

Algeco Gravesend

PEREGA

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Suitability Code	Revision/Version	Date	Written by	Checked by	Description
S2	P1	02/05/2025	Eitel Tchapeu	Robert Masson	Issued for information
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1. Introduction

- 1.1 This flood risk assessment (FRA) has been prepared by Perega Ltd on behalf of their client, Algeco for their property at Wharf Road, in Gravesend comprising for the amendments to their existing container refurbishment operation in Gravesend, including office relocations and minor site layout changes.
- 1.2 The application boundary covers an area of approximately 1.87 hectares (ha) and is a brownfield site.
- 1.3 This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) 2024 and the associated Technical Guidance.
- 1.4 The key site details are presented in Table 1, below.

Table 1 - Site Summary

Site Name	Algeco Gravesend
Location	Algeco Gravesend, Wharf Rd, Gravesend, DA12 2RU
Grid Reference	TQ 66076 74183
Development Site Area	1.87 Hectares Approx.
Development Type	Commercial
Flood Zone	Flood Zone 3 (High Probability Risk)
Surface Water Flood Risk	Medium to High Probability Risk
Local Water Authority	Southern Water
Local Planning Authority	Gravesham Borough Council
Lead Local Flood Authority	Kent County Council

- 1.5 The development area is located in Flood Zone 3 therefore, in line with standing advice, an independent FRA is required under the guidance of the National Planning Policy Framework (NPPF).
- 1.6 This report has been prepared solely as a Flood Risk Assessment (FRA). It therefore only addresses any environmental issues to the extent they are impacted by flooding. The findings are based on information evaluated at the time of preparation.
- 1.7 The report is the property of Perega and is produced for the exclusive use of our client and is confidential to that client. The contents may not be made use of by any third party without the express written consent of Perega. Any liability to any third party is expressly excluded.
- 1.8 This report is made on behalf of Perega. By receiving this report and acting on it, the client, or any third party relying on it, accepts that no individual is personally liable in contract, tort, or breach of statutory duty (including negligence).

2. Methodology

- 2.1 This is a desk-based study that utilises existing, publicly held information in the form of mapping and previously undertaken work. Conclusions made about flooding have been made using our expert judgement and knowledge of similar events.
- 2.2 In preparing this report, information has been gathered and referenced from several sources. These are as follows:
- i. The Environment Agency's Flood Map for Planning.
 - ii. The Long-Term Flood Risk Map for England.
 - iii. The National Planning Policy Framework 2023, and.
 - iv. The Planning Practice Guidance.
 - v. As-Built topographical survey information for the property

3. Site Details

Site Setting

- 3.1 The site is an irregular shape parcel of land and currently contains a mixture of offices and containers, and associated private parking areas and access road.
- 3.2 The site is bound by Wharf Road along the north boundary, Canal Basin along the West and private commercial properties to the south and east boundaries. The surrounding of the site is all commercial premises.
- 3.3 The site is accessible via Wharf Road to the north of the site via an existing gated vehicular access.
- 3.4 A site location plan are included in **Appendix A** of this report.

Surface Water Features

- 3.5 The site is located approximately 130m south of the River Thames. There is Thames and Medway Canal approximately 320m East of site and a canal basin approximately 370m west of site serving as a ship dock.

Geology

- 3.6 BGS Geology Viewer indicates that site is situate on the Lewes Nodular Chalk formation and Newhaven Chalk formation which are noted to be mainly chalk. Superficial deposits are mostly identified as alluvium, with clay, silt, sand and peat.
- 3.7 No Geoenvironmental Desk study report was available at the time of writing.
- 3.8 A set of borehole logs from BGS GeoIndex (ref: TQ67SE76 -79) located within the site records the topsoil comprising mainly of made ground which extend to depths of approximately 0.53 – 2.44m bgl. Beneath this, very lose dark silt and dark grey silty clay firm to stiff clay with loose to compact gravel and flints present, reaching termination depths of around 12.34 – 15.24m bgl.
- 3.9 All borehole logs are included in **Appendix B** of this report.
- 3.10 No intensive ground investigation have been conducted at time of writing this report.

Hydrogeology

3.11 The sets of BGS boreholes log (ref: TQ67SE76 -79) recorded that no groundwater was encountered. However, a different set of BGS boreholes logs (ref: TQ67SE1 -2) taken just North of the site recorded that groundwater was encountered with water level that was observed around 3.35m bgl.

3.12 Defra's Magic Maps indicates that the site is located in an area of Medium-High Groundwater vulnerability with soluble rock risk.

Existing Drainage

3.13 The incumbent sewage undertaker is Southern Water.

3.14 There are private sewers located within the site. A series of gullies collect the surface water from the existing private hardstanding and discharge into a nearby brook located east of the site. Sewers convey the runoff underneath the building through Ø800 surface water pipes from west to east discharging into an existing brook east of the site.

3.15 There are no records of public foul sewerage provided, but it is assumed they are present to serve the existing office buildings and development.

3.16 The CCTV survey plan from RA Utility Solutions is included in **Appendix C** of this report.

Source Protection Zones

3.17 Groundwater Source Protection Zones (SPZ's) are defined around groundwater abstraction sources such as wells, boreholes and springs that are used for public drinking water supply.

3.18 SPZ's show the risk of contamination to groundwater from any activities that might cause pollution in the area. The closer the activity to the source of abstraction, the greater the risk. The maps show three main zones; inner – Zone 1; outer – Zone 2 and total catchment – Zone 3.

3.19 Zone 1 is defined as the 50-day travel time from any point below the water table to the source of abstraction. This zone has a minimum radius of 50 metres.

3.20 Zone 2 is defined by a 400-day travel time from a point below the water table to the source of abstraction. This zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction.

3.21 Zone 3 is defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source of abstraction but is thought to be greater than 400 days travel time.

3.22 **Appendix D** shows Defra's Magic Map which identifies the site is not in an Zone of Source Protection.

Topography

3.23 The site is generally flat with small variation in levels across the hardstanding. The external of the existing buildings and containers are between 3.42 mAOD and 5.00 mAOD with a fall of 1.58m and the lowest point at the site southern boundary.

3.24 The topographic survey can be seen in **Appendix E**.

Existing Discharge Rate

3.25 The existing site is brownfield.

- 3.26 The HR Wallingford tool has been used to calculate the following Greenfield discharge rate per hectare for the site which can be seen in **Appendix F**. This is summarised in Table 2.

Table 2 - Greenfield Runoff rate per ha

Storm Event	Greenfield Rate (l/s)
QBar	8.9
1-year	7.5
30-year	20.4
100-year	28.2

4. The Proposed Development

- 4.1 The proposed development reorganises the current site to a new layout, some buildings are retained with offices and welfare relocated to suit the new layout of the site and internal vehicle routes. No levels or surface water drainage changes are required.
- 4.2 The proposed development can be seen in **Appendix G**.
- 4.3 The impermeable and permeable areas for the site are summarised in Table 3.

Table 3 - Impermeable and Permeable Areas

Description	Impermeable Area (m ²)	Permeable Area (m ²)
Roof/Patio Area	3570	
Private Containers Area	6880	
Private Parking/Hardstanding	8290	
Soft Landscaping		0
Total Area	18740	0

5. Strategic Flood Risk Assessments, Surface Water Management Plans and Local Flood Risk Management Strategies

- 5.1 Strategic Flood Risk Assessments (SFRA's) and Surface Water Management Plans (SWMP's) provide a high-level overview of flood risk and are prepared by the Lead Local Flood Authorities (LLFA). In this case, Kent County Council serves all the LLFA, responsible for managing the local flood risks. SFRA's consider flooding from surface water runoff, groundwater and ordinary watercourses. They also reference historical flooding that has occurred in the local area as well as the potential for future flooding. SWMP's aim to identify areas that are vulnerable to surface water flooding and establish a plan to managing surface water in those areas. The Thameside surface water management plan covers both Kent or Dartford and Gravesham, where the site is located.
- 5.2 A Preliminary Flood Risk Assessment (PFRA) was published by Kent County Council in 2011 to identify key flood risk areas across the district. This assessment informed the future Local Flood Risk Management Strategies and highlighted areas vulnerable to surface water flooding. The Thameside SWMP provides flood risk management measures to be implemented through strategic planning policies and localized interventions. Areas at higher risk of surface water flooding benefit from ongoing risk assessments and mitigation strategies incorporated within broader flood risk planning frameworks.

The Environment Agency Flood Map for Planning

- 5.3 The Environment Agency's Flood Map for Planning gives an indicative prediction of areas at risk of fluvial and tidal flooding. The mapping is an amalgamation of modelled flood levels and historical flood event outlines.

- 5.4 The Flood Map is split into 'Flood Zones', which demarcate the extent of flooding from rivers or the sea for different return periods. The Flood Map for Planning shows the extent of the natural floodplain if there were no defences or other man-made structures. They do not provide a definitive picture of where flooding would occur; rather, they provide an indicative prediction of areas at risk.
- 5.5 Table 4 lists the flood zone categories and explains the flood risk probabilities they represent.

Table 4 - Flood Zone Categories

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their SFRAs areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

The National Planning Policy Framework

- 5.6 The NPPF sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. The Technical Guidance to the NPPF provides further information on the policies set out in the NPPF. It encourages development to take place in areas of lower flood risk wherever possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.
- 5.7 Within each Flood Zone, a key factor in determining planning applications for development is the flood risk vulnerability of a development. Table 2 of the Technical Guidance to the NPPF categorises different development types according to their vulnerability to flooding. These categories are:
- Essential infrastructure.
 - Highly vulnerable development.
 - More vulnerable development.
 - Less vulnerable development, and.
 - Water-compatible development.
- 5.8 Within the different Flood Zones each of the above development categories are considered appropriate or not permissible. The PPG lists these as:

Flood Zone 1:

All the development categories listed above are appropriate.

Flood Zone 2:

Water-compatible, less vulnerable development, more vulnerable development and essential infrastructure is appropriate in this zone. An exception test is required for highly vulnerable infrastructure in this zone.

Flood Zone 3a:

Water-compatible and less vulnerable development is appropriate in this zone. Highly vulnerable development should not be permitted in this zone. An exception test is required for more vulnerable and essential infrastructure in this zone.

Flood Zone 3b:

Only water-compatible development and essential infrastructure that must be there should be permitted in this zone. An exception test is required for essential infrastructure.

- 5.9 The above information sets out the basis by which developments must be assessed in terms of flood risk. In Section 7 the vulnerability of the proposed development will be reviewed against the Flood Zone in which it is located. This will inform the suitability of the development as per the advice within the PPG.

6. Historical Flooding

- 6.1 There have been no recorded flood events from fluvial or tidal flooding within the site boundary shown on records consulted.

7. Current and Future Flood Risk

- 7.1 Flooding can arise from a variety or combination of sources. These may be natural or artificial and may be affected by climate change. These are discussed below detail and summarised in Table 9.

Fluvial Flooding

- 7.2 **Appendix H** shows the Environment Agency's Flood Map for Planning at the property location. It lies within Flood Zone 3. However, the risk of flooding from rivers and the sea is **medium**, increasing to **high** between 2040 and 2060. The highest risk of flooding at this site is from the surface water.
- 7.3 This flood risk likely stems from the adjacent River Thames due to proximity to the site.

Flood Risk Vulnerability and Appropriateness of Development

- 7.4 Office buildings and car parks are listed in Annex 3 of the NPPF as being 'less vulnerable' to flooding. A Table in the Flood risk and coastal change section of the PPG (replicated below in Table 5) states that 'less vulnerable' development is considered appropriate in Flood Zone 3a as the building footprint lies within the zone but it is still subjected to compliance with relevant flood risk management requirements.

Table 5: Replicated from the NPPF: Flood Risk Vulnerability and Flood Zone ‘Compatibility’.

Flood Zones	Flood Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a [†]	Exception Test Required [†]	✗	Exception Test Required	✓	✓
Zone 3b*	Exception Test Required*	✗	✗	✗	✓

Key:

✓ - Development is appropriate

✗ - Development should not be permitted

Tidal Flood Risk

- 7.5 The Environment Agency's Flood Map for planning does not differentiate between fluvial and tidal flooding.
- 7.6 The SWMP report indicates that sea defences have been constructed along the North Kent coastline, reducing the impact of a tidal flood event if it occurs.

Surface Water Flood Risk

- 7.7 Pluvial flooding results from rainfall-generated overland flow, where rainwater has not yet reached a watercourse or sewer and where the local drainage systems become overwhelmed. Pluvial flooding often occurs during short, very intense storms, but can also occur during longer periods of rainfall when the ground is already saturated, or where land has low permeability due to development. Although pluvial flood events are usually short-term, they can be devastating with fast flows and deep waters occurring quickly.
- 7.8 In these conditions surface water can build up where the topography allows it to converge or pond. Where it gathers it will travel down prevailing gradients. Pluvial flooding then occurs at locations where significant surface water flow paths converge, at localised low points and/or due to overland obstructions. In urban areas pluvial flooding often occurs where the built environment channels overland flow routes (down roads that are bounded by kerbs, for example) or where there are obstacles to the natural overland flow routes. Boundary walls and buildings are often the main causes and, hence, affect the likelihood of pluvial flooding to impact property and gardens.
- 7.9 Pluvial flooding is exacerbated in many cases by the mistreatment or failure of the below ground infrastructure (including partial or full blockages of gullies and/or within the combined sewers and the accumulation of fats, oils and greases within the sewer networks).
- 7.10 The Long-Term Flood Map for England (LTFMfE) attempts to model the areas where pluvial flooding is likely to occur. The LTFMfE is a national scale modelled output. It shows the flooding that could take place from the 'surface runoff' generated by rainwater (including snow and other precipitation) which:
- is on the surface of the ground (whether it is moving), and
 - has not yet entered a watercourse, drainage system or public sewer.

- 7.11 The LTFMfE predominantly follows topographical flow paths of existing watercourses, or dry valleys with some isolated ponding located in low lying areas.
- 7.12 The LTFMfE surface water flood risk map for the development location show that the site is located in an area predominantly at a **medium** risk of surface water. This can be seen in Figure 1 and is included in **Appendix H**. The chance of surface water flooding at this site could be between 1% (1 in 100) and 3.3% (1 in 30) each year. The development should therefore take this into consideration to ensure the flood risk from surface water can be managed.
- 7.13 There are no records of the site, which has been developed for decades, flooding reported to Peregga by the landowner. The development will not change the existing levels as well as the current surface water drainage system. We believe that the development of the site will not introduce additional risks as it is the total impermeable area and associated levels will remain as per existing.

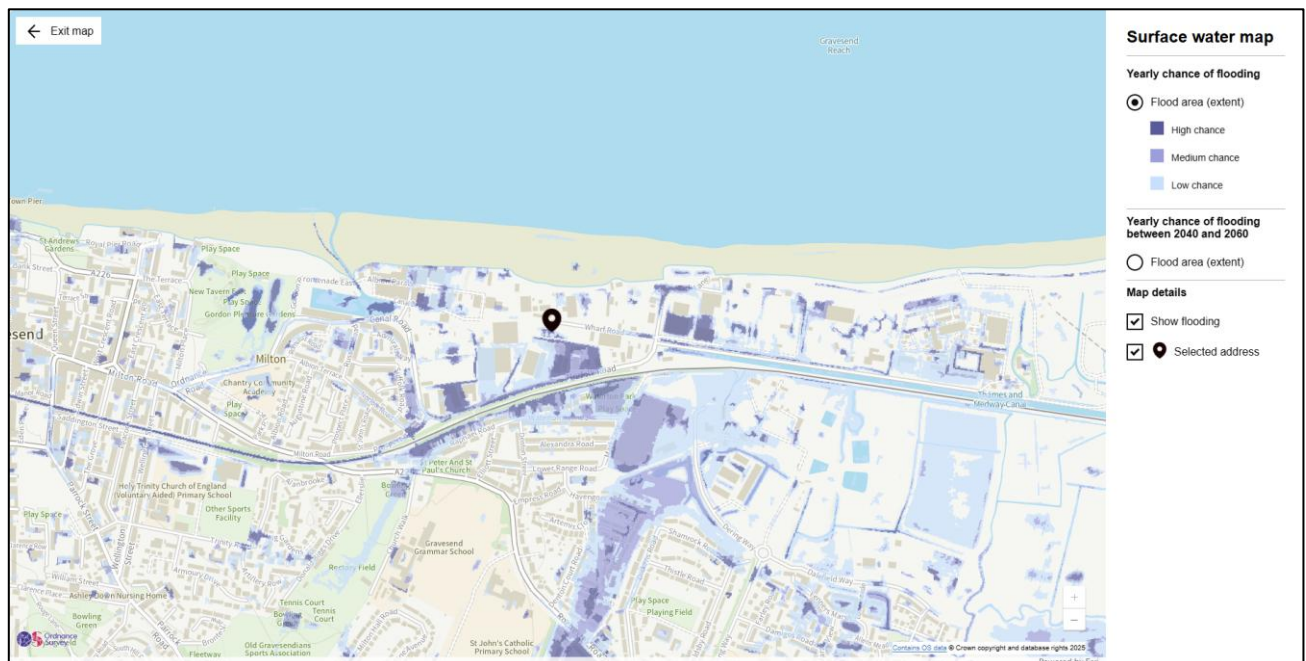


Figure 1 - Surface Water Flood Map – Annual Likelihood of Flooding 1 in 30.

Groundwater Flood Risk

- 7.14 The risk of groundwater flooding is dependent on local geological and hydrogeological conditions at any given time. Groundwater levels rise during wet winter months and fall again in the summer when rainfall is low, and extractions are higher. In very wet winters, rising groundwater levels can reactivate flow in ephemeral streams that only flow for part of the year or even lead to the flooding of normally dry land.
- 7.15 Magic maps indicates that the site is at Medium-High of ground water.

Flood Risk from Canals

- 7.16 The Thames and Medway Canal is 185m east of the site boundary and there is a Canal Basin approximately 195m west of the site boundary.
- 7.17 There are no recorded flood event from canals, therefore it can be assumed the site is not at risk.

