

## EXECUTIVE SUMMARY

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The purpose of this report is to assess the potential for disposing of surface water through a Sustainable Drainage System (SUDS) at 18 Livingstone Drive, Liverpool, L17 4LR.

The SUDS Strategy ensures that a sustainable drainage solution can be achieved which reduces the peak discharge rate to manage and reduce the flood risk posed by the surface water runoff from the site. The SUDS Strategy takes into account the following principles:

- No increase in the volume or runoff rate of surface water runoff from the site.
- No increase in flooding to people or property off-site as a result of the development.
- No surface water flooding of the site.
- The proposals take into account a 30% increase in rainfall intensity due to climate change during the next 100 years which is the lifetime of the development.

The SUDS Strategy is shown in Appendix 5. In line with adopting a 'management train' it is recommended that water is managed as close to source as possible. This will reduce the size and cost of infrastructure further downstream and also shares the maintenance burden more equitably. It is therefore recommended that the site provides its own attenuation. This will be in the form of:

- Oversized pipes.
- Permeable paving of car parking spaces.
- For larger events in other areas such as landscaped courtyard, provided that it will not cause damage or prevent access.

For all development, both the Building Regulations and NPPF promote a hierarchical approach to surface water management. This approach has been adopted within this SUDS Strategy, it is anticipated that discharge will be to the public sewers at a restricted runoff rate of 16.00 litres/second, a reduction of 30% compared to the existing discharge rate of 23.00 litres/second.

The size of the storage has been calculated such that the proposed development has the capacity to accommodate the 1 in 100 year rainfall event including a 30% increase in rainfall intensity that is predicted to occur as a result of climate change. Consequently, all areas drained have been designed to accommodate a 100 year (+30% climate change) storm event. An attenuation storage volume of 34.10m<sup>3</sup> will be required.

Permeable paving will provide storage for the first 5mm (interception storage) as a minimum. It should be noted that any permeable paving system to be installed by a developer must have an infiltration rate of at least 30mm/hr (0.03m/hr) to avoid ponding on the surface before it reaches the natural soil (permeable paving systems generally would have an infiltration rate in excess of 30mm/hr).

These systems also encourage biological treatment of flow and extraction of oils and heavy metals from the run-off. Treatment processes that occur within the surface structure and the geotextile layers include:

- Filtration
- Absorption

- Biodegradation
- Sedimentation

This system will negate the need for a separate collection system such as kerbs and gullies. It will also assist in reducing the flood profile of the site by significantly attenuating the runoff from the development within the sub base material.

The remainder of the site that is not formally drained, i.e. landscaped areas, will be permeable (grass). The majority of rainwater falling on these areas will soak into the ground. Surface water runoff would be directed to the drainage system through drainage gullies located around the perimeter of the buildings and through contouring of the hardstanding areas.

These methods will reduce peak flows, the volume of runoff, and slow down flows and will provide a suitable SUDS solution for this site. These preliminary considerations are based on the outline development scheme provided and hence the design purposes.

The adoption of a SUDS Strategy for the site represents an enhancement from the current conditions as the current surface water runoff from the site is uncontrolled, untreated, unmanaged and unmitigated.

In adopting these principles, it has been demonstrated that a scheme can be developed that does not increase the risk of flooding to adjacent properties and development further downstream.

## 1.0 INTRODUCTION

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### 1.1 Background

This Sustainable Drainage Assessment has been prepared to support a planning application for the proposed development at 18 Livingstone Drive, Liverpool, L17 4LR. The site is currently in a brownfield state and was formally a Children's Home (see Appendix 1). A planning application is to be submitted for a residential development of 3 apartment blocks (see Appendix 2).

This Sustainable Drainage Assessment sets out an approach to achieve the required reduction using Sustainable Urban Drainage (SUDS) principles. It is recognised that developments that are designed without regards to the surface water runoff are likely to result in increased impact on existing off-site service provision and may lead to an increase in flood risk.

### 1.2 Purpose

This Sustainable Drainage Assessment complies with the principles of SUDS presented in the new Defra non-statutory technical standards for SUDS<sup>1</sup>, and the National Planning Policy Framework (NPPF)<sup>2</sup>. A surface water drainage assessment is presented with reference to the hydrological and hydrogeological context of the development.

The report findings are based upon professional judgement and are summarised below with detailed recommendations provided at the end of the report. The report includes baseline data on: flood risk from the Environment Agency, rainfall data from the Flood Estimation Handbook (FEH) and hydrogeological information from the British Geological Survey (BGS). The assessment will summarise and refer to these datasets in the text.

### 1.3 What are SUDS?

A sustainable drainage system (SUDS) is designed to replicate, as closely as possible, the natural drainage from the site (before development) to ensure that the flood risk downstream of the Site does not increase as a result of the land being developed. SUDS can also significantly improve the quality of water leaving the Site and can enhance the amenity and biodiversity that a site has to offer.

There are a range of SUDS options available to provide effective surface water management that intercept and store excess run-off. When considering these options, the destination of the run off should be considered using the order of preference outlined in the Building Regulations Part H document<sup>3</sup>:

- An adequate soakaway or some other adequate infiltration system
- A watercourse
- A sewer

### 1.4 Report Structure

This Sustainable Drainage Assessment has the following report structure:

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<sup>1</sup> Department for Environment, Food and Rural Affairs (2015) Non-statutory technical standards for SUDS (March 2015).

<sup>2</sup> Department for Communities and Local Government (2012). National Planning Policy Framework (NPPF).

<sup>3</sup> HM Government (2010) The building regulations 2010 Part H drainage and waste disposal (2015 edition).

- Section 2 outlines the proposed surface water drainage for the site; and
- Section 3 presents a summary and conclusions.

## **2.0 SURFACE WATER DRAINAGE**

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### **2.1 Surface Water Management Overview**

It is recognised that consideration of flood issues should not be confined to the floodplain. The alteration of natural surface water flow patterns through developments can lead to problems elsewhere in the catchment, particularly flooding downstream. For example, replacing vegetated areas with roofs, roads and other paved areas can increase both the total and the peak flow of surface water runoff from the development site. Changes of land use on previously developed land can also have significant downstream impacts where the existing drainage system may not have sufficient capacity for the additional drainage.

A SUDS Strategy for the site proposals has been developed to manage and reduce the flood risk posed by the surface water runoff from the site. An assessment of the surface water runoff rates has been undertaken, in order to determine the surface water options and attenuation requirements for the site. The assessment considers the impact of the development compared to current conditions. Therefore, the surface water attenuation requirement for the developed site can be determined and reviewed against existing arrangements.

The requirement for managing surface water runoff from developments depends on the pre-developed nature of the site. In the case of brownfield sites, drainage proposals will be measured against the existing performance of the site, although it is preferable for solutions to provide runoff characteristics that are similar to greenfield behaviour.

The surface water drainage arrangements for any development site should be such that the volumes and peak flow rates of surface water leaving a developed site are no greater than the rates prior to the proposed development, unless specific off-site arrangements are made and result in the same net effect.

It should be acknowledged that the satisfactory collection, control and discharge of surface water runoff are now a principle planning and design consideration. This is reflected in recently implemented guidance as well as the new Defra non-statutory technical standards for SUDS.

### **2.2 Opportunities for Discharge of Surface Water**

There are three possible options to discharge the surface water runoff in accordance with requirement H3 of the Building Regulations 2002, this hierarchy is also promoted within the NPPF. Rainwater shall discharge to one of the following, listed in order of priority:

- an adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable,
- a watercourse; or where that is not reasonably practicable,
- a sewer.

It is necessary to identify the most appropriate method of controlling and discharging surface water. The design should seek to improve the local runoff profile by using systems that can either attenuate runoff and reduce peak flow rates or positively impact on the existing surface water runoff.

### **2.2.1 Soakaway/Infiltration System**

In determining the future surface runoff from the site, the potential of using infiltration devices has been considered. Low infiltration rates would be expected within the Made Ground that underlay the whole of the site and it is also recommended that infiltration devices should not be located within 5.00m of any buildings or roads, or within 1.00m of groundwater, the availability of suitable locations on the site is very limited. Therefore, it has been concluded that infiltration methods such as soakaways will not provide a suitable means of surface water disposal.

### **2.2.2 Watercourse**

The next option is discharge to a watercourse. There are no watercourses on, or within the vicinity of the site. Therefore, it will not be possible to discharge surface water runoff from the site into a watercourse.

### **2.2.3 Sewer**

In the event that discharge of surface water via infiltration or discharge to a watercourse is deemed unsuitable, then discharge to the public sewers will be possible. The site has existing connection to the United Utilities public combined sewer via a free discharge and it is considered sustainable to retain and reuse this connection. A CCTV survey shows that the site currently discharges via a 150mm pipe with a gradient of at least 1 in 60 (see Appendix 3). The current maximum discharge rate has been calculated to be 23 litres/second. As there is no history of surface water flooding at the site it is likely that the current drainage system is sufficient for the current and proposed site use. Therefore, it will be possible to discharge to the public sewers.

## **2.3 Surface Water Runoff Rates**

An estimation of surface water runoff is required to permit effective site water management and prevent any increase in flood risk to off-site receptors. The method used is derivation of the Lloyd-Davies Rational Method. This derivation includes for a fixed rainfall rate of 50mm/hr for the 1 in 2 year event.

For the existing impermeable area of 2615m<sup>2</sup>, this gives an existing 1 in 2 year discharge rate of 36.35 litres/second. The existing connection to the United Utilities public sewers has a capacity of 23.00 litres/second.

The proposed discharge to the public sewers would be at 30% of the existing connection to the public sewers as this is lower than the 1 in 2 year discharge rate. Therefore, the surface water runoff from the site will be restricted to 16.00 litres/second.

The proposed development will decrease the surface water runoff from the site. The surface water runoff will decrease post-application compared to pre-application and there will be a decrease in surface water flood risk to the site and off-site locations.

In accordance with The SUDS Manual, the Greenfield run-off from the site has been calculated using the IoH124 method. This is used as a reference representative of the run-off generated on the permeable surfaces within the site. QBAR (rural) has been calculated to be 1.39 litres/second.

## **2.4 SUDS and Water Quality**

Current guidance promotes sustainable water management through the use of SUDS. SUDS measures should be used to control the surface water runoff from the proposed development site therefore, managing the flood risk to the site and surrounding areas from surface water runoff.

One of the aims of the NPPF is to provide not only flood risk mitigation but also to maximise additional gains such as improvements in runoff quality and provision of amenity and bio-diversity. Systems incorporating these features are often termed SUDS and it is the requirement of NPPF that these are considered as the primary means of collection, control and disposal for storm water as close to source as possible.

A hierarchy of techniques is identified<sup>4</sup>:

1. **Prevention** – the use of good site design and housekeeping measures on individual sites to prevent runoff and pollution (e.g. minimise areas of hard standing).
2. **Source Control** – control of runoff at or very near its source (such as the use of rainwater harvesting, permeable paving, soakaways and/or green roofs).
3. **Site Control** – management of water from several sub-catchments (including routing water from roofs and car parks to one/several large soakaways for the whole site, swales and/or infiltration trenches).
4. **Regional Control** – management of runoff from several sites, typically in a detention pond, basins, tanks and/or wetland.

It is generally accepted that the implementation of SUDS as opposed to conventional drainage systems, provides several benefits by:

- reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream;
- reducing the volumes and frequency of water flowing directly to watercourses or sewers from developed sites;
- improving water quality over conventional surface water sewers by removing pollutants from diffuse pollutant sources;
- reducing potable water demand through rainwater harvesting;
- improving amenity through the provision of public open spaces and wildlife habitat; and
- replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.

The most appropriate attenuation system will need to satisfy three main characteristics, firstly, provide the required volume of storage, secondly, minimise the loss of developable land and thirdly, where possible provide local amenity.


The application of the SUDS Manual requires that the runoff from sites is not only restricted to meet the Greenfield runoff characteristics but also that SUDS systems are utilised to improve the quality of the runoff prior to outfall to watercourses.

The SUDS Manual and Environment Agency guidance applies a sustainability hierarchy to the various types of SUDS systems, this is summarised in Table 1.

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<sup>4</sup> CIRIA (2004) Report C609, Sustainable Drainage Systems – Hydraulic, Structural and Water Quality advice.

**Table 1 - Sustainability Hierarchy**

<div>Most Sustainable</div> <div>  </div> <div>Least Sustainable</div>	SUDS Technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife
	<b>Living Roofs</b>	✓	✓	✓
	<b>Basins and ponds</b> <ul style="list-style-type: none"> <li>- Constructed wetlands</li> <li>- Balancing ponds</li> <li>- Detention basins</li> <li>- Retention ponds</li> </ul>	✓	✓	✓
	<b>Filter strips and swales</b>	✓	✓	✓
	<b>Infiltration Devices</b> <ul style="list-style-type: none"> <li>- Soakaways</li> </ul>	✓	✓	✓
	<b>Permeable Surfaces and Filter Drains</b> <ul style="list-style-type: none"> <li>- Gravelled areas</li> <li>- Solid paving blocks</li> <li>- Permeable paving</li> </ul>	✓	✓	
	<b>Tanked systems</b> <ul style="list-style-type: none"> <li>- Over-sized pipes/tanks</li> <li>- Cellular storage</li> </ul>	✓		

Systems at the top of the hierarchy provide a combination of attenuation, treatment and ecology and are deemed the most sustainable options. There are always specific scenarios where systems are more suitable than others and at this stage it is not possible to guide the development towards a particular strategy.

In addition to the above hierarchy the SUDS Manual (Table 5.6) identifies the number of treatment trains or SUDS devices through which flow should pass from various point sources of runoff (see Table 2). This is designed to ensure that the receiving environments are not put at risk of pollution by new development therefore; accordingly, one treatment train will be used on this site.

The usual approach is to consider the 'SUDS train' where each of the above options are considered in turn until a suitable solution is found. Thus, source control techniques such as soakaways, rainwater harvesting and/or infiltration trenches, if suitable on a site, are considered preferable to permeable conveyance and passive treatment systems such as tanks or ponds. The various options are considered in outline below. This volume of attenuation storage could be provided by a variety of means.



**Table 2 - Number of Treatment Train Components (assuming effective pre-treatment is in place)**

Runoff Catchment Characteristic	Receiving Watercourse Sensitivity		
	Low	Medium	High
Roof only	1	1	1
Residential roads Parking areas Commercial zones	2	2	3
Refuse collection Industrial areas Loading bays Lorry parks Highways	3	3	4

## 2.5 Site Storage Volumes

The provision of suitable storage on site to mitigate the flood risk resulting from the development of the site will be a key factor in the evolution of the site development layout. The provision of large volumes of attenuation can be achieved by a number of methods; however, not all systems can be assessed in direct comparison.

One of the aims of the NPPF is to provide not only flood risk mitigation but also to maximise additional gains such as improvements in runoff quality and provision of amenity and bio-diversity. Systems incorporating these features are often termed SUDS and it is the requirement of the NPPF that these are considered as the primary means of collection, control and disposal for storm water as close to source as possible.

The principle applied in the design of storage is to limit the discharge rate of surface water runoff from the developed site for events of similar frequency of occurrence to the same peak rate of runoff as that which takes place from a site prior to the proposed development. A 30% reduction in the existing surface water runoff from the post-application site compared to the pre-application site is required therefore, a limiting discharge rate of 16.00 litres/seconds has been used.

Table 3 shows the volume of storage required for the proposed development estimated using the Masterdrain Drainage Software for the 1 in 100 year event with a 30% allowance for climate change (increase in peak rainfall) assuming the proposed 1434m<sup>2</sup> of impermeable area (see Appendix 4). A conservative estimate of 100% runoff from impermeable areas has been used within the calculations.

**Table 3 - Storage Volume**

Return Period (years)	Limiting Discharge Rate (l/s)	Volume (m <sup>3</sup> )
100 + 30%	16.00	34.10

## 2.6 SUDS Strategy

The objective of this SUDS Strategy is to ensure that a sustainable drainage solution can be achieved which reduces the peak discharge rate to manage and reduce the flood risk posed by the surface water runoff from the site. The SUDS Strategy takes into account the following principles:

- No increase in the volume or runoff rate of surface water runoff from the site.

- No increase in flooding to people or property off-site as a result of the development.
- No surface water flooding of the site.
- The proposals take into account a 30% increase in rainfall intensity due to climate change during the next 100 years which is the lifetime of the development.

