West Burton C (Gas Fired Generating Station)

Appendix 12A: Flood Risk Assessment

EDF Energy (Thermal Generation) Limited

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1. Introduction

1.1 Commission

1.1.1 AECOM Infrastructure and Environment Limited ('AECOM') has been commissioned by EDF Energy (Thermal Generation) Limited (hereafter referred to as 'the Applicant') to prepare a Flood Risk Assessment (FRA) in support of a Development Consent Order (DCO) application for a proposed gas fired generating station on the West Burton Power Station site near Gainsborough, Nottinghamshire (hereafter referred to as the 'Proposed Development').

1.2 Background

1.2.1 The Proposed Development Site (the Site) is located within the existing West Burton Power Station site and encompasses an area of approximately 32.8 hectares (ha) of which approximately 16.3ha comprises the built development and construction laydown area, and approximately 16.5ha of land is proposed for ecology and landscaping works. The centre of the Site is located at national grid reference (NGR) 480275, 386241 (the middle of the Proposed Power Plant Site) and is located approximately 3.5km to the south-west of the town of Gainsborough and approximately 1km to the north-east of Sturton-le-Steeple (see **Figure 1**). Vehicular access to the Site is via Gainsborough Road, which links to the A620 and A631. The nearest settlement is the village of Bole, which is located approximately 1km to the north-west of the Site.

1.2.2 The Site is located in Nottinghamshire, close to the Lincolnshire County boundary, which is defined by the River Trent, and also forms the Site's eastern border. Bassetlaw District Council (BDC) is the Local Planning Authority (LPA).

1.2.3 The Environment Agency Flood Zone Map (Ref 12A-1) shows that the Site lies predominantly within Flood Zone 1, which is land classed as having a less than 1 in 1000 Annual Exceedance Probability (AEP) of fluvial or tidal flooding (<0.1% AEP) in any year. However, there are some areas within the northern and eastern sections of the Site which are located within Flood Zones 2 and 3. These areas are respectively defined as having between a 1 in 100 and 1 in 1000 AEP and more than 1 in 100 AEP chance of flooding in any year.

1.2.4 The National Planning Policy Framework (NPPF) (Ref 12A-2) and the Planning Practice Guidance (PPG) (Ref 12A-3) specify that any development which falls within Flood Zone 2 or 3 should be accompanied by a site-specific FRA that identifies and assesses all forms of flooding to and from the Development. It should demonstrate how these flood risks will be managed so that the Development remains safe throughout its lifetime, taking into account the vulnerability of the Proposed Development and the potential impact of climate change on risk.

1.3 Scope of assessment

1.3.1 The aim of this study is to undertake a FRA that is appropriate to the nature and scale of the Proposed Development, which determines existing flood risk at, and arising from, the Proposed Development, and, where required, recommends suitable mitigation measures.

1.3.2 The objectives of this FRA report are to:

- collect and review existing information relating to the flood risk posed to the Proposed Development from all sources (e.g. fluvial, surface water, artificial, groundwater, drain and sewer flooding);
- consult with the Lead Local Flood Authority (LLFA) and the Environment Agency in relation to flood risk and their requirements for management of any risk;
- assess the flood risk to the Proposed Development under existing and post-development conditions (taking into account climate change); and
- outline any mitigating measures needed to ensure the Proposed Development and its occupants will be safe for the lifetime of the Proposed Development and to meet the requirements of the NPPF.

1.4 Data sources

1.4.1 The baseline conditions for the Site have been established through a desk study and via consultation with the Environment Agency, Nottinghamshire County Council (NCC) and BDC, where required. This information has been utilised to inform the assessment made within the FRA. Data collected during the course of this assessment is described in **Table 1-1**.

Table 1-1: Data sources

Purpose	Data Source	Comments
Identification of Hydrological Features	1: 25,000 Ordnance Survey (OS) mapping	Identifies the position of the Site and local hydrological features.
Identification of Existing Flood Risk	Topographical survey of the Site	Provides existing Site levels.
	Environment Agency Flood Map for Planning (online) (Ref 12A-1)	Identifies fluvial/tidal inundation extents and historical flooding.
	Environment Agency Flood Inundation Mapping (online) (Ref 12A-1)	Provides information on the risk of flooding from reservoirs (artificial

Purpose	Data Source	Comments
		sources).
	Nottinghamshire Preliminary Flood Risk Assessment (PFRA) (Ref 12A-4) Nottinghamshire Local Flood Risk Management Strategy (LFRMS) (Ref 12A-5) Nottinghamshire and Nottingham Level 1 Strategic Flood Risk Assessment (SFRA) (Ref 12A-6) Bassetlaw District Council Strategic Flood Risk Assessment (SFRA) (Ref 12A-7) River Trent Catchment Flood Management Plan (CFMP) (Ref 12A-8)	Assesses flood risk across the NCC and BDC boundary area. Includes flood risk from fluvial/tidal, sewers, overland flow and groundwater.
	British Geological Survey records (online) (Ref 12A-9)	Provides details of geology and hydrogeology in the vicinity of the Site.
	PFRA	Identifies the local drainage system near the Site
Identification of Historical Flooding	Consultation with statutory bodies SFRAs PFRA The Applicant	Provides details of historical flooding.
Details of the Scheme	Indicative Development Plans Outline Drainage Design (**Application Document Ref 7.8**)	Provides layout of the Proposed Development.
Surface Water Drainage	Consultation with statutory bodies OS Mapping SFRAs Environment Agency Flood Risk from Surface Water Map	Identifies existing site drainage, public drainage system near the Site and details of existing surface water runoff from the Site. Provides information

Purpose	Data Source	Comments
	(online) (Ref 12A-1) Bassetlaw District Council Core Strategy & Development Management Policies Development Plan Documents (Ref 12A-10a)	regarding drainage requirements for the Site.

2. Site Information

2.1 Site location and context

2.1.1 The Site is bordered to the east by the River Trent Main River, which forms the administrative boundary between Nottinghamshire and Lincolnshire, and falls within the administrative area of BDC (see **Figure 1**).

2.1.2 There are currently two power stations in operation within the existing West Burton Power Station site: West Burton A and West Burton B (refer to **Annex A**).

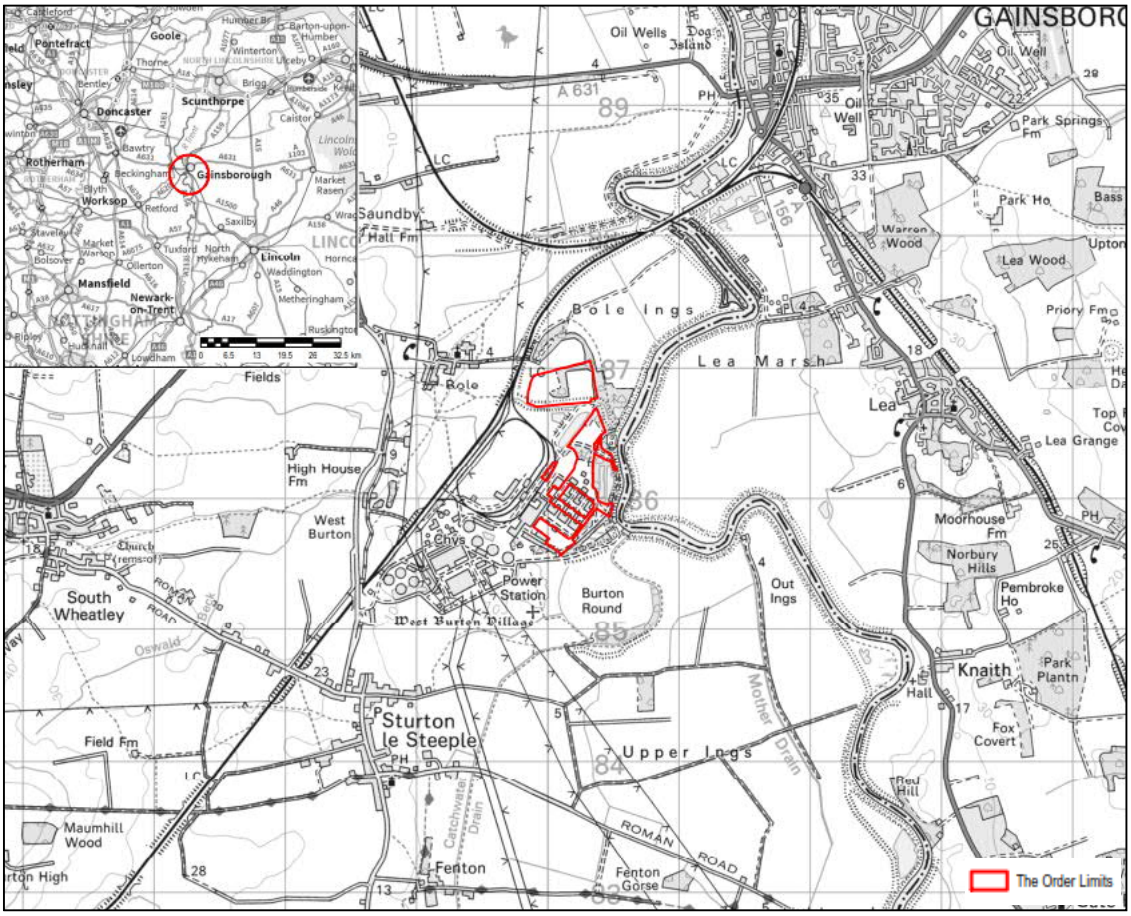
2.1.3 West Burton A (WBA) is a coal fired power station, originally commissioned in 1968, and is fully owned and operated by the Applicant. It comprises four coal fired units served by two chimney stacks (each 198m high) and supplies up to 2,000 megawatts (MW) to the National Grid, providing electricity to approximately two million homes.

2.1.4 West Burton B (WBB) is a combined cycle gas turbine (CCGT) power station, which was commissioned in 2013 and is located adjacent to the east of WBA Power Station. This power station is also fully owned and operated by the Applicant.

2.1.5 Coal for WBA Power Station is currently delivered from a variety of UK and international sources by rail and the West Burton Power Station site includes coal storage areas, and equipment suitable for the conveyancing of coal (and other materials) across the West Burton Power Station site.

2.1.6 Bole Ings Ash Disposal Site, located to the north of the northern boundary of the West Burton Power Station site, receives ash from the WBA Power Station and the nearby Cottam Power Station (which is also owned and operated by the Applicant).

Figure 1: Site location plan

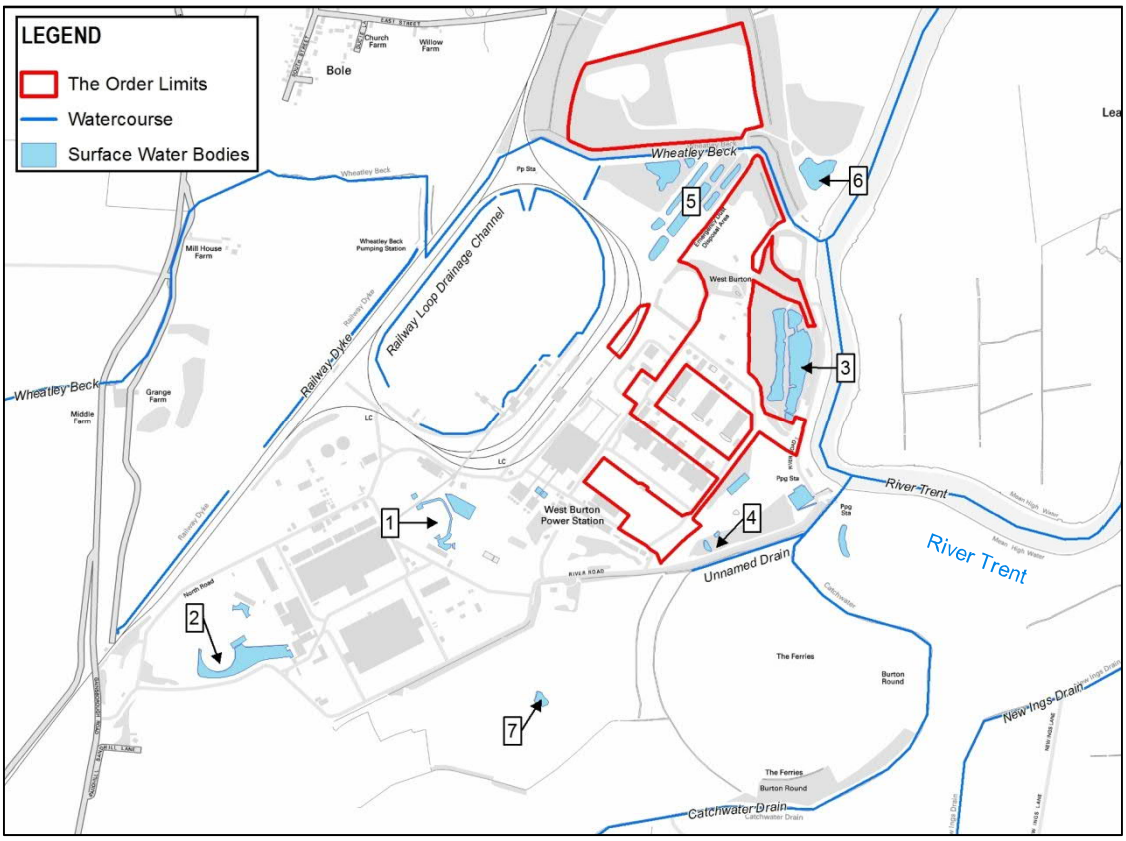


2.2 Local water features

2.2.1 **Figure 2**: Local water features

shows the location of the watercourses in the vicinity of the Proposed Development. These are discussed in more detail below.

