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Surface Water Drainage Strategy 4563_LL14_Cefn Mawr_06

Site Address: Bank Cottage

Waterloo Place

Well Street

Cefn Mawr

LL14 3AS

UK Experts in Flood Modelling, Flood Risk
Assessments, and Surface Water Drainage Strategies

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Document Issue Record

Project: Surface Water Drainage Strategy

Prepared for: Sarah Needham

Reference: 4563_LL14_Cefn Mawr_06

Site Location: Bank Cottage, Waterloo Place, Well Street, Cefn Mawr, LL14 3AS

Issue	Date	Author	Check	Auth.	Comments
1	27/03/2024	Ceri Metcalfe	VW	JM	First issue
2	27/03/2024	Ceri Metcalfe	VW	JM	Appendix D amended to suit client comments

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Summary

Development Description	Existing	Proposed
Development Type	Existing garage to be partially demolished and outbuilding to be demolished	Residential dwelling
Surface Water Drainage	To surface at ground level	Discharge to the ground
Site Size	Approx. 210m ²	No change
Management Measures	Summary	Comment
Site Drainage Plan	Understood that runoff from hardstanding and roof areas discharge to permeable surface at ground level.	On site infiltration into the ground via: - Bioretention area - Permeable paving

1. Introduction

- 1.1. Aegaea were commissioned by the client to prepare a Surface Water Drainage Strategy (SWDS) to facilitate the discharge of conditions of planning condition 8 of the planning consent (ref. P-2023-0847) associated with the proposed development, which states:

“No land drainage run-off or surface water shall be permitted to discharge or connect to the public sewerage system, either directly or indirectly, and foul and surface water shall be drained separately from the site.”

Site Overview

- 1.2. The site of the proposed development is Bank Cottage, Waterloo Place, Well Street, Cefn Mawr, LL14 3AS.



Figure 1: Site Location. (Map data ©2023 Google)

- 1.3. The site is situated and accessed from a private road directly from Well Street (part of the B5096).
- 1.4. The site measures approximately 210m² (0.021ha), comprising of an existing garage that is to be partly demolished and an outbuilding that is to be completely demolished.

- 1.5. Wrexham County Borough Council are the Local Planning Authority (LPA) for the site and also the designated Lead Local Flood Authority (LLFA). The site sits within the Natural Resources Wales (NRW) North East Wales region.
- 1.6. Dwr Cymru Welsh Water (DCWW) are the water and sewage provider for the area.

Development Proposals

- 1.7. The development comprises of the part demolition of an existing garage and full demolition of an existing outbuilding. It is proposed that a two bedroom residential dwelling is to be constructed as part of an extension and conversion of the existing garage within the development site. The proposed site layout is included in Appendix A.

2. Surface Water Drainage Strategy

Existing Drainage System

- 2.1. No details of the existing onsite surface water drainage has been provided; however, it is understood that surface water from roof areas runoff onto the surface.

Ground Conditions

- 2.2. British Geological Survey's (BGS) mapping indicates the site is underlain by bedrock deposits of Cefn Rock (sandstone). A review of publicly available information indicates that the site is an area of slowly permeable seasonally wet acid loamy and clayey soils with impeded drainage.

Infiltration Testing

- 2.3. Infiltration has been carried out on site to the BRE 365 methodology in the anticipated location of the proposed on-site SuDS infiltration feature. Testing was conducted in varying depth trial pits as summarised in Table 1 below.

Table 1 Infiltration testing results.

Trial Pit	Dimensions (m)		
	Length	Width	Depth
TP1 – Test 1	1.20	0.40	1.3
TP1 – Test 2	1.25	0.40	1.16
TP1 – Test 3	1.25	0.40	1.10
TP2 – Test 1	1.30	0.40	0.65
TP2 – Test 2	1.30	0.40	0.56

- 2.4. The results from the tests are summarised within Table 2 below, with full infiltration calculations provided in Appendix B.

Table 2 Infiltration testing results.

Trial Pit	Infiltration Factor (m/s)		
	Test 1	Test 2	Test 3
TP1	1.080×10^{-5}	6.855×10^{-5}	1.047×10^{-4}
TP2	1.783×10^{-5}	1.103×10^{-5}	-

- 2.5. Given the results of the infiltration testing, the soils on site have been deemed suitable for infiltration methods to be used as a form of surface water disposal for the development.

Proposed Drainage Strategy

- 2.6. Current guidance indicates that the following surface water disposal options should be considered, listed in order of preference:
- Disposal via on-site infiltration systems:** Following onsite infiltration testing in line with BRE 365 disposal of surface water via infiltration has been deemed as a suitable option.
 - Disposal to a watercourse/surface water body:** The option to drain to a watercourse/surface water body has been deemed as unfeasible for the site as there are no watercourse within close proximity of the site.
 - Disposal to surface water sewer:** This option has been discounted as it is proposed to discharge via infiltration, however, may be considered if other options are deemed unsuitable for the site.
 - Disposal to combined sewer:** This option will only be considered if all other options are unfeasible.
- 2.7. In accordance with the SuDS hierarchy, it is proposed that surface water is to drain to the ground via infiltration. The use of permeable paving and a bioretention area has been proposed on site to filter water and improve water quality before infiltrating into the ground.
- 2.8. The permeable paving has been designed based on an infiltration rate of 1.103×10^{-5} m/s with a minimum sub-base depth of 450mm with a void ratio of 30%. The bioretention area has also been designed based on an infiltration rate of 1.103×10^{-5} m/s.
- 2.9. All SuDS features have been sized to accommodate surface water runoff from all proposed impermeable areas on site, including all modelled 1 in 100 year storms plus climate change.
- 2.10. Drainage calculations can be found in Appendix C. The proposed drainage layout and details can be found in Appendix D.

3. Future Maintenance Strategy

Management

- 3.1. The surface water drainage network will be managed throughout the lifetime by a Private Management Company setup by the Client for the development.
- 3.2. All drainage, whether piped or SuDS require regular maintenance. the tables below provide an overview of general maintenance tasks and frequency of which they need to be undertaken.

General maintenance for Surface Water Drainage Systems as per CIRIA C753.

Maintenance Schedule	Required Action	Typical frequency
Regular Maintenance	Inspect for sediment and debris in catchpit manholes and gullies. Clean out as required	Twice Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris in catchpits, gullies, attenuation devices and inside concrete manhole rings.	As required, based on inspections.
Remedial actions	Reconstruct and/or replace components, if performance deteriorates or failure/blockage occurs.	As required
	Replacement of clogged components (flow restriction)	As required
Monitoring	Inspect silt traps/gullies/catchpits and note rate of sediment accumulation.	Monthly in the first year and then annually
	Check attenuation devices	Annually

- 3.3. The required maintenance for each component making up the drainage system is scheduled in the tables below, based on CIRIA report C753 – The SuDS manual.

Permeable Paving

General maintenance for permeable paving as per CIRIA C753.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements
Remedial Maintenance	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required
	Remediate work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action.	Three-monthly, 48 hr after large storms in the first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

- 3.4. Many of the specific maintenance activities for pervious pavements can be undertaken as part of a general site cleaning contract (many car parks or roads as swept to remove litter and for visual reasons to keep them tidy) and therefore, if litter management is already required at site, this should have marginal cost implications.

Bioretention Systems

General maintenance for a Bioretention System as per CIRIA C753

Maintenance Schedule	Required Action	Typical Frequency
Regular Inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc. and replace as necessary.	Quarterly
	Inspect inlets and outlets for blockage	Quarterly
Regular Maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or forebays	Quarterly to biannually
Occasional Maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required.	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Monitoring	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years

4. Pollution Prevention & Water Quality Management

SuDS Mitigation Indices

- 4.1. Chapter 26 of the CIRIA C753 The SuDS Manual, provides design advice to meet water quality standards by adopting the SuDS train treatment mechanism and thereby reduce the risk of pollution by evaluating potential pollution hazards at the outset.
- 4.2. The proposed site layout provides the opportunity to introduce SuDS into the scheme to reduce potential contaminant risk further.
- 4.3. Runoff from other roofs is generally viewed as low risk (as per Table 26.2 of C753). Refer to the tables below.

Pollutant Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05

Indicative SuDS Mitigation Indices

	Mitigation Indices				Indices for Calculation		
	TSS	Metals	Hydrocarbons		TSS	Metals	Hydrocarbons
Bioretention systems	0.8	0.8	0.8	100%	0.8	0.8	0.8
Total Mitigation Indices score					0.8	0.8	0.8
Sufficiency of Pollution Mitigation Indices					Sufficient (No additional mitigation required)		

- 4.4. The mitigation indices offered by the proposed bioretention area exceed the hazard indices from residential roofs and therefore provides adequate mitigation.

- 4.5. Runoff from individual property driveways, residential car parks and low traffic roads are generally viewed as low risk (as per Table 26.2 of C753), shown in the tables below.

Pollutant Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Individual property driveways, residential car parks and low traffic roads	Low	0.5	0.4	0.4

Indicative SuDS Mitigation Indices

	Mitigation Indices				Indices for Calculation		
	TSS	Metals	Hydrocarbons		TSS	Metals	Hydrocarbons
Permeable Paving	0.7	0.6	0.7	100%	0.7	0.6	0.7
Total Mitigation Indices score					0.7	0.6	0.7
Sufficiency of Pollution Mitigation Indices					Sufficient (No additional mitigation required)		

- 4.6. The mitigation indices offered by the proposed permeable pavement exceed the hazard indices from individual property driveways and therefore provides adequate mitigation.
- 4.7. It is therefore considered that the proposed SuDS features on site are appropriate and acceptable in terms of water quality.

Appendix A - Proposed Site Layout

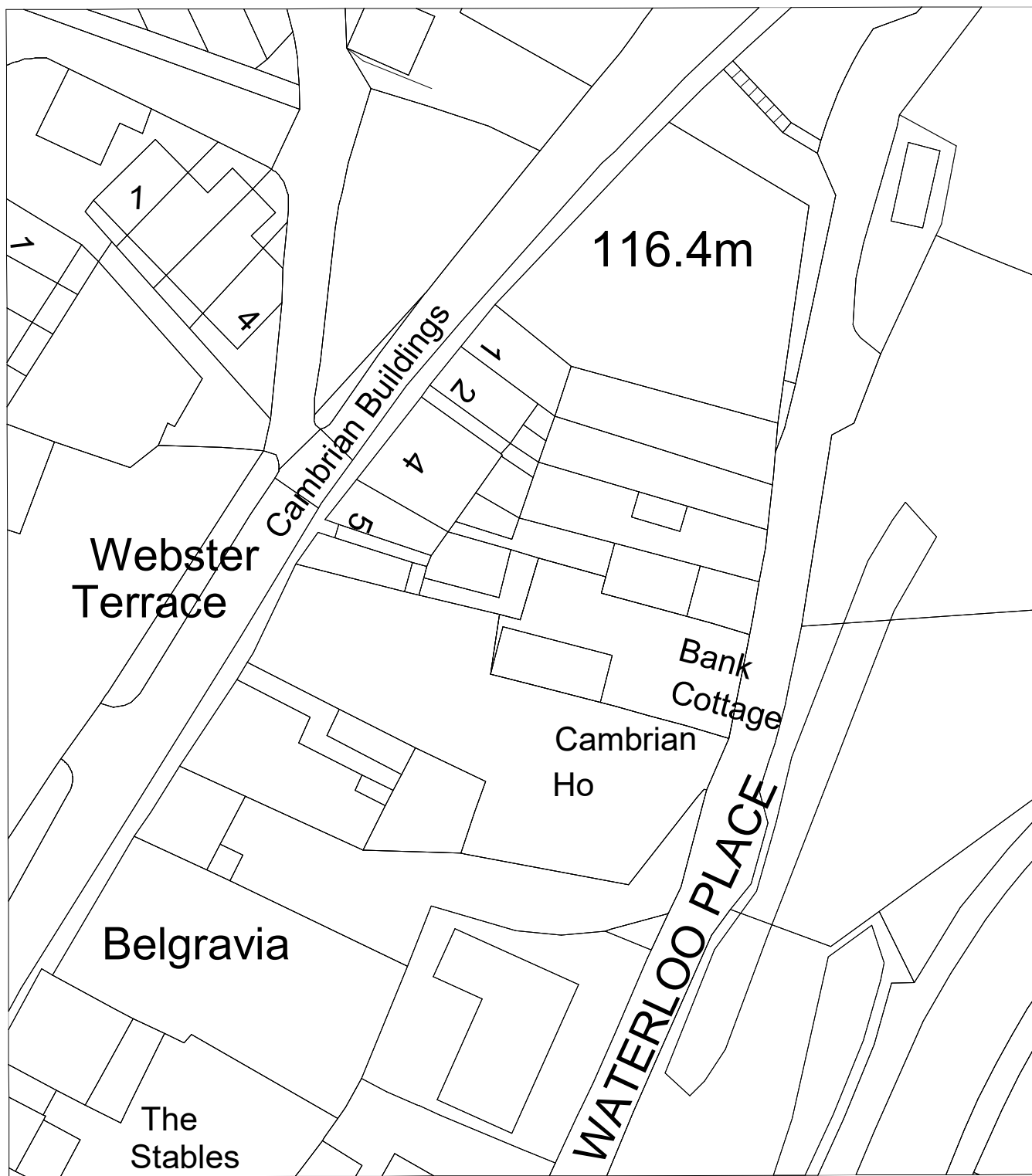


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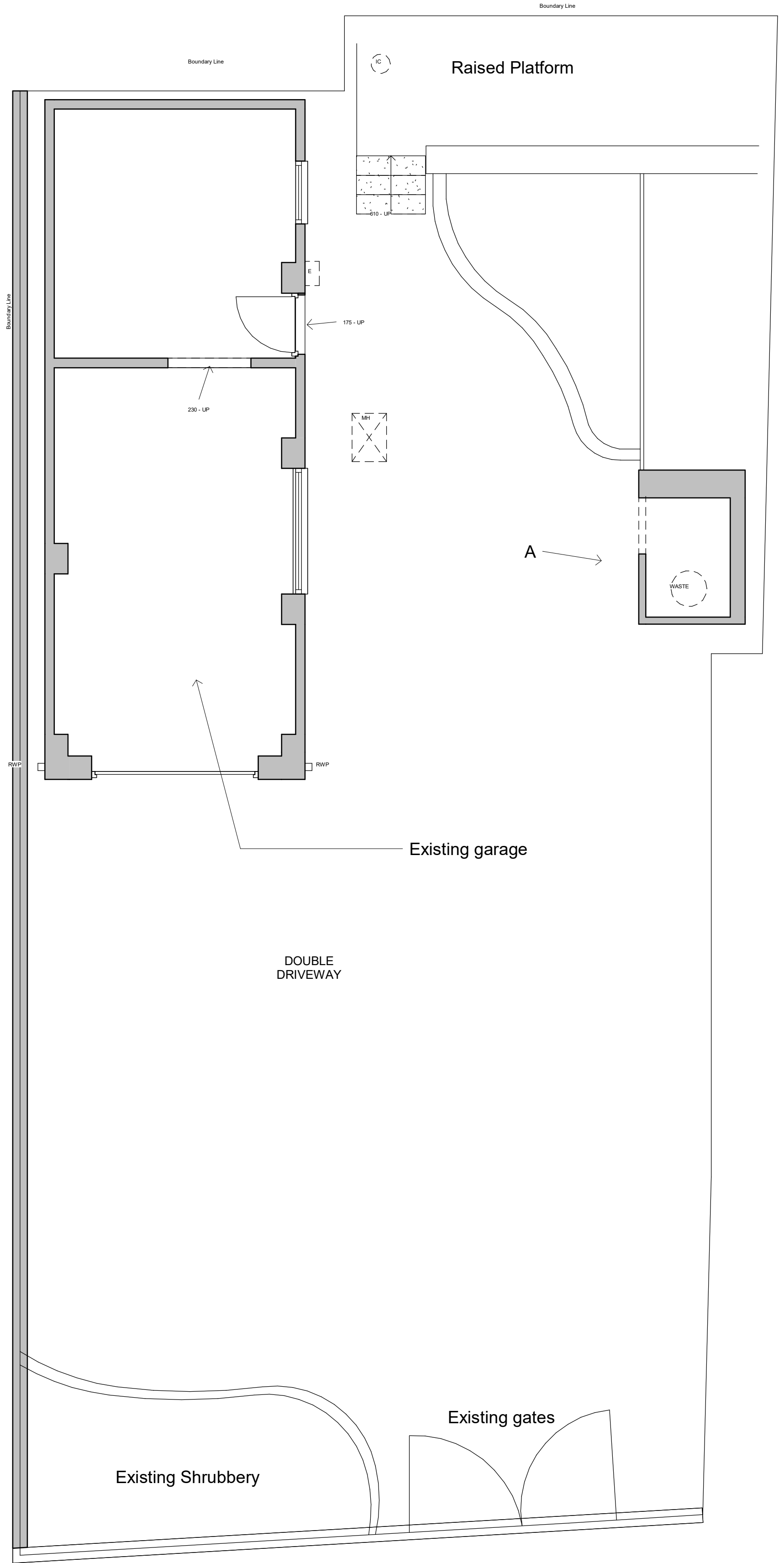
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*** Existing Right**
1 : 100

*** Existing Rear**
1 : 100



Site Plan
1 : 500



***1 Existing Ground Level**
1 : 50

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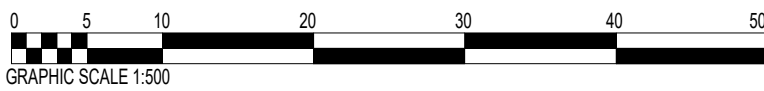
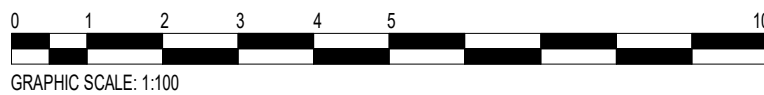
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The Owner, should they need to do so under the requirements of the Party Wall Act 1996 has a duty to serve a party wall notice on any adjoining owner if the building works involves works on or to an existing Party Wall including:
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- Insertion of DPC through wall
- Raising of wall or cutting of projections
- Demolition and rebuilding
- Underpinning
- Insertion of lead flashing
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CLIENT & ADDRESS:
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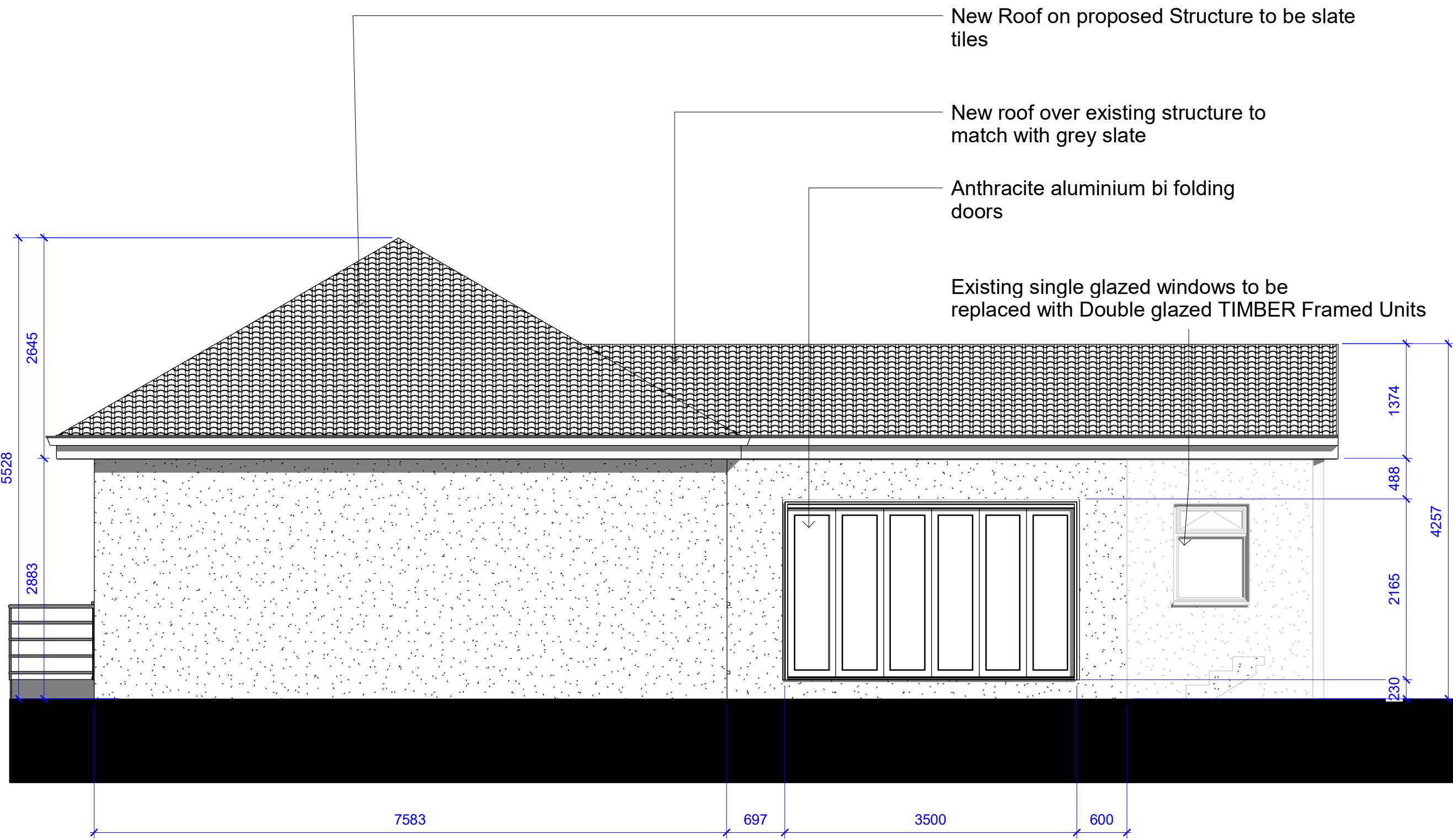
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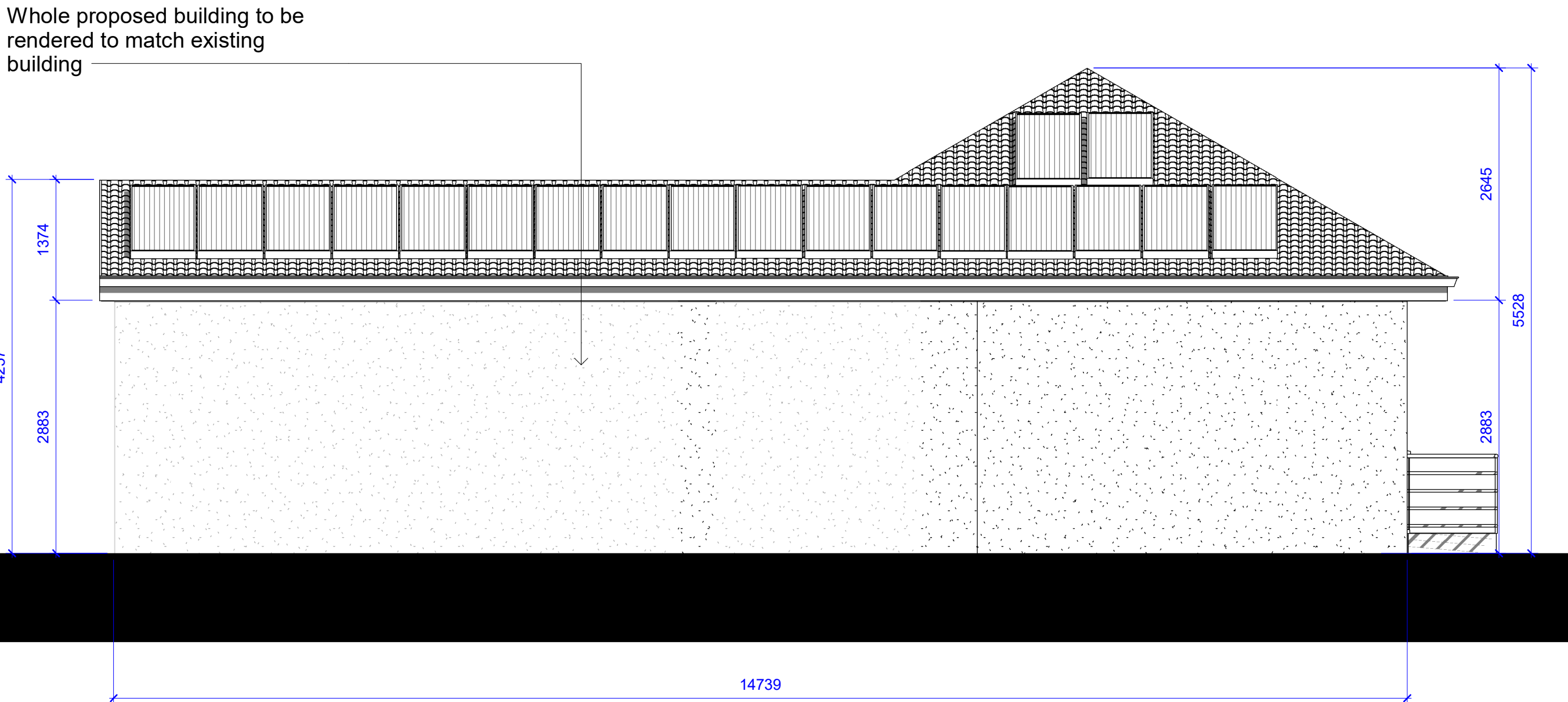
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**** Proposed Right**
1 : 50