The SUDS Strategy is shown in Appendix 5. In line with adopting a 'management train' it is recommended that water is managed as close to source as possible. This will reduce the size and cost of infrastructure further downstream and also shares the maintenance burden more equitably. It is therefore recommended that the site provides its own attenuation. This will be in the form of:

- Oversized pipes.
- Permeable paving of car parking spaces.
- For larger events in other areas such as landscaped courtyard, provided that it will not cause damage or prevent access.

For all development, both the Building Regulations and NPPF promote a hierarchical approach to surface water management. This approach has been adopted within this SUDS Strategy, it is anticipated that discharge will be to the public sewers at a restricted runoff rate of 16.00 litres/second, a reduction of 30% compared to the existing discharge rate of 23.00 litres/second.

The size of the storage has been calculated such that the proposed development has the capacity to accommodate the 1 in 100 year rainfall event including a 30% increase in rainfall intensity that is predicted to occur as a result of climate change. Consequently, all areas drained have been designed to accommodate a 100 year (+30% climate change) storm event. An attenuation storage volume of 34.10m<sup>3</sup> will be required.

Permeable paving will provide storage for the first 5mm (interception storage) as a minimum. It should be noted that any permeable paving system to be installed by a developer must have an infiltration rate of at least 30mm/hr (0.03m/hr) to avoid ponding on the surface before it reaches the natural soil (permeable paving systems generally would have an infiltration rate in excess of 30mm/hr).

These systems also encourage biological treatment of flow and extraction of oils and heavy metals from the run-off. Treatment processes that occur within the surface structure and the geotextile layers include:

- Filtration
- Absorption
- Biodegradation
- Sedimentation

This system will negate the need for a separate collection system such as kerbs and gullies. It will also assist in reducing the flood profile of the site by significantly attenuating the runoff from the development within the sub base material.

The remainder of the site that is not formally drained, i.e. landscaped areas, will be permeable (grass). The majority of rainwater falling on these areas will soak into the ground. Surface water

runoff would be directed to the drainage system through drainage gullies located around the perimeter of the buildings and through contouring of the hardstanding areas.

These methods will reduce peak flows, the volume of runoff, and slow down flows and will provide a suitable SUDS solution for this site. These preliminary considerations are based on the outline development scheme provided and hence the design purposes.

The adoption of a SUDS Strategy for the site represents an enhancement from the current conditions as the current surface water runoff from the site is uncontrolled, untreated, unmanaged and unmitigated.

In adopting these principles, it has been demonstrated that a scheme can be developed that does not increase the risk of flooding to adjacent properties and development further downstream.

## **2.7 Designing for Local Drainage System Failure/Design Exceedance**

When considering residual risk, it is necessary to make predictions as to the impacts of a storm event that exceeds the design event, or the impact of a failure of the local drainage system. The SUDS Strategy applies a safe and sustainable approach to discharging rainfall runoff from the site and this reduces the risk of flooding however, it is not possible to completely remove the risk. This section is therefore associated with the way the residual risk is managed.

As part of the SUDS Strategy it must be demonstrated that the flooding of property would not occur in the event of local drainage system failure and/or design exceedance. It is not economically viable or sustainable to build a drainage system that can accommodate the most extreme events. Consequently, the capacity of the drainage system may be exceeded on rare occasions, with excess water flowing above ground<sup>5</sup>.

The attenuation requirements have been designed to accommodate the 1 in 100 year storm event plus climate change (+30%). The design of the site layout provides an opportunity to manage this local drainage system failure/exceedance flow and ensure that indiscriminate flooding of property does not occur.

An exceedance or blockage event of the system would not affect the proposed buildings because the finished floor level will be raised above the external ground level, ensuring flooding of the buildings will not occur. The gardens and driveways of the properties will rise away from the highways and sewers so that any flows will not enter the property boundaries ensuring any exceedance flooding would not affect the buildings. Exceedance flows would be contained within the highways adjacent to the site and within the site and would flow to the lower ground levels where landscaped areas are located. It is not considered that there is an increased risk to the properties on the site or located adjacent to the site.

In particular, the landscaped areas will include preferential flow paths that convey water away from the proposed buildings as well as the existing buildings adjacent to the site. Surface water runoff would be directed to the drainage system through drainage gullies located around the perimeter of the buildings and through contouring of the hardstanding areas.

When considering the impacts of a storm event that exceeds the 1 in 100 year (+30%) event, there is safety factor for attenuation storage, even under the design event conditions. Consequently, if this event were to be exceeded there is additional capacity with the system in the manholes and pipes to accommodate this. If this freeboard was to be exceeded the consequences would be similar, if not less than for the local drainage system failure. Surface water runoff would be directed to the

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<sup>5</sup> CIRIA (2006) Designing for exceedance in urban drainage – good practice.

drainage system through drainage gullies located around the perimeter of the buildings and through contouring of the hardstanding areas. Drainage gullies will provide additional water storage and provide betterment. Consequently, the impact of an exceedance event is not considered to represent any significant flood hazard.

The above manages and mitigates the flood risk from surface water runoff to the proposed properties from surface water runoff generated by the site development and to offsite locations as well the risk from surface water runoff generated offsite.

## 3.0 SUMMARY AND CONCLUSIONS

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### 3.1 Introduction

This report presents a Sustainable Drainage Assessment for the proposed development at 18 Livingstone Drive, Liverpool, L17 4LR.

### 3.2 SUDS Strategy

The SUDS Strategy ensures that a sustainable drainage solution can be achieved which reduces the peak discharge rate to manage and reduce the flood risk posed by the surface water runoff from the site. The SUDS Strategy takes into account the following principles:

- No increase in the volume or runoff rate of surface water runoff from the site.
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The adoption of a SUDS Strategy for the site represents an enhancement from the current conditions as the current surface water runoff from the site is uncontrolled, untreated, unmanaged and unmitigated.

In adopting these principles, it has been demonstrated that a scheme can be developed that does not increase the risk of flooding to adjacent properties and development further downstream.

### **3.3 Conclusion**

This Sustainable Drainage Assessment demonstrates that the proposed development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of the NPPF. The proposed development will considerably reduce the flood risk posed to the site and to off-site locations due to the adoption of a SUDS Strategy.

The development should not therefore be precluded on the grounds of flood risk.



## **APPENDIX 1 – Existing Site Layout**

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AV	Air valve
BH	Borehole
BOL	Bollard
BV	British Telecom cover
CAT	Cable television cover
CL	Cover level
DPC	Damp proof coating level
EMC	Earning of
ELEC	Electric cover
EP	Electricity pole
Fence I/R	Iron railing fence
Fence GB	Closeboard fence
Fence C/P&P	Concrete post & panel fence
Fence Pa	Palisade fence
Fence P/W	Post and wire fence
Fence P/R	Post and rail fence
Fence P/P	Post and panel fence
FFL	Finished floor level
FI	Flower bed
FIH	Fire Hydrant
G	Gully
GAS	Gas cover
IC	Inspection chamber
IL	Invert level
INV	Invert level
LP	Lamp post
LT	Light
MH	Manhole
Nyxem	Telecommunications cover
OS	Ordnance Survey Bench Mark
PTM	Parking ticket machine
RE	Rodding eye
RS	Road sign
Rt wall	Retaining wall
SBX	Switch box
SP	Sign post
SFS	Safety surfacing surface
ST	Stop step
SV	Service valve
TBM	Temporary Bench Mark
TR	Telegraph pole
TRP	Trid pit
TRL	Traffic light
WL	Water cover
WO	Wash out

SURVEY STATIONS				
Name	Survey	Northing	Height	
1	337234.917	387299.696	25.051	
2	337234.170	387299.387	25.034	
3	337234.867	387271.200	26.988	
4	337235.300	387271.200	26.965	
5	337228.274	387253.815	26.969	
6	337220.648	387255.998	26.733	
6A	337230.912	387228.896	26.850	
7	337230.468	387262.446	26.760	
8	337334.100	387252.150	26.750	
9	337317.800	387267.534	26.810	
9A	337271.600	387281.001	26.744	
10	337271.636	387281.001	26.703	
10C	337175.923	387243.027	26.128	
11	337151.627	387243.027	26.640	
12	337151.621	387292.006	26.520	
12A	337202.140	387292.006	26.510	
12B	337179.022	387298.103	26.804	
13	337344.801	387206.103	26.910	
14	337225.000	387252.667	26.710	

NOTE

Grid and Level related to OS  
using active GPS data network

[illegible]

Meridian House  
58/60 Hillside Road, Frodsham, Cheshire WA6 6AG  
Tel: 01928 734473 Fax: 01928 735573  
Email: [mail@powerstiltman.co.uk](mailto:mail@powerstiltman.co.uk)  
[www.powerstiltman.co.uk](http://www.powerstiltman.co.uk)

18 Livingston Drive

Liverpool

### Topographical Survey

Client: Mersey Design Group Ltd

Surveyed By : PD
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Date : 28/01/16

Al @

Drawn By : PD

Drawing No : 7

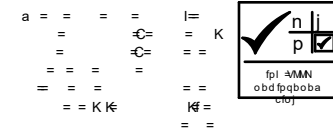
1:250

Checked By : JL

Amendment :

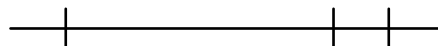
## APPENDIX 2 – Proposed Site Layout

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q l q i d f f fo r i q l k =

$\begin{array}{c} = i l \\ \hline \end{array}$	$\begin{array}{c} h = k \\ \hline \end{array}$	$\begin{array}{c} K = e l l \\ \hline \end{array}$	$\begin{array}{c} q m o f k q \\ \hline \end{array}$	$\begin{array}{c} m o h f k d \\ \hline \end{array}$
$\begin{array}{c} = m q \\ \hline \end{array}$	$\begin{array}{c} = \\ \hline \end{array}$	$\begin{array}{c} = p m \\ \hline \end{array}$	$\begin{array}{c} b p \\ \hline \end{array}$	
$\begin{array}{c} = N N \\ \hline \end{array}$	$\begin{array}{c} = P Q M \\ \hline \end{array}$	$\begin{array}{c} O = N N \\ \hline \end{array}$		
$\begin{array}{c} = N N \\ \hline \end{array}$	$\begin{array}{c} = P R R \\ \hline \end{array}$	$\begin{array}{c} O = N N \\ \hline \end{array}$		
$\begin{array}{c} = Q \\ \hline \end{array}$	$\begin{array}{c} = O O R \\ \hline \end{array}$	$\begin{array}{c} O = Q \\ \hline \end{array}$		
				<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<b>I</b>	<b>i</b>	<b>O</b>	<b>O O</b>	<b>P</b>

[illegible]

mdg ➔

$$\begin{array}{ccccccc}
 & & j & = & d & & \\
 = & & i & & & & WNRNOMTACPN \\
 & & & & e & & WNRNOMTACOT \\
 = & & & & & & W & K \\
 = J & QNp & p & & & & W & K & K \\
 & i & = SNei & & & & & & 
 \end{array}$$

kr dbkq



j l o b a i b W  
N U f s f k d p q l k a o f s b l f

i m  
mol ml pba=OS=

NRM	P	NK/NK1	g
CCM	CCM	ph-BMF	
m		MR	

ao cq

# KOTUMR

$$G =$$

9

mol ml pba ÷ l      qfl k ÷ mi   k ÷ ~~EOS~~ ÷      F

## **APPENDIX 3 – Sewer Surveys**

---





### Legend

AV	Air valve
BH	Borehole
BT	British Telecom cover
CTV	Cable television cover
CL	Cover board
DPC	Damp proof covering level
ENR/EMR	Earthling roof
EP	Electric cover
EP	(Electricity) pole
Fence IR	Iron railing fence
Fence CB	Chainlink fence
Fence PC/P	Concrete post & pointed fence
Fence PA	Palisade fence
Fence PP	Post and wire fence
Fence PIR	Post and rail fence
Fence PIP	Post and pointed fence
FL	Flashed floor level
FG	Flower bed
FH	Fire Hydrant
GS	Gully
GAS	Gas cover
L	Inspection chamber
LC	Level level
Inv	Invent board
LP	Lamp post
LT	Light
M	Mantle
Nyxex	Telecommunications cover
OSBM	Ordnance Survey Bench Mark
P	Parking slot machine
PE	Pipe
RE	Ribbing eye
RS	Road sign
RSX	Retaining wall
RT	Switch box
S	Sign post
SBS	Safety playing surface
ST	Stop lap
SV	Service valve
TEM	Temporary Bench Mark
TEP	Telegraph pole
TRP	Trunk pit
TRL	Traffic light
W	Water cover
WL	Water level
WD	Wash out

