COW SHED – BLACK MOSS FARM

Drainage Strategy Report

Elmridge Lane, Preston, PR3 2NY

CSH-BML-XX-XX-RP-C-0501

Wednesday, 28th February 2024

BarnsleyMarshall

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Contents Amendment Record

This report has been issued and amended as follows:

Revision	Description	Issued by	Checked by	Date
P01	First Issue for Planning Approval	N. Johns	A. Mavhunga	2024-02-06
P02	Drainage details updated	I. Withana	A. Mavhunga	2024-02-28

Barnsley Marshall Limited have prepared this report in accordance with the instructions of their client, FI Construction Limited, for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

Contents

Appendices

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1. Introduction

1.1 Project Background

Barnsley Marshall Ltd have been appointed by FI Construction Limited to provide a SuDS Drainage Strategy Layout for the proposed construction of a Cow Shed at Black Moss Farm, Elmridge Lane, Preston, PR3 2NY.

The report provides Flood Risk Assessment and recommendations for a SuDS surface water drainage strategy for the proposed development based on Government and local authority guidance with regard to flood risk and sustainable drainage.

The report is based on currently available information and preliminary discussions.

Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Barnsley Marshall shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations at no cost to Barnsley Marshall.

1.2 Scope of Drainage Strategy Report

In April 2015, the Government made changes to the National Planning Policy Framework which made Sustainable Urban Drainage Systems (SUDS) a material consideration in the determination of planning applications for new developments. This report has therefore been produced to support the Planning Application in accordance with the Town and Country Planning Order 2015.

The Strategy reviews the following information:

- Environment Agency flood maps for rivers and sea flooding.
- Design and Construction Guidance Version 1 - Oct 2019
- Part H of the Building Regulations: Drainage and waste disposal
- BE EN12056 Part 2 Gravity Drainage Systems Inside Buildings
- Technical Guidance to the National Planning Polity Framework
- CIRIA Report C753 SUDS Manual 2016.
- BS EN 752:2008 Drain and sewer systems outside buildings.

- BS 8582:2013, Code of Practice for surface water management for development sites.
- BS 8533:2011, Assessing and managing flood risk in development – Code of practice.
- CIRIA C635 Designing for exceedance in urban drainage - good practice
- Flood Estimation Handbook (FEH) /Flood Studies Report (FSR) methods.
- Institute of Hydrology (IH) Reports No. 124.
- Environmental Agency (EA) / Department for Environment, Food and Rural Affairs (DEFRA) recommendations.
- Floods and Water Management Act 2010
- Protecting our Water, Soil and Air – A Code of Good Agricultural Practice for farmers, growers and land managers – DEFRA (2009)
- Nitrate Pollution Prevention Regulations (2015)
- Rural Sustainable Drainage Systems (RSuDS) – Environment Agency (EA) (2012)

2. Existing Site Details

2.1 Location and Description

The proposed development is located at Black Moss Farm, Elmridge Lane, Preston, PR3 2NY. The farm is set over approximately 348 Acres, but the proposed cattle building development site (that this report refers to) is set over an area of approximately 0.881Ha. The farm is approximately 3km north of Longridge Town centre. An unnamed stream / large ditch passes approximately 300m north-east of the development site, flowing in an easterly direction. The watercourse is a tributary to the River Loud approximately 1.5 km further to the east. The farm currently has a range cottages and farm buildings which are accessed via Elmridge Lane, refer to ***Figure 1.***

Refer to ***Appendix A*** for the site location plan and proposed masterplan.

Figure 1: Development Site boundary in red

(Source: Google Maps, 2024-01-25)

2.2 Topography

The proposed development site slopes generally from the south-west (with ground levels at approximately 106.700mAOD) to the north-east (with ground levels at approximately 105.200mAOD).

Refer to ***Appendix B*** for the site topography.

2.3 Existing Watercourses

There is an existing Pond on the farm which is adjacent to the proposed development site. The land around the existing pond is generally at a level of 105.100mAOD. An unnamed stream / large ditch passes approximately 300m north-east of the development site, flowing in an easterly direction. The watercourse is a tributary to the River Loud approximately 1.5 km further to the east.

2.4 Existing Public Drainage

Being in the middle of farmland, there is no existing public drainage known within or in the vicinity of the site. The postcode of the site falls within a region supplied by United Utilities.

2.5 Existing Private Drainage

The existing site is severed by a private drainage system (information provided by the topographical survey and briefing from the client). However, the extent of the private drainage network is currently unknown.

2.6 Site Geology

A Site Investigation (SI) was carried out on site by Sub Surface Site Investigation Specialists. In summary, the report indicates that the site is made up of 0.2m deep topsoil underlaid by soft to firm grey and brown sandy silty Clay.

Refer to ***Appendix C*** for details.

The main findings of the SI were that drainage via infiltration was confirmed as not being feasible due to the low permeability of ground conditions. It also showed that no groundwater was encountered within 2m of the test location.

2.7 Site Flooding

From Environment Agency (EA) maps (available online) the site is located in Flood Zone 1 (low probability). This is defined by land having a less than 1 in 1,000 annual probability of river or sea flooding. The sites Flood Risk Vulnerability Classification also falls in the Less Vulnerable category, under “Land and buildings used for agriculture and forestry”.

Refer to **Figure 2** below.

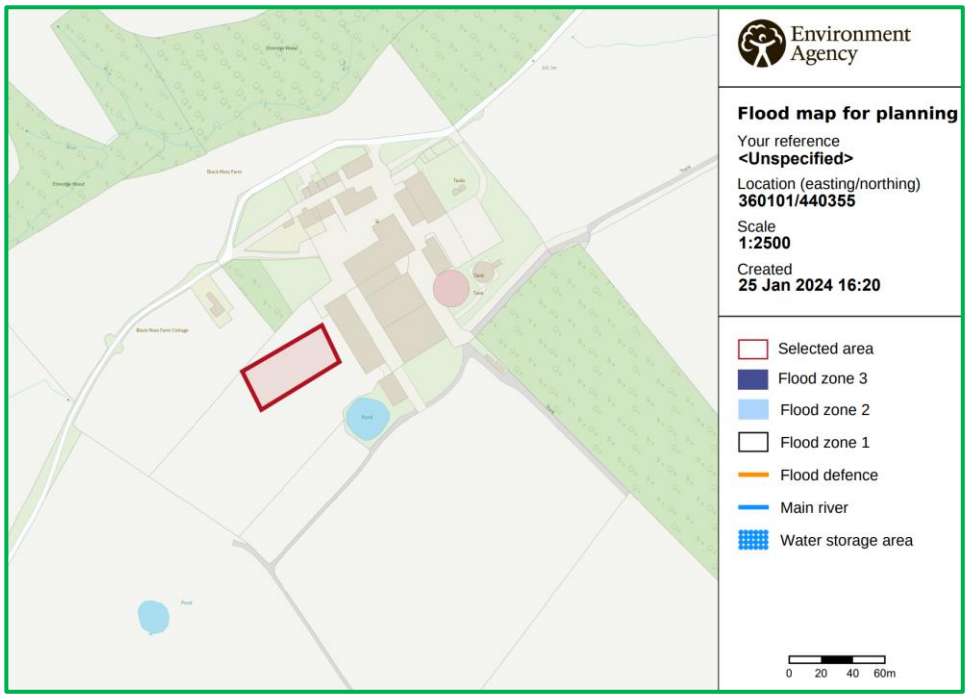


Figure 2: Flood Zone Map

(Source: EA Maps, 2024-01-25)

The risk from surface water flooding for the proposed development site is also very low with the area having a suggested chance of flooding less than 0.1% each year.

