



**193 - 195 LONDON ROAD,  
COWPLAIN, WATERLOOVILLE, PO8  
8ER**

**Proposed Residential Development**

**Drainage Strategy**

**Prepared on behalf of  
Wilson Designer Homes Ltd**

**D1070/DS/1.2  
January 2016**

**RGP Design Limited**

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## DOCUMENT CONTROL

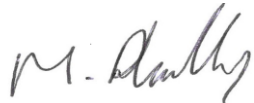
Project: 193 - 195 London Road, Cowplain, Waterloooville, PO8 8ER  
Proposed Residential Development

Document: Drainage Strategy

Client: Wilson Designer Homes Ltd

Reference: D1070/DS/1.2

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## PLANS and DRAWINGS

2016/D1070/SK200 – Impermeable Areas  
2016/D1070/SK300 – Proposed Drainage Strategy  
Public Sewer Records

## MICRODRAINAGE CALCULATIONS

Greenfield Run-off rate (Qbar)  
Greenfield Run-off volume



## **1 INTRODUCTION**

### **1.1 Background**

- 1.1.1 RGP Design Ltd is instructed by Wilson Designer Homes Ltd to prepare a Drainage Strategy to support a planning application for the development of a site at 193-195 London Road, near Waterloooville in Hampshire.
- 1.1.2 This strategy considers Hampshire County Councils Planning Guidance document relating to Flooding and Flood Water, published on Hampshire County Councils website.
- 1.1.3 The proposed development comprises the construction of 3 dwellings, garages and the formation of parking areas.
- 1.1.4 In preparing this strategy, RGP Design Ltd has made reference to the Environment Agency's Flood Risk Maps for Planning, the Local Authorities Strategic Flood Risk Assessment (SFRA), Public Sewer Records and Hampshire County Council's PUSH website.
- 1.1.5 Reference has also been made to a Topographic Survey undertaken by J Brotherton . & Partners Land Surveys.
- 1.1.6 This strategy has been prepared to demonstrate that the proposed development will not increase flood risk and maximises the use of sustainable drainage techniques.
- 1.1.7 This report has been prepared for the benefit of the parties listed in the Terms of Appointment.

### **1.2 Development Location and Description**

- 1.2.1 The proposed development was located on the west edge of London Road (Public Highway), lying centrally with the urbanisation of Cowplain. The site was accessible off London Road via a crossover serving No.195.
- 1.2.2 The site was in use as a residential dwelling.
- 1.2.3 The site was approximately 0.17Ha in size and between 49.6m and 51.7m AOD, sloping in a south-easterly direction. The site was marginally elevated above the surrounding existing roadways.
- 1.2.4 The pre-development impermeable area is 0.0530Ha. as shown on drawing **2016/D1070/SK200**, included in this report.



- 1.2.5 The proposed development comprises 3 dwellings (4x 4 bed houses). New hardstanding areas will be formed to provide parking for the dwellings together with a short length of shared access road.
- 1.2.6 The post-development impermeable area is 0.0585Ha with an additional area of 0.050Ha of permeable driveway. This is shown on drawing **2016/D1070/SK200**, included in this report.
- 1.2.7 Vehicular access to the proposed dwellings will be available from London Road (Public Highway) using the existing dropped kerb access.
- 1.2.8 The River Wallington (Main River) lies approximately 13km to the south west of the site (Tributary known as Billy's Lake).



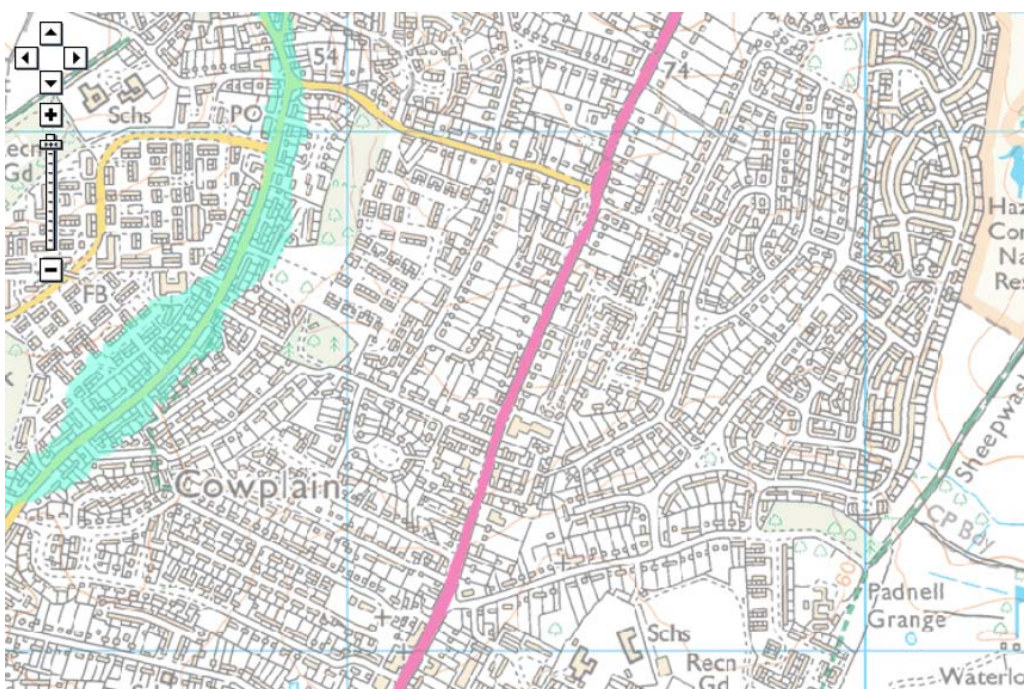
## 2 PROBABILITY OF FLOODING

### 2.1 Strategic Flood Risk Assessment

- 2.1.1 Whilst a formal flood risk assessment is not required due to the site area and its proximity to Environment Agency designated flood zones, a brief assessment of flood risk, generally in accordance with National Planning Policy Guidance: Flood Risk and Coastal Change, follows:
- 2.1.2 The NPPF requires that all sources of flooding are considered being Tidal, Fluvial, Pluvial, Groundwater, Sewers and Man-made reservoirs/canals.
- 2.1.3 The SRFA confirms that some areas of Cowplain are at risk of flooding but these areas are not close to the site.
- 2.1.4 The PUSH web site does not identify that the site is at risk of flooding groundwater, pluvial and fluvial sources.
- 2.1.5 The SRFA does not identify that the site to be at risk of flooding pluvial and fluvial sources.

