



GHBullard & Associates LLP
Civil and Traffic Engineering Consultants

**Proposed Replacement Dwelling
35 Gray's Lane, Hitchin, Hertfordshire**

DRAINAGE STATEMENT

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1. INTRODUCTION

- 1.1. This drainage statement is being submitted to accompany a planning application for a residential development comprising the demolition of an existing bungalow and the construction of a replacement dwelling. Site location plans are attached in **Appendix A**.
- 1.2. The report includes a review of commercially available flood risk and Environment Agency (EA) data indicating potential sources of flood risk to the Site, appropriate to the scale of the development.
- 1.3. The information provided within this report is based on the best available data currently recorded or provided by a third party. The accuracy of this report is therefore not guaranteed and does not obviate the need to make additional appropriate searches, inspections and enquiries.

2. POLICY CONTEXT

- 2.1. The purpose of the planning system is to contribute to the achievement of sustainable development – *NPPF, Paragraph 7*.
- 2.2. At the heart of the National Planning Policy Framework is a presumption in favour of sustainable development which does not change the statutory status of the development plan as the starting point for decision making – *NPPF, Paragraph 12*.
- 2.3. 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 – *NPPF, Paragraph 170*.
- 2.4. The aim of the Sequential Test is to steer new development to areas with the lowest risk of flooding from any source – *NPPF, Paragraph 174*.
- 2.5. Following the Sequential Test, both elements of the Exception Test will have to be passed for development to be allocated or permitted – *NPPF, Paragraph 179*.
- 2.6. The National Planning Policy Framework and relevant planning practice guidance (NPPG); Flood risk and coastal change, updated 17 September 2025.
- 2.7. North Herts Local Plan 2011-2031 adopted 8 November 2022; Policy NE7: Reducing flood risk, Policy NE8: Sustainable drainage systems.
- 2.8. Environment Agency Flood Risk Assessment guidance.
- 2.9. Strategic Flood Risk Assessment North Hertfordshire District Council July 2008.
- 2.10. North Hertfordshire District Council Strategic Flood Risk Assessment Update (2016).
- 2.11. Hertfordshire County Council, as lead local flood authority, document LFRMS 2 2019-2029 - Strategy for the Management of Local Sources of Flood Risk advises on the standards to be used at a local level.
- 2.12. DEFRA Guidance - National standards for sustainable drainage systems (SUDS) updated 30 July 2025
- 2.13. The SuDS Manual (C753) – Ciria Industry Best Practice Guidance.



3. EXISTING SITE INFORMATION

- 3.1. The Site is located at 35 Gray's Lane, within the west of Hitchin, Hertfordshire. The Site is bound by Gray's Lane to the north, residential property to the east and west and a residential garden to the south. Refer to the Site location plans in **Appendix A**.
- 3.2. The Site comprises an existing bungalow and associated garage with an impermeable surfaced driveway, rear patio and garden comprising grass and trees. Refer to the drawing in **Appendix B** for the extent of the existing impermeable area and Site layout.
- 3.3. The Site can be located from the following information:
 - i. Postcode: SG5 2HH
 - ii. NG Reference: TL177290
 - iii. The Site levels range from 83.8m AOD at the north-west boundary to 82.6 m AOD at the south - east boundary. Refer to **Appendix B** for the topographical levels.
- 3.4. The BGS records describe the geology as:
 - i. Superficial: Glaciofluvial deposits, Mid Pleistocene – Sand and gravel
 - ii. Bedrock: Zig Zag Chalk Formation – Chalk (majority of Site area)
West Melbury Chalk Formation – Chalk (north-west Site area)
- 3.5. The BGS 1:50,000 scale drift maps (Figure 3.1) show the form of the Superficial deposits.

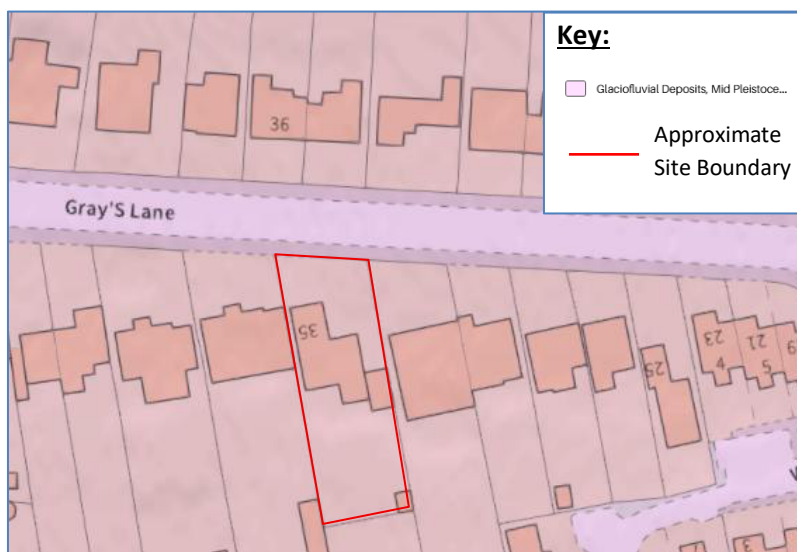


Figure 3.1 - BGS 1:50,000 Superficial Drift Map

- 3.6. The British Geological Survey has borehole records located approximately 515 m to the south-west of the Site, Ref: TL12NE22 (at ground level of 91.1 m AOD), and approximately 445 m north-east of the Site Ref: TL12NE131 (at ground level of 71.6 m AOD). The borehole logs indicate Sand and Gravel to 7.9 m bgl and 3.7 m bgl respectively, over Clay with groundwater at approximately 63 m AOD in each location. Refer to **Appendix C** for the borehole logs.
- 3.7. The greenfield runoff rate for the Site area using FEH Statistical (2025) methodology, is assessed as $Q_{bar} = 0.3 \text{ l/s/ha}$. Refer to the calculation in **Appendix D**.
- 3.8. It is not known from the available utility survey information how the surface water runoff from the bungalow roof currently drains; it is assumed that it either currently discharges via infiltration (soakaways) or to the existing foul drainage network, given the age of the property. The external



impermeable areas appear to currently drain into the permeable garden areas and onto Gray's Lane. Refer to **Appendix E** for the Anglian Water asset mapping and utility survey.

- 3.9. The brownfield discharge rate has been assessed using Info-Drainage based on the roof area only (167 m²), FEH rainfall data and an assumed unattenuated discharge via a 100mm diameter pipe connection (at 1:17 gradient) to the existing foul sewer. It should be noted that the manhole levels provided by Anglian Water (AW) have been adjusted to reflect the surveyed road level (maintaining the AW 7100 manhole depth). The rates are assessed as;

- 1 in 2 year = **3.2 l/s**
- 1 in 30 year = 7.4 l/s
- 1 in 100 year = 9.4 l/s

Refer to the calculation in **Appendix D**.

- 3.10. There is an Anglian Water foul and surface water public sewer located within Gray's Lane. It is understood from the Utility Survey drawing that the Site foul water discharges to the public network in Gray's Lane. Refer to **Appendix E** for the utility survey and Anglian Water asset map.
- 3.11. The Environment Agency has mapped Source Protection Zones which shows the Site is located over a Zone III – Total Catchment protection zone. This is the area around a supply source within which all the groundwater ends up at the abstraction point. This is the point from where the water is taken. This could extend some distance from the source point.
- 3.12. Environment Agency Aquifer (Bedrock Geology) mapping shows that the Site is located over a Principal Aquifer; Principal and secondary aquifers provide significant quantities of drinking water, and water for business needs. They may also support rivers, lakes and wetlands.
- 3.13. Environment Agency Aquifer (Superficial Drift) mapping shows that the Site is located over a Secondary A Aquifer; These aquifers comprise permeable layers that can support local water supplies, and may form an important source of base flow to rivers.
- 3.14. The Environment Agency has mapped groundwater vulnerability and Figure 3.2 shows the Site is located over a Medium to High vulnerability Aquifer with a soluble rock risk.

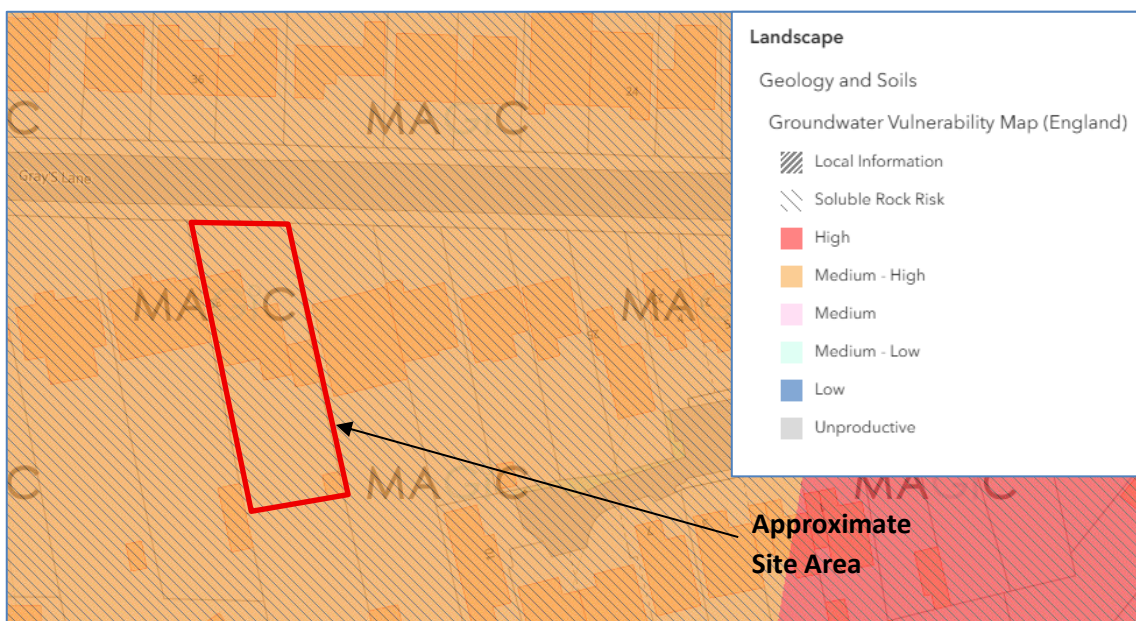


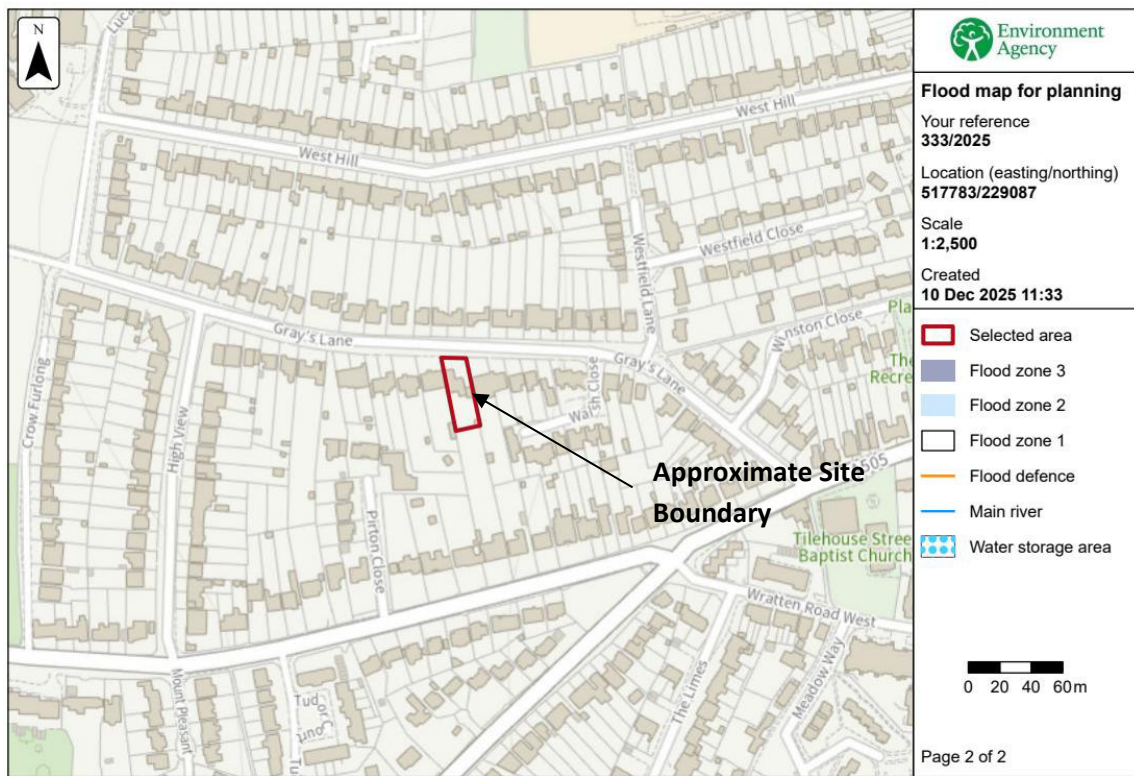
Figure 3.2- Environment Agency Groundwater Vulnerability Zones



4. FLOOD RISK ASSESSMENT

Fluvial Flooding

- 4.1. Fluvial flooding is the flooding associated with rivers. This can take the form of:
 - i. Inundation of floodplains from rivers and watercourses
 - ii. Inundation of areas outside the floodplain due to influence of bridges, embankments and other features that artificially raise water levels
 - iii. Overtopping of defences
 - iv. Breaching of defences
 - v. Blockages of culverts
 - vi. Blockages of flood channels or corridors
- 4.2. The NPPF recommends the Environment Agency (EA) Flood Maps as a starting point for Flood Risk Assessment. An extract from the EA Flood maps is reproduced in Figure 4.1 which shows that the Site is located within Flood Zone 1 where the risk of flooding is less than 1 in 1000 (0.1% AEP), with a low probability of flooding.



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Figure 4.1 – Environment Agency Flood Map (Rivers and Seas)

Tidal Flooding

- 4.3. As outlined in 4.2, the Environment Agency Flood Map for Rivers and Seas shows the Site is located within Flood Zone 1, where the likelihood of tidal flooding is less than 0.1% AEP.

Pluvial Flooding

- 4.4. Pluvial flooding is a risk of overland flows and ponding associated with extreme rainfall events. This can take the form of:



- i. Sheet runoff from adjacent land (urban or rural)
 - ii. Surcharged sewers
- 4.5. As rain falls everywhere within the United Kingdom, there will always be a residual risk of flooding from extreme rainfall events.
- 4.6. The Environment Agency has produced long-term flood risk maps with classifications that show the risk of flooding from surface water runoff including for climate change (for the near-term 2050's epoch, central allowance), and this is shown on the existing Site layout drawing in **Appendix B**. The maps show that there is a Low risk (between 0.1% and 1% AEP) of surface water flooding within the existing rear garden.
- 4.7. The Environment Agency has produced maps that show the likelihood associated with 0.2 m depth of surface water flooding with climate change 1 (2040-2060) and an extract from the mapping, obtained from the Defra Data Services Platform, is shown in Figure 4.2. The mapping shows there is no risk of flooding at 0.2 m depth at the Site.
- 4.8. A review of the existing topographical survey indicates a localised, shallow depression in ground levels at the west boundary; it is therefore considered that the flood extent indicated is the result of runoff from the Site area. It is proposed that the development drainage strategy will intercept, store and discharge the Site runoff in a controlled manner, mitigating for the indicated Low risk flood extent.
- 4.9. The risk of overland flow from adjacent sites is considered to be Low based on the surface water mapping, surrounding Site use and boundary features.