**** Proposed Left**
1 : 50

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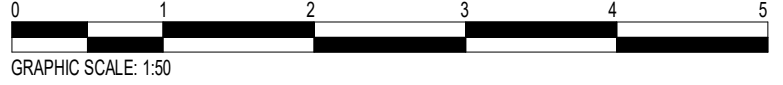
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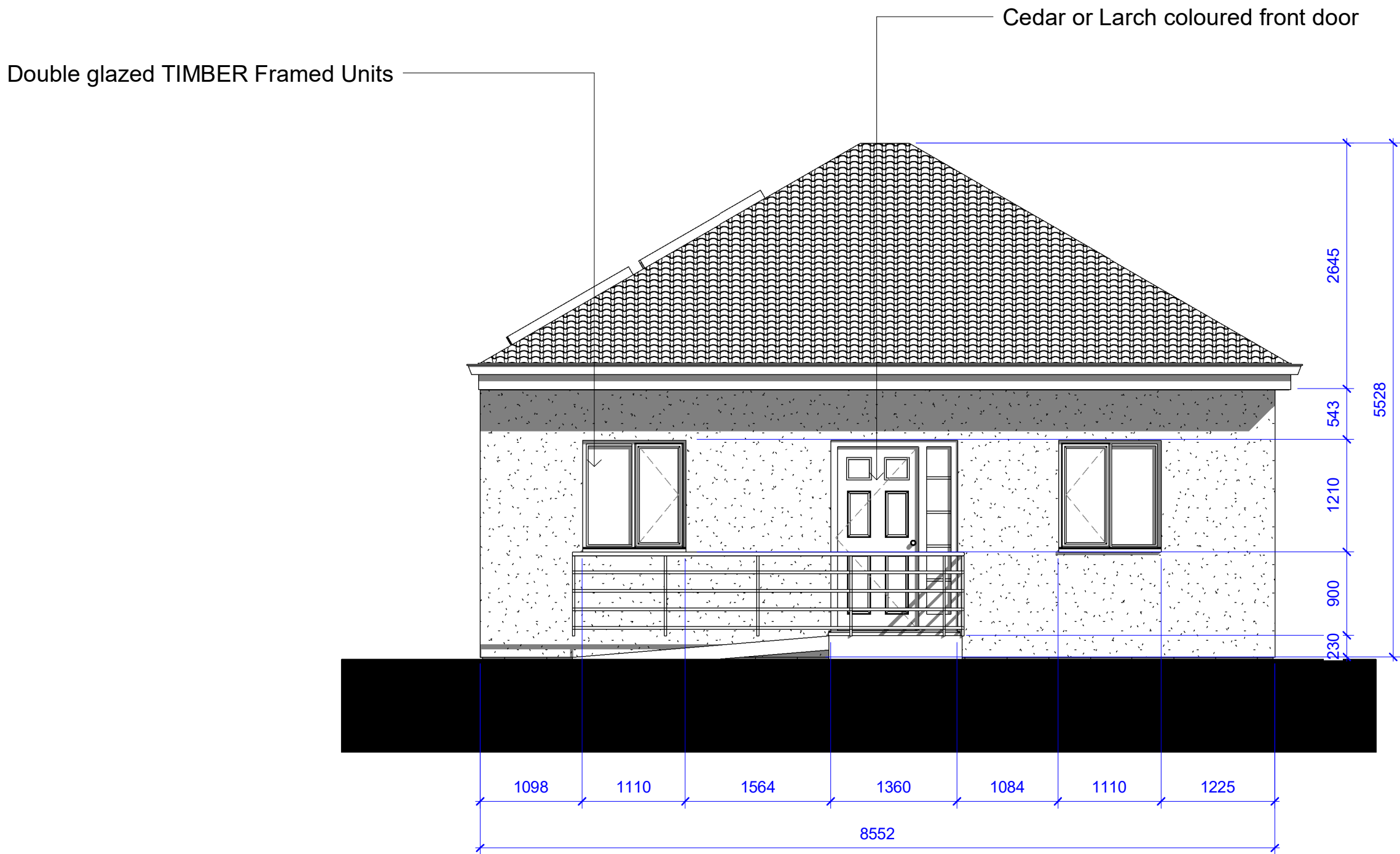
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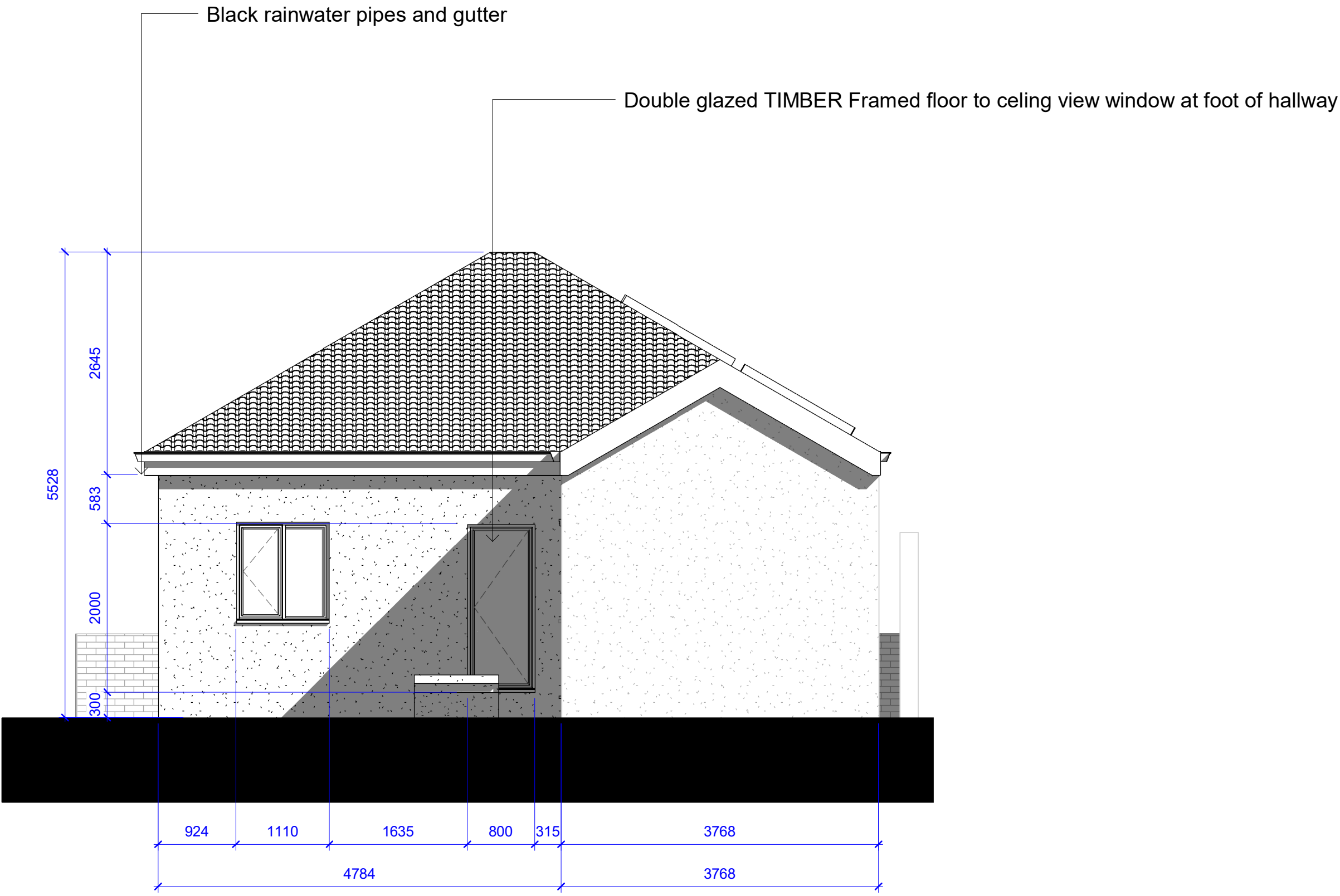
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Windows and doors to be conservation style timber framed units.



**** Proposed Front**
1 : 50



**** Proposed Rear**
1 : 50



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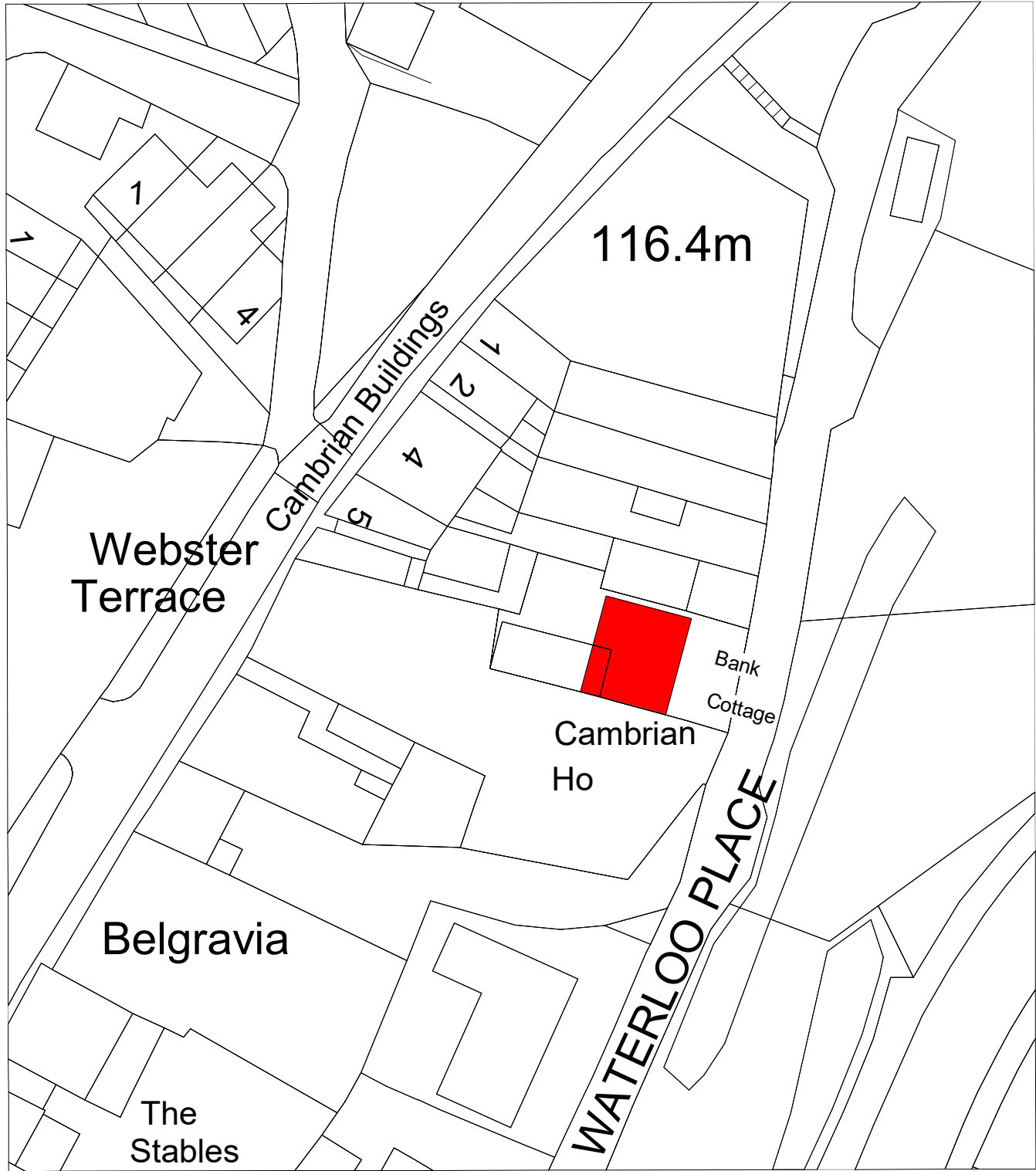
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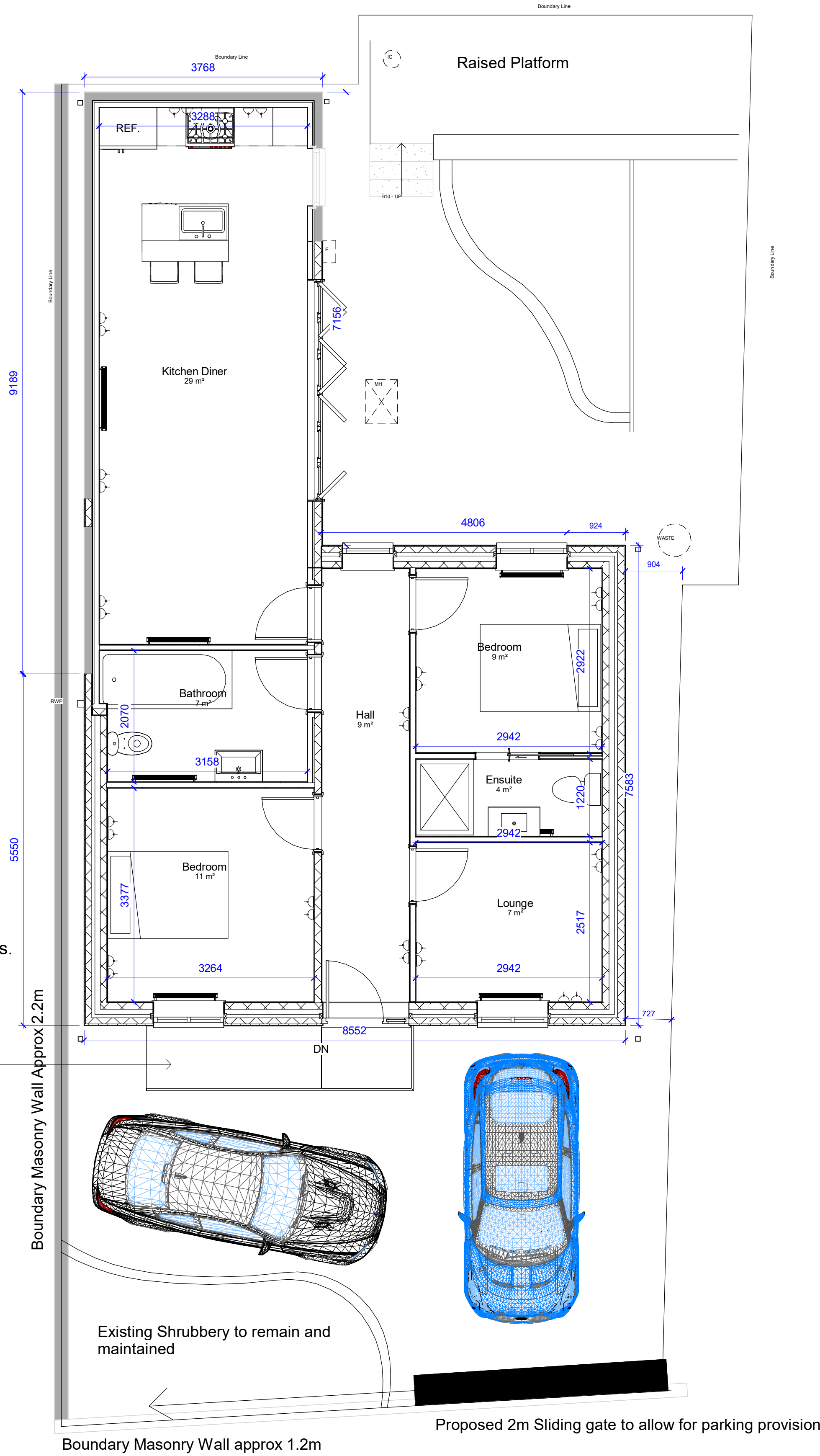
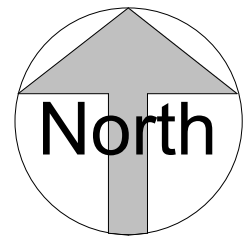
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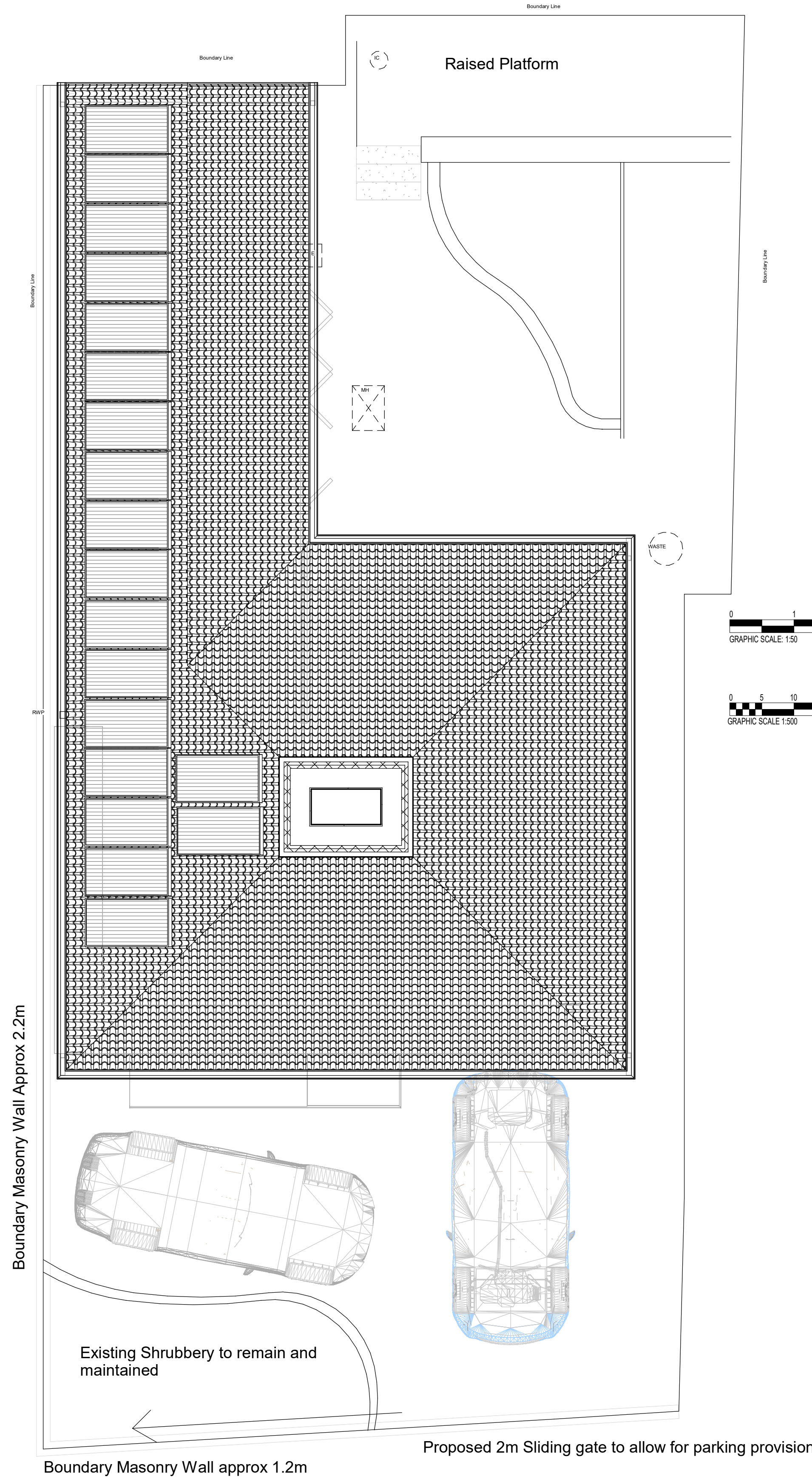
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Site Plan Proposed
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****1 Proposed Ground Level**
1 : 50