### 2.2 Environment Agency Flood Data

- 2.2.1 The Environment Agency Flood Risk Maps for Planning (extract below) show that the site is located in Zone 1 (land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%)).





- 2.2.2 The Environment Agency flood maps for surface water flooding show that the site is at low risk from this source.





### 3 EXISTING DRAINAGE AND GROUND CONDITIONS

#### 3.1 Surface Water

- 3.1.1 The existing run-off rate (QBar) has been calculated using Microdrainage (ICOP SUDS) to be 0.9 l/s. The Greenfield run-off volume is calculated to be 57.051m<sup>3</sup>.
- 3.1.2 The public sewer records show that there is an existing 450mm diameter surface water sewer within the carriageway of London Road at a depth of approximately 1.15m flowing to the south.
- 3.1.3 The topographic survey identifies a small number of rainwater down pipes, chambers and gullies serving No.195. CCTV investigations have confirmed the existing building roof and some of the existing hardstanding surfaces discharge to the existing foul drain.
- 3.1.4 London Road (Public Highway) is drained by traditional road gullies collected by the public surface water sewer aforementioned.

#### 3.2 Foul Water

- 3.2.1 The public sewer records show that there are 2 No. existing foul sewers within the carriageway of London Road; a 225mm diameter at a depth of approximately 2.7m flowing to the south, and a 375mm diameter at a depth of approximately 1.7m flowing to the south.

#### 3.3 Ground Conditions

- 3.3.1 A geotechnical investigation has not yet been undertaken but analysis of the BGS website data within the local area confirms underlying strata to be as follows:

**Bedrock Geology:**

*Lambeth Group - Clay, Silt And Sand. Sedimentary Bedrock formed approximately 56 to 66 million years ago in the Palaeogene Period. Local environment previously dominated by swamps, estuaries and deltas.*

**Superficial Deposits:**

*None.*

- 3.3.2 Review of the BGS borehole logs in the area indicate the site would be primarily underlain by a silty clay. It is unlikely that infiltration methods of drainage will operate successfully. It is recommended that no further infiltration testing or groundwater level monitoring is undertaken.



## **4 PROPOSED DRAINAGE STRATEGY**

### **4.1 Surface Water Run Off**

- 4.1.1 The SUDS manual and Building Regulations sets out a hierarchy of drainage methods to ensure that developments maximise the use of sustainable drainage techniques. In short, this hierarchy favours infiltration methods of disposal over other methods such as watercourses or sewers.
- 4.1.2 It is proposed to construct a new gravity connection to the existing public surface water sewer in London Road to dispose of the run off from the proposed development. It is proposed to take the run-off from No.195 to the new surface water system within the confines of the site.
- 4.1.3 The proposed development will result in an increase in hard surface and roof area on the site of around 551m<sup>2</sup>.
- 4.1.4 The system will require an outfall that is restricted to mimic the Greenfield run-off rate with storage upstream. It is proposed that the flow control device restricts the discharge to a minimum of 5l/s, in accordance with the DEFRA recommendations (minimum practical rate, whilst maintaining reliability). The construction of the outfall to the public surface water will require a S106 connection application.
- 4.1.5 Surface water storage will be provide on the site using either tanks formed with cellular blocks or using the voids available in the sub base of a porous paving construction. Preliminary calculations show that for a 1 in 100 year +30% critical storm, restricted to 5l/s, a storage volume of the order of 50m<sup>3</sup> is required.
- 4.1.6 The proposed surface water drainage system is shown on drawing **2016/D1070/SK300**, included in this report.

### **4.2 Climate Change**

- 4.2.1 NPPF Table sets out percentage increases to be applied to peak rainfall intensity to allow for the effects of climate change over the design life of a development.
- 4.2.2 In designing the proposed storage volume, an increase in peak rainfall intensity of 30% has been applied.

### **4.3 Exceedance**

- 4.3.1 Whilst the proposed drainage system has been designed to accommodate a significant rainfall event, it is possible that the design parameters could be exceeded during an extreme event.



4.3.2 Should this occur, overland flows are likely but due to the nature of the development, they will remain unchanged from the current situation (ground levels on the site will generally remain unchanged).

4.3.3 This surface water drainage strategy will ensure that there is no increase in the rate of flow from the site on to adjacent land or to existing drainage networks.

#### **4.4 Foul Water**

4.4.1 It is proposed to connect the foul drainage from the development to the existing public foul sewer within London Road. This will be discharged to the existing 100mm diameter foul drain within the grounds of No.195.

4.4.2 Based on the residential design guidance provided in Sewers for Adoption, the proposed foul flow will be in the region of 0.19l/s.

4.4.3 The proposed foul drainage layout is shown on drawing **2016/D1070/SK300**.

#### **4.5 Maintenance**

4.5.1 Maintenance plays an important part in the long term performance of a surface water drainage system and will be required to ensure that it remains fully operational.

4.5.2 The traditional parts (inspection chambers, pipes, gullies, etc) of the proposed surface water drainage system will need a minimal amount of maintenance similar to other traditional systems.

4.5.3 The SUDS devices will require slightly more maintenance focusing on reducing the amount of silt that is allowed to enter the system. For the cellular storage tanks this will involve ensuring that upstream catchpits and gully sumps are regularly emptied of silt.

4.5.4 It is important to ensure that the porous paved areas are properly maintained as recommended by the manufacturer which is likely to comprise:

- Periodic surface sweeping to reduce silt and debris accumulation. The porous surfaces should be swept at least twice a year. Additional sweeps in the autumn may be required to clear fallen leaves.
- Periodic silt removal from porous surface as described by manufacturer. If any small areas are showing signs of ponding they shall be dealt with by fully raking out the joints and redressing. The entire surface shall be monitored and when there are signs of excessive siltation resulting in slow drainage over the whole area the blocks shall be uplifted and replacement of the bedding layer and geotextile shall take place.
- Redressing the joints on the block paved surface as required.



