SuDS Statement

January 2020

Land at The Goat Public House
250 High Street
Ponders End
Enfield

Ponders End Properties Ltd

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1 Introduction

1.1 EAS has been commissioned to prepare a Sustainable Drainage Strategy to support a full planning application for the proposed extension and residential development at The Goat Public House, 250 High Street, Ponders End, Enfield, London EN3 4HB. A location plan is in **Appendix A** and the proposed development plans are in **Appendix B**.

1.2 The site comprises The Goat public house with the associated car park to the west of the building. The red line boundary covers 0.096 hectares (ha).

1.3 The contents of this SuDS statement are based on advice set out in The National Planning Policy Framework (NPPF), published February 2019; the Technical Guidance to the NPPF, published in July 2018; and the Planning Practice Guidance (PPG), published March 2014. Climate Change guidance published in February 2016 has also been considered.

1.4 This SuDS statement includes the following:

- Assessment of existing surface water and groundwater flood risk within the site and discussion of any mitigation measures for the proposed development;
- Consideration of the existing drainage arrangements and recommendations for the proposed surface water system to serve the site, including SuDS methods where possible;
- Surface water drainage calculations for up to and including the 1 in 100 year event plus 40% as a proxy for future climate change impacts;
- Existing and proposed discharge rates and volumes, the former comprising pre-development greenfield runoff rates;
- Drainage layout plan for the entire site, including the location of the point of discharge and any existing overland flow routes.

1.5 The information set out in this report demonstrates that the proposed development uses sustainable methods of drainage; will not increase the rate of surface water runoff; and will ensure that water leaving the site is not polluted with hydrocarbons or other potentially harmful chemicals.

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2 Policy Context

Introduction

2.1 This section sets out the policy context. The contents of this SuDS Statement are based on the advice set out in The National Planning Policy Framework (NPPF) published in July 2018 and the Planning Practice Guidance (PPG), published March 2014.

National Planning Policy Framework

2.2 Paragraph 164 footnote 50 of the NPPF states:

"A site-specific flood risk assessment should be provided for all developments in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use."

The flood zones are defined as:

- Flood Zone 1 – Land assessed as having a less than 1 in 1,000 (<0.1%) annual probability of flooding from fluvial sources;
- Flood Zone 2 – Land assessed as having between a 1 in a 100 and 1 in 1,000 (1% to 0.1%) annual probability of flooding from fluvial sources;
- Flood Zone 3a – Land assessed as having a 1 in 100 or greater (>1%) annual probability of flooding from fluvial sources, or at least 0.5% annual probability of tidal flooding;
- Flood Zone 3b – Land where water has to flow or be stored in times of flood.

2.3 Paragraph 155 discusses the suitability of development location, particularly with regards to future risks induced by climate change:

"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere".

2.4 Paragraph 156 of the National Planning Policy Framework (NPPF) sets out how:

"Strategic policies should be informed by a strategic flood risk assessment, and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards".

2.5 Paragraphs 165 NPPF discusses the application of sustainable drainage systems:

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"Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

- Take account of advice from the lead local flood authority;
- Have appropriate proposed minimum operational standards;
- Have maintenance arrangements in place to ensure an acceptable standard of operation of the lifetime of the development; and
- Where possible, provide multifunctional benefits."

2.6 The EA Flood Map for Planning shows the site to be located entirely in Flood Zone 1, at 'Low' risk of flooding from fluvial sources. The EA Flood Map has been enclosed on **Appendix C**. This is considered to be an area with less than 1 in 1000 chance of flooding each year.

Non-Statutory Technical Standards for Sustainable Drainage Systems (2015)

2.7 This document published by Defra in March 2015 provides technical standards for SuDS systems, which should be used in conjunction with the NPPF and PPG. Standards include management of flood risk within and outside of the development; peak flow and volume control; construction and structural integrity; and designing for maintenance considerations. These have been considered in designing of the SuDS strategy for the site.

Local Policy

Enfield Council 2018-2036 New Local Plan

2.8 A new local plan is being produced and will address the main future challenges facing the borough including meeting housing needs, protecting the environment and renewing infrastructure.

London Borough of Enfield Local Flood Risk Management Strategy (March 2016)

2.9 Enfield Council is a Lead Local Flood Authority and has set out how they improve the management of local flood risk in their Local Flood Risk Management Strategy, published in March 2016. The site is approximately 650m north of the Boundary Ditch and not noted to be at significant risk of flooding from any source. It is noted that the number of properties at risk of flooding in Enfield is typically high compared to most other local authorities as most of the properties at risk are also located in the Lee Valley area, which was once a marshland. A wide range of flood defence measures are therefore necessary to manage the flood risk.

2.10 The largest recorded flood in Enfield was the 1947 River Lee event, which led to wide-spread flooding of the eastern half of the borough. The River Lee Flood Relief Channel was constructed in the 1970s to reduce the risk and flooding on this scale has not been experienced since.

2.11 Sustainable drainage measures (SuDS) are promoted in this document as an effective means of managing surface water runoff from new developments. Flood resilient construction methods are also highlighted as being suitable for new developments in flood risk areas.

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London Plan

2.12 First published in 2004, the London Plan provides a strategic plan for London for the next 25 years. The London Plan provides a framework for economic, environmental, transport and social development. There have been numerous revisions to the original London Plan and a new London Plan is currently being drafted. The latest draft was published in July 2019.

2.13 Policy SI13 of the Draft New London Plan relates to Sustainable Drainage and states:

"A. Lead Local Flood Authorities should identify – through their Local Flood Risk Management Strategies and Surface Water Management Plans – areas where there are particular surface water management issues and aim to reduce these risks.

B. Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

- rainwater harvesting (including a combination of green and blue roofs)
- infiltration techniques and green roofs
- rainwater attenuation in open water features for gradual release
- rainwater discharge direct to a watercourse (unless not appropriate)
- rainwater attenuation above ground (including blue roofs)
- rainwater attenuation below ground
- rainwater discharge to a surface water sewer or drain
- rainwater discharge to a combined sewer.

C. Development proposals for impermeable paving should be refused where appropriate, including on small surfaces such as front gardens and driveways.

D. Drainage should be designed and implemented in ways that address issues of water use efficiency, river water quality, biodiversity, amenity and recreation."

2.14 The proposed drainage strategy has considered the requirements of the London Plan and has been designed with this in mind.

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3 Existing Site Assesment

Site Description

3.1 The development site is at The Goat Public House, 250 High Street, Ponders End, Enfield, London EN3 4HB. The site is located in the town centre, surrounded on the north, east and south by retail premises and other business uses. A large Tesco supermarket is around 120m to the north, and part of the Tesco's car park is located approximately 40m to the west of the site. Ponders End train station is located approximately 900m to the east. Residential dwellings are located away from the High Street, around 100m to the north east and south west of the site. A location plan is in **Appendix A.**

3.2 The existing site covers 0.096 hectares in area. The building is an existing public house with a courtyard, and will continue to function as a public house following the development. The car park is currently being used as a hand car wash and valeting centre.

3.3 The proposed scheme will include works to extend and refurbish the existing public house. The proposals also include an apartment block to provide 9 one- to three-bedroom flats along with associated car park and cycle parking area and front gardens.

3.4 Proposed development plans are included at **Appendix B.**

Local Watercourses

3.5 The closest watercourse is approximately 650m to the south of the site, and appears to be a culverted section of the Boundary Ditch.

3.6 The River Lee Navigation is around 1.15km to the east.

Site Levels

3.7 A topographical survey is enclosed in **Appendix D** but is to a local datum rather than Ordnance Datum. However, this can be used to determine the general falls across the site.

3.8 The highest part of the site is in the north west corner, where there are levels of around 10.15m. Ground levels drop to around 9.75m in the centre of the site before rising to around 9.85m along the southern boundary adjacent to Queensway.

3.9 It is noted from the Thames Water sewer records that the ground level along Queensway is approximately 17.30m AOD; however, this surface water drainage strategy has been based on the topographic survey levels.

Sewer Records

3.10 Thames Water sewer records are in **Appendix E**. These show a 225mm diameter Thames Water surface water sewer and foul sewer falling from west to east along Queensway. These sewers connect to surface water and foul sewers located in the High Street, which then fall to the south.

3.11 The sewer records indicate manhole 1901 and 1902 to the south west of the site. Surface water manhole 1902 does not have an associated invert level so it is not clear how deep this sewer

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is. However, the foul manhole 1901 has both a cover level and invert level which suggests the invert is 1.97m below ground level.

Geology

3.12 With reference to the British Geological Survey online mapping, the site is located within an area with a bedrock of London Clay Formation – Clay, Silt and Sand. Superficial deposits of Kempton Park Gravel Member – Sand and Gravel are also recorded.

3.13 The presence of London Clay would not typically be favourable for formal infiltration drainage devices such as soakaways.

3.14 Historic borehole records taken around 200m south west of the site (labelled as TQ39NE480), taken in 1987, records groundwater at 4.70m below ground level. A historic borehole record taken 240m to the north in July 2006 records a groundwater level of 13.30m below datum. These records indicate the groundwater level is relatively deep in the local area so would be unlikely to pose a flood risk.

Existing Drainage

3.15 With reference to images on Google Streetview, the existing public house already has a surface water drainage system which directs roof runoff into gullies on the High Street. The topographic survey in **Appendix D** shows existing gullies in the car park to the west of the public house. As the existing car park is currently functioning as a hand car wash, it is assumed the gullies direct runoff to the public sewers nearby.

Surface Water Flood Risk

3.16 With reference to the surface water mapping on the GOV.UK website (https://flood-warning-information.service.gov.uk/long-term-flood-risk/map), the western side of the site which is currently the car park is in a 'Low' surface water flood risk area. 'Low' risk means the event does not occur often but the resulting flooding represents a 'worst case'. Depths of up to 300mm surface water are associated with this event. The vector mapping shows flowpaths to cross the car park and flow east along Queensway and then south down the High Street.

3.17 The surface water flood extent and flowpaths across the site disappear in the 'Medium' and 'High' risk events (i.e. the more frequent events which result in less flooding). The surface water maps have been included at **Appendix F**.

3.18 The surface water maps assume the sewer network is at capacity and water would be flowing across the site. The new SuDS system serving the proposed apartment block will provide attenuation volume for up to a 1 in 100 year (+40%CC) rainfall event, which would significantly reduce the surface water collecting in this area and flowing across the site.

3.19 The proposed finished floor levels on the ground floor of the new block should be raised 300mm above the external ground level. This will provide some protection against the overland flow route from offsite. If it is not possible to raise the ground floor levels, it is recommended that linear drains are located across the entrances to the ground floor apartments (particularly at the entrance to the garden area of Flat 1) to prevent overland flows from entering these dwellings.

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4 Proposed Drainage Strategy

Pre-Development Runoff Rate

4.1 The site comprises the existing public house with a courtyard and car park to the west of the building which is currently being used as a hand car wash and valeting service.

Public House

4.2 The existing public house will be extended across the courtyard, which is already hardstanding and therefore drainage measures are already in place to serve this area. The existing building footprint/roof area is 289m^2, and with the extension this will increase to 296m^2. The increase is minimal and as the existing building already drains to the Thames Water public sewer in the High Street, this will; continue to be the case for the proposed public house. Therefore, the proposed extension has not been included in the new drainage strategy.

New Residential Block

4.3 The new apartment block is located on an area which is currently a car park and is laid to hardstanding. Gullies are already in place to manage runoff from this area. However, the new building will need a new drainage system to be included to serve the roof areas as well as the new hardstandings in a more sustainable way.

4.4 Using the Modified Rational Method detailed in Butler, D and Davies, J. (2006), Urban Drainage, 2nd ed., SPON, the surface water runoff for the existing impermeable areas of the car park, which totals 446m^2, has been calculated as follows:-

$Q = CiA$ where Q = maximum flow rate (l/s)

C= PIMP/PR

i= rainfall intensity (mm/hr),

A=area (ha)

4.5 It should be noted that a fixed rainfall intensity of 50mm/hr is used in this case, which has been recommended by Butler & Davies (2006) to avoid using inappropriately high intensities or very low concentration times, i.e. small sites.

4.6 Using the Modified Rationale Method (Butler and Davies, 2006), the total rate of runoff from the impermeable areas of the existing site is estimated to be **6.19 l/s**. The runoff calculations are enclosed in **Appendix G**.

Relevant SuDS Policy

4.7 SUDS mimic the natural drainage system and provide a method of surface water drainage which can decrease the quantity of water discharged, and hence reduce the risk of flooding. In addition to reducing flood risk, these features can improve water quality and provide biodiversity and amenity benefits.

4.8 The SUDS management train incorporates a hierarchy of techniques and considers all three SUDS criteria of flood reduction, pollution reduction, and landscape and wildlife benefit. In decreasing order of preference, the preferred means of disposal of surface water runoff is:

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- Discharge to ground.
- Discharge to a surface water body.
- Discharge to a surface water sewer.
- Discharge to a combined sewer.

4.9 The philosophy of SUDS is to replicate as closely as possible the natural drainage from a site pre-development and to treat runoff to remove pollutants, resulting in a reduced impact on the receiving watercourses. The benefits of this approach are as follows:

- Reducing runoff rates, thus reducing the flood risk downstream.
- Reducing pollutant concentrations, thus protecting the quality of the receiving water body.
- Groundwater recharge.
- Contributing to the enhanced amenity an aesthetic value of development areas.
- Providing habitats for wildlife in developed areas, and opportunity for biodiversity enhancement.

Site-Specific SuDS

4.10 The various SUDS methods need to be considered in relation to site-specific constraints. Several SUDS options are available to reduce or temporarily hold back the discharge of surface water runoff. Table 1 outlines the constraints and opportunities to each of the SUDS devices in accordance with the hierarchical approach outlined in The SUDS Manual CIRIA C753. It also indicates what could and could not be incorporated within the development, based upon site-specific criteria.

Device	Description	Constraints / Comments	Appropriate
Living roofs (source control)	Provide soft landscaping at roof level which reduces surface water runoff.	Not proposed due to pitch of roof.	No
Infiltration devices & Soakaways (source control)	Store runoff and allow water to percolate into the ground via natural infiltration.	The underlying geology is likely to have low permeability therefore formal infiltration devices would not be viable.	No
Pervious surfaces (source control)	Storm water is allowed to infiltrate through the surface into a storage layer, from which it can either infiltrate and/or slowly release to sewers.	The underlying geology is likely to have low permeability therefore formal infiltration devices are unlikely to be viable. However, permeable paving is proposed for the car park and access to provide some of the required attenuation volume, and will be unlined to allow for some infiltration to occur if possible.	Yes

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Rainwater harvesting (source control)	Reduces the annual average rate of runoff from the Site by reusing water for non-potable uses e.g. toilet flushing, recycling processes.	Could potentially be used for each apartment although have assumed not for worst case scenario in terms of attenuation volume.	Possibly
Swales (permeable conveyance)	Broad shallow channels that convey / store runoff, and allow infiltration (ground conditions permitting).	Limited space within development boundary for swales.	No
Filter drains & perforated pipes (permeable conveyance)	Trenches filled with granular materials (to take flows from adjacent impermeable areas) that convey runoff while allowing infiltration.	Infiltration unlikely to be viable. A perforated pipe has been used to allow water to enter the permeable paving during extreme rainfall events.	Yes
Filter Strips (permeable conveyance)	Wide gently sloping areas of grass or dense vegetation that remove pollutants from run-off from adjacent areas.	Unlikely to be practical given the use of the development.	No
Infiltration basins (end of pipe treatment)	Depressions in the surface designed to store runoff and allow infiltration.	The underlying geology is unlikely to have the potential for infiltration due to low permeability.	No
Wet ponds & constructed wetlands (end of pipe treatment)	Provide water quality treatment & temporary storage above the permanent water level.	Limited space within development boundary for ponds and wetlands.	No
Attenuation Underground (end of pipe treatment)	Oversized pipes or geo-cellular tanks designed to store water below ground level.	Oversized pipes can be used to provide attenuation volume.	Yes

Table 1: Site Specific Sustainable Drainage

4.11 Given the local geology of London Clay, infiltration methods are not recommended. Instead, an attenuation and discharge system to a nearby sewer has been selected.

Proposed Discharge Rate

4.12 The existing public house and car park appears to discharge surface water runoff to the nearby Thames Water surface water sewer. As previously noted, the existing public house and courtyard already has a drainage system in place so the proposed extension to the public house has not been included in this drainage strategy as the impermeable area has not changed. The new extension will simply connect into the existing drainage system and no increase in discharge rate is anticipated as a result.

4.13 The proposed drainage system discussed here will serve the new apartment block and associated car park and access road. It is proposed that the new drainage system directs surface water runoff to the Thames Water surface water sewer in Queensway, but the discharge rate will be reduced to provide an improvement to the existing system.

4.14 WINDES MicroDrainage ICP SUDS method was used to determine the greenfield runoff rates for 1 hectare and scaled to the proposed impermeable area of 628m^2, which comprises the proposed roof area, car park and access road. The greenfield runoff rates are:

- QBAR – 3.9 l/s/ha (0.245 l/s)

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- 1 in 1 year – 3.3 l/s/ha (0.207 l/s)
- 1 in 30 year – 8.9 l/s/ha (0.559 l/s)
- 1 in 100 year – 12.5 l/s/ha (0.785 l/s)

4.15 The WINDES output it included in **Appendix H**.

4.16 The greenfield runoff rates for the proposed impermeable areas are very low and could result in blockages of the new drainage system. As the site is brownfield, it is instead proposed that a low runoff rate of **1.50 l/s** is used, which would provide an improvement on the existing discharge to the sewer, estimated to be around 6.19 l/s.

4.17 A pre-development enquiry was submitted to Thames Water to confirm they would accept the surface water discharge to their sewer at a discharge rate of 1.50 l/s and be able to accept the foul water flows from the 9 new apartments. Thames Water responded to confirm that there is sufficient capacity in their foul and surface water network to take flows from the proposed development. The Thames Water response is contained in **Appendix I**.

Proposed Drainage Strategy

4.18 Rainwater downpipes are not shown on the new building, therefore downpipe locations have been assumed based on the proposed roof plans in **Appendix B**.

4.19 It is proposed that rainwater downpipes will take roof runoff to a pipe network which will include a perforated pipe to let water back up into the permeable paving sub-base. This system will provide filtration and storage of the runoff.

4.20 It is anticipated that the permeable paving will be constructed using Grasscrete or similar, with attenuation volume provided in the sub-base.

4.21 The following typical construction would be expected for the permeable paving (based on guidance from Marshalls for the popular Priora Paving system):

- 80mm paving course
- 50mm laying course (generally a 6mm aggregate)
- 80mm layer of perforated Asphalt Concrete (DBM)
- A calculated depth of course grade aggregate (generally 250mm – 350mm of a 30mm aggregate)
- An additional sub-base / capping layer if required

4.22 Unlike other attenuation systems, the pollutants carried within the surface water run-off are filtered out as they pass through the course grade aggregate and sub-base. Once trapped they are then broken down over time; figures from the Construction Industry Research and Information Association have shown that 60-95% of suspended solids and 70-90% of hydrocarbons are removed by permeable pavements; as such no further filtration of pollutants will be required.

4.23 A perforated oversized pipe will be located within a trench below the sub-base of the permeable paving in the access road. This will enable runoff to back up within the perforated pipe and flow

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into the permeable paving during extreme events, where it can be stored until it is discharged at a restricted rate to the surface water sewer in Queensway.

4.24 Oversized 300mm diameter pipes are used elsewhere in the proposed drainage network to provide the required attenuation volume to manage up to and including a 1 in 100 year (+40%CC) rainfall event.

4.25 The proposed pipe network was based on the topographic survey in **Appendix D** which is not to Ordnance Datum. The closest Thames Water surface water manhole in the Queensway does not have an associated invert level. Therefore, it was assumed that the surface water sewer invert level is 1.20m below the ground level of the road, based on the guidance in the publication 'Sewers for Adoption'. The ground level in the road was taken from the site-specific topographic survey.

4.26 The system was modelled in WINDES MicroDrainage and a minimum sub-base depth of 269mm would be required to provide the required attenuation volume for a 1 in 100 year (40%CC) rainfall event.

4.27 An orifice plate control would be at the downstream end of the perforated pipe, restricting the runoff to 1.50 l/s. A 27mm diameter orifice plate control with a suitable filter would be required to restrict the discharge rate.

4.28 The WINDES MicroDrainage results are included in **Appendix J** and the proposed SUDS strategy is in **Appendix K**.

Exceedance Flowpaths and Areas

4.29 In a storm event greater than that modelled, the capacity of the oversized pipes and permeable paving may become overwhelmed. In this instance, surface water runoff would pool in the shallower parts of the site, which would be along the proposed access road between manholes MH03 and MH04, and potentially also the proposed car park. As the site falls from north west to south east, the surface water would be directed towards the Queensway in this extreme event. It is also possible that overland flowpaths could develop along the western side of the site, as this is shown on the surface water mapping in **Appendix F**.

Maintenance of Development Drainage

4.30 All elements of the proposed drainage system will remain private and the responsibility for maintenance will be with the site owner or a maintenance company set up by the developer. Regular inspections of the permeable paving car park, outfall, catchpit and orifice plate control should be made, to ensure they are effective throughout the lifetime of the development and do not become blocked or damaged over time. Debris and silt should be removed from the catchpit and orifice plate regularly, especially following periods of heavy rainfall. It is likely that the Hydrobrake would come with a servicing package to ensure it would continue to work effectively. Some maintenance activities for the cellular storage crate detailed in CIRIA C753 'The SuDS Manual' are set out in Table 2.

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Maintenance Schedule	Required Action	Frequency
Regular maintenance	Brushing and vacuuming.	Three times per year at end of winter, mid-summer, after autumn leaf fall, or as required based on site specific observations of clogging or manufacturer's recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas. Removal of weeds.	As required. As required.
Remedial actions	Remediate any landscaping which, through vegetation maintenance of soil slip, has been raised to within 50mm of the level of the paving. Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance of a hazard to the user. Rehabilitation of surface and upper sub-surface.	As required As required As required (if infiltration performance is reduced as a result of significant clogging.)
Monitoring	Initial inspection Inspect for evidence of poor operation and/or weed growth. If required, take remedial action. Inspect silt accumulation rates and establish appropriate brushing frequencies. Monitor inspection chambers.	Monthly for 3 months after installation. 3 monthly, 48 hours after large storms. Annually. Annually.