****4 Proposed Roofplan**
1 : 50

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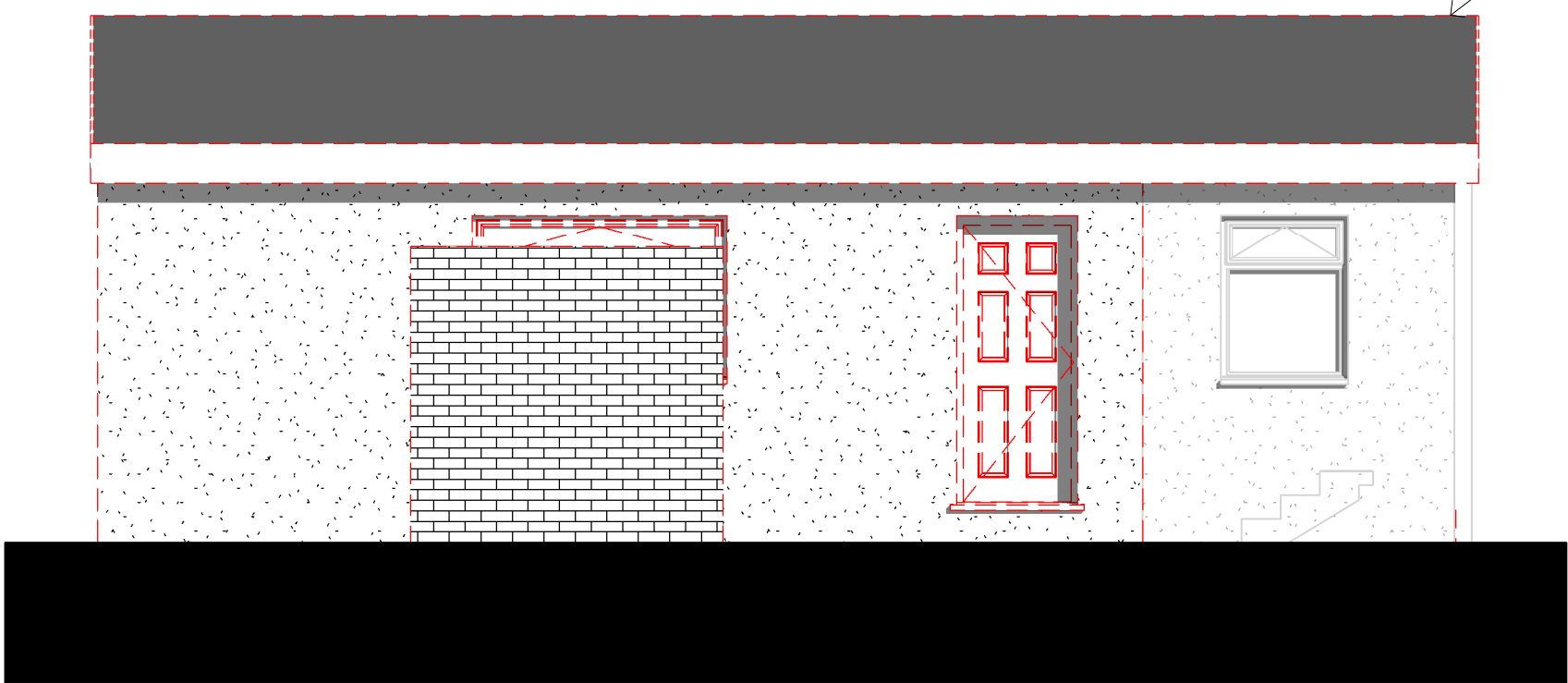
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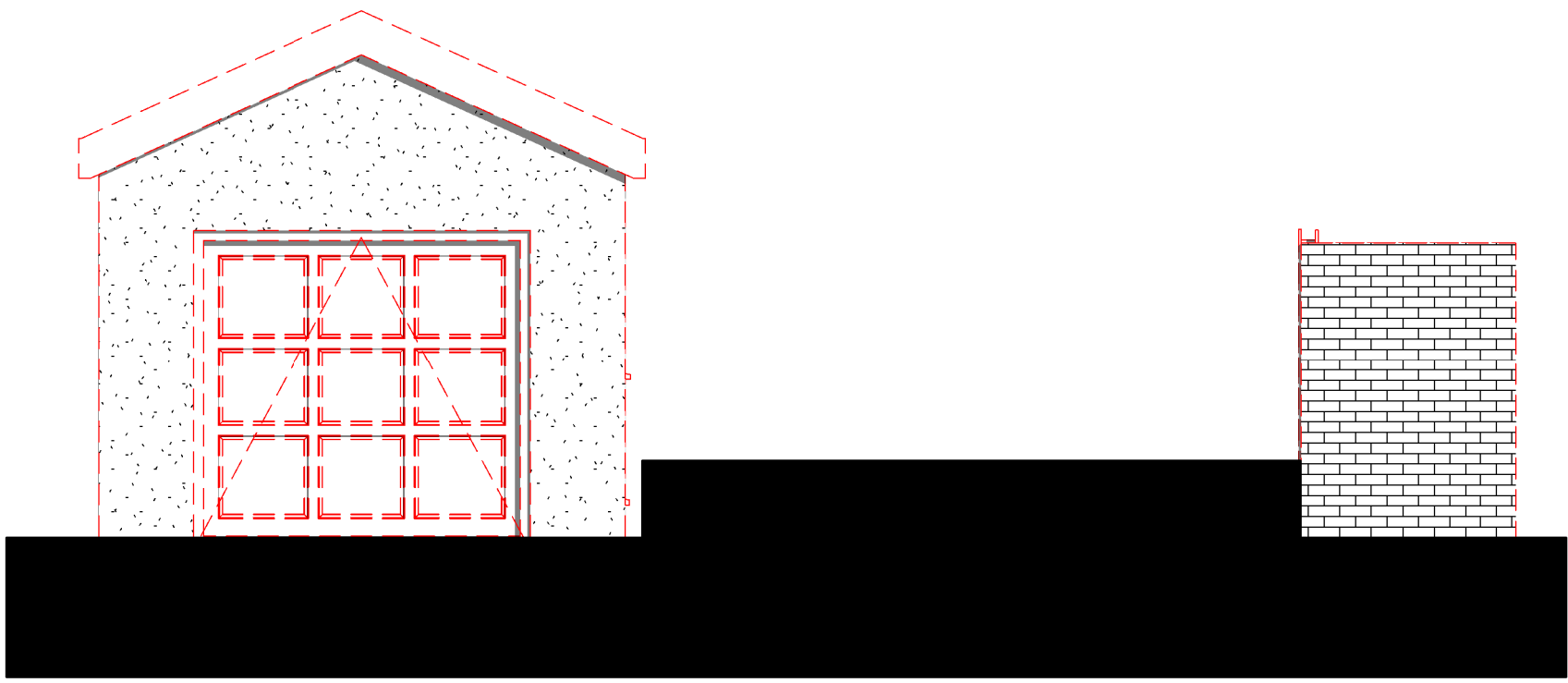
DEMOLITION
Measures to be put in place during and after the demolition to ensure the protection of the public, public amenities and adjoining properties.
Such measures to include:

- The shoring of adjoining buildings.
- The control of dust and noise generation.
- The weatherproofing of any parts of adjoining buildings which are left exposed by the demolition.
- The repairing and making good any damage to any adjacent building effected by the demolition.
- The removal of material or rubbish resulting from the clearance and demolition of the site.
- The disconnection, sealing or removal of any drain or sewer, as required.
- The making good of any disturbed ground.
- Any arrangements necessary for the disconnection off all services (e.g. gas, water, electricity).

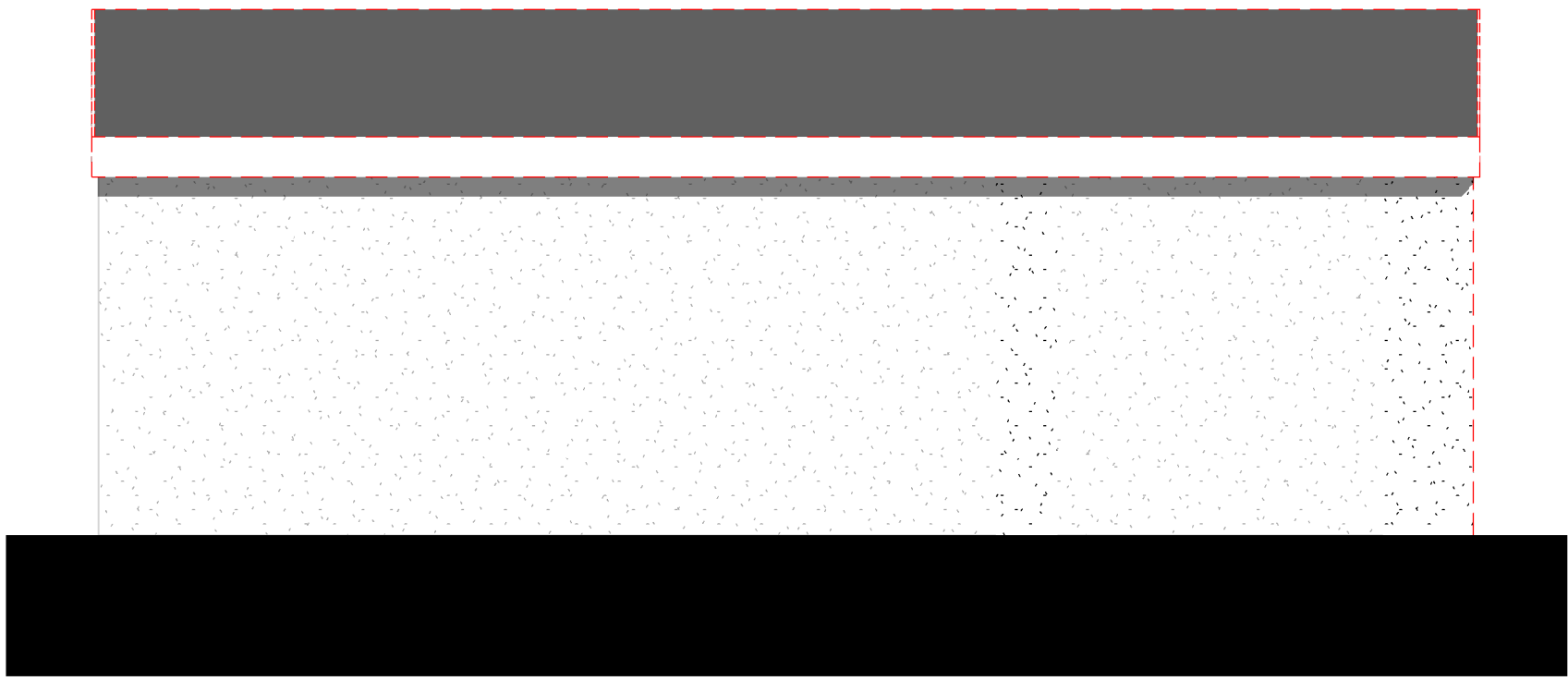
Consultation with the Health and Safety Executive, and Fire Authority should be sought if burning structures or materials on site. If the demolition is more than 50m3 in volume a formal notice of demolition is to be given to building control at least six weeks before any demolition work starts, in accordance with The Building Act 1984: Sections 80-83.
Consultation to be undertaken with the occupiers of adjacent buildings where applicable and a Party Wall agreement put in place. A planning application to demolish to be made where required.
All demolition work to comply with the construction (Design and Management) Regulations 1994 nd a Health and Safety plan is to be provided by the principal contractor.



**** Right Demo
1 : 50

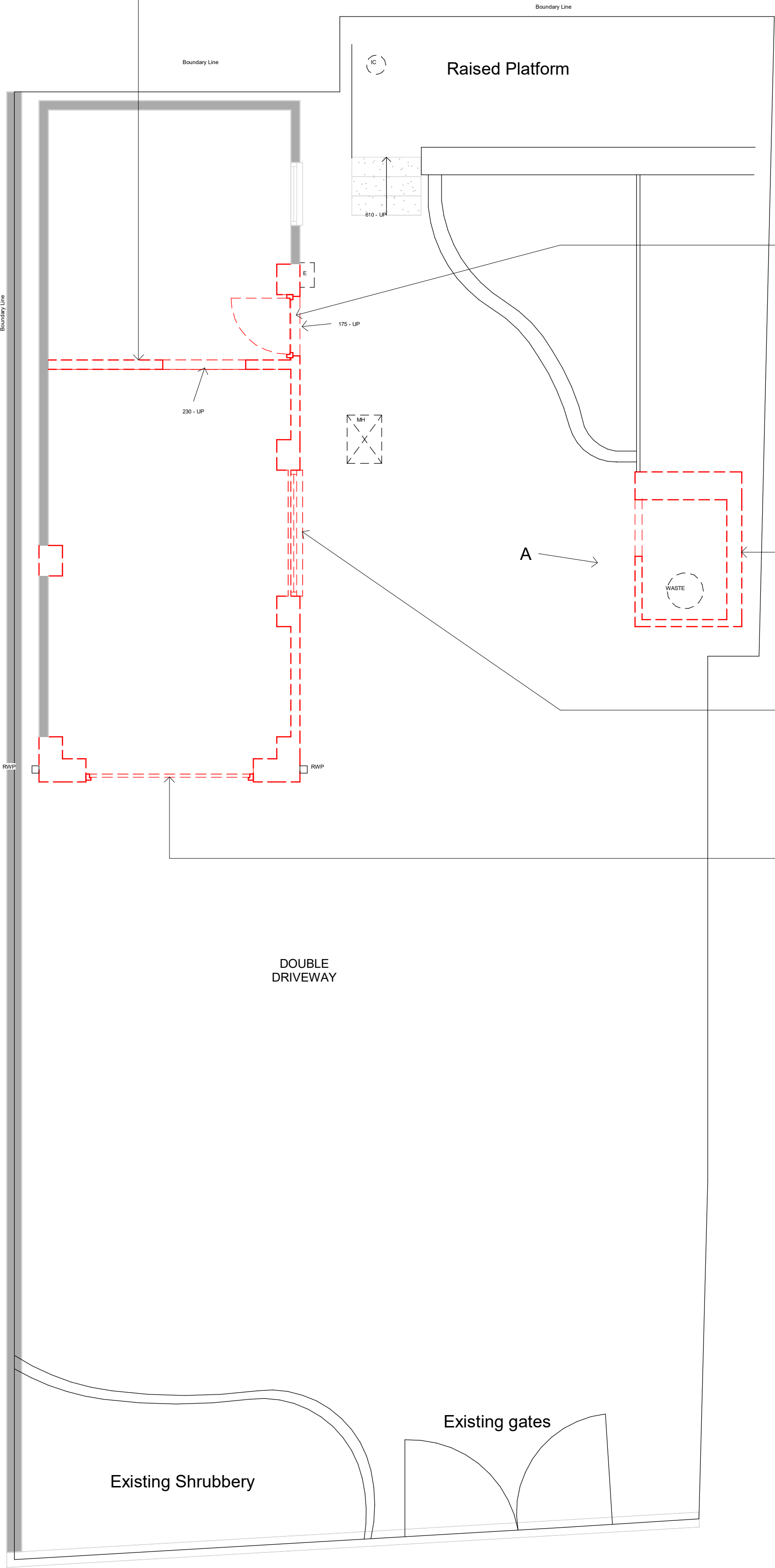


**** Front Demo
1 : 50



**** Left Demo
1 : 50

Internal block wall to be demolished



****1 Ground Level Demo
1 : 50

Garage door to be removed in line for wall to be demolished

Outhouse to be completely demolished

Garage window to be removed and wall demolished to follow

Garage door to be removed inline for proposed extension

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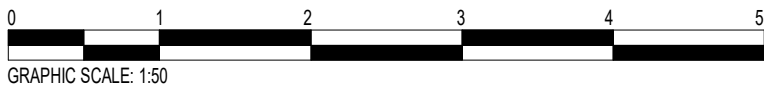
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SCALE (@ A1) 1 : 50

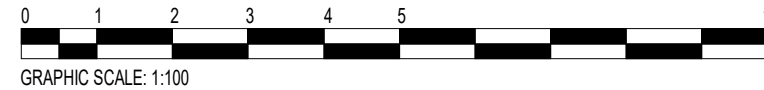
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A104 Demolition Plan

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REV:

[illegible][illegible][illegible]

A7. ABOVE GROUND DRAINAGE

All above ground drainage and plumbing to comply with BS EN 12056-2 for sanitary purposes. All drains have to be in accordance with Part 8 of the Building Regulations. Wastes have to follow TSSmax value of 1mm per 100m run. Waste water traps and rodding eyes to be provided at points of collection.

C. Size of wastes pipes and main length of branch connections (if length is exceeded then all vacuum trips to be used)

Wash basins : 1.5 m - 2m for 30 mm for 40 mm pipe
Bathrooms : 3m - 40m pipe for 40 mm for 50 mm pipe
W/c : min 100mm pipe size for 100 mm pipe

All branch pipes to connect to single soil stack or single waste terminating min 300mm above any openings within 3m.
In 100mm and up to 150mm pipe size, all internal air admission valves opening with full BS EN 12320, provide at least a height that the outlet is above the top of the highest water level.
Supply hot water to connect on to cold water supply within 200mm of the water connection.
Where hot and cold water mix at fittings as appropriate.

S8. SLOPE AND VENT PIPE

To be selected to fit in 100mm dia downpipe to terminate min 900mm above any openings within 3m. Provide a long radius bend at foot of vent pipe.

S9. AUTOMATIC AIR VENT

Ground floor fittings from W/c to be connected to new 150mm UHPV soil pipe with accessible internal air admittance valve complying with BS EN 12056-2. The fitting has to be located below the top of the highest fitting and connected to underground quality drainage extending to open gully at a depth of 150mm.

D9. PIPEDROOF THROUGH WALLS

Pipedroofs through walls must be installed with the pipe work to be provided with waterproofing to give a distance of 150mm either side of wall face. The 'tucker' pipe must have flexible joints and be a minimum length of 600mm.
The piped roof must be installed with the pipe work to be provided with waterproofing to give a distance of 150mm either side of wall face. The 'tucker' pipe must have flexible joints and be a minimum length of 600mm.
Opening both sides with rigid steel material and compressible sealant to prevent entry of air or vermin.

E1. ELECTRICAL

The electrical system must meet the requirements of Part F (electrical safety) must be designed, installed, inspected and tested by a competent person registered under a Competent Person self certification scheme such as BASI registration Ltd, BS INCEC, Certification Engineering Limited, NICEIC, etc. The Electrical Installation Certificate to be issued for the work by a person carrying out the work. A copy of a certificate will be added to building compliance documents.

E2. HEATING

Heating and hot water service from existing to be replaced with new TRVs to facilitate. Heating system to be designed, installed, fully certified by a GAS SAFE registered specialist. All work to be in accordance with the Local Water Authorities byelaws, the Gas Safety (Installation and Use) Regulations and Energy Regulations.

F3. INTERNAL LIGHTING

Install low energy light fittings that will have a minimum efficiency greater than 40 lumens per circuit watt and a total output greater than 100 lumens per circuit watt.
Part 1 of the current Building Regulations Domestic Design and Construction Standards Compliance Guide.

G1. EXTERNAL LIGHTING

External lighting fittings to be fitted as calculated in the DEIR and in compliance with the Domestic Building Compliance Guidance.
Aim to ensure that:

- a. limits capacity to no more than 100m-watts per lighting point and providing with automatic movement detecting devices (PIR) and automated controls ensuring lights shut off automatically when not required;
- b. any energy saving device (45 lumens per circuit-watt; fitted with manual controls and automatic day-light cut-off sensors) to match lights switch off if sufficient is sufficient.

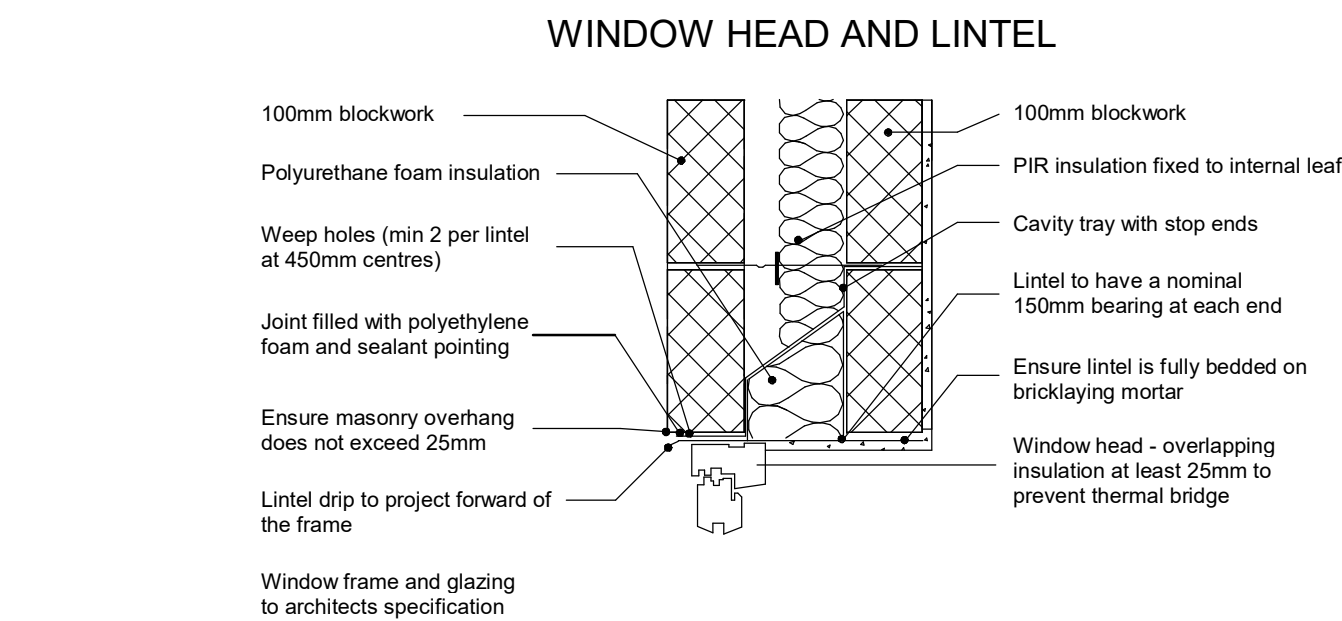
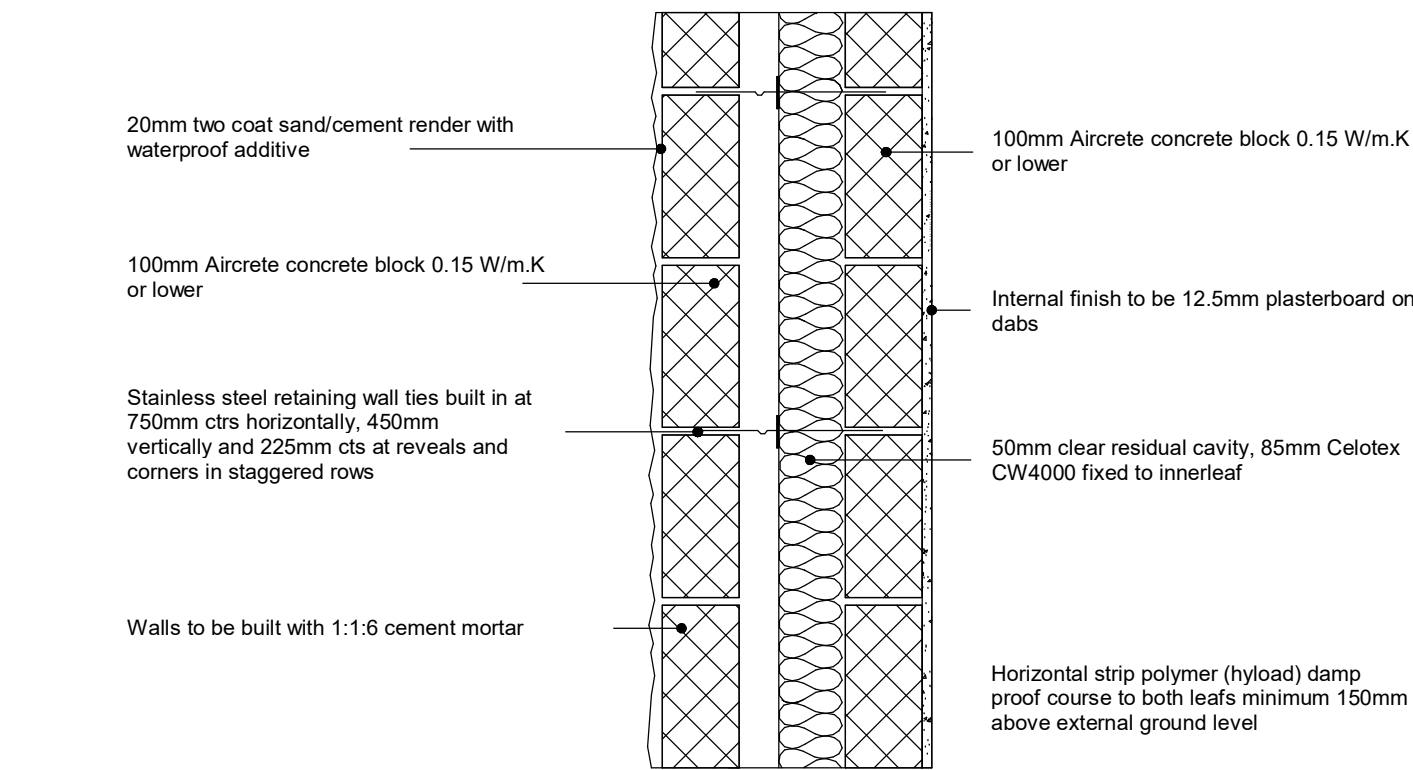
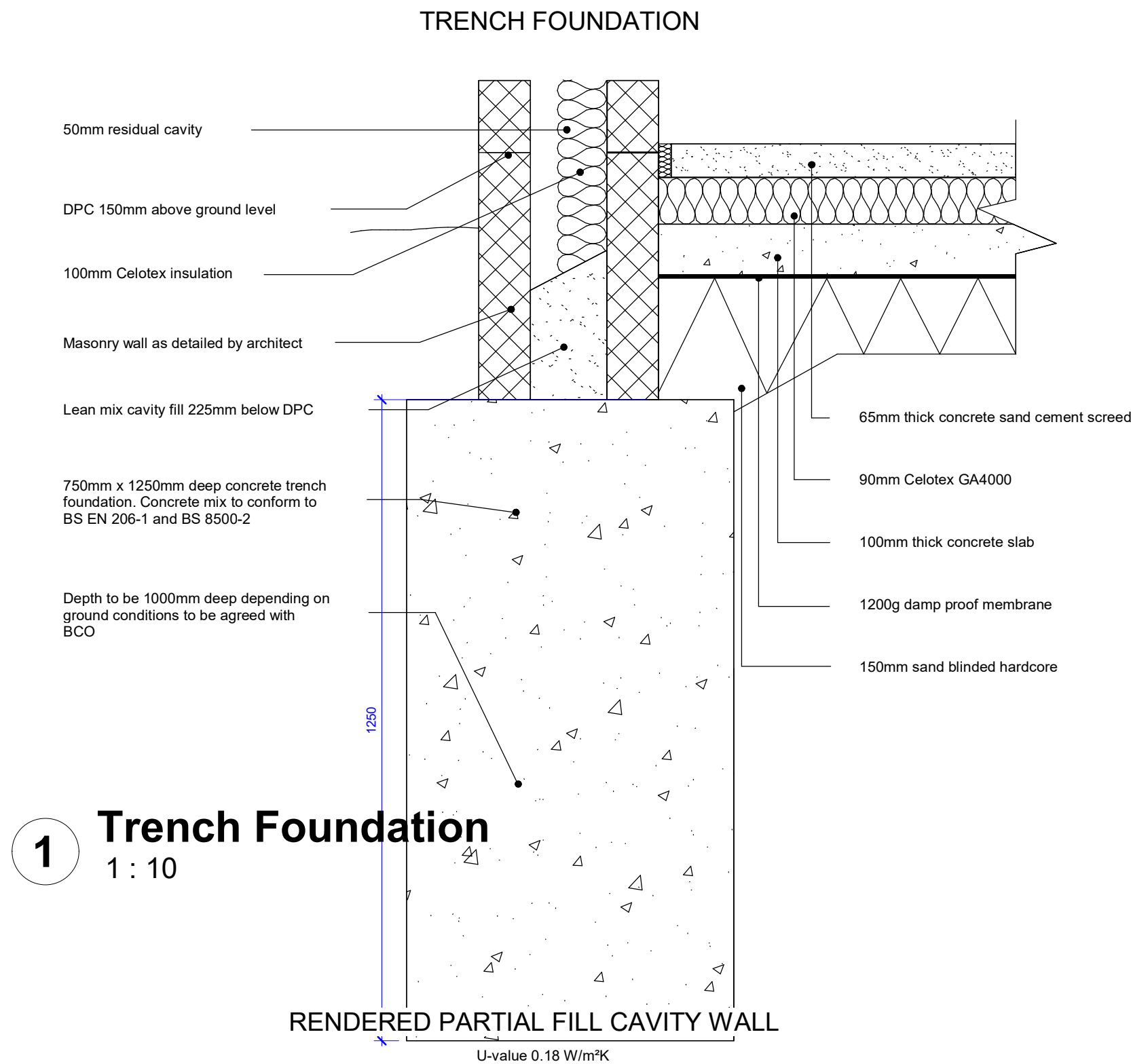
H5. SMOKE DETECTION

Main entrance door alarm detection system to BS EN 54-24 and BS 5838-2014, at least one Category 1 LEDVANCE smoke detector to be mains powered with battery back-up. Smoke alarm should be sited so that there is a smoke alarm in the circulation space on all levels/ floors of every habitable room. If mounted higher than 200mm and less than 2500mm the ceiling, the alarm should be visible. These kitchen areas are not separate from the primary circulation space by a door, therefore should be an interlinked heat detector in the kitchen.