## **5 SUMMARY**

- 5.1.1 This surface water drainage strategy considers the requirements of Hampshire County Councils planning application guidance relating to Flooding and Flood Water.
- 5.1.2 Reference has been made to the Local Authorities Strategic Flood Risk Assessment, Environment Agency's Flood Maps for Planning, Public Sewer Maps, Hampshire County Councils PUSH website and a Topographic Survey.
- 5.1.3 The site is currently in use as a residential dwelling.
- 5.1.4 The site is approximately 0.17Ha in size and it lies between 49.6m and 51.7m AOD, sloping in an easterly direction. The pre-development impermeable area is 0.0530Ha.
- 5.1.5 The site is located in Environment Agency Zone 1.
- 5.1.6 There is no formal drainage within the confines of the site and surface water runs off to an existing Public Foul Sewer within London Road adjacent the east boundary. It is proposed to retain this connection for the new foul system.
- 5.1.7 It is proposed to construct a new surface water drain to the existing Public Storm Sewer. The flow from this outfall will be restricted to predevelopment rates.
- 5.1.8 Although a formal flood risk assessment is not required to support a planning application due to the size of the site and its proximity to Environment Agency flood zones, a brief assessment has been undertaken which concludes that flood risk is low.
- 5.1.9 The proposed development will result in a significant increase in impermeable area which is mitigated by utilising SUDS techniques where possible.
- 5.1.10 The proposed drainage system will be designed to cater for a 1 in 100 year critical storm event including a 30% increase in peak rainfall intensity, to cater for the effects of climate change.
- 5.1.11 The nature of the development will ensure that overflow land flows during exceedance event will remain unchanged.
- 5.1.12 This surface water drainage strategy shows that the development can be implemented without increasing flows on to adjacent land or to existing surface water drainage systems, ensuring that flood risk is not increased.



## **PLANS and DRAWINGS**

2016/D1070/SK200 – Impermeable Areas

2016/D1070/SK300 – Proposed Drainage Strategy

Public Sewer Records



RGP Design  
Metro House  
Chichester  
West Sussex  
PO19 1BE

Your Ref London Road, Waterlooville  
Our Ref 204745  
Date 28 October 2015  
Contact [searches@southernwater.co.uk](mailto:searches@southernwater.co.uk)  
Fax 01634 844514  
DX:400450 Chatham 5

Attention: Mark Akmenkalns

Dear Sirs

**Provision of Public Sewer Main Record Extracts – VAT Receipt**  
**193-195 London Road, Cowplain, Hants PO8 8ER**

Further to your recent enquiry regarding the provision of Southern Water apparatus record extracts for the above location.

Please be aware that there are areas within our region in which there are neither sewers nor water mains. Similarly, whilst the enclosed extract may indicate the approximate location of our apparatus in the area of interest, it should not be relied upon as showing that further infrastructure does not exist and may subsequently be found following site investigation. Therefore actual positions of the disclosed (and any undisclosed) infrastructure should be determined on site, because Southern Water does not accept any responsibility for inaccuracy or omission regarding the enclosed plan and accordingly it should not be considered to be a definitive document.

I confirm payment of the appropriate fee in the sum of £ **49.92**

The breakdown of costs is as follows: -

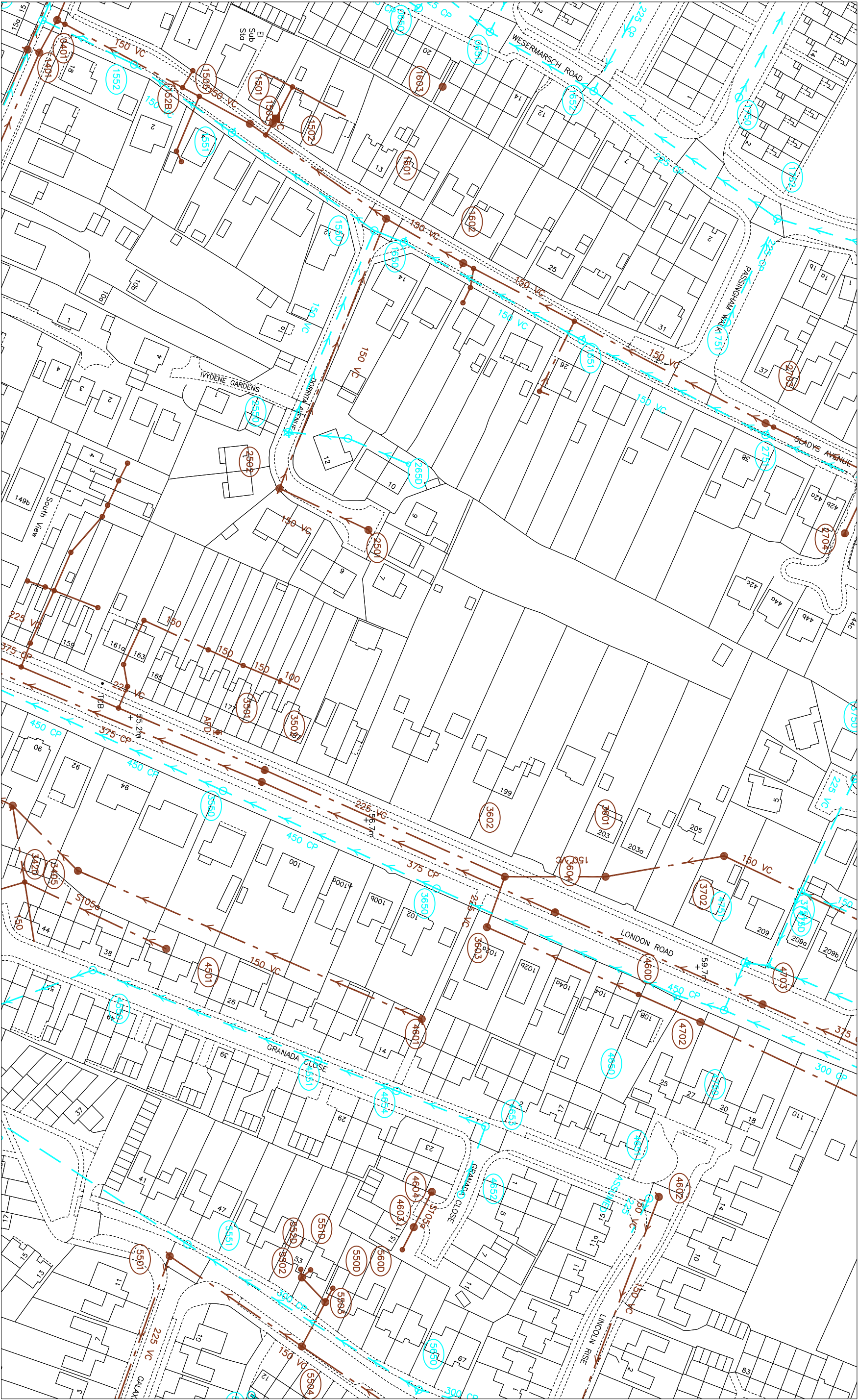
- Provision of record extracts £ 41.60
- VAT @ 20.0% £ 8.32