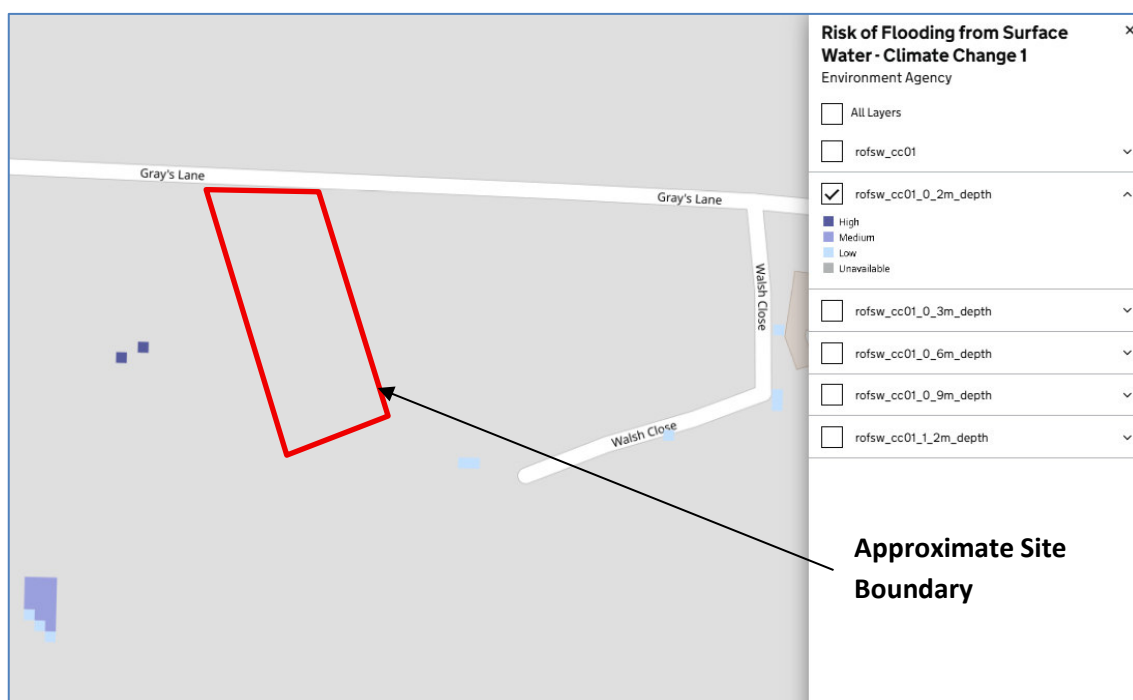


Figure 4.2: Extract from DEFRA Data Services Platform Mapping Showing Risk of Flooding from Surface Water Flood Extents (Climate Change 1) - 0.2m depth

Groundwater Flooding

- 4.10. Groundwater flooding is a risk of the water table rising after prolonged rainfall to emerge above ground level remote from a watercourse. It is most likely to occur in low lying areas underlain by aquifers of high vulnerability.



- 4.11. The Environment Agency has mapped groundwater vulnerability and Figure 3.2 shows the Site is located over a Medium to High vulnerability Aquifer.
- 4.12. The Environment Agency long-term flood risk information advises that the Site is located outside of a groundwater flood alert area.
- 4.13. The Hertfordshire County Council, as lead local flood authority, document LFRMS 2 2019-2029 - Strategy for the Management of Local Sources of Flood Risk includes mapping of the Areas Susceptible to Groundwater Flooding (AStGWF). The mapping is attached in **Appendix F**, and appears to show the Site is located within an area of <25% adjacent to an area at >=25% to <50%.
- 4.14. Based upon the Site geology, locally BGS borehole recorded groundwater level, groundwater vulnerability, topography, no identified historic flood records at the Site and the AStGWF mapping, the Site is considered to be at Low risk of groundwater flooding. However, it is recommended that a site investigation is undertaken to confirm the depth to groundwater to enable consideration of this in the design of the basement structure, and also to confirm the above groundwater flood risk assessment.

Infrastructure Failure Flooding

- 4.15. Infrastructure failure flooding is a risk of collapse, failure or surcharging of man-made structures and drainage systems. This could take the form of:
 - i. Reservoirs
 - ii. Canals
 - iii. Burst water mains
 - iv. Blocked sewers
 - v. Failed pumping stations
- 4.16. The Environment Agency have mapped failure of reservoirs, which shows the Site is not located within the maximum extent of flooding from reservoirs.
- 4.17. The risk of flooding from blocked sewers is considered to be Low based on the Site use and surrounding sites; any flood water would flow south towards the rear garden area or onto Gray's Lane.

Historic Flood Records

- 4.18. The North Hertfordshire Strategic Flood Risk Assessments (2008 and 2016) do not indicate a flood record at the Site.
- 4.19. A review of Hertfordshire County Council's flood investigation reports does not indicate a flood investigation at the Site.

5. DRAINAGE STRATEGY

Proposed Development

- 5.1. The proposed development comprises the demolition of an existing bungalow and the construction of a replacement dwelling comprising a basement, ground, first and second floor. The development also comprises an attached garage, driveway area off Gray's Lane, an external covered pergola structure, open swimming pool and landscaped garden. The proposed layout drawings are attached in **Appendix G**.



5.2. Development Site characteristics:

- Total Development area is 0.07 ha
- Existing impermeable area is 0.042 ha
- Total proposed impermeable development area is 0.045 ha
- The greenfield rate for the Site is $Q_{bar} = 0.3 \text{ l/s/ha}$ giving a rate of **0.012/s** based on the proposed impermeable area
- The existing brownfield rate is assessed as Q_{in2} is **3.2 l/s** (see section 3.9)

Climate Change

- 5.3. The National Planning Policy Framework (NPPF) sets out how the planning system should help to minimise vulnerability and provide resilience to the impacts of climate change.
- 5.4. The climate change allowances are predictions of anticipated change for:
- Peak river flow by river basin district
 - Peak rainfall intensity
 - Sea level rise
 - Offshore wind speed and extreme wave height
- 5.5. The climate change allowances are predictions of anticipated change. The Environment Agency has provided peak rainfall climate change allowances by Management Catchment, which for this Site are summarised in Figure 5.1. In accordance with current Environment Agency guidance, an allowance of 35% and 40% will be used in the design of the drainage strategy for the 3.3% AEP and 1% AEP rainfall events respectively.

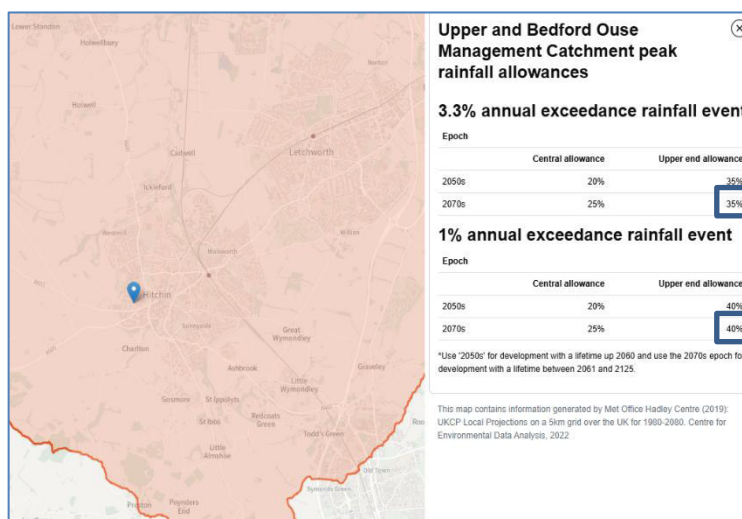


Figure 5.1: Environment Agency Peak Rainfall Allowances

Surface Water Disposal

- 5.6. In accordance with Government and Local Plan Policies and the requirements of the Building Regulations, surface water runoff from the development will be drained at source in a sustainable way by making full use of Sustainable Drainage Systems (SuDS) where possible.
- 5.7. The SuDS hierarchy dictates that infiltration at source is considered first. After infiltrating at source has been considered, the next stage is to deal with runoff in individual catchments,



followed finally by site wide drainage solutions. Runoff from the development should not adversely impact upon drainage systems outside of the Site boundary.

- 5.8. Detailed surface water drainage design should take into account the benefits that can be achieved by SuDS, which are referred to as the 'four pillars of SuDS' in the CIRIA SuDS Manual 2015 as listed below:
- i. **Water Quantity** - to control the quantity of runoff to manage flood risk and protect the natural water cycle.
 - ii. **Water Quality** - to manage the quality of runoff to prevent pollution.
 - iii. **Amenity** - to create and sustain better places for people.
 - iv. **Biodiversity** – to create and sustain better places for nature.

Quantity

- 5.9. Given the ground geology identified as comprising Sand and Gravel outlined in sections 3.4 to 3.6, and the potential depth to the groundwater identified in the BGS borehole logs, it is proposed that the Site runoff will discharge via infiltration. At this planning stage, infiltration testing has not been undertaken; the strategy has been developed based on a minimum assumed infiltration rate of 1×10^{-5} m/s and a Factor of Safety of 3 in accordance with Table 25.2 of the Ciria SuDS Manual C753. It is recommended that infiltration testing in accordance with BRE 365 is undertaken to confirm the rate, with specialist advice obtained regarding the soluble rock risk and the required clearance from a soakaway to structures. At this stage a clearance of 5m has been indicated. It is proposed that the driveway area at the front of the dwelling will discharge via permeable paving, with the remainder of the impermeable areas discharging via a cellular crate soakaway located to the rear of the dwelling. The infiltration drainage strategy calculations and layout drawing are attached in **Appendix H**.
- 5.10. As infiltration testing has not been undertaken at this stage to confirm the viability of discharge via infiltration, an alternative drainage strategy has also been developed. It is assumed that the existing bungalow roof runoff either discharges via a soakaway or to the foul network within the Site (refer to paragraph 3.8). The alternative strategy will be to discharge to the Anglian Water surface water sewer within Gray's Lane, removing the potential current discharge to the foul network. The final discharge will be restricted, with attenuation provided on Site. It is proposed that the runoff will be restricted to **2 l/s**, to align with the usual minimum flow rate required by Anglian Water, with attenuation provided beneath the driveway area in the form of cellular crates and granular sub-base. This proposed connection will be subject to Anglian Water consent and associated charges. The alternative drainage strategy (discharge to the surface water sewer) calculations and layout drawing are attached in **Appendix I**.
- 5.11. Info-Drainage has been used to design the storage associated with up to the 1% AEP event plus an allowance for 40% climate change using FEH data; an allowance of 10% urban creep has also been included for.
- 5.12. The calculations for each strategy approach show that there is no flooding on or off-site during rainfall events up to the 1% AEP plus climate change scenario.



Quality

- 5.13. The water discharging to the ground or surface water sewer must be cleansed and therefore treatment processes are introduced through the drainage network. These should be in accordance with Chapter 26 of the Ciria SuDS Manual C753, where the hazard of low to medium is mitigated with the various SuDS components to equal or exceed the hazard indices. Refer to the following Tables 26.2, 26.3 and 26.4 which show the hazard and mitigation indices associated with the proposed drainage strategies.
- 5.14. **Infiltration Strategy:** It is proposed that the roof areas will drain via downpipe filter chambers prior to the network and that the runoff from the paths and patio will pass through a catchpit prior to the cellular soakaway. The driveway will discharge via permeable paving. These features will suitably cleanse the runoff prior to discharge to the ground.
- 5.15. **Alternative Strategy (discharge to the surface water sewer):** It is proposed that the roof areas will drain via downpipes with in-line filter prior to the network and that the runoff from the paths and patio will pass through a catchpit prior to the cellular storage. The driveway will discharge via permeable paving to the cellular storage below. These features will suitably cleanse the runoff prior to discharge to the surface water sewer.

TABLE 26.2 Pollution hazard indices for different land use classifications

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



TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters

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

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates ¹	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.6 ⁴	0.5	0.6
A soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.8 ⁴	0.8	0.8
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

Biodiversity & Amenity

- 5.16. Amenity and biodiversity are often considered together as they overlap and linkages are made.
- 5.17. Amenity is the multi-functional use that should be highlighted for any part of the SuDS landscape, which is available for use by people when not being used for drainage. This is an underlying principle of place making urban design, to make a location desirable to live and work.
- 5.18. Biodiversity encompasses the number and abundance of all species of life on earth. Locally, biodiversity reflects the character of the plants and wildlife that share the space in which humans live, work and play.



- 5.19. The proposed impermeable area has not increased from the existing Site layout, with landscaping maintained to the rear of the dwelling. There are limited options for increasing biodiversity at the Site.

Exceedance

- 5.20. In an exceedance event in which rainfall surpasses the design capacity, there should be no vulnerable buildings or infrastructure at risk of flooding.
- 5.21. Site ground levels will be locally contoured to deflect water away from the dwelling. The exceedance flow path will be directed away from the building thresholds, either towards Gray's Lane or to the rear garden, replicating the current flow paths.
- 5.22. The exceedance paths have been shown on the drainage layout plans in **Appendix H and Appendix I**.

Foul Water Disposal

- 5.23. Part H of The Building Regulations (2010) 2015 Edition states that "Foul drainage should be connected to a public foul or combined sewer wherever this is reasonably practicable".
- 5.24. It is proposed that the development foul discharge will continue to discharge to the Anglian Water public foul network as currently occurs.

6. MAINTENANCE

- 6.1. The drainage network within the plot boundary will be maintained by the Site owner. It is important to prevent silt from entering the drainage system during the construction phase and a Construction Surface Water Management Plan should be developed prior to commencement of works.
- 6.2. Maintenance of the system will include for frequent inspections of the network, attenuation tank/soakaway, flow control device and permeable paving, with debris removal to ensure designed levels of performance are achieved.



7. SUMMARY

- 7.1. It has been demonstrated that the Site is located within Flood Zone 1.
- 7.2. Table 7.1 summarises the probability of the Site flooding from the five key sources as listed in PPS25.

Source	Description	Risk	
Fluvial	Rivers	Flood Zone 1	(<0.1% AEP)
Tidal	Seas		
Pluvial	Surface Water	Very Low to Low	(<0.1% AEP to 1%-0.1% AEP)
Groundwater	Aquifers	Low	-
Infrastructure failure	Reservoirs	Outside extent of flooding	-
	Blocked Sewers	Low	

Table 7.1 – Flood Risk Summary

- 7.3. Following the guidance from the Environment Agency, the development will be safe for its lifetime without increasing flood risk elsewhere.
- 7.4. Based on the BGS superficial ground geology mapping indicating Sand and Gravel, and the locally recorded (BGS borehole logs) depth to the groundwater, it is proposed that the Site runoff will discharge via infiltration. At this planning stage, infiltration testing has not been undertaken therefore the strategy has been developed based on a minimum assumed infiltration rate of 1×10^{-5} m/s and a Factor of Safety of 3 in accordance with the Ciria SuDS Manual C753. It is recommended that infiltration testing in accordance with BRE 365 is undertaken to confirm the rate, with specialist advice obtained regarding the soluble rock risk and the required clearance from a soakaway feature to structures. At this stage a clearance of 5m has been indicated. It is proposed that the driveway area at the front of the dwelling will discharge via permeable paving, with the remainder of the impermeable areas discharging via a cellular crate soakaway located to the rear of the dwelling.
- 7.5. As infiltration testing has not been undertaken at this stage to confirm the viability of discharge via infiltration, an alternative drainage strategy comprising the discharge of runoff to the Anglian Water surface water sewer within Gray's Lane has been demonstrated (removing a potential current discharge to the foul network). It is proposed that the runoff will be restricted to **2 l/s**, to align with the usual minimum flow rate required by Anglian Water, with attenuation provided beneath the driveway area in the form of cellular crates and granular sub-base.
- 7.6. The drainage strategies have been designed to store and discharge the runoff associated with up to the 1 in 100 year rainfall event plus an allowance of 40% climate change and 10% urban creep, without flooding within the Site.
- 7.7. It is proposed that the roof areas will drain via downpipes with in-line filters prior to the network, the runoff from the paths and patio will pass through a catchpit prior to the cellular soakaway or attenuation storage and the driveway will discharge via permeable paving; these measures will suitably cleanse the runoff prior to discharge to the ground or sewer.