Refer to **Figure 3** below.

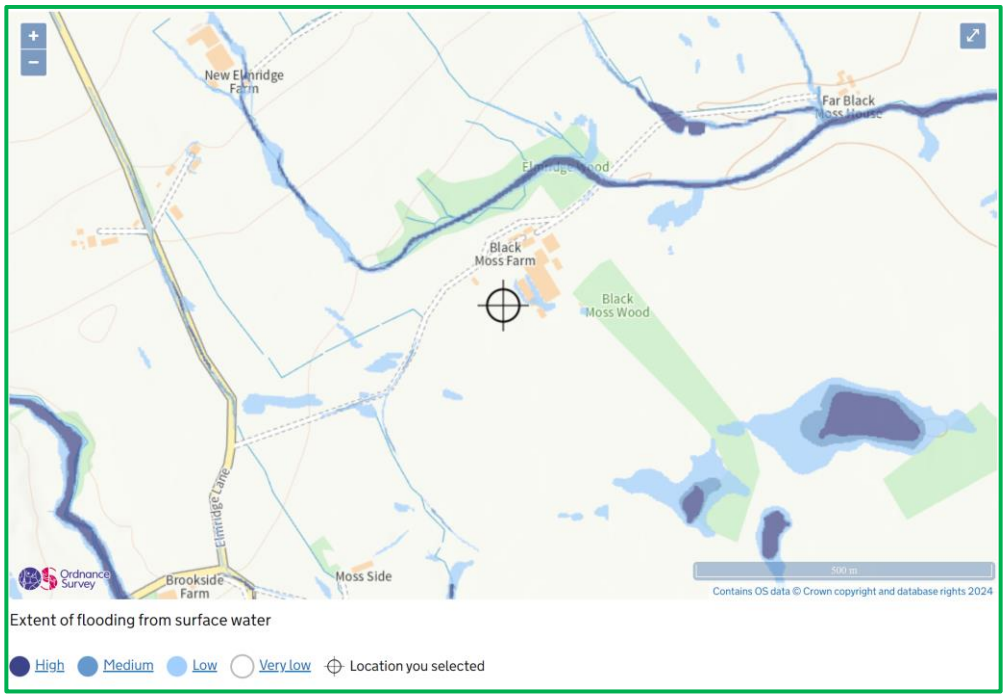


Figure 3: Surface Water Flooding Map

(Source: EA Maps, 2024-01-25)

3. Drainage Strategy

3.1 DEFRA Sustainable Drainage Requirements

For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with the above, then the runoff volume must be discharged at a rate that does not adversely affect flood risk.

The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.

The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed in exceedance routes that minimise the risks to people and property.

3.2 Drainage Definitions

In order to prevent water pollution, it is important that the different forms of drainage and water requirements are identified, so that they can be dealt with appropriately. For the purpose of this report the following definitions apply:

- **Slurry** – defined under SSAFO as a liquid or semi-solid matter composed of excreta produced by livestock, or a mixture consisting mainly of excreta, livestock bedding, rainwater and washings from buildings or yards used by livestock.
- **Dirty Water or Lightly Fouled Water (LFW)** – a term commonly used to describe rainfall run-off from yard areas to which animals have regular access.

- **Other Fouled Water** – unclean water arising on a farm that is not directly contaminated by livestock excreta. It applies to yards where livestock do not have routine access, but are used for farm activities or trafficked by farm vehicles. (Note: this does not include foul water from buildings).
- **Clean Water** – refers to water arising from roofs or other surfaces which can be demonstrated to be free of contamination.
- **Foul Water** – refers to water generated from toilets, sinks, food preparation or washing facilities from buildings on the site.

It is important that the drainage solution deals with these different forms of water separately. Only Other Fouled Water and Clean Water are to be treated and discharged using the SuDS principles highlighted in this report. Any Slurry or Dirty Water / FFW generated by the site are to be collected using an independent system and stored in the onsite Slurry Tanks. Any Foul Water generated from buildings on site is to be dealt with (and potentially treated) using a separate Foul Water System (FWS).

3.3 Key Principles of SuDS

Figure 4 gives the four key design principles critical for the implementation of SuDS:

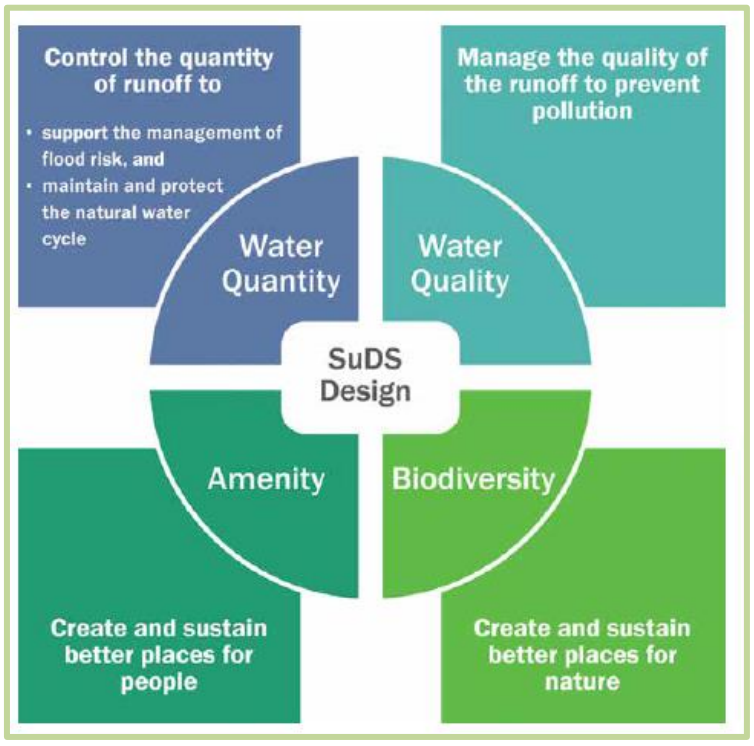


Figure 4: Four Key Principles of SuDS

(Source: CIRIA Report C753 the SuDS Manual)

Quantity Control : Achieved by controlling the quantity of surface water runoff reaching a watercourse, drainage system or sewer. Controlling runoff can aid in mitigating the risk of flooding. The benefits to quantity control include:

- Less surface water entering watercourses, thereby offsetting peak flows and reducing fluvial flood risk.
- Less surface water entering sewers, thereby freeing capacity and reducing flood risk
- Allows for adaption to climate change
- Allows for recharge of underground aquifer

Quality Control : Achieved by improving the quality of surface water reaching a watercourse, drainage system or sewer. The benefits to quality control include:

- Reduces of pollution levels in surface water bodies
- Protects groundwater resources from contamination
- Enables compliance with the Water Framework Directive

Biodiversity and Amenity Value : Achieved by introducing SuDS that enhance the existing biodiversity of the area and/or add amenity value to the community. The benefits include:

- Contributes to community health & wellbeing by providing green spaces with value in terms of landscape, recreation and walking routes
- Provides opportunities for multifunctional areas
- Provides wildlife habitat and ecological benefits
- Increases property values

These key design principles should be considered in all aspects of SuDS selection and design. All SuDS should aim to achieve ***each of these principles.***

3.4 Discharge Hierarchy

Under the terms of Section H of the Building Regulations 2000, the SUDS Manual 2015 report C753, and the Technical Guidance to the National Planning Policy Framework, the management of runoff should follow the hierarchy in ***Table 1.***

Table 1: Surface Water Discharge Hierarchy

Surface Water Discharge Hierarchy	
1	Reuse on site (i.e., rainwater harvesting)
2	Into the ground (infiltration)
3	To a surface water body
4	To a surface water sewer, highway drain, or another drainage system
5	To a combined sewer

3.5 Sustainable Drainage Systems

A SuDS appraisal was conducted based on the SuDS hierarchy given in ***Figure 4***. ***Table 2*** gives the results of the appraisal.