Figure 2: Local water features



Please refer to Section 2.2.10 for details of the numbered waterbodies

Watercourses

2.2.2 The River Trent (Environment Agency Main River) lies immediately east of the Site boundary and is tidally influenced in this location. There are tidal flood defences in place adjacent to the West Burton Power Station site comprising raised earth embankments along the west bank of the River Trent. These embankments provide a 1 in 100 year standard of protection; however, the Site is not located in an area shown to benefit from flood defences.

2.2.3 Wheatley Beck (Ordinary Watercourse under the jurisdiction of Trent Valley IDB) is located to the north and north-east of the Site and flows west to east and then north to south-east adjacent to the areas under consideration for landscaping and biodiversity management and enhancement to the north of the Site before discharging into the River Trent approximately 165m from the north-east boundary of the Site.

2.2.4 Railway Dyke Drain (Ordinary Watercourse, also under the jurisdiction of Trent Valley IDB) flows south-west to north-east, parallel with the railway loop. The drain is pumped, via the Wheatley Beck pumping station, into Wheatley Beck at NGR 479434, 386438.

2.2.5 Catchwater Drain (Ordinary Watercourse under the jurisdiction of Trent Valley IDB) runs south-west to north-east passing to the east of Burton Round.

Catchwater Drain outfalls via a pumped discharge to the River Trent approximately 415m from the eastern boundary of the WBB Power Station 400kV switchyard.

2.2.6 An un-named drain, under the jurisdiction of Trent Valley IDB, is located to the south of the West Burton Power Station site and flows from west to east parallel with River Road. The drain discharges to Catchwater Drain approximately 120m upstream of the pumping station.

2.2.7 There is a small land drain to the north of the railway loop within the coal stockpile area which flows intermittently. The drain serves the low lying area beneath a small viaduct carrying the railway tracks at the northern end of the stockpile area. The drainage system consists of a drainage sump which is emptied by the Viaduct Pump House and discharges to Wheatley Beck. The system only discharges in periods of rainfall and drains a small area of land which is not currently used for coal storage.

2.2.8 There is a drainage channel located around the periphery of the railway loop, which drains water from the railway loop and coal stockpile area. This drainage channel discharges to the Wheatley Beck, to the north-west of the railway loop via oil interceptors.

Other surface water features

2.2.9 The following additional surface water features have been identified within, or in close proximity to, the Site. The numbers correspond to those on **Figure 2**: Local water features

1. areas of open water around the cooling towers along with a single waterbody;
2. a large expanse of water maintained as an ornamental pond with reed bed around the base of the southernmost cooling tower, nearest the main access road into the West Burton Power Station site;
3. several large, longitudinal flooded former gravel pits are present to the east of the Site within West Burton Power Station Local Wildlife Site (LWS). These have steep to vertical banks and deep, clear water (over 1m deep at the margins). The waterbodies have been stocked with a range of coarse fish;
4. several areas of standing open water are present within the reedbeds and wet woodland within West Burton Reedbed LWS to the south-east of the Site;
5. the ash lagoons located in the north-west of the Site;
6. a small area of reedbed (approximately 500m^2) adjacent to an access track in the north of the Site; and
7. a shallow pond located within an area of arable land to the south-west of the West Burton Power Station site.

2.3 Topography

2.3.1 According to a recent topographical survey of the Site (Ref 12A-11), the ground level varies from a low point of 2.6m Above Ordinance Datum (AOD) within the proposed southern drainage connection corridor option, to a high point of 16.2m AOD on a raised mound at the northern end of the Proposed Power Plant Site. The majority of the Site lies between 10 and 14m AOD, including the Proposed Power Plant Site, the electricity connection route, and the western two-thirds of the construction laydown area.

2.3.2 A notable steep ridge is present immediately to the east of the Proposed Power Plant Site and adjacent to the proposed electricity connection route, where ground descends from a plateau at approximately 12m AOD to approximately 3m AOD, over a short distance.

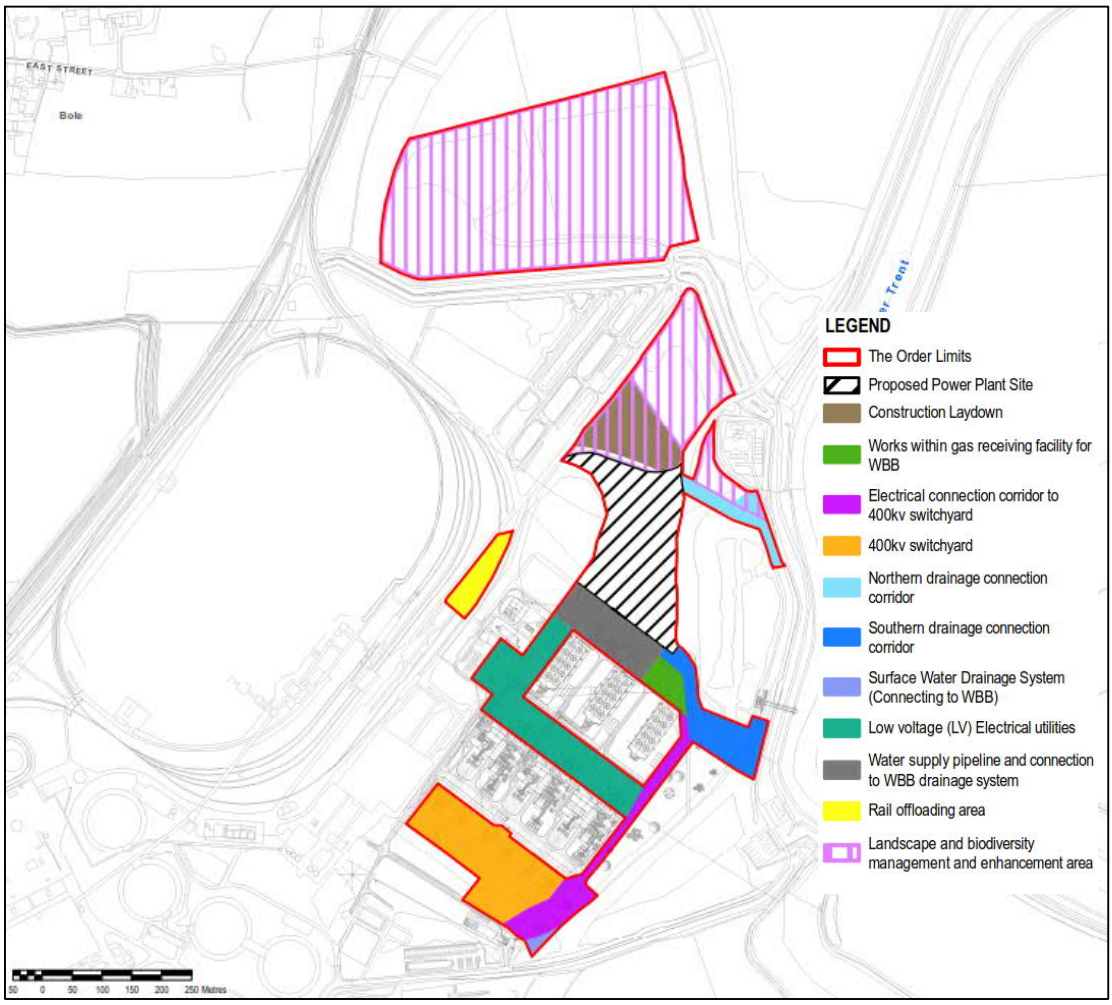
2.3.3 Levels across the landscaping and biodiversity management and enhancement area range from approximately 8m AOD at the base of the mound to 13m AOD on the plateau.

2.4 The Proposed Development

2.4.1 The Proposed Development would involve the construction of a power generation facility on the existing West Burton Power Station site (in addition to WBA and WBB Power Stations). The Proposed Development would involve the construction of a gas fired power station (peaking plant) that would generate up to 299 megawatts (MW) gross electrical output. Peaking plants, such as that proposed, are used to rapidly supply electricity to the network when required by the National Grid. These plants can be fired up at short notice to help cope with periods of high demand or low electricity supply nationally (for example when the wind is not blowing to enable sufficient output to be achieved from the increasing number of wind farms in the UK), or when required to provide ancillary services to support the National Grid. This is expected to be weighted towards the winter period, usually for a few hours at a time. However, as the operation of the plant is driven by the dynamics of the energy market, the plant could run for longer periods, at any time of day, up to the maximum allowed under its Environmental Permit, which is anticipated to be 1,500 hours per year on a rolling five year average.

2.4.2 The main development area, referred to as the Proposed Power Plant Site on **Figure 3** below, is located to the north of the existing gas receiving facility for the WBB Power Station. This land was formerly used for the deposit of pulverised fuel ash (PFA) from the WBA Power Station and more recently as a construction laydown area for the WBB Power Station. It is currently unused and occupied by recently seeded and planted grassland, scrub and immature trees. Given its previous usage for ash deposition, the land is considered to be brownfield in nature.

Figure 3: Site Boundary (Order Limits) and indicative site layout



2.4.3 The Proposed Development would utilise natural gas which is already supplied to the WBB Power Station, with a new above or below ground gas pipeline between the existing gas receiving area and the Proposed Development. A new electrical connection would also be required, with a new connection between the Proposed Power Plant Site and the existing 400kV switchyard, located to the south-west of the WBB Power Station.

2.4.4 Access to the Site would remain via the West Burton Power Station main entrance, off Gainsborough Road.

2.4.5 As the Proposed Development is currently at concept design stage, the precise details relating to the plant choice of technology is yet to be finalised. As such, the Proposed Development may comprise either a single large open cycle gas turbine (OCGT) or up to five smaller gas turbines, potentially housed within building(s). Irrespective of the selected option, the appraisal of flood risk to and from the Site is considered unlikely to change.

2.4.6 In addition to the power generation facility mentioned above, the following additional infrastructure would also likely be required, although this does not represent a final or comprehensive list at this stage:

- emission stack(s);
- gas connection, receiving area and control facilities;
- electrical connection and cabling;
- surface water drainage system including connection to the existing surface water drainage system on the West Burton Power Station site;
- water supply pipeline to connect with existing infrastructure within WBB Power Station;
- administration, welfare and control buildings;
- a rail offloading area; and
- ancillary buildings such as emergency diesel generator and storage, workshops and stores, administration and welfare buildings and security fencing.

2.4.7 The introduction of the Proposed Development will lead to an increase in the amount of surface water runoff from the Site and as such, an Outline Drainage Strategy has been prepared, refer to **Application Document Ref. 7.8**.

2.4.8 The Outline Drainage Strategy (**Application Document Ref. 7.8**) describes that the preferred drainage solution for the Proposed Development is to tie into the existing West Burton Power Station drainage system, following attenuation on-site in a pond (approximately 1,600m^3 volume at 1.5m deep, plus a 150mm freeboard allowance), although a below ground tank solution remains under consideration.

2.4.9 The attenuation system would require a surface water drainage pipeline connecting the Proposed Development with one of the existing purge line chambers that run approximately parallel with River Road from the WBA Power Station cooling towers. It is proposed that flows from the attenuation pond / tank will drain via gravity and be discharged to the River Trent at a controlled rate via the existing WBA Power Station purge lines and outfall. Alternatively, flows from the attenuation pond / tank would be removed via a fixed pump or gravity and connect into the existing WBB Power Station drainage system. This drainage route also connects into the existing WBA Power Station purge line and outfall into the River Trent.