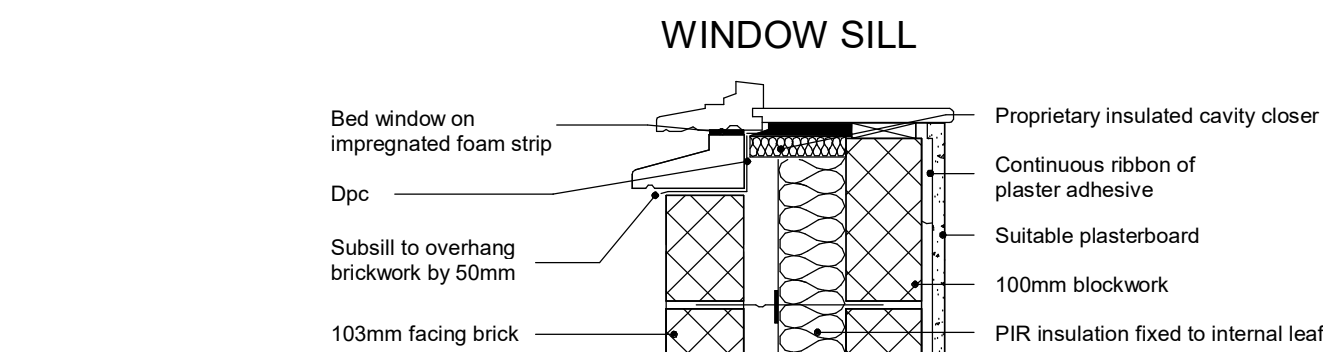
Any window or door opening to be designed with glazing 11.5 in Part F volume 1 (uninterrupted area).

O2. COORDINATION

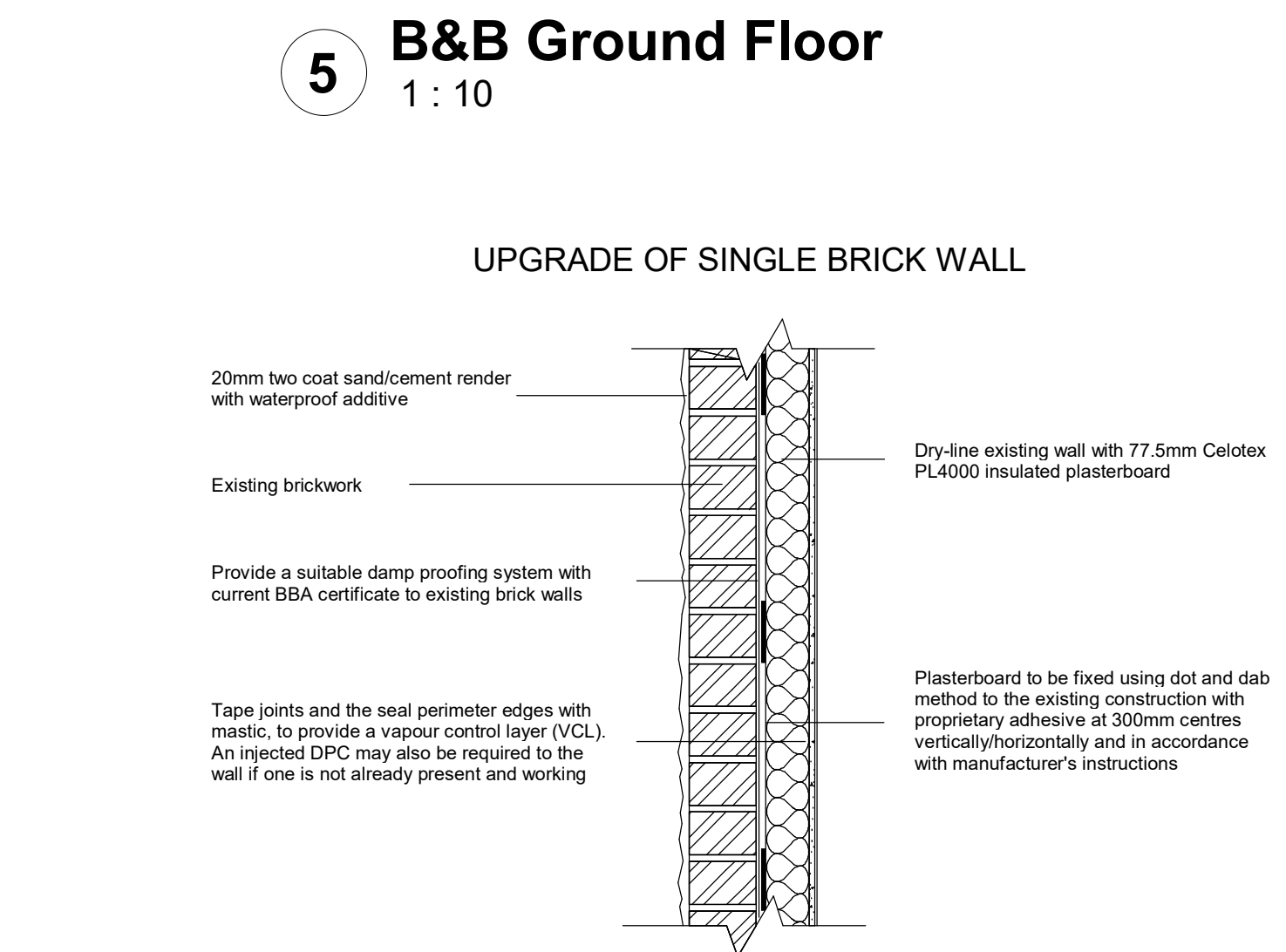
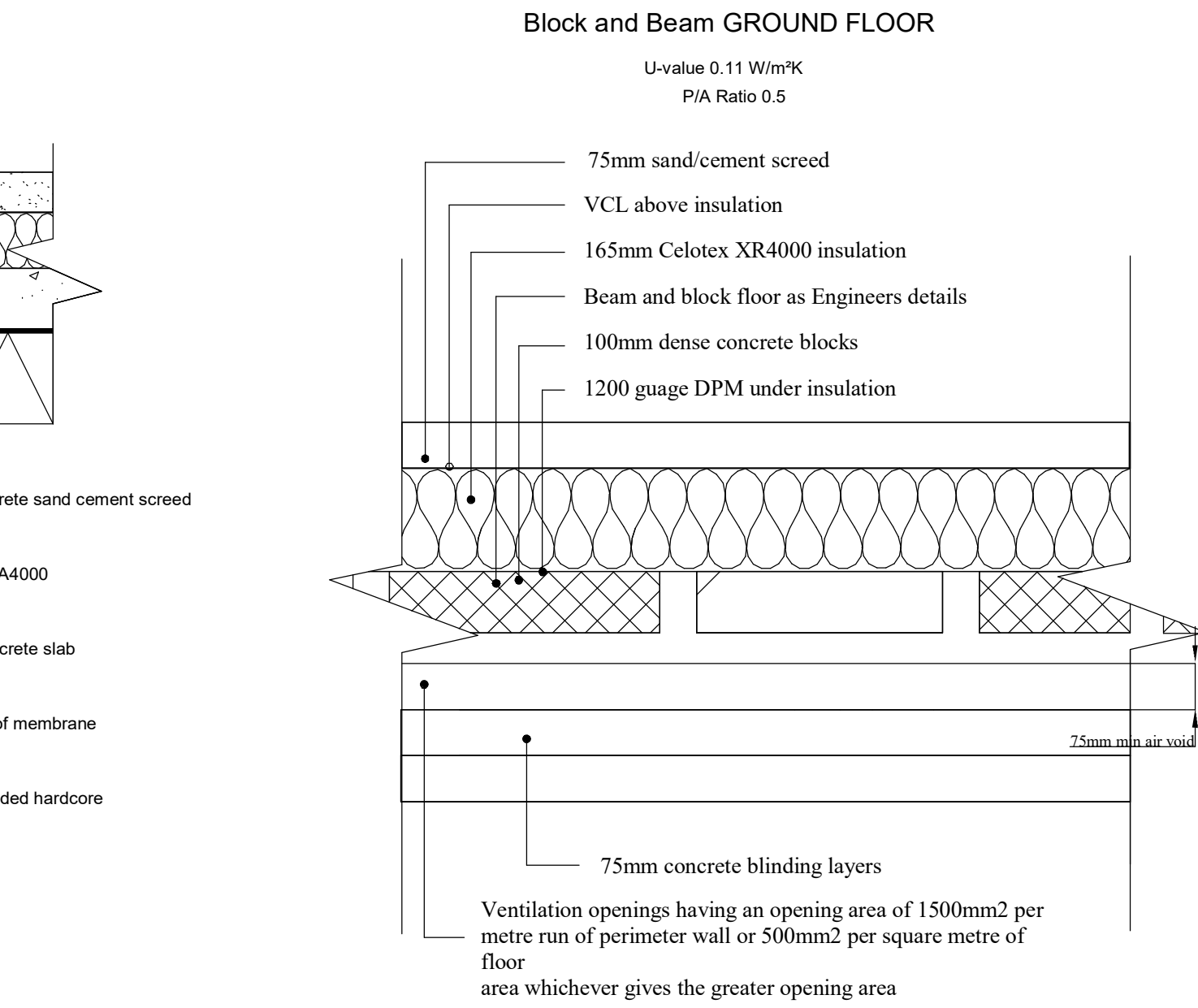
Wall to ceiling junction in building to be constructed and detailed so that their structural and thermal performance will not be adversely affected by intentional condensation, surface condensation or mould growth. Account to be taken of the building's form and orientation relative to prevailing winds. Materials with the highest vapour resistance should be located on the warm side of thermal barriers. UGLs to be provided where necessary to prevent moisture ingress. Refer to the relevant Approved Documents for further details and guidance of BRE [P1] [P1] and BS EN ISO 2013 1:418:2018 for practice of provision for condensation in buildings to be followed.



3 Window Head & Lintel
1 : 10



4 Window Sill
1 : 10



6 Garage Wall Upgrade
1 : 10

UPGRADED INTERNAL BLOCK WALL

Internal finish to be 12.5mm plasterboard on dabs

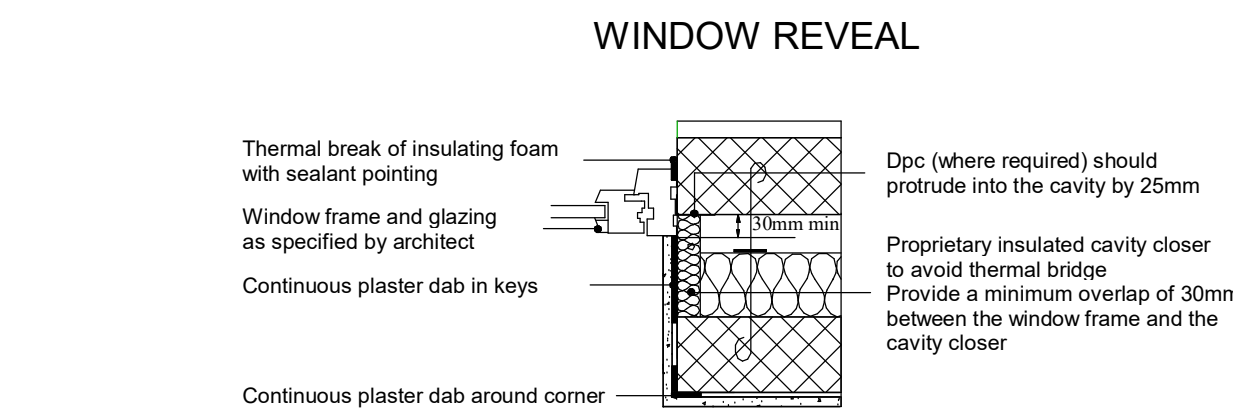
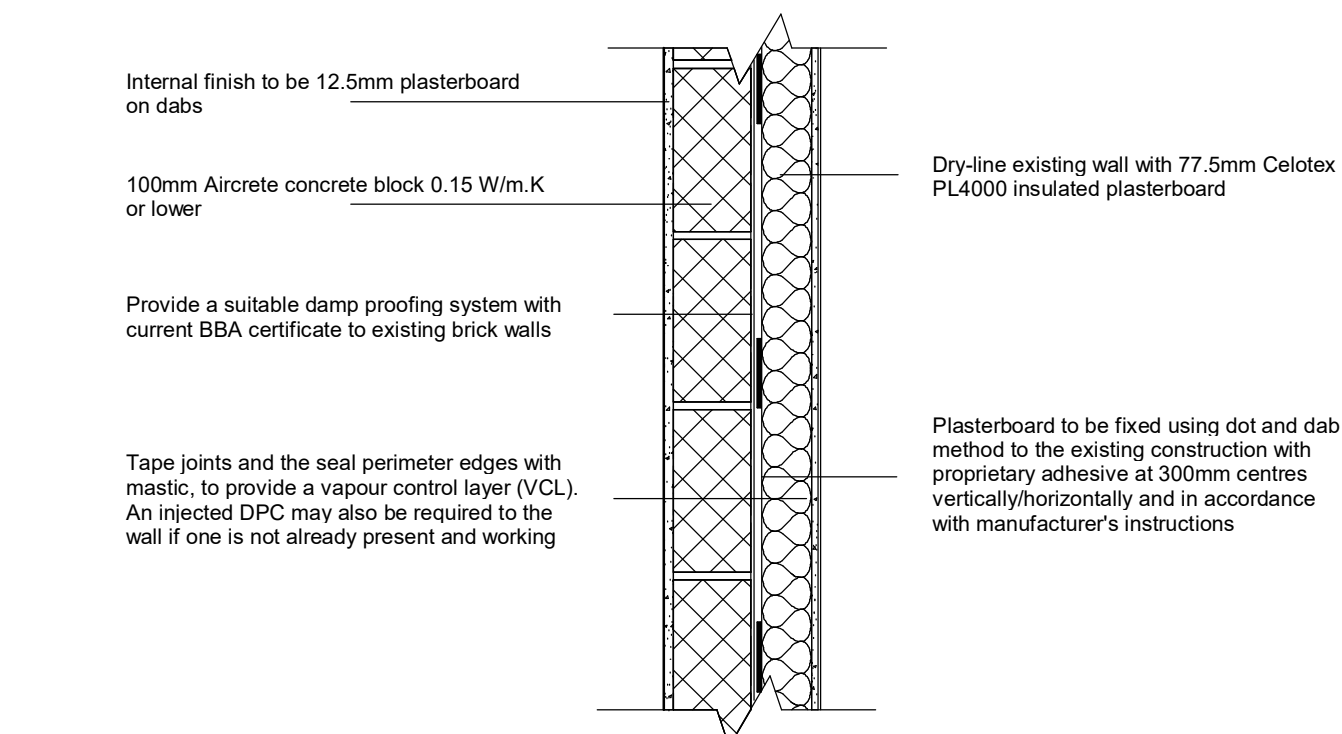
100mm Aircrete concrete block 0.15 W/m.K or lower

Provide a suitable damp proofing system with current BBA certificate to existing brick walls

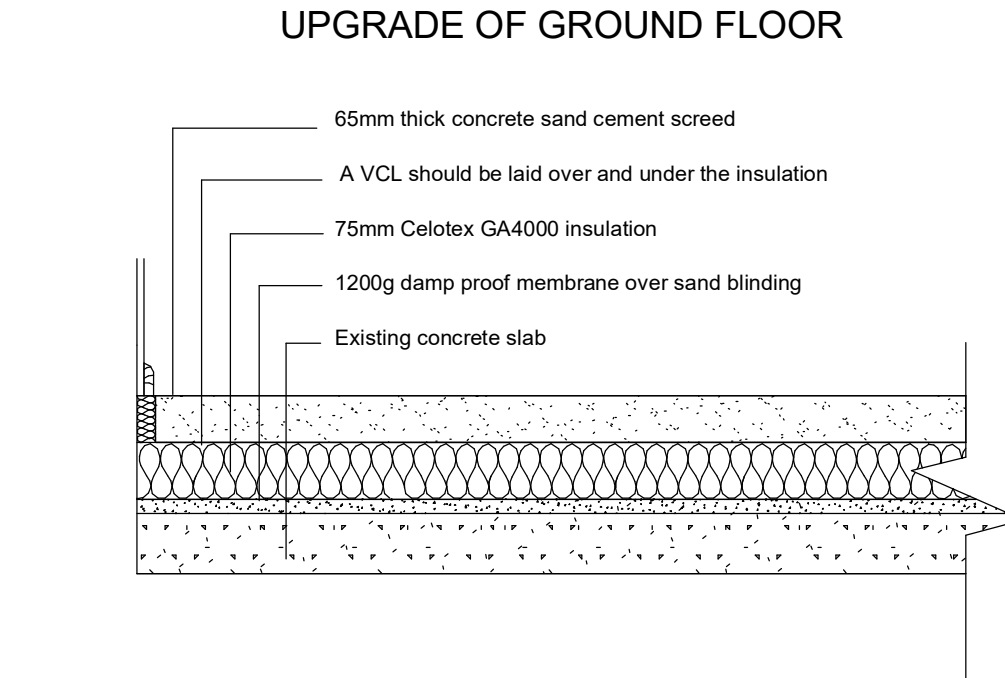
Tape joints and the seal perimeter edges with mastic, to provide a vapour control layer (VCL). An injected DPC may also be required to the wall if one is not already present and working

Dry-line existing wall with 77.5mm Celotex PL4000 insulated plasterboard

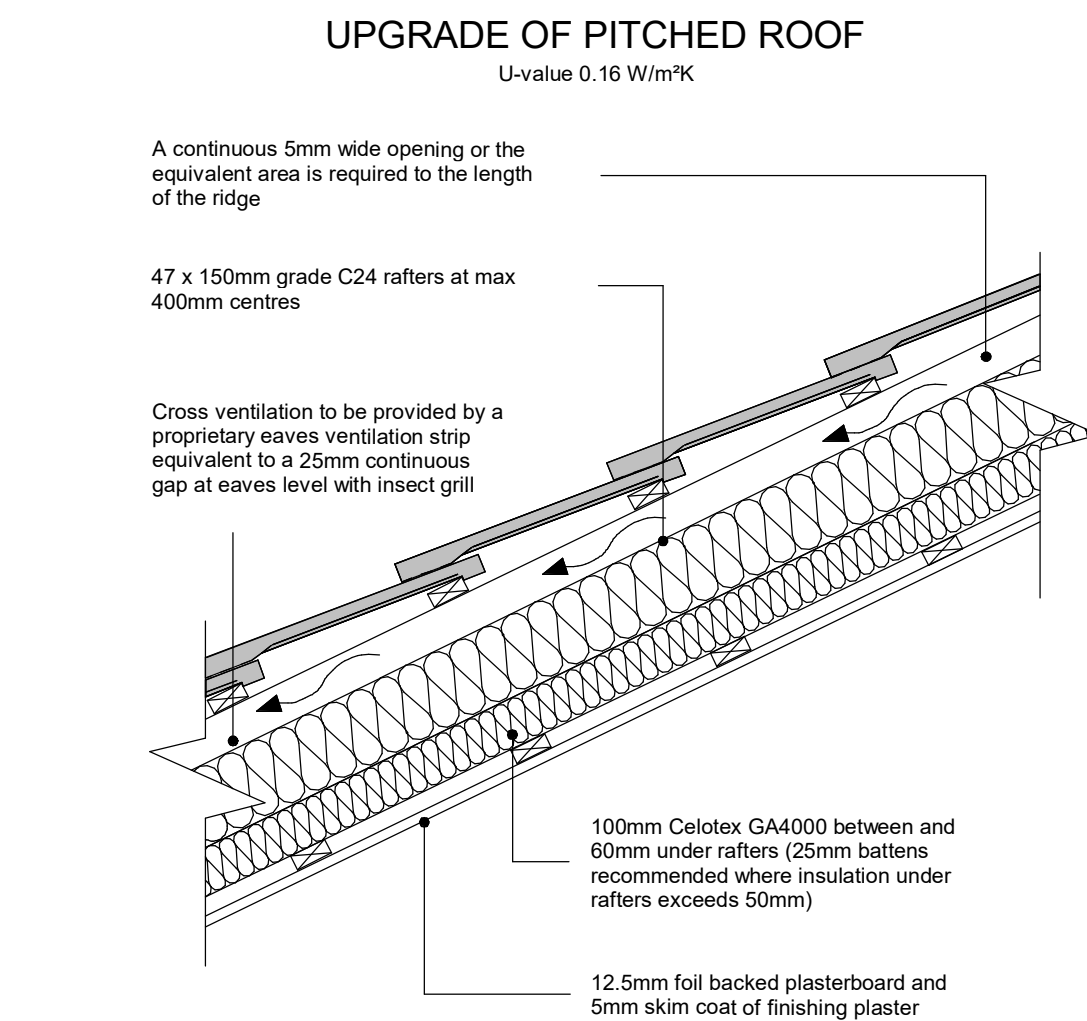
Plasterboard to be fixed using dot and dab method to the existing construction with proprietary adhesive at 300mm centres vertically/horizontally and in accordance with manufacturer's instructions



