Land adjacent to Sycamore House

Wrexham Road, Holt

Flood Consequences Assessment & Drainage Strategy

August 2024



Waterco

Assessment | Modelling | Design

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This report will remain valid for a period of twelve months (from the date of last issue) after which the source data should be reviewed in order to reassess the findings and conclusions on the basis of latest available information.

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Introduction

Waterco has been instructed to prepare a Flood Consequences Assessment (FCA) and Drainage Strategy in respect of a proposed residential development on the land adjacent to Sycamore House, Wrexham Road, Holt, LL13 9YU.

The purpose of this report is to outline the potential flood risk to the site, the impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified flood risk. This report has been prepared in accordance with the guidance contained in Planning Policy Wales (PPW) and Technical Advice Note 15 (TAN15): Development and Flood Risk.

This report also comprises a Sustainable Drainage Strategy. The aim of the Sustainable Drainage Strategy is to identify water management measures, including Sustainable Drainage Systems (SuDS), to provide surface water runoff reduction and treatment. This report has been prepared in accordance with the Welsh Government 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems' (2018) – herein referred to as 'the Statutory Standards for SuDS'.

This report has been prepared in consultation with Wrexham County Council as the Sustainable Drainage Approval Body (SAB) and Dŵr Cymru Welsh Water (DCWW).

Existing Conditions

The site covers an area of approximately 1.72 hectares (ha) and is located at National Grid Reference (NGR) 340580, 353380. A location plan and an aerial image are included in Appendix A.

Online mapping (including Google Maps / Google Streetview imagery, accessed January 2022) shows that the majority of the site is undeveloped. The north-eastern extent of the site currently comprises farm buildings and soft-core surfaces which are not formally drained. The site is bordered by Wrexham Road (B5102) to the north, residential properties and Francis Lane to the east, the A534 Wrexham Road to the south and a wooded area to the west. Access to the site is provided from Wrexham Road to the north.

Local Topography

A topographical survey has been undertaken by MB Surveying in February 2021. The topographical survey shows that the site slopes from 19.11 metres Above Ordnance Datum (m AOD) in the north-east to 14.95m AOD in the south-west.

Topographic levels to m AOD have also been derived from a 1m resolution NRW composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR data shows that the levels generally reflect those identified in the topographical survey.

Topographical information is provided as Appendix B.

Ground Conditions

Published Geology

The British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is underlain by superficial deposits of Devensian Till of variable lithology, usually sandy, silty clay with pebbles, but can contain gravel-rich, or laminated sand layers of varied colour and consistency. The superficial deposits are identified as being underlain by the Chester Formation consisting of sandstone.

The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a site-specific basis.

Ground Investigations

Infiltration Testing was undertaken by e3p in January 2021. In total, four trial pits were excavated to a maximum depth of 1.9 metres below ground level (m.bgl). An exploratory hole location plan is included in Appendix C for reference.

Table 1 provides a summary of the ground conditions identified at each trial pit:

Table 1 – Trial Pits Summary

Reference	Location (NGR)	Ground Conditions
TP101	340485, 353362	Dark brown silty clay with fine to medium sand to a depth of 0.4m.bgl. Coarse sand from 0.4m.bgl – 1m.bgl and gravelly sandy clay from 1m.bgl - 1.9m.bgl. Water was struck at 1.5m.bgl.
TP102	340556, 353336	Dark brown silty, clayey, medium sand with frequent rootlets to 0.6m.bgl. Firm light brown, sandy, gravelly clay from 0.6m.bgl - 0.7m.bgl. Reddish brown slightly sandy clayey gravel from 0.7m.bgl - 1.5m.bgl. Water was struck at 0.3m.bgl.
TP103	340563, 353393	Dark brown silty, clayey medium sand with frequent rootlets to 0.4m.bgl. Firm orange and brown sandy, gravelly clay from 0.4m.bgl - 1.5m.bgl. Water was struck at 1m.bgl.
TP104	340643, 353358	Dark brown silty, very clayey with fine to medium sand to 0.05m.bgl. Orange and brown slightly gravelly with fine to medium sand from 0.05m.bgl -1.4m.bgl. No water was encountered within this trial pit.

The trial pits collapsed in a number of cases across the site and groundwater was encountered at shallow depths in most of the trial pits.

Overall, the infiltration test results provided by ep3 indicate that infiltration techniques are not suitable at this site due to the recorded water strikes and cohesive soils.

BRE 365 infiltration test results and trial pit records are included in Appendix C.

Hydrogeology

According to NRW's Aquifer Designation data, obtained from the BGS GeoIndex online mapping [accessed January 2022], Devensian Till is classified as a Secondary Undifferentiated Aquifer.

Secondary Undifferentiated Aquifers are assigned in 'cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type'.

The underlying Chester Formation is classified as a Principal Aquifer. Principal Aquifers are layers of rock or drift deposits that have high intergranular and/or fracture permeability – meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

Site Visit

A site visit was undertaken by a Waterco representative in June 2021 to investigate any drainage features in the vicinity of the site and to investigate any potential hydraulic connectivity between the site and a watercourse (brook) located to the south. As shown in Figure 1, the brook is located approximately 330m south-east of the site.

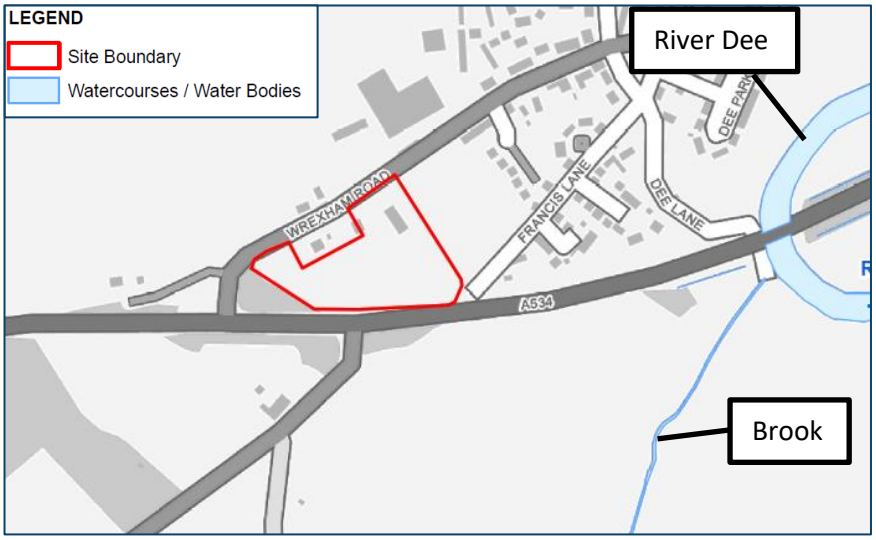


Figure 1 – Location Plan Extract

A photographic record is included in Appendix D. There was no evidence of any formal surface water connection between the site and the Brook (no inspection chambers, piped drains or drainage outlets). No evidence of a piped drainage system serving the site was found and no connection on site to any wider drainage network was evidenced.

Local Drainage

Public sewer records have been obtained from DCWW and are included in Appendix E. The DCWW sewer records show that there is a foul sewer network serving the recently developed Castle Green Homes site

immediately east of the site. There is also a 225mm public combined sewer flowing north-east in Francis Lane approximately 40m east of the site.

A survey of the highway drainage system serving Wrexham Road (A534) to the south of the site has been undertaken by Invek Surveys is August 2024. A drainage layout plan showing the highway drainage is included in Appendix F. The highway drainage system discharges to the River Dee approximately 330m east of the site. The highway drain is 225mm in diameter, upsizing to 300mm near the outfall to the River Dee. The pipework appeared in good condition, however all road gullies were fully silted.

Development Proposals

The proposed development is for the erection of 39No. dwellings with associated parking, gardens, public open space and access roads. A development plan is included in Appendix G.

The developable (net) site area of the site covers 1.24ha. The remaining site area (0.48ha) will comprise public open space and ecological areas (including an attenuation pond).

The proposed development will introduce hardstanding areas in the form of buildings and access roads. Hardstanding will comprise 6,866m^2 or 55% of the developable site area (1.24ha). The remaining permeable, soft landscaped areas will occupy 5,534m^2 or 45% of the developable site area.

All measurements have been derived from a .dwg copy of the 'Site Plan' (drawing number: PInc 100_82_SP_01).

Flood Zone Category and Policy Context

Flood Zone Category

The Welsh Government Development Advice Map, included in Appendix H, shows that the site is located within Flood Zone A – an area considered to be at little or no risk of fluvial or tidal flooding, with a less than 0.1% (1 in 1000) annual probability of flooding.

The NRW Flood Risk Assessment Wales 'Flood Risk from Rivers' map (Appendix H) shows that the site is at very low risk of flooding from rivers, meaning it has less than a 1 in 1000 annual probability of flooding.

Development Vulnerability Classification

The proposed residential development is considered to be 'highly vulnerable' development in accordance with Figure 2 of the Welsh Government's Technical Advice Note 15 – Development and Flood Risk (TAN15).

TAN15 states that highly vulnerable development is considered appropriate in Flood Zone A.

Local Policy

The Wrexham Unitary Development Plan 1996-2011 (adopted February 2005) contains the following policy relating to flood risk and drainage:

'Policy EC12 Development (including the raising of land) within defined flood plains will only be permitted if it:-

a) would not be subject to an unacceptable risk of flooding on-site and/or

b) does not results in an unacceptable risk of flooding on or off-site; and/or

c) does not adversely affect flood management or maintenance schemes.

Wrexham County Borough Council is preparing the Local Development Plan (LDP) which will replace the current adopted Unitary Development Plan. The LDP will be a long-term land use and development strategy focused on achieving sustainable development. The Deposit Local Development Plan (draft LDP) contains the following policies in relation to flood risk:

Policy EC13

Development which would result in an unacceptable adverse impact on the water environment due to additional surface water run-off will not be permitted.

Policy EC14

Development Which would have an unacceptable adverse impact upon the capacity, flow, quality or availability of controlled waters and associated land will not be permitted.

The 'Management of Surface Water Generated from New Development' (Updated March 2019) from the Wrexham County Borough Council local planning guidance portal contains the following guidance:

Surface Water Design Criteria

The Flood & Water Management Team will need to be satisfied that the criteria below are being met. This will normally apply to all major development, or where local site conditions dictate.

Wrexham County Borough Council advocates that surface water run-off should be controlled as near to its source as possible. Preferably sustainable drainage systems (SuDS) should be utilised. The variety of SuDS techniques available means that virtually any development should be able to include a scheme based around these principles. Surface water should be disposed of to the receptors listen in order of priority below:

a) Infiltrated to ground;

b) To a watercourse

c) *To a surface water sewer*

d) *Other*

Storage of Water on Site:

The drainage system should be designed so that flooding does not occur on any part of the development for the 3.33% (1 in 30 year) rainfall event other than in those areas/systems designated to store or convey water. It may be acceptable to allow some on-site flooding of roads etc. for rainfall events beyond this. However, flooding within the development site should not occur in any part of a building or utility plant susceptible to water during a 1% (1 in 100 year) + climate change rainfall event.

Practicable Minimum Limit of Discharge

A practicable minimum limit on the discharge rate from a flow of attenuation device is often a compromise between attenuating to a satisfactorily low flow rate while keeping the risk of blockage to an acceptable level. It is suggested that this is 5 litres per second, using an appropriate vortex flow control device or other technically acceptable flow control device. The minimum size of pipe discharging from a flow attenuation device should be 150mm laid at a gradient not flatter than 1 in 150, which meets the requirements of Sewers for Adoption 7th Edition.

Policy SP19: Climate Change

To mitigate against the effects of climate change and adapt to its impacts, development proposals will need to demonstrate that they have taken into account the following:

i. *Reducing carbon emissions;*

ii. *Protecting and increasing carbon sinks*

iii. *Adapting to the implications of climate change at both a strategic and detailed design level;*

iv. *Promoting energy efficiency and increasing the supply of renewable energy; and*

v. *Maintaining ecological resilience*

vi. *Avoiding areas susceptible to flood risk in the first instance in accordance with the sequential approach set out in national guidance; and*

vii. *Preventing development that increases flood risk.*

Local guidance documents including the Wrexham County Borough Council Preliminary Flood Risk Assessment (PFRA) (2011 and its November 2017 addendum) have been reviewed and inform this report.

Consultation

A consultation request was submitted to the SAB in February 2021. The SAB have provided their statutory guidance document which has been reviewed and informs this report. In their response (Appendix I), the SAB have also stated that:

'I would strongly advise that the local sewerage undertaker is contacted to obtain an approval in principle to connect to the system and agree any likely flow restrictions that may be required. This information is fundamental to any future Full SAB application as it will influence the required layout/attenuation requirement on site.

I would also advise that interception should be provided on the development to prevent the first 5mm rainfall leaving the site.

Additionally, it is essential that both amenity and biodiversity enhancements are delivered as part of the SuDS scheme proposed. These need to be attributable to the SUDS scheme and not the wider development. As such consideration should be given to additional SuDS features that will allow amenity and biodiversity benefits to be delivered.'

Additional correspondence with the SAB dated May 2024 (Appendix I) in regards to a surface water connection from the site to highway drainage states:

'We will accept connections into the Highways Drainage. However, we will only do so after the full SuDS Approving Body (SAB) application has been processed. The best that we can offer as an official okay at the planning stage would be a Pre-Application Advice application into the SAB.

Despite the above, I would say that we have no objection in principle. In order to connect, we will need the following:

- *A CCTV survey of the condition of the pipe into which you would like to discharge to the point of outfall. Both the report and the footage will need to be provided.*
- *We would need full details of the drainage scheme and the catchment area that it will cover.*
- *We would need a chamber to be installed at the point of connection if you will not be entering the system via an existing manhole.*
- *An overview maintenance plan of how the system will be maintained where it remains in private ownership (this will be to the point of connection).*
- *You would also need to arrange the relevant road closures with our teams at highwayroadworks@wrexham.gov.uk for the works within the highway.*

Unfortunately, this is an issue that we will resolve as a separate matter from planning, and we would reserve

the right to ask for improvements to be made to that section of pipe should a defect be discovered.'

A pre-development enquiry request was submitted to DCWW in February 2021. In their response (Appendix E), DCWW have stated that:

'Foul Water Drainage – Sewerage Network

We have considered the impact of foul flows generated by the proposed development and concluded that flows can be accommodated within the public sewerage system which is consistent with our representations to the LDP consultation process. We advise that the flows should be connected to the public sewer at or downstream of manhole SJ40537304 located to the east. Should a planning application be submitted for this development we will seek to control these points of communication via appropriate planning conditions and therefore recommend that any drainage layout or strategy submitted as part of your application takes this into account.

However, should you wish for an alternative connection point to be considered please provide further information to us in the form of a drainage strategy, preferably in advance of a planning application being submitted…

No problems are envisaged with the Wastewater Treatment Works for the treatment of domestic discharges from the site.'

A meeting with DCWW was held in May 2021. The outcome of the DCWW meeting is detailed below and provided in Appendix E. DCWW have stated that:

'*Subject to exhaustion of surface water hierarchy we would accept surface water discharge at an attenuated discharge rate of 5 l/s into 225mm [combined sewer] in Francis Lane.'*

Sources of Flooding and Probability

Fluvial

The nearest watercourse is the River Dee which is located approximately 330m east of the site. The River Dee flows in a northerly direction in this location. A tributary of the River Dee is located 330m south-east of the site and flows north-east.

Fluvial flooding could occur if the River Dee or its tributary overtopped their banks during or following an extreme rainfall event.

The site is located within Flood Zone A – an area considered to be at little or no risk of fluvial, with a less than 0.1% (1 in 1000) annual probability of flooding. The site is elevated approximately 7m above the River Dee and its tributary and is approximately 4m above the Flood Zone C2 (0.1% annual probability) extent.

The NRW 'Historical Flood Map' (Appendix H) indicates that the site is not located within a historical flood extent.

The risk of fluvial flooding is therefore considered to be very low.

Tidal

The site is situated at a minimum of 14.95m AOD and is significantly above sea level. The NRW 'Flood Risk from the Sea' map (Appendix H) shows that the site is at very low risk of flooding from the sea, meaning it has less than a 1 in 1000 annual probability of flooding. The risk of tidal flooding is therefore considered to be very low.

Surface Water

Surface water flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is saturated, frozen or developed, resulting in overland flow and ponding in depressions in topography. Surface water flooding can occur anywhere without warning. However, flow paths can be determined by consideration of contours and relative levels.

The NRW 'Flood Risk from Surface Water and Small Watercourses' map (Appendix H) shows that the site is at very low risk of surface water flooding, meaning it has less than 0.1% annual probability of flooding.

There are no records of surface water flooding at or near to the site. There are no distinct flow routes in the area which would direct any potential surface water flooding towards the site.

It can therefore be concluded that the risk of surface water flooding is very low.

Sewer

Flooding from sewers can occur when a sewer is overwhelmed by heavy rainfall, becomes blocked, is damaged, or is of inadequate capacity. Flooding is mostly applicable to combined and surface water sewers.

The DCWW sewer records (Appendix E) show that there is 225mm public combined sewer in Francis Lane east of the site. Any potential flooding arising from the 225mm public combined sewer in Francis Lane would be directed south-west and onto Wrexham Road. There are no distinct flow routes in this area which would direct any potential sewer flooding arising in adjacent roads towards the site.

It can be concluded that the risk of sewer flooding is very low.

Groundwater

Groundwater flooding occurs when water levels underneath the ground rise above normal levels. Prolonged heavy rainfall soaks into the ground and can cause the ground to become saturated. This results in rising groundwater levels which leads to flooding above ground.

As described above, water strikes were identified in three of the four trial pits excavated on site. The recorded water strikes are likely the result of water perched above cohesive strata.

The PFRA states '*There were no records of past groundwater flooding within WCBC; this is due to the topography and geology of the area*'. There are no records of groundwater flooding at or near to the site.

The site is underlain by clay which will limit the vertical migration of groundwater. Furthermore, no basement levels are identified on plans.

It can therefore be concluded that the risk of groundwater flooding is low.

Artificial Sources

There are no canals in the immediate vicinity of the site. The NRW 'Flood Risk from Reservoirs' map (Appendix H) shows that the site is not at risk of flooding from reservoirs.

It can therefore be concluded that the risk of flooding from artificial sources is very low.

Summary of Potential Flooding

It can be concluded that the risk of flooding from all sources is very low. Therefore, no site-specific flood risk mitigation measures are considered necessary. In accordance with Building Regulations, finished floor levels should be set 150mm above surrounding ground levels.

Surface Water Management

The site is not formally drained and is therefore considered to be 100% permeable.

The proposed development will introduce 6,866m² of hardstanding in the form of buildings and the access roads.

The increase in hardstanding area will result in an increase in surface water runoff rates and volumes. In order to ensure the proposed development will not increase flood risk elsewhere, surface water discharge from the site will be controlled.

Discharge Method

Standard S1 of the Statutory Standards for SuDS sets out the following hierarchy of drainage options:

> *Priority Level 1: Surface water runoff is collected for use;*
>
> *Priority Level 2: Surface water runoff is infiltrated to ground;*
>
> *Priority Level 3: Surface water runoff is discharged to a surface water body;*
>
> *Priority Level 4: Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;*
>
> *Priority Level 5: Surface water runoff is discharged to a combined sewer.*

Priority Level 1: Surface water runoff collected for use

In line with section G1.4 of the Statutory Standards for SuDS, rainwater harvesting is not proposed for this site as:

1. There is no foreseeable need to harvest water at the site as DCWW water resources and drought management plans do not identify potential stresses on mains water supplies;
2. The use of rainwater harvesting is not a viable/ cost-effective part of the solution for managing surface water runoff on the site, taking account of the potential water supply benefits of such a system.

With regards to the second point above, section G1.6 of the Statutory Standards for SuDS states that; in most cases, rainwater harvesting alone will not be adequate to deal with the site drainage and provision will be required for an overflow to a Level 2 or lower priority runoff destination. As downstream provision of attenuation storage will be required to accommodate for rainwater harvesting system overflows, rainwater harvesting is not considered a cost-effective solution for managing surface water runoff.

Water butts will be used where possible to encourage external rainwater re-use.

Priority Level 2: Surface water runoff is infiltrated to ground

Infiltration testing has been undertaken by e3p in January 2021. The infiltration test results showed that infiltration techniques are not suitable at this site due to the recorded water strikes and cohesive soils.

Priority Level 3: Surface water runoff is discharged to a surface water body

The nearest watercourse is the River Dee which is located 330m east of the site. The site is separated from the River Dee by third party, urbanised land. A direct connection to this watercourse is therefore not a practical option.

Priority Level 4: Discharge to a surface water sewer or highway drain

There are no public surface water sewers in the vicinity of the site. A drainage survey of the highway drainage system in Wrexham Road to the south of the site has been undertaken in August 2024. The survey results (Appendix F) shows that there is a 225mm, upsizing to 300mm, highway drain in Wrexham Road to the south of the site which drains to the River Dee.