3. Planning Policy and Guidance

3.1 Overview

3.1.1 The sections below consider the planning policies and guidance of relevance to the Proposed Development with regards to flood risk and surface water management.

3.2 National Planning Policy Context

3.2.1 **Section 5.7** (Flood Risk) of the Overarching National Policy Statement (NPS) for Energy (Ref 12A-12) details that projects of 1ha or greater in Flood Zone 1 in England, and all proposals for energy projects located in Flood Zones 2 and 3 in England should be accompanied by an FRA. The requirements for an FRA are that they should:

- be proportionate to the risk and appropriate to the scale, nature and location of the project;
- consider the risk of flooding arising from the project in addition to the risk of flooding to the project;
- take the impacts of climate change into account, clearly stating the development lifetime over which the assessment has been made;
- be undertaken by competent people, as early as possible in the process of preparing the proposal;
- consider both the potential adverse and beneficial effects of flood risk management infrastructure, including raised defences, flow channels, flood storage areas and other artificial features, together with the consequences of their failure;
- consider the vulnerability of those using the Site, including arrangements for safe access;
- consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and identify flood risk reduction measures, so that assessments are fit for the purpose of the decisions being made;
- consider the effects of a range of flooding events including extreme events on people, property, the natural and historic environment and river and coastal processes;
- include the assessment of the remaining (known as 'residual') risk after risk reduction measures have been taken into account and demonstrate that this is acceptable for the particular project;

- consider how the ability of water to soak into the ground may change with development, along with how the proposed layout of the project may affect drainage systems;
- consider if there is a need to be safe and remain operational during a worst-case flood event over the development's lifetime; and
- be supported by appropriate data and information, including historical information on previous events.

3.2.2 The NPPF (Ref 12A-2) is supported by the PPG (Ref 12A-3), an online resource first published in March 2014 which is regularly updated. The PPG supersedes the Planning Policy Statement (PPS) 25 Practice Guide (Ref 12A-13) and the Technical Guidance to the National Planning Policy (Ref 12A-14), as detailed in the Ministerial Statement 'Making the planning system work more efficiently and effectively' (Ref 12A-15).

3.2.3 The NPPF and PPG must be taken into account in the preparation of local and neighbourhood plans, and are a material consideration in planning decisions. It constitutes guidance for local planning authorities (LPAs) and decision-takers, both in drawing up plans and as a material consideration in determining applications.

3.2.4 The NPPF and PPG recommend that Local Plans should be supported by a Strategic Flood Risk Assessment (SFRA) and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as LLFAs and Internal Drainage Boards (IDBs). Local Plans should apply a sequential, risk-based approach to the location of development to avoid, where possible, flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by:

- applying the Sequential Test;
- applying the Exception Test, if necessary;
- safeguarding land from development that is required for current and future flood management;
- using opportunities offered by new development to reduce the causes and impacts of flooding; and
- seeking opportunities to facilitate the relocation of existing development, including housing, to more sustainable locations where climate change is expected to increase flood risk.

The Sequential and Exception Tests

3.2.5 The overall aim of the Sequential Test is to steer new development to areas designated Flood Zone 1. Where there are no reasonably available sites in Flood

Zone 1 areas, LPAs allocating land in Local Plans or determining planning applications for development at any particular location should take into account the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2 areas, applying the Exception Test if required. Only where there are no reasonably available sites in Flood Zone 1 or 2 areas should the suitability of sites in Flood Zone 3 be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required.

3.2.6 For the Exception Test to be passed:

- it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a SFRA where one has been prepared; and
- a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere and, where possible, will reduce flood risk overall.

3.2.7 Both elements of the test will have to be passed for development to be allocated or permitted.

Development and Flood Risk Vulnerability

3.2.8 The NPPF considers the vulnerability of different forms of development to flooding and classifies proposed uses accordingly. As mentioned in **Section 2.4**, the Proposed Development would comprise the construction and operation of a gas fired generating station and associated infrastructure. The power station is considered 'Essential Infrastructure' under the heading "*Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations[…]*".

3.2.9 Section 7, Paragraph 066 of the PPG illustrates a matrix which identifies which vulnerability classifications are appropriate within each flood zone - this can be seen in **Table 3-1**.

Table 3-1: Flood Risk Vulnerability and Flood Zone Compatibility

Flood risk Vulnerability classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception test required	✓	✓
Zone 3a	Exception	✓	×	Exception	✓

Flood risk Vulnerability classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
	test required			test required	
Zone 3b 'Functional Flood plain'	Exception test required	✓	×	×	×
Key *✓ Development is appropriate.* *× Development should not be permitted*					

3.2.10 Based on the classification shown in **Table 3-1**, the Proposed Development use (as indicated by blue boxes) considered appropriate in Flood Zones 1 and 2. The Proposed Development may also be appropriate in Flood Zone 3, providing it can satisfy the requirements of the Exception Test.

Exception Test

3.2.11 As the only works proposed in Flood Zone 3 relate to the construction of a below ground surface water drainage system, proposed to link into existing West Burton Power Station drainage systems, there will be no requirement for above ground development in Flood Zone 3 associated with the Proposed Development. As a result the Site will not need to satisfy the requirements of the Exception Test.

3.3 Regional Planning Policy

Nottinghamshire and Nottingham Level 1 Strategic Flood Risk Assessment

3.3.1 The Nottinghamshire and Nottingham Level 1 SFRA (Ref 12A-6) was undertaken to provide flood risk information to assist spatial planning decisions across the region. It is intended that the SFRA will be used by both NCC and Nottingham City Council (NCiC) as an evidence base to support the Local Development Frameworks across both areas.

Nottinghamshire Preliminary Flood Risk Assessment

3.3.2 The NCC Preliminary Flood Risk Assessment (PFRA) (Ref 12A-4) provides a high level screening assessment of local flood risk across the borough, including information on historic and potential flooding and the consequences. The PFRA covers the risk of flooding from local sources, namely Ordinary Watercourses, surface water (overland runoff) and groundwater. It does not consider directly flooding from Main Rivers, such as the River Trent.

3.3.3 The PFRA confirms that nowhere within the Nottinghamshire borough has been identified as being within an Environment Agency Indicative Flood Risk Area.

Nottinghamshire Local Flood Risk Management Strategy

3.3.4 The NCC Local Flood Risk Management Strategy (LFRMS) (Ref 12A-5) outlines the sources of flooding in Nottinghamshire focussing on flooding from heavy rainfall, groundwater and from ordinary watercourses (small ditches and streams). The LFRMS gives an overview of how flood risk will be managed and sets out which organisations are responsible for different types of flooding.

3.4 Local Planning Policy

Bassetlaw District Council Level 2 Strategic Flood Risk Assessment

3.4.1 The BDC Level 2 SFRA was completed in 2010 and builds on the recommendations of the Level 1 SFRA. The SFRA contains a thorough review of existing flood risk information and the construction of new hydraulic models to identify the level of flood risk in the Bassetlaw area from fluvial (river flooding) and other sources. This document also includes hazard mapping to enable application of the Sequential and Exception Tests where required.

Bassetlaw District Council Core Strategy and Development Management Policies DPD

3.4.2 The Core Strategy and Development Management Policies DPD was adopted by BDC in December 2011 and forms part of its Local Plan (Ref 12A-10a). The Core Strategy is the key Local Development Framework document that sets out a vision for change in Bassetlaw along with the place-specific policy approaches to be taken in order to achieve this vision over a period of 17 years. A small number of more detailed development management policies, are also included.

3.4.3 Relevant district wide policies with regard to flood risk and surface water management include:

Policy DM10: Renewable and Low Carbon Energy

"The Council will be supportive of proposals that seek to utilise renewable and low carbon energy to minimise CO2 emissions. Proposal for renewable and low carbon energy infrastructure will also need to demonstrate that they… iv. Will not result in unacceptable impacts in terms of visual appearance, noise, shadow flicker, watercourse engineering and hydrological impacts, pollution, or traffic generation."

Policy DM12: Flood Risk, Sewerage and Drainage

"Part A – Flood Risk: Proposals for development of new units in Flood Zones 2, 3a and 3b that are not defined by national planning guidance as being suitable for these zones will not be supported while development sites remain available in sequentially superior locations across the District. Reference should be made to the Council's Strategic Flood Risk Assessment when making assessments about

likely suitability. Site specific Flood Risk Assessments will be required for all developments in flood risk areas, even where flood defences exist, as defined on the Proposals Map.

Part B – Sewerage and Drainage: Proposals for new development in […] vii. North Wheatley, […] ix. South Wheatley and x. Sturton-le-Steeple will only be supported where it is demonstrated to the Council's satisfaction that the proposed development will not exacerbate existing land drainage and sewerage problems in these areas. All new development will be required to incorporate Sustainable Drainage Systems (SuDS) and provide details of adoption, ongoing maintenance and management. Proposals will be required to provide reasoned justification for not using SuDS techniques, where ground conditions and other key factors show them to be technically feasible."

Bassetlaw Draft Local Plan

3.4.4 BDC is currently in the early stages of preparing a new Local Plan for the District and began consulting on a Draft Bassetlaw Local Plan (Ref 12A-10b) in January 2019.

3.4.5 Policy 15: Flood Risk describes the requirements that developers are required to take into account relating to flood risk assessments, siting of developments in Flood Zones 2 and 3a and incorporation of SuDs.

3.4.6 Local policies have been taken account in this assessment.

3.5 Other Relevant Policy and Guidance

Building Standards Regulations 2000 Part H

3.5.1 The Building Standards Regulations 2000 Part H (Ref 12A-16) requires that surface water runoff be preferentially discharged first to soakaway, then to surface watercourse and finally to sewer.

4. Flood Risk

4.1 Overview

4.1.1 The NPPF (Ref 12A-2) requires the effects of all forms of flood risk, both to and from the Proposed Development, are considered within an FRA. There should be demonstration of how these should be managed so that the development remains safe throughout its lifetime, taking into account climate change.

4.1.2 Consultation with the Environment Agency has been undertaken to inform the baseline assessment of flood risk at the Site. The consultation responses are included in **Annex 2**.

4.2 Tidal Flood Risk

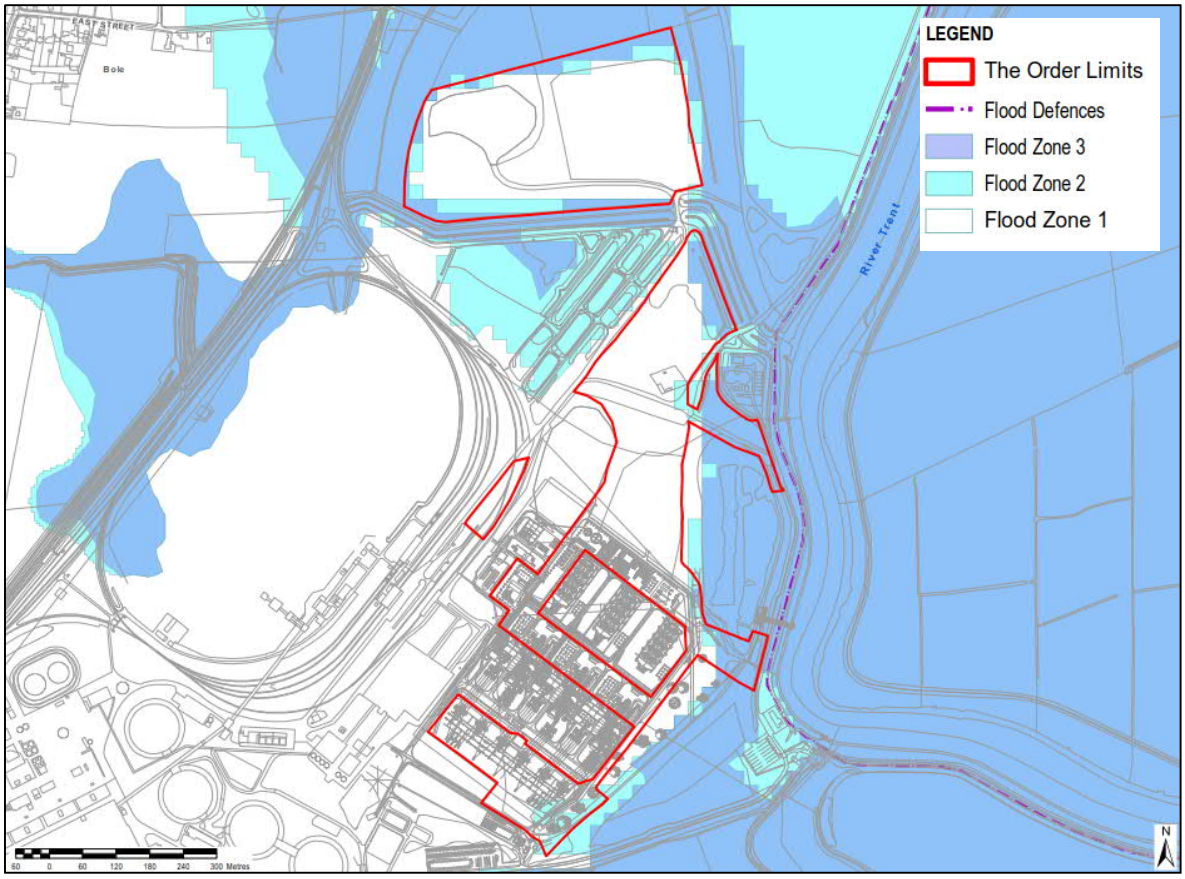
4.2.1 The River Trent runs in part, along the Site's eastern boundary and is considered to be tidally influenced at this location. Consultation with the Environment Agency in August 2018 indicated that whilst the River Trent hydraulic model includes a 20% AEP (1 in 5 year) tidal flow, the dominant flooding mechanisms within the vicinity of the Site are primarily associated with fluvial flooding.