Flood Risk from Reservoirs and Large Water Bodies

- 7.18 Flooding can occur from reservoirs or large water bodies that are impounded above the surrounding ground levels or are used to retain water in times of flood. Although unlikely, reservoirs and large waterbodies can overtop or breach their impounding structures leading to rapid inundation of the downstream floodplain.
- 7.19 The Environment Agency is the enforcement authority for the Reservoirs Act 1975 in England and Wales. All large reservoirs must be regularly inspected and supervised by reservoir panel engineers. Local Authorities are responsible for coordinating Emergency Plans for reservoir flooding and ensuring communities are well prepared. Local Authorities should work with other members of the Local Resilience Forum (LRF) to develop these plans.
- 7.20 There are no reservoirs in the immediate surrounding areas therefore there is no risk from this source.

Flood Risk from Sewers

- 7.21 Sewer flooding can occur when the capacity of the infrastructure is exceeded by excessive flows, or because of a reduction in capacity due to collapse or blockage, or if the downstream system becomes surcharged. This can lead to the sewers flooding onto the surrounding ground via manholes and gullies, which can generate overland flows.
- 7.22 Typically, sewer systems are constructed to accommodate rainstorms with a 30-year return period or less, depending on their age. Consequently, rainstorm events greater than 1 in 30-years would be expected to result in surcharging of some parts of the sewer system. In fact, due to most gullies being poorly maintained and often partially blocked with silt, leaves and other debris, their capacity is often estimated to be closer to the 1 in 10-year storm.
- 7.23 English and Welsh water companies are required to maintain a register of flooding incidences due to hydraulic capacity problems on the sewage network. This database identifies properties where flooding has occurred on a frequency of 1 in 5 years and 1 in 10 years. The database is known as the DG5 and DG10 registers.
- 7.24 Kent County Council's SWMP indicates that Gravesham sewers are managed by Southern Water. These sewers are predominantly foul sewers with some surface water sewers within the urban areas, particularly in Dartford.
- 7.25 There are no record of flooding from sewers within the site boundary.

Climate Change

- 7.26 The NPPF and the supporting Technical Guidance document sets out how flood risk should be considered over the lifetime of a development. This requires an increase in flood risk due to climate change to be considered. Both peak river flows and rainfall intensity should be assessed.

Peak River Flows

- 7.27 A range of climate change allowances have been provided by the NPPF for peak river flow increases - a 'central' allowance, a 'higher central' allowance, an 'upper end' allowance and a 'H++' allowance. The flood zone and risk vulnerability classification of the development decide which allowance to consider.
- 7.28 The NPPF groups England's individual river and rainfall catchments into wider catchment areas that are considered to have similar hydrogeological conditions, physical characteristics, rainfall inputs and responses to storm events.

- 7.29 The development is identified within the 'Medway Management catchment'.
- 7.30 The NPPF states that for 'less vulnerable' developments in Flood Zone 3a the central allowance should be used. Table 6 summarises the data attributed to the Medway Management Catchment.

Table 6: Catchment Peak River Flow Allowances

Epoch	Central Allowance	Higher Allowance	Upper Allowance
2020s	14%	19%	29%
2050s	15%	21%	37%
2070s	27%	37%	62%

- 7.31 Without site-specific modelling, there can be no definitive conclusion regarding whether an increase in peak river flows of 14% - 27% will pose a risk to the development. However, given that the site is already within Flood Zone 3, it is unlikely that an increase in peak river flows will result in the site being within a Flood Zone that would render the development inappropriate.

Peak Rainfall Intensity

- 7.32 With climate change it is becoming more common to see rainfall events of higher intensity. Increased rainfall intensity affects river levels and drainage systems, with the result being an increase in surface water flooding and sewerage surcharge.
- 7.33 The NPPF states that for flood risk assessments for developments with a lifetime beyond 2100, the upper end allowances for the 2070s should be used. Table 7 and Table 8 summarises the data attributed the *Medway Management Catchment*.

Table 7: Catchment Peak River Flow Allowances - 3.3% annual exceedance rainfall event

Epoch	Central Allowance	Upper End Allowance
2050s	20%	35%
2070s	20%	35%

Table 8: Catchment Peak River Flow Allowances - 1% annual exceedance rainfall event

Epoch	Central Allowance	Upper End Allowance
2050s	20%	45%
2070s	20%	40%

- 7.34 Although the proposed development does not include change in level or SW drainage, the developer must ensure that the development is designed to accommodate and discharge peak rainfall flows up to the 1 in 100-year event, including a 45% increase in rainfall for climate change, as identified by the Medway Management Catchment Peak Rainfall allowance for the 1% AEP. Similarly, the 3.3% AEP shall be designed using an increased rainfall uplift of 35%.

- 7.35 This provides surety that surface water originating on-site will be managed for the lifetime of the development, inclusive of the highest climate change estimates for peak rainfall.

Residual Flood Risk

- 7.36 It is important to recognise that flood risk can never be fully mitigated and there will always be a residual risk of flooding. The residual risk is associated with several potential risk factors, including (but not limited to):
- A flood event that exceeds that for which the local flood defences or local drainage system has been designed to withstand.
 - A residual danger posed to property and life because of flood defence failure through overtopping or structural collapse.
 - General uncertainties inherent in the prediction of flooding.
- 7.37 Modelling of flood events is not an exact science. Therefore, there is an inherent uncertainty in the prediction of flood levels and extents used in the assessment of flood risk. The Environment Agency's Flood Map for Planning is largely based upon detailed modelling within the area. The LTFMfE and Ground Water Flooding mapping are based on broader-scale models that require numerous assumptions to be made.
- 7.38 Whilst they all provide a good depiction of flood risk for specific modelled conditions, all modelling requires the making of core assumptions and these might not occur in the open and dynamic environment of a flood event. Also, the Environment Agency's Flood Map for Planning and other flood modelling is updated regularly. Interested parties are recommended to keep abreast of this so that a significant change or increase in flood risk can be determined.

Summary of Flood Risk

Table 9: Summary of Flood Risk on Site

Flood Source	Risk Level				Comment
	High	Medium	Low	Very Low	
Fluvial		X			Fluvial Flood Zone 3a, likely due to the River Thames proximity to the site.
Tidal			X		Tidal Flood Zone 3a, however sea defences along the North Kent coastline are erected.
Groundwater		X			Medium-High groundwater flood risk but no evidence of groundwater flooding and projected risk unreliable.
Surface Water		X			EA Maps shows Medium risk of surface water flooding.
Canals			X		The Thames and Medway Canal and a Canal Basin are within 200m distance to the site, however no record of flood event.
Reservoirs				X	No reservoirs in the vicinity
Sewers			X		Kent County Council does mention about DG5 records some historical sewer flooding however these have no evidence nor georeferenced.

Flood Source	Risk Level				Comment
	High	Medium	Low	Very Low	
Increase due to Climate Change			X		Increased rainfall intensities are not expected to affect the flood risk on site.

8. Flood Avoidance, Resistance and Resilience

8.1 Flood risk can be mitigated through taking measures to avoid, resist and be resilient to flooding. Avoidance is carrying out development in line with the sequential test and relocating development to areas of lower flood risk. There is a range of construction methods that can be incorporated into the design of the property to reduce the risk of flooding at a site. These can either be categorised as resistance or resilience measures.

8.2 Resistance measures are those used to try to prevent floodwaters from reaching or entering a property. Resilience measures are those that acknowledge that flooding is likely to occur and try to minimise the damage caused by floodwaters entering the building. The Environment Agency recommends consideration is given to the incorporation of flood resistance and resilience into the design and construction of a development in areas that are at risk of flooding.

Avoidance

8.3 The best possible mitigation for properties at risk of flooding would be to relocate the building to an area of lower flood risk. This method is regarded as an avoidance measure. In the case of the new building, this is not applicable because the new development is re-development of the existing site. It is not possible to move the property to an area of lower flood risk.

Resistance

8.4 Resistance measures can help to prevent water from entering a property. This is particularly effective for low depth flooding. It is recommended to raise the threshold of a building to above the predicted flood levels, nominally 100 – 150mm. Raising thresholds and floor levels beyond the minimum required or would provide an additional level of protection and would have the additional benefit of lowering the residual risk of flooding.

Resilience

8.5 Resilience measures do not stop water from entering a property; they acknowledge that there will be floodwater ingress and aim to minimise the impact in terms of cost and disruption immediately after a flood event. They can be incorporated into the structure of the building or can be included in the finishes, services, and insulation on a building's internals.

8.6 Further site investigations and groundwater monitoring would be required to confirm that groundwater levels remain below ground and do not pose a risk to flooding at the surface levels in order to determine if the development requires flood resilient construction methods in the proposed building.

9. Proposed Drainage Strategy

9.1 The development will not impact the overall impermeable area as all of the site is either hardstanding or roof. There is therefore no proposed drainage strategy.

Surface Water

- 9.2 As the developments is conducted on a brownfield site, relocating existing buildings, there is no proposed change to the existing surface water drainage network.
- 9.3 There are private sewers located within the site. A series of gullies collect the surface water from the existing private hardstanding and discharge into a nearby brook located east of the site. Sewers convey the runoff underneath the building through Ø800 surface water pipes from west to east discharging into an existing brook east of the site.
- 9.4 Different areas of hardstanding pose different risks of pollution. Table 10 is replicated from CIRIA's C753: The SuDS Manual.

Table 10: Pollution hazard indices for different land use classifications - reproduced from CIRIA C753: The SuDS Manual

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
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 (e.g. cul-de-sacs, home zones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

Notes

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

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

- 9.5 Based on Table 10, the building roofs onsite will have a Low pollution hazard level associated with them and the concrete hardstanding will have a High pollution hazard level.
- 9.6 The roofs are thought to have a suitably low risk as to not require treatment before discharge into the combined sewer. All the runoff from the concrete hardstanding will be treated by a petrol interceptor.

Foul Water

- 9.7 There is no record of foul water across the site provided. The development should adequately drain the relocated building foul waters and discharge them as per the existing arrangements.

10. Conclusion

- 10.1 This flood risk assessment (FRA) has been prepared by Perega Ltd on behalf of the client Algeco to support the detailed planning application for the development at Wharf Road in Gravesend DA12 2RU comprising the relocation of offices and associated minor works on site.
- 10.2 There are no surface water features onsite, and the existing topography is relatively flat across the site. However there is the Thames River located 130m north of the site. A ground investigation found the existing hardstanding surfacing was underlaid with made ground. No groundwater was encountered, however Environmental Agency Flood map indicated the site is located in an area noted to be of Medium-High Groundwater Vulnerability.
- 10.3 The site is located in Flood Zone 3, but benefits from protection from the Thames Flood Defences. These are designed to withstand tidal and fluvial flood events up to and including the 1-in-100 year event. The Long-Term Flood Map for England shows the site has a medium risk of surface water flooding but this will be considered and the flood risk can be managed, therefore it can be concluded that the risk of surface water flooding is not a reason to preclude, or cause concern, with regard to the proposed development. The risk of flooding from groundwater, artificial sources and sewer was found to be Low-Very Low.
- 10.4 The risk of flooding from canals, reservoirs and sewers is considered negligible.
- 10.5 Existing private sewers convey the surface water to a nearby Brook located East of the site. There are no record of the private foul network. It is proposed to utilise these connections for the new developments.
- 10.6 There is no proposed surface and foul water drainage strategy.

Appendix A

Site Location Plan



Appendix B

BGS Borehole Logs

BOREHOLE No.1 7067 SE/1

OD ca + 3m

SITE: *URALITE T.P. HUT*

00 6755

Kent

DATUM FOR LEVELS :- GROUND LEVEL

$2\frac{1}{2}$ E of Gravesend

GROUND LEVEL :- 2' 11" ^(0.24 m) BELOW RAIL LEVEL

POSITION :- SEE SITE PLAN: No. 9/0.7.11

DATE :- 11.11.1959.

C 69, 738

RESEARCH SECTION,
SOUTH SIDE OFFICES,
WATERLOO. EXT. 2786.

BRITISH RAILWAYS, SOUTHERN REGION,
CHIEF CIVIL ENGINEER'S DEPARTMENT,
WATERLOO STATION, S.E.1.

STRATA	THICKNESS	DEPTH	KEY	WATER LEVEL	SAMPLES	REMARKS
<u>MADE GROUND, BROWN CLAY MIXED WITH MEDIUM AND FINE SAND, PIECES OF BRICKS AND CHALK</u>						
		(1.32m)				
<u>MADE GROUND, SOFT BROWN AND GREY-BLUE SILTY CLAY, SANDY IN PLACES WITH SOME ROOTS ON TOP AND FINE GRAVEL, ASHES AND BROKEN BRICKS AT BASE.</u>	4' 4"	4' 4"			T77	
		(1.98m)				
	2' 2"	6' 6"				
SOME SHELLS VERY SOFT GREY-BLUE ORGANIC SILTY CLAY.						
				5.11.52	T48	
					T224	
					Δ 362	WATER SAMPLE
					T172	
		(5.33m)				
	11' 0"	17' 6"				
<u>SOFT BROWN PEAT</u>						
	2' 6"	20' 0"				
3 PENETRATION TEST ☐ UNDISTURBED CORE ☐ DISTURBED SAMPLE ☐ A WATER SAMPLE						
FIELD WORK		M.T.N. DATE		SCALE 2 FT. TO 1 IN.		
DRAWN		M.T.N. DEC. 59		C.C.E. No. 9/07/4		
CHECKED						



BOREHOLE No.1

SHEET No 2

SITE : URALITE T.P. HUT

TQ 67 SE 11

RESEARCH SECTION,
SOUTH SIDE OFFICES,
WATERLOO. EXT. 2786.

BRITISH RAILWAYS, SOUTHERN REGION,
CHIEF CIVIL ENGINEER'S DEPARTMENT,
WATERLOO STATION, S.E.1.

STRATA	THICK NESS	DEPTH	KEY	WATER LEVELS	SAMPLES	REMARKS
VERY SOFT GREY SILTY CLAY WITH COARSE, MEDIUM GRAVEL		(6.40m) 1' 0" 21' 0"				
COMPACT COARSE, MEDIUM AND FINE GRAVEL WITH FINE SAND AND SILT		(6.26m) 1' 6" 22' 6"				N = 38
					Δ 429	WATER SAMPLE
					● 566	
VERY SOFT GREY AND LIGHT BROWN SILTY AND SANDY CLAY						
TRACES OF WHITE CHALK						
		(11.33m) 37' 2"				
LIGHT BROWN SLIGHTLY CLAYEY SILTY FINE SAND		(11.89m) 1' 10" 39' 0"				N = 8
					● 452	
SOFT BROWN-GREY MOTTLED SILTY CLAY.						N = 7
		(12.50m) 41' 0"				
CONTINUED ON SHEET N. 3						
PENETRATION TEST						
N° No. OF BLOWS FOR STANDARD PENETRATION.						
☐ UNDISTURBED CORE	FIELD WORK	M.T.N	DATE	SCALE	2 FT. TO 1 IN.	
☐ DISTURBED SAMPLE	DRAWN	M.T.N	DEC. 59			
☐ WATER SAMPLE	CHECKED			C.C.E. No	9/07/4	

BOREHOLE No. 1

SHEET No 3

SITE :- URALITE T.P. HUT

TQ 67SE/11

RESEARCH SECTION,
SOUTH SIDE OFFICES,
WATERLOO. EXT. 2786.

BRITISH RAILWAYS, SOUTHERN REGION,
CHIEF CIVIL ENGINEER'S DEPARTMENT,
WATERLOO STATION, S.E.1.

STRATA	THICKNESS	DEPTH	KEY	WATER LEVEL	SAMPLES	REMARKS
CONTINUED		(12.50m) 41' 0"			41' 0"	
SOFT BROWN-GRY MOTTLED SILTY CLAY WITH SOME DECAYING GRASS NUMEROUS SMALL PIECES OF SILT- AND SANDSTONE. PENETRATED	4' 0"	(13.11m) 43' 0"			T 191 42' 6" ● 133	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100						
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100						
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100						
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100						
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66						



BOREHOLE No. 2

SHEET No 1

SITE: URALITE T.P. HUT

TQ 67SE 11

DATUM FOR LEVELS: ^(0.29m) GROUND LEVEL

GROUND LEVEL: ^(0.29m) 2' 11" BELOW RAIL LEVEL

POSITION: SEE SITE PLAN: No. 9/U.7/11

DATE: 16.11.1959

RESEARCH SECTION,
SOUTH SIDE OFFICES,
WATERLOO. EXT. 2786.

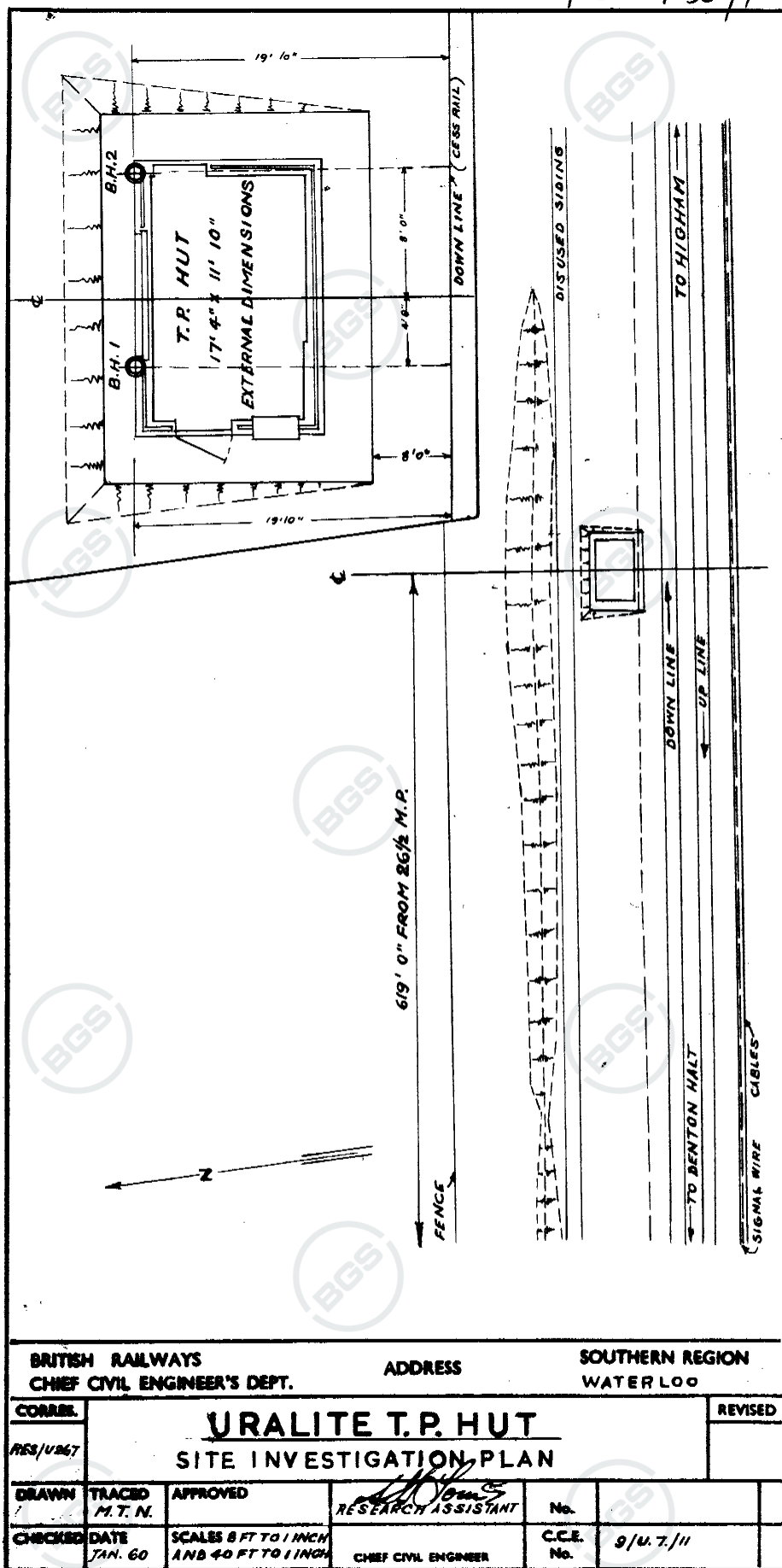
BRITISH RAILWAYS, SOUTHERN REGION,
CHIEF CIVIL ENGINEER'S DEPARTMENT,
WATERLOO STATION, S.E.1.

