



Spring Street, Tottington Outline Sustainable Drainage Strategy

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Client
Mr Paul Power

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EXECUTIVE SUMMARY

Scope and Background

This Sustainable Drainage (SuDS) Strategy has been undertaken by LK Consult Ltd (LKC) to support a planning application for the redevelopment of land to the west of 11 Spring Street, Tottington. The proposed development comprises the redevelopment of the site to provide a new three-storey house, parking including one EV charger parking space, bin store and soft landscaping.

Drainage Strategy

It is proposed to restrict the surface water runoff generated by the proposed development to a rate of 1.0 l/s during all events up to and including the 1 in 100 year plus 45% climate change event. Attenuation will be provided in the form underground geocellular storage. Surface water will discharge into the existing public surface water sewer within Springvale Drive to the south of the site, as per the UU Pre Development Enquiry response, subject to agreement with the LLFA.

Overland flow routes would follow site access roads and permeable areas as per the existing situation ensuring that exceedance flows do not result in flooding of adjacent land or third-party property.

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1. Introduction

1.1. Background

LKC were commissioned to carry out an outline Sustainable Drainage Strategy for Spring Street, Tottington. The report was undertaken in support of the planning application for the redevelopment of the site to provide a new residential dwelling with associated parking and landscaping.

The report will consider the impact of the development on surface water runoff accounting for climate change. The sustainable drainage assessment in Section 4 will provide an overview of the SuDS techniques which could be considered on the site. The sustainable drainage assessment is presented with reference to the hydrological and hydrogeological context of the development.

The report findings are based upon professional judgement and are summarised below. The report includes baseline data from the Environment Agency (EA), rainfall data from the Wallingford Studies and Hydrogeological information from the British Geological Survey (BGS). The assessment will summarise and refer to these datasets in the text.

Drainage on the site has been assessed by considering the following key constraints:

- Topography of the site.
- Local water features and hydrological context.
- Underlying geology, soil types and permeability.
- Layout and geometry of the proposed development.

1.2. Site Details

A summary of the general site details is presented in Table 1-1. Figure 1 indicates the site location.

Location	To the west of 11 Spring Street, Tottington, Bury BL8 3LU Centred at National Grid Reference: 377501, 413032
Area	Approximately 290m ² .
Topography	The site slopes gently from west to east.
Site Use	<u>Existing Site</u> The site comprises an existing external yard area comprising concrete and compacted gravel surfacing. Access to the site is provided to the east via Market Street. <u>Surrounding Area/ Boundary Treatment</u> The site is located within a predominantly residential area. The land use surrounding the site comprises: • Residential dwellings to the east, south and west. • Church and graveyard to the north.
Proposed Development	The proposed development comprises the redevelopment of the site to provide a new three-storey house, parking including one EV charger parking space, bin store and soft landscaping. The proposed development plans are included in Appendix A.

Table 1-1: Summary of site details.

2. Site Setting

2.1. Environmental Setting

LKC has undertaken a review of public domain information including British Geological Survey data, Environment Agency data, and aerial photography to provide a summary of the environmental setting of the site. This is summarised in Table 2-1 below.

Summary of the Environmental Setting			
Geology	Superficial		Devensian Till
	Bedrock		Pennine Lower Coal Measures Formation (Mudstone, Siltstone, and Sandstone).
	BGS Boreholes		There are no borehole logs within the vicinity of the site.
	Defra Soilscape Mapping		Soilscape: Type 17 - slowly permeable seasonally wet acid but base-rich loamy and clayey soils.
Hydrogeology	Aquifer Designation	Superficial	Undifferentiated / Secondary A
		Bedrock	Secondary A Aquifer.
	Source Protection Zone (SPZ)		The site is not located within an SPZ.
Hydrology	All adjacent and internal surface water		A review of the Ordnance Survey mapping indicates the nearest watercourse is an open section of Black Brook located approximately 95m south west of the site. Black Brook is classified as an Ordinary Watercourse and flows in an easterly direction within the vicinity of the site and appears to enter a culvert located approximately 85m south of the site. The route of the culvert is unknown; however, it appears to extend in south easterly direction with open sections of Black Brook shown to the east of Bury Road. Black Brook eventually discharges into Kirklees Brook, an EA defined Main River, approximately 750m south east of the site.
	Flooding		Flood Zone 1.

Table 2-1: Summary of the Environmental Setting.

2.2. Site Topography

A topographic survey has been provided by the client and is included as Appendix B. A review of site topographic levels indicates the following:

- The site is 150.25m AOD in the west and slopes down to 148.90m AOD in the east.
- The northern boundary of the site slopes from 150.00m AOD in the north-west to 149.19 in the north-eastern corner.
- The southern boundary slopes from 150.16m AOD on the south-western corner of the site to 149.53m AOD in the south-eastern corner of the site.
- The north-eastern corner of the site boundary slopes from 149.19m AOD along Spring Street to 148.15m AOD.

An additional review of 1m resolution EA LiDAR Digital Terrain Modelling (DTM) has been undertaken to establish ground levels within the wider site area. It should be noted that LiDAR data has a typically +/- 150mm error margin. The levels surrounding the site are summarised below:

- Spring Street to the east of the development area slopes from 146.89m AOD at the eastern border of the proposed dwelling to 146.6m AOD where it meets Market Street.
- Market Street, to the east of the site, slopes from 146.6m AOD at Spring Street to 144.33m AOD at the junction of Market Street and Spring Vale Drive.
- The ground levels to the south of the development slope southward via the private garden area of the properties associated with Market Street from 148.60m AOD to 146.80m AOD at Spring Vale Drive.

3. Consultation

Information from all relevant consultees is summarised in Table 3-1 below.

Source	Details	
Bury Metropolitan Borough Council (BMBC): Lead Local Flood Authority (LLFA)	Consultation has been undertaken with the LLFA. A response has not been received at the time of writing.	
United Utilities (UU)	Sewer Map	Consultation has been undertaken with UU to obtain public sewer records which are included as Appendix C. The following sewers are indicated in the vicinity of the site: • A 225mm diameter surface water sewer is located to the south-west of the site. Node 4905 beneath the junction of Springdale Close and Spring Close is shown to have a cover level of 146.72m AOD an invert level of 145.90m AOD with a depth of 0.82m. The sewer flows in an easterly direction beneath Springdale Drive before turning south beneath Spring Close and discharging into the Black Brook; • A 150mm diameter public combined sewer appears to originate within Spring Terrace to the south of the site. The combined sewer is shown to flow in an easterly direction before discharging into a 375mm diameter combined sewer located beneath Market Street; • A 225mm diameter public foul sewer is shown to be located beneath Springvale Drive to the south of the site. The sewer is shown to flow in an easterly direction before discharging into a 225mm diameter combined sewer which subsequently drains into the combined sewer beneath Market Street; • A public combined sewer appears to serve the existing residential dwellings immediately east of the site. This sewer is shown to flow in a southerly direction before discharging to the aforementioned combined sewer originating within Spring Terrace.
	Pre-development enquiry response	Consultation has been undertaken with UU in the form of a Pre-Development Enquiry to confirm acceptable foul and surface water pass forward flow rates to the public sewer network. Within their response (included as Appendix D) UU have identified that surface water runoff generated by the proposed development should discharge to the 225mm public surface water within Springvale Drive to the south of the site at a rate to be agreed by the Lead Local Flood Authority. UU have requested that any agreed rate does not exceed 5l/s. UU have identified that their preferred point of connection of the foul effluent would be to the 150mm diameter public combined sewer originating within Spring Terrace. UU have identified that foul effluent can discharge at an unrestricted rate.

Table 3-1: Summary consultee information.

4. Sustainable Drainage Strategy

4.1. Introduction

The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface run-off from development sites through the use of Sustainable Drainage Systems (SuDS), this being complementary to the control of development within the floodplain.

The site is located within the administrative boundary of BMBC. In March 2024, the Council adopted the Places for Everyone Joint Development Plan which sets out the framework for sustainable growth across Greater Manchester. Policy JP-S4 'Flood Risk and Water Environment' sets out the Plan's approach to flood risk and water management. Policy JP-S4 states that proposed development should achieve greenfield runoff rates unless it is demonstrated to be impracticable.

The anticipated design life of residential buildings is in excess of 100 years. The EA climate change guidance for peak rainfall intensity (published in May 2022) identifies that development with a lifespan beyond 2100 should consider the upper end climate change allowance. According to the EA Peak Rainfall Allowances map, the site is located within the Irwell Management Catchment in which the upper end allowance equates to a 45% increase in peak rainfall intensity.

The accepted principles are that surface water arising from a developed area should, as far as practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

The Planning Practice guidance identifies that surface water runoff should be disposed of in the following order of preference:

1. Into the ground (infiltration);
2. To a surface water body;
3. To a surface water sewer, highway drain, or another drainage system; or
4. To a combined sewer

Suitability of different SuDS will be governed by prevailing site conditions, such as the type and scale of development, topography, ground conditions (soil permeability, ground stability, depth to water table), local hydrogeology and risk of groundwater contamination (presence of sensitive aquifers and source protection zones) etc.

4.2. Sustainable Drainage Hierarchy

4.2.1. Infiltration

Publicly available geological information indicates the site is underlain by superficial deposits of Devensian Till which are further underlain by bedrock deposits from the Pennine Middle Coal Measures Formation. The presence of cohesive superficial strata and underlying bedrock is likely to preclude the use infiltration within the site.