Correspondence from Wrexham Council (Appendix I) states that there is no objection in principle to connecting to the highway drain subject to provision of:

- A CCTV survey of the condition of the pipe.
- Full details of the drainage scheme and the catchment area that it will cover.
- Installation of a new chamber at the point of connection (unless connection will be to an existing chamber).
- An overview maintenance plan of how the system will be maintained where it remains in private ownership (this will be to the point of connection*).*

A CCTV survey has been undertaken and the files are available on request. The highway drain was generally in good condition however the highway gullies require cleansing.

An existing chamber (reference HW06 on the drainage layout in Appendix F) is located immediately south of the site and would form a suitable point of connection. Manhole HW06 has an identified invert level of 12.97m AOD and a cover level of 14.73m AOD. Based on a minimum site level of 14.95m AOD, a gravity connection appears feasible.

Priority Level 5: Surface water runoff is discharged to a combined sewer

Should any issues arise with the connection to highway drainage at the full SAB application stage, DCWW have stated that:

‘*Subject to exhaustion of surface water hierarchy we would accept surface water discharge at an attenuated discharge rate of 5 l/s into 225mm in Francis Lane.’*

Based on site levels and local topography, a pumped solution will be required to achieve a connection to the public combined sewer in Francis Lane.

Proposed Discharge Rate

In order to establish the proposed limited discharge rate, the existing greenfield runoff rates have been estimated using the Revitalised Flood Hydrograph Model (ReFH2) method. A summary of the greenfield runoff rates for a range of events is provided as Appendix J. The existing 1 in 1 year greenfield runoff rate for the 1.24ha development site is 0.93 l/s.

A discharge rate of 2 l/s is proposed for this site to ensure the drainage system is self-cleansing.

Attenuation Storage

In order to achieve a discharge rate of 2 l/s, attenuation storage will be required. An attenuation storage estimate has been derived using MicroDrainage and is included in Appendix K. An estimated storage volume of 574m³ will be required to accommodate the 1 in 100 year plus 30% Climate Change (CC) event. The storage estimate is based on a discharge rate of 2 l/s, storage within a tank or pond structure, an impermeable drainage area of 6,866m², a design head of 1m and a pumped outflow control.

Provision has been made within the site layout for an attenuation storage pond. A 1m deep pond with a base (invert) area of 450m², 1 in 3 side slopes and a total surface area of 704m² (at the top water level) will provide 577m³ of attenuation storage, sufficient to accommodate the 1 in 100 year plus 30% CC event. A 300mm freeboard above the top water level to the top bank level should also be provided.

Concept Surface Water Drainage Scheme

Surface water runoff will be discharged by gravity to the highway drain on the verge of Wrexham Road to the south of the site at a limited discharge rate of 2 l/s. Surface water runoff up to the 1 in 100 year plus 30% CC event will be attenuated on site. A total attenuation volume of 574m³ will be required to achieve the discharge rate and will be provided in the form of an attenuation pond located in the southern extent of the site.

A Concept Drainage Sketch is included in Appendix L.

Exceedance Event

Storage will be provided for the 1 in 100 year plus 30% CC event. Storm events in excess of the 1 in 100 year plus 30% CC event should be permitted to produce temporary shallow depth flooding within the access road and landscaped areas. Finished floor levels will be set at a minimum of 150mm above surrounding ground levels ensuring exceedance flooding will not affect the buildings.

Surface Water Treatment

The Statutory Standards for SuDS sets out the following guidance for surface water treatment;

S3 - Surface water quality management

Treatment for surface water runoff should be provided to prevent negative impacts on the receiving water quality and/or protect downstream drainage systems, including sewers.

In accordance with the CIRIA C753 publication 'The SuDS Manual' (2015), residential roofs have a 'very low' pollution hazard level, with individual property driveways and low traffic roads classified as having a 'low' pollution hazard level. Table 2 shows the pollution hazard indices for each type of land use.

Table 2 – Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2	0.2	0.05
Individual Property Driveways and Low Traffic Roads	Low	0.5	0.4	0.4

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2
* Indices values range from 0-1.

Runoff from roofs and roads will be directed to a pond. Table 3 demonstrates that a pond will provide sufficient treatment. The development therefore provides sufficient treatment to runoff and is compliant with Standard S3 – 'Water Quality' of the Statutory standards for sustainable drainage systems.

Table 3 – SuDS Mitigation Indices

	Mitigation Indices		
Type of SuDS	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Pond	0.7	0.7	0.5

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.3

Amenity and Biodiversity

The Statutory Standards for SuDS provide the following guidance in relation to Standard S4 Amenity and Standard S5 Biodiversity:

*'**Standard S4 – Amenity** - The design of the surface water management system should maximise amenity*

benefits.

Standard S5 – Biodiversity *- The design of the surface water management system should maximise biodiversity benefits.*

The proposed development makes provision for a pond which will maximise the amenity and biodiversity value of the proposed drainage system.

Construction, Operation and Maintenance

Standard S6 of the Statutory Standards for SuDS states:

S6 – Design of drainage for Construction, Operation and Maintenance

1) All elements of the surface water drainage system should be designed so that they can be constructed easily, safely, cost-effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy).

2) All elements of the surface water drainage system should be designed to ensure maintenance and operation can be undertaken (by the relevant responsible body) easily, safely, cost-effectively, in a timely manner, and with the aim of minimising the use of scarce resources and embedded carbon (energy).

3) The surface water drainage system should be designed to ensure structural integrity of all elements under anticipated loading conditions over the design life of the development site, taking into account the requirement for reasonable levels of maintenance.

All drainage systems will be readily accessible for maintenance access. The drainage system will be offered for adoption to the SAB who will then be responsible for maintenance. A maintenance schedule for a pond is included in Appendix M.

Foul Drainage

Correspondence from DCWW (Appendix E) states that:

'We have considered the impact of foul flows generated by the proposed development and concluded that flows can be accommodated within the public sewerage system which is consistent with our representations to the LDP consultation process. We advise that the flows should be connected to the public sewer at or downstream of manhole SJ40537304 located to the east.'

Foul flows should therefore be discharged to the 225mm public combined sewer in Francis Lane as stipulated by DCWW. Based on local topography, a pumped solution will be required. A Type 3 adoptable pumping

station has been shown on the 'Site Plan' ((drawing number: PInc 100_82_SP_01).

It is proposed that the foul water pumping station will be adopted by DCWW under a Section 104 Agreement.

In accordance with Sewer Sector Guidance, a minimum 15m easement is required from the wet well of a pumping station to any habitable dwellings. A 15m easement has been provided. Tanker access to the pumping station compound will be provided from an adopted access road.

Storage will be required to accommodate for pump failure. In accordance with Sewer Sector Guidance, the storage requirement is 160 litres per dwelling. Storage can be provided within the pumping station wet well. Provision of standby pumps, an automated pump exercise regime and a pump failure alarm system would limit the risk of pump failure.

Conclusions

The proposed development is for the erection of 39No. dwellings with associated parking, gardens, public open space and access roads.

Flood Risk

The site is located within Flood Zone A on the Welsh Government Development Advice Map – an area considered to be at little or no risk of fluvial or tidal flooding, with a less than 0.1% (1 in 1000) annual probability of flooding.

The risk of flooding from all sources has been assessed and the flood risk to the site is considered to be very low. In accordance with Building Regulations, finished floor levels should be set 150mm above surrounding ground levels.

Drainage

The proposed development will introduce impermeable drainage area in the form of buildings and access roads. This will result in an increase in surface water runoff. In order to ensure the increase in surface water runoff will not increase flood risk elsewhere, flow control will be used and attenuation will be provided on site to accommodate storm events up to and including the 1 in 100 year plus 30% climate change event.

All methods of surface water discharge have been assessed. Infiltration techniques have been discounted due to the cohesive nature of the underlying strata, as evidence by BRE365 infiltration testing.

A connection to highway drainage is feasible and is acceptable in principle to the Council. Discharge can be made by gravity to the highway drain in the verge of Wrexham Road to the south of the site. Discharge will be made at a limited rate of 2 l/s.

Attenuation storage will be required on site in order to restrict surface water discharge to 2 l/s. Attenuation will be provided in the form of a pond located in the southern extent of the site.

Provision of a pond will ensure that sufficient treatment to surface water runoff is provided. The pond will also provide amenity and biodiversity value.

DCWW have confirmed that foul flows can discharge to the 225mm public combined sewer in Francis Lane east of the site. Based on site and local topography, a pumped solution is required. Provision for an adoptable foul pumping station has been made within the site layout.

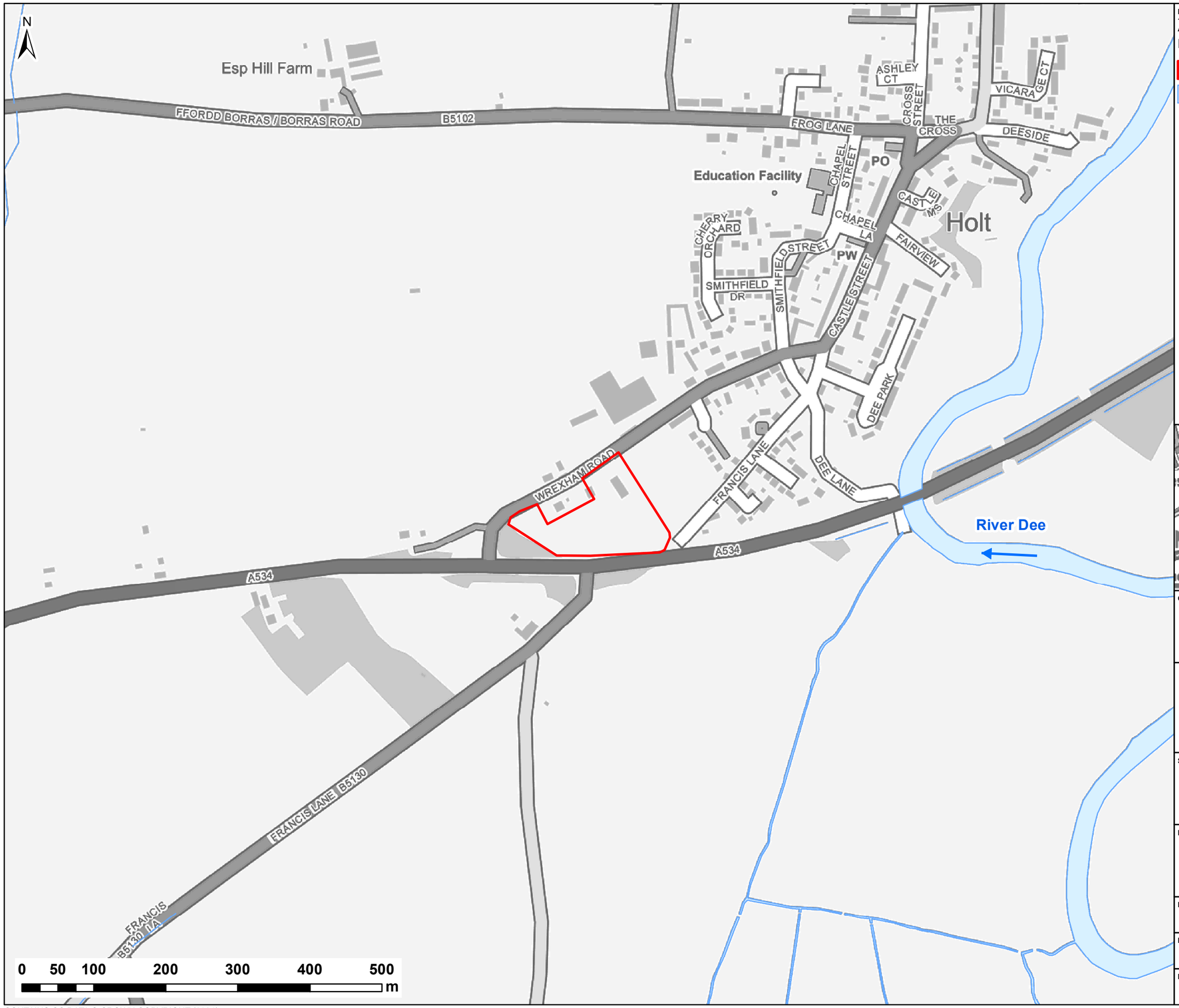
A Concept Designer's Risk Assessment (cDRA) has been prepared to inform future designers of any identified hazards associated with the scheme. The cDRA has been included in Appendix N.

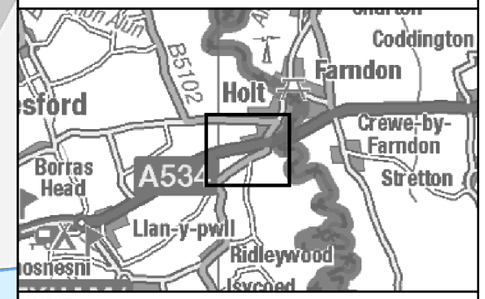
Recommendations

1. Submit this Flood Consequences Assessment and Drainage Strategy to the Planning Authority in support of the Planning Application.

2. Verify the attenuation volumes included in this report when undertaking detailed drainage design.

Appendix A Location Plan and Aerial Image





NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Watercourses / Water Bodies

CLIENT:

MRS V PRIDDING

waterco

www.waterco.co.uk

SCHEME:

LAND ADJACENT TO SYCAMORE HOUSE, WREXHAM ROAD, HOLT

PLOT TITLE:

LOCATION PLAN

PLOT STATUS:	DATE:
FINAL	09/03/2021

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
CM	AW	VG	1:5,000 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
13604-Location_Plan	-

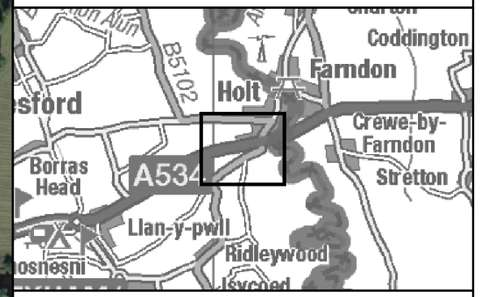
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NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

Site Boundary



CLIENT:

MRS V PRIDDING

waterco

www.waterco.co.uk

SCHEME:

LAND ADJACENT TO SYCAMORE HOUSE, WREXHAM ROAD, HOLT

PLOT TITLE:

AERIAL PLAN

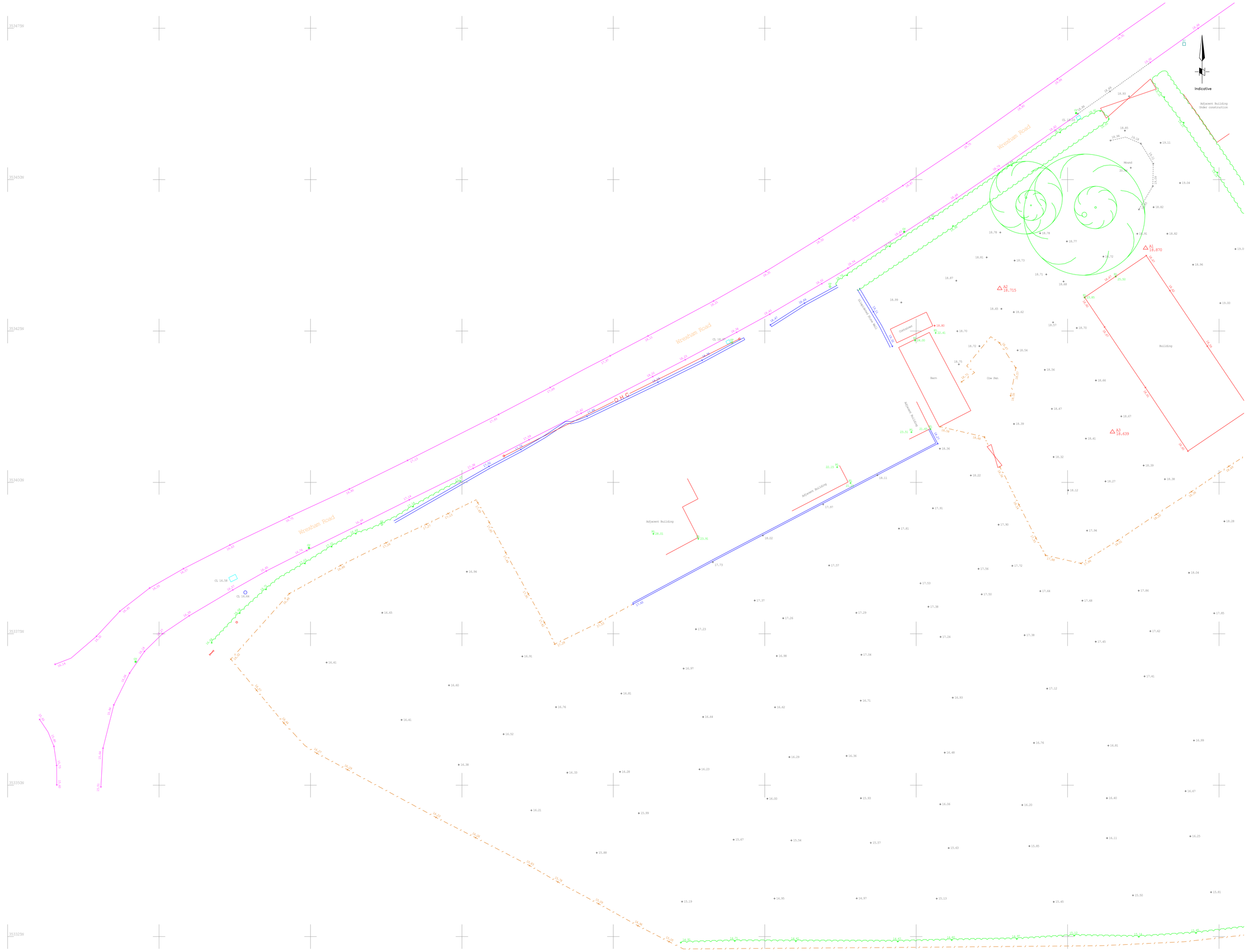
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FINAL	09/03/2021

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
CM	AW	VG	1:5,000 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
13604-Aerial_Plan	-

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Appendix B Topographical Information



NOTES

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Legend

AV	Air valve
BH	Borehole
BOL	Bollard
BT	British Telecom cover
CATV	Cable television cover
CL	Cover level
DPC	Damp proof coarsing level
Earth/ER	Earthing rod
ELEC	Electric cover
EP	Electricity pole
Fence I/R	Iron railing fence
Fence C/B	Closeboard fence
Fence C/P&P	Concrete post & panel fence
Fence Pa	Palisade fence
Fence P/W	Post and wire fence
Fence P/R	Post and rail fence
Fence P/P	Post and panel fence
FFL	Finished floor level
F/B	Flower bed
FH	Fire Hydrant
GY	Gulley
GAS	Gas cover
IC	Inspection chamber
IL	Invert level
INV	Invert level
LP	Lamp post
LT	Light
MH	Manhole
Nynex	Telecommunications cover
OSBM	Ordnance Survey Bench Mark
PTM	Parking ticket machine
RE	Rodding eye
RS	Road sign
Ret.wall	Retaining wall
SBX	Switch box
SP	Sign post
SPS	Safety playing surface
ST	Stop tap
SV	Service valve
TBM	Temporary Bench Mark
TP	Telegraph pole
THL	Threshold Level
TRL	Traffic light
W.Ht	Wall Height
WL	Water level
WO	Wash out

Building
Building overhead / Foundations / Ruins
Road edge / Change of surface / Drain
Change of slope
Fence
Safety barrier
Overhead cable
Gate
Hedge
Limit of foliage/tree canopies
Stile
Tree
52.47 Spot level

Co-ordinates and Levels related to Ordnance Survey National Grid and Datum using Leica's GS08+ dual frequency GNSS receiver and SmartNet RTK corrections.

Station	Easting	Northing	Level
A1	340613.878	353438.702	18.870
A2	340588.785	353432.030	18.715
A3	340607.408	353409.341	18.639

REV	DESCRIPTION	DWN	CHKD	DATE
--	--	--	--	--

CLIENT
Pridding Farming Partnership

PROJECT
Land Off Wrexham Road, Holt.

TITLE
Topographical Survey

DWN	DATE	CHKD	DATE	APP'D	DATE	SCALE
MB	8/8/18					1-200@A0

MB SURVEYING 4D
Land & Hydrographic Surveyors
Pine Cottage,Kelsall Road,
Ashton Hayes,Cheshire, CH3 8BH
Tel: 01829 759936
www.mbsurveying.co.uk

Drawing Number MBS914 A0 REV

Chartered Land Surveyors

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Building overhead / Foundations / Ruins
Road edge / Change of surface / Drain
Change of slope
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Overhead cable
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Hedge
Tree
Limit of foliage/tree canopies
52.47 Spot level

Co-ordinates and Levels related to Ordnance Survey National Grid and Datum using Leica's GS08+ dual frequency GNSS receiver and SmartNet RTK corrections.