Table 2: Scheme Appraisal of SuDS Drainage Features

SuDS Feature	Is feature suitable for the proposed site?	Comment
Soakaway	NO	SI revealed low permeability of ground conditions.
Green/Brown Roofs	NO	Proposed roofs have PV panels or are unsuitable.
Filter Trench/Drain	YES	Proposed along the side of the sheds to convey water from the RWP's.
Swale	YES	Proposed as a form of treatment before water is discharged.
Permeable Paving	NO	Not practical for the site
Infiltration Basin	NO	Low permeability
Detention Basin	NO	Ponds are to be used instead
Bioretention System (Rain Garden / Stormwater Planters)	NO	Spatial constraints and layout make use of Bioretention Systems unsuitable.
Pond	YES	Provided in the form of re-using the existing pond and creating a new pond.
Storage System: Geo-cellular or Tank	NO	Open-system features (Pond and Swale) proposed instead to provide cleansing and improve water quality.

Based on the selected SuDS features as per ***Table 1***, the main SuDS features associated with the proposed drainage strategy are summarised below:

Filter Drains in Type H bedding: Provide physical filtration of clean water runoff from the roof. Solid-bound pollutants are removed from the water before the runoff reaches the Pond.

Flow Control Devices: Runoff from the development to unnamed watercourse to the north east of the development shall be controlled to maximum 5.0 l/s for all storm events up to and including the 100-year + 40% CC storm event. This is achieved by two Hydro-brake Outflow Controls located at the downstream end of the existing and proposed pond outlets, details of which are shown in ***Appendix D.***

Lancashire County Council shall be consulted and fully briefed on the proposed drainage strategy so they can provide a formal Ordinary Watercourse Discharge Consent to the unnamed watercourse / ditch before construction begins.

Rigistorm Separate Catchpit: The catchpits with 450mm deep sumps have been strategically placed to capture debris and silt before the runoff reaches locations where it would be onerous to remove the silt.

Ponds/Swales: Provide chemical treatment, and must have reeds and/or special grass (like Perennial Rye) - exact specification to be confirmed. The flora (planted grass/lawn/reeds) within the Ponds/Swales areas absorb the pollutants via photosynthesis and reduce pollutant concentrations in the runoff. The microbial action of any fauna (bacteria/slugs) within the ponds/swales area also cause chemical cleansing of the runoff and enhance water quality. The ponds/swales also provide physical treatment via adsorption of suspended solids to the flora (grass/lawn/reeds).

3.6 Surface Water Drainage

The plan layout of the proposed surface water drainage is shown in ***Appendix D,*** which also contains the Pavement Design (External Surfaces) proposals. The drainage system has been designed so that no part of the system floods for all storm events up to and including the 100-year + 40% CC event.

Figure 6 gives a summary of the proposed SuDS Drainage Strategy.

The proposed development has an approximate plan area of 0.881Ha. The IH124 method was used to estimate the greenfield runoff rates from the site since the site is less than 200Ha. Because the site is also less than 50ha, the ICP SUDS tool in Micro-drainage Source Control module was used to calculate the greenfield runoff rates. The tool uses the IH124 approach to calculate the greenfield runoff for 50ha, then linearly interpolate to get the flows for smaller catchments. The 1-year, 30-year, and 100-year Greenfield runoff rates were found to be 5.7 l/s, 11.0 l/s, and 13.6 l/s respectively, refer to ***Appendix E*****.**

Qbar is 6.5 l/s for both rural and urban.

Runoff from the development is to be split into different systems depending on its type. Runoff from the concrete aprons in front of the proposed sheds and slurry tanks is considered to be Dirty Water / LFW and shall be diverted into and stored in the proposed slurry tanks (sized by others).

The Clean Water arising from the roof of the proposed sheds (and any overland flows from adjacent fields) shall be collected via filter drains and discharged into the existing (enlarged) 519.3m³ pond. Discharge from the existing (enlarged) pond shall be controlled to maximum 3.0 l/s for all storm events up to and including the 100-year + 40% CC storm event by a Hydro-brake Outflow Control.

The Clean Water arising from the roof of the proposed slurry tanks shall be collected via a closed surface water pipe system and discharged into a new proposed 261.0m³ pond. Discharge from the new pond shall be controlled to maximum 2.0 l/s for all storm events up to and including the 100-year + 40% CC storm event by a Hydro-brake Outflow Control.

The combined flow from the two ponds shall then be discharged into the new proposed swale, which will help further filter the water before it is ultimately discharged into the existing unnamed watercourse / ditch. The outfall into the existing unnamed watercourse / ditch is to be free-flowing and is to be set above the surveyed top of water level. A RipRap boulder or sandbag scour control system is to be used at the outfall position to protect against erosion. Details of the overall surface water drainage system for the proposed development are shown in ***Appendix D.***

Lancashire County Council shall be consulted and fully briefed on the proposed drainage strategy so they can provide a formal Ordinary Watercourse Discharge Consent to the unnamed watercourse / ditch before construction begins.