Table 2: Maintenance tasks for permeable paving (Source: CIRIA C753, The SUDS Manual)

Manholes and Sewers/Oversized Pipe

4.31 Manhole covers should be lifted each year to remove visible debris and check for blockages – it is suggested that this is undertaken every November after the heaviest leaf-fall has occurred.

4.32 Should a blockage occur at any time, it is advised to seek professional help to jet the drainage system to clean and clear the system.

Gutters and Downpipes

4.33 It is good practice to ensure that these are occasionally inspected to ensure they are in good order and free of leaves & debris. Once every 6 months should be sufficient.

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5 Conclusions

5.1 The site is located entirely within Flood Zone 1 on the EA flood map, which indicates a 'low' risk of flooding from fluvial and tidal sources. 'Low' risk areas have an annual probability of flooding of less than 0.1% (or 1 in 1000 years).

5.2 The EA Flood Risk from Surface Water map is included shows that the western side of the site is at 'Low' risk of flooding, and up to 300mm surface water depth could occur. The overland flow routes appear to direct runoff into Queensway and towards the High Street. The 'Medium' and 'High' risk events do not show the site to flood.

5.3 There are Thames Water surface water and foul sewers in Queensway to the south of the site and in the High Street to the east. The existing public house and car park are likely to discharge unrestricted to these sewers.

5.4 The extension of the public house will be onto an area which is already impermeable, and the increase in roof area is minimal. Therefore, a new drainage strategy has not been designed to serve the new extension and the extended area will discharge to the existing surface water drainage system serving the public house.

5.5 The new apartment block and car park will have a new sustainable drainage system. The local geology suggests that infiltration methods would not be effective, so an attenuation method has been discussed with a restricted outfall to the Thames Water surface water sewer. The greenfield runoff rate from the site is very low, however as the site is brownfield an improvement can be made by restricting runoff to 1.50 l/s.

5.6 The proposed SuDS drainage strategy will direct roof runoff from all parts of the building into oversized pipes. The car park will be formed of permeable paving (Grasscrete or similar), and a perforated pipe will allow water to 'back up' into the permeable paving for additional storage. An orifice plate control will restrict the discharge rate to 1.50 l/s prior to discharge to the surface water sewer in Queensway.

5.7 This system was modelled in WINDES MicroDrainage for a 1 in 100 year (+40%CC) storm event and shown to work effectively. The reduction in runoff to the Thames Water surface water sewer will provide an improvement on the existing situation.

5.8 The proposed drainage system will remain private. Some management and maintenance tasks for permeable paving, oversized pipes and other elements of the drainage system have been described. It is recommended that regular inspections take place to ensure the drainage features remain effective.

5.9 To conclude, it is considered that development of the site with appropriate sustainable drainage features will provide the opportunity to reduce flood risk downstream in accordance with local plan policies.

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
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6 Appendices

Appendix: A – Location Plan
Appendix: B – Proposed Development Plans
Appendix: C – EA Flood Map for Planning
Appendix: D – Topographical Survey
Appendix: E – Thames Water Sewer Records
Appendix: F – Surface Water Maps
Appendix: G – Existing Runoff Rates
Appendix: H – Greenfield Runoff Rates
Appendix: I – Thames Water Pre-Development Enquiry
Appendix: J - WINDES MicroDrainage Results
Appendix K - Proposed SUDS Strategy

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Appendix: A – Location Plan

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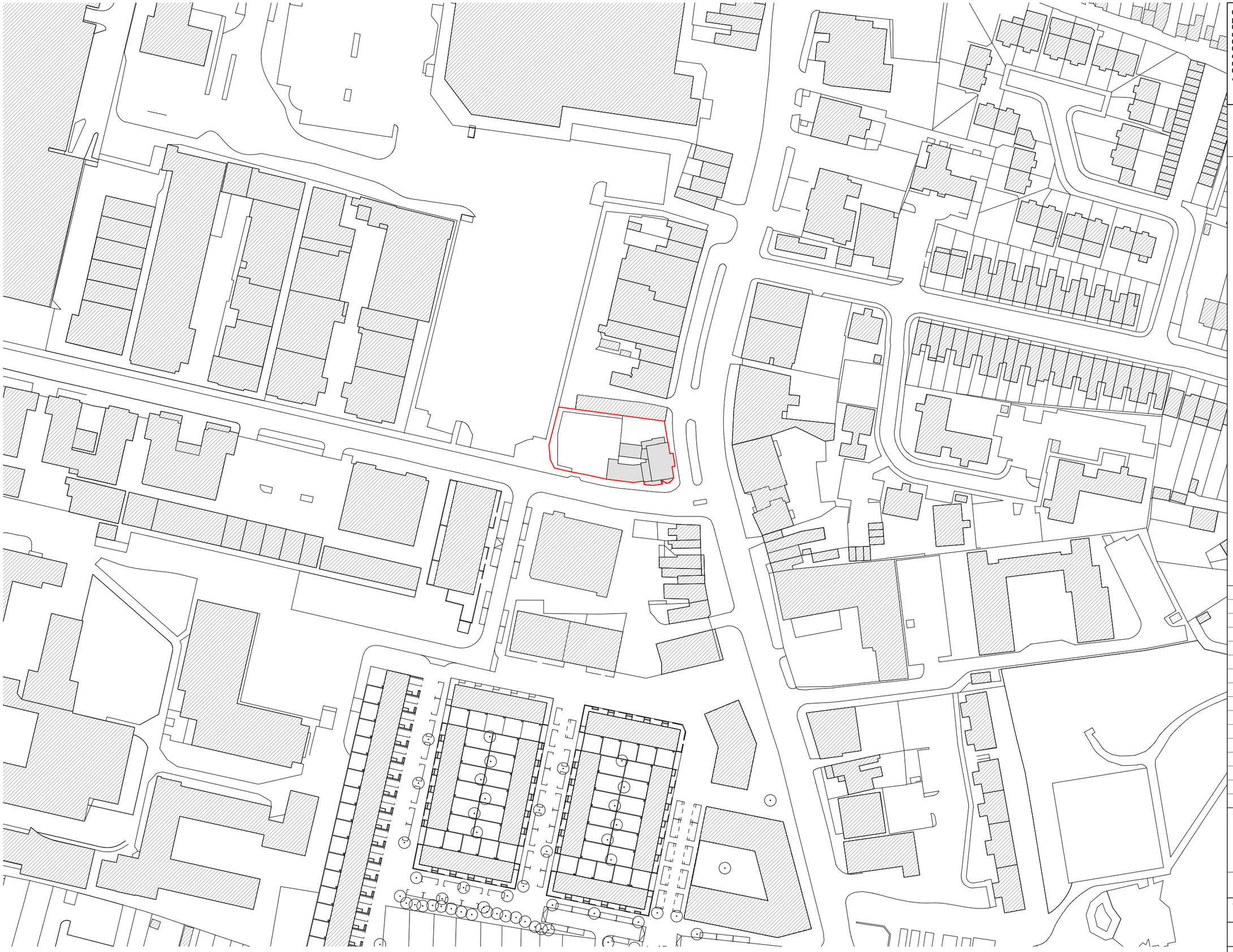

01 Existing - Location Plan
E/001 Scale 1:625@A1 1:1250@A3

Notes:

Notes:

- This drawing is for planning purposes only

KEY

Site boundary

N

0 12.5 25 37.5 50 62.5m

Scalebar - 1:625 @ A1, 1:1250 @A3

Revision	Description	Date
2	Full Planning Application	23/10/2019
1	Pre-Planning Application	21/12/2018
*	Proposed drawings DRAFT	23/11/2018

Status
- ○ Pre-Planning
- ● Planning
- ○ Tender
- ○ Construction
- ○ As Built

- ● Information
- ○ Discussion

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Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:625 @ A1, 1:1250 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Existing - Location Plan
Drawing No: E/001
Revision: 2

Appendix: B – Proposed Development Plans

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
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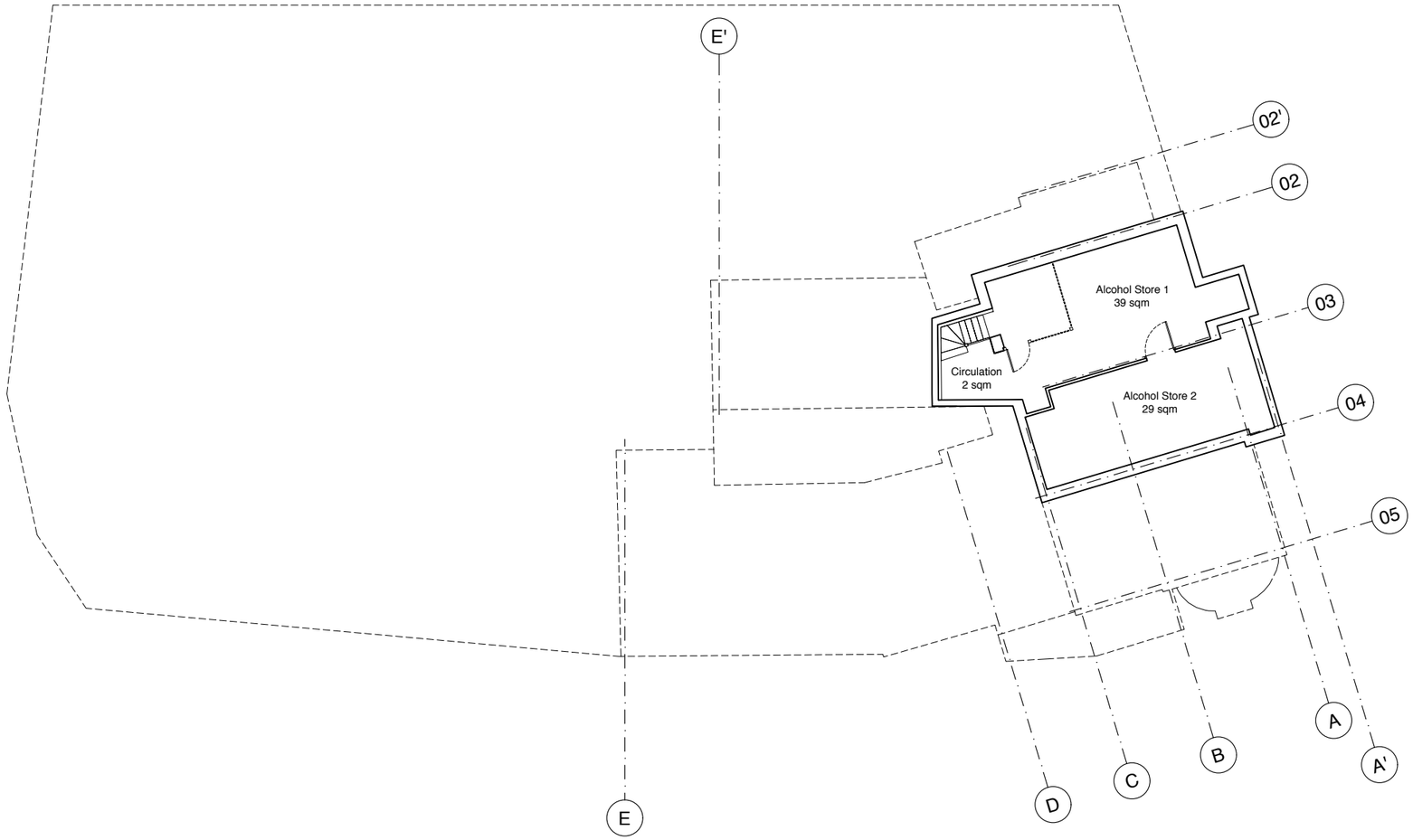

01 Proposed - Basement Plan
P/099 Scale 1:100@A1 1:200@A3

Notes:

- This drawing is for planning purposes only

N

0 2 4 6 8 10m

Scalebar - 1:100 @ A1, 1:200 @A3

Revision	Description	Date
7	Full Planning Application	23/10/2019
6	Revised Planning Set	18/10/2019
5	Full Planning Application DRAFT	19/08/2019
4	Planning Application FINAL DRAFT	21/06/2019
3	Pre-Planning Application	21/12/2018
2	Pre-Application FINAL DRAFT	18/12/2018
1	Pre-planning DRAFT	12/12/2018
*	Pre-Planning	05/07/2018

Status
- ○ Pre-Planning
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- ○ Tender
- ○ Construction
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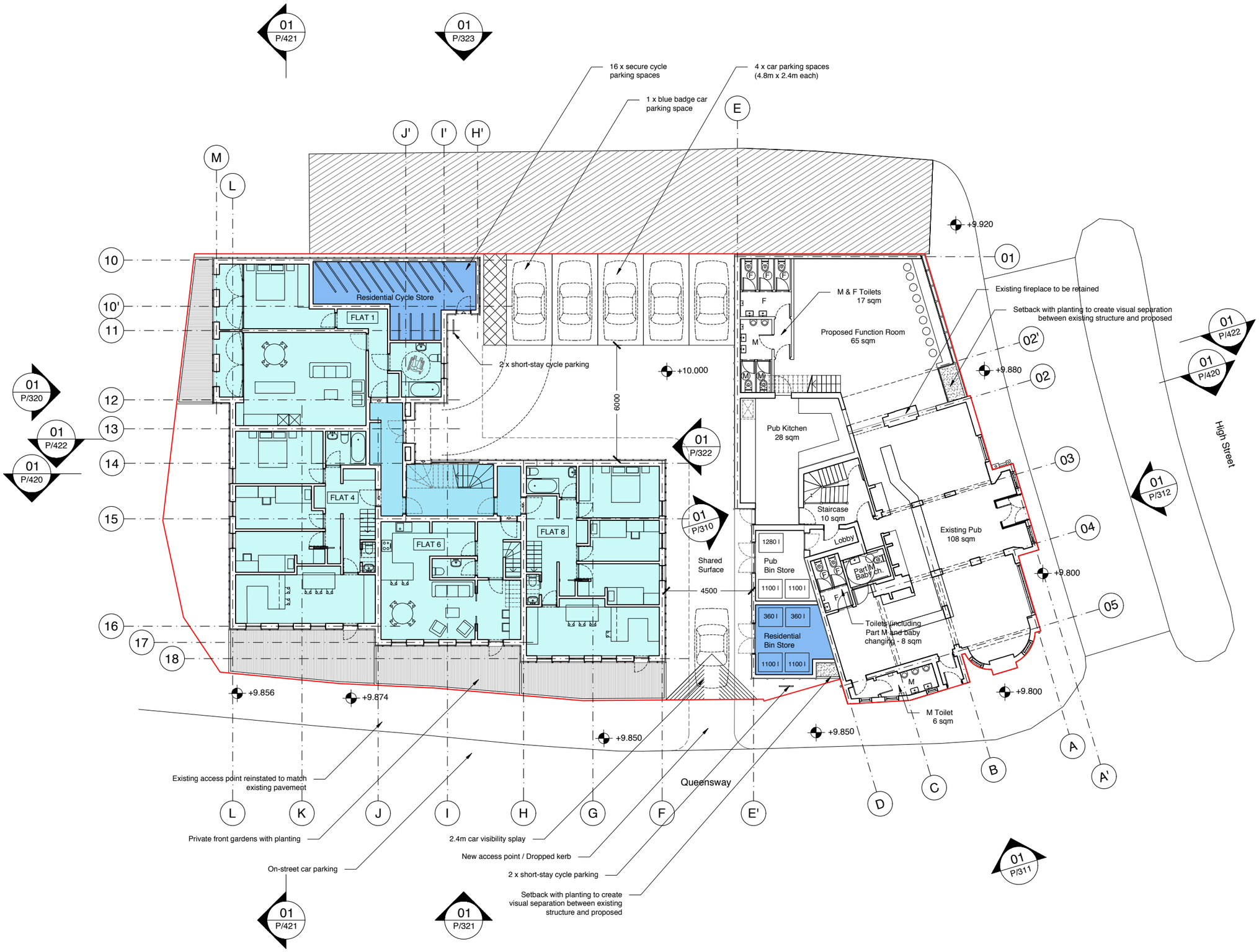
Client Name: Ponders End Properties LTD

Project Name	Project Number
Ponders End Housing	VINE92

Date	Scale	Drawn by	Checked by
23.10.2019	1:100 @ A1 1:200 @ A3	PJ	RPR

Drawing Name	Drawing No	Revision
Proposed GA Basement Plan	P/099	7



01 P/100 Proposed - Ground Floor Plan
Scale 1:100@A1 1:200@A3

Notes:

- This drawing is for planning purposes only

Pub Recycling and Waste Storage

Waste material	2 x	1100 litre
Recyclable material	1 x	1280 litre

Residential Recycling and Waste Storage

Waste material	2 x	1100 litre
Recyclable material	2 x	360 litre

Ground Floor Cycle Parking

Long-stay parking	16 spaces
Short-stay parking	4 spaces

N

0 2 4 6 8 10m

Scalebar - 1:100 @ A1, 1:200 @A3

Revision	Description	Date
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3	Pre-planning DRAFT	12/12/2018
2	Revised lift, bike store and bin stores	28/11/2018
1	Proposed drawings DRAFT	23/11/2018
*	Pre-Planning	05/07/2018

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Project Name	Project Number
Ponders End Housing	VINE92

Date	Scale	Drawn by	Checked by
23.10.2019	1:100 @ A1 1:200 @ A3	PJ	RPR

Drawing Name	Drawing No	Revision
Proposed GA Ground Floor Plan	P/100	9

01 P/101 Proposed - Layout First Floor Plan
Scale 1:100@A1 1:200@A3

Notes:

- This drawing is for planning purposes only

N

0 2 4 6 8 10m
Scalebar - 1:100 @ A1, 1:200 @A3

Revision	Description	Date
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Client Name: Ponders End Properties LTD

Project Name	Project Number
Ponders End Housing	VINE92

Date	Scale	Drawn by	Checked by
23.10.2019	1:100 @ A1 1:200 @ A3	PJ	RPR

Drawing Name	Drawing No	Revision
Proposed GA First Floor Plan	P/101	9

Notes:

- This drawing is for planning purposes only

01 P/102 Proposed - GA Second Floor Plan
Scale 1:100@A1 1:200@A3

N

0 2 4 6 8 10m
Scalebar - 1:100 @ A1, 1:200 @A3

Revision	Description	Date
9	Full Planning Application	23/10/2019
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1	Proposed drawings DRAFT	23/11/2018
*	Pre-Planning	05/07/2018

Status
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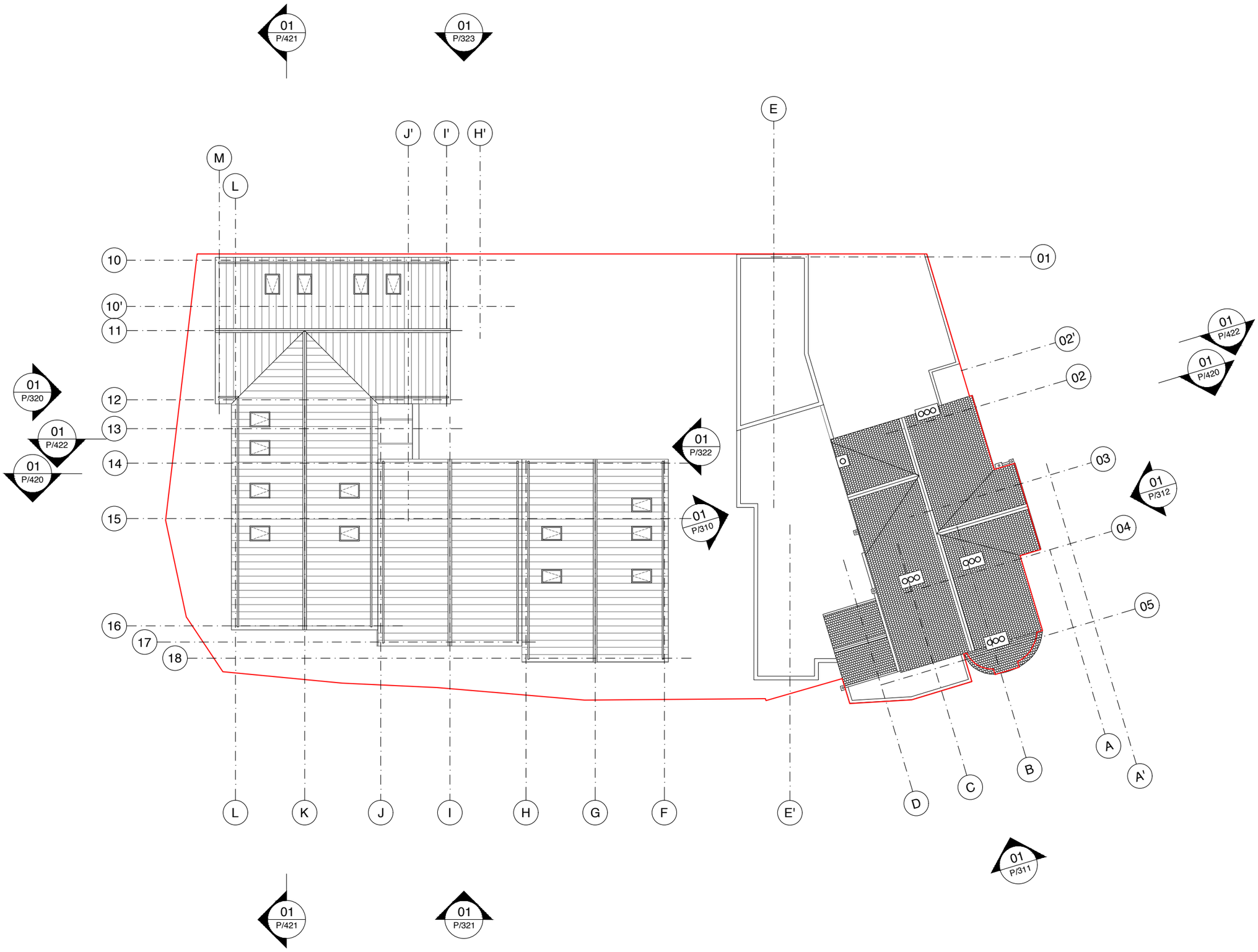
Client Name: Ponders End Properties LTD

Project Name	Project Number
Ponders End Housing	VINE92

Date	Scale	Drawn by	Checked by
23.10.2019	1:100 @ A1 1:200 @ A3	PJ	RPR

Drawing Name	Drawing No	Revision
Proposed GA Second Floor Plan	P/102	9



01 P/103 Proposed - GA Roof Plan
Scale 1:100@A1 1:200@A3

Notes:

- This drawing is for planning purposes only

N

0 2 4 6 8 10m
Scalebar - 1:100 @ A1, 1:200 @A3

Revision	Description	Date
9	Full Planning Application	23/10/2019
8	Revised Planning Set	18/10/2019
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3	Pre-planning DRAFT	12/12/2018
2	Revised lift, bike store and bin stores	28/11/2018
1	Proposed drawings DRAFT	23/11/2018
*	Pre-Planning	05/07/2018

Status
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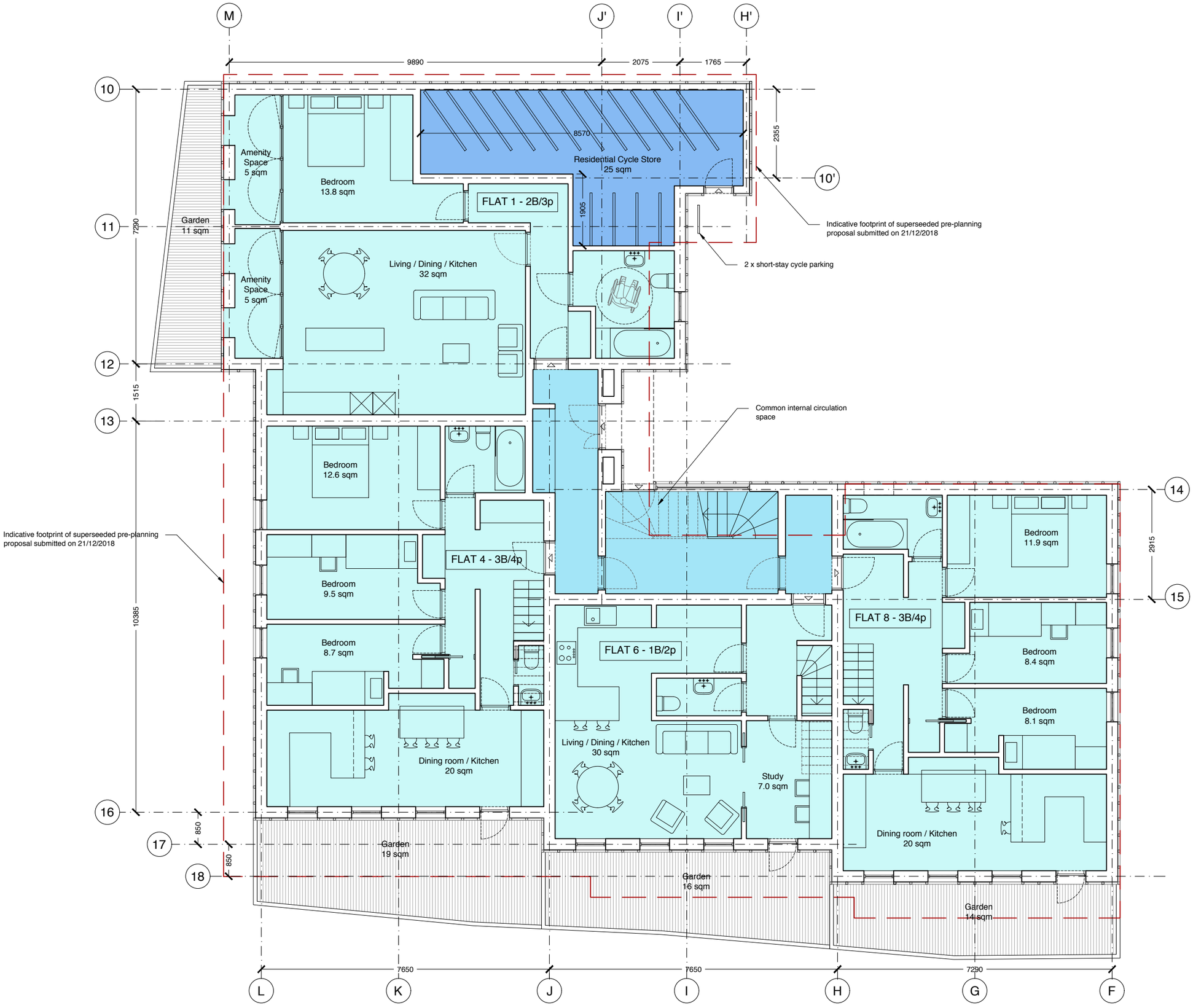
Client Name: Ponders End Properties LTD

Project Name	Project Number
Ponders End Housing	VINE92

Date	Scale	Drawn by	Checked by
23.10.2019	1:100 @ A1 1:200 @ A3	PJ	RPR

Drawing Name	Drawing No	Revision
Proposed GA Roof Plan	P/103	9



01 P/120 Proposed - Residential Ground Floor Plan
Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

N

0 1 2 3 4 5m

Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
9	Full Planning Application	23/10/2019
8	Revised Planning Set	18/10/2019
7	Full Planning Application DRAFT	19/08/2019
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-	-	
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3	Pre-Application FINAL DRAFT	18/12/2018
2	Pre-planning DRAFT	12/12/2018
1	Revised lift, bike store and bin stores	28/11/2018
*	Proposed drawings DRAFT	23/11/2018

Status
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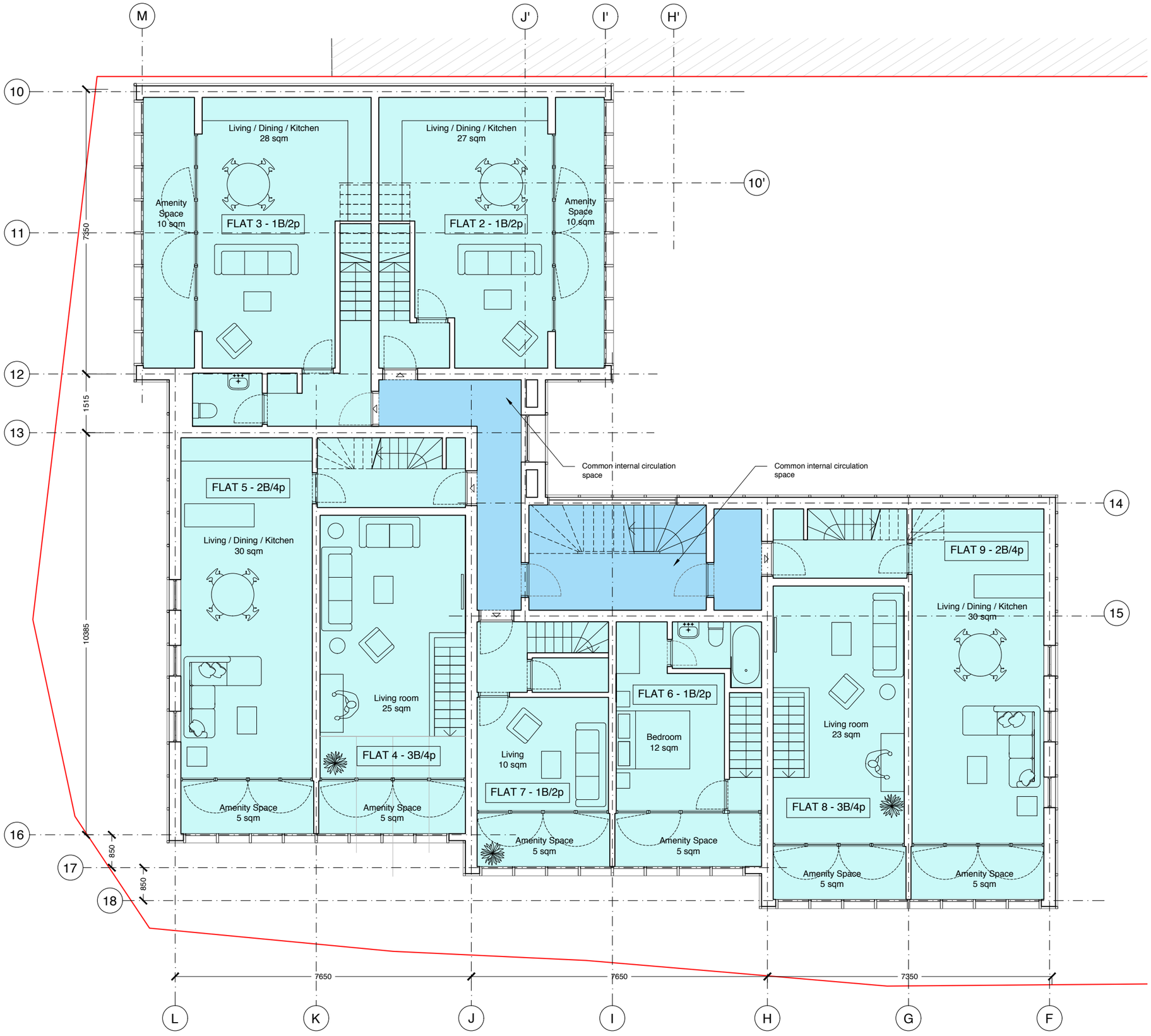
Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:50 @ A1, 1:100 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed Residential Ground Floor Plan
Drawing No: P/120
Revision: 9



01 P/121 Proposed - Residential First Floor Plan
Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

N

0 1 2 3 4 5m

Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
9	Full Planning Application	23/10/2019
8	Revised Planning Set	18/10/2019
7	Full Planning Application DRAFT	19/08/2019
6	Planning Application FINAL DRAFT	21/06/2019
5	-	
4	Pre-Planning Application	21/12/2018
3	Pre-Application FINAL DRAFT	18/12/2018
2	Pre-planning DRAFT	12/12/2018
1	Revised lift, bike store and bin stores	28/11/2018
*	Proposed drawings DRAFT	23/11/2018

Status
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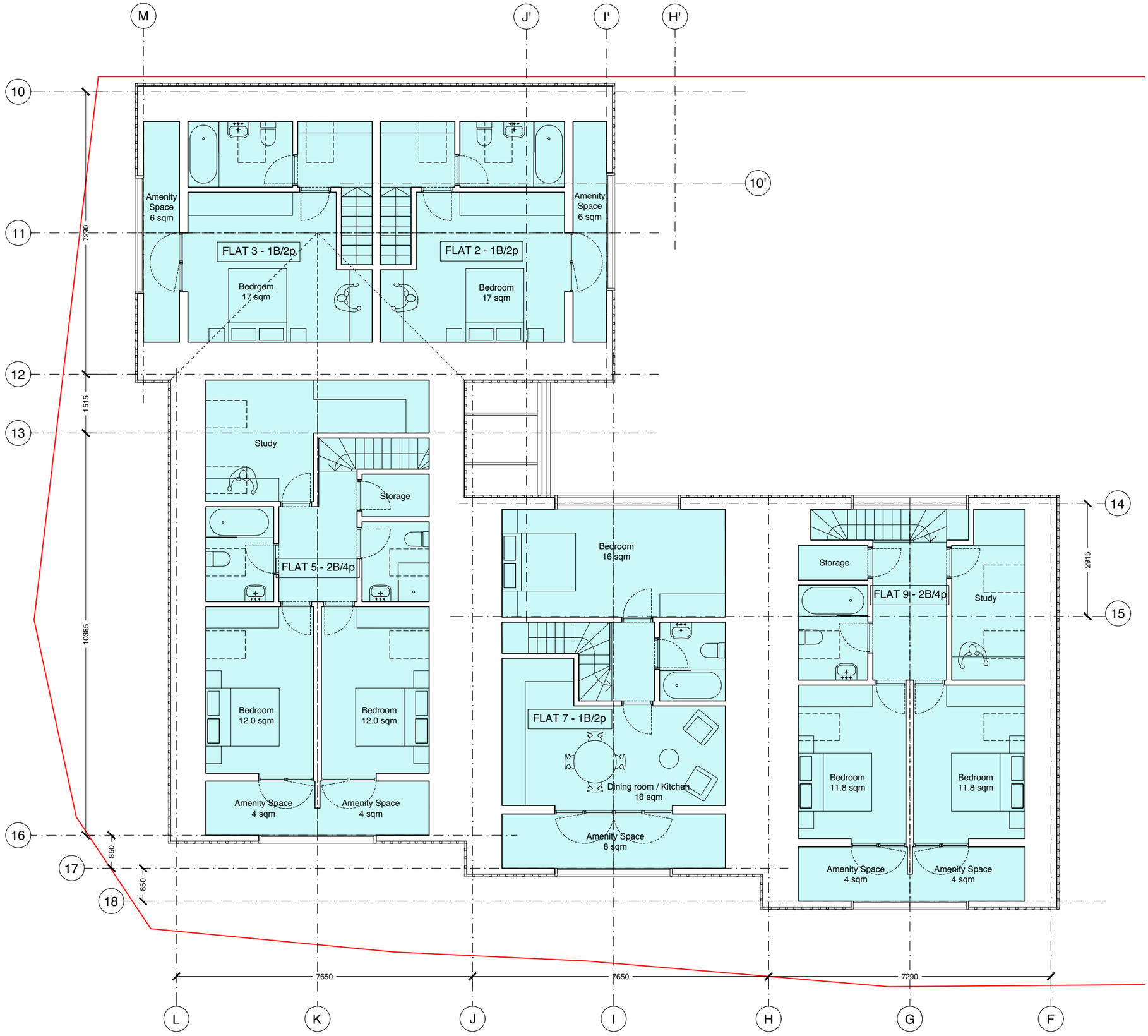
Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:50 @ A1, 1:100 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed Residential First Floor Plan
Drawing No: P/121
Revision: 9



01 Proposed - Residential Second Floor Plan
P/122 Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

N

0 1 2 3 4 5m

Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
9	Full Planning Application	23/10/2019
8	Revised Planning Set	18/10/2019
7	Full Planning Application DRAFT	19/08/2019
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1	Revised lift, bike store and bin stores	28/11/2018
*	Proposed drawings DRAFT	23/11/2018

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Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing

Project Number: VINE92

Date: 23.10.2019

Scale: 1:50 @ A1, 1:100 @ A3

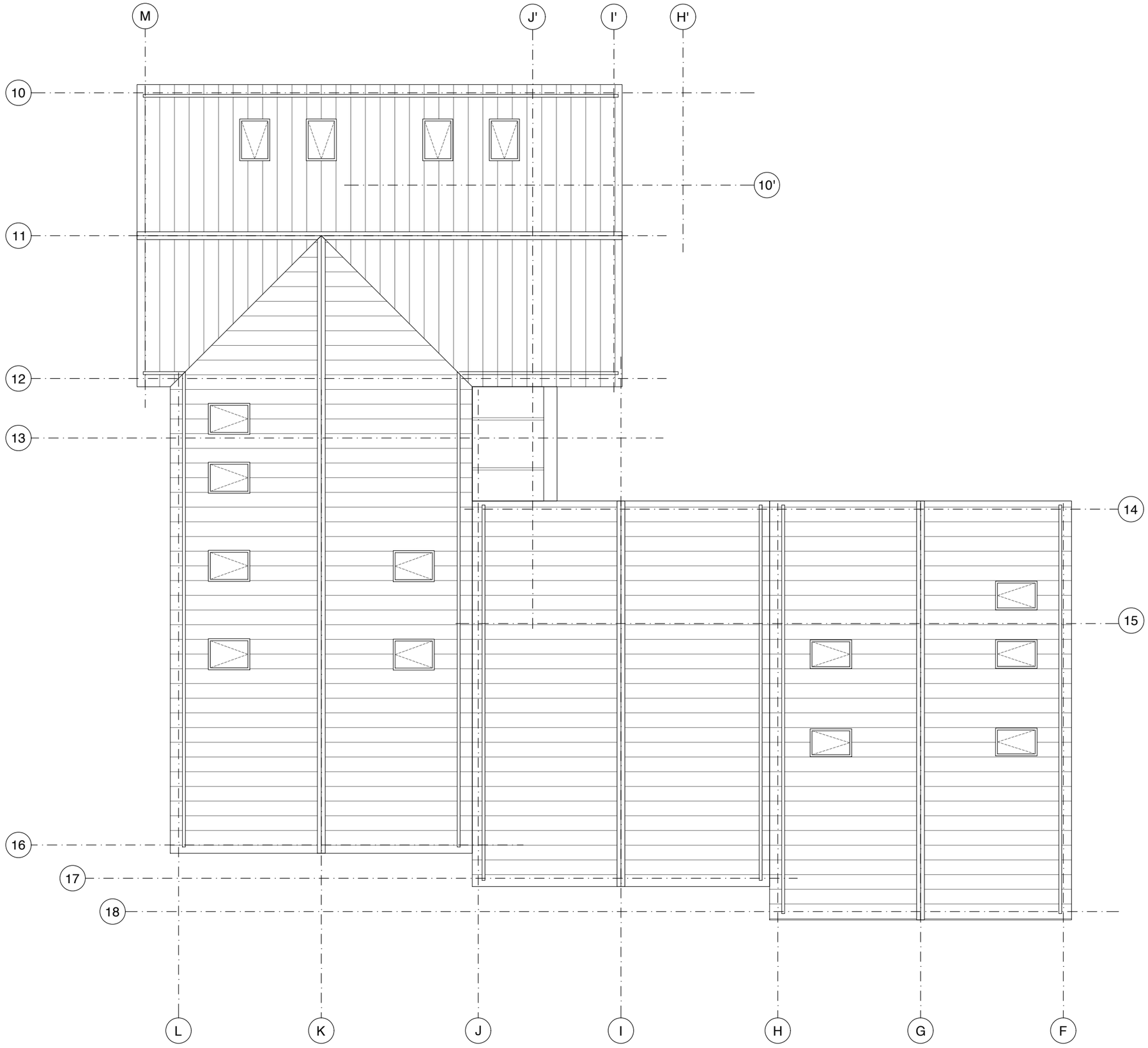
Drawn by: PJ

Checked by: RPR

Drawing Name: Proposed Residential Second Floor Plan

Drawing No: P/122

Revision: 9



01 P/123 Proposed - Residential Roof Plan
Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

N

0 1 2 3 4 5m

Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
9	Full Planning Application	23/10/2019
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7	Full Planning Application DRAFT	19/08/2019
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5	-	
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*	Proposed drawings DRAFT	23/11/2018

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Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:50 @ A1, 1:100 @ A3
Drawn by: PJ
Checked by: RPR

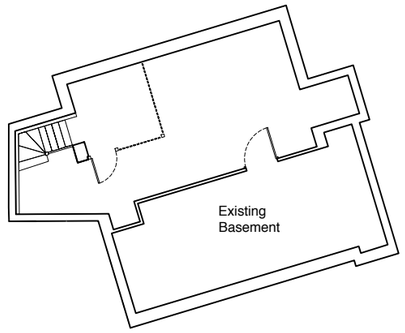
Drawing Name: Proposed Residential Roof Plan
Drawing No: P/123
Revision: 9

Notes:

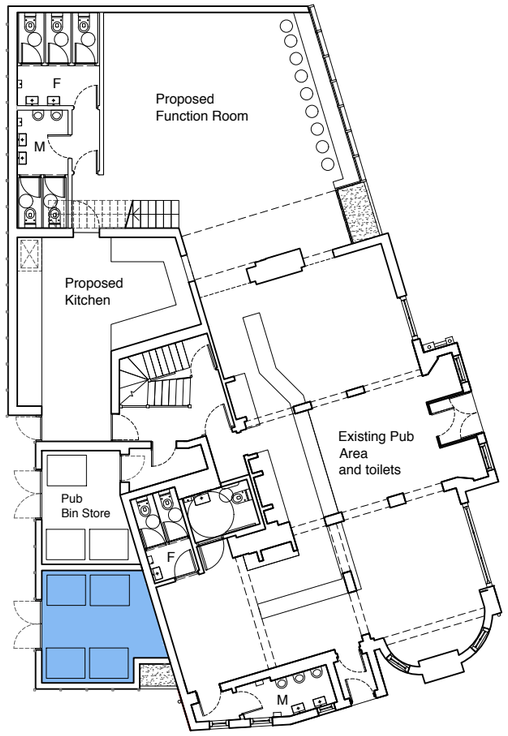
- This drawing is for planning purposes only

BASEMENT

Existing basement (Retained)	70 sqm
Tot Basement	**70 sqm**



01 P/251 Proposed - Basement Plan
Scale 1:100@A1 1:200@A3



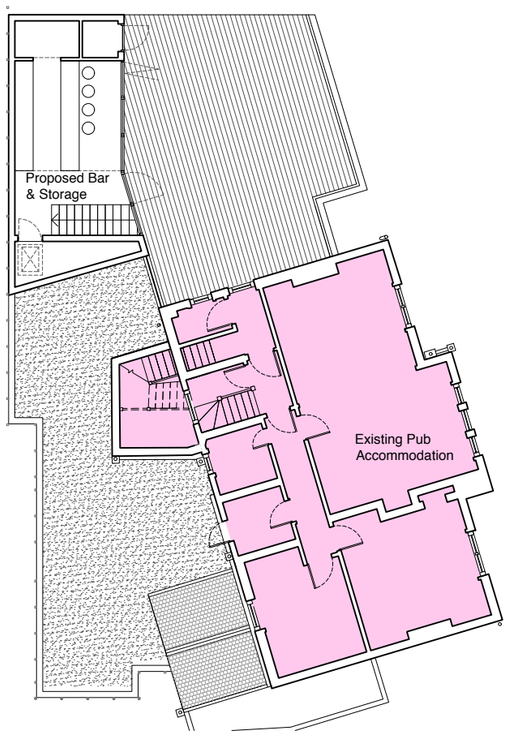
GROUND FLOOR

Existing Pub Area and toilets (Retained)	130 sqm
Proposed Function Room	68 sqm
Proposed Pub Kitchen	28 sqm
Proposed Pub Toilets	17 sqm
Proposed Bin Store	10 sqm
Tot Ground Floor	**253 sqm**