4.2.2 The risk of flooding from tidal sources is therefore considered to be low, however there is a residual risk of flooding from this source. The risk of residual flooding is considered further in **Section 6.2**.

4.3 Fluvial Flood Risk

4.3.1 A Review of the Environment Agency Flood Map for Planning (FMfP) (Ref 12A-1) suggests that the majority of the Site lies within Flood Zone 1, which is land considered to be at low risk of fluvial flooding, with less than 1 in 1000 annual probability (<0.1% AEP) of flooding from fluvial events in any given year, refer to **Figure 4**.

Figure 4: Environment Agency Flood Zones and Site Boundary



4.3.2 However, review of the Land Use Zones Plan contained within **Figure 3**, suggests that part of the eastern and northern sections of the Site are located within Flood Zone 2 which is land classified as being at medium risk of flooding, having between 1 in 100 and 1 in 1000 (1% - 0.1% AEP) annual probability of river flooding and Flood Zone 3, which is land classified as having a high risk of flooding, having a 1 in 100 annual probability of flooding or greater in any given year (>1% AEP).

4.3.3 A small area of the Site, associated with the proposed construction laydown area, is located within Flood Zone 2 and therefore considered to be at medium risk of fluvial flooding. However, use of this area is temporary in nature, and would only be required during the construction phase of the Proposed Development.

4.3.4 The parts of the Site located within Flood Zone 3 are the proposed northern and southern drainage connection corridor options and therefore not considered to be at risk of fluvial flooding.

4.3.5 Flood risk can be expressed as the following equation;

Flood Risk = Likelihood of Flooding x Consequence of Flooding

4.3.6 Whilst the consequence of a flood event could be significant, due to the temporary nature of the use of this area of the Site, the likelihood of a flood event occurring whilst the compound is in use is considered to be low.

4.3.7 Furthermore, consultation with the Environment Agency suggests that the Site is protected by a series of raised earth flood embankments running along the west bank of the River Trent, which are considered to provide a 1% AEP (1 in 100 year) Standard of Protection (SoP).

4.3.8 Although the Site is not located within an area considered by the Environment Agency dataset to 'Benefit from Defences', consultation with the Environment Agency has confirmed that the defences are Environment Agency managed with regular inspection and maintenance regimes. Based on the latest Environment Agency review, the average condition of the defences in this area is considered to be 'fair' (Condition Grade 3). Precise details relating to the height and condition of these defences can be found in **Annex 2B**.

4.3.9 Given that the Site is therefore protected by flood defences considered to deliver a 1% AEP SoP, the indication of a low probability of flooding is further supported, although there is a residual risk of defence breach failure, refer to **Section 6.2**.

4.3.10 The Environment Agency has provided the modelled flood levels for the Site, from the Tidal Trent Strategic Flood Risk Management Model (**Table 4-1**) (Ref 12A-17) shows the modelled flood water levels for the River Trent to the east of the Site and includes the effect of local flood defences. Model node locations are presented in **Annex 2B**.

4.3.11 It should be noted that the climate change flood levels provided are based on historic guidance (Ref 12A-18) which was superseded in 2016 (Ref 12A-19). Following consultation with the Environment Agency it was agreed that an approximate calculation to determine likely water levels under the 30% climate change scenario should be undertaken to inform minimum ground levels at the Site. An estimated 30% increase has been applied to the 1% AEP modelled flood level (1% AEP + 30% Climate Change (CC)) (mAOD) in **Table 4-1**). This was calculated using the 1% AEP level and the 1% + 20% CC level provided in the August 2017 data request. All other levels contained within **Table 4-1** remain unaltered.

Table 4-1: Tidal Trent strategic flood risk management modelled flood levels

Model Node	1% AEP (mAOD)	1% AEP +20% CC (mAOD)	1% AEP +30% CC (mAOD)	0.1% AEP (mAOD)
TRENT_010	6.62	6.94	7.10	7.09
TRENT_008	6.62	6.95	7.11	7.10
TRENT_006	6.62	6.95	7.11	7.09

4.3.12 Anecdotal evidence from the Environment Agency suggests that the results of provisional modelling carried out by the Environment Agency, using the 50% climate change allowance, provide similar levels and extents, to the modelled 0.1% AEP level presented in **Table 4-1**. This indicates that the 30% climate change allowance calculated in **Table 4-1** provides a conservative estimate of water levels under climate change scenarios. On the basis of the information above and following discussion with the Environment Agency, it is suggested that the modelled 0.1% AEP flood levels are used as a proxy to provide indicative ground levels at the Site.

4.3.13 Review of the flood defence heights contained within **Annex 2B** suggests that the minimum defence height within the vicinity of the Site is 7.23m AOD. Following a review of **Table 4-1**, it is therefore suggested that flooding to the Site would not occur, even when based on the conservative estimated of flood levels under climate change scenarios.

4.3.14 As a result of the above, the level of flood risk to the Site from Main Rivers is considered to be low, taking into account the presence of defences. There is, however a residual risk of flooding that would occur in the event of a breach of these defences (discussed in **Section 6.2**) and as such mitigation is required, refer to **Section 8**.

Flooding from Ordinary Watercourses

4.3.15 Wheatley Beck is located to the north-west of the Site boundary and forms a confluence with the River Trent to the north-east of the Site. The watercourse flows within a deep, largely inaccessible channel and ground levels are shown to increase from approximately 6m AOD at Wheatley Beck to approximately 12m AOD at the northern extent of the Site. Flood mapping indicates that the flood extent from Wheatley Beck extends to the north-western extent of the Site boundary. However, based on a review of the topography within the vicinity of the Site, it is considered that this flooding is a result of Wheatley Brook being unable to discharge when water levels in the River Trent are high. Out of bank flooding therefore occurs due to reverse flow and water backing up within the channel, as opposed to fluvial flooding directly from the watercourse.

4.3.16 The Railway Dyke Drain is located to the west of the railway loop and coal stockpile and flows parallel with the West Burton Power Station site boundary. The Drain is pumped into the Wheatley Beck via the Wheatley Beck Pumping Station. Given the regulated nature of this watercourse, and the presence of the railway embankment between it and the Site, there is considered to be a low risk of flooding from this drain.

4.3.17 Catchwater Drain runs south-west to north-east passing to the east of Burton Round. Catchwater Drain outfalls via a pumped discharge to the River Trent approximately 415m from the eastern boundary of the 400kV switchyard within the WBB Power Station. Given the regulated nature of this watercourse, and the distance from the Proposed Development, the risk of flooding from this drain is considered to be low.

4.3.18 Based on the topography of the Site in relation to the surrounding watercourses, and the presence of the railway embankment interrupting potential flow paths from the west (and Railway Dyke Drain), it is considered unlikely that Site would be impacted by fluvial flooding from Wheatley Beck and/or Railway Dyke Drain.

4.4 Surface Water (Overland Flow)

4.4.1 Overland flow results from rainfall that fails to infiltrate the surface and travels over the ground surface; this is exacerbated where the permeability of the ground is low due to the type of soil and geology (such as clayey soils) or urban development with impermeable surfaces.

4.4.2 The Environment Agency publishes Risk of Flooding from Surface Water (RoFSW) maps. This mapping indicates areas at risk from surface water flooding when rainwater does not drain away through the normal drainage systems or soak into the ground, but instead lies on or flows over the ground. The RoFSW flood map for the Site can be viewed on the Environment Agency website (Ref 12A-1).

4.4.3 The map shows that the majority of the Site is considered to be at ‘very low’ risk of flooding from surface water. The Environment Agency define ‘very low risk’ as an area that has a less than a 1 in 1,000 (0.1%) probability of flooding in any given year.

4.4.4 The areas of the Site that are shown to be at risk of flooding from surface water largely coincide with the surface water bodies at the Site (as described in **Section 4.4**).

4.4.5 Beyond the West Burton Power Station site boundary, land to the west of the railway loop and adjacent to Wheatley Beck is shown to be at high risk of surface water flooding. The Environment Agency defines ‘high risk’ as an area with a chance of flooding of greater than a 1 in 30 (3.3%) in any given year. The extent of surface water flood risk in this area coincides with the extent of the flood map for planning and it is considered likely that this flooding is the result of water from

Wheatley Beck and surrounding greenfield areas pooling along the toe of the railway loop embankment. Due to the distance from the Site, and the presence of raised railway embankments which interrupt flow pathways, the risk from this source to the Proposed Development is considered to be low.

4.4.6 Historical records in both the SFRA and PFRA show that surface water flooding occurred in Sturton-le-Steeple and North and South Wheatley during June/July 2007. There is no indication that the West Burton Power Station site was affected by this flood event which primarily comprising flooding from surface water runoff which was exacerbated by lack of capacity in local drainage infrastructure.

4.4.7 A surface water management plan would be implemented, in line with the recommendations discussed in **Section 7**, to manage this risk as far as possible. Based on the above information, the risk of surface water flooding within both the Site and within the West Burton Power Station site boundary is considered to be low. Any residual risk would be mitigated through the measures outlined in **Section 8**.

4.5 Artificial Waterbodies

4.5.1 Artificial flood sources include raised channels, such as canals, or storage features such as ponds and reservoirs.

4.5.2 The Environment Agency's map of Flood Risk from Reservoirs (Ref 12A-1) shows that the Site is not located in an area at residual risk of flooding from a large reservoir in the event of a structural failure or breach. The Reservoir Act 1975 defines a large reservoir as one that holds over 25,000m^3 of water although under the Flood and Water Management Act this has been reduced to 10,000m^3.

4.5.3 There are no canals in close proximity to the Site.

4.5.4 Within the West Burton Power Station site there is a drainage channel located around the periphery of the railway loop that drains water from the railway loop and coal stockpile area. This drainage channel discharges to the Wheatley Beck, via oil interceptors, to the north-west of the railway loop. In addition a small land drain is operational to the north of the coal stockpile, draining a small area of land which has not been used for coal storage. The drainage system consists of a drainage sump which is emptied by the Viaduct Pump House and discharges to Wheatley Beck during periods of rainfall. These land drains are part of the managed drainage system for the West Burton Power Station site and as such are considered to be highly regulated. On this basis, the risk of flooding to the Site is considered low.

4.5.5 An un-named drain is located to the south of the West Burton Power Station site and flows from west to east parallel with River Road. The drain discharges to Catchwater Drain approximately 120m upstream of the pumping station. The distance of this watercourse from the Site, coupled with the topography suggests

that the risk of flooding from this drain is low. Should flows, and therefore discharges to the drain and subsequently Catchwater Drain increase, any impacts would occur downstream of the Proposed Development.

4.5.6 Additional surface water features have been identified within, or in close proximity to, the West Burton Power Station site, as detailed in **Section 2.2.5**. Given the nature of the identified surface water features it is unlikely that flooding from these artificial waterbodies would pose a risk to the Site. The largely flat topography of the local area means that if flooding were to occur it would remain localised to the water feature be short-term and due to dissipation it would most likely be shallow in depth. Furthermore, there are no flow routes from this location to other areas within the Site boundary.