It is recommended that infiltration testing in accordance with BRE365 Digest guidance is undertaken to confirm site infiltration rates, however, for the purposes of this assessment, discharge to an alternative receptor has been considered in order to demonstrate a feasible drainage solution in the event that infiltration is found to be unsuitable.

4.2.2. Watercourses

The nearest watercourse is the Black Brook located approximately 95m to the southwest of the site. A connection to this watercourse would require significant engineering works through third party land therefore a connection to the watercourse has not been considered further at this stage.

4.2.3. To a surface water sewer, highway drain or another drainage system

Consultation with UU has identified that surface water runoff generated by the proposed development should discharge to the 225mm diameter public surface water sewer located beneath Springvale Drive to the south of the site. UU records indicate the public surface water sewer network subsequently discharges to Black Brook.

4.2.4. To a combined sewer

In the event that a connection to the public surface water sewer network is not feasible, an alternative connection to the 150mm public combined sewer originating within Spring Terrace or the public combined sewer serving the residential dwellings immediately east of the site would provide alternative receptors subject to agreement with UU.

4.3. Surface Water Runoff Rates

4.3.1. Greenfield Runoff Rates

Greenfield runoff rates have been calculated using the loH124 method based on a proposed contributing catchment area of 0.020ha and are summarised in Table 4-1 below.

Return Period	Greenfield Runoff Rate
1 in 1	0.2
QBAR	0.2
1 in 30	0.3
1 in 100	0.4

Table 4-1: Greenfield runoff rates

Based on the above, it is proposed to restrict surface water runoff rates during all events up to and including the 1 in 100 year plus 45% climate change scenario to a rate of 1.0 l/s which is typically considered as the minimum self-cleansing rate for a Hydrobrake or similar flow control device.

4.4. Surface Water Attenuation Requirements

An initial Quick Storage Estimate (QSE) has been undertaken using Causeway Flow modelling software to determine the attenuation volume required to achieve the proposed discharge rate of 1.0 l/s. Based on a proposed contributing hardstanding area of 0.020ha, the QSE indicates that between 8-13m³ of attenuation will be required for the 1 in 100 year plus 45% climate change event.

4.5. Consideration of SuDS

Table 4-2 provides a summary of the SuDS options appraisal with consideration of CIRIA C753 (The SUDS Manual)³ for the development:

SuDS Option	Description	Benefits	Comments	Appropriate to Development
Infiltration				
Soakaways	Soakaways provide stormwater attenuation, stormwater treatment and groundwater recharge. Runoff is treated by physical filtration to remove solids, by absorption into the soil and removal and by biochemical reactions involving micro-organisms growing on the soil.	Water quantity: Attenuation, treatment, and recharge. Water quality: Filtration and biochemical treatment.	Likely to be unsuitable based on published ground conditions.	X
Infiltration Basin	Infiltration basin reduces the volume of runoff from a drainage area, can be very effective at pollutant removal via filtering through the soils, contributes to groundwater recharge and baseflow augmentation. Runoff is treated by physical filtration to remove solids, by absorption into the soil and removal and by biochemical reactions involving micro-organisms growing on the soil.	Water quantity: Reduces runoff volume. Water quality: Effective pollutant removal. Biodiversity & Amenity: Potential if space allows.	Likely to be unsuitable based on published ground conditions.	X
Infiltration Trench	An Infiltration trench can create temporary subsurface storage of stormwater runoff, thereby enhancing the natural capacity of the ground to store and drain water. Infiltration trenches allow water to dissipate into the surrounding soils from the bottom and sides of the trench where runoff is treated by physical filtration, adsorption and biochemical reactions involving micro-organisms growing in the soil. Infiltration trenches are easy to integrate into a site. They are ideal for use around playing fields, recreational areas, or public open space.	Water quantity: Subsurface storage. Water quality: Filtration and biochemical treatment. Amenity: Can be integrated into open spaces.	Likely to be unsuitable based on published ground conditions.	X
Infiltration Rain Gardens	Attractive features that can help to improve open space. Can be planned as landscaping features. Flexible layout to fit into landscape. Runoff can be treated by physical filtration to remove solids, by absorption and removal by biochemical reactions involving micro-organisms growing on the soil. They can reduce rate of run off and provide some volume reduction.	Amenity: Attractive and flexible. Water quality: Filtration and microbial treatment. Water quantity: Some reduction. Biodiversity: Supports planting.	Likely to be unsuitable based on published ground conditions.	X
Filtration				
Filter Drain / Trench	Filter trenches create temporary subsurface storage of stormwater runoff and provide stormwater treatment. These trenches can be used to filter and convey stormwater to downstream SuDS components.	Water quantity: Subsurface storage and conveyance. Water quality: Filtration.	Likely to be unsuitable based on published ground conditions.	X
Filter Strip	A filter strip offers no storage and is used solely to remove pollutants from surface water. The vegetation traps organic and mineral particles that are then incorporated into the soil, while the vegetation takes up	Water quality: Pollutant removal via vegetation. Amenity & Biodiversity: Moderate potential.	Unsuitable due to limited space and lack of storage capacity.	X

SuDS Option	Description	Benefits	Comments	Appropriate to Development
	any nutrients. A filter strip features medium amenity potential. Local wild grass and flower species can be introduced for visual interest and to provide a wildlife habitat.			
Retention & Detention				
Detention Basin	Detention basins provide flow control through attenuation of stormwater runoff for a wide range of rainfall events. Basins treat runoff in a variety of ways: settlement of solids in still or slow-moving water, adsorption by the soil, biological activity. Basins offer many opportunities for the landscape designer. Basins should not be built on but can be used for sports and recreation. Basins can be part of public open space.	Water quantity: Flow control. Water quality: Sediment removal. Amenity & Biodiversity: High potential.	Unsuitable due to insufficient available space.	X
Attenuation Ponds	Ponds will attenuate the surface water flow prior to discharging to the public surface water sewers. The storage volume afforded by these features should not include any permanent water in the pond. Ponds treat runoff in a variety of ways: settlement of solids in still water (having plants in the water enhances calm conditions and promotes settlement), adsorption by aquatic vegetation, biological activity. Permanently wet ponds can be used to store water for reuse and offer excellent opportunities for the provision of wildlife habitats. Ponds can be part of public open space.	Water quantity: Attenuation. Water quality: Sediment and pollutant removal. Amenity & Biodiversity: High.	Unsuitable due to insufficient available space.	X
Geo-cellular Storage Systems	Geo-cellular systems can be used to control and manage rainwater surface water runoff either as a soakaway or as a storage tank. Geo-cellular storage systems provide high storage volume capacity High void ratios (up to 96%). Capable of managing high flow events.	Water quantity: High-capacity storage. Suitable for high flow events. Can be used as soakaway or tank.	Suitable for underground storage. High void ratio and compact footprint.	✓
Oversized Pipes	Oversized pipes can reduce rate of run off and provide some volume reduction.	Water quantity: Reduces runoff rate and provides volume reduction.	Unsuitable due to insufficient available space. .	✓
Tanks	Storage tanks can be used to control and manage rainwater surface water runoff providing high storage volume capacity. Tanks are capable of managing high flow events.	Water quantity: High-volume control. Suitable for high flow events.	Suitable for high-capacity underground storage.	✓
Swales & Conveyance Channels				
Swales	Swales are effective at removing polluting suspended solids through filtration and sedimentation. The vegetation traps organic and mineral particles that are then incorporated into the soil, while the vegetation takes up any nutrients. Swales are often integrated into the surrounding land use. Local wild grass and flower species can be introduced for visual interest and to provide a wildlife habitat. Swales are usually	Water quality: Filtration and sedimentation. Amenity & Biodiversity: High. Water quantity: Some attenuation.	Unsuitable due to space constraints and infiltration limitations.	X

SuDS Option	Description	Benefits	Comments	Appropriate to Development
	designed as conveyance systems but can also be designed with check dams to increase attenuation and, where applicable, infiltration.			
Channels & Rills	Effective in water & pollution treatment. Can act as pre-treatment to remove silt before water is conveyed into further SuDS features. Can be visually appealing in urban landscapes. Amenity value for the local community and biodiversity value (design dependant).	Water quality: Pre-treatment. Amenity & Biodiversity: High (design dependent). Water quantity: Some attenuation.	Unsuitable due to space and permanent water management requirements.	X
Control Structures				
Flow Control Devices	Control the peak flow. Complex controls can reduce upstream storage requirements.	Water quantity: Peak flow control.	Suitable for managing peak flows and reducing upstream storage needs.	✓
Inlets, Outlets and Other Control Structures	Inlets, outlets and other control structures are key elements of well-designed SuDS. Inlet and outlet features allow water to flow into and out of features and also limit the rate at which water flows along and out of the system. There are many different approaches and products available, and they can be easily designed to add interest to the urban landscape. Can provide accurate flow control from one SuDS feature to another.	Water quantity: Peak flow control. Water quality Amenity	Suitable for managing peak flows and reducing upstream storage needs.	✓
Source Control				
Green Roofs	Green roof installations can help to reduce surface water runoff from roof areas depending on the system specified. Good removal capability of atmospherically deposited urban pollutants. Ecological, aesthetic and amenity benefits.	Water quality: Pollutant removal. Water quantity: Reduces runoff. Amenity & Biodiversity: High.	Unsuitable due to proposed pitched roofs and maintenance responsibilities falling to individual property owners.	X
Blue Roofs	Blue roofs are designed to attenuate and manage stormwater on a flat roof in urban areas where options for ground-based attenuation systems are limited, and in particular, where construction is being carried out within flood sensitive areas. Amenity value for the local community	Water quantity: Attenuation on roofs. Amenity & Biodiversity: Moderate.	Unsuitable due to proposed pitched roofs and maintenance responsibilities falling to individual property owners.	X
Rainwater Harvesting	In the process, a volume of water is kept out of the storm-water management system, thereby helping to reduce flooding risks. When required, the water is pumped to the point of use, thus displacing what would otherwise be a demand for mains-water. Reduces demand on mains water.	Water quantity: Reduces demand on drainage and mains water.	May be suitable depending on demand for non-potable water, however, the attenuation benefits provided by rainwater harvesting are considered to be limited and are only realised when tanks are empty. Rainwater harvesting has been excluded for the purposes of the outline drainage strategy;	*