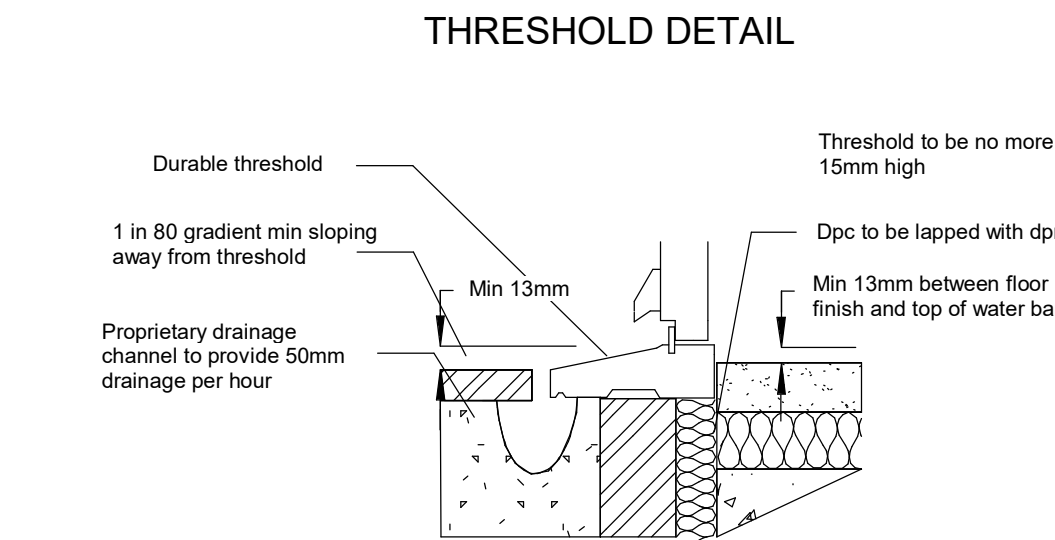
8 Window Reveal
1 : 10



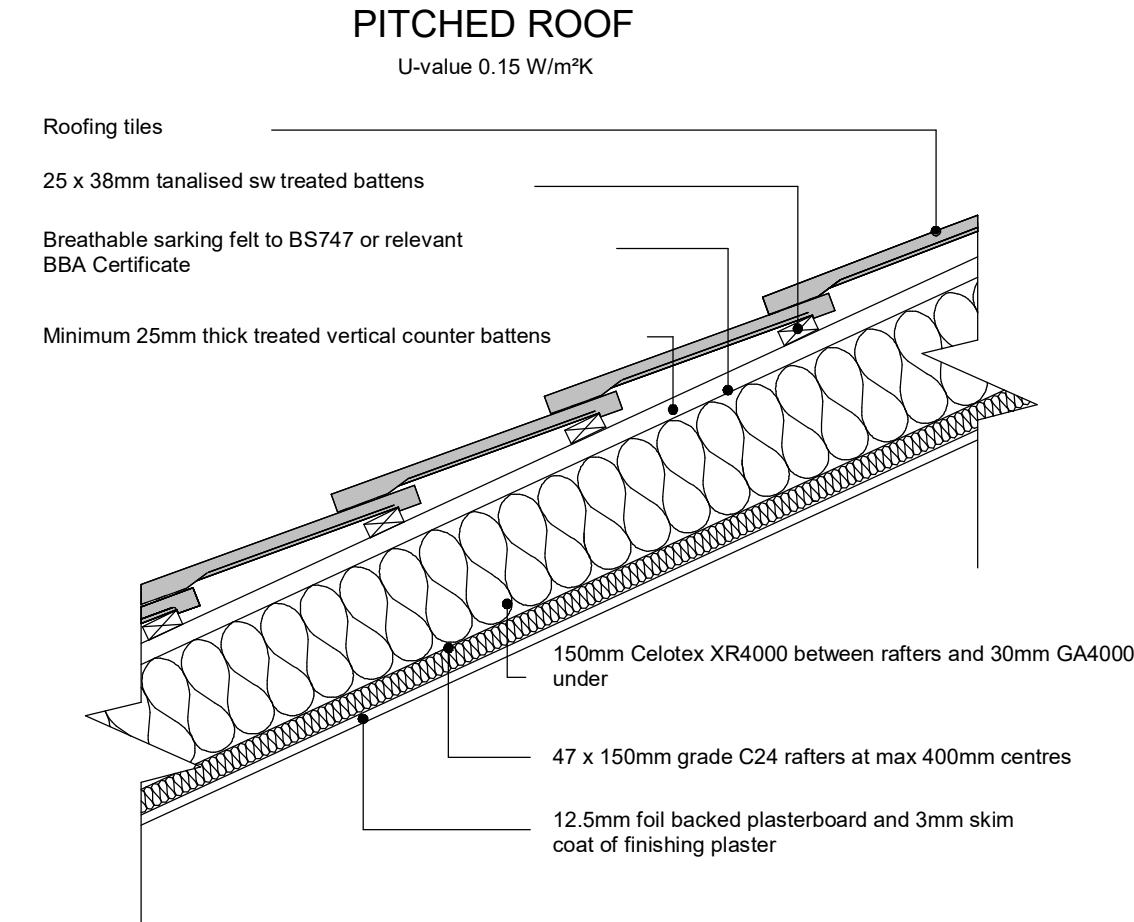
9 Garage Floor Upgrade
1 : 10



11 Garge Pitched Roof Upgrade
1 : 10

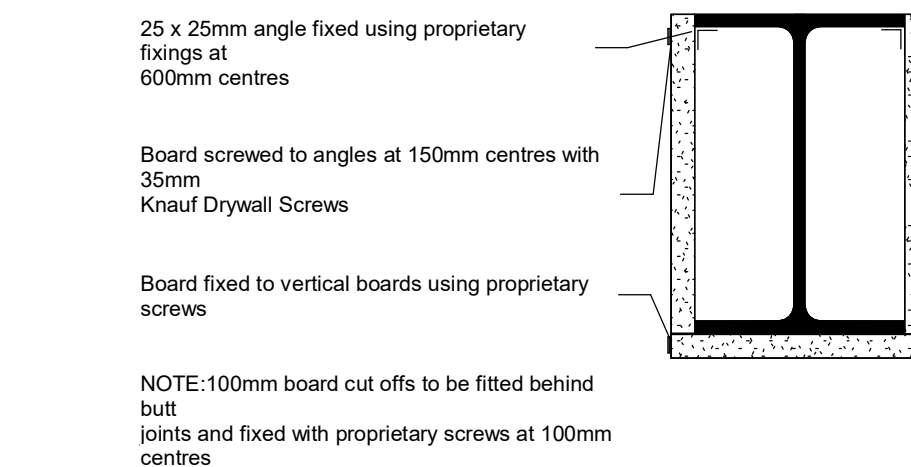


13 Threshold Detail
1 : 10



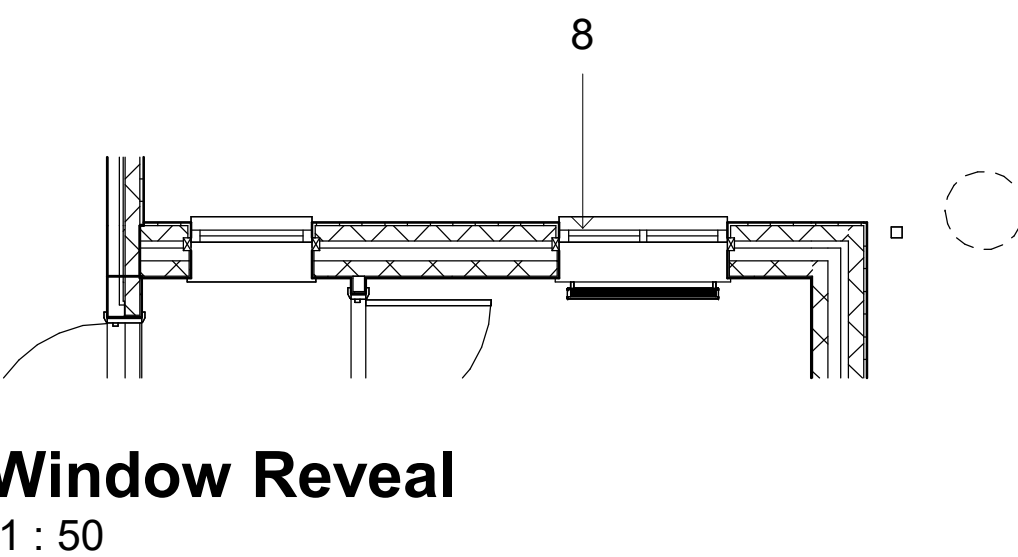
10 Pitched Roof
1 : 10

FIRE PROTECTION OF STEEL BEAM
(Knauf fire board - as section 6 :2012 of manufacturer's details)



12 Steel Fire Protection
1 : 10

SEE NUMBER SPECIFIED TO RELEVANT DETAILED DRAWING



ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE

ANY DISCREPANCIES ARE TO BE REPORTED TO CONTACT ARCHITECTURE BEFORE ANY WORK COMMENCES

THIS DRAWING SHALL NOT BE SCALED TO ASCERTAIN ANY DIMENSIONS WORK TO FIGURED DIMENSIONS ONLY

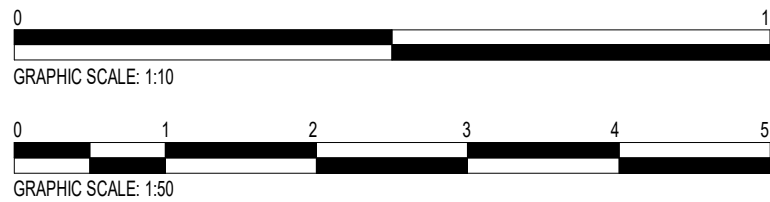
THIS DRAWING SHALL NOT BE REPRODUCED WITHOUT EXPRESS WRITTEN PERMISSION FROM CONTACT ARCHITECTURE LTD.

READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS, SPECIFICATIONS, CONSULTANTS, SPECIALISTS, SUBCONTRACTORS DRAWINGS/ SPECIFICATIONS.

THESE DRAWINGS ARE FOR PLANNING AND BUILDING CONTROL PURPOSES ONLY.

PARTY WALL ACT 1996.
The Owner, should they need to do so under the requirements of the Party Wall Act 1996 has a duty to serve a party wall notice on any adjoining owner if the building works involves works on or to an existing Party Wall including:
- Support beams
- Insertion of DPC through wall
- Raising of wall or cutting of projections
- Demolition and rebuilding
- Underpinning
- Insertion of lead flashing
- Excavation within 3M of an existing structure where the new foundations will go deeper than the adjoining foundations or within 6M of an existing structure where the new foundations are within a 45 degree line of adjoining foundations.

A PARTY WALL AGREEMENT IS TO BE IN PLACE BEFORE ANY WORKS START ON SITE , IF REQUIRED.



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DRAWN BY Dan Cash

SCALE (@ A1) As indicated

DRAWING NUMBER:
A107 Detailed Drawings

CHECKED BY Dan Jervis

DATE:
24/01/2023
11:35:34

REV:
1

PLANNING NOTE

SINGLE-STORY EXTENSION

An extension or addition to your house is considered to be permitted development, not requiring an application for planning permission, provided certain limits and conditions are met.

1. On designated land* - no cladding of the exterior. *Designated land (Article 2(3)) includes national parks and the Broads, Areas of Outstanding Natural Beauty, conservation areas and World Heritage Sites.
2. On designated land* - no side extensions. Rear extension - No permitted development for rear extensions of more than one storey. The regime for larger single-storey rear extensions (see point 9) does NOT apply to houses on designated land.

3. No more than half the area of land around the "original house" would be covered by additions or other buildings. Sheds and other outbuildings must be included when calculating the 50 per cent limit.
4. No extension forward of the principal elevation or side elevation fronting a highway.
5. Materials to be similar in appearance to the existing house.
6. Side extensions to be single storey. Width of side extension must not have a width greater than half the width of the original house.
7. Side extensions to have a maximum height of four metres and width no more than half that of the original house.
8. If the extension is within 2m of a boundary, maximum eaves height should be no higher than 3m to be permitted development.
9. Single-storey rear extensions must not extend beyond the rear wall of the original house by more than 4m if a detached house; or more than 3m for any other house. Where not on designated land (Article 2(3)) or a Site of Special Scientific Interest, this limit is increased to 8m if a detached house; or 6m for any other house.
10. Maximum height of a single-storey rear extension of 4m.

* Maximum eaves and ridge height of extension no higher than existing house.

TWO-STORY REAR EXTENSION

An extension or addition to your house is considered to be permitted development, not requiring an application for planning permission, provided certain limits and conditions are met.

1. On designated land extensions of more than one storey are not permitted development. * Designated land includes national parks and the Broads, Areas of Outstanding Natural Beauty, conservation areas and World Heritage Sites.
2. Extensions (including previous extensions) and other buildings must not exceed 50% of the total area of land around the original house. * Sheds and other outbuildings must be included when calculating the above 50% limit.
3. Maximum eaves and ridge height of extension no higher than existing house. If extension is within two metres of a boundary maximum eaves height should be no higher than three metres to be permitted development.
4. Extensions of more than one storey must not extend beyond the rear wall of original house by more than three metres or be within seven metres of any boundary opposite the rear wall of the house.
5. Roof pitch of extensions higher than one storey to match that of the existing house, as far as is practicable.
6. Materials used in exterior work to be similar in appearance to those of the exterior of the existing house.
7. Any upper-floor window in a wall or roof slope in a side elevation must be obscure-glazed and nonopening unless the parts which can be opened are more than 1.7 metres above the floor of the room in which it is installed.
8. No balconies or verandas are permitted development.

CDM REGULATIONS 2015

The client must abide by the Construction Design and Management Regulations 2015. The client must appoint a contractor, if more than one contractor is to be involved, the client will need to appoint (in writing) a principal designer (to plan, manage and coordinate the planning and design work) and a principal contractor (to plan, manage and coordinate the construction and ensure there are arrangements in place for managing and organising the project).

Domestic clients

The domestic client is to appoint a principal designer and a principal contractor when there is more than one contractor, if not your duties will automatically transferred to the contractor or principal contractor.

The designer can take on the duties, provided there is a written agreement between you and the designer to do so.

The Health and Safety Executive is to be notified as soon as possible before construction work starts if the works:

- (a) Last longer than 30 working days and has more than 20 workers working simultaneously at any point in the project.
- Or;
- (b) Exceeds 500 person days.

PARTY WALL ACT

The owner, should they need to do so under the requirements of the Party Wall Act 1996, has a duty to serve a Party Structure Notice on any adjoining owner if building work on, to or near an existing Party Wall involves any of the following:

- Support of beam
 - Insertion of DPC through wall
 - Raising a wall or cutting off projections
 - Demolition and rebuilding
 - Underpinning
 - Insertion of lead flashings
 - Excavations within 3 metres of an existing structure where the new foundations will go deeper than adjoining foundations, or within 6 metres of an existing structure where the new foundations are within a 45 degree line of the adjoining foundations.
- A Party Wall Agreement is to be in place prior to start of works on site.

HEALTH AND SAFETY

The contractor is reminded of their liability to ensure due care, attention and consideration is given in regard to safe practice in compliance with the Health and Safety at Work Act 1974.

THERMAL BRIDGING

Care shall be taken to limit the occurrence of thermal bridging in the insulation layers caused by gaps within the thermal element, (i.e. around windows and door openings). Reasonable provision shall also be made to ensure the extension is constructed to minimise unwanted air leakage through the new building fabric.

MATERIALS AND WORKMANSHIP

All works are to be carried out in a workmanlike manner. All materials and workmanship must comply with Regulation 7 of the Building Regulations, all relevant British Standards, European Standards, Agreement Certificates, Product Certification of Schemes (Kite Marks) etc. Products conforming to a European technical standard or harmonised European product should have a CE marking.

DEMOLITION

Measures to be put in place during and after the demolition to ensure the protection of the public, public amenities and adjoining properties.

Such measures to include:

- The shoring of adjoining buildings.
- The control of dust and noise generation.
- The weatherproofing of any parts of adjoining buildings which are left exposed by the demolition.
- The repairing and making good any damage to any adjacent building effected by the demolition.
- The removal of material or rubbish resulting from the clearance and demolition of the site.
- The disconnection, sealing or removal of any drain or sewer, as required.
- The making good of any disturbed ground.
- Any arrangements necessary for the disconnection off all services (e.g. gas, water, electricity).

Consultation with the Health and Safety Executive, and Fire Authority should be sought if burning structures or materials on site. If the demolition is more than 50m3 in volume a formal notice of demolition is to be given to building control at least six weeks before any demolition work starts,

in accordance with The Building Act 1984: Sections 80-83. Consultation to be undertaken with the occupiers of adjacent buildings where applicable and a Party Wall agreement put in place. A planning application to demolish to be made where required. All demolition work to comply with the construction (Design and Management) Regulations 1994 nd a Health and Safety plan is to be provided by the principal contractor.

SITE PREPARATION

Ground to be prepared for new works by removing all unsuitable material, vegetable matter and tree or shrub roots to a suitable depth to prevent future growth. Seal up, cap off, disconnect and remove existing redundant services as necessary. Reasonable precautions must also be taken to avoid danger to health and safety caused by contaminants and ground gases e.g. landfill gases, radon, vapours etc. on or in the ground covered, or to be covered by the building.

EXISTING STRUCTURE

Existing structure including foundations, beams, walls and lintels carrying new and altered loads are to be exposed and checked for adequacy prior to commencement of work and as required by the Building Control Officer.

BEAMS

Supply and install new structural elements such as new beams, roof structure, floor structure, bearings, and padstones in accordance with the Structural Engineer's calculations and details. New steel beams to be encased in 12.5mm Gyproc FireLine board with staggered joints. Gyproc FireCase or painted in Nullifire S or similar intumescent paint to provide 1/2 hour fire resistance as agreed with Building Control. All fire protection to be installed as detailed by specialist manufacturer.

LINTELS

- For uniformly distributed loads and standard 2 storey domestic loadings only Lintel widths are to be equal to wall thickness. All lintels over 750mm sized internal door openings to be 65mm deep pre-stressed concrete plank lintels. 150mm deep lintels are to be used for 900mm sized internal door openings. Lintels to have a minimum bearing of 150mm on each end. Any existing lintels carrying additional loads are to be exposed for inspection at commencement of work on site. All pre-stressed concrete lintels to be designed and manufactured in accordance with BS EN 1992-1-1, with a concrete strength of 50 or 40 N/mm² and incorporating steel strands to BS 5896 to support loadings assessed to BS 5877 Part 1.

For other structural openings provide proprietary insulated steel lintels suitable for spans and loadings in compliance with Approved Document A and lintel manufacturer's standard tables. Stop ends, DPC trays and weep holes to be provided above all externally located lintels.

Independent lintels to have an insulated cavity closure between the inner and outer lintel. Common leaf lintels base plates should not be continuous and the lintel core to be insulated.

STRAPPING FOR PITCHED ROOF

Gable walls should be strapped to roofs at 2m centres. All external walls running parallel to roof rafters to be restrained at roof level using 1000mm x 30mm x 5mm galvanised mild steel horizontal straps or other approved to BSEN 845-1 built into walls at max 2000mm centres and to be taken across minimum 3 rafters and screw fixed. Provide solid noggins between rafters at strap positions. All wall plates to be 100 x 50mm fixed to inner skin of cavity wall using 30mm x 5mm x 1000mm galvanised metal straps or other approved to BSEN 845-1 at maximum 2m centres.

STRAPPING OF FLOORS

Provide lateral restraint where joists run parallel to walls, floors are to be strapped to walls with 1000mm x 30mm x 5mm galvanised mild steel straps or other approved in compliance with BS EN 845-1 at max 2.0m centres, straps to be taken across minimum of 3 joists. Straps to be built into walls. Provide 38mm wide x ¼ depth solid noggins between joists at strap positions.

OPENINGS AND RETURNS

An opening or recess greater than 0.1m² shall be at least 550mm from the supported wall (measured internally).

TRENCH FOUNDATION

Provide 750mm x 1250mm deep trench fill foundations, concrete mix to conform to BS EN 206 and BS 8500-2. All foundations to be a minimum of 1000mm below ground level, exact depth to be agreed on site with Building Control Officer to suit site conditions. All constructed in accordance with 2010 Building Regulations A1/2 and BS 8004 Code of Practice for Foundations. Ensure foundations are constructed below invert level of any adjacent drains. Base of foundations supporting internal walls to be min 600mm below ground level. Sulphate resistant cement to be used if required. Please note that should any adverse soil conditions or difference in soil type be found or any major tree roots in excavations, the Building Control Officer is to be contacted and the advice of a structural engineer should be sought.

8. SUSPENDED BLOCK AND BEAM FLOOR

To meet min U value required of 0.11 W/m²K Remove top soil and vegetation, apply weed killer – provide 50mm concrete ground cover if required by BCO. The underside of beams not less than 150mm above the top of the ground. PCC beams to be supplied and fixed to beam manufacturer's plan, layout and details (details and calculations to be sent to Building Control and approved before works commence). Minimum bearing 100mm onto DPC and load bearing walls. Provide concrete blocks to BS EN 772-2, wet and grout all joints with 1:4 cement/sand mix. Provide double beams below non-load bearing partitions. Lay 1200g DPM/radon barrier, with 300mm laps double wetted and taped at joints and service entry points using radon gas proof tape, over beam and block floor. Lay floor insulation over DPM, 165mm Celotex XR4000 applied as a rigid material. 25mm insulation to continue around floor perimeters to avoid thermal bridging. Lay 500g separating layer over insulation and provide 75mm sand/cement screed over and prepare for floor finishes as required. The top surface of the ground cover under the building shall be above the finished level of the adjoining ground. Ventilation - Provide cross-ventilation of the under floor to outside air by ventilators in at least 2 opposite external walls of the building. Ventilation openings having an opening area of 1500mm² per metre run of perimeter wall or 500mm² per square metre of floor area, whichever is the greater. Sleeper walls shall be of honeycombed construction or have provision for distribution of ventilation.

UPGRADING EXISTING SOLID FLOOR

To meet min U value required of 0.25 W/m²K The existing solid floor slab must be checked for stability and be free from defects as required by Building Control. The existing floor will need upgrading to ensure adequate damp protection and to prevent heat loss. Provide 1200 gauge polythene DPM or 3 coats RIW over existing concrete slab (if required). DPM to be lapped in with DPC in walls. Floor to be insulated over slab and DPM with min 75mm thick Celotex GA4000, 25mm Celotex insulation to continue around floor perimeters to avoid thermal bridging.

A VCL should be laid over the insulation boards and turned up 100mm at room perimeters behind the skirting, all joints to be lapped 150mm and sealed. Finish with 65mm sand/cement finishing screed with light mesh reinforcement. Care should be taken to ensure any existing airbricks for the main house are not obstructed by this work. If so, they should be extended through the new floor to external air. Where drain runs pass under floor provide A142 mesh 1.0m wide and min 50mm concrete cover over length of drain. A lesser provision may be appropriate where meeting such a standard would create significant problems in relation to adjoining floor level.

WALLS BELOW GROUND

All new walls below ground to be constructed using blockwork compliant with BS EN 771 and suitable for below ground level or semi engineering brickwork. Walls to be built using 1:4 masonry mortar mix or equal approved specification to BS EN 1996-1-1. Cavities below ground level to be filled with lean mix concrete min 225mm below damp proof course. Or provide lean mix backfill at base of cavity wall (150mm below damp course) laid to fall to weepholes.