4.5.7 The risk of Site flooding from artificial sources is therefore considered to be low.

4.6 Groundwater Sources

4.6.1 Groundwater flooding can occur when groundwater levels rise above ground surface levels. The underlying geology has a major influence on where this type of flooding takes place; it is most likely to occur in low-lying areas underlain by permeable rocks (aquifers).

Geology

4.6.2 Information on the geology of the Site has been obtained from the British Geological Survey (BGS) Geology of Britain viewer (Ref 12A-20). The bedrock consists of Mercia Mudstone Group (Mudstone) overlain by superficial deposits of alluvium (clay, silt, sand, and gravel).

4.6.3 The Environment Agency classification for the identified superficial deposits and bedrock underlying the Site are summarised in **Table 4-2**.

Table 4-2: Environment Agency classification of superficial and bedrock geology

Type	Formation	Environment Agency Aquifer Classification
Superficial Deposits	Alluvium (clay, silt, sand and gravel)	Secondary A
	Glacial Till (clay)	Secondary (undifferentiated)
Bedrock	Mercia Mudstone Group	Secondary B

Key:

Secondary A aquifer – defined by the Environment Agency as *'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

Secondary B aquifer – defined by the Environment Agency as *'predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.'*

Secondary Undifferentiated aquifer – defined by the Environment Agency as *'an aquifer where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.'*

4.6.4 The underlying bedrock is permeable and the classification as a Secondary Aquifer indicates that the lower layers are capable of storing and transmitting water at a local scale. The alluvial superficial deposits associated with the floodplain of the River Trent also indicate permeable layers capable of storing and transmitting groundwater at a local scale. Permeable geology, coupled with the proximity of the Site to the River Trent, suggests good connectivity between groundwater and the surface and therefore is likely to be associated with a higher risk of emergence following high or prolonged periods of rainfall or raised water table related to the Trent floodplain.

4.6.5 A Phase I Geoenvironmental Site Assessment has been carried out (see **Appendix 11A**) to determine the likely ground conditions beneath the Site and the potential for ground contamination arising from historical or current on-site or off-site activities. More detailed information of the geological conditions beneath the Site can be found in **Section 3** of **Appendix 11A**: Phase I Geoenvironmental Site Assessment (also refer to **Chapter 11:** Ground Conditions and Hydrogeology (ES Volume I)). The results of the environmental sampling carried out as part of the December 2017 ground investigation (Ref 11-23) are presented in **Appendix 11B**: WBC Ground Investigation Environmental Support and Sampling (ES Volume II).

Hydrogeology

4.6.6 Groundwater levels across the Site are monitored on a quarterly basis throughout the year from boreholes located around the Site. Recent groundwater data, recorded in December 2017 (Ref 12A-21) suggests that, within the Site, estimated groundwater levels may vary from:

- 2.5m below ground level (m bgl) close to the banks of the River Trent; to
- 4 – 5.9m bgl in the north of the Proposed Development; to
- 7.5 – 9.3m in the south and beneath the Proposed Power Plant Site (stated figures are based on readings taken prior to sampling works, conducted in December 2017).

4.6.7 On the basis of historical site wide monitoring data and the results of the December 2017 investigation, the inferred hydraulic gradient is broadly from the south-west towards the east and north-east.

Groundwater Flooding

4.6.8 The BDC SFRA and NCC PFRA contain no records of historical groundwater flooding in the location of the West Burton Power Station site. Although there is a lack of historic records documenting groundwater flooding in the area, it does not necessarily mean there have been no incidents of groundwater flooding, only that such events have not been recorded or have not been attributed to groundwater.

4.6.9 Groundwater flooding is not recognised in the River Trent CFMP as a significant problem within the Nottinghamshire area. However, the CFMP notes that flooding has been known to occur through alluvial gravels and sands within the main Trent Valley, causing occasional flooding in unexpected areas, but more generally resulting in areas which routinely tend to become more waterlogged when river levels are high.

4.6.10 The 'Areas Susceptible to Groundwater Flooding' maps provided by the Environment Agency to inform the NCC LFRMS, can be used to identify areas where geological conditions could enable groundwater flooding to occur and where groundwater may come close to the ground surface. This information is shown as a proportion of 1km grid squares where there is potential for groundwater emergence. The data does not show where flooding is likely to occur, but instead should be used at a strategic level to indicate areas for further investigation. The dataset presented in the NCC LFRMS indicates that the majority of the Site is located in an area with moderate (>=50% - 75%) to high (>75%) potential for groundwater flooding to occur.

4.6.11 Considering the susceptibility data, the lack of historic flood records and the presence of a perched water table within the Secondary A aquifer, the Site is classified as being at medium flood risk from groundwater sources. . It is noted, however, that groundwater may be encountered during the construction phase in lower lying areas although it is considered that this could be dealt with by the use of a small pump, and would not increase groundwater flood risk to the wider area during or after the construction phase.

4.7 Flooding from Sewers and Drainage Infrastructure

4.7.1 Sewer and surface water flooding are often interconnected; insufficient drainage capacity in the sewer network can result in extensive surface water flooding and, by the same rationale, large volumes of surface water can overload the public sewers, causing the sewer network to back up, surcharge and ultimately flood.

4.7.2 The Site comprises predominantly undeveloped land that drains via natural processes over overland flow and infiltration to ground. Areas of the Site where hardstanding is located (the existing gas receiving facility used by and located within the WBB Power Station site and the 400kV switchyard within the WBB Power Station site) will continue to drain to the existing surface water drainage system associated with the WBB Power Station. It is assumed that any increase in

discharge to this system will be agreed with Severn Trent Water at the detailed design stage and flood risk will not increase as a result.

4.7.3 West Burton Sewage Treatment Works (STW) is located to the east of the Site, within the wider West Burton Power Station site and is owned and operated by Severn Trent Water which holds the appropriate consent to discharge to the River Trent. The STW receives foul water from the West Burton Power Station site. The volume of foul flow associated with the Proposed Development welfare facilities is unknown although it is proposed that foul drainage from any permanent welfare facilities would be directed to an on-site septic tank for storage and treatment. The tank would be emptied by road tanker as and when required. It is assumed that flood risk from this source will not increase as a result.

4.7.4 Based on Severn Trent records used to inform the BDC SFRA, historic sewer flooding has occurred to the south of the Site in Sturton-le-Steeple. The PFRA further identifies both North Wheatley and South Wheatley as having flooded in the past.

4.7.5 In April 2018 a high tide event along the River Trent caused flooding to the WBB Power Station CCGT pump house such that the forwarding pumps were submerged. As a consequence the decision was made to safely shut down the Power Station and to declare it unavailable.

4.7.6 The cause of the flooding was attributable to two main factors:

1. failure of the flap valves (non-return valves) on the purge line outfall into the River Trent allowing the water level inside the purge pipes to rise to a level higher than the manhole entrances. A manhole entrance cover was also in a failed state of repair, allowing water to pass underneath the cover; and
2. failure of the overflow flap valve that takes water from the fishing ponds back to the River Trent. This failure allowed the valve to stay open during the high tide event allowing a direct route from the River Trent to the flood area.

4.7.7 Following this flood event maintenance work was undertaken and inspection procedures put in place in order to reduce the residual risk of similar flood events occurring in the future, including:

- all manhole entrances along the purge pipes were inspected and repaired, where required;
- the area in front of the overflow flap was cleared and is now included as part of an inspection regime. For the long-term, the Applicant has requested to take over responsibility of this overflow with a view to sealing the overflow pipe and a permanent pumping system being installed for use when water levels in the Fishing Ponds are high; and
- large temporary pumps and hoses are located on-site. Contact systems have been clarified with the necessary authorities to ensure exceptionally high tides are notified in advance and to facilitate the use of further heavy duty pumping

systems, should the risk of flooding through extreme high tides occur in the future.

4.7.8 Considering the above information and the measures put in place since April 2018, the risk of flooding from sewers and drains at the Site is considered to be low.

5. Climate Change

5.1 Context

5.1.1 NPS-EN1 (Ref 12A-12) and the NPPF (Ref 12A-2) require site specific FRAs accompanying applications which assess the risk of all sources of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.

5.1.2 The Environment Agency published updated climate change guidance in February 2016 (Ref 12A-19). The guidance indicates that climate change is likely to increase river flows, sea levels, rainfall intensity, wave height and wind speed.

5.2 Peak River Flow Allowances by River Basin District

5.2.1 The peak river flow allowances show the anticipated changes to peak flow by river basin district. The range of climate change allowances is based on percentiles. A percentile is a measure used in statistics to describe the proportion of possible scenarios that fall below an allowance level.

5.2.2 The Proposed Development lies within the Humber River Basin District **Table 5-1** shows the climate change allowances for the Humber River Basin District.

Table 5-1: Climate change allowance for the Humber River basin district

Allowance category	Total potential change anticipated for '2020s' (2015 to 2039)	Total potential change anticipated for '2050s' (2040 to 2069)	Total potential change anticipated for '2080s' (2070 to 2115)
Upper end	20%	30%	50%
Higher central	15%	20%	30%
Central	10%	15%	20%

Peak River Flow Allowances for Different Assessments

5.2.3 For FRAs, the "flood risk vulnerability classification" for the type of development and the "flood zone" should be used to decide which peak river flow allowances (allowance category) to use based on the lifetime of the Proposed Development (see **Table 5-2)**.

Table 5-2: Peak river flow allowances based on flood risk vulnerability classification and flood zone

Flood Zone 2
Essential infrastructure – use the higher central and upper end to assess a range of allowances. Highly vulnerable – use the higher central and upper end to assess a range of allowances. More vulnerable – use the central and higher central to assess a range of allowances. Less vulnerable – use the central allowance. Water compatible – use none of the allowances.
Flood Zone 3a
Essential infrastructure – use the upper end allowance. Highly vulnerable – development should not be permitted. More vulnerable – use the higher central and upper end to assess a range of allowances. Less vulnerable – use the central and higher central to assess a range of allowances. Water compatible – use the central allowance.
Flood Zone 3b
Essential infrastructure – use the upper end allowance. Highly vulnerable – development should not be permitted. More vulnerable – development should not be permitted. Less vulnerable – development should not be permitted. Water compatible – use the central allowance.
If (exceptionally) development is considered appropriate when not in accordance with flood zone vulnerability categories, then it would be appropriate to use the upper end allowance.

Peak River Flow Allowances for the Proposed Development

5.2.4 The Proposed Development footprint (as shown in **Figure 3**), which is classified as Essential Infrastructure, is located predominantly in Flood Zone 1 with a small area in Flood Zone 2. As such, the Higher Central and Upper End climate change allowances should be assessed to measure a range of impacts.

5.2.5 It is understood that the lifetime of the Proposed Development is up to circa 40 years and therefore decommissioning activities are currently anticipated to commence after 2063. Therefore the peak river flow climate change allowances for the lifetime of the Proposed Development should be assessed as shown in **Table 5-3**.

Table 5-3: Peak river flow allowances for the Proposed Development

Proposed Development	
River Basin District	Humber
Flood Zone	1 and 2
Flood risk vulnerability classification	Essential Infrastructure
Lifetime of development	40 years (2050s epoch)
Climate change allowance to be assessed	Higher Central (20%) Upper End Allowance (30%)

5.3 Peak Rainfall Intensity Allowance

5.3.1 Increased rainfall affects river levels and land and urban drainage systems. **Table 5-4** shows anticipated changes in extreme rainfall intensity in small and urban catchments. For FRAs and SFRAs, both the central and upper end allowances need to be assessed to understand the range of impact.

5.3.2 The lifetime of the Proposed Development determines that the highest epoch needs to be evaluated. As shown in **Table 5-4** an increase in peak rainfall allowance of between 20 – 40% needs to be assessed.

Table 5-4: Peak rainfall intensity allowance

Applies across all of England	**Total potential change anticipated for 2010 to 2039**	**Total potential change anticipated for 2040 to 2059**	**Total potential change anticipated for 2060 to 2115**
Upper End	10%	20%	40%
Central	5%	10%	20%

5.4 Impact of Climate Change

Tidal Flooding

5.4.1 As the Site is not considered to be at risk from tidal flooding, the impact of climate change has not been considered further.