SuDS Option	Description	Benefits	Comments	Appropriate to Development
			however, further consideration may be required at the detailed design stage.	
Permeable Pavements (with storage)	Reduced peak flows to watercourses, reducing the risk of flooding downstream. Reduced effects of pollution in runoff on the environment.	Water quality: Pollutant reduction. Water quantity: Attenuation and volume reduction.	Suitable for parking areas. Provides both surface and subsurface storage.	✓
Wetlands				
Wetlands	Wetlands provide both stormwater attenuation and treatment. Wetlands detain flows for an extended period to allow sediments to settle, and to remove contaminants by facilitating adhesion to vegetation and aerobic decomposition. They also provide significant ecological benefits.	Water quality: High treatment potential. Water quantity: Attenuation and volume reduction.	Unsuitable due to space and maintenance requirements.	X

Table 4-2: Summary of the SuDS options appraisal.

Notes

✓ Suitable for use given the nature and scale of the development.

* Possibly suitable for use – not included in the client and architect design proposal at present.

X Not suitable.

4.6. Surface Water Drainage Strategy

It is proposed to restrict surface water runoff generated by the proposed development to a rate of 1.0 l/s, during all events up to and including the 1 in 100 year plus 45% climate change scenario.

To achieve the required discharge rate, it is proposed to provide attenuation in the form of underground geocellular storage, as shown on the Conceptual Surface Water Drainage Strategy included as Appendix E.

It is proposed that the underground geocellular storage crates will measure an area of 12m² x 0.8m deep with a 95% porosity which will provide approximately 9.12m³ of attenuation. Causeway flow calculations (included as Appendix F) indicate the proposed geocellular storage crates will provide the required storage volume to ensure there is no flooding on site during all events up to and including the 1 in 100 year plus 45% climate change event.

Surface water runoff is proposed to discharge into the existing 225mm diameter public surface water within Springvale Drive to the south of the site, subject to agreement with the LLFA and relevant third party consent. It is recommended that the invert levels of the receiving sewer are confirmed via an appropriate survey; however, based on the invert level information provided by UU, as detailed in Table 3-1, it is anticipated that a gravity connection would be feasible.

Assuming that the conceptual surface water drainage strategy outlined above is acceptable to the LLFA, a more detailed design can be presented and agreed with the appropriate regulatory bodies during the detailed design phase. Cover and invert levels for the surface water assets will be provided during the detailed design phase.

4.6.1. Existing Flow Paths

The existing ground levels for the site and wider area are described in Section 2.2. The site benefits from a relatively elevated position compared to the surrounding areas. The levels at the north eastern corner of the site boundary are 149.19m AOD which slope down Spring Street to the east of the site at 148.15m AOD before adjoining Market Street at 146.6m AOD. The gradient continues to slope down Market Street in a southerly direction, away from the site. This demonstrates an existing flow path for surface water as it is conveyed away from the site to the east of the site.

Additionally, levels described in Section 2.2 demonstrate an existing preferential flow path to the south of the site where surface water would follow the natural slope southward from the proposed dwelling. The southern area of the proposed development is shown to have a level of 148.99m AOD and continues to slope southward via the landscaped gardens to the existing gullies within Spring Vale Drive at 146.80m AOD.

4.6.2. Exceedance Flow Management

Exceedance flows generated during events in excess of the design event would be managed through controlled overland flow routing. The existing flow paths are described above. The post development preferential flow routes are likely to follow the access road to the east of the site which would provide conveyance of surface water to the highway gullies within Market Street to the east. Additionally, levels slope southward from the proposed dwelling where surface water would follow the natural down gradient via the landscaped gardens to the existing gullies within Spring Vale Drive.

Finished floor levels of the proposed dwelling would be set at a minimum of 150mm above surrounding ground levels. Overland flow routes would follow site access roads and permeable areas, ensuring that exceedance flows do not result in flooding of adjacent land or third-party property.

4.7. Foul Sewage

Consultation undertaken with UU in the form of a Pre-Development Enquiry has confirmed that foul sewage from this site would be allowed to drain to the 150mm public combined sewer located to the

south of the site (manhole reference SD77125901), at an unrestricted rate. The cover and invert levels for the foul drainage assets will be provided during the detailed design phase.

4.8. Maintenance and management

Maintenance of proposed SuDS features will be required to ensure these remain operational over the lifetime of the proposed development. An indicative maintenance plan for the proposed SuDS and associated features is provided in Table 4-3 below. The SuDS maintenance and inspections responsibility rests with the owners or could be arranged through appointment of a site management company.

Maintenance Schedule	Required Action	Typical Frequency
Geocellular Storage Crates		
Regular Maintenance	Remove debris from the catchment surface (where it may cause risks to performance).	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually or as required.
Remedial Actions	Repair/rehabilitate inlets, outlet and overflows and vents.	As required.
Monitoring	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years or as required.
	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually
Pervious Pavements		
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the	As required

Maintenance Schedule	Required Action	Typical Frequency
	structural performance or a hazard to users, and replace lost jointing material	
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	Quarterly, 48 hr after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
Hydrobrake Flow Control		
Monitoring	Inspect vegetation above and around flow control chamber and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Remove sediment from flow control chambers	Annually
	Flow control devices: Check for and clear obstructions	Quarterly
Remedial Actions	Repair of Penstock and flow control device	As required
Monitoring	Inspect structures for evidence of poor operation	Monthly/after large storm
	Inspect structures, flow control and pipework etc. for evidence of physical damage	Monthly/after large storm
	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly

Table 4-3: Maintenance and management plan

5. Summary Conclusions

The site comprises an existing external yard area comprising concrete and compacted gravel surfacing. The proposed development is for the redevelopment of the site to provide a new three-storey house, parking including one EV charger parking space, bin store and soft landscaping

It is proposed to discharge surface water runoff generated by the proposed development at a rate of 1.0 l/s, which represents the minimum rate for self-cleansing of a Hydrobrake or similar flow control device, during all events up to and including the 1 in 100 year plus 45% climate change event.

It is proposed to provide attenuation for the site via an underground geocellular storage facility and permeable paving.

Consultation has been undertaken with UU in the form of a pre-development enquiry. UU have confirmed that surface water runoff should be discharged to the 225mm diameter public surface water sewer located to the south of the site. In addition, UU have confirmed that foul flows from the site will be allowed to discharge to the 150mm diameter public combined sewer withing Spring Terrace at an unrestricted rate.

It is recommended that the invert levels of the receiving sewer are confirmed via an appropriate survey. In the event that gravity discharge is not feasible, a pumped outfall may be required.

The post development preferential flow routes are likely to follow the existing gradient surrounding the site facilitating conveyance of surface water to the highway gullies within Market Street to the east and to the existing gullies within Spring Vale Drive via the landscaped gardens to the south. Overland flow routes would follow site access roads and permeable areas, ensuring that exceedance flows do not result in flooding of adjacent land or third-party property.

Assuming that the conceptual surface water drainage strategy outlined above is acceptable to the Local Authority a more detailed design can be presented and agreed with the appropriate regulatory bodies during the detailed design phase.