**VAT Registration Number 813 0378 56**

Should you require any additional information regarding this matter please contact this office at the address given at the foot of this letter.

Yours faithfully

Land Search Department



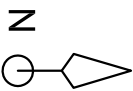
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O.S. REF.  
**SU6911NW**

Title: 204745\_193-195 London Road, Co

Drawn by: **kumaria**  
Scale: **1:1250**  
Date: **28/10/2015**

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy.  
The actual positions should be determined on site.  
**WARNING: BAC pipes are constructed of Bonded Asbestos Cement**  
**WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement**  
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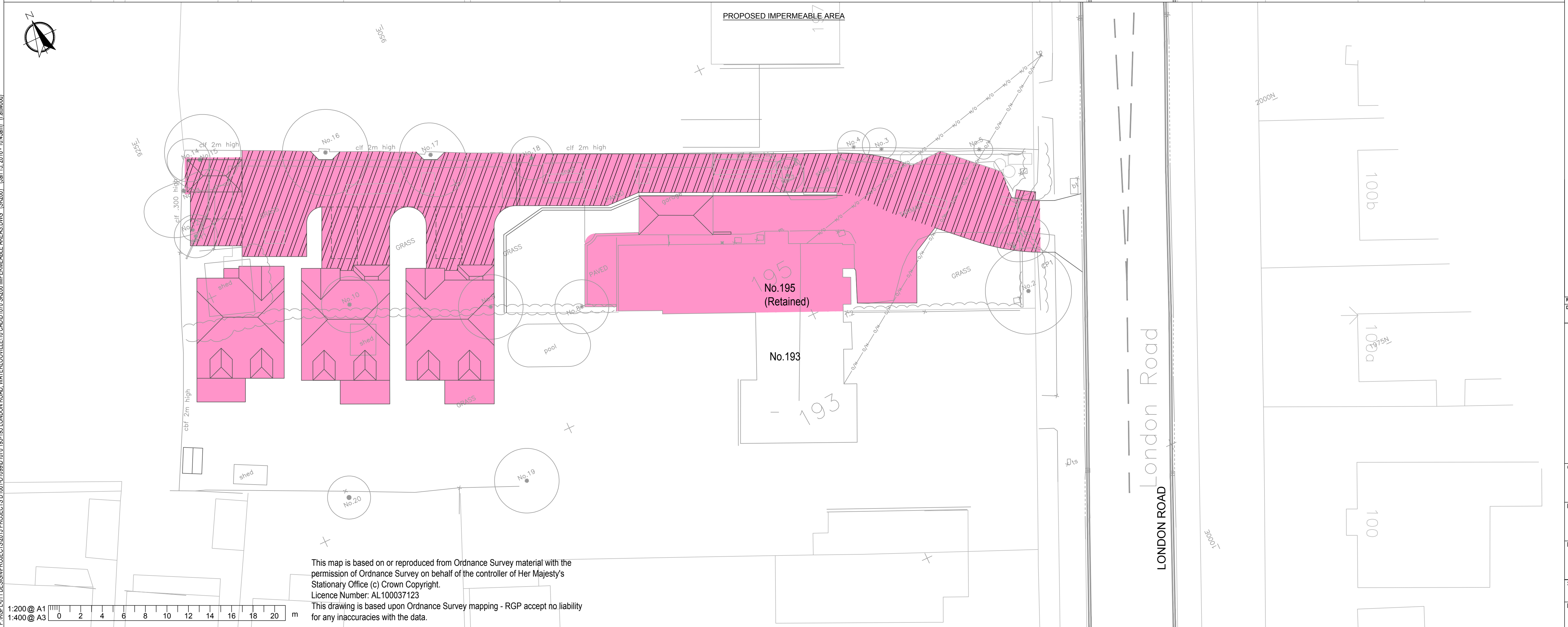
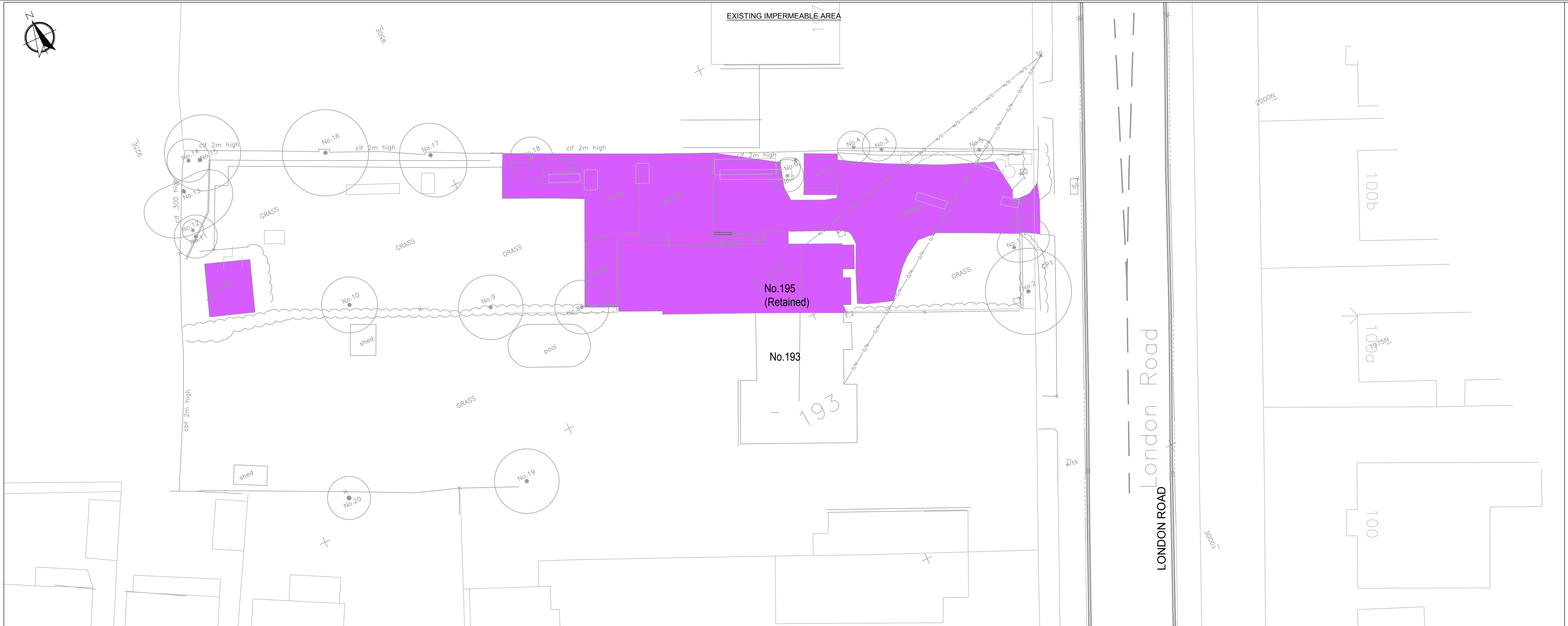
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SEWER RECORDS PAGE 2 OF 2

