Friar Park, Wednesbury

Flood Risk Assessment and Drainage Strategy

For

West Midlands Combined Authority

Project Number:

13568

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EXECUTIVE SUMMARY

The site located off Friar Park Road, Wednebsury is being developed for residential end use. CampbellReith was appointed to produce a Drainage Strategy and Flood Risk Assessment (FRA) to assess the risk of flooding both to and from the site in support of a forthcoming planning application.

The total site boundary is approximately 26.4ha in area. The site currently comprises of predominantly fields and green space.

Current OS Maps show two drains on the site, one from the north to the centre of the site and another towards the south east corner. The location of this identified southern drain has been surveyed and is no longer existing. The northern drain passes beneath the railway. The River Tame, an EA main river, is approximately 250m north east of the site and is also approximately 750m west of the site.

In accordance with the National Planning Policy Framework (NPPF), residential development is classified as 'More Vulnerable'. The Environment Agency (EA) Flood Maps showed the development to be in Flood Zone 1.

The geology of the site indicates that the ground is likely to have a bedrock geology of mudstone, siltstone and sandstone with superficial river terrace deposits (sand and gravel). Ground Investigations were undertaken by WYG in July 2019 which confirmed the expected geology and the presence of clay across the site.

The preliminary surface water strategy utilises basins across the site and a controlled runoff limited to 128.4l/s before discharging into the existing Severn Trent surface water sewer in the south eastern corner of the site.

Features such as linear storage and swales will also attenuate additional runoff and further measures likely to form part of the more detailed iterations of the drainage strategy for the site in due course include pervious pavements, rainwater harvesting and green roofs to potentially reduce the overall attenuation requirements. However at this stage, specific SuDS components to be used are yet to be determined.

1.0 INTRODUCTION

1.1. Brief

1.1.1. CampbellReith has been commissioned by West Midlands Combined Authority to prepare a Flood Risk Assessment (FRA) in accordance with the National Planning Policy Framework, to inform the residential development at Friar Park, Wednesbury, herein referred to as 'the site'. The site location is contained in Appendix A.

1.1.2. This assessment is a qualitative report and has been based on readily available information.

1.1.3. The FRA has been prepared in support of a Planning Application for the above proposed development.

1.2. Project Overview

1.2.1. The proposals comprise residential development with associated infrastructure and areas of formal and informal public open space. A nature reserve will be created along the north eastern boundary.

1.3. Aims and Objectives

1.3.1. This report has been prepared in accordance with the National Planning Policy Framework (NPPF)[1] and the accompanying Planning Practice Guidance (PPG)[2].

1.3.1. This FRA aims to identify the sources of flooding related to the site whilst demonstrating the feasibility of residential development and how residual risks, if any, could be managed.

1.3.2. The objectives of this FRA are to:

- Establish whether the site is likely to be affected by current or future flooding from any source;
- Establish whether proposed future development will increase flood risk elsewhere;
- Establish whether the measures proposed to deal with these effects and risks are appropriate;
- Ensure the evidence to satisfy the Local Planning Authority's (LPA) (if necessary) Sequential Test, and;
- Establish whether the Lead Local Flood Authority (LLFA) has records of flood risk on the site and within the surrounding area;
- Present the findings of the assessment through a site constraints plan (if applicable)
- Demonstrate surface water can be managed on site by preparing an illustrative surface water drainage strategy.

[1] Ministry of Housing, Communities & Local Government (2021) National Planning Policy Framework. Ref: ISBN 978-1-5286-1033-9, CP 48.
[2] Department for Environment, Food & Rural Affairs and Environment Agency (2021) Planning Practice Guidance: Flooding and Coastal Change

2.0 PLANNING POLICY

2.1. National Planning Policy Framework (NPPF)

2.1.1. The NPPF as updated in July 2021 sets out the government's national planning policies to protect people and property from flooding from either now or in the future which all Local Planning Authorities (LPAs) are expected to follow. There are three main steps which should be followed to ensure that the risk of flooding from development is minimised; assess the flood risk, avoid flood risk and manage and mitigate the flood risk.

2.1.2. The NPPF recommends that new development adopts a sequential, flood risk-based approach to the location of development, taking into account climate change and its impact to or by current or future flood risk. Subject to the type of development proposed and the relative flood zone (Zone 1 being the least risk and Zone 3b the greatest risk) in which the development site is located, there can be a requirement for a sequential test and an exception test.

2.1.3. The aim of the sequential test is to steer development to areas considered to be at the lowest risk from sources of flooding. If this is not possible then the exception test would be required demonstrating that the development would provide wider sustainability benefits to the community that would outweigh the flood risk and that the development would be safe for its lifetime taking into account the vulnerability of the users without increasing flood risk elsewhere and where possible reducing the current risk of flooding.

2.1.4. The NPPF also states that major developments should incorporate sustainable drainage systems (SuDS) unless there is clear evidence that this would be inappropriate.

2.2. Flood Risk and Coastal Change Planning Practice Guidance (PPG)

2.2.1. A FRA is required when developments are:

- Located within a Flood Zone 2 or 3 including minor development and change of use;
- More than 1 hectare (ha) in a Flood Zone 1;
- Less than 1 ha in a Flood Zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and sea (for example surface water, reservoirs); or
- In an area within a Flood Zone 1 which has critical drainage problems as notified by the Environment Agency (EA).

2.2.2. Annex 3 of NPPF defines the various flood risk vulnerability classifications and identifies the different types of development within each category. Table 2.1 on the following page summarises the flood risk vulnerability and incompatibility as extracted from Paragraph 079 (Table 2) of the PPG in relation to the above flood zones.

Table 2.1: Flood Vulnerability and Flood Zone 'Incompatibility' Table

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

Key ✓Development is appropriate.

× Development should not be permitted.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

2.3. Roles and Responsibilities

2.3.1. The EA are a statutory consultee for planning applications. The EA are responsible for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea.

2.3.2. The roles of the LLFAs were established following the Flood Risk Regulations (2009) and the Flood and Water Management Act (2010). They are responsible for developing, maintaining and applying a strategy for local flood risk management in their areas and maintaining a register of flood risk assets. They also have lead responsibility for managing the risk of flooding from surface water, groundwater and ordinary watercourses.

2.4. Climate Change[3]

2.4.1. The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. The EA provide guidance on the climate change allowances which should be considered when assessing the future risk of flooding.

2.4.2. EA has produced a range of climate change allowances to be applied to the peak river flow and rainfall intensity based upon the river basin management catchment. Management catchments are sub-catchments of river basin districts. The site is located in the Tame Anker and Mease Management Catchment within the Humber River Basin District. Table 2.2 shows the anticipated changes to peak flow, which should be considered for the area.

[3] EA Climate Change Allowances: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

2.4.3. The range of allowances is based upon a statistical analysis above the 50th percentile which is regarded as being the central category. The higher central is based upon the 70th percentile and the upper end is based on the 95th percentile.

Table 2.2: Peak River flow allowances by Tame Anker and Mease Management Catchment within the Humber river basin district (use 1961 to 1990 baseline)

Allowance Category	Total Potential Change Anticipated For The '2020s' (2015 to 2039)	Total Potential Change Anticipated For The '2050s' (2040 to 2069)	Total Potential Change Anticipated For The "2080s" (2070 to 2115)
Central	10%	11%	22%
Higher central	15%	17%	30%
Upper end	24%	30%	51%

2.4.4. Climate change allowances should be applied to the peak rainfall intensities. EA has produced updated rainfall allowances for both 1% and 3.3% annual exceedance rainfall events for each Management Catchment. Table 2.3 and Table 2.4 show the anticipated change in extreme rainfall intensity in small and urban catchments. The upper end allowances for both the 1% and 3.3% annual exceedance probability events should be applied for Flood Risk Assessments to assess the range of impact.

Table 2.3: EA Peak Rainfall Intensities (3.3% annual exceedance probability)

	Total Potential Change Anticipated For The '2050s' (2040 to 2069)	Total Potential Change Anticipated For The "2080s" (2070 to 2115)
Central	20%	25%
Upper end	35%	35%

Table 2.4: EA Peak Rainfall Intensities (1% annual exceedance probability)

	Total Potential Change Anticipated For The '2050s' (2040 to 2069)	Total Potential Change Anticipated For The "2080s" (2070 to 2115)
Central	20%	25%
Upper end	40%	40%

3.0 LOCAL POLICIES AND GUIDANCE

3.1.1. The following documents have been reviewed to inform this assessment:

- The Black Country [February 2011] Core Strategy
- The Black Country [June 2020] Strategic Flood Risk Assessment (SFRA)
- The Black Country [October 2015] Local Flood Risk Management Strategy (LFRMS)
- The Black Country [September 2009] Water Cycle Study and Scoping Surface Water Management Plan
- Sandwell Metropolitan Borough Council [December 2017] Preliminary Flood Risk Assessment (PFRA)
- Sandwell Metropolitan Borough Council [2012-2015] Flood Plan
- Sandwell Metropolitan Borough Council [January 2014] Residential Design Guide SPD

3.2. Local Flood Risk Policy

3.2.1. The Black Country Core strategy was adopted in February 2011 and sets out the Council's policies on development of the four boroughs up to 2026. Of relevance to the site is ENV5 'Flood Risk, Sustainable Drainage Systems and Urban Heat Island' where it states that for sites requiring a Flood Risk Assessment "*reduce surface water flows back to equivalent greenfield rates*".

3.2.2. It also states that all developments should;

- Incorporate Sustainable Drainage Systems (SUDs) unless impractical to do so;
- Open up culverted watercourses where feasible (and ensure development does not occur over existing culverts where there are deliverable strategies in place to implement this);
- Take every opportunity to reinstate natural, sinuous river channels;
- Create new green space, increase tree cover and/or provide green roofs

3.3. Strategic Flood Risk Assessment

3.3.1. A LEVEL 1 SFRA was prepared by JBA Consulting for The Black Country in June 2020. The following sources of flood risk were identified within the study area:

- Fluvial
- Surface Water
- Groundwater
- Sewer
- Artificial Sources

3.3.2. Applicable maps and extracts are contained in Appendix B.

4.0 SITE CONTEXT

4.1. Site Location

4.1.1. The site is located at the land off Friar Park Road, Wednesbury, as illustrated in Figure 3.1 below. The nearest postcode for the site is WS10 0GA and the National Grid Reference for the approximate centre of the site is 401127E 295424N. The site is approximately 26.4Ha in area.

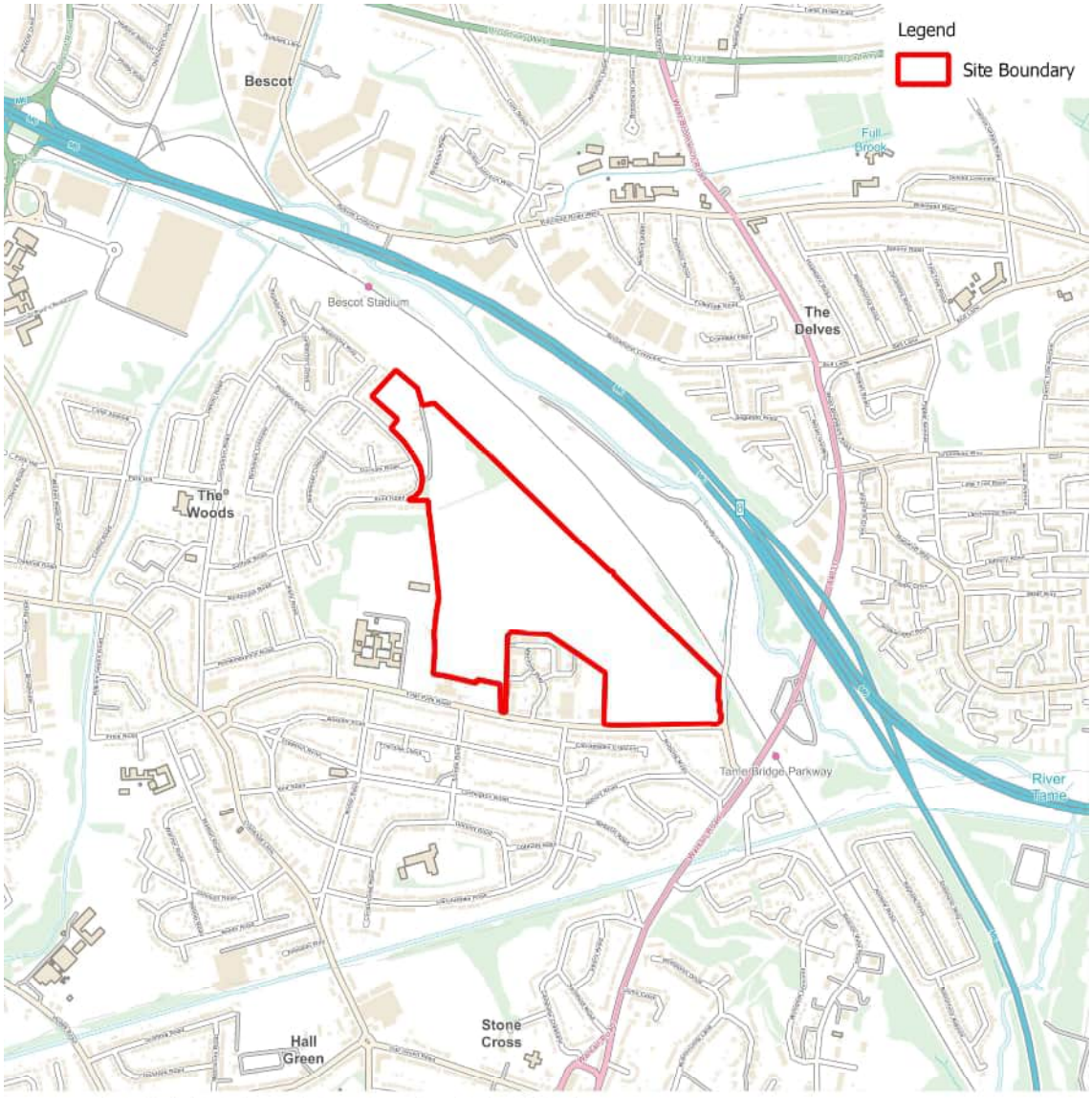


Figure 4.1: Site Boundary

4.1.2. Sandwell Metropolitan Borough are the Local Planning Authority (LPA) for the site and act as the LLFA for the area in partnership with Staffordshire County Council.

4.1.3. The existing site is predominantly greenfield. The site is bound to the north and east by national railway lines and Besot Rail Depot, to the south by Friar Park Road and residential development and to the west by a leisure centre, allotments and residential development.

4.1.4. The site is approximately 2.2km east of Wednesbury Town Centre. The River Tame is approximately 250m north east of the site and is also approximately 750m west of the site.

4.2. Site History

4.2.1. Old Maps Online displays the sites predominant use as agricultural land dating back to 1920. An old tramway, a hospital and a sewage farm are also present on the site at this date.

4.2.2. The SFRA Appendix A map contained in Appendix B displays that the site was a historical landfill.

4.3. Topography

4.3.1. Lidar data has been obtained as part of this assessment and is shown in Figure 4.2 below.

4.3.2. A topographical survey was undertaken by Dywidag in February 2021 (ref: 2560T_Friar Park_Topographical Survey_SU001) and is contained in Appendix C.

4.3.3. Available data indicates the site has a high point in the north western corner at approximately 119m AOD, and the western boundary continues this high ground ranging from 119m AOD to 118m AOD. The site falls gradually to the south west, where the low point in the south western corner is approximately 111.5m.

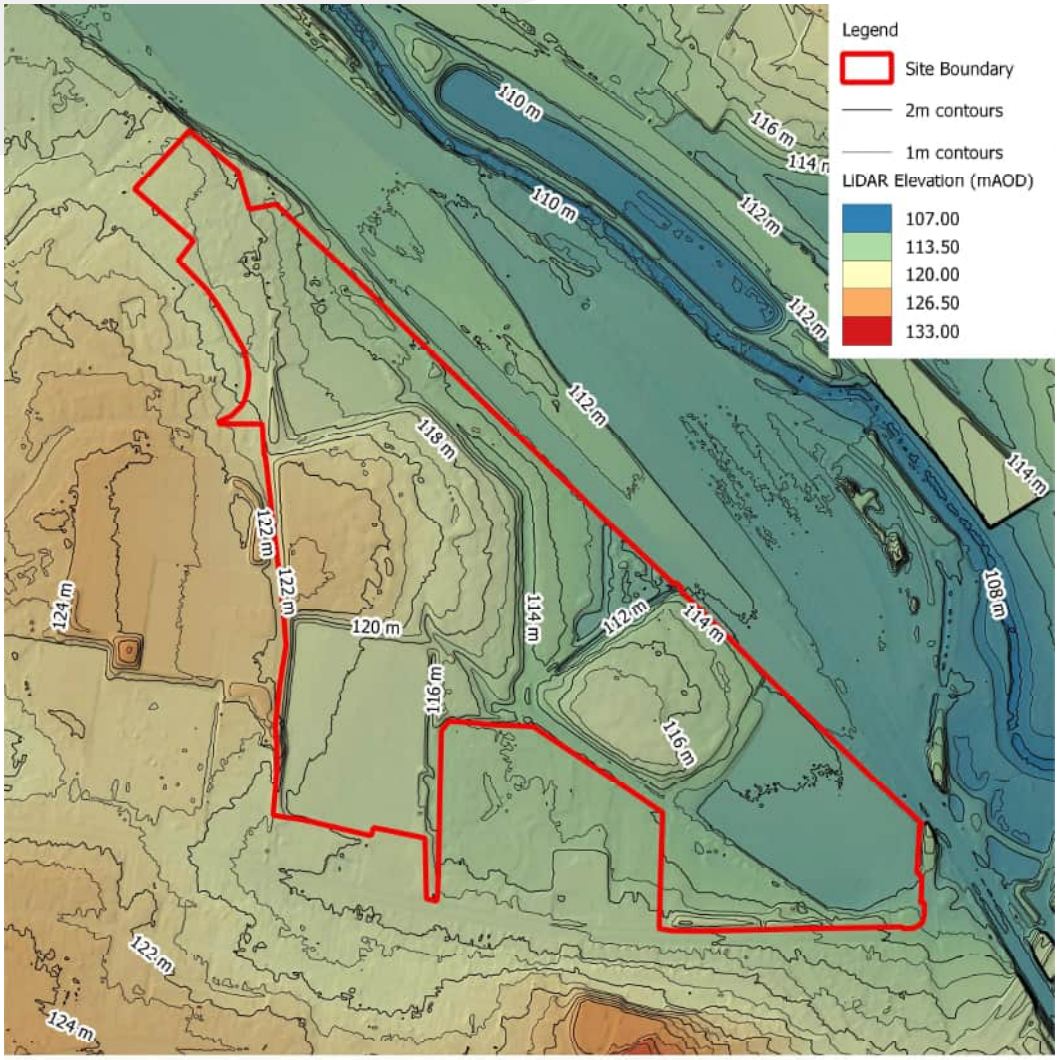


Figure 4.2: Lidar Data

4.4. Geology

4.4.1. The British Geological Survey (BGS) Online Geology Viewer[4] notes the underlain bedrock for the site as Pennine Lower Coal Measures Formation (mudstone, siltstone and sandstone) and notes the superficial deposits on the east of the site as River Terrace Deposits (sand and gravel). The superficial deposits on the west of the site are noted as Diamicton (till).

4.4.2. Ground Investigations were undertaken by WYG in July 2019 and are contained in Appendix D. The investigations confirmed the expected geology, and confirmed the presence of clay across the site.

4.5. Hydrology

4.5.1. A desk-study review of ordnance survey mapping notes a small surface water ditch to the east of the site, implemented as part of a drainage system for the former treatment works and is no longer in use.

[4] British Geological Survey (BGS) Online Geology http://mapapps.bgs.ac.uk/geologyofbritain/home.html

4.5.2. The closest EA main river is the River Tame, which is approximately 250m north east of the site and is also approximately 750m west of the site.

4.5.3. The Tame Valley Canal is approximately 350m south of the site.

4.6. Hydrogeology

4.6.1. The site is not located on a Source Protection Zone (SPZ).

4.6.2. The site is situated above a Secondary A aquifer, with a small section above a Secondary B aquifer along the railway to the east. The superficial deposits are classified as a Secondary A aquifer. The groundwater vulnerability for the site is medium at the northern tip, medium-low across the site with a central section and the southern tip classified as low.

4.6.3. Groundwater monitoring was undertaken by WYG in June and July 2020. Out of 6 locations, three had a water level less than 3m bgl, and the other three range from 5.71m BGL to 12.31m BGL. These results are contained in Appendix D.

4.7. Existing Site Drainage

4.7.1. Severn Trent are the incumbent sewerage utility provider for the area. A review of Severn Trent's Records, contained in Appendix E, confirms an existing public foul sewer crossing the site from the north to the south east. Sections of both the public surface water sewer and foul sewer cross the site slightly in the south eastern corner. An existing public 900mm diameter surface water sewer and an existing public foul sewer border the site to the south within Friar Park Road.

4.7.2. Current OS Maps show two drains on the site, one from the north to the centre of the site and another towards the south east corner. The location of this identified southern drain has been surveyed and is no longer existing. The northern drain passes beneath the railway.

4.7.3. The natural surface water flow paths have been devised from reviewing the available Lidar and topographical data and is shown on Figure 4.3 below.

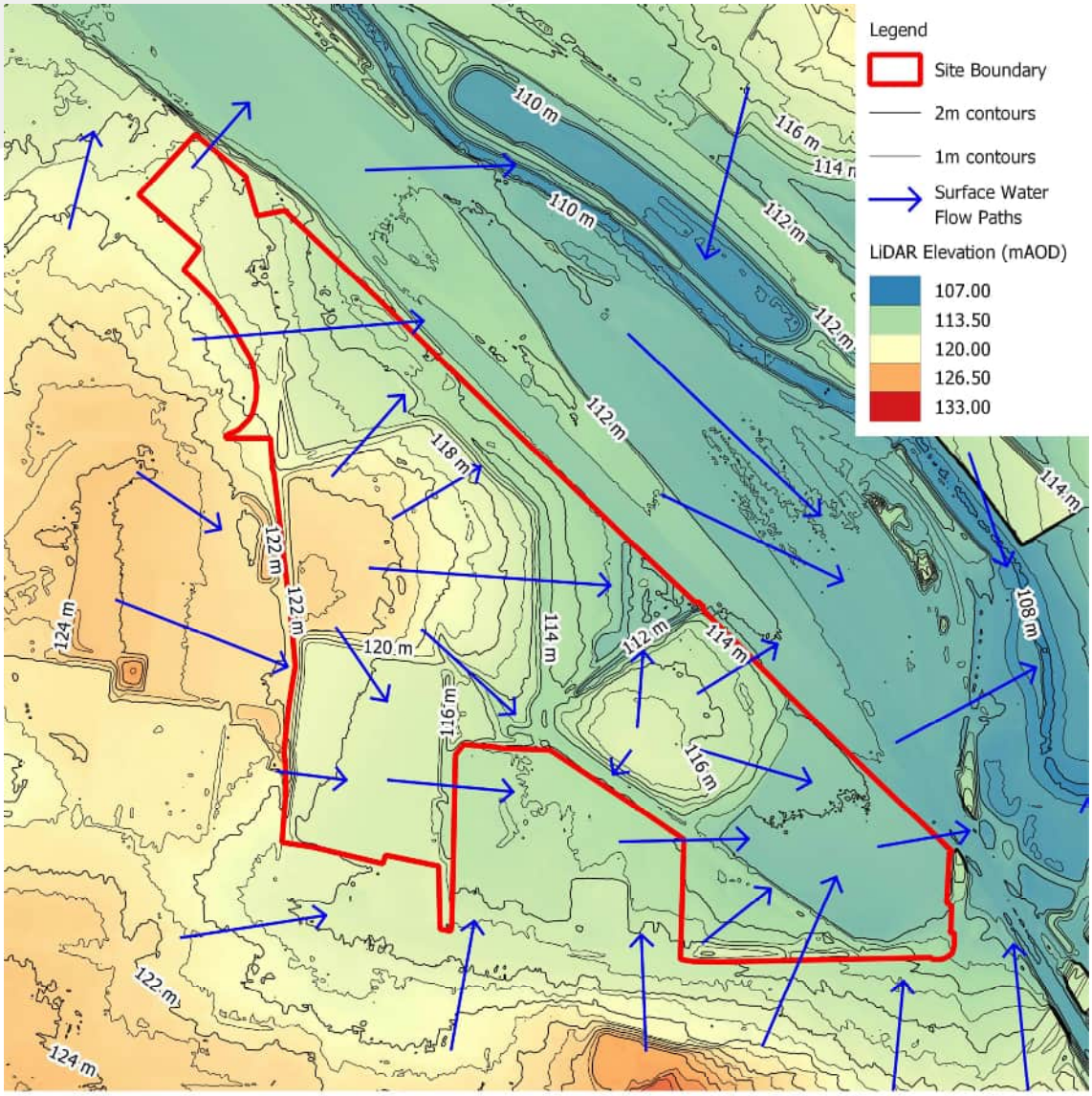


Figure 4.3: Surface Water Flow Paths

4.7.4. The greenfield runoff rates for the site were calculated using the IH124 method and are summarised in Table 4.2.

Table 4.1: Greenfield runoff rates

Storm Event	Greenfield Runoff Rate (litres/second)
Qbar	128.4
1 in 1 Year	106.6
1 in 30 Year	256.8
1 in 100 Year	329.9

5.0 EXISTING FLOOD RISK TO THE SITE

5.1. Fluvial Flood Risk

5.1.1. The EA Flood Zone Map shows the site is located mostly within a Flood Zone 1 as shown in Figure 5.1. The EA defines Flood Zones from rivers or the sea in Paragraph 078 (Table 1) of the PPG, as follows:

- Flood Zone 1 (Low Probability): Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2, 3a and 3b).