- 7.8. Exceedance flow will be directed away from the dwelling and outflow along its original path to either Gray's Lane or the rear garden as currently occurs.
- 7.9. In accordance with government policy, SuDS will be used on Site where possible, and surface water drainage of the Site will be carried out in a sustainable way.
- 7.10. As long as maintenance of the new drainage systems are correctly carried out, the risk of flooding and the subsequent risks from infrastructure failure or pluvial means, is very Low.
- 7.11. The Environment Agency accepts that extreme floods will occur and it will never be possible to eliminate flood risk altogether.
- 7.12. It is considered that the risk of flooding to the Site has been adequately considered and therefore development of the Site, in accordance with the recommendations outlined in this report, does not pose an unacceptable flood risk either to occupants of the Site or to others off site.



APPENDICES



Appendix A

Site Location Plans

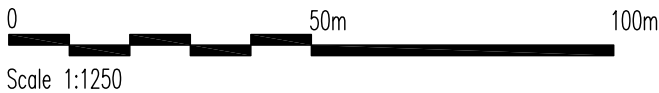
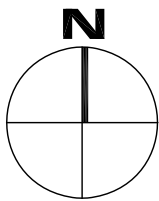
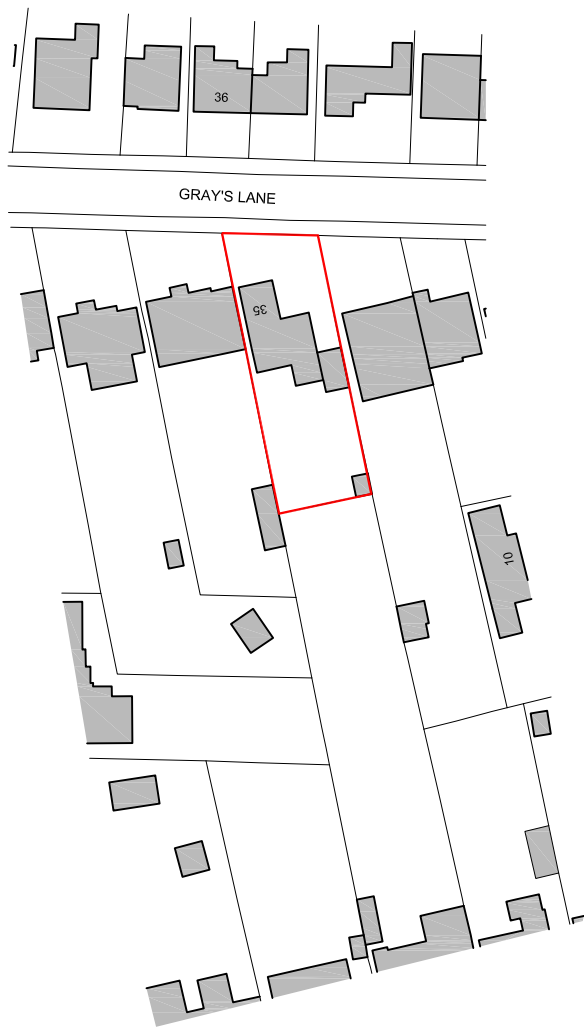


Site Location Plan



DIMENSIONS TO BE CHECKED ON SITE BEFORE ANY WORKS.
ANY QUERIES REGARDING DIMENSIONS TO BE TAKEN UP WITH
PENTANGLE DESIGN GROUP. ALL DIMENSIONS OF EXISTING
BUILDINGS TO BE VERIFIED ON SITE. THIS DRAWING IS THE
COPYRIGHT OF PENTANGLE DESIGN GROUP AND SHALL NOT BE IN
ANY WAY USED OR REPRODUCED WITHOUT THEIR PRIOR WRITTEN
CONSENT.

NOTES



PLANNING

PENTANGLE

DESIGN GROUP

SUITE 1, 21 BANCROFT HITCHIN HERTS SG5 1JW
T:01462 431133 E:pdg@pentangledesign.co.uk

JOB TITLE
Proposed Replacement Dwelling at
35 Grays Lane, Hitchin

for -

DRAWING TITLE

Location Plan

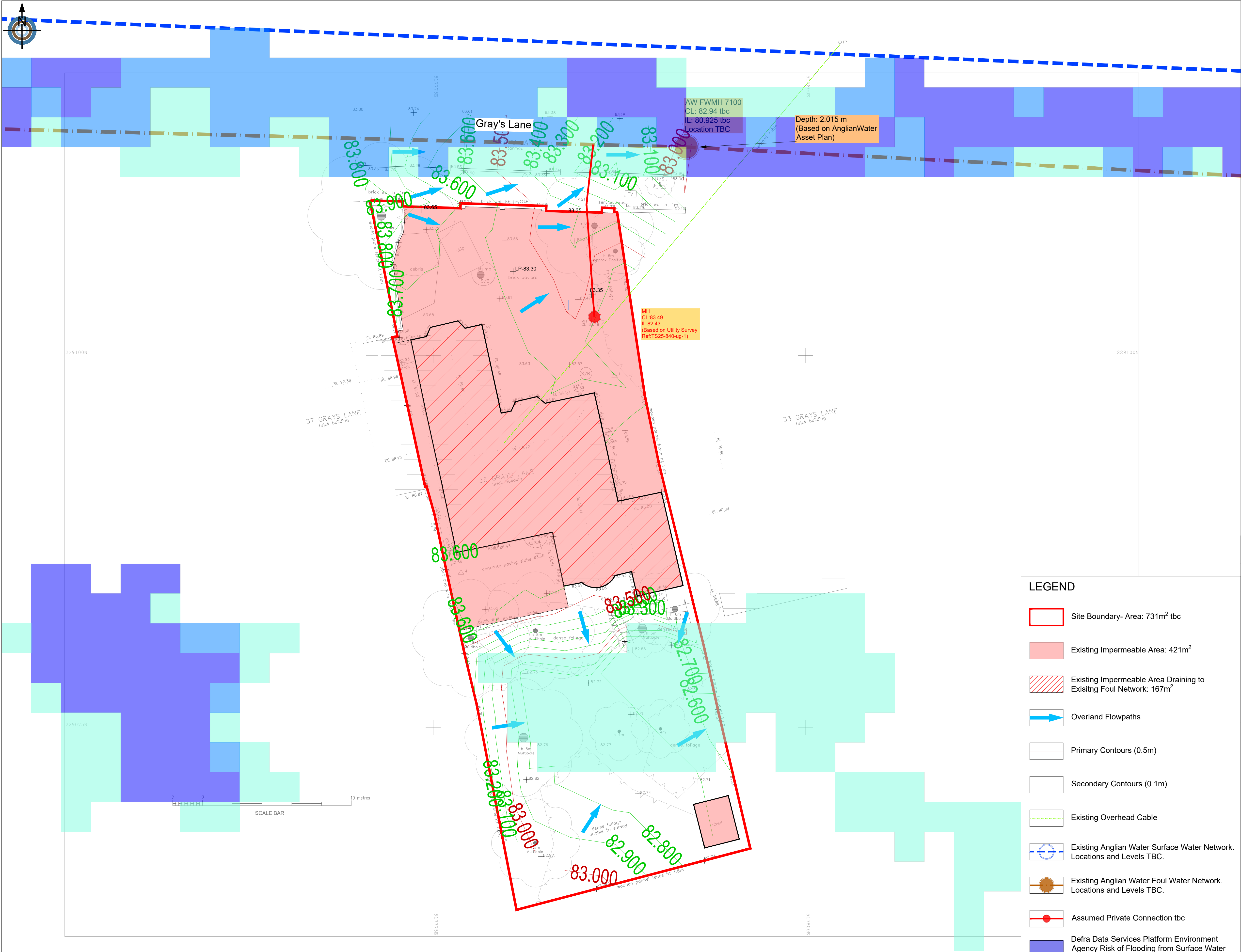
SCALE	DRAWING NUMBER	REVISION
1:1250	01	-
Sept '25		
SHT. SIZE A4		
JOB NUMBER 3959		

CHARTERED ARCHITECTS

Appendix B

Existing Site Layout





- NOTES:
1. This drawing is to be read in conjunction with GHB series 333/2025 drawings and documents and any other relevant project team documents.
 2. Preliminary Issue - This drawing is not to be used for construction or detailed pricing purposes. Any work undertaken before approvals are received (in writing) are at risk of abortive works.
 3. This drawing has been produced based upon the following information:
Topographical Survey by Terrain Surveys (Ref. TS25-840-1 dated NOV 2025) subject to transformation of :
Scale 1 and translation (0,0,0) about point (0,0,0).
Architectural Layout by Pentangle Design Group (Ref. 3959-02 dated Sept 25) subject to transformation of :
Scale 0.001 and translation (513950.40, 230186.18, 0) about point (0,0,0).
 4. All site levels and finished floor levels to remain indicative for planning purposes and are subject to verification following detailed design.
 5. This drawing has been prepared solely for the purpose of obtaining a Planning Consent based on information available and planning requirements at the date of issue only.

LEGEND

- Site Boundary- Area: 731m² tbc
- Existing Impermeable Area: 421m²
- Existing Impermeable Area Draining to Existing Foul Network: 167m²
- Overland Flowpaths
- Primary Contours (0.5m)
- Secondary Contours (0.1m)
- Existing Overhead Cable
- Existing Anglian Water Surface Water Network. Locations and Levels TBC.
- Existing Anglian Water Foul Water Network. Locations and Levels TBC.
- Assumed Private Connection tbc
- Defra Data Services Platform Environment Agency Risk of Flooding from Surface Water Climate Change 1 - HIGH RISK (>3.3%)
- Defra Data Services Platform Environment Agency Risk of Flooding from Surface Water Climate Change 1 - MEDIUM RISK (1%-3.3%)
- Defra Data Services Platform Environment Agency Risk of Flooding from Surface Water Climate Change 1 - LOW RISK (0.1%-1%)

P1	09/12/25	Initial Issue		PRJ	JAH
Rev	Rev Date	Description		Drawn	Chck'd
© Copyright					
 GHBullard & Associates LLP Civil and Traffic Engineering Consultants			27 Barton Road, Thurston, Suffolk, IP31 3PA		
T: (01359) 235071 F: (01359) 231138 W: http://www.ghbullard.co.uk Partnership No. OC383830, Registered in England and Wales			Client:		
MR A DAY					
Project: 35 GRAYS LANE, HITCHIN, HERTFORDSHIRE, SG5 2HH					
Drawing Title: DRAINAGE STRATEGY EXISTING SITE LAYOUT					
Status:					
FOR INFORMATION					
Scale: 1:125 @ A1			Drawn: PRJ		
Created: DEC 2025			Checked: JAH		
DWG Reference: 333-2025.DWG					
Drawing Number: 333/2025/002				Revision: P1	