Station	Easting	Northing	Level
A1	340612.870	353435.720	18.870
A2	340588.765	353432.030	18.715
A3	340607.458	353409.341	18.639

REV	DESCRIPTION	DWN	CHK'D	DATE
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CLIENT: Pridding Farming Partnership

PROJECT: Land Off Wrexham Road, Holt.

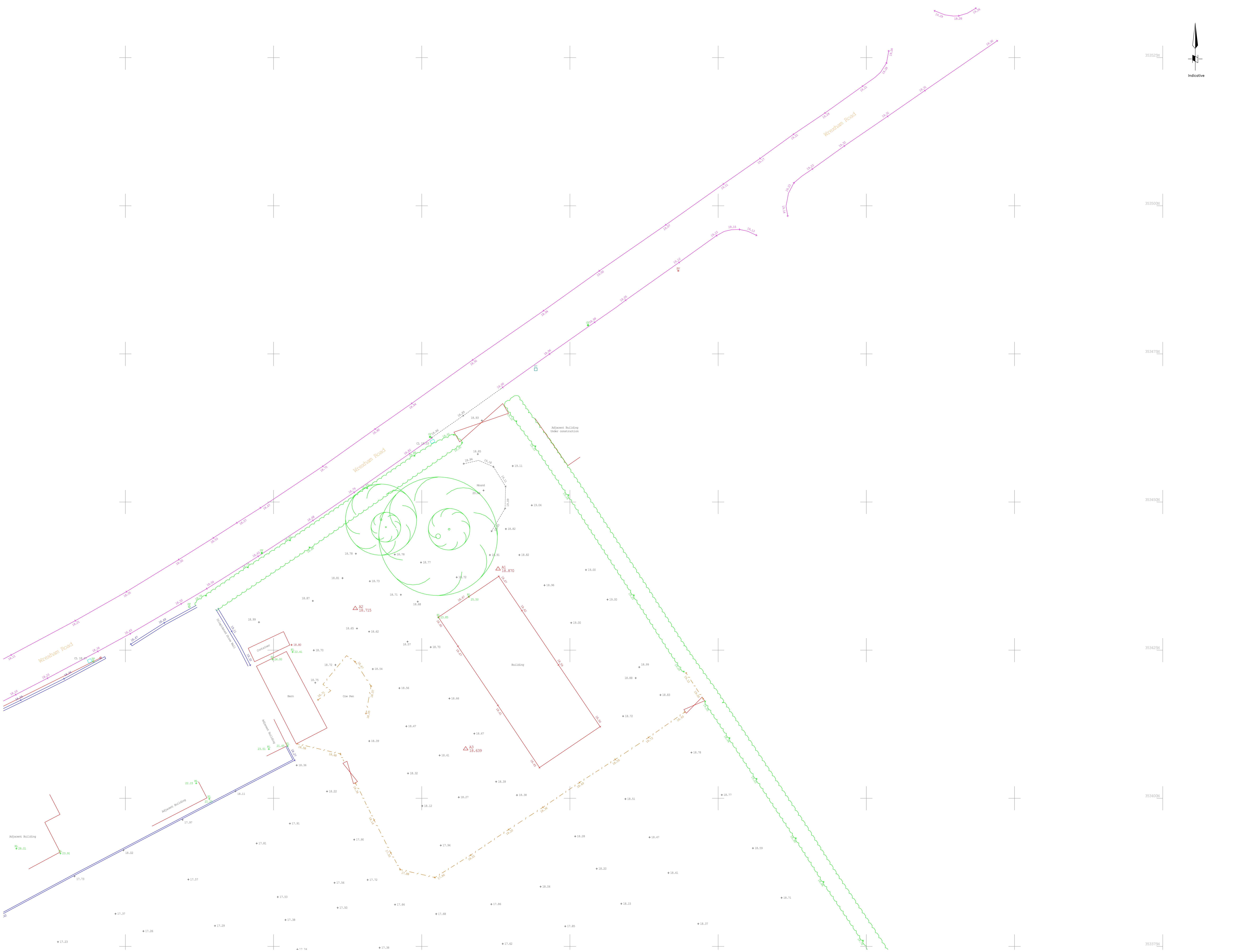
TITLE: Topographical Survey

DWN	DATE	CHK'D	DATE	APP'D	DATE	SCALE
MB	16/10/20					1-200@A0

MB SURVEYING 4D Land & Hydrographic Surveyors
Pine Cottage,Kelsall Road, Ashton Hayes,Cheshire, CH3 8BH
Tel: 01829 755006
www.mbsurveying.co.uk

Drawing Number: MBS914 | A0 | REV

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Building overhead / Foundations / Ruins
Road edge / Change of surface / Drain
Change of slope
C/L Fence

Safety barrier
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Co-ordinates and Levels related to Ordnance Survey National Grid and Datum using Leica's GS08+ dual frequency GNSS receiver and SmartNet RTK corrections.

Station	Easting	Northing	Level
A1	340612.876	353438.702	18.870
A2	340588.785	353432.030	18.715
A3	340607.408	353408.341	18.639

REV	DESCRIPTION	DWN	CHK'D	DATE
--	--	--	--	--

CLIENT: Pridding Farming Partnership

PROJECT: Land Off Wrexham Road, Holt.

TITLE: Topographical Survey

DWN	DATE	CHK'D	DATE	APP'D	DATE	SCALE
MB	02/02/2021					1-200@A0

MB SURVEYING 4D
Land & Hydrographic Surveyors
Pine Cottage,Kelsall Road,
Ashton Hayes,Cheshire, CH3 8BH
Tel: 01829 759306
www.mbsurveying.co.uk

Drawing Number: MBS914 | A0 | REV

NATIONWIDE SERVICE

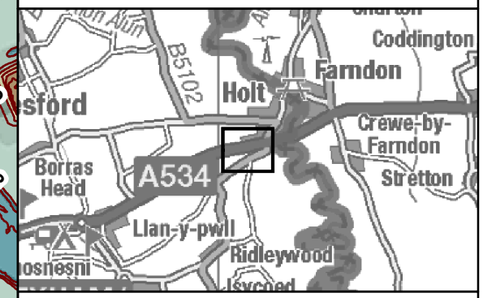
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Site Levels

Ground Elevation (m AOD)

- < 8
- 8 - 10
- 10 - 12
- 12 - 14
- > 14



CLIENT:

MRS V PRIDDING

www.waterco.co.uk

SCHEME:

LAND ADJACENT TO SYCAMORE HOUSE, WREXHAM ROAD, HOLT

PLOT TITLE:

LIDAR ELEVATIONS

1m RESOLUTION

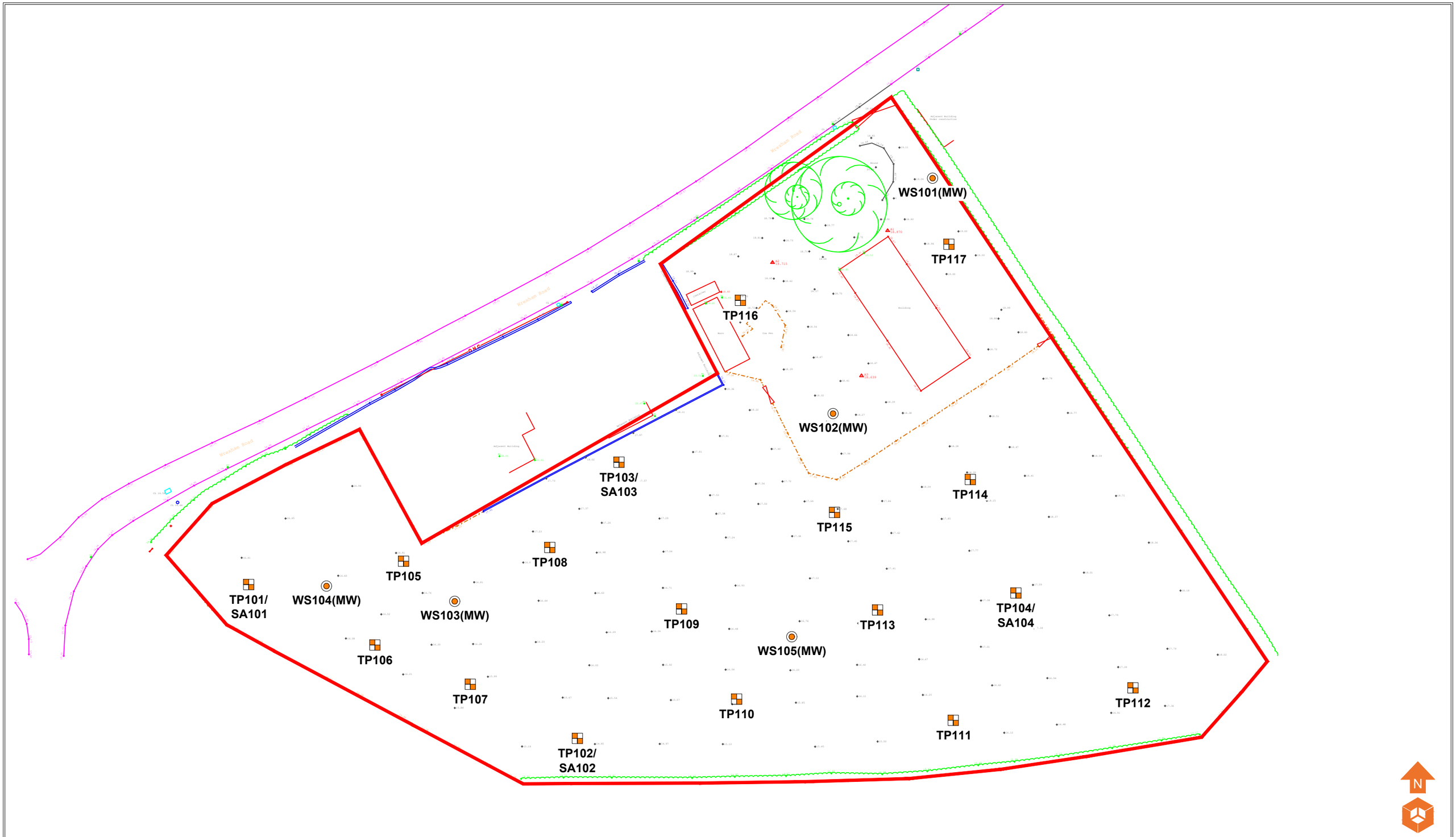
PLOT STATUS:	DATE:
FINAL	09/03/2021

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
CM	AW	VG	1:3,000 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
13604-LiDAR	-

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Appendix C Infiltration Assessment



Location Symbols

- WS101(MW) — Approximate Window Sample Probehole Location with Install
- TP101 — Approximate Trial Pit Location
- SA101 — Approximate Soakaway Test Location

Notes:

Phase	Issue	Date	Drawn	Checked
P1	REVB	11.03.2021	HM	NS
P1	REVA	12.02.2021	CB	JS

Client: Mrs V and Mr A Pridding

Job No: 14-608

Date: 11.03.2021

Drawing No: 005

Scale: NTS

Job Title: Wrexham Road, Holt

Drawing Title: Exploratory Hole Location Plan

e3p
Environmental Engineering Partnership Ltd
Taylor Road, Trafford Park
Urmston, Manchester, M41 7JQ
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

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Trial Pit Log

TrialPit No TP101/ SA101
Sheet 1 of 1

Project Name: Wrexham Road	Project No. 14608	Co-ords: 340485.00 - 353362.00 Level:	Date 28/01/2021
Location: Holt, LL13 9YU		Dimensions (m): 2.20 x 1.20 Depth 1.90	Scale 1:30
Client: J10 Planning			Logged I.McQuillan

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40			Dark brown silty clayey fine to medium SAND with frequent rootlets (Topsoil).
				1.00			Light brown fine to coarse SAND.
1.50	1.50	B		1.90			Firm light grey slightly gravelly sandy CLAY. Gravel is fine to medium subrounded to rounded of mudstone.
							End of Pit at 1.90m

DRAFT

Trial Pit Photographs



Trial Pit 101/ Soakaway 101



Trial Pit 101/ Soakaway 101 Spoil

Remarks: 1. Complete 2. Water strike encountered at 1.50m bgl. 3. Unstable from 0.60m bgl. 4. Clay is friable.

Stability: Unstable

Trial Pit Log

TrialPit No TP102/ SA102
Sheet 1 of 1

Project Name: Wrexham Road	Project No. 14608	Co-ords: 340556.00 - 353336.00 Level:	Date 28/01/2021
Location: Holt, LL13 9YU		Dimensions (m): Depth 1.50 — 2.20 × 1.20	Scale 1:30
Client: J10 Planning			Logged I.McQuillan

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
▼ 0.30							Dark brown silty clayey fine to medium sand with frequent rootlets (Topsoil).
				0.60			
				0.70			Firm light brown sandy gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone. Reddish brown slightly sandy clayey GRAVEL. Gravel is fine to medium subrounded to rounded of mudstone.
				1.50			End of Pit at 1.50m

DRAFT

Trial Pit Photographs



Trial Pit 102/ Soakaway 102



Trial Pit 102/ Soakaway 102 Spoil

Remarks: 1. Complete 2. Rapid water strike encountered at 0.30m bgl. 3. Stable.

Stability: Stable

Trial Pit Log

TrialPit No TP103/ SA103
Sheet 1 of 1

Project Name: Wrexham Road	Project No. 14608	Co-ords: 340563.00 - 353393.00 Level:	Date 28/01/2021
Location: Holt, LL13 9YU		Dimensions (m): 2.20 x 1.20 Depth 1.50	Scale 1:30
Client: J10 Planning			Logged I.McQuillan

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.40			Dark brown silty clayey fine to medium sand with frequent rootlets (Topsoil).
1.00				1.50			Firm orange brown sandy gravelly CLAY. Gravel is fine to medium subrounded to rounded of mudstone. End of Pit at 1.50m

DRAFT

Trial Pit Photographs



Trial Pit 103/ Soakaway 103



Trial Pit 103/ Soakaway 103 Spoil

Remarks: 1. Complete 2. Water strike encountered at 1.00m bgl 3. Unstable past 0.40m bgl.

Stability: Unstable

Trial Pit Log

TrialPit No TP104/ SA104
Sheet 1 of 1

Project Name: Wrexham Road	Project No. 14608	Co-ords: 340643.00 - 353358.00 Level:	Date 28/01/2021
Location: Holt, LL13 9YU		Dimensions (m): 2.20 x 1.20 Depth 1.40	Scale 1:30
Client: J10 Planning			Logged I.McQuillan

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.05			Dark brown silty very clayey fine to medium SAND (Topsoil). Orange brown slightly gravelly fine to medium SAND. Gravel is fine to coarse subangular to subrounded of mudstone.
				1.40			End of Pit at 1.40m

DRAFT

Trial Pit Photographs



Trial Pit 104/ Soakaway 104



Trial Pit 104/ Soakaway 104 Spoil

Remarks: 1. Complete 2. Unstable from 0.10m bgl.

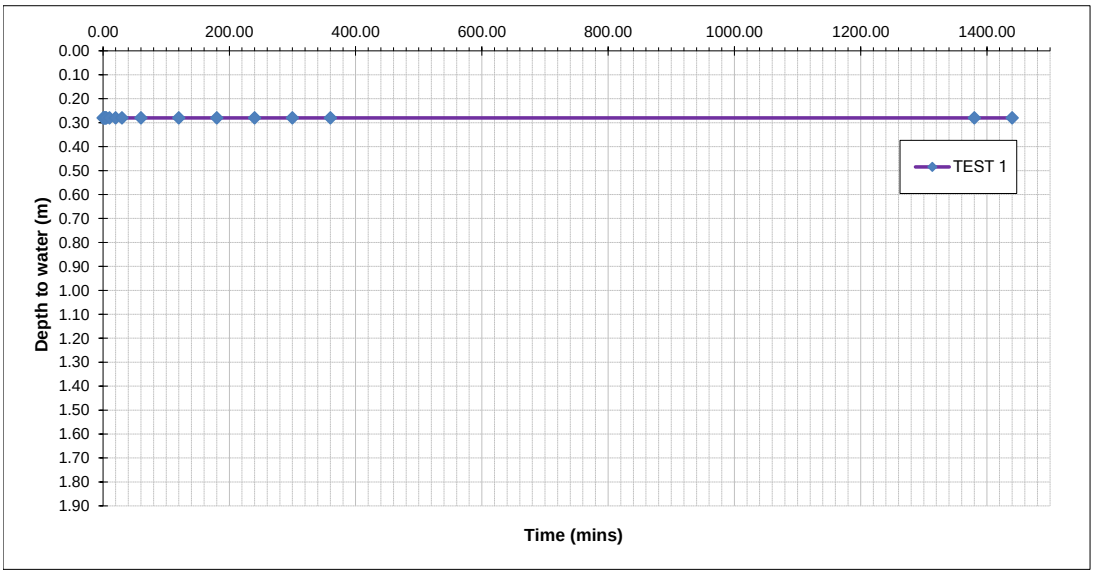
Stability: Unstable

Site:	Wrexham Road, Holt	**Trial Pit Number:**	TP101/SA101
Job Number:	14-608	**Length:**	2.20 m
Date of Test:	28/01/2021	**Width:**	1.20 m
		Depth:	1.90 m
		Groundwater Level:	1.50 m

The test did not reach 25% or 75% effective storage depth and therefore rate could not be calculated.

	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.00	0.28				
	1.00	0.28				
	2.00	0.28				
	3.00	0.28				
	4.00	0.28				
	5.00	0.28				
	10.00	0.28				
	20.00	0.28				
	30.00	0.28				
	60.00	0.28				
	120.00	0.28				
	180.00	0.28				
	240.00	0.28				
	300.00	0.28				
	360.00	0.28				
	1380.00	0.28				
	1440.00	0.28				
Effective Storage Depth	m	1.62				
75% Effective Storage Depth	m	1.22				
(i.e. depth below GL)	m	0.69				
25% Effective Storage Depth	m	0.41				
(i.e. depth below GL)	m	1.50				
Effective Storage Depth 75%-25%	m	0.81				
Time to fall to 75% effective depth	mins	N/A				
Time to fall to 25% effective depth	mins	N/A				
V (75%-25%)	m3	2.14				
a (50%)	m2	8.15				
t (75%-25%)	mins	N/A				
SOIL INFILTRATION RATE	m/s	**N/A**				

DESIGN SOIL INFILTRATION RATE, f	**N/A**



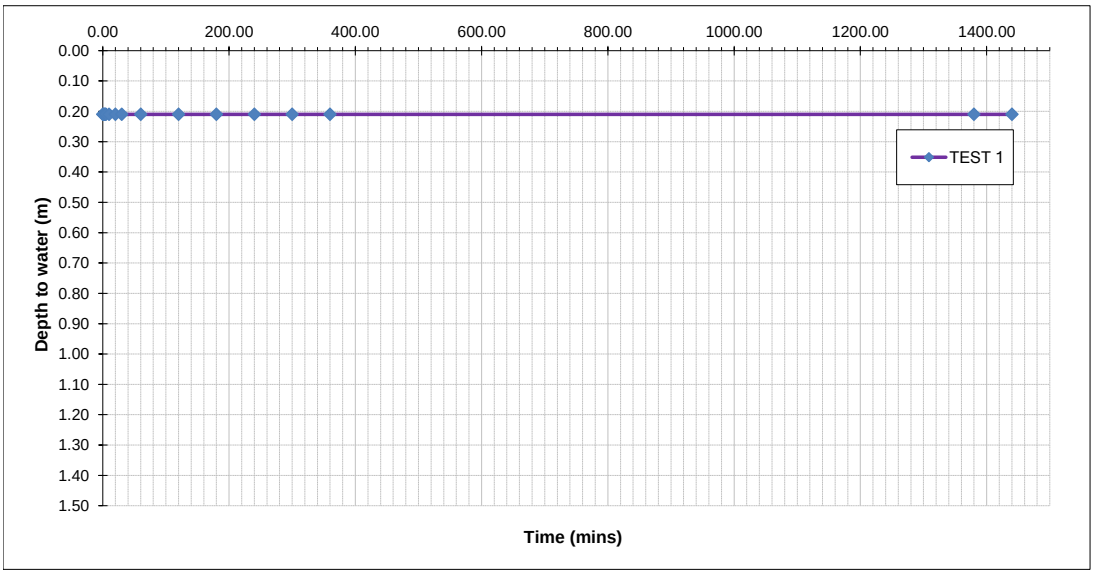
e3p	**Site:** Wrexham Road, Holt **Job Number:** 14-608 **Date of Test:** 28/01/2021	**Trial Pit Number:** TP102/SA102 **Length:** 2.20 m **Width:** 1.20 m **Depth:** 1.50 m **Groundwater Level:** 0.30 m

The test did not reach 25% or 75% effective storage depth and therefore could not be calculated.