PARTIAL FILL CAVITY WALL

To achieve minimum U Value of 0.18 W/m²K 20mm two coat sand/cement render to comply to BS EN 13914-1 with waterproof additive on 100mm lightweight block, 0.15 W/m²K, e.g. Celcon Solar, Thermalte Turbo. Ensure a 50mm clear residual cavity and provide 85mm Celotex CW4000 fixed to inner leaf constructed using 100mm block, 0.15 W/m²K, e.g. Celcon Solar, Thermalte Turbo. Internal finish to be 12.5mm plasterboard on dabs. Walls to be built with 1:1:6 cement mortar.

DPC

Provide horizontal strip polymer (hyload) damp proof course to both internal and external skins minimum 150mm above external ground level. New DPC to be made continuous with existing DPC's and with floor DPM. Vertical DPC to be installed at all reveals where cavity is closed.

WALL TIES

All walls constructed using stainless steel vertical twist type retaining wall ties built in at 750mm ctrs horizontally, 450mm vertically and 225mm ctrs at reveals and corners in staggered rows. Wall ties to be suitable for cavity width and in accordance with BS EN 845

CAVITIES

Provide cavity trays over openings. All cavities to be closed at eaves and around openings using Thermabate or similar non combustible insulated cavity closers. Provide vertical DPCs around openings and abutments. All cavity trays must have 150mm upstands and suitable cavity weep holes (min 2) at max 900mm centres.

EXISTING TO NEW WALL

Cavities in new wall to be made continuous with existing where possible to ensure continuous weather break. If a continuous cavity cannot be achieved, where new walls abuts the existing walls provide a movement joint with vertical DPC. All tied into existing construction with suitable proprietary stainless steel profiles.

CAVITY BARRIERS

30 minute fire resistant cavity barriers to be provided at at tops of walls, gable end walls and vertically at junctions with separating walls & horizontally at separating walls with cavity tray over installed according to manufacturer's details.

MOVEMENT JOINTS

Movement joints to be provided at the following maximum spacing: Clay brickwork - 12m. Calcium silicate brick - 7.5-9m. Lightweight concrete block - density not exceeding 1,500kg/m³ - 6m. Dense concrete block - density exceeding 1,500kg/m³ – 7.5-9m. Any masonry in a parapet wall (length to height ratio greater than 3:1) - half the above spacings and 1.5m from corners. Movement joint widths for clay bricks to be not less than 1.3mm/m i.e. 12m = 16mm and for other masonry not less than 10mm. Additional movement joints may be required where the aspect ratio of the wall (length :height) is more than 3:1. Considerations to be given to BS EN 1996-1-2:2005 Eurocode 6. Design of masonry structure.

GARAGE BLOCK WORK INFILL

To achieve minimum U Value of 0.18 W/m²K 20mm two coat sand/cement render to comply to BS EN 13914-1 with waterproof additive on 100mm lightweight block, 0.15 W/m²K, e.g. Celcon Solar, Thermalte Turbo. Two layers of 12.5mm plasterboard fixed to block work. 77.5mm Celotex PL4000 insulated plasterboard between 25mm x 50mm battens at 600mm centres to give a nominal 250mm cavity between the masonry and insulation (50mm cavity to be provided if required by building control). Fix a vapour control layer on the warm side of the insulation. An injected DPC may also be required to the wall if one is not already present and working. Internal finish to be 12.5mm plasterboard on dabs. Walls to be built with 1:1:6 cement mortar.

UPGRADE OF EXISTING SINGLE SKIN WALL

Existing garage wall to be exposed and checked for its suitability. Provide a suitable damp proofing system with current BBA certificate to existing brick walls and floor (manufacturer's details to be given to building control). Dry-line existing wall with 77.5mm Celotex PL4000 insulated plasterboard.

Plasterboard to be fixed mechanically to 25 x 50mm treated timber battens fixed to the existing construction under a vapour control layer. An injected DPC may also be required to the wall if one is not already present and working. All work in accordance with BS 8212 (Code of practice for dry lining). A lesser provision of insulation may be appropriate where meeting such a standard would result in a reduction of more than 5% in the internal floor area of the room.

INTERNAL STUD PARTITIONS

100mm x 50mm softwood treated timbers studs at 400mm ctrs with 50 x 100mm head and sole plates and solid intermediate horizontal noggins at 1/3 height or 450mm. Provide min 10kg/m² density acoustic soundproof cut tightly packed (eg. 100mm Rockwool or Iso wool mineral fibre sound insulation) in all voids the full depth of the stud. Partitions built off doubled up joists where partitions run parallel or provide noggins where at right angles, or built off DPC on thickened concrete slab if solid ground floor. Walls faced throughout with 12.5mm plaster board with skim plaster finish. Taped and jointed complete with beads and stops.

INTERNAL MASONRY PARTITIONS

Construct non load bearing internal masonry partitions using dense concrete blocks built off thickened floor slab and tied at 225mm centres with proprietary steel profiles or block bonded to all internal and external walls. Walls faced throughout with 12.5mm plasterboard on dabs with skim plaster finish or 13mm lightweight plaster.

INTERNAL UPGRADED MASONRY PARTITIONS

Construct non load bearing internal masonry partitions using dense concrete tied at 225mm centres with proprietary steel profiles or block bonded to all internal and external walls. Half side wall faced with 12.5mm plasterboard on dabs with skim plaster finish or 13mm lightweight plaster. Garage side wall to have two layers of 12.5mm plasterboard fixed, 77.5mm Celotex PL4000 insulated plasterboard between 25mm x 50mm battens at 600mm centres to give a nominal 25mm cavity between the masonry and insulation (50mm cavity to be provided if required by building control). Fix a vapour control layer on the warm side of the insulation. An injected DPC may also be required to the wall if one is not already present and working. Fininsh with 12.5mm plaster board dot and dabbed with plaster skim finish.

NEW AND REPLACEMENT DOORS

New and replacement doors to achieve a U-Value of 1.80W/m²K. Glazed areas to be double glazed with 16mm argon gap and soft low-E glass. Glass to be toughened or laminated safety glass to BS 6206, BS EN 14179 or BS EN ISO 12543-1 and Part K (Part N in Wales) of the current Building Regulations.

NEW AND REPLACEMENT WINDOWS

New and replacement windows to be timber famed double glazed with 16mm argon gap and soft coat low-E glass. Window Energy Rating to be Band C or better and to achieve U-value of 1.6 W/m²K. The door and window openings should be limited to 25% of the extension floor area plus the area of any existing openings covered by the extension.

SAFETY GLAZING

All glazing in critical locations to be toughened or laminated safety glass to BS 6206, BS EN 14179 or BS EN ISO 12543-1 and Part K (Part N in Wales) of the current Building Regulations, i.e. within 1500mm above floor level in doors and side panels within 300mm of door opening and within 800mm above floor level in windows.

UNVENTED PITCHED ROOF

Pitch 22-45°

To achieve U-value 0.15 W/m²K Timber roof structures to be designed by an Engineer in accordance with NHBC Technical Requirement R5 Structural Design. Calculations to be based on BS EN 1995-1-1. Roofing tiles to match existing on 25 x 38mm tanalised sw treated battens on minimum 25mm thick treated vertical counter battens with a proprietary eaves carrier system on breathable sarking felt to relevant BBA Certificate. Supported on 47 x 195mm grade C24 rafters at max 400mm centres span to engineer's details. Rafters supported on 100 x 50mm sw wall plates. Insulation to be 150mm Celotex GA4000 between rafters and 25mm TB4000 under. Fix 12.5mm foil backed plasterboard (joints staggered) to the underside of all ceilings using galvanized plasterboard nails. Finish with 5mm skim coat of finishing plaster. Restraint strapping - Ceiling joists tied to rafters (if raised collar roof consult structural engineer). 100mm x 50mm wall plate strapped down to walls. Ceiling joists and rafters to be strapped to walls and gable walls, straps built into cavity, across at least 3 timbers with noggins. All straps to be 1000 x 30 x 5mm galvanized straps or other approved to BSEN 845-1 at 2m centres. THIS IS A GENERAL GUIDE BASED ON NORMAL LOADING CONDITIONS FOUND IN DOMESTIC CONSTRUCTION. IT IS YOUR RESPONSIBILITY TO ASSESS YOUR DESIGN TO ASCERTAIN WHETHER ENGINEER'S DETAILS/CALCULATIONS ARE REQUIRED. PLEASE REFER TO THE TRADA DOCUMENT – 'SPAN TABLES FOR SOLID TIMBER MEMBERS IN FLOORS, CEILINGS AND ROOFS FOR DWELLINGS' OR ASK YOUR BUILDING CONTROL OFFICER FOR ADVICE.

UPGRADE OF PITCHED ROOF

(Imposed load max 0.75 kN/m² - dead load max 0.75 kN/m²) Vented roof – pitch 22-45° To achieve U-value 0.16 W/m²K Existing roof structure to be assessed by a structural engineer and any alterations to be carried out in strict accordance with structural engineer's details and calculations which must be approved by building control before works commence on site. The existing roof condition must be checked and be free from defects as required by the Building Control Officer any defective coverings or felt to be replaced in accordance with manufacturer's details. Roof construction - 47 x 150mm Grade C24 rafters at max 400mm centres max span 3.47m. Insulation to be 100mm Celotex GA4000 between rafters and 60mm under rafters. Fix 12.5mm foil backed plasterboard (joints staggered) and 5mm skim coat of finishing plaster to the underside of all ceilings using galvanized plasterboard nails. Provide a cavity of 25mm by fixing battens between plasterboard and under rafter insulation (recommended where insulation under rafters exceeds 50mm). Maintain a 50mm air gap above insulation to ventilate roof. Provide opening at eaves level at least equal to continuous strip 25mm wide and opening at ridge equal to continuous strip 5mm wide to promote ventilation or provide equivalent high and low level tile vents in accordance with manufacturer's details. THIS IS A GENERAL GUIDE BASED ON NORMAL LOADING CONDITIONS FOUND IN DOMESTIC CONSTRUCTION. IT IS YOUR RESPONSIBILITY TO ASSESS YOUR DESIGN TO ASCERTAIN WHETHER ENGINEER'S DETAILS/CALCULATIONS ARE REQUIRED. PLEASE REFER TO THE TRADA DOCUMENT – 'SPAN TABLES FOR SOLID TIMBER MEMBERS IN FLOORS, CEILINGS AND ROOFS FOR DWELLINGS' OR ASK YOUR BUILDING CONTROL OFFICER FOR

LEAD WORK AND FLASHINGS

All lead flashings, any valleys or soakers to be Code 5 lead and laid according to Lead Development Association. Flashings to be provided to all jams and below window openings with welded upstands. Joints to be lapped min 150mm and lead to be dressed 200mm under tiles, etc. All work to be undertaken in accordance with the Lead Development Association recommendations.

INTERMEDIATE FLOORS

Intermediate floor to be 25mm t&g flooring grade chipboard or floorboards laid on C24 joists at 400mm ctrs (see engineer's calculation for sizes and details). Lay 100mm Rockwool mineral fibre quilt insulation min 10kg/m² or equivalent between floor joists. Ceiling to be 12.5 FireLine plasterboard with skim plaster set and finish. Joist spans over 2.5m to be strengthened mid span using 38 x 38mm herringbone brussling or 38mm solid strutting (at least 2/3 of joist depth). In areas such as kitchens, utility rooms and bathrooms, flooring to be moisture resistant grade in accordance with BS EN 312. Identification marking must be laid upper most to allow easy identification. Provide lateral restraint where joists run parallel to walls, floors are to be strapped to walls with 1000mm x 30mm x 5mm galvanised mild steel straps or other approved in compliance with BS EN 845-1 at max 2.0m centres, straps to be taken across minimum 3 no. joists. Straps to be built into walls. Provide 38mm wide x ¼ depth solid noggins between joists at strap positions.

PITCHED ROOF VENTILATION

Maintain a 50mm air gap above insulation in the roof pitch to ventilate roof. Provide opening at eaves level at least equal to continuous strip 25mm wide and opening at ridge equal to continuous strip 5mm wide to promote ventilation.

BACKGROUND AND PURGE VENTILATION

Background ventilation - Controllable background ventilation via trickle vents in compliance with Approved Document F within the window frame to be provided to new habitable rooms at a rate of min 5000mm², and to kitchens, bathrooms, WCs and utility rooms at a rate of 2500mm² Purge ventilation - New Windows/rooflights to have operable area in excess of 1/20th of their floor area, if the window opens more than 30° or 1/10th of their floor area if the window opens less than 30° Internal doors should be provided with a 10mm gap below the door to aid air circulation. Ventilation provision in accordance with the Domestic Ventilation Compliance Guide.

EXTRACT TO KITCHEN

Kitchen to have mechanical ventilation with an extract rating of 60l/sec or 30l/sec if adjacent to hob to external air, sealed to prevent entry of moisture. Internal doors should be provided with a 10mm gap below the door to aid air circulation. Ventilation provision in accordance with the Domestic Ventilation Compliance Guide. Intermittent extract fans to BS EN 13141-4, Cooker hoods to BS EN 13141-3. All fixed mechanical ventilation systems, where they can be tested and adjusted, shall be commissioned and a commissioning notice given to the Building Control Body.

EXTRACT TO BATHROOM

Bathroom to have mechanical vent ducted to external air to provide min 15 litres / sec extraction. Vent to be connected to light switch and to have 15 minute over run if no window in room. Internal doors should be provided with a 10mm gap below the door to aid air circulation. Ventilation provision in accordance with the Domestic Ventilation Compliance Guide. Intermittent extract fans to BS EN 13141-4. All fixed mechanical ventilation systems, where they can be tested and adjusted, shall be commissioned and a commissioning notice given to the Building Control Body.

EXTRACT FOR SHOWER ROOM

Provide mechanical extract ventilation to shower room ducted to external air capable of extracting at a rate of not less than 15 litres per second. Vent to be connected to light switch and to have 15 minute over run if no window in the room. Internal doors should be provided with a 10mm gap below the door to aid air circulation. Ventilation provision in accordance with the Domestic Ventilation Compliance Guide. Intermittent extract fans to BS EN 13141-4. All fixed mechanical ventilation systems, where they can be tested and adjusted, shall be commissioned and a commissioning notice given to the Building Control Body.

RAINWATER DRAINAGE

New rainwater goods to be new 110mm UPVC half round gutters taken and connected into 68mm dia UPVC downpipes. Rainwater taken to new soakaway, situated a min distance of 5.0m away from any building, via 110mm dia UPVC pipes surrounded in 150mm granular fill. Soakaway to be min of 1 cubic metre capacity (or to depth to Local Authorities approval) with suitable granular fill and with geotextile surround to prevent migration of fines. If necessary carry out a porosity test to determine design and depth of soakaway.

UNDERGROUND FOUL DRAINAGE

Underground drainage to consist of 100mm diameter UPVC proprietary pipe work to give a 1:40 fall. Surround pipes in 100mm pea shingle. Provide 600mm suitable cover (900mm under drives). Shallow pipes to be covered with 100mm reinforced concrete slab over compressible material. Provide rodding access at all changes of direction and junctions. All below ground drainage to comply with BS EN 1401-1.

ABOVE GROUND DRAINAGE

All new above ground drainage and plumbing to comply with BS EN 12056-2 for sanitary pipework. All drainage to be in accordance with Part H of the Building Regulations. Wastes to have 75mm deep anti vac bottle traps and rodding eyes to be provided at changes of direction.

Size of wastes pipes and max length of branch connections (if max length is exceeded then anti vacuum traps to be used) Wash basin - 1.7m for 32mm pipe 3m for 40mm pipe Bath/shower - 3m for 40mm pipe 4m for 50mm pipe W/c - 6m for 100mm pipe for single WC

All branch pipes to connect to 110mm soil and vent pipe terminating min 900mm above any openings within 3m. Or to a 110mm upvc soil pipe with accessible internal air admittance valve complying with BS EN 12380, placed at a height so that the outlet is above the trap of the highest fitting. Waste pipes not to connect on to SVP within 200mm of the WC connection. Supply hot and cold water to all fittings as appropriate.

SOIL AND VENT PIPE

Svp to be extended up in 110mm dia UPVC and to terminate min 900mm above any openings within 3m. Provide a long radius bend at foot of SVP.

AUTOMATIC AIR VALVE

Ground floor fittings from WC to be connected to new 110mm UPVC soil pipe with accessible internal air admittance valve complying with BS EN 12380, placed at a height so that the outlet is above the trap of the highest fitting and connected to underground quality drainage encased with pea gravel to a depth of 150mm.

PIPEWORK THROUGH WALLS

Where new pipework passes through external walls the pipe work is to be provided with 'rocker pipes' at a distance of 150mm either side of the wall face. The 'rocker pipes' must have flexible joints and be a maximum length of 600mm.1. Alternatively provide 75mm deep pre-cast concrete plank lintels over drain to form opening in wall to give 50mm space all round pipe: mask opening both sides with rigid sheet material and compressible sealant to prevent entry of fill or vermin.

ELECTRICAL

All electrical work required to meet the requirements of Part P (electrical safety) must be designed, installed, inspected and tested by a competent person registered under a competent person self certification scheme such as BRE certification Ltd, BSI, NICEIC Certification Services or Zurich Ltd. An appropriate BS7671 Electrical Installation Certificate is to be issued for the work by a person competent to do so. A copy of a certificate will be given to Building Control on completion.

ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE

ANY DISCREPANCIES ARE TO BE REPORTED TO CONTACT ARCHITECTURE BEFORE ANY WORK COMMENCES

THIS DRAWING SHALL NOT BE SCALED TO ASCERTAIN ANY DIMENSIONS WORK TO FIGURED DIMENSIONS ONLY

THIS DRAWING SHALL NOT BE REPRODUCED WITHOUT EXPRESS WRITTEN PERMISSION FROM CONTACT ARCHITECTURE LTD.

READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS, SPECIFICATIONS, CONSULTANTS, SPECIALISTS, SUBCONTRACTORS DRAWINGS/ SPECIFICATIONS.

THESE DRAWINGS ARE FOR PLANNING AND BUILDING CONTROL PURPOSES ONLY.

PARTY WALL ACT 1996.
The Owner, should they need to do so under the requirements of the Party Wall Act 1996 has a duty to serve a party wall notice on any adjoining owner if the building works involves works on or to an existing Party Wall including:
- Support beams
- Insertion of DPC through wall
- Raising of wall or cutting of projections
- Demolition and rebuilding
- Underpinning
- Insertion of lead flashing
- Excavation within 3M of an existing structure where the new foundations will go deeper than the adjoining foundations or within 6M of an existing structure where the new foundations are within a 45 degree line of adjoining foundations.

A PARTY WALL AGREEMENT IS TO BE IN PLACE BEFORE ANY WORKS START ON SITE , IF REQUIRED.



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DRAWN BY

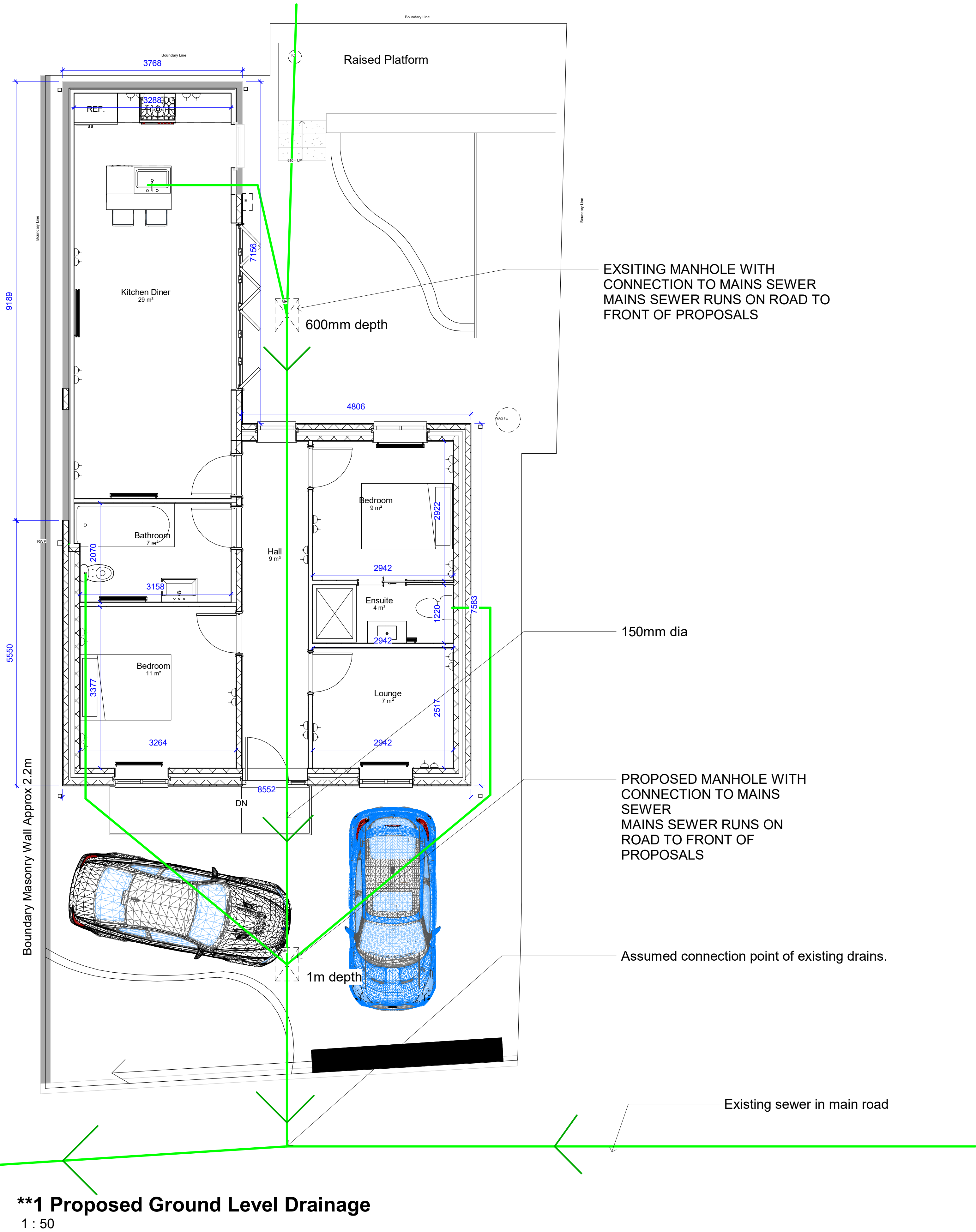
SCALE (@ A1) 1 : 50

DRAWING NUMBER:
A109 Drainage Plan

CHECKED BY

DATE:
24/01/2023
11:35:35

REV:
1



Site Plan Copy 1

Appendix B - Infiltration Testing

14th March 2024

Dear Louis Williamson,

Re: Infiltration Testing at Bank Cottage, Waterloo Place, Cefn Mawr, Wrexham, LL14 3AS.

Introduction

EnviroSolution attended the aforementioned site on the 8th of March 2024 to complete the following work:

- Excavation of 2 no. test locations, designated as TP1 and TP2
- 3 no. Infiltration Tests at each test location

The infiltration tests were commissioned to investigate the ground conditions in order to discharge Condition 8 of the relevant planning application.

This letter report presents the findings of this work.

Site Description

The site is irregular in shape, with the majority of the area occupied by a recently erected bungalow. The east-southeastern section of the site is still unfinished, and it will be converted into the parking area of the dwelling.

Boundaries of the site consist of low stone walls along the east and north sides, and brick walls along the west and south.

The topography of the site is flat and level, slightly elevated over the access road, lying at approximately 120m aOD.

Encountered Ground Conditions

The trial pits were excavated in the east-southeast section of the site, in an area that will be used as vehicular parking area.