| Node  | Cover | Invert | Size | Material | Shape | Node  | Cover | Invert | Size | Material | Shape | Node  | Cover | Invert | Size | Material | Shape | Node  | Cover | Invert | Size | Material | Shape |
|-------|-------|--------|------|----------|-------|-------|-------|--------|------|----------|-------|-------|-------|--------|------|----------|-------|-------|-------|--------|------|----------|-------|
| 0401X | 51.77 | 49.65  | 300  | VC       | CIRC  | 3603X | 57.26 |        | 225  | VC       | CIRC  | 1602X | 58.02 |        | 150  | VC       | CIRC  | 1610X | 58.02 |        | 150  | VC       | CIRC  |
| 0451X | 51.74 | 50.93  | 225  | PF       | CIRC  | 3604X | 58.17 | 56.46  | 450  | CP       | CIRC  | 1603X | 58.02 |        | 150  | VC       | CIRC  | 1611X | 58.02 |        | 150  | VC       | CIRC  |
| 0650X | 55.91 | 54.52  | 225  | CP       | CIRC  | 3650X | 57.24 | 56.09  | 150  | VC       | CIRC  | 1604X | 58.02 |        | 150  | VC       | CIRC  | 1612X | 58.02 |        | 150  | VC       | CIRC  |
| 0651X | 57.09 | 55.6   | 225  | CP       | CIRC  | 3702X |       |        | 225  | VC       | CIRC  | 1605X | 58.02 |        | 150  | VC       | CIRC  | 1613X | 58.02 |        | 150  | VC       | CIRC  |
| 1401X | 51.89 | 49.69  | 300  | VC       | CIRC  | 3750X | 60.86 |        | 225  | VC       | CIRC  | 1606X | 58.02 |        | 150  | VC       | CIRC  | 1614X | 58.02 |        | 150  | VC       | CIRC  |
| 1402X | 51.75 | 49.21  | 525  | CP       | CIRC  | 3751X | 59.55 | 58.54  | 225  | VC       | CIRC  | 1607X | 58.02 |        | 150  | VC       | CIRC  | 1615X | 58.02 |        | 150  | VC       | CIRC  |
| 1501X | 54.55 |        | 150  | VC       | CIRC  | 4501X |       |        | 225  | VC       | CIRC  | 1608X | 58.02 |        | 150  | VC       | CIRC  | 1616X | 58.02 |        | 150  | VC       | CIRC  |
| 1502X |       |        | 150  | VC       | CIRC  | 4501X |       |        | 225  | VC       | CIRC  | 1609X | 58.02 |        | 150  | VC       | CIRC  | 1617X | 58.02 |        | 150  | VC       | CIRC  |
| 1503X |       |        | 150  | VC       | CIRC  | 4550X |       |        | 225  | VC       | CIRC  | 1610X | 58.02 |        | 150  | VC       | CIRC  | 1618X | 58.02 |        | 150  | VC       | CIRC  |
| 1505X |       |        | 150  | VC       | CIRC  | 4551X |       |        | 225  | VC       | CIRC  | 1611X | 58.02 |        | 150  | VC       | CIRC  | 1619X | 58.02 |        | 150  | VC       | CIRC  |
| 1508X |       |        | 150  | VC       | CIRC  | 4601X | 56.38 | 54.94  | 150  | VC       | CIRC  | 1612X | 58.02 |        | 150  | VC       | CIRC  | 1620X | 58.02 |        | 150  | VC       | CIRC  |
| 1509X |       |        | 150  | VC       | CIRC  | 4602X | 57.31 | 56.09  | 150  | VC       | CIRC  | 1613X | 58.02 |        | 150  | VC       | CIRC  | 1621X | 58.02 |        | 150  | VC       | CIRC  |
| 1510X |       |        | 150  | VC       | CIRC  | 4603X |       |        | 150  | VC       | CIRC  | 1614X | 58.02 |        | 150  | VC       | CIRC  | 1622X | 58.02 |        | 150  | VC       | CIRC  |
| 1511X |       |        | 150  | VC       | CIRC  | 4604X |       |        | 150  | VC       | CIRC  | 1615X | 58.02 |        | 150  | VC       | CIRC  | 1623X | 58.02 |        | 150  | VC       | CIRC  |
| 1512X |       |        | 150  | VC       | CIRC  | 4605X | 58.63 | 57.23  | 450  | CP       | CIRC  | 1616X | 58.02 |        | 150  | VC       | CIRC  | 1624X | 58.02 |        | 150  | VC       | CIRC  |
| 1513X |       |        | 150  | VC       | CIRC  | 4651X |       |        | 225  | VC       | CIRC  | 1617X | 58.02 |        | 150  | VC       | CIRC  | 1625X | 58.02 |        | 150  | VC       | CIRC  |
| 1514X |       |        | 150  | VC       | CIRC  | 4652X |       |        | 225  | VC       | CIRC  | 1618X | 58.02 |        | 150  | VC       | CIRC  | 1626X | 58.02 |        | 150  | VC       | CIRC  |
| 1515X | 56.6  | 55.79  | 150  | VC       | CIRC  | 4653X |       |        | 225  | VC       | CIRC  | 1619X | 58.02 |        | 150  | VC       | CIRC  | 1627X | 58.02 |        | 150  | VC       | CIRC  |
| 1551X | 54.48 | 53.57  | 150  | VC       | CIRC  | 4654X |       |        | 225  | VC       | CIRC  | 1620X | 58.02 |        | 150  | VC       | CIRC  | 1628X | 58.02 |        | 150  | VC       | CIRC  |
| 1552X | 52.73 | 51.93  | 150  | VC       | CIRC  | 4702X | 58.17 |        | 225  | VC       | CIRC  | 1621X | 58.02 |        | 150  | VC       | CIRC  | 1629X | 58.02 |        | 150  | VC       | CIRC  |
| 1601X | 56.67 | 54.83  | 150  | VC       | CIRC  | 4703X | 60.62 | 59.08  | 375  | CP       | CIRC  | 1622X | 58.02 |        | 150  | VC       | CIRC  | 1630X | 58.02 |        | 150  | VC       | CIRC  |
| 1602X | 58.02 | 55.97  | 150  | VC       | CIRC  | 4750X | 59.31 | 57.55  | 450  | CP       | CIRC  | 1623X | 58.02 |        | 150  | VC       | CIRC  | 1631X | 58.02 |        | 150  | VC       | CIRC  |
| 1603X |       |        | 150  | VC       | CIRC  | 4751X | 60.19 | 57.59  | 225  | BRE      | CIRC  | 1624X | 58.02 |        | 150  | VC       | CIRC  | 1632X | 58.02 |        | 150  | VC       | CIRC  |
| 1610X |       |        | 150  | VC       | CIRC  | 4750X |       |        | 225  | VC       | CIRC  | 1625X | 58.02 |        | 150  | VC       | CIRC  | 1633X | 58.02 |        | 150  | VC       | CIRC  |
| 1611X |       |        | 150  | VC       | CIRC  | 5501X | 54.66 | 53.13  | 225  | VC       | CIRC  | 1626X | 58.02 |        | 150  | VC       | CIRC  | 1634X | 58.02 |        | 150  | VC       | CIRC  |
| 1620X |       |        | 150  | VC       | CIRC  | 5502X |       |        | 225  | VC       | CIRC  | 1627X | 58.02 |        | 150  | VC       | CIRC  | 1635X | 58.02 |        | 150  | VC       | CIRC  |
| 1630X | 57.09 | 56.23  | 150  | VC       | CIRC  | 5503X |       |        | 225  | VC       | CIRC  | 1628X | 58.02 |        | 150  | VC       | CIRC  | 1636X | 58.02 |        | 150  | VC       | CIRC  |
| 1651X | 60.16 | 59.45  | 150  | VC       | CIRC  | 5504X |       |        | 225  | VC       | CIRC  | 1629X | 58.02 |        | 150  | VC       | CIRC  | 1637X | 58.02 |        | 150  | VC       | CIRC  |
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| 2410X |       |        | 225  | CP       | CIRC  |       |       |        |      |          |       | 1635X | 58.02 |        | 150  | VC       | CIRC  | 1643X | 58.02 |        | 150  | VC       | CIRC  |
| 2420X |       |        | 225  | CP       | CIRC  |       |       |        |      |          |       | 1636X | 58.02 |        | 150  | VC       | CIRC  | 1644X | 58.02 |        | 150  | VC       | CIRC  |