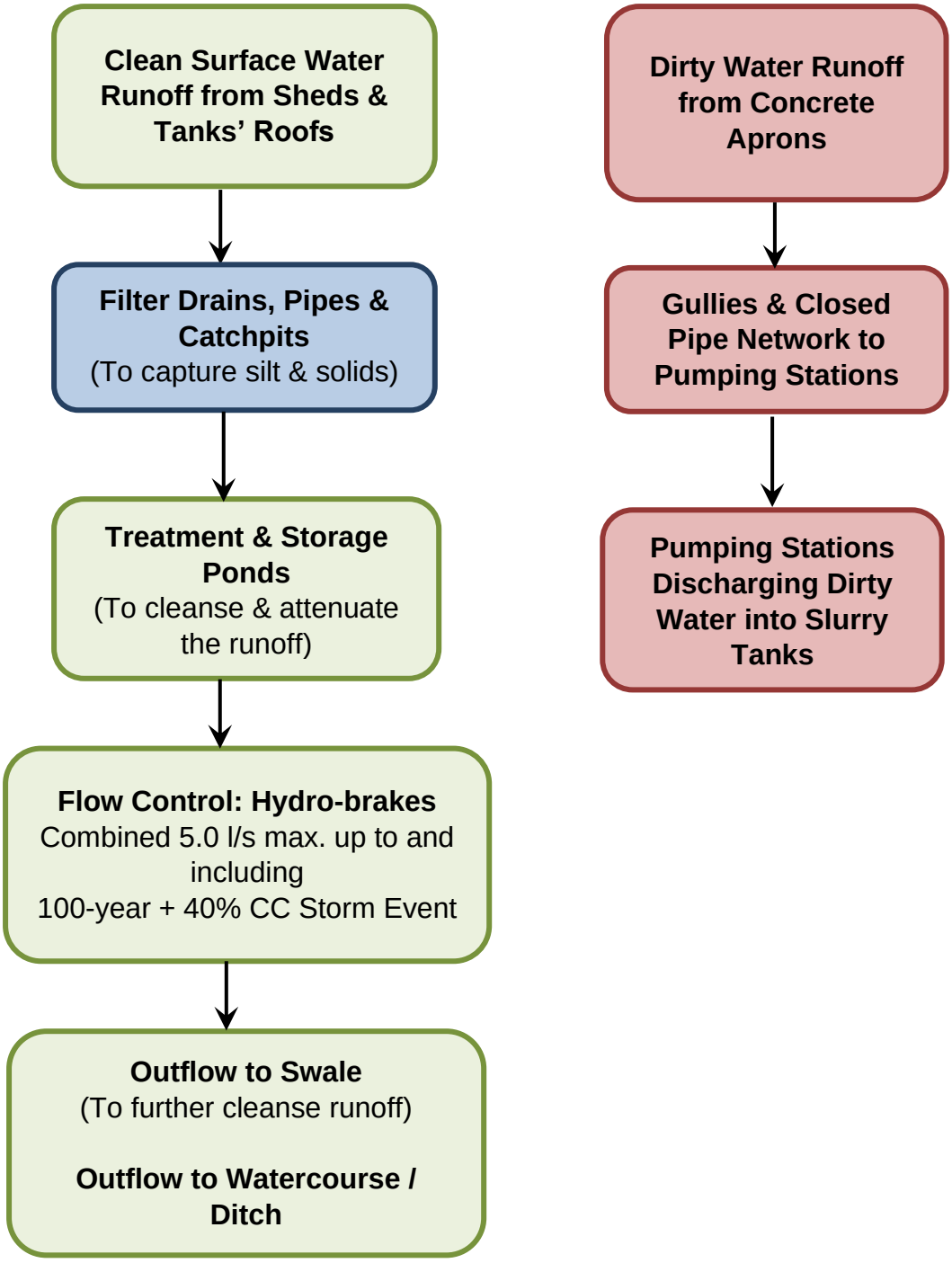


Figure 6: SuDS Drainage Strategy Summary

3.5 Pollution Control and Water Quality

The following pollution control devices have been proposed for the Clean Surface Water Runoff System for the development:

- ***Filter Drains (Proposed sheds primary treatment train):***
  The proposed filter drains are to collect the runoff form the existing car parking, new car parking and hard standing to the new proposed building. Solid-bound pollutants are removed from the effluent before the runoff reaches the Detention Basin / Attenuation Tank. Refer to ***Appendix E*** for the location and the construction of the filter drains.

- ***Treatment Ponds & Swale (Proposed primary & secondary treatment train):***
  The proposed ponds and swale work as treatment plants for both dissolved and solid-bound pollutants and as a temporary flood holding areas in event of storms larger than 100-year + 40% CC. The flora (planted grass/lawn/reeds) within the pond/ditch/swale absorb the pollutants via photosynthesis and reduce the concentrations in the runoff. The reeds also provide physical treatment via adsorption of suspended soils to the flora (grass/lawn/reeds). Refer to ***Appendix D*** for pond and swale details.

- ***Catchpits:***
  Catchpits have been strategically placed to capture debris and silt before the runoff reaches areas which would make it difficult to cleanse the system of the pollutants.

The Dirty Water System (which drains the proposed concrete aprons with regular animal access) is to be independent and isolated from Clean Surface Water Runoff System. Any water that is directly contaminated by livestock excreta is not to discharge into the SuDS system.

The drainage system for the proposed development should be added to the farms Accident and Emergency Plan to prevent pollution, and help deal with any incidents if they happen. The Environment Agency is to be immediately informed if any surface water pollution event occurs.

CIRIA report C753, The SuDS Manual, says on page 567 ‘To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type).’

Table 3 shows Table 26.2 of the SuDS Manual, which gives the pollution hazard indices for various land uses.

Table 3: Pollution hazard indices for different land use classifications

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

Notes

1 Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

2 These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.

Table 4 shows Table 26.3 of the SuDS Manual, which gives indicative SuDS mitigation indices for discharges to surface waters.

Table 4: Indicative SuDS mitigation indices for discharges to surface waters

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters

	Mitigation indices[1]		
Type of SuDS component	**TSS**	**Metals**	**Hydrocarbons**
Filter strip	0.4	0.4	0.5
Filter drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond[4]	0.7[3]	0.7	0.5
Wetland	0.8[3]	0.8	0.8
Proprietary treatment systems[5,6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Notes

1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.

2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.

3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.

4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.

5 See Chapter 14 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: **http://tinyurl.com/qf7yulj7**

6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

Table 5 gives a summary analysis of the adequacy of the proposed SuDS drainage in addressing pollution control and water quality.

Where the mitigation index of an individual component is insufficient, two components (or more) in series will be required, where:

Total SuDS mitigation index = mitigation index$_{(1)}$ + 0.5 (mitigation index$_{(2)}$)

Where mitigation index$_{(n)}$ = mitigation index for component n

A factor of 0.5 is used to account for the reduced performance of secondary or tertiary components associated with already reduced inflow concentrations.

Table 5: Mitigation versus hazard indices for proposed layouts

SuDS Drainage Layout	SuDS device/Land Use	TSS	Metals	Hydro-carbons	Remark
Proposed Sheds Roof Runoff	Filter Drains, Catchpits, Pond & Swale	**1.00**	**1.05**	**0.95**	**OK**, SuDS element provides sufficient treatment.
	Shed Roofs	0.30	0.20	0.05	
Proposed Slurry Tanks Roof Runoff	Catchpits, Pond & Swale	**0.95**	**1.00**	**0.80**	**OK**, SuDS element provides sufficient treatment.
	Slurry Tank Roofs	0.3	0.2	0.05	

3.6 Exceedance Flows

Exceedance flows are those flows generated by flooding of part or all of the drainage scheme due to storm events in excess of the design storm event [100-year + 40% CC storm event]. Proposed Drainage hydraulic calculations (***Appendix E***) show that there shall be ***no flooding of the proposed development*** for all storm events up to and including the 100-year + 40% CC storm.

To check the effect of an extreme event and how flooding will be managed on site, a 1000-year 15-minute winter storm event was run in Micro-drainage and Flood Flow Analysis carried out using Alternate Direction Implicit and Fine Dynamic Time stepping.

The results of the analysis indicated that exceedance flood water will gather around the head of the Clean Surface Water System to the sheds. This demonstrates that the proposed Sheds will be fairly resilient to flooding by virtue of their raised FFL's and the unused storage capacity of the filter drains in the system. It also indicates that the slurry tanks would be potentially unaffected by exceedance event flood water.

Refer to ***Appendix F*** for FloodFlow Analysis and plan layout showing flooding effects of a 1000-year 15-minute winter storm event on site.

3.7 Foul Drainage Strategy

The proposed development has no requirements for foul drainage.