STRATA	THICKNESS	DEPTH	KEY	WATER LEVELS	SAMPLES	REMARKS
MADE GROUND. SOFT TO FIRM BROWN SILTY CLAY WITH PIECES OF BRICKS					0'-4" 7/45 1'-10" 2'-4" 3'-4" 3'-10" 4'-10" 5'-4" 6'-4"	N = 5 N = 15 N = 13
SOFT GREY-BROWN SILTY CLAY PENETRATED		(1.93m) 6'-4"				
		(2.13m) 7'-0"				
		END OF BOREHOLE				

1 PENETRATION TEST	N. N. OF BLOWS	FOR STANDARD	PENETRATION
☐ UNDISTURBED CORE	FIELD WORK	M.T.N. DATE	SCALE 2 FT. TO 1 IN.
☐ DISTURBED SAMPLE	DRAWN	M.T.N. DEC. 1959	C.C.E. No. 9/U.7/5
☐ WATER SAMPLE	CHECKED		



TQ 67 SE 1



B.R. 90615

TQ67SE / 2
6604, 7425

1st May 1924.

1' 271

BOREHOLE SECTION

TILBURY - GRAVESEND TUNNEL. BH No 6

BORED & COMMUNICATED BY LE GRAND, SUTCLIFF & GELL LTD. Southall.

BORED FOR. Sir Maurice Fitzmaurice, C.M.G., F.R.S., M. Inst. C.E.
9, Victoria Street,
London, S.W.

POSITION OF BORING. On the Gravesend side of the River.

MAPS. 6" Ord. Essex. New 95. 2.47
1" Geo. Old Series. 1.S.E. O.D. OF SITE. 9.76.
1" 271

WATER LEVEL. 11' 0" taken in the evening of 15th. April 1924.

BOREHOLE NO. 6.

<u>STRATA</u>	<u>THICKNESS</u>		<u>DEPTH</u>	
	<u>Ft.</u>	<u>Ins.</u>	<u>Ft.</u>	<u>Ins.</u>
Brown Clay	5	0	5	0
			(1.52m)	
Blue Clay	10	0	15	0
			(4.57m)	
Peat	2	0	17	0
			(5.18m)	
Blue Clay	4	0	21	0
			(6.40m)	
Thames Gravel	15	0	36	0
			(10.97m)	
" Sand	2	0	38	0
			(11.58m)	
Red Gravel	19	0	57	0
			(17.37m)	
Chalk and Flints	x63	0	120	0
			(36.58m)	
	120	0	120	0

LE GRAND, SUTCLIFF & GELL LTD.

Signature :

x Mr. Case measured up this work on completion
and the boring rods gave the depth as being
64.6 for chalk - making the total depth 121' 6"
as stated in his letter to Sir Maurice Fitzmaurice
dated 17th April.

LI/W.

(34) A.H.C.



SECTION OF Gravel AT Gravesend TQ 67SE/2

One inch Map (NS) Six-inch Map 6604.7425

Made by Coode, Vignamice, Wilson & Mitchell Date 1905

Communicated by P. L. A.

HEIGHT ABOVE O.D. 9' 9" WATER LEVEL

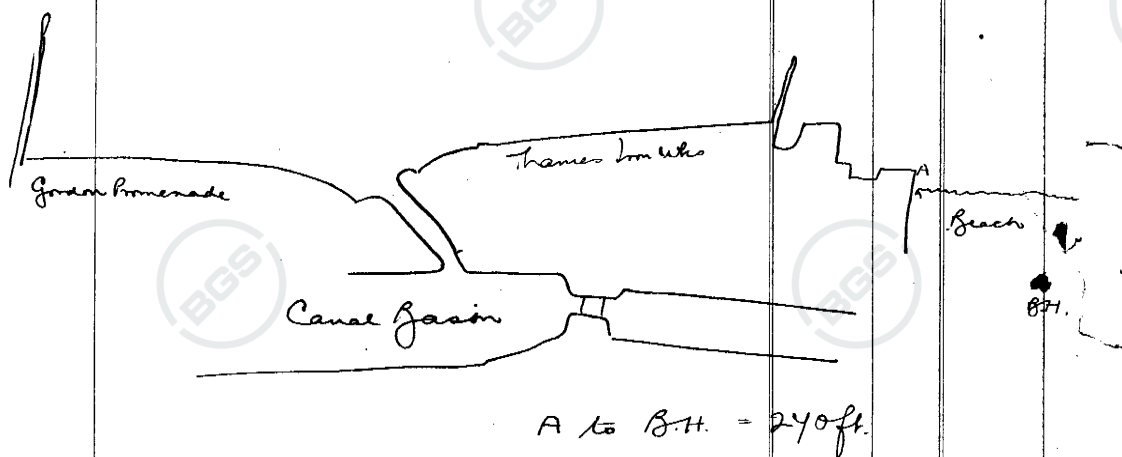
YIELD

271 Misc

Sheet 271

	THICKNESS.		DEPTH.	
	Feet.	Inches.	Feet.	Inches.
Brown Clay	5	—	5	—
Blue Clay	10	—	15	—
Peat	2	—	17	—
Blue clay	4	—	21	—
Thames gravel	15	—	36	—
" sand	2	—	38	—
Red gravel	19	—	57	—
Chalk with flints	64	6	121	6

Site



Confidential



TQ 67 SE 76
6601 7414

HOLST & CO. LTD. SITE INVESTIGATION DEPT. PARKSIDE LANE LEEDS LS115SX.										
Contract No. <u>T3770/F1622</u>		Borehole No. <u>4</u>								
Location <u>Gravesend</u>		Ground Level								
Client <u>Livesey, Handerson & Partners</u>		Date <u>24th July, 1970</u>								
BOREHOLE LOG										
STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	φ deg.	m.c %	γ lb/cu. ft.	N	
MADE GROUND:- Ashes		6"	6"	2'3"						
MADE GROUND:- Clay soil and Bricks		5'9"	5'3"	I						26
Very soft light brown mottled organic silty clay				6'3"	480	0	46.6	109		
			13'9"	11'6"	100	0	31.9	92		
				16'0"	140	0	74.1	90		
		19'6"		21'6"	190	0	79.0	89		
Brown Peat		22'0"	2'6"	I						
Dark grey silt		23'6"	1'6"							
Compact gravel and flints with traces of silt				25'6"						18
			17'6"	30'0"						24
				35'0"						20
				39'6"						26
		41'0"								
Water Struck at <u>8'6"</u>		Maximum Observed Water Level <u>7'6"</u>								
Undisturbed Sample □ Disturbed Sample ○ Water Sample Δ Penetration Test I					c = Cohesion φ = Angle of Internal Friction m.c = Moisture Content γ = Bulk Density N = Standard Penetration Value					
Water levels are subject to seasonal or tidal variation and should not be taken as constant										



TQ 67 SE

77

6604 7420

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

PARKSIDE LANE

LEEDS LS115SX.

Contract No. T3770/F1622

Borehole No. 5

Location Gravesend

Ground Level

Client Livesey, Henderson & Partners

Date 28th July, 1970

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	ϕ deg.	m.c %	y lb/cu. ft.	N
MADE GROUND:- Chalk, clay, brick and wood			2'0"	I					17
		8'0"	8'0"	I					
		8'0"	7'6"	I					3
Loose black silt		11'6"	3'6"	I					
			12'6"	I					1
Very soft dark grey organic silty clay			12'6"	I					
			17'0"	I	160	0	57.0	103	
			22'0"	I	190	0	50.6	97	
		24'0"	2'0"	I					
Brown Peat		26'0"	2'0"	I	300	0	41.5	113	
Loose dark grey silt with occasional pebbles			7'0"	I					3
		33'0"		I					
Compact gravel and flints			8'6"	I					22
			40'0"	I					
		41'6"		I					21

Water Struck at 8'0"

Maximum Observed Water Level 7'6"

Undisturbed Sample ☐
Disturbed Sample ☐
Water Sample
Penetration Test

c = Cohesion
 ϕ = Angle of Internal Friction
m.c = Moisture Content
y = Bulk Density
N = Standard Penetration Value

Water levels are subject to seasonal or tidal variation and should not be taken as constant



TQ 67SE

78

664 7416

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.

PARKSIDE LANE

LEEDS LS155X.

Contract No. T3770/F1622

Borehole No. 6

Location Gravesend

Ground Level

Client Livesey, Henderson & Partners

Date 24th July, 1970

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	ϕ deg.	m.c %	γ lb/cu. ft.	N
MADE GROUND:- Clay, stones, wire, concrete.		7'0"	7'0"	2'0" I					4
Very loose black silt		11'6"	4'6"	7'0" I					1
Very loose dark grey silt		19'6"	8'0"	12'3" I					1
Peat		23'0"	3'6"	17'6" I	120	0	101.0	86	1
Very loose dark grey silt		27'0"	4'0"	20'6" □					2
Peat		29'0"	2'0"	25'0" I					2
Loose gravel and flints with grey silty clay		40'6"	11'6"	29'0" □	260	0	26.4	123	7
				34'0" I					2
				39'0" I					

Water Struck at 7'0"

Maximum Observed Water Level 9'6"

Undisturbed Sample □
Disturbed Sample o
Water Sample Δ
Penetration Test I

c = Cohesion
 ϕ = Angle of Internal Friction
m.c = Moisture Content
 γ = Bulk Density
N = Standard Penetration Value

Water levels are subject to seasonal or tidal variation and should not be taken as constant

7067 SE

79

6620 7414

HOLST & CO. LTD.

SITE INVESTIGATION DEPT.
PARKSIDE LANE
LEEDS LS115SX.

Contract No. T3770/F1622

Location Gravesend

Client Livesey, Henderson & Partners

Borehole No. 7

Ground Level

Date 23rd July, 1970

BOREHOLE LOG

STRATA	Legend	Depth below Ground Level	Thickness of Strata	Type of Sample	c lb/sq. ft.	deg.	m.c %	y lb/cu. ft.	N
MADE GROUND:- Soil & Stones		1'0"	1'0"	3'0"					
MADE GROUND:- Gravel chalk and clay		1'9"	9"	□	1000	0	34.6	107	
Firm dark brown stony clay		3'6"	1'9"	7'0"	560	0	41.8	95	
Firm, light brown mottled silty clay		5'9"	2'3"	□					
Very soft dark grey silty organic clay		14'9"		12'0"	100	0	69.0	83	
				17'6"	260	0	54.5	96	
		20'6"		22'6"	480	0	75.6	73	
Dark brown Peat		23'0"	2'6"	□					
Soft dark grey silty clay		25'0"	2'0"						
Brown peat		26'0"	1'0"	27'6"	200	0	20.6	108	
Soft light grey silt		28'3"	2'3"	□					
Compact sand and gravel with flints			7'9"	32'6"					17
		36'0"		I					
Compact light grey silt		39'0"	3'0"	38'0"	3200	17	10.7	136	
Compact gravel and flints			11'0"	45'0"					25
				I					
				48'6"					18
				I					
		50'0"							

Water Struck at Slight at 7'0" Maximum Observed Water Level 12'9"

Undisturbed Sample □
Disturbed Sample ○
Water Sample △
Penetration Test I

c = Cohesion
φ = Angle of Internal Friction
m.c = Moisture Content
y = Bulk Density
N = Standard Penetration Value

Low tidal variation and should not be taken as constant

Appendix C

CCTV Survey

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Project Name	Project Number	Project Date
1387 - Rayer Construction - Gravesend		4/4/2025

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Project Information

Project Name
1387 - Rayer Construction - Gravesend

Project Number

Project Date
4/4/2025

Client

Company: Rayer Construction
Contact: Steve Southall
Department: Director
Street: Unit 5, Brick Kiln Way
Town or City: Rugeley
County: Staffordshire
Post Code: WS15 1RD
Phone: 01889 579337
Mobile: 07969884367
Email: rayer@hotmail.co.uk



Contractor

Company: RA Utility Solutions
Description: Director
Contact: Joe Ely
Street: Unit D92 Commerce Way
Town or City: Liverpool
County: Merseyside
Post Code: L8 7BA
Phone: 0330 122 0512
Mobile: 07578264121
Email: joe.ely@rautilitysolutions.co.uk



Scoring Summary

Project Name
1387 - Rayer Construction - Gravesend

Project Number

Project Date
4/4/2025

Structural Defects

Item No.	PLR	Grade	Description
All inspected pipes are in an acceptable structural condition (< grade 3).			

Service / Operational Condition

- Grade 3: Best practice suggests consideration should be given to maintenance activities in the medium term.
- Grade 4: Best practice suggests consideration should be given to maintenance activity to avoid potential blockages.
- Grade 5: Best practice suggests that this pipe is at a high risk of backing up or causing flooding.

Item No.	PLR	Grade	Description
1	CP01 LAT BX	3	Settled deposits, coarse, 5% cross-sectional area loss
3	CP01 LAT DX	3	Multiple defects
3	GYF 1X	3	Settled deposits, fine, 5% cross-sectional area loss

Abandoned Surveys

Item No.	PLR	Description
1	CP01X	Survey abandoned
3	CP01 LAT DX	Survey abandoned
3	GYF 1X	Survey abandoned

Information

These scoring summaries are based on the SRM grading from the WRc.

Project Summary

Project Name 1387 - Rayer Construction - Gravesend	Project Number	Project Date 4/4/2025
--	-----------------------	---------------------------------

Pipe Summary

No.	Type	PLR	Upstream Node	Downstream Node	Road	Town	Use	Mat.	Profile	Length
1	SEC	CP01X	CP01	CP01 D/S	Wharf Road	Gravesend	S	VC		8.91 m
2	SEC	CP02 U/SX	CP02 U/S	CP02	Wharf Road	Gravesend	S	VC	Circular 150mm	8.57 m
3	SEC	GYF 1X	GYF 1	MH03	Wharf Road	Gravesend	S	VC		15.19 m
4	LAT	CP01 LAT BX	CP01 LAT B	CP01	Wharf Road	Gravesend	S	VC	Circular 150mm	14.36 m
5	LAT	CP01 LAT CX	CP01 LAT C	CP01	Wharf Road	Gravesend	S	VC	Circular 100mm	8.16 m
6	LAT	CP01 LAT DX	CP01 LAT D	CP01	Wharf Road	Gravesend	S	VC	Circular 150mm	31.21 m
Total:										86.40 m

Pipe Levels

No.	PLR	Upstream Node	Upstream C.L.	Upstream I.L.	Upstream I.D.	Downstream Node	Downstream C.L.	Downstream I.L.	Downstream I.D.
1	CP01X	CP01			0.000 m	CP01 D/S			0.000 m
2	CP02 U/SX	CP02 U/S			0.000 m	CP02			0.000 m
3	GYF 1X	GYF 1			0.000 m	MH03			0.000 m
4	CP01 LAT BX	CP01 LAT B			0.000 m	CP01			0.000 m
5	CP01 LAT CX	CP01 LAT C			0.000 m	CP01			0.000 m
6	CP01 LAT DX	CP01 LAT D			0.000 m	CP01			0.000 m

Pipe Summary by Profile

Profile	Total Length	No. Pipes
	8.91 m 15.19 m	
Unknown =	24.10 m	2
Circular 100mm	8.16 m	
Circular 100mm =	8.16 m	1
Circular 150mm	8.57 m	
Circular 150mm	14.36 m	
Circular 150mm	31.21 m	

Project Summary

Project Name 1387 - Rayer Construction - Gravesend	Project Number	Project Date 4/4/2025
--	-----------------------	---------------------------------

Profile	Total Length	No. Pipes
Circular 150mm =	54.14 m	3
Total =	86.40 m	6

Inspection Summary

Pipe No.	Insp. No.	Upstream Node	Downstream Node	Dir.	Operator	Insp. Date	Insp. Time	Str	Ser	Final Observation	Length
1	1	CP01	CP01 D/S	DS	T.Wall	28/03/2025	0:00	1	1	SA, MH01 SURCHARGED DS CUW UTC	8.91 m
2	1	CP02 U/S	CP02	US	T.Wall	28/03/2025	0:00	1	1	GYF, GYF BURIED GULLY	8.57 m
3	1	GYF 1	MH03	DS	T.Wall	28/03/2025	0:00	1	3	SA, LOST VISUAL CUW	15.19 m
4	1	CP01 LAT B	CP01	US	T.Wall	28/03/2025	0:00	2	3	MHF	14.36 m
5	1	CP01 LAT C	CP01	US	T.Wall	28/03/2025	0:00	1	1	GYF, GYF	8.16 m
Total:											55.19 m