02 P/251 Proposed - Ground Floor Plan
Scale 1:100@A1 1:200@A3

1st FLOOR

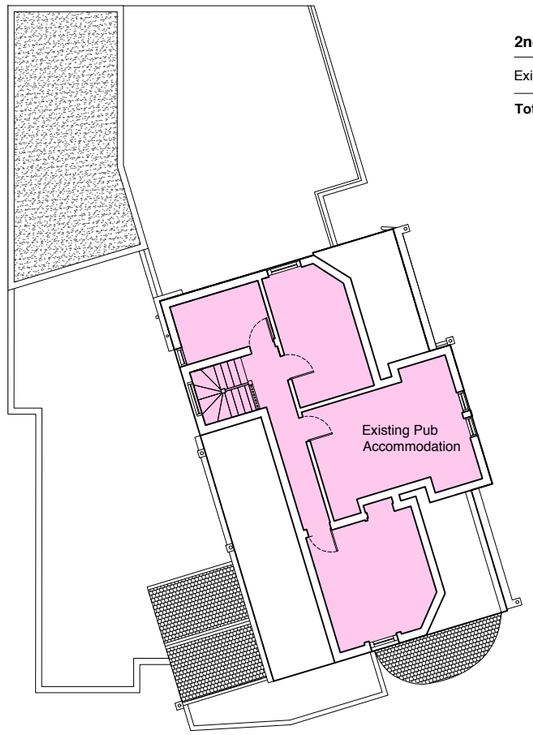
Proposed Bar & Storage	30 sqm
Existing Accommodation	94 sqm
Tot First Floor	**124 sqm**



03 P/251 Proposed - First Floor Plan
Scale 1:100@A1 1:200@A3

2nd FLOOR

Existing Accommodation	58 sqm
Tot Second Floor	**58 sqm**



04 P/251 Proposed - Second Floor Plan
Scale 1:100@A1 1:200@A3

PROPOSED PUB AREA SCHEDULE
GIA per Function (sqm)

Function	Area
Existing Basement	70 sqm
Existing Pub Area and Toilets	130 sqm
Existing 1st Floor Pub Accommodation	94 sqm
Existing 2nd Floor Pub Accommodation	58 sqm
Proposed Function Room	68 sqm
Proposed Pub Kitchen	28 sqm
Proposed Toilets in Extension Area	17 sqm
Proposed Bar and Storage 1st Floor	30 sqm
Proposed Bin Store	10 sqm
TOTAL PROPOSED AREA	**505 sqm**

N

0 2 4 6 8 10m
Scalebar - 1:100 @ A1, 1:200 @A3

Revision	Description	Date
2	Full Planning Application	23/10/2019
1	Revised Planning Set	18/10/2019
*	Full Planning Application DRAFT	19/08/2019

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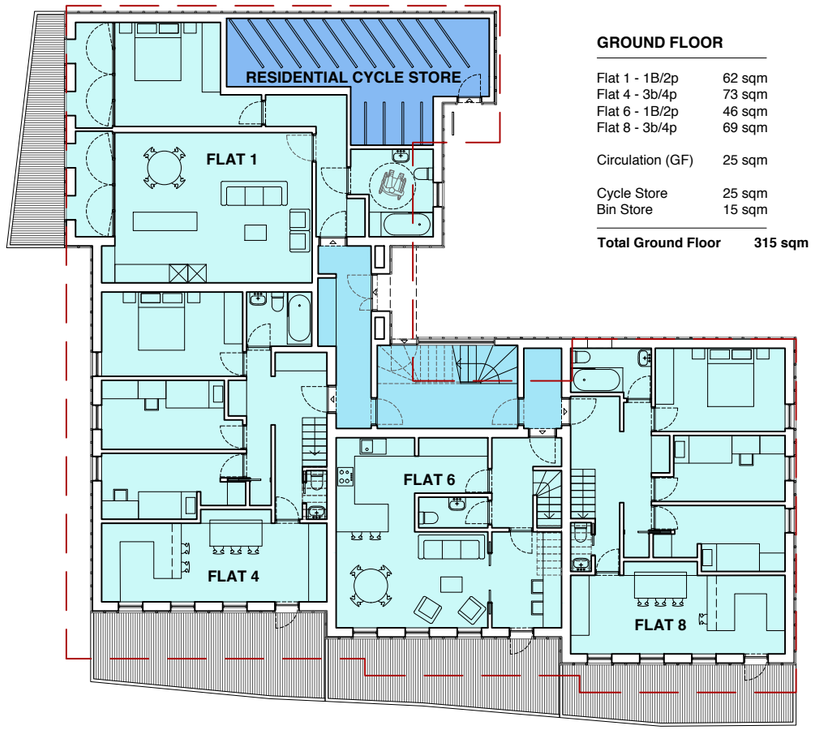
Client Name: Ponders End Properties LTD

Project Name	Project Number
Ponders End Housing	VINE92

Date	Scale	Drawn by	Checked by
23.10.2019	1:100 @ A1 1:200 @ A3	PJ	RPR

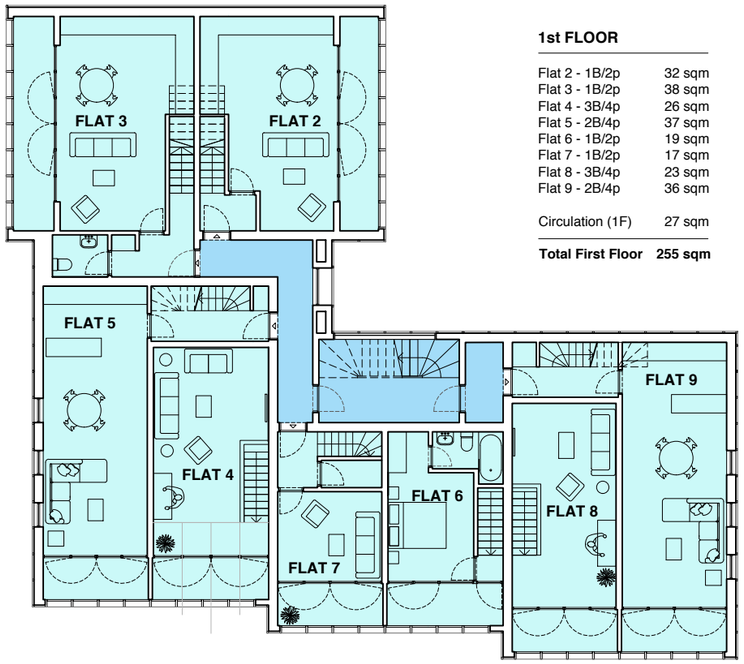
Drawing Name	Drawing No	Revision
Proposed Pub Accommodation schedule	P/251	2



GROUND FLOOR

Flat 1 - 1B/2p	62 sqm
Flat 4 - 3b/4p	73 sqm
Flat 6 - 1B/2p	46 sqm
Flat 8 - 3b/4p	69 sqm
Circulation (GF)	25 sqm
Cycle Store	25 sqm
Bin Store	15 sqm
Total Ground Floor	**315 sqm**

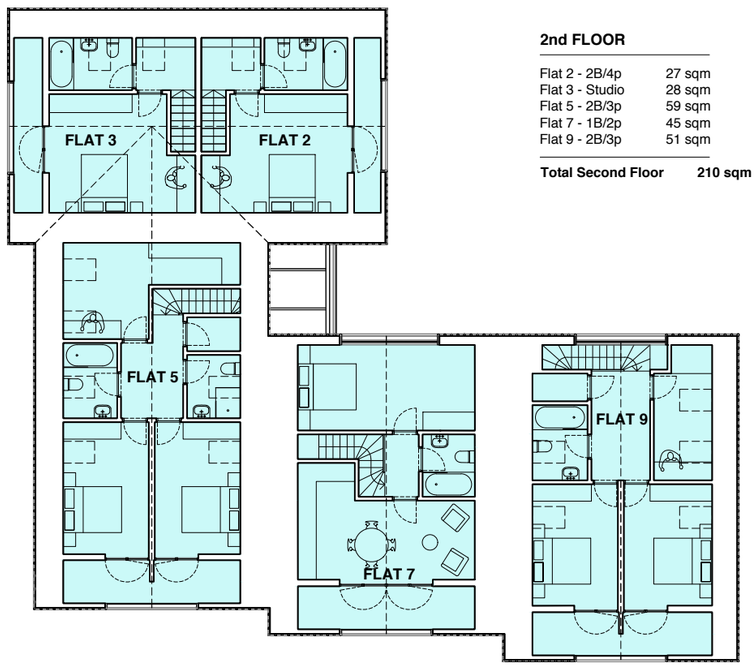
01 P/252 Proposed - Ground Floor Plan
Scale 1:100@A1 1:200@A3



1st FLOOR

Flat 2 - 1B/2p	32 sqm
Flat 3 - 1B/2p	38 sqm
Flat 4 - 3B/4p	26 sqm
Flat 5 - 2B/4p	37 sqm
Flat 6 - 1B/2p	19 sqm
Flat 7 - 1B/2p	17 sqm
Flat 8 - 3B/4p	23 sqm
Flat 9 - 2B/4p	36 sqm
Circulation (1F)	27 sqm
Total First Floor	**255 sqm**

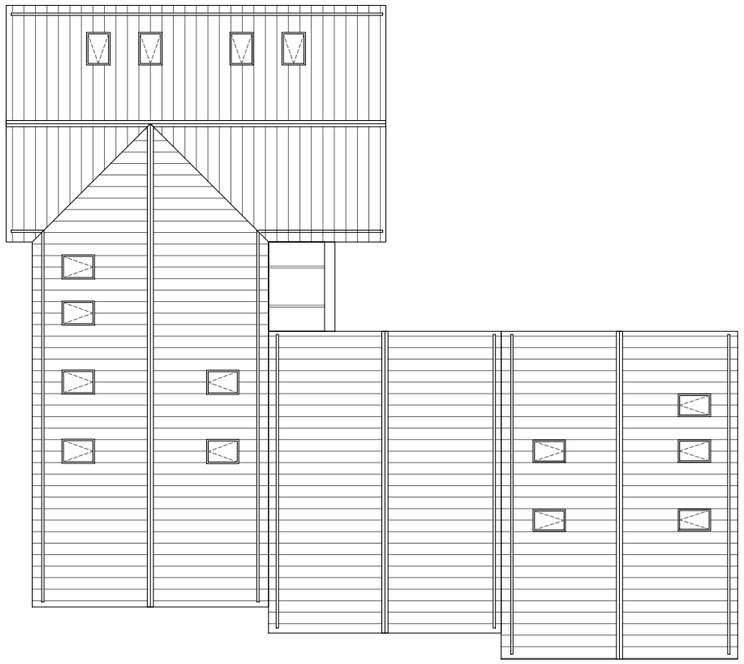
02 P/252 Proposed - First Floor Plan
Scale 1:100@A1 1:200@A3



2nd FLOOR

Flat 2 - 2B/4p	27 sqm
Flat 3 - Studio	28 sqm
Flat 5 - 2B/3p	59 sqm
Flat 7 - 1B/2p	45 sqm
Flat 9 - 2B/3p	51 sqm
Total Second Floor	**210 sqm**

03 P/252 Proposed - Second Floor Plan
Scale 1:100@A1 1:200@A3



04 P/252 Proposed - Roof Plan
Scale 1:100@A1 1:200@A3

Notes:

- This drawing is for planning purposes only

PROPOSED RESIDENTIAL AREA SCHEDULE
GIA Per Flat (sqm)

Flat	Type	GF	1F	2F	Tot Area
FLAT 1	1b 2p	62	-	-	**62 sqm**
FLAT 2	1b 2p	-	32	27	**59 sqm**
FLAT 3	1b 2p	-	38	28	**66 sqm**
FLAT 4	3b 4p	73	26	-	**99 sqm**
FLAT 5	2b 4p	-	37	59	**96 sqm**
FLAT 6	1b 2p	46	19	-	**65 sqm**
FLAT 7	1b 2p	-	17	45	**62 sqm**
FLAT 8	3b 4p	69	23	-	**92 sqm**
FLAT 9	2b 4p	-	36	51	**87 sqm**
Total Flats Area					**688 sqm**
Total Circulation					**52 sqm**
Residential Cycle Parking Store					**25 sqm**
Residential Bin Store					**15 sqm**
TOTAL PROPOSED AREA					**780 sqm**

N

0 2 4 6 8 10m
Scalebar - 1:100 @ A1, 1:200 @A3

Revision	Description	Date
7	Full Planning Application	23/10/2019
6	Revised Planning Set	18/10/2019
5	Full Planning Application DRAFT	19/08/2019
4	Pre-Planning Application	21/12/2018
3	Pre-Application FINAL DRAFT	18/12/2018
2	Pre-planning DRAFT	12/12/2018
1	Revised lift, bike store and bin stores	28/11/2018
*	Proposed drawings DRAFT	23/11/2018

Status
○ Pre-Planning
● Planning
○ Tender
○ Construction
○ As Built
● Information
○ Discussion

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Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:100 @ A1, 1:200 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed Residential Accommodation schedule
Drawing No: P/252
Revision: 7

01 P/301 Proposed - South Elevation
Scale 1:125@A1 1:250@A3

Notes:

- This drawing is for planning purposes only

0 2.5 5 7.5 10 12.5m
Scalebar - 1:125 @ A1, 1:250 @A3

Revision	Description	Date
2	Full Planning Application	23/10/2019
1	Revised Planning Set	18/10/2019
*	Full Planning Application DRAFT	19/08/2019

Status
- ○ Pre-Planning
- ● Planning
- ○ Tender
- ○ Construction
- ○ As Built

- ● Information
- ○ Discussion

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Client Name: Ponders End Properties LTD

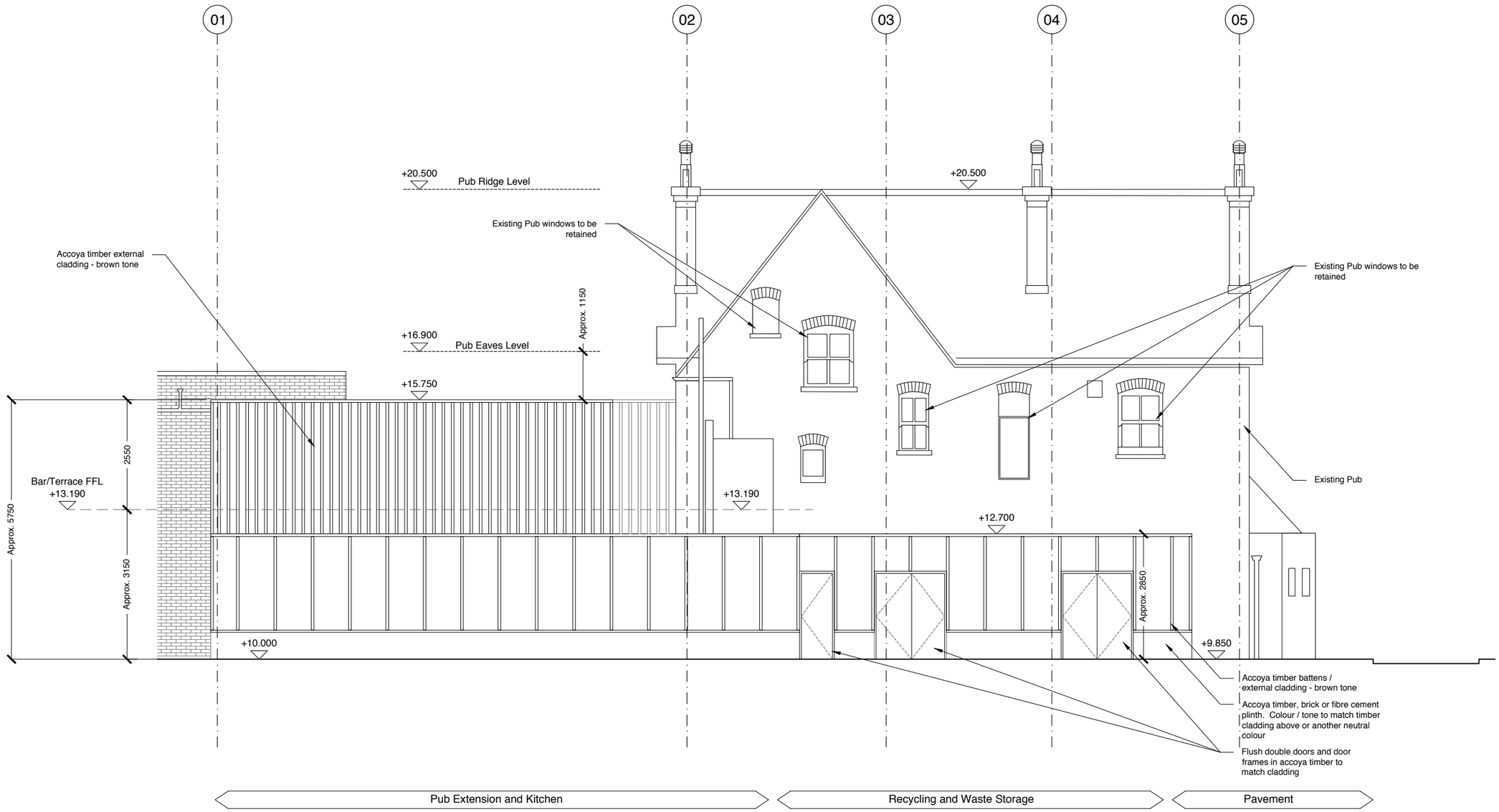
Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:125 @ A1, 1:250 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed Residential South Elevation
Drawing No: P/301
Revision: 2

Notes:

- This drawing is for planning purposes only



0 1 2 3 4 5m

Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
6	Full Planning Application	23/10/2019
5	Revised Planning Set	18/10/2019
4	Full Planning Application DRAFT	19/08/2019
3	Planning Application FINAL DRAFT	20/06/2019
2	Pre-Planning Application	21/12/2018
1	Pre-Application FINAL DRAFT	18/12/2018
*	Pre-planning DRAFT	12/12/2018

Status
- ○ Pre-Planning
- ● Planning
- ○ Tender
- ○ Construction
- ○ As Built

- ● Information
- ○ Discussion

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Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing

Project Number: VINE92

Date: 23.10.2019

Scale: 1:50 @ A1, 1:100 @ A3

Drawn by: PJ

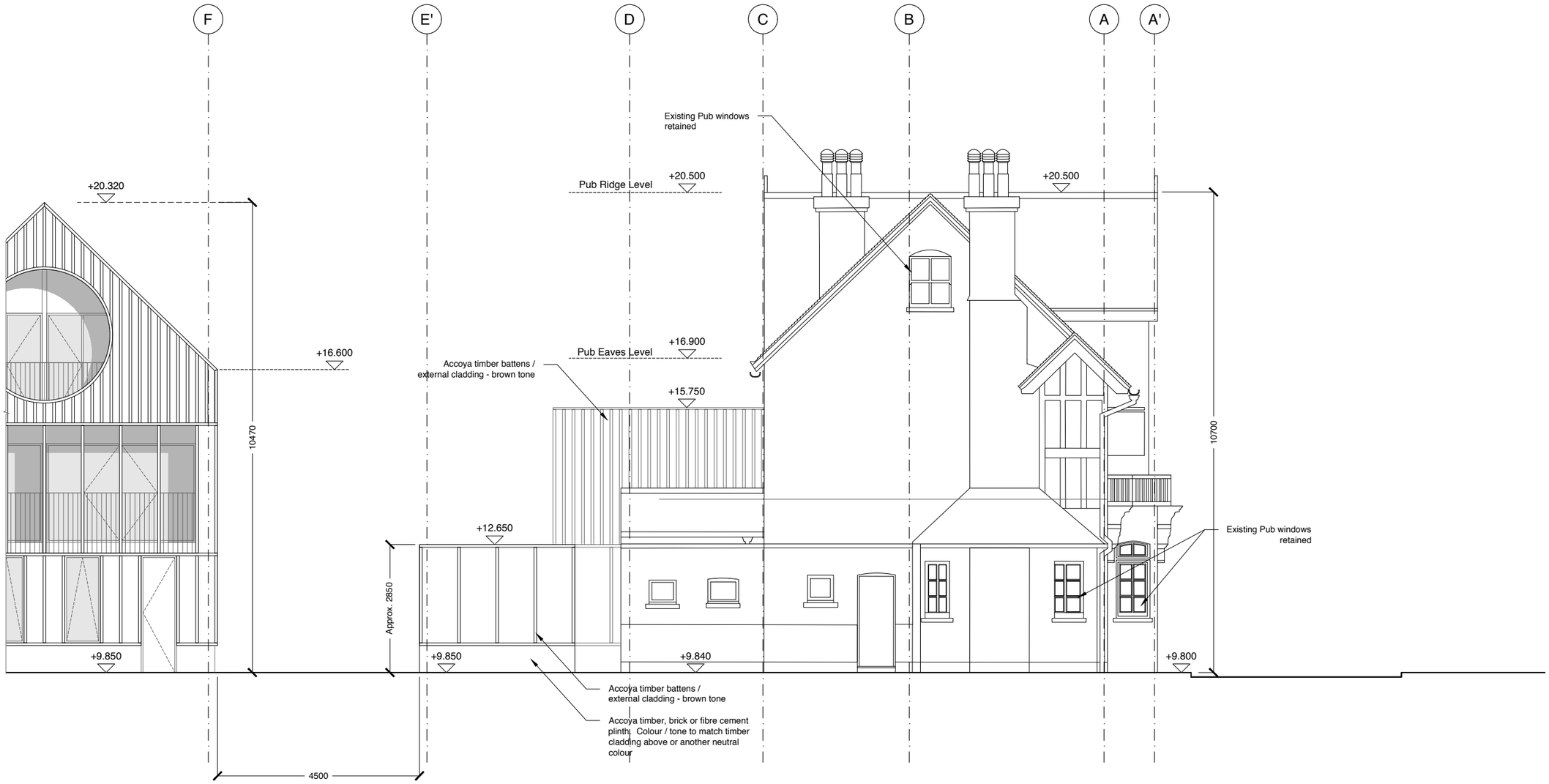
Checked by: RPR

Drawing Name: Proposed Pub West Elevation

Drawing No: P/310

Revision: 6

01 / P/310 Proposed - Pub West Elevation
Scale 1:50@A1 1:100@A3



01 / P/311 Proposed - Pub South Elevation
Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

0 1 2 3 4 5m
Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
6	Full Planning Application	23/10/2019
5	Revised Planning Set	18/10/2019
4	Full Planning Application DRAFT	19/08/2019
3	Planning Application FINAL DRAFT	19/106/2019
2	Pre-Planning Application	21/12/2018
1	Pre-Application FINAL DRAFT	18/12/2018
*	Pre-planning DRAFT	12/12/2018