SURVEY STATIONS			
Name	Easting	Northing	Height
1	377294.417	387760.680	26.101
2	377294.175	387713.767	26.102
3	377293.810	387666.854	26.103
4	377283.263	387659.672	26.103
5	377272.714	387652.490	26.103
6	377262.166	387645.308	26.103
7	377251.617	387638.126	26.103
8	377241.068	387630.944	26.103
9A	377230.519	387623.762	26.103
10	377219.970	387616.580	26.103
11	377209.421	387609.398	26.103
12	377198.872	387602.216	26.103
13	377188.323	387595.034	26.103
14	377177.774	387587.852	26.103
15	377167.225	387580.670	26.103
16	377156.676	387573.488	26.103
17	377146.127	387566.306	26.103
18	377135.578	387559.124	26.103
19	377125.029	387551.942	26.103
20	377114.480	387544.760	26.103
21	377103.931	387537.578	26.103
22	377093.382	387530.396	26.103
23	377082.833	387523.214	26.103
24	377072.284	387516.032	26.103
25	377061.735	387508.850	26.103
26	377051.186	387501.668	26.103
27	377040.637	387494.486	26.103
28	377030.088	387487.304	26.103
29	377019.539	387480.122	26.103
30	377008.990	387472.940	26.103
31	376998.441	387465.758	26.103
32	376987.892	387458.576	26.103
33	376977.343	387451.394	26.103
34	376966.794	387444.212	26.103
35	376956.245	387437.030	26.103
36	376945.696	387429.848	26.103
37	376935.147	387422.666	26.103
38	376924.598	387415.484	26.103
39	376914.049	387408.302	26.103
40	376903.500	387401.120	26.103
41	376892.951	387393.938	26.103
42	376882.402	387386.756	26.103
43	376871.853	387379.574	26.103
44	376861.304	387372.392	26.103
45	376850.755	387365.210	26.103
46	376840.206	387358.028	26.103
47	376829.657	387350.846	26.103
48	376819.108	387343.664	26.103
49	376808.559	387336.482	26.103
50	376798.010	387329.300	26.103
51	376787.461	387322.118	26.103
52	376776.912	387314.936	26.103
53	376766.363	387307.754	26.103
54	376755.814	387300.572	26.103
55	376745.265	387293.390	26.103
56	376734.716	387286.208	26.103
57	376724.167	387279.026	26.103
58	376713.618	387271.844	26.103
59	376703.069	387264.662	26.103
60	376692.520	387257.480	26.103
61	376681.971	387250.298	26.103
62	376671.422	387243.116	26.103
63	376660.873	387235.934	26.103
64	376650.324	387228.752	26.103
65	376639.775	387221.570	26.103
66	376629.226	387214.388	26.103
67	376618.677	387207.206	26.103
68	376608.128	387200.024	26.103
69	376597.5	387192.842	26.103
70	376586.951	387185.660	26.103
71	376576.402	387178.478	26.103
72	376565.853	387171.296	26.103
73	376555.304	387164.114	26.103
74	376544.755	387156.932	26.103
75	376534.206	387149.750	26.103
76	376523.657	387142.568	26.103
77	376513.108	387135.386	26.103
78	376502.559	387128.204	26.103
79	376492.010	387121.022	26.103
80	376481.461	387113.840	26.103
81	376470.912	387106.658	26.103
82	376460.363	387099.476	26.103
83	376449.814	387092.294	26.103
84	376439.265	387085.112	26.103
85	376428.716	387077.930	26.103
86	376418.167	387070.748	26.103
87	376407.618	387063.566	26.103
88	376397.069	387056.384	26.103
89	376386.520	387049.202	26.103
90	376375.971	387042.020	26.103
91	376365.422	387034.838	26.103
92	376354.873	387027.656	26.103
93	376344.324	387020.474	26.103
94	376333.775	387013.292	26.103
95	376323.226	387006.110	26.103
96	376312.677	386998.928	26.103
97	376302.128	386991.746	26.103
98	376291.579	386984.564	26.103
99	376281.030	386977.382	26.103
100	376270.481	386970.200	26.103
101	376259.932	386963.018	26.103
102	376249.383	386955.836	26.103
103	376238.834	386948.654	26.103
104	376228.285	386941.472	26.103
105	376217.736	386934.290	26.103
106	376207.187	386927.108	26.103
107	376196.638	386919.926	26.103
108	376186.089	386912.744	26.103
109	376175.540	386905.562	26.103
110	376164.991	386898.380	26.103
111	376154.442	386891.198	26.103
112	376143.893	386884.016	26.103
113	376133.344	386876.834	26.103
114	376122.795	386869.652	26.103
115	376112.246	386862.470	26.103
116	376101.697	386855.288	26.103
117	376091.148	386848.106	26.103
118	376080.599	386840.924	26.103
119	376070.050	386833.742	26.103
120	376059.501	386826.560	26.103
121	376048.952	386819.378	26.103
122	376038.403	386812.196	26.103
123	376027.854	386805.014	26.103
124	376017.305	386797.832	26.103
125	376006.756	386790.650	26.103
126	375996.207	386783.468	26.103
127	375985.658	386776.286	26.103
128	375975.109	386769.104	26.103
129	375964.560	386761.922	26.103
130	375954.011	386754.740	26.103
131	375943.462	386747.558	26.103
132	375932.913	386740.376	26.103
133	375922.364	386733.194	26.103
134	375911.815	386726.012	26.103
135	375901.266	386718.830	26.103
136	375890.717	386711.648	26.103
137	375880.168	386704.466	26.103
138	375869.619	386697.284	26.103
139	375859.070	386690.102	26.103
140	375848.521	386682.920	26.103
141	375837.972	386675.738	26.103
142	375827.423	386668.556	26.103
143	375816.874	386661.374	26.103
144	375806.325	386654.192	26.103
145	375795.776	386647.010	26.103
146	375785.227	386639.828	26.103
147	375774.678	386632.646	26.103
148	375764.129	386625.464	26.103
149	375753.580	386618.282	26.103
150	375743.031	386611.100	26.103
151	375732.482	386603.918	26.103
152	375721.933	386596.736	26.103
153	375711.384	386589.554	26.103
154	375700.835	386582.372	26.103
155	375690.286	386575.190	26.103
156	375679.737	386568.008	26.103
157	375669.188	386560.826	26.103
158	375658.639	386553.644	26.103
159	375648.090	386546.462	26.103
160	375637.541	386539.280	26.103
161	375626.992	386532.098	26.103
162	375616.443	386524.916	26.103
163	375605.894	386517.734	26.103
164	375595.345	386510.552	26.103
165	375584.796	386503.370	26.103
166	375574.247	386496.188	26.103
167	375563.698	386489.006	26.103
168	375553.149	386481.824	26.103
169	375542.600	386474.642	26.103
170	375532.051	386467.460	26.103
171	375521.502	386460.278	26.103
172	375510.953	386453.096	26.103
173	375500.404	386445.914	26.103
174	375489.855	386438.732	26.103
175	375479.306	386431.550	26.103
176	375468.757	386424.368	26.103
177	375458.208	386417.186	26.103
178	375447.659	386410.004	26.103
179	375437.110	386402.822	26.103
180	375426.561	386395.640	26.103
181	375416.012	386388.458	26.103
182	375405.463	386381.276	26.103
183	375394.914	386374.094	26.103
184	375384.365	386366.912	26.103
185	375373.816	386359.730	26.103
186	375363.267	386352.548	26.103
187	375352.718	386345.366	26.103
188	375342.169	386338.184	26.103
189	375331.620	386331.002	26.103
190	375321.071	386323.820	26.103
191	375310.522	386316.638	26.103
192	375300.0	386309.456	26.103
193	375289.451	386302.274	26.103
194	375278.902	386295.092	26.103
195	375268.353	386287.910	26.103
196	375257.804	386280.728	26.103
197	375247.255	386273.546	26.103
198	375236.706	386266.364	26.103
199	375226.157	386259.182	26.103
200	375215.608	386251.999	26.103

KEY DIMENSIONS SHOULD BE CHECKED ON SITE  
BEFORE COMMENCEMENT OF ANY WORKS

**NOTE**

Grid and Level related to OS  
using active GPS data network

[illegible]

Meridian House  
58/60 Hillside Road, Frodsham, Cheshire WA6 6AG  
Tel: 01928 734473 Fax: 01928 735573  
Email: [mail@powerstiltman.co.uk](mailto:mail@powerstiltman.co.uk)  
[www.powerstiltman.co.uk](http://www.powerstiltman.co.uk)

18 Livingston Drive

Liverpool

Topographical Survey

Client: Mersey Design Group Ltd

Surveyed By: PD	Date: 28/01/16	A1 @ 1:250
Drawn By: PD	Drawing No: 7427/01	
Checked By: JL	Amendment:	



**Interim Consultancy Solutions  
Suite 8, Church House  
1 Hanover Street  
Liverpool  
Merseyside  
L1 3DN**

**FAO: David Ricketts**

Dear Sirs

**Location: Former Childrens Home 18 Livingstone Drive**

I acknowledge with thanks your request dated 13/06/17 for information on the location of our services.

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

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

If you are planning works anywhere in the North West, please read our access statement before you start work to check how it will affect our network.

<http://www.unitedutilities.com/work-near-asset.aspx>.

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

If you have any queries regarding this matter please telephone us on 0370 7510101.

Yours Faithfully,

Karen McCormack  
Property Searches Manager

**United Utilities Water Limited**

Property Searches  
Ground Floor Grasmere House  
Lingley Mere Business Park  
Great Sankey  
Warrington  
WA5 3LP

Telephone 0370 751 0101

[Property.searches@uuplc.co.uk](mailto:Property.searches@uuplc.co.uk)

Your Ref: 427  
Our Ref: 1300483  
Date: 17/6/2017

## **TERMS AND CONDITIONS - WASTERWATER & WATER DISTRIBUTION PLANS**

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

### **TERMS AND CONDITIONS:**

1. This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
2. This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
3. In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only and given in accordance with the best information available. The nature of the relevant system and/or its actual position may be different from that shown on the plan and UUWL is not liable for any damage caused by incorrect information provided save as stated in section 199 of the Water Industry Act 1991. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
4. The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
5. The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
6. This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
7. No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
8. If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
9. This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.





Ratno	Cover	Func	Invert	Size	xSize	yShape	Mat	Length	Grad	Ratno	Cover	Func	Invert	Size	xSize	yShape	Mat	Length	Grad
0001	23.28	CO	20.85	225	CI	VC	70.72			4205	27.08	CO	4205	27.08	CI	VC	61.7	167	
0002	24.16	CO	21.14	225	CI	VC	42.72			4302	27.08	CO	4302	27.08	CI	VC	61.7	167	
0003	20.82	CO								4305	27.08	CO	4305	27.08	CI	VC	61.7	167	
0004	20.82	CO								4401	27.08	CO	4401	27.08	CI	VC	61.7	167	
0008	24.07	CO	17.07	300	CI	BR	48.37			6805	27.08	CO	6805	27.08	CI	VC	61.7	167	
0101	26.83	CO	0	225	CI	VC	29.41			0010	27.08	CO	0010	27.08	CI	VC	61.7	167	
0103	26.83	CO	25.08	225	CI	VC	33.3			0117	27.08	CO	0117	27.08	CI	VC	61.7	167	
0104	24.33	CO	0	225	CI	VC	20.39			0119	27.08	CO	0119	27.08	CI	VC	61.7	167	
0105	24.33	CO	22.1	225	CI	VC	9.05			0120	27.08	CO	0120	27.08	CI	VC	61.7	167	
0106	24.33	CO	0	225	CI	VC	15.05			0203	27.08	CO	0203	27.08	CI	VC	61.7	167	
0107	24.33	CO	0	225	CI	VC	14.42			0206	27.08	CO	0206	27.08	CI	VC	61.7	167	
0108	24.33	CO	0	225	CI	VC	18.03			0207	27.08	CO	0207	27.08	CI	VC	61.7	167	
0109	25.17	CO								0210	27.08	CO	0210	27.08	CI	VC	61.7	167	
0110	24.08	CO	22.38	225	CI	VC	38.59			0212	27.08	CO	0212	27.08	CI	VC	61.7	167	
0113	24.08	CO	0	225	CI	VC	22.84			0301	27.08	CO	0301	27.08	CI	VC	61.7	167	
0114	24.08	CO	0	225	CI	VC	38.59			0402	27.08	CO	0402	27.08	CI	VC	61.7	167	
0115	24.08	CO	0	225	CI	VC	22.84			0403	27.08	CO	0403	27.08	CI	VC	61.7	167	
0116	24.08	CO	0	225	CI	VC	38.59			0404	27.08	CO	0404	27.08	CI	VC	61.7	167	
0201	28.1	CO	0	150	CI	VC	16.64			1100	27.08	CO	1100	27.08	CI	VC	61.7	167	
0202	28.1	CO	17.74	720	1240	EG	BR	34.06	106	1106	27.08	CO	1106	27.08	CI	VC	61.7	167	
0204	27.67	CO	26.07	225	CI	VC	36.36		40	1108	27.08	CO	1108	27.08	CI	VC	61.7	167	
0205	27.67	CO	26.07	225	CI	VC	37.81			1109	27.08	CO	1109	27.08	CI	VC	61.7	167	
0208	27.67	CO	26.07	225	CI	VC	37.81			1110	27.08	CO	1110	27.08	CI	VC	61.7	167	
0211	27.67	CO	26.07	225	CI	VC	37.81			1111	27.08	CO	1111	27.08	CI	VC	61.7	167	
0213	27.67	CO	26.07	225	CI	VC	37.81			1208	27.08	CO	1208	27.08	CI	VC	61.7	167	
0214	27.67	CO	26.07	225	CI	VC	37.81			1416	27.08	CO	1416	27.08	CI	VC	61.7	167	
0215	27.67	CO	26.07	225	CI	VC	37.81			1417	27.08	CO	1417	27.08	CI	VC	61.7	167	
0216	27.67	CO	26.07	225	CI	VC	37.81			1420	27.08	CO	1420	27.08	CI	VC	61.7	167	
0217	27.67	CO	26.07	225	CI	VC	37.81			1421	27.08	CO	1421	27.08	CI	VC	61.7	167	
0302	29.58	CO	26.14	300	CI	VC	47.42			1424	27.08	CO	1424	27.08	CI	VC	61.7	167	
0303	29.58	CO	26.14	300	CI	VC	47.42			1425	27.08	CO	1425	27.08	CI	VC	61.7	167	
0304	29.58	CO	26.14	300	CI	VC	47.42			1426	27.08	CO	1426	27.08	CI	VC	61.7	167	
0401	29.77	CO	25.4	600	1143	EG	BR	37.64	452	1428	27.08	CO	1428	27.08	CI	VC	61.7	167	
1001	24.47	SW	21.1	1200	CI	VC	18.1			1431	27.08	CO	1431	27.08	CI	VC	61.7	167	
1002	25.34	SW	21.06	1200	CI	VC	22.87			2109	27.08	CO	2109	27.08	CI	VC	61.7	167	
1003	25.07	SW	21.1	1200	CI	VC	28.59		408	2205	27.08	CO	2205	27.08	CI	VC	61.7	167	
1004	25.72	SW	21.1	1200	CI	VC	28.59			2414	27.08	CO	2414	27.08	CI	VC	61.7	167	
1005	25.43	SW	21.1	1200	CI	VC	28.59			2415	27.08	CO	2415	27.08	CI	VC	61.7	167	
1006	25.1	SW	21.1	1200	CI	VC	28.59			3010	27.08	CO	3010	27.08	CI	VC	61.7	167	
1007	26.03	FO	24.53	150	CI	VC	8.8		80	3011	27.08	CO	3011	27.08	CI	VC	61.7	167	
1008	25.78	FO	24.53	150	CI	VC	8.8			3013	27.08	CO	3013	27.08	CI	VC	61.7	167	
1009	25.12	FO	21.69	150	CI	VC	21.87		78	3016	27.08	CO	3016	27.08	CI	VC	61.7	167	
1010	23.38	FO	21.9	150	CI	VC	17.21		82	3017	27.08	CO	3017	27.08	CI	VC	61.7	167	
1011	24.62	FO	21.9	150	CI	VC	17.21			3018	27.08	CO	3018	27.08	CI	VC	61.7	167	
1012	25.21	FO	21.9	150	CI	VC	17.21			3020	27.08	CO	3020	27.08	CI	VC	61.7	167	
1013	25.21	FO	21.9	150	CI	VC	17.21			3023	27.08	CO	3023	27.08	CI	VC	61.7	167	
1101	27.91	CO	0	225	CI	VC	9.84			3100	27.08	CO	3100	27.08	CI	VC	61.7	167	
1102	27.91	CO	0	225	CI	VC	9.84			3101	27.08	CO	3101	27.08	CI	VC	61.7	167	
1103	27.91	CO	0	225	CI	VC	9.84			3112	27.08	CO	3112	27.08	CI	VC	61.7	167	
1104	27.91	CO	0	225	CI	VC	9.84			3113	27.08	CO	3113	27.08	CI	VC	61.7	167	
1105	24.76	CO	23.6	900	CI	VC	24.5		408	3114	27.08	CO	3114	27.08	CI	VC	61.7	167	
1112	26.79	SW	23.6	900	CI	VC	24.5			3115	27.08	CO	3115	27.08	CI	VC	61.7	167	
1113	26.79	SW	23.6	900	CI	VC	24.5			3117	27.08	CO	3117	27.08	CI	VC	61.7	167	
1114	27.29	SW	23.6	900	CI	VC	24.5			3120	27.08	CO	3120	27.08	CI	VC	61.7	167	
1115	26.54	FO	24.75	150	CI	VC	17.9		384	3204	27.08	CO	3204	27.08	CI	VC	61.7	167	
1116	25.05	FO	24.75	150	CI	VC	17.9		81	3207	27.08	CO	3207	27.08	CI	VC	61.7	167	
1201	27.91	CO	18.96	711	1143	EG	BR	32.45		3404	27.08	CO	3404	27.08	CI	VC	61.7	167	
1202	27.91	CO	18.96	711	1143	EG	BR	32.45		3514	27.08	CO	3514	27.08	CI	VC	61.7	167	
1204	27.91	CO	18.96	711	1143	EG	BR	32.45		4008	27.08	CO	4008	27.08	CI	VC	61.7	167	
1205	27.91	CO	18.96	711	1143	EG	BR	32.45		4106	27.08	CO	4106	27.08	CI	VC	61.7	167	
1206	27.91	CO	18.96	711	1143	EG	BR	32.45		4107	27.08	CO	4107	27.08	CI	VC	61.7	167	
1208	27.91	CO	18.96	711	1143	EG	BR	32.45		4109	27.08	CO	4109	27.08	CI	VC	61.7	167	
1209	27.91	CO	18.96	711	1143	EG	BR	32.45		4111	27.08	CO	4111	27.08	CI	VC	61.7	167	
1210	27.91	CO	18.96	711	1143	EG	BR	32.45		4112	27.08	CO	4112	27.08	CI	VC	61.7	167	
1302	27.91	CO	18.96	711	1143	EG	BR	32.45		4204	27.08	CO	4204	27.08	CI	VC	61.7	167	
1304	27.91	CO	18.96	711	1143	EG	BR	32.45		4205	27.08	CO	4205	27.08	CI	VC	61.7	167	
1312	27.91	CO	18.96	711	1143	EG	BR	32.45		4304	27.08	CO	4304	27.08	CI	VC	61.7	167	
1313	27.91	CO	18.96	711	1143	EG	BR	32.45		4402	27.08	CO	4402	27.08	CI	VC	61.7	167	
1401	30.7	CO	26.03	600	990	EG	BR	43.93	146	5002	27.08	CO	5002	27.08	CI	VC	61.7	167	
1403	30.29	CO	26.29	225	CI	VC	56.89			0007	27.08	CO	0007	27.08	CI	VC	61.7	167	
1405	29.89	CO	26.47	600	900	EG	BR	80.72		0118	27.08	CO	0118	27.08	CI	VC	61.7	167	
1407	30.25	CO	26.47	600	900	EG	BR	80.72		0209	27.08	CO	0209	27.08	CI	VC	61.7	167	
1408	30.25	CO	26.47	600	900	EG	BR	80.72		1105	27.08	CO	1105	27.08	CI	VC	61.7	167	
1409	30.25	CO	26.47	600	900	EG	BR	80.72		1307	27.08	CO	1307	27.08	CI	VC	61.7	167	
1410	30.25	CO	26.47	600	900	EG	BR	80.72		1310	27.08	CO	1310	27.08	CI	VC	61.7	167	
1411	30.14	CO	26.55	600	900	EG	BR	70.61	228	1415	27.08	CO	1415	27.08	CI	VC	61.7	167	
1412	30.14	CO	26.55	600	900	EG	BR	70.61		1416	27.08	CO	1416	27.08	CI	VC	61.7	167	
1413	30.14	CO	26.55	600	900	EG	BR	70.61		1418	27.08	CO	1418	27.08	CI	VC	61.7	167	
1414	30.14	CO	26.55	600	900	EG	BR	70.61		1423	27.08	CO	1423	27					



Project

Project Name	Interim Consultancy Solutions Limited
Description	18 Livingston Drive Liverpool
Start Date	28/06/2017

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<b>Interim Consultancy Solutions Limited</b>		<b>06/07/2017</b>
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## Scoring Summary

Project Name :  
Interim Consultancy Solutions Limited

Project Number :

Date :  
06/07/2017

### Structural Defects

Section	Pipe Ref	Grade	Description
1	AX	5	Collapsed drain/sewer
4	C1X	3	Fracture, multiple at joint from 12 o'clock to 12 o'clock
12	BX	3	Fracture, longitudinal at joint at 7 o'clock
14	AX	5	Collapsed drain/sewer
27	AX	5	Collapsed drain/sewer
28	BX	5	Collapsed drain/sewer
29	CX	5	Collapsed drain/sewer
31	C6X	5	Hole in drain/sewer from 8 o'clock to 12 o'clock
39	C17X	5	Collapsed drain/sewer
40	AX	5	Collapsed drain/sewer
45	C7X	3	Fracture, circumferential from 10 o'clock to 6 o'clock

Grade 3: Best practice suggests consideration should be given to repairs in the medium term.