Inspection Summary by Profile

Profile	Total Length	No. Inspections
	8.91 m 15.19 m	
Unknown =	24.10 m	2
Circular 100mm	8.16 m	
Circular 100mm =	8.16 m	1
Circular 150mm	8.57 m	
Circular 150mm	14.36 m	
Circular 150mm =	22.93 m	2
Total =	55.19 m	5

Project Summary

Project Name 1387 - Rayer Construction - Gravesend	Project Number	Project Date 4/4/2025
--	-----------------------	---------------------------------

Defect Summary				CCTV Drainage Survey Observation Count																				
				General				Structural Condition								Service Condition					Misc			
Sect. No.	Insp. No.	Upstream Node	Downstream Node	Insp. Length (m)	No. Grade 4/5 Obs.	Survey Abandoned	Camera Under Water	Cracks	Fractures	Broken	Deformed	Collapsed	Holes	Surface Damage	Displaced Joints	Open Joints	Roots	Infiltration	Encrustation	Silt	Grease	Obstruction	Water Level	Line Deviates
1	1	CP01	CP01 D/S	8.9		1														1			2	
2	1	CP02 U/S	CP02	8.6																			3	
3	1	GYF 1	MH03	15.2		1	1													1			5	
4	1	CP01 LAT B	CP01	14.4			2	2															3	
5	1	CP01 LAT C	CP01	8.2																			1	
Total:				55.2		2	3	2												2			14	

Section Profile - 3/28/2025 - CP01X

Project Name
1387 - Rayer Construction - Gravesend

Project Number

Project Date
4/4/2025

Circular, 100 mm, 0 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
3	GYF 1	MH03	3/28/2025	WHARF ROAD	Vitrified clay	15.19 m	15.19 m

Total: 1 Inspection x Circular 100 mm, 0 mm = 15.19 m Total Length and 15.19 m Inspected Length

Circular, 150 mm, 0 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
1	CP01	CP01 D/S	3/28/2025	WHARF ROAD	Vitrified clay	8.91 m	8.91 m
2	CP02 U/S	CP02	3/28/2025	WHARF ROAD	Vitrified clay	8.57 m	8.57 m

Total: 2 Inspections x Circular 150 mm, 0 mm = 17.48 m Total Length and 17.48 m Inspected Length

Total: 3 Inspections = 32.67 m Total Length and 32.67 m Inspected Length

Section Summary

Project Name 1387 - Rayer Construction - Gravesend	Project Number	Project Date 4/4/2025
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Number of sections	3
Total length of sections	32.67 m
Total length of inspected sections	32.67 m
Total length of not inspected sections	0.00 m
Number of abandoned inspections	2
Number of section inspection photos	20
Number of section inspection videos	3
Number of section inspection scans	0
Number of section inclination measurements	0

PLR:	CP01X	Upstream Node:	CP01
Inspection Direction:	Downstream	Downstream Node:	CP01 D/S
Inspected Length:	8.91 m	Dia/Height:	150 mm
Total Length:	8.91 m	Material:	Vitrified clay

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP01
2	0.00	WL	Water level, 0% of the vertical dimension
3	0.73	WL	Water level, 5% of the vertical dimension
4	5.65	DES	Settled deposits, fine, 5% cross-sectional area loss, start
5	8.75	CUD	Loss of vision, silt, start
6	8.91	SA	Survey abandoned

PLR:	CP02 U/SX	Upstream Node:	CP02 U/S
Inspection Direction:	Upstream	Downstream Node:	CP02
Inspected Length:	8.57 m	Dia/Height:	150 mm
Total Length:	8.57 m	Material:	Vitrified clay

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP02 U/S
2	0.00	WL	Water level, 0% of the vertical dimension
3	3.18	WL	Water level, 5% of the vertical dimension
4	4.15	WL	Water level, 0% of the vertical dimension
5	8.57	GYF	Finish node, gully, reference: CP02

PLR:	GYF 1X	Upstream Node:	GYF 1
Inspection Direction:	Downstream	Downstream Node:	MH03
Inspected Length:	15.19 m	Dia/Height:	100 mm
Total Length:	15.19 m	Material:	Vitrified clay

Section Summary

Project Name 1387 - Rayer Construction - Gravesend	Project Number	Project Date 4/4/2025
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No.	m+	Code	Observation
1	0.00	GY	Start node, gully, reference: GYF 1
2	0.00	WL	Water level, 0% of the vertical dimension
3	5.08	DES	Settled deposits, fine, 5% cross-sectional area loss
4	5.55	WL	Water level, 10% of the vertical dimension
5	6.21	WL	Water level, 10% of the vertical dimension
6	13.17	WL	Water level, 5% of the vertical dimension
7	13.97	WL	Water level, 10% of the vertical dimension
8	14.27	CUW	Loss of vision, camera under water, start
9	15.19	SA	Survey abandoned

PLR:	CP01 LAT BX	Upstream Node:	CP01 LAT B
Inspection Direction:	Upstream	Downstream Node:	CP01
Inspected Length:	14.36 m	Dia/Height:	150 mm
Total Length:	14.36 m	Material:	Vitrified clay

No.	m+	Code	Observation
1	0.04	CP	Start node, catchpit, reference: CP01 LAT B
2	0.04	WL	Water level, 0% of the vertical dimension
3	0.04	DER	Settled deposits, coarse, 5% cross-sectional area loss
4	0.83	CCJ	Crack, circumferential at joint from 12 o'clock to 2 o'clock
5	0.83	CCJ	Crack, circumferential at joint from 7 o'clock to 12 o'clock
6	1.05	WL	Water level, 5% of the vertical dimension
7	1.52	CUW	Loss of vision, camera under water, start
8	2.90	WL	Water level, 0% of the vertical dimension
9	2.90	CUW	Loss of vision, camera under water, finish
10	14.36	MHF	Finish node, manhole, reference: CP01 - CP02

PLR:	CP01 LAT CX	Upstream Node:	CP01 LAT C
Inspection Direction:	Upstream	Downstream Node:	CP01
Inspected Length:	8.16 m	Dia/Height:	100 mm
Total Length:	8.16 m	Material:	Vitrified clay

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP01 LAT C
2	0.00	WL	Water level, 0% of the vertical dimension
3	8.16	GYF	Finish node, gully, reference: CP01

PLR:	CP01 LAT DX	Upstream Node:	CP01 LAT D
Inspection Direction:	Upstream	Downstream Node:	CP01
Inspected Length:	31.21 m	Dia/Height:	150 mm
Total Length:	31.21 m	Material:	Vitrified clay

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: CP01 LAT D
2	0.00	WL	Water level, 5% of the vertical dimension
3	1.09	DEE	Attached deposits, encrustation from 10 o'clock to 1 o'clock, 5% cross-sectional area loss
4	1.09	DEE	Attached deposits, encrustation from 3 o'clock to 4 o'clock, 5% cross-sectional area loss
5	3.81	WL	Water level, 10% of the vertical dimension

Section Summary

Project Name 1387 - Rayer Construction - Gravesend	Project Number	Project Date 4/4/2025
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No.	m+	Code	Observation
6	7.71	JN	Junction at 10 o'clock, 100mm dia
7	14.94	WL	Water level, 0% of the vertical dimension
8	17.29	WL	Water level, 5% of the vertical dimension
9	22.82	DER	Settled deposits, coarse, 5% cross-sectional area loss
10	23.15	JN	Junction at 10 o'clock, 100mm dia
11	24.44	WL	Water level, 0% of the vertical dimension
12	29.46	WL	Water level, 5% of the vertical dimension
13	30.49	WL	Water level, 10% of the vertical dimension
14	31.19	SA	Survey abandoned
15	31.21	CUW	Loss of vision, camera under water, start

Lateral Profile - 3/28/2025 - CP01 LAT BX

Project Name
1387 - Rayer Construction - Gravesend

Project Number

Project Date
4/4/2025

Circular, 100 mm, 0 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
2	CP01 LAT C	CP01	3/28/2025	WHARF ROAD	Vitrified clay	8.16 m	8.16 m

Total: 1 Lateral x Circular 100 mm, 0 mm = 8.16 m Total Length and 8.16 m Inspected Length

Circular, 150 mm, 0 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
1	CP01 LAT B	CP01	3/28/2025	WHARF ROAD	Vitrified clay	14.36 m	14.36 m

Total: 1 Lateral x Circular 150 mm, 0 mm = 14.36 m Total Length and 14.36 m Inspected Length

Total: 2 Laterals = 22.52 m Total Length and 22.52 m Inspected Length

Node Profile

Project Name
1387 - Rayer Construction - Gravesend

Project Number

Project Date
4/4/2025

Catchpits

Node No.	Node ID	Town or Village	Road	Node Depth	Date
2	CP01		Wharf Road	1.290 m	3/28/2025
4	CP03		Wharf Road		3/28/2025
10	CP02		Wharf Road	1.290 m	3/28/2025

Total: 3 Catchpits

Manholes

Node No.	Node ID	Town or Village	Road	Node Depth	Date
6	MH02		Wharf Road	2.010 m	3/28/2025
7	MH01		Wharf Road	1.900 m	3/28/2025
12	MH03		Wharf Road		3/28/2025

Total: 3 Manholes

Total: 6 Nodes

Abandoned section inspection



Item No. 1	Insp. No. 1	Date 28/03/25	Time 12:58	Client's Job Ref GRAVESEND	Weather No Rain Or Snow	Pre Cleaned Yes	PLR CP01X
Operator T.WALL		Vehicle Not Specified		Camera Not Specified	Preset Length Not Specified	Legal Status Not Specified	Alternative ID 1

Town or Village:	Gravesend	Inspection Direction:	Downstream	Upstream Node:	CP01
Road:	Wharf Road	Inspected Length:	8.91 m	Upstream Pipe Depth:	
Location:	Property or buildings	Total Length:	8.91 m	Downstream Node:	CP01 D/S
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	150 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Sample condition survey	Lining Material:	No Lining		

Comments:

Recommendations:

Scale:1:78

Position [m]

Code

Observation

MPEG

Photo

Grade

Depth: m

CP01

Section Pictures - 3/28/2025 - CP01X

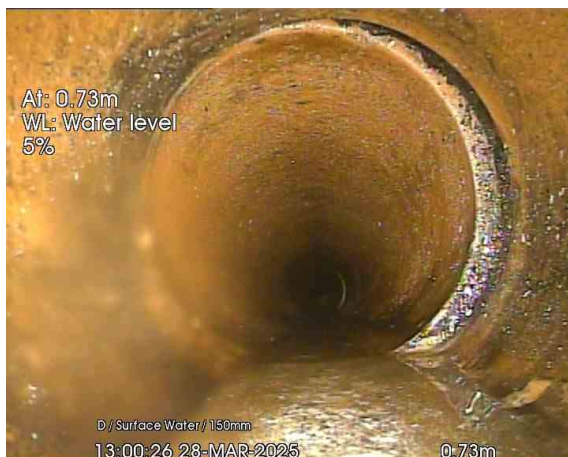
Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
1	Downstream	CP01X	GRAVESEND	



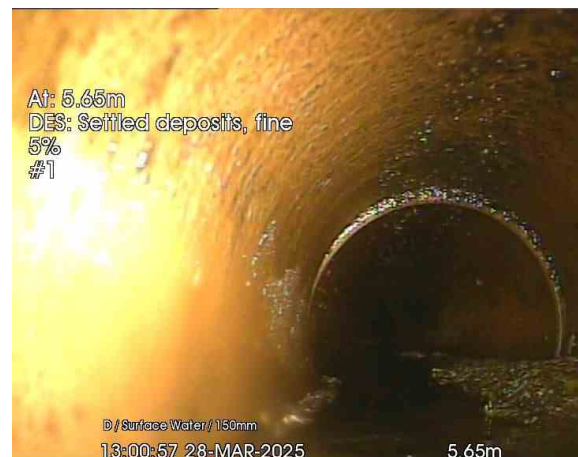
CP01 DS_0-00m_125959.jpg, 00:00:00, 0.00 m
Start node, catchpit, reference: CP01



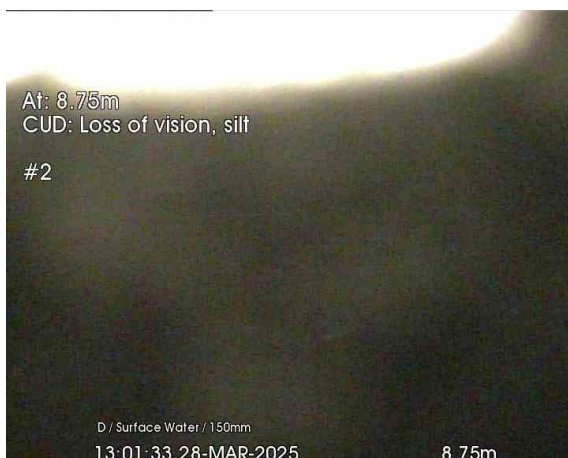
CP01 DS_0-00m_130009.jpg, 00:00:03, 0.00 m
Water level, 0% of the vertical dimension



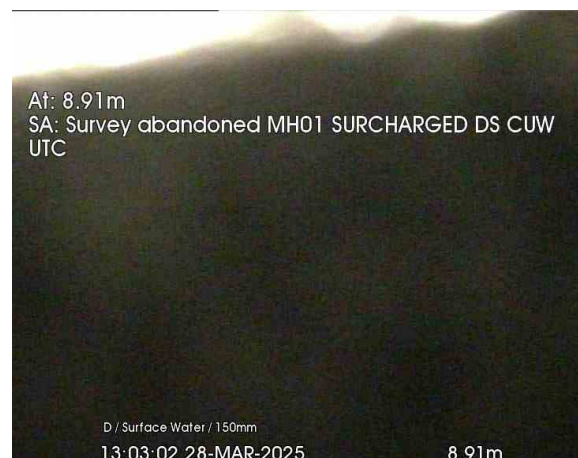
CP01 DS_0-73m_130026.jpg, 00:00:12, 0.73 m
Water Level, 5% of the vertical dimension



CP01 DS_5-65m_130057.jpg, 00:00:29, 5.65 m
Settled deposits, fine, 5% cross-sectional area loss, start



CP01 DS_8-75m_130133.jpg, 00:00:45, 8.75 m
Loss of vision, silt, start



CP01 DS_8-91m_130302.jpg, 00:00:54, 8.91 m
Survey abandoned, MH01 SURCHARGED DS CUW UTC

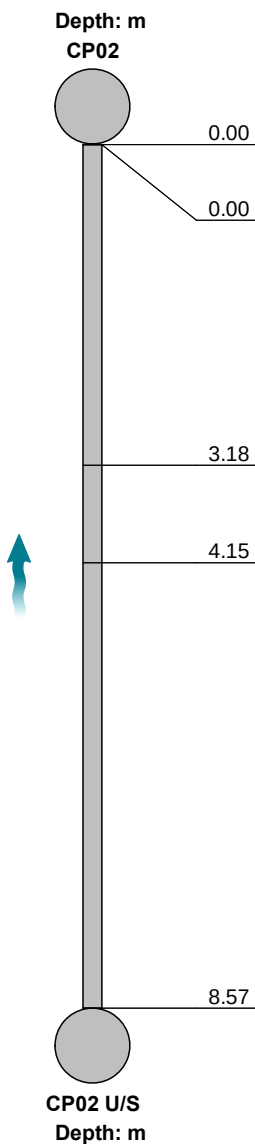
Completed section inspection



Item No. 2	Insp. No. 1	Date 28/03/25	Time 12:05	Client's Job Ref GRAVESEND	Weather No Rain Or Snow	Pre Cleaned Yes	PLR CP02 U/SX
Operator T.WALL		Vehicle Not Specified		Camera Not Specified	Preset Length Not Specified	Legal Status Not Specified	Alternative ID 1

Town or Village:	Gravesend	Inspection Direction:	Upstream	Upstream Node:	CP02 U/S
Road:	Wharf Road	Inspected Length:	8.57 m	Upstream Pipe Depth:	
Location:	Property or buildings	Total Length:	8.57 m	Downstream Node:	CP02
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	150 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Sample condition survey	Lining Material:	No Lining		

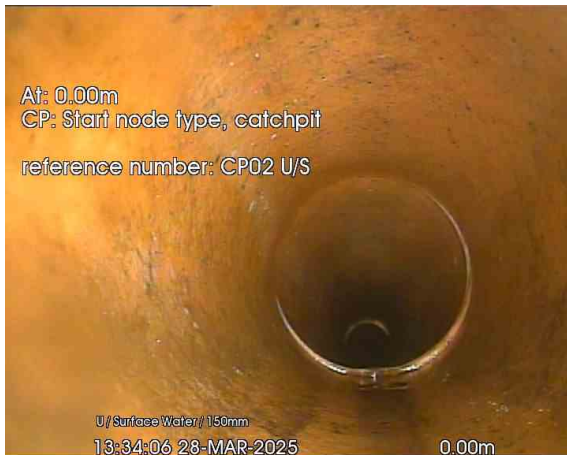
Comments:
Recommendations:

Scale:	1:75	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m CP02 							
	0.00	CP	Start node, catchpit, reference: CP02 U/S	00:00:01			
	0.00	WL	Water level, 0% of the vertical dimension	00:00:04			
	3.18	WL	Water level, 5% of the vertical dimension	00:00:16			
	4.15	WL	Water level, 0% of the vertical dimension	00:00:21			
	8.57	GYF	Finish node, gully, reference: CP02: GYF BURIED GULLY	00:00:45			
CP02 U/S Depth: m							

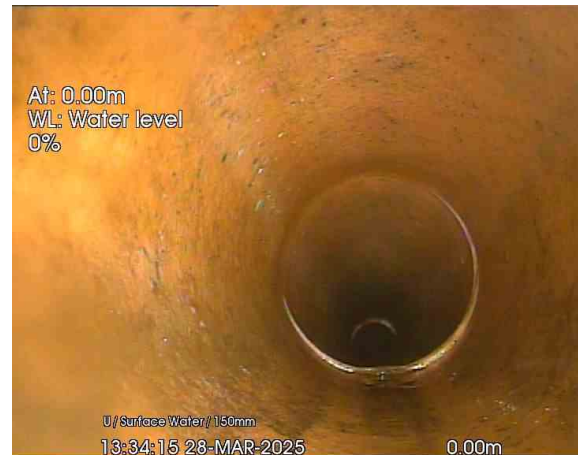
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