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.00	0.21				
1.00	0.21				
2.00	0.21				
3.00	0.21				
4.00	0.21				
5.00	0.21				
10.00	0.21				
20.00	0.21				
30.00	0.21				
60.00	0.21				
120.00	0.21				
180.00	0.21				
240.00	0.21				
300.00	0.21				
360.00	0.21				
1380.00	0.21				
1440.00	0.21				

Effective Storage Depth	m	1.29		
75% Effective Storage Depth	m	0.97		
(i.e. depth below GL)	m	0.53		
25% Effective Storage Depth	m	0.32		
(i.e. depth below GL)	m	1.18		
Effective Storage Depth 75%-25%	m	0.65		
Time to fall to 75% effective depth	mins	N/A		
Time to fall to 25% effective depth	mins	N/A		
V (75%-25%)	m3	1.70		
a (50%)	m2	7.03		
t (75%-25%)	mins	N/A		
SOIL INFILTRATION RATE	m/s	**N/A**		

DESIGN SOIL INFILTRATION RATE, f	**N/A**



Site:	Wrexham Road, Holt	
Job Number:	14-608	
Date of Test:	28/01/2021	

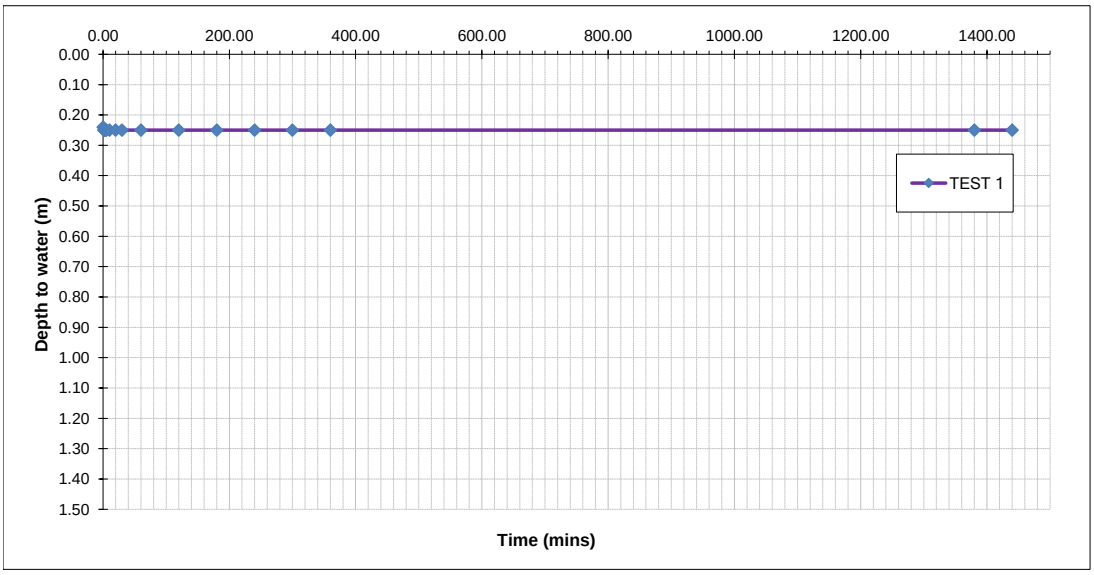
Trial Pit Number:	TP103/SA103	
Length:	2.20	m
Width:	1.20	m
Depth:	1.50	m
Groundwater Level:	1.00	m

The test did not reach 25% or 75% effective storage depth and therefore could not be calculated.

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.00	0.24				
1.00	0.25				
2.00	0.25				
3.00	0.25				
4.00	0.25				
5.00	0.25				
10.00	0.25				
20.00	0.25				
30.00	0.25				
60.00	0.25				
120.00	0.25				
180.00	0.25				
240.00	0.25				
300.00	0.25				
360.00	0.25				
1380.00	0.25				
1440.00	0.25				

Effective Storage Depth	m	1.26		
75% Effective Storage Depth	m	0.95		
(i.e. depth below GL)	m	0.56		
25% Effective Storage Depth	m	0.32		
(i.e. depth below GL)	m	1.19		
Effective Storage Depth 75%-25%	m	0.63		
Time to fall to 75% effective depth	mins	N/A		
Time to fall to 25% effective depth	mins	N/A		
V (75%-25%)	m3	1.66		
a (50%)	m2	6.92		
t (75%-25%)	mins	N/A		
SOIL INFILTRATION RATE	m/s	**N/A**		

DESIGN SOIL INFILTRATION RATE, f	**N/A**



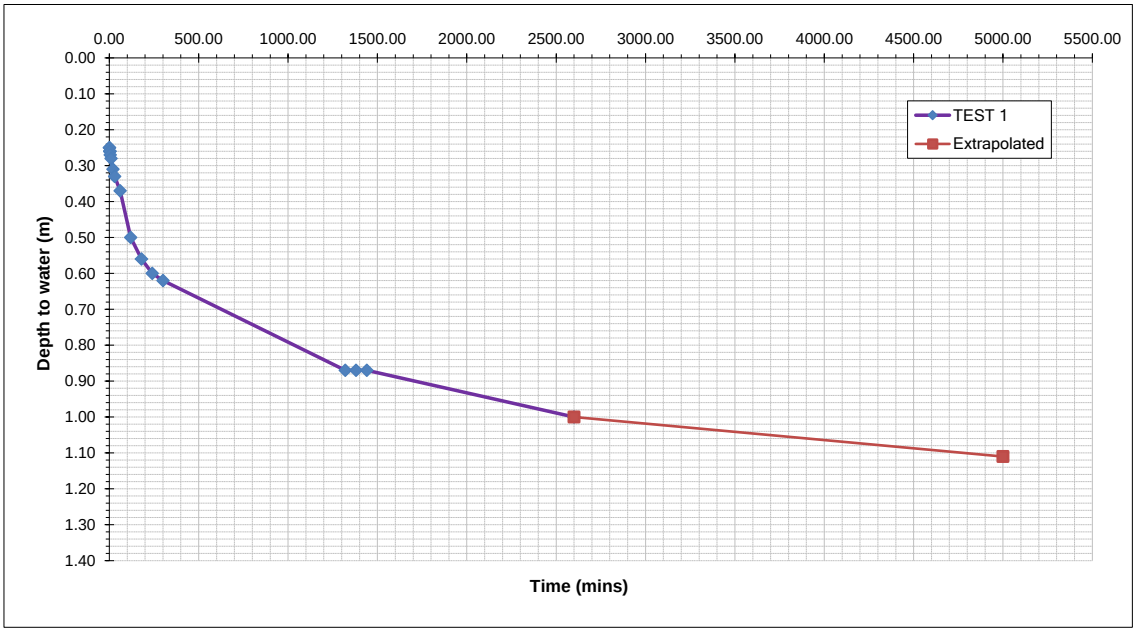
Site:	Wrexham Road, Holt	**Trial Pit Number:**	TP104/SA104
Job Number:	14-608	**Length:**	2.20 m
Date of Test:	28/01/2021	**Width:**	1.20 m
		Depth:	1.40 m
		Groundwater Level:	N/A m

The time to fall 25% effective storage depth has been extrapolated to calculate an infiltration rate.

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.00	0.25				
1.00	0.25				
2.00	0.26				
3.00	0.26				
4.00	0.26				
5.00	0.27				
10.00	0.28				
20.00	0.31				
30.00	0.33				
60.00	0.37				
120.00	0.5				
180.00	0.56				
240.00	0.6				
300.00	0.62				
1320.00	0.87				
1380.00	0.87				
1440.00	0.87				
2600.00	1.00				
5000.00	1.11				

Effective Storage Depth	m	1.15		
75% Effective Storage Depth	m	0.86		
(i.e. depth below GL)	m	0.54		
25% Effective Storage Depth	m	0.29		
(i.e. depth below GL)	m	1.11		
Effective Storage Depth 75%-25%	m	0.58		
Time to fall to 75% effective depth	mins	160.00		
Time to fall to 25% effective depth	mins	5000.00		
V (75%-25%)	m3	1.52		
a (50%)	m2	6.55		
t (75%-25%)	mins	4840.00		
SOIL INFILTRATION RATE	m/s	**7.98E-07**		

DESIGN SOIL INFILTRATION RATE, f	**7.98E-07**



Appendix D Photographic Record

PHOTOGRAPHIC LOG

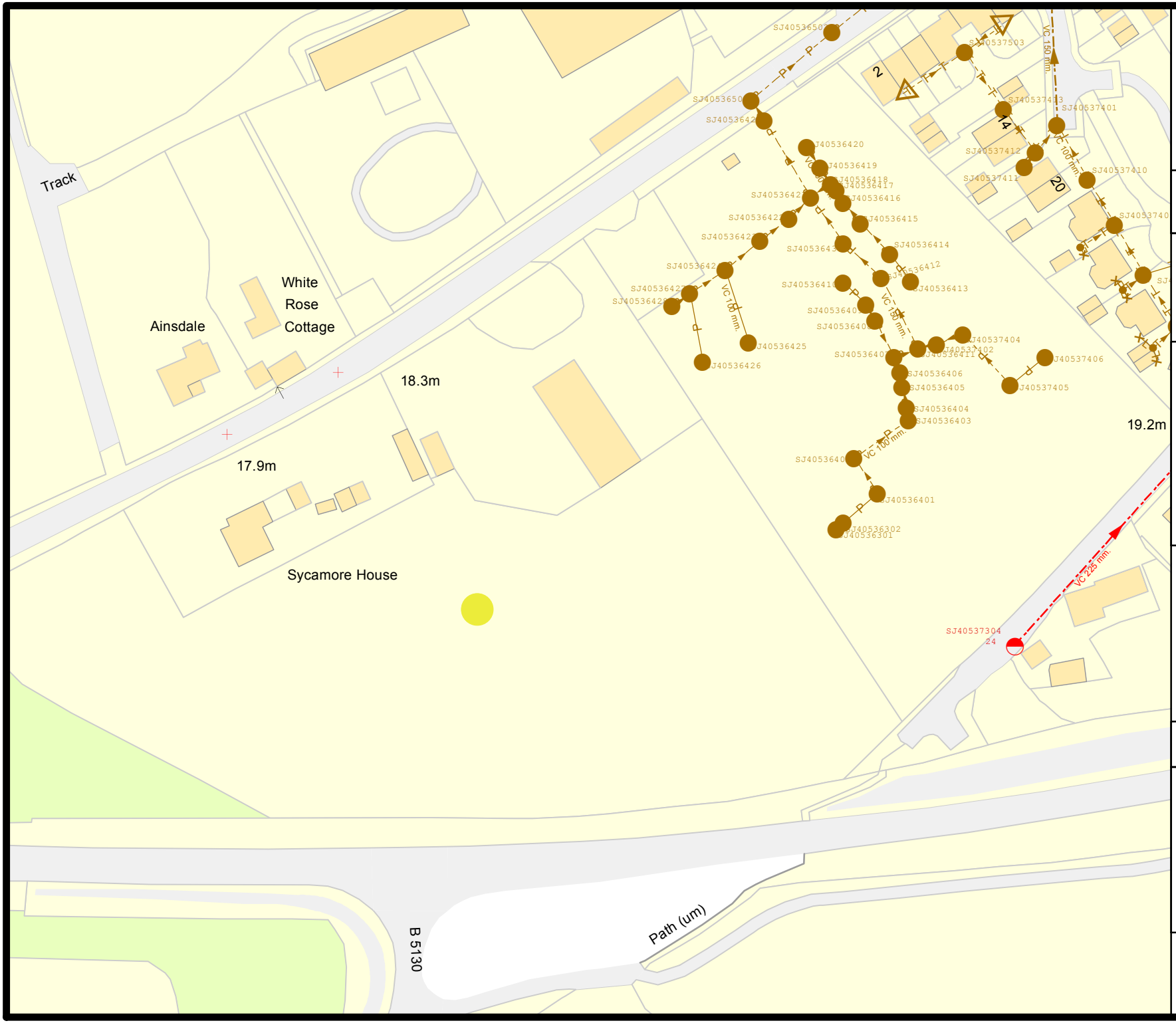
Photo No.1	**13604-Land Adjacent to Sycamore House, Holt**
Date: 24th May 2021 **Description:** Agricultural buildings on site which re not formally drained. Approximate NGR: 340606, 353442	

Photo No. 2	**13604-Land Adjacent to Sycamore House, Holt**
Date: 24th May 2021 **Description:** View of site looking east. Approximate NGR: 340467, 353369	

Photo No.3	13604-Land Adjacent to Sycamore House, Holt
Date: 24th May 2021	
Description: Looking north towards the site across the A534. No evidence of a drainage system downstream of site. Approximate NGR: 340583, 353279	

Photo No. 4	13604-Land Adjacent to Sycamore House, Holt
Date: 24th May 2021	
Description: View of Francis' Lane south of the site. Manhole SJ4053730524 photographed Approximate NGR: 340722, 353369	

Appendix E DCWW Sewer Plan and Correspondence



Dŵr Cymru
Welsh Water

PPA0005556

N
W E
S

LEGEND(Representative of most common features)

Waste network:

	Foul chamber		Outfall
	Surface water chamber	LH	Lamphole
	Combined chamber		Storm Overflow
C O	Combined sewer overflow		Rising main
SPC	Special purpose chamber		Gravity sewer
	Treatment works	P	Private sewer
	Pumping station	S 104 P	Private sewer subject to Sect. 104 adoption agreement
		T	Private Sewer Transfer
		L	Lateral Drain
			Inspection Chamber

NB: Sewer symbol colour indicates the type.

RED - Combined
GREEN - Surface Water
BROWN - Foul
Purple - Former S24 sewers (for indicative purposes only)

Notes:

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

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

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

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

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Map Ref:	340617,353400
Map scale:	1:1250
Printed by:	Danielle Crowe
Printed on:	18 Mar 2021

Dŵr Cymru
Welsh Water

Developer Services
PO Box 3146
Cardiff
CF30 0EH

Tel: +44 (0)800 917 2652
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Gwasanaethau Datblygu
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Caerdydd
CF30 0EH

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Ffacs: +44 (0)2920 740472
E.bost: developer.services@dwrcymru.com

Waterco
Waterco Eden Court
Lon Parcwr Business Park
Ruthin
Denbighshire
LL15 1NJ

Date: 18/03/2021
Our Ref: PPA0005556

Dear Mr Jones,

Grid Ref: 340589 353375
Site Address: Holt Road Wrexham
Development: Land adjacent to Sycamore House, Holt Road, Wrexham

I refer to your pre-planning enquiry received relating to the above site, seeking our views on the capacity of our network of assets and infrastructure to accommodate your proposed development. Having reviewed the details submitted I can provide the following comments which should be taken into account within any future planning application for the development.

APPRAISAL

Firstly, we note that the proposal relates to a residential development on land adjacent to Sycamore House, Holt Road, Wrexham and acknowledge that the site is proposed to be allocated within the Local Development Plan (LDP) for 35 no. units. In reference to our representations during the LDP consultation process, we can confirm that an assessment has been undertaken of the public sewerage and watermains systems to accommodate [LDP No. 35of Units] and informs our appraisal as follows. Please note, however, this proposal comprises an increase to the LDP allocation and the following assessment takes account of an additional 10 no. units accordingly.

Please note, notwithstanding the following assessment, we would advise there is also a mandatory requirement to undertake pre-application consultation with all 'Specialist Consultees', including Dwr Cymru Welsh Water as the statutory water and sewerage undertaker, in accordance with Schedule 4 of Town & Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016. As a major development, amounting to more than 10 units, you will be statutorily required to consult Welsh Water and a substantive response will be issued within 28 days from the date of the notice as per the requirements of Article 2E.

glas
Glas Cymru Cyfyngedig

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Mae Dŵr Cymru yn eiddo i Glas Cymru – cwmni 'nid-er-elw'.

We welcome correspondence in Welsh and English

Dŵr Cymru Cyf, a limited company registered in Wales no 2366777. Registered office: Pentwyn Road, Nelson, Treharris, Mid Glamorgan CF46 6LY

Rydym yn croesawu gohebiaeth yn y Gymraeg neu yn Saesneg

Dŵr Cymru Cyf, cwmni cyfyngedig wedi'i gofrestru yng Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn Nelson, Treharris, Morgannwg Ganol CF46 6LY.

Public Sewerage Network

The proposed development site is located in the immediate vicinity of a separate sewerage system, comprising combined, foul and surface water public sewers, which drains to Holt Wastewater Treatment Works (WwTW). We can advise that Holt WwTW does not have a phosphate permit. You will need to discuss this matter further with the local planning authority.

You are also advised that some public sewers and lateral drains may not be recorded on our maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The presence of such assets may affect the proposal. In order to assist you may contact Dwr Cymru Welsh Water on 0800 085 3968 to establish the location and status of the apparatus in and around your site. Please be mindful that under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

Surface Water Drainage

As of 7th January 2019, this proposed development is subject to Schedule 3 of the Flood and Water Management Act 2010. The development therefore requires approval of Sustainable Drainage Systems (SuDS) features, in accordance with the 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems'. As highlighted in these standards, the developer is required to explore and fully exhaust all surface water drainage options in accordance with a hierarchy which states that discharge to a combined sewer shall only be made as a last resort. Disposal should be made through the hierarchical approach, preferring infiltration and, where infiltration is not possible, disposal to a surface water drainage body in liaison with the Land Drainage Authority and/or Natural Resources Wales.

It is therefore recommended that the developer consult with Wrexham Council, as the determining SuDS Approval Body (SAB), in relation to their proposals for SuDS features. Please note, DCWW is a statutory consultee to the SAB application process and will provide comments to any SuDS proposals by response to SAB consultation. Please refer to further detailed advice relating to surface water management included in our attached Advice & Guidance note. In addition, please note that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system.

Foul Water Drainage – Sewerage Network

We have considered the impact of foul flows generated by the proposed development and concluded that flows can be accommodated within the public sewerage system which is consistent with our representations to the LDP consultation process. We advise that the flows should be connected to the public sewer at or downstream of manhole SJ40537304 located to the east. Should a planning application be submitted for this development we will seek to control these points of communication via appropriate planning conditions and therefore recommend that any drainage layout or strategy submitted as part of your application takes this into account.

However, should you wish for an alternative connection point to be considered please provide further information to us in the form of a drainage strategy, preferably in advance of a planning application being submitted.

You may need to apply to Dwr Cymru Welsh Water for any connection to the public sewer under Section 106 of the Water industry Act 1991. However, if the connection to the public sewer network is either via a lateral drain (i.e. a drain which extends beyond the connecting property boundary) or via a new sewer (i.e. serves more than one property), it is now a mandatory requirement to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991). The design of the sewers and lateral drains must also conform to the Welsh Ministers Standards for Foul Sewers and Lateral Drains, and conform with the publication "Sewers for Adoption"- 7th Edition. Further information can be obtained via the Developer Services pages of www.dwrcymru.com.

Foul Water Drainage – Sewage Treatment

No problems are envisaged with the Wastewater Treatment Works for the treatment of domestic discharges from this site.

I trust the above information is helpful and will assist you in forming water and drainage strategies that should accompany any future planning application. I also attach copies of our water and sewer extract plans for the area, and a copy of our Planning Guidance Note which provides further information on our approach to the planning process, making connections to our systems and ensuring any existing public assets or infrastructure located within new development sites are protected.

Please note that our response is based on the information provided in your enquiry and should the information change we reserve the right to make a new representation. Should you have any queries or wish to discuss any aspect of our response please do not hesitate to contact our dedicated team of planning officers, either on 0800 917 2652 or via email at **developer.services@dwrcymru.com**

Please quote our reference number in all communications and correspondence.

Yours faithfully,



Owain George
Planning Liaison Manager
Developer Services

***Please Note** that demands upon the water and sewerage systems change continually; consequently the information given above should be regarded as reliable for a maximum period of 12 months from the date of this letter.*

Anthony Jones

From: Rhodri Perry <Rhodri.Perry@dwrcymru.com>
Sent: 21 May 2021 13:55
To: Anthony Jones
Subject: RE: PPA0005556 - 13604

Categories: Info

Hi Anthony,

Subject to exhaustion of surface water hierarchy we would accept surface water discharge at an attenuated discharge rate of 5 l/s into 225mm in Francis Lane.

We would caveat that as this site will be subject to SAB, while we are a consultee for SAB any final decision is the SAB's.

In regards to land drainage/highway flows we have no duty to accept these, if there is no alternative discharge option for this, I would advise we would be open to reviewing this.

Thank you,

Rhodri

Rhodri Perry
Development Control Officer | Developer Services
Dŵr Cymru Welsh Water

W: dwrcymru.com
E: developer.services@dwrcymru.com
T: 0800 917 2652 | M: 07557 849514
A: PO Box 3146, Cardiff, CF30 0EH

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---

From: Anthony Jones <anthony.jones@waterco.co.uk>
Sent: 11 May 2021 16:44
To: Rhodri Perry <Rhodri.Perry@dwrcymru.com>
Subject: RE: PPA0005556 - 13604

******** External Mail ********
Reference Number PPA0005556

Land adjacent to Sycamore House, Wrexham Road, Holt, LL13 9YU. NGR: 340580, 353380

Hi Rhodri,

It was good chatting to you last month. Following on from our call please can you provide clarification on the following points we discussed.