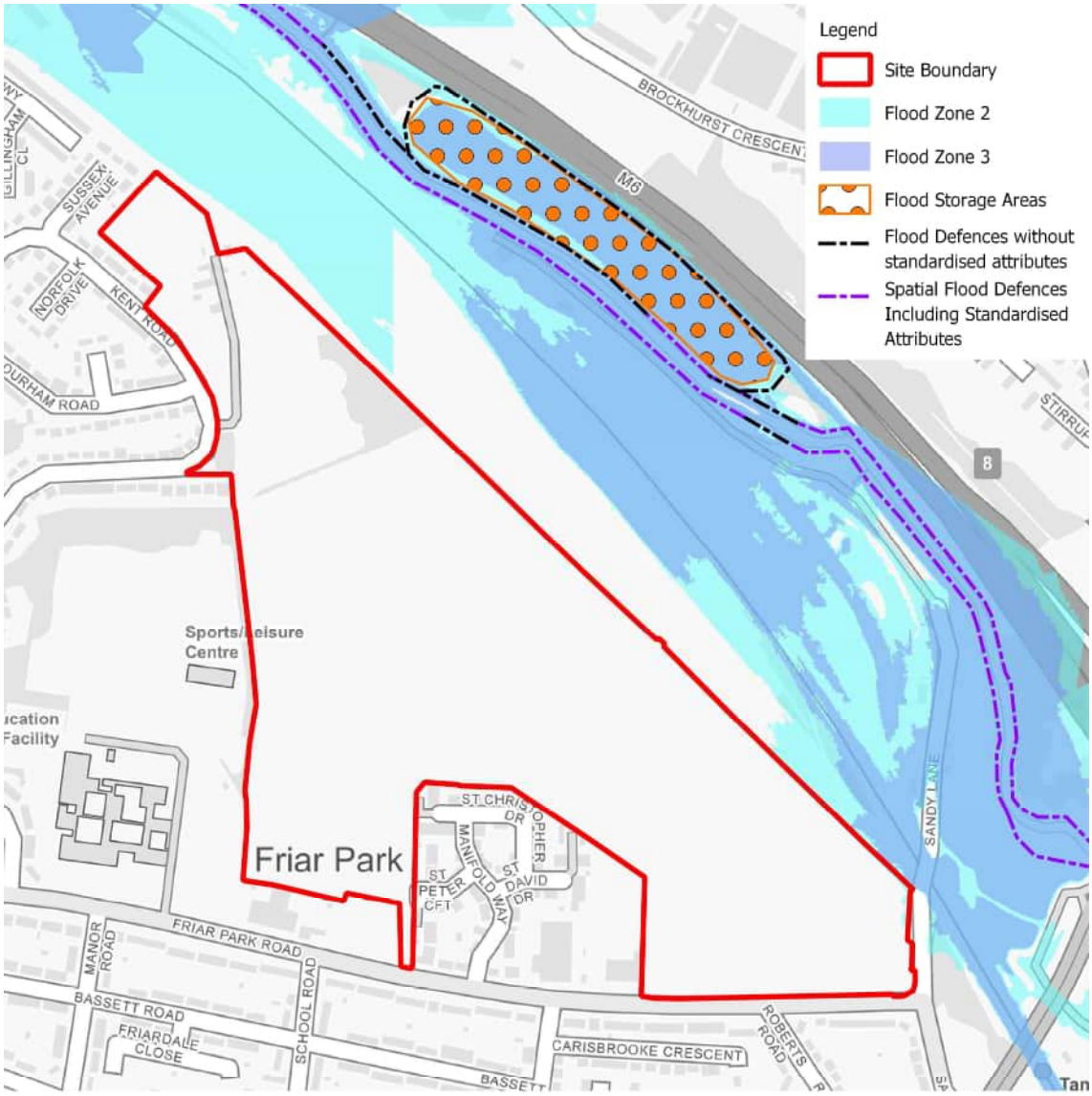


Figure 5.1: Environment Agency Flood Zones

5.1.2. Current OS Maps show two drains on the site, one from the north to the centre of the site and another towards the south east corner. The location of this identified southern drain has been surveyed and is no longer existing. The northern drain is shown on the SFRA Appendix B map

and passes beneath the railway. There is no evidence to suggest there are any upstream discharge points and there is little flood risk associated with this existing artificial drain.

5.1.3. The Black Country SWMP mentions that Wednesbury is at the upstream end of the River Tame so is not a critical area. The Black Country SFRA has information on the River Tame, Wednesbury catchment, draining towards West Bromwich which includes 89 SMBC flood hotspots. The SFRA Appendix A contained in Appendix B displays the two closest to the site to be directly to the west and the south, with a further 4 in the residential area to the west of the site boundary.

5.1.4. The Sandwell Council PFRA has no records of historic flooding with significant consequences.

5.1.5. The risk of fluvial flooding is deemed as low.

5.2. Tidal Flood Risk

5.2.1. The site is not affected by tidal flooding.

5.3. Flood Alert Area

5.3.1. The site does not fall within a flood alert or flood warning area. However, as shown on the SFRA Appendix A map contained in Appendix B, it does border a Flood Warning Area in the eastern corner and the northern tip of the site. It also borders the Flood Alert area along the eastern boundary.

5.4. Surface Water Flood Risk

5.4.1. The EA classify surface water flood risk as follows:

- VERY LOW – the area has a chance of surface water flooding of less than 0.1%
- LOW – the area has a chance of surface water flooding of between 0.1% and 1%
- MEDIUM – the area has a chance of surface water flooding of between 1% and 3.3%
- HIGH - the area has a chance of surface water flooding of greater than 3.3%

5.4.2. The EA's Risk of Flooding from Surface Water (RoFSW) map is presented in Figure 5.2.

5.4.3. This map shows that the site has a low-medium surface water flood risk across the north eastern boundary of the site and several areas throughout the centre. There are a few sections of high risk flowing down across the site towards the south-eastern corner where there is a larger area of high surface water flood risk.

5.4.4. The Sandwell PFRA states that the area has an issue with ponding of surface water due to heavy rainfall, as is evident in the below map. Additionally, there are known issues with blocked grids on culverts but improvements in grid maintenance is reported to have reduced flooding and there were no reported severe floods in recent years. However, the 2018 Addendum reported a significant flood event in June 2016 which alerted the Council to a number of areas of flood risk.

5.4.5. The Black Country SFRA confirms that Friar Park is an area affected by surface water flooding and the flood event in June 2016 was a high intensity storm that resulted in surface water and sewer flooding in Wednesbury.

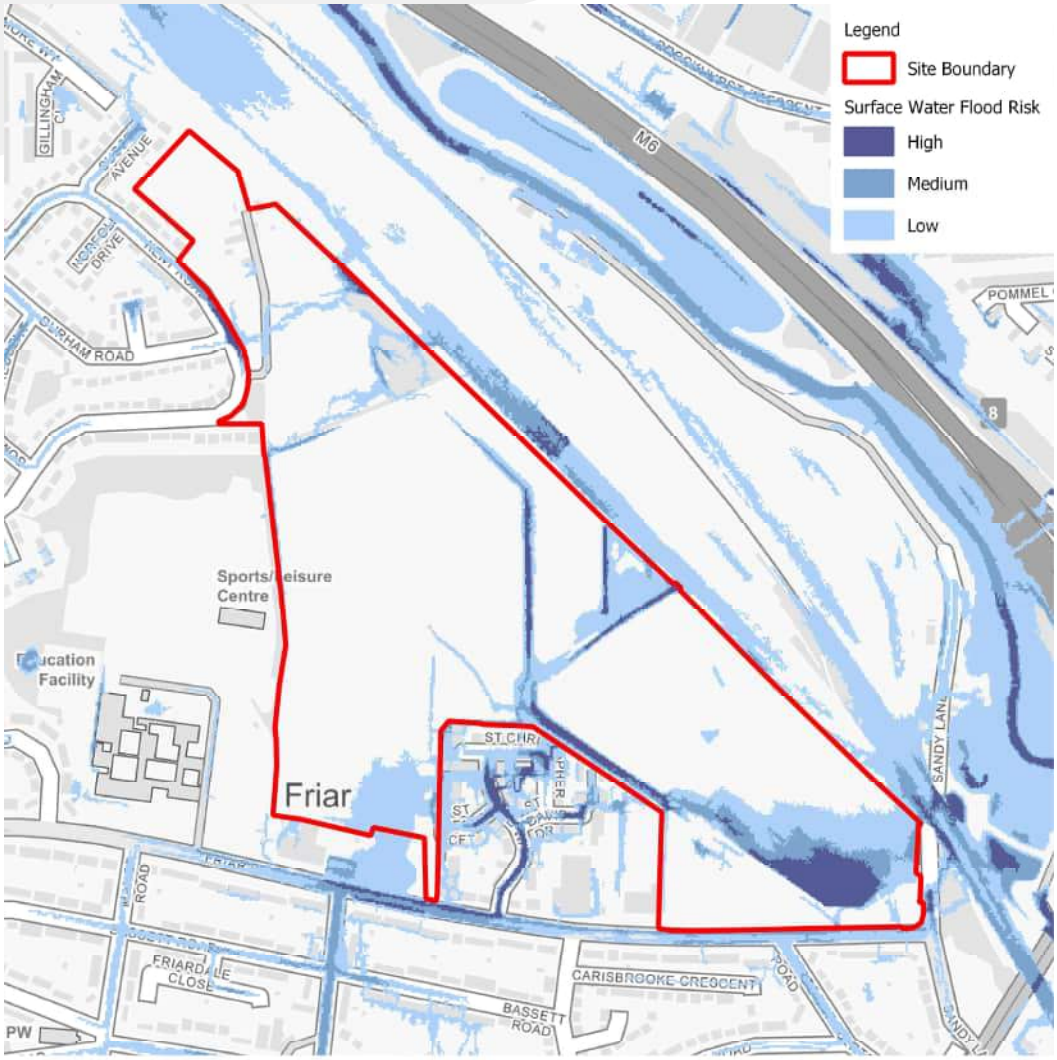


Figure 5.2: EA Updated Flood Map for Surface Water

5.5. Groundwater Flood Risk

5.5.1. A review of the PFRA confirms the site is in an area of susceptible to groundwater flooding. According to the map, contained in Appendix B, the east of the site is greater than 75% susceptibility and the west of the site is between 50% and 75% susceptibility.

5.5.2. The bedrock geology of the site is mudstone, siltstone and sandstone.

5.5.3. Groundwater monitoring was undertaken by WYG in June and July 2020. Out of 6 locations, three had a water level less than 3m bgl, and the other three range from 5.71m BGL to 12.31m BGL. These results are contained in Appendix D.

5.5.4. The risk of groundwater flooding is classified as medium.

5.6. Sewer Flood Risk

5.6.1. As previously mentioned, the Sandwell PFRA states that there are known issues with blocked grids on culverts but improvements in grid maintenance is reported to have reduced flooding and there were no reported severe floods in recent years.

5.6.2. However, the Severn Trent sewer records show that no surface water sewers pass through the site, only along the site boundary in the south within Friar Park Road.

5.6.3. In addition, the Black Country SFRA shows that the highest risk of sewer flooding is not within the Sandwell borough.

5.6.4. Therefore, risk of sewer flooding for the proposed development is low.

5.7. Artificial Flood Risk

5.7.1. The Tame Valley Canal is approximately 350m south of the site. The Black Country SFRA has no records of this canal breaching.

5.7.2. Information available from the EA for risk of inundation from reservoirs indicates that a small portion of the eastern section of the site is at risk of reservoir flooding when there is also flooding from rivers, as shown in Figure 5.3.

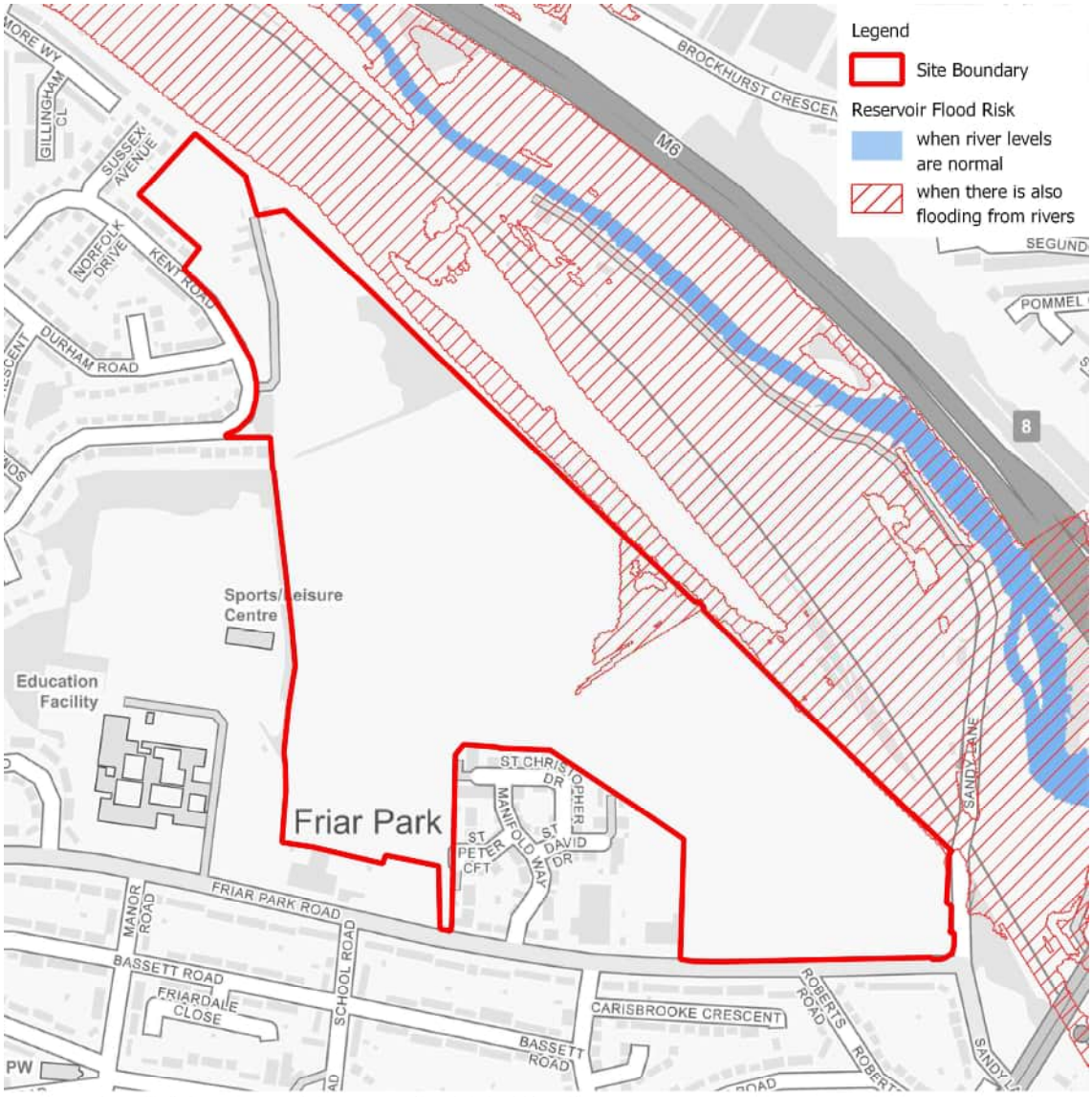


Figure 5.3: EA Updated Flood Map for Reservoir Flood Risk

5.7.3. Additionally, the Black Country SFRA states that in Wednesbury there is a reservoir inundation risk related to flooding from Bescot Reservoir.

5.7.4. However, reservoir failure flood risk mapping displays a worst-case scenario and is only intended as a guide to identify the areas at risk of flooding from the failure of a reservoir. The probability of such a flood event occurring is considered to be extremely low as reservoirs are required to undergo rigorous inspections and maintenance regimes by the Environment Agency, Severn Trent and/or the Lead Local Flood Authority (LLFA) or the for the area the reservoir is situated.

5.7.5. The risk associated with flooding resulting from the failure of the nearby reservoir is considered to be very low. However, in the extremely unlikely event that the reservoir was to fail, the impact event is expected to be high, with impacts ranging from evacuations, to significant damage to property and even loss of life. Emergency service early warnings should usually be expected.

5.7.6. Based upon the information available and given the site is on the outer edge of the defined reservoir flood map, is only slightly impacted in the reservoir flood map and has safe egress to the south it is considered that the risk of inundation from reservoirs to the proposed development is low.

5.8. Flood Risk Summary

Table 5.1: Summary of existing flood risk

Flood Risk	Level of Risk
Fluvial	Low
Tidal	N/A
Surface Water	Medium
Groundwater	Medium
Sewer	Low
Artificial	Low

5.9. Climate Change Impact

5.9.1. Climate change must be considered as an integral part of any site specific FRA in order to minimise the impact of future flooding and allow adequate consideration for resilience to alleviate the burden on potential future users of the proposed development.

6.0 DEVELOPMENT PROPOSALS

6.1. Proposed Development Description

6.1.1. The proposals comprise residential development with associated infrastructure and areas of formal and informal public open space. A nature reserve will be created along the north eastern boundary.

6.1.2. The proposed development masterplan is contained in Appendix G.

6.1.3. The expected lifetime of the development is 100 years.

6.2. Vulnerability of Development

6.2.1. Paragraph 66 of the PPG defines the different categories of development in terms of flood risk vulnerability. Residential development is classified as More Vulnerable in terms of flood risk.

6.2.2. Therefore, residential development is appropriate in this location.

6.3. Urban Creep Allowance

6.3.1. New developments should factor in the effect urban creep. This is the increase in impermeable area on developments due to conservatories/extensions/driveways etc.

6.3.2. For new housing, an additional increase of 10% to the proposed impermeable areas is considered the minimum allowance for urban creep where development density is less than 25 dwellings per hectare.

6.4. Sequential Test

6.4.1. This FRA has not undertaken a review to support the sequential test. It is deemed that the Planning Authority has undertaken the Sequential Test and is satisfied that the site is suitable.

6.5. Exception Test

6.5.1. An exception test is not required.

7.0 SURFACE WATER MANAGEMENT

7.1. Overview

7.1.1. The surface water drainage system has been designed in accordance with the NPPF and the accompanying Guidance and Technical Standards for SuDS. It also complies with the requirements under Building Regulations Part H.

7.1.2. In line with the SuDS hierarchy under paragraph 56 of the PPG, surface water should be managed by:

1.) Infiltration to the maximum extent that is practical – where it is safe and acceptable to do so

2.) Discharge to watercourses

3.) Discharge to surface water sewer, highway drain or another drainage system

4.) Discharge to combined sewers (last resort)

7.2. Site Constraints

7.2.1. A review of the site characteristics has informed the following site constraints:

- Existing Severn Trent foul sewer crossing the site

7.3. Existing and Proposed Impermeable and Permeable Areas

7.3.1. The existing and proposed impermeable and permeable areas are presented in Table 6.1.

Table 7.1: Existing and Proposed Impermeable and Permeable Areas

	Permeable (ha)	Impermeable (ha)
Existing	26.4	0
Proposed	14.6	11.8

7.4. Proposed Surface Water Runoff Rates

7.4.1. As previously mentioned in 4.7.4. the surface water catchment has been analysed and the Greenfield runoff rate (Qbar) calculated. The proposed discharge rates for the development should be restricted to Qbar at 128.4l/s.

7.5. Surface Water Volume

7.5.1. The surface water storage volume requirement has been based on FEH data. The total required storage volume is approximately 8170m^3.

7.6. SuDS Strategy

7.6.1. The preliminary drainage strategy layout presented in Appendix H, illustrates the SuDS features proposed to manage the surface water runoff from the site.

7.6.2. The surface water drainage strategy aims to control runoff from impermeable areas at source and attenuate through SuDS features.

7.6.3. Due to the clayey ground and high ground water table infiltration has not been utilised as part of this strategy. The River Tame is separated from the site by the rail depot and several railway lines so a connection into the watercourse is not feasible.

7.6.4. The following SuDS features have been considered within the proposed surface water drainage strategy:

- Swales
- Attenuation Basins/Ponds

7.6.5. The preliminary SuDS strategy involves draining the surface water from the north down towards the south eastern corner of the site, with online attenuation in three locations. The final attenuation feature is positioned in the south eastern corner of the site prior to a restricted discharge into the existing Severn Trent surface water sewer.

7.6.6. A connection into the public surface water sewer has been agreed in principle with Severn Trent Water and the LLFA have agreed in principle to the stated discharge rate. A copy of this correspondence is contained in Appendix F.

7.6.7. The proposed surface water drainage system can effectively control all runoff generated within the site and maintain pre-development Greenfield runoff, without increasing flood risk elsewhere.

7.6.8. The maintenance of SuDS is vital ensuring that they work as efficiently as they set out to do and is discussed in Chapter 10.

7.7. Surface Water Quality

7.7.1. The SuDS components within the surface water drainage strategy have been designed in accordance with the guidance set-out in the SuDS Manual.

7.7.2. Treatment within SuDS components is essential for frequent low intensity and duration rainfall events, where urban contaminants are being mobilised and washed off urban surfaces and the aggregated contribution to the total pollutant load to the receiving surface water body is potentially high. For rainfall events greater than the 1 in 1 return period, the pollutants become diluted and the environmental risks will be reduced which means that the SuDS treatment process becomes less crucial. Treatment effectiveness is strongly linked to the hydraulic control of runoff, in particular velocity control and retention time.

7.7.3. Table 26.2 of the CIRIA SuDS Manual provides the pollution hazard indices for different land use classifications as shown in the table below.

Table 7.2: CIRIA Pollution hazard indices for different land use classifications

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-carbons
Residential Roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads, car parks with infrequent change	Low	0.5	0.4	0.4

7.7.4. The level of pollution associated with the proposed development is low.

7.7.5. Table 7.3 below summarises the treatment efficiency of different potential SuDS components discharging to surface waters as detailed in Chapter 26 of the SuDS Manual.

Table 7.3: CIRIA Indicative SuDS Mitigation Indices for Discharges to surface water

	Mitigation Indices		
Type of SuDS Component	Total Suspended Solids (TSS)	Metals	Hydro-carbons
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
Detention Basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8

7.7.6. Where multiple drainage features are used, the efficiency of the secondary system to treat water is reduced. By using a swale discharging into a detention basin the combined mitigation indices is as follows:

Table 7.4: Mitigation Indices for Proposed Combined Drainage System

	Mitigation Indices	Total Mitigation
TSS	0.5 + 0.5(0.5)	0.75
Metals	0.6 + 0.5(0.5)	0.85
Hydrocarbons	0.6 + 0.5(0.6)	0.90

7.8. Foul Water Strategy

7.8.1. The preliminary proposed foul water strategy is to connect into the existing Severn Trent foul sewer at a location to be determined at detailed design dependant on final location of houses and proposed ground levels.

7.8.2. A connection into the public foul sewer has been agreed in principle with Severn Trent Water. A copy of this correspondence is contained in Appendix F.

7.8.3. This existing foul sewer is 300mm diameter and runs from the north east of the site to the centre where it runs directly south before following the site boundary to the east and heading south to Friar Park road. A copy of the Severn Trent sewer record is contained in Appendix E.

8.0 FLOOD RISK FROM THE PROPOSED DEVELOPMENT

8.1. Fluvial Flood Risk

8.1.1. All proposed development is located within Flood Zone 1. Surface water runoff from the proposed development is to be controlled to no more than QBar in all storm events up to and including the 1 in 100 year plus climate change. Therefore, the proposed development is unlikely to increase the fluvial flood risk on or off the site.

8.2. Tidal Flood Risk

8.2.1. The proposed development will not increase the tidal flood risk on or off the site.

8.3. Surface Water Flood Risk

8.3.1. The majority of the site is in an area currently at medium risk from surface water flooding.

8.3.2. The drainage strategy has been devised to best mimic natural flow paths across the site and to suit the existing topography. Surface water from the development will be managed in a dedicated SuDS network and is to be restricted to no more than QBar in all storm events up to and including the 1 in 100 year plus climate change.

8.3.3. Therefore the proposed development is not considered likely to increase the surface water flood risk on or off the site.

8.4. Groundwater Flood Risk

8.4.1. The proposed development is residential which would have little to no impact to natural groundwater movements.

8.4.2. The proposed development is unlikely to increase the groundwater flood risk to the site.

8.5. Sewer Flood Risk

8.5.1. The proposed development is unlikely to increase the sewer flood risk to the site.

8.6. Artificial Flood Risk

8.6.1. The proposed development is unlikely to increase the artificial flood risk to the site.

8.7. Climate Change Impact

8.7.1. The impact of climate change has been adequately factored into the proposed drainage design in line with all current best practice and guidance.

9.0 SCHEDULE OF MAINTENANCE

9.1. Introduction

9.1.1. The maintenance of SuDS features is vital ensuring that they work as efficiently as they set out to do. Maintenance activities can be broadly defined as:

- Regular maintenance – basic tasks carried out regularly;
- Occasional maintenance – tasks that are required periodically but on a much less frequent basis; and
- Remedial maintenance – tasks required when a fault needs rectifying and often includes unforeseen events.

9.1.2. The proposed drainage system is to remain private and maintained by a third party management company to be set up post-construction.

9.1.3. Numerous features are considered to be feasible on the site at this stage and the main ones that are anticipated to be used have been considered in these maintenance requirements. However, specific SuDS components to be used are yet to be determined.

9.1.4. Maintenance requirements for each SuDS feature has been outlined below.

9.2. Filter Drains

Construction

9.2.1. During construction it is important to prevent muddy water from flowing into the system. Where possible, construction should be undertaken during dry periods. The filter drains should be constructed with adequate fall to ensure the area drains efficiently. During construction the contractor must ensure the designed width and depth are correct and the geotextile has the specified porosity.

Maintenance Schedule

9.2.2. The table below shows the operation and maintenance requirements for filter drains, taken from the CIRIA C753 SuDS Manual.

Table 9.1: Operation and maintenance requirements for filter drains (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage.	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional maintenance	Remove or control tree roots when they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	Clear perforate pipework or blockages	As required

9.3. Swales

Construction

9.3.1. Construction vehicles and equipment not directly involved in the construction of the rills and swales should be kept away from these areas. Excavations for the swales should aim to be undertaken in times of dry weather, when possible, to prevent mobilisation of sediments from exposed surfaces. Exposed surfaces after rill or swale excavations should be stabilised as soon as possible with grass seed and straw mulch. Perimeter controls should be installed prior to construction to protect watercourses.

Maintenance Schedule

9.3.2. The table below shows the operation and maintenance requirements for the swale, taken from the CIRIA C753 SuDS Manual.

Table 9.2: Operation and maintenance requirements for swales (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut grass - to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets for silt accumulation, establish appropriate silt removal frequencies	Half yearly
	Inspect check dams for blockages and failure.	Half yearly
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

9.4. Detention Basins

Construction

9.4.1. Construction vehicles and equipment not directly involved in the construction of the detention basin will be kept away from these areas. Silt fences, staged excavation works and temporary drainage swales/bunds to divert runoff away from exposed areas will be utilised, as appropriate, to manage the risks associated with, and to intercept the discharge of, sediment laden runoff prior to its discharge to nearby watercourses. Excavations for the detention basin should aim to be undertaken in times of dry weather when possible, to prevent mobilisation of sediments, during rainfall events. Surfaces exposed as part of the detention basin construction should be stabilised as soon as possible, by the use of hydroseeding or an alternative approved approach. Perimeter controls should be installed prior to construction to protect watercourses. Perimeter controls should be installed prior to construction to protect watercourses.

Maintenance Schedule

9.4.2. The table below shows the operation and maintenance requirements for the detention basins, taken from the CIRIA C753 SuDS Manual.

Table 9.3: Operation and maintenance requirements for detention basins (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass - public areas	Monthly (during growing season)
	Cut the meadow grass	Half yearly (spring, before nesting season, and autumn)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc. for evidence of blockage and/or physical damage	Monthly
	Inspect silt accumulation rates in the detention basin and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options	Half yearly
	Check any mechanical devices, e.g. penstocks	Half yearly
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract)	Annually
	Remove sediment from any forebay.	Every 1-5 years, or as required
	Remove sediment and planting from one quadrant of the main body of detention basins without sediment forebays.	Every 5 years, or as required
Occasional maintenance	Remove sediment from the main body of big detention basins when pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, e.g. every 25-50 years
Remedial actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate detention basin when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair/rehabilitate inlets, outlets and overflows.	As required

9.5. Ponds

Construction

9.5.1. Construction vehicles and equipment not directly involved in the construction of the ponds are to be kept away from these areas. Silt fences, staged excavation works and temporary drainage swales/bunds to divert runoff away from exposed areas will be utilised, as appropriate, to

manage the risks associated with, and to intercept the discharge of, sediment laden runoff prior to its discharge to the receiving watercourse. Excavations for the ponds should be undertaken in times of dry weather when possible, to prevent mobilisation of sediments, during rainfall events. Surfaces exposed as part of the pond construction should be stabilised as soon as possible, by the use of hydroseeding or an alternative approved approach. Care should be taken to ensure that the impermeable liner it is not damaged during construction. Perimeter controls should be installed prior to construction to protect the existing water bodies.

Maintenance Schedule

9.5.2. The following table shows the operation and maintenance requirements for the detention basins, adopted from the SuDS Manual C753.

Table 9.4: Operation and maintenance requirements for ponds (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass	Monthly (during growing season)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework for evidence of blockage and/or physical damage	Monthly
	Inspect water body for signs of poor water quality	Monthly (May – October only)
	Inspect silt accumulation rates in the detention basin and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options	Half yearly
	Check any mechanical devices	Half yearly
	Hand cut submerged and emergent aquatic plans (at minimum of 0.1m above pond base; include maximum 25% of pond surface)	Annually
	Remove 25% of bankside vegetation from water's edge to a minimum of 1m above water level	Annually
	Tidy all dead growth (scrub clearance) before start of growing season	Annually
Occasional maintenance	Remove sediment build-up	As required
Remedial actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate pond when signs of eutrophication are detected	As required
	Repair/rehabilitate inlets, outlets and overflows.	As required

9.6. Bio-retention areas, Rain Gardens and Tree Pits

Construction

9.6.1. Construction vehicles and equipment not directly involved in the construction of the tree pits will be kept away from these areas. Silt fences, staged excavation works and temporary drainage swales/bunds to divert runoff away from exposed areas will be utilised, as appropriate, to manage the risks associated with, and to intercept the discharge of, sediment laden runoff prior to its discharge to the drainage network. Excavations for the tree pits should aim to be undertaken in times of dry weather when possible, to prevent mobilisation of sediments, during

rainfall events. Surfaces exposed as part of the tree pit construction should be stabilised as soon as possible. Perimeter controls should be installed prior to construction. Root protection measures should be undertaken if working in proximity to existing trees.

Maintenance Schedule

9.6.2. The table below shows the operation and maintenance requirements for rain gardens and tree pits, taken from the CIRIA C753 SuDS Manual.

Table 9.5: Operation and maintenance requirements for tree pits (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass - public areas	Monthly (during growing season)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc. for evidence of blockage and/or physical damage	Monthly
	Inspect silt accumulation rates in the rain garden/tree pit and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options	Half yearly
	Check any mechanical devices	Half yearly
	Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract)	Annually
	Remove sediment from any forebay.	Every 1-5 years, or as required
Occasional maintenance	Remove sediment from the main body of the tree pits when water volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, e.g. every 25-50 years
	Check edging and kerbing plus any inlets to rain garden/tree pit and repair/replace if required	As required
Remedial actions	Repair erosion or other damage	As required
	Replant, where necessary	As required
	Aerate tree pit when signs of eutrophication are detected	As required
	Repair/rehabilitate inlets, outlets and overflows.	As required

9.7. Attenuation Tanks

Construction

9.7.1. Construction vehicles and equipment not directly involved in the construction of the attenuation tank will be kept away from these areas. Silt fences, staged excavation works and temporary drainage swales/bunds to divert runoff away from exposed areas will be utilised, as appropriate, to manage the risks associated with, and to intercept the discharge of, sediment laden runoff prior to its discharge to nearby watercourses. Excavations for the attenuation tank should aim to be undertaken in times of dry weather when possible, to prevent mobilisation of sediments during rainfall events. Perimeter controls should be installed prior to construction to protect watercourses.

Maintenance Schedule

9.7.2. The table below shows the operation and maintenance requirements for the Attenuation tanks, taken from the CIRIA C753 SuDS Manual.

Table 9.6: Operation and maintenance requirements for attenuation storage tanks (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	Remove sediment from catchpits/ gullies/ sumps.	Annually, or as required
Occasional Maintenance	Removal of sediment from tank via vacuum pumping (if appropriate)	As required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

9.8. Proprietary Treatment Systems

9.8.1. The proprietary treatment systems include conventional pipework, gullies, catchpits, manholes, channels and headwalls.

Construction

9.8.2. During construction the principal contractor must ensure that preventative measures have been put in place as to not allow the construction runoff drain into the system. Measures must be taken to ensure debris from the construction site does not block the components. Routine inspections should be undertaken ensuring that the drainage is functioning properly. Outfalls

must be constructed to the correct level and all joints must be correctly sealed. During construction backfill should be correctly installed as specified as per the manufactures' recommendations.

Maintenance Schedule

9.8.3. The maintenance schedule for the aforementioned SuDS has been adopted from the SuDS Manual C753 and are summarised in the table below.

Table 9.7: Maintenance and Operation of Proprietary Treatment Systems (CIRIA C753, 2015)

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Monitoring	Inspect monthly
Occasional maintenance	Sediment management	Annually or as required
Remedial maintenance	Structure rehabilitation/repair	As required

10.0 CONCLUSION

10.1.1. CampbellReith has been commissioned to prepare a Flood Risk Assessment and Drainage Strategy in accordance with the National Planning Policy Framework in support of the planning application for the proposed development located at the land off Friar Park Road, Wednesbury.

10.1.2. Current OS Maps show two drains on the site, one from the north to the centre of the site and another towards the south east corner. The location of this identified southern drain has been surveyed and is no longer existing. The northern drain is assumed to pass beneath the railway. The River Tame, an EA main river, is approximately 250m north east of the site and is also approximately 750m west of the site.

10.1.3. The geology of the site indicates that the ground is likely to have a bedrock geology of mudstone, siltstone and sandstone with superficial river terrace deposits (sand and gravel). Ground Investigations were undertaken by WYG in July 2019 which confirmed the expected geology and the presence of clay across the site.

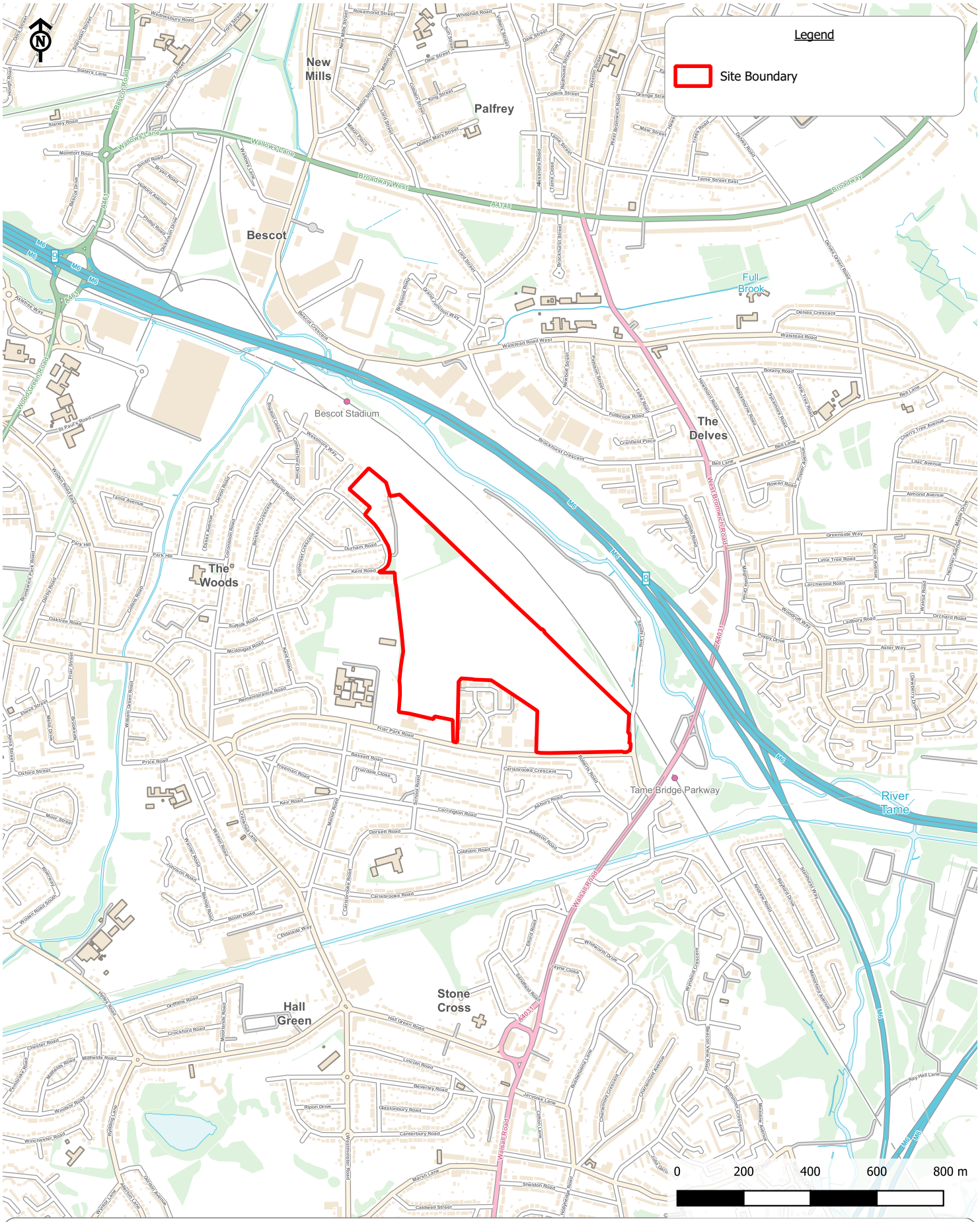
10.1.4. The preliminary surface water strategy utilises basins across the site and a controlled runoff limited to 128.4l/s before discharging into the existing Severn Trent surface water sewer in the south eastern corner of the site.

10.1.5. The preliminary proposed foul strategy is to connect into the public foul sewer that crosses the site.

10.1.6. The maintenance of SuDS is vital to ensuring that they work as efficiently as they are intended to.

10.1.7. The proposed drainage strategy will not increase flood risk from any source on or off the site and is considered appropriate for the proposed development in its current location.

Appendix A: Site Location



Friar Park, Wednesbury

Site Location

Client: West Midlands Combined Authority

Scale: 1:15000@A4

Job Number: 13569

Drawn by - Checked by: RLF - RF

Drg No - Status/Revision: 13568-CRH-XX-XX-FG-G-7019 - P1

File location: N:\13500 - 13749\13568 L - Friar Park, Wednesbury - Planning\Project_Workspaces\FRA (pdf in Outputs)

Date (Revision History): 24/10/2022 (P1, First Issue, 24/10/22, RLF)

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LONDON 020 7340 1700 ☐ ☒ MANCHESTER 0161 819 3060
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BRISTOL 0117 916 1066 ☐ ☐ DUBAI 00 971 4453 4735
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Appendix B: SFRA Map Extracts

Figure 5-1 Historic flooding in the Black Country

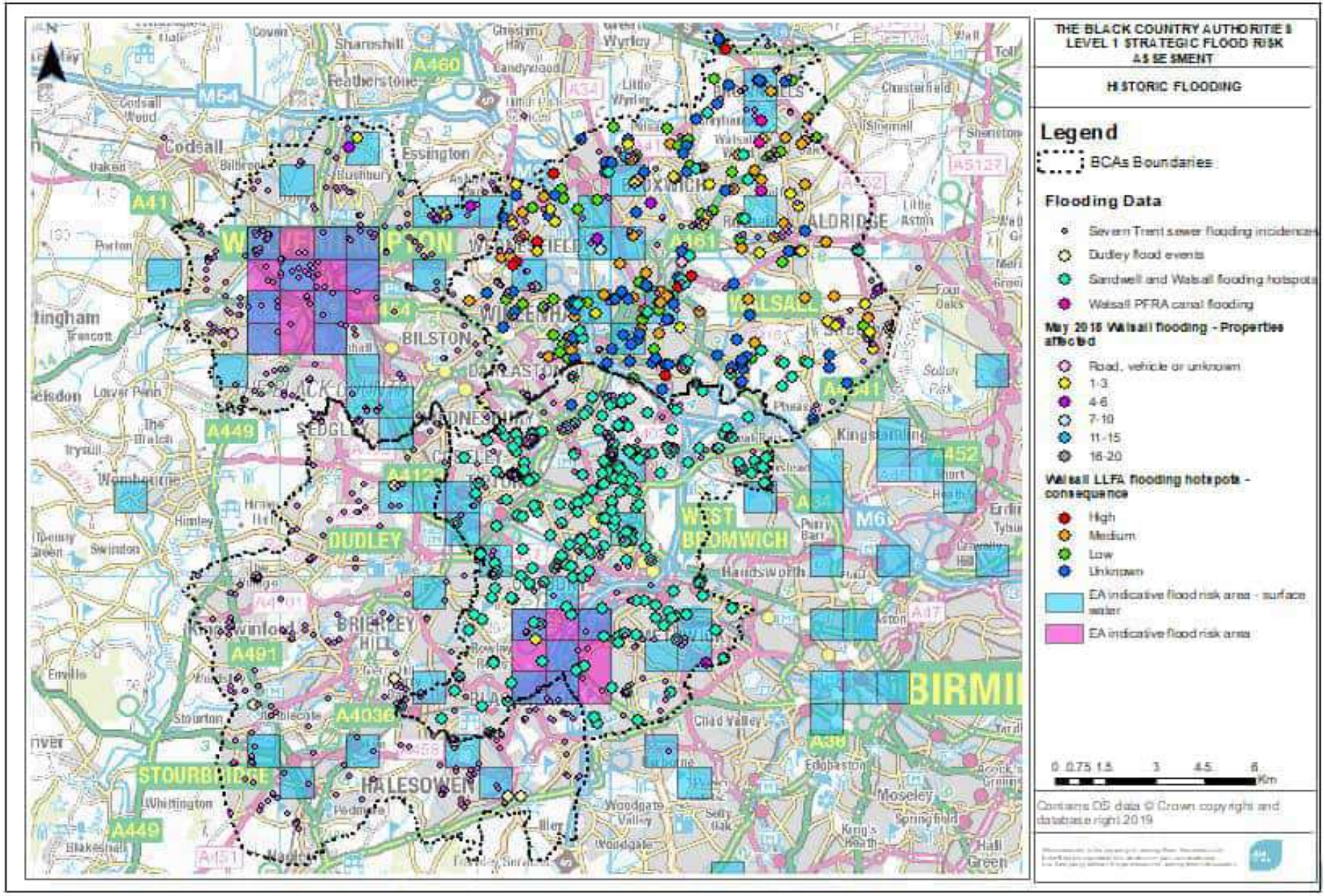
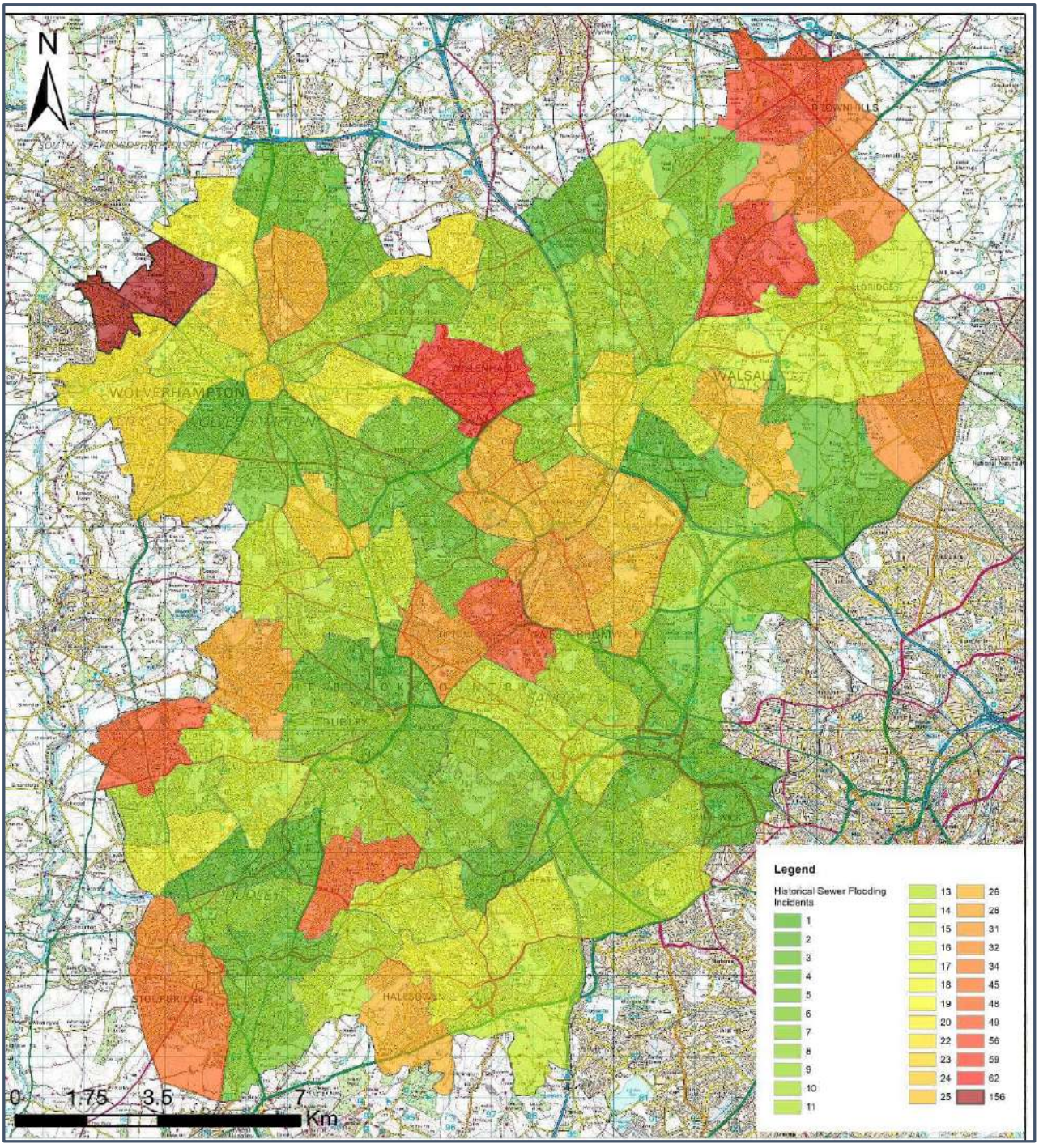


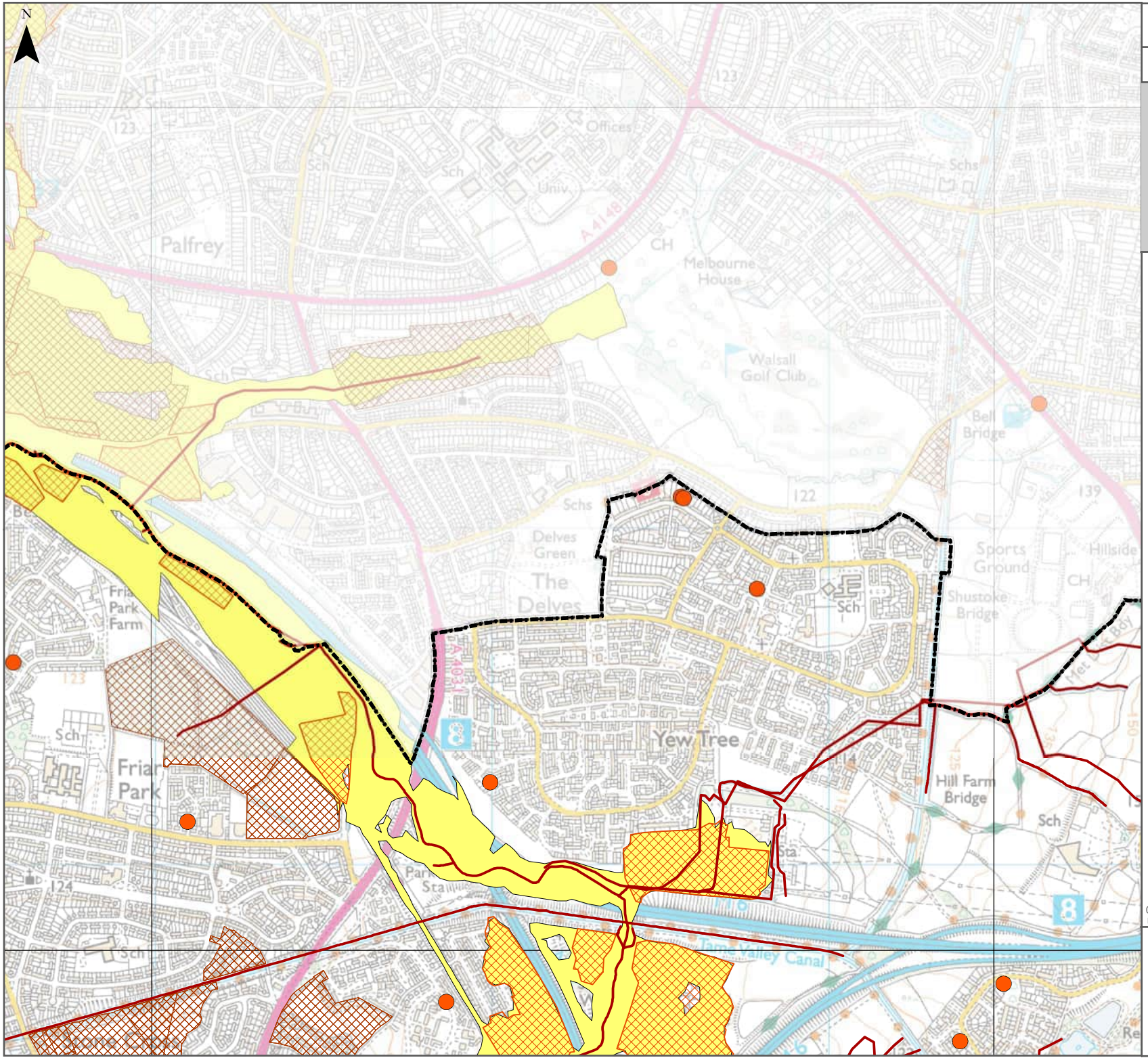
Figure 5-8: Heatmap illustrating historical sewer incidents recorded by Severn Trent Water across the Black Country



5.10 Flooding from reservoirs

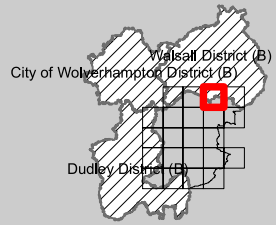
Reservoirs with an impounded volume greater than 25,000 cubic metres are governed by the Reservoir Act 1975 and are on a register held by the Environment Agency. The level and standard of inspection and maintenance required under the Act means that the risk of flooding from reservoirs is very low.

Flooding from reservoirs occurs following partial or complete failure of the control structure designed to retain water in the artificial storage area. Reservoir flooding is very different from other forms of flooding; it may happen with little or no warning and evacuation will need to happen immediately. The likelihood of such flooding is difficult to estimate but is extremely low



BLACK COUNTRY AUTHORITES LEVEL 1 STRATEGIC FLOOD RISK ASSESSMENT

APPENDIX A: GEO PDF INDEX GRID:A4



Note: All layers are turned off by default. Click the box next to the layer of interest to turn on.

Authority Information
- Sandwell Council Boundary

- [x] Additional watercourses
- [ ] Canals
- [ ] Main Rivers
- [ ] Culverts

Flood Zones
- [ ] Indicative Flood Zone 3b
- [ ] Indicative Flood Zone 2
- [ ] Flood Zone 3b
- [ ] Flood Zone 3a
- [ ] Flood Zone 2

Surface Water
- [ ] RoFfSW 3.3% AEP
- [ ] RoFfSW 1% AEP
- [ ] RoFfSW 0.1% AEP

Areas Susceptible to Groundwater Flooding
- [ ] >= 75%
- [ ] >= 50% <75%
- [ ] >= 25% <50%
- [ ] < 25%

Limestone
- [ ] Former Lime works
- [ ] Limestone Seam

Climate Change
- [ ] Climate Change Central
- [ ] Climate Change Higher Central
- [ ] Climate Change Upper End
- [ ] Indicative %CC

Historic Flood Map
- [ ] Historic Flooding

Flooding Hotspots
- [x] Flooding Hotspots

Culvert Blockage Results
- [ ] Modelled Culverts
- [ ] 10% AEP Event Depth- m
- [ ] 1% AEP Event Depth- m
- [ ] 0.1% AEP Event Depth- m

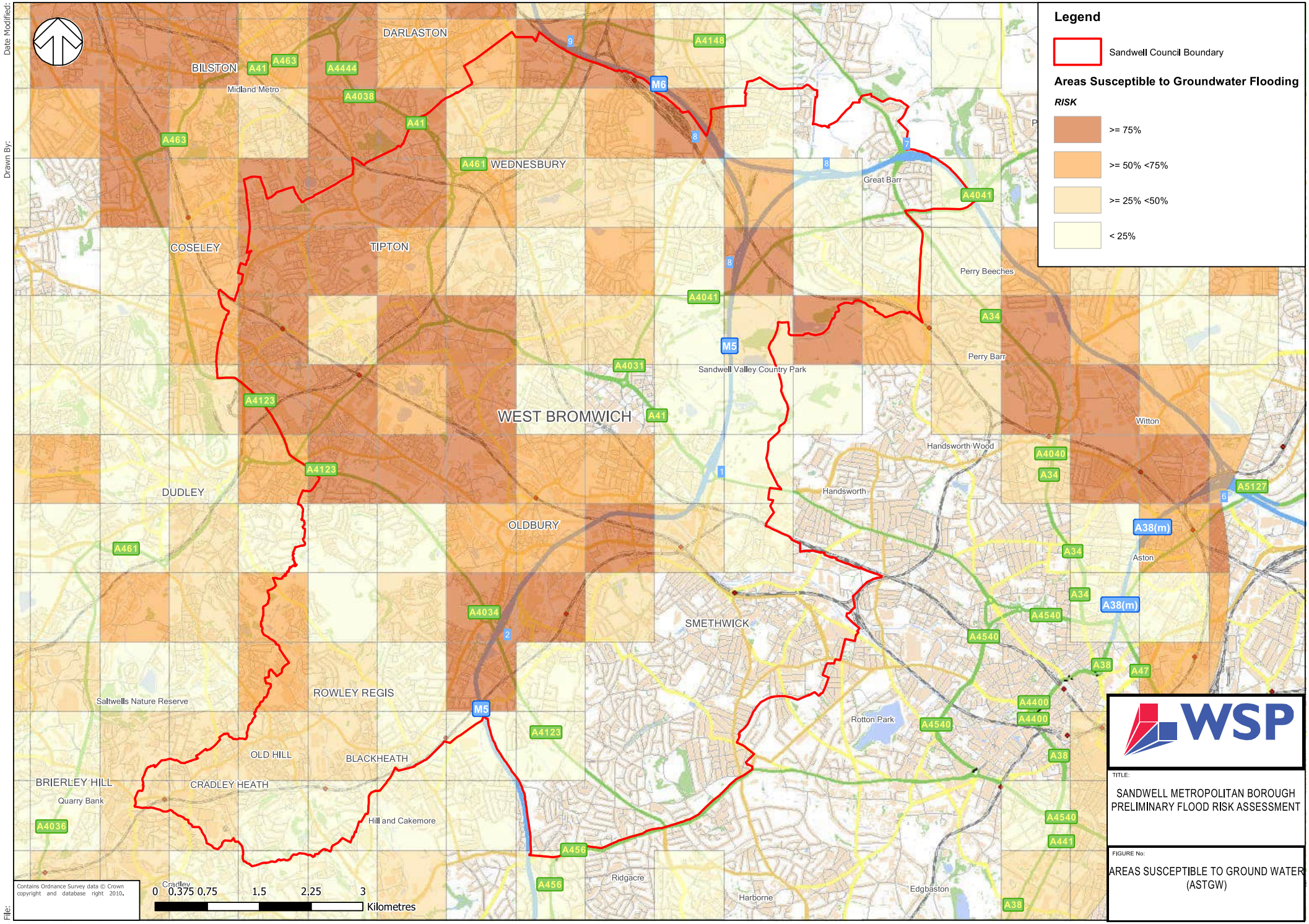
Defences
- [ ] embankment
- [ ] wall
- [ ] not specified

Emergency Planning
- [x] Flood Warning Areas
- [x] Flood Alert Areas

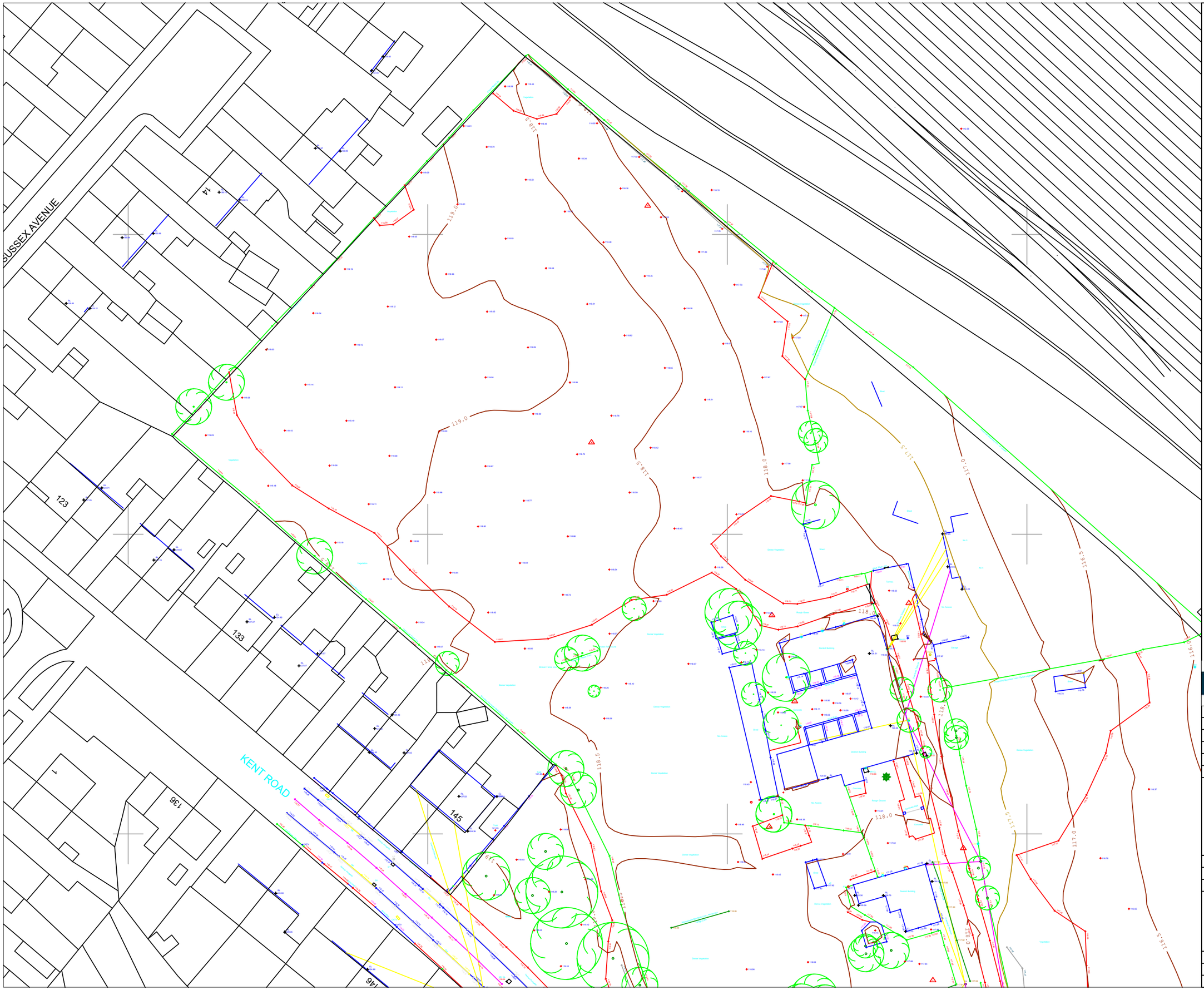
Flood Assets and Infrastructure
- [ ] Trash Screen Inlets
- [ ] Trash Screen Outfalls

Historic Landfills
- [x] Historic Landfills

0 5 10 20 30 40 Km


Legend
Sandwell Council Boundary
Areas Susceptible to Groundwater Flooding
RISK
>= 75%
>= 50% <75%
>= 25% <50%
< 25%
DARLASTON
BILSTON
Midland Metro
WEDNESBURY
Great Barr
COSELEY
TIPTON
Perry Beeches
Perry Barr
Sandwell Valley Country Park
WEST BROMWICH
Witton
Handsworth Wood
Handsworth
DUDLEY
OLDBURY
Aston
SMETHWICK
Saltwells Nature Reserve
ROWLEY REGIS
Rotton Park
OLD HILL
BLACKHEATH
BRIERLEY HILL
CRADLEY HEATH
Quarry Bank
Hill and Cakemore
Cradley
Ridgacre
Harborne
Edgbaston
M6
M5
A41
A463
A4444
A4038
A461
A4148
A4041
A34
A4031
A4123
A4040
A5127
A38(m)
A4034
A4540
A38
A47
A4400
A456
A441
Contains Ordnance Survey data © Crown copyright and database right 2010.
0 0.375 0.75 1.5 2.25 3
Kilometres
WSP
TITLE:
SANDWELL METROPOLITAN BOROUGH PRELIMINARY FLOOD RISK ASSESSMENT
FIGURE No:
AREAS SUSCEPTIBLE TO GROUND WATER (ASTGW)
Date Modified:
Drawn By:
File:

Appendix C: Topographical Survey



All levels related to OSGB36(15)

DT1	401648.22	295009.79	116.84
DT2	401612.64	294961.87	117.51
DT3	401570.59	295004.39	115.31
DT4	401565.27	295088.60	112.43
DT5	401498.92	295061.18	114.32
DT6	401435.71	295061.22	115.11
DT7	401374.44	295060.33	115.76
DT8	401308.39	295059.38	116.19
DT9	401206.59	295061.73	116.93
DT10	401080.42	295079.67	117.36
PW1	400771.85	295770.86	119.12
PW2	400814.83	295712.11	118.94
PW3	400827.91	295653.21	119.51
PW4	400807.28	295623.36	120.81
PW5	400846.60	295613.91	119.83
PW6	400857.38	295506.75	120.85
PW7	400870.80	295385.15	121.28
PW8	400859.51	295294.70	122.30
PW9	400860.71	295248.55	121.21
PW10	400854.03	295143.89	118.15
PW11	400912.78	295301.75	118.14
PW12	401037.11	295373.50	117.30
PW13	401067.63	295321.12	116.25
PW14	401169.63	295369.00	113.44
PW15	401218.05	295395.95	111.61
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DYWIDAG

REV.	DATE	DESCRIPTION OF REVISION	DATE

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Web : www.dywidaggroup.com

SURVEYED BY	Peter Walsh	DATE	12/02/2021
DRAWN BY	Peter Walsh	DATE	19/02/2021
CHECKED BY	Danny Rushworth	DATE	19/02/2021

Topographical Survey

Friar Park, Wednesbury

Sheet 1 of 21

CampbellReith

SCALES	SCALE 1:200	ORIGINAL - A0
PROJECT No.	25607	
DRAWING No.	25607_Friar Park_Topographical Survey_SU001	

L Twr

KENT ROAD
PLAY AREA

All levels related to OSGB36(15)

DT1	401648.22	295009.79	116.84
DT2	401612.64	294961.87	117.51
DT3	401570.59	295004.39	115.31
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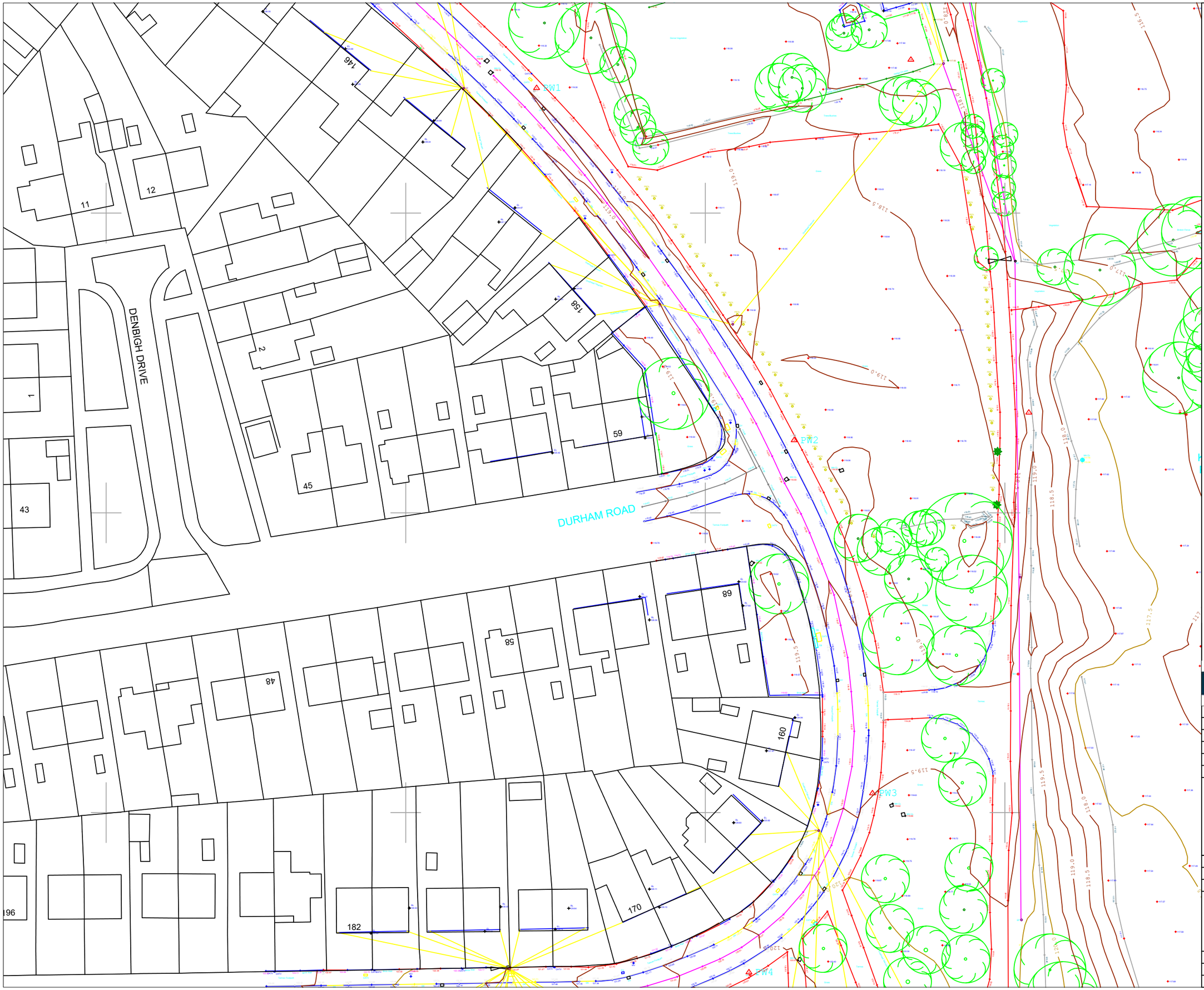
Topographical Survey

Friar Park, Wednesbury

Sheet 2 of 21

CampbellReith

SCALES	SCALE 1:200	ORIGINAL - A0
PROJECT No.	25607	
DRAWING No.	25607_Friar Park_Topographical Survey_SU001	



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Topographical Survey

Friar Park, Wednesbury

Sheet 3 of 21

CampbellReith

SCALES	SCALE 1:200	ORIGINAL - A0
PROJECT No.	25607	
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All levels related to OSGB36(15)

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Topographical Survey

Friar Park, Wednesbury

Sheet 4 of 21

CampbellReith

SCALES	SCALE 1:200	ORIGINAL - A0
PROJECT No.	2560T	
DRAWING No.	2560T_Friar Park_Topographical Survey_SU001	

All levels related to OSGB36(15)

DT1	401648.22	295009.79	116.84
DT2	401612.64	294961.87	117.51
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DYWIDAG

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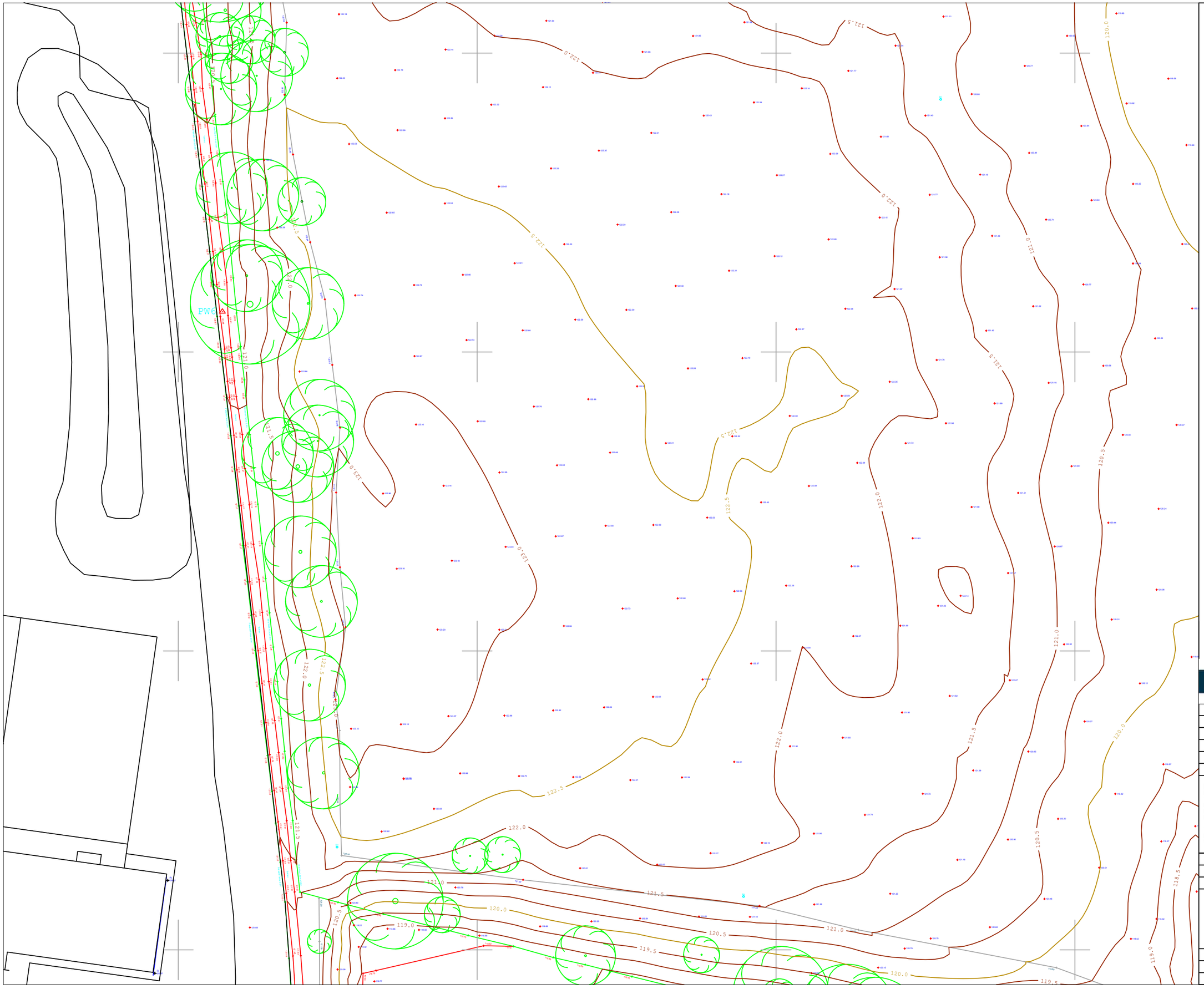
Topographical Survey

Friar Park, Wednesbury

Sheet 5 of 21

CampbellReith

SCALES	SCALE 1:200	ORIGINAL - A0
PROJECT No.	2560T	
DRAWING No.	2560T_Friar Park_Topographical Survey_SU001	



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Topographical Survey

Friar Park, Wednesbury

Sheet 6 of 21

CampbellReith

SCALES	SCALE 1:200	ORIGINAL - A0
PROJECT No.	25607	
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Topographical Survey

Friar Park, Wednesbury

Sheet 7 of 21

CampbellReith

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Topographical Survey

Friar Park, Wednesbury

Sheet 8 of 21

CampbellReith

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PROJECT No.	25607	
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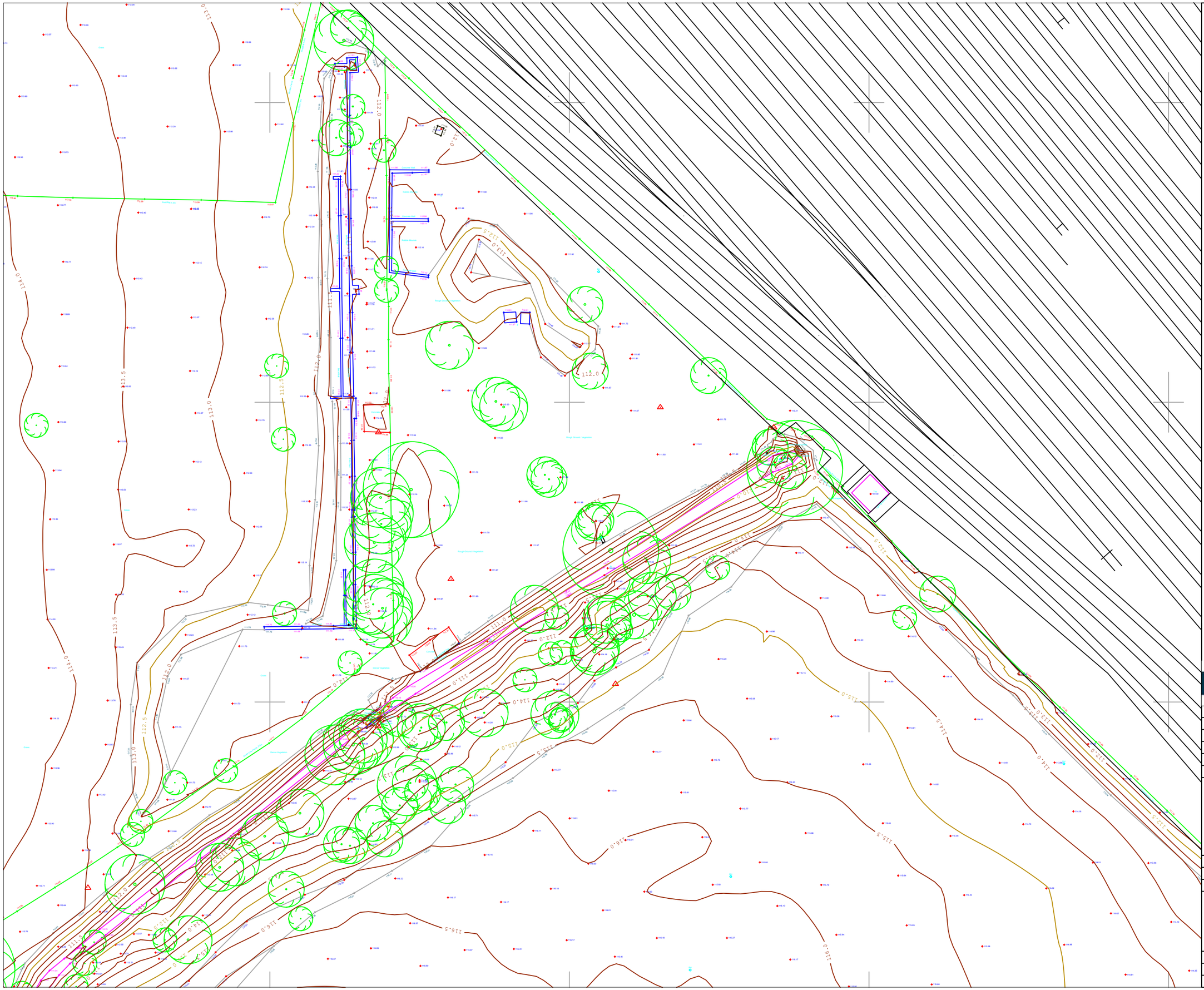

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DT2	401612.64	294961.87	117.51
DT3	401570.59	295004.39	115.31
DT4	401565.27	295088.60	112.43
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PW6	400857.38	295506.75	120.85
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PW12	401037.11	295373.50	117.30
PW13	401067.63	295321.12	116.25
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PW16	401257.69	295403.02	114.98

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- Canopy
- Platform
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- Girder
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DYWIDAG

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SURVEYED BY	Peter Walsh	DATE	12/02/2021
DRAWN BY	Peter Walsh	DATE	19/02/2021
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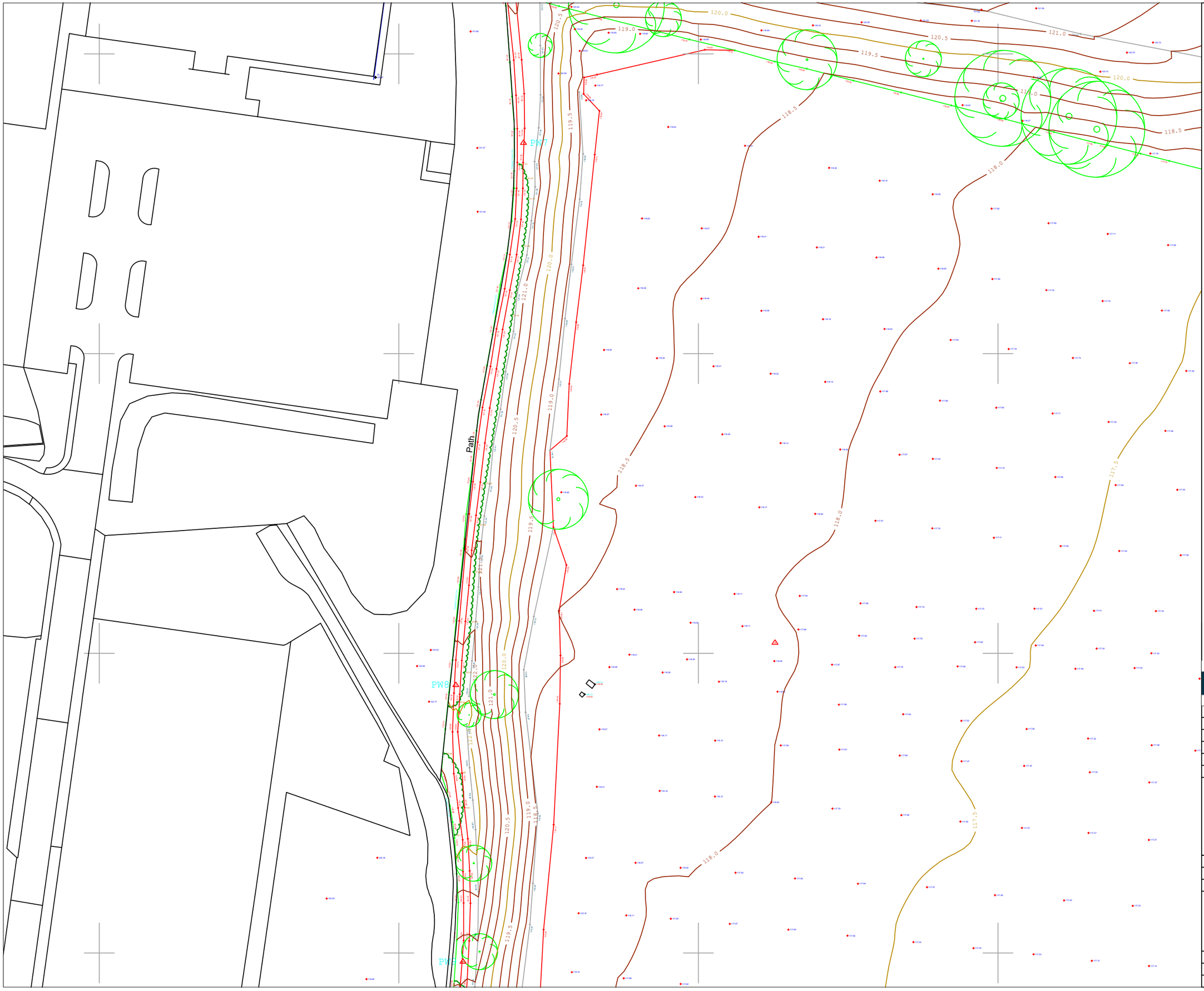
Topographical Survey

Friar Park, Wednesbury

Sheet 9 of 21

CampbellReith

SCALES	SCALE 1:200	ORIGINAL - A0
PROJECT No.	25607	
DRAWING No.	25607_Friar Park_Topographical Survey_SU001	



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Topographical Survey

Friar Park, Wednesbury

Sheet 10 of 21

CampbellReith

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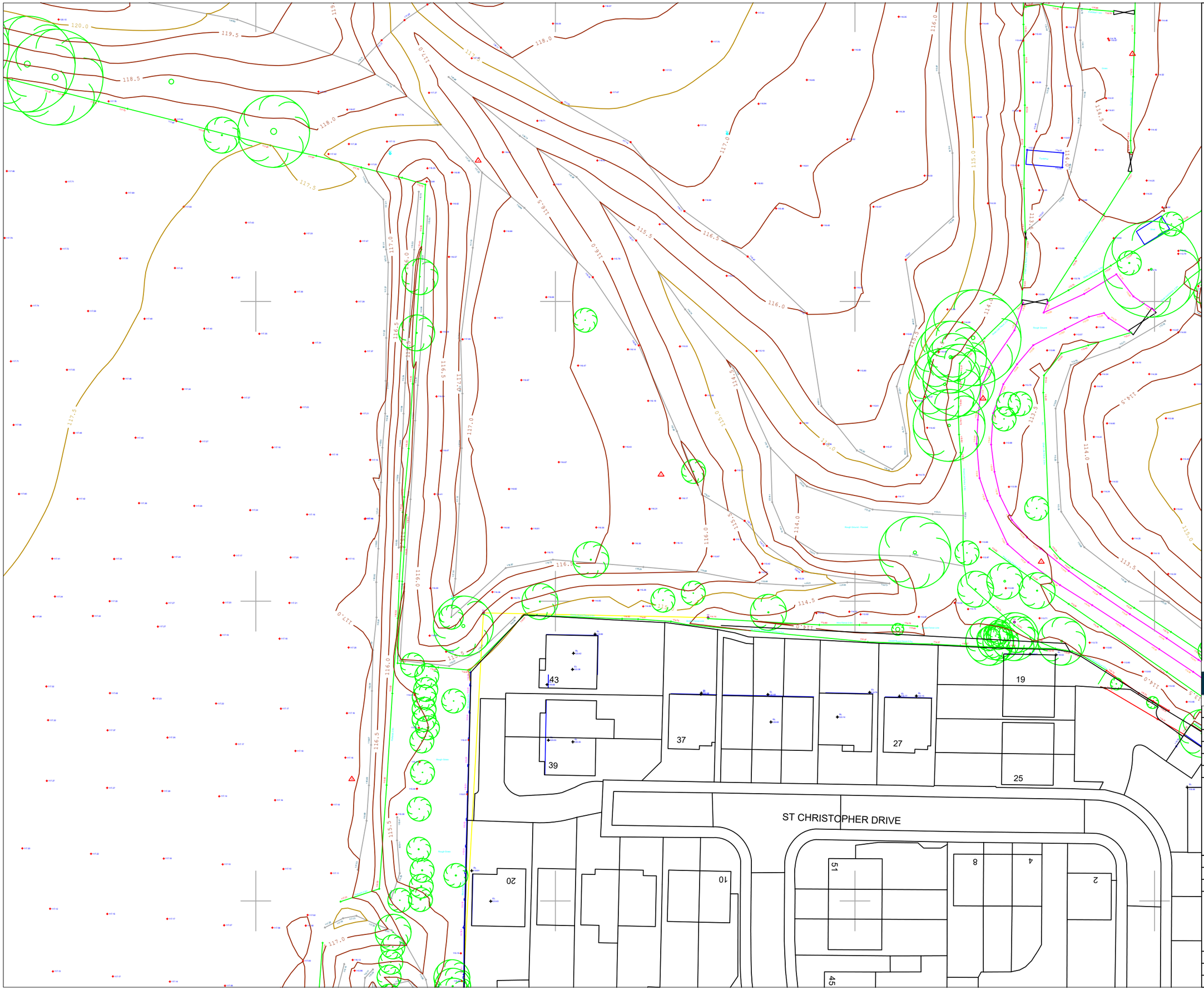
PROJECT No.	2560T	
DRAWING No.	2560T_Friar Park_Topographical Survey_SU001	



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Topographical Survey

Friar Park, Wednesbury

Sheet 11 of 21

CampbellReith

SCALES	SCALE 1:200	ORIGINAL - A0
PROJECT No.	25607	
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Topographical Survey

Friar Park, Wednesbury

Sheet 12 of 21

CampbellReith

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PROJECT No.	2560T	
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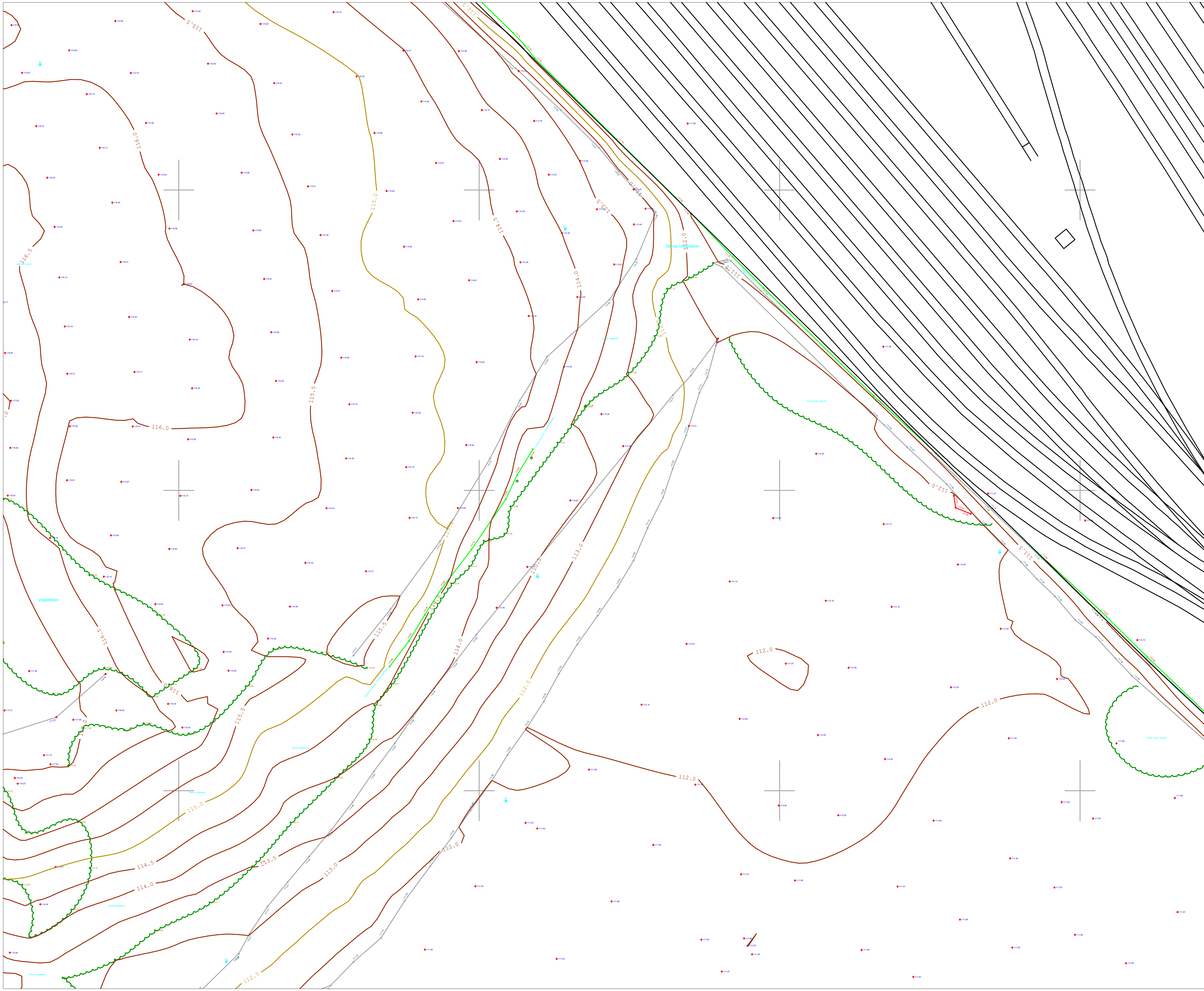

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Topographical Survey

Friar Park, Wednesbury

Sheet 13 of 21

CampbellReith

SCALES	SCALE 1:200	ORIGINAL - A0
PROJECT No.	2560T	
DRAWING No.	2560T_Friar Park_Topographical Survey_SU001	

Allotment

Gardens

PW1

PW2

PW3

118.6m

Friar Park

Millennium Centre

Clinic

Sports Court

Play Area

FRIAR PARK ROAD

131

143

155

167

169

All levels related to OSGB36(15)

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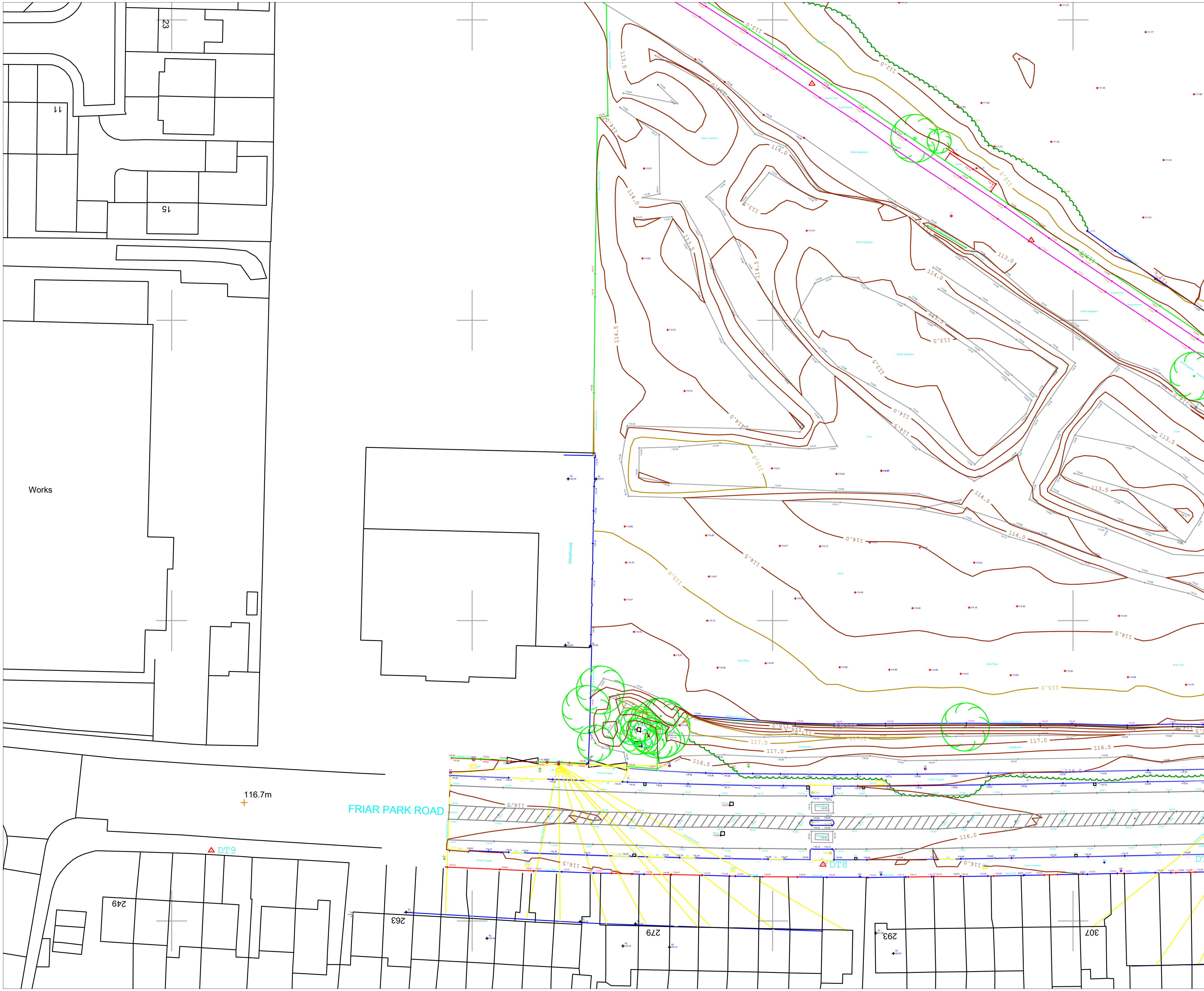

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Fence
Gate
Highway
Kerb
Path
Channel
Water
Vegatation

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DYWIDAG

REV.	DATE	DESCRIPTION OF REVISION	DATE

DYWIDAG Ltd.
DATUM House
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Fax.+44(0)161 797 5522
Web : www.dywidaggroup.com

SURVEYED BY	Peter Walsh	DATE	12/02/2021
DRAWN BY	Peter Walsh	DATE	19/02/2021
CHECKED BY	Danny Rushworth	DATE	19/02/2021

Topographical Survey

Friar Park, Wednesbury

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CampbellReith

SCALES	SCALE 1:200	ORIGINAL - A0
PROJECT No.	2560T	
DRAWING No.	2560T_Friar Park_Topographical Survey_SU001	

All levels related to OSGB36(15)

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DT6	401435.71	295061.22	115.11
DT7	401374.44	295060.33	115.76
DT8	401308.39	295059.38	116.19
DT9	401206.59	295061.73	116.93
DT10	401080.42	295079.67	117.36
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PW6	400857.38	295506.75	120.85
PW7	400870.80	295385.15	121.28
PW8	400859.51	295294.70	122.30
PW9	400860.71	295248.55	121.21
PW10	400854.03	295143.89	118.15
PW11	400912.78	295301.75	118.14
PW12	401037.11	295373.50	117.30
PW13	401067.63	295321.12	116.25
PW14	401169.63	295369.00	113.44
PW15	401218.05	295395.95	111.61
PW16	401257.69	295403.02	114.98

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Topographical Survey

Friar Park, Wednesbury

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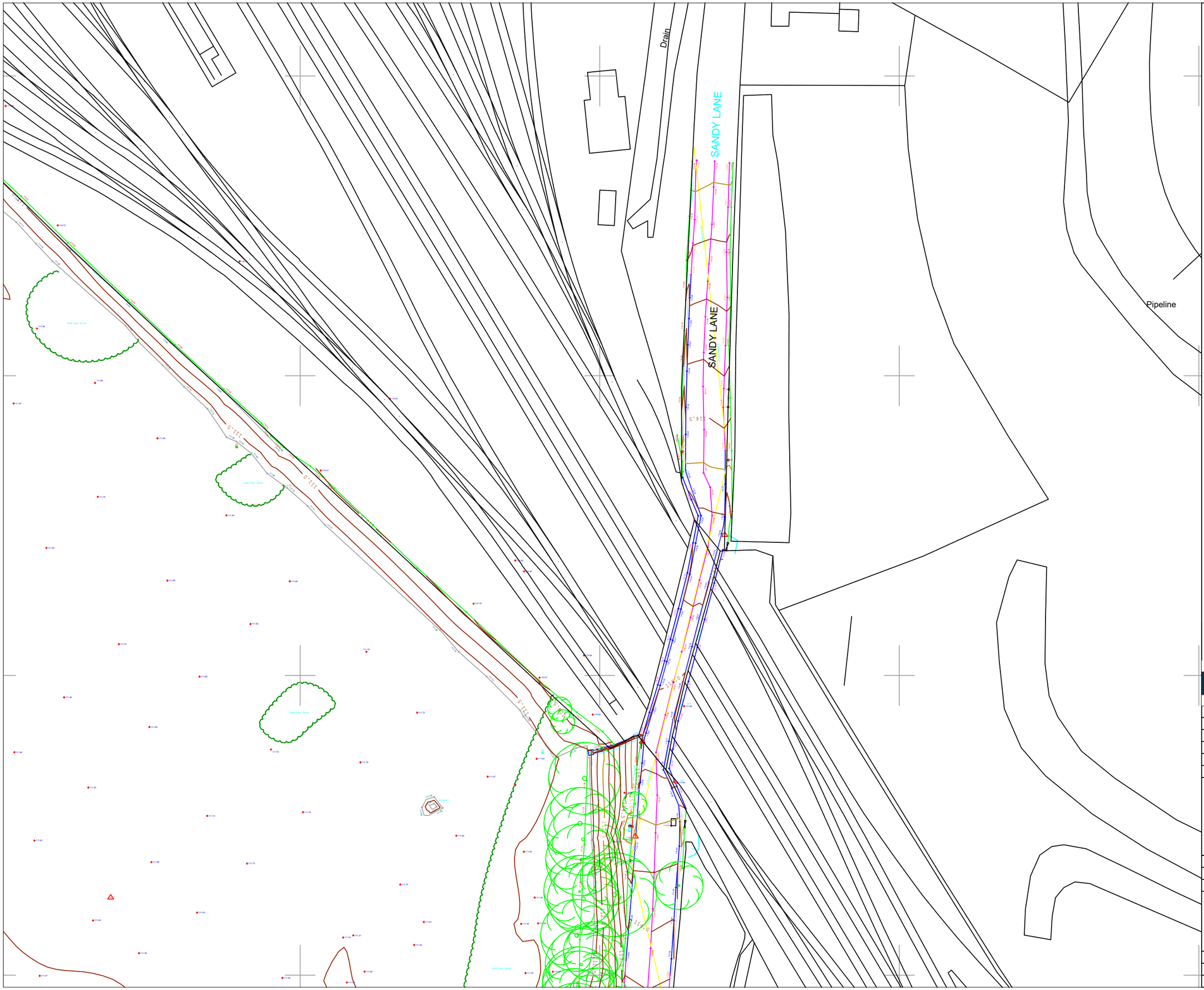

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Topographical Survey

Friar Park, Wednesbury

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CampbellReith

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Topographical Survey

Friar Park, Wednesbury

Sheet 19 of 21

CampbellReith

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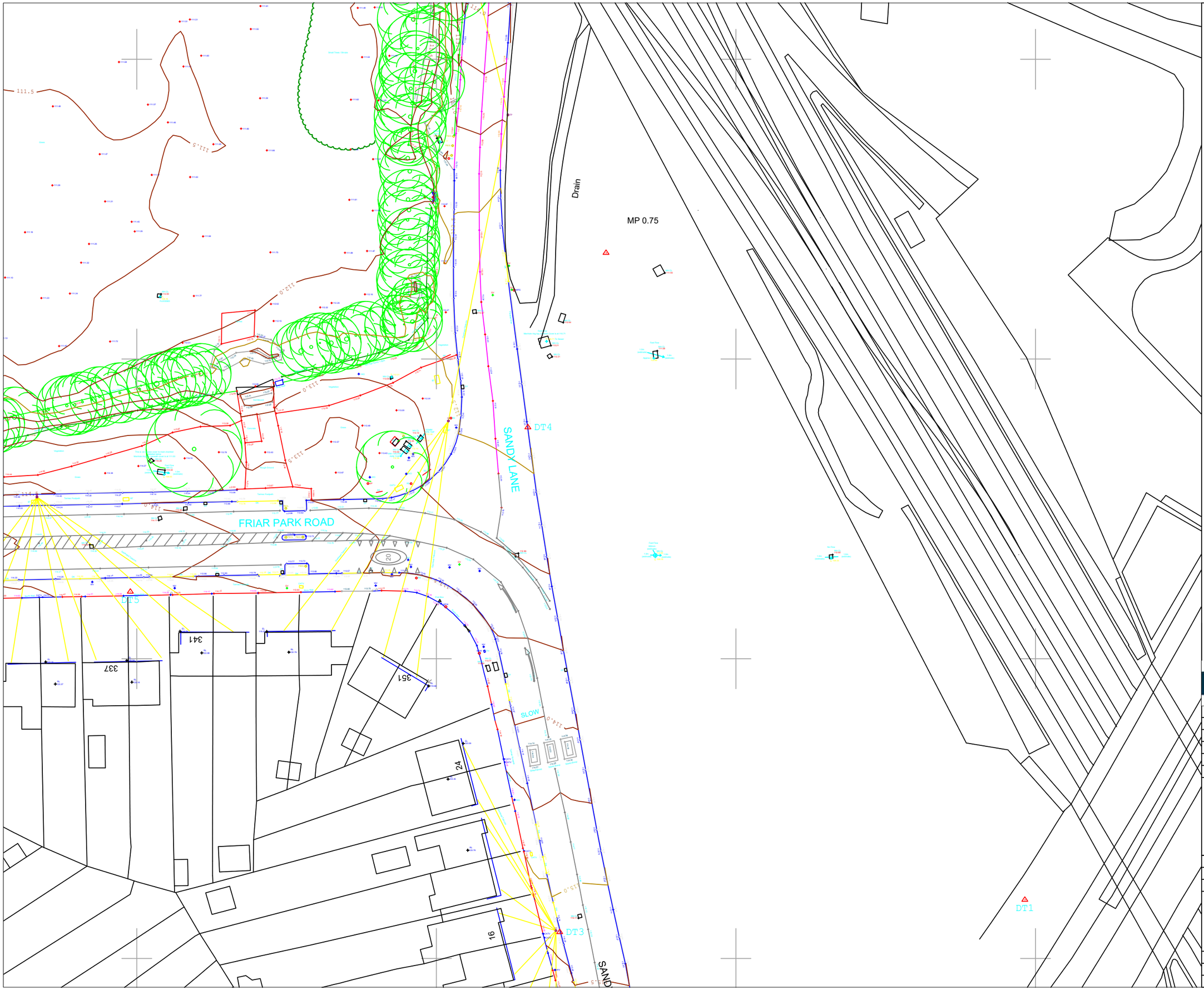

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Topographical Survey

Friar Park, Wednesbury

Sheet 20 of 21

CampbellReith

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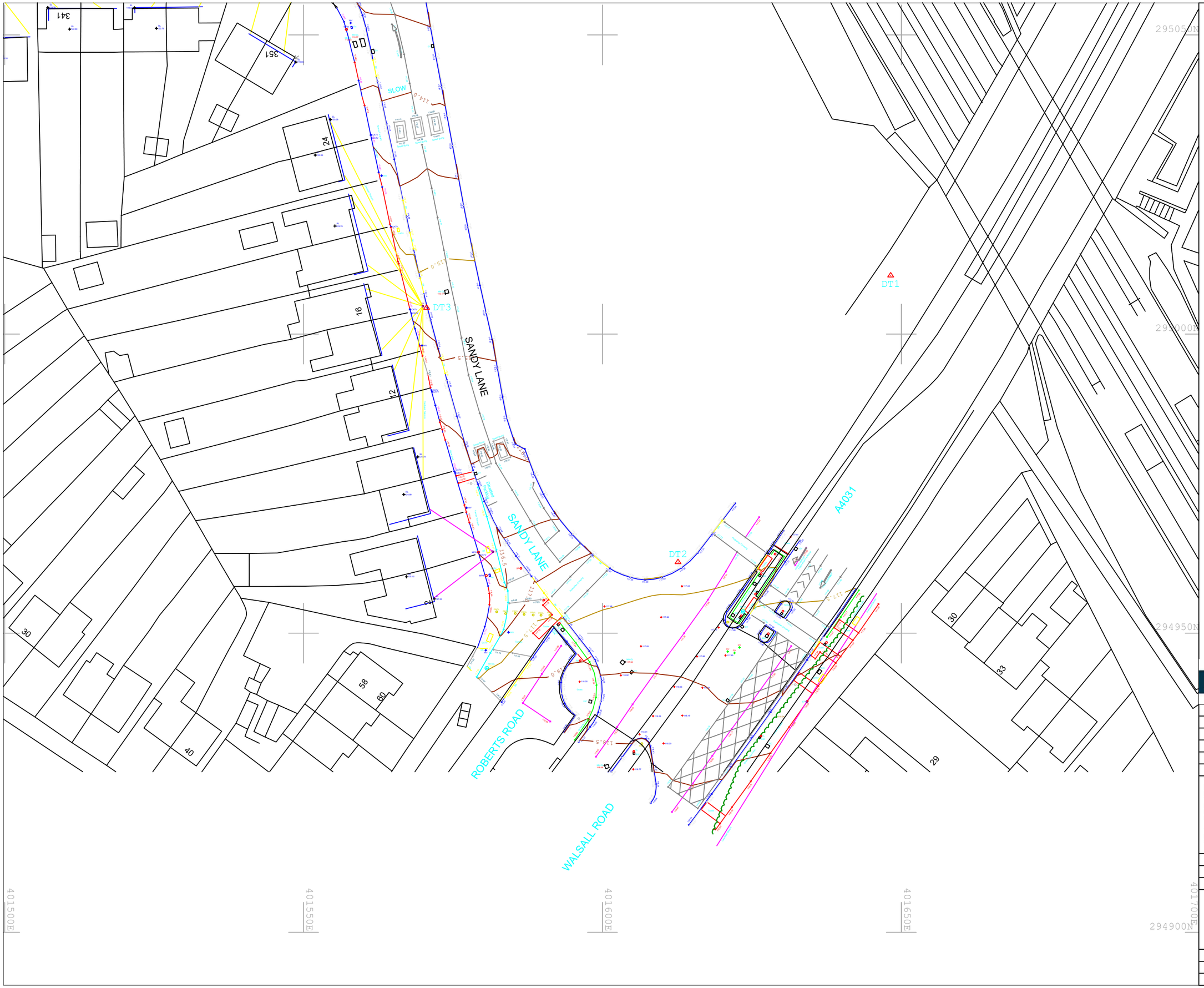

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Topographical Survey

Friar Park, Wednesbury

Sheet 21 of 21

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SCALES	SCALE 1:200	ORIGINAL - A0
PROJECT No.	25607	
DRAWING No.	25607_Friar Park_Topographical Survey_SU001	

Appendix D: Ground Investigation

Friar Park, Sandwell

N

Proposed Boreholes and Monitoring Locations

WMCA

Legend

- Additional Borehole Locations for Groundwater Sampling
- Existing Borehole Locations for Groundwater Sampling

Additional Borehole Locations

BH ID	Easting	Northing
WYG01	400930.23	295628.02
WYG02	400949.84	295381.73
WYG03	401348.44	295266.99

Existing Borehole Locations

BH ID	Easting	Northing
BH01	400943	295575
BH02	401027	295525
BH03	401093	295550

Notes:

Drawn by: AW

Drawing No. A112979

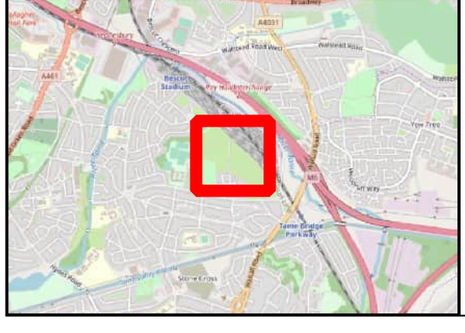
Checked by: DH

Revision No.1

0 25 50 75 100 Meters

Scale: 1:2000 @A3

13/8/2019



Geneva Building,
Lake View Drive,
Sherwood Business Park,
Annesley,
Nottingham, NG15 0ED

Tel: 01623 684550
Email: nottingham@wyg.com

Project: **Friar Park Road**	Location Details		Status	Borehole Number
Location: **Wednesbury**	Easting:	Northing:	DRAFT	**WYG01**
Client: **West Midlands Combined Authority**	Level:	Depth: 10.00m		Sheet 1 of 1
	Logger: AT	Type: CP		
		Inclination: 90°		

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time					Scale: 1:50
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)	Checked By:
0.00	1.20	Inspection Pit	Hand Tools	RD/BD	1.20	200	10.00	150	31/07	08:00	0.00	0.00		Approved By:
1.20	10.00	Cable Percussion	Dando 175	RD/BD	10.00	150			31/07	13:00	10.00	10.00	6.15	Start Date: 31/07/2019
														Finish Date: 31/07/2019

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
TOPSOIL: Grass over firm greyish brown slightly sandy CLAY.		0.10						
MADE GROUND: Firm grey slightly sandy friable CLAY with rare gravels of subangular to subrounded quartz.		0.20						
MADE GROUND: Firm to stiff dark grey silty CLAY with rare gravels of subangular medium to coarse sandstone.		1.00						
PROBABLE MADE GROUND: Pale greyish brown slightly silty slightly gravelly medium SAND. Gravel is subangular to subrounded quartz and sandstone.		1.20						
POSSIBLE MADE GROUND: Soft to firm orange brown mottled grey slightly sandy SILT.								
Firm to stiff grey mottled brown slightly silty friable CLAY with rare gravels of angular to subangular fine to medium sandstone and coal. (Pennine Lower Coal Measures Formation).		3.00						
At 8.00m with band of coal, recovered as angular fine to medium gravel.								
Below 9.70m tending to extremely weak mudstone.								
EOH at 10.00m - Target depth reached.		10.00						

Observations / Remarks

1. Groundwater encountered at 3.80m, rising to 2.80m after 20 mins; and at 7.30m, rising to 6.15m after 20 mins.
2. Chiselling from 9.60m to 9.80m for 0.5hrs.
3. 50mm ID HDPE gas/groundwater monitoring standpipe installed to 10.00m. Response zone between 1.00m and 10.00m with gravel filter and geosock. Lockable flush cover fitted at surface.

Chiselling

From (m)	To (m)	Time (mins)
9.60	9.80	30

Water Added

From (m)	To (m)

Hammer Information

Serial No.	Energy Ratio %

Groundwater

Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks
3.80	4	-	20	2.80	
7.30	7	-	20	6.15	

Project Number

A112979

Project: **Friar Park Road**	Location Details	Status	Borehole Number
Location: **Wednesbury**	Easting: Northing:	DRAFT	**WYG02**
Client: **West Midlands Combined Authority**	Level: Depth: 7.60m		Sheet 1 of 1
	Logger: AT Type: CP		
	Inclination: 90°		

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time					Scale: 1:50
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)	Checked By:
0.00	1.20	Inspection Pit	Hand Tools	MD	1.20	200	1.50	150	20/08	08:00	0.00	0.00		Approved By:
1.20	7.60	Cable Percussion	Dando 175	MD	7.60	150			20/08	14:00	7.60	1.50		Start Date: 20/08/2019
														Finish Date: 20/08/2019

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfil	Samples and Testing: Depth (m)	Ref	Tests / Results
TOPSOIL: Grass over brown slightly clayey slightly gravelly fine SAND. Gravel is subangular to rounded fine to medium mudstone and quartzite.		0.10						
MADE GROUND: Dark brown slightly gravelly fine to medium SAND. Gravel is angular to subrounded fine to medium mudstone, slag, ash and clinker.		0.50						
Dark orange brown slightly silty slightly gravelly fine to medium SAND with rare cobbles of mudstone. Gravel is subangular to rounded fine to coarse mudstone, siltstone and sandstone.								
Soft to firm greyish brown silty slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium mudstone and sandstone.		1.80						
Firm grey silty slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium mudstone, sandstone and occasional coal.		3.00						
Below 4.00m becoming firm to stiff.								
Soft to firm light grey silty slightly sandy slightly gravelly CLAY. Gravel is subangular to rounded fine mudstone and quartzite.		4.80						
COAL recovered as black and dark grey gravelly medium to coarse SAND with occasional coarse gravel-sized pockets of soft grey clay. Gravel is angular fine to coarse coal.		6.80						
Stiff to very stiff grey slightly silty CLAY, in parts tending to extremely weak mudstone.		7.10						
EOH at 7.60m - Target strata reached.		7.60						

Observations / Remarks

1. No groundwater encountered.
2. 50mm ID HDPE gas/groundwater monitoring standpipe installed to 7.60m. Response zone between 1.00m and 7.60m with gravel filter and geosock. Lockable flush cover fitted at surface.

Chiselling			Water Added		Hammer Information	
From (m)	To (m)	Time (mins)	From (m)	To (m)	Serial No.	Energy Ratio %

Groundwater					
Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks

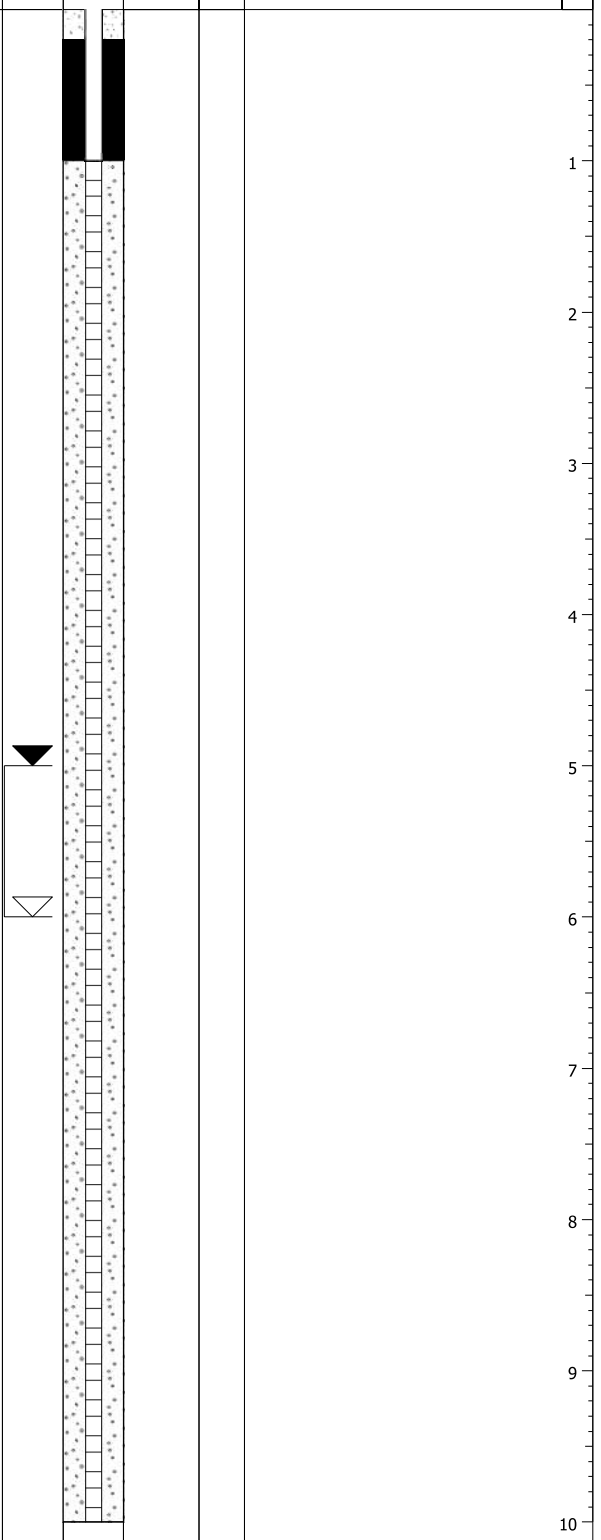
Project Number

A112979

Project: **Friar Park Road**	Location Details		Status	Borehole Number
Location: **Wednesbury**	Easting:	Northing:	DRAFT	**WYG03**
Client: **West Midlands Combined Authority**	Level:	Depth: 10.00m		Sheet 1 of 1
	Logger: AT	Type: CP		
		Inclination: 90°		

Method, Plant and Crew					Diameter		Casing		Drilling Progress by Time					Scale: 1:50
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Date	Time	Depth (m)	Casing (m)	Water (m)	Checked By:
0.00	1.20	Inspection Pit	Hand Tools	RT/JT	1.20	200	10.00	150	13/09	08:00	0.00	0.00		Approved By:
1.20	10.00	Cable Percussion	Dando 175	RT/JT	10.00	150			13/09	15:00	10.00	10.00	5	Start Date: 13/09/2019
														Finish Date: 13/09/2019

Strata Description	Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing: Depth (m)	Ref	Tests / Results
TOPSOIL: Grass over brown slightly clayey slightly gravelly fine SAND. Gravel is subangular to rounded fine to medium mudstone and quartzite.		0.10						
MADE GROUND: Dark reddish brown slightly silty slightly gravelly coarse SAND. Gravel is subangular to subrounded fine to medium, occasionally coarse, mudstone and quartzite.								
MADE GROUND: Soft dark grey silty slightly sandy slightly gravelly friable CLAY. Gravel is angular to rounded fine to medium brick, ash and clinker.		0.60						
Dark greyish brown silty slightly gravelly medium to coarse SAND. Gravel is subangular to rounded fine to coarse mudstone. (River Terrace Deposits)		2.50						
Orange brown clayey SAND & GRAVEL of subangular to rounded fine to coarse mixed lithologies, with low cobble content of subangular to rounded mudstone and sandstone. (River Terrace Deposits)		5.50						
EOH at 10.00m - Target depth reached.		10.00						



Observations / Remarks

1. Groundwater encountered at 6.00m, rising to 5.00m after 20 mins.
2. 50mm ID HDPE gas/groundwater monitoring standpipe installed to 10.00m. Response zone between 1.00m and 10.00m with gravel filter and geosock. Lockable flush cover fitted at surface.

Chiselling			Water Added		Hammer Information	
From (m)	To (m)	Time (mins)	From (m)	To (m)	Serial No.	Energy Ratio %
			1.20	6.00		

Groundwater					
Strike (m)	Casing (m)	Sealed (m)	Time (min)	Rose To (m)	Remarks
6.00	-	-	20	5.00	

Project Number

A112979

WYG ENVIRONMENT

3rd Floor, 54 Hagley Road, Edgbaston, Birmingham, B16 8PE
Tel: 0121 516 5320

GROUNDWATER / GAS MONITORING RECORD SHEET

Client:	WMCA	**Job No.:**	A112428-38	**Instruments Used:**	Dip Meter & Infra Red Gas Analyser
Project:	Friar Park	**Date:**	22.06.2020 & 01.07.2020	**Monitored By:**	**AT**
Weather:	Cloudy, light wind				

Installation No.	Elevation of cover (m agl)	Peak [1] CH_4 (% vol)	Peak [1] CO_2 (% vol)	Steady [2] CH_4 (% vol)	Steady [2] CO_2 (% vol)	Steady [2] O_2 (% vol)	Steady [2] CO (ppm)	Steady [2] H_2S (ppm)	Total gas flow rate (l/hr)	Peak CH_4 flow rate (l/hr)	Peak CO_2 flow rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth to Cover (m bgl)	Base Depth (m bgl)	Water Level (m bgl)	Remarks
WYG01	0.00	0.0	0.8	0.0	0.8	19.8	1.0	0.0	0.0	0.000	0.000	993	2.83	9.78	2.83	Undertaken on 22.06.20
WYG02	0.00											993	5.71	7.45	5.71	Undertaken on 22.06.20. Cover desroyed, no bung
WYG03	0.00	2.2	0.5	2.2	0.5	4.8	1.0	0.0	0.2	0.004	0.001	993	2.26	10.01	2.26	Undertaken on 22.06.20
BH01	0.00	0.0	6.2	0.0	6.2	17.1	1.0	0.0	3.1	0.000	0.192	993	12.31	22.17	12.31	Undertaken on 01.07.20
BH02	0.00	0.2	0.9	0.2	0.9	19.4	1.0	1.0	0.2	0.000	0.002	993	1.61	4.59	1.61	Undertaken on 01.07.20
BH03	0.00	17.6	17.4	17.6	17.4	1.2	2.0	1.0	6.3	1.109	1.096	993	8.11	14.13	8.11	Undertaken on 01.07.20

Background Gas Levels:

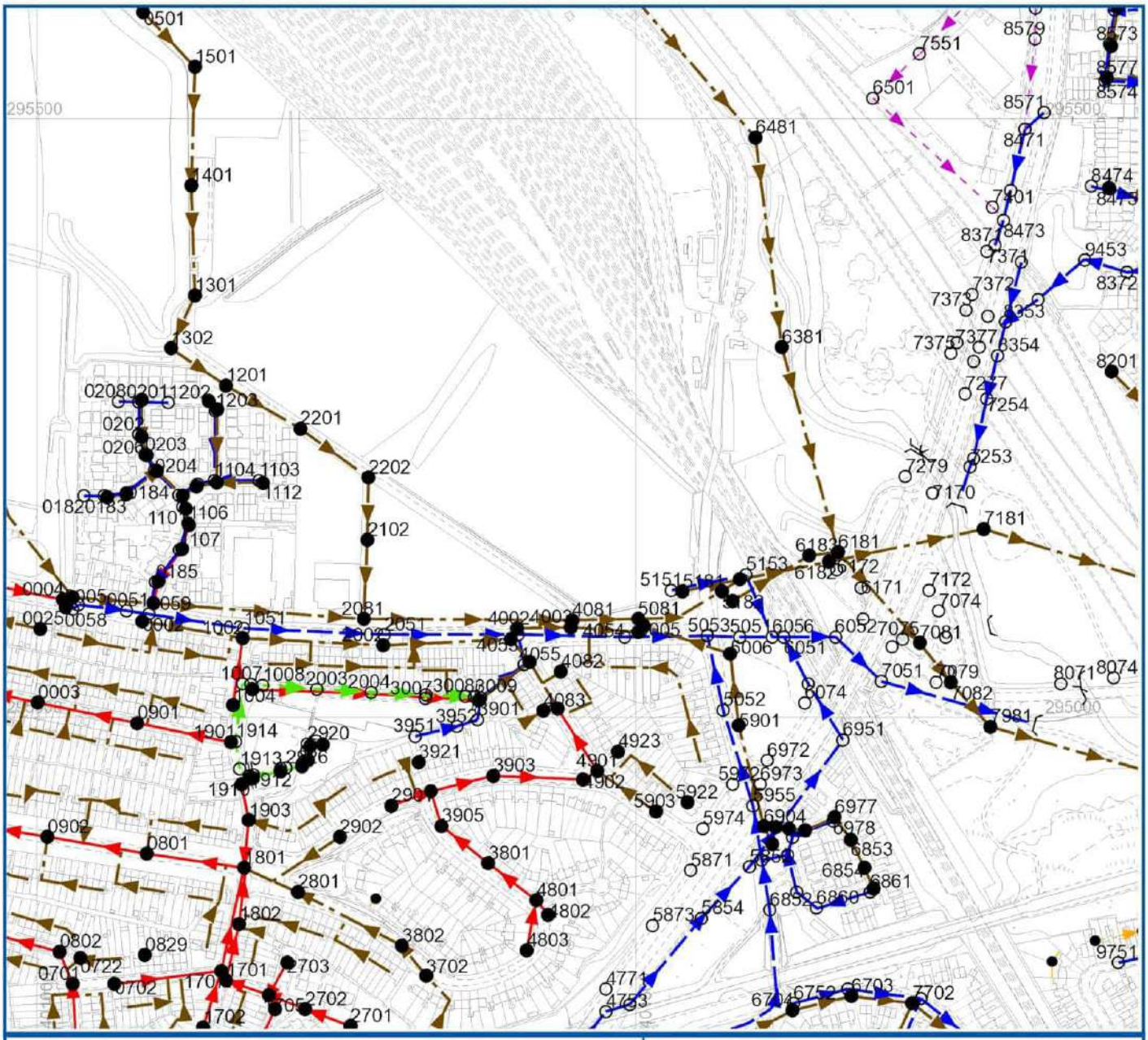
	CH_4 (%)	CO_2 (%)	O_2 (%)	Atmos. (mbar)
Before Monitoring	0.0	0.1	21.2	992
After Monitoring	0.0	0.1	20.9	994

Characteristic Gas Situation	
1	
2	
3	
4	

[1] The peak reading is the maximum recorded level during a monitoring event.

[2] The steady reading is the level which remained constant after approximately 1 minute.

Appendix E: Existing Site Drainage



LEGEND

Ancillary
- Balancing Lagoon
- Grease Trap
- Interceptor
- Screen

Chamber
- Flushing Chamber
- Soakaway
- Overflow

Fitting
- Blind Shaft
- Facility Connector
- Head Node
- Lamphole
- Sewerage Air Valve
- Sewerage Chemical Injection Point
- Sewerage Hatch Box
- Sewerage Pressure Washout
- Vent Column
- Waste Water Outfall

Control Valve
- Hydrobrake
- Penstock
- Sewerage Isolation Valve
- Sewerage Non Return Valve

Manhole
- Foul Bifurcation Manhole
- Combined Bifurcation Manhole
- Surface Water Bifurcation Manhole
- Dual Manhole
- Foul Single Manhole
- Combined Single Manhole
- Surface Water Single Manhole
- Twin Manhole
- Foul Adopted Manhole
- Combined Adopted Manhole
- Surface Adopted Manhole
- Transferred Manhole
- Unsurveyed Manhole

Operational Site

Waste Water Pump
- S104
- Transferred Asset
- S102
- Not STW
- Adopted Sewer
- None
- Highway Drain
- Not Private
- S98

Storage
- Disposal Site
- Off-Line Waste Water Storage
- On-Line Waste Water Storage
- Wet Well

Waste Water Process Structure
- Sewage Treatment Point
- Sewage Treatment Structure
- Sludge Treatment Point
- Sludge Treatment Structure

Gravity Sewer Pipe
- Foul Gravity Sewer
- Combined Gravity Sewer
- Surface Water Gravity Sewer
- S104 Surface Water Gravity Sewer
- S104 Combined Gravity Sewer
- S104 Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Transferred Surface Water Sewer
- Transferred Combined Sewer
- Transferred Foul Sewer
- Disposal Pipe
- Overflow Pipe
- Culverted Water Course
- Waste Internal Site Pipe
- Sewer Service Connection
- Gravity Sewer Others

Pressure Sewer Pipe
- Surface Water Pressure Sewer
- Combined Pressure Sewer
- Foul Pressure Sewer
- S104 Surface Water Pressure Sewer
- S104 Combined Pressure Sewer
- S104 Foul Pressure Sewer
- Private Surface Water Pressure Sewer
- Private Combined Pressure Sewer
- Private Foul Pressure Sewer
- Surface Water Vacuum Sewer
- Foul Vacuum Sewer
- Combined Vacuum Sewer
- S104 Surface Water Vacuum Sewer
- S104 Combined Vacuum Sewer
- S104 Foul Vacuum Sewer
- Private Surface Water Vacuum Sewer
- Private Combined Vacuum Sewer
- Private Foul Vacuum Sewer
- Surface Water Siphon
- Combined Siphon
- Foul Siphon
- Private Surface Water Siphon
- Private Combined Siphon
- Private Foul Siphon
- S104 Surface Water Siphon
- S104 Combined Siphon
- S104 Foul Siphon
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Disposal Pipe

Service Pipe
- Surface Water Lateral Drain
- Combined Lateral Drain
- Foul Lateral Drain
- S104 Surface Water Lateral Drain
- S104 Combined Lateral Drain
- S104 Foul Lateral Drain
- Private Surface Water Lateral Drain
- Private Combined Lateral Drain
- Private Foul Lateral Drain
- Transferred Surface Water Lateral D
- Transferred Combined Lateral Drain
- Transferred Foul Lateral Drain

Print500mLine

N, W, E, S

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0345 601 6616

SEWER RECORD

O/S Map Scale: 1:5,000

This map is centred upon:

Date of Issue: 05-03-20

X: 401298.38 **Y:** 295529.02

Disclaimer Statement:

1 Do not scale off this Map.

2 This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.

3 On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, Transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012. Private pumping stations, which form part of these sewers or lateral drains, will transfer to ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not possess complete records of these assets. These assets may not be displayed on the map.

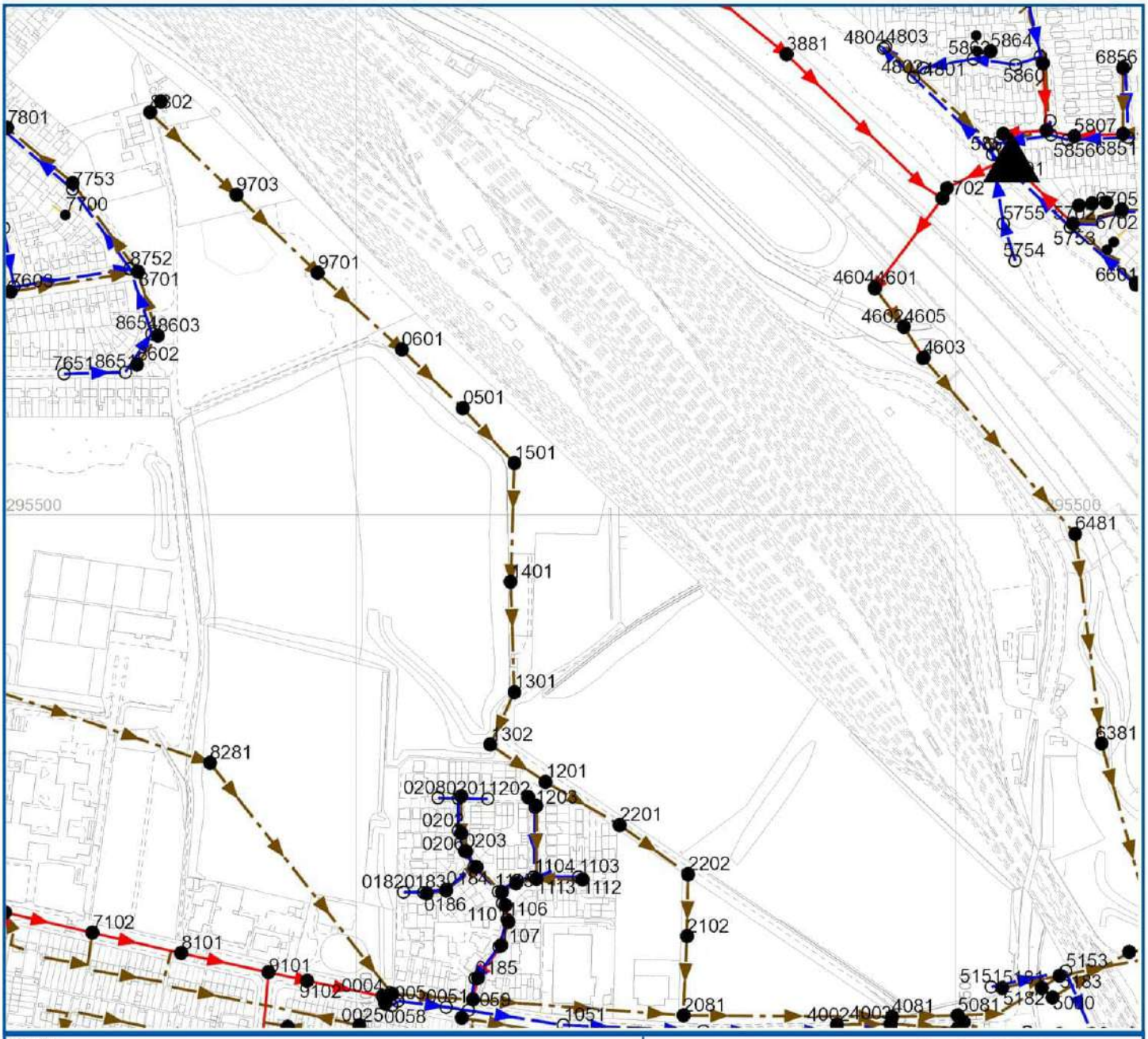
5 Ordnance Survey licence number: **100031673**

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SP01955004	<UNK>	110.685	<UNK>	F	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SP01955754	<UNK>	<UNK>	<UNK>	S	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP01945901	115.525	114.331	112.086	F	VC	C	375	<UNK>	26.85	31/12/1899 00:00:00
SP01956052	111.97	108.24	<UNK>	S	CO	C	1125	<UNK>	0	31/12/1899 00:00:00
SP01956381	109.25	104.54	104.12	F	CSB	C	2100	<UNK>	422.24	31/12/1899 00:00:00
SP01957252	109.902	107.942	107.912	S	CO	C	750	<UNK>	254	31/12/1899 00:00:00
SP01957254	<UNK>	<UNK>	107.942	S	CO	C	750	<UNK>	0	31/12/1899 00:00:00
SP01961002	113.22	111.29	110.96	C	CO	C	525	<UNK>	133.12	31/12/1899 00:00:00
SP01954006	115.9929	113.656	113.1	F	VC	C	375	<UNK>	50.77	31/12/1899 00:00:00
SP01955808	<UNK>	<UNK>	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP00949902	121.0899	117.966	117.201	C	CO	C	525	<UNK>	49.96	31/12/1899 00:00:00
SP00959703	115.72	114.18	113.82	F	VC	C	225	<UNK>	261.31	31/12/1899 00:00:00
SP01940801	122.2099	120.381	119.685	C	VC	C	450	<UNK>	120.24	31/12/1899 00:00:00
SP01941902	124.4199	122.591	122.07	C	VC	C	225	<UNK>	58.83	31/12/1899 00:00:00
SP01942901	126.8199	124.636	122.422	C	VC	C	225	<UNK>	15.89	31/12/1899 00:00:00
SP01951003	120.069	118.164	116.212	C	VC	C	225	<UNK>	98.17	31/12/1899 00:00:00
SP01952051	116.2129	112.174	111.504	S	CO	C	825	<UNK>	167.16	31/12/1899 00:00:00
SP01953052	118.1679	116.593	114.565	S	VC	C	225	<UNK>	23.16	31/12/1899 00:00:00
SP01954601	109.7799	104.9	104.87	F	CSB	C	2100	<UNK>	1333.33	31/12/1899 00:00:00
SP01954603	109.44	104.77	104.647	F	CSB	C	2100	<UNK>	1618.83	31/12/1899 00:00:00
SP01954702	111.5	105.26	104.9	F	CSB	C	2100	<UNK>	260	31/12/1899 00:00:00
SP01955005	114.3	112	<UNK>	F	VC	C	300	<UNK>	0	31/12/1899 00:00:00
SP01955006	113.2959	112.086	110.685	F	VC	C	225	<UNK>	53.99	31/12/1899 00:00:00
SP01955151	112.2279	109.51	109.178	S	VC	C	450	<UNK>	191.97	31/12/1899 00:00:00
SP01955182	111.5	108.24	105.82	F	CO	C	1500	<UNK>	4.98	31/12/1899 00:00:00
SP01955182	111.5	108.24	108.23	F	CO	C	900	<UNK>	1808	31/12/1899 00:00:00
SP01954605	109.8	104.87	104.77	C	CO	R	2100	1500	307.6	31/12/1899 00:00:00
SP01955051	112.7979	109.191	108.5	S	CO	C	900	<UNK>	39.13	31/12/1899 00:00:00
SP01957081	110.65	104.014	103.986	F	CSU	C	2400	<UNK>	1400.33	31/12/1899 00:00:00
SP01957253	109.7819	107.912	<UNK>	S	CO	C	750	<UNK>	0	31/12/1899 00:00:00
SP01951302	113.7399	112.47	112.29	F	VC	C	300	<UNK>	308.17	31/12/1899 00:00:00
SP01955702	<UNK>	<UNK>	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP01956851	<UNK>	<UNK>	<UNK>	S	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP01955804	<UNK>	<UNK>	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP00958001	119.8779	117.744	116.711	C	VC	C	225	<UNK>	89.87	31/12/1899 00:00:00
SP00958603	119.65	117.74	117.31	F	VC	C	225	<UNK>	129.91	31/12/1899 00:00:00
SP00958651	121.05	118.69	117.81	S	VC	C	225	<UNK>	44.38	31/12/1899 00:00:00
SP00958281	118.4	109.78	109.63	F	CSB	C	2100	<UNK>	1637.8	31/12/1899 00:00:00
SP01942902	127.9499	125.791	122.272	F	VC	C	225	<UNK>	19.07	31/12/1899 00:00:00
SP01943903	122.1699	119.935	116.806	C	VC	C	225	<UNK>	23.98	31/12/1899 00:00:00
SP01940901	120.5599	117.944	117.13	C	VC	C	300	<UNK>	104.59	31/12/1899 00:00:00
SP01950003	119.568	117.13	116.661	C	VC	C	375	<UNK>	178.62	31/12/1899 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SP01950501	114.58	113.32	113.09	F	VC	C	300	<UNK>	273.78	31/12/1899 00:00:00
SP01951004	121.302	118.838	114.451	C	VC	C	225	<UNK>	12.89	31/12/1899 00:00:00
SP01952202	113.2259	111.85	111.58	F	VC	C	300	<UNK>	192.63	31/12/1899 00:00:00
SP01954002	115.9	113	112.55	F	VC	C	300	<UNK>	100.02	31/12/1899 00:00:00
SP01954003	114.8399	112.55	112	F	VC	C	300	<UNK>	102.07	31/12/1899 00:00:00
SP01954055	115.952	114.565	111.504	S	VC	C	225	<UNK>	8.33	31/12/1899 00:00:00
SP01954081	114.9199	109.4	109.37	F	CSB	C	2100	<UNK>	1833.67	31/12/1899 00:00:00
SP01955052	115.0559	113.227	110.525	S	VC	C	300	<UNK>	23.46	31/12/1899 00:00:00
SP01955081	114.15	109.37	108.24	F	CSB	C	2100	<UNK>	67.27	31/12/1899 00:00:00
SP01955181	112.1999	109.29	108.23	F	CI	C	950	<UNK>	46.27	31/12/1899 00:00:00
SP01956056	112.3659	108.5	108.25	S	CO	C	900	<UNK>	40	31/12/1899 00:00:00
SP01956183	<UNK>	105.16	104.42	F	CO	C	1500	<UNK>	32.69	31/12/1899 00:00:00
SP01951002	117.1429	114.451	113.762	F	VC	C	300	<UNK>	169.78	31/12/1899 00:00:00
SP01951201	113.5199	112.29	112.03	F	VC	C	300	<UNK>	275.73	31/12/1899 00:00:00
SP01955853	<UNK>	<UNK>	<UNK>	S	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP01945852	119.231	116.513	<UNK>	S	VC	C	450	<UNK>	0	31/12/1899 00:00:00
SP00958602	120.48	118.02	117.74	F	VC	C	225	<UNK>	105.36	31/12/1899 00:00:00
SP00958802	117.9	116.08	114.18	F	VC	C	225	<UNK>	52.48	31/12/1899 00:00:00
SP01941901	123.9	121.538	117.944	C	VC	C	225	<UNK>	22.18	31/12/1899 00:00:00
SP01941903	124.4899	122.07	121.674	C	VC	C	225	<UNK>	100.5	31/12/1899 00:00:00
SP01943801	128.85	126.335	125.373	C	VC	C	225	<UNK>	51.9	31/12/1899 00:00:00
SP00959701	115.36	113.82	113.54	F	VC	C	225	<UNK>	338.75	31/12/1899 00:00:00
SP01955153	110.688	109.178	108.5	S	CO	C	950	<UNK>	83.03	31/12/1899 00:00:00
SP01956181	109.18	104.12	104.014	F	CSU	C	2400	<UNK>	927.09	31/12/1899 00:00:00
SP01957051	<UNK>	<UNK>	<UNK>	S	CO	C	1125	<UNK>	0	31/12/1899 00:00:00
SP01958354	111.383	109.44	<UNK>	S	CO	C	750	<UNK>	0	31/12/1899 00:00:00
SP01961104	113.05	110.96	110.82	C	CO	C	525	<UNK>	327.07	31/12/1899 00:00:00
SP01951051	117.0169	113.055	112.174	S	CO	C	825	<UNK>	133.08	31/12/1899 00:00:00
SP01955701	<UNK>	<UNK>	<UNK>	C	<UNK>	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP01955701	<UNK>	<UNK>	<UNK>	F	U	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP01950005	117.2129	113.63	113.63	F	CO	C	825	<UNK>	0	31/12/1899 00:00:00
SP01956853	<UNK>	<UNK>	<UNK>	S	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP01955859	<UNK>	<UNK>	<UNK>	S	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP01953903	<UNK>	<UNK>	112.24	C	VC	C	375	<UNK>	0	31/12/1899 00:00:00
SP01955807	<UNK>	<UNK>	<UNK>	C	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP01955852	<UNK>	<UNK>	<UNK>	S	U	U	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP01950051	117.2129	113.378	113.317	S	CO	C	825	0	314.83	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	<UNK>	<UNK>	<UNK>	<UNK>	<UNK>	10/05/2012 00:00:00
SP01966002	122.3	120.41	117.48	C	VC	C	225	0	6.92	31/12/1899 00:00:00
SP01957757	<UNK>	<UNK>	<UNK>	S	U	U	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP01954083	<UNK>	0	0	F	<UNK>	C	0	0	0	31/12/1899 00:00:00
SP01954082	<UNK>	<UNK>	<UNK>	F	<UNK>	C	<UNK>	<UNK>	0	31/12/1899 00:00:00



LEGEND

Ancillary
- Balancing Lagoon
- Grease Trap
- Interceptor
- Screen

Chamber
- Flushing Chamber
- Soakaway
- Overflow

Fitting
- Blind Shaft
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- Sewerage Air Valve
- Sewerage Chemical Injection Point
- Sewerage Hatch Box
- Sewerage Pressure Washout
- Vent Column
- Waste Water Outfall

Control Valve
- Hydrobrake
- Penstock
- Sewerage Isolation Valve
- Sewerage Non Return Valve

Manhole
- Foul Bifurcation Manhole
- Combined Bifurcation Manhole
- Surface Water Bifurcation Manhole
- Dual Manhole
- Foul Single Manhole
- Combined Single Manhole
- Surface Water Single Manhole
- Twin Manhole
- Foul Adopted Manhole
- Combined Adopted Manhole
- Surface Adopted Manhole
- Transferred Manhole
- Unsurveyed Manhole

Operational Site

Waste Water Pump
- S104
- Transferred Asset
- S102
- Null STW
- Adopted Sewer
- None
- Highway Drain
- Null Private
- S04

Storage
- Disposal Site
- Off-Line Waste Water Storage
- On-Line Waste Water Storage
- Wet Well

Waste Water Process Structure
- Sewage Treatment Point
- Sewage Treatment Structure
- Sludge Treatment Point
- Sludge Treatment Structure

Gravity Sewer Pipe
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- Surface Water Gravity Sewer
- S104 Surface Water Gravity Sewer
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- S104 Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Transferred Surface Water Sewer
- Transferred Combined Sewer
- Transferred Foul Sewer
- Disposal Pipe
- Overflow Pipe
- Culverted Water Course
- Waste Internal Site Pipe
- Sewer Service Connection
- Gravity Sewer Others

Pressure Sewer Pipe
- Surface Water Pressure Sewer
- Combined Pressure Sewer
- Foul Pressure Sewer
- S104 Surface Water Pressure Sewer
- S104 Combined Pressure Sewer
- S104 Foul Pressure Sewer
- Private Surface Water Pressure Sewer
- Private Combined Pressure Sewer
- Private Foul Pressure Sewer
- Surface Water Vacuum Sewer
- Foul Vacuum Sewer
- Combined Vacuum Sewer
- S104 Surface Water Vacuum Sewer
- S104 Combined Vacuum Sewer
- S104 Foul Vacuum Sewer
- Private Surface Water Vacuum Sewer
- Private Combined Vacuum Sewer
- Private Foul Vacuum Sewer
- Surface Water Siphon
- Combined Siphon
- Foul Siphon
- Private Surface Water Siphon
- Private Combined Siphon
- Private Foul Siphon
- S104 Surface Water Siphon
- S104 Combined Siphon
- S104 Foul Siphon

Service Pipe
- Surface Water Lateral Drain
- Combined Lateral Drain
- Foul Lateral Drain
- S104 Surface Water Lateral Drain
- S104 Combined Lateral Drain
- S104 Foul Lateral Drain
- Private Surface Water Lateral Drain
- Private Combined Lateral Drain
- Private Foul Lateral Drain
- Transferred Surface Water Lateral D
- Transferred Combined Lateral Drain
- Transferred Foul Lateral Drain

Print500mLine

N
W E
S

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0345 601 6616

SEWER RECORD

O/S Map Scale: 1:5,000

This map is centred upon:

Date of Issue: 05-03-20

X: 401179.94 **Y:** 295438.15

Disclaimer Statement:

1 Do not scale off this Map.

2 This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.

3 On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, Transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012. Private pumping stations, which form part of these sewers or lateral drains, will transfer to ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not possess complete records of these assets. These assets may not be displayed on the map.

5 Ordnance Survey licence number: **100031673**

Appendix F: Drainage Connection Correspondence

WONDERFUL ON TAP

Severn Trent Water Ltd
Regis Road
Wolverhampton
WV6 8RU

Tel: 0345 2667930
www.stwater.co.uk
net.dev.west@severntrent.co.uk

Contact: Sadeq Hadi

Your ref:
Our ref: 8398186

Mr Charlie Smith
Campbell Reith Hill LLP
1 Marsden Street
Manchester
M2 1HW

27th February 2020

Dear Mr Smith,

Proposed development for 750 houses @ Friars Park Road, Wednesbury

I refer to your 'Development Enquiry Request' in respect of the above site. Please find enclosed the sewer records that are included in the fee together with the Supplementary Guidance Notes which refer to surface water disposal from development sites.

Public Sewers within the site – Required Protection.

According to our sewer records there is a 2100mm Concrete sectioned foul sewer that runs through the proposed site and south of the site. This sewer will have a statutory 7.5M protection zone either side of the centre line of the pipe where no building will be allowed. The sewer records also illustrate a 300mm foul sewer within the eastern section of the site. This sewer will have a 5M protection zone either side of the centre line of the pipe where no building will be allowed. The surface water and foul sewers located south of the site will also require protective strips. It should be noted that the layout of proposed dwellings should accommodate access to public sewers and therefore these pipes should not be contained within rear gardens or private accesses.

Also, due to a change in legislation on 1st October 2011, there may be former private sewers on the site which have transferred to the responsibility of Severn Trent Water Limited, which are not shown on the statutory sewer records, but are located in your client's land. These sewers would have protective strips that we will not allow to be built over. If such sewers are identified to be present on the site, please contact us for further guidance.

Foul Water Drainage

A connection will be acceptable into the 2100mm foul sewer crossing the site or into the 300mm located within the eastern section of the site, at any convenient point. You may wish to have multiple connections to accommodate the site using both networks, this will be acceptable to the company. Each connection into the sewer will require a S106 approval.

Surface Water Drainage

Under the terms of Section H of the Building Regulations 2010, the disposal of surface water by means of soakaways should be considered as the primary method. In the event that following testing, it is demonstrated that soakaways would not be possible on the site, then satisfactory evidence will need to be submitted. The evidence should be either percolation test results or a statement from the SI consultant (extract or a supplementary letter). This would satisfy the SGN.

If this is not practical, a connection into the 450mm surface water network south of the site at manhole 5154, 5153 or into the 900mm concrete surface water network in Friar Park Road at any convenient point will be acceptable to the company, subject to flow restrictions in accordance with Lead Local Flood Authority. Connection into the network will require a S106 approval (see below).

New Connections

For any new connections (including the re-use of existing connections) to the public sewerage system, the developer will need to submit Section 106 application forms. Application to have the development sewers adopted by the Water Company under S104 of the 1991 Water Industry Act should be made separately from any S106 sewer connection application. Our New Connections department are responsible for handling all such enquiries and applications. To contact them for an application form and associated guidance notes please call 0800 7076600 or download from www.stwater.co.uk.

Please quote 8398186 in any future correspondence (including e-mails) with STW Limited. Please note that 'Development Enquiry' responses are only valid for 6 months from the date of this letter.

Yours sincerely

Sadeq Hadi
Asset Protection (Waste Water) West
Wholesale Production

RE: 13568: Friar Park, Wednesbury - Discharge rate enquiry
Mark Sifford to: ElannaHerod@campbellreith.com 15/04/2021 16:45
History:
This message has been forwarded.

Elanna,

Further to our recent emails I can confirm that following additional discussions with Staffs CC that in accordance with CIRIA C753 Section 24.2.2 the whole site area may be used in the generation of greenfield run-off calculations for the proposed development.

Again, I apologise for the delay in providing this confirmation.

Kind regards,

Mark Sifford
Engineer – Highways and Lead Local Flood Authority
Due to the ongoing COVID 19 issues I am now primarily working from home.
I can be contacted via e-mail, the below mobile number, SKYPE or Microsoft Teams.

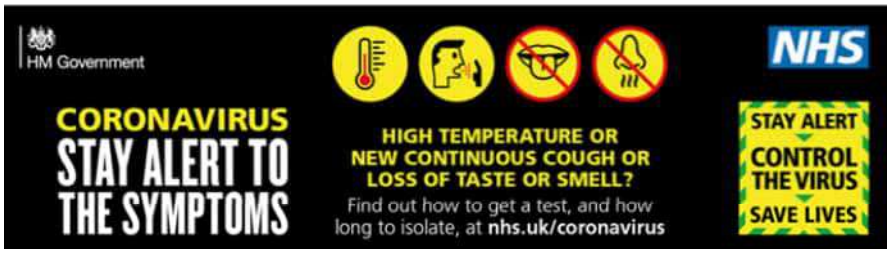
Sandwell
Metropolitan Borough Council

Sandwell Council...working for you

T: 0121 569 4030
M: 07813 546891
E: mark_sifford@sandwell.gov.uk

Sandwell Council
Council House
Oldbury
B69 3DE
W: www.sandwell.gov.uk

Get social with Sandwell...



From: ElannaHerod@campbellreith.com <ElannaHerod@campbellreith.com>
Sent: 15 April 2021 12:08
To: Mark Sifford <Mark_Sifford@sandwell.gov.uk>
Subject: Fw: 13568: Friar Park, Wednesbury - Discharge rate enquiry

Good morning Mark,

I sent you an email back in March enquiring about the method for calculating the greenfield runoff rate for our site at Friar Park in Wednesbury. I understand from our previous correspondence that this will need to be confirmed with Staffordshire County Council. If no response has been received to date would it be beneficial to set up a video conference meeting with yourself and SCC to discuss our below enquiry?

Kind Regards

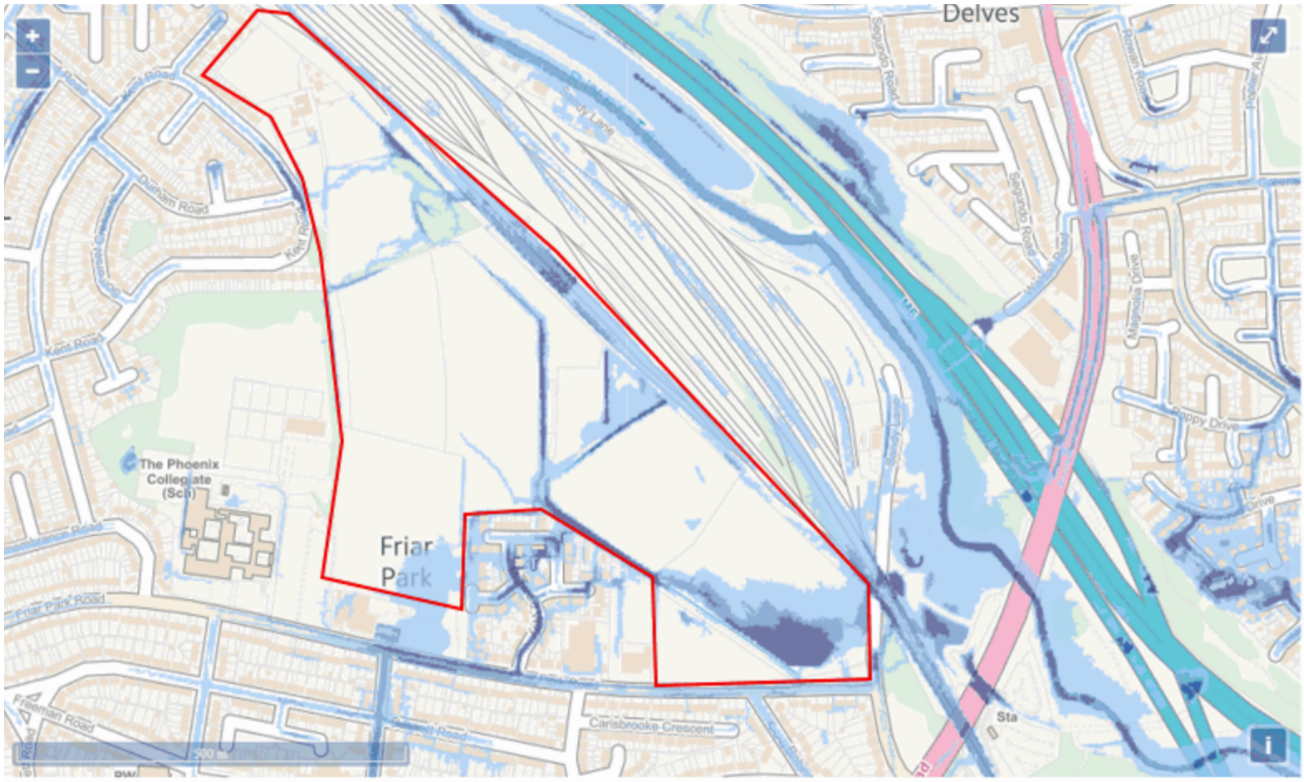
Elanna Herod
Project Engineer

CampbellReith
consulting engineers
No. 1 Marsden Street
Manchester
M2 1HW

Tel: +44 (0)161 819 3062
www.campbellreith.com
----- Forwarded by Elanna Herod/CRH on 15/04/2021 10:22 -----

From: Elanna Herod/CRH
To: "Mark Sifford" <Mark_Sifford@sandwell.gov.uk>
Cc: Garry Taylor/CRH@Campbellreith
Date: 16/03/2021 16:32
Subject: 13568: Friar Park, Wednesbury - Discharge rate enquiry

Good afternoon Mark,
We are currently in the process of producing a drainage design for the proposed development off Friar Park Road in Wednesbury, WS10 0ST.
In our correspondence dated 19th February 2021 it was stated that the peak flow rate should be calculated based on the proposed impermeable area x 5 l/s/ha to provide the surface water drainage discharge rate post-development (see email thread below) however, we would like to discuss further the rationale behind the calculation of the peak flow from the site.
Borehole logs obtained from the British Geological Survey Website shows a number of boreholes within the site boundary. A review of these logs show the underlying ground to comprise primarily of clay and made ground with areas of shallow groundwater around 2-3m below ground level. The topography of the site is also shown to be relatively steep with a fall of approximate 12m across the site.
Taking into account the underlying clay and the steep topography of the site, the proportion of rainfall which forms runoff is likely to be significantly increased. This is evidenced by the Environment Agency's Surface Water Flood Map which shows a number of existing overland flow routes running through the site and accumulating in the south east corner of the site in a topographical depression.



Since the site falls towards Friar Park Road, it is expected that runoff from proposed pervious areas, such as gardens/landscaped areas, will continue to follow the natural topography through the proposed development and into the proposed drainage system, which will ultimately outfall into the River Tame 200m to the east of the site. As such we feel an approach in accordance with CIRIA C-753 Section 24.2.2 would be more appropriate in this instance.

Section 24.2.2 states that:

The runoff area used in any of the runoff estimation methods should be consistent; for example, if the whole site area is used in the greenfield runoff rate calculations, the whole site should also be represented in the runoff calculations for the proposed development. If there is a landscaped area in the developed scenario that discharges directly to receiving waters and does not contribute to the drainage system (so is excluded from the calculations) then this area should also be excluded from the greenfield calculations.

This is also reiterated in the Environment Agency's Rainfall Runoff Management for Developments Report – SC030219 which states that
The assumption should be made that all pervious areas continue to generate runoff for an extreme storm event, unless areas are specifically shown to have been designed not to contribute because of the topography of the site.
Although OS maps indicate two small ditches within the site boundary, a site investigation has proven that there is no evidence of a ditch in the south of the site and the northern ditch was implemented as part of a drainage system for the former treatment works previously occupied at the site and is no longer in use. Taking into consideration the above statements, the existing landscaped areas do not directly discharge to a watercourse and given the steep topography the proposed landscaped areas will not be able to be designed out. Therefore, the whole site is considered to contribute to the proposed drainage system for which allowances will need to be made and as such, the whole site area should be used to calculate the peak flow from the site.
We would be grateful for your thoughts on the above and if you feel a meeting to discuss further would be beneficial we would be happy to attend.

Kind Regards

Elanna Herod
Project Engineer

CampbellReith
consulting engineers

No. 1 Marsden Street
Manchester
M2 1HW

Tel: +44 (0)161 819 3062
www.campbellreith.com

From: "Mark Sifford" <Mark_Sifford@sandwell.gov.uk>
To: "ElannaHerod@campbellreith.com" <ElannaHerod@campbellreith.com>
Date: 19/02/2021 12:37
Subject: RE: General Enquiry - Greenfield Runoff Rate Methodology

Elanna,

Further to my recent email below I have now been able to discuss your enquiry, relating to areas for consideration of greenfield rate, with Staffs CC.

They have responded that the preference is for proposed greenfield rates to be based on the proposed impermeable area, the reasoning being that any non-impermeable areas will generally continue to run-off at greenfield rates.

Regards,

Mark Sifford
Engineer – Highways and Lead Local Flood Authority
Due to the ongoing COVID 19 issues I am now primarily working from home.
I can be contacted via e-mail, the below mobile number, SKYPE or Microsoft Teams.

Sandwell
Metropolitan Borough Council

Sandwell Council...working for you

T: 0121 569 4030
M: 07813 546891
E: mark_sifford@sandwell.gov.uk

Sandwell Council
Council House
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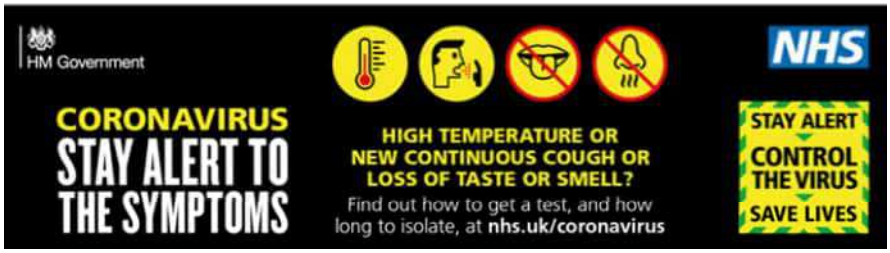
B69 3DE
W: www.sandwell.gov.uk

Get social with Sandwell...



From: Mark Sifford
Sent: 17 February 2021 10:17
To: ElannaHerod@campbellreith.com
Subject: General Enquiry - Greenfield Runoff Rate Methodology

Elanna,

I confirm I am in receipt of your enquiry dated 12th February.

By way of introduction I am involved with providing generic pre-app guidance for developers for Sandwell Lead Local Flood Authority. However, due to resourcing, Sandwell work in partnership with Staffordshire County Council's flood team with respect to their Lead Local Flood Authority duties. Staffordshire are LLFA consultees to Sandwell's Planning Team for all major applications so there is unfortunately some cross-over regarding parameter setting.

With respect to your specific enquiry I have now consulted with Staffs CC, their response is a follows;

Yes Wallingford would be our preferred approach.
The figures given however:

345 ls for 1/100 = 12.5 ls / ha
Ideally we would want to see near to 5ls per ha – they need to demonstrate they have looked at this rate of 5ls
If this approach to get to 5 ls is not achievable – they need to demonstrate why not achievable.

I would therefore, based on 27.6 Ha developable site area look to achieve closer to 138 l/s for 1 in 100 yr event or otherwise be able to provide justifiable reasons as requested.

For your further reference I attach Sandwell's standing advice for Flood Risk Assessments / SuDS and also Staffordshire CC's SuDS Handbook which under partnership working has been adopted by Sandwell MBC.

Regards,

Mark Sifford
Engineer - Highways Services / Lead Local Flood Authority

Sandwell
Metropolitan Borough Council

Sandwell Council…working for you

T 0121 5694030

M 07813 546891
E: mark_sifford@sandwell.gov.uk
W: www.sandwell.gov.uk

Sandwell Council
Regeneration & Growth
Sandwell Council House
PO Box 2374

Oldbury
West Midlands
B69 3DE.

satnav post code: B69 3DB

Get social with Sandwell...

Appendix G: Proposed Development Masterplan

Appendix H: Preliminary Drainage Strategy and Supporting Calculations

Notes

1. Do not scale from this drawing on print or electronically. Work from figured dimensions only.
2. No deviation from the details on this drawing is allowed without CampbellReith's prior permission in writing.
3. Read this drawing with all Architect's, Service Engineer's and CampbellReith's relevant details, specifications and drawings.
4. All work is to be done in accordance with the relevant specifications issued by CampbellReith, British Standard Codes of Practice, Statutory Requirements and the Contract Documents.
5. Drawing revision:
   - **P: Preliminary** Evolving drawings for approvals, tenders, billings etc.
   - **C: Contractual** Drawings authorized and approved for stage completion Stage-Tender or Stage 5-Construction.
6. Drawing status:
   Work in progress
   S0 - Initial status
   Shared (Non-contractual)
   S1 - Suitable for coordination, **S2** - Suitable for information, **S3** - Suitable for review and comment, **S4** - Suitable for stage approval.
   Published (For contractors purposes)
   A1, **An** etc - Authorised and accepted ('n' relates to work stages)
   B1, **Bn** etc - Partial sign-off (with comments)
   CR - As constructed record document (Final Construction ONLY. Any deviations to that which is on site is not the liability of CampbellReith)
7. Work Stages:
   2 - Concept, **3** - Definition, **4** - Design, **5** - Build & commission, **6** - Handover
8. Only drawings with **revision Cn and status A5 to be used for Construction**.

Rev	Description	Date	By

CampbellReith
consulting engineers

London	020 7340 1700	☐	■ Manchester	0161 819 3060	
Surrey	01737 784500	☐	☐ Birmingham	01675 467 484	
Bristol	0117 916 1066	☐	☐ Dubai	00 971 4345 7088	

www.campbellreith.com

Job Title: Friar Park, Wednesbury

Client: West Midlands Combined Authority

Drainage Layout

Drawn by	Date made	Scale @ A3	Checked by	Suitability	CR Project
JM	09/09/22	NTS	BT	S2	13568

Project No	Orig.	Funct.	Spatial	Form	Disc.	Number	Rev
13568	CRH	XX	0000	SK	C	4005	P1

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E: london@campbellreith.com

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Bristol

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