Status
- ○ Pre-Planning
- ● Planning
- ○ Tender
- ○ Construction
- ○ As Built

- ● Information
- ○ Discussion

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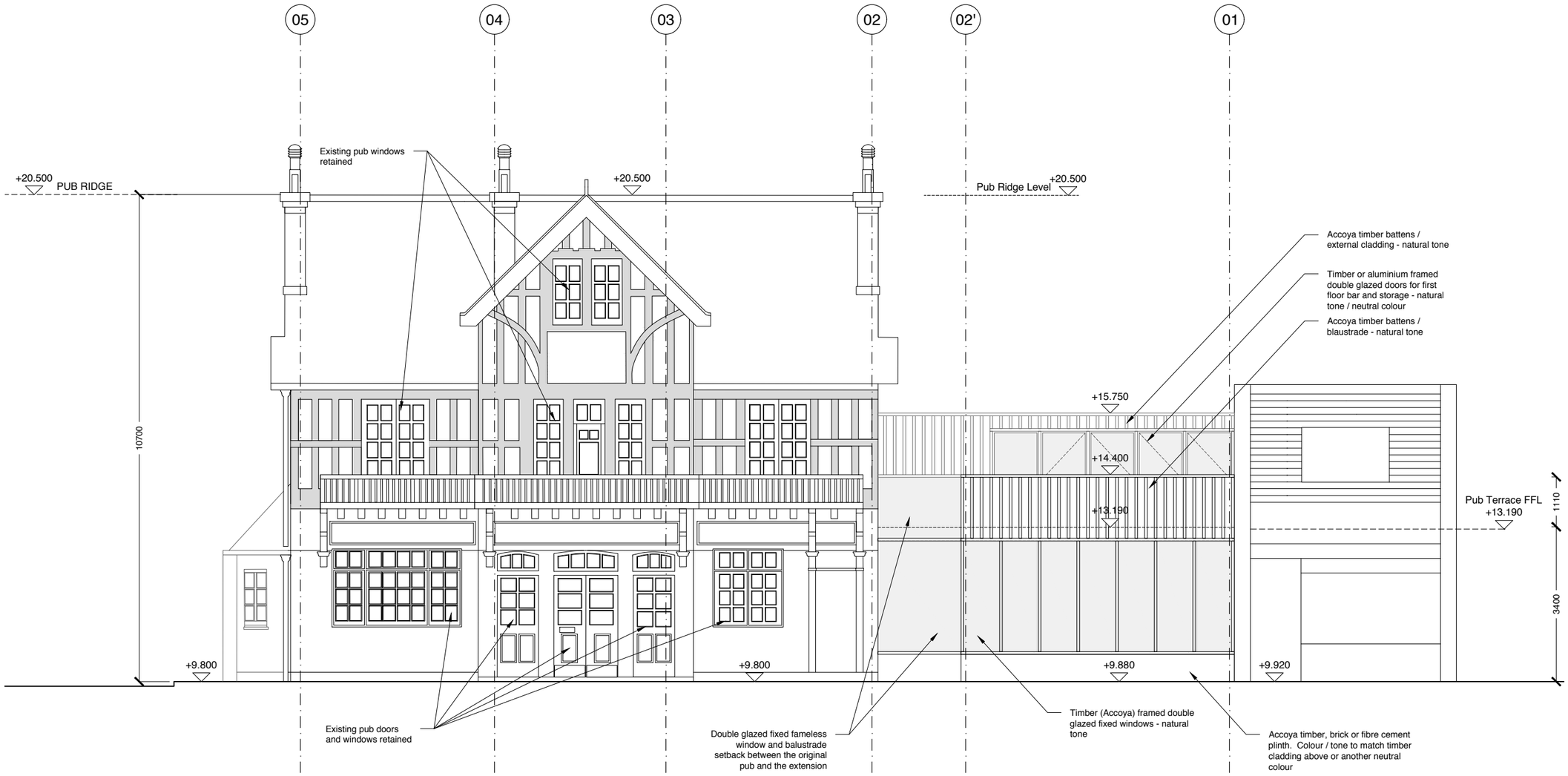
Client Name: Ponders End Properties LTD

Project Name	Project Number
Ponders End Housing	VINE92

Date	Scale	Drawn by	Checked by
23.10.2019	1:50 @ A1 1:100 @ A3	PJ	RPR

Drawing Name	Drawing No	Revision
Proposed Pub South Elevation	P/311	6



01 Proposed - Pub East Elevation
P/312 Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

0 1 2 3 4 5m
Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
6	Full Planning Application	23/10/2019
5	Revised Planning Set	18/10/2019
4	Full Planning Application DRAFT	19/08/2019
3	Planning Application FINAL DRAFT	19/06/2019
2	Pre-Planning Application	21/12/2018
1	Pre-Application FINAL DRAFT	18/12/2018
*	Pre-planning DRAFT	12/12/2018

Status
- ○ Pre-Planning
- ● Planning
- ○ Tender
- ○ Construction
- ○ As Built

- ● Information
- ○ Discussion

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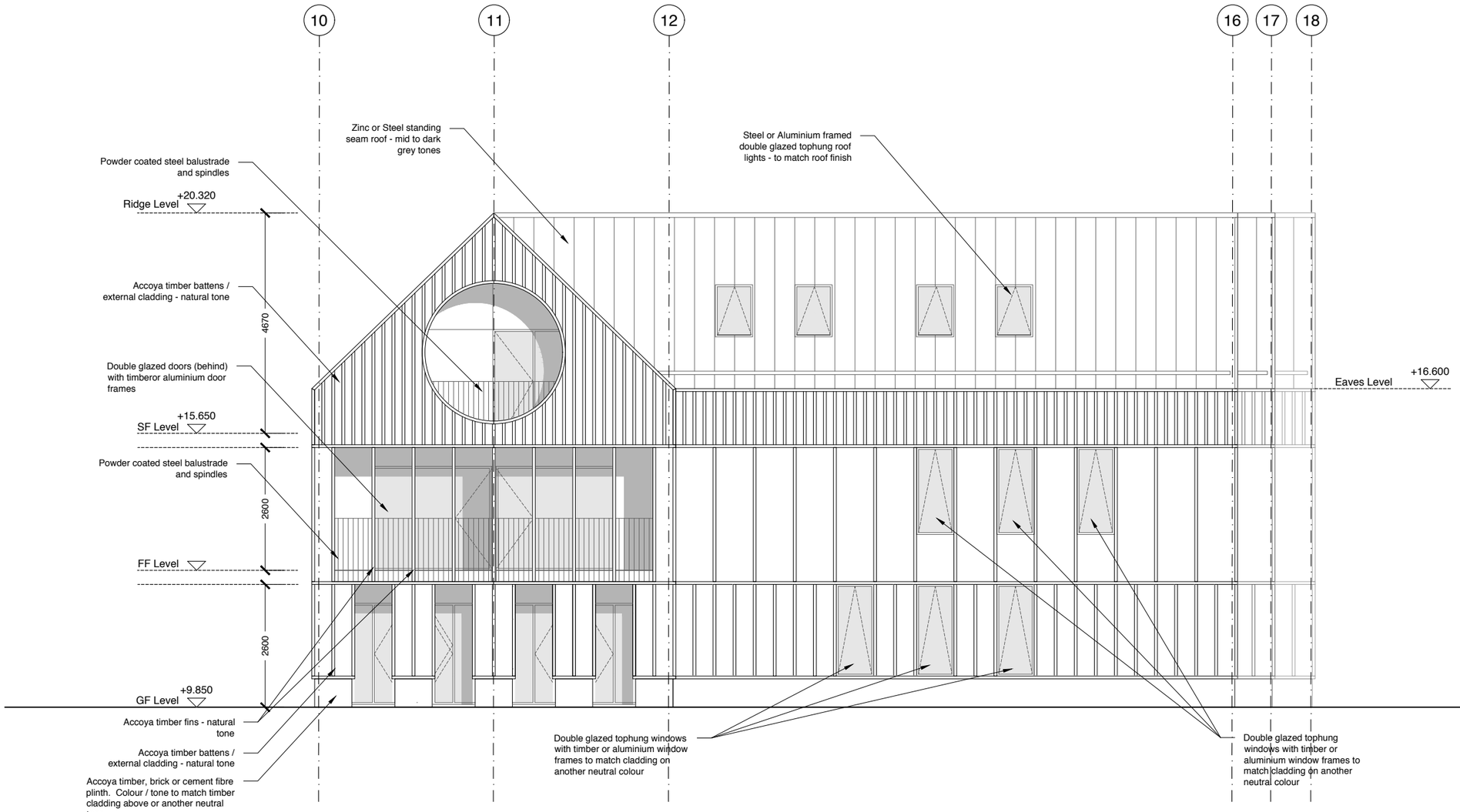
Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:50 @ A1, 1:100 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed Pub East Elevation
Drawing No: P/312
Revision: 6



01 P/320 Proposed - Residential West Elevation
Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

0 1 2 3 4 5m
Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
7	Full Planning Application	23/10/2019
6	Revised Planning Set	18/10/2019
5	Full Planning Application DRAFT	19/08/2019
4	Planning Application FINAL DRAFT	19/06/2019
3	Pre-Planning Application	21/12/2018
2	Pre-Application FINAL DRAFT	18/12/2018
1	Pre-planning DRAFT	12/12/2018
*	Proposed drawings DRAFT	23/11/2018

Status
○ Pre-Planning
● Planning
○ Tender
○ Construction
○ As Built

● Information
○ Discussion

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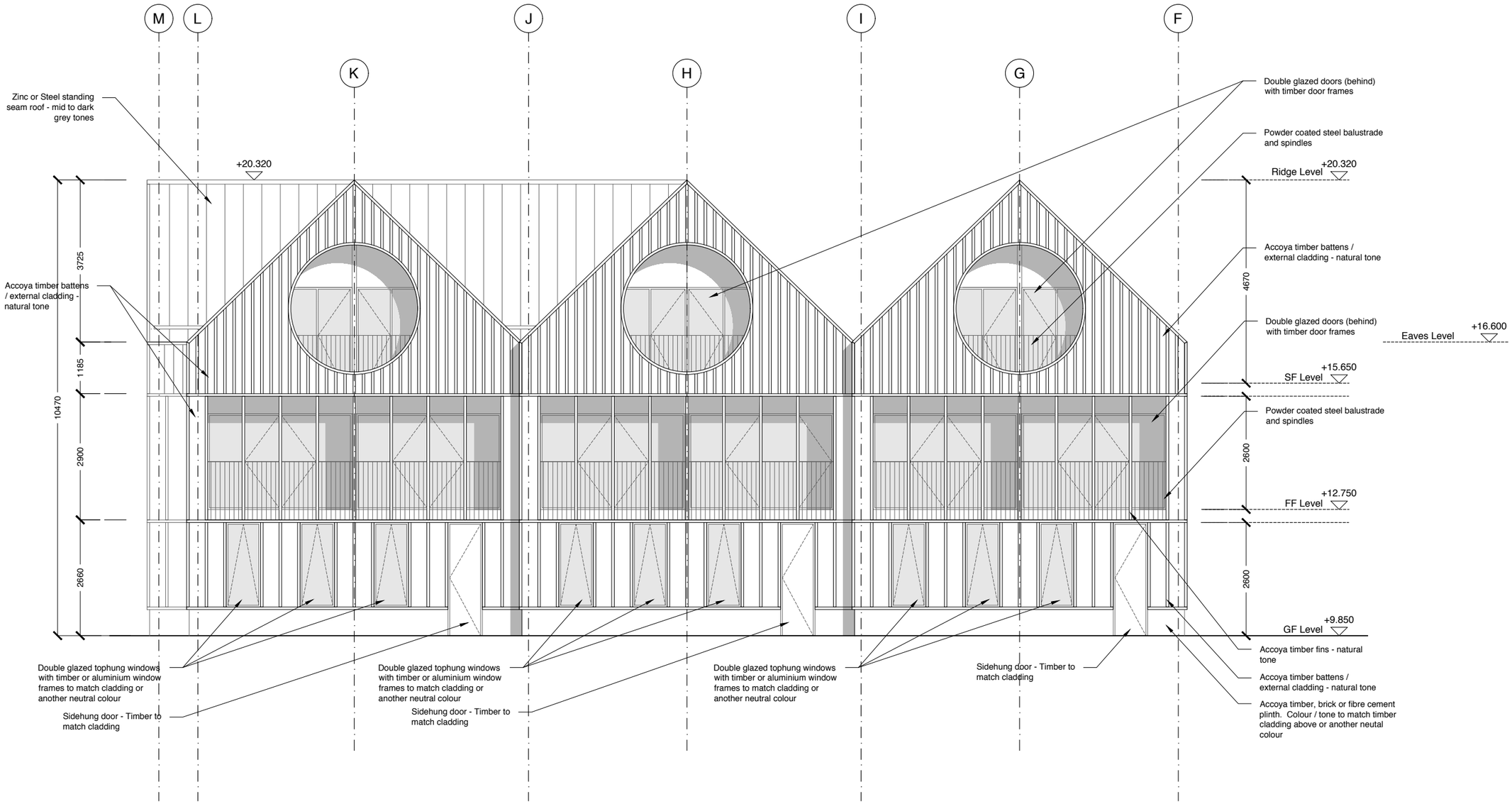
Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:50 @ A1, 1:100 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed Residential West Elevation
Drawing No: P/320
Revision: 7



01 Proposed - Residential South Elevation
P/321 Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

0 1 2 3 4 5m
Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
7	Full Planning Application	23/10/2019
6	Revised Planning Set	18/10/2019
5	Full Planning Application DRAFT	19/08/2019
4	Planning Application FINAL DRAFT	19/06/2019
3	Pre-Planning Application	21/12/2018
2	Pre-Application FINAL DRAFT	18/12/2018
1	Pre-planning DRAFT	12/12/2018
*	Proposed drawings DRAFT	23/11/2018

Status
○ Pre-Planning
● Planning
○ Tender
○ Construction
○ As Built
● Information
○ Discussion

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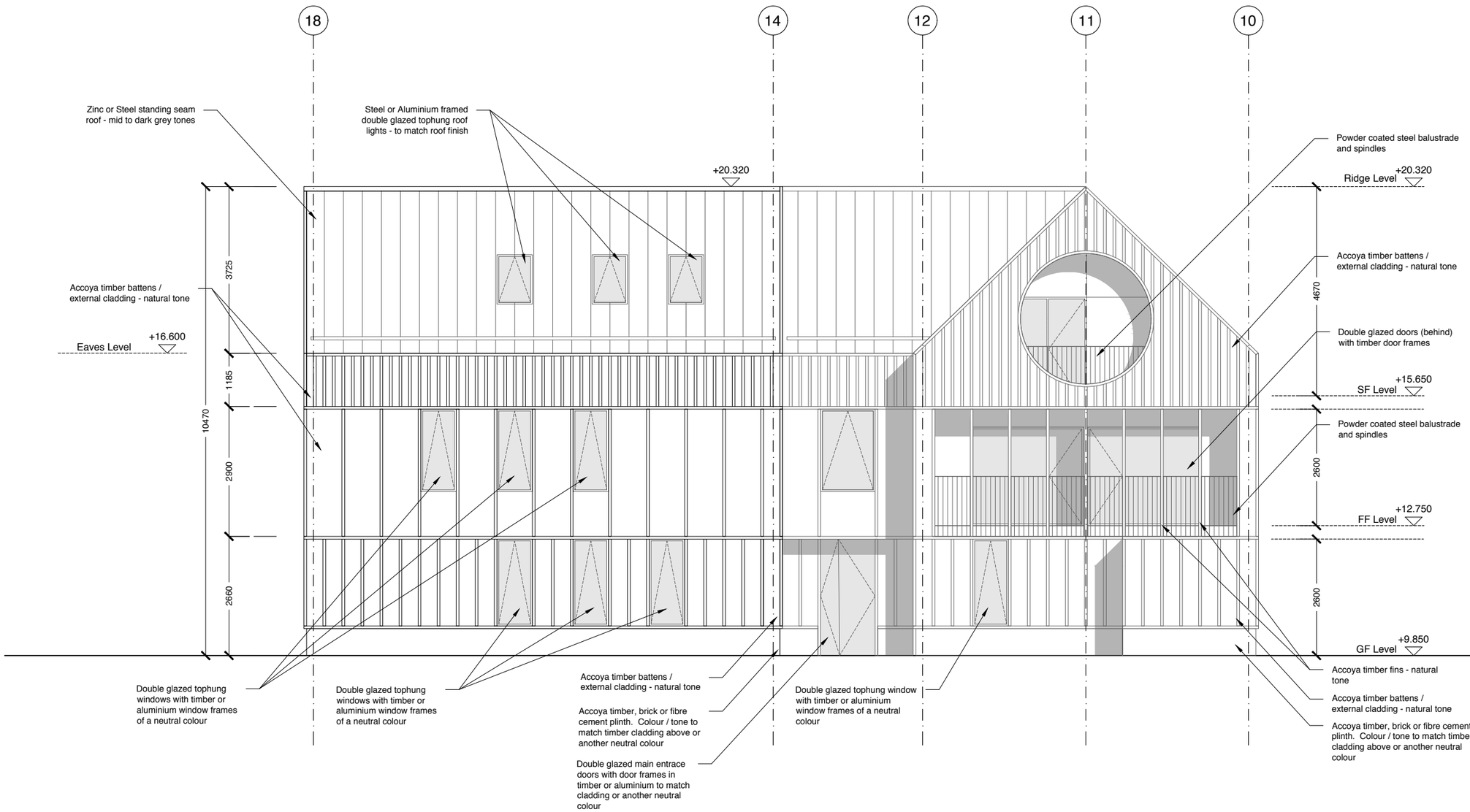
Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:50 @ A1, 1:100 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed Residential South Elevation
Drawing No: P/321
Revision: 7



01
P/322
Proposed - Residential East Elevation
Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

0 1 2 3 4 5m

Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
7	Full Planning Application	23/10/2019
6	Revised Planning Set	18/10/2019
5	Full Planning Application DRAFT	19/08/2019
4	Planning Application FINAL DRAFT	19/06/2019
3	Pre-Planning Application	21/12/2018
2	Pre-Application FINAL DRAFT	18/12/2018
1	Pre-planning DRAFT	12/12/2018
*	Proposed drawings DRAFT	23/11/2018

Status
- ○ Pre-Planning
- ● Planning
- ○ Tender
- ○ Construction
- ○ As Built

- ● Information
- ○ Discussion

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Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing

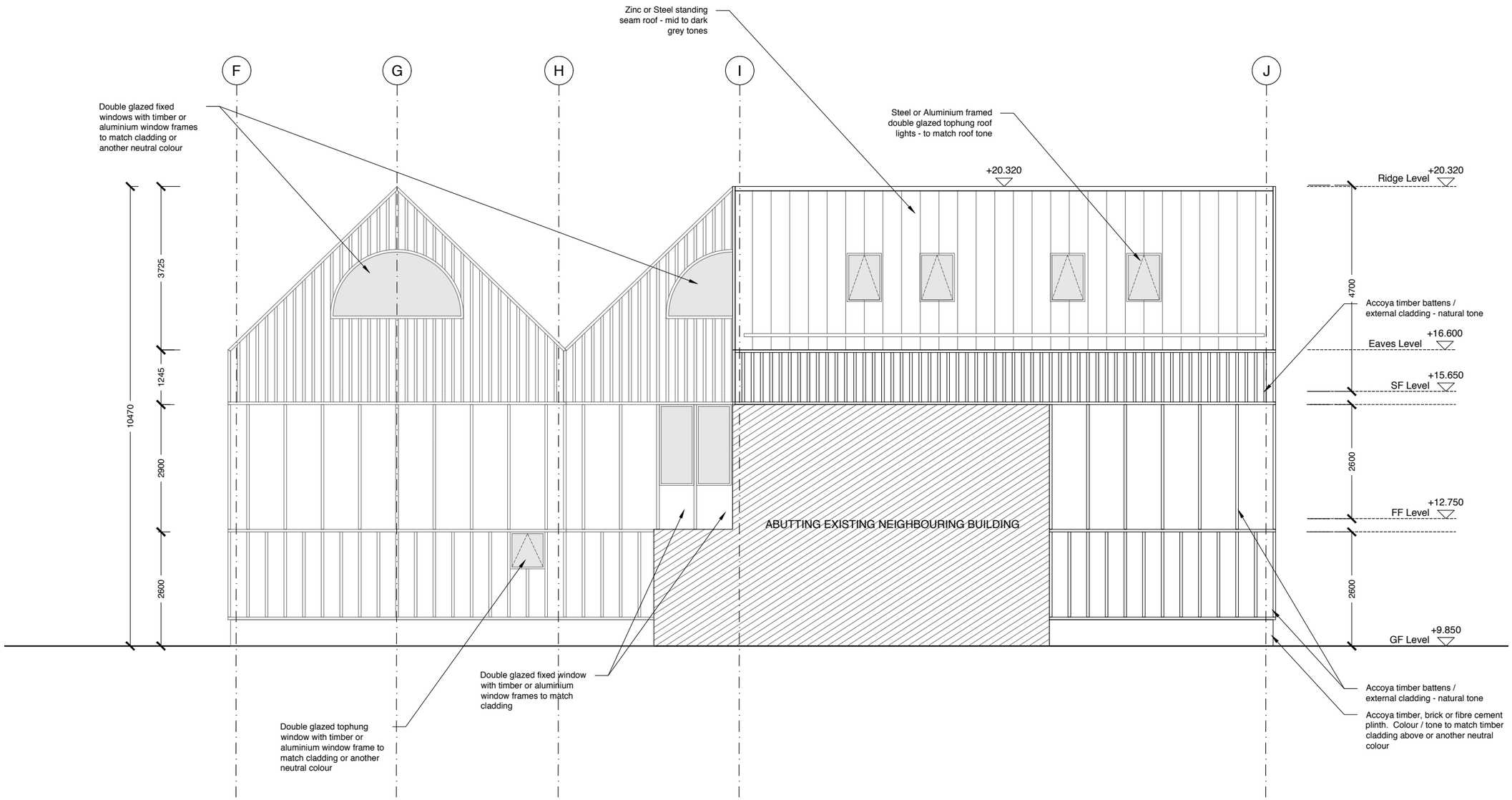
Project Number: VINE92

Date	Scale	Drawn by	Checked by
23.10.2019	1:50 @ A1 1:100 @ A3	PJ	RPR

Drawing Name: Proposed Residential East Elevation

Drawing No: P/322

Revision: 7



01 P/323 Proposed - Residential North Elevation
Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

0 1 2 3 4 5m
Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
7	Full Planning Application	23/10/2019
6	Revised Planning Set	18/10/2019
5	Full Planning Application DRAFT	19/08/2019
4	Planning Application FINAL DRAFT	19/06/2019
3	Pre-Planning Application	21/12/2018
2	Pre-Application FINAL DRAFT	18/12/2018
1	Pre-planning DRAFT	12/12/2018
*	Proposed drawings DRAFT	23/11/2018