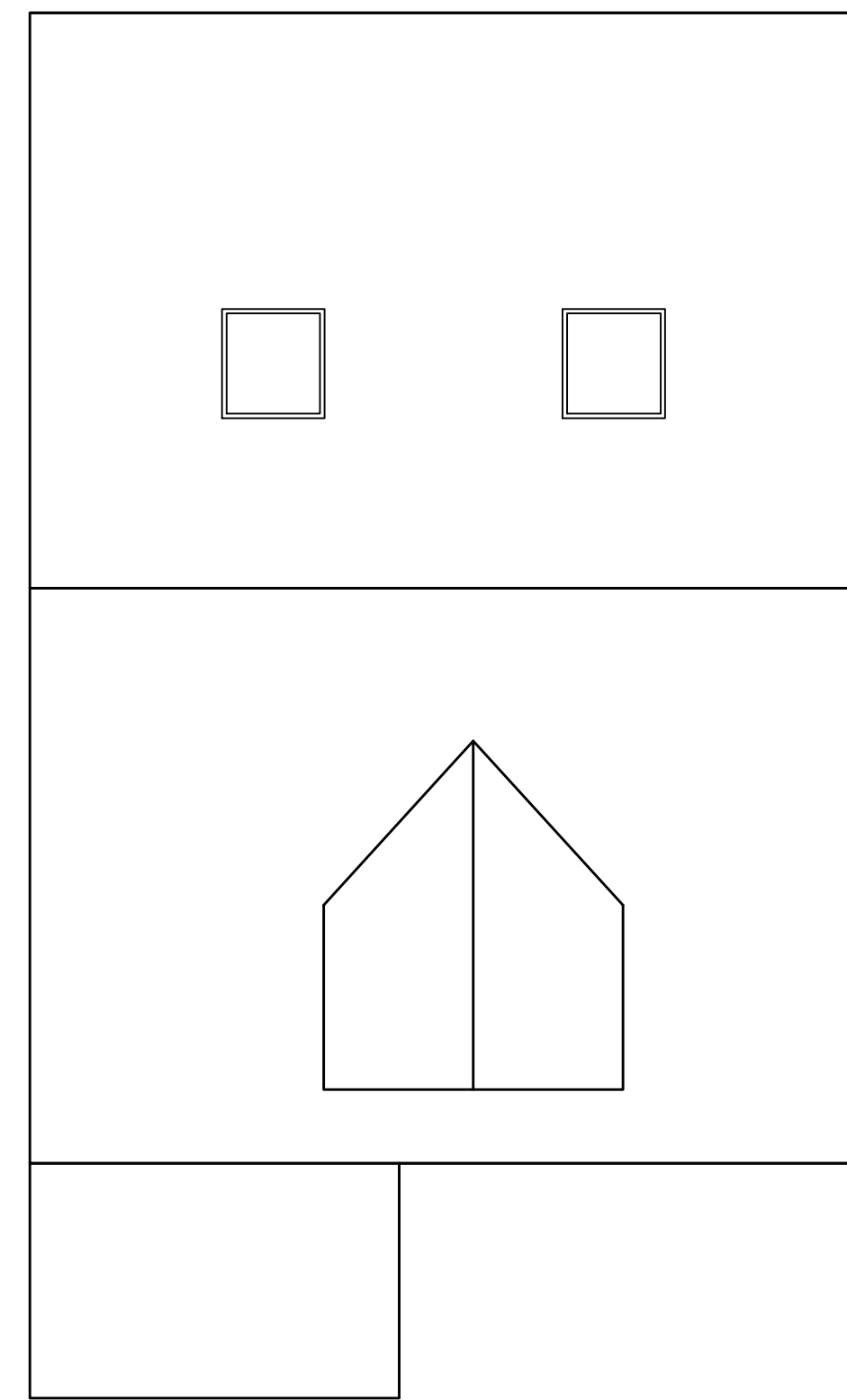
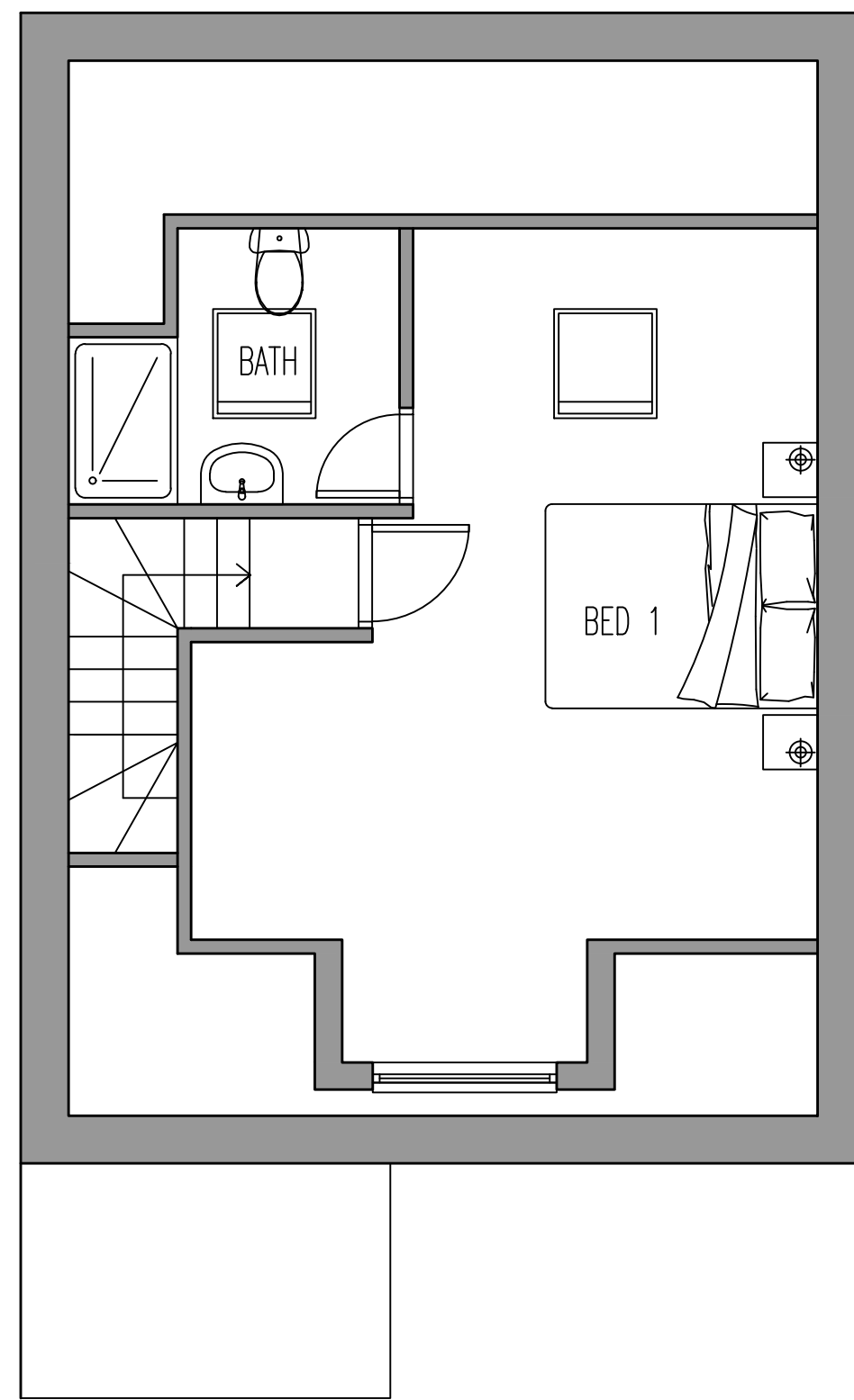
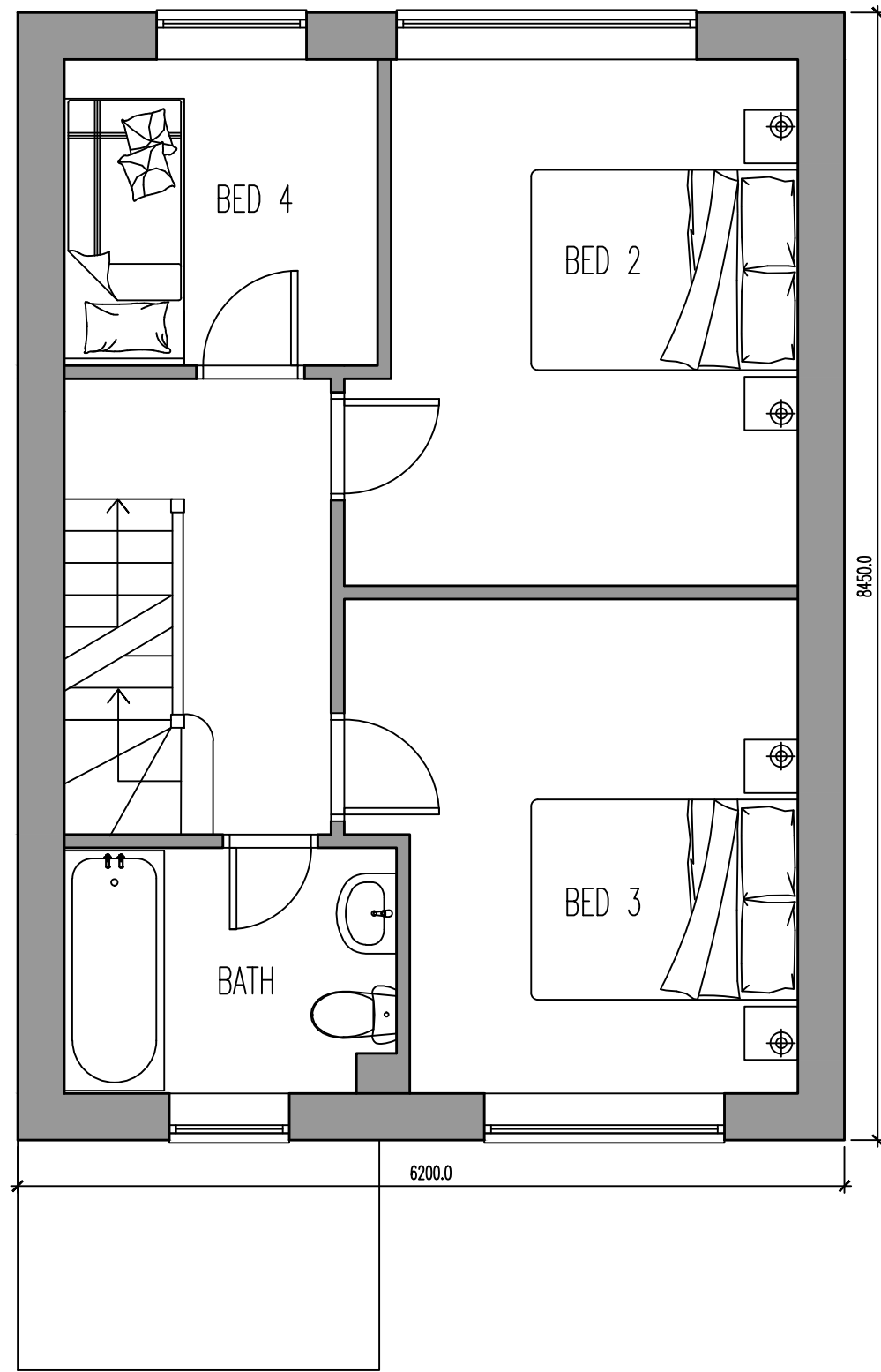
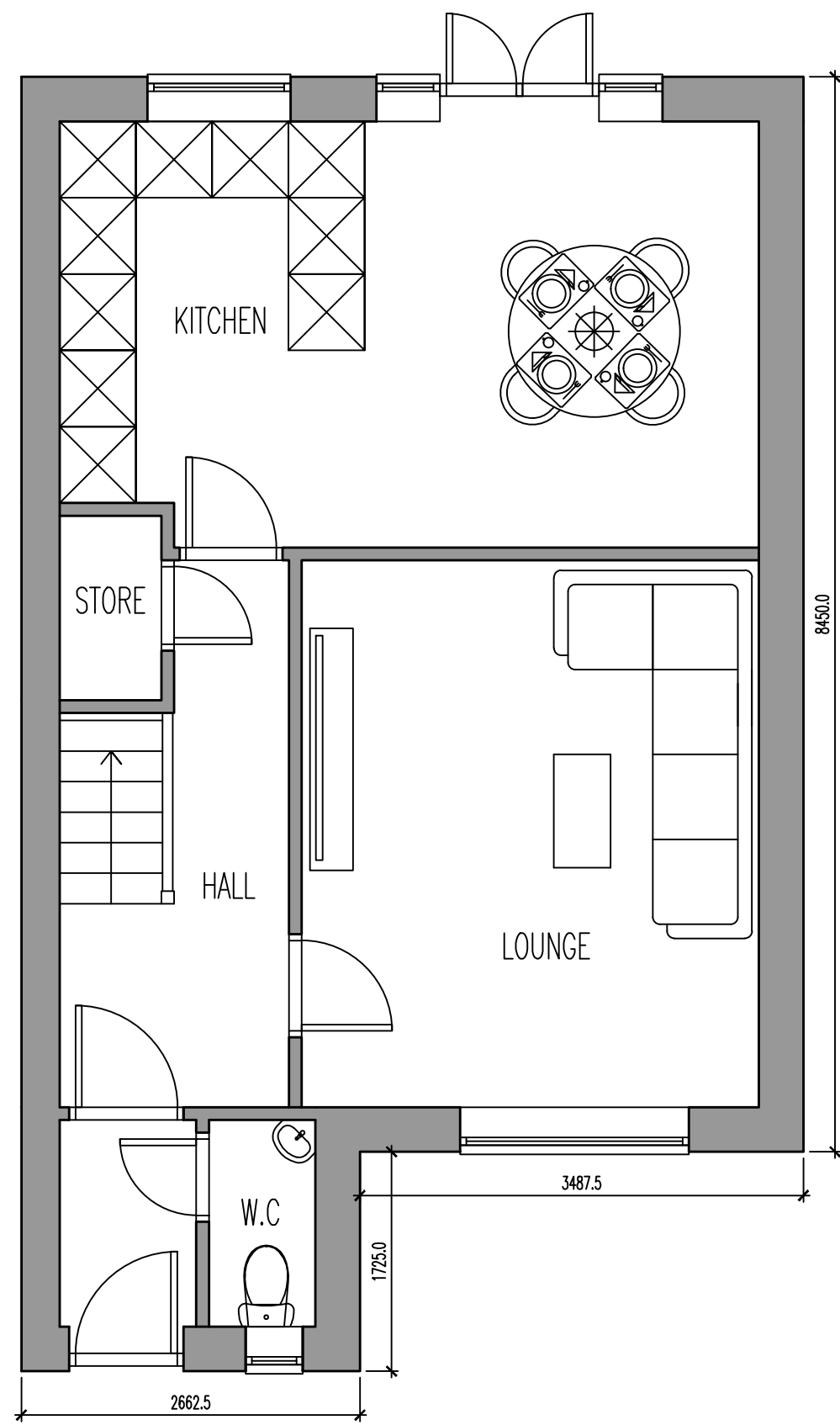
Figures