As discussed, you were going to check the capacity and advise on a flow rate for surface water flows from the site (2-5l/s mentioned on phone TBC) discharging to the combined sewer in Francis Lane (subject to applying the drainage hierarchy)?

We further noted in the developer enquiry '*that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system*.' We discussed that infiltration results for the site had been received which have shown that infiltration is not feasible. Therefore please can you confirm whether surface water runoff from the proposed access road will be allowed to discharge to the combined sewer network?

If you require any further information, please do not hesitate to contact me.

Kind regards,

Anthony Jones BSc (Hons) MSc
Environmental Consultant

DDI: 01244 986027
Office: 01824 702220
Teams: anthony.jones@waterco.co.uk

For 2021 we've been included in the CIWEM Consultant & Contractor File, which is available here

Waterco Assessment, Modelling, Design
CIWEM Chartered Institution of Water and Environmental Management

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Please consider the environment before printing this email.

From: Rhodri Perry <Rhodri.Perry@dwrcymru.com>
Sent: 30 March 2021 11:47
To: Anthony Jones <anthony.jones@waterco.co.uk>
Subject: RE: PPA0005556 - 13604

Thank you Anthony,

I will set up teams call for 2pm, if there are any issues with this please let me know.

Thank you,

Rhodri

Rhodri Perry
Development Control Officer | Developer Services
Dŵr Cymru Welsh Water

W: dwrcymru.com
E: developer.services@dwrcymru.com
T: 0800 917 2652 | M: 07557 849514
A: PO Box 3146, Cardiff, CF30 0EH

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---

From: Anthony Jones <anthony.jones@waterco.co.uk>
Sent: 29 March 2021 15:41
To: Rhodri Perry <Rhodri.Perry@dwrcymru.com>
Subject: RE: PPA0005556 - 13604

******** External Mail ********
Hi Rhodri,

No problem about Friday, I'm free anytime tomorrow to discuss over Teams so whenever is convenient for you.

Kind regards,

Anthony Jones BSc (Hons) MSc
Assistant Environmental Consultant

DDI: 01244 986027
Office: 01824 702220
Teams: anthony.jones@waterco.co.uk

For 2021 we've been included in the CIWEM Consultant & Contractor File, which is available here



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Please consider the environment before printing this email.

From: Rhodri Perry <Rhodri.Perry@dwrcymru.com>
Sent: 29 March 2021 11:16
To: Anthony Jones <anthony.jones@waterco.co.uk>
Subject: RE: PPA0005556 - 13604

Hi Anthony,

Apologies I got caught up in few tasks on Friday,

I have availability today/tomorrow for teams call, please let me know if good for you?

Thank you,

Rhodri

Rhodri Perry
Development Control Officer | Developer Services
Dŵr Cymru Welsh Water

W: dwrcymru.com

E: developer.services@dwrcymru.com
T: 0800 917 2652 | M: 07557 849514
A: PO Box 3146, Cardiff, CF30 0EH

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---

From: Anthony Jones <anthony.jones@waterco.co.uk>
Sent: 25 March 2021 16:39
To: Rhodri Perry <Rhodri.Perry@dwrcymru.com>
Subject: RE: PPA0005556 - 13604

******** External Mail ********
HI Rhodri,

Thanks for the quick reply, yes I'm free anytime tomorrow to discuss over Teams so whenever is convenient for you.

Kind regards,

Anthony Jones BSc (Hons) MSc
Assistant Environmental Consultant

DDI: 01244 986027
Office: 01824 702220
Teams: anthony.jones@waterco.co.uk

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Please consider the environment before printing this email.

From: Rhodri Perry <Rhodri.Perry@dwrcymru.com>
Sent: 25 March 2021 16:33
To: Anthony Jones <anthony.jones@waterco.co.uk>
Subject: RE: PPA0005556 - 13604 [Filed 25 Mar 2021 16:35]

Hi Anthony,

Thank you for the email below relating to our pre planning response, I completed the response for this site.

Are you free tomorrow for phone call/teams call on this?

Rhodri

Rhodri Perry
Development Control Officer | Developer Services

Dŵr Cymru Welsh Water

W: dwrcymru.com
E: developer.services@dwrcymru.com
T: 0800 917 2652 | M: 07557 849514
A: PO Box 3146, Cardiff, CF30 0EH

Before you print please think about the **ENVIRONMENT**

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---

From: Anthony Jones <anthony.jones@waterco.co.uk>
Sent: 23 March 2021 15:47
To: services developer <developer.services@dwrcymru.com>
Subject: Re: PPA0005556 - 13604

******** External Mail ********
Reference Number PPA0005556

Land adjacent to Sycamore House, Wrexham Road, Holt, LL13 9YU. NGR: 340580, 353380

Dear Sir/Madam,

Please can you provide clarification on the following points below in relation to the pre-development enquiry we have received for the above site (dated 18/03/2021).

You have advised that foul flows should preferably discharge to the public combined sewer in Francis Lane south-east of the site. Can we therefore assume that the public combined sewer in Francis Lane would also be the preferred connection point for surface water flows (subject to applying the drainage hierarchy)?

We further that you have stated '*that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system*.' We have now received infiltration results for the site which have shown that infiltration is not feasible. Therefore please can you provide further clarification as to whether surface water runoff from the proposed access road will be allowed to discharge to the combined sewer network?

If you require any further information, please do not hesitate to contact me.

Kind regards,

Anthony Jones BSc (Hons) MSc
Assistant Environmental Consultant

DDI: 01244 986027
Office: 01824 702220
Teams: anthony.jones@waterco.co.uk

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www.dwrcymru.com/waterefficiency to find out how you can become water wise. Mae Dwr Cymru Welsh Water wedi ymrwymo i warchod adnoddau dwr a hyrwyddo defnydd dwr effeithiol. Mae cyngor i' ch helpu i ddefnyddio dwr yn ddoeth yn www.dwrcymru.com/waterefficiency

_____

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Appendix F Wrexham Road Highway Drainage Survey



N

Legend/Notes:

- Combined Sewer
- Foul Sewer
- SW Sewer
- Assumed Sewer (Not Proven)
- Rising Main
- Highway Drainage
- Culvert Sewer
- Open Water Course
- Overflow Line
- Treated Line
- RDP Rain Water Down Pipe
- FDP Foul Down Pipe
- CDP Combined Down Pipe
- GDP Grey Water Down Pipe
- Highway Gully
- Septic Tanks
- Direction of overland flows
- 48.591 Spot levels

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Warrington Business Park, Long Lane, Warrington, Cheshire, WA2 8TX
Tel: 01925 244376 Fax: 01925 241517
Email: kevin@invek.com – www.invek.com

Client: Waterco

Drawing Title: Wrexham Road, Holt Drainage Layout

Scale(s)	N.T.S	Drawn	PW
Date	08.08.24	Checked	RD
Job Number	2279	Approved	KN

Sheet Size, Drawing Number & Revision: A1_2279/01_Rev_00

Invek Surveys 6.16 — Manhole Details

08/08/24

OS ref SJ4053689325 — M/H no SJ40536351

Location VERGE OF WREXHAM ROAD

Year laid — Status HD — Function S — Type M — Survey date 07/08/24

COVER — Shape S — Hinged N — Lockable N — Duty H — Size 610 x 610 — Toxic N

SHAFT — Side N — Noreg — Depth 270 — Size 600 x — Vermn N

CHAMBER — Soffit S — Steps 5 — Ladders 0 — Lndgs 0 — Size 900 x — Const P

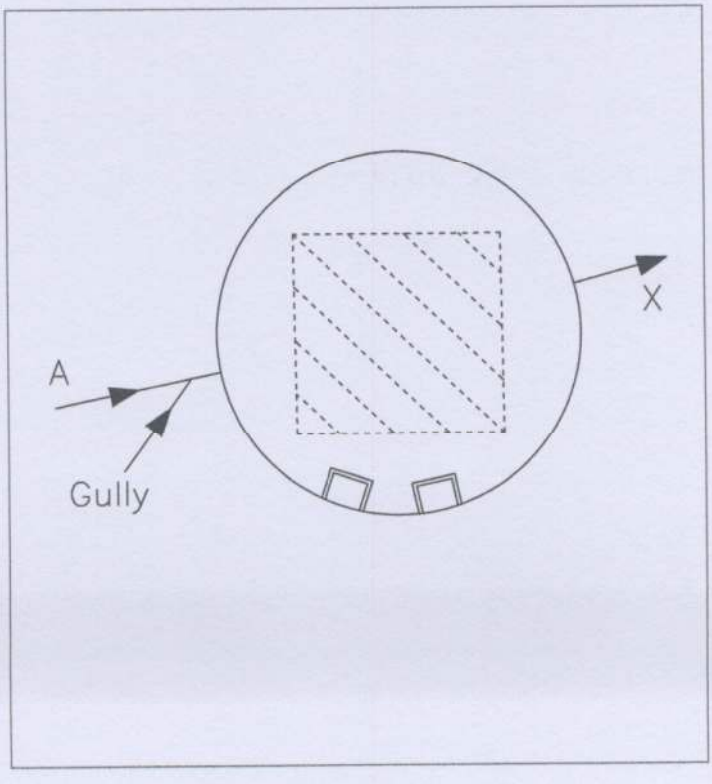
Depth flow — Depth silt — Ht surch — Cover level 14.73

		Up/dn ref	Shp	Size		Bdrop		Mat	Lng	Depth	Invert
In	A	GULLY	C	225	x			VC		1.76	12.97
	B				x						
	C				x						
	D				x						
	E				x						
	F				x						
						TV	Crt				
Ou	X	40537350	C	225	x	N	C	VC		1.77	12.96
	Y				x	N	C				

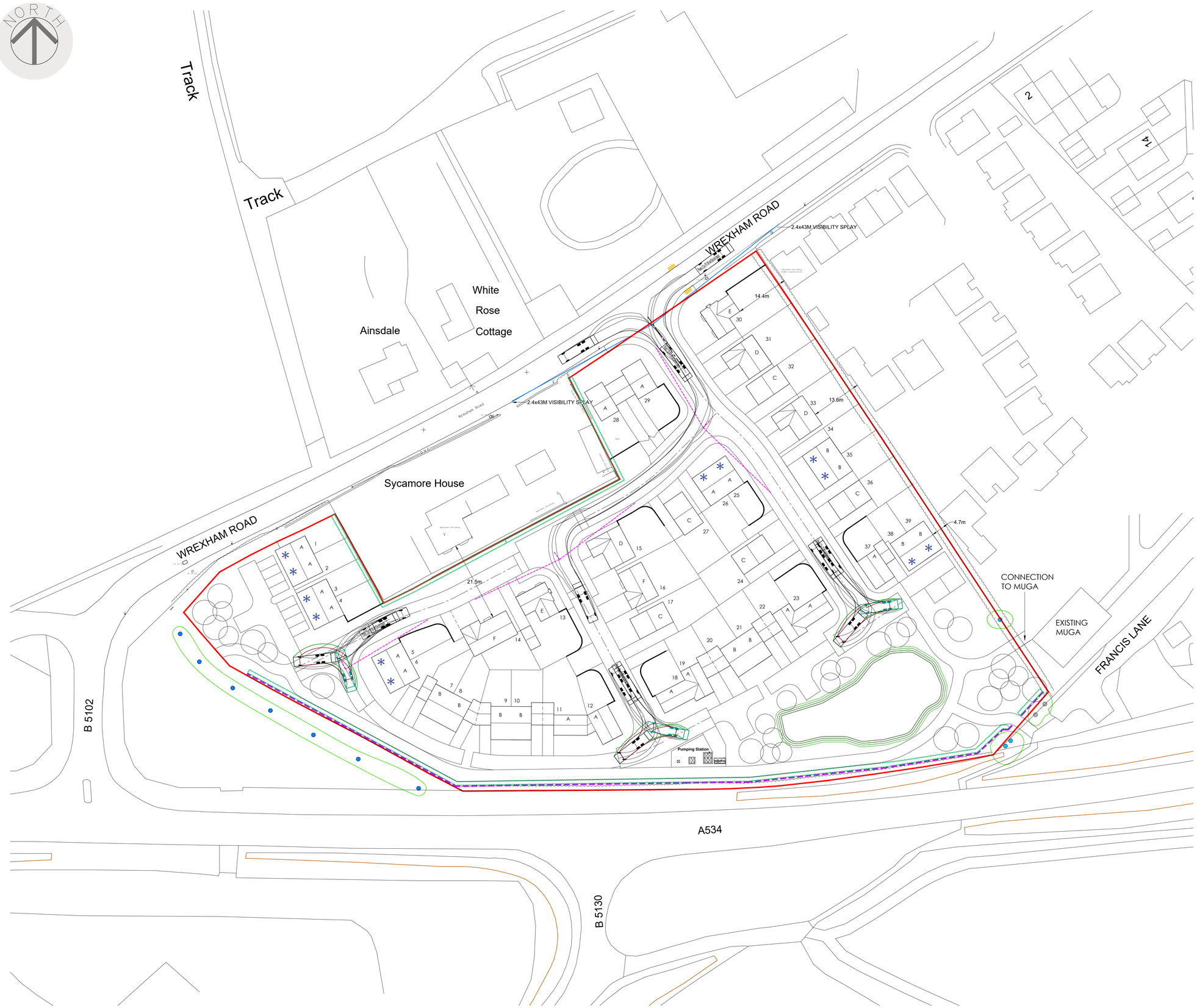
Attention Cover N — Step/Lad N — Shaft N — Chamb N — Bch/ch N — Other N

Remarks HW06. LARGE GULLY COVER OVER CATCHPIT. DAC
OVERALL DEPTH=1.84M.





Appendix G Development Plan



REF	BEDS	SQ FT	QTY	TOTAL	TYPE
A	2	964	17	16388	2 BED SEMI
B	3	1100	10	11000	3 BED SEMI
C	3	1200	5	6000	4 BED DETACHED
D	3	1245	3	3735	4 BED DETACHED
E	3	1250	2	2500	4 BED DETACHED
F	4	1350	2	2700	4 BED DETACHED
		TOTAL	39	42323	

Units / Net/ Hectare / Acre	31 / 12
Gross area	1.72 hectares / 4.26 acres
POS area	0.41 hectares / 1.01 acres
Undevelopable area	0.06 hectares / 0.15 acres
Net area	1.24 hectares / 3.10 acres

Legend

Root Protection Area
Modified to Account for
Site Features

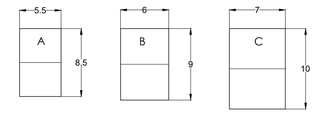
Category
Crown Spread
Tree Number
Root Protection Area

- Category A (High Quality)
- Category B (Moderate Quality)
- Category C (Low Quality)
- Category U (Dead/Dying/In Decline)
- Tree Position Approximate (not shown on original survey)
- Tree Proposed for Removal

Key

- Open Space
- Suds
- Dwelling
- Affordable dwelling
- Acoustic Fence

Typical Property Sizes.



2 Bed 3 Bed 4 Bed

* NOTE
ALL BUILDINGS ARE UP TO 2.5 STOREY MAX
(9.7m GROUND TO RIDGE LEVEL)
DIMENSIONS SHOWN HAVE A DEVIATION OF +/- 3m

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PROJECT
LAND OFF WREXHAM ROAD, HOLT

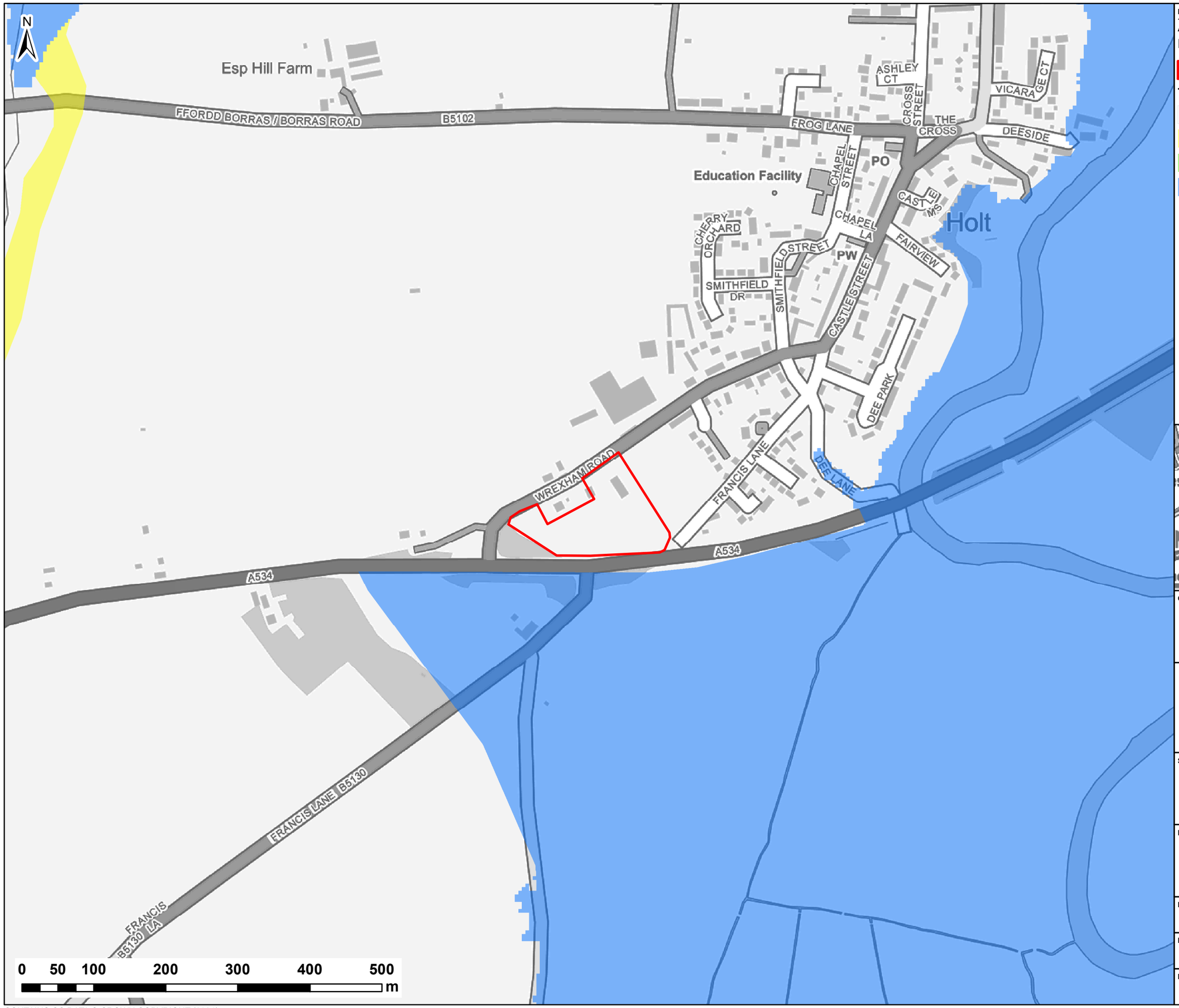
CLIENT
PRIDDING FARMING PARTNERSHIP

DRAWING TITLE
SITE PLAN

SCALE	1:500 @ A1
DATE	22:12:2021
CHECKED	IP

PROJECT REF:
Plnc 100/83 Holt Pridding
DRAWING REF:
Plnc 100_82_SP 01

Appendix H NRW Flood Maps



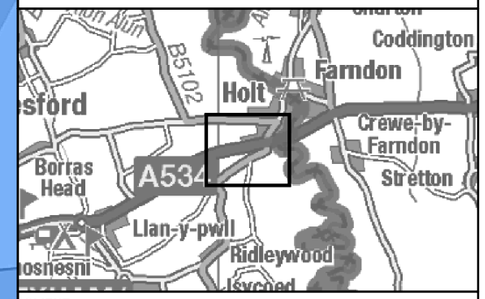
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary

TAN15 Classification

- Zone A
- Zone B
- Zone C1
- Zone C2



CLIENT:

MRS V PRIDDING

waterco

www.waterco.co.uk

SCHEME:

LAND ADJACENT TO SYCAMORE HOUSE, WREXHAM ROAD, HOLT

PLOT TITLE:

WELSH GOVERNMENT DEVELOPMENT ADVICE MAP

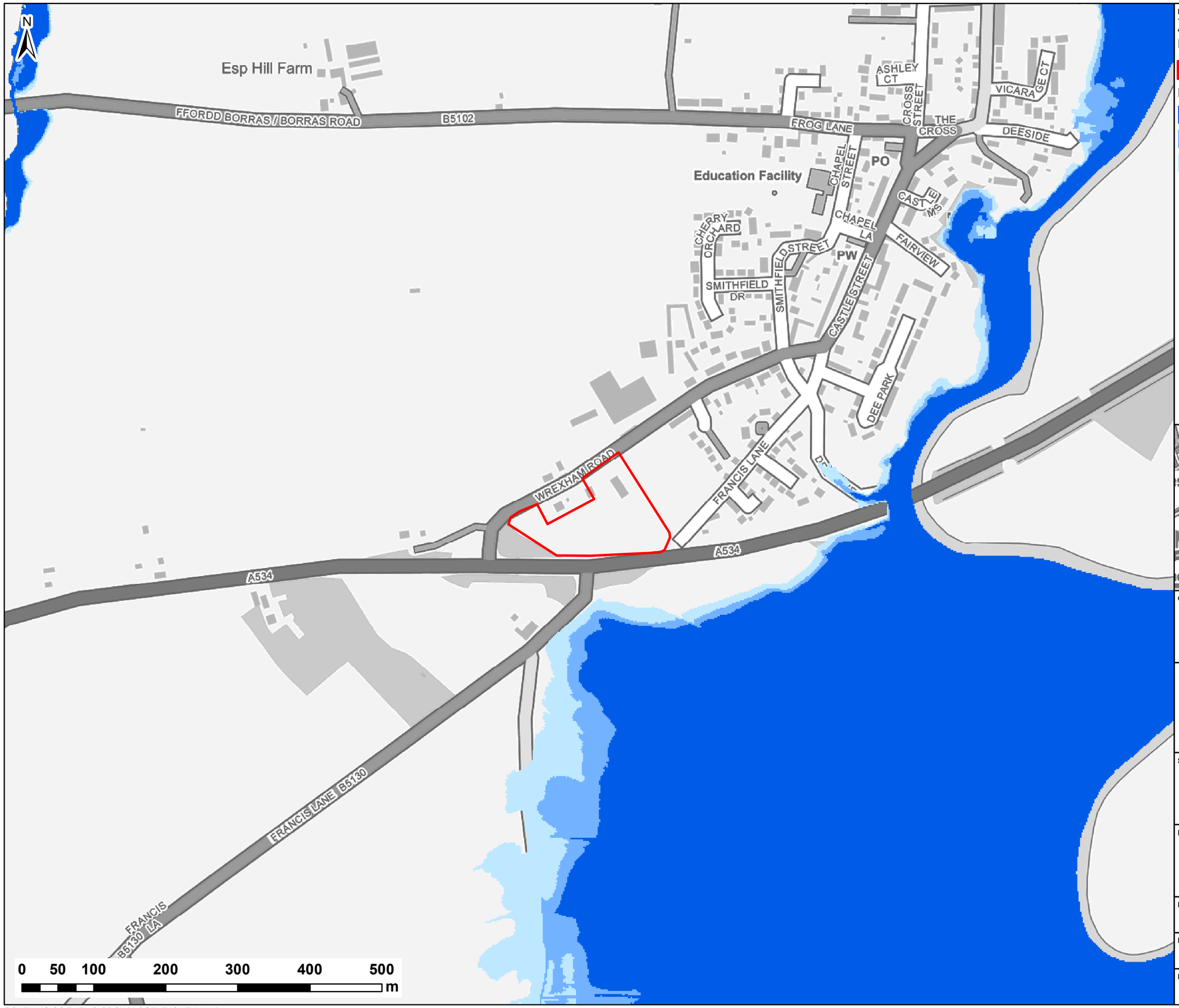
DATA ACCESSED MARCH 2021

PLOT STATUS:	DATE:
FINAL	09/03/2021

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
CM	AW	VG	1:5,000 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
13604-TAN_15	-

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NRW TAN15 DEVELOPMENT ADVICE MAP DATA © NRW (2021) - DATA DOWNLOADED FROM THE LLE GEO-PORTAL



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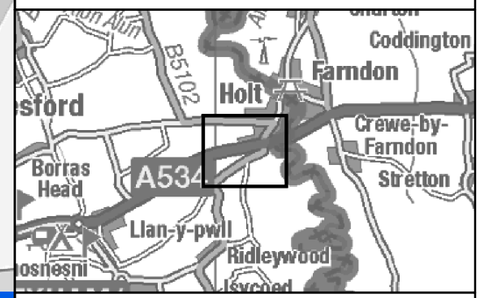
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

Site Boundary

Flood Risk from Rivers

- High
- Medium
- Low



CLIENT:

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SCHEME:

LAND ADJACENT TO SYCAMORE HOUSE, WREXHAM ROAD, HOLT

PLOT TITLE:

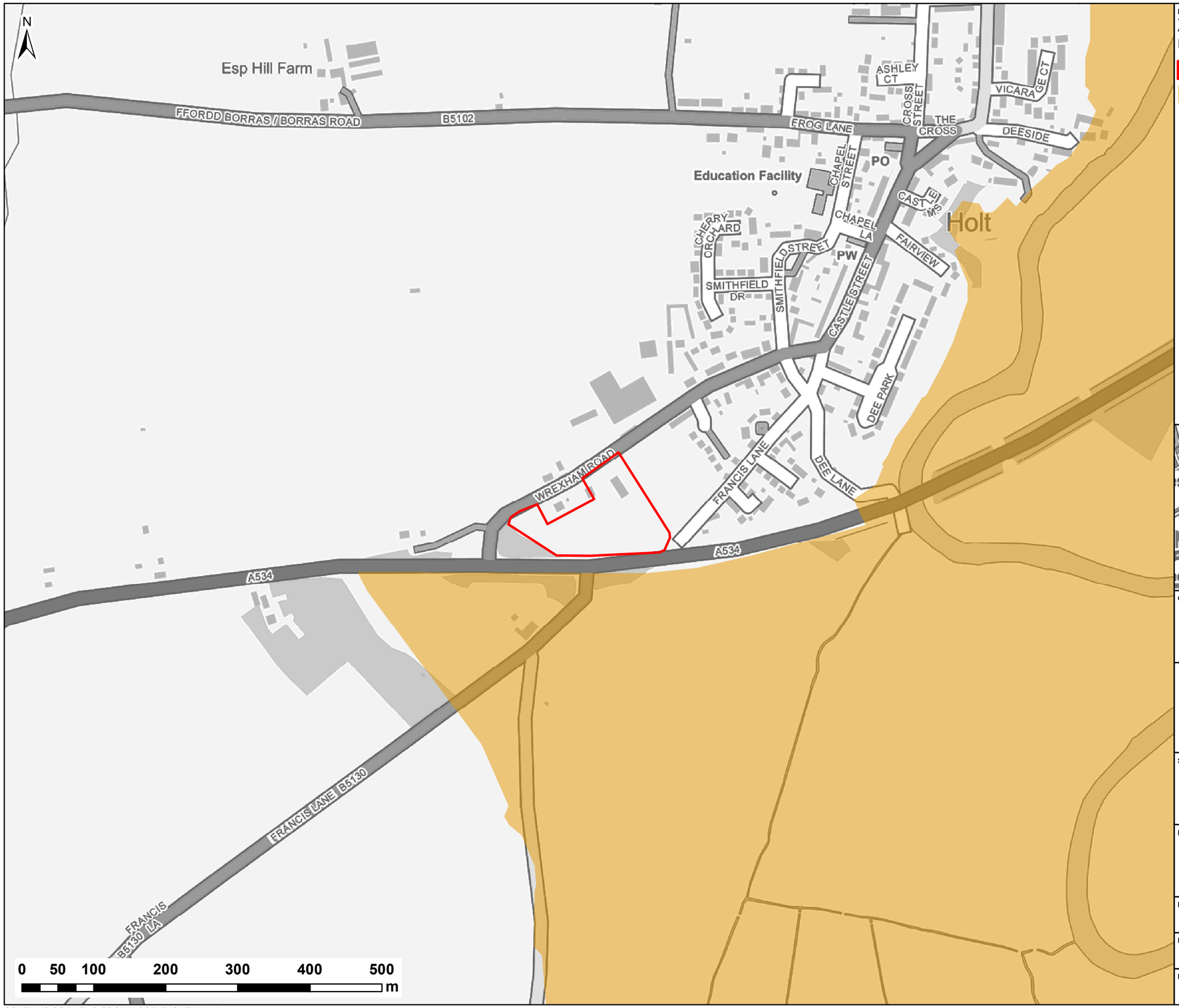
NRW FLOOD RISK FROM RIVERS

DATA ACCESSED MARCH 2021

PLOT STATUS:	DATE:
FINAL	09/03/2021

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
CM	AW	VG	1:5,000 (UNLESS STATED OTHERWISE)

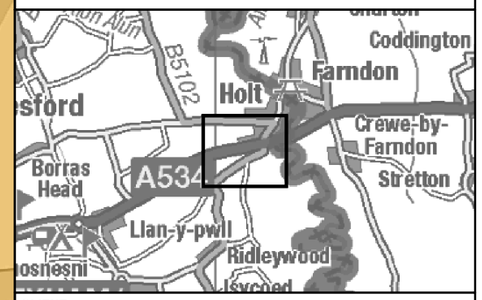
PLOT NAME:	REV:
13604-NRW_Risk_from_Rivers	-



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Historical Flood Map



CLIENT:

MRS V PRIDDING

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SCHEME:

LAND ADJACENT TO SYCAMORE HOUSE, WREXHAM ROAD, HOLT

PLOT TITLE:

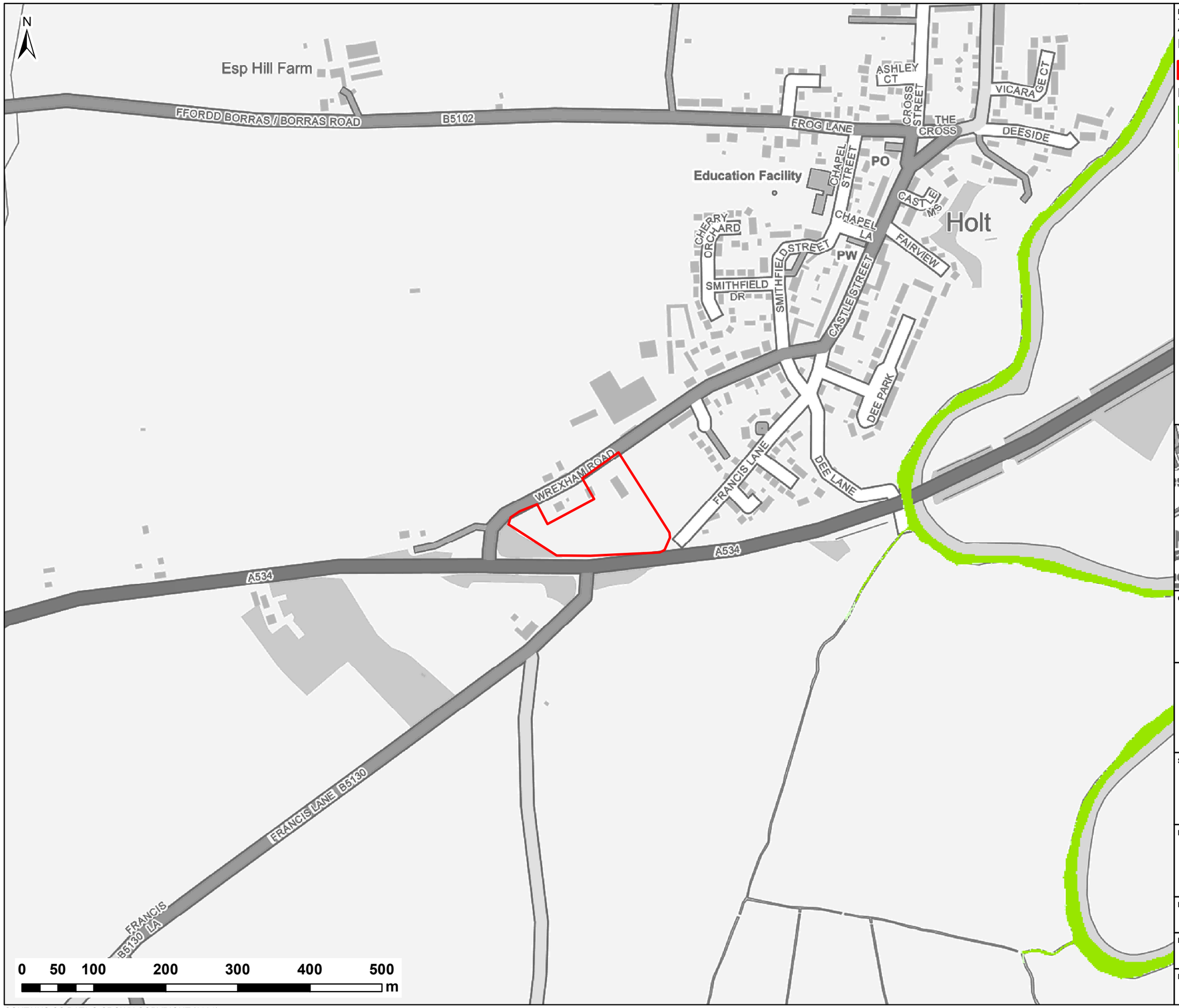
NRW HISTORICAL FLOOD MAP

PLOT STATUS:	DATE:
FINAL	09/03/2021

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
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PLOT NAME:	REV:
13604-NRW_HIST	-

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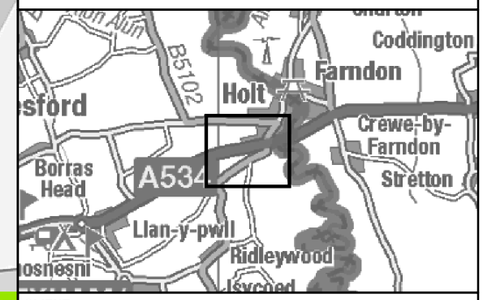
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

Site Boundary

Flood Risk from the Sea

- High
- Medium
- Low



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SCHEME:

LAND ADJACENT TO SYCAMORE HOUSE, WREXHAM ROAD, HOLT

PLOT TITLE:

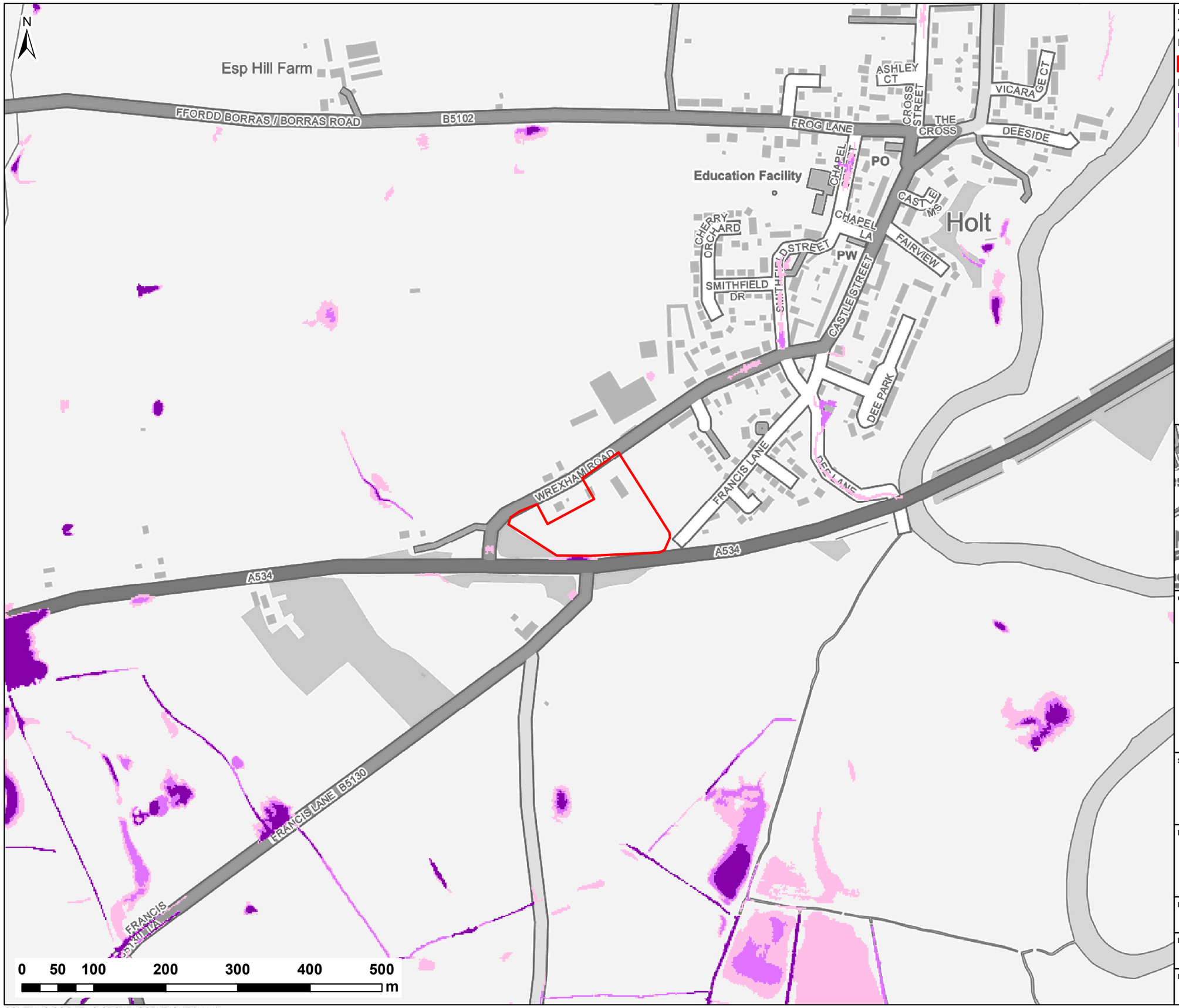
NRW FLOOD RISK FROM THE SEA

DATA ACCESSED MARCH 2021

PLOT STATUS:	DATE:
FINAL	09/03/2021

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
CM	AW	VG	1:5,000 (UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
13604-NRW_Risk_From _Sea	-



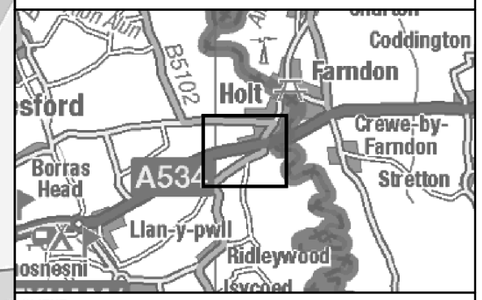
NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

Site Boundary

Flood Risk from Surface Water & Small Watercourses

- High
- Medium
- Low



CLIENT:

MRS V PRIDDING

waterco

www.waterco.co.uk

SCHEME:

LAND ADJACENT TO SYCAMORE HOUSE, WREXHAM ROAD, HOLT

PLOT TITLE:

NRW FLOOD RISK FROM SURFACE WATER AND SMALL WATERCOURSES

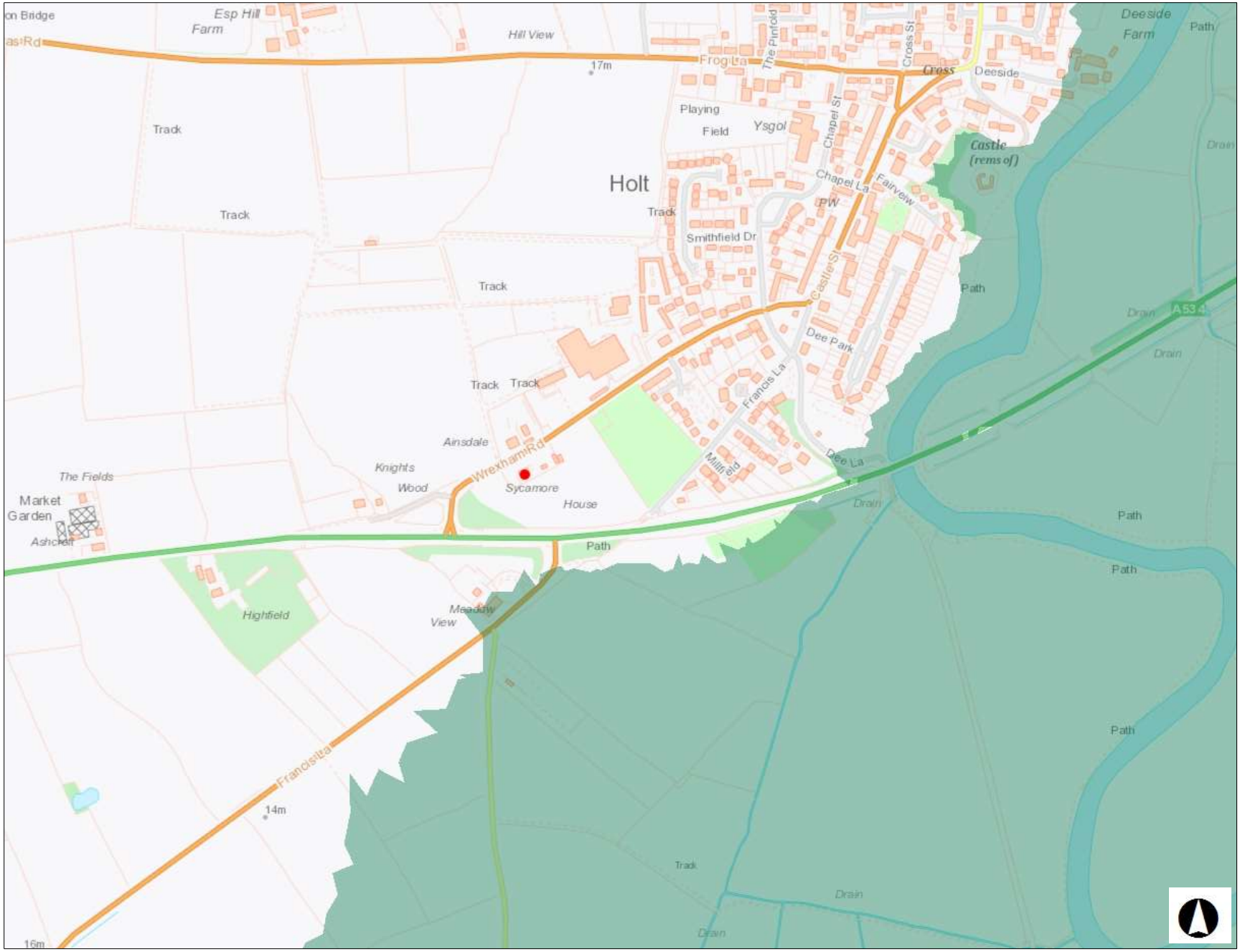
DATA ACCESSED MARCH 2021

PLOT STATUS:	DATE:
FINAL	09/03/2021

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
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PLOT NAME:	REV:
13604-NRW_SW	-

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Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Risk from Reservoirs

Allwedd / Map Key

Flood Risk from Reservoirs

Graddfa / Scale at A3 1:4,999

Dyddiad / Date
19/03/2021

0.3 0 0.13 0.3
British_National_Grid Kilometers

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Appendix I SAB Correspondence

Anthony Jones

From: SAB <SAB@wrexham.gov.uk>
Sent: 26 February 2021 11:06
To: Anthony Jones
Subject: RE: 13604 - SAB Request
Attachments: Management of Surface Water Generated from New Dev_E_03 19.pdf

Categories: Info

Hi Anthony,

Guidance for Pre-Application Approval and Full Application Approval of SuDS on new developments in accordance with The Sustainable Drainage (Approval and Adoption Procedure) (Wales) Regulations 2018 and all available information including links to the National Standards, FAQ's and statutory guidance can be found via: https://www.wrexham.gov.uk/english/planning_portal/sab/sab.htm

For information relating to the management of surface water generated from new developments please refer to the attached guidance.