Grade 4: Best practice suggests consideration should be given to repairs to avoid a potential collapse.

Grade 5: Best practice suggests that this pipe is at risk of collapse at any time. Urgent consideration should be given to repairs to avoid total failure

### Service / Operational Defects

Section	Pipe Ref	Grade	Description
1	AX	4	Roots, tap
4	C1X	4	Roots, tap at joint
14	AX	3	Roots, mass at joint, 10% cross-sectional area loss
16	CX	5	Other obstacles, external pipe or cable from 4 o'clock to 8 o'clock, 20% cross-sectional area loss
28	BX	5	Roots, mass, 75% cross-sectional area loss
29	CX	4	Multiple defects
39	C17X	4	Roots, tap at joint
41	C15X	4	Roots, tap at joint

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.

## Scoring Summary

Project Name :  
**Interim Consultancy Solutions Limited**

Project Number :

Date :  
**06/07/2017**

### Abandoned Surveys

Section	Pipe Ref	Description
1	AX	Survey abandoned
12	BX	Survey abandoned
14	AX	Survey abandoned
16	CX	Survey abandoned
17	DX	Survey abandoned
27	AX	Survey abandoned
28	BX	Survey abandoned
29	CX	Survey abandoned
39	C17X	Survey abandoned
40	AX	Survey abandoned

### Information

These summaries are based on the SRM grading from the WRC.



## Project Information

Project Name <b>Interim Consultancy Solutions Limited</b>	Client's ref : <b>18 Livingston Drive</b>	Contractor's ref : <b>16792</b>	Date: <b>06/07/2017</b>
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Description      18 Livingston Drive Liverpool

### **Client**

Company: Interim Consultancy Solutions Limited  
Contact: David  
Department: Owner  
Street: 616a The Cotton Exchange, 16 Bixteth Street  
City: Liverpool L3 9LQ  
Phone:  
Fax:  
Mobile: 07909 870466  
E-Mail: david@interimcs.co.uk

### **Site**

Company: 18 Livingston Drive  
Contact:  
Department:  
Street: Liverpool  
City: Merseyside  
Phone:  
Fax:  
Mobile:  
E-Mail:

### **Contractor**

Company: Clearground Ltd  
Contact: Mike Box  
Department: Drainage Operations Manager  
Street: 67C Corporation Road  
City: Birkenhead  
Phone: 01516528010  
Fax: 01516662930  
Mobile: 07918734752  
E-Mail: mike@clearground.co.uk



## Section Summary

Project Name  
**Interim Consultancy Solutions Limited**

Project Number:



Date:  
**7/1/-4713**

Number of sections	45
Total length of sewer network	282.90 m
Inspected length of sewer network	282.90 m
Not inspected length of sewer network	0.00 m
Total abandoned inspections	10
Number of section inspection photos	0
Number of section inspection videos	0
Number of section inspection scans	0
Number of section inclination measurements	0



## Section Summary

Project Name <b>Interim Consultancy Solutions Limited</b>	Project Number:	Date: <b>7/1/-4713</b>
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PLR <b>AX</b>	Upstream MH <b>A</b>
Town or Village <b>LIVERPOOL</b>	Downstream MH <b>C1</b>
Street <b>18 LIVINGSTON DRIVE</b>	
Expected length <b>1.1</b>	Material <b>Vitrified clay pipe</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C1
2 	0.00	WL	Water level, 05% of the vertical dimension
3	0.00	RT	Roots, tap
4	1.10	XP	Collapsed drain/sewer
5	1.10	SA	Survey abandoned / UNABLE TO CAMERA PAST COLLAPSE



PLR <b>BX</b>	Upstream MH <b>B</b>
Town or Village <b>LIVERPOOL</b>	Downstream MH <b>C1</b>
Street <b>18 LIVINGSTON DRIVE</b>	
Expected length <b>3.5</b>	Material <b>Vitrified clay pipe</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C1
2 	0.00	WL	Water level, 05% of the vertical dimension
3	0.90	REM	General remark / BURRIED MANHOLE
4	1.90	LR	Line deviates right
5	3.50	MHF	Finish node type, manhole, reference number: B / POP UP

PLR <b>CX</b>	Upstream MH <b>C</b>
Town or Village <b>LIVERPOOL</b>	Downstream MH <b>C1</b>
Street <b>18 LIVINGSTON DRIVE</b>	
Expected length <b>6.5</b>	Material <b>Vitrified clay pipe</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C1
2 	0.00	WL	Water level, 05% of the vertical dimension
3	6.00	JN	Junction at 9 o'clock, diameter: 100mm
4	6.50	MHF	Finish node type, manhole, reference number: C / GULLY

PLR <b>C1X</b>	Upstream MH <b>C1</b>
Town or Village <b>LIVERPOOL</b>	Downstream MH <b>C2</b>
Street <b>18 LIVINGSTON DRIVE</b>	
Expected length <b>25.1</b>	Material <b>Vitrified clay pipe</b>



	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C1
2 	0.00	WL	Water level, 05% of the vertical dimension
3	2.80	CCJ	Crack, circumferential at joint from 5 o'clock to 7 o'clock
4	3.90	JN	Junction at 3 o'clock, diameter: 100mm
5	12.40	CCJ	Crack, circumferential at joint from 4 o'clock to 8 o'clock
6	12.40	RTJ	Roots, tap at joint
7	12.50	JN	Junction at 3 o'clock, diameter: 100mm
8	15.70	CCJ	Crack, circumferential at joint from 5 o'clock to 7 o'clock
9	15.70	RMJ	Roots, mass at joint, 05% cross-sectional area loss
10	18.40	FMJ	Fracture, multiple at joint from 12 o'clock to 12 o'clock
11	18.40	JN	Junction at 3 o'clock, diameter: 100mm
12	24.90	LR	Line deviates right
13	25.10	MHF	Finish node type, manhole, reference number: C2





## Section Summary

Project Name <b>Interim Consultancy Solutions Limited</b>	Project Number:	Date: <b>7/1/-4713</b>
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PLR	<b>C2X</b>	Upstream MH	<b>C2</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C3</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>13.6</b>	Material	<b>Polyvinyl chloride</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C3
2 	0.00	WL	Water level, 05% of the vertical dimension
3	13.30	JN	Junction at 3 o'clock, diameter: 100mm
4	13.50	LL	Line deviates left
5	13.60	MHF	Finish node type, manhole, reference number: C2



PLR	<b>C3X</b>	Upstream MH	<b>C3</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C4</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>2.4</b>	Material	<b>Polyvinyl chloride</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C3
2 	0.00	WL	Water level, 25% of the vertical dimension
3	2.40	WL	Water level, 05% of the vertical dimension
4	2.40	MHF	Finish node type, manhole, reference number: C4



PLR	<b>AX</b>	Upstream MH	<b>A</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C4</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>6.3</b>	Material	<b>Polyvinyl chloride</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C4
2 	0.00	WL	Water level, 05% of the vertical dimension
3	0.00	LR	Line deviates right
4	3.50	LR	Line deviates right
5	5.90	LL	Line deviates left
6	6.30	MHF	Finish node type, manhole, reference number: A / POP UP

PLR	<b>BX</b>	Upstream MH	<b>B</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C4</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>4.2</b>	Material	<b>Vitrified clay pipe</b>











	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C4
2 	0.00	WL	Water level, 05% of the vertical dimension
3	0.00	LU	Line deviates up
4	2.90	LL	Line deviates left
5	4.20	LU	Line deviates up
6	4.20	MHF	Finish node type, manhole, reference number: B / POP UP

PLR	<b>CX</b>	Upstream MH	<b>C</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C4</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>5.1</b>	Material	<b>Vitrified clay pipe</b>









	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C4
2 	0.00	WL	Water level, 05% of the vertical dimension

## Section Summary
















Project Name <b>Interim Consultancy Solutions Limited</b>	Project Number:	Date: <b>7/1/-4713</b>
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	m+	OC	Observation	
3	5.10	MHF	Finish node type, manhole, reference number: C / MANHOLE UNKNOWN	
PLR	<b>C4X</b>		Upstream MH	<b>C4</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH	<b>C5</b>
Street	<b>18 LIVINGSTON DRIVE</b>			
Expected length	<b>9.1</b>		Material	<b>Vitrified clay pipe</b>
	m+	OC	Observation	
1	 0.00	MH	Start node type, manhole, reference number: C4	
2	 0.00	WL	Water level, 05% of the vertical dimension	
3	9.10	MHF	Finish node type, manhole, reference number: C5	
PLR	<b>AX</b>		Upstream MH	<b>A</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH	<b>C10</b>
Street	<b>18 LIVINGSTON DRIVE</b>			
Expected length	<b>1.6</b>		Material	<b>Vitrified clay pipe</b>
	m+	OC	Observation	
1	 0.00	MH	Start node type, manhole, reference number: C10	
2	 0.00	WL	Water level, 05% of the vertical dimension	
3	0.00	LU	Line deviates up	
4	0.60	LR	Line deviates right	
5	0.80	LD	Line deviates down	
6	1.60	MHF	Finish node type, manhole, reference number: A / POP UP	
PLR	<b>BX</b>		Upstream MH	<b>B</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH	<b>C10</b>
Street	<b>18 LIVINGSTON DRIVE</b>			
Expected length	<b>1.1</b>		Material	<b>Vitrified clay pipe</b>
	m+	OC	Observation	
1	 0.00	MH	Start node type, manhole, reference number: C10	
2	 0.00	WL	Water level, 05% of the vertical dimension	
3	0.00	LU	Line deviates up	
4	0.40	LD	Line deviates down	
5	1.10	FLJ	Fracture, longitudinal at joint at 7 o'clock	
6	1.10	SA	Survey abandoned / CAN'T CLIMB UP LINE	
PLR	<b>C10X</b>		Upstream MH	<b>C10</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH	<b>C9</b>
Street	<b>18 LIVINGSTON DRIVE</b>			
Expected length	<b>8.1</b>		Material	<b>Vitrified clay pipe</b>
	m+	OC	Observation	
1	 0.00	MH	Start node type, manhole, reference number: C10	
2	 0.00	WL	Water level, 05% of the vertical dimension	
3	8.10	MHF	Finish node type, manhole, reference number: C9	
PLR	<b>AX</b>		Upstream MH	<b>A</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH	<b>C9</b>
Street	<b>18 LIVINGSTON DRIVE</b>			
Expected length	<b>0.6</b>		Material	<b>Vitrified clay pipe</b>
	m+	OC	Observation	
1	 0.00	MH	Start node type, manhole, reference number: C9	
2	 0.00	WL	Water level, 05% of the vertical dimension	

## Section Summary











Project Name <b>Interim Consultancy Solutions Limited</b>		Project Number:	Date: <b>7/1/-4713</b>
m+	OC	Observation	
3	0.20 RMJ	Roots, mass at joint, 10% cross-sectional area loss	
4	0.60 XP	Collapsed drain/sewer	
5	0.60 SA	Survey abandoned / UNABLE TO CAMERA PAST COLLAPSE	
PLR	<b>BX</b>	Upstream MH	<b>B</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C9</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>2.4</b>	Material	<b>Vitrified clay pipe</b>
m+	OC	Observation	
1 	0.00 MH	Start node type, manhole, reference number: C9	
2 	0.00 WL	Water level, 05% of the vertical dimension	
3	0.50 JDM	Joint displaced, medium / PIPE JOIN IN LINE	
4	0.60 JN	Junction at 3 o'clock, diameter: 100mm	
5	0.70 LL	Line deviates left	
6	2.40 MHF	Finish node type, manhole, reference number: B / GULLY	
PLR	<b>CX</b>	Upstream MH	<b>C</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C9</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>0.4</b>	Material	<b>Vitrified clay pipe</b>
m+	OC	Observation	
1 	0.00 MH	Start node type, manhole, reference number: C9	
2 	0.00 WL	Water level, 05% of the vertical dimension	
3	0.40 OBP	Other obstacles, external pipe or cable from 4 o'clock to 8 o'clock, 20% cross-sectional area loss / E	
4	0.40 SA	Survey abandoned / UNABLE TO CAMERA PAST INTRUDING BAR	
PLR	<b>DX</b>	Upstream MH	<b>D</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C9</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>0.3</b>	Material	<b>Vitrified clay pipe</b>
m+	OC	Observation	
1 	0.00 MH	Start node type, manhole, reference number: C9	
2 	0.00 WL	Water level, 05% of the vertical dimension	
3	0.00 LU	Line deviates up	
4	0.30 LD	Line deviates down	
5	0.30 SA	Survey abandoned / CAN'T CLIMB UP LINE	
PLR	<b>C9X</b>	Upstream MH	<b>C9</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C8</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>3.1</b>	Material	<b>Vitrified clay pipe</b>
m+	OC	Observation	
1 	0.00 MH	Start node type, manhole, reference number: C9	
2 	0.00 WL	Water level, 05% of the vertical dimension	
3	3.10 MHF	Finish node type, manhole, reference number: C8	
PLR	<b>AX</b>	Upstream MH	<b>A</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C8</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>3.2</b>	Material	<b>Vitrified clay pipe</b>
m+	OC	Observation	