P# = Preliminary, C# = Construction, AB# = As Built

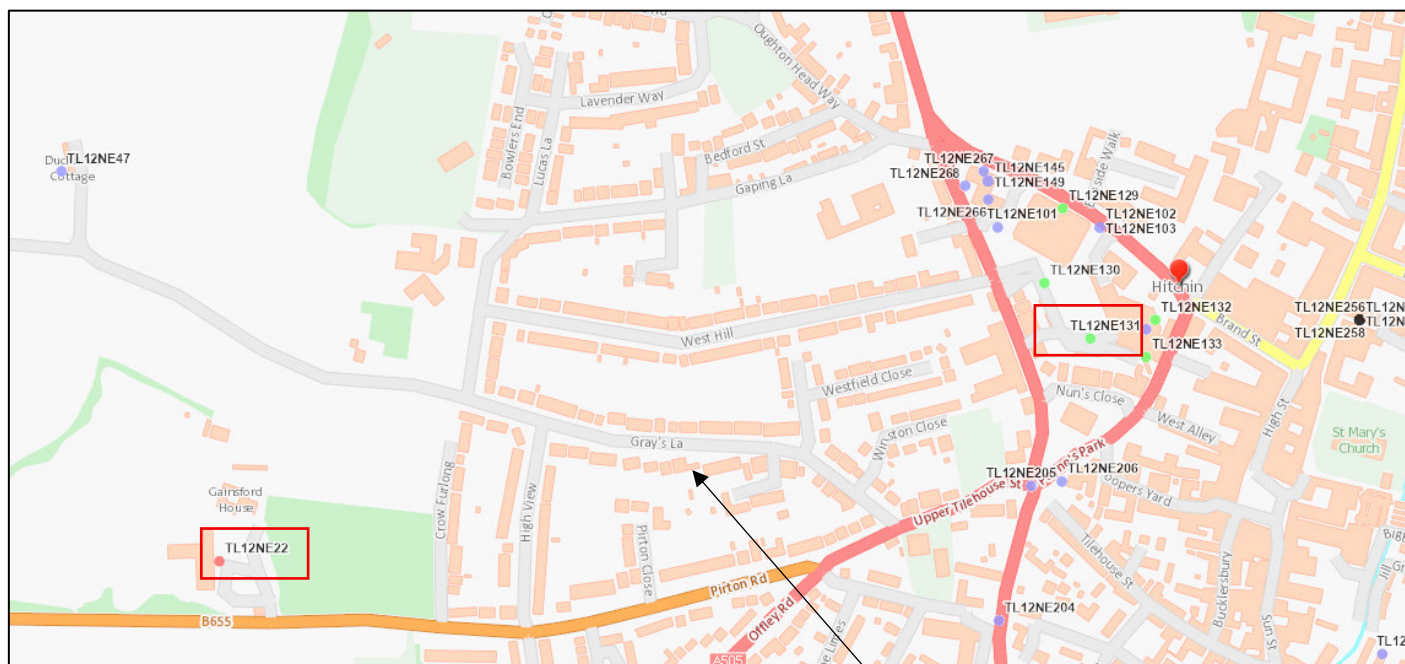
Appendix C

BGS Borehole Logs

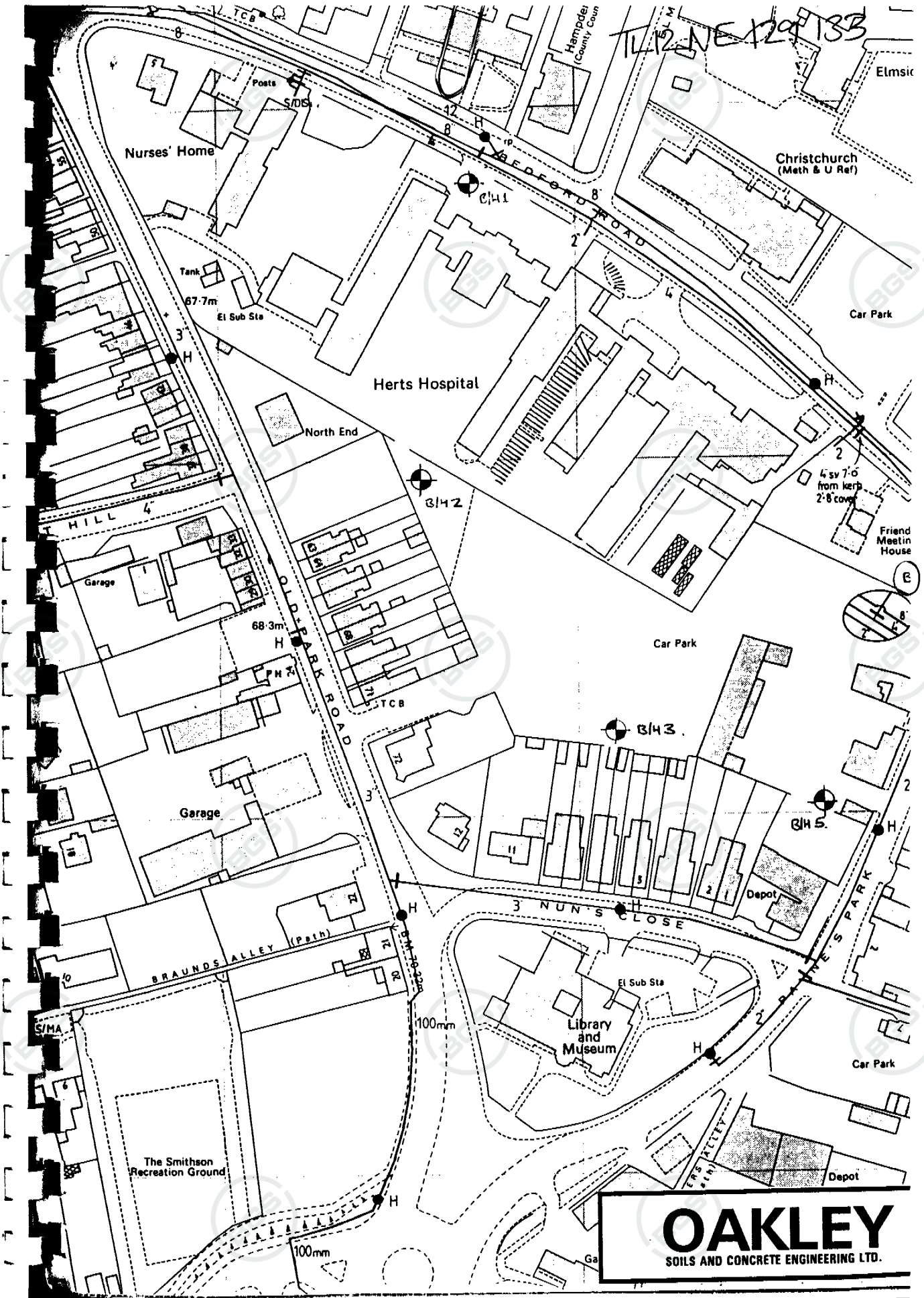


333/2025: 35 Gray's Lane, Hitchin, Hertfordshire, SG5 2HH

BGS Borehole Logs Location Plan



Approximate
Site Location





OAKLEY SOILS AND CONCRETE ENGINEERING LTD			THE WINDMILL HILDERSHAM CAMBRIDGE CB1 6BS		BOREHOLE No: 3 Sheet 1 of 2						
Type of boring: Cable Percussion		TL12NE 131		Feature: North Herts Hospital							
Type of rig: Pilcon Wayfarer		1821-2923		Location: Hitchin							
Dia of boring: 200mm to 15.00m				Ground level: 71.60							
Casing details: 200mm to 15.00m				TL Coordinates: E 1821 N 2923							
Date & (Time)	Depth & diam. of boring & (depth of casing)	Ground Water	Samples & Tests			Strata					
			Sample	Depth	Test & Instr	Depth	Reduced Level	Legend	Thickness	Description	
10.7.86						metres					
	200mm dia					0.10			0.10	TARMACADAM	
	1.00 (1.45)		1 ↓	0.50- 0.80		0.90			0.80	MADE GROUND: Soft clayey silty sand with f/m/c flint gravel and some f/m chalk.	
	2.50 (2.50)		2 ↓	1.00- 1.45	N=27	2				Medium dense becoming very dense brown clayey silty f/m/c SAND with some f/m flint and chalk gravel.	
	4.00 (4.00)		3 ↓	2.50- 2.95	N=54	3			2.80		
	5.50 (5.50)		4 ↓	4.00- 4.45	18 blows	4				Firm orangish brown silty sandy CLAY with f/m chalk, flint gravel.	
	7.00 (7.00)		5 ↓	4.50- 4.95		5					
	8.60 (8.50)	STRIKE 8.60	6 ↓	5.50- 5.95	14 blows	6			4.80	becoming more sandy with depth.	
	10.00 (10.00)		7 ↓	7.00- 7.45	N=13	7					
			8 ↓	8.50- 8.95	N=57	8					
			9 ↓			9			3.30	Very dense dark grey clayey silty f/m/c SAND with f/m/c chalk and flint gravel.	
			10 ↓			10					
● Small disturbed sample ● Large disturbed sample — Undisturbed sample — Standard penetration test ▲ Water sample □ Drill core sample - x Vane test ○ Field permeability test - m Moisture content (%)			Remarks: 1 hour chiselling through tarmac and fill.							Scale 1.50 metres	
			Date started 10.7.86							Logged by AB	
			Date finished 10.7.86							Checked by AF	
										Date	
							Fig. No. 6				



OAKLEY		THE WINDMILL HILDERSHAM CAMBRIDGE CB1 6BS		BOREHOLE No: 3 Sheet 2 of 2						
Type of boring: Cable Percussion		Type of rig: Pilcon Wayfarer		Feature: North Herts Hospital						
Dia of boring: 200mm to 15.00m		Casing details: 200mm to 15.00m		Location: Hitchin						
				Ground level:						
				Coordinates: E N						
Date & (Time)	Depth & diam. of boring & (depth of casing)	Ground Water	Samples & Tests			Strata				
			Sample	Depth	Test & Instr	Depth	Reduced Level	Legend	Thickness	Description
	200mm dia		11	10.00- 10.45	N=43	metres 10		X	3.30	Very dense dark grey clayey silty f/m/c SAND with f/m/c chalk and flint gravel.
	12.00 (12.00)		12	12.00- 12.45	N=25	11.80 12		X	1.30	Medium dense f/m chalk and flint GRAVEL with some silty clayey sand.
	13.50 (13.50)		13	13.50- 13.95	N=52	13.10 14		X	(1.90)	Very dense becoming dense brown and greyish brown clayey silty f/m/c SAND and f/m/c flint and chalk GRAVEL
	14.50 (14.50)		14	14.50- 14.95	N=40	15		X		
10.7.86	15.00 (15.00)	8.60								
						6				
						7				
						8				
						9				
						0				

● Small disturbed sample

⬮ Large disturbed sample

▬ Undisturbed sample

⌋ Standard penetration test

▲ Water sample

○ Drill core sample

x Vane test

⊗ Field permeability test

m Moisture content (%)

Remarks:

Date started ..10.7.86.....
Date finished ..10.7.86.....

Scale 1:50
metres
Logged by ..AB....
Checked by ..AF....
Date ..
Fig. No. 7



221/42 St. Michael's Boys Catholic School, Foxholes, Hitchin. (Filled in)

TL 12 NE/22

W.S.B.M. p. 223. Surface +299'. Bore. Before 1921.
R.W.L. 2021. Aug. 1956, -208. Mar. 1957.

ODIC. 92 m

1727.2899

Sand and Gravel (Buried channel) ... 26
Boulder Clay (Buried channel) ... 140

26
166

GEOLOGICAL
CLASSIFICATION

NATURE OF STRATA

THICKNESS
ft.

DEPTH
ft.

	Silt	2	2
Sand & Gravel 26'	Red Clayey Sand	10	12
	Grey sand, with chalk	14	26 7.9
Boulder Clay 140'	Yellow - grey clay	10	36 11 m
	Grey Boulder Clay, with chalk lumps	130	166 = 50.6 m

PR. L.P. Thomas 8/3/68.

Box. 2 H. 5.
Page 223.

186.287

HITCHIN

OD $\approx 64m$

5. Queen Street. Steam Laundry. 1912.

W. HILL, *Proc. Geol. Assoc.*, 1912, vol. xxiii, p. 222.

[Glacial Drift.] Sandy gravel and small stones, passing down into sand, with a thin bed of greasy clay at 62 ft. deep. 125 ft., and Chalk not reached.

125' = 38m

and gravel
in channel
by house

see fig 724

note letter from the Hitchin Laundry,

13/6/40. (file 4507/221)

clay at 18.9m

$\approx 49m$ OD

-300 yds. SSE of St. Mary's Church.

Surface ≈ 210 ft.

Visited "Hitchin Laundry" well as large house.
Laundry on the stairs.

OD $\approx +225'$

Sited by A on floor. 12 NW/NE.
Apr 20/2/60.



221/42 St. Michael's Boys Catholic School, Foxholes, Hitchin. (Filled in)

TL 1727 2899

W.S.B.H. p. 223. Surface +299½. Bore. Before 1921.

R.W.L. +202½. Aug. 1956; +208. Mar. 1957.

TL12/94

Sand and Gravel	(Buried channel)	...	26	26
Boulder Clay	(Buried channel)	...	140	166

GEOLOGICAL
CLASSIFICATION

NATURE OF STRATA

THICKNESS
ft.

DEPTH
ft.

	Soil	2	2
Sand & Gravel 26'	Red clayey sand	10	12
	grey sand, with chalk	14	26
Boulder Clay 140'	Yellow - grey clay	10	36
	grey Boulder clay, with chalk lumps	130	166

pr. L.P. Thomas 8/3/68.

HITCHIN

- * 3. Foxholes (Mount Pleasant of old map). Westward of the town.
W. HILL, *Quart. Journ. Geol. Soc.*, 1907, vol. lxiv, p. 16.

Boulder Clay and gravel, without reaching water or Chalk, 100 ft., although Chalk crops out close by. A trial then made some 25 or 30 yards nearer the out-crop, found Chalk close to the surface.

Presumably the following note from W. HILL (September, 1914) refers to this well. It describes a boring at the SE. corner of Mount Pleasant, which gave the following section:—

Soil	...	...	...	...	2
Sand and gravel	Red clayey sand	...	...	...	10
	Rather sharp grey sand, with some chalk	...	...	...	14
	Yellowish-grey clay, seemed to pass into the next	...	...	...	10
Boulder Clay	Grey Boulder Clay, with small chalk lumps:	...	...	...	130
in buried channel	few boulders	...	...	...	
mgc July '66					

166 ft.

Herts 12 NW/W

L.P.T. 9/3/68. * 6" Herts 12 NW-W shows both Foxholes and Mount Pleasant, separated by about 100 yds.

Foxholes: 1350 yds W. by S. of St. Mary's Church.
Surface c. 300 ft.

Property of Mr. H. G. Moss, Elmsoide Walk, Hitchin.
Well disused according to Engineer, Hitchin U.D.C.
D.A.Y. 22/11/56

Visited. Several inspection covers near site on our maps. Unable to lift them. New owners know nothing of well.

mgc 23/9/60

Visited. Well situated in bicycle shed. Filled in.
House → landing house for St. Michael's Boys Catholic School.
9/11/64 B.M.

Water Supply
of
Bucks. & Herts.
Page 223.



Reference No.10.

Mr. H.J. Moss, "Foxholes", Pirton Road.

Ground Level - O.D. 299.55 ft.

221/42

TL12/94

Date.	Water Level.		Date.	Water Level.	
	ft.	ins.		ft.	ins.
13.8.56	96	-	21.1.57	93	8
20.8.56	97	-	22.1.57	93	8
28.8.56	95	11	23.1.57	93	7
3.9.56	95	5	24.1.57	93	5
10.9.56	95	6	25.1.57	93	6
17.9.56	96	5	26.1.57	93	6
24.9.56	96	2	27.1.57	93	6
1.10.56	95	10	28.1.57	93	7
10.10.56	95	10	29.1.57	93	7
21.10.56	95	10	30.1.57	93	7
28.10.56	95	6	31.1.57	93	6
4.11.56	95	6	1.2.57	93	8
11.11.56	95	10	2.2.57	93	8
18.11.56	96	3	3.2.57	93	8
25.11.56	96	-	4.2.57	93	7
1.12.56	95	4	10.2.57	93	4
8.12.56	95	2	17.2.57	92	9
11.12.56	95	-	24.2.57	92	-
14.12.56	95	4	3.3.57	92	-
16.12.56	95	1	10.3.57	91	6
23.12.56	95	2	17.3.57	91	6
30.12.56	95	-	24.3.57	91	5
1.1.57	94	10	31.3.57	91	7
2.1.57	94	9 (morning reading)	7.4.57	91	9
2.1.57	94	8 (afternoon)			
3.1.57	94	9			
6.1.57	94	4			
9.1.57	94	2			
9.1.57	94	2			
13.1.57	94	-			
20.1.57	93	9			

DATA Bank

Appendix D

Greenfield and Brownfield Runoff Rate Calculations



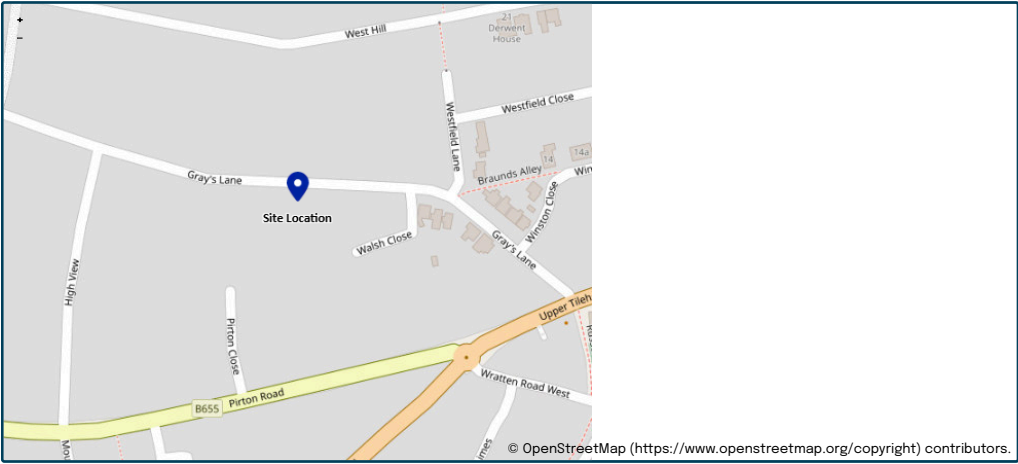
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	10/12/2025
Calculated by	ER
Reference	333/2025
Model version	2.2.2

Location

Site name	Gray's Lane
Site location	Hitchin



Site easting (British National Grid)	517780
Site northing (British National Grid)	229092

Site details

Total site area (ha)	1	ha
----------------------	---	----

Greenfield runoff

Method

Method	FEH statistical (2025)
--------	------------------------

FEH statistical (2025)

SAAR9120 (mm)	My value651	Map value	mm
BFIHOST19scaled	0.942		
QMed-QBar conversion	1.124	☐	1.124
QMed (l/s)	0.3	l/s	
QBar (FEH statistical 2025) (l/s)	0.3	l/s	

Growth curve factors

Hydrological region	My value5	Map value	☐	5
1 year growth factor	0.87			
2 year growth factor	0.89			
10 year growth factor	1.65			
30 year growth factor	2.45			
100 year growth factor	3.56			
200 year growth factor	4.21			

Results

Method	FEH statistical (2025)	
Flow rate 1 year (l/s)	0.2	l/s
Flow rate 2 year (l/s)	0.3	l/s
Flow rate 10 years (l/s)	0.5	l/s
Flow rate 30 years (l/s)	0.7	l/s
Flow rate 100 years (l/s)	1.0	l/s
Flow rate 200 years (l/s)	1.2	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Project: 333-2025 Hitchin 35 Gray Lane	Date: 08/12/2025			
Report Details: Type: Inflows Storm Phase: Phase	Designed by: PRJ	Checked by: JAH	Approved By:	
	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk, IP31 3PA			