Please see responses to your specific queries below in red.

If you require any further information please do not hesitate to contact us.

Jason Russell
Peiriannydd / Engineer

Cyngor Bwrdeistref Sirol Wrecsam, Adran Amgylchedd a Thechnegol, De Ffordd yr Abaty, Ystad Ddiwydiannol Wrecsam, Wrecsam LL13 9PW
Wrexham County Borough Council, Environment & Technical Department, Abbey Road South, Wrexham Industrial Estate, Wrexham LL13 9PW
wrecsam.gov.uk | wrexham.gov.uk
twitter.com/cbswrecsam | twitter.com/wrexhamcbc
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From: Anthony Jones <anthony.jones@waterco.co.uk>
Sent: 25 February 2021 17:00
To: SAB <SAB@wrexham.gov.uk>
Subject: 13604 - SAB Request

Land adjacent to Sycamore House, Wrexham Road, Holt, LL13 9YU. NGR: 340580, 353380

Dear Sir/Madam,

We are currently preparing a Flood Consequences Assessment and Drainage Strategy and are seeking a pre-application service from the SuDS Approval Body (SAB) in relation to a proposed development at the above address.

The land adjacent Sycamore House, Wrexham Road is a draft allocation site for Wrexham's Local Development Plan and our Client is looking to obtain outline permission for a residential development comprising a minimum of 35

houses with associated adopted estate roads and utility infrastructure. Development plans are currently being prepared by the architect and we wish to consider SuDS at the earliest opportunity.

Reference to the British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is underlain by superficial deposits of Devensian Till. Infiltration may be a feasible option. Infiltration testing is currently being carried out at the site, the results of which are awaited. There are no watercourses within close proximity of the site, therefore where infiltration is not feasible, the combined sewer would form the only alternative option.

We propose the following drainage scheme for which we would appreciate indicative / initial SAB comments:

- Individual soakaways to be used in private gardens to serve roof drainage
- An infiltration basin to be sited at the lowest point of the site to accommodate highway drainage.

Where infiltration is not suitable, a pond will be proposed to provide attenuation and treatment to runoff from roofs and roads. I would strongly advise that the local sewerage undertaker is contacted to obtain an approval in principle to connect to the system and agree any likely flow restrictions that may be required. This information is fundamental to any future Full SAB application as it will influence the required layout/attenuation requirement on site.

I would also advise that interception should be provided on the development to prevent the first 5mm rainfall leaving the site.

Additionally, it is essential that both amenity and biodiversity enhancements are delivered as part of the SuDS scheme proposed. These need to be attributable to the SUDS scheme and not the wider development. As such consideration should be given to additional SuDS features that will allow amenity and biodiversity benefits to be delivered. Please refer to https://gov.wales/sites/default/files/publications/2019-06/statutory-national-standards-for-sustainable-drainage-systems.pdf for further details.

Please could you confirm the climate change allowance amount to be applied when sizing sustainable drainage features (20%, 30% etc.). 30% would be acceptable

If you have any questions or require any further information to process my request please don't hesitate to contact me.

Kind regards,

Anthony Jones BSc (Hons) MSc
Assistant Environmental Consultant

DDI: 01244 986027
Office: 01824 702220
Teams: anthony.jones@waterco.co.uk

For 2021 we've been included in the CIWEM Consultant & Contractor File, which is available here

Waterco
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CIWEM Chartered Institution of Water and Environmental Management

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Ewch i weld - mi fedrwch chi dalu, rhoi gwybod, gwneud cais, dweud eich dweud, a dod o hyd i wybodaeth ar-lein yn www.wrecsam.gov.uk. Arbedwch bapur - meddyliwch cyn argraffu!

Mae'r neges e-bost hon ac unrhyw atodiadau wedi eu bwriadu ar gyfer yr unigolyn neu?r sefydliad y?i cyfeirir atynt yn unig. Am yr amodau llawn yngl?n ? chynnwys a defnyddio?r neges e-bost hon, ac unrhyw atodiadau, cyfeiriwch at www.wrecsam.gov.uk/top_navigation/disclaimersw.htm

We welcome correspondence in Welsh. We will respond to any correspondence in Welsh and this will not lead to any delay.

Take a look - you can pay, report, request, have your say and find information online at www.wrexham.gov.uk. Save paper - think before you print!

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Aled Williams

From: Cathryn Hughes <Cathryn.Hughes@wrexham.gov.uk>
Sent: 20 May 2024 16:09
To: Aled Williams
Cc: JamesM Davies
Subject: RE: Land adjacent to Sycamore House, Wrexham Road - Potential Connection to Highway Drainage.

Categories: Info

Caution: This is an external email and may be malicious. Please take care when clicking links or opening attachments.

Hi Aled,
I do apologise for the delay in my response.

We will accept connections into the Highways Drainage. However, we will only do so after the full SuDS Approving Body (SAB) application has been processed. The best that we can offer as an official okay at the planning stage would be a Pre-Application Advice application into the SAB.

Despite the above, I would say that we have no objection in principle. In order to connect, we will need the following:

- A CCTV survey of the condition of the pipe into which you would like to discharge to the point of outfall. Both the report and the footage will need to be provided.
- We would need full details of the drainage scheme and the catchment area that it will cover.
- We would need a chamber to be installed at the point of connection if you will not be entering the system via an existing manhole.
- An overview maintenance plan of how the system will be maintained where it remains in private ownership (this will be to the point of connection).
- You would also need to arrange the relevant road closures with our teams at highwayroadworks@wrexham.gov.uk for the works within the highway.

I have highlighted the sections that will be covered in the SAB application. Unfortunately, this is an issue that we will resolve as a separate matter from planning, and we would reserve the right to ask for improvements to be made to that section of pipe should a defect be discovered.

I hope that this helps, but please do get back in touch if you require any clarification.

Kind regards,

Cathryn Hughes
Swyddog Risg Llifogydd Technegol
Technical Flood Risk Officer

BSc (Hons) Earth and Environmental Science, MSc Sustainable Water Management.

01978 729639 or 07789 745497
Cyngor Bwrdeistref Sirol Wrecsam, Adran Amgylchedd a Thechnegol, De Ffordd yr Abaty, Ystad Ddiwydiannol Wrecsam, Wrecsam LL13 9PW
Wrexham County Borough Council, Environment & Technical Department, Abbey Road South, Wrexham Industrial Estate, Wrexham LL13 9PW
wrecsam.gov.uk | wrexham.gov.uk
twitter.com/cbswrecsam | twitter.com/wrexhamcbc
facebook.com/cyngorwrecsam | facebook.com/wrexhamcouncil

From: Aled Williams <Aled.Williams@waterco.co.uk>
Sent: 20 May 2024 10:41
To: Cathryn Hughes <Cathryn.Hughes@wrexham.gov.uk>
Cc: JamesM Davies <JamesM.Davies@wrexham.gov.uk>
Subject: RE: Land adjacent to Sycamore House, Wrexham Road - Potential Connection to Highway Drainage.

Hi Cathryn,

Just wondering if you have had an opportunity to consider my email below?

Kind Regards,

Aled Williams BSc (Hons) MCIWEM C.WEM
Associate

01244 986026
Aled.Williams@waterco.co.uk

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From: Aled Williams
Sent: Wednesday, April 3, 2024 9:13 AM
To: 'Cathryn.Hughes@wrexham.gov.uk' <Cathryn.Hughes@wrexham.gov.uk>
Cc: 'JamesM.Davies@wrexham.gov.uk' <JamesM.Davies@wrexham.gov.uk>
Subject: Land adjacent to Sycamore House, Wrexham Road - Potential Connection to Highway Drainage.

Land adjacent to Sycamore House, Wrexham Road, Holt, LL13 9YU. NGR: 340580, 353380

Hi Cathryn,

I'm hoping you can help me on a surface water discharge query for a development site at the above address. Please find a location plan attached with red line boundary and development plan for reference.

The site is a draft allocation site for Wrexham's Local Development Plan and our Client is looking to obtain outline permission for a residential development comprising 39 No. dwellings.

In line with the drainage hierarchy, infiltration testing has been undertaken on site which has discounted infiltration drainage, in addition the site is separated from the River Dee by third party land, and there are no public surface water sewers within the vicinity of the site. There is potential to connect to the public combined sewer, however this is a last resort. Prior to seeking to connect to the public combined sewer, we are looking into the potential of connecting to the highway drain in Wrexham Road (A543) to the south.

Please could you advise if Wrexham CBC accept connections to highway drainage in principle, and if so, what information (survey / assessment etc.) would you require the developer to provide to support the connection application. We would propose a limited greenfield discharge rate of 2 l/s.

If you have any questions or require any further information to process my request, please don't hesitate to contact me.

Kind Regards,

Aled Williams BSc (Hons) MCIWEM C.WEM
Associate

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Aled.Williams@waterco.co.uk

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Ewch i weld - mi fedrwch chi dalu, rhoi gwybod, gwneud cais, dweud eich dweud, a dod o hyd i wybodaeth ar-lein yn www.wrecsam.gov.uk. Arbedwch bapur - meddyliwch cyn argraffu!

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We welcome correspondence in Welsh. We will respond to any correspondence in Welsh and this will not lead to any delay.

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Appendix J Greenfield Runoff Rates

DOCUMENT VERIFICATION RECORD	
Project:	Land adjacent to Sycamore House, Wrexham Road, Holt
Report Title:	FCA & Drainage Strategy
Date:	28th June 2021

DOCUMENT REVIEW & APPROVAL	
Author:	Anthony Jones BSc (Hons) MSc
Checker:	Jessica Roberts BSc (Hons) MCIWEM
Approver:	Aled Williams BSc (Hons) MCIWEM

Return Period (Years)	As-Rural Peak Flow (l/s)
1	0.929855
2	1.082213
5	1.63435
10	2.112823
30	3.091248
50	3.659579
75	4.156739
100	4.532569
200	5.511789
1000	8.143177

*Runoff Rates printed from the ReFH Flood Modelling software package

Appendix K MicroDrainage Storage Volumes

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.330	0.330	2.0	189.6	O K
30 min Summer	9.438	0.438	2.0	252.0	O K
60 min Summer	9.554	0.554	2.0	318.6	O K
120 min Summer	9.659	0.659	2.0	379.1	O K
180 min Summer	9.720	0.720	2.0	414.0	Flood Risk
240 min Summer	9.761	0.761	2.0	437.5	Flood Risk
360 min Summer	9.812	0.812	2.0	466.8	Flood Risk
480 min Summer	9.841	0.841	2.0	483.7	Flood Risk
600 min Summer	9.859	0.859	2.0	493.8	Flood Risk
720 min Summer	9.869	0.869	2.0	499.8	Flood Risk
960 min Summer	9.876	0.876	2.0	504.0	Flood Risk
1440 min Summer	9.861	0.861	2.0	495.2	Flood Risk
2160 min Summer	9.810	0.810	2.0	465.5	Flood Risk
2880 min Summer	9.765	0.765	2.0	439.7	Flood Risk
4320 min Summer	9.687	0.687	2.0	395.1	O K
5760 min Summer	9.626	0.626	2.0	359.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	148.079	0.0	142.6	16
30 min Summer	98.766	0.0	168.2	31
60 min Summer	62.833	0.0	290.1	62
120 min Summer	37.803	0.0	326.6	122
180 min Summer	27.817	0.0	337.9	182
240 min Summer	22.270	0.0	338.2	242
360 min Summer	16.154	0.0	334.9	362
480 min Summer	12.796	0.0	331.6	482
600 min Summer	10.651	0.0	328.4	602
720 min Summer	9.152	0.0	325.2	722
960 min Summer	7.184	0.0	318.6	960
1440 min Summer	5.074	0.0	305.1	1440
2160 min Summer	3.553	0.0	605.5	1860
2880 min Summer	2.755	0.0	600.5	2216
4320 min Summer	1.922	0.0	554.6	2944
5760 min Summer	1.500	0.0	741.6	3752

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
7200 min Summer	9.585	0.585	2.0	336.2	O K
8640 min Summer	9.557	0.557	2.0	320.0	O K
10080 min Summer	9.539	0.539	2.0	310.2	O K
15 min Winter	9.369	0.369	2.0	212.4	O K
30 min Winter	9.491	0.491	2.0	282.4	O K
60 min Winter	9.621	0.621	2.0	357.3	O K
120 min Winter	9.740	0.740	2.0	425.4	Flood Risk
180 min Winter	9.809	0.809	2.0	465.2	Flood Risk
240 min Winter	9.856	0.856	2.0	492.0	Flood Risk
360 min Winter	9.915	0.915	2.0	526.0	Flood Risk
480 min Winter	9.950	0.950	2.0	546.1	Flood Risk
600 min Winter	9.972	0.972	2.0	558.7	Flood Risk
720 min Winter	9.985	0.985	2.0	566.6	Flood Risk
960 min Winter	9.998	0.998	2.0	573.7	Flood Risk
1440 min Winter	9.989	0.989	2.0	568.9	Flood Risk
2160 min Winter	9.939	0.939	2.0	540.1	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
7200 min Summer	1.260	0.0	778.5	4544
8640 min Summer	1.107	0.0	819.2	5368
10080 min Summer	1.005	0.0	859.5	6160
15 min Winter	148.079	0.0	154.3	16
30 min Winter	98.766	0.0	171.7	31
60 min Winter	62.833	0.0	314.3	62
120 min Winter	37.803	0.0	340.7	122
180 min Winter	27.817	0.0	340.4	180
240 min Winter	22.270	0.0	338.9	240
360 min Winter	16.154	0.0	335.9	358
480 min Winter	12.796	0.0	333.0	476
600 min Winter	10.651	0.0	330.0	594
720 min Winter	9.152	0.0	327.1	708
960 min Winter	7.184	0.0	321.2	942
1440 min Winter	5.074	0.0	309.2	1398
2160 min Winter	3.553	0.0	635.4	2052

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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
2880 min Winter	9.878	0.878	2.0	505.1	Flood Risk
4320 min Winter	9.779	0.779	2.0	448.0	Flood Risk
5760 min Winter	9.693	0.693	2.0	398.7	O K
7200 min Winter	9.631	0.631	2.0	362.8	O K
8640 min Winter	9.584	0.584	2.0	335.6	O K
10080 min Winter	9.550	0.550	2.0	316.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
2880 min Winter	2.755	0.0	615.6	2368
4320 min Winter	1.922	0.0	571.6	3204
5760 min Winter	1.500	0.0	830.6	4096
7200 min Winter	1.260	0.0	871.7	4976
8640 min Winter	1.107	0.0	914.6	5800
10080 min Winter	1.005	0.0	957.3	6656

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 340580 353380 SJ 40580 53380
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.687

Time (mins) From:	To:	Area (ha)
0	1	0.687

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Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	575.0	1.000	575.0

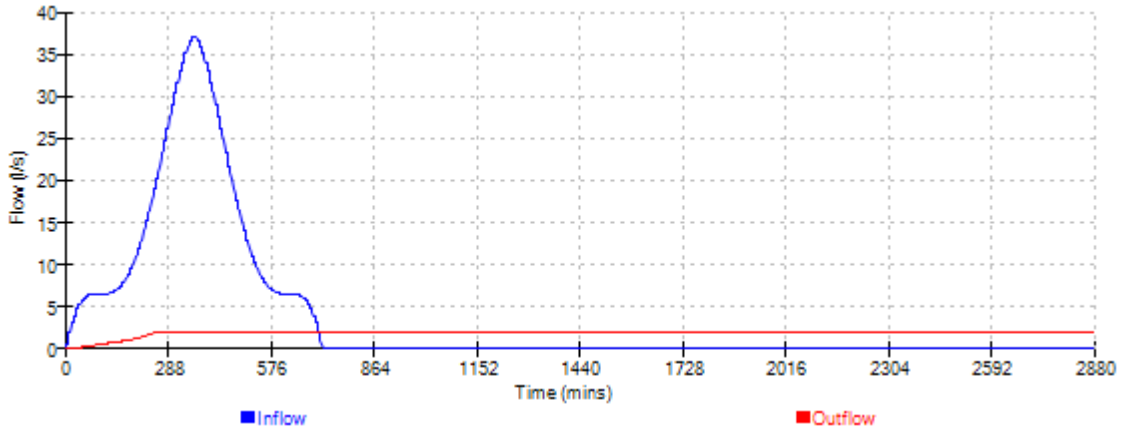
Pump Outflow Control

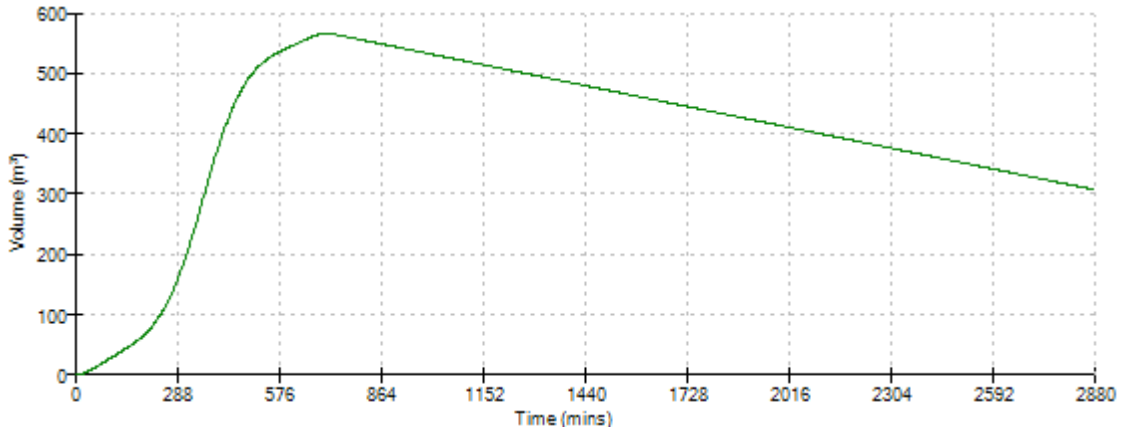
Invert Level (m) 8.995

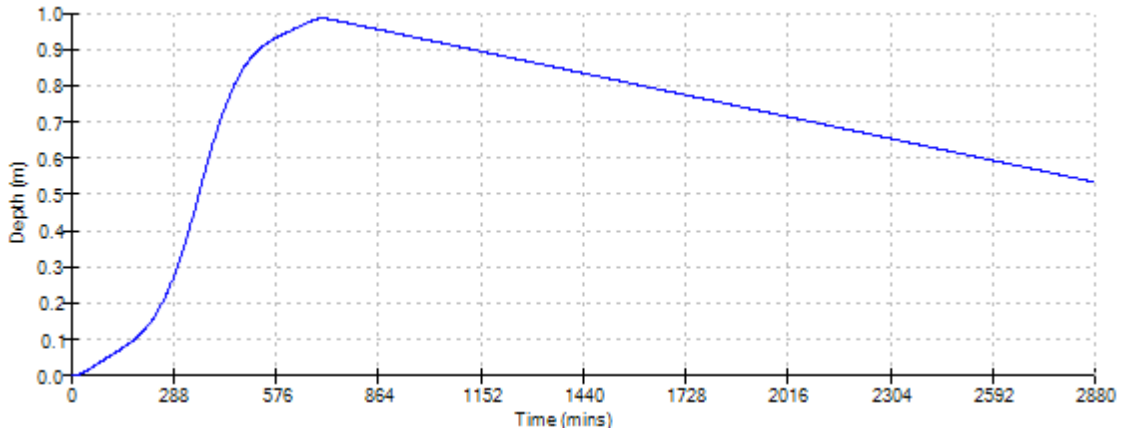
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	2.0000	1.800	2.0000	3.400	0.0000	5.000	0.0000
0.400	2.0000	2.000	2.0000	3.600	0.0000	5.200	0.0000
0.600	2.0000	2.200	0.0000	3.800	0.0000	5.400	0.0000
0.800	2.0000	2.400	0.0000	4.000	0.0000	5.600	0.0000
1.000	2.0000	2.600	0.0000	4.200	0.0000	5.800	0.0000
1.200	2.0000	2.800	0.0000	4.400	0.0000	6.000	0.0000
1.400	2.0000	3.000	0.0000	4.600	0.0000		
1.600	2.0000	3.200	0.0000	4.800	0.0000		