| 2430X |       |        | 225  | CP       | CIRC  |       |       |        |      |          |       | 1637X | 58.02 |        | 150  | VC       | CIRC  | 1645X | 58.02 |        | 150  | VC       | CIRC  |
| 2501X | 57.55 | 56.36  | 150  | VC       | CIRC  |       |       |        |      |          |       | 1638X | 58.02 |        | 150  | VC       | CIRC  | 1646X | 58.02 |        | 150  | VC       | CIRC  |
| 2502X | 57.08 | 55.63  | 150  | VC       | CIRC  |       |       |        |      |          |       | 1639X | 58.02 |        | 150  | VC       | CIRC  | 1647X | 58.02 |        | 150  | VC       | CIRC  |
| 2508X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1640X | 58.02 |        | 150  | VC       | CIRC  | 1648X | 58.02 |        | 150  | VC       | CIRC  |
| 2509X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1641X | 58.02 |        | 150  | VC       | CIRC  | 1649X | 58.02 |        | 150  | VC       | CIRC  |
| 2510X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1642X | 58.02 |        | 150  | VC       | CIRC  | 1650X | 58.02 |        | 150  | VC       | CIRC  |
| 2511X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1643X | 58.02 |        | 150  | VC       | CIRC  | 1651X | 58.02 |        | 150  | VC       | CIRC  |
| 2512X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1644X | 58.02 |        | 150  | VC       | CIRC  | 1652X | 58.02 |        | 150  | VC       | CIRC  |
| 2513X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1645X | 58.02 |        | 150  | VC       | CIRC  | 1653X | 58.02 |        | 150  | VC       | CIRC  |
| 2514X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1646X | 58.02 |        | 150  | VC       | CIRC  | 1654X | 58.02 |        | 150  | VC       | CIRC  |
| 2515X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1647X | 58.02 |        | 150  | VC       | CIRC  | 1655X | 58.02 |        | 150  | VC       | CIRC  |
| 2516X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1648X | 58.02 |        | 150  | VC       | CIRC  | 1656X | 58.02 |        | 150  | VC       | CIRC  |
| 2517X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1649X | 58.02 |        | 150  | VC       | CIRC  | 1657X | 58.02 |        | 150  | VC       | CIRC  |
| 2518X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1650X | 58.02 |        | 150  | VC       | CIRC  | 1658X | 58.02 |        | 150  | VC       | CIRC  |
| 2519X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1651X | 58.02 |        | 150  | VC       | CIRC  | 1659X | 58.02 |        | 150  | VC       | CIRC  |
| 2520X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1652X | 58.02 |        | 150  | VC       | CIRC  | 1660X | 58.02 |        | 150  | VC       | CIRC  |
| 2521X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1653X | 58.02 |        | 150  | VC       | CIRC  | 1661X | 58.02 |        | 150  | VC       | CIRC  |
| 2522X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1654X | 58.02 |        | 150  | VC       | CIRC  | 1662X | 58.02 |        | 150  | VC       | CIRC  |
| 2523X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1655X | 58.02 |        | 150  | VC       | CIRC  | 1663X | 58.02 |        | 150  | VC       | CIRC  |
| 2524X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1656X | 58.02 |        | 150  | VC       | CIRC  | 1664X | 58.02 |        | 150  | VC       | CIRC  |
| 2525X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1657X | 58.02 |        | 150  | VC       | CIRC  | 1665X | 58.02 |        | 150  | VC       | CIRC  |
| 2526X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1658X | 58.02 |        | 150  | VC       | CIRC  | 1666X | 58.02 |        | 150  | VC       | CIRC  |
| 2527X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1659X | 58.02 |        | 150  | VC       | CIRC  | 1667X | 58.02 |        | 150  | VC       | CIRC  |
| 2528X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1660X | 58.02 |        | 150  | VC       | CIRC  | 1668X | 58.02 |        | 150  | VC       | CIRC  |
| 2529X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1661X | 58.02 |        | 150  | VC       | CIRC  | 1669X | 58.02 |        | 150  | VC       | CIRC  |
| 2530X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1662X | 58.02 |        | 150  | VC       | CIRC  | 1670X | 58.02 |        | 150  | VC       | CIRC  |
| 2531X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1663X | 58.02 |        | 150  | VC       | CIRC  | 1671X | 58.02 |        | 150  | VC       | CIRC  |
| 2532X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1664X | 58.02 |        | 150  | VC       | CIRC  | 1672X | 58.02 |        | 150  | VC       | CIRC  |
| 2533X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1665X | 58.02 |        | 150  | VC       | CIRC  | 1673X | 58.02 |        | 150  | VC       | CIRC  |
| 2534X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1666X | 58.02 |        | 150  | VC       | CIRC  | 1674X | 58.02 |        | 150  | VC       | CIRC  |
| 2535X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1667X | 58.02 |        | 150  | VC       | CIRC  | 1675X | 58.02 |        | 150  | VC       | CIRC  |
| 2536X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1668X | 58.02 |        | 150  | VC       | CIRC  | 1676X | 58.02 |        | 150  | VC       | CIRC  |
| 2537X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1669X | 58.02 |        | 150  | VC       | CIRC  | 1677X | 58.02 |        | 150  | VC       | CIRC  |
| 2538X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1670X | 58.02 |        | 150  | VC       | CIRC  | 1678X | 58.02 |        | 150  | VC       | CIRC  |
| 2539X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1671X | 58.02 |        | 150  | VC       | CIRC  | 1679X | 58.02 |        | 150  | VC       | CIRC  |
| 2540X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1672X | 58.02 |        | 150  | VC       | CIRC  | 1680X | 58.02 |        | 150  | VC       | CIRC  |
| 2541X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1673X | 58.02 |        | 150  | VC       | CIRC  | 1681X | 58.02 |        | 150  | VC       | CIRC  |
| 2542X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1674X | 58.02 |        | 150  | VC       | CIRC  | 1682X | 58.02 |        | 150  | VC       | CIRC  |
| 2543X |       |        | 150  | VC       | CIRC  |       |       |        |      |          |       | 1675X |       |        |      |          |       |       |       |        |      |          |       |