3.8 Maintenance and Operation

A SuDS Operation and Maintenance Manual has been produced and issued as a separate document from this report. The Manual shall be revised post-construction to suit as-built drainage (which should be in accordance with details approved at planning stage) and added to the Health and Safety File.

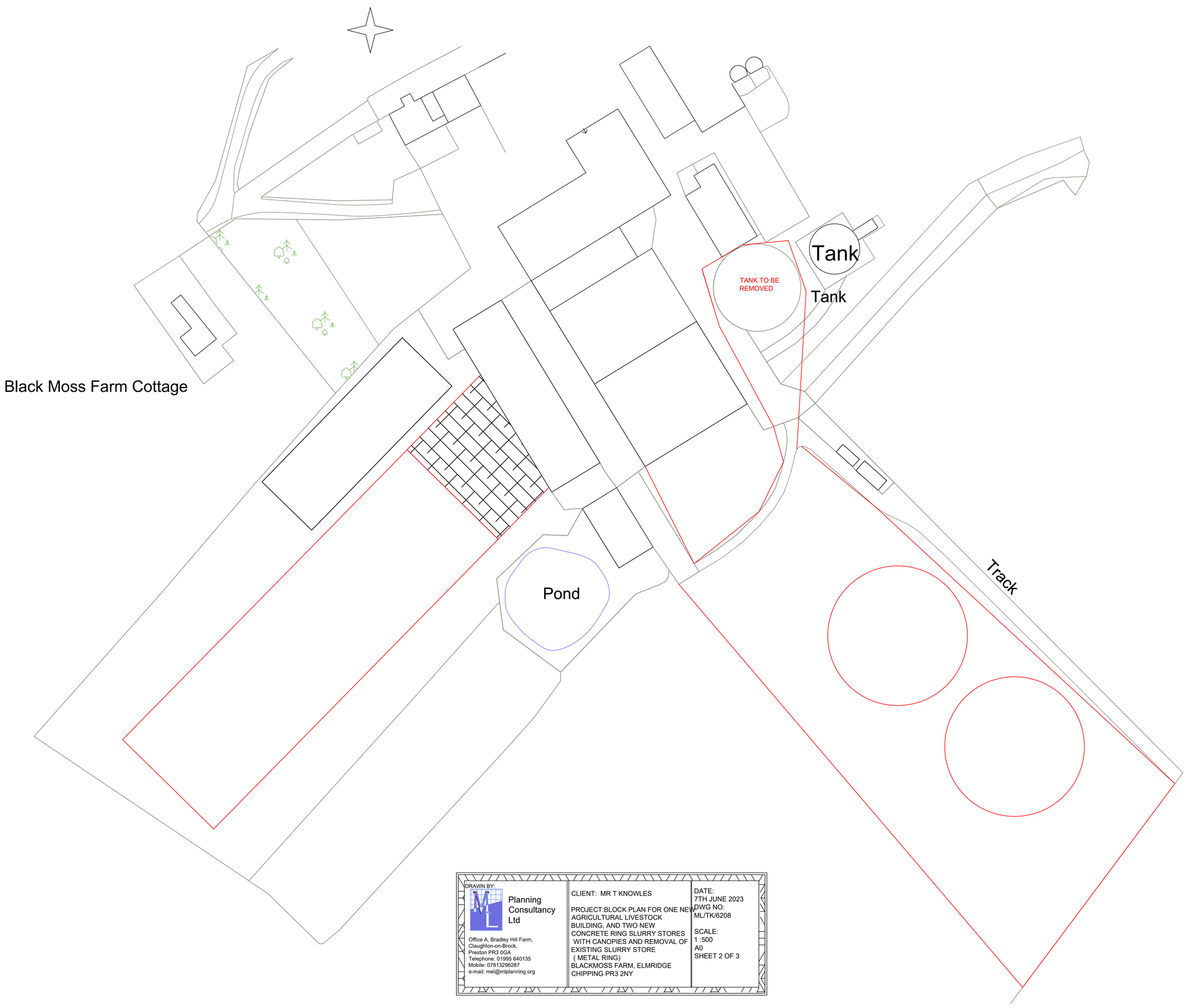
Please refer to report ***CSH-BML-XX-XX-RP-C-0502*** SuDS Operation and Maintenance Manual for details of Owner and Maintainer of the assets, and recommended maintenance regime for the drainage assets.

APPENDICES

Appendix A

Site Location Plan & Masterplan

BLOCK PLAN SCALE 1:500



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PROJECT:BLOCK PLAN FOR ONE NEW AGRICULTURAL LIVESTOCK BUILDING, AND TWO NEW CONCRETE RING SLURRY STORES WITH CANOPIES AND REMOVAL OF EXISTING SLURRY STORE (METAL RING)
BLACKMOSS FARM, ELMRIDGE
CHIPPING PR3 2NY

DATE:
7TH JUNE 2023
DWG NO:
ML/TK/6208

SCALE:
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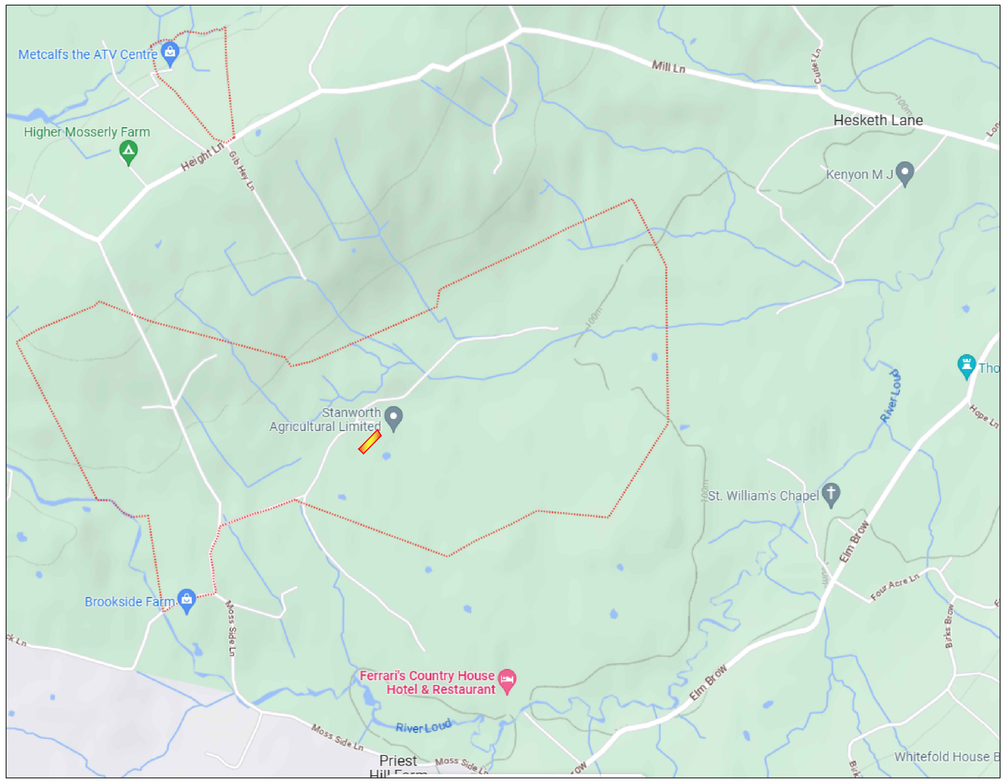
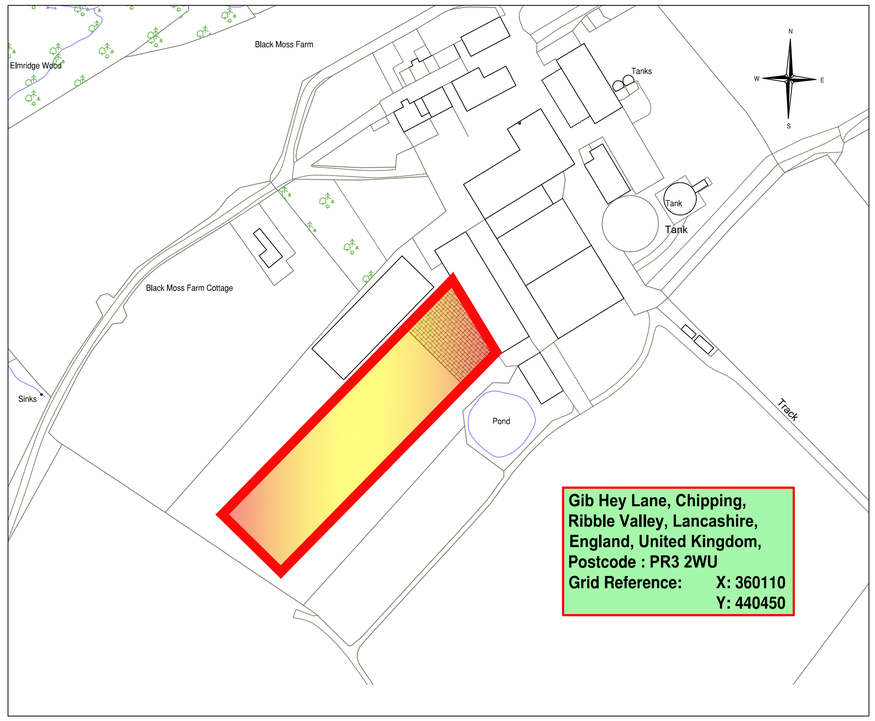
A0
SHEET 2 OF 3