Fluvial Flooding

5.4.2 The effect of climate change on flood levels throughout the Humber River Basin District is presented in **Table 5-1**. This suggests that river flows in the Main River Trent may increase by up to 30% over the lifetime of the Proposed Development and therefore the risk of flooding from this source will increase. The impact of climate change is discussed in more detail in **Section 4.2** and suggests that due to the presence of flood defences, flooding to the Site would not occur, even under the conservative estimate of flood levels under climate change scenarios used in this FRA.

5.4.3 The River Trent CFMP indicates that the policy in this area is to maintain the current level of protection, improving the standard of protection of defences to keep pace with climate change.

5.4.4 The residual flood risk at the Site due to breaching of the flood defences is not likely to increase as a result of climate change. However, if a breach were to occur, climate change would result in an increase in the depth of floodwater at the Site. This is discussed further in **Section 6.2**.

5.4.5 As with flooding from the River Trent, flows in the Ordinary watercourses in close proximity to the Site (e.g. Wheatley Beck, Railway Dyke Drain etc.) may increase over the lifetime of the Proposed Development by up to 30%. The current risk of flooding from fluvial sources is low and it is considered unlikely that this will change. Climate change does however, still have the potential to increase flood depths on the Site should flooding occur.

Surface Water Runoff Generation and Overland Flow

5.4.6 Climate change must be taken into account when considering surface water runoff generated by development sites. This is usually represented by increasing the peak rainfall intensities. An increase in rainfall intensity will increase runoff rates and volumes and therefore the design of the Proposed Development drainage system at the Site would need to take this into account, in accordance with the guidance of the NPPF, the Environment Agency, LPA and IDB. Peak runoff from the Site should be attenuated up to the 1% AEP (1 in 100 year) rainfall event including a 20 – 40% climate change allowance (based on **Table 5-4**).

5.4.7 An outline surface water strategy outlining how surface water runoff will be managed on-Site post-development is summarised in **Section 7** and included in **Application Document Ref. 7.8.**

Groundwater Flooding

5.4.8 The predicted increase in the wetness of winters and the intensity of storm events could impact the groundwater level fluctuations at the Site and possibly increase the level of the water table. As the likelihood of groundwater emergence under the

climate change scenario is likely to increase, the potential for groundwater flooding to impact infrastructure on the Site will also increase.

5.4.9 The predicted increase in the wetness of winters and the intensity of storm events could impact the groundwater level fluctuations at the Site and possibly increase the height of the water table. Even though the risk of groundwater flooding may increase under the climate change scenario, the finished ground level of the Proposed Development, combined with what would be a predominantly impermeable surface post-development, suggests that the potential for groundwater flooding to impact infrastructure at the Site will remain at medium risk.

Flooding from Drainage Infrastructure

5.4.10 It is difficult to predict precisely the impact of climate change on sewer flooding; however, the anticipated increase in rainfall intensity may cause greater volumes of rainfall to enter the surface water sewer network during storm events. This may require the upgrading of existing infrastructure to maintain the same level of service and for new infrastructure to be designed with greater capacities.

5.4.11 On the basis of the above, it is anticipated that the risk from the sewer system, which is currently considered to be low, would not increase significantly as a result of climate change to the point that it would increase the risk of flooding to the Proposed Development. Furthermore, the proposed surface water drainage (**Section 7**) would be designed in order to reduce pressure on the local sewer network and, therefore, reduce the local risk of flooding from this source.

6. Post-Development Impacts and Residual Risk

6.1 Off-Site Impacts

6.1.1 The Site benefits from flood defences for events up to and including the 1% AEP flood. Sequential allocation of development within the Site means that the Proposed Development would be located in Flood Zone 1 during operation and therefore would not impact upon fluvial and/or tidal floodplain storage.

6.1.2 Should storage of materials be necessary within the part of the proposed construction laydown area that is partially located in Flood Zone 2, mitigation measures in line with the Framework Construction Environmental Management Plan (CEMP) presented as **Application Document Ref 7.3** would be followed, as outlined in **Chapter 12:** Flood Risk, Hydrology and Water Resources (ES Volume I) and discussed in **Section 8** of this FRA.

6.1.3 There is potential for the Proposed Development to increase surface water runoff, resulting in increased discharge to the River Trent and other local waterbodies, which in turn could increase flood risk downstream of the Site. It is proposed that storage will be provided on Site for up to and including the 1% AEP storm event, with a 20% allowance for climate change, to ensure that the Proposed Development would not increase flood risk elsewhere. The proposed outline surface water drainage design would therefore meet with the requirements of the NPPF. The drainage strategy would also meet with the requirements of the BDC local planning policy and where possible, the Environment Agency.

6.1.4 Following implementation of mitigation measures as outlined in **Section 8**, it is considered that the Proposed Development would not result in any off-site flood risk impacts.

6.2 Residual Risk

Breach of Flood Defences

6.2.1 The River Trent CFMP (Ref 12A-8) states that fluvial flooding can occur behind defences when high flows and/or tidal effects prevent the free outflow of water from tributaries and drainage channels.

6.2.2 Breach modelling of the tidal flood defences along the west bank of the River Trent was undertaken to inform the BDC SFRA (Ref 12A-7). Breaches were set at 100m wide intervals within the earth embankments and with a full defence failure assumed i.e. failure down to ground level behind the defence.

6.2.3 The nearest modelled breach node is located approximately 580m upstream of the Site, adjacent to the West Burton STW and also represents the location where the defence is most likely to breach based on Environment Agency asset inspections. Modelled flood depths in the event of a breach are included in **Annex 2B** and largely follow the modelled fluvial flood extents as shown in **Figure 4**.

6.2.4 The water levels adjacent to eastern boundary of the Site under different breach scenarios are shown in **Table 6-1**. As discussed in **Section 4.2**, the 0.1% AEP levels are considered to provide a suitable proxy for flood levels under the climate change scenario.

Table 6-1: Maximum water level based on a breach of the River Trent flood defences under different scenarios

	1% AEP (mAOD)	0.1% AEP (mAOD)
Water Level (mAOD)	6.62	7.38

6.2.5 The extent of flooding in the event of a breach shown in **Annex 2B** suggests that water levels will not impact the Proposed Development and will be constrained to the lower lying areas between the eastern and northern boundaries and the River Trent and Wheatley Beck.

6.2.6 Based on the information presented above, the risk of Site flooding from a breach is considered to be low. As there remains a residual risk, mitigation measures for the Site are provided in **Section 8**.

Surface Water and Drainage Infrastructure

6.2.7 Failure, blockage and exceedance of design events for the drainage system are a potential risk to the Site and the surrounding area. Regular maintenance of the drainage system will be undertaken by the operator to ensure that the system continues to perform as designed.

6.2.8 As detailed in Section 4.7, there is a residual risk of flooding from infrastructure failure should an extreme tidal event occur along the River Trent. Measures, including inspection regimes and proposed pumping, have now been put in place to prevent and/or minimise the residual risk (See Section 4.7) of flooding from this source.

6.2.9 Should SuDS features be proposed at the detailed design stage, an appropriate 'body' (being either the Applicant or the LLFA (NCC)) to adopt these features once operational would need to be identified. It would be the responsibility of the 'SuDS adoption body' to make sure that the SuDS features are regularly inspected and maintained to ensure their design standard is not compromised over the lifetime of the Proposed Development.

6.2.10 There also remains the risk of surface water flooding in the event of a storm in excess of the 'design storm'. To manage the risk from exceedance flows, the Proposed Development drainage design should follow appropriate guidance (i.e. Wallingford Method (Ref 12A-22)) to provide flow paths such that any overland flow is directed away from impacting any surrounding development.

7. Surface Water Management

7.1 Overview

7.1.1 This section provides a summary of the Outline Drainage Strategy (**Application Document Ref. 7.8**) prepared to accompany the Application. The report reviews the current drainage arrangement and is intended to provide an outline drainage strategy to deal with surface, foul and process water.

7.2 Policy Requirements

7.2.1 There are a number of national and local policy requirements which need consideration in the design of any drainage strategy to ensure that the Proposed Development would be sustainable and can, if possible, contribute to a decreased flood risk elsewhere.

7.2.2 The NPPF (Ref 12A-2) requires that new development should not increase flood risk both on the site and in the area surrounding it. This effectively means that surface water runoff should not exceed the peak volumes already generated on the Site and that betterment should be provided where possible.

7.3 Proposed Outline Surface Water Drainage Design

7.3.1 The outline drainage arrangement is included in Appendix D4 – D6 of the Outline Drainage Design Report (**Application Document Ref. 7.8**). Three options (referred to in **Application Document Ref 7.8**) have been considered.

7.3.2 In Options A and B, it is proposed that surface water from the Site will be drained via a pipe network to an attenuation pond located within the Proposed Power Plant Site. Flows from the attenuation pond will then be discharged to the River Trent via the existing sluice gate at a controlled rate via a new connection to the existing WBA Power Station purge lines (via the northern drainage connection corridor).

7.3.3 At this stage only the main ('trunk') drains have been designed to an assumed layout based on runoff from assumed catchment areas. Detailed design would also incorporate design of branch drains that will be required to serve particular downpipe locations and avoid other buried infrastructure.

7.3.4 The below ground pipe network has been sized to accommodate a 1 in 100 year event plus a 20% allowance for climate change, in accordance with the Environment Agency Climate Change Guidance.

7.3.5 The outline drainage design considers the use of an attenuation pond along with other water attenuation methods.

7.3.6 Discharge from the attenuation pond would be restricted to the equivalent greenfield runoff rate calculated at 5 litres per second (l/s). Flow from the

attenuation pond would be restricted to 5l/s using a flow control device at the system outfall. The Environmental Permit application has been drafted to include this discharge, to account for the surface water from the Site.

7.3.7 An alternative 'Option C' has also been evaluated to connect into the existing WBB Power Station site drainage system to the south of the Proposed Power Plant Site; its feasibility will be dependent on final plant design and the volumes of surface water to be accommodated.

7.3.8 Appendix D6 presented within **Application Document Ref 7.8** provides details of the alternative open attenuation tank option and pumped or gravity fed discharge to WBB Power Station under Option 'C'. Surface water from the tank would be removed using a fixed pump or gravity fed system to the existing WBB Power Station drainage system and discharge into the existing WBA Power Station purge lines.

7.3.9 The drainage options may include the installation of an oil water separator for oily water drainage required to serve the gas turbine(s), fuel delivery area and transformer compound.

7.3.10 Other Sustainable Urban Drainage System (SuDS) techniques such as permeable paving and soakaways may be considered at the detailed design stage.

8. Flood Risk Management Measures

8.1 Overview

8.1.1 As discussed in **Sections 4** and **5**, the sequential allocation of development within the Site (refer to **Figure 4**) means that only a small part of the proposed construction laydown area and surface water drainage system would be located in Flood Zone 2. All other infrastructure would be located within Flood Zone 1.

8.1.2 This results in a small part of the Site being at medium risk of flooding from fluvial flooding during construction, with the wider Site at low residual risk of fluvial flooding as a result of a breach of defences during the operation of the Proposed Development. General mitigation measures to be implemented during construction and operation are outlined below.

8.2 Construction Mitigation

8.2.1 Construction works undertaken adjacent to, beneath and within watercourses would comply with relevant guidance during construction, including the requirements of any Environmental Permit, Ordinary Watercourse Consent, Environment Agency Pollution Guidance of Prevention of Pollution (GPP) and the Trent Valley IDB byelaws, particularly Byelaws 3, 6, 10, and 17, as required.

8.2.2 Activities carried out within the floodplain of a Main River are considered regulated activities and as such require permission from the Environment Agency to carry out. As the Proposed Development will not require development within 16m of the bank of a tidal watercourse, a Bespoke Permit under the Environmental Permit (Flood Risk Activities) - The Environmental Permitting (England and Wales) Regulations 2016 - will not be required.

8.2.3 Construction works within either of the proposed drainage connection corridor options would, as far as reasonably practicable, take place during lower flow periods to reduce the likelihood of flooding.

8.2.4 A CEMP would incorporate measures aimed at preventing an increase in flood risk during construction works, as far as reasonably practicable. This would include:

- topsoil and other construction materials would be stored outside of the 1 in 100 year (1% AEP) floodplain extent (Flood Zone 3);
- connectivity would be maintained between the floodplain and River Trent, with no changes in ground levels within the floodplain as far as practicable;
- adequate containment of storage areas, to ensure that material does not wash away and cause pollution and damage to infrastructure;
- the construction laydown area site office and supervisor would be notified of any potential flood occurring by use of the Flood line Warnings Direct service;

- the Contractor would be required to produce a Method statement outlining appropriate temporary dewatering/pumping measures to be employed to prevent flooding of the Site; and
- the Contractor would be required to produce a Flood Risk Management Action Plan/Method statements which would provide details of the response to flooding in the event of a breach of the defences occurring.