TP1 recorded 0.9m of Made Ground overlying 0.4m of soft yellowish brown sandy clay with scattered coal fragments. The Made Ground comprised dark brown silty sandy loam with bricks, sandstone gravel to cobbles, concrete fragments, pottery fragments, coal and glass.

TP2 recorded 0.65m of Made Ground comprising dark grey to black loam with sandstone medium to coarse gravel, bricks, roof slate fragments, pottery fragments, glass and plastic waste.

Infiltration Tests

The test locations are shown on the enclosed plan. The falling head test methodology was used in accordance with BRE 365. The test locations were filled rapidly with water. Subsequent water level observations were made with a dip-meter lowered down into the water from the top of the hole. Testing was undertaken initially to prove the feasibility of the infiltration testing and to visually assess the permeability of the soils. Time increments from the feasibility testing were not recorded but the test pits showed a reduction in water level. Therefore, further testing was carried out.

During the testing, the total depth of the pits changed slightly between tests due to partial erosion of the walls while filling the holes with water.

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The infiltration test pit dimensions were as follows:

Infiltration Test ID	Dimensions (m)		
	Length	Width	Depth
TP1 – Test 1	1.20	0.40	1.3
TP1 – Test 2	1.25	0.40	1.16
TP1 – Test 3	1.25	0.40	1.10
TP2 – Test 1	1.30	0.40	0.65
TP2 – Test 2	1.30	0.40	0.56

Results

Three tests were completed in TP1. Test 2 in TP2 was visually still draining but testing was ended before the water fell below 25% of the storage depth due to time constraints on site. Therefore, time and depth have been extrapolated from the graph in order to calculate the relevant parameters.

The infiltration test data obtained (tabulated and graphed) are enclosed. The results are presented in the tables below:

Parameter	TP1			TP2	
	Test 1	Test 2	Test 3	Test 1	Test 2
Depth of Water	1.0	0.96	0.89	0.52	0.43
Total Effective Storage Depth (m)	1.0	0.96	0.89	0.52	0.43
Effective Storage Depth (m)	1.0	0.96	0.89	0.52	0.43
Volume (m ³)	0.24	0.24	0.2225	0.1352	0.1118
Area (m ²)	2.08	2.08	1.9685	1.404	1.252
Time (seconds)	10680	1680	1080	5400	8100
Soil infiltration rate (m/s)	1.08038E-05	6.85495E-05	1.04658E-04	1.78326E-05	1.10331E-05

Calculations show a significant difference in infiltration rate for the Made Ground between TP1 and TP2, with TP2 showing a significantly lower infiltration rate than TP1.

The worst-case infiltration rate for the subsoils was recorded in TP1 during test 1. Subsequent tests in TP1 showed an increase of the infiltration rate for the subsoils, due to the reduction in total depth between tests. This allowed for the 25% of the storage depth to be located in the Made Ground for test 3 rather than in the clay (very low permeability). An infiltration rate of 1.04658×10^{-4} m/s for the Made Ground in TP1 can be assumed.

It was possible to calculate a worst-case infiltration rate of 1.10331×10^{-5} m/s for the subsoils in TP2.

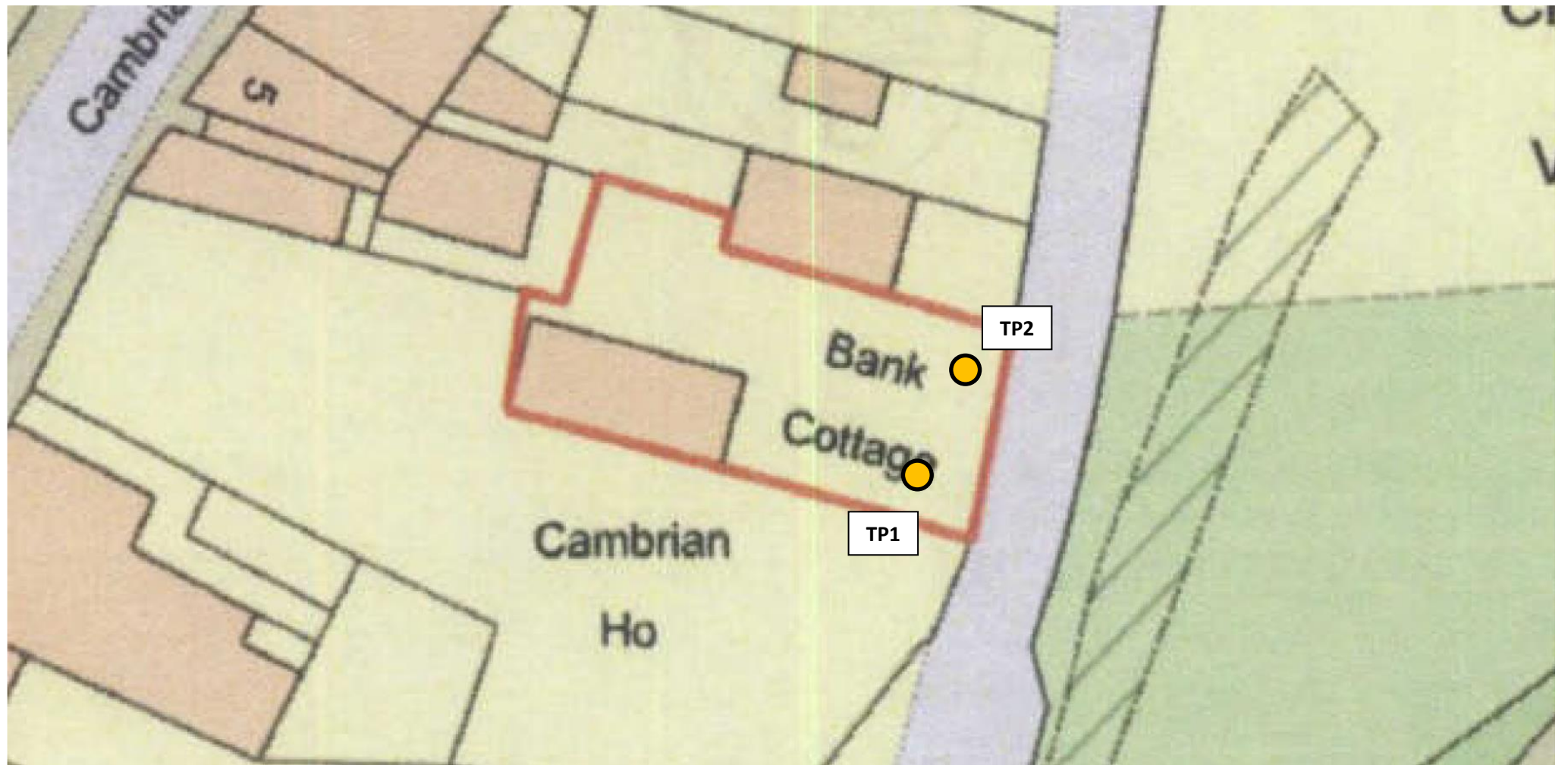
We trust that the information contained within this letter satisfies your current requirements. However, if you require any further information or have any queries, then please do not hesitate to contact me.

Yours sincerely

For EnviroSolution Limited

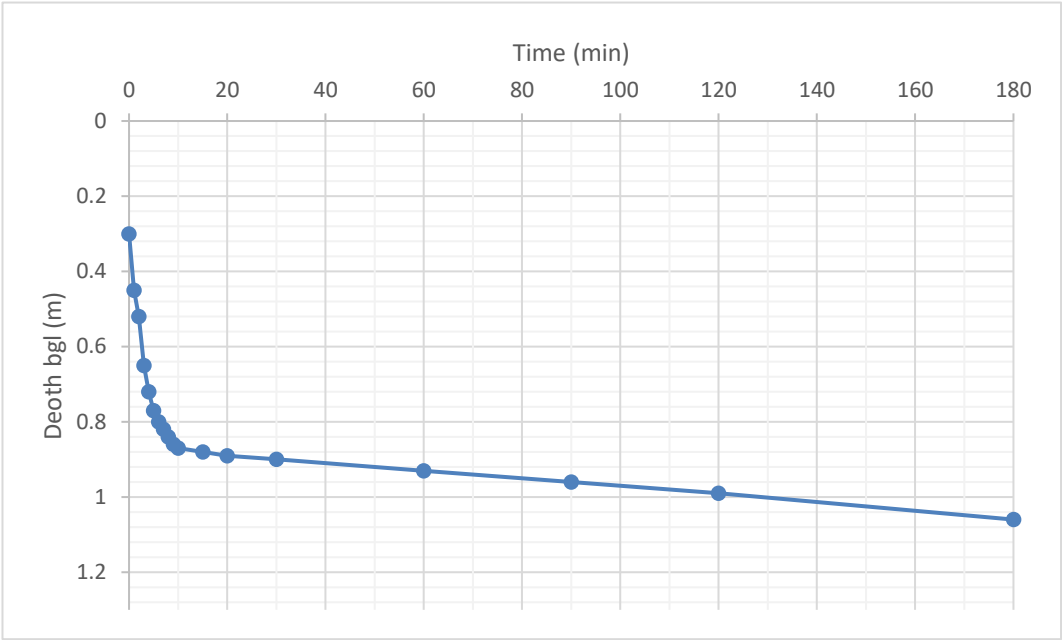


Angel Arantegui, Geologist



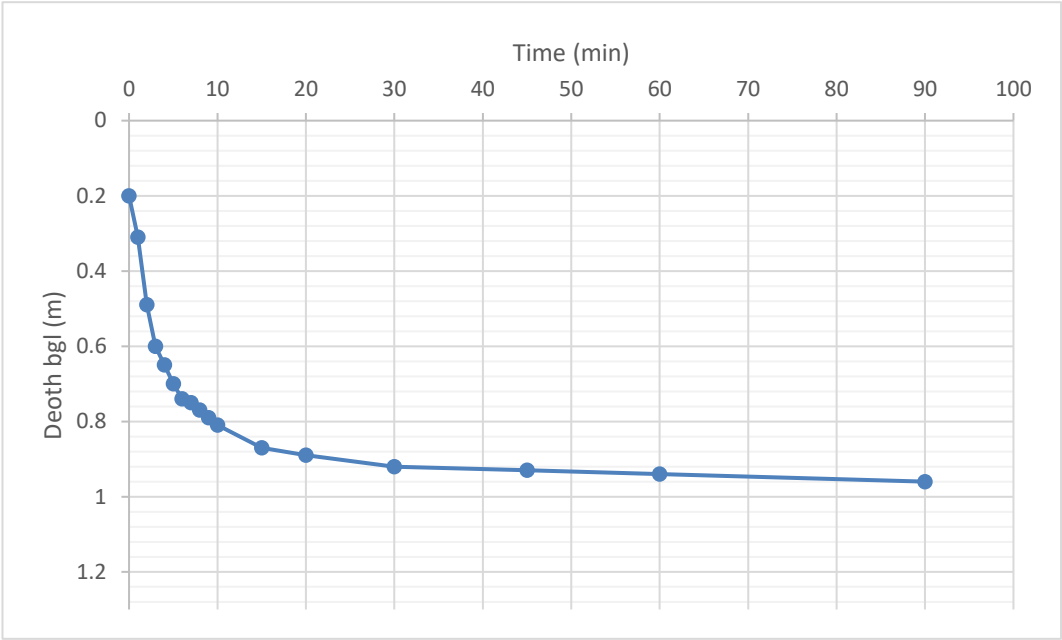
In-Situ Infiltration Test Results

TP1, Test 1



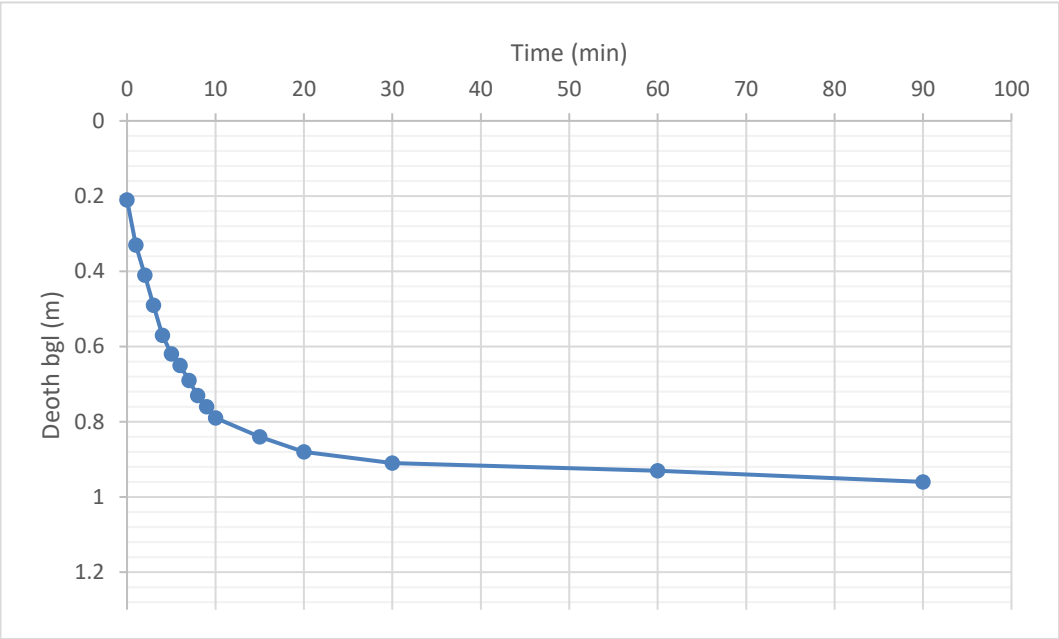
Time Elapsed	Depth of water bgl
0	0.3
1	0.45
2	0.52
3	0.65
4	0.72
5	0.77
6	0.8
7	0.82
8	0.84
9	0.86
10	0.87
15	0.88
20	0.89
30	0.9
60	0.93
90	0.96
120	0.99
180	1.06

TP1, Test 2



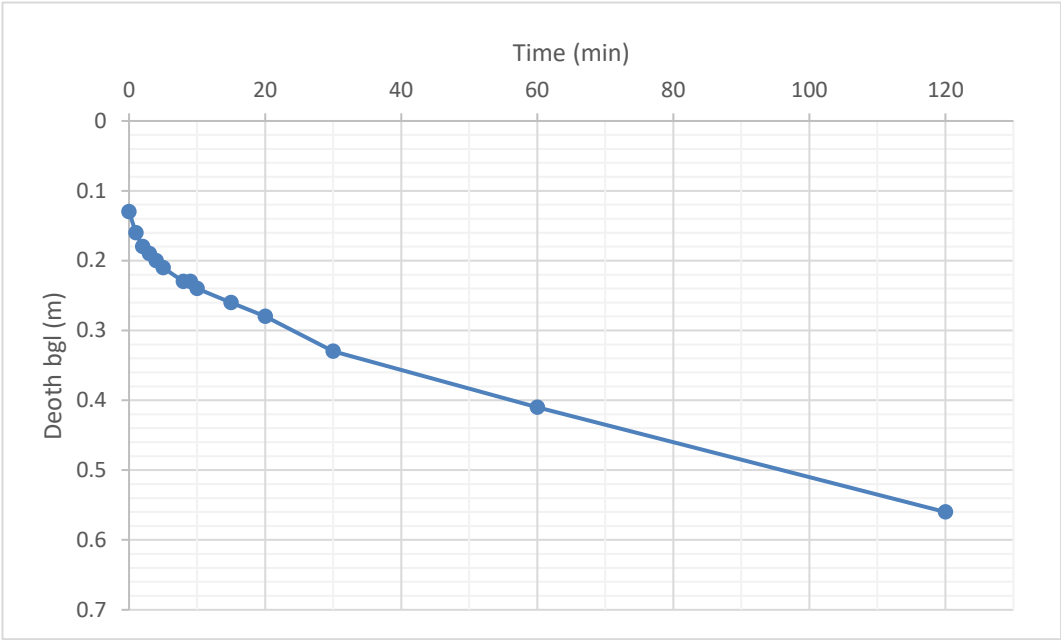
Time Elapsed	Depth of water Bgl
0	0.2
1	0.31
2	0.49
3	0.6
4	0.65
5	0.7
6	0.74
7	0.75
8	0.77
9	0.79
10	0.81
15	0.87
20	0.89
30	0.92
45	0.93
60	0.94
90	0.96

TP1, Test 3



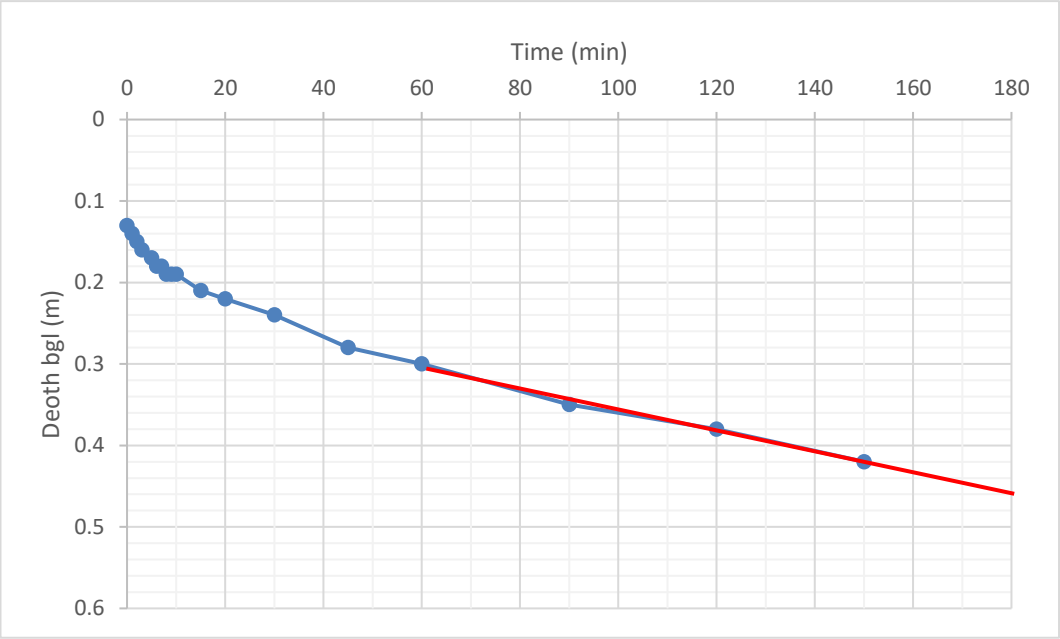
Time Elapsed	Depth of water Bgl
0	0.21
1	0.33
2	0.41
3	0.49
4	0.57
5	0.62
6	0.65
7	0.69
8	0.73
9	0.76
10	0.79
15	0.84
20	0.88
30	0.91
60	0.93
90	0.96

TP2, Test 1



Time Elapsed	Depth of water Bgl
0	0.13
1	0.16
2	0.18
3	0.19
4	0.2
5	0.21
8	0.23
9	0.23
10	0.24
15	0.26
20	0.28
30	0.33
60	0.41
120	0.56

TP2, Test 2



Time Elapsed	Depth of water Bgl
0	0.13
1	0.14
2	0.15
3	0.16
5	0.17
6	0.18
7	0.18
8	0.19
9	0.19
10	0.19
15	0.21
20	0.22
30	0.24
45	0.28
60	0.3
90	0.35
120	0.38
150	0.42



TP1 machine excavation



Site overview showing location of TP1 and TP2



Testing of TP1



Testing of TP2

Appendix C - Drainage Calculations

Project: Cefn Mawr	Date: 26/03/2024			
	Designed by: Ceri Metcalfe	Checked by:	Approved By:	
Report Details:	Company: Aegaea			
Type: Inflows				
Storm Phase: Phase				



Catchment Area

Type : Catchment Area

Area (ha)	0.006
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (1)

Type : Catchment Area

Area (ha)	0.005
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (2)

Type : Catchment Area

Area (ha)	0.007
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (4)

Type : Catchment Area

Area (ha)	0.004
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: Cefn Mawr	Date: 26/03/2024			
	Designed by: Ceri Metcalfe	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company: Aegaea			



Bioretention

Type : Bioretention

Ponding Area		
Exceedance Level (m)		0.000
Depth (m)		0.900
Base Level (m)		-0.900
Top Area (m²)		9.82
Side Slope (1:X)		0.00
Base Area (m²)		9.82
Freeboard (mm)		0
Porosity (%)		100
Length (m)		5.461
Long. Slope (1:X)		1000.00
Filtration Rate (m/hr)		0.3
Friction Scheme	Manning's n	
n		0.003
Total Volume (m³)		12.531

Filter Area		
Base Level (m)		-1.800

Filtration Layers					
Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☒	Filter Layer	800	40	0.3	Soil Type
	Drainage Layer	100	56	2.0	

Inlets													
<table><tr><th colspan="2">Inlet</th></tr><tr><td>Inlet Type</td><td>Point Inflow</td></tr><tr><td>Incoming Item(s)</td><td>Catchment Area (2)</td></tr><tr><td>Bypass Destination</td><td>(None)</td></tr><tr><td>Inlet Destination</td><td>Ponding Area</td></tr><tr><td>Capacity Type</td><td>No Restriction</td></tr></table>		Inlet		Inlet Type	Point Inflow	Incoming Item(s)	Catchment Area (2)	Bypass Destination	(None)	Inlet Destination	Ponding Area	Capacity Type	No Restriction
Inlet													
Inlet Type	Point Inflow												
Incoming Item(s)	Catchment Area (2)												
Bypass Destination	(None)												
Inlet Destination	Ponding Area												
Capacity Type	No Restriction												

Advanced	
Safety Factor	2.0

Ponding Area	
Base Perimeter (m)	14.518
Top Perimeter (m)	14.518

Filter Area	
Base Infiltration Rate (m/hr)	0.0397

Project: Cefn Mawr	Date: 26/03/2024		
	Designed by: Ceri Metcalfe	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company: Aegaea		



Porous Paving

Type : Porous Paving

Dimensions

Exceedance Level (m)	0.000
Depth (m)	0.580
Base Level (m)	-0.580
Paving Layer Depth (mm)	110
Membrane Percolation (m/hr)	2.5
Porosity (%)	30
Length (m)	11.286
Long. Slope (1:X)	500.00
Width (m)	3.802
Total Volume (m³)	6.112

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	100
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (1)
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area (4)
Bypass Destination	(None)
Capacity Type	No Restriction

Advanced

Base Infiltration Rate (m/hr)	0.0397
Safety Factor	2.0
Conductivity (m/hr)	500.0

Project: Cefn Mawr	Date: 26/03/2024			
	Designed by: Ceri Metcalfe	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	Company: Aegaea			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall	
FSR	Type: FSR
Region	England And Wales
M5-60 (mm)	17.0
Ratio R	0.300
Summer	☒
Winter	☒

Return Period	
Return Period (years)	Increase Rainfall (%)
2.0	0.000
30.0	0.000
100.0	40.000

Storm Durations	
Duration (mins)	Run Time (mins)
15	30
30	60
60	120
180	360
240	480
360	720
480	960
960	1920
1440	2880

Project: Cefn Mawr	Date: 26/03/2024		
	Designed by: Ceri Metcalfe	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company: Aegaea		





FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FSR: 2 years: +0 %: 15 mins: Winter	0.01	0.8	0.358
Catchment Area (1)	FSR: 2 years: +0 %: 15 mins: Winter	0.00	0.7	0.305
Catchment Area (2)	FSR: 2 years: +0 %: 15 mins: Winter	0.01	1.0	0.445
Catchment Area (4)	FSR: 2 years: +0 %: 15 mins: Winter	0.00	0.5	0.233

Project: Cefn Mawr	Date: 26/03/2024		
	Designed by: Ceri Metcalfe	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company: Aegaea		





FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FSR: 30 years: +0 %: 15 mins: Winter	0.01	1.5	0.680
Catchment Area (1)	FSR: 30 years: +0 %: 15 mins: Winter	0.00	1.2	0.578
Catchment Area (2)	FSR: 30 years: +0 %: 15 mins: Winter	0.01	1.8	0.838
Catchment Area (4)	FSR: 30 years: +0 %: 15 mins: Winter	0.00	0.9	0.440