Location Plan



Site Plan

Scale 1:1250

Safety, Health & Environmental Information:

In addition to the hazards and risks normally associated with the types of work detailed on this drawing, please note the significant hazards identified by symbols below,

INDICATES A RESIDUAL RISK AS A WARNING

INDICATES A RESIDUAL RISK FOR INFORMATION

and described below:

Construction/Maintenance/Cleaning/Demolition

Refer to Drawing:

General Notes:

1. Do not scale from this drawing.

2. All dimensions are in millimetres (mm), all levels in metres (m) unless noted otherwise.

3. Discrepancies or omissions are to be reported to the Engineer prior to work commencing.

4. Materials and workmanship are to comply in all respects with current British Standard Specifications, Codes of Practice, and Building Regulations Approved Documents.

5. The copyright of this drawing is vested in the Engineer and must not be copied or reproduced without written consent.

6. The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at connection points before work commences.

7. This drawing is to be read in conjunction with all relevant specifications and drawings issued by the Engineer, Architect and other Specialists.

Rev	By / Chk'd	Date	Description
P01	DH/AM	19/07/2023	For Discussion

PRELIMINARY DRAWING
This drawing is not to be used for construction

Client

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PR3 2NY

Drawing

Site Location Plan

By/Chk'd DH/AM Date 18/07/2023

Drawing No.
CSH-BML-XX-XX-DR-C-0100

Revision
P01

BML Job No.
1000-05

Status
-

Drawing Scale at A1: As Shown

CAD Filename: Y:\Projects\1000-05 Cow Shed\Information - Working\CAD\CSH-BML-XX-XX-DR-C-0100 P01 - Plan Location.dwg

Appendix B

Site Topography

Notes

Coordinates and levels are all relative to Ordnance Survey National Grid GPS system (OSGB36 (15))
A true OSGB36(15) coordinate has been established at M2 and another value established at M1 and M3 to determine a bearing - no scale factor or transformation.

Where tree species are to be critically identified, this should be undertaken by an arboriculturalist.

Survey Control

Foul Drainage

An existing foul drain has been approximated in location after exposing the trench in which it is believed to be located. A singular cover has been surveyed within the site and plotted.

Surface Water Drainage

It is not clear whether there is a surface water drainage connection available.