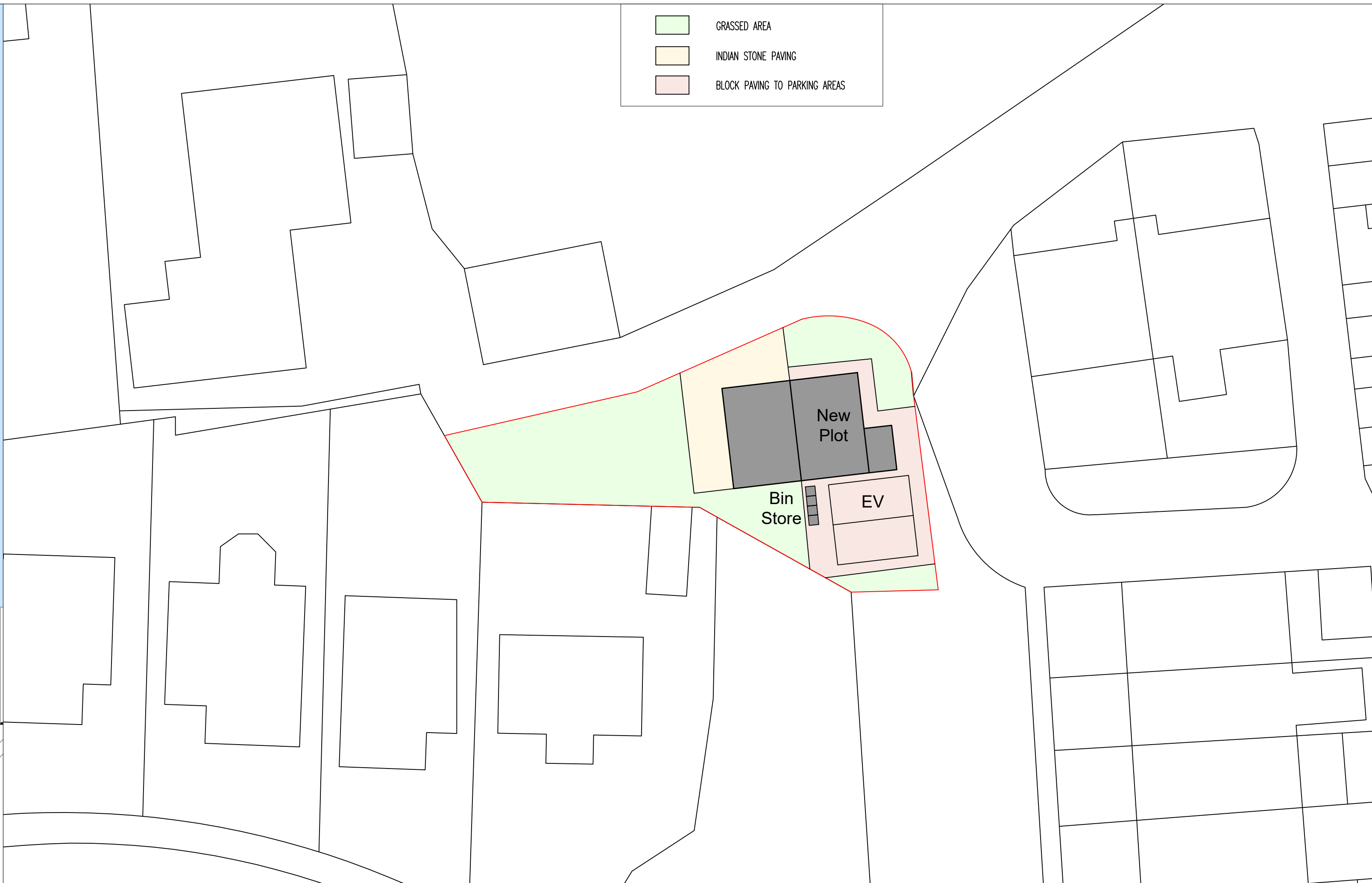
Client: Mr Paul Power				Title: Site Location & Boundary Plan		 LK CONSULT			
Site: Spring Street, Tottington				Scale (see scale bar): 1:5,000 & 1:1000 @ A4				Figure: 1	Revision:
Job No.: FRA251239	Drawn By: AY	Checked By: DP	Drawn: Nov 2025						

Appendix A – Proposed Site Layout

01 Proposed Floor Plans
Scale 1:50



02 Proposed Typical Elevation
Scale 1:50



03 Proposed Site Plan
Scale 1:200

Notes Copyright in all documents and drawings prepared by the architectural designer and any works executed from these documents and drawings shall, unless otherwise agreed, remain the property of the designer and must not be reproduced by, lent or disclosed to, a third party without the written consent of Zach Thorp.