Section Pictures - 3/28/2025 - CP02 U/SX

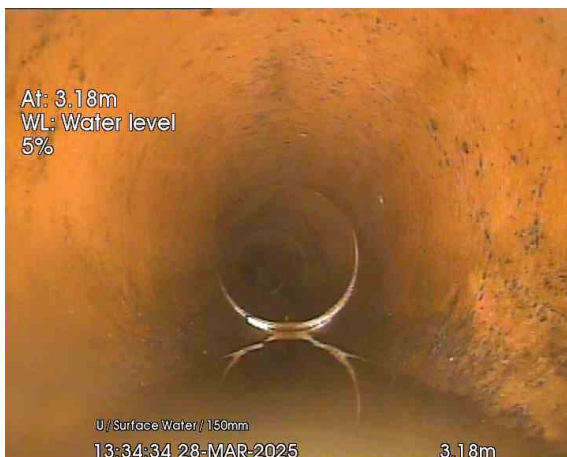
Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
2	Upstream	CP02 U/SX	GRAVESEND	



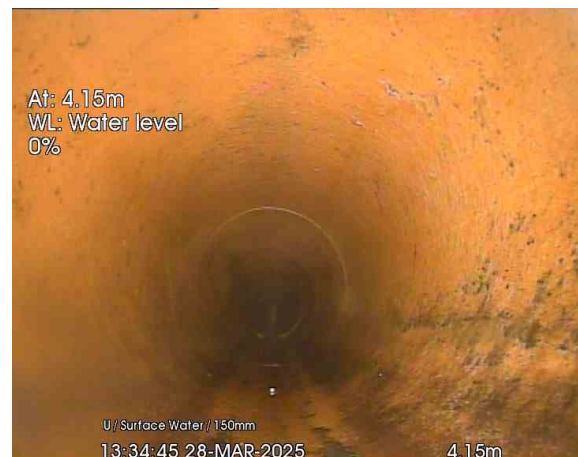
CP02 US_0-00m_133406.jpg, 00:00:01, 0.00 m
Start node, catchpit, reference: CP02 U/S



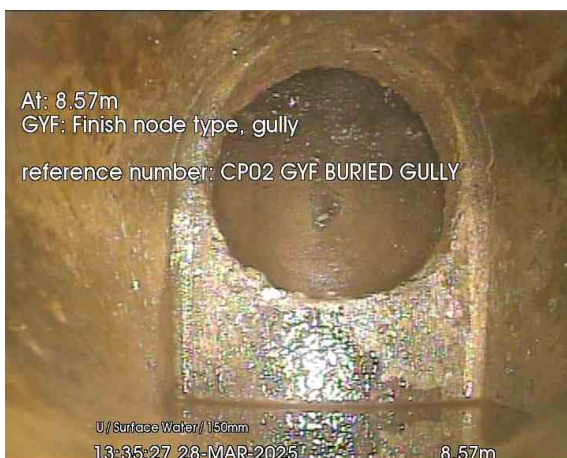
CP02 US_0-00m_133415.jpg, 00:00:04, 0.00 m
Water level, 0% of the vertical dimension



CP02 US_3-18m_133434.jpg, 00:00:16, 3.18 m
Water level, 5% of the vertical dimension



CP02 US_4-15m_133445.jpg, 00:00:21, 4.15 m
Water level, 0% of the vertical dimension



CP02 US_8-57m_133527.jpg, 00:00:45, 8.57 m
Finish node, gully, reference: CP02, GYF BURIED GULLY

Abandoned section inspection



Item No. 3	Insp. No. 1	Date 28/03/25	Time 15:10	Client's Job Ref GRAVESEND	Weather No Rain Or Snow	Pre Cleaned Yes	PLR GYF 1X
Operator T.WALL		Vehicle Not Specified		Camera Not Specified	Preset Length Not Specified	Legal Status Not Specified	Alternative ID 1

Town or Village:	Gravesend	Inspection Direction:	Downstream	Upstream Node:	GYF 1
Road:	Wharf Road	Inspected Length:	15.19 m	Upstream Pipe Depth:	
Location:	Property or buildings	Total Length:	15.19 m	Downstream Node:	MH03
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	100 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Sample condition survey	Lining Material:	No Lining		

Comments:
Recommendations:

Scale: 1:132

Position [m]

Code

Observation

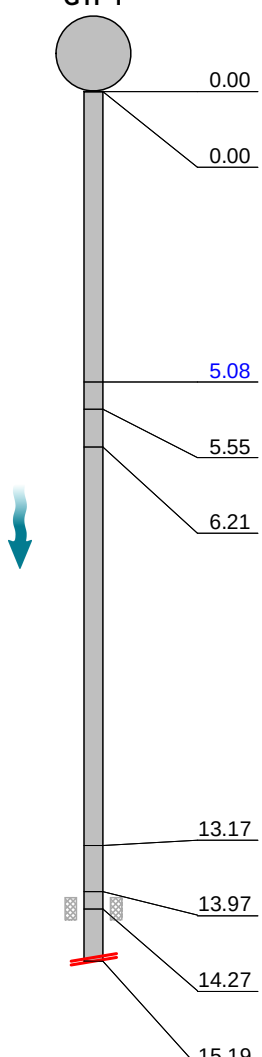
MPEG

Photo

Grade

Depth: m

GYF 1



0.00	GY	Start node, gully, reference: GYF 1	00:00:02			
0.00	WL	Water level, 0% of the vertical dimension	00:00:04			
5.08	DES	Settled deposits, fine, 5% cross-sectional area loss	00:00:19			3
5.55	WL	Water level, 10% of the vertical dimension	00:00:23			
6.21	WL	Water level, 10% of the vertical dimension	00:00:28			
13.17	WL	Water level, 5% of the vertical dimension	00:00:50			
13.97	WL	Water level, 10% of the vertical dimension	00:00:57			
14.27	S01	CUW	Loss of vision, camera under water, start	00:01:02		
15.19	SA	Survey abandoned: LOST VISUAL CUW	00:01:10			

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	1	2.0	0.1	2.0	3.0

Section Pictures - 3/28/2025 - GYF 1X

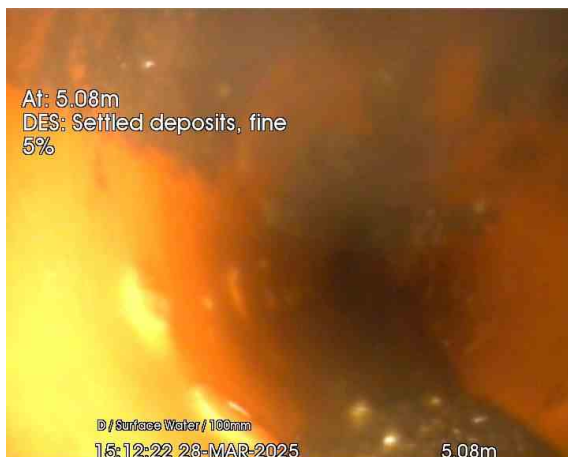
Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Downstream	GYF 1X	GRAVESEND	



GYF 1_0-00m_151148.jpg, 00:00:02, 0.00 m
Start node, gully, reference: GYF 1



GYF 1_0-00m_151156.jpg, 00:00:04, 0.00 m
Water level, 0% of the vertical dimension



GYF 1_5-08m_151222.jpg, 00:00:19, 5.08 m
Settled deposits, fine, 5% cross-sectional area loss



GYF 1_5-55m_151232.jpg, 00:00:23, 5.55 m
Water level, 10% of the vertical dimension



GYF 1_6-21m_151244.jpg, 00:00:28, 6.21 m
Water level, 10% of the vertical dimension



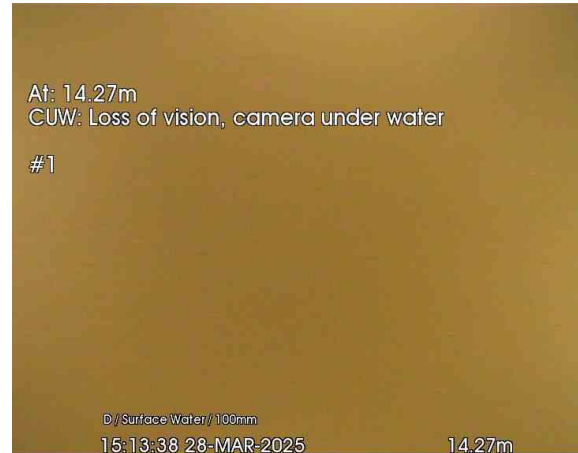
GYF 1_13-17m_151311.jpg, 00:00:50, 13.17 m
Water level, 5% of the vertical dimension

Section Pictures - 3/28/2025 - GYF 1X

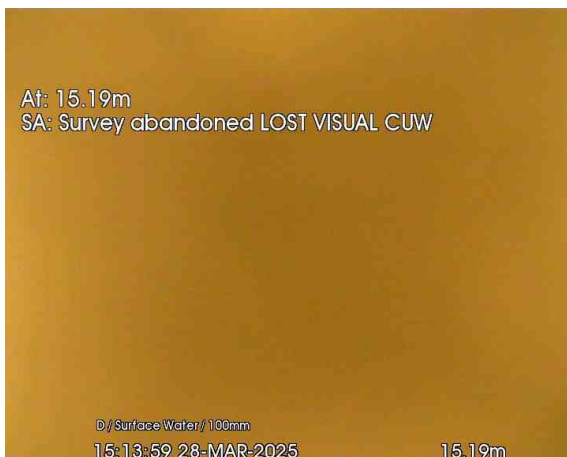
Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Downstream	GYF 1X	GRAVESEND	



GYF 1_13-97m_151324.jpg, 00:00:57, 13.97 m
 Water level, 10% of the vertical dimension



GYF 1_14-27m_151338.jpg, 00:01:02, 14.27 m
 Loss of vision, camera under water, start



GYF 1_15-19m_151359.jpg, 00:01:10, 15.19 m
 Survey abandoned, LOST VISUAL CUW

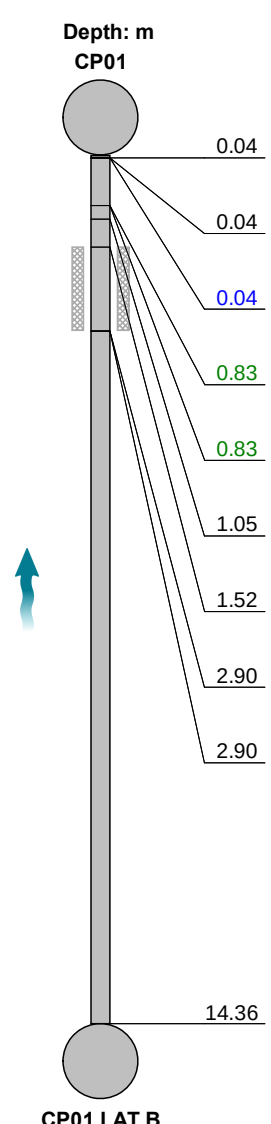
Completed section inspection



Item No. 1	Insp. No. 1	Date 28/03/25	Time 10:15	Client's Job Ref GRAVESEND	Weather No Rain Or Snow	Pre Cleaned Yes	PLR CP01 LAT BX
Operator T.WALL		Vehicle Not Specified		Camera Not Specified	Preset Length Not Specified	Legal Status Not Specified	Alternative ID 1

Town or Village:	Gravesend	Inspection Direction:	Upstream	Upstream Node:	CP01 LAT B
Road:	Wharf Road	Inspected Length:	14.36 m	Upstream Pipe Depth:	
Location:	Property or buildings	Total Length:	14.36 m	Downstream Node:	CP01
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	150 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Sample condition survey	Lining Material:	No Lining		

Comments:
Recommendations:

Scale: 1:125	Position [m]	Code	Observation	MPEG	Photo	Grade
						
	0.04	CP	Start node, catchpit, reference: CP01 LAT B	00:00:00		
	0.04	WL	Water level, 0% of the vertical dimension	00:00:03		
	0.04	DER	Settled deposits, coarse, 5% cross-sectional area loss	00:00:05		3
	0.83	CCJ	Crack, circumferential at joint from 12 o'clock to 2 o'clock	00:00:34		2 / 2
	0.83	CCJ	Crack, circumferential at joint from 7 o'clock to 12 o'clock	00:00:37		2 / 2
	1.05	WL	Water level, 5% of the vertical dimension	00:00:43		
	1.52 S01	CUW	Loss of vision, camera under water, start	00:00:48		
	2.90	WL	Water level, 0% of the vertical dimension	00:01:04		
	2.90 F01	CUW	Loss of vision, camera under water, finish	00:01:07		
	14.36	MHF	Finish node, manhole, reference: CP01 - CP02	00:01:52		

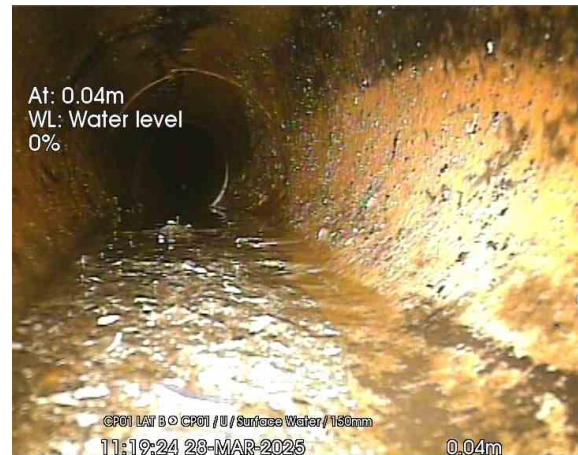
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
2	20.0	1.4	20.0	2.0	3	2.0	0.3	4.0	3.0

Section Pictures - 3/28/2025 - CP01 LAT BX

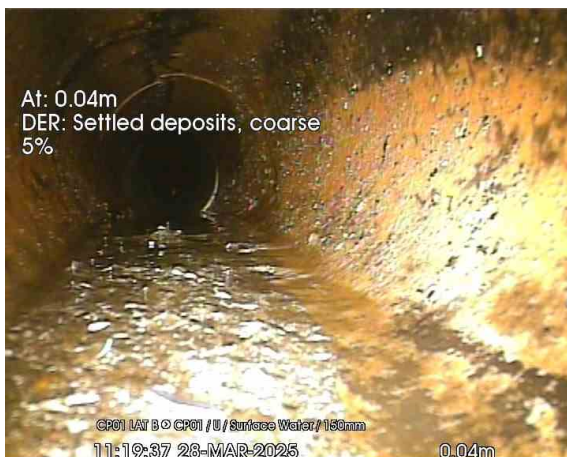
Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
1	Upstream	CP01 LAT BX	GRAVESEND	



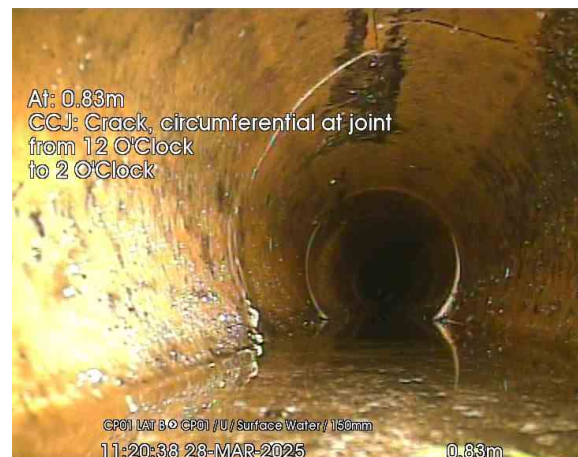
CP01 LAT B_0-04m_111914.jpg, 00:00:00, 0.04 m
Start node, catchpit, reference: CP01 LAT B



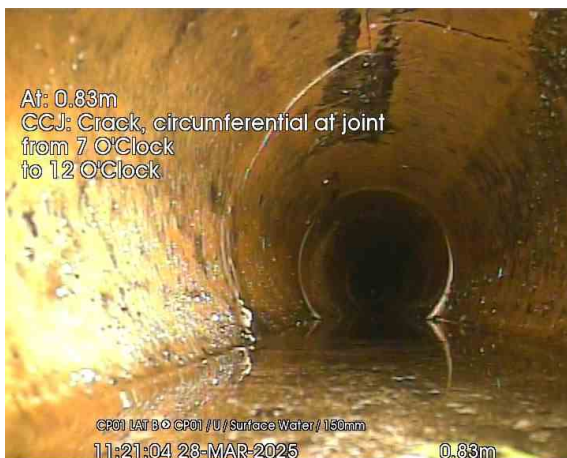
CP01 LAT B_0-04m_111924.jpg, 00:00:03, 0.04 m
Water level, 0% of the vertical dimension



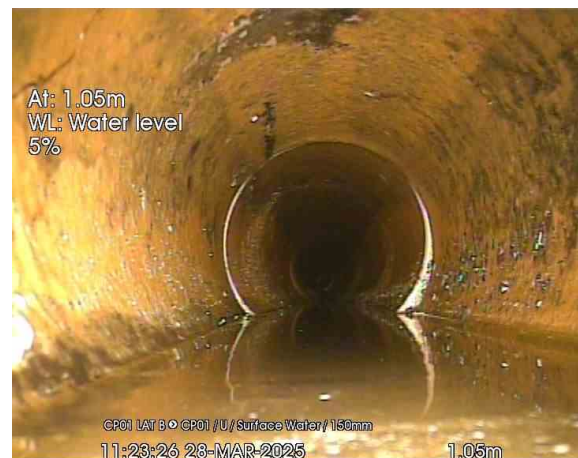
CP01 LAT B_0-04m_111937.jpg, 00:00:05, 0.04 m
Settled deposits, coarse, 5% cross-sectional area loss



CP01 LAT B_0-83m_112038.jpg, 00:00:34, 0.83 m
Crack, circumferential at joint from 12 o'clock to 2 o'clock