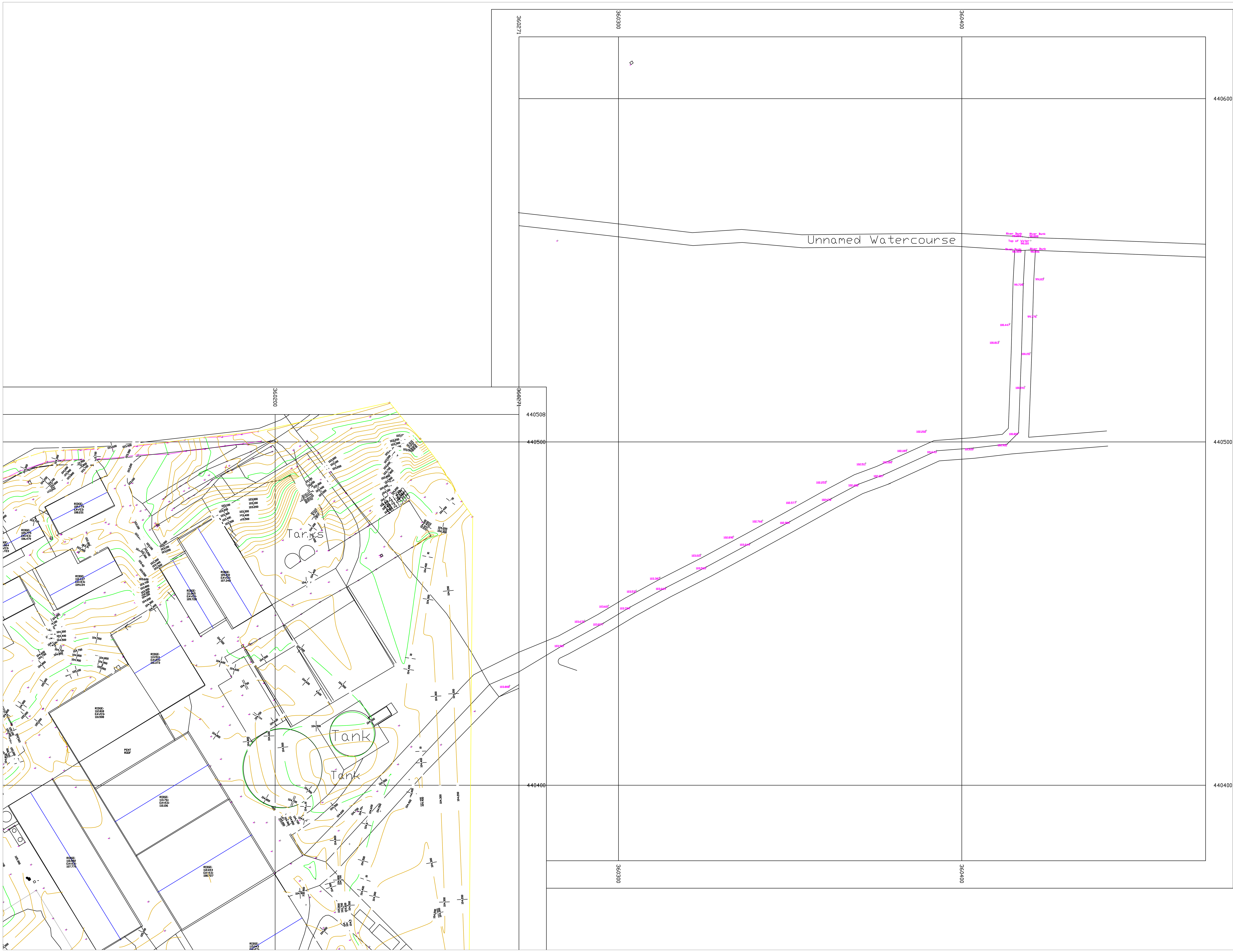
Key

	GAS CHAMBER
	GATE
	HEDGE
LP	LAMPOST
	MANHOLE
	POST AND RAIL
	ROAD CHANNEL
RS	ROAD SIGN
	STOCK FENCE
	SURVEY CONTROL
TP	TELEGRAPH POLE
	TOP OF KERB
	TREE
	MISC FENCE

Survey Grid:	LOCAL SITE GRID
Client:	M PHILLIPS ENGINEERING LIMITED
	FI CONSTRUCTION
Drawing Title:	Blackmoss Farm - Topographical Survey

Scale:	Sheet Size	Drawn:	Date:
1:500	A1	MP	01/12/2023

Drawing Number:	Revision:
BMF_TS_001	DRAFT



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1:500	A1	MP	01/12/2023

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BMF_TS_001	DRAFT

Appendix C

Site Geology

SUB SURFACE
SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL & ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907

Insitu Test Results

Site: BLACKMOSS FARM, ELMRIDGE LANE, LONGRIDGE, PRESTON, PR3 2NY

Client: FI CONSTRUCTION LIMITED

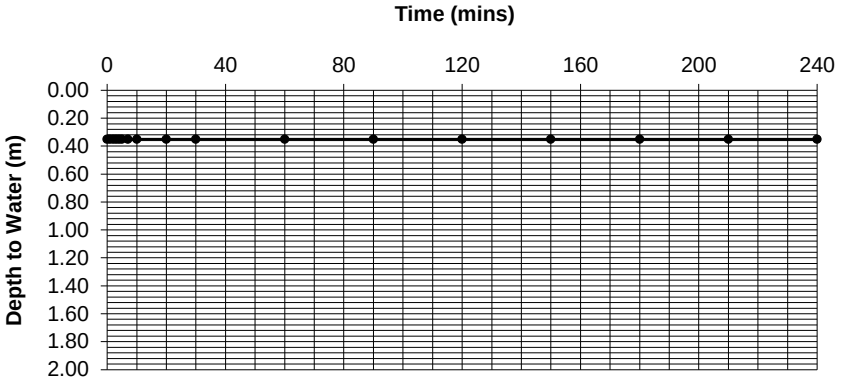
Job Number: 7856

Sheet: 1 / 1

SOAKAWAY TEST

Position: TP1

Test Number: 1
Date: 22/11/23



Time (min)	Depth (m)
0	0.35
1	0.35
2	0.35
3	0.35
4	0.35
5	0.35
7	0.35
10	0.35
20	0.35
30	0.35
60	0.35
90	0.35
120	0.35
150	0.35
180	0.35
210	0.35
240	0.35

Length of pit:	L =	1.70	m
Width of pit:	W =	0.60	m
Depth of pit	D =	2.00	m
Base area of pit:	A =	1.02	m^2
100% effective depth	D100 =	0.35	m
75% effective depth	D75 =	0.76	m
50% effective depth	D50 =	1.18	m
25% effective depth	D25 =	1.59	m
time to D75	T75 =	-	sec
time to D25	T25 =	-	sec
time from D75 to D25 (T25 - T75)	t_{p75-25} =	-	sec
volume between D75 & D25 (A x (D25 - D75))	V_{p75-25} =	0.84	m^3
surface area to D50 inc. base ((2x(D-D50)x(W+L)) + A)	a_{p50} =	4.82	m^2

SOIL INFILTRATION RATE **f =** $\frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

f = - m/sec *

Test Strata: See TP1 Log.

Remarks: * Unable to calculate Soil Infiltration Rate due to very low permeability of strata.

SUB SURFACE

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Site	Trial Pit Number
BLACKMOSS FARM, ELMRIDGE LANE, LONGRIDGE, PRESTON, PR3 2NU	TP1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
MECHANICAL EXCAVATOR	0.6m x 1.70m		FI CONSTRUCTION LTD	7856
	Location AS PLAN	**Dates** 22/11/2023	**Engineer**	**Sheet** 1/1

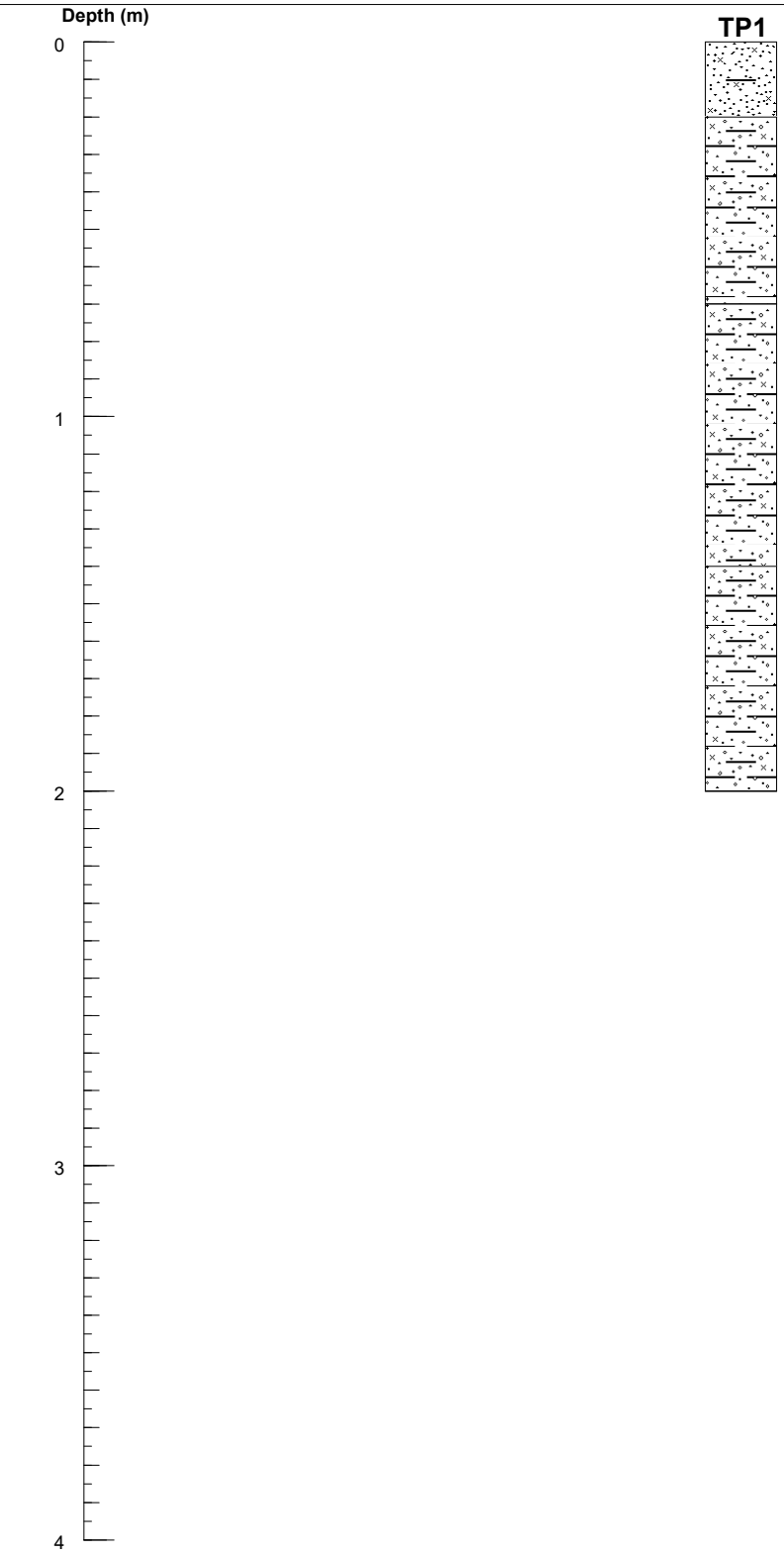
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.20	B				(0.20) 0.20	Dark brown slightly clayey silty fine SAND with occasional roots and some rootlets. (Possible made ground)		
0.20-0.40	B				(0.50) 0.70	Soft to firm grey and occasional greyish brown mottled slightly gravelly slightly sandy silty CLAY. Gravel is subangular to subrounded fine to coarse siltstone, sandstone and quartz		
0.70-0.90	B				(0.70) 1.40	Firm greyish brown and occasional grey and orangish brown mottled slightly gravelly slightly sandy silty CLAY with low siltstone cobble content. Gravel is subangular to subrounded fine to coarse sandstone, siltstone and quartz		
1.40-1.60	B				(0.60) 2.00	Firm greyish brown and occasional grey mottled slightly gravelly slightly sandy silty CLAY with low sandstone and siltstone cobble content. Gravel is subangular to subrounded fine to coarse sandstone, siltstone and quartz ...below 1.8m: occasional pockets of sand		
1.80-2.00	B		22/11/2023:DRY			Complete at 2.00m		