- NOTES:**
1. This drawing is to be read in conjunction with all other RGP drawings, and with all relevant Architect's and Engineer's drawings and specification. Any discrepancies found are to be reported immediately to the Engineer.
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  3. Do not scale, work to figured dimensions only. All dimensions are in millimeters unless noted otherwise and all levels are in metres from the topographic survey datum.
  4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority, however accuracy is not certain.

FOR HBC PLANNING APPLICATION  
BASED ON ADP ARCHITECTS  
DRAWING 1722 01P.

-KEY-

|                                                                                       |                            |   |        |
|---------------------------------------------------------------------------------------|----------------------------|---|--------|
|  | Existing Impermeable Area  | = | 530SQM |
|  | Proposed Impermeable Area  | = | 585SQM |
|  | Proposed Driveway (Porous) | = | 496SQM |

| Rev             | Date | Amendment | Drawn | App |
|-----------------|------|-----------|-------|-----|
| Revision Status |      |           |       |     |

## PLANNING



**Transport Planners and Infrastructure Design Consultants**  
Metro House, Northgate, Chichester, West Sussex, PO19 1BB  
Tel: 01243 210418 [www.rqpdesign.co.uk](http://www.rqpdesign.co.uk)

Client **Wilson Designer Homes Ltd**

Project 193-195 London Road,  
Cowplain, PO8 8ER

Drawing Title Highway Appraisal  
Impermeable Areas

|                                   |                             |                          |                           |
|-----------------------------------|-----------------------------|--------------------------|---------------------------|
| Scale at A1<br><b>1:200</b>       | Drawn By<br><b>RAA</b>      | Checked By<br><b>MJA</b> | Approved By<br><b>MJA</b> |
| Drawing No.<br><b>D1070/SK200</b> | Date<br><b>January 2016</b> | Rev.<br><b>-</b>         |                           |

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4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority, however accuracy is not certain.

FOR HBC PLANNING APPLICATION  
BASED ON ADP ARCHITECTS  
DRAWING 1722 01P

PUBLIC SEWERS OVERLAID TO OS  
MAP FROM SOUTHERN WATER  
RECORDS.