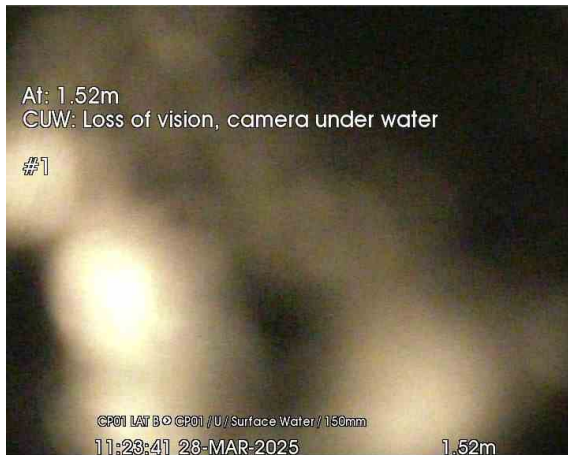
CP01 LAT B_0-83m_112104.jpg, 00:00:37, 0.83 m
Crack, circumferential at joint from 7 o'clock to 12 o'clock



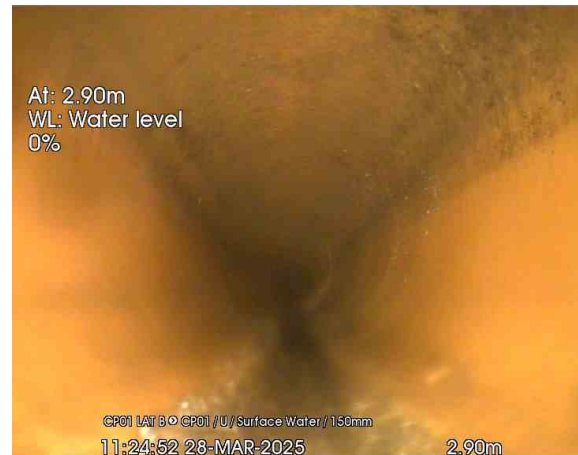
CP01 LAT B_1-05m_112326.jpg, 00:00:43, 1.05 m
Water level, 5% of the vertical dimension

Section Pictures - 3/28/2025 - CP01 LAT BX

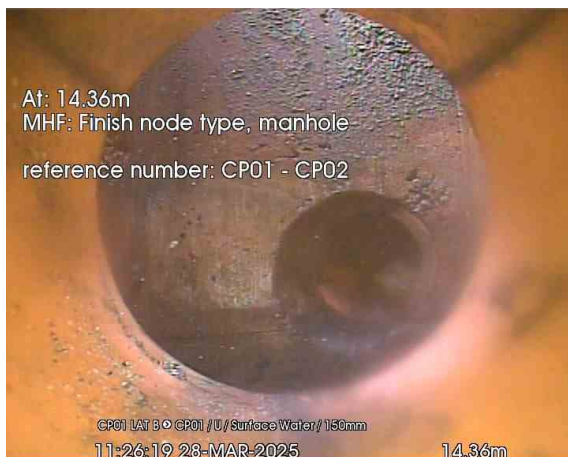
Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
1	Upstream	CP01 LAT BX	GRAVESEND	



CP01 LAT B_1-52m_112341.jpg, 00:00:48, 1.52 m
 Loss of vision, camera under water, start



CP01 LAT B_2-90m_112452.jpg, 00:01:04, 2.90 m
 Water level, 0% of the vertical dimension



CP01 LAT B_14-36m_112619.jpg, 00:01:52, 14.36 m
 Finish node, manhole, reference: CP01 - CP02

Completed section inspection



Item No. 2	Insp. No. 1	Date 28/03/25	Time 10:36	Client's Job Ref GRAVESEND	Weather No Rain Or Snow	Pre Cleaned Yes	PLR CP01 LAT CX
Operator T.WALL		Vehicle Not Specified		Camera Not Specified	Preset Length Not Specified	Legal Status Not Specified	Alternative ID 1

Town or Village:	Gravesend	Inspection Direction:	Upstream	Upstream Node:	CP01 LAT C
Road:	Wharf Road	Inspected Length:	8.16 m	Upstream Pipe Depth:	
Location:	Property or buildings	Total Length:	8.16 m	Downstream Node:	CP01
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	100 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Sample condition survey	Lining Material:	No Lining		

Comments:

Recommendations:

Scale: 1:71 Position [m] Code Observation MPEG Photo Grade

Depth: m
CP01



0.00

CP

Start node, catchpit, reference: CP01 LAT C

00:00:00

0.00

WL

Water level, 0% of the vertical dimension

00:00:02

8.16

GYF

Finish node, gully, reference: CP01: GYF

00:01:19

CP01 LAT C
Depth: m

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

Section Pictures - 3/28/2025 - CP01 LAT CX

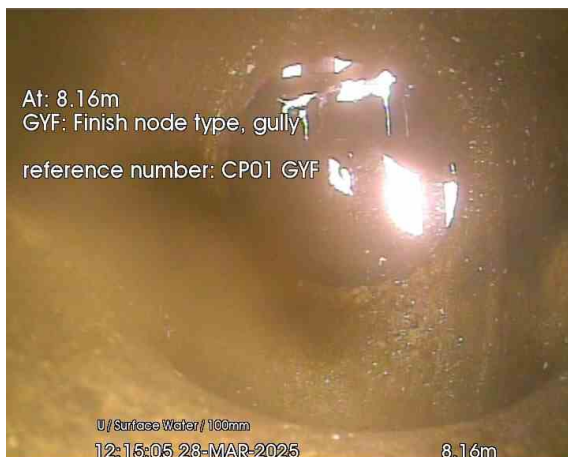
Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
2	Upstream	CP01 LAT CX	GRAVESEND	



CP01 LAT C_0-00m_121315.jpg, 00:00:00, 0.00 m
 Start node, catchpit, reference: CP01 LAT C



CP01 LAT C_0-00m_121325.jpg, 00:00:02, 0.00 m
 Water level, 0% of the vertical dimension



CP01 LAT C_8-16m_121505.jpg, 00:01:19, 8.16 m
 Finish node, gully, reference: CP01, GYF

Combined section inspection



Item No. 3	Insp. No. 1	Date 28/03/25	Time 10:33	Client's Job Ref GRAVESEND	Weather No Rain Or Snow	Pre Cleaned Yes	PLR CP01 LAT DX
Operator T.WALL		Vehicle Not Specified		Camera Not Specified	Preset Length Not Specified	Legal Status Not Specified	Alternative ID 1

Town or Village:	Gravesend	Inspection Direction:	Upstream	Upstream Node:	CP01 LAT D
Road:	Wharf Road	Inspected Length:	31.21 m	Upstream Pipe Depth:	
Location:	Property or buildings	Total Length:	31.21 m	Downstream Node:	CP01
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	150 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Sample condition survey	Lining Material:	No Lining		

Comments:
Recommendations:

Scale:	1:271	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m CP01 <							

Section Pictures - 3/28/2025 - CP01 LAT DX

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	CP01 LAT DX	GRAVESEND	



CP01 LAT D_0-00m_123452.jpg, 00:00:00, 0.00 m
 Start node, catchpit, reference: CP01 LAT D



CP01 LAT D_0-00m_123500.jpg, 00:00:02, 0.00 m
 Water level, 5% of the vertical dimension



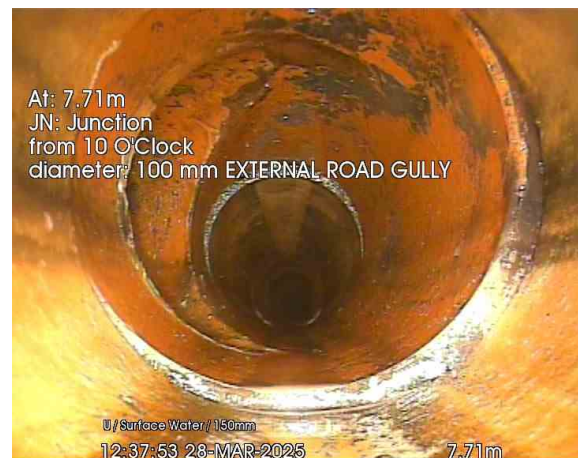
CP01 LAT D_1-09m_123601.jpg, 00:00:29, 1.09 m
 Attached deposits, encrustation from 10 o'clock to 1 o'clock, 5% cross-sectional area loss



CP01 LAT D_1-09m_123615.jpg, 00:00:31, 1.09 m
 Attached deposits, encrustation from 3 o'clock to 4 o'clock, 5% cross-sectional area loss



CP01 LAT D_3-81m_123635.jpg, 00:00:44, 3.81 m
 Water level, 10% of the vertical dimension



CP01 LAT D_7-71m_123753.jpg, 00:01:09, 7.71 m
 Junction at 10 o'clock, 100mm dia, EXTERNAL ROAD GULLY

Section Pictures - 3/28/2025 - CP01 LAT DX

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	CP01 LAT DX	GRAVESEND	



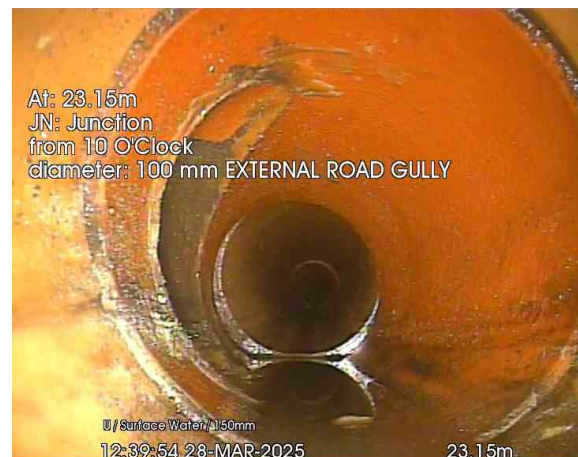
CP01 LAT D_14-94m_123822.jpg, 00:01:32, 14.94 m
Water level, 0% of the vertical dimension



CP01 LAT D_17-29m_123836.jpg, 00:01:40, 17.29 m
Water level, 5% of the vertical dimension



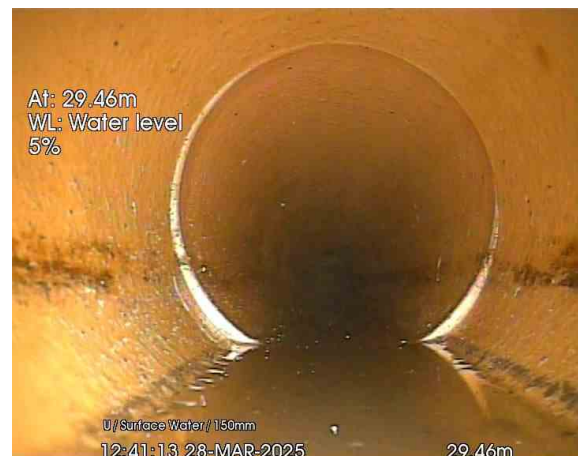
CP01 LAT D_22-82m_123907.jpg, 00:02:02, 22.82 m
Settled deposits, coarse, 5% cross-sectional area loss



CP01 LAT D_23-15m_123954.jpg, 00:02:31, 23.15 m
Junction at 10 o'clock, 100mm dia, EXTERNAL ROAD GULLY



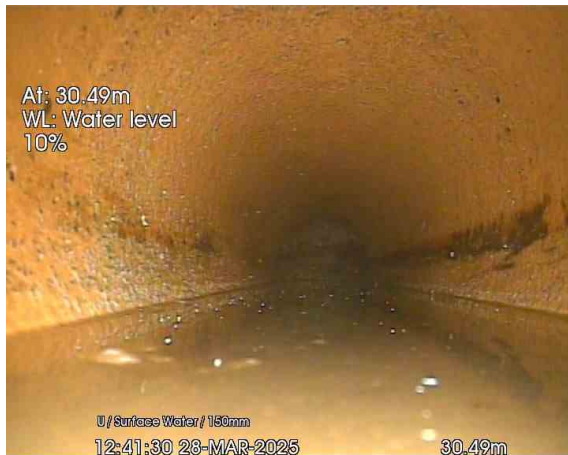
CP01 LAT D_24-44m_124012.jpg, 00:02:42, 24.44 m
Water level, 0% of the vertical dimension



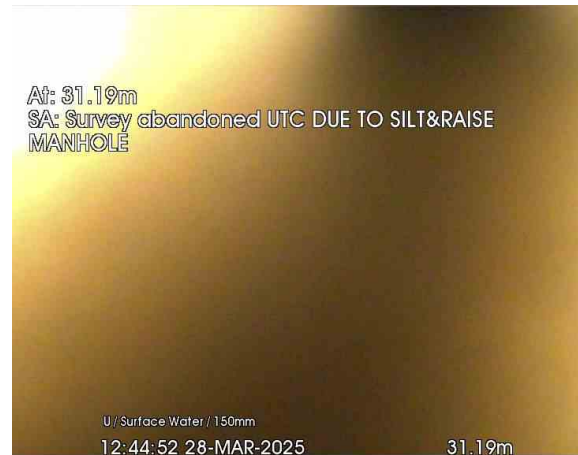
CP01 LAT D_29-46m_124113.jpg, 00:03:14, 29.46 m
Water level, 5% of the vertical dimension

Section Pictures - 3/28/2025 - CP01 LAT DX

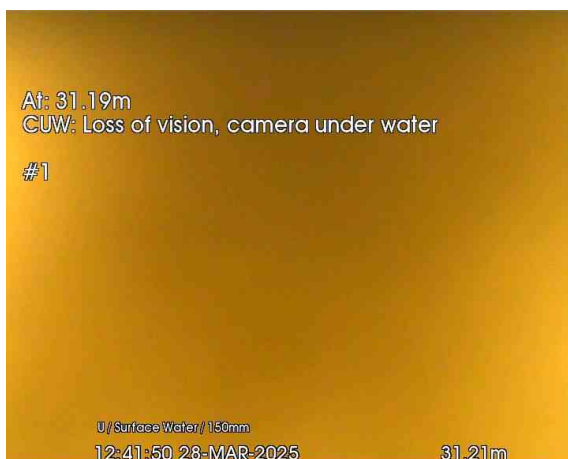
Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Upstream	CP01 LAT DX	GRAVESEND	



CP01 LAT D_30-49m_124130.jpg, 00:03:25, 30.49 m
 Water level, 10% of the vertical dimension



CP01 LAT D_31-19m_124452.jpg, 00:03:51, 31.19 m
 Survey abandoned, UTC DUE TO SILT&RAISE MANHOLE



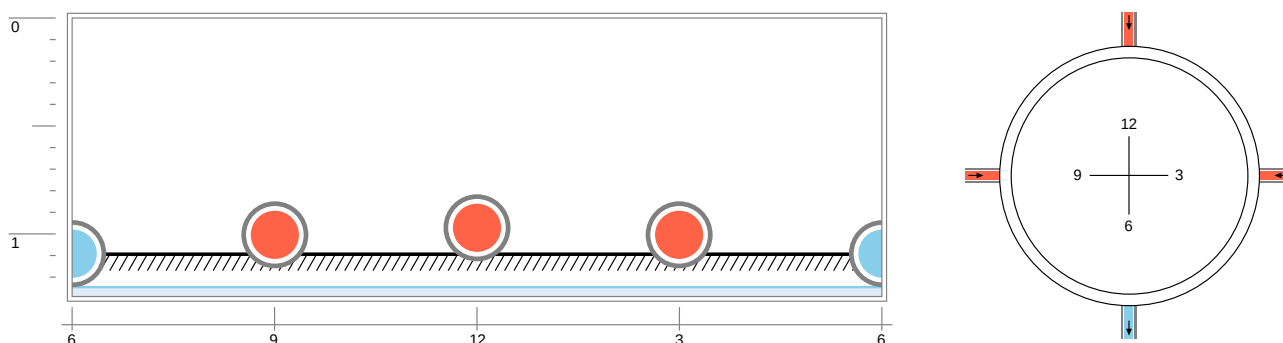
CP01 LAT D_31-21m_124150.jpg, 00:03:35, 31.21 m
 Loss of vision, camera under water, start

Node Report



Node ID CP01	Alternative ID Not Specified	Date 28/03/2025	Node Type Catchpit	Year Constructed Not Specified	Use Surface Water
Operator Not Specified	Vehicle Not Specified	Client's Job Ref Not Specified	Contractor's Job Ref Not Specified	Node Depth 1.290 m	Criticality Not Specified

Node Schematic



General Node Information

Road:	Wharf Road	Land Ownership:	
Town or Village:		Node Ownership:	Private
Division or District:	Gravesend	Easting:	
Drainage Area:		Northing:	
Location:		Cover Level:	

General Node Inspection Information

Weather:		Vertical Ref.:	Cover point
Temperature:		Circular Ref.:	6 o'clock
Sheet Number:		Inspection Method:	
Status:		Surcharge Level:	
Flow Control:		Inspection Purpose:	
Cover Shape:	Rectangular	Cover Duty:	Medium
Material:		Construction Style:	
Comments:			
Recommendations:			

Observations

No.	Depth	Code	Observation	Remarks
1	0.00 m	REM	Picture	
2	0.00 m	REM	Picture	
3	0.00 m	REM	Picture	
4	0.00 m	REM	Picture	
5	0.00 m	REM	Picture	

Node Report



Node ID CP01	Alternative ID Not Specified	Date 28/03/2025	Node Type Catchpit	Year Constructed Not Specified	Use Surface Water
Operator Not Specified	Vehicle Not Specified	Client's Job Ref Not Specified	Contractor's Job Ref Not Specified	Node Depth 1.290 m	Criticality Not Specified

Inlets & Outlets

No.	Clock	Depth	Type	Shape	Material	Dia/Height	Width	Pipe ID	Remarks
	3	1.160 m	Inlet	Circular	Vitrified clay	150 mm			
	9	1.160 m	Inlet	Circular	Vitrified clay	150 mm			
	12	1.130 m	Inlet	Circular	Vitrified clay	100 mm			
	6	1.250 m	Outlet	Circular	Vitrified clay	150 mm			

Cover

Shape:	Rectangular	Dia/Length:	670 mm
Material:	Cast Iron	Width:	520 mm
Lowest Point:		Height:	
Requires Attention?		Cover Duty:	Medium
Remarks:			