Plan

Remarks

Trial pit remained vertical and stable
No groundwater encountered
On completion backfilled with arisings

Scale (approx)	Logged By	Figure No.
1:25	WJP/HB	7856.TP1



Key

- Groundwater Strike
- Strike Rise Level
- Silty sandy gravelly CLAY
- Clayey silty SAND

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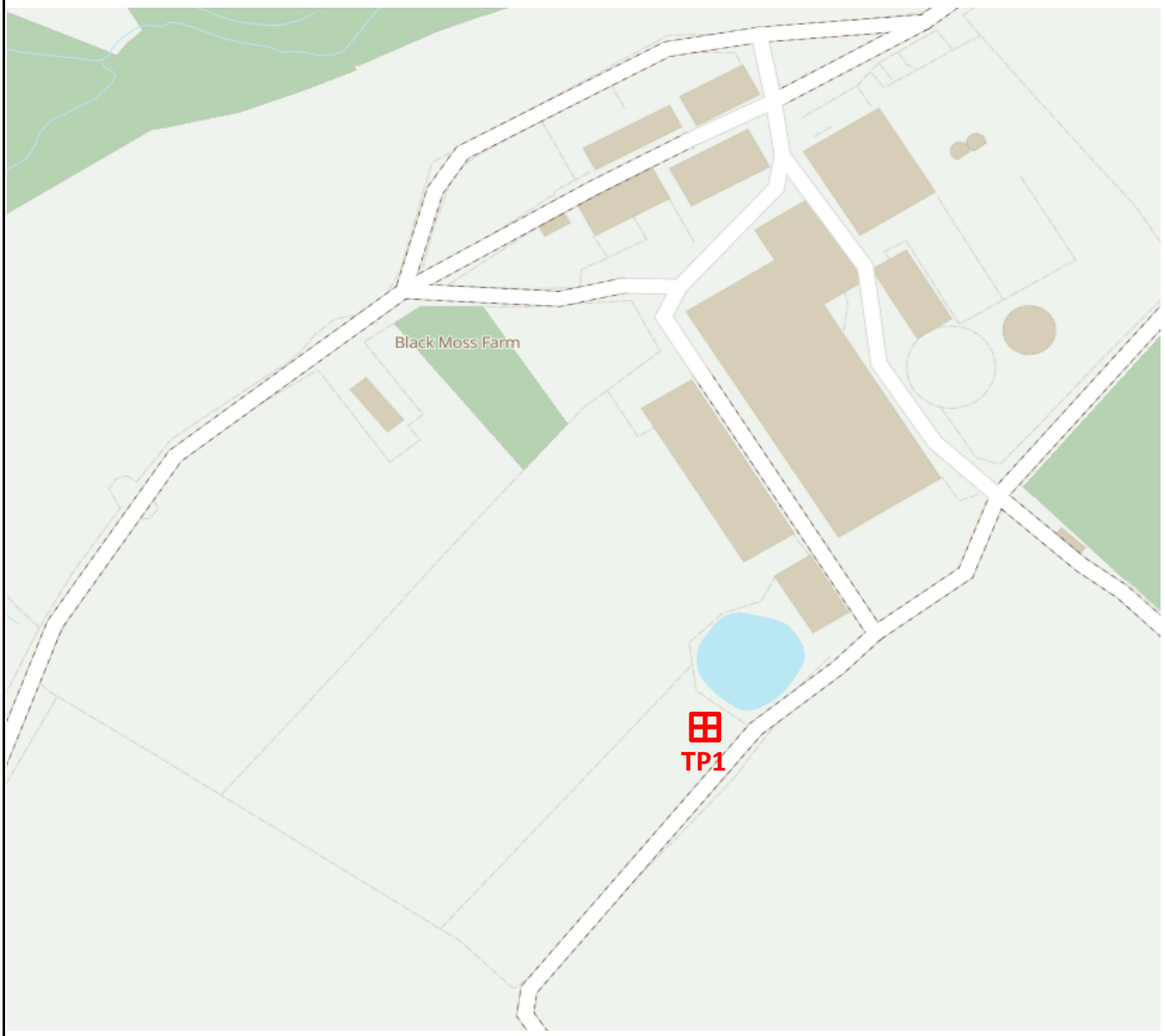
Nominal Section

Site	Date Drawn	Date Checked	Sheet	Job Number
BLACKMOSS FARM, ELMRIDGE LANE, LONGRIDGE, PRESTON, PR3 2NU	30/11/2023		1/1	7856
Client	**Drawn By**	**Checked By**	**Scale**	**Figure No.**
FI CONSTRUCTION LTD			1:20[V]	7856.1



SUB SURFACE SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907				Soakaway Location Plan
Site BLACKMOSS FARM, ELMRIDGE LANE, LONGRIDGE, PRESTON, PR3 2NY	Date Drawn 28-Nov-23	Date Checked –	Orientation N	Job No. 7856
Client FI CONSTRUCTION LIMITED	Drawn By SS	Checked By –	Scale –	Figure No. 1