Existing Impermeable Area

Type : Catchment Area

Area (ha)	0.017
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: 333-2025 Hitchin 35 Gray Lane		Date: 08/12/2025			
Report Details: Type: Junctions Storm Phase: Phase		Designed by: PRJ	Checked by: JAH		Approved By:
		Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk, IP31 3PA			

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
Manhole	Manhole	208521.614	601541.476	83.490	1.060	82.430	Circular	1.200
AW FWMH 7100	Manhole	208537.947	601561.999	82.940	2.015	80.925	Circular	1.200

Name	Lock
Manhole	None
AW FWMH 7100	None

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
Manhole	Outlet	Pipe	Free Discharge

Project: 333-2025 Hitchin 35 Gray Lane		Date: 08/12/2025			
Report Details: Type: Connections Storm Phase: Phase		Designed by: PRJ	Checked by: JAH		Approved By:
		Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk, IP31 3PA			

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
Pipe	26.230	Pipe	17.429		0.6	100	83.490	82.430

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Part Family	Lock	Culvert Type	Culvert Entrance
Pipe	82.940	80.925		None	(None)	(None)

Project: 333-2025 Hitchin 35 Gray Lane	Date: 08/12/2025		
	Designed by: PRJ	Checked by: JAH	Approved By:
Report Title: Rainfall Analysis Criteria	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk, IP31 3PA		



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

FEH

Type: FEH

Site Location	GB 517783 229095 TL 17783 29095
Rainfall Version	2022
Summer	☒
Winter	☒

Return Period

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

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Project: 333-2025 Hitchin 35 Gray Lane		Date: 08/12/2025		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: PRJ	Checked by: JAH	
		Approved By:		
		Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk, IP31 3PA		



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Manhole	FEH: 2 years: +0 %: 15 mins: Summer	83.49 0	82.43 0	82.462	0.032	3.2	0.036	0.000	3.1	1.440	OK
AW FWMH 7100	FEH: 2 years: +0 %: 15 mins: Summer	82.94 0	80.92 5	80.956	0.031	3.1	0.000	0.000	3.2	1.440	OK

Project: 333-2025 Hitchin 35 Gray Lane		Date: 08/12/2025		
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: PRJ	Checked by: JAH	
		Approved By:		
		Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk, IP31 3PA		



FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Manhole	FEH: 30 years: +0 %: 15 mins: Summer	83.49 0	82.43 0	82.481	0.051	7.5	0.058	0.000	7.3	3.319	OK
AW FWMH 7100	FEH: 30 years: +0 %: 15 mins: Summer	82.94 0	80.92 5	80.975	0.050	7.3	0.000	0.000	7.4	3.319	OK

Project: 333-2025 Hitchin 35 Gray Lane		Date: 08/12/2025			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: PRJ	Checked by: JAH		Approved By:
		Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk, IP31 3PA			



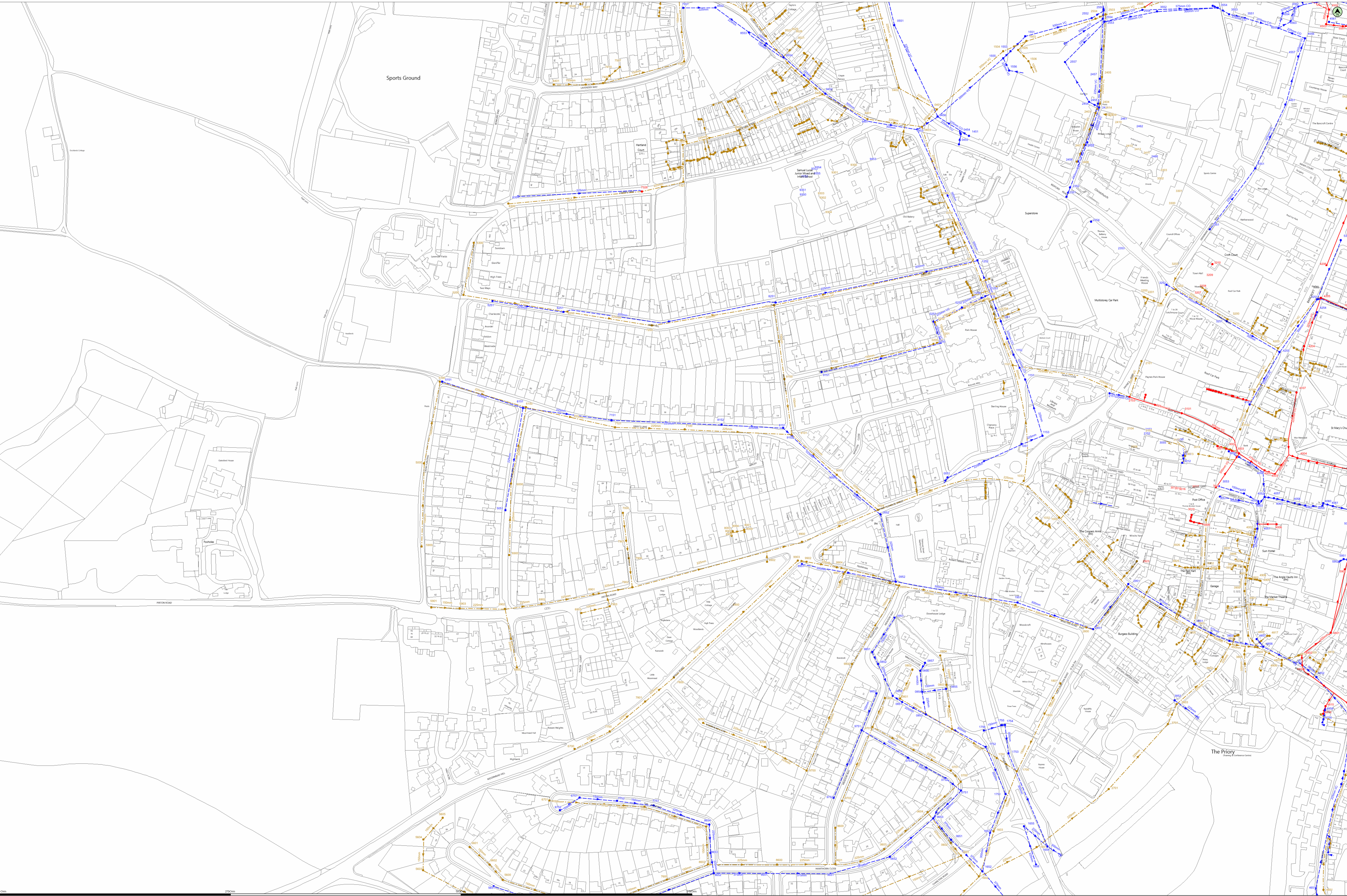
FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flooded Volume

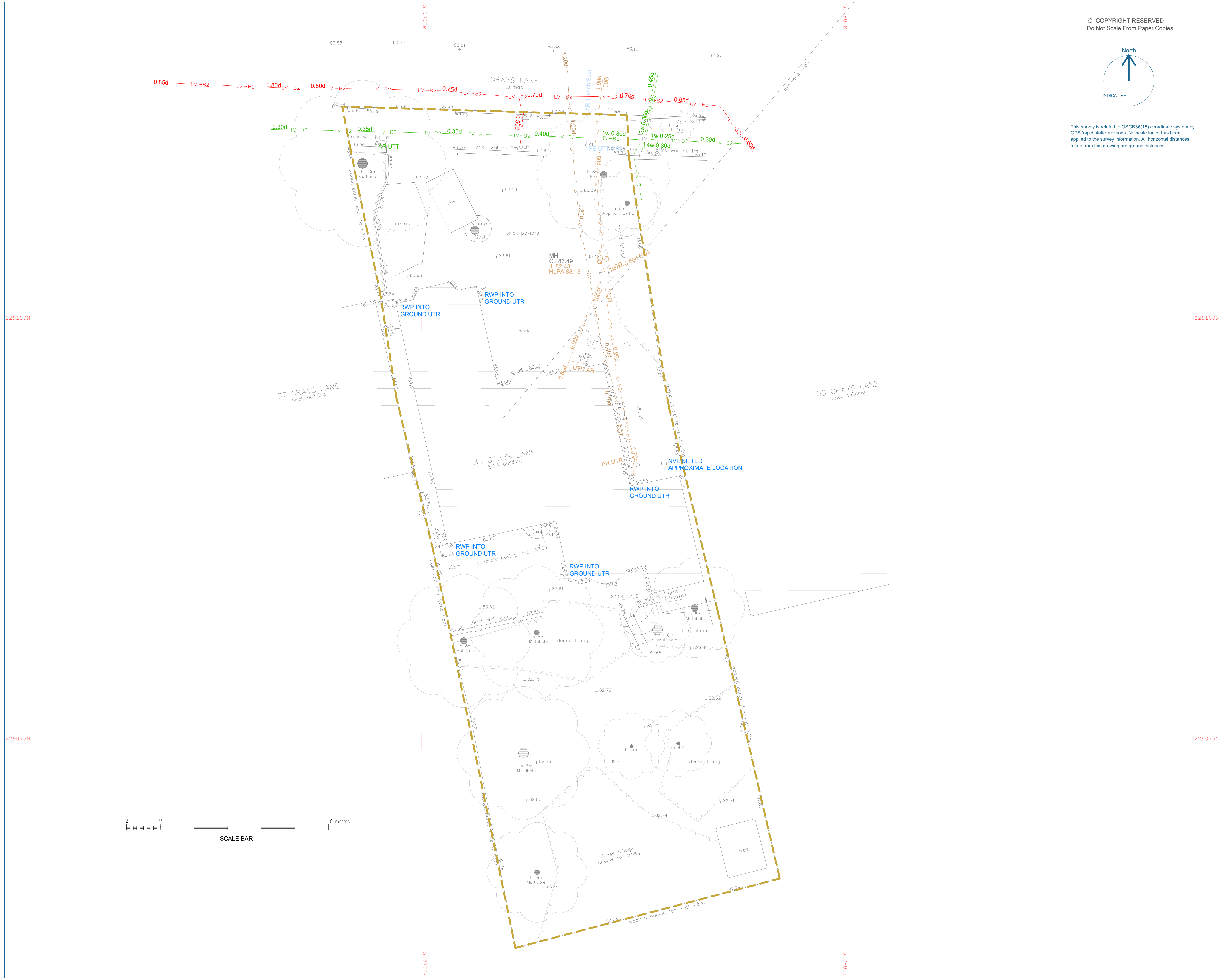
Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Manhole	FEH: 100 years: +0 %: 15 mins: Summer	83.49 0	82.43 0	82.490	0.060	9.5	0.067	0.000	9.2	4.176	OK
AW FWMH 7100	FEH: 100 years: +0 %: 15 mins: Summer	82.94 0	80.92 5	80.982	0.057	9.2	0.000	0.000	9.4	4.176	OK

Appendix E

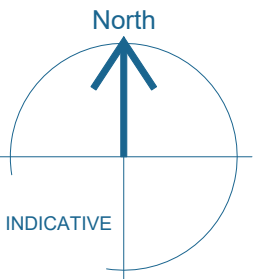
Anglian Water Asset Plan and On-site Utility Survey







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This survey is related to OSGB36(15) coordinate system by GPS 'rapid static' methods. No scale factor has been applied to the survey information. All horizontal distances taken from this drawing are ground distances.

UTILITY KEY

— HV = B2 —	— LV = B2 —	— LV = B2 —	High Voltage Cabling
— LV = B2 —	— LV = B2 —	— LV = B2 —	Low Voltage Cabling
— W = B2 —	— W = B2 —	— W = B2 —	Water Main
— SFW = B2 —	— SFW = B2 —	— SFW = B2 —	Sewer Foul Water
— SW = B2 —	— SW = B2 —	— SW = B2 —	Sewer Surface Water
— SW = B2 —	— SW = B2 —	— SW = B2 —	Sewer Surface Water 3000 and above
— SFW = B2 —	— SFW = B2 —	— SFW = B2 —	Sewer Foul Water 3000 and above
— SFW = B2 —	— SFW = B2 —	— SFW = B2 —	Foul Water Rising Main
— BT = B2 —	— BT = B2 —	— BT = B2 —	Telecom
— FT = B2 —	— FT = B2 —	— FT = B2 —	Telecom (Fibre Optic Cable)
— COMS = B2 —	— COMS = B2 —	— COMS = B2 —	Communications
— V = B2 —	— V = B2 —	— V = B2 —	Vodafone
— VM = B2 —	— VM = B2 —	— VM = B2 —	Virgin Media
— CCTV = B2 —	— CCTV = B2 —	— CCTV = B2 —	Closed Circuit Television
— D = B2 —	— D = B2 —	— D = B2 —	Duct (Empty)
— U = B2 —	— U = B2 —	— U = B2 —	Unidentified EML
— GPR = B2 —	— GPR = B2 —	— GPR = B2 —	Unidentified GPR
— H = B2 —	— H = B2 —	— H = B2 —	Heating Pipe
— F = B2 —	— F = B2 —	— F = B2 —	Fuel Pipe
— TS = B2 —	— TS = B2 —	— TS = B2 —	Traffic Signals
— S = B2 —	— S = B2 —	— S = B2 —	Survey Boundary
— C = B2 —	— C = B2 —	— C = B2 —	Extent of Chamber
— T = B2 —	— T = B2 —	— T = B2 —	Traffic Sensor Loop
— O = B2 —	— O = B2 —	— O = B2 —	Overhead Service
Inaccessible areas, shown thus:			1:200 Depth to service (applicable to all types)
			Change Of Quality Code

ABBREVIATIONS

AC Asbestos cement	FH Fire Hydrant	PVC Polyvinyl Chloride
ALK Alkathene	FL Flood Light	RE Roding Eye
AR Assumed Route	FD Flood Drain	RS Road Sign
AV Air valve	FP Feeder Pipe	RWP Rain Water Pipe
BD Back drop	FWS Foul Water Sewer	SA Sockaway
BN Bone hole	GY Gully	SC Stop Cock
BL Base Level	GM Gas Meter	SI Span Iron
BR Brick	GPR Ground Penetrating	SL Sull Level
BT British Telecom	Rdr Reader	SP Soil Pipe
CA Compressed Air	GV Gate Valve	ST Steel
CATV Cable TV	HOR Head of Run	SV Stop Valve
CCTV Closed Circuit	HV High Voltage	SVP Soil Vent Pipe
IC Inspection Chamber	IC Inspection Chamber	SW Sink Waste
CI Cast Iron	IL Invert Level	SWS Surface Water Sewer
CL Cover Level	KV Kilo Volt	TTR Taken from Record
CM Cable Marker	LP Lamp Post	TR Trapped Inlet
CP Catch Pit	LPG Liquid Petroleum Gas	TTO Trapped Outlet
CU Copper	LV Low Voltage	TP Telegraph Pole
CR Cable Riser	MDPE Medium Density Polyethylene	UST Underground Storage Tank
CSWS Combined Water Sewer	MH Manhole	UTL Unable to Lift
OWS Combined Water Sewer	MK Manhole	UTF Unable to Find
DB Direct Buried	NFI No Further Information	UTGA Unable to Gain Access
DI Ductile Iron	NLT Not Located - Plotted	UTR Unable to Rod
EDP Electric Cable Pit	NS Not Located - Plotted	UTS Unable to Trace
EHV Extra High Voltage	NS No Signal	VC Vertical Clay
EJB Electric Joint Box	NVE No Visible Exit	VP Vent Pipe
EP Electricity Pole	OH Overhead	WL Water Level
ER Earthing Rod	PE Polyethylene	WM Water Meter
ES Earthing Strap	PTE Put End	WO Wash Out
EOT End of Trace	PR Pipe Riser	

— — — — —	HORIZONTAL AND VERTICAL LOCATION OF THE UTILITY DETECTED BY MULTIPLE GEOPHYSICAL TECHNIQUES USED
— — — — —	HORIZONTAL AND VERTICAL LOCATION OF THE UTILITY DETECTED BY ONE GEOPHYSICAL TECHNIQUE USED
— — — — —	HORIZONTAL LOCATION ONLY OF THE UTILITY DETECTED BY ONE GEOPHYSICAL TECHNIQUE USED (PASSIVE)
— — — — —	A UTILITY SEGMENT WHICH IS SUSPECTED TO EXIST BUT HAS NOT BEEN DETECTED AND IS THEREFORE SHOWN AS AN ASSUMED ROUTE
— — — — —	A UTILITY SEGMENT WHICH HAS BEEN TAKEN FROM UTILITY RECORDS SUPPLIED TO US BY THE SERVICE PROVIDER

DISCLAIMER

ELECTRO-MAGNETIC TECHNIQUES AND/OR GROUND PENETRATING RADAR HAVE BEEN USED IN THE LOCATION OF UNDERGROUND SERVICES. THE RESULTS ARE NOT INFALLIBLE AND TRAIL EXCAVATIONS SHOULD BE CARRIED OUT TO CONFIRM SERVICE IDENTIFICATION. POSITIONS AND PARTICULARLY DEPTHS WHERE THESE ARE CRITICAL. ALTHOUGH A REASONABLE EFFORT HAS BEEN MADE IN SEARCHING AVAILABLE RECORD DRAWINGS, THE COMPLETENESS OF THE UNDERGROUND SERVICES INFORMATION CANNOT BE GUARANTEED. THE METHOD OF SURVEY DOES NOT DIFFERENTIATE BETWEEN LIVE AND DEAD SERVICES AND AS SUCH ALL SERVICES SHOULD BE TREATED AS LIVE, UNLESS OTHERWISE STATED.