8.2.5 Potentially hazardous materials would be stored in locations that are outside of areas within Flood Zones 2 and 3, or on raised areas.

8.2.6 A site specific Emergency Response plan would be produced detailing emergency evacuations procedures in the event of a flood or breach of the defences.

8.2.7 Provision will be made for the safe access and egress from all working areas of the Site in case of flooding.

8.3 Operation Mitigation

8.3.1 During the operation of the Proposed Development, it is assumed that all above ground infrastructure will be located in Flood Zone 1. However, as there remains a residual risk of flooding from fluvial, surface water and drainage infrastructure sources, operation mitigation measures are suggested below:

- it is recommended that ground levels in the area of the Proposed Power Plant Site are set at a minimum of the 0.1% AEP modelled fluvial flood level to allow for an increase in flood flows under climate change. A minimum ground level of 7.10mAOD is therefore required, to reduce the residual flood risk associated with the development of the Proposed Power Plant Site;
- the Applicant would subscribe to the Environment Agency's Flood Alert Service in the area;
- as a precaution, flood resilience measures would as far as reasonably practicable be incorporated into the design of the Proposed Development to minimise the amount of damage and reduce the recovery time in the unlikely case of the Site becoming inundated;
- flood proofing, including the use of flood resistant building materials, the use of water resistant coatings, use of galvanised and stainless steel fixings and raising electrical sockets and switches;
- below ground infrastructure would be dry proofed to protect against water ingress as far as reasonably practicable;
- emergency response procedures would be developed for the Proposed Development. These would link closely with those of the West Burton Power Station site and form part of a wider site plan, if and when one is developed. It is recommended that at least one designated Flood Warden would be appointed on site who is familiar with the risks and remains vigilant to news

reports, Environment Agency flood warnings and water levels in the River Trent;

- implementation of a Surface Water Management Strategy as outlined in Section 7 would ensure that any likely increase in surface water as a result of the Proposed Development would be attenuated. Therefore, flood risk from this source, either to or from the Site, would not increase. It is confirmed that the detailed drainage design will follow appropriate guidance (i.e. The Wallingford Procedure) (Ref 12A-22) to include measures to provide pathways for exceedance flows, or to set levels for roadways and open areas in the Site such that they contain overland flood waters temporarily;
- the Site is considered to be at low risk of sewer flooding. However, further assessment is required at the detailed design stage to ensure that surface water run-off can be managed on-site. The proposed drainage infrastructure design will be agreed with the LLFA before construction to ensure that the risks of flooding from drainage infrastructure are not increased due to the Proposed Development; and
- an inspection and maintenance programme would be put in place for the drainage infrastructure to prevent/minimise the residual risk of flooding from this source, should it occur.

9. Conclusion

9.1 General

9.1.1 This FRA serves to demonstrate that the Proposed Development would remain safe during its lifetime and would not increase flood risk elsewhere. The following conclusions can be made regarding flood risk to the Proposed Development:

- the majority of the Site lies in Flood Zone 1, the zone of lowest flood risk from fluvial and tidal sources. A small area within the construction laydown area is located in Flood Zone 2;
- it is proposed that surface water from the Site will be discharge to the River Trent via the existing WBA Power Station purge lines and outfall. It has been assumed that discharge consent would be sought from the Environment Agency and discharge rates would be confirmed. Discharges to the receiving watercourse would be in line with rates stipulated and would not increase flood risk as a result;
- there are formal flood defences along the western bank of the River Trent that afford the Site a 1 in 100 year (1% AEP) standard of protection;
- there are no historic records of groundwater flooding at the Site and at present the risk of flooding from groundwater is considered medium. The Site is at low risk of flooding from fluvial sources, surface water, artificial sources, and sewage and drainage infrastructure;
- there is a residual risk of flooding from a breach of the flood defences on the River Trent, fluvial flood risk from Wheatley Beck associated with high water levels in the River Trent and from failure, blockage or exceedance of design capacity of drainage infrastructure, however the likelihood of this occurring is considered low;
- an Outline Drainage Strategy has been provided (**Application Document Ref. 7.8**) and outlines the proposed option for surface water management at the Site;
- the drainage design considers the use of an attenuation pond or tank along with other water attenuation methods. The inclusion of other possible SuDs methods would be considered at the detailed design stage;
- maximum attenuation volumes have been calculated for a range of 1.0% AEP storm durations. 1, 2, 6, 10, 24 and 48 hour storm durations have been considered. A climate change allowance of 20% has been applied to rainfall depths in calculation of attenuation volumes. The maximum design attenuation volume would be calculated at the detailed design stage;
- the preferred discharge route from any attenuation feature outfall has not been finalised however options under consideration include: the northern or southern drainage connection corridors connecting to the existing WBA Power

Station purge line with flows discharging to the River Trent via the existing sluice and outfall near the existing sewage treatment works; or a connection to the existing WBB Power Station site drainage system to the south of the Proposed Power Plant Site, north of WBB Power Station. This drainage route also connects into the WBA Power Station purge line. Either option may include the installation of an oil water separator;

- surface water run-off from the Proposed Development will be restricted to the equivalent greenfield runoff rate (5l/s) using a flow control structure at the system outfall;
- following implementation of a surface water management plan, the Proposed Development is not likely to increase surface water runoff and is therefore consistent with the requirements of both the NPS, NPPF and local planning policies;
- there remains a residual risk of tidal flooding from the River Trent in the event of failure or breach of the flood defences or fluvial flooding from Wheatley Beck associated with high water levels in the River Trent. It is recommended that ground levels at the Proposed Power Plant Site are raised to a minimum of 7.10m AOD (equivalent to the 0.1% AEP flood level as discussed with the Environment Agency) to mitigate against this risk. It is proposed that this would be secured via a requirement of the draft DCO ;
- there is a potential residual risk of failure of the surface water drainage system or exceedance of the system's design capacity. Regular maintenance and inspection of the drainage system would be undertaken to ensure that the system continues to perform as designed; and
- additional mitigation measures have been suggested for implementation during the construction and operation phase of the Proposed Development to minimise risk as far as practicable. These include provision of safe access and egress routes, development of a site specific emergency evacuation plan and use of flood resilient and resistant construction.

9.1.2 Following implementation of mitigation measures, there are considered to be no on or off-site impacts as a result of the Proposed Development in relation to flood risk.

10. References

Ref 12A-1	Environment Agency (2017) *Environment Agency Flood Map for Planning* [Online] Available from: https://flood-map-for-planning.service.gov.uk/ [Accessed: 04.03.2019].
Ref 12A-2	Ministry of Housing, Communities and Local Government (2019) *National Planning Policy Framework*.
Ref 12A-3	Ministry of Housing, Communities and Local Government (2018) *Planning Practice Guidance: Flood risk and coastal change.*
Ref 12A-4	JBA (2011) *Nottinghamshire Preliminary Flood Risk Assessment.*
Ref 12A-5	Nottinghamshire County Council (2016) *Nottinghamshire Local Flood Risk Management Strategy 2016 – 2021.*
Ref 12A-6	URS Scott Wilson (2011) *Nottinghamshire and Nottingham Level 1 Strategic Flood Risk Assessment. Minerals and Waste.*
Ref 12A-7	JBA (2010) *Bassetlaw District Council Strategic Flood Risk Assessment. Volume Three, Technical Summary. Final Report.*
Ref 12A-8	Environment Agency (2010) *River Trent Catchment Flood Management Plan.*
Ref 12A-9	British Geological Survey (2017) *GeoIndex* [Online] Available from: http://www.bgs.ac.uk/geoindex/ [Accessed: 07.07.2017].
Ref 12A-10a	Bassetlaw District Council (2011) *Bassetlaw District Local Development Framework: Core Strategy & Development Management Policies DPD.*
Ref 12A-10b	Bassetlaw Draft Local Plan (2019).
Ref 12A-11	Site Surveying Services Ltd (6th June 2017) *Drawing No. sss-7478-West Burton Power Station.*
Ref 12A-12	Department of Energy and Climate Change (2011) *Overarching National Policy Statement for Energy (EN-1).*
Ref 12A-13	Communities and Local Government, (2012) *'Planning Policy Statement 25: Development and Flood Risk, Practice Guidance'.*
Ref 12A-14	Communities and Local Government, (2012) *'Technical Guidance to the National Planning Policy Framework'.*
Ref 12A-15	Communities and Local Government (2014) *'Making the planning system work more efficiently and effectively'*.
Ref 12A-16	Office of the Deputy Prime Minister (2002) *The Building Regulations 2000, Drainage and Water Disposal (Approved Document H).*
Ref 12A-17	Mott MacDonald (2013) *Tidal Trent Strategic Flood Risk Management Model.*

Ref 12A-18 Department for Communities and Local Government (2010) *Planning Policy Statement 25: Development and Flood Risk.*

Ref 12A-19 Environment Agency (2016) *Flood risk assessments: climate change allowances.*

Ref 12A-20 *British Geological Society Geology of Britain Viewe*r [Online] Available from: http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html [Accessed: 24.07.2017].

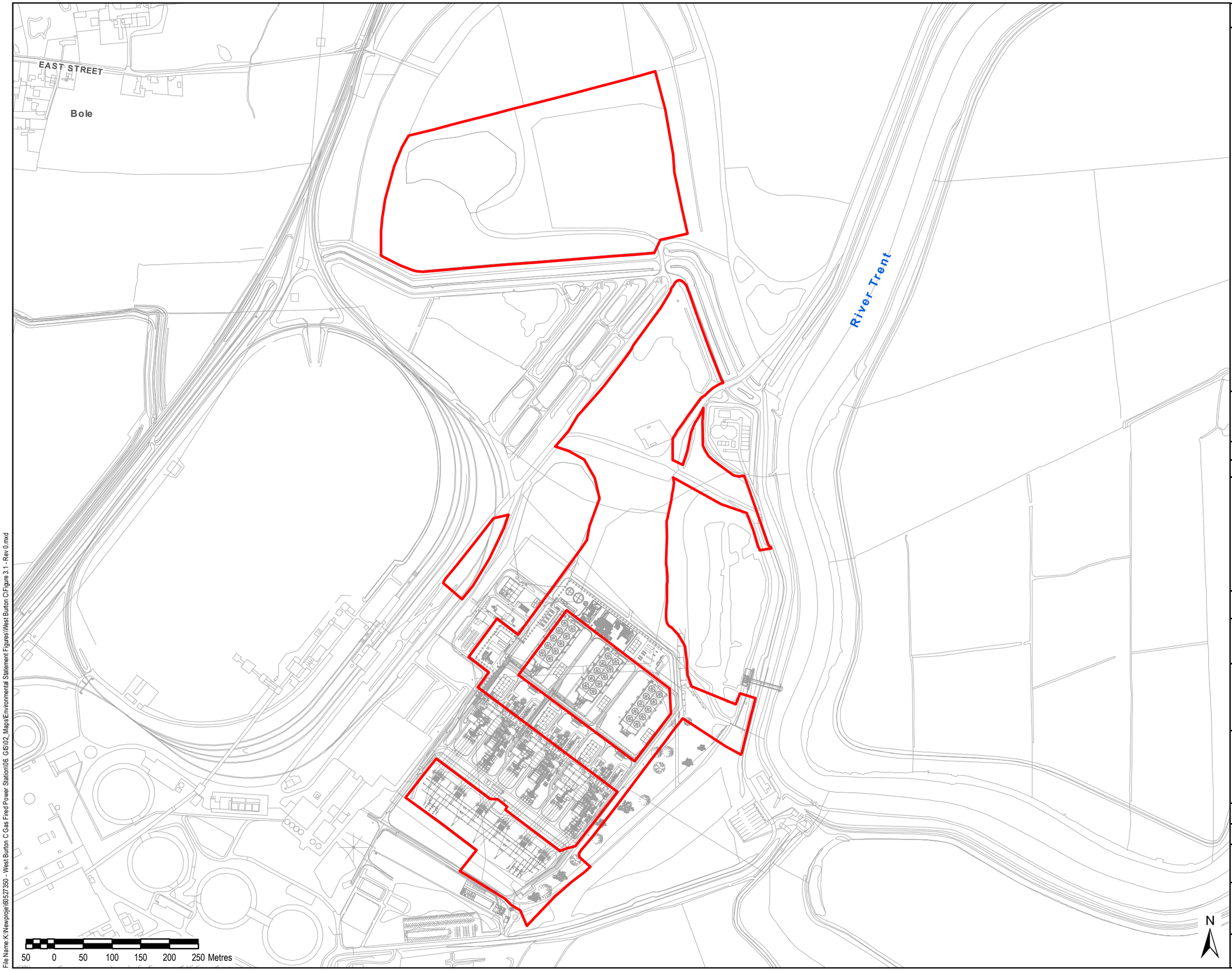
Ref 12A-21 Sir Robert McAlpine (2017) *West Burton Power Station Ground Investigation.*