Do not scale off this drawing

All dimensions are to be checked on site and any discrepancies to be referred to the designer before proceeding. All levels to be checked on site All discrepancies between information shown on the drawings and the information in the specification to be referred to the designer prior to proceeding. All component sizes and references to be checked before ordering

Position of existing drain runs to be confirmed prior to proceeding and drains checked as necessary.

All relevant boundary positions are to be checked prior to proceeding

Building regulation drawings can be used for building estimates, however for an accurate quote builders must attend site as these drawings do not account for all aspects of the building works.

MATERIALS
WALLS: RED BRICK
WINDOWS: GREY/BLACK UPVC
FEATURES: STONE CILL/HEADS
DOORS: GREY/BLACK UPVC
SOFFIT: GREY/BLACK UPVC
ROOF TILE: GREY
DORMERS: GREY CLADDING

Rev	Description	Date	By	Chk
Status		Purpose for Issue		
Survey	☐	Tender	☐	
Construction	☒	As Built	☐	
Client				
Paul Power				
11 Spring Street, Tottington				
Contract				
1x New Build 4 Bed House				
Drawing				
Proposed Plans and Elevations				
Drawing No. TDS-25-196-02		Revision	/	
Scales	1:50	Date	July '25	
Drawn	ZTT	Checked		



Appendix B – Topographic Survey



Appendix C – United Utilities Public Sewer Record

LKGroup**Unit 29
Eton Hill Road,
Radcliffe,
m26 2zs****FAO:****How to contact us:****United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP****Telephone: 0370 7510101****E-mail: propertysearches@uuplc.co.uk****Your Ref: FRA251239 Spring street
Our Ref: UUPS-ORD-686080
Date: 22/10/2025****Dear Sirs****Location: FRA251239 Spring street**

I acknowledge with thanks your request dated 21/10/2025 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



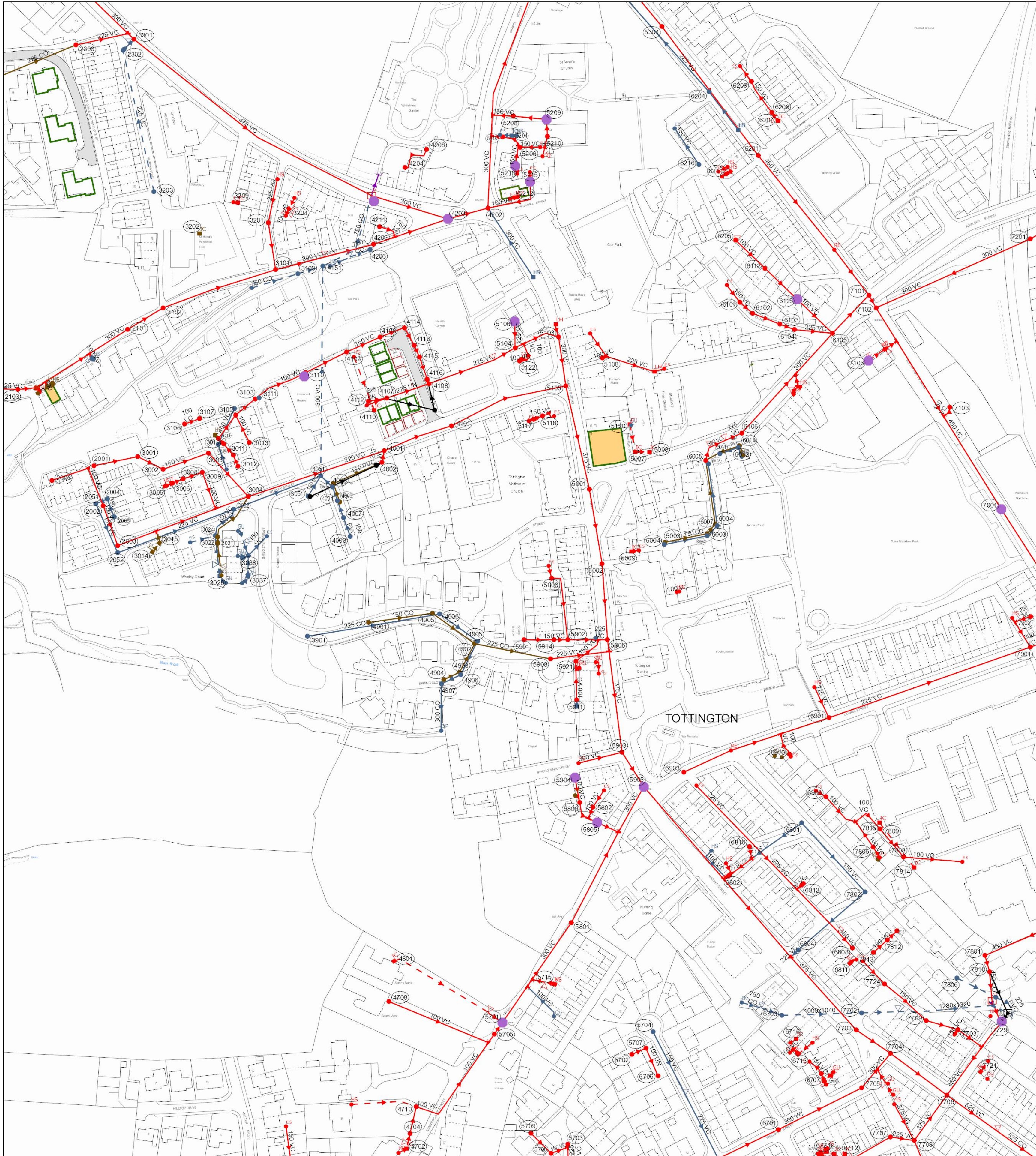
Karen McCormack
Property Searches Manager

