.44095	1 in 216	
2209	30.23	FO	26.4	300		VC	28.81784	1 in 222	
4901	32.26	CO	29.55	225		VC	21.54066	1 in 83	
4402	35.4	SW	31.84	600		VC	76.15807	1 in 83	
4402	35.4	SW	31.84	600		VC	76.15807	1 in 83	
0305	29.36	FO	25.31	300		VC	57.80425	1 in 131	
3202	31.5	SW	27.44	1800		VC	41.46094	1 in 1037	
1401	30.77	FO	27.86	525		CO	41.1045		
1501	31.39	SW	26.64	450		CO	79.86327	1 in 78	
1501	31.39	SW	26.64	450		CO	79.86327	1 in 78	
1402	30.76	SW	26.45	900		VC	38.47092		
1201	28.83	FO	26.98	300		VC	67.21171	1 in 48	
0304	30.4	FO	26.39	525		VC	32.23992	1 in 48	
2404	31.53	SW	28.13	750		VC	76.47771	1 in 118	
9502	29.24	FO	26.13	225		VC	94.56497	1 in 53	
9502	29.24	FO	26.13	225		VC	94.56497	1 in 53	
9502	29.24	FO	26.13	225		VC	94.56497	1 in 53	
3906		CO	100			PVC	11.46236	1 in 73	
1603	31	SW	29.49	225		VC	61.86992	1 in 73	
2206	29.98	SW	27.33	900		CO	34.29524	1 in 36	
0302	29.72	FO	24.4	675		CO	98.97717	1 in 202	
0302	29.72	FO	24.4	675		CO	98.97717	1 in 202	
3901	31.63	CO	29.83	225		VC	47.42362	1 in 474	
0501	30.32	SW	27.62	525		CO	89.70023	1 in 82	
0501	30.32	SW	27.62	525		CO	89.70023	1 in 82	
4001		CO	0	150		PVC	21.52386		
1403	31.14	SW	26.65	225		VC	85.26216	1 in 84	
1403	31.14	SW	26.65	225		VC	85.26216	1 in 84	
4401	35.43	FO	32.29	525		CO	79.1012	1 in 95	
5203	33.28	FO	29.5	300		VC	10.64609	1 in 133	
2403	31.53	FO	28.63	525		VC	76.0618	1 in 107	
2403	31.53	FO	28.63	525		VC	76.0618	1 in 107	
2210	29.85	FO	28.27	300		VC	57.43233	1 in 93	
0202	30.17	SW	0	225		CO	68.70882		
0202	30.17	SW	0	225		CO	68.70882		
0311		SW	0	900		CO	2.399017		
3905		CO	100			PVC	10.64044		
0310		SW	0	900		CO	10.78367		
3912		CO	100			PVC	15.57949		
0308	30.17	SW	0	900		CO	2.617212		

Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
5201	33.26	SW	30.68	300		VC	12.42345	1 in 4	
4201	32.8	SW	29.5	300		VC	32.74879	1 in 17	
2205	30.28	SW	27.35	1800		CO	23.01705	1 in 1151	
9002		FO	0	225		VC	76.84399		
9002		FO	0	225		VC	76.84399		
4204	32.81	FO	28.6	300		VC	38.42133	1 in 213	
5202	33.14	SW	27.56	1800		VC	61.07722	1 in 1018	
4202	32.31	SW	27.5	1800		VC	22.09162	1 in 736	
2204	29.26	SW	27.78	375		VC	40.77466	1 in 127	
0502	30.37	FO	27.12	225		VC	94.39835	1 in 85	
0502	30.37	FO	27.12	225		VC	94.39835	1 in 85	
3402	34	SW	30.35	675		CO	76.05919	1 in 82	
3402	34	SW	30.35	675		CO	76.05919	1 in 82	
3002		CO	0	100		VC	18.30024		
4902		CO	0	100		VC	18.30024		
0307	29.93	FO	24.87	300		PVC	18.24101		
0307	29.93	FO	24.87	300		PVC	21.70387	1 in 241	
0312		SW	0	900		CO	6.548992	1 in 241	
0312		SW	0	900		CO	6.548992		
9201		SW	0	450		CO	68.7968		
9201		SW	0	450		CO	68.7968		
2207	29.4	SW	26.37	150		CO	18.02735	1 in 49	
3203	30.84	SW	27.4	1800		VC	44.19337	1 in 884	
0001		FO	0	225		VC	72.94518		
0001		FO	0	225		VC	72.94518		
4203	32.01	SW	27.47	1800		VC	39.45291	1 in 1315	
9501	29.26	SW	26.65	525		CO	101.7462	1 in 75	
9501	29.26	SW	26.65	525		CO	101.7462	1 in 75	
9501	29.26	SW	26.65	525		CO	101.7462	1 in 75	
9501	29.26	SW	26.65	525		CO	101.7462	1 in 75	
3401	33.97	FO	30.41	525		CO	78.1601	1 in 82	
3401	33.97	FO	30.41	525		CO	78.1601	1 in 82	
4205		VC	22.2599	300		VC	22.2599		
1204	32.27	FO	29.06	300		VC	27.12157	1 in 223	
2203	29.16	FO	26.32	300		VC	40.05208	1 in 118	
0401	30.53		0	525		CO	89.78237		
0303	30.24	SW	25.52	900		CO	59.59299	1 in 136	
1203	29.92	FO	27.48	375		VC	94.1675		
0309	30.17	SW	0	225		CO	12.45991		
0309	30.17	SW	0	225		CO	39.1512	1 in 218	
0313	31.96	CO	28.75	450		CO	19.17859		
0313		CO	28.75	450		CO	19.17859		
4204	33.15	FO	29.42	300		VC	63.19396	1 in 175	
0402	30.48	SW	0	900		CO	87.49032		
3607		FO	0	150		VC	16.09037		
3204	31.41	FO	28.78	300		VC	42.26207	1 in 222	
3601		FO	0	100		VC	27.07722		
9304	30.17	SW	0	225		CO	61.20567		
9304	30.17	SW	0	225		CO	61.20567		
2401	32.47	FO	29.37	525		CO	89.2491	1 in 124	
0002	28.32	SW	26.18	375		VC	76.55064	1 in 174	
0002	28.32	SW	26.18	375		VC	76.55064	1 in 174	



MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

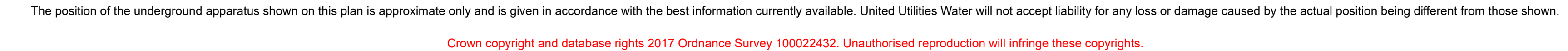
CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL	
AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culvert
PSC	Plastic / Steel Composite
GRC	Glass Reinforced Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:
ALFRED PRICE & SONS LTD PENRHYN ROAD,
KNOWSLEY BUSINESS PARK,
PRESCOT,
L34 9HY

OS sheet SJ4396NW
Number:
Scale: 1:1250 Date: 01/06/2021
Nodes: 52
Sheet: 3 of 4

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The diagram illustrates the Sanitary Sewer Collection System. It shows four input categories at the top: Abandoned, Foul, Surface Water, and Combined. These inputs feed into a central collection system, which then discharges into various outlets on the right. The outlets are: Public Sewer, Private Sewer, Section 104, Rising Main, Sludge Main, Overflow, Water Course, and Highway Drain. The flow paths are color-coded: Abandoned (black), Foul (green), Surface Water (blue), and Combined (red). The diagram shows that Abandoned, Foul, and Surface Water flows are collected and then combined into a single stream that flows into the Public Sewer, Private Sewer, and Section 104. The Combined flow also goes directly to the Rising Main, Sludge Main, Overflow, Water Course, and Highway Drain.

Manhole	State entry manhole
Head of System	Outfall
Extent of Survey	Screen Chamber
Rodding Eye	Inspection Chamber
Inlet	Bifurcation Chamber
Discharge Point	Lamp Hole
Vortex	T Junction / Saddle
Penstock	Catchpit
Washout Chamber	Valve Chamber
Valve	Vent Column
Air Valve	Vortex Chamber
Non Return Valve	Penstock Chamber
Soakaway	Network Storage Tank
Gully	Sewer Overflow
Cascade	Ww Treatment Works
Flow Meter	Ww Pumping Station
Hatch Box	Septic Tank
Oil Interceptor	Control Kiosk
Summit	Change of Characteristic
Drop Shaft	
Orifice Plate	

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

C	Circular	TR	Trapezoidal
G	Egg	AR	Arch
V	Oval	BA	Barrel
T	Flat Top	HO	HorseShoe
E	Rectangular	UN	Unspecified
Q	Square		

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Material
CO	Concrete
CSB	Concrete Segment Box
CSU	Concrete Segment Unit
CC	Concrete Box Culvert
PSC	Plastic / Steel Composite
GRC	Glass Reinforced Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

ALFRED PRICE & SONS LTD PENRHYN ROAD,
KNOWSLEY BUSINESS PARK,
PRESCOT,
L34 9HY

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Water for the North West