WHERE SERVICES ARE NON-METALLIC POSITIONS MAY BE TAKEN FROM RECORDS, TRENCH SCARS A SURFACE DETAIL, WHERE QUOTED, DEPTH ESTIMATIONS ARE GENERALLY TO THE CENTRE OF THE SERVICE. DEPTHS TO GRAVITY SEWERS AND DRAINS ARE GENERALLY TO INVERT LEVELS UNLESS OTHERWISE STATED.

PIPE SIZES WHICH CANNOT BE OBTAINED BY VISUAL SURVEY ARE TAKEN FROM RECORD DRAWINGS OR MANHOLE PLATES WHERE AVAILABLE.

WHERE GROUND PENETRATING RADAR HAS BEEN USED IT WILL PRIMARILY HAVE BEEN TO IDENTIFY UNDERGROUND UTILITIES IF POSSIBLE WE WILL ALSO IDENTIFY UNDERGROUND STRUCTURES, TANKS ETC. BUT CANNOT GUARANTEE TO HAVE LOCATED ALL SUCH ITEMS. THE USE OF RADAR CAN BE LIMITED BOTH BY SURFACE CONDITIONS AND ALSO BY SOIL TYPE. DEPTH ESTIMATES WOULD NOT NORMALLY BE PROVIDED FOR SERVICES LOCATED WITH GPR.

Client			
PENTANGLE DESIGN GROUP			
Project			
35 GRAYS LANE HITCHIN HERTS			
Title			
UTILITY SURVEY			
Drawing Number			
TS25-840-UG-1			
Revision	Description	Rev. By	Date
Scale	1:100@A1	Sheet	1 of 1
Drawn by	DM	Checked by	DAS
Date of Survey	NOV 2025		

TERRAIN SURVEYS

Tel: 01438 841300
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Accreditations:

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ICS

THE SURVEY ASSOCIATION

UKAS
17798

SSIP
Registered Member

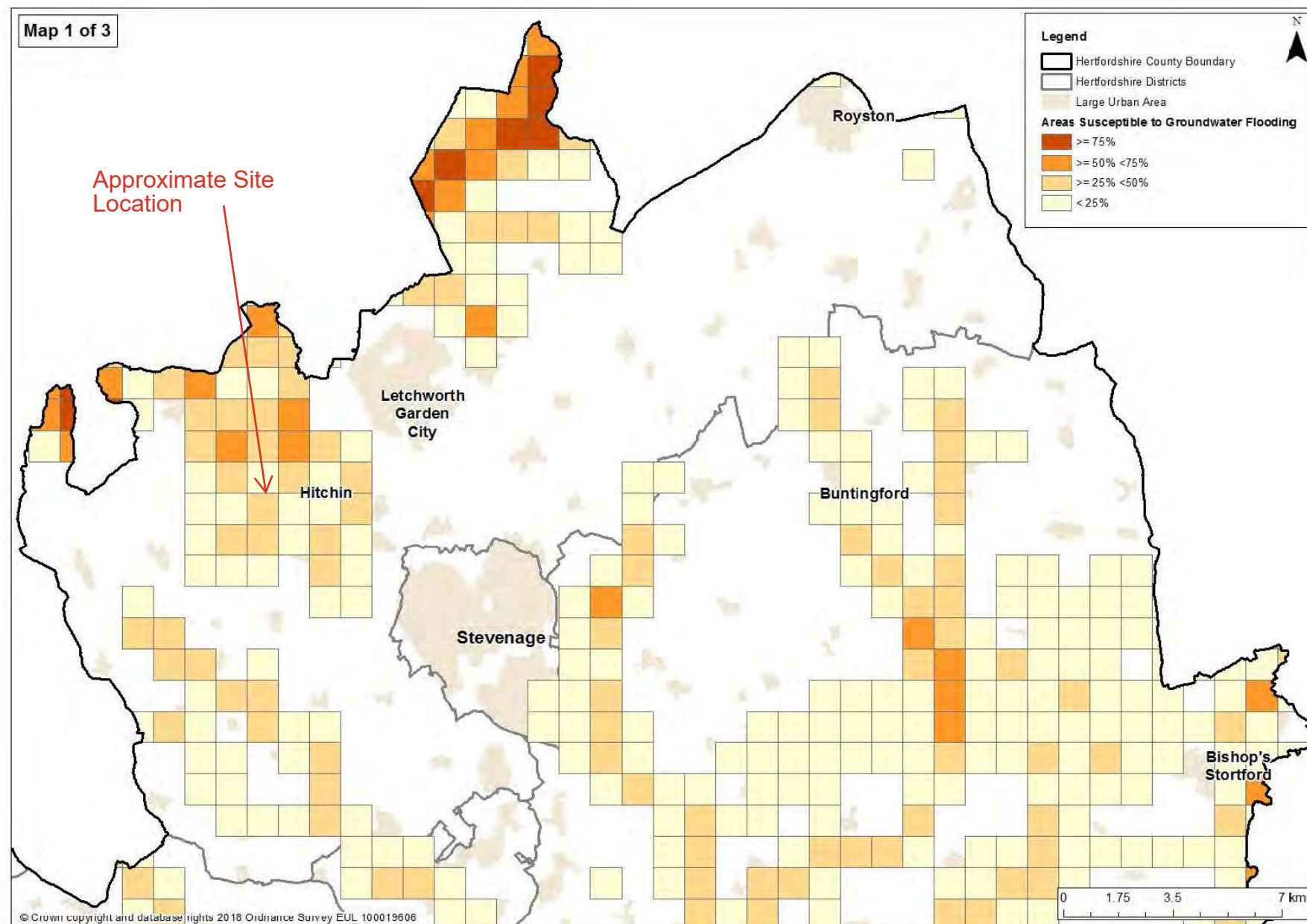
Constructionline
Gold Member

Accreditation

Appendix F

LFRMS 2 - Areas Susceptible to Groundwater Flooding (AStGWF) mapping





Map 6a: Map 1 of 3 – Areas Susceptible to Groundwater Flooding in Hertfordshire (North)

Appendix G

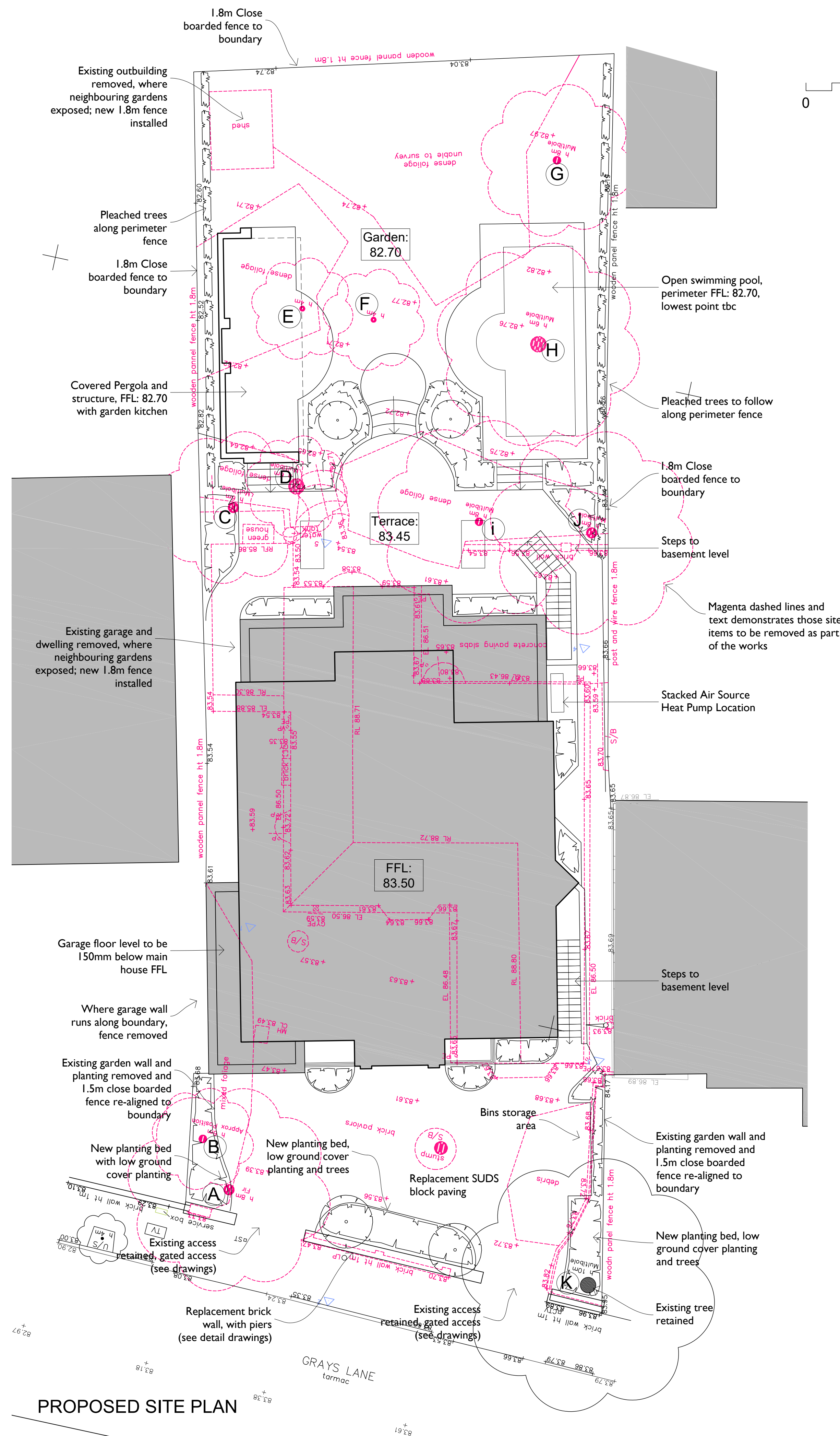
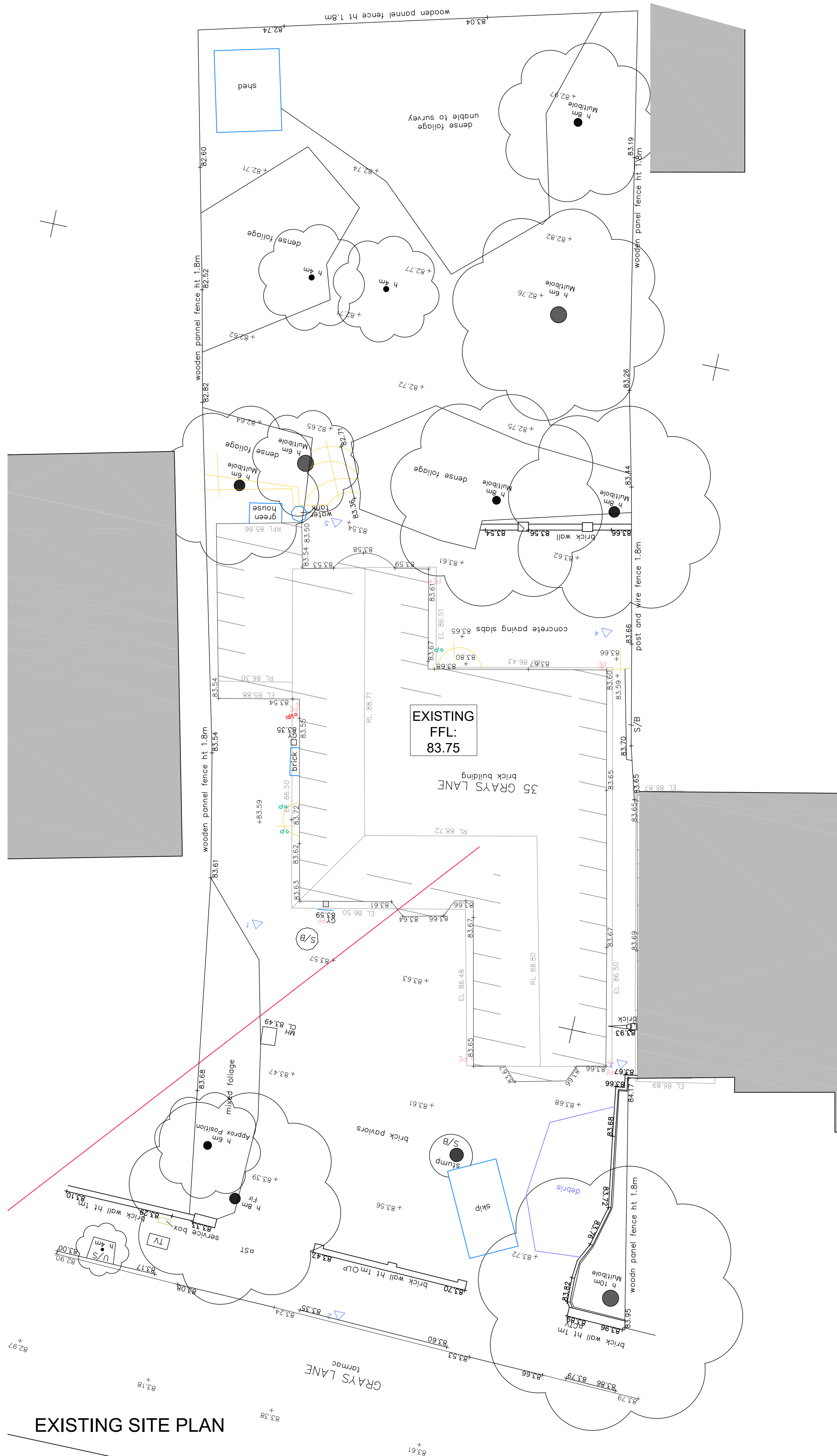
Proposed Development Drawings