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
6014	FO	0	100	20	40	457	PVC	20.40457	
2306	CO	0	235				VC	29.52544	
4114	CO	0	154.42	150			VC	10.90409	
7702	SW	155.75	1000				UN	20.03645	
4107	155.75	CO	153.71	225			UN	24.01664	1 in 101
6102	141.07	VC	16.15649	225			VC	16.15649	
7809	CO	0	100				VC	20.30382	
7709	CO	0	150				VC	18.09002	
6101	141.27	CO	139.65	150			VC	9.219544	1 in 32
4116	CO	0	150				VC	3.045066	
4009	156.61	FO	155.3	50			PVC	10.76086	1 in 154
4108	CO	0	225				VC	38.32165	
5118	CO	0	150				VC	8.187732	
4211	CO	0	150				VC	11.32723	
4115	CO	0	150				VC	12.81426	1 in 30
4113	CO	0	150				VC	7.124459	
6801	139.39	CO	138.3	150			VC	51.66236	1 in 18
4101	152.86	CO	150.25	225			VC	67.36276	1 in 21
6209	CO	0	150				VC	10.42273	
7103	CO	0	150				VC	6.763763	
4106	138.77	CO	154.5	150			VC	14.40986	1 in 181
6801	138.78	CO	117.652	225			VC	117.652	1 in 37
7802	136.51	SW	135.46	150			VC	48.9183	1 in 204
4704	CO	0	150				VC	15.13321	
6104	140.51	CO	139.01	225			VC	21.06502	1 in 21
7703	CO	0	150				VC	16.33691	
6810	CO	0	150				VC	12.52029	
4203	156.02	SW	155.02	150			PVC	10.90125	1 in 136
5210	CO	0	150				VC	9.381453	
7901	135.75	CO	133.54	300			VC	28.4605	1 in 49
4904	147.14	CO	145.39	150			VC	9.469313	1 in 35
2005	CO	0	150				VC	10.58262	
4801	147.03	CO	145.62	100			VC	17.91638	1 in 22
6816	CO	0	150				VC	6.650787	
6003	FO	0	150				CO	8.890492	
5702	CO	0	100				UN	8.490638	
4907	147.17	SW	145.42	300			VC	25.82422	1 in 172
5905	142.42	CO	138.36	375			VC	177.8992	1 in 31
5914	136.7	CO	132.08	450			VC	79.61156	1 in 215
4205	147.99	CO	146.6	300			VC	43.24348	
7712	CO	0	150				PVC	13.84198	
7201	137.68	CO	133.63	300			VC	93.10747	
6103	140.68	CO	139.17	225			VC	8.544003	1 in 66
5206	CO	0	150				VC	12.11745	
6801	139.39	CO	139.34	150			VC	24.41311	1 in 128
6804	136.79	SW	135.14	225			VC	5.656854	
6008	CO	0	150				VC	2.363093	
3201	151.32	VC	148.07	225			VC	26.36689	1 in 29
6906	CO	0	100				VC	22.24076	
6205	CO	0	150				VC	1.3176	1 in
4204	CO	0	0				PVC	20.03956	
5112	CO	0	150				VC	10.76895	
2101	158.31	CO	155.61	390			VC	22.88154	1 in 10
6803	142.43	CO	140.68	225			VC	85.55964	1 in 22
7705	136.93	CO	134.89	300			VC	24.95378	1 in 12
5002	145.47	CO	141.94	375			VC	42.10701	
7102	139.33	CO	134.26	450			VC	139.6981	1 in 61
3901	154.63	SW	152.67	225			CO	74.0433	1 in 12
4007	156.35	SW	154.94	150			PVC	9.869522	1 in 105
4901	151.26	FO	149.91	150			CO	35.50599	1 in 10
7101	139.39	CO	139.34	150			VC	8.622238	450
5904	142.45	CO	142.45	100			VC	13.93044	
5105	146.85	CO	146.24	375			VC	58.40897	
4201	155.1	CO	153.56	225			VC	39.5977	1 in 12
7703	135.48	CO	131.9	375			VC	23.02173	1 in 74
6205	CO	0	150				VC	7.298048	
5805	CO	0	141.83	100			VC	12.8461	
5117	CO	0	150				VC	5.253352	
6707	CO	0	150				VC	9.443939	
3903	143.24	CO	139.38	375			VC	22.4722	1 in 27
4205	148.79	FO	146.31	150			VC	28.76062	1 in 19
4203	149.89	CO	145.58	300			VC	22.80331	1 in 19
5215	CO	0	100				VC	33.89704	
3102	155.83	CO	153.14	300			VC	65.48023	1 in 11
3001	161.98	CO	160.26	150			VC	15.65248	1 in 27
5106	CO	0	225				VC	14.39072	
6004	CO	0	150				VC	35.54199	
3002	161.39	CO	159.64	150			VC	26.57066	1 in 39
4710	CO	0	100				VC	68.71334	
2302	159.23	CO	155.96	225			VC	4.24264	
4004	156.63	SW	154.88	150			PVC	8.013495	1 in 134
3006	CO	0	150				VC	21.49355	
7704	135.08	CO	131.56	375			VC	38.60052	1 in 33
5801	CO	0	150				VC	16.97051	
7801	135.46	CO	130.23	450			VC	9.362917	1 in 78
5208	CO	0	150				VC	11.53149	
6006	CO	0	150				VC	7.969814	
2051	164.19	SW	162.33	150			PVC	29.54657	1 in 59
7806	CO	0	225				VC	23.65337	
4202	150.01	CO	145.37	300			VC	162.8476	1 in 20
5709	CO	0	150				VC	15.75135	
6703	136.37	SW	133.13	1000			VC	43.99479	
5103	151.2	CO	147.65	300			VC	27.27022	1 in 22
5209	CO	0	150				VC	16.50877	
5708	CO	0	137.96	150			VC	9.747351	
6802	139.34	CO	137.96	225			VC	3.605551	
6204	140.91	SW	139.38	225			VC	72.24957	1 in 88
3105	CO	0	100				VC	14.04322	
5707	CO	0	100				UN	16.65527	
5801	141.73	CO	0	300			VC	85.09111	
4112	CO	0	225				UN	10.24927	
5704	139.3	SW	138.27	150			VC	39.50734	1 in 187
7706	134.44	CO	129.33	525			VC	34.4093	1 in 123
5806	CO	0	100				VC	16.90277	
6106	143.75	CO	139.72	300			VC	74.33035	1 in 28
4008	156.88	SW	154.82	150			PVC	8.987646	1 in 150
6208	CO	0	150				VC	20.62086	
5003	CO	0	150				CO	23.70124	
5304	146.8	CO	133.37	450			VC	88.60023	1 in 316
4805	146.72	SW	145.9	300			VC	20.84668	1 in 65
7808	CO	0	100				VC	32.42531	
5004	CO	0	225				VC	24.10833	
4010	156.88	FO	155.23	150			PVC	29.21045	1 in 27
3051	157.31	CO	155.39	150			VC	13.1963	1 in 29
6708	CO	0	150				VC	4.475986	
6007	CO	0	150				VC	34.49813	
2004	CO	0	100				VC	6.814673	
4906	147.04	SW	145.58	300			CO	11.88922	1 in 74
6701	137.38	CO	136.28	300			VC	51.42956	1 in 41
2002	164.23	CO	161.45	150			VC	23.4094	1 in 78
5703	144.55	CO	143.43	225			VC	30.01066	1 in 63
3008	CO	0	100				VC	11.23262	
3203	CO	0	225				VC	79.85107	
6105	140.05	CO	137.06	300			VC	29	1 in 19
5901	148.11	CO	147.51	150			VC	16.44158	
7802	CO	0	100				VC	8.646201	
5216	CO	0	150				VC	11.83176	
4006	148.52	CO	146.41	225			VC	25.50156	1 in 50
7729	132.71	CO	130.35	450			VC	49.67847	
5802	CO	0	100				VC	6.71815	
7724	CO	0	150				VC	30.70787	
5207	CO	0	150				VC	6.356431	
5104	151.99	CO	149.85	225			VC	26.09644	1 in 15
6812	CO	0	100				VC	4.830336	
3106	CO	0	100				VC	8.746276	
2006	CO	0	100				VC	43.27104	
4002	155.35	CO	154.14	225			VC	6.502743	1 in 12
5001	CO	0	375				VC	41.59327	
2103	163.63	CO	161.37	225			VC	10.94968	1 in 6
2001	162.65	CO	161.73	150			VC	24.5153	1 in 17
5705	CO	0	300				VC	7.726285	
7708	136.14	CO	0	375			VC	30.86584	
6201	141.01	CO	133.09	450			VC	66.8431	
4706	CO	0	100				VC	56.3951	
5902	147.32	CO	144.9	225			VC	22	
4102	150	CO	144.11	300			VC	20.12378	
5701	146.21	CO	144.11	300			VC	66.85117	1 in 15
7812	CO	0	100				VC	7.329584	
3052	160.04	SW	158.13	225			VC	51.3379	1 in 19
5908	145.32	CO	143.44	225			VC	32.5513	
2102	162.5	CO	159.5	300			VC	59.60331	1 in 15
7813	CO	0	100				VC	10.3339	
3101	149.95	CO	147.14	300			VC	27.80205	1 in 147
4902	146.94	FO	144.81	225			CO	42.62292	1 in 31
3004	159.32	CO	157.2	225			VC	79.06686	1 in 22
5122	CO	0	100				VC	3.076492	
3006	CO	0	155.85	100			VC	0.0012029	
3301	159.34	FO	157.4072	375					

Appendix D – United Utilities Pre-Development Enquiry

United Utilities Grasmere House, 2nd Floor
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

13th November 2025

Dear **Customer**

Pre-Development Enquiry for **11 Spring St, Tottington, Bury, BL8 3LU** UU Reference Number: **08404110**

We have assessed your application based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your strategy will need review by other authorities as part of the planning process. We advise conducting necessary site investigations to confirm viability of your proposals.

Modelled Flood Risk [Please see the image at the end of this letter for details](#)

I can confirm that we do not have modelled flood risk within the vicinity of the proposed development.

Please note that our modelling data is indicative, and only representative of the 1:100year storm event.

[Please see **comment 2** of the attached guidance sheet](#)

Asset Protection

1. We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of the proposed development.

[Please see **comment 3** of the attached guidance sheet and **Working Near Our Pipelines Guidance document**](#)

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 150mm diameter public combined sewer located south of your proposed development, adjacent to number 13 at a maximum pass forward flow an unrestricted rate.

Manhole reference SD77125901, **Grid reference** 377518, 412984

[Please see the images at the end of this letter for clarification](#)

Surface Water

Follow the National Planning Policy Guidance drainage hierarchy and Provide evidence for discounting higher options before considering public sewer discharge. Consult the Lead Local Flood Authority regarding surface water concerns.

[Please see comment 4 within the guidance sheet](#)

Infiltration

[Please see comment 4 within the guidance sheet](#)

Public Sewer

United Utilities will consider a connection to the 225mm diameter public surface water sewer within Spring Vale Drive located South of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities requests that any agreed rate does not exceed 5l/s.

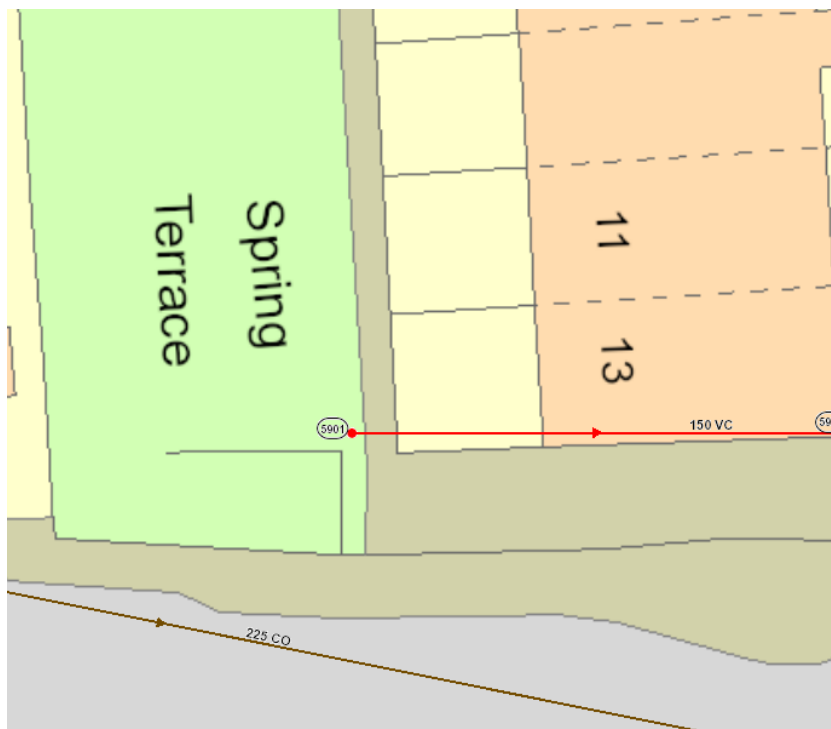
Manhole reference SD77124905, **Grid reference** 377491, 412986