## Section Summary

Project Name				Project Number:		Date:	
Interim Consultancy Solutions Limited						7/1/-4713	
		m+	OC	Observation			
1			0.00	MH	Start node type, manhole, reference number: C8		
2			0.00	WL	Water level, 05% of the vertical dimension		
3			1.10	LU	Line deviates up		
4			1.30	JDM	Joint displaced, medium / PIPE JOIN		
5			3.20	MHF	Finish node type, manhole, reference number: A / POT UTL		
PLR		BX			Upstream MH	B	
Town or Village		LIVERPOOL			Downstream MH	C8	
Street		18 LIVINGSTON DRIVE					
Expected length		2.1			Material	Vitrified clay pipe	
		m+	OC	Observation			
1			0.00	MH	Start node type, manhole, reference number: C8		
2			0.00	WL	Water level, 05% of the vertical dimension		
3			0.00	LU	Line deviates up		
4			0.10	CCJ	Crack, circumferential at joint from 12 o'clock to 12 o'clock		
5			0.10	LU	Line deviates up		
6			1.50	LR	Line deviates right		
7			2.10	MHF	Finish node type, manhole, reference number: B / POP UP		
PLR		CX			Upstream MH	C	
Town or Village		LIVERPOOL			Downstream MH	C8	
Street		18 LIVINGSTON DRIVE					
Expected length		0.4			Material	Vitrified clay pipe	
		m+	OC	Observation			
1			0.00	MH	Start node type, manhole, reference number: C8		
2			0.00	WL	Water level, 05% of the vertical dimension		
3			0.40	LU	Line deviates up		
4			0.40	MHF	Finish node type, manhole, reference number: C / POP UP		
PLR		C8X			Upstream MH	C8	
Town or Village		LIVERPOOL			Downstream MH	C5	
Street		18 LIVINGSTON DRIVE					
Expected length		7.7			Material	Vitrified clay pipe	
		m+	OC	Observation			
1			0.00	MH	Start node type, manhole, reference number: C8		
2			0.00	WL	Water level, 05% of the vertical dimension		
3			7.70	MHF	Finish node type, manhole, reference number: C5		
PLR		C13X			Upstream MH	C13	
Town or Village		LIVERPOOL			Downstream MH	C6	
Street		18 LIVINGSTON DRIVE					
Expected length		15.3			Material	Vitrified clay pipe	
		m+	OC	Observation			
1			0.00	MH	Start node type, manhole, reference number: C13		
2			0.00	WL	Water level, 05% of the vertical dimension		
3			15.30	MHF	Finish node type, manhole, reference number: C6		
PLR		OFF SITEX			Upstream MH	OFF SITE	
Town or Village		LIVERPOOL			Downstream MH	C13	
Street		18 LIVINGSTON DRIVE					
Expected length		18.7			Material	Vitrified clay pipe	



## Section Summary

Project Name <b>Interim Consultancy Solutions Limited</b>	Project Number:	Date: <b>7/1/-4713</b>
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	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C13
2 	0.00	WL	Water level, 05% of the vertical dimension
3	7.30	JN	Junction at 9 o'clock, diameter: 100mm
4	14.50	JN	Junction at 9 o'clock, diameter: 100mm
5	18.70	MHF	Finish node type, manhole, reference number: OFF SITE / CHAMBER OFF PROPERTY
PLR	<b>C5X</b>		Upstream MH <b>C5</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH <b>C6</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>12.5</b>		Material <b>Vitrified clay pipe</b>
	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C5
2 	0.00	WL	Water level, 05% of the vertical dimension
3	4.90	WL	Water level, 25% of the vertical dimension
4	11.40	WL	Water level, 05% of the vertical dimension
5	12.50	MHF	Finish node type, manhole, reference number: C6
PLR	<b>C12X</b>		Upstream MH <b>C12</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH <b>C6</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>2.2</b>		Material <b>Vitrified clay pipe</b>
	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C6
2 	0.00	WL	Water level, 05% of the vertical dimension
3	1.90	LR	Line deviates right
4	2.20	MHF	Finish node type, manhole, reference number: C12
PLR	<b>AX</b>		Upstream MH <b>A</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH <b>C6</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>3.5</b>		Material <b>Vitrified clay pipe</b>
	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C6
2 	0.00	WL	Water level, 05% of the vertical dimension
3	3.50	XP	Collapsed drain/sewer
4	3.50	SA	Survey abandoned / UNABLE TO CAMERA PAST COLLAPSE
PLR	<b>BX</b>		Upstream MH <b>B</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH <b>C6</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>2.8</b>		Material <b>Vitrified clay pipe</b>
	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C6
2 	0.00	WL	Water level, 05% of the vertical dimension
3	2.80	RM	Roots, mass, 75% cross-sectional area loss
4	2.80	XP	Collapsed drain/sewer
5	2.80	SA	Survey abandoned / UNABLE TO CAMERA AST COLLAPSE
PLR	<b>CX</b>		Upstream MH <b>C</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH <b>C6</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>2.6</b>		Material <b>Vitrified clay pipe</b>

## Section Summary



Project Name <b>Interim Consultancy Solutions Limited</b>	Project Number:	Date: <b>7/1/-4713</b>
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	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C6
2 	0.00	WL	Water level, 05% of the vertical dimension
3	1.10	RTJ	Roots, tap at joint
4	2.50	RTJ	Roots, tap at joint
5	2.60	XP	Collapsed drain/sewer
6	2.60	SA	Survey abandoned / UNABLE TO CAMERA PAST COLLAPSE



PLR	<b>DX</b>	Upstream MH	<b>D</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C6</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>1.5</b>	Material	<b>Vitrified clay pipe</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C6
2 	0.00	WL	Water level, 05% of the vertical dimension
3	1.50	MHF	Finish node type, manhole, reference number: D



PLR	<b>C6X</b>	Upstream MH	<b>C6</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C7</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>4.8</b>	Material	<b>Vitrified clay pipe</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C6
2 	0.00	WL	Water level, 05% of the vertical dimension
3	0.40	LR	Line deviates right
4	0.40	FMJ	Fracture, multiple at joint from 12 o'clock to 12 o'clock
5	0.40	H	Hole in drain/sewer from 8 o'clock to 12 o'clock
6	3.20	FMJ	Fracture, multiple at joint from 2 o'clock to 10 o'clock
7	4.80	FMJ	Fracture, multiple at joint from 12 o'clock to 12 o'clock / AT DROP SHAFT
8	4.80	MHF	Finish node type, manhole, reference number: C7
















PLR	<b>AX</b>	Upstream MH	<b>A</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C12</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>6.5</b>	Material	<b>Vitrified clay pipe</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C12
2 	0.00	WL	Water level, 05% of the vertical dimension
3	0.00	LU	Line deviates up
4	1.00	LD	Line deviates down
5	1.80	LL	Line deviates left
6	6.50	LU	Line deviates up
7	6.50	MHF	Finish node type, manhole, reference number: A / POP UP





PLR	<b>C11X</b>	Upstream MH	<b>C11</b>
Town or Village	<b>LIVERPOOL</b>	Downstream MH	<b>C12</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>4.4</b>	Material	<b>Vitrified clay pipe</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C12
2 	0.00	WL	Water level, 05% of the vertical dimension
3	4.40	MHF	Finish node type, manhole, reference number: C11

## Section Summary

Project Name Interim Consultancy Solutions Limited				Project Number:		Date: 7/1/-4713	
PLR	AX			Upstream MH	A		
Town or Village	LIVERPOOL			Downstream MH	C11		
Street	18 LIVINGSTON DRIVE						
Expected length	4.6			Material	Polyvinyl chloride		
	m+	OC	Observation				
1		 0.00	MH	Start node type, manhole, reference number: C11			
2		0.00	WL	Water level, 05% of the vertical dimension			
3		1.40	LL	Line deviates left			
4		1.90	LL	Line deviates left			
5		4.60	MHF	Finish node type, manhole, reference number: A / POP UP			
PLR	BX			Upstream MH	B		
Town or Village	LIVERPOOL			Downstream MH	C11		
Street	18 LIVINGSTON DRIVE						
Expected length	4.8			Material	Polyvinyl chloride		
	m+	OC	Observation				
1		 0.00	MH	Start node type, manhole, reference number: C11			
2		0.00	WL	Water level, 05% of the vertical dimension			
3		1.50	LL	Line deviates left			
4		4.80	MHF	Finish node type, manhole, reference number: B / POP UP			
PLR	AX			Upstream MH	A		
Town or Village	LIVERPOOL			Downstream MH	C17		
Street	18 LIVINGSTON DRIVE						
Expected length	3.6			Material	Polyvinyl chloride		
	m+	OC	Observation				
1		 0.00	MH	Start node type, manhole, reference number: C17			
2		0.00	WL	Water level, 05% of the vertical dimension			
3		2.80	LR	Line deviates right			
4		3.60	MHF	Finish node type, manhole, reference number: A / POP UP			
PLR	BX			Upstream MH	B		
Town or Village	LIVERPOOL			Downstream MH	C17		
Street	18 LIVINGSTON DRIVE						
Expected length	6.6			Material	Polyvinyl chloride		
	m+	OC	Observation				
1		 0.00	MH	Start node type, manhole, reference number: C17			
2		0.00	WL	Water level, 05% of the vertical dimension			
3		6.60	MHF	Finish node type, manhole, reference number: B / POP UP			
PLR	CX			Upstream MH	C		
Town or Village	LIVERPOOL			Downstream MH	C17		
Street	18 LIVINGSTON DRIVE						
Expected length	7.5			Material	Polyvinyl chloride		
	m+	OC	Observation				
1		 0.00	MH	Start node type, manhole, reference number: C17			
2		0.00	WL	Water level, 05% of the vertical dimension			
3		0.70	LR	Line deviates right			
4		4.90	LL	Line deviates left			
5		5.80	LR	Line deviates right			
6		7.50	MHF	Finish node type, manhole, reference number: C / POP UP			



## Section Summary



Project Name <b>Interim Consultancy Solutions Limited</b>		Project Number:	Date: <b>7/1/-4713</b>
PLR Town or Village Street Expected length	<b>C17X</b> <b>LIVERPOOL</b> <b>18 LIVINGSTON DRIVE</b> <b>6.5</b>	Upstream MH Downstream MH  Material	<b>C17</b> <b>C16</b>  <b>Polyvinyl chloride</b>
	m+ OC Observation		
1	 0.00 MH	Start node type, manhole, reference number: C17	
2	0.00 WL	Water level, 05% of the vertical dimension	
3	1.00 LU	Line deviates up	
4	1.00 RTJ	Roots, tap at joint	
5	4.80 JN	Junction at 10 o'clock, diameter: 100mm	
6	6.50 XP	Collapsed drain/sewer	
7	6.50 SA	Survey abandoned / UNABLE TO CAMERA PAST COLLAPSE	
PLR Town or Village Street Expected length	<b>AX</b> <b>LIVERPOOL</b> <b>18 LIVINGSTON DRIVE</b> <b>2.3</b>	Upstream MH Downstream MH  Material	<b>A</b> <b>C15</b>  <b>Vitrified clay pipe</b>
	m+ OC Observation		
1	 0.00 MH	Start node type, manhole, reference number: C15	
2	0.00 WL	Water level, 05% of the vertical dimension	
3	0.40 LU	Line deviates up	
4	1.10 LL	Line deviates left	
5	2.30 XP	Collapsed drain/sewer	
6	2.30 SA	Survey abandoned / UNABLE TO CAMERA PAST COLLAPSE	
PLR Town or Village Street Expected length	<b>C15X</b> <b>LIVERPOOL</b> <b>18 LIVINGSTON DRIVE</b> <b>13.5</b>	Upstream MH Downstream MH  Material	<b>C15</b> <b>C16</b>  <b>Vitrified clay pipe</b>
	m+ OC Observation		
1	 0.00 MH	Start node type, manhole, reference number: C15	
2	0.00 WL	Water level, 05% of the vertical dimension	
3	8.30 CCJ	Crack, circumferential at joint from 12 o'clock to 12 o'clock	
4	12.40 JDM	Joint displaced, medium	
5	12.40 RTJ	Roots, tap at joint	
6	13.50 MHF	Finish node type, manhole, reference number: C16	
PLR Town or Village Street Expected length	<b>C14X</b> <b>LIVERPOOL</b> <b>18 LIVINGSTON DRIVE</b> <b>17.4</b>	Upstream MH Downstream MH  Material	<b>C14</b> <b>C15</b>  <b>Polyvinyl chloride</b>
	m+ OC Observation		
1	 0.00 MH	Start node type, manhole, reference number: C14	
2	0.00 WL	Water level, 05% of the vertical dimension	
3	7.40 JN	Junction at 10 o'clock, diameter: 100mm	
4	12.10 JN	Junction at 11 o'clock, diameter: 100mm	
5	17.40 MHF	Finish node type, manhole, reference number: C15 / DROP SHAFT	
PLR Town or Village Street Expected length	<b>AX</b> <b>LIVERPOOL</b> <b>18 LIVINGSTON DRIVE</b> <b>13.2</b>	Upstream MH Downstream MH  Material	<b>A</b> <b>C14</b>  <b>Polyvinyl chloride</b>





## Section Summary

Project Name <b>Interim Consultancy Solutions Limited</b>	Project Number:	Date: <b>7/1/-4713</b>
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	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C14
2 	0.00	WL	Water level, 05% of the vertical dimension
3	13.20	MHF	Finish node type, manhole, reference number: A
PLR	<b>C16X</b>		Upstream MH <b>C16</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH <b>C7</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>15.0</b>		Material <b>Vitrified clay pipe</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C16
2 	0.00	WL	Water level, 05% of the vertical dimension
3	6.90	CCJ	Crack, circumferential at joint from 5 o'clock to 7 o'clock
4	9.10	CCJ	Crack, circumferential at joint from 5 o'clock to 7 o'clock
5	13.60	FLJ	Fracture, longitudinal at joint at 3 o'clock
6	13.60	FLJ	Fracture, longitudinal at joint at 9 o'clock
7	13.60	REM	General remark / PREVIOUS REPAIR GONE WRONG
8	15.00	MHF	Finish node type, manhole, reference number: C7
PLR	<b>C7X</b>		Upstream MH <b>C7</b>
Town or Village	<b>LIVERPOOL</b>		Downstream MH <b>MAIN</b>
Street	<b>18 LIVINGSTON DRIVE</b>		
Expected length	<b>5.2</b>		Material <b>Vitrified clay pipe</b>

	m+	OC	Observation
1 	0.00	MH	Start node type, manhole, reference number: C7
2 	0.00	WL	Water level, 05% of the vertical dimension
3	1.40	LL	Line deviates left
4	3.50	FC	Fracture, circumferential from 10 o'clock to 6 o'clock
5	5.00	CL	Crack, longitudinal at 7 o'clock
6	5.10	LD	Line deviates down
7	5.10	LR	Line deviates right
8	5.20	LL	Line deviates left
9	5.20	LD	Line deviates down
10	5.20	MHF	Finish node type, manhole, reference number: MAIN / MAINLINE



## Inspection Report

Section Number : <b>1</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>AX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C1</b> ← <b>A</b>	US MH: <b>A</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>1.10</b>	DS MH: <b>C1</b>
Surface Cover:	Pipe Length: <b>1.10</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 100</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C1			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.00	RT	Roots, tap			4
	1.10	XP	Collapsed drain/sewer			5
	1.10	SA	Survey abandoned: UNABLE TO CAMERA PAST COLLAPSE			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	165.0	150.0	150.0	5.0	1	5.0	4.5	5.0	4.0



## Inspection Report

Section Number : <b>2</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>BX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C1</b> ← <b>B</b>	US MH: <b>B</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>3.50</b>	DS MH: <b>C1</b>
Surface Cover:	Pipe Length: <b>3.50</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C1			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.90	REM	General remark: BURRIED MANHOLE			0
	1.90	LR	Line deviates right			0
	3.50	MHF	Finish node type, manhole, reference number: B: POP UP			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



**Clearground Ltd**  
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Tel. 01516528010  
mike@clearground.co.uk

## Inspection Report

Section Number : <b>3</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>CX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C1</b> ← <b>C</b>	US MH: <b>C</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>6.50</b>	DS MH: <b>C1</b>
Surface Cover:	Pipe Length: <b>6.50</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:55	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C1			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	6.00	JN	Junction at 9 o'clock, diameter: 100mm			0
	6.50	MHF	Finish node type, manhole, reference number: C: GULLY			0
<p>Depth: <b>C</b></p>						

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>4</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C1X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C1 → C2</b>	US MH: <b>C1</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>25.10</b>	DS MH: <b>C2</b>
Surface Cover:	Pipe Length: <b>25.10</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:212	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C1</b></p> <p>Depth: <b>C2</b></p> </div>						
	0.00	MH	Start node type, manhole, reference number: C1			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	2.80	CCJ	Crack, circumferential at joint from 5 o'clock to 7 o'clock			2
	3.90	JN	Junction at 3 o'clock, diameter: 100mm			0
	12.40	CCJ	Crack, circumferential at joint from 4 o'clock to 8 o'clock			2
	12.40	RTJ	Roots, tap at joint			4
	12.50	JN	Junction at 3 o'clock, diameter: 100mm			0
	15.70	CCJ	Crack, circumferential at joint from 5 o'clock to 7 o'clock			2
	15.70	RMJ	Roots, mass at joint, 05% cross-sectional area loss			3
	18.40	FMJ	Fracture, multiple at joint from 12 o'clock to 12 o'clock			3
	18.40	JN	Junction at 3 o'clock, diameter: 100mm			0
	24.90	LR	Line deviates right			0
	25.10	MHF	Finish node type, manhole, reference number: C2			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
4	40.0	2.8	2.8	3.0	2	5.0	0.4	9.0	4.0