0 5 10 m



- A Overgrown tree, poorly maintained and risk to highway, removed
B Small tree, not maintained effectively, removed
C Unhealthy multi-bolt deciduous tree, risk to neighbouring property, removed
D Unhealthy multi-bolt deciduous tree, removed
E Unhealthy fruit tree, removed
F Unhealthy fruit tree, removed
G Unhealthy multi-bolt deciduous tree, removed
H Unhealthy multi-bolt deciduous tree, removed
i Unhealthy multi-bolt deciduous tree, removed
J Unhealthy multi-bolt deciduous tree, overhanging boundary, removed
K Healthy tree with good amenity standing, retained



PLANNING

PENTANGLE
DESIGN GROUP

SUITE 1, 21 BANCROFT HITCHIN HERTS SG5 1JW
T:01462 431133 E:pdg@pentangledesign.co.uk

JOB TITLE

Proposed Replacement Dwelling at
35 Grays Lane, Hitchin

For -

DRAWING TITLE

Proposed Site Plan

SCALE

1:100

DATE

Oct '25

SHEET SIZE

A1

JOB NUMBER

3959

DRAWING NUMBER

30

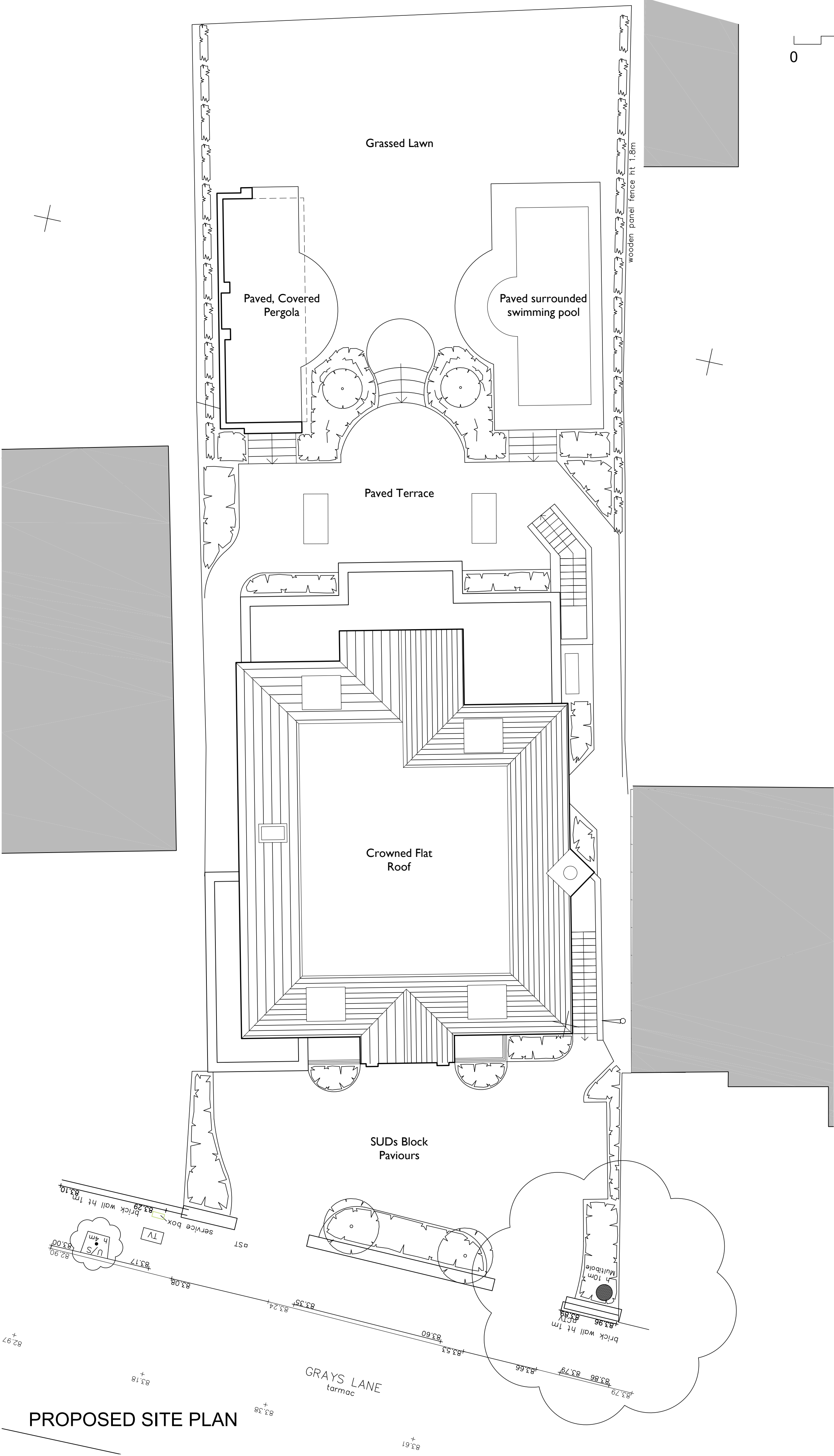
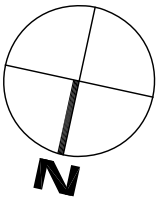
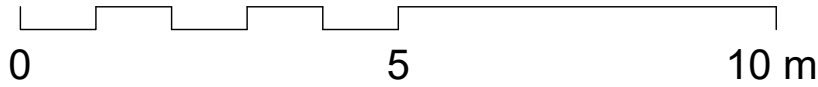
REVISION

-

CHARTERED ARCHITECTS

DIMENSIONS TO BE CHECKED ON SITE BEFORE ANY WORKS.
ANY QUERIES REGARDING DIMENSIONS TO BE TAKEN UP WITH
PENTANGLE DESIGN GROUP. ALL DIMENSIONS OF EXISTING
BUILDINGS TO BE VERIFIED ON SITE. THIS DRAWING IS THE
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CONSENT.

NOTES



PROPOSED SITE PLAN

PLANNING

PENTANGLE

DESIGN GROUP

SUITE 1, 21 BANCROFT HITCHIN HERTS SG5 1JW
T:01462 431133 E:pdg@pentangledesign.co.uk

JOB TITLE

Proposed Replacement Dwelling at
35 Grays Lane, Hitchin

For -

DRAWING TITLE

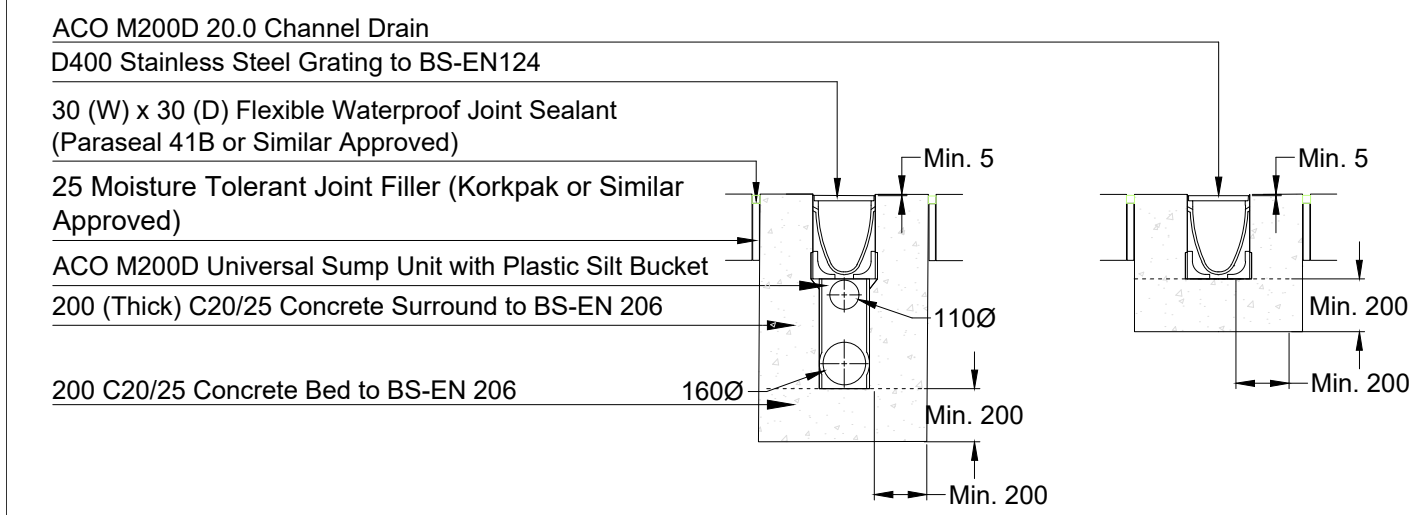
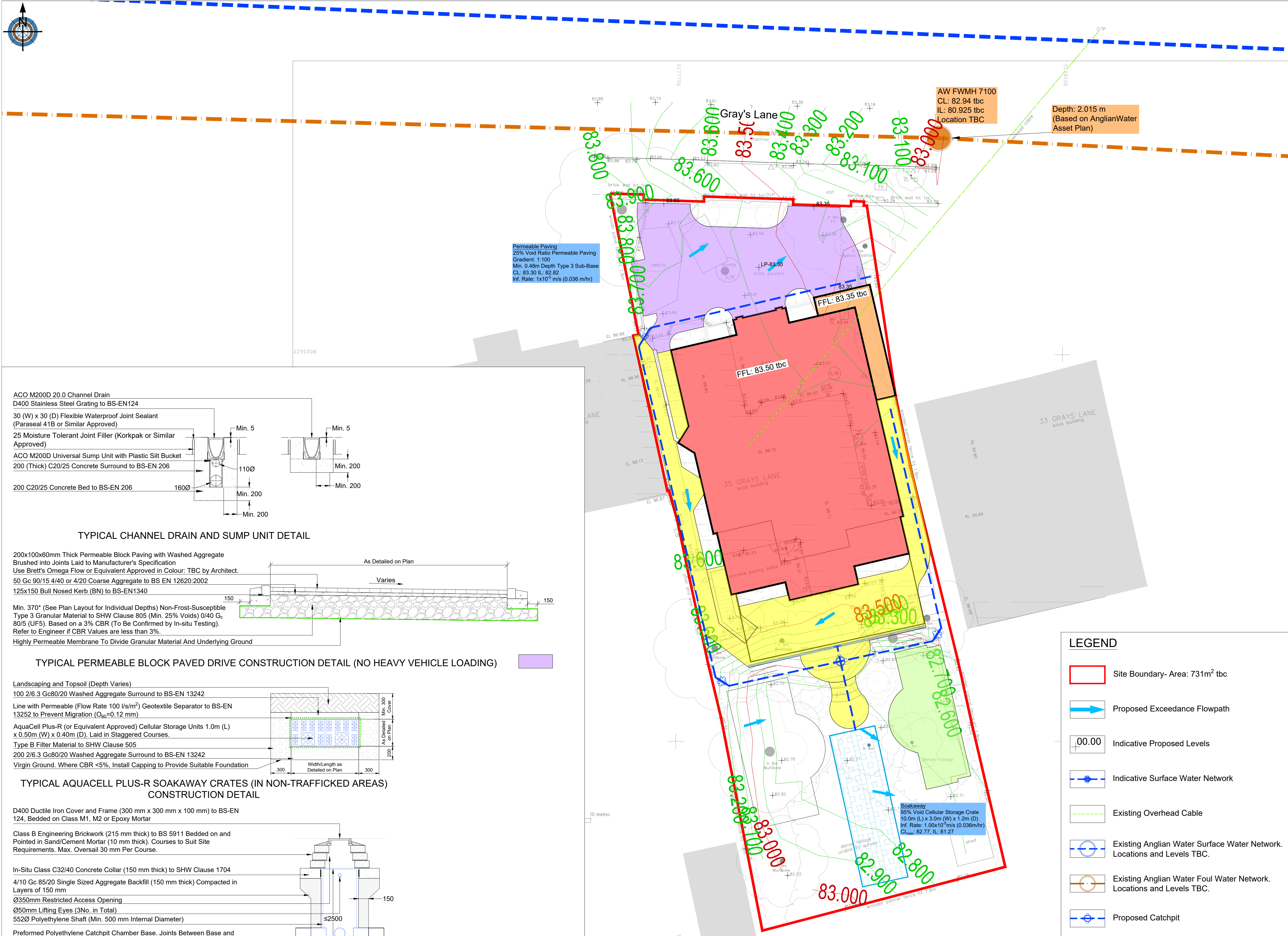
Proposed Roof Plan

SCALE	1:100	DRAWING NUMBER	REVISION
DATE	Nov '25	41	-
SHT SIZE	A2		
JOB NUMBER	3959		
CHARTERED ARCHITECTS			

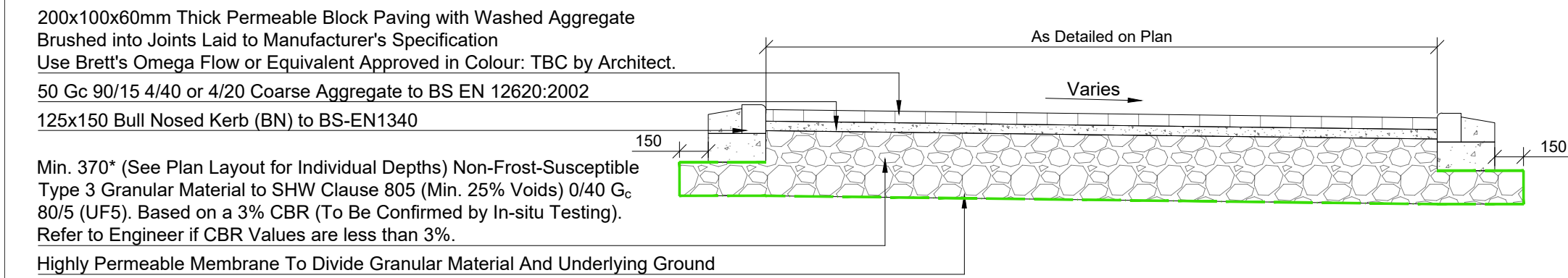
Appendix H

Infiltration Strategy - Proposed Drainage Strategy Drawing and Hydraulic Calculations

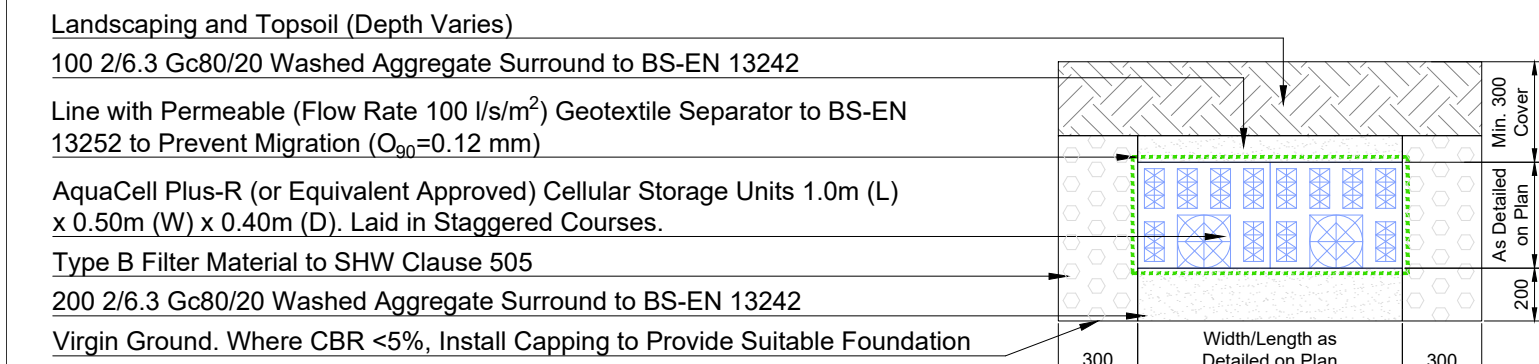




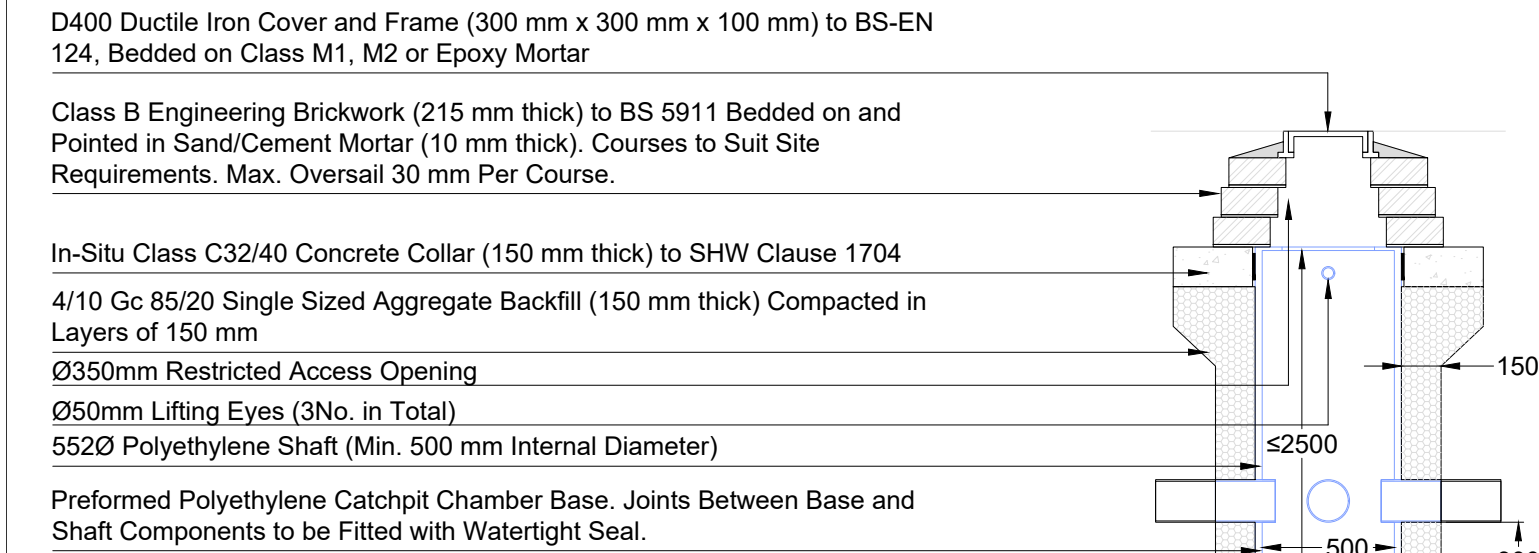
TYPICAL CHANNEL DRAIN AND SUMP UNIT DETAIL



TYPICAL PERMEABLE BLOCK PAVED DRIVE CONSTRUCTION DETAIL (NO HEAVY VEHICLE LOADING)



TYPICAL AQUACELL PLUS-R SOAKAWAY CRATES (IN NON-TRAFFICKED AREAS) CONSTRUCTION DETAIL



TYPICAL 500mm INSPECTION CATCH PIT CHAMBER

CONSTRUCTION DETAILS
N.T.S

Proposed Impermeable Area Table			
Catchment	Measured Area (m²)	10% Creep (m²)	Total (m²)
Plot	208	20.8	228.8
Garage	12	0	12.0
Drive	88	0	88.0
Patio	110	0	110.0
Garden	31	0	31
Kitchen	31	0	31
Sub Total-	449.0	20.8	469.8

LEGEND

- Site Boundary- Area: 731m² tbc
- Proposed Exceedance Flowpath
- Indicative Proposed Levels
- Indicative Surface Water Network
- Existing Overhead Cable
- Existing Anglian Water Surface Water Network. Locations and Levels TBC.
- Existing Anglian Water Foul Water Network. Locations and Levels TBC.
- Proposed Catchpit
- Primary Contours (0.5m)
- Secondary Contours (0.1m)
- Proposed Permeable Private Driveway (Infiltration Assumed) (1x10⁻⁵ m/s)
- Proposed Private Soakaway - Cellular Storage

- NOTES:
- This drawing is to be read in conjunction with GHB series 333/2025 drawings and documents and any other relevant project team documents.
 - Preliminary Issue - This drawing is not to be used for construction or detailed pricing purposes. Any work undertaken before approvals are received (in writing) are at risk of abortive works.
 - This drawing has been produced based upon the following information:
Topographical Survey by Terrain Surveys (Ref. TS25-840-1 dated NOV 2025) subject to transformation of :
Scale 1 and translation (0,0,0) about point (0,0,0).
Architectural Layout by Pentangle Design Group (Ref. 3959-02 dated Sept 25) subject to transformation of :
Scale 0.001 and translation (513950.40, 230186.18, 0) about point (0,0,0).
 - All site levels and finished floor levels to remain indicative for planning purposes and are subject to verification following detailed design.
 - This drawing has been prepared solely for the purpose of obtaining a Planning Consent based on information available and planning requirements at the date of issue only.

P1	09/12/25	Initial Issue	PRJ	JAH
Rev	Rev Date	Description	Drawn	Chck'd
© Copyright				
			27 Barton Road, Thurston, Suffolk, IP31 3PA	
T: (01359) 235071 F: (01359) 231138 W: http://www.gbullard.co.uk		Partnership No. OC383830, Registered in England and Wales		
Client: MR A DAY				
Project: 35 GRAYS LANE, HITCHIN, HERTFORDSHIRE, SG5 2HH				
Drawing Title: DRAINAGE STRATEGY PLAN LAYOUT (INFILTRATION - 1X10 ⁻⁵ m/s)				
Status: FOR INFORMATION				
Scale: 1:125 @ A1				
Created: DEC 2025			Drawn: PRJ	
DWG Reference: 333-2025.DWG			Checked: JAH	
Drawing Number: 333/2025/003				Revision: P1

PI# = Preliminary, CI# = Construction, AB# = As Built

Project: 333-2025-Infiltration 35 Hitchin, Grays Lane Hertfordshire	Date: 09/12/2025		
	Designed by: PRJ	Checked by: JAH	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		



Drive

Type : Catchment Area

Area (ha)	0.009
-----------	-------

Preliminary Sizing

Volumetric Runoff Coefficient	1.000
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Impermeable Area

Type : Catchment Area

Area (ha)	0.038
-----------	-------

Preliminary Sizing

Volumetric Runoff Coefficient	1.000
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: 333-2025-Infiltration 35 Hitchin, Grays Lane Hertfordshire	Date: 09/12/2025		
	Designed by: PRJ	Checked by: JAH	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		





Permeable Paving

Type : Porous Paving

Dimensions

Exceedance Level (m)	83.300
Depth (m)	0.480
Base Level (m)	82.820
Paving Layer Depth (mm)	110
Membrane Percolation (m/hr)	3.0
Porosity (%)	25
Length (m)	15.749
Long. Slope (1:X)	100.00
Width (m)	5.611
Total Volume (m³)	8.174

Advanced

Base Infiltration Rate (m/hr)	0.036
Safety Factor	3.0
Conductivity (m/hr)	500.0

Project: 333-2025-Infiltration 35 Hitchin, Grays Lane Hertfordshire	Date: 09/12/2025		
	Designed by: PRJ	Checked by: JAH	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		





Cellular Storage

Type : Cellular Storage

Dimensions

Exceedance Level (m)	82.770
Depth (m)	1.200
Base Level (m)	81.270
Number of Crates Long	10
Number of Crates Wide	6
Number of Crates High	3
Porosity (%)	95
Crate Length (m)	1
Crate Width (m)	0.5
Crate Height (m)	0.4
Total Volume (m³)	34.500

Advanced

Base Infiltration Rate (m/hr)	0.036
Side Infiltration Rate (m/hr)	0.036
Safety Factor	3.0

Project: 333-2025-Infiltration 35 Hitchin, Grays Lane Hertfordshire	Date: 09/12/2025		
	Designed by: PRJ	Checked by: JAH	Approved By:
Report Title: Rainfall Analysis Criteria	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		



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

Project: 333-2025-Infiltration 35 Hitchin, Grays Lane Hertfordshire	Date: 09/12/2025		
	Designed by: PRJ	Checked by: JAH	Approved By:
Report Title: Rainfall Analysis Criteria	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		



FEH

Type: FEH

Site Location	GB 517783 229095 TL 17783 29095		
Rainfall Version			2022
Summer		☒	
Winter		☒	

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0.000
30.0	0.000
30.0	35.000
100.0	0.000
100.0	40.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	20000
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Project: 333-2025-Infiltration 35 Hitchin, Grays Lane Hertfordshire		Date: 09/12/2025			
		Designed by: PRJ	Checked by: JAH		Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase		Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk			



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

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. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Status
Permeable Paving	FEH: 2 years: +0 %: 180 mins: Summer	83.073	82.820	0.096	0.000	0.7	0.802	0.000	1.999	0.0	0.000		OK
Cellular Storage	FEH: 2 years: +0 %: 360 mins: Winter	81.559	81.559	0.289	0.289	1.2	8.223	0.000	5.001	0.0	0.000		OK

Project: 333-2025-Infiltration 35 Hitchin, Grays Lane Hertfordshire		Date: 09/12/2025			
		Designed by: PRJ	Checked by: JAH		Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase		Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk			



FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Resident Volume

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. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Status
Permeable Paving	FEH: 30 years: +35 %: 120 mins: Summer	83.247	82.977	0.270	0.157	2.3	3.185	0.000	3.580	0.0	0.000		OK
Cellular Storage	FEH: 30 years: +35 %: 600 mins: Winter	82.115	82.115	0.845	0.845	2.0	24.077	0.000	28.927	0.0	0.000	710	OK

Project: 333-2025-Infiltration 35 Hitchin, Grays Lane Hertfordshire	Date: 09/12/2025		
	Designed by: PRJ	Checked by: JAH	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		





FEH: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Resident Volume

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. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Status
Permeable Paving	FEH: 100 years: +40 %: 120 mins: Winter	83.287	83.054	0.309	0.234	2.1	4.482	0.000	3.772	0.0	0.000	25	OK
Cellular Storage	FEH: 100 years: +40 %: 600 mins: Winter	82.376	82.376	1.106	1.106	2.6	31.515	0.000	36.781	0.0	0.000	1375	OK

Appendix I

Alternative Strategy (Discharge to Surface Water Sewer) - Proposed Drainage Strategy Drawing
and Hydraulic Calculations



Project: 333-2025 35 Hitchin, Grays Lane Hertfordshire	Date: 09/12/2025		
	Designed by: PRJ	Checked by: JAH	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		



Imp. Area

Type : Catchment Area

Area (ha)	0.047
-----------	-------

Preliminary Sizing

Volumetric Runoff Coefficient	1.000
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: 333-2025 35 Hitchin, Grays Lane Hertfordshire		Date: 09/12/2025			
		Designed by: PRJ	Checked by: JAH		Approved By:
Report Details: Type: Junctions Storm Phase: Phase		Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk			

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
FCC	Manhole	517781.356	229109.217	83.550	1.190	82.360	Circular	0.500
Outfall	Manhole	517791.511	229122.239	83.200	1.010	82.190	Circular	1.200

Name	Lock
FCC	None
Outfall	None

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
FCC	Outlet (1)	Pipe	Orifice
	Diameter (m)	0.030	
	Coefficient of Discharge	0.600	
	Invert Level (m)	82.360	

Project: 333-2025 35 Hitchin, Grays Lane Hertfordshire	Date: 09/12/2025		
	Designed by: PRJ	Checked by: JAH	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		



Attenuation Structure

Type : Pond

Dimensions

Exceedance Level (m)	83.300
Depth (m)	0.880
Base Level (m)	82.420
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	-0.864
Total Volume (m³)	25.238

Depth (m)	Area (m²)	Volume (m³)
0.000	36.575	0.000
0.400	36.575	14.630
0.401	22.085	14.659
0.880	22.085	25.238

Outlets

Outlet

Outgoing Connection	Pipe (1)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	14.260
Friction Scheme	Manning's n
n	0.04

Project: 333-2025 35 Hitchin, Grays Lane Hertfordshire	Date: 09/12/2025		
	Designed by: PRJ	Checked by: JAH	Approved By:
Report Title: Rainfall Analysis Criteria	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		



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

Project: 333-2025 35 Hitchin, Grays Lane Hertfordshire	Date: 09/12/2025	
Report Title: Rainfall Analysis Criteria	Designed by: PRJ Checked by: JAH Approved By:	
Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		

FEH

Type: FEH

Site Location	GB 517783 229095 TL 17783 29095	
Rainfall Version	2022	
Summer	☒	
Winter	☒	

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0.000
30.0	0.000
30.0	35.000
100.0	0.000
100.0	40.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Project: 333-2025 35 Hitchin, Grays Lane Hertfordshire	Date: 09/12/2025		
	Designed by: PRJ	Checked by: JAH	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		





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

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
FCC	FEH: 2 years: +0 %: 180 mins: Summer	83.55 0	82.36 0	82.570	0.210	0.8	0.041	0.000	0.8	10.465	Surcharged
Outfall	FEH: 2 years: +0 %: 180 mins: Summer	83.20 0	82.19 0	82.214	0.024	0.8	0.000	0.000	0.8	10.459	OK

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FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Outflow

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
FCC	FEH: 30 years: +35 %: 180 mins: Summer	83.550	82.360	82.971	0.611	1.9	0.120	0.000	1.4	21.849	Surcharged
Outfall	FEH: 30 years: +35 %: 180 mins: Winter	83.200	82.190	82.223	0.033	1.4	0.000	0.000	1.4	21.796	OK

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Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk		





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

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
FCC	FEH: 100 years: +40 %: 180 mins: Winter	83.550	82.360	83.235	0.875	2.0	0.172	0.000	1.7	26.114	Surcharged
Outfall	FEH: 100 years: +40 %: 180 mins: Winter	83.200	82.190	82.226	0.036	1.7	0.000	0.000	1.7	26.080	OK

Project: 333-2025 35 Hitchin, Grays Lane Hertfordshire		Date: 09/12/2025			
		Designed by: PRJ	Checked by: JAH		Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase		Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk			



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

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. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Attenuation Structure	FEH: 2 years: +0 %: 180 mins: Summer	82.571	82.571	0.151	0.151	3.5	5.525	0.000	0.000	0.8	10.458	OK

Project: 333-2025 35 Hitchin, Grays Lane Hertfordshire		Date: 09/12/2025			
		Designed by: PRJ	Checked by: JAH		Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase		Company Address: GHBullard & Associates 27 Barton Road, Thurston Suffolk			



**FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By:
Max. Resident Volume**

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. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Attenuation Structure	FEH: 30 years: +35 %: 180 mins: Winter	82.973	82.973	0.553	0.553	6.5	18.023	0.000	0.000	1.5	22.096	OK

Project: 333-2025 35 Hitchin, Grays Lane Hertfordshire		Date: 09/12/2025			
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**FEH: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By:
Max. Resident Volume**

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. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Attenuation Structure	FEH: 100 years: +40 %: 180 mins: Winter	83.239	83.239	0.819	0.819	8.3	23.883	0.000	0.000	2.0	26.529	OK