Project: Cefn Mawr	Date: 26/03/2024		
	Designed by: Ceri Metcalfe	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company: Aegaea		





FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FSR: 100 years: +40 %: 15 mins: Winter	0.01	2.6	1.218
Catchment Area (1)	FSR: 100 years: +40 %: 15 mins: Winter	0.00	2.2	1.032
Catchment Area (2)	FSR: 100 years: +40 %: 15 mins: Winter	0.01	3.2	1.509
Catchment Area (4)	FSR: 100 years: +40 %: 15 mins: Winter	0.00	1.7	0.789

Project: Cefn Mawr	Date: 26/03/2024			
	Designed by: Ceri Metcalfe	Checked by:	Approved By:	
Report Details:	Company: Aegaea			
Type: Stormwater Controls Summary Storm Phase: Phase				



FSR: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Porous Paving	FSR: 2 years: +0 %: 60 mins: Winter	-0.496	-0.496	0.061	0.084	1.0	0.940	0.000	1.493	0.0	0.000	38	84.628
Bioretention	FSR: 2 years: +0 %: 15 mins: Winter	-0.883	-0.884	0.911	0.916	1.0	0.620	0.000	0.045	0.0	0.000	246	95.051

Project: Cefn Mawr	Date: 26/03/2024			
	Designed by: Ceri Metcalfe	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company: Aegaea			

Status
OK
OK

Project:
Cefn Mawr

Report Details:
Type: Stormwater Controls Summary
Storm Phase: Phase

Date:
26/03/2024

Designed by:
Ceri Metcalfe

Company:
Aegaea

Checked by:

Approved By:

I

DRN



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Porous Paving	FSR: 30 years: +0 %: 180 mins: Winter	-0.383	-0.383	0.174	0.197	1.0	2.394	0.000	4.339	0.0	0.000	88	60.824
Bioretention	FSR: 30 years: +0 %: 30 mins: Winter	-0.845	-0.845	0.950	0.955	1.2	1.277	0.000	0.139	0.0	0.000	293	89.813

Project: Cefn Mawr	Date: 26/03/2024			
	Designed by: Ceri Metcalfe	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company: Aegaea			

Status
OK
OK

Project: Cefn Mawr	Date: 26/03/2024			
	Designed by: Ceri Metcalfe	Checked by:	Approved By:	
Report Details:	Company: Aegaea			
Type: Stormwater Controls Summary Storm Phase: Phase				



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By:
Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Porous Paving	FSR: 100 years: +40 %: 180 mins: Winter	-0.119	-0.119	0.438	0.461	1.9	5.789	0.000	4.930	0.0	0.000	218	5.280
Bioretention	FSR: 100 years: +40 %: 60 mins: Winter	-0.748	-0.748	1.047	1.052	1.8	2.798	0.000	0.330	0.0	0.000	477	77.671

Project: Cefn Mawr	Date: 26/03/2024			
	Designed by: Ceri Metcalfe	Checked by:	Approved By:	
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company: Aegaea			

Status
OK
OK

Project: Cefn Mawr	Date: 26/03/2024			
	Designed by: Ceri Metcalfe	Checked by:	Approved By:	
Report Details:	Company: Aegaea			
Type: Phase Management				
Storm Phase: Phase				



Phase
FSR: 2 years: Increase Rainfall (%): +0: 15 mins: Summer

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
TOTAL	2.8	1.197	0.0	0.000

Project: Cefn Mawr	Date: 26/03/2024			
	Designed by: Ceri Metcalfe	Checked by:	Approved By:	
Report Details:	Company: Aegaea			
Type: Phase Management Storm Phase: Phase				



Phase
FSR: 30 years: Increase Rainfall (%): +0: 15 mins: Summer

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
TOTAL	5.2	2.247	0.0	0.000

Project: Cefn Mawr	Date: 26/03/2024			
	Designed by: Ceri Metcalfe	Checked by:	Approved By:	
Report Details:	Company: Aegaea			
Type: Phase Management Storm Phase: Phase				



Phase
FSR: 100 years: Increase Rainfall (%): +40: 15 mins: Summer

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
TOTAL	9.4	4.060	0.0	0.000

Appendix D - Proposed Drainage Layout & Drainage Details

DO NOT SCALE THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
THE CONTRACTOR MUST CHECK & VERIFY ALL DIMENSIONS ON SITE.
ANY DISCREPANCIES MUST BE REPORTED IMMEDIATELY TO THE ENGINEER
FOR CLARIFICATION BEFORE PROCEEDING.
THIS DRAWING IS COPYRIGHT AND OWNED BY AEGAEA.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
REFER TO THE RELEVANT CONSTRUCTION (DESIGN AND MANAGEMENT)
DOCUMENTATION WHERE APPLICABLE.
IT IS ASSUMED THAT ALL WORKS ON THIS DRAWING WILL BE CARRIED OUT BY
A COMPETENT CONTRACTOR, WORKING WHERE APPROPRIATE TO AN
APPROVED METHOD STATEMENT.

GENERAL NOTES

- ALL SITE DIMENSIONS AND LEVELS, INCLUDING EXISTING DITCH POSITION & LEVELS, ARE TO BE CONFIRMED PRIOR TO DETAILED DESIGN.
- POSITIONS OF EXISTING SERVICES/STATUTORY UNDERTAKERS APPARATUS ADJACENT TO OR CROSSING PROPOSED EXCAVATIONS ARE TO BE CONFIRMED.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH AND CHECKED AGAINST ALL, ENGINEERING DETAILS, SPECIFICATIONS, GEOTECHNICAL AND OTHER RELEVANT DOCUMENTATION PROVIDED.
- THIS DRAWING IS SCHEMATIC FOR CLARITY ONLY; POSITIONS OF PIPE RUNS AND MANHOLES MAY VARY ON SITE DUE TO SITE CONDITIONS.
- THE DESIGN AND CONSTRUCTION IS TO COMPLY IN ALL ASPECTS WITH THE CURRENT BRITISH STANDARDS, BUILDING REGULATIONS AND BUILDING LEGISLATION ETC.
- ALL PIPE SIZES, CHAMBER DEPTHS, SIZE & QUANTITY SUBJECT TO REVIEW AND DETAILED DESIGN.
- ALL ATTENUATION VOLUMES/DIMENSIONS ARE BASED UPON CURRENT SITE LAYOUT AND IS SUBJECT TO CHANGE FOLLOWING RECEIPT OF REVISED ARCHITECTURAL SITE PLANS AND/OR APPROVAL BY LLFA / STATUTORY UNDERTAKER.

LEGEND

- PROPOSED SURFACE WATER SEWER
- PROPOSED PERMEABLE PAVING
- PROPOSED PERFORATED PIPE
- PROPOSED BIORETENTION AREA
- PROPOSED GULLY
- PROPOSED CHANNEL DRAIN
- PROPOSED RODDING EYE

THIS DRAWING IS FOR APPROVAL
PURPOSES ONLY AND IS NOT TO
BE USED FOR CONSTRUCTION.

A02 27.03.2024 AMENDED TO SUIT CLIENT COMMENTS CM

A01 26.03.24 FIRST ISSUE CM

Rev Date Description By

Client

LOUIS WILLIAMSON

Project
BANK COTTAGE, WATERLOO PLACE,
CEFN MAWR, LL14 3AS

Title

PROPOSED DRAINAGE LAYOUT

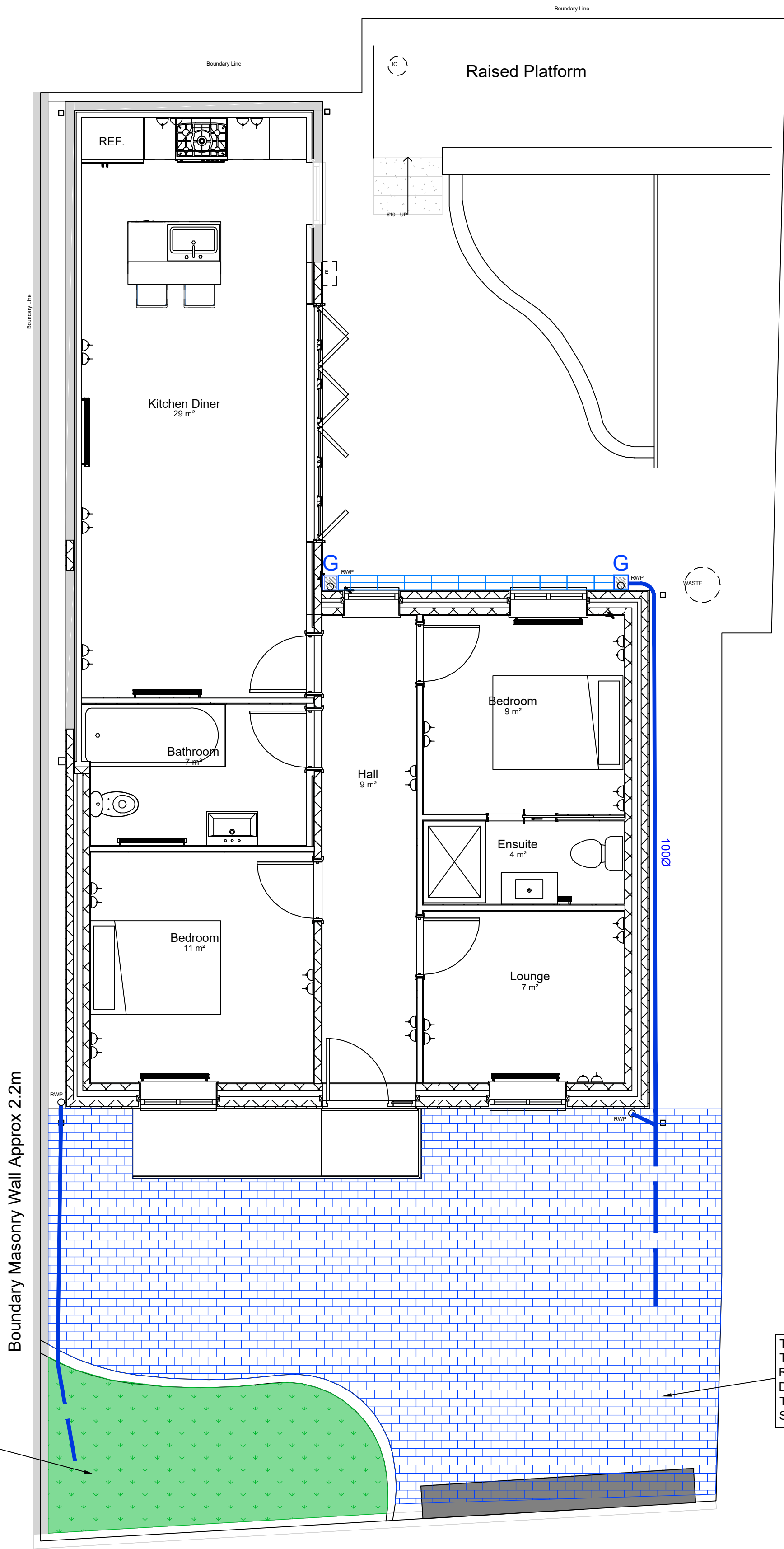
Project No. Drawing No. Revision
AEG4563 DR001 A02

Drawn Checked Approved Date Scale @ A1
CM VW JM MAR 2024 1:50

Drawing Status

APPROVAL

aegaea
water, civils and environment

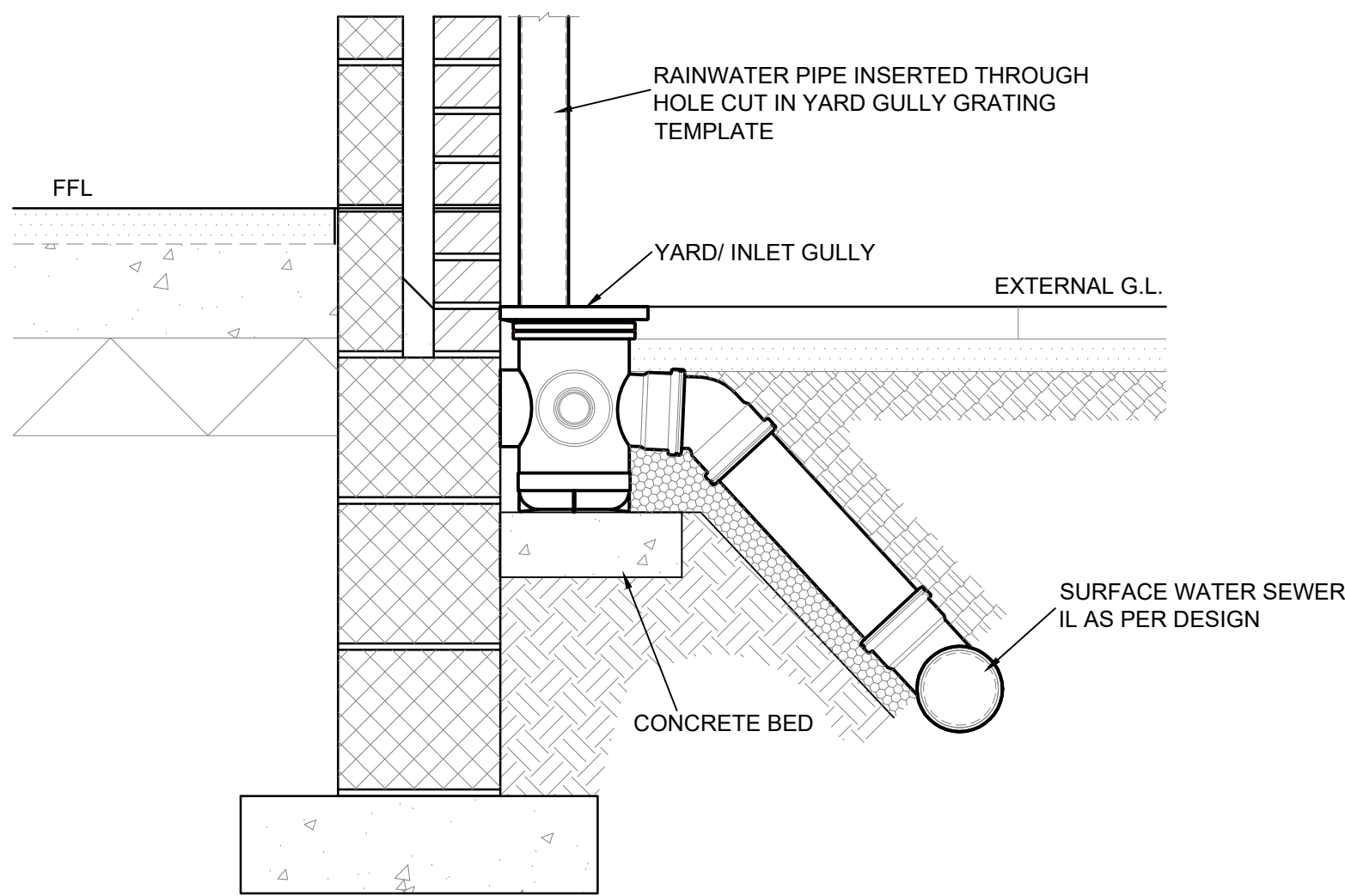


PROPOSED BIORETENTION AREA
TO INFILTRATE TO GROUND.
REFER TO DRAWING AEG4563 -
DR002 FOR TYPICAL DETAIL.

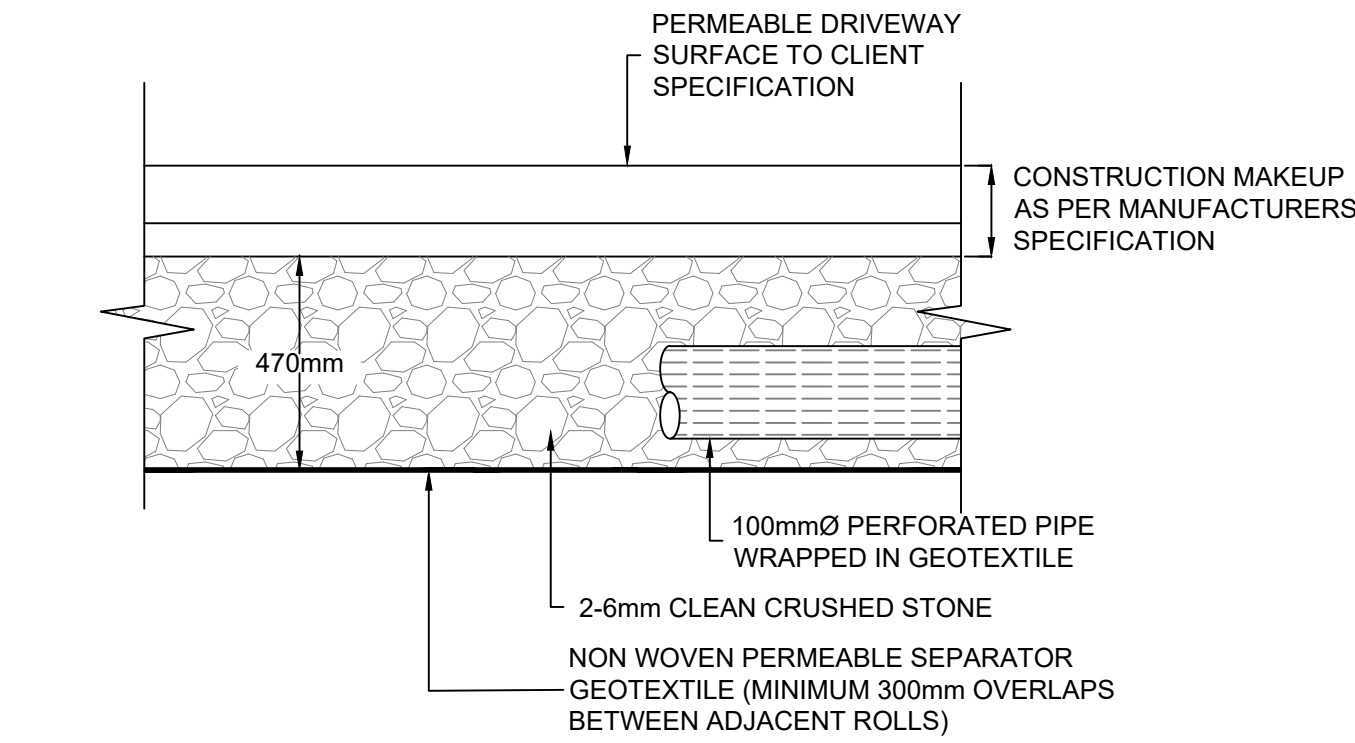
TYPE A - PERMEABLE PAVING
TOTAL INFILTRATION.
REFER TO DRAWING AEG4563 -
DR002 FOR TYPICAL DETAIL.
TO BE PER MANUFACTURERS
SPECIFICATION.

0m 1 2 3 4 5

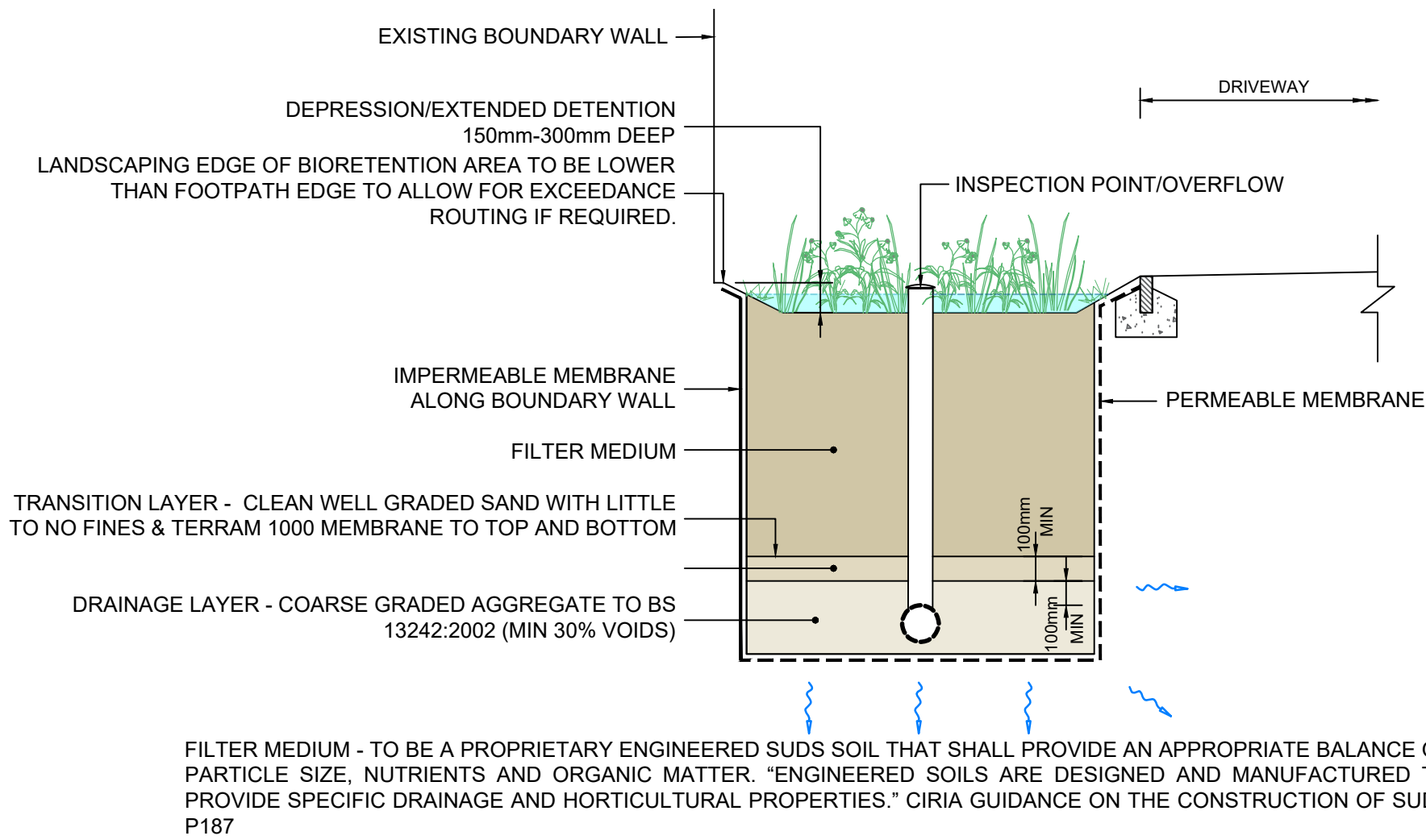
SCALE 1 : 50



RWP CONNECTION TO YARD GULLY DETAIL
(SCALE 1:10)



TYPICAL PERMEABLE PAVING WITH TOTAL INFILTRATION
(SCALE 1:25)
SPECIALIST MANUFACTURER DESIGN TO TAKE PRECEDENCE OVER THIS DETAIL



TYPICAL SECTION THROUGH INFILTRATION BIORETENTION AREA
(SCALE 1:25)
SPECIALIST MANUFACTURER DESIGN TO TAKE PRECEDENCE OVER THIS DETAIL

DO NOT SCALE THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
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GENERAL NOTES

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THIS DRAWING IS FOR APPROVAL PURPOSES ONLY AND IS NOT TO BE USED FOR CONSTRUCTION.

A02	26.03.24	AMENDED TO SUIT CLIENT COMMENTS	CM
A01	26.03.24	FIRST ISSUE	CM
Rev	Date	Description	By

Client

LOUIS WILLIAMSON

Project
BANK COTTAGE, WATERLOO PLACE,
CEFN MAWR, LL14 3AS

Title

PROPOSED DRAINAGE DETAILS

Project No.		Drawing No.		Revision
AEG4653		DR002		A02
Drawn	Checked	Approved	Date	Scale @ A1
CM	VW	JM	MAR 2024	AS SHOWN

Drawing Status
APPROVAL