## Inspection Report

Section Number : <b>5</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C2X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C3 ← C2</b>	US MH: <b>C2</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>13.60</b>	DS MH: <b>C3</b>
Surface Cover:	Pipe Length: <b>13.60</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Polyvinyl chloride</b>

Comment:  
Recommendation:

1:115	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C3</b></p> </div>						
	0.00	MH	Start node type, manhole, reference number: C3			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	13.30	JN	Junction at 3 o'clock, diameter: 100mm			0
	13.50	LL	Line deviates left			0
	13.60	MHF	Finish node type, manhole, reference number: C2			0
Depth:						

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



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## Inspection Report

Section Number : <b>6</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C3X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C3 → C4</b>	US MH: <b>C3</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>2.40</b>	DS MH: <b>C4</b>
Surface Cover:	Pipe Length: <b>2.40</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Polyvinyl chloride</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C3			0
	0.00	WL	Water level, 25% of the vertical dimension			0
	2.40	WL	Water level, 05% of the vertical dimension			0
	2.40	MHF	Finish node type, manhole, reference number: C4			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>7</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>AX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C4 ← A</b>	US MH: <b>A</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>6.30</b>	DS MH: <b>C4</b>
Surface Cover:	Pipe Length: <b>6.30</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Polyvinyl chloride</b>

Comment:  
Recommendation:

1:54	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C4</b></p> <p>0.00      <b>MH</b>      Start node type, manhole, reference number: C4      0</p> <p>0.00      <b>WL</b>      Water level, 05% of the vertical dimension      0</p> <p>0.00      <b>LR</b>      Line deviates right      0</p> <p>3.50      <b>LR</b>      Line deviates right      0</p> <p>5.90      <b>LL</b>      Line deviates left      0</p> <p>6.30      <b>MHF</b>      Finish node type, manhole, reference number: A: POP UP      0</p> <p><b>A</b> Depth:</p> </div>						

<b>Structural defects</b>					<b>Constructional features</b>				
<b>Service and maintenance defects</b>					<b>Miscellaneous features</b>				
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





## Inspection Report

Section Number : <b>8</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>BX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C4 ← B</b>	US MH: <b>B</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>4.20</b>	DS MH: <b>C4</b>
Surface Cover:	Pipe Length: <b>4.20</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
Depth: <b>C4</b>	0.00	MH	Start node type, manhole, reference number: C4			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.00	LU	Line deviates up			0
	2.90	LL	Line deviates left			0
	4.20	LU	Line deviates up			0
Depth: <b>B</b>	4.20	MHF	Finish node type, manhole, reference number: B: POP UP			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>9</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>CX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C4</b> ← <b>C</b>	US MH: <b>C</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>5.10</b>	DS MH: <b>C4</b>
Surface Cover:	Pipe Length: <b>5.10</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C4			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	5.10	MHF	Finish node type, manhole, reference number: C: MANHOLE UNKNOWN			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>10</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C4X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C4 → C5</b>	US MH: <b>C4</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>9.10</b>	DS MH: <b>C5</b>
Surface Cover:	Pipe Length: <b>9.10</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:77	Position m	Code	Observation	MPEG	Photo	Grade
<div> <div>Depth: <b>C4</b></div> <div> <div>0.00</div> <div>0.00</div> </div> <div> <div>9.10</div> <div><b>C5</b></div> <div>Depth:</div> </div> </div>						
		MH	Start node type, manhole, reference number: C4			0
		WL	Water level, 05% of the vertical dimension			0
		MHF	Finish node type, manhole, reference number: C5			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>11</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>AX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C10 ← A</b>	US MH: <b>A</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>1.60</b>	DS MH: <b>C10</b>
Surface Cover:	Pipe Length: <b>1.60</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C10			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.00	LU	Line deviates up			0
	0.60	LR	Line deviates right			0
	0.80	LD	Line deviates down			0
	1.60	MHF	Finish node type, manhole, reference number: A: POP UP			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



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## Inspection Report

Section Number : <b>12</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>BX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C10</b> ← <b>B</b>	US MH: <b>B</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>1.10</b>	DS MH: <b>C10</b>
Surface Cover:	Pipe Length: <b>1.10</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C10			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.00	LU	Line deviates up			0
	0.40	LD	Line deviates down			0
	1.10	FLJ	Fracture, longitudinal at joint at 7 o'clock			3
	1.10	SA	Survey abandoned: CAN'T CLIMB UP LINE			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	40.0	36.4	36.4	3.0	0	0.0	0.0	0.0	1.0



## Inspection Report

Section Number : <b>13</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C10X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C10 → C9</b>	US MH: <b>C10</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>8.10</b>	DS MH: <b>C9</b>
Surface Cover:	Pipe Length: <b>8.10</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:69	Position m	Code	Observation	MPEG	Photo	Grade
<div> <div>Depth: <b>C10</b></div> <div> <div>0.00</div> <div>0.00</div> </div> <div> <div>8.10</div> <div><b>C9</b> Depth:</div> </div> </div>						
		MH	Start node type, manhole, reference number: C10			0
		WL	Water level, 05% of the vertical dimension			0
		MFH	Finish node type, manhole, reference number: C9			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



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## Inspection Report

Section Number : <b>14</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>AX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C9 ← A</b>	US MH: <b>A</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>0.60</b>	DS MH: <b>C9</b>
Surface Cover:	Pipe Length: <b>0.60</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C9			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.20	RMJ	Roots, mass at joint, 10% cross-sectional area loss			3
	0.60	XP	Collapsed drain/sewer			5
	0.60	SA	Survey abandoned: UNABLE TO CAMERA PAST COLLAPSE			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	165.0	275.0	275.0	5.0	1	4.0	6.7	4.0	3.0



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## Inspection Report

Section Number : <b>15</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>BX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C9 ← B</b>	US MH: <b>B</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>2.40</b>	DS MH: <b>C9</b>
Surface Cover:	Pipe Length: <b>2.40</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C9			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.50	JDM	Joint displaced, medium: PIPE JOIN IN LINE			1
	0.60	JN	Junction at 3 o'clock, diameter: 100mm			0
	0.70	LL	Line deviates left			0
	2.40	MHF	Finish node type, manhole, reference number: B: GULLY			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	1.0	0.4	0.4	1.0	0	0.0	0.0	0.0	1.0





## Inspection Report

Section Number : <b>16</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>CX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C9</b> ← <b>C</b>	US MH: <b>C</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>0.40</b>	DS MH: <b>C9</b>
Surface Cover:	Pipe Length: <b>0.40</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C9			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.40	OBP	Other obstacles, external pipe or cable from 4 o'clock to 8 o'clock, 20% cross-sectional area loss: BAR THROUGH PIPE			5
	0.40	SA	Survey abandoned: UNABLE TO CAMERA PAST INTRUDING BAR			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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	10.0	25.0	10.0	5.0



## Inspection Report

Section Number : <b>17</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>DX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C9 ← D</b>	US MH: <b>D</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>0.30</b>	DS MH: <b>C9</b>
Surface Cover:	Pipe Length: <b>0.30</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C9			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.00	LU	Line deviates up			0
	0.30	LD	Line deviates down			0
	0.30	SA	Survey abandoned: CAN'T CLIMB UP LINE			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



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## Inspection Report

Section Number : <b>18</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C9X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C9 → C8</b>	US MH: <b>C9</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>3.10</b>	DS MH: <b>C8</b>
Surface Cover:	Pipe Length: <b>3.10</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C9			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	3.10	MHF	Finish node type, manhole, reference number: C8			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



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## Inspection Report

Section Number : <b>19</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>AX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C8 ← A</b>	US MH: <b>A</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>3.20</b>	DS MH: <b>C8</b>
Surface Cover:	Pipe Length: <b>3.20</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C8			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	1.10	LU	Line deviates up			0
	1.30	JDM	Joint displaced, medium: PIPE JOIN			1
	3.20	MHF	Finish node type, manhole, reference number: A: POT UTL			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	1.0	0.3	0.3	1.0	0	0.0	0.0	0.0	1.0



## Inspection Report

Section Number : <b>20</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>BX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C8 ← B</b>	US MH: <b>B</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>2.10</b>	DS MH: <b>C8</b>
Surface Cover:	Pipe Length: <b>2.10</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C8			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.00	LU	Line deviates up			0
	0.10	CCJ	Crack, circumferential at joint from 12 o'clock to 12 o'clock			2
	0.10	LU	Line deviates up			0
	1.50	LR	Line deviates right			0
	2.10	MHF	Finish node type, manhole, reference number: B: POP UP			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	10.0	4.8	4.8	2.0	0	0.0	0.0	0.0	1.0



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## Inspection Report

Section Number : <b>21</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>CX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C8 ← C</b>	US MH: <b>C</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>0.40</b>	DS MH: <b>C8</b>
Surface Cover:	Pipe Length: <b>0.40</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C8			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.40	LU	Line deviates up			0
	0.40	MHF	Finish node type, manhole, reference number: C: POP UP			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



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## Inspection Report

Section Number : <b>22</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C8X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C8 → C5</b>	US MH: <b>C8</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>7.70</b>	DS MH: <b>C5</b>
Surface Cover:	Pipe Length: <b>7.70</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:65	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C8</b></p> </div>						
	0.00	MH	Start node type, manhole, reference number: C8			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	7.70	MHF	Finish node type, manhole, reference number: C5			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>23</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C13X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C13 → C6</b>	US MH: <b>C13</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>15.30</b>	DS MH: <b>C6</b>
Surface Cover:	Pipe Length: <b>15.30</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:130	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C13</b></p> </div>						
	0.00	MH	Start node type, manhole, reference number: C13			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	15.30	MHF	Finish node type, manhole, reference number: C6			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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





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## Inspection Report

Section Number : <b>24</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>OFF SITES</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C13</b>	US MH: <b>OFF SITE</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>18.70</b>	DS MH: <b>C13</b>
Surface Cover:	Pipe Length: <b>18.70</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:158	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C13</b></p> </div>						
	0.00	MH	Start node type, manhole, reference number: C13			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	7.30	JN	Junction at 9 o'clock, diameter: 100mm			0
	14.50	JN	Junction at 9 o'clock, diameter: 100mm			0
	18.70	MHF	Finish node type, manhole, reference number: OFF SITE: CHAMBER OFF PROPERTY			0
OFF SITE Depth:						

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>25</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C5X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C5 → C6</b>	US MH: <b>C5</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>12.50</b>	DS MH: <b>C6</b>
Surface Cover:	Pipe Length: <b>12.50</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:106	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C5</b></p> <p>0.00</p> <p>0.00</p> <p>4.90</p> <p>11.40</p> <p>12.50</p> <p><b>C6</b></p> <p>Depth:</p> </div>						
	0.00	MH	Start node type, manhole, reference number: C5			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	4.90	WL	Water level, 25% of the vertical dimension			0
	11.40	WL	Water level, 05% of the vertical dimension			0
	12.50	MHF	Finish node type, manhole, reference number: C6			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



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## Inspection Report

Section Number : <b>26</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C12X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C6</b> ← <b>C12</b>	US MH: <b>C12</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>2.20</b>	DS MH: <b>C6</b>
Surface Cover:	Pipe Length: <b>2.20</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C6			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	1.90	LR	Line deviates right			0
	2.20	MHF	Finish node type, manhole, reference number: C12			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>27</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>AX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C6 ← A</b>	US MH: <b>A</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>3.50</b>	DS MH: <b>C6</b>
Surface Cover:	Pipe Length: <b>3.50</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C6			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	3.50	XP	Collapsed drain/sewer			5
	3.50	SA	Survey abandoned: UNABLE TO CAMERA PAST COLLAPSE			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	165.0	47.1	47.1	5.0	0	0.0	0.0	0.0	1.0



## Inspection Report

Section Number : <b>28</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>BX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C6 ← B</b>	US MH: <b>B</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>2.80</b>	DS MH: <b>C6</b>
Surface Cover:	Pipe Length: <b>2.80</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C6			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	2.80	RM	Roots, mass, 75% cross-sectional area loss			5
	2.80	XP	Collapsed drain/sewer			5
Depth:	2.80	SA	Survey abandoned: UNABLE TO CAMERA AST COLLAPSE			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	165.0	58.9	58.9	5.0	1	20.0	7.1	20.0	5.0



## Inspection Report

Section Number : <b>29</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>CX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C6 ← C</b>	US MH: <b>C</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>2.60</b>	DS MH: <b>C6</b>
Surface Cover:	Pipe Length: <b>2.60</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C6			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	1.10	RTJ	Roots, tap at joint			4
	2.50	RTJ	Roots, tap at joint			4
	2.60	XP	Collapsed drain/sewer			5
Depth:	2.60	SA	Survey abandoned: UNABLE TO CAMERA PAST COLLAPSE			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	165.0	63.5	63.5	5.0	2	5.0	3.8	10.0	4.0



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## Inspection Report

Section Number : <b>30</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>DX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C6 ← D</b>	US MH: <b>D</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>1.50</b>	DS MH: <b>C6</b>
Surface Cover:	Pipe Length: <b>1.50</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
 Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C6			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	1.50	MHF	Finish node type, manhole, reference number: D			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>31</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C6X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C6 → C7</b>	US MH: <b>C6</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>4.80</b>	DS MH: <b>C7</b>
Surface Cover:	Pipe Length: <b>4.80</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C6			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.40	LR	Line deviates right			0
	0.40	FMJ	Fracture, multiple at joint from 12 o'clock to 12 o'clock			3
	0.40	H	Hole in drain/sewer from 8 o'clock to 12 o'clock			5
	3.20	FMJ	Fracture, multiple at joint from 2 o'clock to 10 o'clock			3
	4.80	FMJ	Fracture, multiple at joint from 12 o'clock to 12 o'clock: AT DROP SHAFT			3
	4.80	MHF	Finish node type, manhole, reference number: C7			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
4	205.0	59.4	59.4	5.0	0	0.0	0.0	0.0	1.0





## Inspection Report

Section Number : <b>32</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>AX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C12 ← A</b>	US MH: <b>A</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>6.50</b>	DS MH: <b>C12</b>
Surface Cover:	Pipe Length: <b>6.50</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:55	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C12</b></p> </div>						
	0.00	MH	Start node type, manhole, reference number: C12			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.00	LU	Line deviates up			0
	1.00	LD	Line deviates down			0
	1.80	LL	Line deviates left			0
	6.50	LU	Line deviates up			0
	6.50	MHF	Finish node type, manhole, reference number: A: POP UP			0
<div> <p>Depth: <b>A</b></p> </div>						

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



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## Inspection Report

Section Number : <b>33</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C11X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C12 ← C11</b>	US MH: <b>C11</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>4.40</b>	DS MH: <b>C12</b>
Surface Cover:	Pipe Length: <b>4.40</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C12			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	4.40	MHF	Finish node type, manhole, reference number: C11			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



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## Inspection Report

Section Number : <b>34</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>AX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C11 ← A</b>	US MH: <b>A</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>4.60</b>	DS MH: <b>C11</b>
Surface Cover:	Pipe Length: <b>4.60</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Polyvinyl chloride</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C11			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	1.40	LL	Line deviates left			0
	1.90	LL	Line deviates left			0
	4.60	MHF	Finish node type, manhole, reference number: A: POP UP			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>35</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>BX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C11 ← B</b>	US MH: <b>B</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>4.80</b>	DS MH: <b>C11</b>
Surface Cover:	Pipe Length: <b>4.80</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Polyvinyl chloride</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C11			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	1.50	LL	Line deviates left			0
	4.80	MHF	Finish node type, manhole, reference number: B: POP UP			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>36</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>AX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C17 ← A</b>	US MH: <b>A</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>3.60</b>	DS MH: <b>C17</b>
Surface Cover:	Pipe Length: <b>3.60</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Polyvinyl chloride</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C17			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	2.80	LR	Line deviates right			0
	3.60	MHF	Finish node type, manhole, reference number: A: POP UP			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>37</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>BX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C17 ← B</b>	US MH: <b>B</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>6.60</b>	DS MH: <b>C17</b>
Surface Cover:	Pipe Length: <b>6.60</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Polyvinyl chloride</b>

Comment:  
Recommendation:

1:56	Position m	Code	Observation	MPEG	Photo	Grade
<b>Depth:</b> <b>C17</b>						
	0.00	MH	Start node type, manhole, reference number: C17			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	6.60	MHF	Finish node type, manhole, reference number: B: POP UP			0
<b>B</b> <b>Depth:</b>						

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>38</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>CX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C17 ← C</b>	US MH: <b>C</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>7.50</b>	DS MH: <b>C17</b>
Surface Cover:	Pipe Length: <b>7.50</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Polyvinyl chloride</b>

Comment:  
Recommendation:

1:64	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C17</b></p> </div>						
	0.00	MH	Start node type, manhole, reference number: C17			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.70	LR	Line deviates right			0
	4.90	LL	Line deviates left			0
	5.80	LR	Line deviates right			0
	7.50	MHF	Finish node type, manhole, reference number: C: POP UP			0
<p><b>C</b> Depth:</p>						

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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 Number : <b>39</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C17X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Use:	Combined	Pipe Shape:	Circular
Year Laid:		Width / Height	100 / 0
Purpose:	Investment planning	Flow Control:	
Lining:		Pipe Material:	Polyvinyl chloride

Comment:
Recommendation:

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	165.0	25.4	25.4	5.0	1	5.0	0.8	5.0	4.0





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## Inspection Report

Section Number : <b>40</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>AX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C15 ← A</b>	US MH: <b>A</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>2.30</b>	DS MH: <b>C15</b>
Surface Cover:	Pipe Length: <b>2.30</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>100 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
	0.00	MH	Start node type, manhole, reference number: C15			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	0.40	LU	Line deviates up			0
	1.10	LL	Line deviates left			0
	2.30	XP	Collapsed drain/sewer			5
	2.30	SA	Survey abandoned: UNABLE TO CAMERA PAST COLLAPSE			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
1	165.0	71.7	71.7	5.0	0	0.0	0.0	0.0	1.0



## Inspection Report

Section Number : <b>41</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C15X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C15 → C16</b>	US MH: <b>C15</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>13.50</b>	DS MH: <b>C16</b>
Surface Cover:	Pipe Length: <b>13.50</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:114	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C15</b></p> </div>						
	0.00	MH	Start node type, manhole, reference number: C15			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	8.30	CCJ	Crack, circumferential at joint from 12 o'clock to 12 o'clock			2
	12.40	JDM	Joint displaced, medium			1
	12.40	RTJ	Roots, tap at joint			4
	13.50	MHF	Finish node type, manhole, reference number: C16			0
Depth: <b>C16</b>						

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	10.0	0.8	0.8	2.0	1	5.0	0.4	5.0	4.0



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## Inspection Report

Section Number : <b>42</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C14X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C14 → C15</b>	US MH: <b>C14</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>17.40</b>	DS MH: <b>C15</b>
Surface Cover:	Pipe Length: <b>17.40</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Polyvinyl chloride</b>

Comment:  
Recommendation:

1:147	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C14</b></p> </div>						
	0.00	MH	Start node type, manhole, reference number: C14			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	7.40	JN	Junction at 10 o'clock, diameter: 100mm			0
	12.10	JN	Junction at 11 o'clock, diameter: 100mm			0
	17.40	MHF	Finish node type, manhole, reference number: C15: DROP SHAFT			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>43</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>AX</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C14 ← A</b>	US MH: <b>A</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>13.20</b>	DS MH: <b>C14</b>
Surface Cover:	Pipe Length: <b>13.20</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Polyvinyl chloride</b>

Comment:  
Recommendation:

1:112	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C14</b></p> </div>						
	0.00	MH	Start node type, manhole, reference number: C14			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	13.20	MHF	Finish node type, manhole, reference number: A			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
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



## Inspection Report

Section Number : <b>44</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C16X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C16 → C7</b>	US MH: <b>C16</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length: <b>15.00</b>	DS MH: <b>C7</b>
Surface Cover:	Pipe Length: <b>15.00</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height: <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:127	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C16</b></p> <p>0.00 <b>MH</b> Start node type, manhole, reference number: C16 <b>0</b></p> <p>0.00 <b>WL</b> Water level, 05% of the vertical dimension <b>0</b></p> <p>6.90 <b>CCJ</b> Crack, circumferential at joint from 5 o'clock to 7 o'clock <b>2</b></p> <p>9.10 <b>CCJ</b> Crack, circumferential at joint from 5 o'clock to 7 o'clock <b>2</b></p> <p>13.60 <b>FLJ</b> Fracture, longitudinal at joint at 3 o'clock <b>3</b></p> <p>13.60 <b>FLJ</b> Fracture, longitudinal at joint at 9 o'clock <b>3</b></p> <p>13.60 <b>REM</b> General remark: PREVIOUS REPAIR GONE WRONG <b>0</b></p> <p>15.00 <b>MHF</b> Finish node type, manhole, reference number: C7 <b>0</b></p> <p>Depth: <b>C7</b></p> </div>						

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
4	80.0	6.7	6.7	4.0	0	0.0	0.0	0.0	1.0



## Inspection Report

Section Number : <b>45</b>	Date : <b>06/07/2017</b>	Client's Ref : 18 Livingston Drive Liverpool	Weather : <b>No rain or snow</b>	Critical Drain/Sewer:	PLR : <b>C7X</b>
Operator : <b>STEVE MURPHY</b>	Vehicle :	Camera :	Preset :	Cleaned : <b>yes</b>	Type of Drain : <b>Gravity drain/sewer</b>

Place: <b>LIVERPOOL</b>	Direction: <b>C7 → MAIN</b>	US MH: <b>C7</b>
Road: <b>18 LIVINGSTON DRIVE</b>	Catchment:	US Depth:
Location: <b>Property with buildings</b>	Total Length <b>5.20</b>	DS MH: <b>MAIN</b>
Surface Cover:	Pipe Length: <b>5.20</b>	DS Depth:

Use: <b>Combined</b>	Pipe Shape: <b>Circular</b>
Year Laid:	Width / Height <b>150 / 0</b>
Purpose: <b>Investment planning</b>	Flow Control:
Lining:	Pipe Material: <b>Vitrified clay pipe</b>

Comment:  
Recommendation:

1:50	Position m	Code	Observation	MPEG	Photo	Grade
<div> <p>Depth: <b>C7</b></p> <p>Depth: <b>MAIN</b></p> </div>						
	0.00	MH	Start node type, manhole, reference number: C7			0
	0.00	WL	Water level, 05% of the vertical dimension			0
	1.40	LL	Line deviates left			0
	3.50	FC	Fracture, circumferential from 10 o'clock to 6 o'clock			3
	5.00	CL	Crack, longitudinal at 7 o'clock			2
	5.10	LD	Line deviates down			0
	5.10	LR	Line deviates right			0
	5.20	LL	Line deviates left			0
	5.20	LD	Line deviates down			0
	5.20	MHF	Finish node type, manhole, reference number: MAIN: MAINLINE			0

Structural defects					Constructional features				
Service and maintenance defects					Miscellaneous features				
STR no def	STR peak	STR mean	STR total	STR grade	SER no def	SER peak	SER mean	SER total	SER grade
2	40.0	9.6	9.6	3.0	0	0.0	0.0	0.0	1.0

## **APPENDIX 4 – 1 in 100 Year (+30%) Storage Volume**

---



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Data:-

Location = LIVERPOOL      Grid reference = SJ3591  
M5-60 (mm) = 18.9      r = 0.40  
Soil index = 0.45      SAAR (mm/yr) = 825  
Return period = 100      WRAP = 4  
UCWI = 88.6      Climate change = 30%

Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Pipeline storage = 0.0 m<sup>3</sup>      Available MH storage = 0.0 m<sup>3</sup>  
Offline storage = 0.0 m<sup>3</sup>

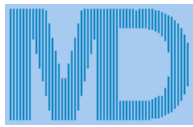
Percentage runoff = 100.0% (manual setting)

Imperv. area = 1434 m<sup>2</sup>      Pervious area = 0 m<sup>2</sup>  
Total area = 1434 m<sup>2</sup>      Equiv area = 1434 m<sup>2</sup> (Tot. area x % runoff).  
Total runoff = 56.8 m<sup>3</sup>      Discharge rate = 16.000 l/s  
**Storage (m<sup>3</sup>) = 34.1 m<sup>3</sup> (Sum of all balance quantities)**  
Total rainfall depth = 39.6 mm

Calculations :-

Time (hrs)	%Mean intens	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)	Cumulative (m3)
0.005	20.0	15.8	0.114	0.288	0.000	0.000
0.010	20.0	15.8	0.114	0.288	0.000	0.000
0.015	21.0	16.6	0.119	0.288	0.000	0.000
0.020	21.0	16.6	0.119	0.288	0.000	0.000
0.025	22.0	17.4	0.125	0.288	0.000	0.000
0.030	23.0	18.2	0.131	0.288	0.000	0.000
0.035	24.0	19.0	0.136	0.288	0.000	0.000
0.040	26.0	20.6	0.148	0.288	0.000	0.000
0.045	27.0	21.4	0.153	0.288	0.000	0.000
0.050	29.0	23.0	0.165	0.288	0.000	0.000
0.055	31.0	24.6	0.176	0.288	0.000	0.000
0.060	32.0	25.4	0.182	0.288	0.000	0.000
0.065	33.0	26.1	0.187	0.288	0.000	0.000
0.070	34.0	26.9	0.193	0.288	0.000	0.000
0.075	36.0	28.5	0.205	0.288	0.000	0.000
0.080	38.0	30.1	0.216	0.288	0.000	0.000
0.085	39.0	30.9	0.222	0.288	0.000	0.000
0.090	40.0	31.7	0.227	0.288	0.000	0.000
0.095	42.0	33.3	0.239	0.288	0.000	0.000
0.100	45.0	35.7	0.256	0.288	0.000	0.000
0.105	49.0	38.8	0.278	0.288	0.000	0.000
0.110	53.0	42.0	0.301	0.288	0.013	0.013
0.115	57.0	45.2	0.324	0.288	0.036	0.049
0.120	62.0	49.1	0.352	0.288	0.064	0.113
0.125	66.0	52.3	0.375	0.288	0.087	0.200
0.130	71.0	56.3	0.403	0.288	0.115	0.316
0.135	77.0	61.0	0.437	0.288	0.149	0.465
0.140	84.0	66.6	0.477	0.288	0.189	0.654
0.145	91.0	72.1	0.517	0.288	0.229	0.883
0.150	98.0	77.7	0.557	0.288	0.269	1.152
0.155	105.0	83.2	0.597	0.288	0.309	1.461
0.160	114.0	90.3	0.648	0.288	0.360	1.820
0.165	125.0	99.1	0.710	0.288	0.422	2.243
0.170	135.0	107.0	0.767	0.288	0.479	2.722
0.175	143.0	113.3	0.812	0.288	0.524	3.246
0.180	154.0	122.0	0.875	0.288	0.587	3.833
0.185	164.0	130.0	0.932	0.288	0.644	4.477
0.190	173.0	137.1	0.983	0.288	0.695	5.172
0.195	183.0	145.0	1.040	0.288	0.752	5.924
0.200	194.0	153.7	1.102	0.288	0.814	6.738





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## Calculations (cont.) :-

Time (hrs)	%Mean intens	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)	Cumulative (m3)
0.205	204.0	161.7	1.159	0.288	0.871	7.609
0.210	212.0	168.0	1.205	0.288	0.917	8.525
0.215	219.0	173.5	1.244	0.288	0.956	9.482
0.220	226.0	179.1	1.284	0.288	0.996	10.478
0.225	233.0	184.6	1.324	0.288	1.036	11.513
0.230	239.0	189.4	1.358	0.288	1.070	12.583
0.235	244.0	193.3	1.386	0.288	1.098	13.682
0.240	248.0	196.5	1.409	0.288	1.121	14.803
0.245	249.0	197.3	1.415	0.288	1.127	15.929
0.250	250.0	198.1	1.420	0.288	1.132	17.062
0.255	250.0	198.1	1.420	0.288	1.132	18.194
0.260	249.0	197.3	1.415	0.288	1.127	19.321
0.265	248.0	196.5	1.409	0.288	1.121	20.442
0.270	244.0	193.3	1.386	0.288	1.098	21.540
0.275	239.0	189.4	1.358	0.288	1.070	22.610
0.280	233.0	184.6	1.324	0.288	1.036	23.646
0.285	226.0	179.1	1.284	0.288	0.996	24.642
0.290	219.0	173.5	1.244	0.288	0.956	25.598
0.295	212.0	168.0	1.205	0.288	0.917	26.515
0.300	204.0	161.7	1.159	0.288	0.871	27.386
0.305	194.0	153.7	1.102	0.288	0.814	28.200
0.310	183.0	145.0	1.040	0.288	0.752	28.952
0.315	173.0	137.1	0.983	0.288	0.695	29.647
0.320	164.0	130.0	0.932	0.288	0.644	30.291
0.325	154.0	122.0	0.875	0.288	0.587	30.878
0.330	143.0	113.3	0.812	0.288	0.524	31.402
0.335	135.0	107.0	0.767	0.288	0.479	31.881
0.340	125.0	99.1	0.710	0.288	0.422	32.303
0.345	114.0	90.3	0.648	0.288	0.360	32.663
0.350	105.0	83.2	0.597	0.288	0.309	32.972
0.355	98.0	77.7	0.557	0.288	0.269	33.240
0.360	91.0	72.1	0.517	0.288	0.229	33.469
0.365	84.0	66.6	0.477	0.288	0.189	33.659
0.370	77.0	61.0	0.437	0.288	0.149	33.808
0.375	71.0	56.3	0.403	0.288	0.115	33.923
0.380	66.0	52.3	0.375	0.288	0.087	34.010
0.385	62.0	49.1	0.352	0.288	0.064	34.075
0.390	57.0	45.2	0.324	0.288	0.036	34.111
0.395	53.0	42.0	0.301	0.288	0.013	34.124
0.400	49.0	38.8	0.278	0.288	0.000	34.114
0.405	45.0	35.7	0.256	0.288	0.000	34.082
0.410	42.0	33.3	0.239	0.288	0.000	34.032
0.415	40.0	31.7	0.227	0.288	0.000	33.972
0.420	39.0	30.9	0.222	0.288	0.000	33.905
0.425	38.0	30.1	0.216	0.288	0.000	33.833
0.430	36.0	28.5	0.205	0.288	0.000	33.750
0.435	34.0	26.9	0.193	0.288	0.000	33.655
0.440	33.0	26.1	0.187	0.288	0.000	33.554
0.445	32.0	25.4	0.182	0.288	0.000	33.448
0.450	31.0	24.6	0.176	0.288	0.000	33.336
0.455	29.0	23.0	0.165	0.288	0.000	33.213
0.460	27.0	21.4	0.153	0.288	0.000	33.078
0.465	26.0	20.6	0.148	0.288	0.000	32.938
0.470	24.0	19.0	0.136	0.288	0.000	32.787
0.475	23.0	18.2	0.131	0.288	0.000	32.629
0.480	22.0	17.4	0.125	0.288	0.000	32.466
0.485	21.0	16.6	0.119	0.288	0.000	32.298
0.490	21.0	16.6	0.119	0.288	0.000	32.129
0.495	20.0	15.8	0.114	0.288	0.000	31.954
0.500	20.0	15.8	0.114	0.288	0.000	31.780

Storage volume (m<sup>3</sup>) = 34.1 m<sup>3</sup> (Sum of all balance quantities)