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Event: 720 min Winter

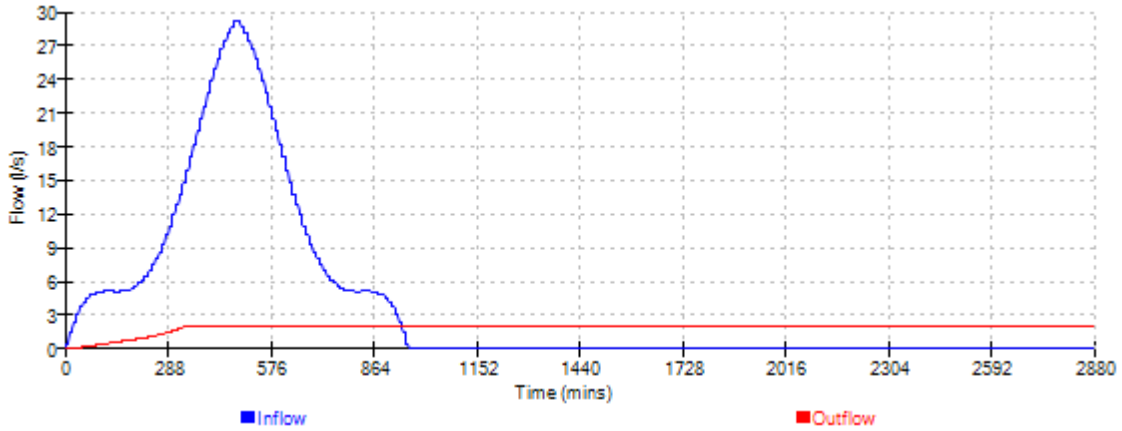


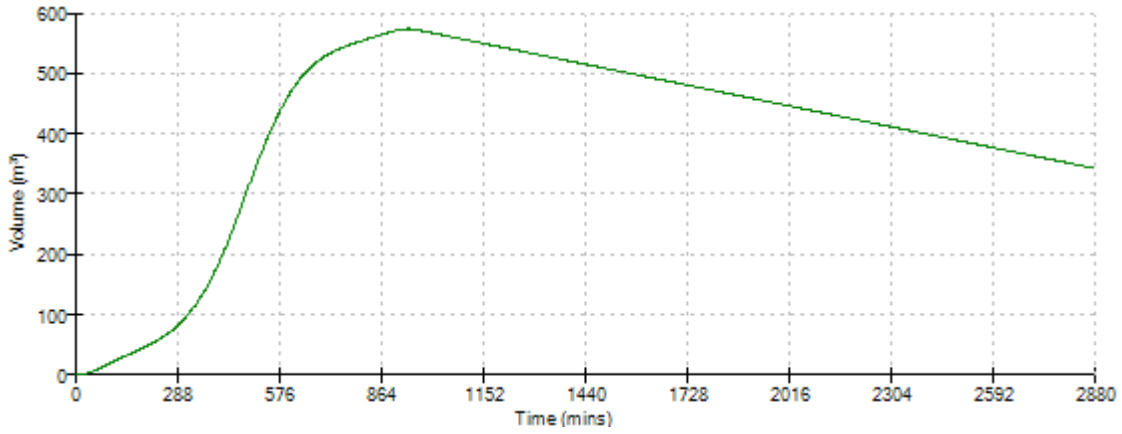


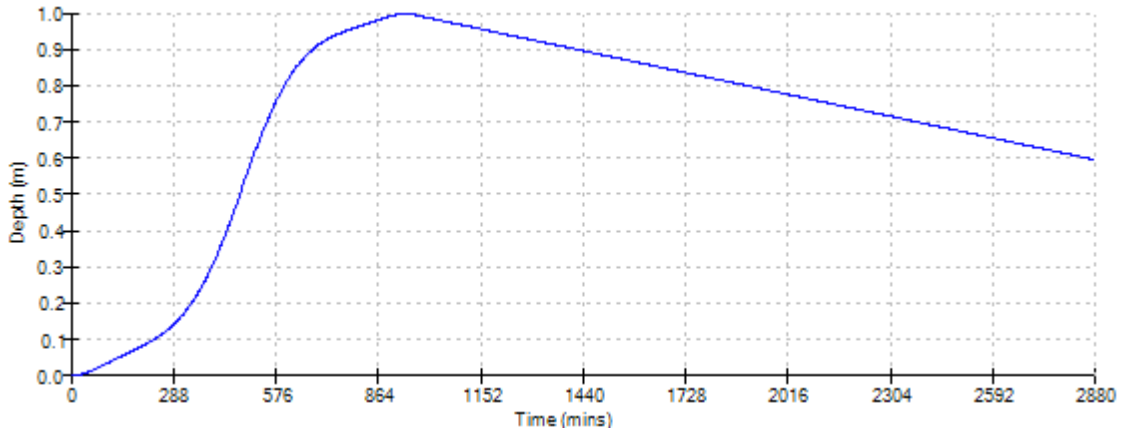


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Event: 960 min Winter

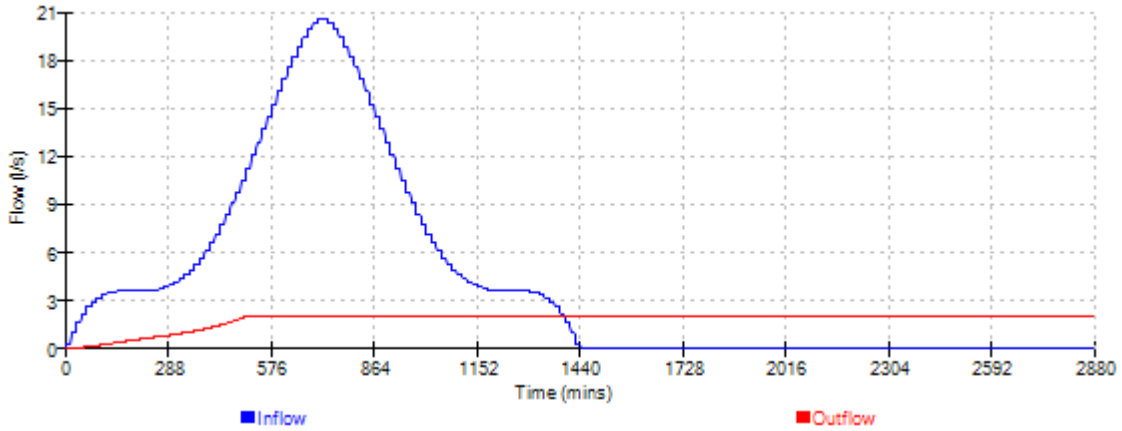


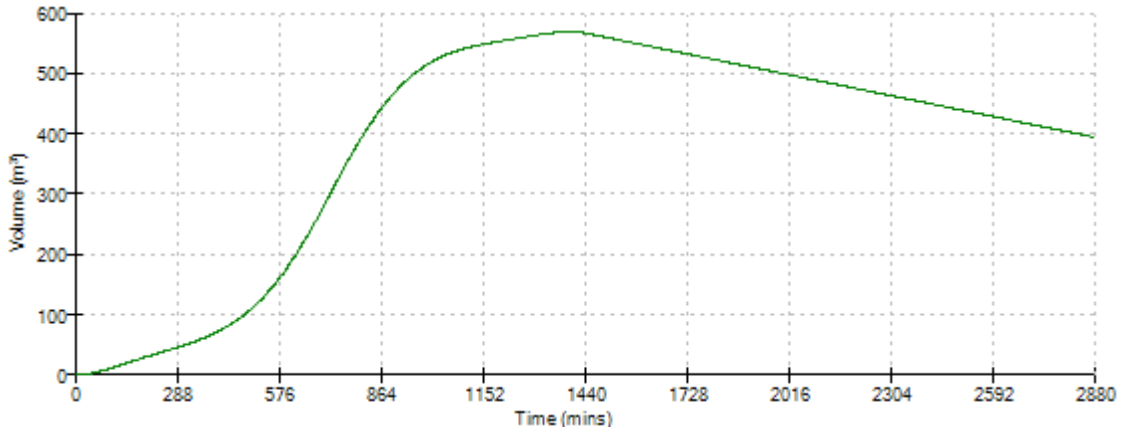


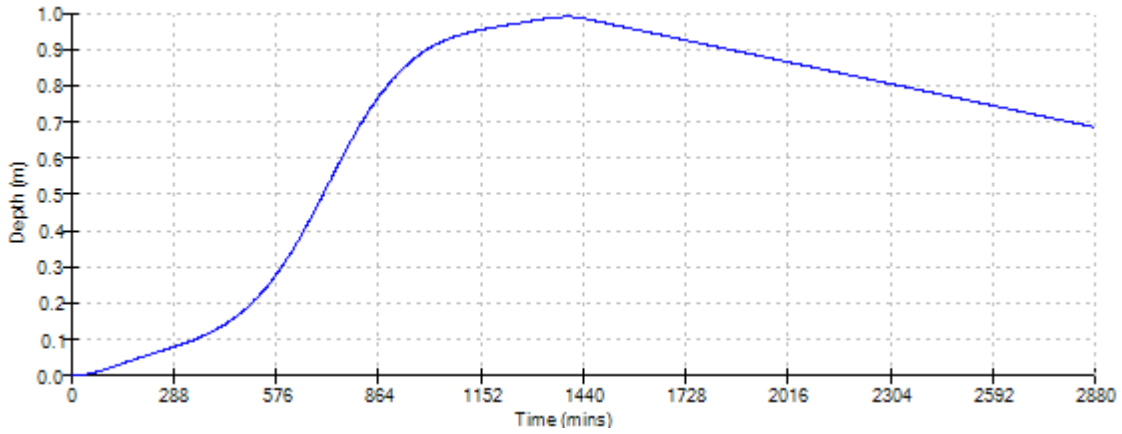


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Event: 1440 min Winter







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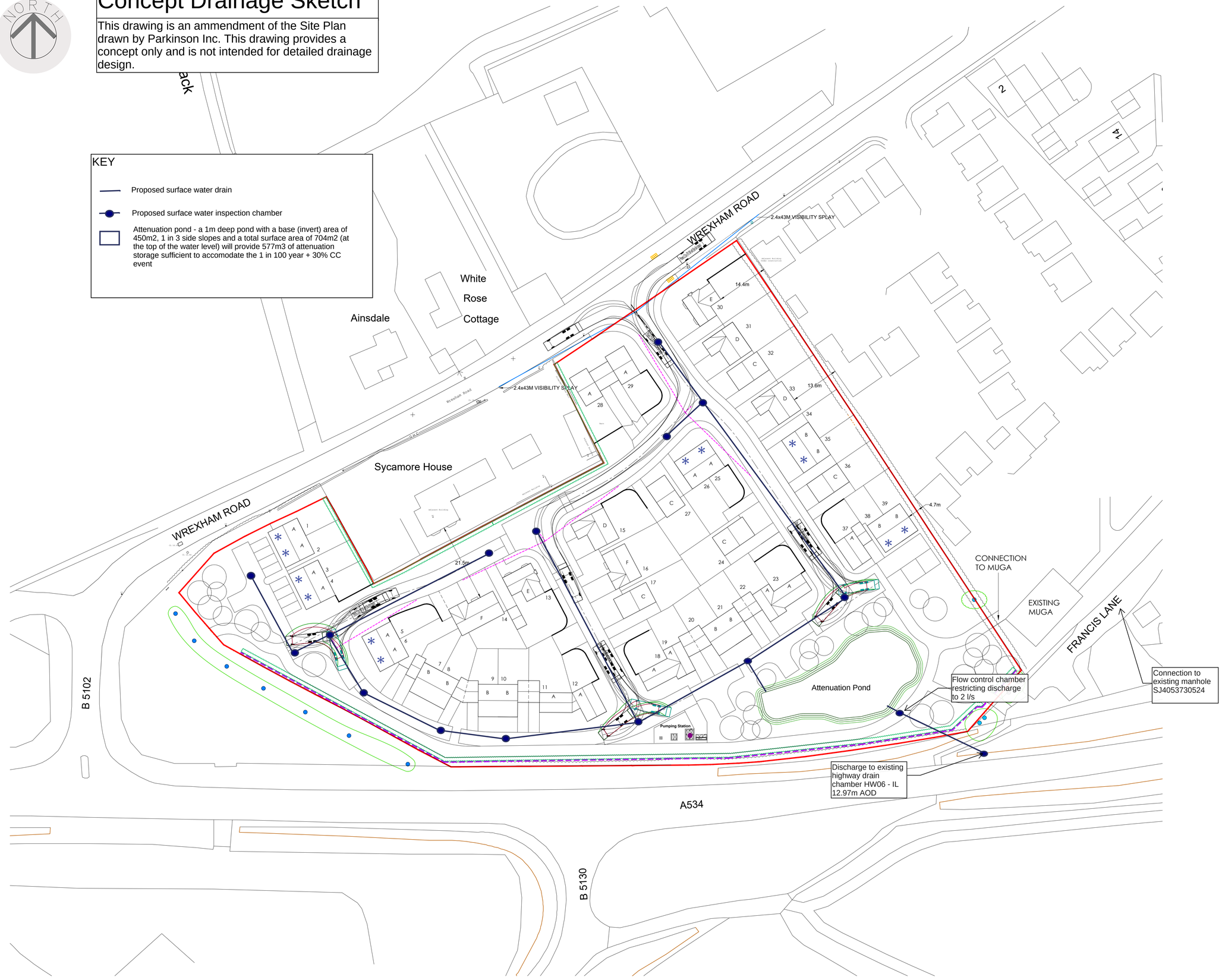
Appendix L Concept Drainage Sketch

Concept Drainage Sketch

This drawing is an ammendment of the Site Plan drawn by Parkinson Inc. This drawing provides a concept only and is not intended for detailed drainage design.

KEY

- Proposed surface water drain
- Proposed surface water inspection chamber
- Attenuation pond - a 1m deep pond with a base (invert) area of 450m2, 1 in 3 side slopes and a total surface area of 704m2 (at the top of the water level) will provide 577m3 of attenuation storage sufficient to accomodate the 1 in 100 year + 30% CC event

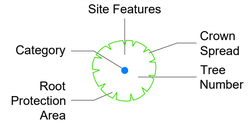


REF	BEDS	SQ FT	QTY	TOTAL	TYPE
A	2	964	17	16388	2 BED SEMI
B	3	1100	10	11000	3 BED SEMI
C	3	1200	5	6000	4 BED DETACHED
D	3	1245	3	3735	4 BED DETACHED
E	3	1250	2	2500	4 BED DETACHED
F	4	1350	2	2700	4 BED DETACHED
		TOTAL	39	42323	

Units / Net/ Hectare / Acre	31 / 12
Gross area	1.72 hectares / 4.26 acres
POS area	0.41 hectares / 1.01 acres
Undevelopable area	0.06 hectares / 0.15 acres
Net area	1.24 hectares / 3.10 acres

Legend

Root Protection Area
Modified to Account for
Site Features

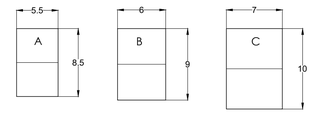


- Category A (High Quality)
- Category B (Moderate Quality)
- Category C (Low Quality)
- Category U (Dead/Dying/In Decline)
- Tree Position Approximate (not shown on original survey)
- Tree Proposed for Removal

Key

- Open Space
- Suds
- Dwelling
- Affordable dwelling
- Acoustic Fence

Typical Property Sizes.



2 Bed 3 Bed 4 Bed

* NOTE
ALL BUILDINGS ARE UP TO 2.5 STOREY MAX
(9.7m GROUND TO RIDGE LEVEL)
DIMENSIONS SHOWN HAVE A DEVIATION OF +/- 3m

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PROJECT
LAND OFF WREXHAM ROAD, HOLT

CLIENT
PRIDDING FARMING PARTNERSHIP

DRAWING TITLE
SITE PLAN

SCALE	1:500 @ A1	PROJECT REF: Plnc 100/83 Holt Pridding
DATE	22:12:2021	DRAWING REF: Plnc 100_82_SP 01
CHECKED	IP	

Appendix M Maintenance Schedules

CONCEPT DESIGNER'S RISK ASSESSMENT

Project:	Land adjacent to Sycamore House, Wrexham Road, Holt	**Project No:**	13604
Report Reference:	FCA & Drainage Strategy		

Prepared by:	Anthony Jones	**Date:**	10/01/2022
Checked by:	Jessica Roberts	**Date:**	11/01/2022
Reviewed by:	Aled Williams	**Date:**	13/01/2022

Requirement:

The Construction (Design and Management) Regulations 2015 (CDM 2015) place an obligation on the Designer to take all reasonable steps to provide, with the design, sufficient information about the design, construction or maintenance of the structure, to adequately assist the client, other designers and contractors to comply with their duties under CDM. The Designer has undertaken this assessment to identify any extra-ordinary risks, or those that would not be expected on this particular project by an experienced and competent Contractor. The aim is to avoid needless paperwork and bureaucracy and ensure the assessment is project specific, relevant and proportionate to the risk.

DRA Summary

Each of the following risk areas has been considered using the question below. Is a risk present which is considered to be **extra-ordinary or unexpected** in this instance?

If **YES** - A detailed risk assessment is required at design stage
If **UNKNOWN** - Insufficient information has been provided at concept design stage and the risks are unknown. Further consideration must be given at design stage(s)
If **NO** - No further action is required.

Hazard Ref.	Risk Areas	YES, UNKNOWN or NO	Comments
1	Ground Conditions	Unknown	
2	Hazardous Environment	Unknown	
3	Existing Working Environment	Unknown	Existing agricultural buildings and associated activities
4	Existing Services	Unknown	Existing agricultural buildings and associated activities
5	Proximity to Other Structure(s)	Unknown	A534 and Sycamore House
6	Near Waterbody / flood risk	No	Flood Zone A
7	Proximity to Other Activities	Unknown	
8	Sequence of Construction	Unknown	
9	Access	Unknown	
10	Interfaces	Unknown	
11	Confined Space Working	Unknown	
12	Maintenance Considerations	Unknown	
13	Working at Height	Unknown	
14	Steep Slopes	Unknown	
15	Demolition / Refurbishment / Repair	Unknown	Demolition of existing agricultural buildings
16	Welfare	Unknown	
17	Occupational Health	Unknown	
18	Environmental Issues	Unknown	
19	Other Significant Hazards not Identified Above	Unknown	
20	Residual Risk to Future Users	Unknown	

Appendix N Concept Designer's Risk Assessment

Operation and Maintenance Requirements for Ponds and Wetlands

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass – public areas	Monthly (during growing season), or as required
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc for evidence of blockage, and / or physical damage.	Monthly
	Inspect water body for signs of poor water quality	Monthly (May – October)
	Inspect silt accumulation rates in any forebay and in main body of the pond and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options.	Half yearly
	Check any mechanical devices e.g. penstocks	Half yearly
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above pond base; include max 25% of pond surface)	Annually
	Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level	Annually
	Remove sediment from any forebay	Every 1 – 5 years, or as required
	Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays	Every 5 years, or as required
Occasional maintenance	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, e.g. 25-50 years
Remedial actions	Repair erosion or other damage	As required
	Replant where necessary	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair/rehabilitate of Inlets, outlets and overflows	As required

Ref. Table 23.1 CIRIA C753 'The SuDS Manual'

The maintenance requirements detailed above are to be undertaken by the site owner.

Name :

Position :

Date :

Signed on behalf of the site owner :