Node Pictures - 3/28/2025

Node No.	Node ID	Alternative ID	Client's Job Ref	Contractor's Job Ref
2	CP01			



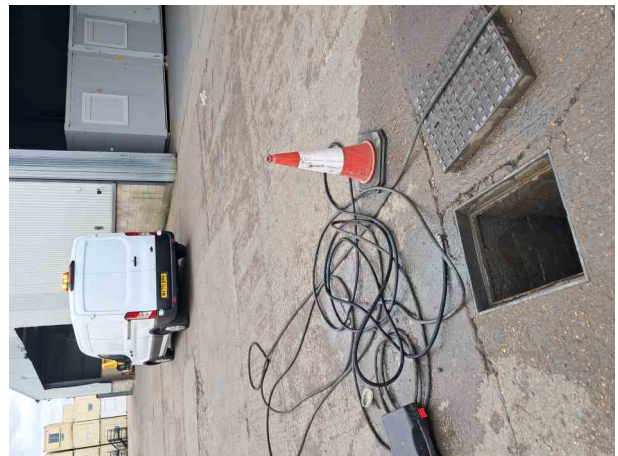
12903b6b-4f3d-45b0-a43b-c438c4e7f9c4.jpg, 00:00:00, 0.00
m
Picture



d73861ab-7dca-4665-ac61-797993670a34.jpg, 00:00:00, 0.00
m
Picture



f1d9f9b2-374c-4b46-9814-6b5e902a8ea8.jpg, 00:00:00, 0.00
m
Picture



55854a0a-621a-42c9-8a4d-89edd0745992.jpg, 00:00:00, 0.00
m
Picture



7bbb0240-42cc-46e2-b468-f681bb763ac2.jpg, 00:00:00, 0.00
m
Picture

Node Report



Node ID CP03	Alternative ID Not Specified	Date 28/03/2025	Node Type Catchpit	Year Constructed Not Specified	Use Surface Water
Operator Not Specified	Vehicle Not Specified	Client's Job Ref Not Specified	Contractor's Job Ref Not Specified	Node Depth Not Specified	Criticality Not Specified

General Node Information

Road:	Wharf Road	Land Ownership:	
Town or Village:		Node Ownership:	Private
Division or District:	Gravesend	Easting:	
Drainage Area:		Northing:	
Location:		Cover Level:	

General Node Inspection Information

Weather:		Vertical Ref.:	Cover point
Temperature:		Circular Ref.:	6 o'clock
Sheet Number:		Inspection Method:	
Status:		Surcharge Level:	
Flow Control:		Inspection Purpose:	
Cover Shape:	Rectangular	Cover Duty:	Heavy
Material:		Construction Style:	
Comments:	Unable to Raise		
Recommendations:	SEIZED MH		

Observations

No.	Depth	Code	Observation	Remarks
1	0.00 m	REM	Picture	
2	0.00 m	REM	Picture	
3	0.00 m	REM	Picture	
4	0.00 m	REM	Picture	

Cover

Shape:	Rectangular	Dia/Length:	
Material:	Mixed Material Construction	Width:	
Lowest Point:		Height:	
Requires Attention?		Cover Duty:	Heavy
Remarks:	UTR SEIZED		

Node Pictures - 3/28/2025

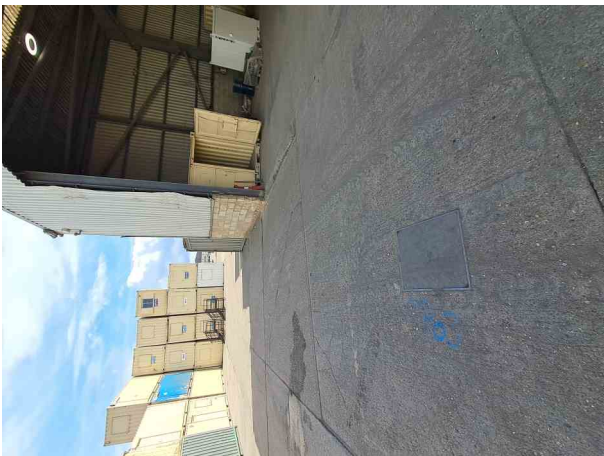
Node No.	Node ID	Alternative ID	Client's Job Ref	Contractor's Job Ref
4	CP03			



bbc568bd-5ee2-49a5-a477-d3d57f5e00a4.jpg, 00:00:00, 0.00 m
 Picture



46117549-f12f-48d6-b048-f05626e8a1d5.jpg, 00:00:00, 0.00 m
 Picture



f98103cd-9be5-4af4-a5c5-fea61170ba3f.jpg, 00:00:00, 0.00 m
 Picture



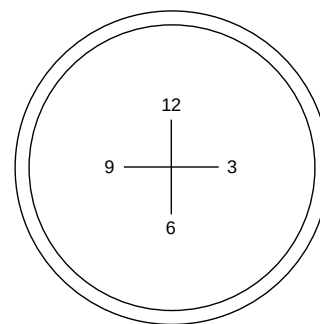
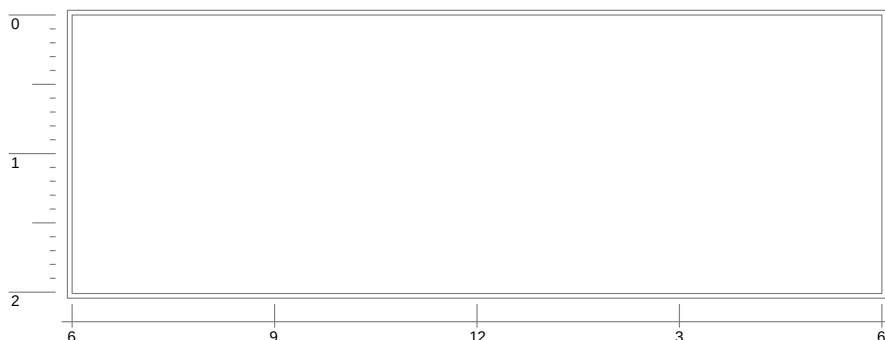
7f8bbb7d-18e6-4c2b-8166-3e81042abf34.jpg, 00:00:00, 0.00 m
 Picture

Node Report



Node ID MH02	Alternative ID Not Specified	Date 28/03/2025	Node Type Manhole	Year Constructed Not Specified	Use Surface Water
Operator Not Specified	Vehicle Not Specified	Client's Job Ref Not Specified	Contractor's Job Ref Not Specified	Node Depth 2.010 m	Criticality Not Specified

Node Schematic



General Node Information

Road:	Wharf Road	Land Ownership:	
Town or Village:		Node Ownership:	Private
Division or District:	Gravesend	Easting:	
Drainage Area:		Northing:	
Location:		Cover Level:	

General Node Inspection Information

Weather:		Vertical Ref.:	Cover point
Temperature:		Circular Ref.:	6 o'clock
Sheet Number:		Inspection Method:	
Status:		Surcharge Level:	850
Flow Control:		Inspection Purpose:	
Cover Shape:	Rectangular	Cover Duty:	Medium
Material:		Construction Style:	
Comments:	Unable to Survey		
Recommendations:	SURCHARGED		

Observations

No.	Depth	Code	Observation	Remarks
1	0.00 m	REM	Picture	
2	0.00 m	REM	Picture	
3	0.00 m	REM	Picture	
4	0.00 m	REM	Picture	

Node Report



Node ID MH02	Alternative ID Not Specified	Date 28/03/2025	Node Type Manhole	Year Constructed Not Specified	Use Surface Water
Operator Not Specified	Vehicle Not Specified	Client's Job Ref Not Specified	Contractor's Job Ref Not Specified	Node Depth 2.010 m	Criticality Not Specified

Cover

Shape:	Rectangular	Dia/Length:	650 mm
Material:	Cast Iron	Width:	500 mm
Lowest Point:		Height:	
Requires Attention?	No	Cover Duty:	Medium
Remarks:	SURCHARGED		

Node Pictures - 3/28/2025

Node No.	Node ID	Alternative ID	Client's Job Ref	Contractor's Job Ref
6	MH02			



6e70cfd8-7000-4a4e-87de-be60411a3d5b.jpg, 00:00:00, 0.00

m

Picture



746ea0ed-406a-4abd-875d-c82b12aec564.jpg, 00:00:00, 0.00

m

Picture



f5da08d0-1afa-481c-944a-3c7e749a078f.jpg, 00:00:00, 0.00

m

Picture



9282b128-e912-4279-8e9e-a60a051a68e3.jpg, 00:00:00, 0.00

m

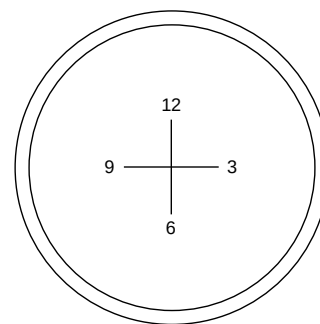
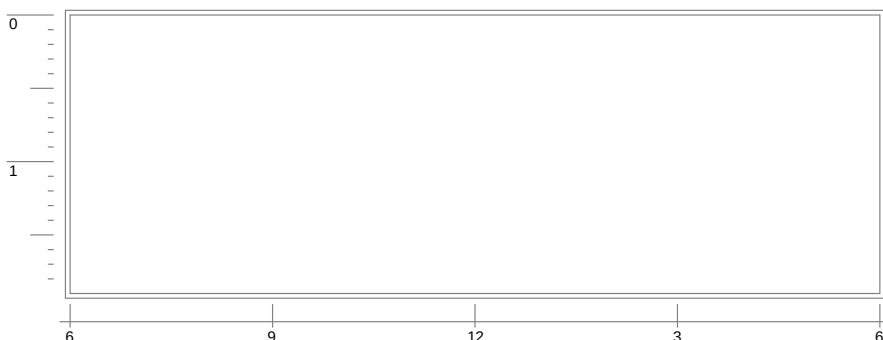
Picture

Node Report



Node ID MH01	Alternative ID Not Specified	Date 28/03/2025	Node Type Manhole	Year Constructed Not Specified	Use Surface Water
Operator Not Specified	Vehicle Not Specified	Client's Job Ref Not Specified	Contractor's Job Ref Not Specified	Node Depth 1.900 m	Criticality Not Specified

Node Schematic



General Node Information

Road:	Wharf Road	Land Ownership:	
Town or Village:		Node Ownership:	Private
Division or District:	Gravesend	Easting:	
Drainage Area:		Northing:	
Location:		Cover Level:	

General Node Inspection Information

Weather:		Vertical Ref.:	Cover point
Temperature:		Circular Ref.:	6 o'clock
Sheet Number:		Inspection Method:	
Status:		Surcharge Level:	890
Flow Control:		Inspection Purpose:	
Cover Shape:	Rectangular	Cover Duty:	Medium
Material:		Construction Style:	
Comments:	Unable to Survey		
Recommendations:	SURCHARGED		

Observations

No.	Depth	Code	Observation	Remarks
1	0.00 m	REM	Picture	
2	0.00 m	REM	Picture	
3	0.00 m	REM	Picture	
4	0.00 m	REM	Picture	

Node Report



Node ID MH01	Alternative ID Not Specified	Date 28/03/2025	Node Type Manhole	Year Constructed Not Specified	Use Surface Water
Operator Not Specified	Vehicle Not Specified	Client's Job Ref Not Specified	Contractor's Job Ref Not Specified	Node Depth 1.900 m	Criticality Not Specified

Cover

Shape:	Rectangular	Dia/Length:	700 mm
Material:	Cast Iron	Width:	550 mm
Lowest Point:		Height:	
Requires Attention?		Cover Duty:	Medium
Remarks:			

Node Pictures - 3/28/2025

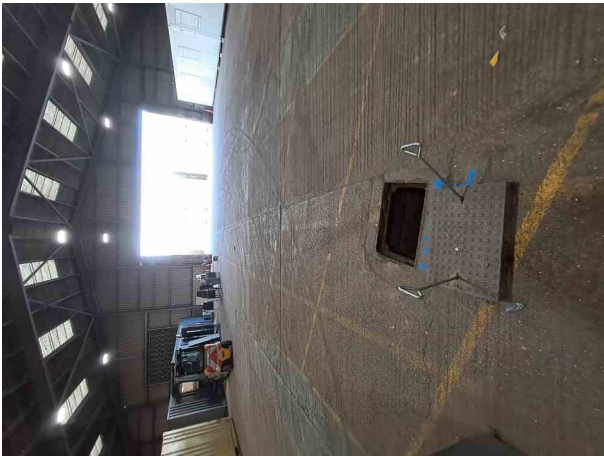
Node No.	Node ID	Alternative ID	Client's Job Ref	Contractor's Job Ref
7	MH01			



4cc2ec17-6748-467f-ba3b-129d55441614.jpg, 00:00:00, 0.00
 m
 Picture



8880ead2-63df-46c6-bd52-1c9fc648aae2.jpg, 00:00:00, 0.00
 m
 Picture



db1d8b82-2d84-4cde-ad20-033bcbf5cb6a.jpg, 00:00:00, 0.00
 m
 Picture



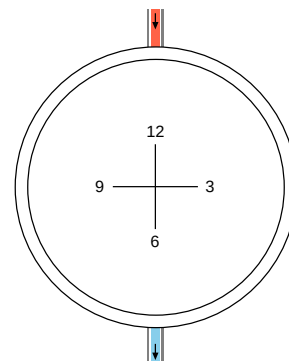
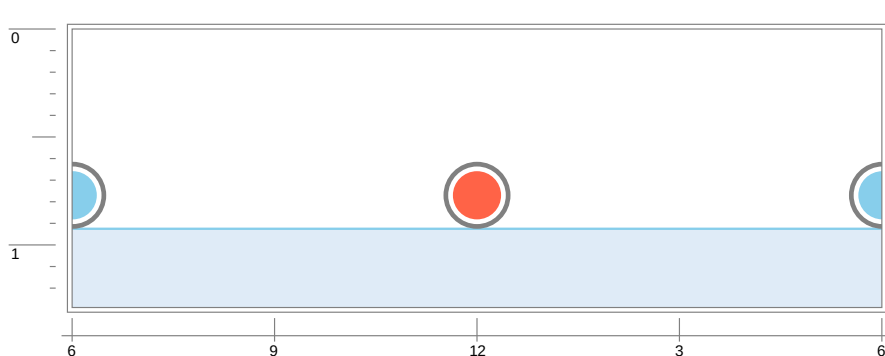
8ed103da-71aa-41dc-a8f8-b3ac75c00125.jpg, 00:00:00, 0.00
 m
 Picture

Node Report



Node ID CP02	Alternative ID Not Specified	Date 28/03/2025	Node Type Catchpit	Year Constructed Not Specified	Use Surface Water
Operator Not Specified	Vehicle Not Specified	Client's Job Ref Not Specified	Contractor's Job Ref Not Specified	Node Depth 1.290 m	Criticality Not Specified

Node Schematic



General Node Information

Road:	Wharf Road	Land Ownership:	
Town or Village:		Node Ownership:	Private
Division or District:	Gravesend	Easting:	
Drainage Area:		Northing:	
Location:		Cover Level:	

General Node Inspection Information

Weather:		Vertical Ref.:	Cover point
Temperature:		Circular Ref.:	6 o'clock
Sheet Number:		Inspection Method:	
Status:		Surcharge Level:	
Flow Control:		Inspection Purpose:	
Cover Shape:	Rectangular	Cover Duty:	Heavy
Material:		Construction Style:	
Comments:			
Recommendations:			

Observations

No.	Depth	Code	Observation	Remarks
1	0.00 m	REM	Picture	
2	0.00 m	REM	Picture	
3	0.00 m	REM	Picture	
4	0.00 m	REM	Picture	
5	0.00 m	REM	Picture	
6	0.00 m	REM	Picture	

Node Report



Node ID CP02	Alternative ID Not Specified	Date 28/03/2025	Node Type Catchpit	Year Constructed Not Specified	Use Surface Water
Operator Not Specified	Vehicle Not Specified	Client's Job Ref Not Specified	Contractor's Job Ref Not Specified	Node Depth 1.290 m	Criticality Not Specified

Inlets & Outlets

No.	Clock	Depth	Type	Shape	Material	Dia/Height	Width	Pipe ID	Remarks
	6	0.930 m	Outlet	Circular	Vitrified clay	150 mm			
	12	0.930 m	Inlet	Circular	Vitrified clay	150 mm			

Cover

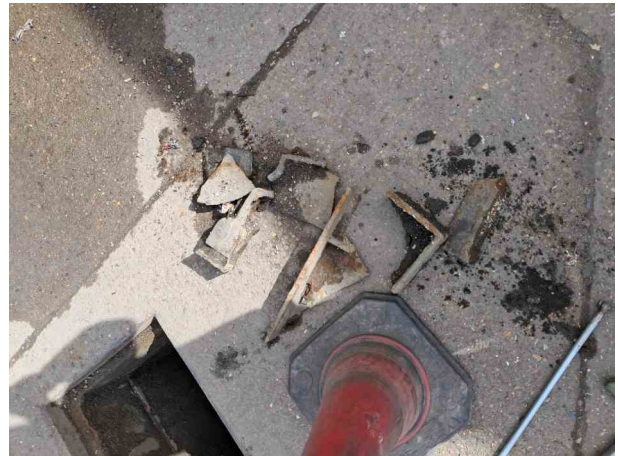
Shape:	Rectangular	Dia/Length:	670 mm
Material:	Cast Iron	Width:	520 mm
Lowest Point:		Height:	
Requires Attention?	Yes	Cover Duty:	Heavy
Remarks:	COVER DAMAGED		