Status
○ Pre-Planning
● Planning
○ Tender
○ Construction
○ As Built

● Information
○ Discussion

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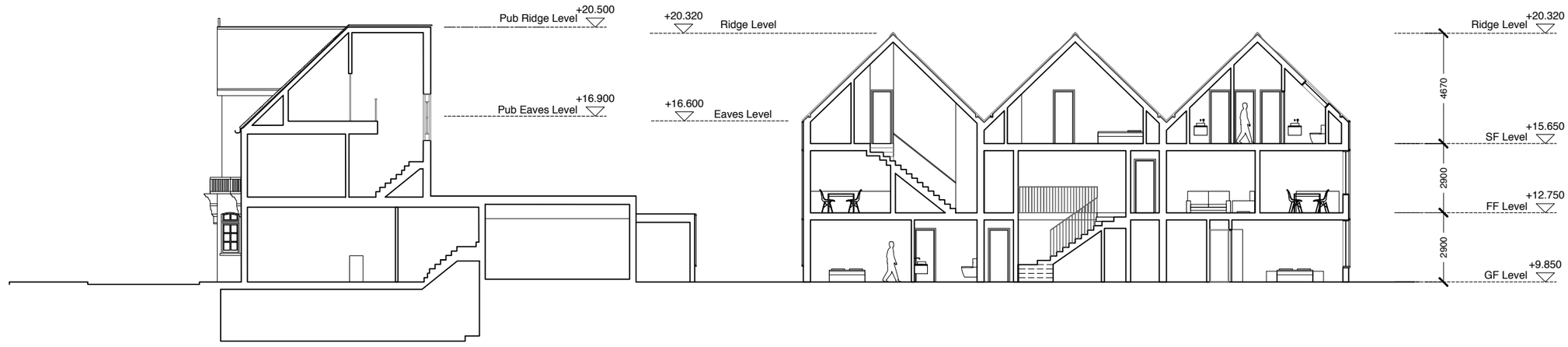
Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:50 @ A1, 1:100 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed Residential North Elevation
Drawing No: P/323
Revision: 7



01 P/401 Proposed - Section through Pub & Residential Proposal
Scale 1:100@A1 1:200@A3

Notes:

- This drawing is for planning purposes only

0 2 4 6 8 10m

Scalebar - 1:100 @ A1, 1:200 @A3

Revision	Description	Date
3	Full Planning Application	23/10/2019
2	Revised Planning Set	18/10/2019
1	Full Planning Application DRAFT	19/08/2019
*	Proposed drawings DRAFT	23/11/2018

Status
○ Pre-Planning
● Planning
○ Tender
○ Construction
○ As Built

● Information
○ Discussion

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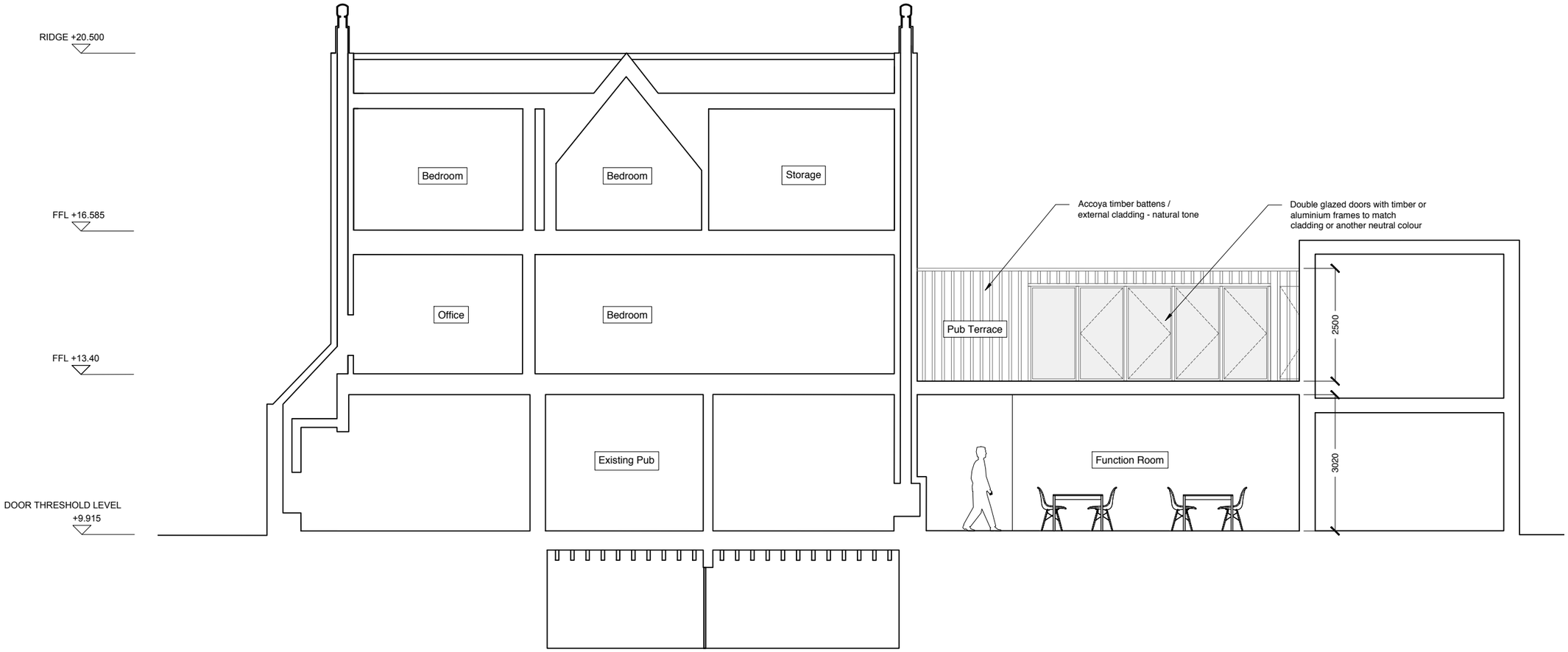
Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:100 @ A1, 1:200 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed - Section through Pub & Residential Proposal
Drawing No: P/401
Revision: 3



01 P/420 Proposed - Residential Section AA
Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

0 1 2 3 4 5m
Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
*	Full Planning Application	23/10/2019

Status
- ○ Pre-Planning
- ● Planning
- ○ Tender
- ○ Construction
- ○ As Built

- ● Information
- ○ Discussion

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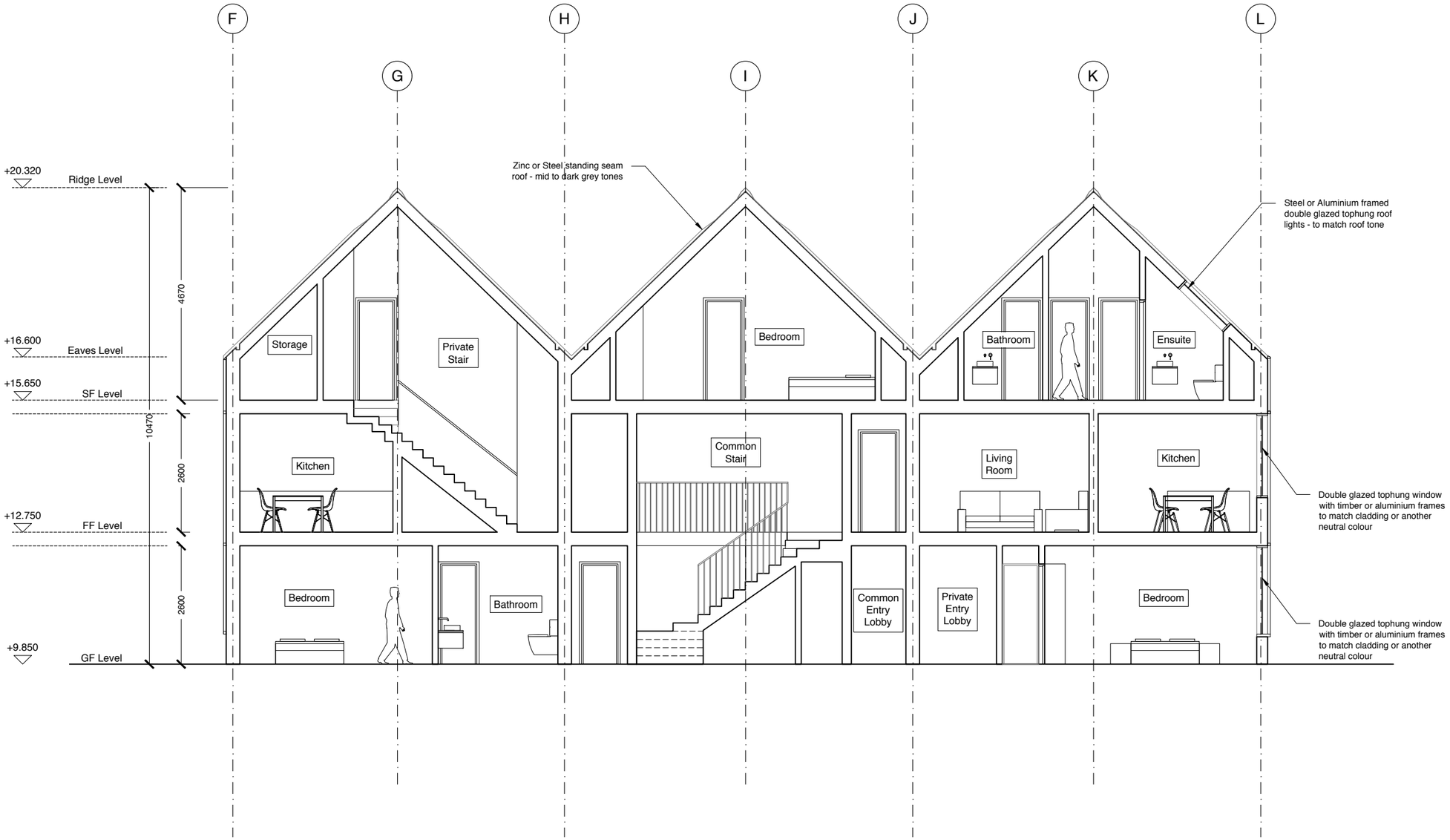
Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:50 @ A1, 1:100 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed Pub Extension Short Section
Drawing No: P/411
Revision: *



01 P/420 Proposed - Residential Section AA
Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

0 1 2 3 4 5m
Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
3	Full Planning Application	23/10/2019
2	Revised Planning Set	18/10/2019
1	Full Planning Application DRAFT	19/08/2019
*	Proposed drawings DRAFT	23/11/2018

Status
○ Pre-Planning
● Planning
○ Tender
○ Construction
○ As Built

● Information
○ Discussion

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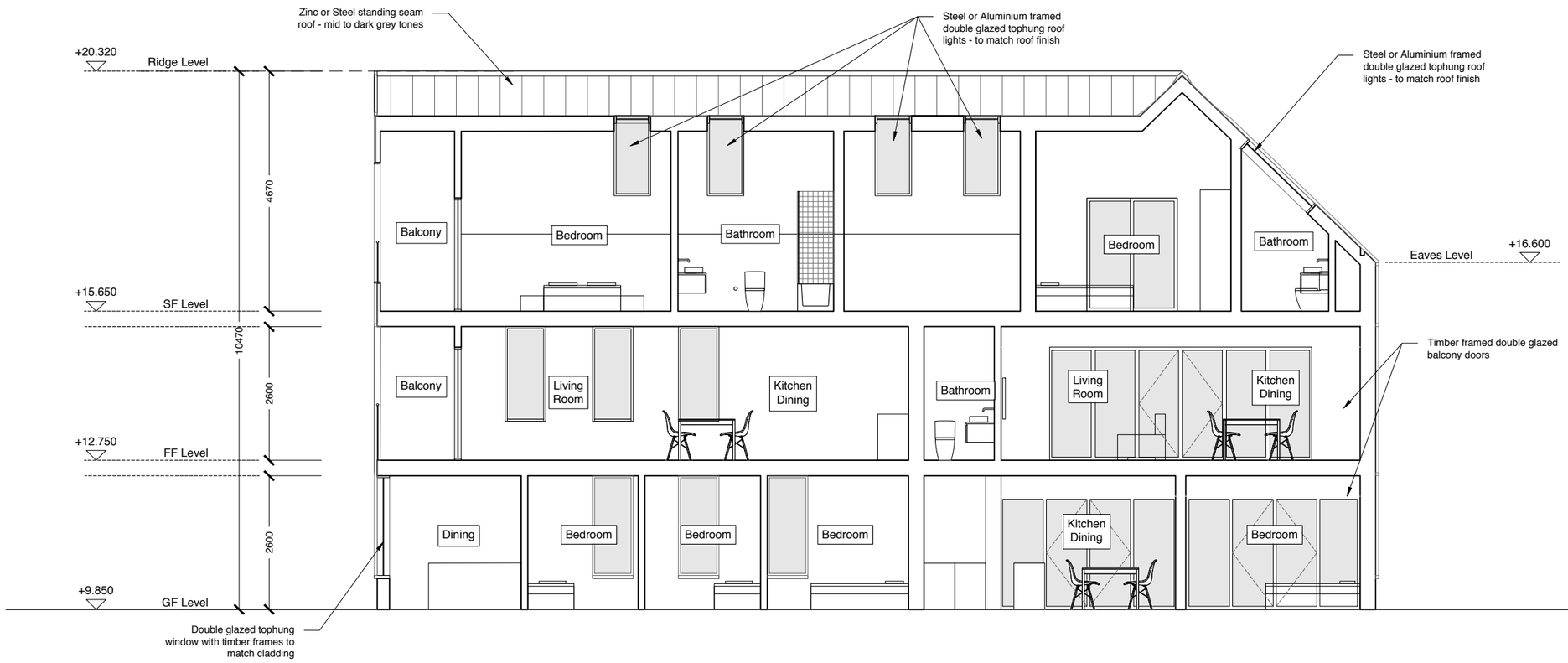
Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:50 @ A1, 1:100 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed Residential Section AA
Drawing No: P/420
Revision: 3



01 P/421 Proposed - Residential Section BB
Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

0 1 2 3 4 5m
Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
3	Full Planning Application	23/10/2019
2	Revised Planning Set	18/10/2019
1	Full Planning Application DRAFT	19/08/2019
*	Proposed Planning FINAL DRAFT	21/06/2019

Status
- ○ Pre-Planning
- ● Planning
- ○ Tender
- ○ Construction
- ○ As Built

- ● Information
- ○ Discussion

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www.vinearchitecture.com
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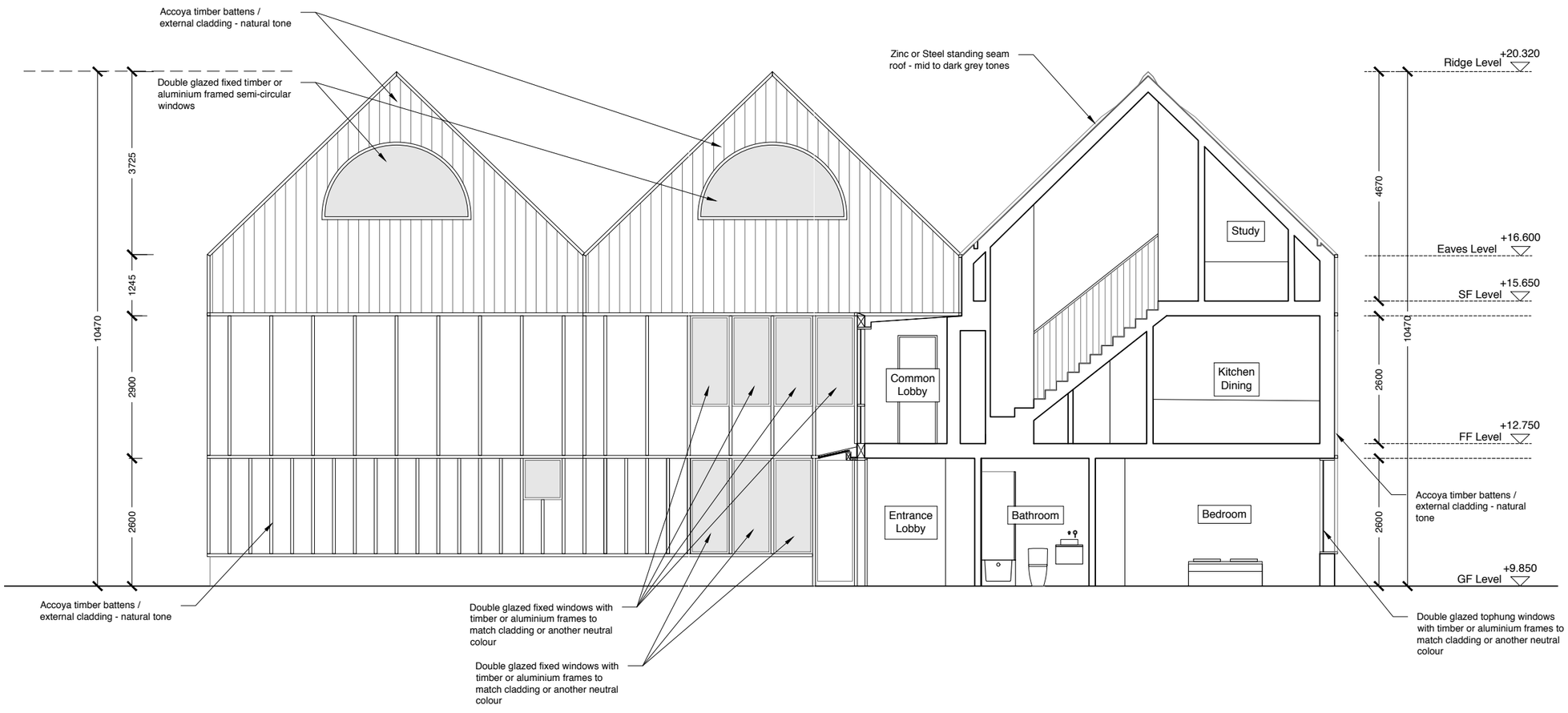
T 0207 377 5465

Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date	Scale	Drawn by	Checked by
23.10.2019	1:50 @ A1 1:100 @ A3	PJ	RPR

Drawing Name: Proposed Residential Section BB
Drawing No: P/421
Revision: 3



01 P/422 Proposed - Residential Section CC
Scale 1:50@A1 1:100@A3

Notes:

- This drawing is for planning purposes only

0 1 2 3 4 5m
Scalebar - 1:50 @ A1, 1:100 @A3

Revision	Description	Date
3	Full Planning Application	23/10/2019
2	Revised Planning Set	18/10/2019
1	Full Planning Application DRAFT	19/08/2019
*	Proposed Planning FINAL DRAFT	21/06/2019

Status
○ Pre-Planning
● Planning
○ Tender
○ Construction
○ As Built

● Information
○ Discussion

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www.vinearchitecture.com
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T 0207 377 5465

Client Name: Ponders End Properties LTD

Project Name: Ponders End Housing
Project Number: VINE92

Date: 23.10.2019
Scale: 1:50 @ A1, 1:100 @ A3
Drawn by: PJ
Checked by: RPR

Drawing Name: Proposed Residential Section CC
Drawing No: P/422
Revision: 3

Appendix: C – EA Flood Map for Planning

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

Flood map for planning

Your reference	Location (easting/northing)	Created
The Goat	**535187/196010**	**7 Jan 2020 15:37**

Your selected location is in flood zone 1, an area with a low probability of flooding.

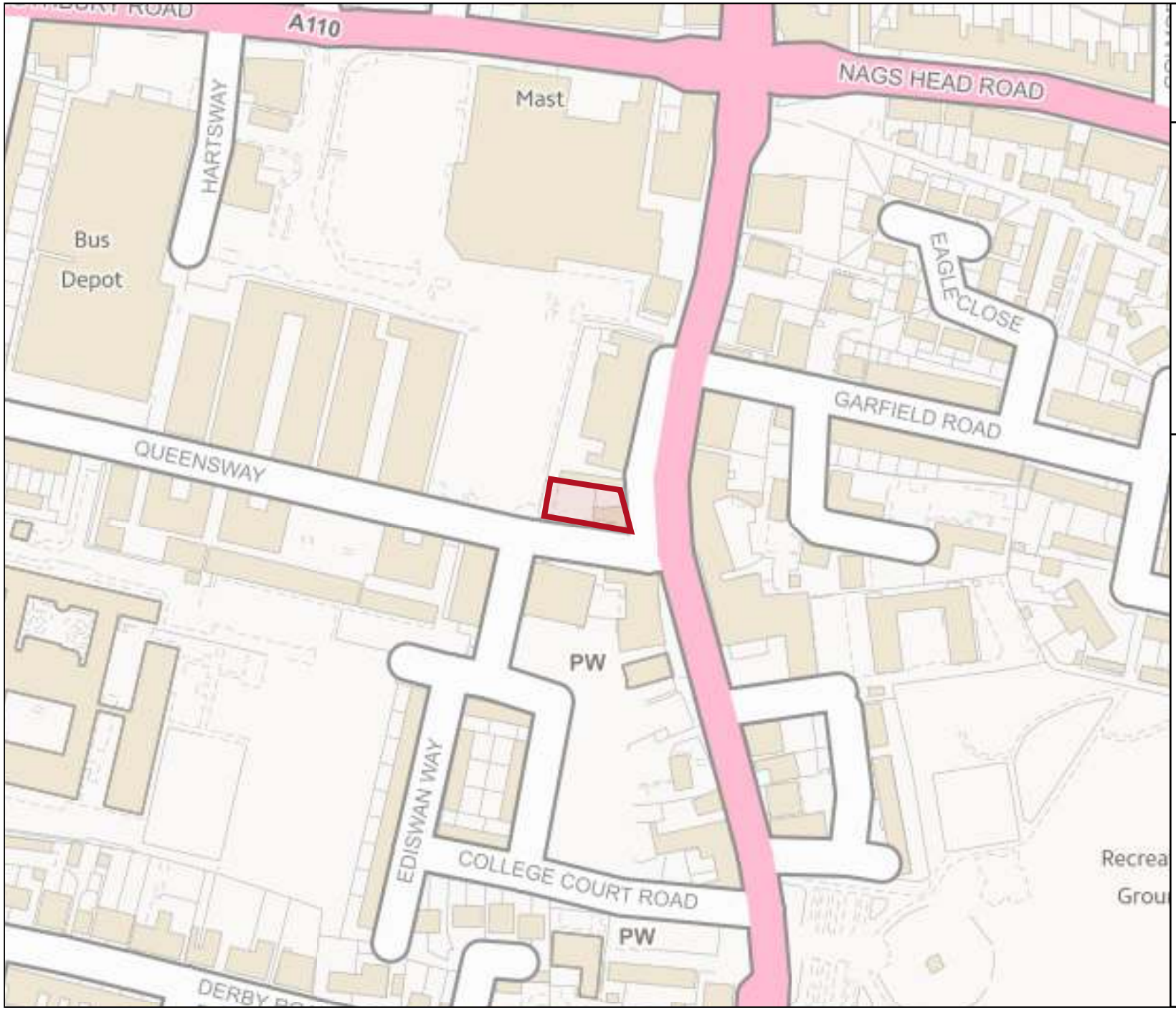
This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.