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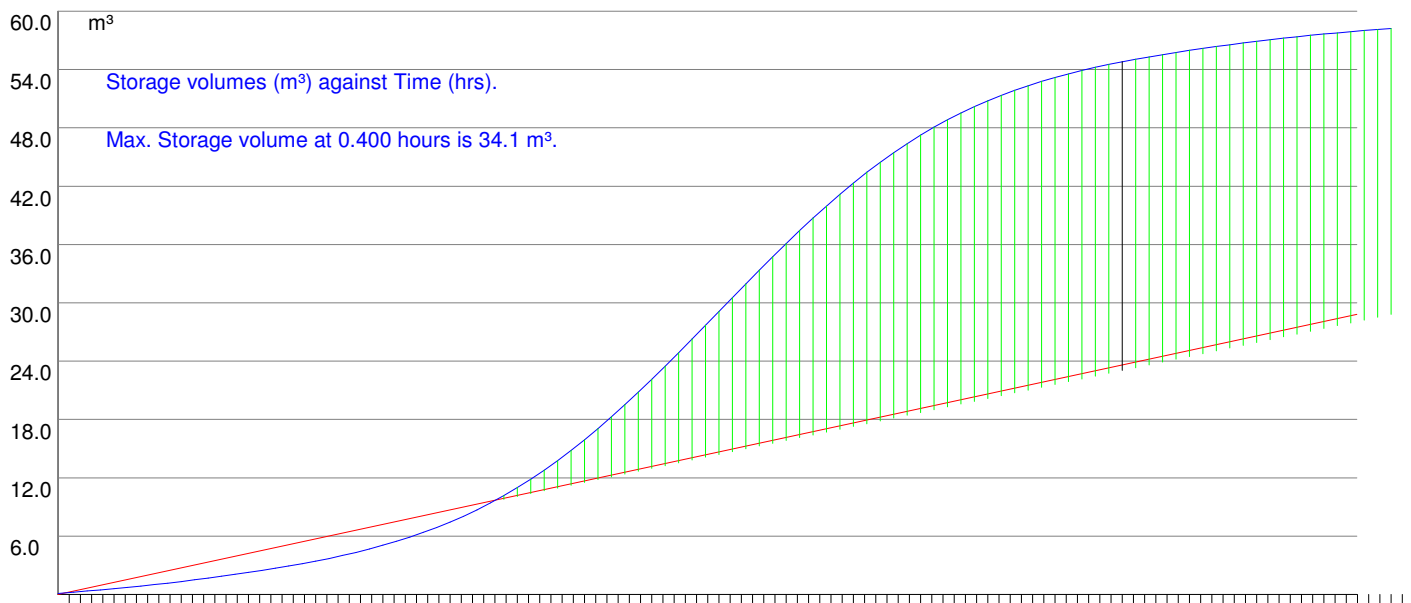
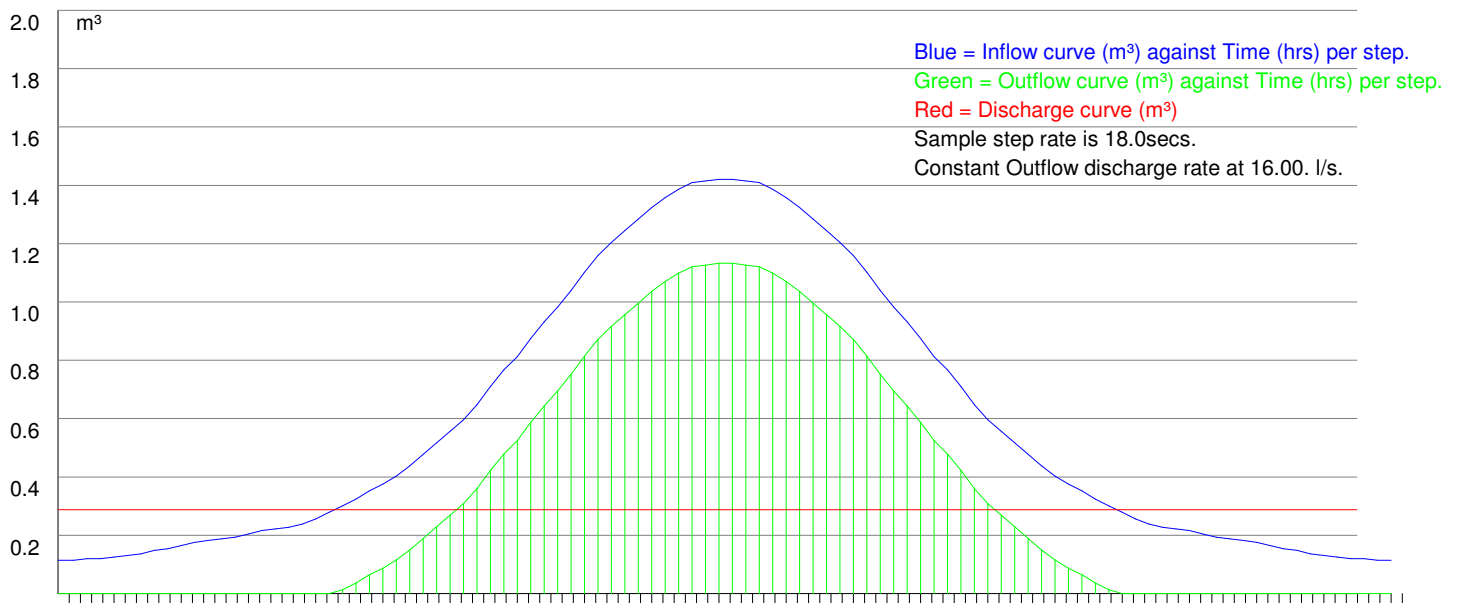
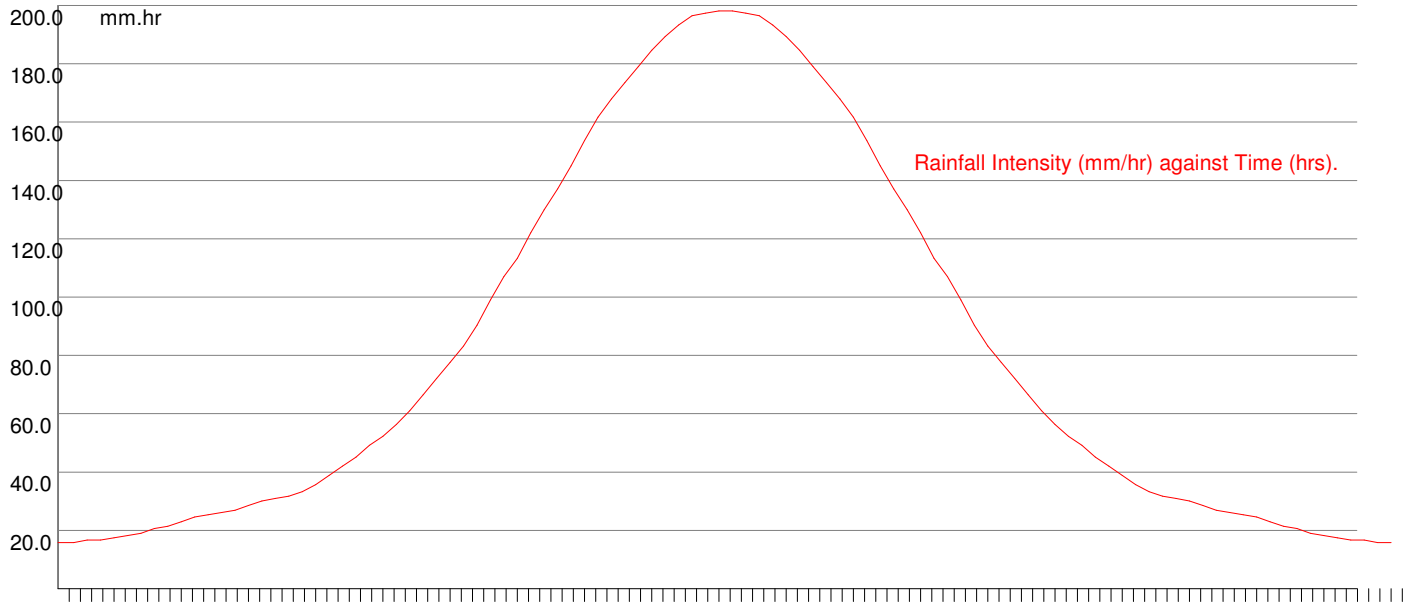
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## Maximum storage volumes for varying duration storms.

Storm length (hrs)	Max. Vol (m <sup>3</sup> )	Max. Vol time	Mean intens (mm/hr)	Step time. (mins)	Peak found
0.25	30.80	0.25	120.57	0.2	Peak found
0.5	34.12	0.50	79.24	0.3	
1	31.72	----	49.66	0.6	
2	20.77	----	30.11	1.2	
3	10.09	----	22.19	1.8	
4	2.17	----	17.77	2.4	
5	0.00	----	14.91	3.0	
6	0.00	----	12.90	3.6	
7	0.00	----	11.43	4.2	
8	0.00	----	10.28	4.8	
9	0.00	----	9.37	5.4	
10	0.00	----	8.62	6.0	
12	0.00	----	7.46	7.2	
15	0.00	----	6.25	9.0	
18	0.00	----	5.40	10.8	
20	0.00	----	4.96	12.0	
24	0.00	----	4.29	14.4	
30	0.00	----	3.59	18.0	
36	0.00	----	3.10	21.6	
42	0.00	----	2.74	25.2	
48	0.00	----	2.46	28.8	
54	0.00	----	2.23	32.4	
60	0.00	----	2.05	36.0	
66	0.00	----	1.90	39.6	
72	0.00	----	1.77	43.2	
84	0.00	----	1.56	50.4	
96	0.00	----	1.40	57.6	
120	0.00	----	1.17	72.0	
150	0.00	----	0.97	90.0	
175	0.00	----	0.86	105.0	
200	0.00	----	0.77	120.0	
250	0.00	----	0.64	150.0	
300	0.00	----	0.55	180.0	
375	0.00	----	0.46	225.0	
500	0.00	----	0.36	300.0	
750	0.00	----	0.26	450.0	
1000	0.00	----	0.21	600.0	
1250	0.00	----	0.17	750.0	
1500	0.00	----	0.15	900.0	
1570	0.00	----	0.14	942.0	
2000	0.00	----	0.12	1200.0	
2500	0.00	----	0.10	1500.0	
3000	0.00	----	0.09	1800.0	
3500	0.00	----	0.08	2100.0	
4000	0.00	----	0.07	2400.0	



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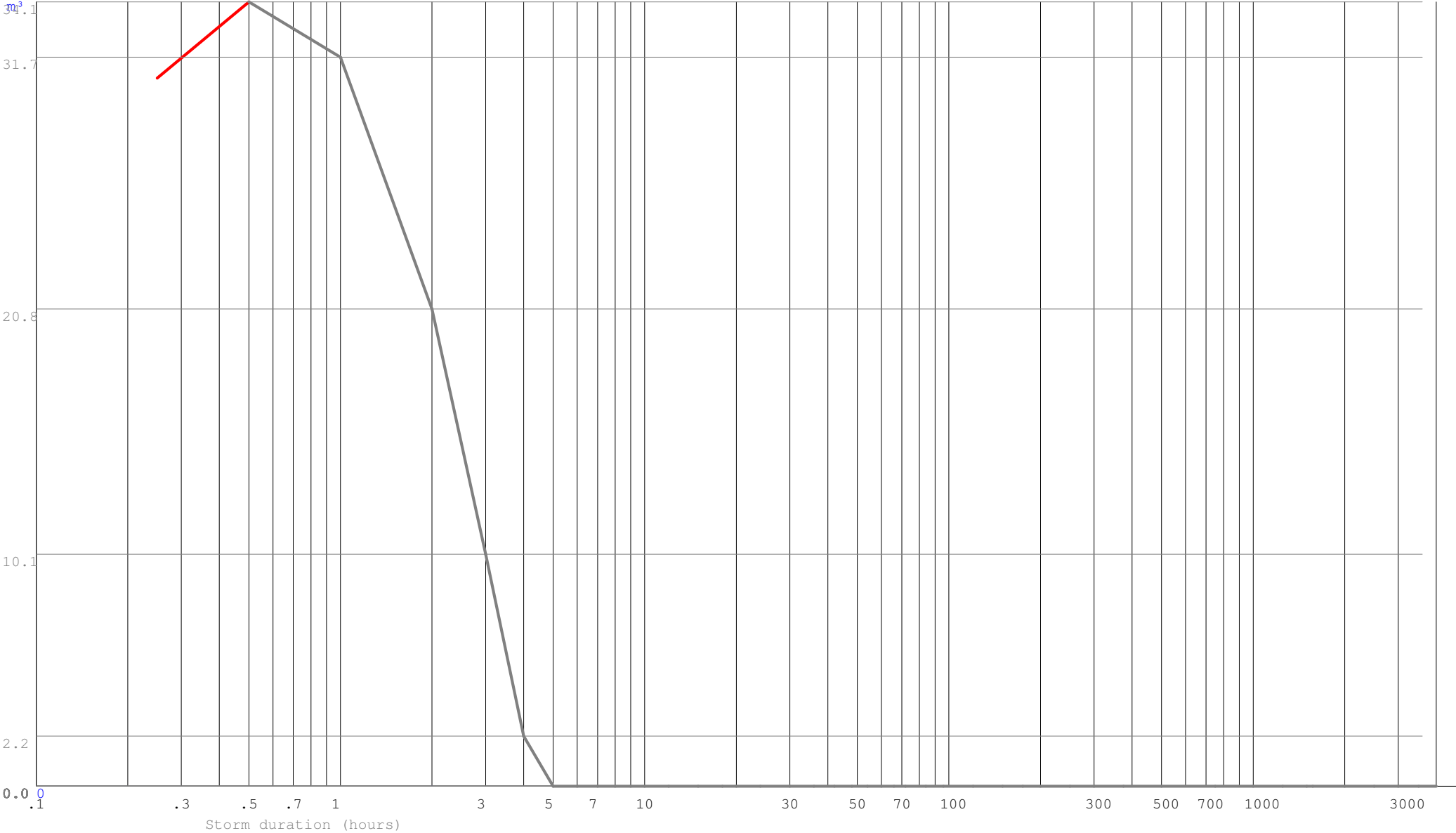
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Sequential storage volume at specific storm durations.





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### Explanatory notes for Peak Flow Storage

- 1) This system uses the rainfall intensity/ duration curve calculated using either the Wallingford or FEH method as selected.
- 2) The balance is calculated from the inflow minus the outflow.
- 3) The storage volume is the maximum value of the balance curve.
- 4) This method was described by Davis (1963) - see Butler & Davies, 2nd edition, p294
- 5) References to 'storm duration' relate only to the hydrograph method (qv).
- 6) There are always 600 steps in the calculation process, thus a 'run' time of 10 hours will be sampled every minute,

### Explanatory notes for Hydrograph Storage

- 1) The user has the choice of Summer or Winter curves
- 2) The mean intensity varies with the duration of the storm curve
- 3) There are always 120 steps in the calculation process, irrespective of storm duration.
- 4) The balance is calculated from the inflow minus the outflow.
- 5) The storage volume is the sum of the balance values for each step.
- 6) Varying durations should be tried to find the maximum storage value - this can be narrowed down very closely.

\*Modelling using the flow characteristics of the restrictor is available using Vortex Control modelling function. Please be aware that this function needs the full design data file to function.

### Why do the two methods give different results?

The rainfall characteristics for each method are very different.

The Peak flow (using the Intensity/Duration/Frequency curve) does not model the actual rainfall. This curve is joined points which represent the mean intensity of a storm at a given duration i.e. a value of 19.5 mm/hr for a 60 minute storm indicates that over the sixty minute period, the mean intensity was 19.5 mm/hr. The calculation method samples the IDF curve for a given location and frequency (Return Period) and calculates the storage for that rate and duration less the outflow volume. The maximum value is displayed as the 'worst case' storage.

The hydrograph method uses a standard curve for either Winter or Summer storms. Traditionally these are symmetrical about the central peak. UK rainfall does not fit into this convenient curve, so the calculations are dealing with a stylised set of data. The mean intensity for the storm is calculated from the IDF curve and applied to the curve data, calculating the storage for that step less the outflow volume. The final storage volume is the sum of the storage for all the steps.

It can be seen that these two methods are very different, and the user may have the choice of which result to use. This is not an exact science, though is often treated as such by those that do not understand the principles of the calculations.

## **APPENDIX 5 – SUDS Strategy**

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1. This drawing to be read in conjunction with all other architect's and engineer's drawings and specifications.



KEY

- EXISTING UU SEWER
- IC ON NEW FOUL SEWER
- IC ON NEW SURFACE WATER SEWER
- RE RODDING EYE

Rev:	Description:	Date:	By:	Chkd:
<div><p>Church House 1 Hanover Street, Liverpool L1 3DN t: 07909 870466 e:info@interimcs.co.uk</p></div>				
Status: <b>FOR APPROVAL</b>				
Project: <b>18 LIVINGSTONE DRIVE LIVERPOOL L17 4LR</b>				
Drg Title: <b>PROPOSED DRAINAGE LAYOUT</b>				
Scale: 1:200	Size: A1	First Issue: July 2017	Drawn: AP	Checked: DR
Drg No: <b>427/STRL001</b>				Rev: