Northern Gateway

Area GMA 1.2 – Flood and Drainage High Level Constraints Plan

A104444-5

September 2020

Prepared by WYG Environment Planning Transport Limited

On behalf of Northern Gateway Development Vehicle LLP

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1.0 Introduction

WYG has been commissioned by Northern Gateway Development Vehicle LLP ('NGDV') to undertake a high level desk top and site reconnaissance constraints and opportunities review of a site known as Area GMA 1.2 ('the site') at the proposed Greater Manchester Northern Gateway development area.

Part of the site is identified as Allocation GM 1.2 in the draft Greater Manchester Strategic Framework (GMSF). If forms part of the strategic cross-boundary 'Northern Gateway' allocation positioned around the intersection of the M60, M62 and M66 motorways.

1.1 Instruction

This desk top assessment and constraints review provides information to support the promotion of the site for allocation in the Greater Manchester Spatial Framework (GMSF) and the assessment work will inform the proposed Masterplan for the site.

This report has assessed the land shown on A104444-5-MAN-N-02 as this area was identified by the NGDV for baseline technical and environmental assessment. **However, only part of this wider assessment site is being identified for allocation for development within the GMSF (land to the south east of Simister)**.

1.2 Objectives

The overall objectives of the report are to:

1. Provide background desktop and site reconnaissance information.
2. To assess the constraints and opportunities for development.
3. To present next steps a) to assess constraints and opportunities and b) to address planning requirements (for allocation stage only).

The specialism specific objectives are:

1. Review the existing desk top assessments (Flood Risk and Drainage) for Areas 1 and 2, WYG reports A104444 High Level Constraints Volume 1 of August 2017.
2. Produce a flood risk and drainage report to include key constraints/opportunities relating the GMA 1.2 Development Site.

1.3 Proposed Development

It is understood at this stage that Area GMA 1.2 will be developed for residential purposes as well as a potential primary school and local centre, with associated spine roads, public open space, and soft and hard landscaping.

1.4 Report Conditions

Report conditions are enclosed as Appendix A.

1.5 Report Conclusions

The report concludes that flood risk to the development from existing fluvial (rivers and watercourses) sources is low and this is demonstrated on the Environment Agency Flood Map for Planning. The masterplan is being developed with consideration of the existing watercourses and where feasible the plans promote green/blue corridors adjacent to the existing watercourses.

The developing surface water drainage strategy promotes the widescale use of sustainable drainage features in accordance with the CIRIA SuDS Manual. Flood risk from the development will be mitigated through these features and water quality will be improved by following the recommendation for pollution prevention for large scale commercial/industrial schemes.

There will be negotiations with United Utilities (UU) to develop an acceptable foul water strategy for the scheme and this is likely to include upgrades of the existing public sewer network and nearby Bury Wastewater Treatment Works. UU have representation on the greater Manchester infrastructure board and will be fully engaged with the delivery of Northern Gateway.

2.0 Site Setting

2.1 Location and Size

Key details for Area GMA 1.2 are summarised in the table below. For ease of analysis, this report has divided the GMA 1.2 site into two sub-areas, land to the south of the M62 & east of the M60 Simister Island junction and land to south and west of the M60 Simister Island junction.

Site Specifics	
Address	Land to the south of the M62 & east of the M60 junction (Simister Island), Rochdale and to south and west of the M60.
Grid Reference	Land to the south of the M62 & east of the M60: 383939, 405837 Land to the west and south of the M60: 382841, 405490
Site Area	Land to the south of the M62 & east of the M60: 146 Hectares Land to the west and south of the M60: 22 Hectares

2.2 Site Description

Both development packages, together forming the 'site' currently comprise agricultural land with local & main roads crossing through the proposed development area. There are a number of farms & residential properties within the site boundary.

Both sites have overhead power lines running through them with them being more notable on the land to the west and south of the M60.

Boundary	Description
North	Land to the south of the M62 & east of the M60: The M62 and agricultural land Land to the west and south of the M60: the Simister roundabout and M60 junction 18.
East	Land to the south of the M62 & east of the M60: The A6045, residential properties and agricultural land. Land to the west and south of the M60: The M60 carriageway with residential properties and agricultural land beyond.
South	Land to the south of the M62 & east of the M60: The M60 carriageway and residential properties with agricultural land beyond. Land to the west and south of the M60: Heaton Park.
West	Land to the south of the M62 & east of the M60: The M60 carriageway and residential properties with agricultural land beyond.

	Land to the west and south of the M60: A school and residential properties.

2.3 Site Walkover

The land to the west and south of the M60 comprises of mainly agricultural land with several items of note including overhead electricity infrastructure with associated pylons, areas of stockpiled materials (including wood) and standing water.

The land from to the south of the M62 & east of the M60 was identified as mainly agricultural land moving from south to north the following items of note were identified; boggy areas, fly tipped waste (particularly in the centre and north west, in the north west the material included an oil drum, oil containers, plastic, metal containers, a potential tank and wood)), electricity substations, stockpiles of wood and bunded soil. Possible asbestos containing materials were identified at one location in the west. In the northern centre of the site a solar farm was identified accompanied with a number of wind turbines,

The topography is undulating with surface water features (typically ponds, streams, standing water and ditches). The site is open to the public with some vehicle access routes and bridleways.

3.0 Site Overview and Catchment Assessment

The site currently comprises agricultural land with local roads crossing parts of the proposed development areas totalling 168 ha. The entire area being promoted by the NGDV lies within the Bury Council boundary.

As described previously, the site can be split into two distinct areas, land to the south of the M62 & east of the M60 Simister Island junction (South-East Area) and land to south and west of the M60 Simister Island junction (South-West Area).

For the purposes of this report these two distinct areas have been split into sub-areas based on geographical areas, flow paths and local topography. The sub-areas are detailed following and can be seen in Figure 2.

- South-West 1 (SW1) - South west of M62 junction 18, north of Simister Lane.
- South-West 2 (SW2) – North-east of Heaton Park Reservoir, south of Simister Lane.
- South-East 1 (SE1) – Between Blueball Lane and M62.
- South-East 2 (SE2) – South of Blueball Lane.
- South-East 3 (SE3) - North of M60 junction 19.

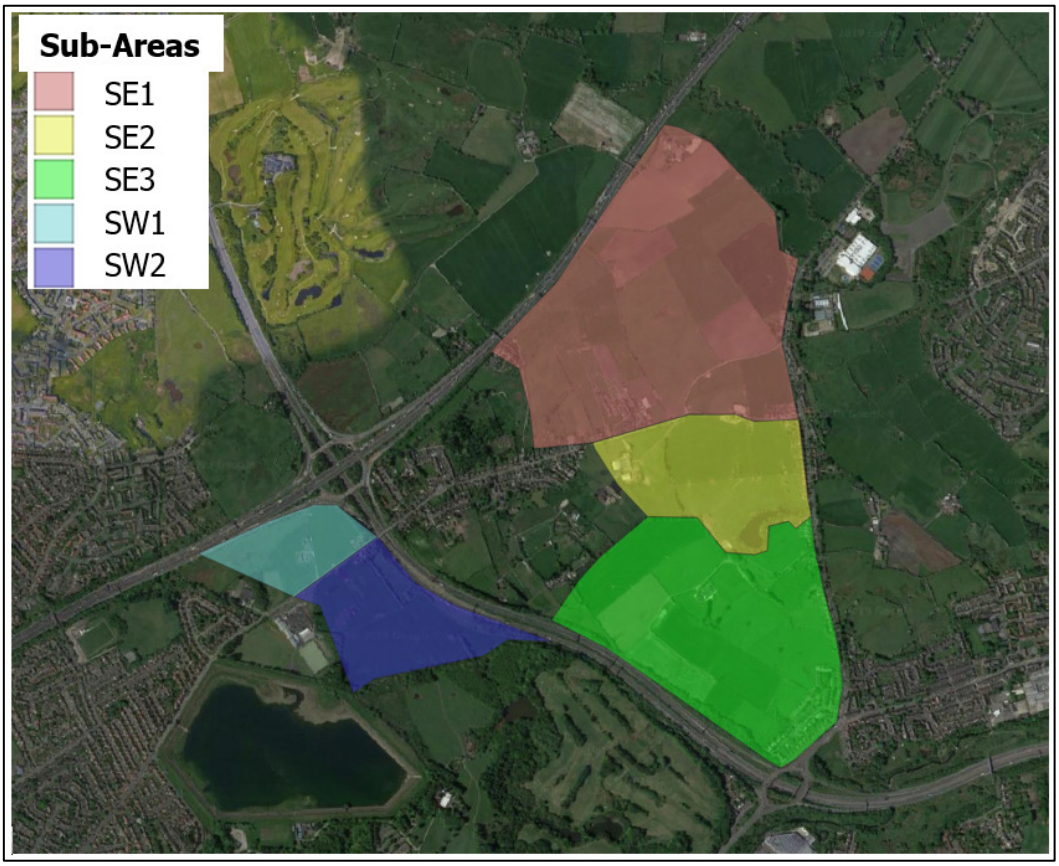

Figure 2 – Sub-Areas of GMA 1.2 Development Site

Historical Ordnance Survey maps indicate that the GMA 1.2 site has predominantly been used for farming with some clusters of residential developments. This trend has continued to the present day.

3.1 Sub-Area Assessments

The following section contains an assessment and watershed analysis for each of the GMA 1.2 Sub-Areas. Note the following assessments, in particular the existing drainage catchments, will need to be verified following the future topographic survey of each development site.

A plan of the watershed analysis for the GMA 1.2 sites is included in Appendix B.

3.1.1 South-West 1

The South-West 1 (SW1) boundary currently contains existing residential properties, playing fields, agrarian land and grassed embankments of the M62/M60.

The central part of SW1 lies in a depression at approximately 98m AOD, with the areas to the

north, east and south increasing in elevation to 101-104m AOD. There is a slight fall in a north-westerly direction, to a ditch within the SW1 boundary at 93m AOD.

Figure 3 following shows the lie of the land and directions of fall.

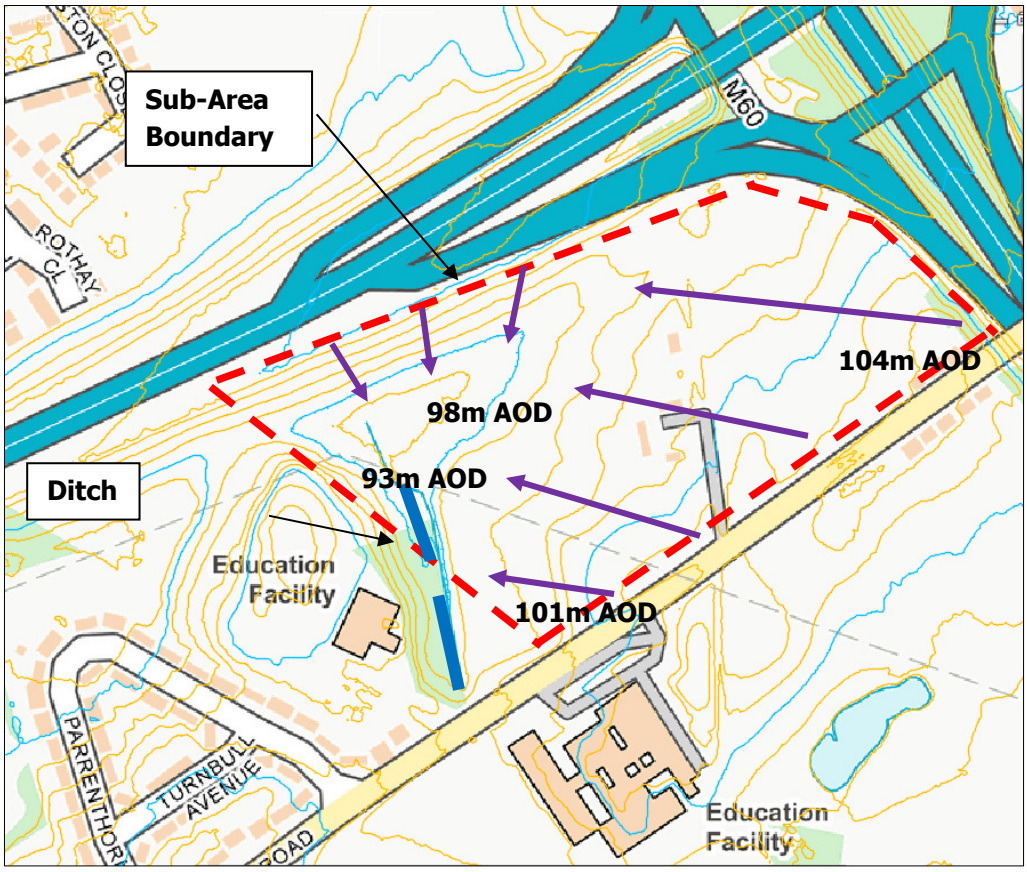

Figure 3: Area SW1 – Existing Topography

3.1.2 South-West 2

The South-West 2 (SW2) boundary contains agrarian land and a pond / kettle hole to the west.

Land falls from the north-west (107m AOD) to the south-east (95m AOD).

There is an unnamed ordinary watercourse in the south-east of the boundary which flows southwards into Heaton Park, via a number of ponds prior to discharging to the River Irk adjacent to Middleton Road.

There is a historic landfill site within the SW2 boundary, with waste classified as inert. Refer to the WYG Area GMA 1.2 Geo-Environmental High Level Constraints Review for more information.

Figure 4 following shows the lie of the land, existing watercourses and location of the inert historic landfill site.

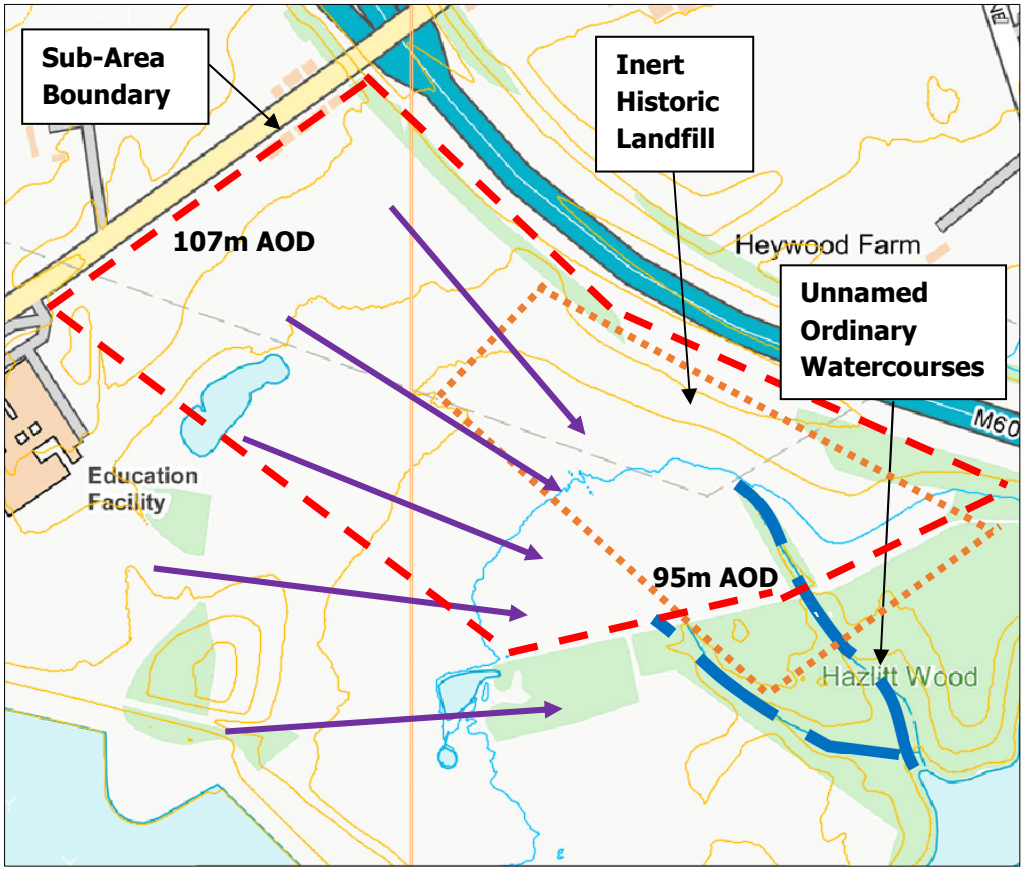

Figure 4: Area SW2 – Existing Topography

3.1.3 South-East 1

The South-East 1 (SE1) boundary is made up of agrarian land with agricultural buildings located in the centre of the boundary. There is an existing residential area to the south-west of the boundary.

There are two central localised highpoints within the boundary at 110m AOD and 106m AOD. Aside from the two highpoints there is a general fall boundary across the boundary from south at 102m AOD to the north at 97m AOD.

There is a historic landfill site and sand pit in the centre of the SE1 boundary, with waste classified as inert and industrial. Refer to the WYG Area GMA 1.2 Geo-Environmental High Level Constraints Review for more information.

Additionally, a 200mm diameter foul sludge main runs across part of the Sub-Area (refer to Public Sewer Records within Appendix C).

Figure 5 following shows the lie of the land, existing watercourses and location of the inert historic landfill site and sand pit.

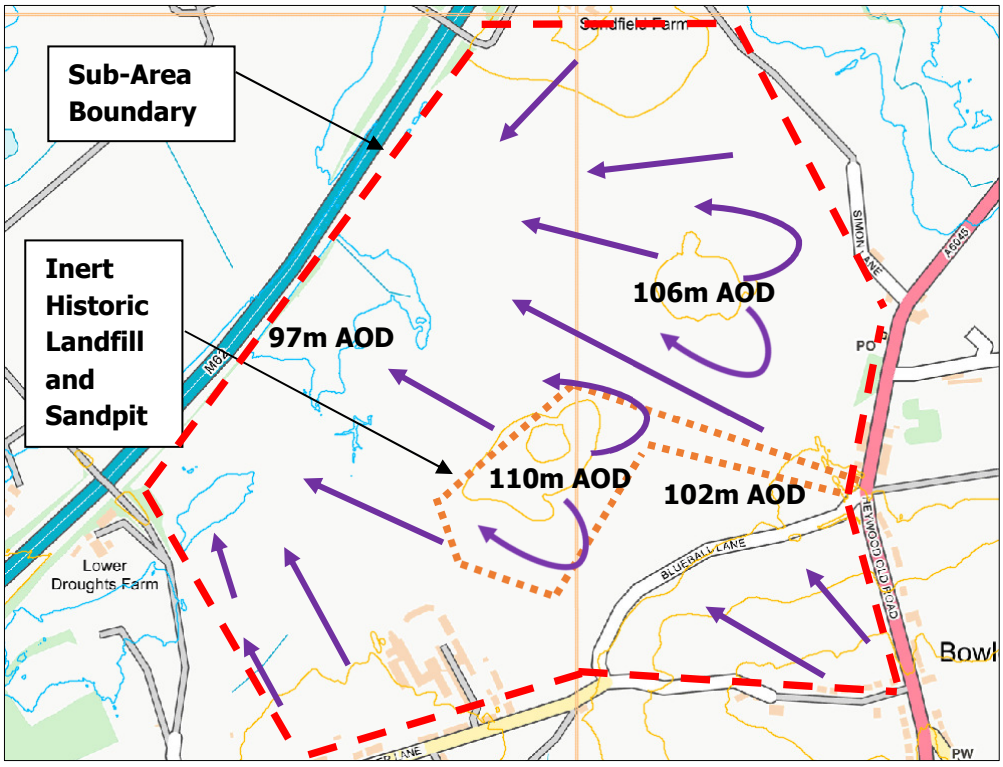

Figure 5: Area SE1 – Existing Topography

3.1.4 South-East 2

The South-East 2 (SE2) boundary is made up of agrarian land with agricultural buildings located to the north of the boundary.

General fall direction of fall is from the north-west at 116m AOD, to the south-east towards an unnamed watercourse to the west of the boundary at 84m AOD.

The unnamed watercourse flows southerly through the boundary and into Sub-Area SE3. There is also a small embanked reservoir / pond to the south-east, which feeds into the unnamed watercourse. Based on the area it is considered unlikely that this holds 25,000m³ or more, and is therefore not considered to be a large raised reservoir under the Reservoir Act 1975.

Figure 6 following shows the lie of the land and the existing watercourses.

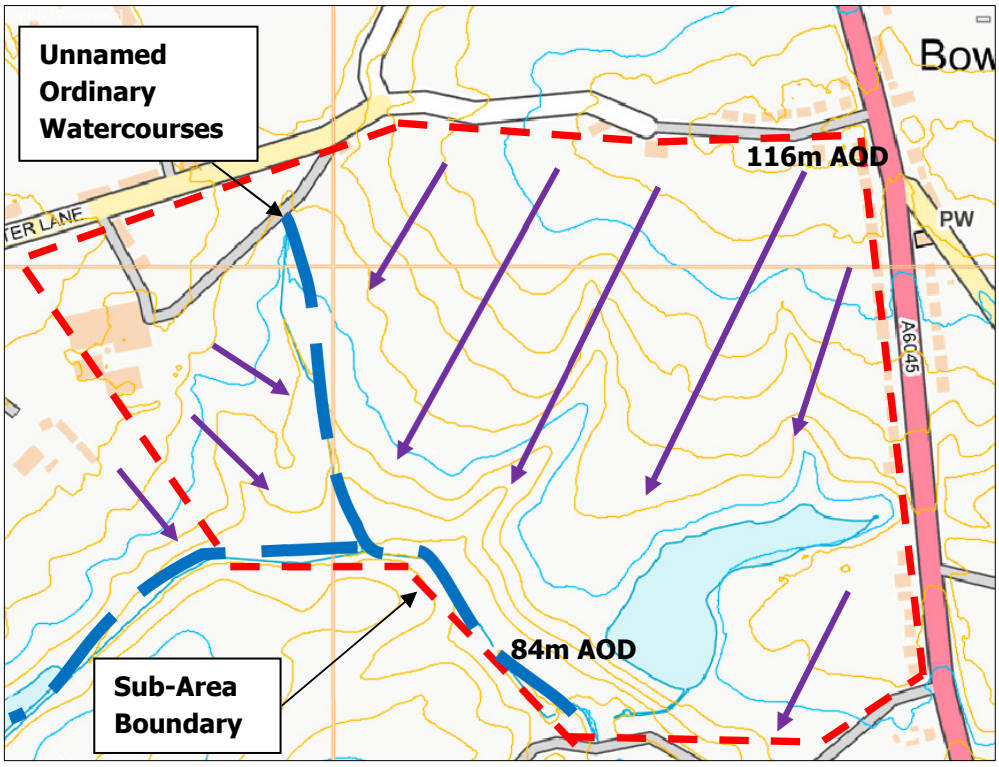

Figure 6: Area SE2 – Existing Topography

3.1.5 South-East 3

The South-East 3 (SE3) boundary is made up of agrarian land with agricultural buildings located in the centre of the boundary.

The highest elevations within the central part of the SE3 boundary with a peak of 105m AOD. The land falls in all directions from this point to 91m AOD to the north, 76m AOD to the east and 76m AOD to the south. Land to the east rises again within the boundary from 76m AOD to 95m AOD.

At the 76m AOD low point with the boundary there is an unnamed ordinary watercourse flowing from north to south. The point of discharge has not been confirmed however is assumed to discharge into the River Irk south of Old Manchester Road via. A series of culverts under the Rhodes residential area. There is also a pond to the north-east, outside of the boundary, which feeds into the unnamed watercourse.

Figure 7 following shows the lie of the land and the existing watercourses.

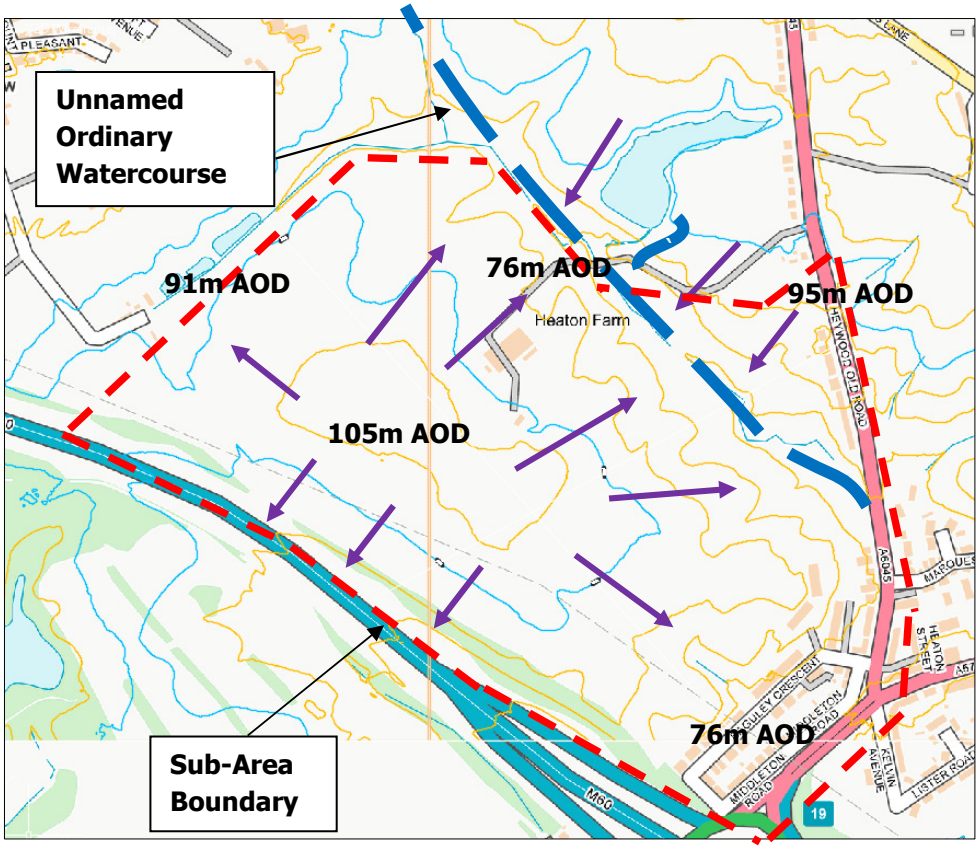

Figure 7: Area SE3 – Existing Topography

4.0 Flood Risk

A review has been undertaken of the EA Flood Maps for planning and the Bury Strategic Flood Risk Assessment mapping to identify the existing fluvial flood risk.

4.1 Fluvial Flood Risk

There are no main rivers across the GMA 1.2 site. The EA flood maps identify that all Sub-Areas are located within Flood Zone 1 (i.e. land assessed as having a lower than 1 in 1000 annual probability of river or sea flooding (<0.1% Annual Exceedance Probability (AEP)) in any one year) and is therefore land most suitable for residential development.

Figure 8 following shows the EA fluvial flood map for the area.

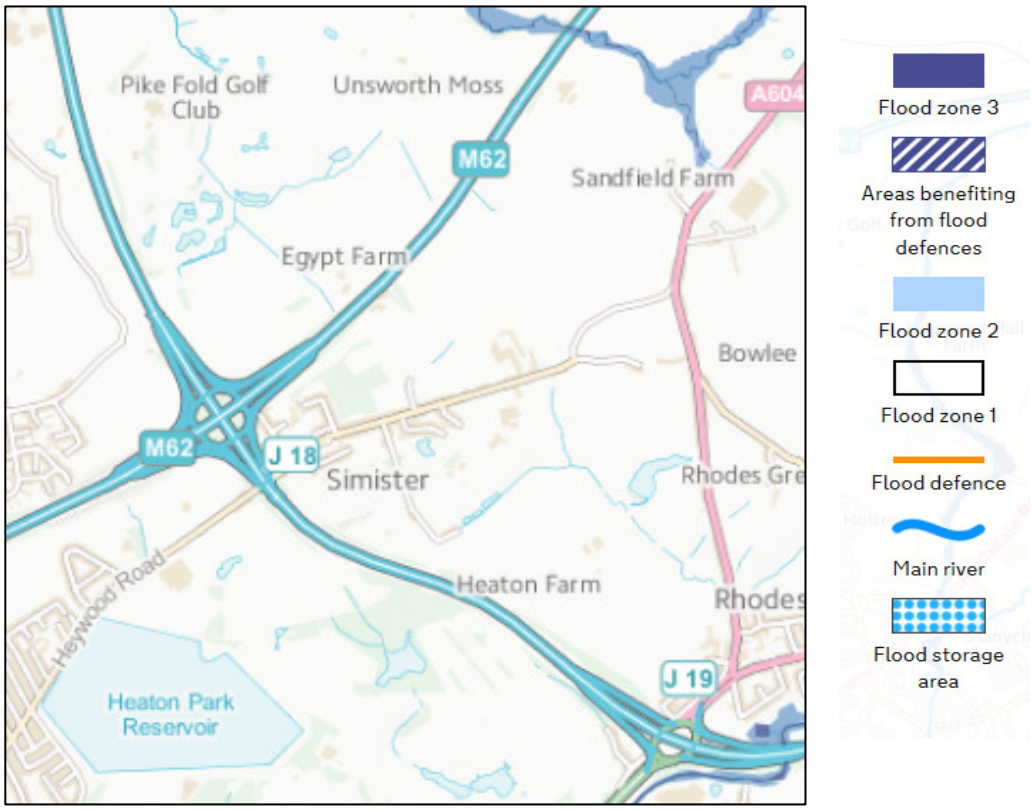

Figure 8: EA Fluvial Flood Map for Planning (Nov. 2019)

4.2 Surface Water and Overland Flows

The majority of the Sub-Areas drain overland to existing watercourses, as identified within Section 3.1 of this report.

Figure 9 following shows the EA surface water flood map for the area. The most at risk areas within the GMA 1.2 site have been highlighted.

As can be seen, the majority of the flood risk is around the local receiving watercourses. Additionally, there are some areas at risk of localised ponding. These are:

- The north-western region of SW1.
- The south and central region of SE1.

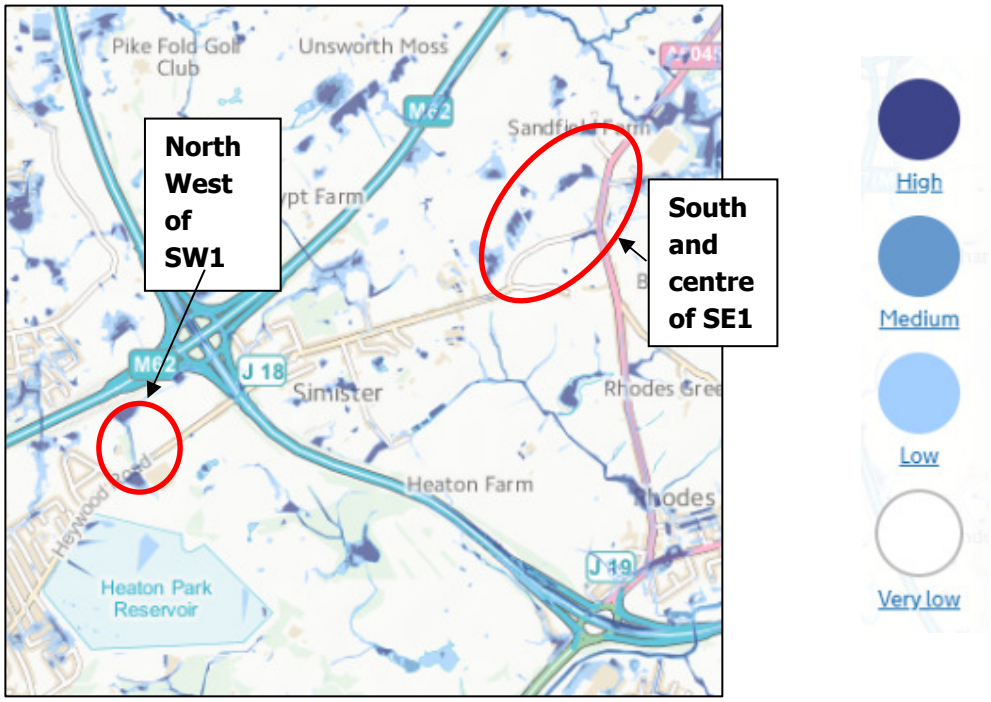

Figure 9: EA Surface Water Flood Map for Planning (Nov. 2019)

The predicted flooding in SW1 is concentrated to the north and south of the unnamed ditch identified in Section 0.

The predicted flooding in SE1 is on the flattest sections of land within the Sub-Area. Under existing site conditions localised ponding could occur in these areas.

The potential risk posed by surface water flooding can be mitigated by maintaining the existing flow paths, implementing an appropriate drainage solution and developing a masterplan that

is mindful of the flood risk. Potential measures include but are not limited to providing land drainage, raising Finished Floor Levels, maintaining existing flow paths, and maximising the amount of permeable area retained within the development.

4.3 Groundwater Flooding

Groundwater levels generally rise during wet winter months and fall over the summer months as water flows out into rivers. In very wet winters, rising water levels may lead to the flooding of normally dry land, as well as reactivating flow in 'bournes' (streams that only flow for part of the year).

The Bury, Rochdale and Oldham Strategic Flood Risk Assessment dated November 2009 details that there have been relatively few reported incidents of groundwater flooding in the areas and did not identify any substantial evidence of groundwater flooding occurring in the region.

Geological maps for the area indicate that Glacial Till underlies the whole GMA 1.2 site, with localised areas of moraine, head, peat and ice contact deposits above it.

The soils at the site are classified as having low to high leaching potential. The Peat and Glaciofluvial Deposits typically have high leaching potential, whereas the leaching potential of the Glacial Till is low.

The British Geological Survey Groundwater Flood Map (shown in Figure 10 following) shows that there is potential for groundwater flooding across Sub-Area SE1, and adjacent to the unnamed watercourse which flows southerly through Sub-Areas SE2 and SE3.

It is therefore considered that there is a localised risk of groundwater flooding at and below ground level across parts of the eastern section GMA 1.2 site. Notwithstanding this, Finished Floor Levels will be set appropriately to mitigate against any groundwater flood risk issue and the avoidance of the construction of basement levels wherever possible and applying appropriate waterproofing and anti-flotation measures to reduce the impact of high ground water to any below ground structures. Where necessary local land drainage systems will be designed and installed to lower the risk of groundwater flooding. The exact measures to be implemented will need to be considered further at detailed design.

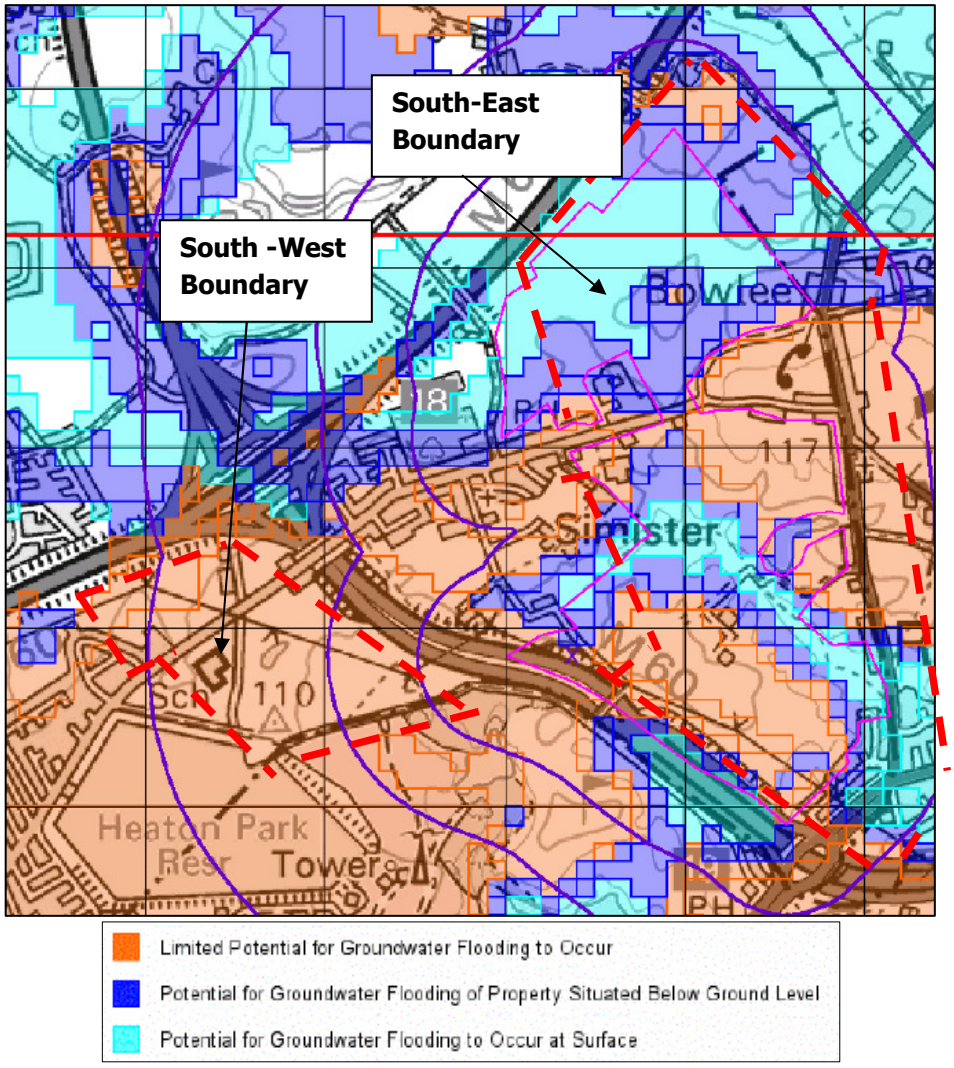

Figure 10: BGS Groundwater Flood Map (2017)

4.4 Reservoir Flooding

A review of the EA online map of 'Risk of Flooding from Reservoirs' identified that the Sub Areas SW1 and SW2 are at risk of flooding as a result of Heaton Park Reservoir failure. Sub Areas SE1, SE2 and SE3 are not identified on the map as being at risk of reservoir flooding. It should be noted, as described in Section 0, that there is an additional body of water to the south-east of Sub-Area SE2. Based on the area it is considered unlikely that this holds 25,000m³ or more, and is therefore not considered to be a large raised reservoir under the Reservoir Act 1975. It may however pose a risk of flooding to lower lying areas.

Although the probability of catastrophic dam failure is considered to be extremely low, the consequence of such an event would be severe.

It should be noted, all reservoirs greater than 25,000m³ are regularly monitored and inspected by a certified Panel Engineer, in-line with the Reservoirs Act 1975. Responsibility lies with reservoir owners, and failure to carry out adequate inspections is a criminal offence. Therefore, due to the ongoing inspection of the reservoirs, the actual risk from a failure and subsequent flooding is considered to be low.

Developers should however be aware of this low flood risk.

Figure 11 following shows the EA reservoir flood map for the area.

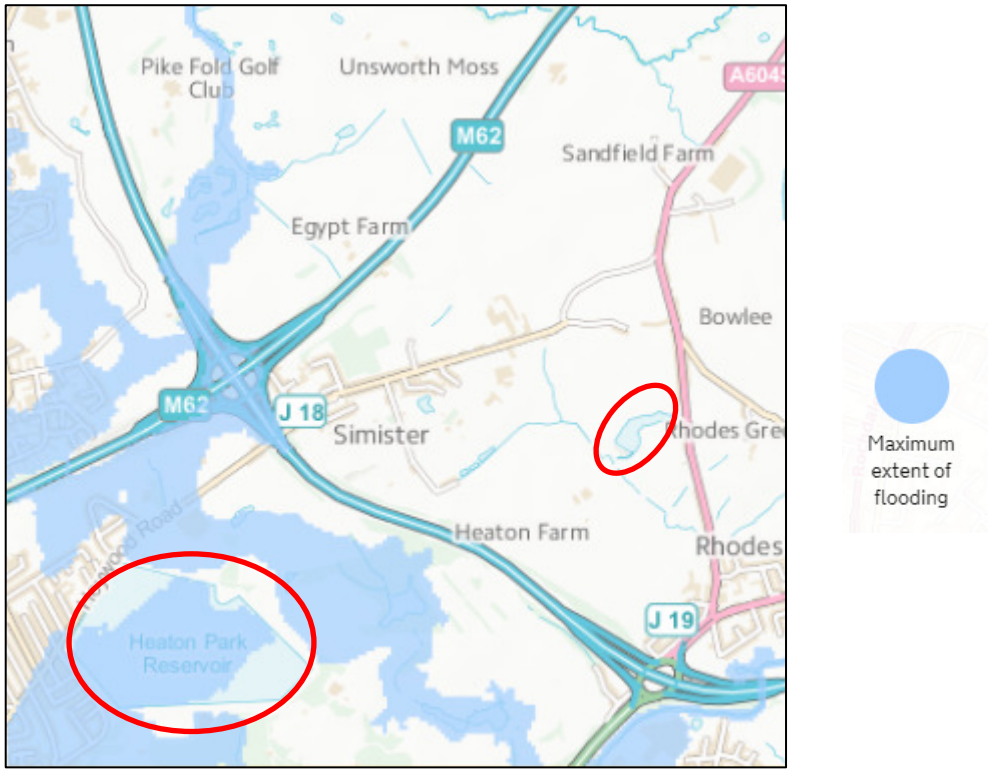

Figure 11: EA Reservoir Flood Map for Planning (Nov. 2019)

4.5 Sewer Flooding

Other than a 175mm diameter public combined sewer along Heywood Road between Sub-Areas SW1 and SW2, there are no existing public sewers within the GMA 1.2 development site. A copy of the public sewer records has been included within Appendix C.

The Bury, Rochdale and Oldham Strategic Flood Risk Assessment dated November 2009, states that the United Utilities DG5 sewer flooding database (June 2007) was provided during the

SFRA production, and details that Bury had minimal recorded DG5 flooding incidents. It is anticipated that this trend has continued to present day.

Whilst this data can give an idea of areas with limited drainage capacity, it should be noted that it is a register of properties that have already been flooded due to exceedance or the blockage or failure of sewer systems, not properties at risk of flooding. For this reason, the DG5 register has limited usefulness in predicting future flooding locations.

More useful indicators of risk are associated with the data generated using hydraulic sewer network models, which should be investigated by United Utilities as Northern Gateway plans development and points of connection are determined.

At this stage, taking into account all of the above, it is considered that the site is at low risk of sewer flooding.

4.6 Greater Manchester Strategic Flood Risk Management Framework

The Strategic Management Framework published September 2018 did not identify any additional potential sources of flood risk to the site.

4.7 Bury, Rochdale, and Oldham Joint Strategic Flood Risk Assessment

The Strategic Flood Risk Assessment (SFRA) jointly published in November 2009 included a review of DG5 records provided by United Utilities detailing internal and external flooding of properties caused by sewers. It did not identify any instances of public sewer flooding within the site boundary.

No other additional information was noted during the review of the SFRA.

5.0 Preliminary Design Considerations

5.1 Flood Risk

As described in Section 4.0 of this report, there is potential for groundwater flooding within the GMA 1.2 boundary. This flood mechanism (and others) should be considered throughout the development process to ensure that all flood risks are understood, mitigated against, and not worsened elsewhere.

The main design considerations to mitigate this flood risk are:

- Existing watercourses should be maintained in open channels with culverting and or major diversions avoided where possible;
- Existing watercourses should form an integral element to any future development. Consideration should be given to green / blue corridors centred around the natural channels of the watercourses. This would provide a cost effective and efficient method of delivering flood risk mitigation, SuDS features, habitats and biodiversity throughout the development area;
- As the areas are to be developed it is likely that ground levels will be adjusted, altering overland flow routes and areas at risk of flooding. It is essential that future plans for the GMA 1.2 site take into account the overland flow routes and potential areas of ponding, particularly in Sub-Areas SW1 and SE1 where surface water flooding is currently predicted. Surveys of watercourses and areas of standing water may be required by Developers during the design stages to fully understand flow paths across the area;
- Developers should consider maintaining a minimum 3m clear zone either side of any existing ordinary watercourses which pass through the development site; and,
- Sub Areas SW1 and SW2 (and potentially SE2) are at risk of flooding as a result of reservoir failure, the consequence of such an event would be severe. All reservoirs greater than 25,000m³ are regularly monitored and inspected by a certified Panel Engineer, in-line with the Reservoirs Act 1975. Responsibility lies with reservoir owners, and failure to carry out adequate inspections is a criminal offence. Therefore, due to the ongoing inspection of the reservoirs, the actual risk from a failure and subsequent flooding is considered to be low. Developers should however be aware of this low flood risk.

5.2 Local Planning Polices

Local Council policies were reviewed along with the Greater Manchester Combined Authority policies.

5.2.1 Greater Manchester Spatial Framework

The Greater Manchester Spatial Policy (GMSF) details Manchester's future plan for homes, jobs and the environment. The draft GMSF published January 2019 notes that there are areas of flood risk within Manchester and presents policy GM-S 5 'Flood Risk and the Water Environment'. The policy states that efforts should be made to adopt natural flood management including the use of Sustainable Drainage System to minimise the impact of present and future flooding. Furthermore, discharge of surface water should be restricted to greenfield run-off rates or alternative rates specified in district local plans.

Area GMA 1.2 is allocated within the draft GMSF published in January 2019 as GM Allocation 1.2 'Simister/Bowlee (Northern Gateway)' for primarily residential development. This allocation and two others, GM 1.2 and GM 1.3, together form the wider 'Northern Gateway' cross-boundary strategic allocation (Policy GM Allocation 1).

The GMSF sets high level principles for flood risk and drainage in the Greater Manchester area, these will need to be incorporated within the GMA 1.2 development. Policy GM Allocation 1.2 and the supporting text specifies that:

- A drainage strategy will be required to control surface water run-off from the site.
- Designed features should look to mimic the natural drainage features on the Development Site.
- Sustainable drainage features should be incorporated and include 'green and blue' infrastructure. These shall address both flooding and water quality issues.
- Recreational areas should be incorporated into SuDS features.

5.2.2 Bury Unitary Development Plan

Section 2 of the Bury Unitary Development Plan adopted August 1997 includes policy EN5/1 – New Development and Flood Risk. As part of this clause the council will not permit development where *such development would be at risk of flooding, would be likely to increase the risk of flooding elsewhere, or would adversely affect river flood defences*.

5.3 Surface Water Drainage

5.3.1 Surface Water Drainage Strategy

In order to ensure that surface water runoff from the site does not cause an increase in flood risk, the management of runoff has been considered via a sequential approach, in line with Building Regulations and national planning policy.

The following options for the disposal of surface water runoff were considered, in order of preference:

i) A soakaway or some other infiltration system - Based on the ground conditions detailed within Section 4.3, it is considered that the use of infiltration techniques may be viable on parts of the GMA 1.2 Development Site. This is the preferential option to discharge surface water from the site.

ii) A watercourse or tidal outfall - The majority of Sub-Areas drain overland to existing watercourses. It is therefore assumed that these will provide suitable points of surface water discharge for future developments.

iii) A sewer – there are minimal public sewers within or adjacent to the Development Site.

If infiltration is deemed unsuitable within a Sub-Area the potential discharge points are:

- SW1 – If identified as flowing, to the unnamed ordinary watercourse to northwest of boundary. Land falls in this direction.
- SW2 – To unnamed ordinary watercourse in south-east of development, eventual discharge to River Irk. Land falls in this direction. Note, the presence of an historic landfill site to the south-west of the Sub-Area means infiltration may not be suitable in some areas.
- SE1 – As ground falls northward towards the M62, there is a depression of land where (without significant alteration of ground levels) surface water may require discharge by either pumping to local watercourse or by means of infiltration. Note, the presence of an historic landfill site to the central region of the Sub-Area means infiltration may not be suitable in some areas.
- SE2 – to unnamed ordinary watercourse to west of boundary. Land falls in this direction.
- SE3 - Developments in north, central, eastern and southern likely able to discharge to unnamed ordinary watercourse to the east of the boundary as land fall in this direction. Developments to the west may be able to discharge to the watercourse

also, although due to distance and topography may need to find alternative points of discharge such as infiltration or pumping.

Suitable points of discharge for future surface water run-off will be required for all development Sub-Areas, with the allowable discharge rate being restricted to the pre-development greenfield discharge rates.

In draining the new development sites, it will be necessary to design the drainage to ensure that there is no increased flood risk outside of each site for all events up to and including the 1 in 100 year plus climate change storm event. In addition, the design should seek to maximise the use of SuDS techniques as required by the Bury Flood Risk & Drainage planning policy and the policies within the GMSF.

5.3.2 Required Attenuation

As the development will result in a significant increase in the impermeable area, on-site attenuation is likely to be required which may be provided in plot, phase, or development wide attenuation features.

The preferred and most economical solution is generally to provide a suitable sized attenuation basin, which maximising infiltration where feasible, within each phase of the development serving a number of plots and these would ideally be located adjacent to, and at a higher elevation than, their receiving watercourse.

The attenuation basins, which can be singular per individual development plot or site wide attenuation features can be designed as a dry basin or a pond which retains a shallow level of permanent water.

A preliminary attenuation estimate has carried out based on the following parameters:

- Greenfield Run-Off QBar Rate – 7.5 l/s/ha (calculations within Appendix E).
- Total Area – 182 ha.
- Assumed 60% impermeable land for proposed residential areas.

Therefore, the total greenfield run off rate for the 109 ha impermeable area of the GMA 1.2 site is 818 l/s.

For the 1 in 30 year storm event approximately **37,000 m³** of attenuation is required for the GMA 1.2 site (assuming no infiltration), equating to **203 m³ per hectare** (MicroDrainage Storage Estimate screenshots are included within Appendix F).

Additional storage will be required to cater for all events up to and including the 1 in 100 + CC storm events and this can either be provided by allowing temporary above ground flooding to hardstanding areas such as roads and car parks, or alternatively approximately doubling the size of attenuation ponds. Total required attenuation including above ground on-site storage is approximately **81,000 m3** (assuming no infiltration), equating to **445 m3 per hectare**. As it is currently proposed that the development site is purely for residential use it is considered that a lifespan of 100 years through to 2119 is suitable in this instance; Environment Agency guidance for peak rainfall intensity increase due to climate change over this period is +40%.

The actual required attenuation will depend on the extent of the impermeable area in each phase, which may differ from the 60% estimate made, and the infiltration properties of the soils throughout the site. If there is infiltration potential within the soil, this will reduce the volume of attenuation required. This infiltration potential shall be determined through ground investigation in latter stages of the planning process.

5.4 Sustainable Drainage Systems (SuDS)

The new developments in GMA 1.2 offer an opportunity to deliver a fully compliant SuDS design in relation to the surface water drainage of each site.

In order to comply with the national guidelines and policies set by the local authorities and the Non-Statutory Technical Standards for Sustainable Drainage, the design of the surface water drainage system should seek to maximise the use of SuDS techniques.

This section reviews the suitability of the different SuDS elements available for the application site.

5.4.1 Potential for Infiltration

As detailed in Section 4.3, Glacial Till underlies the GMA 1.2 site, with localised areas of moraine, head and ice contact deposits above it.

The bedrock of Pennine Coal Measures and Glaciofluvial Deposits present on the Eastern Sub-Areas can provide a level of permeability. Additionally, Chester Formation bedrock found at the Southern Sub-Area are layers of rock that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. A Geology Plan displaying the local ground conditions is included within Appendix G.

It is therefore considered that infiltration techniques may be viable on parts of the GMA 1.2 Development Site. As described previously, this is the preferential option to discharge surface water from the site and has the potential to reduce the attenuation requirements across the site.

Ground conditions will need to be confirmed by ground investigation on a more localised basis as the GMA 1.2 development plans progress, to determine where infiltration of surface water may be utilised.

5.4.2 The SuDS Management Train

The overarching principles of a SuDS system are to minimise the impacts arising from the development, whilst at the same time replicating the natural drainage from the site before development.

SuDS key objectives are to minimise the impacts from the development on the quantity and quality of run-off and to maximise amenity and biodiversity opportunities.

The accepted SuDS management train consists of three elements:

- Source Control: Water butts, green roofs, filter drains, pervious surfaces, swales.
- Site Control: Swales, ponds, wetlands, infiltration devices
- Regional Control: Basins, ponds, wetlands, and reservoirs

The following (Figure 12) is an illustration of the SuDS principles and how they may be applied to a development via a SuDS Management Train.

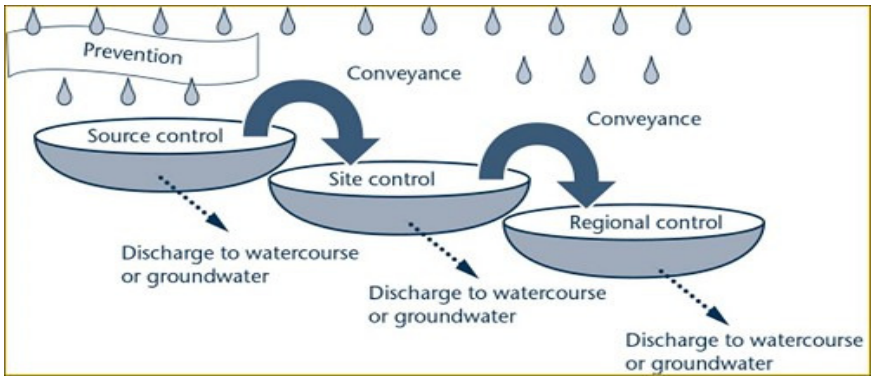

Figure 12: SuDS Principles

Table 5.1 following reviews the suitability of different SuDS elements within the site. Note development plans, and therefore applicable SuDS elements, are indicative at this stage.

Table 5.1 – Review of SuDS Options

Type of SuDS		Description	Applicability to the Site
Source Control	Water butts	Small storage tanks on each individual housing plot.	May be appropriate for the site.
	Rain water harvesting	Recycling of water from roofs and impermeable areas.	May be appropriate for the site however not common for standard residential properties.
	Green roofs	Vegetated roofs that reduce runoff and remove pollutants.	May be appropriate for the site however not common for standard residential properties.
	Pervious surfaces	Permeable surfaces that allow surface water inflow into underlying basal stone drainage systems and then into the surface water sewers.	May be appropriate for the site.
Site & Regional Control	Filter drains	Linear drains or trenches filled with granular material that allow infiltration to the surrounding ground.	May be appropriate for the site however is dependent on localised ground conditions.
	Swales	Vegetated channels to convey store and treat runoff.	May be appropriate for the site.
	Basins/ponds	Shallow areas of open space that temporarily hold water and collect silt.	May be appropriate for the site.
	Infiltration basin	Shallow depression that stores runoff before it infiltrates into the subsoil.	May be appropriate for the site however is dependent on localised ground conditions.
	Infiltration devices	Generally granular trenches or soakaways that store water and allow infiltration to the surrounding ground.	May be appropriate for the site however is dependent on localised ground conditions.

5.4.3 Water Quality

The SuDS design should seek to provide an appropriate management train of SuDS components to effectively mitigate the pollution risks associated with the different site users.

Within the GMA 1.2 site, based solely on residential developments, there are likely two key drivers in respect of pollutant risks to the receiving groundwater:

- Pollution from vehicle parking areas and access roads;
- Pollution from residential roofs.

In accordance with Table 26.2 of The SuDS Manual, as summarised in Table 5.2 following, if the site is solely standard residential developments the overall pollution hazard level would likely be 'Low'. Therefore, the requirements for discharge to surface waters state that the 'Simple index approach' should be used.

Step 1 of the simple index approach is to identify the pollution hazard indices for the proposed land use, as set out in Table 5.2 following.

Table 5.2 – Pollution Hazard Indices

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential Roofs	Very Low	0.2	0.2	0.05
Other Roofs	Low	0.3	0.2	0.05
Individual property driveways, residential car parks, low traffic roads and non-residential car parking with infrequent change	Low	0.5	0.4	0.4

Step 2 of the simple index approach is to select SuDS with a total pollution mitigation index that equals or exceeds the required pollution hazard index identified within Table 5.2.

Table 26.3 of The SuDS Manual states the various mitigation indices for discharges to surface waters. As plans for the GMA 1.2 site are indicative at this stage, it is not possible to determine the exact SuDS management strategy and treatment processes. For reference, the treatment properties for the SuDS elements detailed in Table 5.1 previously can be seen in Table 5.3 following. It is clear that for some SuDS elements, such as filter strips and filter drains, two levels of SuDS treatment will be required.

Table 5.3 – SuDS Mitigation Indices

Types of SuDS component	TSS	Metals	Hydrocarbons
Filter Strip	0.4	0.4	0.5
Filter Drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention System	0.8	0.8	0.8
Permeable Pavement	0.7	0.6	0.7
Detention Basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8

Provided that the mitigation indices of the treatment techniques are greater than or equal to the hazard indices for the proposed development then there should be no reduction in the overall water quality within the receiving system.

5.4.4 Maintenance of the Drainage System

In order for the SuDS elements to work effectively ongoing maintenance of the drainage system will be required. Depending on the drainage adoption strategy, the maintenance will be undertaken by either the local water authority (United Utilities), local authority or an approved management company.

United Utilities are currently preparing for the implementation of the Sewerage Sector's Design and Construction Guidance (DCG) that has been produced as a requirement of Ofwat's Adoption Code which will be implemented in April 2020. A major change in the new guidance is that, for the first time, guidance is provided on the type of SuDS that will be adoptable (by meeting the definition of a sewer) by Water Companies in England.

5.5 Foul Drainage

5.5.1 Existing Foul Drainage

Copies of the United Utilities public sewer records have been obtained for the Development Site. Analysis of these has confirmed that in Sub-Areas:

SW1 and SW2

- The only existing foul sewerage is a 175mm diameter public combined sewer along Heywood Road between Sub-Areas SW1 and SW2.
- There is an existing foul water pump station off Heywood Road, opposite St. Margaret's Primary School. This is outside of the GMA 1.2 development boundary.
- There is an existing foul water pump station, accessed between 49 and 51 Parrenthorn Road. This is outside of the GMA 1.2 development boundary.

SE1, SE2 and SE3

- Within the eastern Sub-Areas (SE1, SE2 and SE3) there are no existing public foul sewers within the development site and limited public sewers adjacent to the boundaries. Note, from analysis of United Utilities sewer plans it appears records may be incomplete as they do not show any public sewer system along Old Heywood Road.
- An existing foul water pump station is present to the west of the SE1 Sub-Area, approximately 150m outside of the boundary.
- It is understood that the existing farms located within the development site are drained to private septic tanks or similar non-mains sewage systems.
- There is a 200 mm diameter sludge main running across Sub-Area SE1 to the north of Simister Lane. A 6m easement will be required along the alignment of this main, this will require consideration during the development of plans for the area.

The nearest United Utilities wastewater treatment works is south of Bury, it is located approximately 2km to the north-west of the GMA 1.2 area.

To the north, within the G1.1 development boundary, industrial estates drain to private sewage treatment plants, which discharge into adjacent watercourses.

Copies of the United Utilities Sewer Records are Contained within Appendix C.

5.5.2 Foul Water Drainage Strategy

United Utilities have a responsibility to provide points of connection for new developments. A full consultation with United Utilities will be required to confirm and agree on the overall development strategy for foul water. UU have been engaged through the Greater Manchester Infrastructure Board forum and consultation is continuing to determine appropriate points of discharge to coordinate with the wider upgrade works of the public sewer network in the region. This desktop study has identified the following options for disposing of foul water from the different development sites.

SW1 and SW2

It is anticipated that the 175mm diameter combined sewer is operating close to capacity however there may be opportunity to discharge foul flows to this from some of the new developments adjacent to Heywood Road for the SW1 and SW2 developments.

If capacity issues are present along the 175mm diameter sewer there may be an opportunity to connect directly into the foul pump station opposite St. Margaret's school. Alternatively, some upsizing of sewers may be required by United Utilities.

Foul flows from developments to the north of Sub-Area SW1 will need pumping up to the higher elevation at Heywood Road, if connection to either the 175mm diameter sewer or pump station opposite St. Margaret's school is authorised by United Utilities.

An alternative would be to connect to the additional foul pump station between 49 and 51 Parrenthorn Road. This would require sewerage to be constructed across private land so would therefore require requisition. The pump station pumps flow in a southerly direction up to Heywood Road where it is discharged and flows westerly by gravity.

Any foul flows from the south of Sub-Area SW2 will need pumping up to the higher elevation at Heywood Road.

SE1, SE2 and SE3

It is anticipated some upgrade works will be required by United Utilities to facilitate the construction of the SE1, SE2 and SE3 developments.

There is potential for developments in the SE1 Sub-Area to drain to the existing foul water pump station to the west of the boundary. This would require sewerage to be constructed across private land, therefore a requisition would be required.

The logical foul water drainage strategy for Sub-Areas SE2 and SE3 is to drain from north to south with the lie of the land, and discharge into the existing public sewer network to the north-east of the M60 junction 19. If a public sewer is present along Old Heywood Road, this would also provide a point of connection for some developments.

It is anticipated that United Utilities will have to provide upgrade works to enable the connection of both the eastern and southern developments to their network.

6.0 Constraints and Opportunities

There are no significant constraint that preclude the development of the site provided consideration is given to the following during planning and detailed design.

6.1.1 Surface Water

- Discharge is to be restricted to the greenfield run-off rate of 7.5 l/s/ha.
- At the restricted discharge rate it is estimated that 37,000m³ (203m³/ha) of attenuation storage will be required across the GMA 1.2 development for the 1 in 30 AEP storm event and a total of 81,000m³ (445m³/ha) for the 1 in 100 AEP + 40% climate change storm event. Attention is drawn to the fact that any body of water with an excess of 25,000m³ of storage above ground level is classed as a reservoir and as such must meet the requirements of the Reservoirs Act 1975.
- As it is proposed that some Sub-Areas are discharged to watercourses, consultations should be made to the Lead Local Flood Authority and Environment Agency and Flood Defence Consent applied for where required.
- Parts of the site have been identified as historic landfill sites; it is considered that infiltration of surface water may not be an environmentally safe option in these areas.

6.1.2 Foul Water

- Consultations will need to be made with United Utilities at the planning application stage to confirm the capacity of the existing foul water network and determine preferential points of connection.
- If the construction of sewerage outside the red line boundary is required, this will require requisitions.
- An easement will be required over the existing 200mm diameter sludge main within the Sub-Area SE1.

6.2 Opportunities

- The drainage strategy provides an opportunity to bring the GMA 1.2 Development in-line with the Greater Manchester Spatial Framework Policy. The drainage system should include a variety of SuDS feature providing green/blue spaces (such as detention basins and swales). These shall address both flooding and water quality issues and be designed to mimic natural drainage features of the Development Site and provide recreational areas for the public.

- It is recommended that, due to the scale of the attenuation required, that this is provided in phase specific detention basins.
- Alternate SuDS options, such as wetlands, provide an opportunity to maximise biodiversity and maximise public open space.
- Infiltration may be possible across much of the GMA 1.2 Development Site, subject to detailed ground investigations on a localised basis.

7.0 Conclusions

The Flood Risk and Drainage Constraints Assessment has determined that the GMA 1.2 development area is at low risk of flooding from fluvial sources. This is supported by the EA Flood Maps for Planning which indicate the development is entirely in Flood Zone 1. The masterplan should be developed with due consideration for the existing topography, watercourses and rivers, and development plots located with substantial offsets from these features. Opportunities should be maximised to create green/blue corridors adjacent to the alignments of these existing watercourses. Furthermore, this approach does not require the diversion of any of these existing watercourses and culverting works will be kept to a minimum and required only where there are highway crossings.

The report sets out the high level principles for how the scheme can be served for surface water drainage and it is proposed to comprehensively promote the use of sustainable drainage systems across the scheme to mitigate flood risk occurring from the development and to minimise pollution runoff into the receiving waterbodies. It is proposed that all SuDS features will comply with CIRIA C753, The SuDS Manual, and any requirements of Bury Council in their capacity as the Lead Local Flood Authority. It is proposed that the post-development discharge rates will be limited to existing greenfield and where possible the increase in volumetric run-off will be limited by the potential use of infiltration structures such as basins, soakaways, filter drains, etc. Where it is not possible to infiltrate to the ground the additional volume of run-off will be attenuated and discharged at existing greenfield rates. All surface water discharge points are proposed to connect to the existing watercourses in and around the development site over existing public sewerage which would require significant upgrades. This strategy is in accordance with the hierarchy established in planning guidance, the SuDS Manual, and Building Regulations Part H.

Engagement with UU is proposed to establish a feasible regional foul drainage strategy which will rely upon upgrade works of the UU public sewer network and potentially to Bury Wastewater Treatment Works. It has been identified that the majority of the development site is likely to discharge to the Bury Wastewater Treatment Works to the west of the M66. Provision should be allowed for in the masterplan for a primary foul pump station to facilitate this strategy. Discharge from the foul pump station would be either directly into the public sewer network or into the sewer network of GMA 1.1 to the north.

This Assessment demonstrates there are no flood risk or drainage constraints that would preclude the proposed development of Area GMA 1.2 and the site is suitable for allocation in the GMSF.

Further detailed investigations and consultation with UU, the EA and the Lead Local Flood Authority will be undertaken as part of the detailed design stage for any future planning application.

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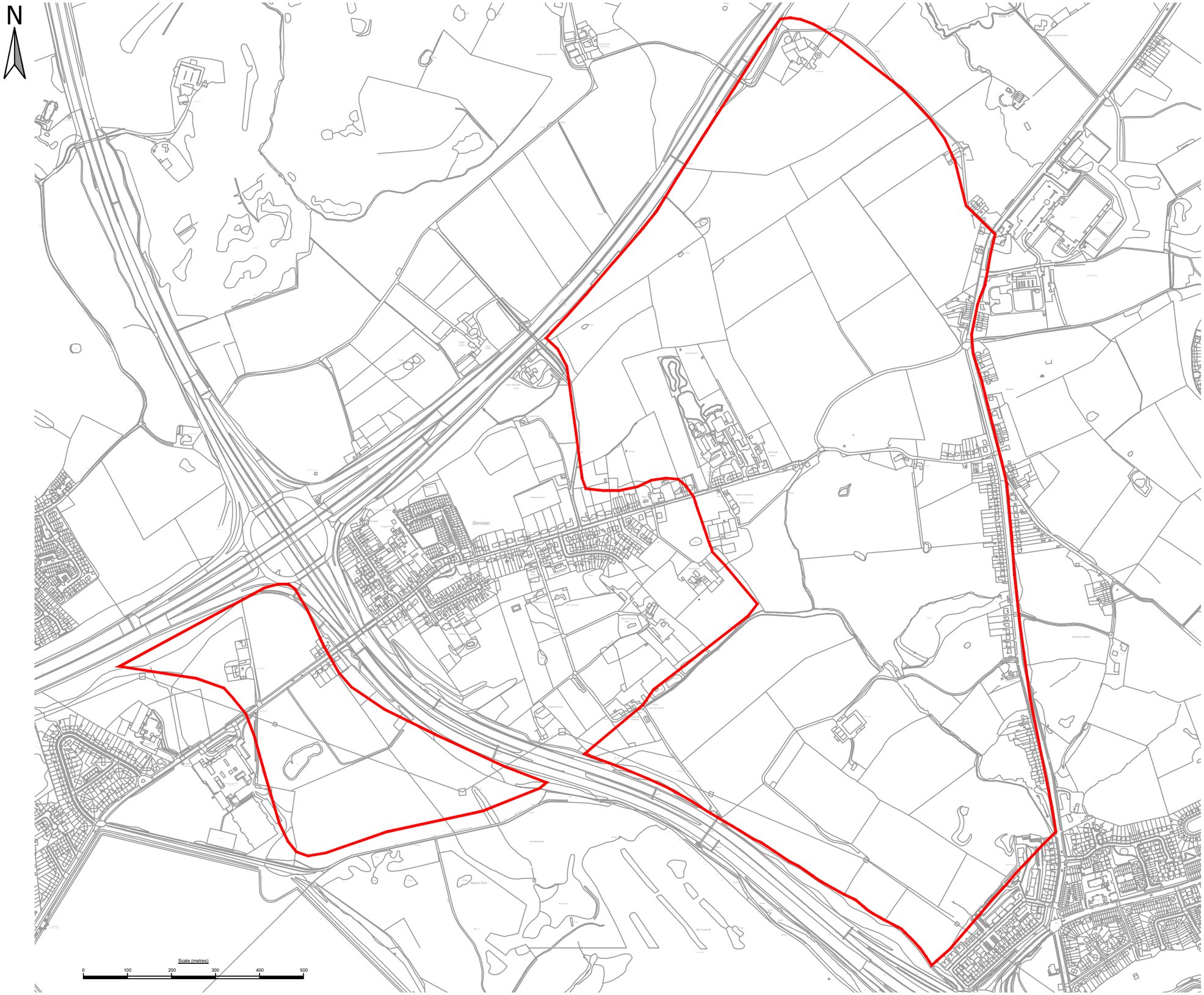
KEY

GMA 1.2 - SITE BOUNDARY



REV	DESCRIPTION	BY	CHK	APP	DATE
B	PREVIOUS SITE BOUNDARIES REMOVED	CM	CEM	PG	04.12.19
A	GMA 1.2 BOUNDARY UPDATED	CM	CEM	PG	19.11.19

QUAY WEST at MediaCity UK
TRAFFORD WHARF ROAD
TRAFFORD PARK
MANCHESTER
M17 1HH
TEL: +44 (0)161 872 3223
FAX: +44 (0)161 872 3193
e-mail: manchester@wyg.com

Client:
NORTHERN GATEWAY DEVELOPMENT VEHICLE LLP

Project: A104444-5
NORTHERN GATEWAY GMA 1.2

Drawing Title:
GMA 1.2: SITE BOUNDARY PLAN

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
1:8,500	CM	14.11.19	CEM	14.11.19	PG	14.11.19

Project No.	Office	Type	Drawing No.	Revision
A104444-5	MAN	N	02	B

8.0 Appendices

Appendix A - Report Conditions

This Report has been prepared using reasonable skill and care for the sole benefit of Northern Gateway Development Vehicle LLP ("the Client") for the proposed uses stated in the report by WYG Environment Planning Transport Limited ("WYG"). WYG exclude all liability for any other uses and to any other party. The report must not be relied on or reproduced in whole or in part by any other party without the copyright holder's permission.

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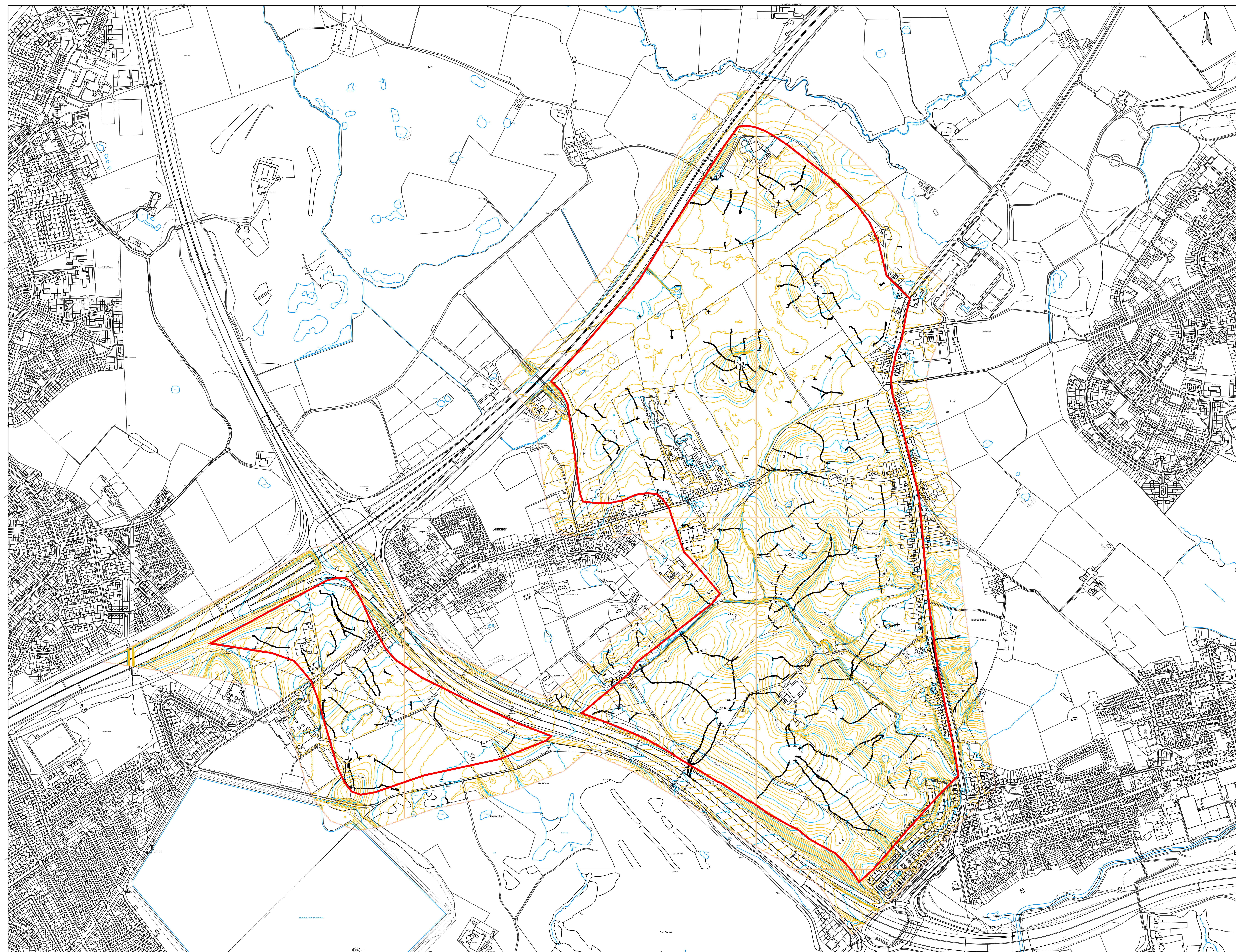
The report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections'. Environmental conditions can vary and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times. No investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather-related conditions. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions. The "shelf life" of the Report will be determined by a number of factors including; its original purpose, the Client's instructions, passage of time, advances in technology and techniques, changes in legislation etc. and therefore may require future re-assessment.

The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. WYG accept no liability for issues with performance arising from such factors.

Appendix B – Watershed Analysis of GMA 1.2 Sub-Areas



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N

NOTES

1. ALL LEVELS IN METRES AOD
2. CONTAINS LIDAR AND OS BACKGROUND DATA PUBLIC AVAILABLE UNDER OPEN GOVERNMENT LICENCE V3.0, CROWN COPYRIGHT
3. SITE BOUNDARY FROM WYG DRAWING A104444-5-MAN-N-02-REV-A, NOV 2019

KEY

- DEVELOPMENT BOUNDARY
- SURFACE WATER FLOW PATH

0 50 100 150 200 250m

SCALE 1:5000

PRELIMINARY ISSUE

REV	DESCRIPTION	BY	CHK	APP	DATE
-	INITIAL ISSUE	OC	JP	MSE	

ARNDALE COURT
HEADINGLEY
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Client:
NORTHERN GATEWAY DEVELOPMENT VEHICLE LLP

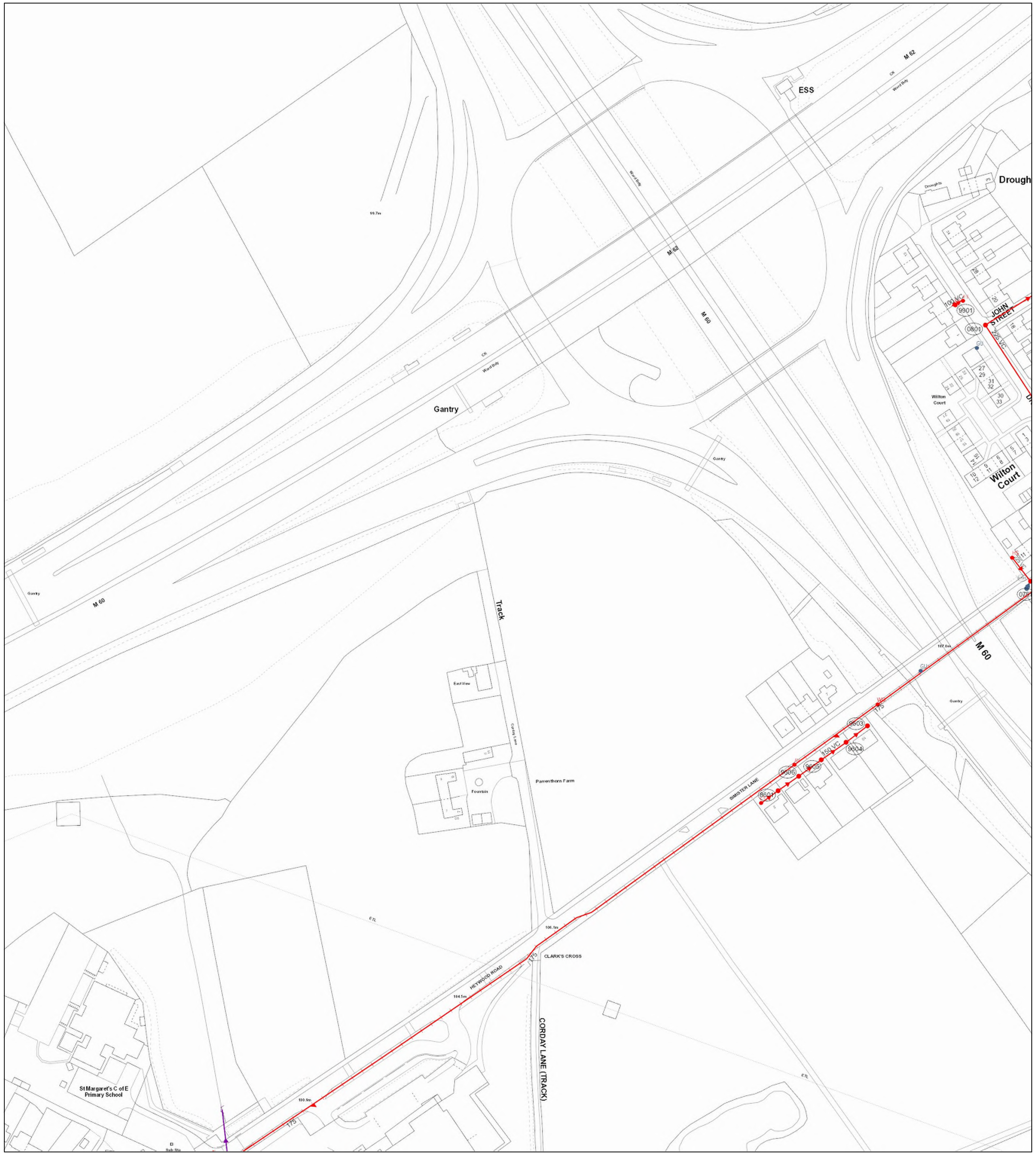
Project: A104444-5
NORTHERN GATEWAY GMA 1.2

Drawing Title:
GMA 1.2 (SOUTH OF M62)
EXISTING OVERLAND FLOW PATHS

Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
1:5000	OC	NOV 19	JP	NOV 19	MSE	NOV 19

Project No.	Office	Type	Drawing No.	Revision
A104444-5	MAN	N	103	-

Appendix C – Existing Pubic Sewer Records



The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
0751	107.34	SW	104.59	225			VC	4.472136	1 in 64
0751	107.34	SW	104.59	225			VC	4.472136	1 in 64
9604		CO		150			VC	15.07877	
0801		CO	0	225			VC	56.60389	
0801		CO	0	225			VC	56.60389	
0701	107.37	CO	104.53	225			VC	57.2014	1 in 99
0701	107.37	CO	104.53	225			VC	57.2014	1 in 99
9606		CO		150			VC	15.32549	
8601		CO		150			VC	14.12485	
9605		CO		150			VC	16.85521	
0802	106.69	CO	103.51	225			VC	96.79876	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned	Foul	Surface Water	Combined	
				Public Sewer
				Private Sewer
				Section 104
				Rising Main
				Sludge Main
				Overflow
				Water Course
				Highway Drain

All point assets follow the standard colour convention:
red - combined, blue - surface water, brown - foul, purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforced Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

G1.2,

OS sheet Number: SD8205NE
Scale: 1:1250 Date: 15/11/2019
Nodes: 11
Sheet: 4 of 7

Printed by: Property Searches

SEWER RECORDS

United Utilities
helping life flow smoothly

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
0702	93.1	CO	88.24	675			CO	30.40076	1 in 264
0611		CO		150			VC	19.0503	
1702	91.76	CO	89.28	450			CO	20.59126	1 in 82
9004	92.55	CO	87.88	750			CO	54.86152	
0705		CO	0	225			VC	40.5216	
1905	93.67	SW	92.73	150			VC	33.37664	1 in 73
2252	96.02	SW	94.02	300			VC	219.9682	
2704		SW		600			CO	56.20532	
1803		CO	0	225			VC	38.07887	
1651		SW	0	750			CO	80.90383	
9605	91.28	CO	89.59	225			VC	54.20332	1 in 115
0902	95.77	CO	87.87	750			CO	41.4367	
1605		CO		225			VC	17.37348	
2707		SW	0	375			CO	30.5955	
2703		SW	0	450			VC	84.32053	
2803	92.34	SW	91.12	225			VC	36.06559	1 in 78
3903		FO		150			VC	14.20356	
0603	92.56	CO	89.53	225			VC	28.01785	1 in 108
2910	92.62	SW	91.72	225			VC	27.89265	1 in 155
0011		FO		150			VC	18.44569	
9004	92.55	CO		750			CO	10.87287	
1703	92.17	CO	90.41	225			VC	53.33854	1 in 167
9611		CO		150			VC	12.35377	
0706	93.7	CO	91.96	225			VC	58.85575	1 in 92
0708		CO		150			VC	24.19754	
2816		CO		100			VC	12.25912	
2602		SW	0	150			VC	5.696429	
0704	91.62	CO	88.53	675			CO	66.61081	1 in 238
0001		CO	0	225			VC	67.74216	
2804	91.61	SW	90.53	450			CO	56.45259	
2652	92.68	SW	91.18	1050			ST	17.46425	1 in 134
9613		CO		150			VC	10.89182	
2203	96	SW	93.4	300			VC	293.8859	
0009		CO		100			VC	14.0689	
1903	93.37	SW	91.63	225			VC	54.45181	1 in 109
0006		CO		100			VC	21.58714	
2905	94.04	SW	91.99	225			VC	8.944272	1 in 128
9604	91.73	CO	88.83	450			CO	43.86343	1 in 439
0605		CO		150			VC	2.436164	
2402		CO		150			VC	60.21351	
1906	93.55	SW	92.25	150			VC	3.162278	1 in 53
1904	93.97	SW	92.28	150			VC	7.81025	1 in 24
9651	91.71	SW	89.8	750			CO	65.29931	
1707		CO	89.13	450			CO	32.62936	
3902	92.62	SW	91.43	375			VC	39.11522	1 in 244
3704		SW		225			VC	14.66231	1 in
2911	93.43	SW	91.92	225			VC	11.6619	1 in 78
2604		SW	0	150			VC	16.80216	
2909	92.86	SW	91.7	300			CO	29.41088	1 in 147
3807	92.87	SW	91.53	225			VC	19.23538	1 in 101
1913		FO		225			VC	13.60007	
0501	93.8	CO	91.11	300			VC	48.50773	1 in 135
0501	93.8	CO	91.11	300			VC	48.50773	1 in 135
0651	91.87	SW	90.14	750			CO	84.09518	1 in 255
1601	91.69	CO	88.97	525			CO	69.77106	1 in 872
1801		CO	0	225			VC	63.78872	
2701	91.38	CO	89.67	150			VC	34.0147	1 in 850
2705		SW	0	375			CO	43.42638	
3803	92.69	SW	91.65	225			VC	10.19804	1 in 146
2812		SW	0	525			CO	3.268058	
1701	91.61	CO	89.13	450			CO	22.73308	
9904		CO		150			VC	16.26534	
2702	91.67	CO	89.99	150			VC	34.1321	1 in 110
3805	92.69	SW	91.18	450			CO	26	1 in 2600
0707		CO		150			VC	42.70714	
9802	93.79	CO	88.05	750			CO	57.30619	1 in 1433
3809	93.02	SW	91.75	225			VC	14.86607	1 in 114
1907	93.41	SW	92.12	225			VC	15.29706	1 in 1530
2806	92.42	SW	90.88	525			CO	8.484115	
2908	93	SW	91.75	150			VC	11.40175	
3503	92.87	CO	91.2	125			VC	7.28345	
3503	92.87	CO	91.2	125			VC	7.28345	
2917		FO		225			VC	37.50442	
0804	94.41	CO	91.57	225			VC	27.45906	1 in 78
0012		CO		150			VC	30.93111	
0807		CO		225			VC	3.3598	
0652	92.83	CO	90.71	300			VC	73.37575	1 in 120
1608	93.31	SW	92.1	225			VC	19.64688	1 in 116
2707		SW	0	375			CO	30.44319	
2802	91.46	SW	90.65	225			VC	26.12058	1 in 256
0601	91.94	CO	88.72	600			CO	39.62323	1 in 396
4401		CO		150			VC	18.95707	
3801	92.66	SW	91.26	450			CO	49.20366	1 in 703
0007		CO		100			VC	11.25582	
1706		FO	0	150			CO	10.35349	
2904	93.49	SW	92.37	150			VC	24.69818	1 in 73
2705		SW	0	375			CO	43.40717	
2808	92.71	SW	91.78	225			VC	38.60052	1 in 322
2916		FO		150			VC	8.338629	
3705		SW		225			VC	37.2664	1 in
2706		SW	0	375			CO	22.90296	
1608		CO		150			VC	6.109011	
2703		SW	0	450			VC	84.00595	
1802	92.81	SW	89.41	450			CO	24.33105	1 in 221
2603		SW	0	150			VC	19.65259	
3901	92.6	SW	91.47	375			CO	15.6205	1 in 521
3810	92.99	SW	91.11	525			CO	37.74458	1 in 210
2704		SW		600			CO	55.84533	
2706		SW	0	375			CO	23.01205	
3802	92.63	SW	91.57	225			VC	19.92486	1 in 74
0903	96.78	CO	94.45	225			VC	25.70992	1 in 89
1901	95.61	CO	92.66	225			VC	38.63936	1 in 77
9009		CO		150			VC	17.55115	
0008		CO		100			VC	14.41337	
1652	92.42	SW	90.39	750			CO	4.472136	
4407		CO		150			VC	21.02151	
4407		CO		150			VC	21.02151	
0904	96.98	CO	94.15	225			VC	30.26549	1 in 20
0803	94.99	CO	87.99	750			CO	16.49242	1 in 825
2804	91.61	SW	89.81	450			CO	56.00893	
9007		CO		150			VC	8.37149	
3703		SW	0	375			CO	36.68269	
2651	92.93	SW	91.36	450			VC	98.83119	
2653	92.59	SW	91.05	1650			ST	44.72136	1 in 128
2404		CO		150			VC	27.06427	
2404		CO		150			VC	27.06427	
2651	92.93	SW	91.36	450			VC	98.48858	
2711		FO	0	150			VC	63.80659	
0606		CO		150			VC	11.03652	
0802	95.44	CO	87.96	750			CO	65.27634	1 in 725
2809	92.82	SW	91.82	150			VC	17.49286	1 in 175
9612		CO		150			VC	10.30952	
1912		FO		225			VC	38.41493	
2813		SW	0	525			CO	12.70097	
0609		CO		150			VC	12.57419	
2907	93.54	SW	91.81	225			VC	14.76482	1 in 148
3812		CO		100			VC	61.83148	
2708		FO	0	150			VC	8.907598	
2903	93.2	SW	91.75	225			VC	20.51828	1 in 228
3701	92.6	SW	90.92	525			CO	52.01282	1 in 5201
1603		CO		150			VC	27.16352	
0612		CO		150			VC	7.064793	
9008		CO		150			VC	40.83394	
3403		CO		150			VC	4.215875	
3403		CO		150			VC	4.215875	
1604		CO		225			VC	10.84837	
2906	94.12	SW	91.89	225			VC	12.52996	1 in 179
2805	92.08	SW	90.8	525			CO	15.63679	1 in 391
2501	92.6	SW	91.41	375			CO	28.6007	
2501	92.6	SW	91.41	375			CO	28.6007	
3804	92.67	SW	91.82	150			VC	20.24846	1 in 127
2901	93.46	SW	92.54	150			VC	21.58703	1 in 80
2815		SW	0	525			CO	11.69513	
0004		CO		150			VC	17.00051	
2912		FO		150			VC	35.38	
2902	92.95	SW	92.07	150			VC	21.09502	1 in 78
2508	93.36	SW	91.5	450			CO	26.01922	
2509	93.36	SW	91.5	450			CO	26.01922	
2814		SW	0	525			CO	18.13732	
2807	92.41	CO	90.3	225			VC	27.20294	
3706		SW		225			ST	95.46697	1 in
3702		SW	0	525			CO	28.17403	
0901	93.81	CO	87.9	750			CO	36.63925	
9605		CO		150			VC	14.16905	
1607		CO		150			VC	6.937133	
3806	93.3	SW	91.16	525			CO	40.80441	1 in 1360
2551	95.07	SW	91.16	1050			CO	116.2111	
2551	95.07	SW	91.16	1050			CO	116.2111	
3702		SW	0	525			CO	28.07204	
2601		SW	0	375			CO	5.548374	
1805		CO		150			VC	10.71623	
0010		CO		100			VC	54.26541	
2001	94.75	SW	92.31	150			VC	25	1 in 93
2819		SW		150			VC	9.484123	
0602	92.13	CO	88.85	525			CO	17.20465	1 in 344
1902	95.56	CO	92.16	225			VC	40.4475	
3808	92.95	SW	91.6	225			VC	13.0384	1 in 217
1911		FO		225			VC	4.97331	
2823		FO		225			VC	14.15681	
2810	92.7	CO	0	225			VC	19.69772	
0806		CO		150			VC	1.846026	
2811		SW	0	525			CO	5.563354	
2709		FO	0	150			VC	44.11528	
2822		FO		225			VC	16.05855	
2710		FO	0	150			VC	16.04791	
2601		SW	0	375			CO	5.506853	
1807		CO		150			VC	10.4952	
2801	91.79	CO	90.89	225			VC	44.01136	1 in 68

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned · Foul · Surface Water · Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined · blue - surface water
brown - foul · purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforced Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

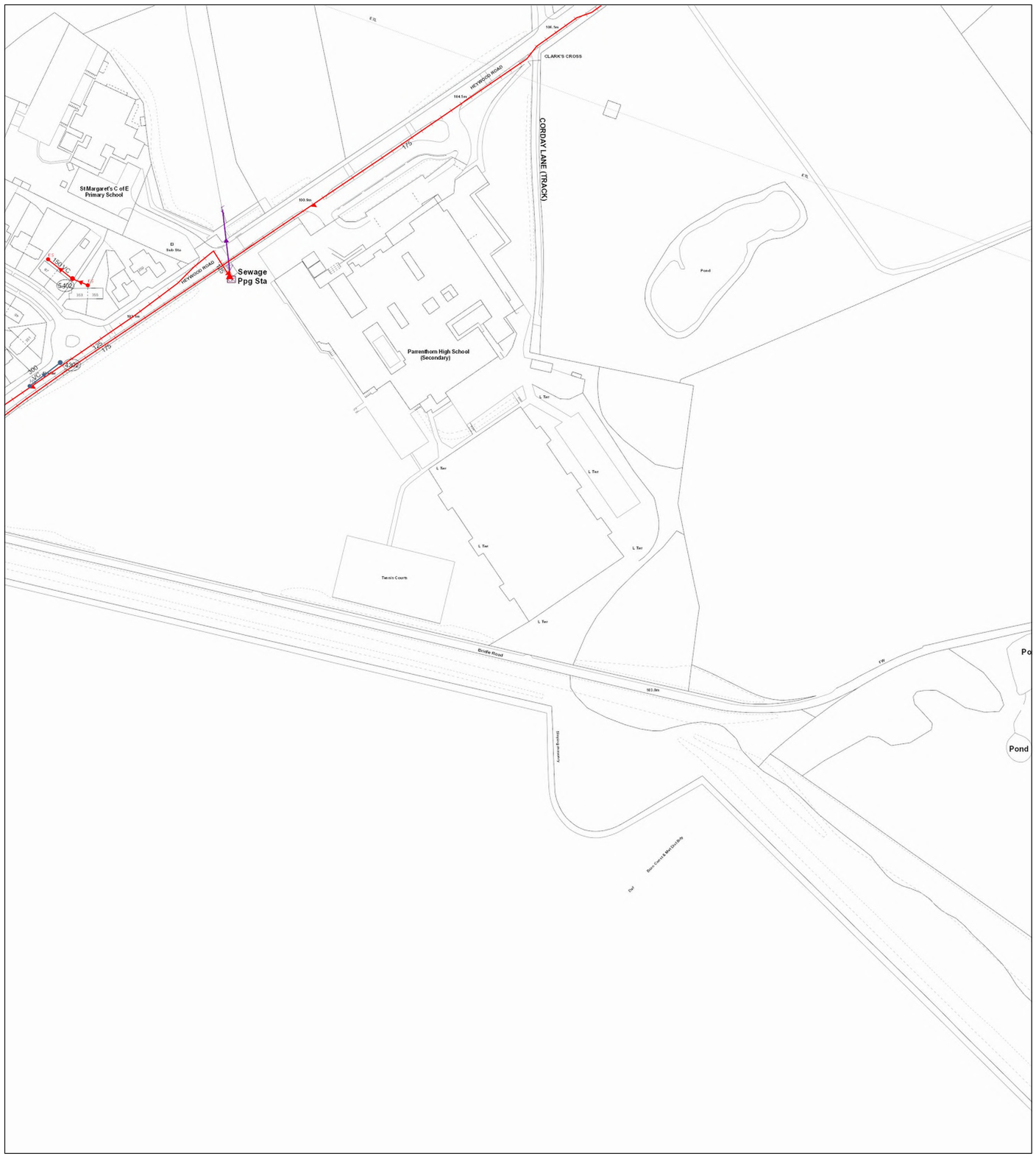
G1.2,

OS sheet Number: SD8205NW
Scale: 1:1250 **Date:** 15/11/2019
Nodes: 178
Sheet: 1 of 7

Printed by: Property Searches

SEWER RECORDS

United Utilities
helping life flow smoothly



Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
5402		CO		150			VC	17.29277	
5402		CO		150			VC	17.29277	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

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Abandoned | Foul | Surface Water | Combined

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- Valve Chamber
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- Ww Pumping Station
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- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

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GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

G1.2,

OS sheet Number: SD8205SE
Scale: 1:1250 **Date:** 15/11/2019
Nodes: 2
Sheet: 3 of 7

Printed by: Property Searches

SEWER RECORDS

United Utilities — helping life flow smoothly

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
4305		FO		150			VC	39.42585	
1201	99.3	SW	97.3	225			VC	62.68174	1 in 19
0113		CO		100			VC	7.659512	
1001	106.93	CO	104.13	225			VC	90.78546	1 in 84
4401		CO		150			VC	18.95707	
9003	109.82	CO	107.87	150			VC	13	1 in 41
2106		CO		150			VC	9.020096	
3102	105.87	CO	103.97	450			VC	69.64194	1 in 240
0908		CO		150			VC	0.00169746	
1010		CO		150			VC	9.37092	
2015		CO		150			VC	6.750944	
0115		CO		150			VC	4.590699	
2204	98.48	CO	95.78	225			VC	29.52965	1 in 16
9903	111.42	CO	107.32	225			VC	153.0655	1 in 42
9004	110.79	SW	109.29	225			VC	34.48188	1 in 18
2252	96.02	SW	94.02	300			VC	219.9682	
1003	105.82	SW	104.57	225			VC	68.96376	1 in 192
3204	105.9	SW	104.9	225			VC	99.40322	1 in 1243
1111	101.49	CO	99.79	225			VC	39.11522	1 in 19
2005	105.9	CO	103	375			VC	28.01785	1 in 133
0002	108.3	CO	106.55	300			VC	45.65085	1 in 55
2002	105.88	SW	103.43	300			VC	58.59181	1 in 167
0003	108.28	SW	106.98	225			VC	45.17743	1 in 43
2200	105.45	SW	102.65	225			VC	9.219544	
2210		SW		225			VC	64.26706	
1102	107.13	SW	106.18	225			VC	47.41308	1 in 53
1108	105.72	SW	103.06	300			VC	45	1 in 115
0004	109.03	CO	106.5	225			VC	32.64965	1 in 126
1103	106.24	SW	104.99	225			VC	69.77106	1 in 174
4202	105.94	SW	104.79	225			VC	28.42534	1 in 98
0907		CO		150			VC	16.50911	
2901	105.87	CO	102.64	375			VC	60.41523	1 in 137
1005	107.62	CO	104.53	225			VC	45.17743	1 in 122
2003	105.89	SW	104.8	150			VC	32.24903	1 in 43
2202	102.65	CO	100.45	225			VC	16.12452	1 in 24
2006	105.88	SW	104.22	225			VC	11	1 in 100
2251	100.12	SW	97.22	225			VC	53.53503	1 in 20
4407		CO		150			VC	21.02151	
4407		CO		150			VC	21.02151	
0111		CO		150			VC	7.90433	
2201	100.12	CO	96.92	225			VC	25.23886	1 in 74
1202	99.37	CO	97.07	225			VC	62.96825	1 in 17
1902	107.01	CO	103.83	225			VC	90.82401	1 in 90
3302		FO		150			VC	10.38453	
1106	104.82	CO	103.07	225			VC	43.41659	1 in 21
1051	106.85	SW	104.66	150			VC	46.95743	1 in 23
2007	105.8	SW	104.08	225			VC	47.16991	
1203		CO		150			VC	10.89933	
0011		CO		100			VC	12.16253	
1109	105.77	CO	104.32	225			VC	49.64877	1 in 87
2404		CO		150			VC	27.06427	
2404		CO		150			VC	27.06427	
3202	105.94	CO	104.87	225			VC	27.29469	1 in 101
1901	107	SW	104.97	150			VC	89.00562	1 in 43
2114		CO		150			VC	23.60024	
2302	100.58	CO	99.03	225			VC	28.6531	1 in 58
2301	100.57	SW	99.02	225			VC	27.29469	1 in 16
2203	96	CO	93.4	300			VC	293.8859	
3201	102.51	SW	0	225			VC	15.81139	
3208		CO		150			VC	20.68832	
1114		CO		100			VC	8.799988	
1906		CO		150			VC	6.790132	
2253	98.48	SW	96.33	225			VC	30.23243	1 in 13
1903	104.77	CO	102.19	450			VC	58.30952	1 in 150
2402		CO		150			VC	60.21351	
0102	105.34	CO	103.59	225			VC	103.7738	1 in 39
3205	106.11	CO	104.96	225			VC	10.29563	1 in 41
4404		CO		150			VC	35.22446	
1105	102.81	CO	100.91	225			VC	71.02816	1 in 19
2254	99.36	CO	96.53	225			VC	27.45906	1 in 9
3403		CO		150			VC	4.215875	
3403		CO		150			VC	4.215875	
0105		CO		150			VC	4.468547	
2014		CO		150			VC	16.3	
2104		CO		150			VC	17.38721	
2205	105.6	SW		225			VC	14.52284	
4403		CO		150			VC	10.05421	
2501	92.6	SW	91.41	375			CO	28.6007	
2501	92.6	SW	91.41	375			CO	28.6007	
2001	105.89	CO	103.72	225			VC	60.41523	1 in 96
0012		CO		150			VC	16.51452	
2111		CO		150			VC	7.361799	
9002	110.43	CO	107.38	225			VC	74.06078	1 in 224
1101	105.43	SW	104.08	225			VC	11.6619	1 in 69
2508	93.36	SW	91.5	450			CO	26.01922	
2508	93.36	SW	91.5	450			CO	26.01922	
0203		FO		150			VC	36.13997	
9001		FO		150			VC	16.44662	
3103	105.89	SW	103.54	225			VC	62.96825	1 in 78
1204		FO		150			VC	5.256345	
2102	105.92	SW	104.37	225			VC	63.81223	1 in 82
0501	93.8	CO	91.11	300			VC	48.50773	1 in 135
0501	93.8	CO	91.11	300			VC	48.50773	1 in 135
2213		CO		150			VC	3.052598	
0006	107.53	CO	0	225			VC	25.94224	
2551	95.07	SW	91.16	1050			CO	116.2111	
2551	95.07	SW	91.16	1050			CO	116.2111	
9101	106.18	CO	103.83	225			VC	53.85165	1 in 154
0001	107.39	CO	105.69	225			VC	92.84934	1 in 51
3303		CO		150			VC	19.15774	
0202		FO		150			VC	30.0877	
1104	102.72	SW	101.22	225			VC	69.06519	1 in 18
9925		CO		150			VC	6.024174	
0901	109.66	CO	106.22	225			VC	33.61547	1 in 78
1009		CO		150			VC	20.96134	
1004	106.41	CO	103.14	225			VC	62.60991	1 in 330
2113		CO		150			VC	4.504671	
5402		CO		150			VC	17.29277	
5402		CO		150			VC	17.29277	
0112		CO		100			VC	8.20413	
4201	106.17	CO	105.32	150			VC	44.41846	1 in 103
9104		CO		150			VC	11.62976	
3203	105.89	CO	104.33	375			VC	26.92582	1 in 117
2012		CO		150			VC	20.57911	
3503	92.87	CO	91.2	125			VC	7.28345	
3503	92.87	CO	91.2	125			VC	7.28345	
1110	101.35	SW	100.2	225			VC	38.83298	1 in 19
2103	105.93	CO	103.63	450			VC	36.71512	1 in 118
3107		CO		150			VC	11.12096	
2004	105.91	SW	103.77	300			VC	52.83938	1 in 182
3101	105.75	CO	104.22	225			VC	13.0384	1 in 163
2101	105.84	SW	103.62	300			VC	20	
1107	104.92	SW	103.37	225			VC	46.40043	1 in 23
1002	105.78	CO	102.93	225			VC	26.07681	1 in 174
4402		CO		150			VC	23.43096	
1904	104.63	SW	100.71	300			VC	14.31782	1 in 95
0005	109.04	CO	106.69	225			VC	4.472136	1 in 50
0951	109.55	SW	105.4	150			VC	77.41447	1 in 46
0902	108.69	CO	105.73	225			VC	66.19468	1 in 66
3211		CO		150			VC	9.097001	
0101	105.71	SW	104.21	225			VC	116.5032	1 in 40

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

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- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

- FO Foul
- SW Surface Water
- CO Combined
- OV Overflow

SEWER SHAPE

- CI Circular
- TR Trapezoidal
- EG Egg
- AR Arch
- OV Oval
- BA Barrel
- FT Flat Top
- HO HorseShoe
- RE Rectangular
- UN Unspecified
- SQ Square

SEWER MATERIAL

- AC Asbestos Cement
- BR Brick
- PE Polyethylene
- RP Reinforced Plastic Matrix
- CO Concrete
- CSB Concrete Segment Bolted
- CSU Concrete Segment Unbolted
- CC Concrete Box Culverted
- PSC Plastic / Steel Composite
- GRC Glass Reinforced Plastic
- DI Ductile Iron
- PVC Polyvinyl Chloride
- CI Cast Iron
- SI Spun Iron
- ST Steel
- VC Vitrified Clay
- PP Polypropylene
- PF Pitch Fibre
- MAC Masonry, Coursed
- MAR Masonry, Random
- U Unspecified

Address or Site Reference:

G1.2,

OS sheet Number: SD8205SW

Scale: 1:1250 **Date:** 15/11/2019

Nodes: 131

Sheet: 2 of 7

Printed by: Property Searches

SEWER RECORDS

United Utilities — helping life flow smoothly

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
0401	65.19	CO	60.41	300			VC	168.7157	1 in 174

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned	Foul	Surface Water	Combined	
				Public Sewer
				Private Sewer
				Section 104
				Rising Main
				Sludge Main
				Overflow
				Water Course
				Highway Drain

All point assets follow the standard colour convention:

red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
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CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry; Random
U	Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8304NE
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 1
Sheet: 4 of 20

Printed by: Property Searches

SEWER RECORDS

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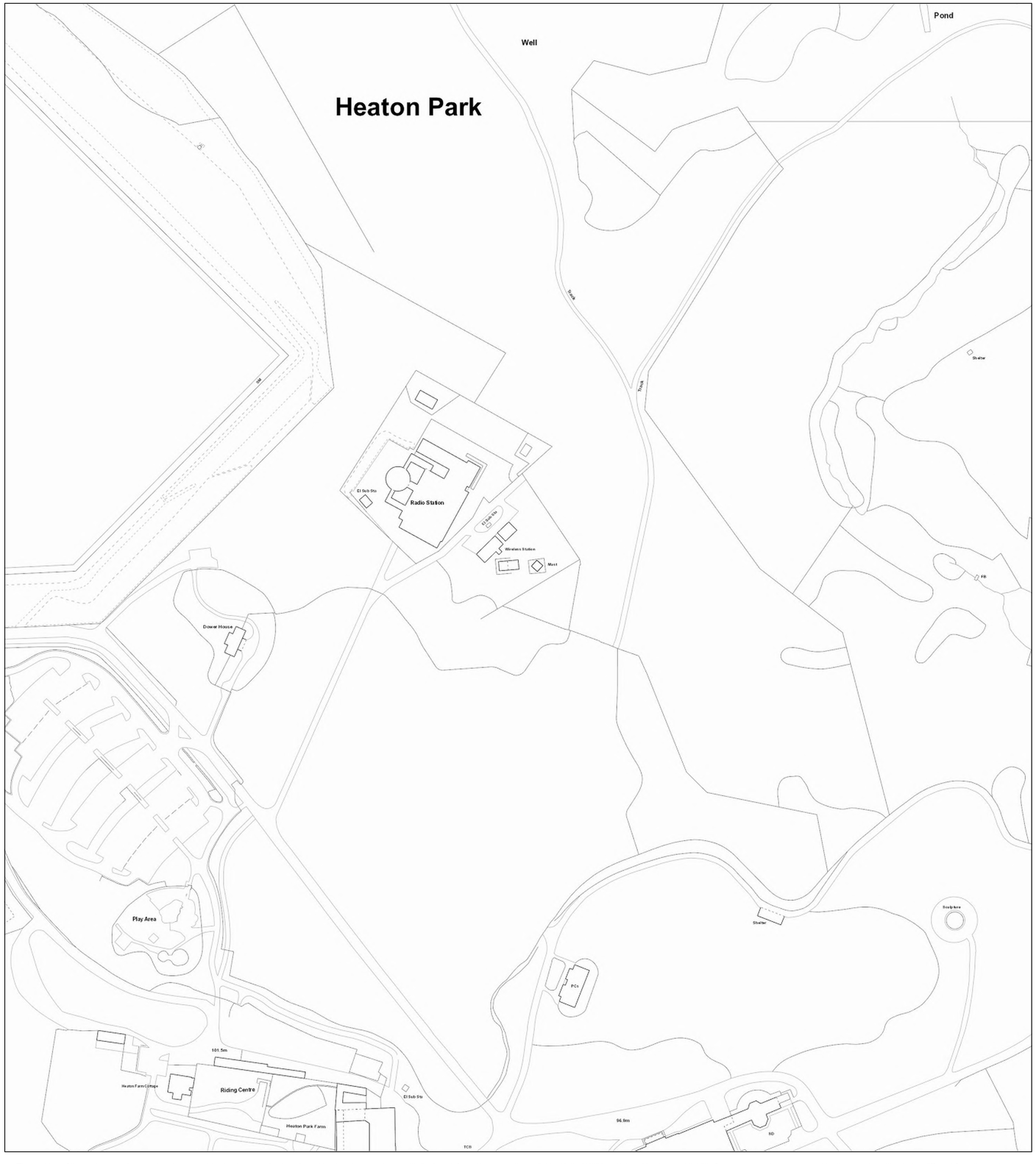

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:

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- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
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- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
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MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

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EG	Egg	AR	Arch
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SQ	Square		

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DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

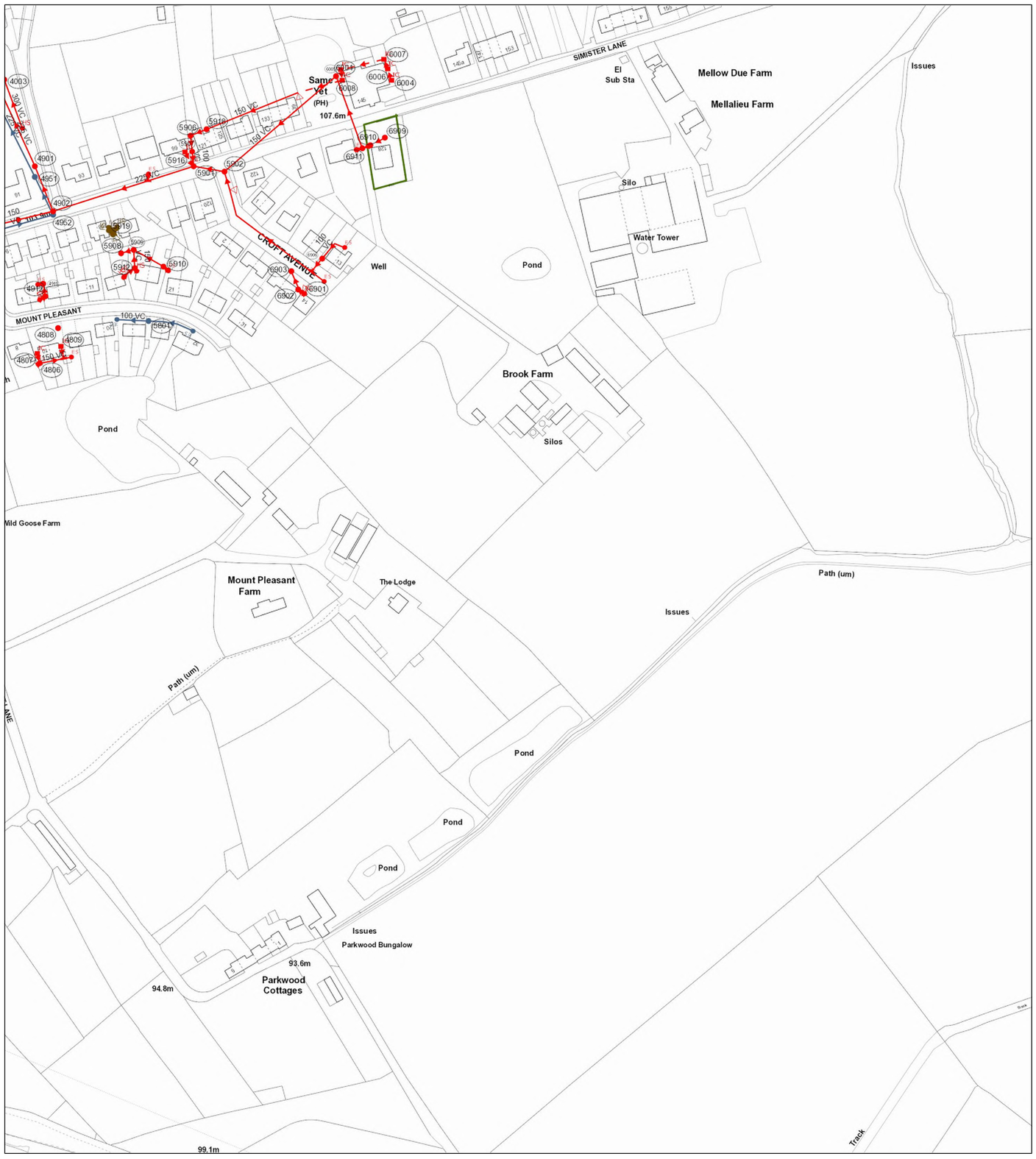
Simister wide plan,

OS sheet Number: SD8304NW
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 0
Sheet: 2 of 20

Printed by: Property Searches

SEWER RECORDS

United Utilities — helping life flow smoothly



Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
5906		CO		100			VC	8.152598	
5906		CO		100			VC	8.152598	
5901	105.44	CO	103.68	225			VC	81.90849	1 in 0.80491829
5901	105.44	CO	103.68	225			VC	81.90849	1 in 0.80491829
4911		CO		100			VC	3.120101	
4902	103.87	CO	100.84	225			VC	26.92582	1 in 168
4902	103.87	CO	100.84	225			VC	26.92582	1 in 168
6902		CO		100			VC	11.01956	
5912		CO		150			VC	10.22828	
5801		SW		100			VC	17.48525	
5909		CO		150			VC	7.29926	
5909		CO		150			VC	7.29926	
6001		CO	0	150			VC	81.56593	
6001		CO	0	150			VC	81.56593	
5906		CO		100			VC	8.890598	
5906		CO		100			VC	8.890598	
4003		CO	0	450			CO	193.7282	
4003		CO	0	450			CO	193.7282	
4901	102.82	CO	97.68	225			VC	50.56679	
4901	102.82	CO	97.68	225			VC	50.56679	
4951	103.47	SW	98.83	225			VC	55.9017	
4951	103.47	SW	98.83	225			VC	55.9017	
5910		CO		150			VC	18.95776	
5902	106.23	CO	104.95	225			VC	17.26268	1 in 0.16600323
5902	106.23	CO	104.95	225			VC	17.26268	1 in 0.16600323
4912		CO		100			VC	7.13172	
4952	104.03	SW	102.71	225			VC	23.25941	1 in 21
4952	104.03	SW	102.71	225			VC	23.25941	1 in 21
4806		CO		150			VC	17.98729	
6911		CO		150			VC	42.67335	
6911		CO		150			VC	42.67335	
5918		CO		150			VC	9.603898	
5918		CO		150			VC	9.603898	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

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- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
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- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
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CSU	Concrete Segment Unbolted
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GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8305NE
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 33
Sheet: 8 of 20

Printed by: Property Searches

SEWER RECORDS

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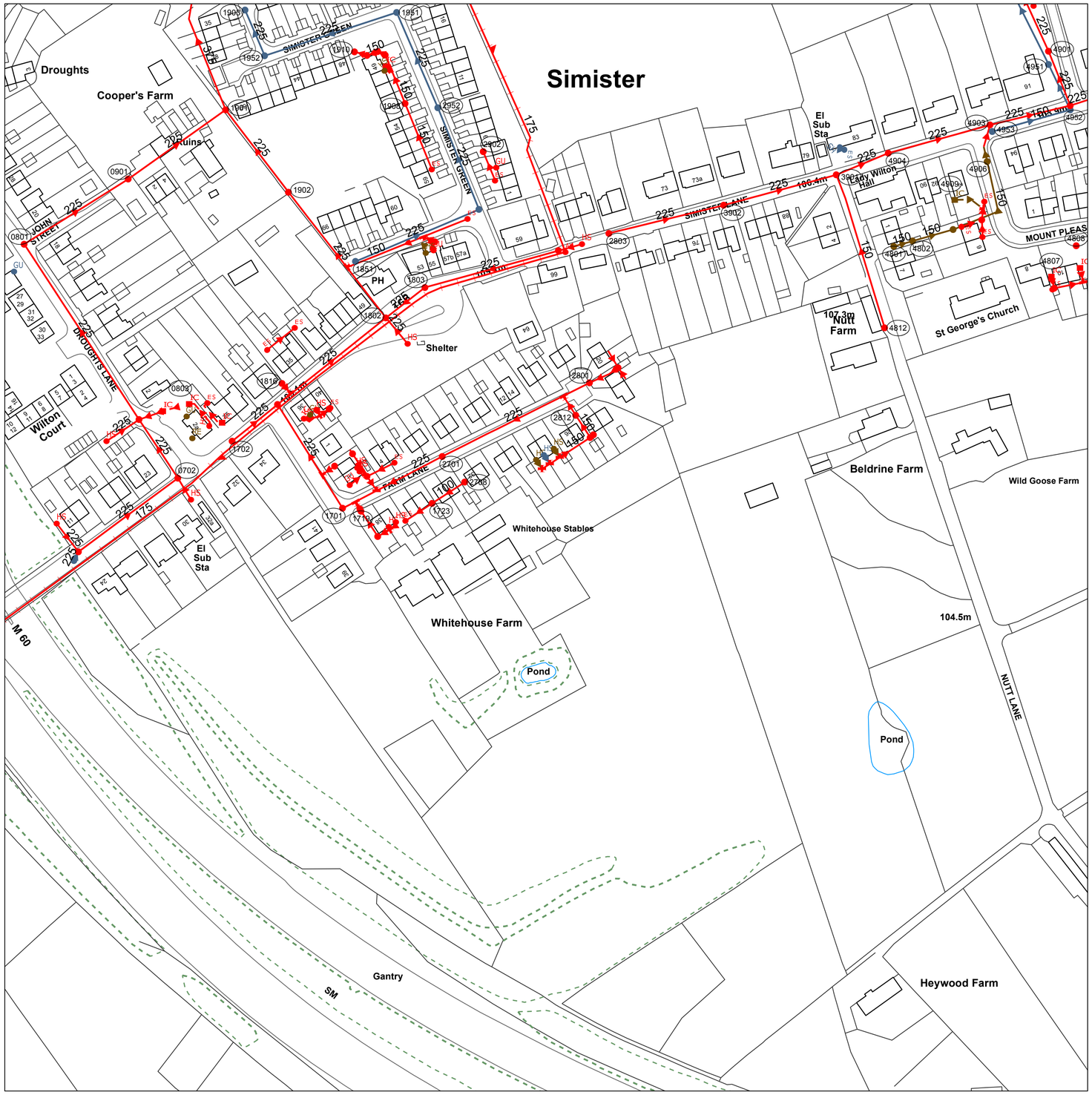

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Mati	Length	Grad
0701	107.37	CO							
0702	107.89	CO							
0751	107.34	SW							
0801		CO							
0802	106.69	CO							
0803		CO							
0804		CO							
0901		CO							
1701	108.51	CO							
1702	108.6	CO	106.62	225		CI	VC	27.02	150
1704		CO		100		CI	VC	12.39	
1705		CO		100		CI	VC	7.96	
1715		CO		100		CI	VC	7.21	
1718		CO		100		CI	VC	13.97	
1719		CO		100		CI	VC	5.1	
1723		CO		100		CI	VC	14.72	
1801	109.09	CO							
1802	108.37	CO							
1803	108.58	CO	106.8	225		CI	VC	22.8	67
1807		CO		150		CI	VC	5.84	
1815		CO							
1816		CO		100		CI	VC	6.4	
1819		CO							
1824		CO							
1851		SW	0	225		CI	VC	61.85	
1901		CO							
1902		CO	0	225		CI	VC	47.8	
1903		SW							
1905		CO		150		CI	VC	5.33	
1906		CO							
1908		CO							
1909		CO							
1910		CO							
1911		CO		150		CI	VC	6.07	
1951	100.91	SW							
1952	100.65	SW							
2701	109.02	CO	107	225		CI	VC	51.88	741
2708		CO		100		CI	VC	17.98	
2801	108.5	CO							
2802	108.75	CO	107.31	225		CI	VC	64	136
2803	108.17	CO	106	225		CI	VC	54.57	57
2807		CO							
2810		CO		100		CI	VC	5.18	
2812		CO		150		CI	VC	10.72	
2813		CO		100		CI	VC	2	
2902		CO							
2951	107.01	SW							
2952	103.45	SW							
3901	106.48	CO							
3902	107.42	CO							
4801		FO		150		CI	VC	8.96	
4802		FO							
4803		FO							
4806		CO							
4807		CO							
4808		CO							
4809		CO							
4812		CO		150		CI	UN	74.11	
4901	102.82	CO	97.68	225		CI	VC	50.57	
4902	103.87	CO							
4903	104.37	CO	102.74	225		CI	VC	38.08	63
4904	105.92	CO	103.58	225		CI	VC	48.76	59
4906		FO							
4907		CO		100		CI	VC	8.52	
4909		CO							
4951	103.47	SW							
4952	104.03	SW							
4953	104.48	SW	103.4	150		CI	VC	37.36	57
0703		CO	0	225		CI	VC	16.4	
0704		CO	0	225		CI	VC	11.66	
0705		CO	0	225		CI	VC	18.03	
0805		CO							
0806		CO							
0809		SW							
0811		FO							
1703		CO							
1708		CO							
1709		CO							
1710		CO							
1716		CO							
1720		CO							
1804		CO	0	225		CI	VC	15.62	
1808		CO							
1810		FO							
1811		FO							
1812		CO							
1820		FO							
1821		CO							
1822		CO							
1825		CO							
1907		FO							
1913		CO							
1915		CO							
2703		FO							
2705		SW		100		CI	VC	4.89	
2707		FO							
2804		CO							
2805		CO	0	225		CI	VC	11.22	
2809		CO		100		CI	VC	9.09	
2811		CO		100		CI	VC	6.19	
2903		CO							
3904		SW							
4905		CO							
4005		CO	0	300		CI	VC	28.79	
1706		CO							
1711		CO							
1712		CO							
1713		CO							
1714		CO							
1717		CO							
1721		CO							
1809		CO							
1813		CO							
1814		CO							
1817		CO							
1818		CO		100		CI	VC	5.04	
1912		CO							
1914		CO							
2702		CO		150		CI	VC	26.53	
2704		CO							
2706		CO							
2806		CO	0	175		CI	PVC	375.89	
2808		CO							
4810		CO							
4910		CO							

WASTE WATER SYMBOLOGY

Foul Surface Combined Overflow

Manhole
Manhole, Side Entry
MainSewer, Public
MainSewer, Private
MainSewer, S104
Rising Main, Public
Rising Main, Private
Rising Main, S104
Highway Drain, Private

Foul Surface Combined

WW Site Termination
Air Valve
Cascade
Non Return Valve
Extent of Survey
Flow Meter
Gulley
Hatch Box
Head of System
Hydrobrake / Vortex
Inlet
Inspection Chamber
Bifurcation
Catchpit
Contaminated Surface Water
WW Pumping Station
Sludge Pumping Station
Sewer Overflow
TJunction/Saddle
LampHole
OilInterceptor
PenStock
Pump
RoddingEye
Soakaway
Summit
Valve
Valve Chamber
Washout Chamber
DropShaft
WW Treatment Works
Septic Tank
Vent Column
Network Storage Tank
Orifice Plate
Vortex Chamber
Penstock Chamber
Blind Manhole

Foul Surface Combined Overflow

Screen Chamber
Discharge Point
Outfall
Control Kiosk
Unspecified

Sludge Main, Public
Sludge Main, Private
Sludge Main, S104

ABANDONED PIPE

MainSewer
Rising Main
Highway Drain
Sludge Main

LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

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AC	Asbestos Cement	DI	Ductile Iron
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GRC	Glass Reinforced Concrete	MAR	Masonry, Random
GRP	Glass Reinforced Plastic	U	Unspecified

OS Sheet No: SD8305NW
Scale: 1:1250 Date: 18/07/2017
125 Nodes
Sheet 1 of 1

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SEWER RECORDS

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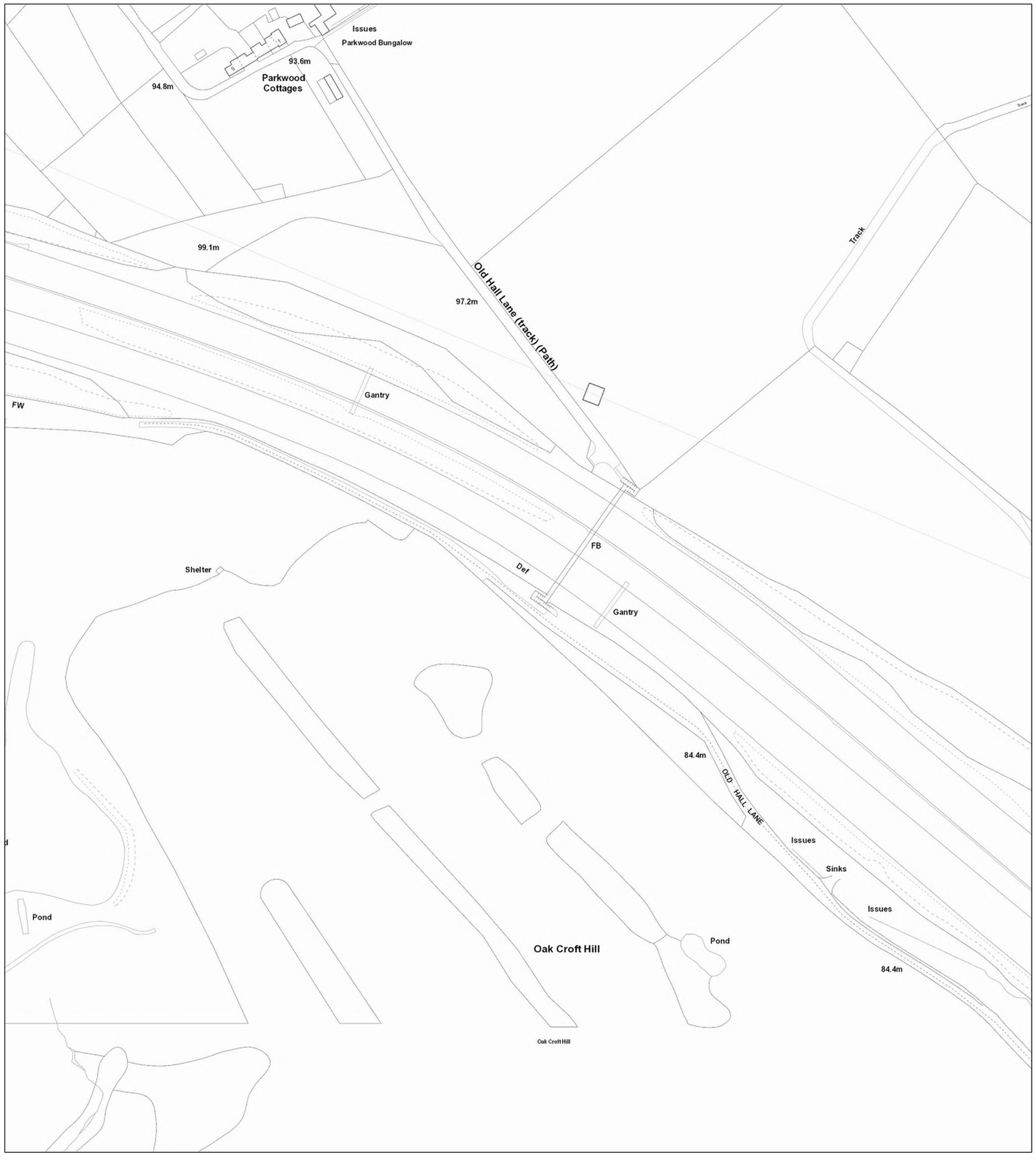
OS Sheet No: SD8305NW

Scale: 1:1250 Date: 18/07/2017



Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned / Foul / Surface Water / Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

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- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
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- Non Return Valve
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- Cascade
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- Ww Treatment Works
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- Septic Tank
- Control Kiosk
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MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

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ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

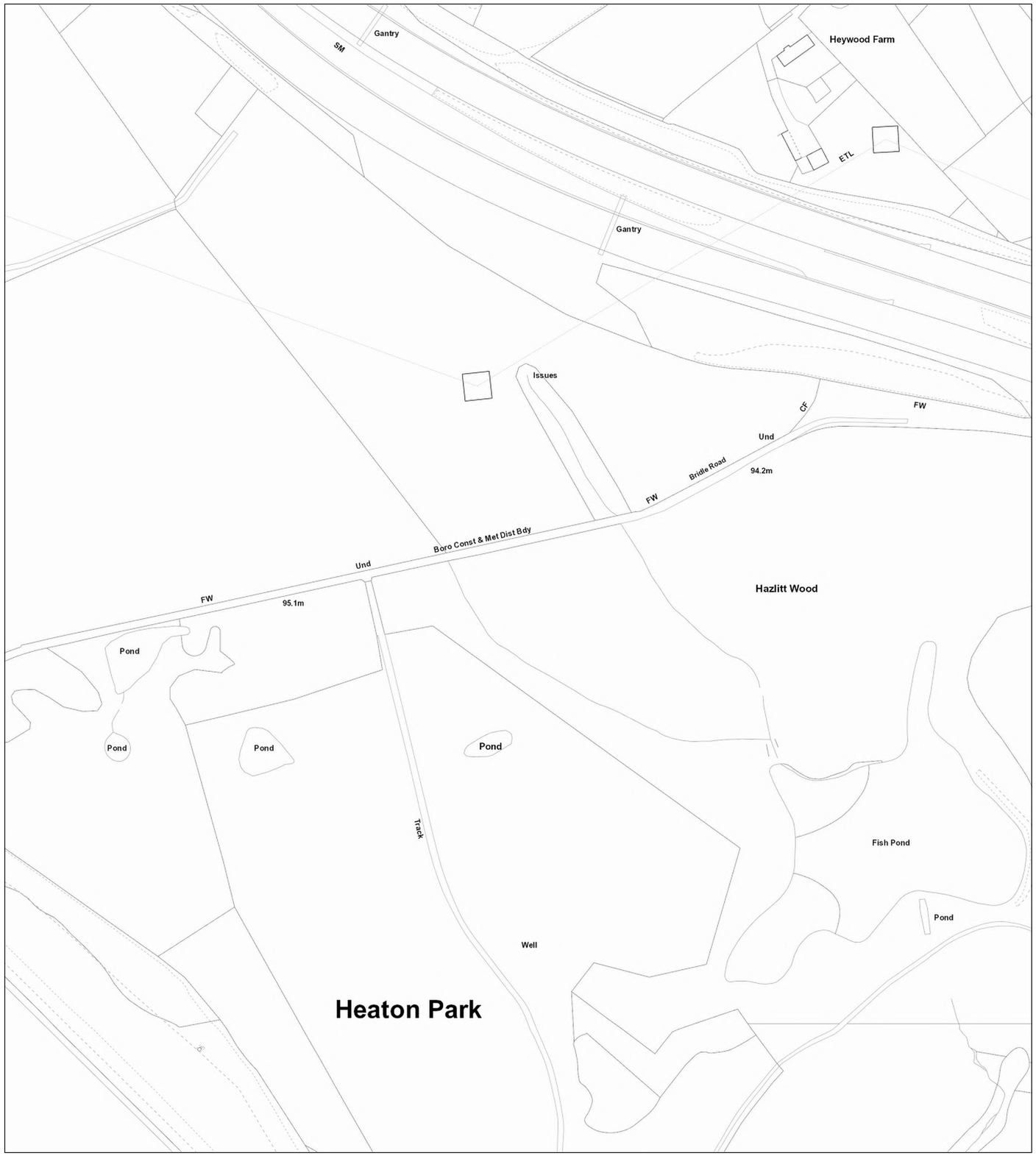
Simister wide plan,

OS sheet Number: SD8305SE
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 0
Sheet: 7 of 20

Printed by: Property Searches

SEWER RECORDS

United Utilities — helping life flow smoothly



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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned	Foul	Surface Water	Combined	
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				Private Sewer
				Section 104
				Rising Main
				Sludge Main
				Overflow
				Water Course
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- Vortex
- Penstock
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- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
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- Bifurcation Chamber
- Lamp Hole
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- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
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- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

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SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8305SW
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 0
Sheet: 6 of 20

Printed by: Property Searches

SEWER RECORDS

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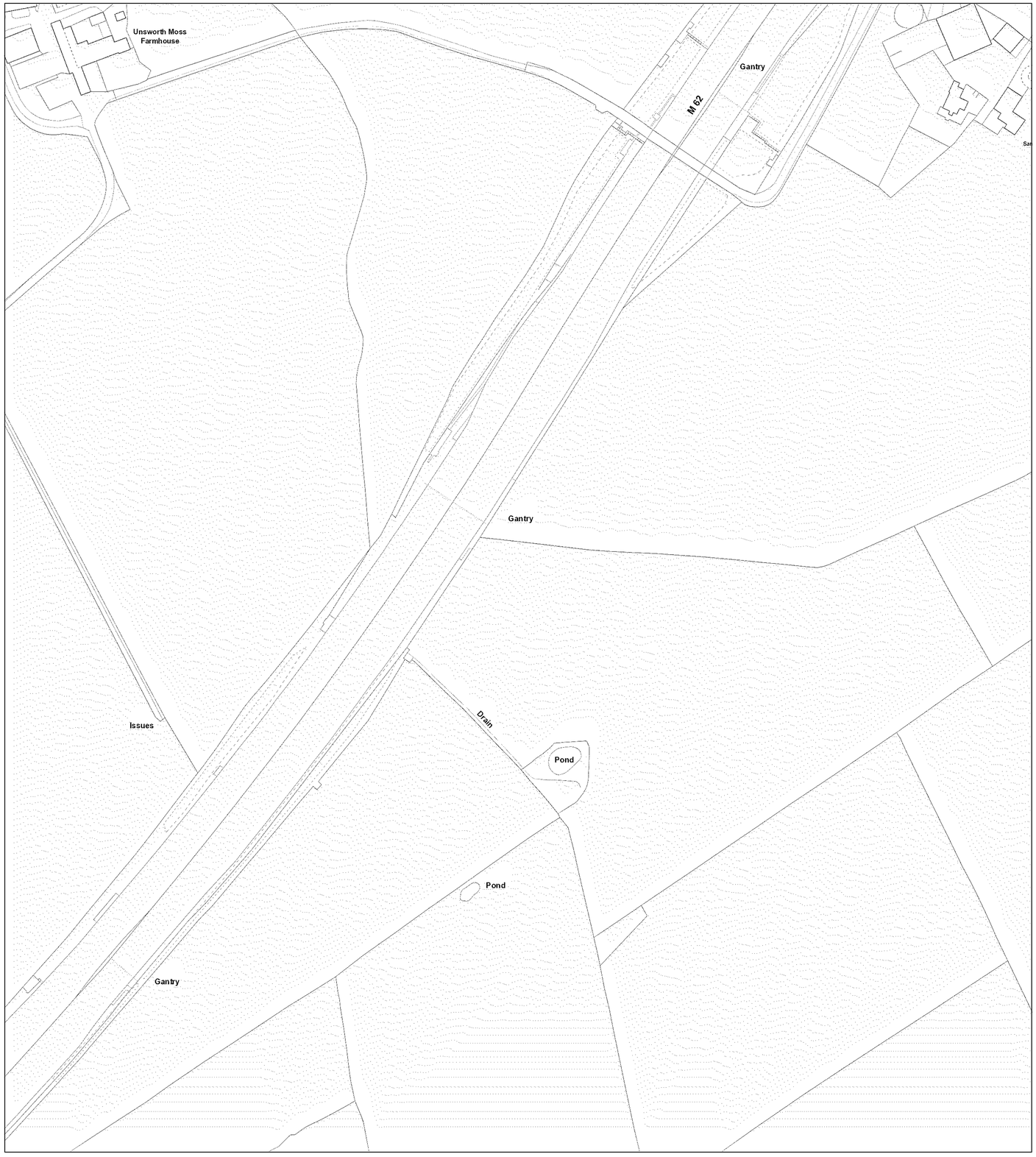

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:

red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8306NE
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 0
Sheet: 12 of 20

Printed by: Property Searches

SEWER RECORDS

United Utilities
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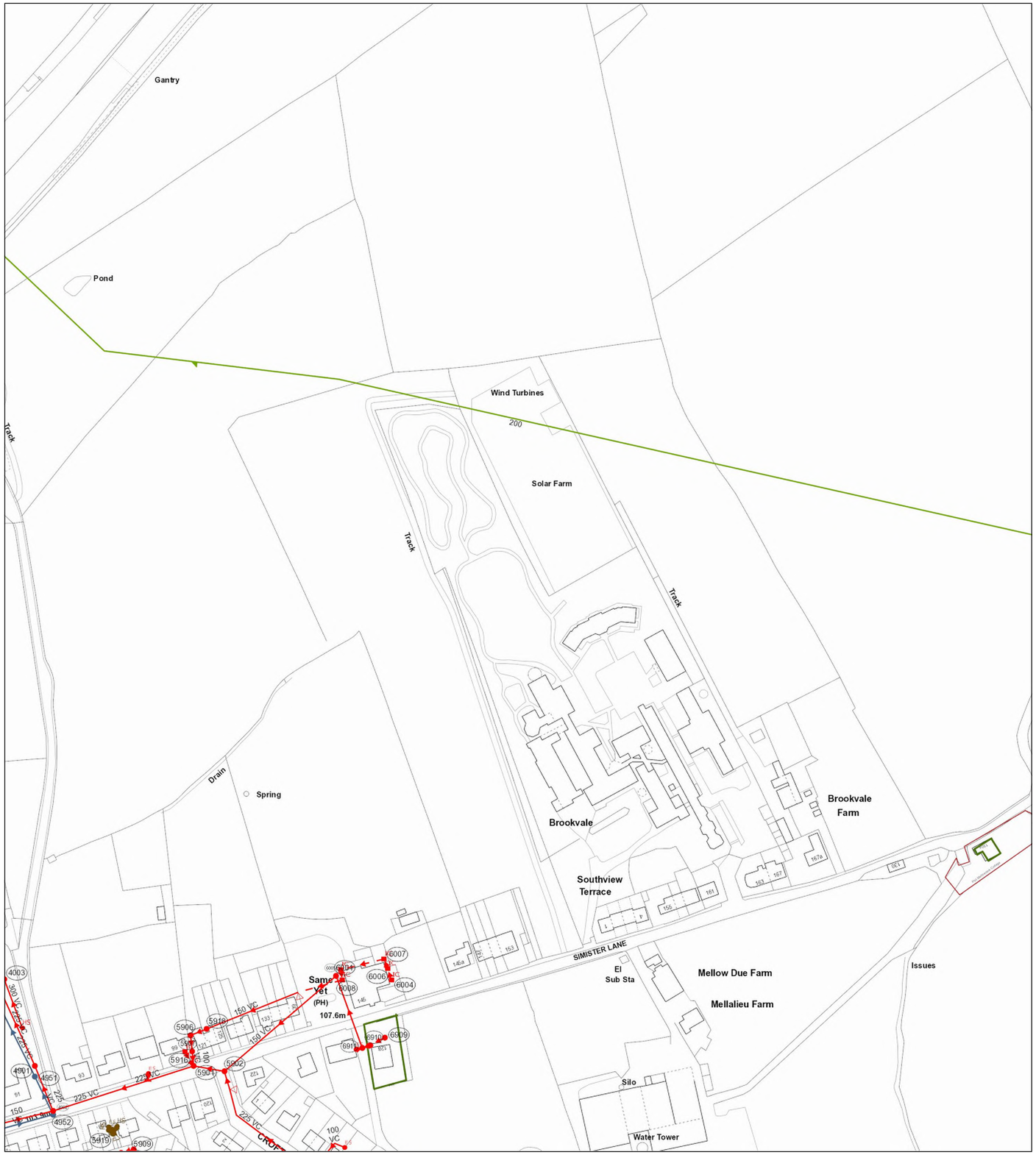

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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
5906		CO		100			VC	8.152598	
5906		CO		100			VC	8.152598	
5901	105.44	CO	103.68	225			VC	81.90849	1 in 0.80491829
5901	105.44	CO	103.68	225			VC	81.90849	1 in 0.80491829
6001		CO	0	150			VC	81.56593	
6001		CO	0	150			VC	81.56593	
5906		CO		100			VC	8.890598	
5906		CO		100			VC	8.890598	
4902	103.87	CO	100.84	225			VC	26.92582	1 in 168
4902	103.87	CO	100.84	225			VC	26.92582	1 in 168
4003		CO	0	450			CO	193.7282	
4003		CO	0	450			CO	193.7282	
4901	102.82	CO	97.68	225			VC	50.56679	
4901	102.82	CO	97.68	225			VC	50.56679	
4951	103.47	SW	98.83	225			VC	55.9017	
4951	103.47	SW	98.83	225			VC	55.9017	
5910		CO		150			VC	18.98776	
5902	106.23	CO	104.95	225			VC	17.26268	1 in 0.16600323
5902	106.23	CO	104.95	225			VC	17.26268	1 in 0.16600323
5912		CO		150			VC	10.22828	
5909		CO		150			VC	7.29926	
5909		CO		150			VC	7.29926	
4952	104.03	SW	102.71	225			VC	23.25941	1 in 21
4952	104.03	SW	102.71	225			VC	23.25941	1 in 21
6911		CO		150			VC	42.67335	
6911		CO		150			VC	42.67335	
5918		CO		150			VC	9.603898	
5918		CO		150			VC	9.603898	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned · Foul · Surface Water · Combined

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FO	Foul
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SEWER SHAPE

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EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

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PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8306SE
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 28
Sheet: 11 of 20

Printed by: Property Searches

SEWER RECORDS

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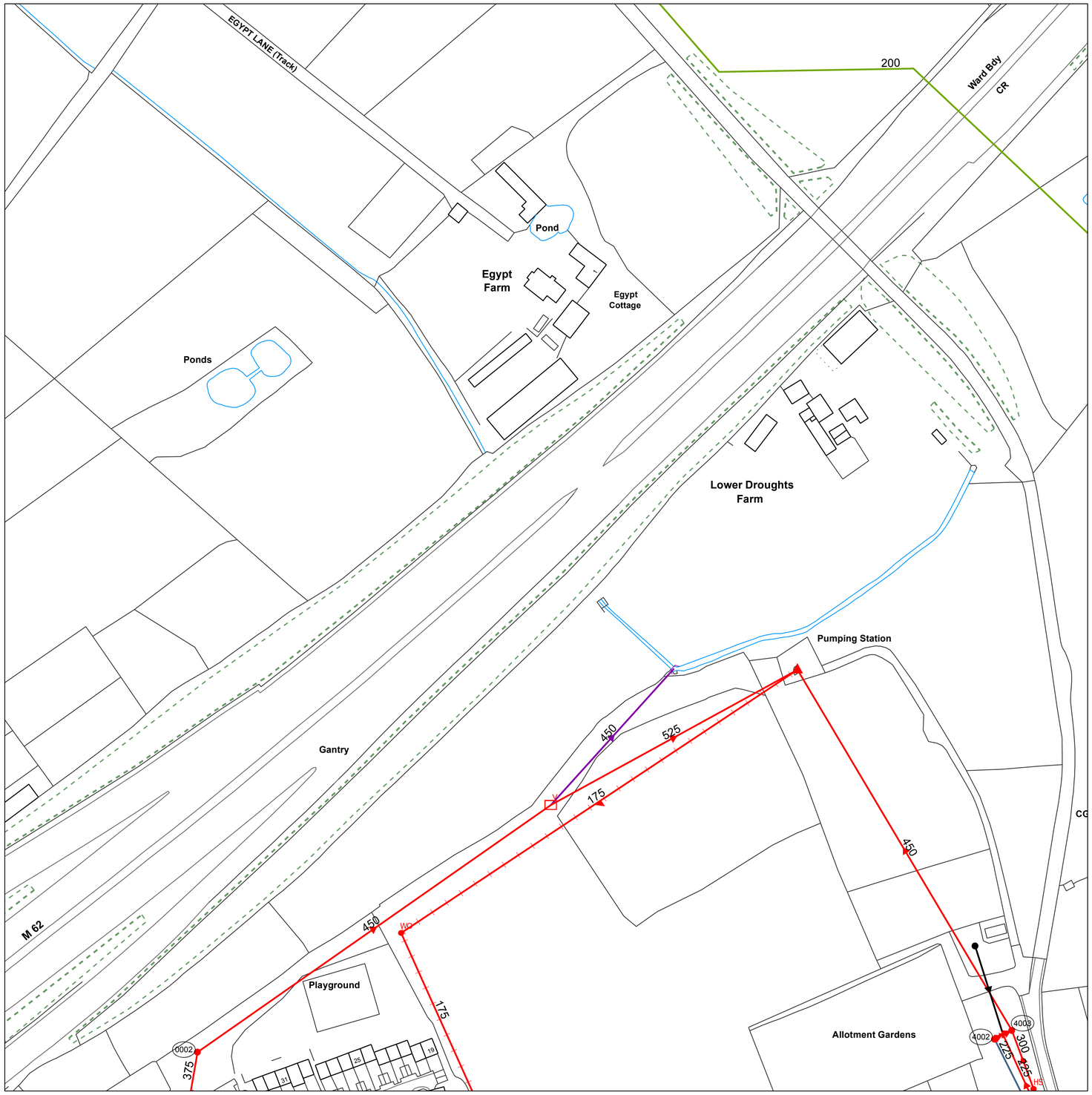

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Mati	Length	Grad
0002	99.67	CO	0	450		CI	CO	199.05	
4002		CO							
4003		CO	0	450		CI	CO	193.73	
4004		CO							
4001		CO							
2101		CO							
3102		CO	0	175		CI	PVC	219.71	

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Mati	Length	Grad

OS Sheet No: SD8306SW

Scale: 1:1250 Date: 18/07/2017

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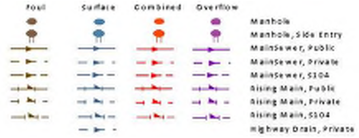
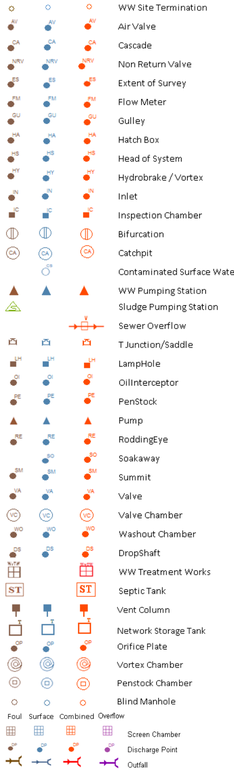
WASTE WATER SYMBOLOGY





ABANDONED PIPE

- MainSewer
- Rising Main
- Highway Drain
- Sludge Main

LEGEND

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
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CC	Concrete Box Culverted	PF	Pitch Fibre
PSC	Plastic/Steel Composite	MAC	Masonry, Coursed
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GRP	Glass Reinforced Plastic	U	Unspecified

OS Sheet No: SD8306SW

Scale: 1:1250 Date: 18/07/2017

7 Nodes

Sheet 1 of 1

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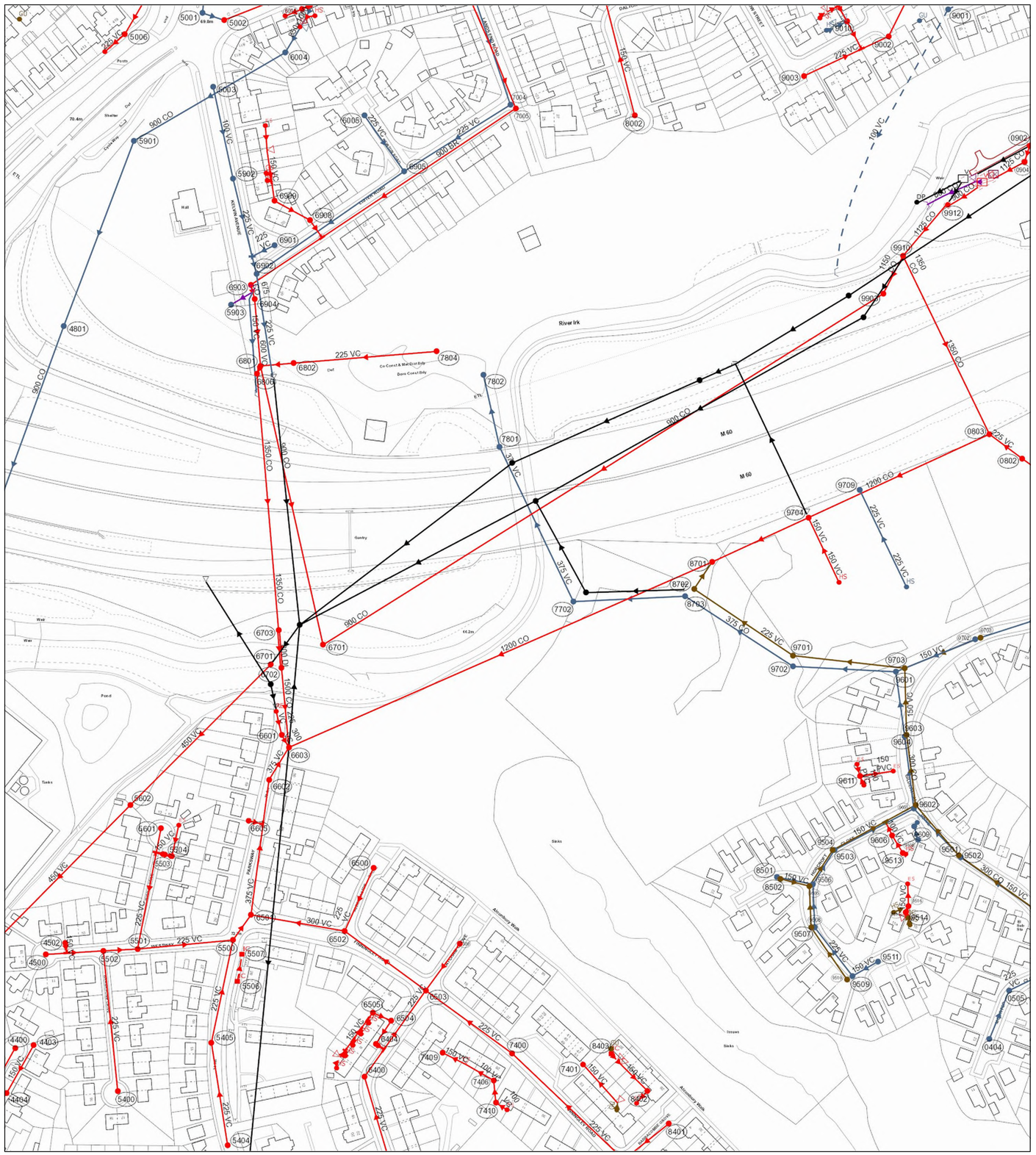
SEWER RECORDS



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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
6703	63.27	CO	60.65	800			DI	21.23	1 in 265
8703		SW	0	375			CO	62.07254	
6601	69.12	CO	65.42	300			VC	8.062258	
6602	69.9	CO	0	375			VC	21.09502	
9611		CO		150			PVC	18.61181	
8402		CO		150			VC	9.146832	
7804		CO	0	225			VC	79.51984	
5003		SW	0	100			VC	52.17279	
5003		SW	0	100			VC	52.17279	
7005	70.4	CO	66.54	900			BR	176.672	1 in 930
7005	70.4	CO	66.54	900			BR	176.672	1 in 930
5602		CO	0	450			VC	112.4322	
5602		CO	0	450			VC	112.4322	
8002		CO	0	150			VC	65	
8002		CO	0	150			VC	65	
0802		CO	0	225			VC	22.64229	
8401	83.25	CO	0	225			VC	32.01562	
6605		CO	0	150			VC	5.192343	
9702		SW	0	375			CO	71.56116	
9509	87.76	SW	85.53	225			VC	34.20526	1 in 13
5005		CO		225			VC	21.1353	
8501	83.72	SW	81.59	150			VC	20.39608	1 in 89
6802		CO	0	225			VC	18.51408	
9510	87.82	FO	85.97	150			VC	35.22783	1 in 13
9501	87.6	SW	84.91	300			CO	37.48333	1 in 14
6003	69.55	SW	65.74	850			BR	17	1 in 36
6505		CO		150			VC	11.20077	
6606	85.23	FO	83.07	150			VC	23.02173	1 in 16
6404		CO		150			VC	5.401882	
9506	83.76	SW	81.2	225			VC	22.4722	1 in 187
0803	73.67	CO	62.7	1200			CO	110.6828	1 in 209
6504		CO		150			VC	15.52236	
7500	77.99	CO	75.39	225			VC	32.20248	1 in 22
7001	70.53	SW	69.43	225			VC	72.73238	
5002	69.77	CO	0	375			VC	54.78138	
5002	69.77	CO	0	375			VC	54.78138	
5002	74.36	CO	72.25	225			VC	58.24946	1 in 38
9002		CO	0	225			VC	62.60991	
9002		CO	0	225			VC	62.60991	
7801		SW	0	375			VC	41	
6901	69.55	SW	0	225			VC	13.88078	
6901	69.55	SW	0	225			VC	13.88078	
7004		SW	0	225			VC	69.64194	
7004		SW	0	225			VC	69.64194	
5501	70.04	CO	66.53	225			VC	53.23532	1 in 205
0904	68.28	CO	65.83	1125			CO	19.71212	1 in 60
0904	68.28	CO	65.83	1125			CO	19.71212	1 in 60
6908		CO		150			VC	11.74628	
6908		CO		150			VC	11.74628	
6004	69.76	SW	0	900			CO	97.24711	
6004	69.76	SW	0	900			CO	97.24711	
6703	63.27	CO	60.65	800			CO	21.19462	1 in 265
5901	70.91	SW	0	900			CO	110.1363	
5901	70.91	SW	0	900			CO	110.1363	
4400	68.82	CO	67.05	225			VC	72.06941	1 in 58
4400	68.82	CO	67.05	225			VC	72.06941	1 in 58
0902	68.31	CO	65.92	1125			CO	9.389579	1 in 104
0902	68.31	CO	65.92	1125			CO	9.389579	1 in 104
5500	72.58	CO	66.26	225			VC	17.20465	
6801	65.31	CO	0	900			VC	158.7756	
9604	82.15	FO	79.67	150			VC	37.01351	
4403		CO		150			VC	30.68866	
4403		CO		150			VC	30.68866	
0702	82.85	SW	79.64	150			VC	47.53946	
9912	67.55	CO	65.55	1125			CO	37.77274	
9912	67.55	CO	65.55	1125			CO	37.77274	
6909		CO		150			VC	22.41766	
6909		CO		150			VC	22.41766	
9507	85.3	SW	82.82	225			VC	24.02082	1 in 15
9603	82.19	SW	79.37	300			CO	36.34556	
0505	93.74	SW	91.45	225			VC	34.43835	1 in 215
9511	88.07	SW	0	150			VC	16.12452	
9605	84.55	SW	80.71	300			CO	40.31129	1 in 31
5902		SW	0	225			VC	44.55107	
5902		SW	0	225			VC	44.55107	
9516		CO		150			VC	12.34136	
9001		SW		100			VC	159.9999	
9001		SW		100			VC	159.9999	
9515		CO		150			VC	3.759029	
5001		SW	0	150			VC	12.64911	
5001		SW	0	150			VC	12.64911	
6903	69.14	CO	66.11	675			CO	8.246211	
6904	68.98	CO	65.37	600			VC	37.21489	1 in 10
9910	66.46	CO	63.14	1350			CO	110.032	1 in 250
6502	73.39	CO	70.79	300			VC	52.7731	1 in 66
5115		SW	0	150			VC	82.58644	
6400	77.53	CO	75.18	225			CO	58.82177	1 in 37
5504		CO		150			VC	4.986892	
9910	66.46	CO	63.14	1150			CO	23.74042	
8702		FO	0	225			VC	18.02776	
6902	69.18	SW	67.43	225			VC	57.70615	
9703		FO	0	225			VC	62.39391	
9608		SW		0			VC	7.761896	
6010		CO		150			VC	10.07087	
6010		CO		150			VC	10.07087	
4500	68.73	CO	67.06	225			VC	32.06244	1 in 134
4500	68.73	CO	67.06	225			VC	32.06244	1 in 134
6701		CO	0	450			VC	110.3087	
0904	68.28	CO		0			UN	6.38147	
0904	68.28	CO		0			UN	6.38147	
9003		CO	0	225			VC	51.89412	
9003		CO	0	225			VC	51.89412	
0703	82.72	FO	79.9	150			VC	45.31004	
5503		CO		150			VC	4.109229	
7702		SW	0	375			VC	95.27329	
5006		CO		225			VC	14.83492	
5006		CO		225			VC	14.83492	
5006		CO		225			VC	14.83492	
5502	69.61	CO	66.81	225			VC	19.0263	1 in 73
5502	69.61	CO	66.81	225			VC	19.0263	1 in 73
4801	73.45	SW	70.91	900			CO	163.8658	
4801	73.45	SW	70.91	900			CO	163.8658	
6702	63.27	CO	60.57	1500			CO	44.41994	1 in 202
8502	83.76	FO	81.84	150			VC	16.49242	1 in 92
9704		CO	62.17	1200			CO	58.89605	1 in 88
6905		SW	0	225			VC	99.86491	
6905		SW	0	225			VC	99.86491	
6503	75.89	CO	72.66	300			VC	55.80323	1 in 67
9701		FO	0	225			VC	66.28725	
5404	76.02	CO	73.76	225			VC	57.70615	1 in 39
8701	76.32	CO	61.5	1200			CO	256.5814	1 in 223
7410		CO		100			VC	12.4263	
6500	76.03	CO	73.34	225			VC	38.48376	1 in 15
9504	83.63	SW	81.04	225			VC	49.64877	1 in 165
6005		SW	0	225			VC	38.01316	
6005		SW	0	225			VC	38.01316	
5601	69.05	CO	67.2	225			VC	68.24954	1 in 108
5400	71.76	CO	69.91	225			VC	78.40918	1 in 38
5400	71.76	CO	69.91	225			VC	78.40918	1 in 38
9903		CO	0	900			CO	367.0776	
4404		CO		150			VC	15.44606	
4404		CO		150			VC	15.44606	
6806		CO	0	1350			CO	142.925	
9601		SW	0	375			CO	57.07889	
0404	93.5	SW	91.63	225			VC	29.15476	1 in 182
6501	72.11	CO	69.98	375			VC	75.66444	1 in 17
7406		CO		100			VC	17.60476	
9609		SW		0			VC	2.501009	
6801	65.31	CO	61.36	1350			CO	4.745431	
9502	86.94	FO	84.58	150			VC	36.87818	1 in 18
4502		CO		150			VC	5.74484	
4502		CO		150			VC	5.74484	
9503	83.64	FO	81.42	150			VC	52.35456	1 in 154
7400	79.67	CO	77.04	225			VC	59.40539	1 in 20
9513		CO		100			VC	11.397	
9602	84.53	FO	81.01	150			VC	39.31921	1 in 31
9505	83.83	FO	81.61	150			VC	23.85372	1 in 149
9606		CO		100			VC	8.653045	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

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Address or Site Reference:

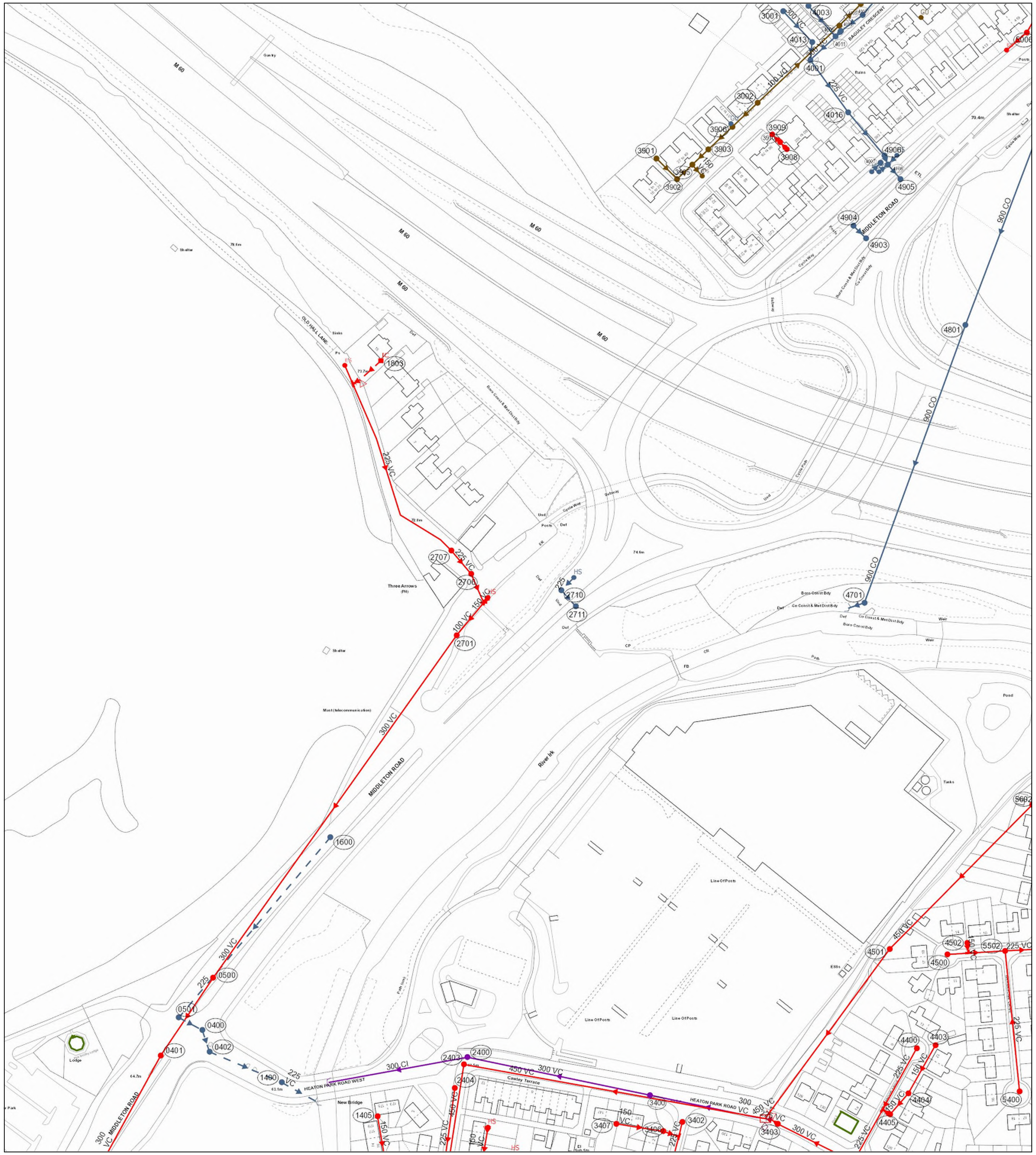
Simister wide plan,

OS sheet Number: SD8404NE
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 149
Sheet: 17 of 20

Printed by: Property Searches

SEWER RECORDS

United Utilities — helping life flow smoothly



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3903		FO		100			VC	18.17553	
3903		FO		100			VC	18.17553	
1600	72.11	SW	70.23	225				130.5986	1 in 25
0402	64.68	SW	62.79	225				43.46263	1 in 36
3001	75.78	SW	74.28	300			VC	23.34524	1 in 40
3001	75.78	SW	74.28	300			VC	23.34524	1 in 40
2404	63.72	CO	62.33	225			VC	58.54913	1 in 122
3901		FO		100			VC	16.13335	
3901		FO		100			VC	16.13335	
0401	65.19	CO	60.41	300			VC	168.7157	1 in 174
4006	76.3	FO	75.61	150			VC	16.97056	1 in 242
4006	76.3	FO	75.61	150			VC	16.97056	1 in 242
4016	74.47	SW	0	225			VC	31.241	
4016	74.47	SW	0	225			VC	31.241	
4001	75.06	SW	72.89	225			VC	35.80503	
4001	75.06	SW	72.89	225			VC	35.80503	
4007	76.25	FO	75.53	150			VC	18.43909	
4007	76.25	FO	75.53	150			VC	18.43909	
2400	63.5	OV	61.37	300			CI	78.26238	1 in 36
5602		CO	0	450			VC	112.4322	
5602		CO	0	450			VC	112.4322	
2701	71.88	CO	0	300			VC	233.0772	
4005		SW	0	225			VC	15	
4005		SW	0	225			VC	15	
3905		FO		150			VC	8.402295	
3905		FO		150			VC	8.402295	
4015	75.34	SW	73.51	225			VC	4.24264	1 in 47
4015	75.34	SW	73.51	225			VC	4.24264	1 in 47
4701		SW	0	900			CO	9.486833	
3403	67.37	CO	64.64	300			VC	3.605551	1 in 90
2707	71.38	CO	0	225			VC	17.02939	
3908		CO		100			VC	5.348752	
3908		CO		100			VC	5.348752	
4908	71.49	SW	69.55	225			VC	10.63015	1 in 22
4908	71.49	SW	69.55	225			VC	10.63015	1 in 22
3400	65.73	OV	63.11	300			VC	103.1601	1 in 60
5005		CO		225			VC	21.1353	
3910		CO		100			VC	6.1593	
3910		CO		100			VC	6.1593	
4013	75.2	SW	73.67	225			VC	10.04988	1 in 14
4013	75.2	SW	73.67	225			VC	10.04988	1 in 14
0400	65.74	SW	64.24	225				12.64911	1 in 10
4500	68.73	CO	67.06	225			VC	32.06244	1 in 134
4500	68.73	CO	67.06	225			VC	32.06244	1 in 134
6701		CO	0	450			VC	110.3087	
4011	74.98	SW	73.44	300			VC	19.10497	1 in 60
4011	74.98	SW	73.44	300			VC	19.10497	1 in 60
5006		CO		225			VC	14.83492	
5006		CO		225			VC	14.83492	
5006		CO		225			VC	14.83492	
5006		CO		225			VC	14.83492	
4012	76	SW	74.12	225			VC	18.43909	
4906	71.46	SW	69.72	225			VC	5.385165	1 in 36
4906	71.46	SW	69.72	225			VC	5.385165	1 in 36
5502	69.61	CO	66.81	225			VC	19.0263	1 in 73
5502	69.61	CO	66.81	225			VC	19.0263	1 in 73
4801	73.45	SW	70.91	900			CO	163.8658	
4801	73.45	SW	70.91	900			CO	163.8658	
3902		FO		100			VC	12.4241	
3902		FO		100			VC	12.4241	
4405		CO		150			VC	4.92371	
2710	74.32	SW	72.77	225				12.04159	1 in 33
1400	63.3	SW	60.47	225			VC	22.82542	1 in 16
2403	63.62	CO	55.68	450			VC	149.7765	1 in 174
3903		FO		100			VC	19.19835	
3903		FO		100			VC	19.19835	
3903		FO		100			VC	62.32206	
3903		FO		100			VC	62.32206	
2706	71.31	CO	69.16	225			VC	17.46425	
5400	71.76	CO	69.91	225			VC	78.40918	1 in 38
5400	71.76	CO	69.91	225			VC	78.40918	1 in 38
4003		SW	0	225			VC	22.67157	
4003		SW	0	225			VC	22.67157	
1405		CO		150			VC	31.39963	
4904	73.05	SW	71.2	225			VC	9.899495	1 in 14
4904	73.05	SW	71.2	225			VC	9.899495	1 in 14
5901	70.91	SW	0	900			CO	110.1363	
5901	70.91	SW	0	900			CO	110.1363	
3902		FO		100			VC	11.56015	
3902		FO		100			VC	11.56015	
4400	68.82	CO	67.05	225			VC	72.06941	1 in 58
4400	68.82	CO	67.05	225			VC	72.06941	1 in 58
4404		CO		150			VC	15.44606	
4404		CO		150			VC	15.44606	
4004		SW	0	225			VC	14.76482	
0500	67.45	CO	61.72	300			VC	51.86521	1 in 98
4403		CO		150			VC	30.66866	
4403		CO		150			VC	30.66866	
0501	66.13	SW	64.92	225				14.76482	1 in 25
4502		CO		150			VC	5.74484	
4502		CO		150			VC	5.74484	
3402	66.39	CO	64.49	225			VC	54.57404	1 in 114
4501		CO	0	450			VC	116.6062	
3406		CO		150			VC	9.175671	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforced Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8404NW
Scale: 1:1250 Date: 07/05/2019
Nodes: 94
Sheet: 3 of 20

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SEWER RECORDS

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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
5601		SW	0	225			VC	252.2604	
5601		SW	0	225			VC	252.2604	
0401		CO		150			VC	43.66489	
0401		CO		150			VC	43.66489	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

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- Inlet
- Discharge Point
- Vortex
- Penstock
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- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
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SEWER MATERIAL

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RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8405NE
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 4
Sheet: 19 of 20

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SEWER RECORDS

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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
5601		SW	0	225			VC	252.2604	
5601		SW	0	225			VC	252.2604	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned	Foul	Surface Water	Combined	
				Public Sewer
				Private Sewer
				Section 104
				Rising Main
				Sludge Main
				Overflow
				Water Course
				Highway Drain

All point assets follow the standard colour convention:

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brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
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- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
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SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
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CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8405NW
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 2
Sheet: 9 of 20

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SEWER RECORDS

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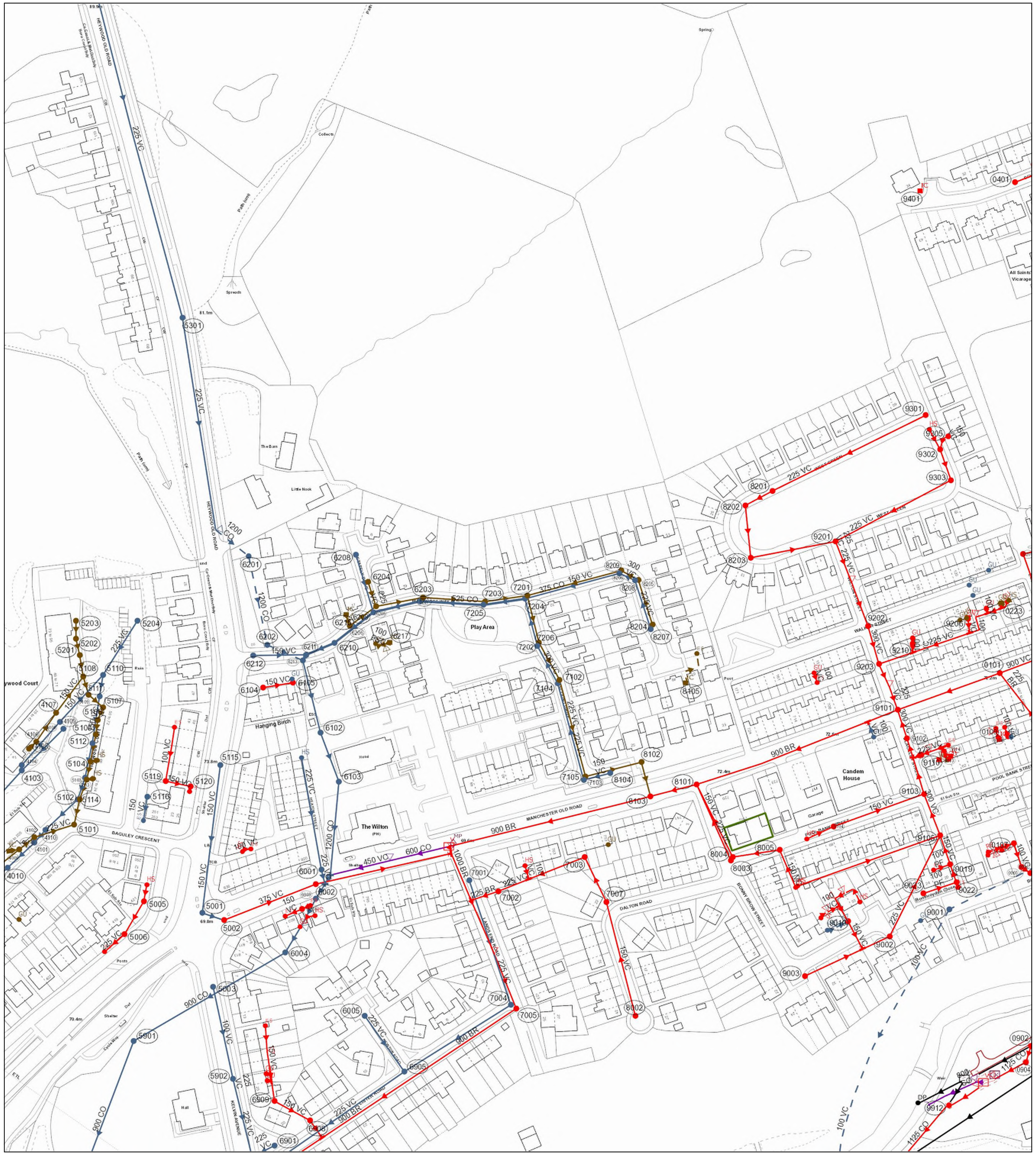

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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
6201	73.66	SW		1200			CO	21.55676	
9301	74.44	CO	72.74	225			VC	94.81033	
5102		FO	0	150			VC	14.31782	
5102		FO	0	150			VC	14.31782	
0107		CO		100			VC	13.93157	
7201		FO	68.69	225			VC	26.80562	1 in 148.920099
7202		FO	68.51	225			VC	23.6735	1 in 147.959399
9023		CO		100			PF	19.26357	
6211		SW	69.28	0			UN	3.722638	1 in 5.39512814
4105	87.51	FO	86.8	150			VC	5.656854	1 in 40
4105	87.51	FO	86.8	150			VC	5.656854	1 in 40
9305		CO		150			VC	9.40594	
5108		FO	0	150			VC	10.44031	
5108		FO	0	150			VC	10.44031	
5204		SW	0	225			VC	35.51056	
5003		SW	0	100			VC	52.17279	
5003		SW	0	100			VC	52.17279	
7005	70.4	CO	66.54	900			BR	176.672	1 in 930
7005	70.4	CO	66.54	900			BR	176.672	1 in 930
6201	73.66	SW		1200			CO	52.06475	
8002		CO	0	150			VC	65	
8002		CO	0	150			VC	65	
9101	72.35	CO	67.27	900			BR	118.8311	1 in 424
5107		FO	0	150			VC	7.615773	
5107		FO	0	150			VC	7.615773	
5203		FO	0	150			VC	10	
5203		FO	0	150			VC	10	
8209		SW	69.97	375			CO	54.27714	1 in 246.714269
5005		CO		225			VC	21.1353	
9201	72.7	CO	0	225			VC	24.69818	
6212		SW	73	150			VC	29.38516	1 in 7.89923712
8206		FO	69.53	150			VC	53.89359	1 in 69.9916799
4106	87.23	FO	86.64	150			VC	19.41649	1 in 29
4106	87.23	FO	86.64	150			VC	19.41649	1 in 29
0104		CO		100			VC	5.510288	
6003	69.55	SW	65.74	850			BR	17	1 in 36
4008		FO	0	150			VC	27.55404	
7104		SW	70.05	300			VC	23.76045	1 in 125.054990
8004	72.54	CO	70.95	150			VC	44.97197	1 in 41
0401		CO		150			VC	43.66489	
0401		CO		150			VC	43.66489	
7001	70.53	SW	69.43	225			VC	72.73238	
5002	69.77	CO	0	375			VC	54.78138	
5002	69.77	CO	0	375			VC	54.78138	
5112	80.01	SW	77.47	225			VC	19.41649	1 in 15
5112	80.01	SW	77.47	225			VC	19.41649	1 in 15
9002		CO	0	225			VC	62.60991	
9002		CO	0	225			VC	62.60991	
8202		CO	0	225			VC	29.15476	
4110	77.14	SW	75.51	225			VC	9.219544	1 in 154
4110	77.14	SW	75.51	225			VC	9.219544	1 in 154
6901	69.55	SW	0	225			VC	13.88078	
6901	69.55	SW	0	225			VC	13.88078	
6204		FO	69.68	150			VC	14.36677	1 in 34.2066047
7004		SW	0	225			VC	69.64194	
7004		SW	0	225			VC	69.64194	
6203		FO	69.08	225			VC	34.50125	1 in 143.755192
9105	71.76	CO	68.32	300			VC	24.69818	1 in 112
0904	68.28	CO	65.83	1125			CO	19.71212	1 in 60
0904	68.28	CO	65.83	1125			CO	19.71212	1 in 60
6908		CO		150			VC	11.74628	
6908		CO		150			VC	11.74628	
6209		SW	69.39	525			CO	27.53191	1 in 393.313059
6004	69.76	SW	0	900			CO	97.24711	
6004	69.76	SW	0	900			CO	97.24711	
5202		FO	0	150			VC	9.219544	
5202		FO	0	150			VC	9.219544	
4108		SW	0	150			VC	35.38361	
4108		SW	0	150			VC	35.38361	
5901	70.91	SW	0	900			CO	110.1363	
5901	70.91	SW	0	900			CO	110.1363	
0902	68.31	CO	65.92	1125			CO	9.389579	1 in 104
0902	68.31	CO	65.92	1125			CO	9.389579	1 in 104
7003		CO	0	225			VC	51.62364	
5116		SW		150			VC	13.29401	
9303	73.21	CO	71.39	225			VC	72.47068	1 in 91
8208		SW	70.09	300			VC	9.425949	1 in 188.518990
8205		FO	69.64	150			VC	10.73486	1 in 97.5896139
4104	84.44	SW	83.07	150			VC	31.89044	
4104	84.44	SW	83.07	150			VC	31.89044	
8101	72.34	CO	0	900			BR	26.42491	
9104	72.25	CO	70.55	150			VC	53.14132	1 in 130
8203		CO	0	225			VC	47.85394	
9912	67.55	CO	65.55	1125			CO	37.77274	
9912	67.55	CO	65.55	1125			CO	37.77274	
4109	86.9	SW	83.23	225			VC	32.52691	
4109	86.9	SW	83.23	225			VC	32.52691	
6909		CO		150			VC	22.41766	
6909		CO		150			VC	22.41766	
0002		CO	0	225			VC	39.20459	
5111		SW	0	225			VC	26.30589	
5111		SW	0	225			VC	26.30589	
9110		CO	0	225			VC	4.817728	
6201	73.66	SW		1200			CO	50.21382	
9202	72.63	CO	69.86	300			VC	21.84033	1 in 70
5902		SW	0	225			VC	44.55107	
5902		SW	0	225			VC	44.55107	
5106		FO	0	150			VC	8.062258	
5106		FO	0	150			VC	8.062258	
4101	77.23	SW	75.42	225			VC	20.51828	1 in 22
4101	77.23	SW	75.42	225			VC	20.51828	1 in 22
7007		CO	0	225			VC	27.73085	
9001		SW		100			VC	159.9999	
9001		SW		100			VC	159.9999	
0101	72.36	CO	67.07	900			BR	60.18025	
5104		FO	0	150			VC	10.19804	
5104		FO	0	150			VC	10.19804	
6206		FO	70.02	150			VC	18.1475	1 in 23.8782949
5001		SW	0	150			VC	12.64911	
5001		SW	0	150			VC	12.64911	
6208		SW	70.5	225			VC	33.29655	1 in 29.9968889
6104		CO		150			VC	16.66387	
5201		FO	0	150			VC	12.16553	
5201		FO	0	150			VC	12.16553	
5105		FO	0	150			VC	15.29706	
5105		FO	0	150			VC	15.29706	
7203		FO	68.84	225			VC	23.64988	1 in 157.665854
7102		FO	68.35	225			VC	55.49141	1 in 149.976795
5301		SW	0	225			VC	119.0282	
5110		SW	0	225			VC	12.16553	
5110		SW	0	225			VC	12.16553	
0003		CO		100			VC	5.951587	
5115		SW	0	150			VC	82.58644	
9102	71.91	CO	0	300			VC	16.68775	
7103		FO	67.98	225			VC	31.94821	1 in 152.134353
8102		FO	67.77	225			VC	19.5756	1 in 150.581525
5601		SW	0	225			VC	252.2604	
5601		SW	0	225			VC	252.2604	
6010		CO		150			VC	10.07087	
6010		CO		150			VC	10.07087	
9203	72.64	CO	69.47	300			VC	14.31782	
0904	68.28	CO		0			UN	6.38147	
0904	68.28	CO		0			UN	6.38147	
9003		CO	0	225			VC	51.89412	
9003		CO	0	225			VC	51.89412	
6001		SW	0	225			VC	8.246211	
7204		SW	69.6	525			CO	23.30825	1 in 466.164960
6210		SW	69.32	525			CO	16.83529	1 in 420.882385
5006		CO		225			VC	14.83492	
5006		CO		225			VC	14.83492	
5006		CO		225			VC	14.83492	
5006		CO		225			VC	14.83492	
8003	72.61	CO	70.91	225			VC	46.35397	
4107	87.28	FO	85.9	150			VC	25	
4107	87.28	FO	85.9	150			VC	25	
9302	73.51	CO	71.56	225			VC	18.02776	1 in 120
6205		FO	69.26	225			VC	26.52715	1 in 147.373043
8204		FO	69.9	150			VC	26.05876	1 in 100.225992
9103	71.7	CO	68.08	300			VC	20.88061	
6905		SW	0	225			VC	99.86491	
6905		SW	0	225			VC	99.86491	
9022		CO		150			VC	10.54387	
4014		FO		150			VC	10.86471	
4014		FO		150			VC	10.86471	
5103		FO	0	150			VC	11.7047	
5103		FO	0	150			VC	11.7047	
8104		SW	70.9	150			VC	15.10808	1 in 100.720530
6201	73.66	SW		1200			CO	29.01177	
6005		SW	0	225			VC	38.01316	
6005		SW	0	225			VC	38.01316	
7105		SW	70.68	225			VC	55.34121	1 in 100.620374
8207		SW	70.35	225			VC	28.39871	1 in 149.466881
5113	78.94	SW	76.2	225			VC	12.64911	1 in 90
5113	78.94	SW	76.2	225			VC	12.64911	1 in 90
4103		SW	0	225			VC	84.95882	
4103		SW	0	225			VC	84.95882	
4102	77.67	FO	75.03	225			VC	23.08679	
4102	77.67	FO	75.03	225			VC	23.08679	
7205		SW	69.55	525			CO	35.18365	1 in 351.836522
6201	73.66	SW		1200			CO	41.17992	
8005	72.47	CO	71.48	150			VC	26.30589	1 in 51
8201		CO	0	225			VC	17	
6207		SW	69.45	525			CO	26.56135	1 in 442.689098
5114	77.22	SW	76.03	225			VC	24.75884	1 in 50
5114	77.22	SW	76.03	225			VC	24.75884	1 in 50
5109		FO	0	150			VC	10.63015	
5109		FO	0	150			VC	10.63015	
4010	76.46	SW	74.49	225			VC	19.10497	1 in 53
4010	76.46	SW	74.49	225			VC	19.10497	1 in 53
7206		SW	69.86	375			CO	26.96401	1 in 103.707736
0201	73.18	CO	69.92	300			VC	57.24509	
8101	72.34	CO	0	900			BR	115.131	
9210		CO		100			VC	4.808618	
5119		CO		150			VC	14.05871	
6002	69.24	CO	67.5	375			VC	76.90253	
7002		CO	0	225			BR	15.81139	
5120		CO		150			VC	2.970975	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO Foul
SW Surface Water
CO Combined
OV Overflow

SEWER SHAPE

CI Circular TR Trapezoidal
EG Egg AR Arch
OV Oval BA Barrel
FT Flat Top HO HorseShoe
RE Rectangular UN Unspecified
SQ Square

SEWER MATERIAL

AC Asbestos Cement
BR Brick
PE Polyethylene
RP Reinforced Plastic Matrix
CO Concrete
CSB Concrete Segment Bolted
CSU Concrete Segment Unbolted
CC Concrete Box Culverted
PSC Plastic / Steel Composite
GRC Glass Reinforced Plastic
DI Ductile Iron
PVC Polyvinyl Chloride
CI Cast Iron
SI Spun Iron
ST Steel
VC Vitrified Clay
PP Polypropylene
PF Pitch Fibre
MAC Masonry, Coursed
MAR Masonry, Random
U Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8405SE
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 187
Sheet: 18 of 20

Printed by: Property Searches

SEWER RECORDS

United Utilities
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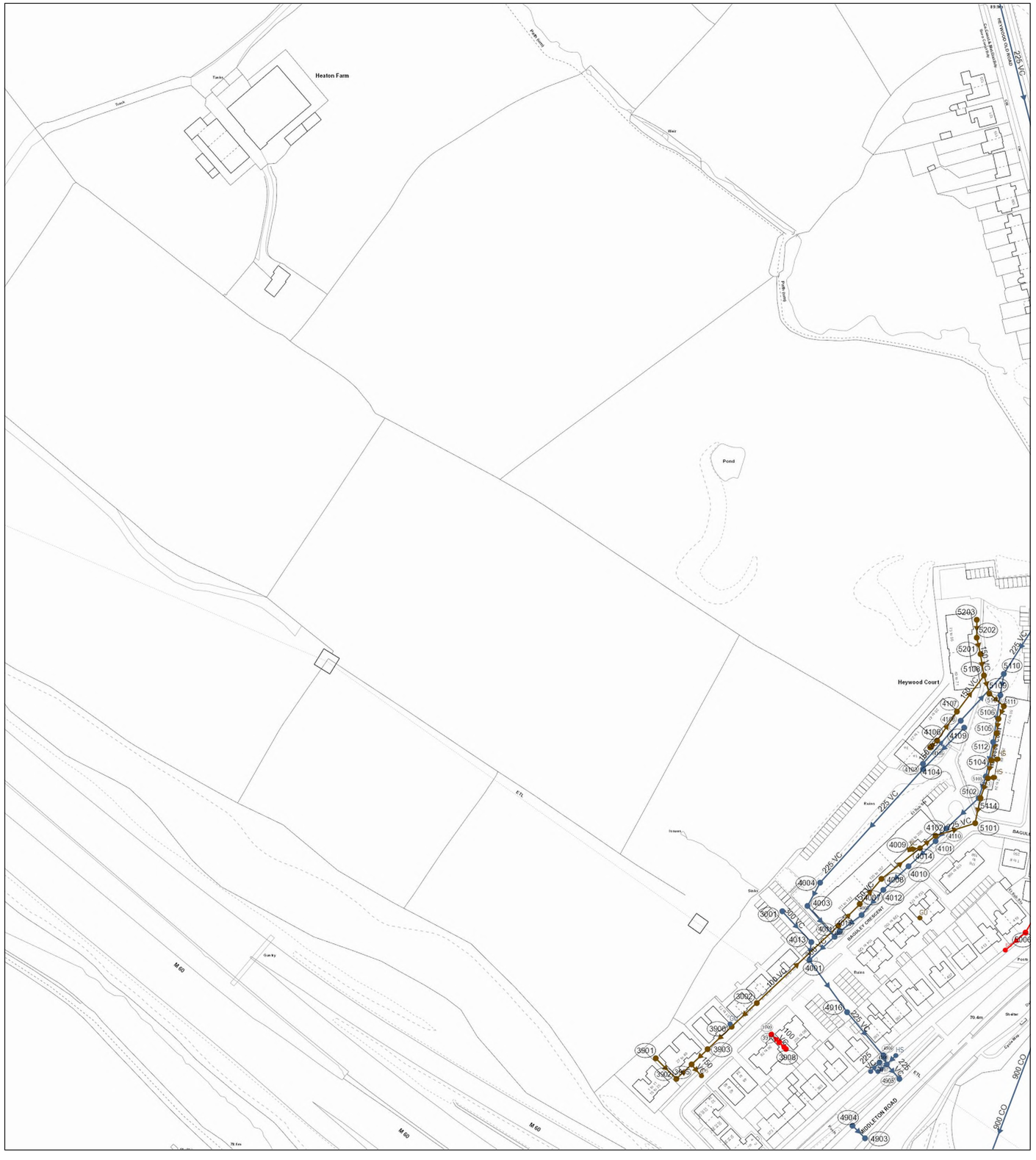

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
3903		FO		100			VC	18.17553	
3903		FO		100			VC	18.17553	
5102		FO	0	150			VC	14.31782	
5102		FO	0	150			VC	14.31782	
3001	75.78	SW	74.28	300			VC	23.34524	1 in 40
3001	75.78	SW	74.28	300			VC	23.34524	1 in 40
3901		FO		100			VC	16.13335	
3901		FO		100			VC	16.13335	
4006	76.3	FO	75.61	150			VC	16.97056	1 in 242
4006	76.3	FO	75.61	150			VC	16.97056	1 in 242
5111		SW	0	225			VC	26.30589	
5111		SW	0	225			VC	26.30589	
4016	74.47	SW	0	225			VC	31.241	
4016	74.47	SW	0	225			VC	31.241	
5106		FO	0	150			VC	8.062258	
5106		FO	0	150			VC	8.062258	
4101	77.23	SW	75.42	225			VC	20.51828	1 in 22
4101	77.23	SW	75.42	225			VC	20.51828	1 in 22
4001	75.06	SW	72.89	225			VC	35.80503	
4001	75.06	SW	72.89	225			VC	35.80503	
4105	87.51	FO	86.8	150			VC	5.656854	1 in 40
4105	87.51	FO	86.8	150			VC	5.656854	1 in 40
4007	76.25	FO	75.53	150			VC	18.43909	
4007	76.25	FO	75.53	150			VC	18.43909	
5108		FO	0	150			VC	10.44031	
5108		FO	0	150			VC	10.44031	
5204		SW	0	225			VC	35.51056	
5104		FO	0	150			VC	10.19804	
5104		FO	0	150			VC	10.19804	
4005		SW	0	225			VC	15	
4005		SW	0	225			VC	15	
3905		FO		150			VC	8.402295	
3905		FO		150			VC	8.402295	
4015	75.34	SW	73.51	225			VC	4.24264	1 in 47
4015	75.34	SW	73.51	225			VC	4.24264	1 in 47
5107		FO	0	150			VC	7.615773	
5107		FO	0	150			VC	7.615773	
5201		FO	0	150			VC	12.16553	
5201		FO	0	150			VC	12.16553	
5105		FO	0	150			VC	15.29706	
5105		FO	0	150			VC	15.29706	
5203		FO	0	150			VC	10	
5203		FO	0	150			VC	10	
3908		CO		100			VC	5.348752	
3908		CO		100			VC	5.348752	
5110		SW	0	225			VC	12.16553	
5110		SW	0	225			VC	12.16553	
4908	71.49	SW	69.55	225			VC	10.63015	1 in 22
4908	71.49	SW	69.55	225			VC	10.63015	1 in 22
5005		CO		225			VC	21.1353	
4106	87.23	FO	86.64	150			VC	19.41649	1 in 29
4106	87.23	FO	86.64	150			VC	19.41649	1 in 29
5601		SW	0	225			VC	252.2604	
5601		SW	0	225			VC	252.2604	
3910		CO		100			VC	6.1593	
3910		CO		100			VC	6.1593	
4013	75.2	SW	73.67	225			VC	10.04988	1 in 14
4013	75.2	SW	73.67	225			VC	10.04988	1 in 14
4008		FO	0	150			VC	27.55404	
4011	74.98	SW	73.44	300			VC	19.10497	1 in 60
4011	74.98	SW	73.44	300			VC	19.10497	1 in 60
5006		CO		225			VC	14.83492	
5006		CO		225			VC	14.83492	
5006		CO		225			VC	14.83492	
5006		CO		225			VC	14.83492	
4012	76	SW	74.12	225			VC	18.43909	
4906	71.46	SW	69.72	225			VC	5.385165	1 in 36
4906	71.46	SW	69.72	225			VC	5.385165	1 in 36
4107	87.28	FO	85.9	150			VC	25	
4107	87.28	FO	85.9	150			VC	25	
5112	80.01	SW	77.47	225			VC	19.41649	1 in 15
5112	80.01	SW	77.47	225			VC	19.41649	1 in 15
4110	77.14	SW	75.51	225			VC	9.219544	1 in 154
4110	77.14	SW	75.51	225			VC	9.219544	1 in 154
4014		FO		150			VC	10.86471	
4014		FO		150			VC	10.86471	
3902		FO		100			VC	12.4241	
3902		FO		100			VC	12.4241	
5103		FO	0	150			VC	11.7047	
5103		FO	0	150			VC	11.7047	
3903		FO		100			VC	19.19835	
3903		FO		100			VC	19.19835	
3903		FO		100			VC	62.32206	
3903		FO		100			VC	62.32206	
4003		SW	0	225			VC	22.67157	
4003		SW	0	225			VC	22.67157	
5202		FO	0	150			VC	9.219544	
5202		FO	0	150			VC	9.219544	
4904	73.05	SW	71.2	225			VC	9.899495	1 in 14
4904	73.05	SW	71.2	225			VC	9.899495	1 in 14
4108		SW	0	150			VC	35.38361	
4108		SW	0	150			VC	35.38361	
5901	70.91	SW	0	900			CO	110.1363	
5901	70.91	SW	0	900			CO	110.1363	
3902		FO		100			VC	11.56015	
3902		FO		100			VC	11.56015	
5113	78.94	SW	76.2	225			VC	12.64911	1 in 90
5113	78.94	SW	76.2	225			VC	12.64911	1 in 90
4103		SW	0	225			VC	84.95882	
4103		SW	0	225			VC	84.95882	
4102	77.67	FO	75.03	225			VC	23.08679	
4102	77.67	FO	75.03	225			VC	23.08679	
4004		SW	0	225			VC	14.76482	
4104	84.44	SW	83.07	150			VC	31.89044	
4104	84.44	SW	83.07	150			VC	31.89044	
5114	77.22	SW	76.03	225			VC	24.75884	1 in 50
5114	77.22	SW	76.03	225			VC	24.75884	1 in 50
5109		FO	0	150			VC	10.63015	
5109		FO	0	150			VC	10.63015	
4010	76.46	SW	74.49	225			VC	19.10497	1 in 53
4010	76.46	SW	74.49	225			VC	19.10497	1 in 53
4109	86.9	SW	83.23	225			VC	32.52691	
4109	86.9	SW	83.23	225			VC	32.52691	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8405SW
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 113
Sheet: 5 of 20

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SEWER RECORDS

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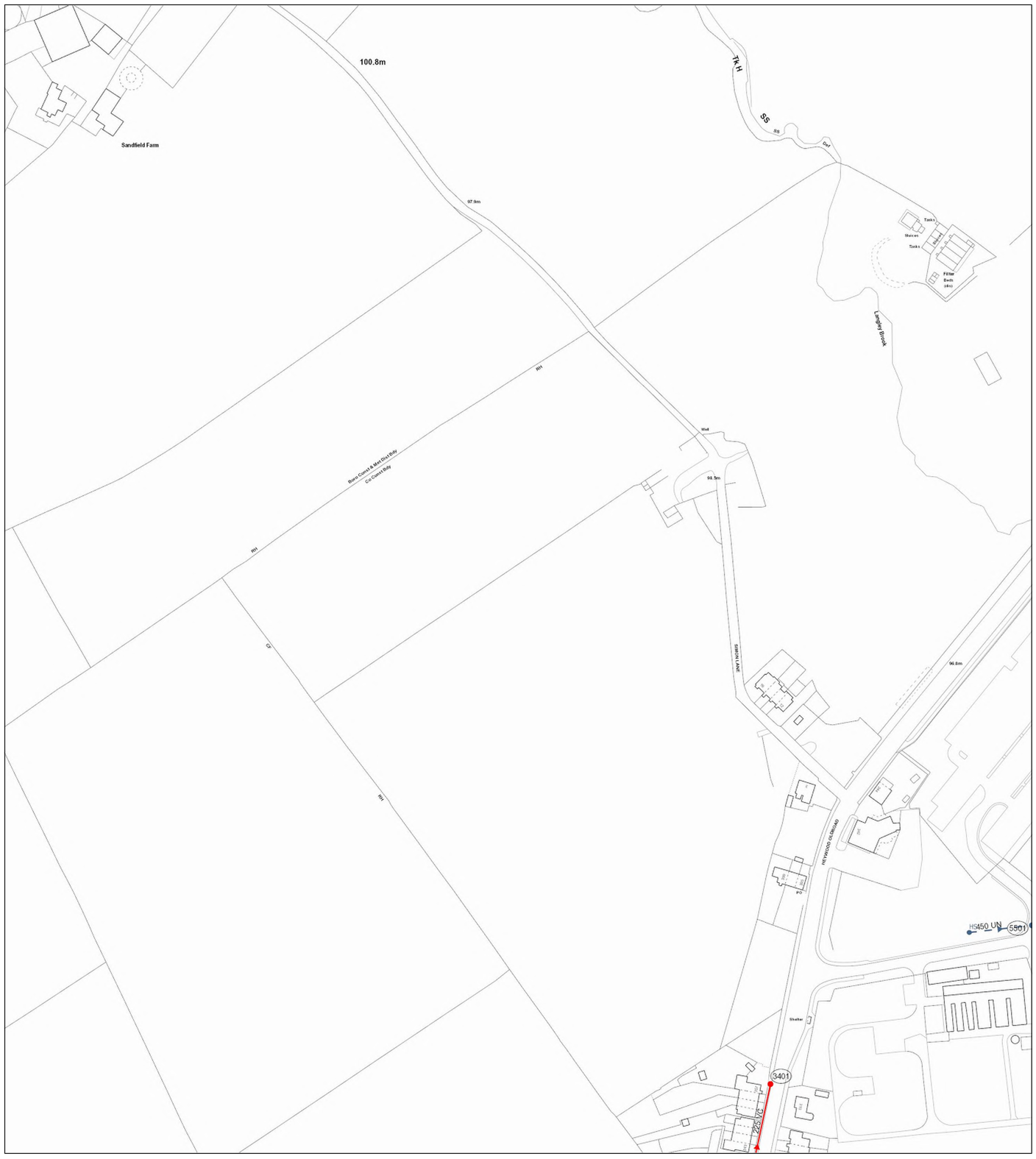

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
3402		CO		225			VC	70.62482	
5501		SW		450				44.5462	
5501		SW		450				44.5462	
5501		SW		450				44.5462	
5501		SW		450				44.5462	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8406NW
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 5
Sheet: 13 of 20

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SEWER RECORDS

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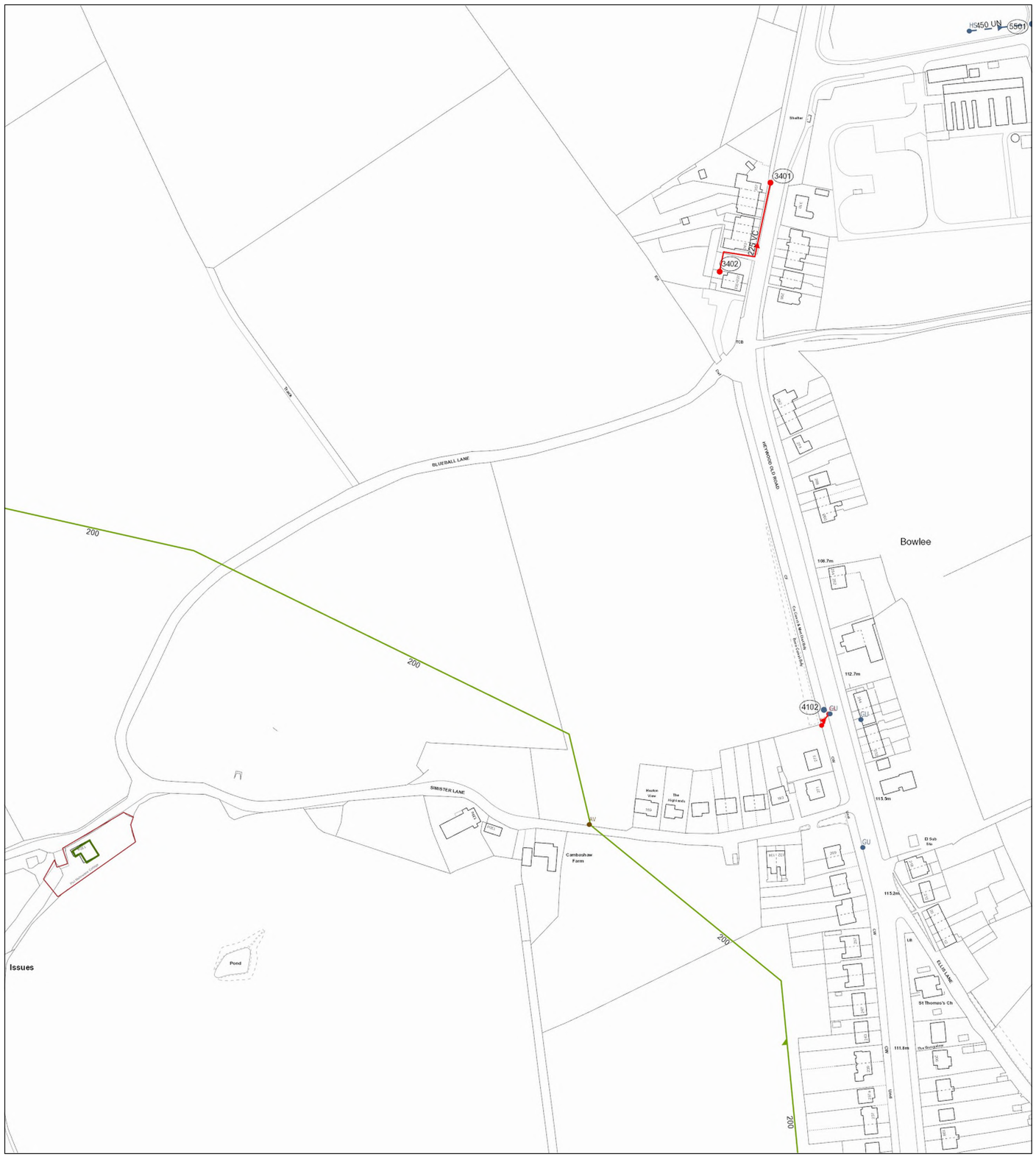

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
3402		CO		225			VC	70.62482	
5501		SW		450				44.5462	
5501		SW		450				44.5462	
5501		SW		450				44.5462	
5501		SW		450				44.5462	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforced Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

Simister wide plan,

OS sheet Number: SD8406SW
Scale: 1:1250 **Date:** 07/05/2019
Nodes: 5
Sheet: 10 of 20

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SEWER RECORDS

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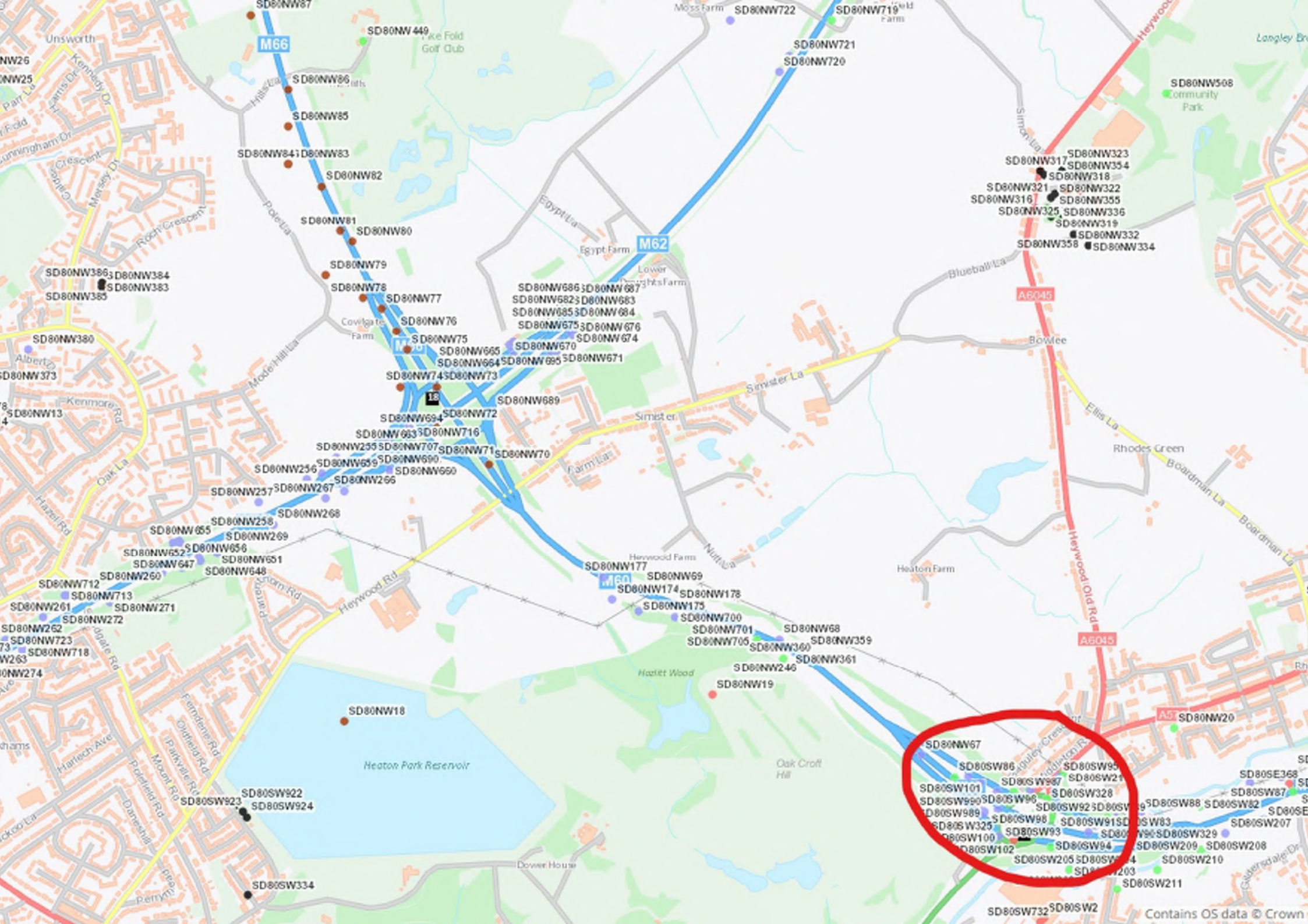
Appendix D – Historic Borehole Records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Unsworth
Lake Fold Golf Club
Egypt Farm
Lower Knights Farm
Cowlgate Farm
Moss Farm
Bowlee
Simister
Simister La
Rhodes Green
Ellis La
Boardman La
Heywood Old Rd
Heaton Farm
Herwood Farm
Hazlet Wood
Heaton Park Reservoir
Oak Croft Hill
Dower House
Heywood Rd
Bluebell La
Oak La
Mode Hill La
Egypt La
Nuttall La
Langley Br
Contains OS data © Crown

SD 80SW/99

8434 0480

Sampling		Properties			Strata			
Depth	Type	Strength kN m²	w %	SPT N	Description	Depth	Level BM 7	Legend
					TOPSOIL and clay with occasional bricks.	G.L	76.31	
0.5-1.0	U(39)					0.45	75.8	
1.0	D				MADE GROUND: Soft to firm brown silty very sandy CLAY with occasional pockets of sand and rock and brick fragments.			
1.5-2.0	U(41)		13					
2.0	D							
2.5	D		18		Boulder obstruction between 2.4 and 3.2m.			
2.65-2.95	C			200+				
3.3-3.8	U(38)		18			3.2	73.1	
3.8	D				Firm brown silty sandy CLAY with bands of sand.			
4.3-5.3	B		19			4.2	72.1	
4.45-4.75	DS			22				
5.3-6.3	B				Medium dense brown medium SAND with nodules of dark brown silty very sandy clay.			
5.45-5.75	DS			29				
6.5-7.5	B		17					
6.65-6.95	DS			27				
8.2	D		8		Stiff dark brown silty very sandy CLAY with fine gravel and coal fragments.	8.2	68.1	
8.2-8.7	U(118)	300	11			8.4	67.9	
8.7	D				Stiff dark brown laminated silty slightly sandy CLAY. Occasional partings of light brown SAND.			
9.0-9.5	U(91)		15					
9.5	D							
					Continued over from 10.0m.	10.0	66.3	

Drilling					Ground Water						
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water
Shell and	G.L	8.5	0.2	-	17.0	Moderate flow, rose to 16.8m in		5.8.81	Nil	Nil	Nil
Auger	8.5	10.0	0.15	-		20 minutes.		5.8.81	4.2	3.3	Nil
								7.8.81	4.2	3.3	Nil

Remarks Rock Chisel used between 2.35 and 3.15m (¾ hour) - Boulder obstruction.

Borehole Record

exploration associates

Project North Western Road Construction Unit,
L. G. Mouchel & Partners,
M60 Manchester Outer Ring Road.
Supplementary Site Investigation Section 3

Contract S2904

Borehole 589

Sheet 1 of 3

SD 80 SW/99

Sampling		Properties			Strata			
Depth	Type	Strength kN m²	w %	SPT N	Description	Depth	Level	Legend
10.0-10.5	U(68)				Continued from 10.0m.	10.0	66.3	
10.5	D				Stiff to very stiff dark brown laminated silty slightly sandy CLAY with partings of light brown fine SAND.			
11.5-12.0	U(70)	170	24 25					
12.0	D		24 25					
13.15-13.45	DS			43	Dense grey clayey silty SAND.	13.0	63.3	
13.8 14.0-14.5	D U(130)					13.8	62.5	
14.5	D				Very stiff and stiff, dark brown silty very sandy CLAY with occasional smooth rock fragments.			
15.5-16.0	U(130)	210	10 10					
16.0	D		13					
17.0 17.0 -18.0 17.15-17.45	W D DS			30	Dense brown fine to medium SAND with occasional fine gravel.	16.9	59.4	
18.65-18.95	DS			32				
					Continued over from 20.0m.	20.0	56.3	

Drilling

Type	From	To	Size	Fluid
Shell and Auger	10.0	20.0	0.15	

Ground Water

Struck	Behaviour	Sealed	Date	Hole	Cased	Water
			7.8.81	18.9	18.5	16.8
			8.8.81	18.9	18.5	16.6
			8.8.81	25.0	25.0	17.4

Remarks

Borehole Record

exploration associates

Project North western Road Construction Unit,
L. G. Mouchel & Partners,
M66 Manchester Outer Ring Road,
Supplementary Site Investigation Section 3

Contract S2904

Borehole 589

Sheet 2 of 3

SD 80SW/99

Sampling		Properties			Strata			
Depth	Type	Strength kN m²	w %	SPT N	Description	Depth	Level	Legend
20.0–21.0	B				Continued from 20.0m.			
20.15–21.45	DS			42	Dense brown fine to medium SAND with occasional fine gravel.	20.0	56.3	
21.5–22.5	B							
21.65–21.95	DC			95	Very dense brown medium occasionally coarse SAND and fine to coarse GRAVEL with cobbles.	21.4	54.9	
23.0–23.9	B							
23.0–23.5	DC			97				
24.0–25.0	B							
24.15–24.45	DS			60	Very dense brown fine to coarse SAND with occasional fine gravel.	23.9	51.4	
25.15–25.45	DS			61				
					End of Borehole.	25.5	50.8	

Drilling					Ground Water						
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water
Shell and Auger	20.0	25.5	0.15								

Remarks

Borehole Record

exploration associates

Project North Western Road Construction Unit,
L. G. Mouchel & Partners,
M60 Manchester Outer Ring Road,
Supplementary Site Investigation Section 3

Contract 52904

Borehole 509

Sheet 3 of 3

SD 80SW/101

8427 0489

Sampling		Properties			Strata			
Depth	Type	Strength kN m²	w %	SPT N	Description	Depth	Level BM 7	Legend
						G.L	82.36	
0.5	D				MADE GROUND: Firm to stiff dark brown very sandy silty clay with brick fragments.			
0.5-1.0	U(65)					0.6	81.8	
1.0	D				MADE GROUND: Firm becoming stiff dark brown mottled grey silty clay laminated in parts, with occasional sand partings and rock fragments.			
1.5-2.0	U(52)		16					
2.0	D				Brick and tile fragments at 3.0m.			
2.5-3.0	U(55)		16					
3.0	D		13					
3.5-4.0	U(53)		12			3.5	78.9	
4.0	D				Firm brown poorly laminated silty sandy CLAY with zones of medium sand and occasional rock fragments.			
4.5-5.5	B					4.4	78.0	
4.65-4.95	DS		11	28				
6.0-7.0	B							
6.15-6.45	DS		19	22				
7.5-8.0	B				Medium dense dark brown medium to coarse occasionally fine carbonaceous SAND with occasional gravel.			
7.65-7.95	DS			26				
9.0-10.0	B			29				
9.15-9.45	DS							
					Continued over from 10.0m.	10.0	72.4	

Drilling

Type	From	To	Size	Fluid
Shell and Auger	G.L	10.0	0.20	-

Ground Water

Struck	Behaviour	Sealed	Date	Hole	Cased	Water
19.1	Slow flow becoming faster with		3.8.81	Nil	Nil	Nil
	depth. Rose to 18.9m in 20		3.8.81	16.0	16.0	-
	minutes. (Casing at 18.0m)	-	4.8.81	16.0	16.0	-

Remarks

Borehole Record

exploration associates

Project North Western Road Construction Unit, L. G. Mouchel & Partners, M66 Manchester Outer Ring Road, Supplementary Site Investigation Section 3

Contract S2904

Borehole 591

Sheet 1 of 3

SD 80 SW/101

Sampling		Properties			Strata			
Depth	Type	Strength kN/m²	w %	SPT N	Description	Depth	Level	Legend
					Continued from 10.0m.	10.0	72.4	
10.5-11.5	B		9	30				
10.65-10.95	DS							
					Medium dense to dense brown SAND with occasional fine GRAVEL.			
12.0-13.0	B			28				
12.15-12.45	DS							
13.5-14.5	B			27				
13.65-13.95	DS							
15.0-16.0	B			29				
15.15-15.45	DS							
						16.0	66.4	
16.5-17.5	B			34				
16.65-16.95	DS				Dense brown slightly carbonaceous fine to medium gravelly SAND.			
18.0-19.0	B			32				
18.15-18.45	DS							
19.1	W							
19.5-20.5	B			35				
19.65-19.95	DS							
					Continued over from 20.0m.	20.0	62.4	

Drilling

Type	From	To	Size	Fluid
Shell and	10.0	17.0	0.20	-
Auger	17.0	20.0	0.15	

Ground Water

Struck	Behaviour	Sealed	Date	Hole	Cased	Water
			4.8.81	25.0	25.0	20.2
			5.8.81	25.0	25.0	18.3
			5.8.81	28.5	28.5	18.9

Remarks

Borehole Record

exploration associates

Project North Western Road Construction Unit,
L. G. Mouchel & Partners,
M66 Manchester Outer Ring Road.
Supplementary Site Investigation Section 3

Contract S2904

Borehole 501

Sheet 2 of 3

SD 80 SW 101

Sampling		Properties			Strata			
Depth	Type	Strength kN m²	w %	SPT N	Description	Depth	Level	Legend
					Continued from 20.0m.	20.0	62.4	
21.0-22.0	B			34	Dense brown slightly carbonaceous fine to medium gravelly SAND.			
21.15-21.45	DS							
22.5-23.0	B			35				
22.65-22.95	DS							
24.15-24.45	DBS			48				
24.65-24.95	DBC			96		24.4	58.0	
					Very dense brown medium to coarse SAND and GRAVEL with occasional cobbles.			
26.0-27.0	B							
26.15-26.55	DC			85				
27.5-28.5	B							
27.65-27.95	DC			92				
28.15-28.45	DC			79				
						28.5	53.9	
					End of Borehole.			

Drilling					Ground Water						
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water
Shell and Auger	20.0	28.5	0.15	-							

Remarks

Borehole Record

exploration associates

Project North Western Road Construction Unit,
L. G. Mouchel & Partners,
M60 Manchester Outer Ring Road,
Supplementary Site Investigation Section 3

Contract S2904

Borehole 591

Sheet 3 of 3

Appendix E – Greenfield Run-Off Calculations

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Chris Baker
Site name:	Site G1.2
Site location:	Manchester

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

Site Details

Latitude:	53.54733° N
Longitude:	2.25428° W
Reference:	1278222508
Date:	Nov 14 2019 08:38

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 1

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	999	999
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

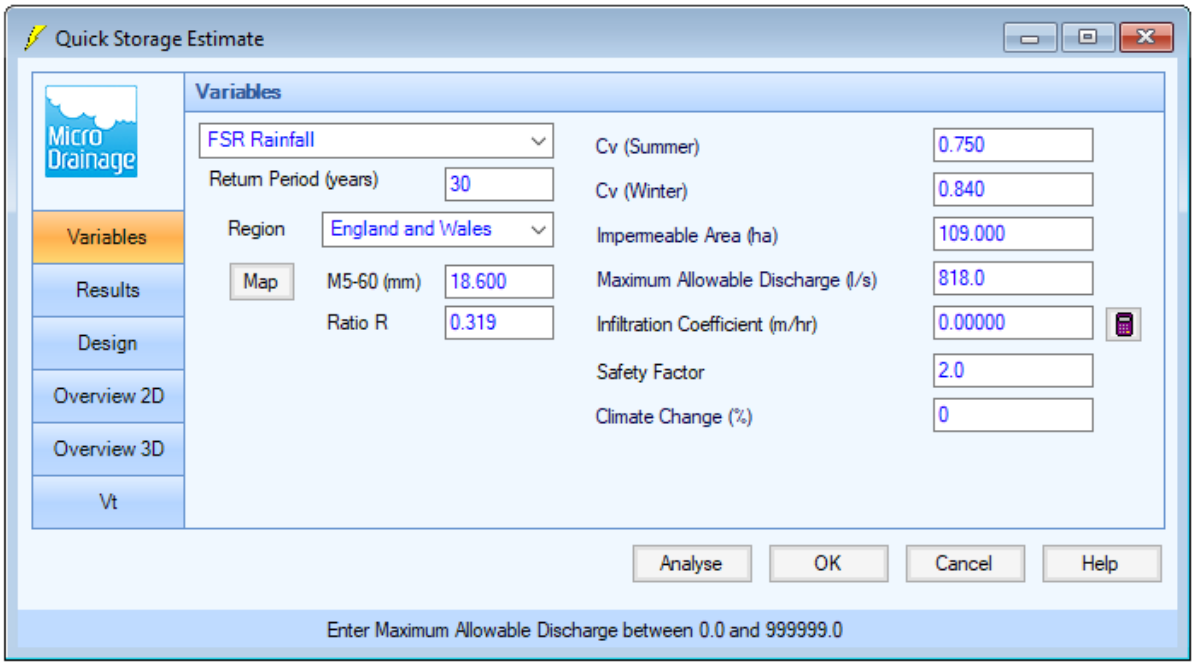
Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

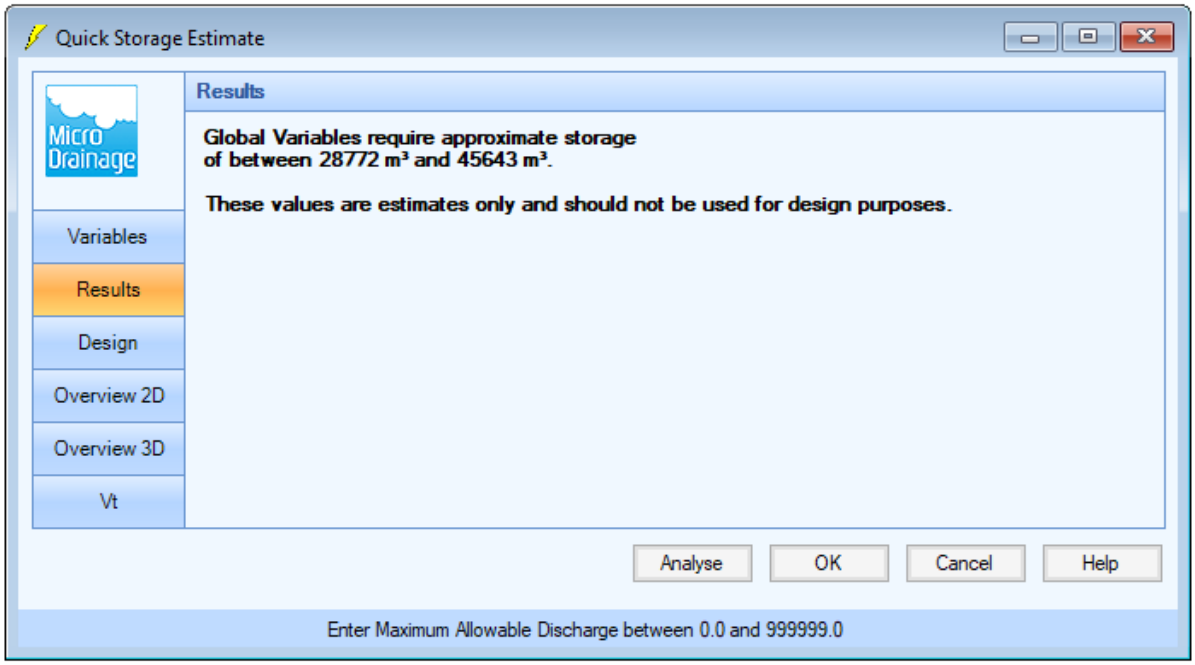
Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	7.32	7.32
1 in 1 year (l/s):	6.37	6.37
1 in 30 years (l/s):	12.44	12.44
1 in 100 year (l/s):	15.22	15.22
1 in 200 years (l/s):	17.35	17.35

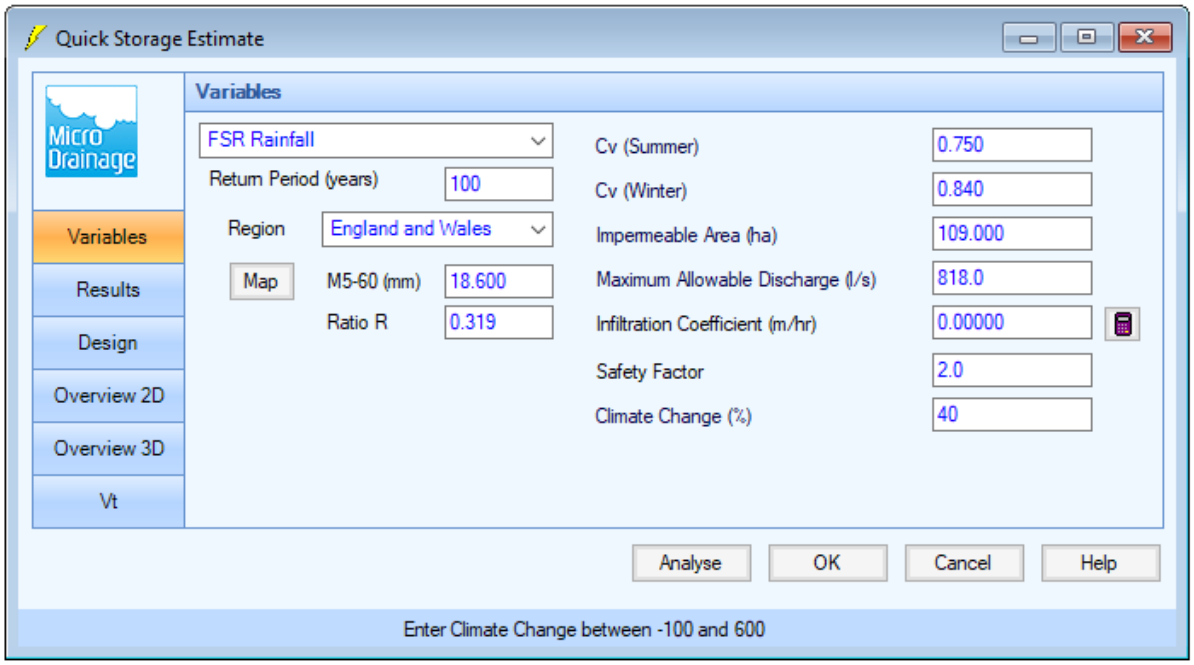
Appendix F – Supporting Micro Drainage Calculations

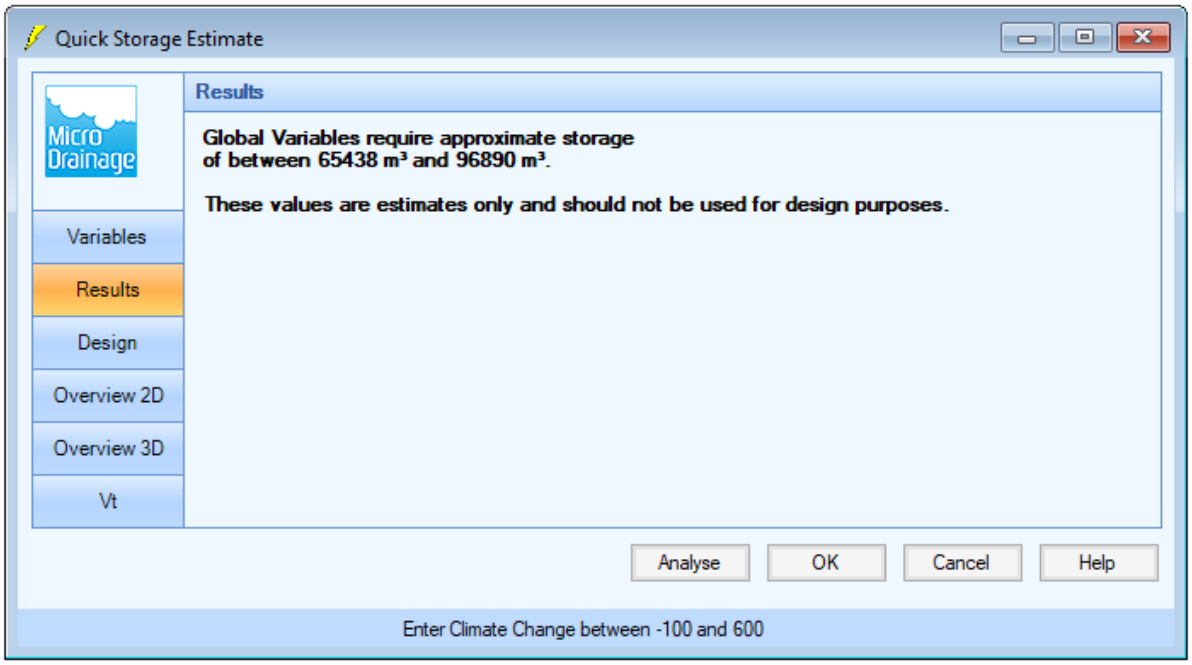
1 in 30 Year Storm Event - Attenuation Storage Estimate





1 in 100 Year Storm Event +40% Climate Change - Attenuation Storage Estimate





Appendix G – Geology Plan

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

N

PMCM

PLCM

MD

BRADLEY FOLD FAULT

Scale (metres)

0 100 200 300 400 500

KEY

GMA 1.2 - SITE BOUNDARY

GEOLOGY - DRIFT

DRIFT GEOLOGICAL BOUNDARY

ICE CONTACT DEPOSITS

GLACIAL FLUVIAL DEPOSITS

HEAD DEPOSITS

PEAT

GLACIAL TILL (UNDERLYING ALL MORAINIC DEPOSTIS)

MD — MORAINIC DEPOSITS

GEOLOGY - BEDROCK

BEDROCK GEOLOGICAL BOUNDARY

PLCM - PENNINE LOWER COAL MEASURES

PMCM - PENNINE MIDDLE COAL MEASURES

CHESTER PEBBLE BEDS (TRIASSIC)

MANCHESTER MARL (PERMIAN)

STRUCTURAL GEOLOGY

T — FAULT

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:

NORTHERN GATEWAY DEVELOPMENT VEHICLE LLP

QUAY WEST at MediaCity UK
TRAFFORD WHARF ROAD
TRAFFORD PARK
MANCHESTER
M17 1HH
TEL: +44 (0)161 872 3223
FAX: +44 (0)161 872 3193
e-mail: manchester@wyg.com

Project: A104444-5

NORTHERN GATEWAY GMA 1.2

Drawing Title:

GMA 1.2: GEOLOGY PLAN

Scale @ A2	Drawn	Date	Checked	Date	Approved	Date
1:5,500	CM	14.11.19	CEM	05.12.19		

Project No.	Office	Type	Drawing No.	Revision
A104444-5	MAN	N	06	