EXACT LOCATIONS OF EXISTING  
APPARATUS MAY VARY ON SITE &  
SHALL BE VERIFIED PRIOR TO  
FINALISING DRAINAGE STRATEGY.

|     |        |                                               |       |      |
|-----|--------|-----------------------------------------------|-------|------|
| B   | Jan 16 | IC relocated                                  | LDF   | MJA  |
| A   | Jan 16 | Architects GA updated for planning submission | RJA   | MJA  |
| Rev | Date   | Amendment                                     | Drawn | Appr |

Drawing Status

PLANNING



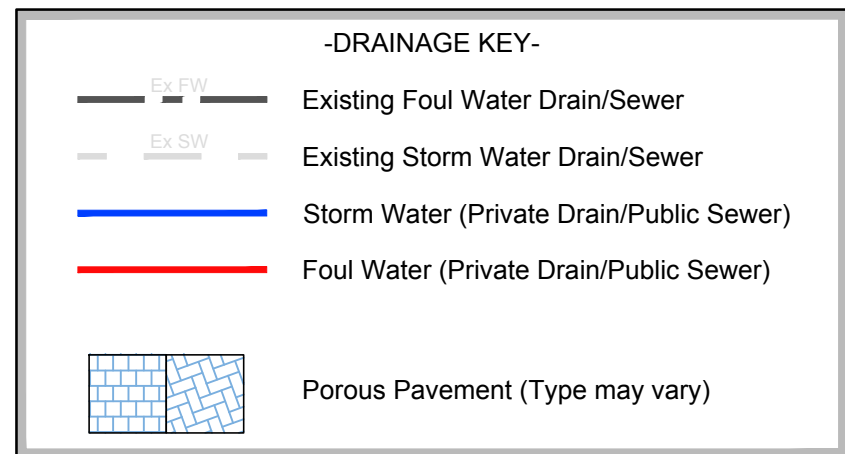
Client  
Wilson Designer Homes Ltd

Project  
193-195 London Road,  
Cowplain, PO8 8ER

Drawing Title  
Drainage Strategy  
Foul & Surface Water Proposals

|                            |                      |                   |                    |
|----------------------------|----------------------|-------------------|--------------------|
| Scale at A1<br>1:200       | Drawn By<br>MJA      | Checked By<br>LDF | Approved By<br>LDF |
| Drawing No.<br>D1070/SK300 | Date<br>January 2016 | Rev.<br>B         |                    |

P:\RGP\011 DESIGN\PROJECTS\2016 PROJECTS\10014-010690\0701 193-195 LONDON ROAD WATER\DWG\10 SK300 DRAINAGE STRATEGY (REV B).DWG (SK300) Jan 19 2016 3:29pm (1 hour)



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1:200 @ A1  
1:400 @ A3  
0 2 4 6 8 10 12 14 16 18 20 m



## **MICRODRAINAGE CALCULATIONS**

Greenfield Run-off rate (Qbar)  
Greenfield Run-off volume

|                                                 |                                        |                                                                                     |
|-------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| RGP Design Limited                              |                                        | Page 1                                                                              |
| Metro House<br>Northgate<br>Chichester P019 1BE |                                        |  |
| Date 04/01/2016 14:14<br>File                   | Designed by m.akmenkalns<br>Checked by |                                                                                     |
| XP Solutions Source Control 2015.1              |                                        |                                                                                     |

ICP SUDS Mean Annual Flood

Input

Return Period (years) 100 SAAR (mm) 835 Urban 0.000  
Area (ha) 0.170 Soil 0.450 Region Number Region 7

**Results l/s**

QBAR Rural 0.9  
QBAR Urban 0.9

Q100 years 2.9

Q1 year 0.8  
Q30 years 2.1  
Q100 years 2.9

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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|-----------------------|-----|-----------------------|-----|--------|-------------------|------------|--------|---------|-------|------------------------|------|-----------|-------|-----------|-----|-----|---------|-------|-------|-----|--------|-----------------------|-------|--------------------------------------------|--------|
| RGP Design Limited                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        | Page 1                                                                              |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| Metro House<br>Northgate<br>Chichester P019 1BE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |  |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| Date 04/01/2016 14:16<br>File                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Designed by m.akmenkalns<br>Checked by |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        | Source Control 2015.1                                                               |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| <p style="text-align: center;"><u>Greenfield Runoff Volume</u></p> <p style="text-align: center;">FSR Data</p> <table> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>Storm Duration (mins)</td> <td>360</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> </tr> <tr> <td>M5-60 (mm)</td> <td>19.700</td> </tr> <tr> <td>Ratio R</td> <td>0.323</td> </tr> <tr> <td>Areal Reduction Factor</td> <td>1.00</td> </tr> <tr> <td>Area (ha)</td> <td>0.170</td> </tr> <tr> <td>SAAR (mm)</td> <td>835</td> </tr> <tr> <td>CWI</td> <td>119.036</td> </tr> <tr> <td>Urban</td> <td>0.000</td> </tr> <tr> <td>SPR</td> <td>47.000</td> </tr> </table> <p style="text-align: center;">Results</p> <table> <tr> <td>Percentage Runoff (%)</td> <td>50.04</td> </tr> <tr> <td>Greenfield Runoff Volume (m<sup>3</sup>)</td> <td>57.051</td> </tr> </table> |                                        |                                                                                     | Return Period (years) | 100 | Storm Duration (mins) | 360 | Region | England and Wales | M5-60 (mm) | 19.700 | Ratio R | 0.323 | Areal Reduction Factor | 1.00 | Area (ha) | 0.170 | SAAR (mm) | 835 | CWI | 119.036 | Urban | 0.000 | SPR | 47.000 | Percentage Runoff (%) | 50.04 | Greenfield Runoff Volume (m <sup>3</sup> ) | 57.051 |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 100                                    |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| Storm Duration (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 360                                    |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | England and Wales                      |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 19.700                                 |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.323                                  |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| Areal Reduction Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1.00                                   |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| Area (ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.170                                  |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| SAAR (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 835                                    |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| CWI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 119.036                                |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| Urban                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.000                                  |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| SPR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 47.000                                 |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| Percentage Runoff (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 50.04                                  |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
| Greenfield Runoff Volume (m <sup>3</sup> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 57.051                                 |                                                                                     |                       |     |                       |     |        |                   |            |        |         |       |                        |      |           |       |           |     |     |         |       |       |     |        |                       |       |                                            |        |
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