Node Pictures - 3/28/2025

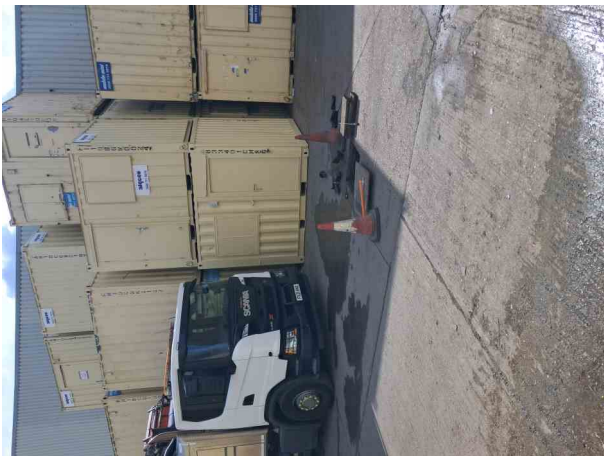
Node No.	Node ID	Alternative ID	Client's Job Ref	Contractor's Job Ref
10	CP02			



b952b626-bb0f-4e64-88f6-f6b02add8feb.jpg, 00:00:00, 0.00 m
Picture



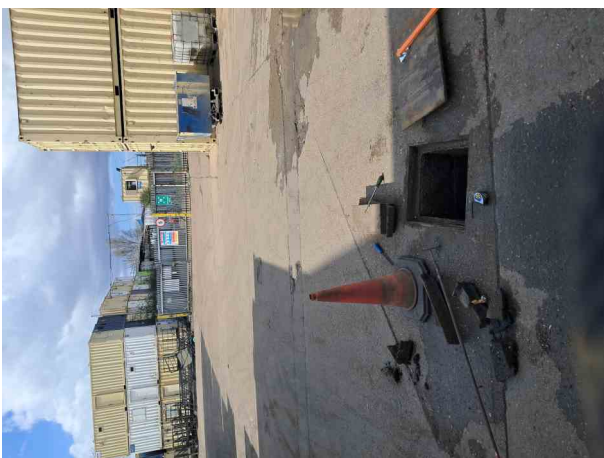
50b66741-6117-4065-b933-694c0b5a8fb2.jpg, 00:00:00, 0.00 m
Picture



e8b53d6e-1caf-4e97-929e-1e5c427e39b3.jpg, 00:00:00, 0.00 m
Picture



ae63e7c8-3080-4e8c-aa07-1664ed8ccff2.jpg, 00:00:00, 0.00 m
Picture



70bcd94d-a1e5-48b2-9fe6-480148eefd84.jpg, 00:00:00, 0.00 m
Picture



d7434ac8-65ff-4f23-9904-aacfee39bc6a.jpg, 00:00:00, 0.00 m
Picture

Node Report



Node ID MH03	Alternative ID Not Specified	Date 28/03/2025	Node Type Manhole	Year Constructed Not Specified	Use Surface Water
Operator Not Specified	Vehicle Not Specified	Client's Job Ref Not Specified	Contractor's Job Ref Not Specified	Node Depth Not Specified	Criticality Not Specified

General Node Information

Road:	Wharf Road	Land Ownership:	
Town or Village:		Node Ownership:	Private
Division or District:	Gravesend	Easting:	
Drainage Area:		Northing:	
Location:		Cover Level:	

General Node Inspection Information

Weather:		Vertical Ref.:	Cover point
Temperature:		Circular Ref.:	6 o'clock
Sheet Number:		Inspection Method:	
Status:		Surcharge Level:	
Flow Control:		Inspection Purpose:	Other purpose
Material:		Construction Style:	
Comments:	Unable to Raise		
Recommendations:	UNDER CONTAINER		

Observations

No.	Depth	Code	Observation	Remarks
1	0.00 m	REM	Picture	
2	0.00 m	REM	Picture	
3	0.00 m	REM	Picture	
4	0.00 m	REM	Picture	

Cover

Shape:	Rectangular	Dia/Length:	
Material:	Cast Iron	Width:	
Lowest Point:		Height:	
Requires Attention?		Cover Duty:	
Remarks:			

Node Pictures - 3/28/2025

Node No.	Node ID	Alternative ID	Client's Job Ref	Contractor's Job Ref
12	MH03			



8d0fade0-0cc0-417c-84d3-a1c2396458be.jpg, 00:00:00, 0.00
m
Picture



430a4d7e-c42b-4f30-96ee-df9662b22b26.jpg, 00:00:00, 0.00
m
Picture



79617d64-69e5-4d80-b081-f05b1e5088e0.jpg, 00:00:00, 0.00
m
Picture



b71b2423-e99c-41ab-a4e8-e5b5769a694b.jpg, 00:00:00, 0.00
m
Picture

Appendix D

Magic Map

Legend

Only layers selected and visible at this map scale will be shown

Magic

Designations

Land-Based Designations

Non-statutory

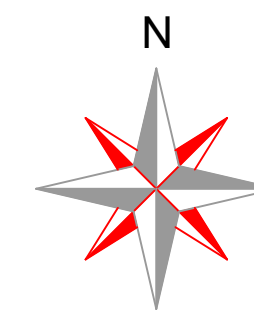
Source Protection Zones merged (England)

- Zone I - Inner Protection Zone
- Zone I - Subsurface Activity
- Zone II - Outer Protection Zone
- Zone II - Subsurface Activity
- Zone III - Total Catchment
- Zone III - Subsurface Activity
- Zone of Special Interest

200 m Coords: (563946,173237) | Grid Ref: TQ63947323 | Scale 1:7700

Appendix E

Topographical Survey



SURVEY STATIONS			
Name	Easting	Northing	Height
JL1	566069.607	174198.642	4.3
JL2	565972.101	174206.338	4.3
JL3	565969.755	174160.750	3.7
JL4	565985.420	174139.568	3.6

OS Net:
This survey has been oriented to the Ordnance Survey (O.S.) National Grid OSG83(15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS Net).
A true OSG83(15) coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.
The survey has been correlated to this point and a further **on or more OSG83(15) points** established to create a true O.S. bearing and distance oriented survey.
No scale factor has been applied to the survey therefore the coordinates shown are **arbitrary** & not true O.S. Coordinates which have a scale factor applied.
Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Some services may have been omitted due to containers, structures and other ground obstructions.

[illegible]

Appendix F

HR Wallingford

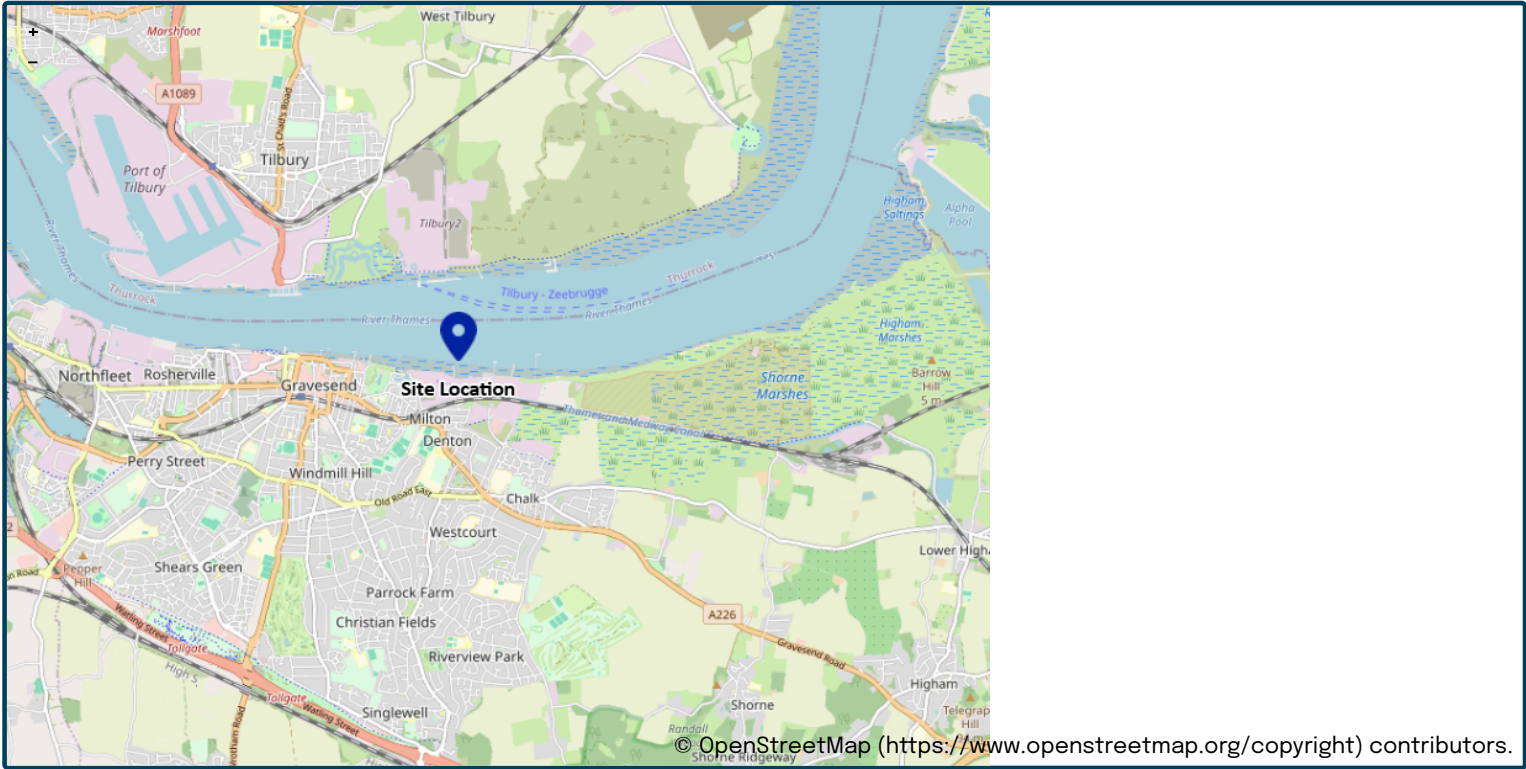
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). 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	29/04/2025
Calculated by	ET
Reference	G28565
Model version	2.0.0

Location

Site name	Algeco - Gravesend
Site location	Algeco, Wharf Rd, Gravesend



Site easting	566190
Site northing	174233

Site details

Total site area (ha)	1.87	ha
----------------------	-----------------------------------	----

Greenfield runoff

Method

Method	IH124	
	<u>My value</u>	<u>Map value</u>
SAAR (mm)	551 mm	☐ 551
How should SPR be derived?	WRAP soil type	
WRAP soil type	5	☐ 3
SPR	0.53	
QBar (IH124) (l/s)	8.9 l/s	

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	7	☐ 7
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

Method	IH124	
Flow rate 1 year (l/s)	7.5 l/s	
Flow rate 2 year (l/s)	7.8 l/s	
Flow rate 10 years (l/s)	14.3 l/s	
Flow rate 30 years (l/s)	20.4 l/s	
Flow rate 100 years (l/s)	28.2 l/s	
Flow rate 200 years (l/s)	33.1 l/s	

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.0.0) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>).

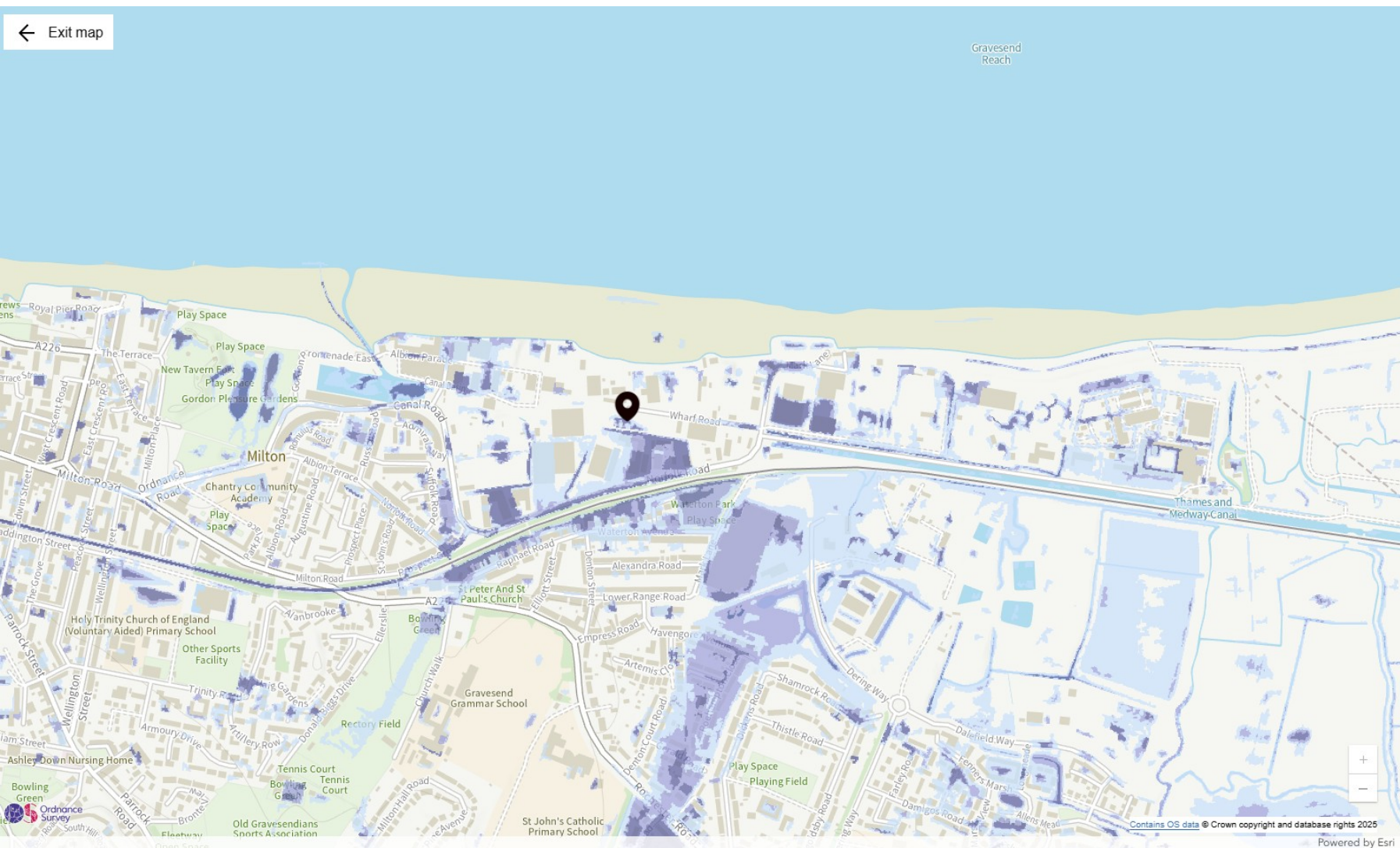
The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff 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.

Appendix G

Propose Site Layout

Appendix H

Flood Risk Maps



Surface water map

Yearly chance of flooding

- ☒ Flood area (extent)
 - High chance
 - Medium chance
 - Low chance

Yearly chance of flooding between 2040 and 2060

- ☐ Flood area (extent)

Map details

- ☒ Show flooding
- ☒ Selected address

Flood map for planning

Get a boundary report

[Add](#)

Datasets

- ☒ Flood zones 2 and 3
- ☐ River and sea with defences
- ☐ River and sea without defences
- ☐ Surface water
- ☐ None

Map features

- ☐ Water storage
- ☒ Flood defence
- ☒ Main Rivers

Search

Key



Flood zone 2



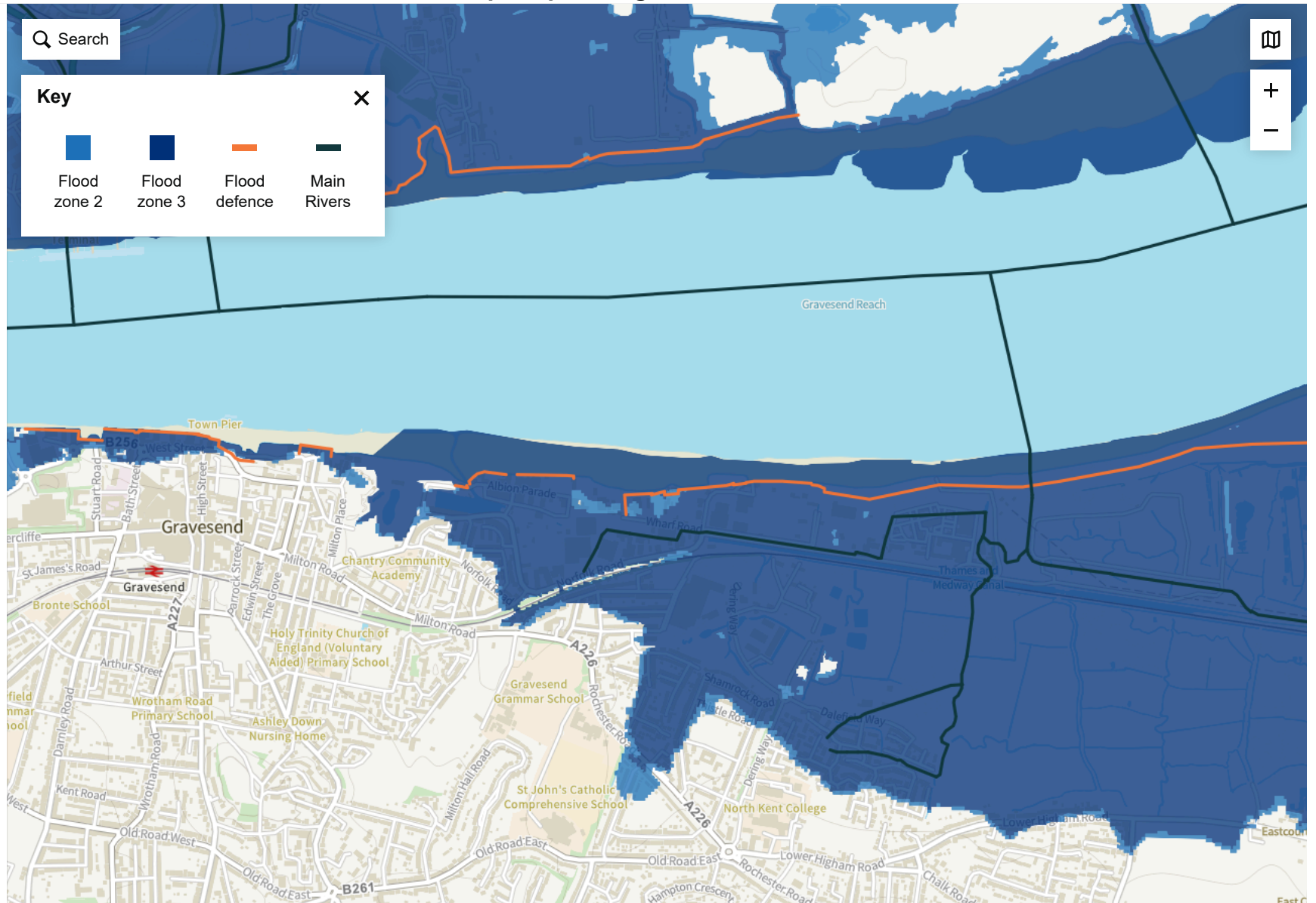
Flood zone 3



Flood defence



Main Rivers



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