[Please see images at the end of this letter for clarification](#)

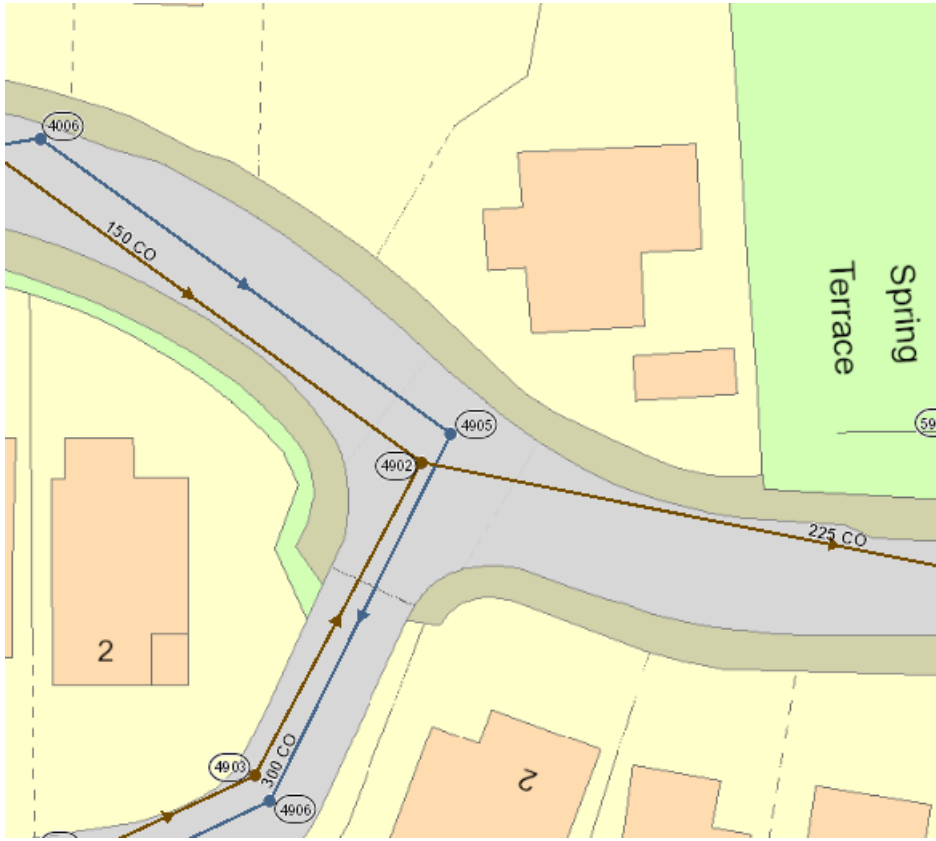
Site Images



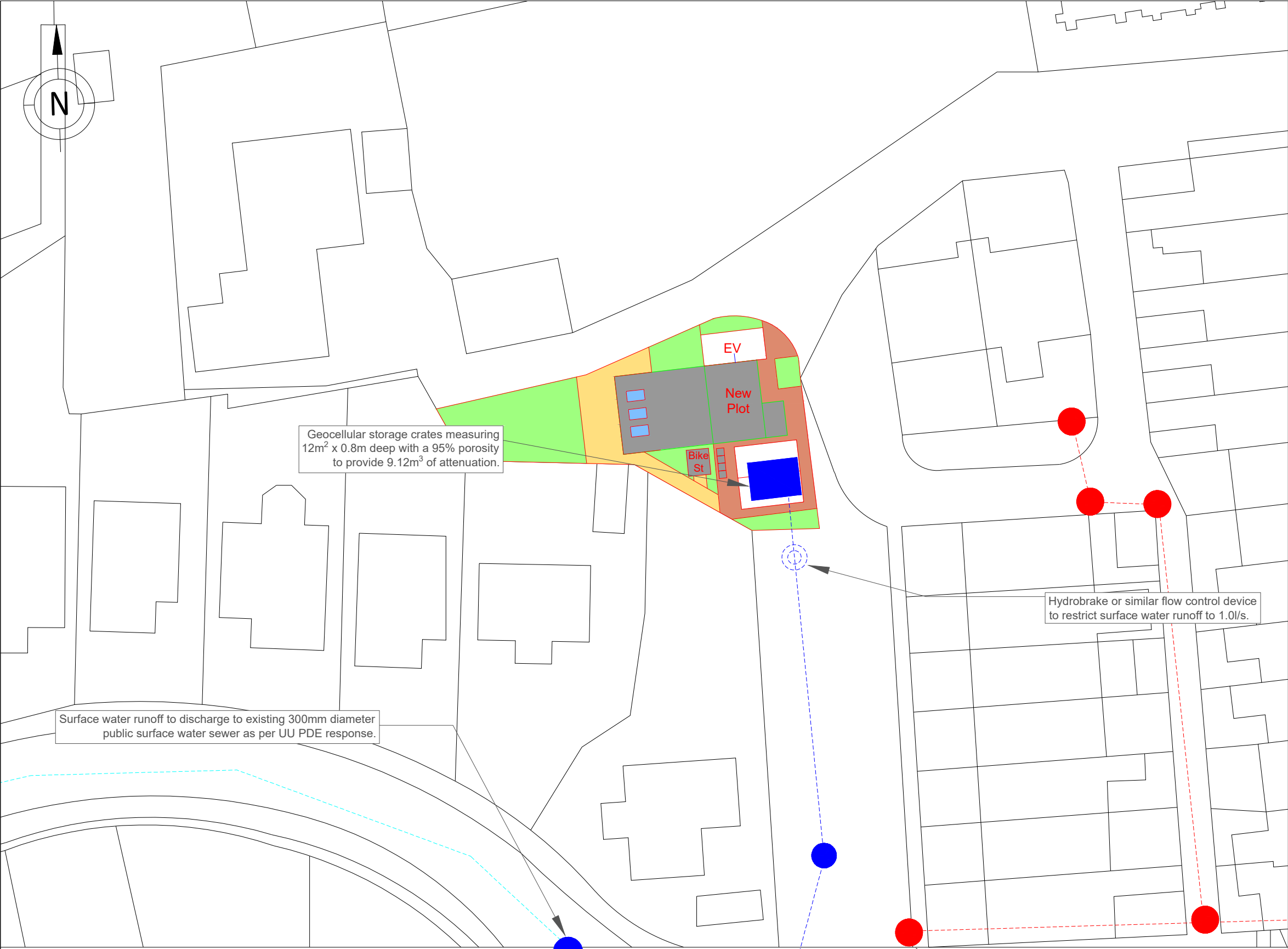
Foul Connection Point:



Surface Water Connection Point:



Appendix E – Conceptual Surface Water Drainage Strategy



KEY:

Geocellular storage crates

Indicative UU Surface Water Sewer Location

Indicative SW sewer

Indicative UU Combined Sewer Location

NOTES:

1. This drawing represents a conceptual SuDS layout and aims to demonstrate a suitable surface water drainage strategy for the proposed development. Detailed drainage design will be required at the detailed design stage.

2. Location, dimensions and storage volumes provided by proposed SuDS features to be confirmed at the detailed design.

3. Final site discharge rate to be limited to 1.0 l/s.

4. Surface water runoff to discharge into existing UU public surface water sewer located beneath Springvale Drive subject to agreement with UU.

5. Location of the existing public combined and surface water sewer based on UU public sewer records. It is recommended that the location and invert level of the receiving sewer is confirmed prior to undertaking detailed drainage design.

Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information. Subject to detailed design.

LK CONSULT

Client:

Paul Power

Site:

Spring Street, Tottingham

Title:

Conceptual SW Drainage Layout

Job No.:
FRA251239

Scale (See Scale Bar):
NTS

App:
E

Revision:
1

Drawn By:
AY

Checked By:
DP

Drawn:
March 2026

Extract From Plan Supplied by Thorp Design Services LTD
Drawing No. TDS-25-196-02

Consultation undertaken with UU in the form of a Pre-Development Enquiry has determined Manhole SD77125901 as the point of connection for foul sewage. (Indicative location of the manhole)

Appendix F – Causeway Flow Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
Depth/Area 1	0.020	100.000	35.829	72.138	2.000

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node Depth/Area 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	98.000	Product Number	CTL-SHE-0049-1000-0800-1000
Design Depth (m)	0.800	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

Node Depth/Area 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	98.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	81

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	12.0	12.0	0.800	12.0	21.8	0.801	0.0	21.8

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	Depth/Area 1	60	98.757	0.757	7.8	8.6303	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
60 minute winter	Depth/Area 1	Hydro-Brake®	1.0	11.4

Appendix G – References

³ CIRIA, December 2015, "The SUDS Manual", C753.

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