Environment Agency

Flood map for planning

Your reference
The Goat

Location (easting/northing)
535187/196010

Scale
1:2500

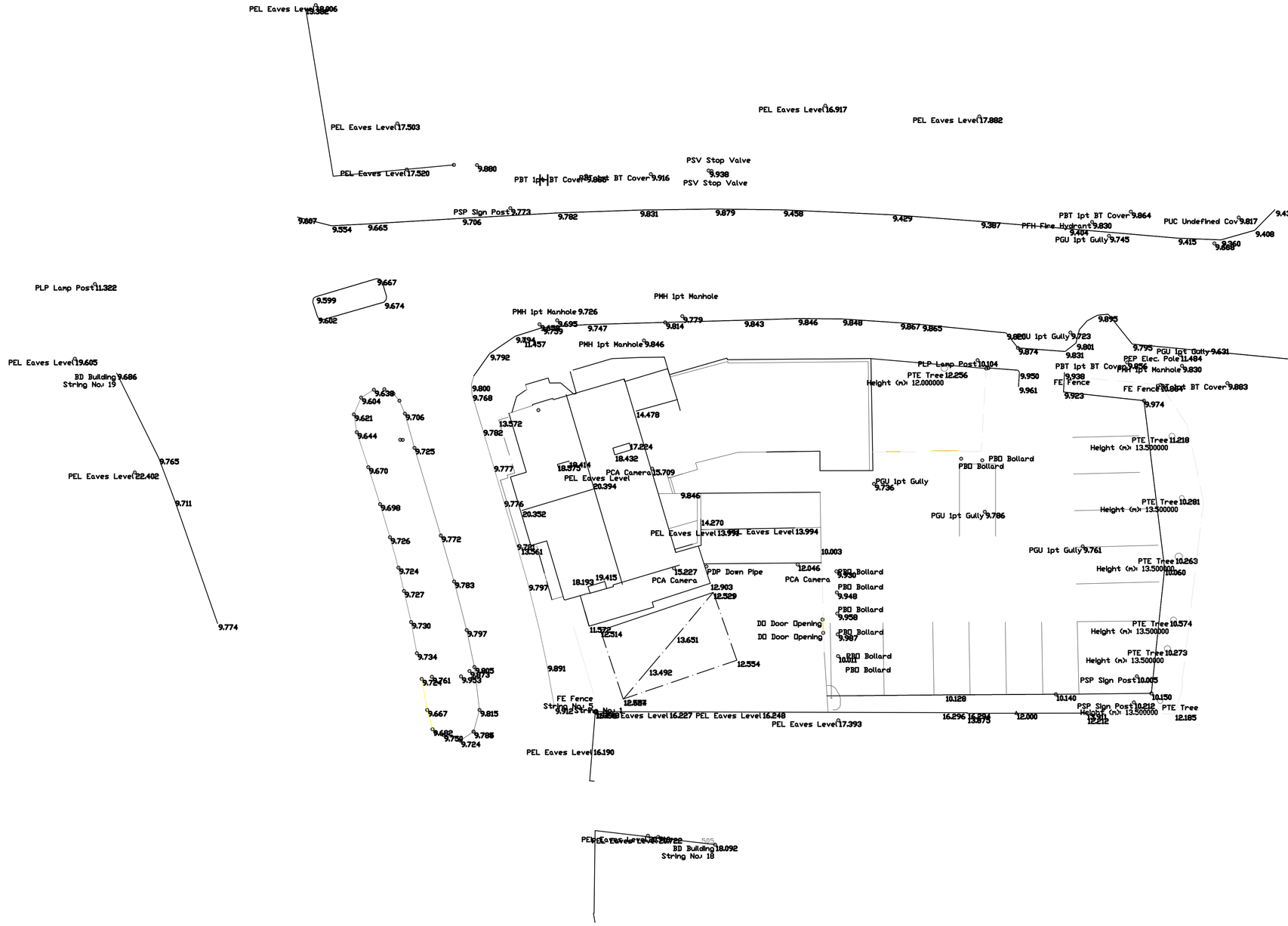
Created
7 Jan 2020 15:37

- Selected area
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 20 40 60m

Appendix: D – Topographical Survey

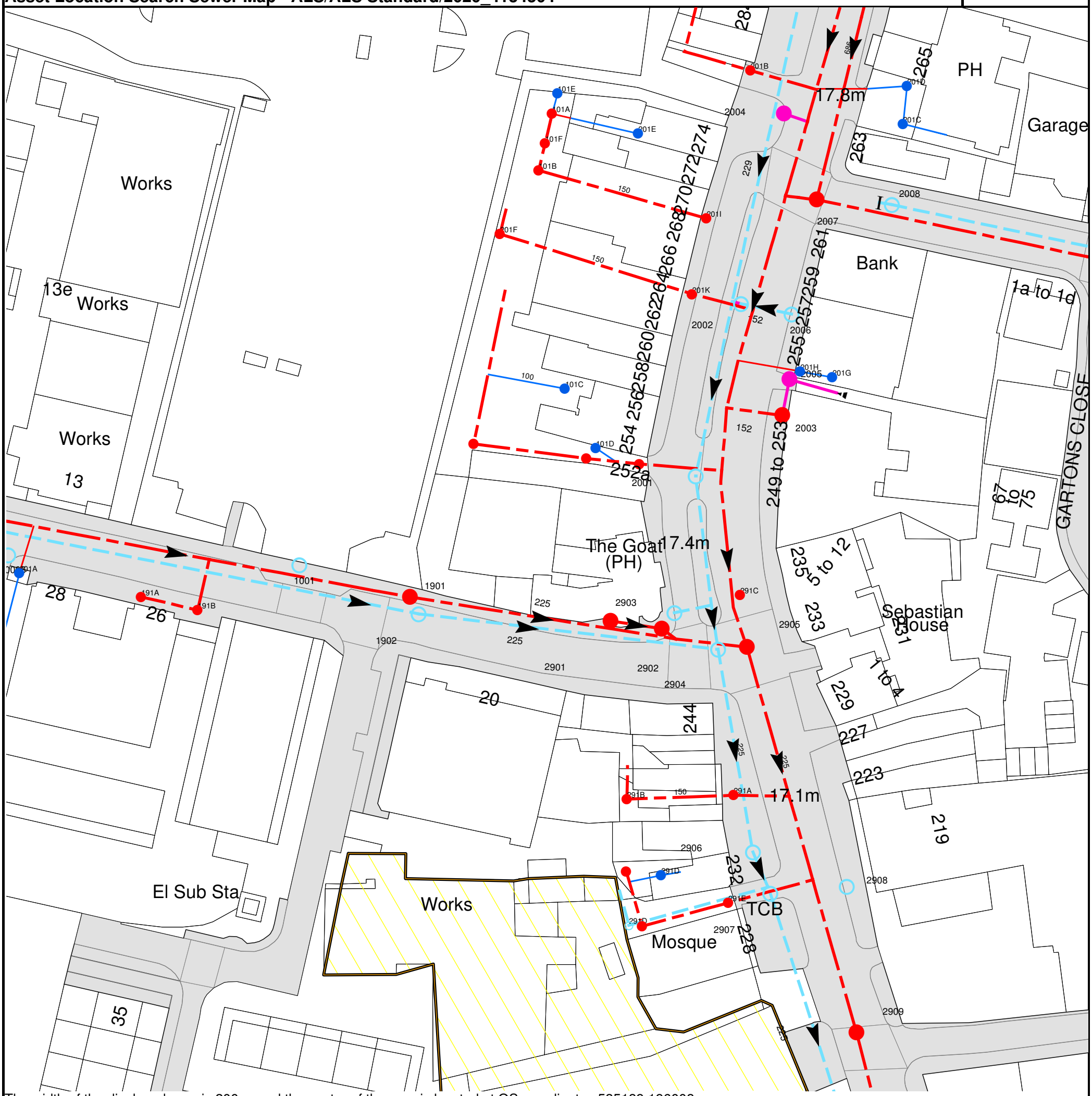
TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk


PEL Eaves Level 18.806
PEL Eaves Level 17.503
PEL Eaves Level 17.520
PEL Eaves Level 16.917
PEL Eaves Level 17.882
PSV Stop Valve
PSV Stop Valve
PBT 1pt BT Cover 9.916
PSP Sign Post 9.773
PBT 1pt BT Cover 9.864
PUC Undefined Cov 9.817
PFH Fire Hydrant 9.830
PGU 1pt Gully 9.745
PLP Lamp Post 11.322
PMH 1pt Manhole
PMH 1pt Manhole 9.726
PMH 1pt Manhole 9.846
PGU 1pt Gully 9.723
PEL Eaves Level 19.605
BD Building String No: 19
PLP Lamp Post 10.104
PTE Tree 12.256
Height (m): 12.000000
PEP Elec. Pole 11.484
PMH 1pt Manhole 9.830
PBT 1pt BT Cover 9.883
FE Fence
FE Fence 10.884
PTE Tree 11.218
Height (m): 13.500000
PBO Bollard
PBO Bollard
PCA Camera 15.709
PEL Eaves Level 20.394
PGU 1pt Gully 9.736
PGU 1pt Gully 9.786
PEL Eaves Level 13.994
PEL Eaves Level 13.994
PTE Tree 10.281
Height (m): 13.500000
PGU 1pt Gully 9.761
PTE Tree 10.263
Height (m): 13.500000
PDP Down Pipe
PCA Camera
PCA Camera
PBO Bollard
PBO Bollard
PBO Bollard
PBO Bollard
PBO Bollard
DO Door Opening
DO Door Opening
PTE Tree 10.574
Height (m): 13.500000
PTE Tree 10.273
Height (m): 13.500000
PSP Sign Post 10.005
PSP Sign Post 10.212
Height (m): 13.500000
PTE Tree
FE Fence
String No: 5
String No: 1
PEL Eaves Level 16.227
PEL Eaves Level 16.248
PEL Eaves Level 17.393
PEL Eaves Level 16.190
PEL Eaves Level 22.402
PEL Eaves Level 24.568
BD Building String No: 18

Appendix: E – Thames Water Sewer Records

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2020_4134304



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 535189,196008

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
201I	n/a	n/a
201F	n/a	n/a
101B	n/a	n/a
101F	n/a	n/a
101A	n/a	n/a
101E	n/a	n/a
201B	n/a	n/a
291E	n/a	n/a
2907	17	15.68
2908	16.78	15.88
2909	16.74	14.71
2906	17.04	15.72
291A	n/a	n/a
2904	17.1	15.88
2905	17.38	16.09
291C	n/a	n/a
2001	17.24	16.09
2003	17.47	15.8
2005	17.46	15.99
201G	n/a	n/a
201H	n/a	n/a
2006	17.42	14.98
2002	17.47	16.55
201K	n/a	n/a
2008	17.48	15.82
2007	17.65	14.53
201C	n/a	n/a
2004	17.69	16.06
201D	n/a	n/a
29BD	n/a	n/a
291D	n/a	n/a
291D	n/a	n/a
29BC	n/a	n/a
291B	n/a	n/a
2902	17.24	15.64
2901	17.31	15.86
1902	17.31	n/a
2903	17.38	16.09
191B	n/a	n/a
1901	17.31	15.34
191A	n/a	n/a
001A	n/a	n/a
1001	n/a	n/a
0006	n/a	n/a
2022	n/a	n/a
1003	n/a	n/a
101D	n/a	n/a
1002	n/a	n/a
101C	n/a	n/a
201E	n/a	n/a

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

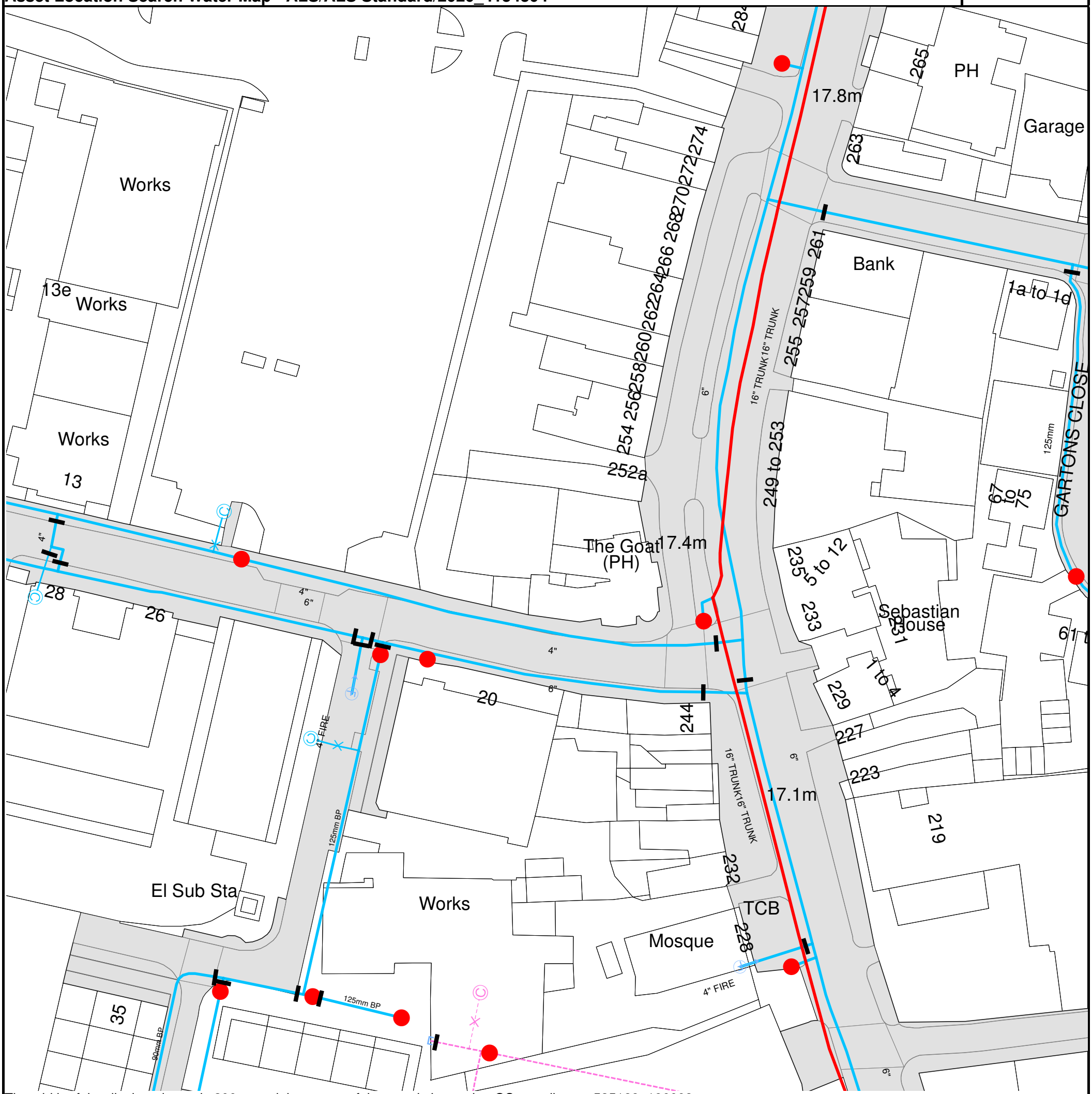
Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2020_4134304



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 535189, 196008.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

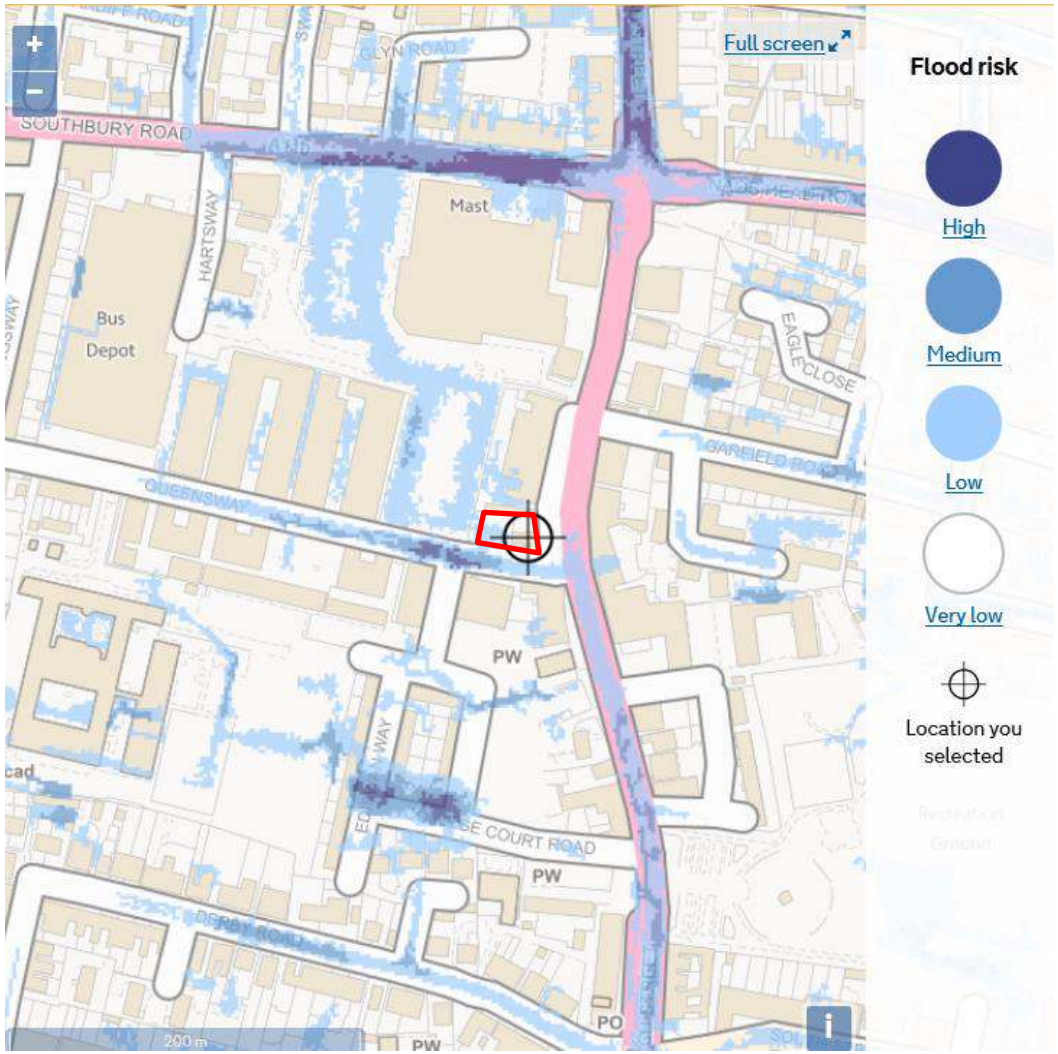
Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Appendix: F – Surface Water Maps

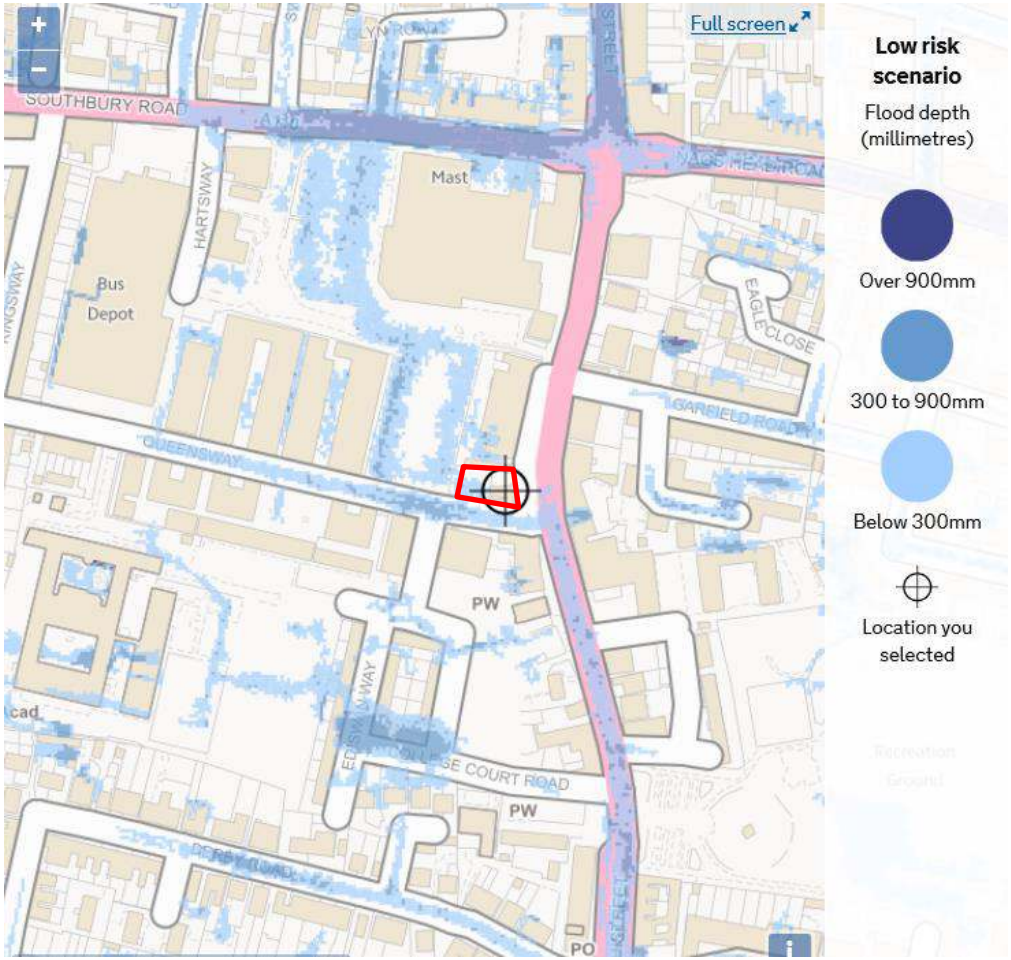
TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

EA Risk of Surface Water Flooding - Extent



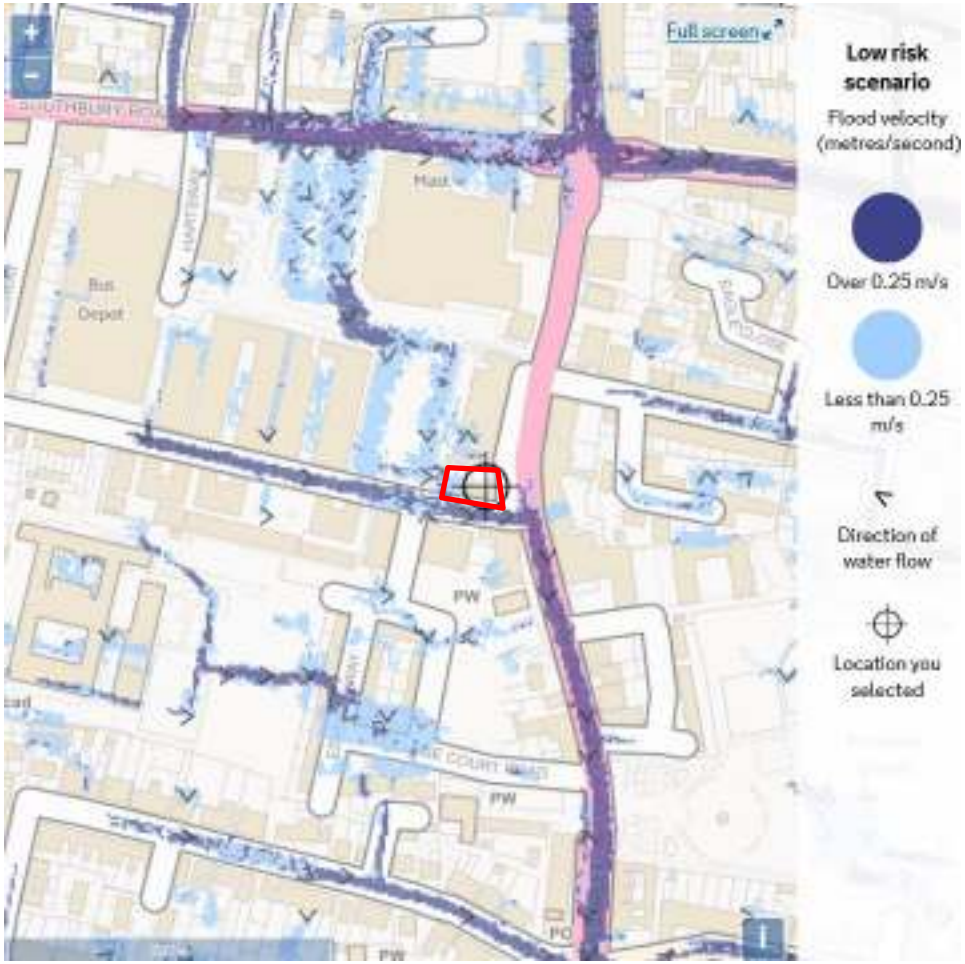
Site Boundary

EA Risk of Surface Water Flooding – Low Risk Depth



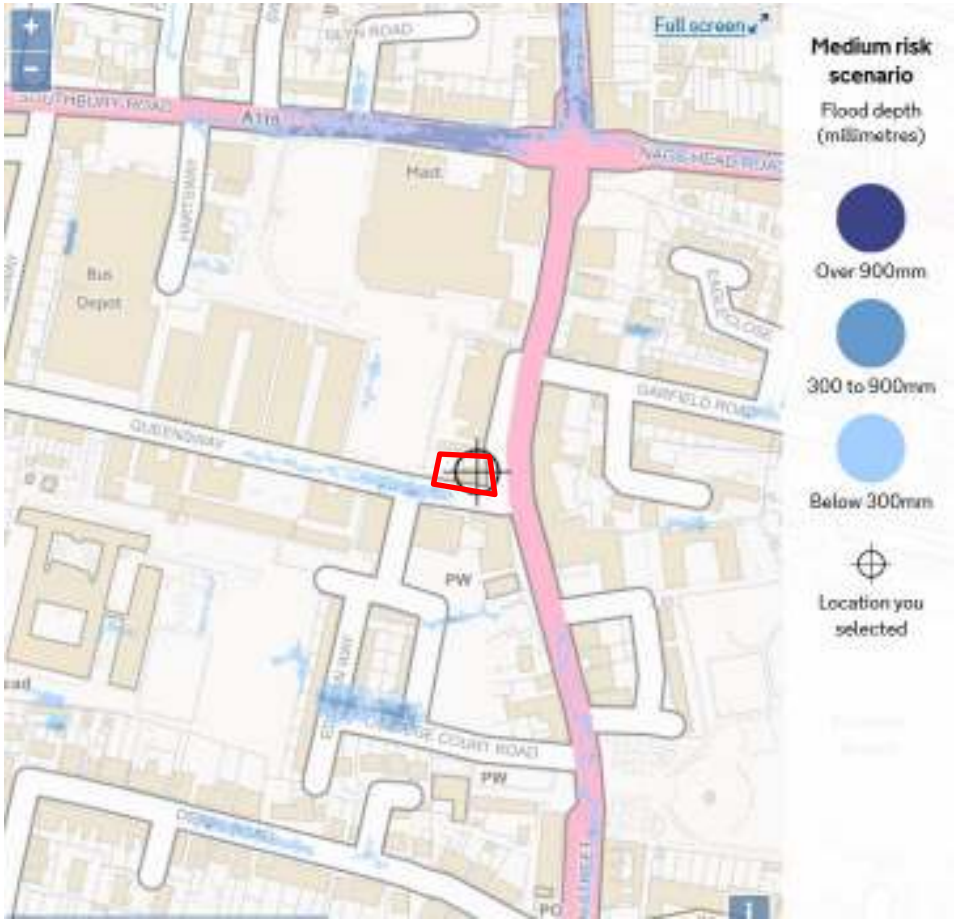
Site Boundary

EA Risk of Surface Water Flooding – Low Risk Velocity



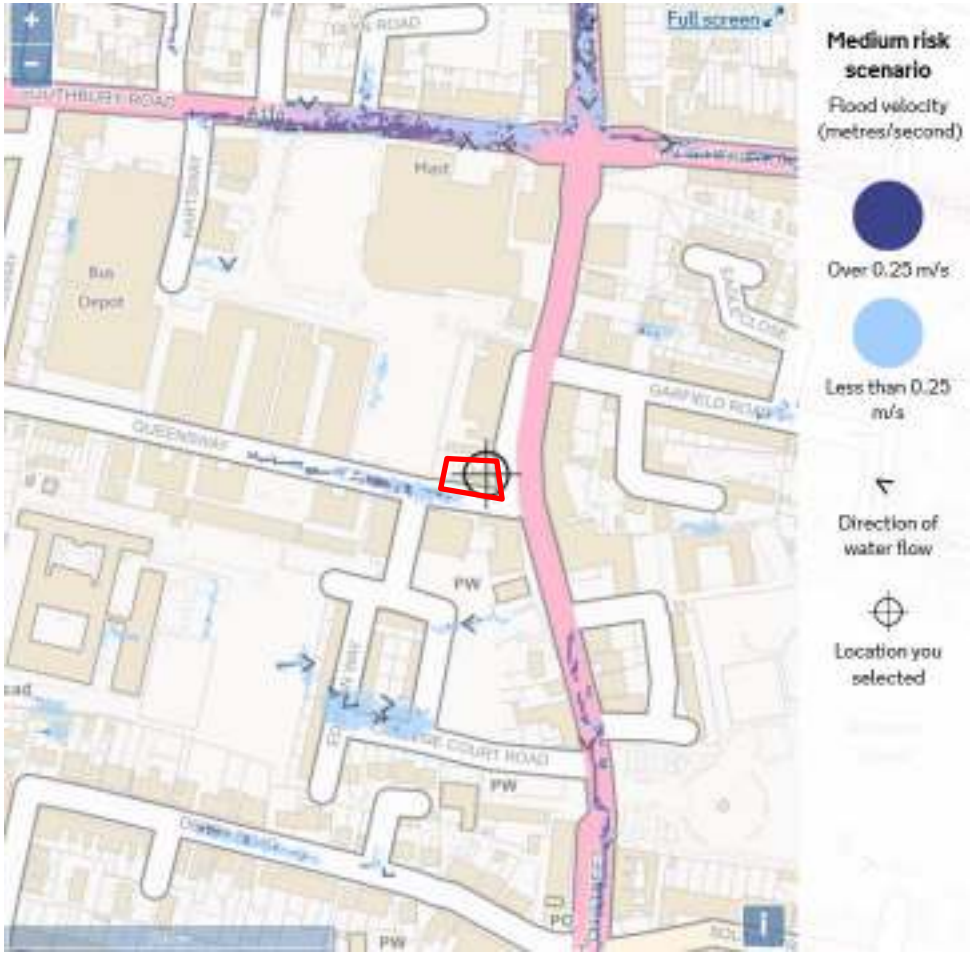
Site Boundary

EA Risk of Surface Water Flooding – Medium Risk Depth



Site Boundary

EA Risk of Surface Water Flooding – Medium Risk Velocity



Site Boundary

Appendix: G – Existing Runoff Rates

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

Run-off from Existing Site

Methodology

Using the Modified Rational Method, the surface water run-off rate has been calculated for the existing impermeable areas of the car park.

Ref: Butler, D and Davies, J. (2006), Urban Drainage, 2nd ed, SPON.

$Q = CiA$

where

$$C = \frac{PIMP}{PR}$$

PIMP = Percentage of impervious area to total area
PR = Percentage Runoff

	Surface Area (m^2)
Existing Impervious Areas	446
Total Area	446

i (Rainfall intensity, mm/hr) = 50.00
i (Rainfall intensity, m/hr) = 0.050
i (Rainfall intensity, m/s) = 1.38×10^{-5}

Percentage run-off (PR)
Existing Impervious Area = 100%

Percentage of impervious area to total area (PIMP)
PIMP = 446/446 = 100%

Therefore $C = \frac{PIMP}{PR} = 1$

Runoff from existing site:
$Q = CiA$
$Q = 1 \times 1.38 \times 10^{-5} \times 446 m^2$
$Q = 0.006194 m^3 s^{-1}$
$Q = 6.19\ ls^{-1}$

Total Q for the existing site = 6.19 ls^{-1}

Appendix: H – Greenfield Runoff Rates

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
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ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	1.000	Urban	0.000
SAAR (mm)	633	Region Number	Region 6

Results l/s

QBAR Rural	3.9
QBAR Urban	3.9
Q100 years	12.5
Q1 year	3.3
Q30 years	8.9
Q100 years	12.5

Appendix: I – Thames Water Pre-Development Enquiry

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

Louisa Wade

EAS
Unit 23 The Maltings
Stanstead Abbotts
Hertfordshire
SG12 8HG

Wastewater pre-planning
Our ref **DS6069325**

20 January 2020

Pre-planning enquiry: Capacity Confirmation

Site: The Goat, 250 High Street, Enfield EN3 4HB

Dear Louisa,

Thank you for providing information on your development.

Proposed site: Flats (9 units)
Proposed foul water to discharge by gravity via manhole TQ35951901
Proposed surface water to discharge at 1.50 l/s for all storm events up to and including 1:100yr+40%CC into 225mm surface water sewer on Queensway.

We have completed the assessment of the foul water flows and surface water run-off based on the information submitted in your application with the purpose of assessing sewer capacity within the existing Thames Water sewer network.

We're pleased to confirm that there will be sufficient foul and surface water capacity in our sewerage network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

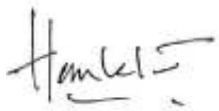
Please note that you must keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient sewerage capacity.

What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you have any further questions, please contact me on 020 3577 9224.

Yours sincerely



Hemlata Gurung
Technical Coordinator
Developer Services – Sewer Adoptions Team

Appendix: J - WINDES MicroDrainage Results

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk

Existing Network Details for Existing

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	6.900	0.040	172.5	0.005	5.00	0.0	0.600	o	300
1.001	10.300	0.050	206.0	0.012	0.00	0.0	0.600	o	300
1.002	14.200	0.060	236.7	0.012	0.00	0.0	0.600	o	300
2.000	11.700	0.050	234.0	0.007	5.00	0.0	0.600	o	300
2.001	19.900	0.080	248.8	0.000	0.00	0.0	0.600	o	300
2.002	5.200	0.050	104.0	0.005	0.00	0.0	0.600	o	300
1.003	5.000	0.050	100.0	0.022	0.00	0.0	0.600	o	150

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	8.800	0.005	0.0	1.19	84.4
1.001	8.760	0.017	0.0	1.09	77.2
1.002	8.710	0.029	0.0	1.02	71.9
2.000	8.830	0.007	0.0	1.02	72.3
2.001	8.780	0.007	0.0	0.99	70.1
2.002	8.700	0.012	0.0	1.54	109.0
1.003	8.650	0.063	0.0	1.00	17.8

Manhole Schedules for Existing

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
MH01	9.900	1.100	Open Manhole	1200	1.000	8.800	300				
MH02	9.900	1.140	Open Manhole	1200	1.001	8.760	300	1.000	8.760	300	
MH03	9.900	1.190	Open Manhole	1200	1.002	8.710	300	1.001	8.710	300	
MH05	10.010	1.180	Open Manhole	1200	2.000	8.830	300				
MH06	9.970	1.190	Open Manhole	1200	2.001	8.780	300	2.000	8.780	300	
MH07	9.800	1.100	Open Manhole	1200	2.002	8.700	300	2.001	8.700	300	
MH04	9.900	1.250	Open Manhole	1200	1.003	8.650	150	1.002	8.650	300	
								2.002	8.650	300	
	9.900	1.300	Open Manhole	0		OUTFALL		1.003	8.600	150	

PIPELINE SCHEDULES for Existing

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	300	MH01	9.900	8.800	0.800	Open Manhole	1200
1.001	o	300	MH02	9.900	8.760	0.840	Open Manhole	1200
1.002	o	300	MH03	9.900	8.710	0.890	Open Manhole	1200
2.000	o	300	MH05	10.010	8.830	0.880	Open Manhole	1200
2.001	o	300	MH06	9.970	8.780	0.890	Open Manhole	1200
2.002	o	300	MH07	9.800	8.700	0.800	Open Manhole	1200
1.003	o	150	MH04	9.900	8.650	1.100	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	6.900	172.5	MH02	9.900	8.760	0.840	Open Manhole	1200
1.001	10.300	206.0	MH03	9.900	8.710	0.890	Open Manhole	1200
1.002	14.200	236.7	MH04	9.900	8.650	0.950	Open Manhole	1200
2.000	11.700	234.0	MH06	9.970	8.780	0.890	Open Manhole	1200
2.001	19.900	248.8	MH07	9.800	8.700	0.800	Open Manhole	1200
2.002	5.200	104.0	MH04	9.900	8.650	0.950	Open Manhole	1200
1.003	5.000	100.0		9.900	8.600	1.150	Open Manhole	0

Free Flowing Outfall Details for Existing

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003		9.900	8.600	0.000	0	0

Simulation Criteria for Existing

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Simulation Criteria for Existing

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.450		

Online Controls for Existing

Orifice Manhole: MH04, DS/PN: 1.003, Volume (m³): 2.6

Diameter (m) 0.027 Discharge Coefficient 0.600 Invert Level (m) 8.650

Storage Structures for Existing

Porous Car Park Manhole: MH04, DS/PN: 1.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	14.7
Membrane Percolation (mm/hr)	1000	Length (m)	14.7
Max Percolation (l/s)	60.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	9.300	Cap Volume Depth (m)	0.000

Summary of Critical Results by Maximum Outflow (Rank 1) for Existing

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.450
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

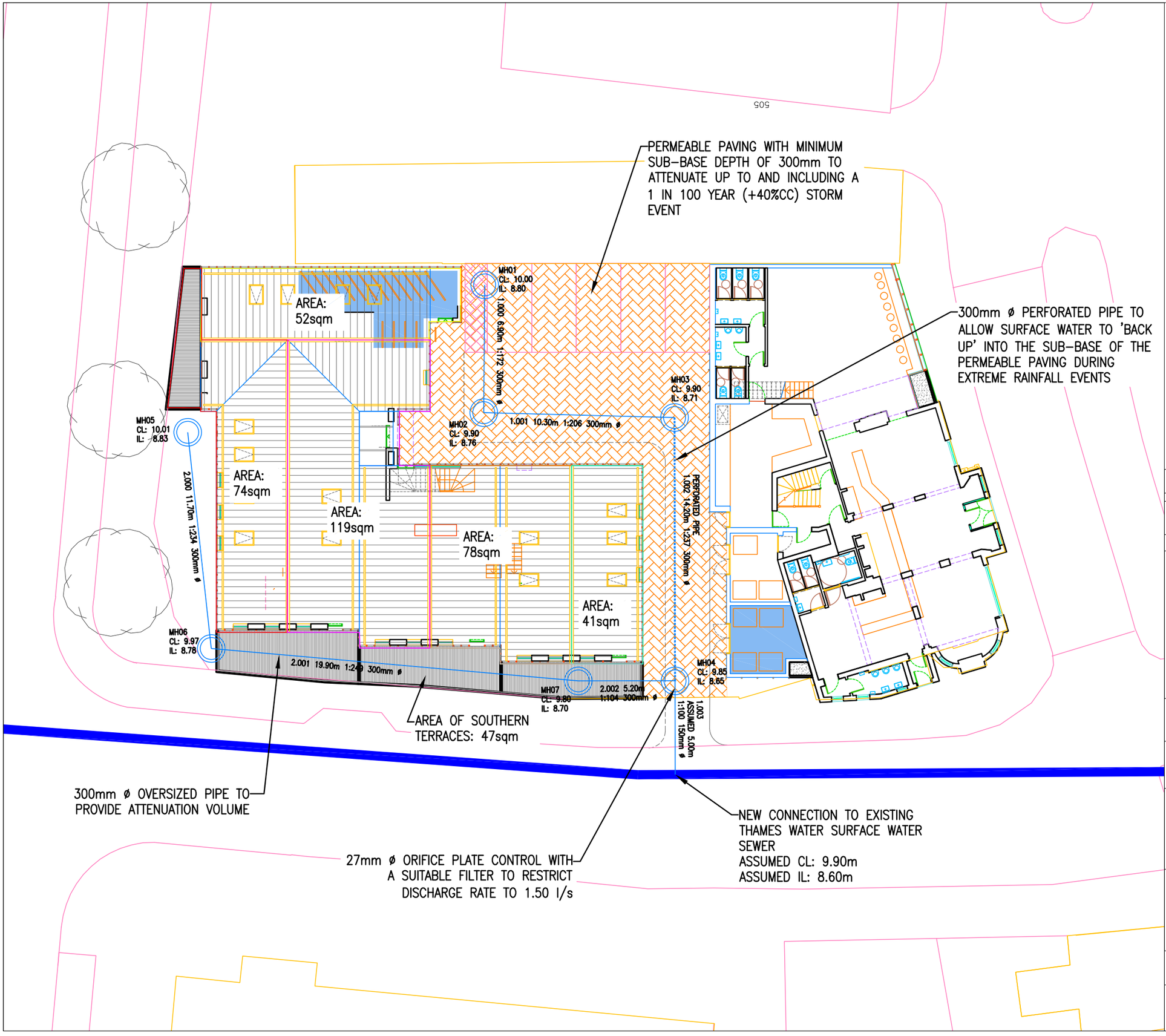
Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+40%	30/15 Summer				
1.001	15 Winter	100	+40%	30/15 Summer				
1.002	15 Winter	100	+40%	30/15 Summer				
2.000	15 Winter	100	+40%	30/15 Winter				
2.001	15 Winter	100	+40%	30/15 Summer				
2.002	15 Winter	100	+40%	30/15 Summer				
1.003	120 Winter	100	+40%	1/15 Summer				

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	MH01	9.468	0.368	0.000	0.03	0.0	2.1	SURCHARGED
1.001	MH02	9.468	0.408	0.000	0.13	0.0	7.8	SURCHARGED
1.002	MH03	9.467	0.457	0.000	0.23	0.0	13.6	SURCHARGED
2.000	MH05	9.467	0.337	0.000	0.05	0.0	3.1	SURCHARGED
2.001	MH06	9.467	0.387	0.000	0.04	0.0	2.4	SURCHARGED
2.002	MH07	9.466	0.466	0.000	0.06	0.0	3.9	SURCHARGED
1.003	MH04	9.601	0.801	0.000	0.11	0.0	1.5	FLOOD RISK

Appendix K - Proposed SUDS Strategy

TRANSPORT PLANNING ■ HIGHWAYS AND DRAINAGE ■ FLOOD RISK ■ TOPOGRAPHICAL SURVEYS
Unit 23 The Maltings Stanstead Abbotts Hertfordshire SG12 8HG Tel 01920 871 777 e: contact@eastp.co.uk www.eastp.co.uk



KEY:

- 217sqm PERMEABLE PAVING (GRASSCRETE OR SIMILAR)
- 300mm ø PERFORATED PIPE
- 300mm ø OVERSIZED PIPE
- MANHOLE CHAMBER
- EXISTING THAMES WATER SURFACE WATER SEWER

REV	DATE	BY	DESCRIPTION	CHK	APD

DRAWING STATUS:

EAS

Unit 23, The Maltings, Stanstead Abbotts, Hertfordshire, SG12 8HG
Tel: 01920 871777

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CLIENT:
PONDERS END PROPERTIES LTD

ARCHITECT:
VINE ARCHITECTURE STUDIO

PROJECT:
THE GOAT PUBLIC HOUSE
250 HIGH STREET ENFIELD

TITLE:
PROPOSED SUDS STRATEGY

SCALE @ A3:	DESIGN-DRAWN:	DATE:
1:200	LW	16.01.20

PROJECT No:	DRAWING No:
2564	SK01