Ref 12A-22 HR Wallingford (1981) *Design and Analysis of Urban Storm Drainage: The Wallingford Procedure.*

Annex A: Site Information

A. West Burton Power Station Site

B. Topographic Survey



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LEGEND

The Order Limits

First Issue	GB	SE	05.01.18	0
Revision Details	By	Check	Check Date	Suffix

Purpose of Issue
ENVIRONMENTAL STATEMENT

Client
EDF ENERGY
(THERMAL GENERATION) LIMITED

Project Title
WEST BURTON C

Drawing Title
FIGURE 3.1
THE ORDER LIMITS

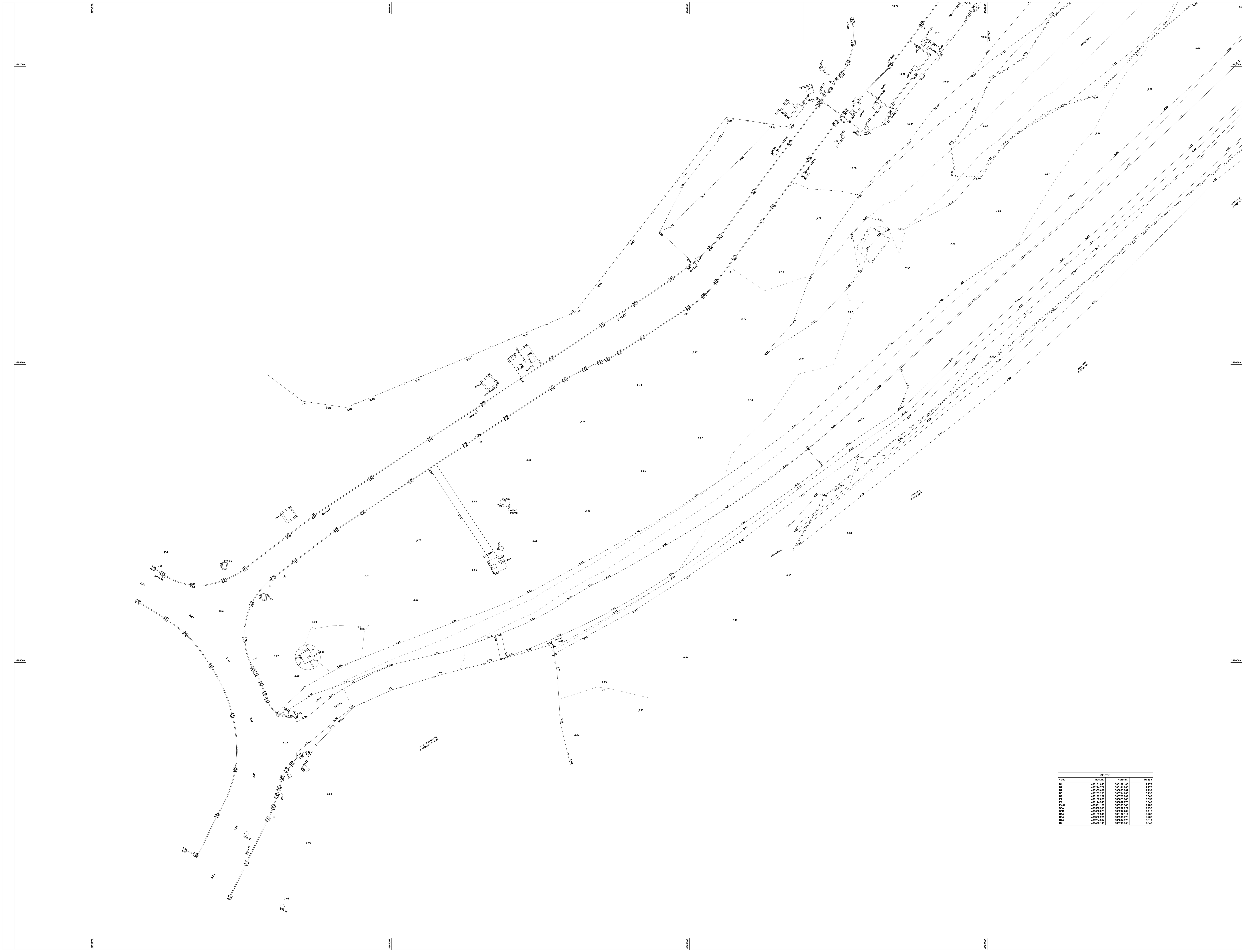
Drawn	Checked	Approved	Date
GB	SE	RL	05.01.18

AECOM Internal Project No.	Scale @ A3
60527350	1:6,000

AECOM
Scott House
Alencon Link, Basingstoke
Hampshire, RG21 7PP
Telephone (01256) 310200
Fax (01256) 310201
www.aecom.com

Drawing Number
60527350/WBC/ES/FIGURE 3.1

Rev



SF- TO 1			
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B2	480214.777	386141.965	12.276
B7	480305.609	385863.962	11.299
B8	480253.205	385794.665	10.796
B9	480192.262	385720.809	10.866
E1	480162.059	385673.846	9.553
E2	480114.345	385637.775	8.648
EX62	480501.166	385953.940	7.283
S3A	480508.315	386282.727	7.192
S5B	480536.079	386202.282	7.115
B1A	480167.340	386167.117	12.266
B6A	480360.265	385936.778	12.266
B7A	480284.314	385834.320	10.810
R2	480498.141	385796.850	7.845

deciduous tree
defined by one point at centre & one point on spread
d=.5
trunk radius as drawn
(girth size and position +/- 50mm)
station
trial pit
conifer tree (defined as above)
gate
bush
borehole
window sample

- note heights / points / lines all same colour
- e.g. for channel, all crosses / lines / heights are magenta

56.24
spot level

bottom of batter / wood / ridge / timber face / gutter
top of batter
break line / discontinuity
wall (see text nearby for height / width / type)
retaining wall (see text nearby for height / width / type)
channel (all levels at channel unless noted)
kerb levels (shown parallel to channel -)
railway
drain / river / canal
overhead lines / buildings (not surveyed unless specified)
concrete / ramp
building / stone
face of cladding / flower bed
canopy
verge
fence (see text nearby for height / width / type)
(panel / security / etc.)
columns / gridlines / conveyors / column face
brick
cycle lane / bus lane / white line (see text)
tanks / decking
hedge scaled to width
line may be as above, if just one edge
i.e. for level specific surveys both sides
measured not to show level change
(see text for type / height / width / etc)
path / window / door
track
contours
143
142.5
pipe line
bt cable
electric cable
gas
tarmac
footpath

M can't lift - can't lift
cl=65.23
il=59.78

- only manholes found on site during survey marked
- other manholes may be present but covered
- all invert levels taken where possible at main channel
- all surveys to our specification based on RICS (see website)
- some surveying done with GPS - please contact us regarding accuracy

?	unknown cover
ac box	air conditioning box
av	air valve
bb	belisha beacon
bin	bin
bt	bt line
bt	bt manhole
bt	bt post
bt box	bt box
bm	OSBM
block	blocked manhole
bus shelter	bus shelter
cable	cable
can't lift	can't lift
ctv box	cable tv box
ctv	cable tv manhole
data mh	data manhole
dk	drop kerb
ds&g	down spout (with gulley)
dsr	recessed downspout
ds	building step back
	not surveyed
el. post	electric post
el.	electric
el. mh	electric manhole
el box	electric box
earth	earth strap/spike
f.hydr	fire hydrant
gas	gas
gas mh	gas man hole
gas box	gas box
gu=5.68	gulley top
guy	guy rope/stay
.5 dia	pipe diameter
light	light
lp	lamp post
lt	left turn arrow
peg	peg
phone box	phone box
post box	post box
pipe	pipe
planter	planter
post	post
rod. eye	rodding eye
rsj	steel rsj
rt	right turn
salt	salt box
security cam	security camera
seat	seat
si	sign - with indicative text
slab=3.19	slab (generally conc.)
st.tap	stop tap
str.	straight on
sv.	sluice valve
tactile paving	tactile paving
ts.	traffic signal
ts. mh	traffic signal manhole
ts.box	traffic signal box
trap	trap
utility	utility (unknown)
utility mh	utility manhole (unknown)
utility box	utility box (unknown)
water	water
water mh	water manhole
water box	water box
wo	wash out valve
tap	tap
parking meter	parking meter
cycle rack	cycle rack
cycle shelter	cycle shelter

STANDARD FENCE ABBREVIATIONS
b/w - barbed wire
c/l - chain link
cl/b - close boarded
c/i - corrugated iron
con/pan - concrete panel
cr/ba - crash barrier
h/r - hand rail
i/r - iron rail
pal - palisade
panel - panel
p/b - public barrier
pick - picket
p/r - post & rail
p/w - post & wire
sec. - security fence
wood - wooden fence

STANDARD ABBREVIATIONS
conc. - concrete
conc. boll. - concrete bollard
conc. wall - concrete wall
edg.cut grass - edge cut grass
el.sub st. - elec. substation
face conc. - face of concrete
face clad. - face of cladding
face tim. - face of timber
trel - trellis
hi pr. gas - high pressure gas
no ri. turn - no right turn
rough ground - rough ground
ret. wall - retaining wall
sur. drain - surface drain
ped. studs - pedestrian studs

cl=5.32 (manhole cover level)
dpc=56.45 (dpc level)
eav=34.29 (eaves level)
ffl=5.34 (finished floor level)
gu=34.29 (gulley level)
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twl=56.72 (top of wall)
wal=56.19 (water level)
cfl=5.67 (cellar floor level)
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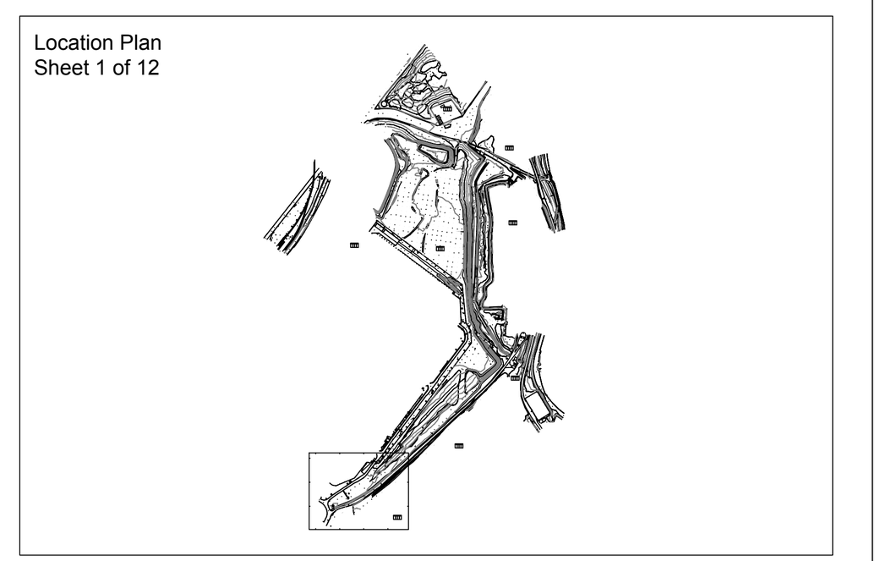
windowtop=13.59
windowbottom=14.41

Location Plan
Sheet 1 of 12



Site Surveying Services - A.M.I.C.E.S.
Suite 7
Grindleton Business Centre
Grindleton, Lancs
BB7 4DH
Tel: 01200 438320
Fax: 07092376338
www.sitesurvey.co.uk
Land / Engineering Surveyors

Setting Out & Control Surveys
Topographic/Volumetric Surveys
GPS Specialists using also
GPS Post Process to tie any site
to OS without trig point or BM
Construction Line Registered
TSA member

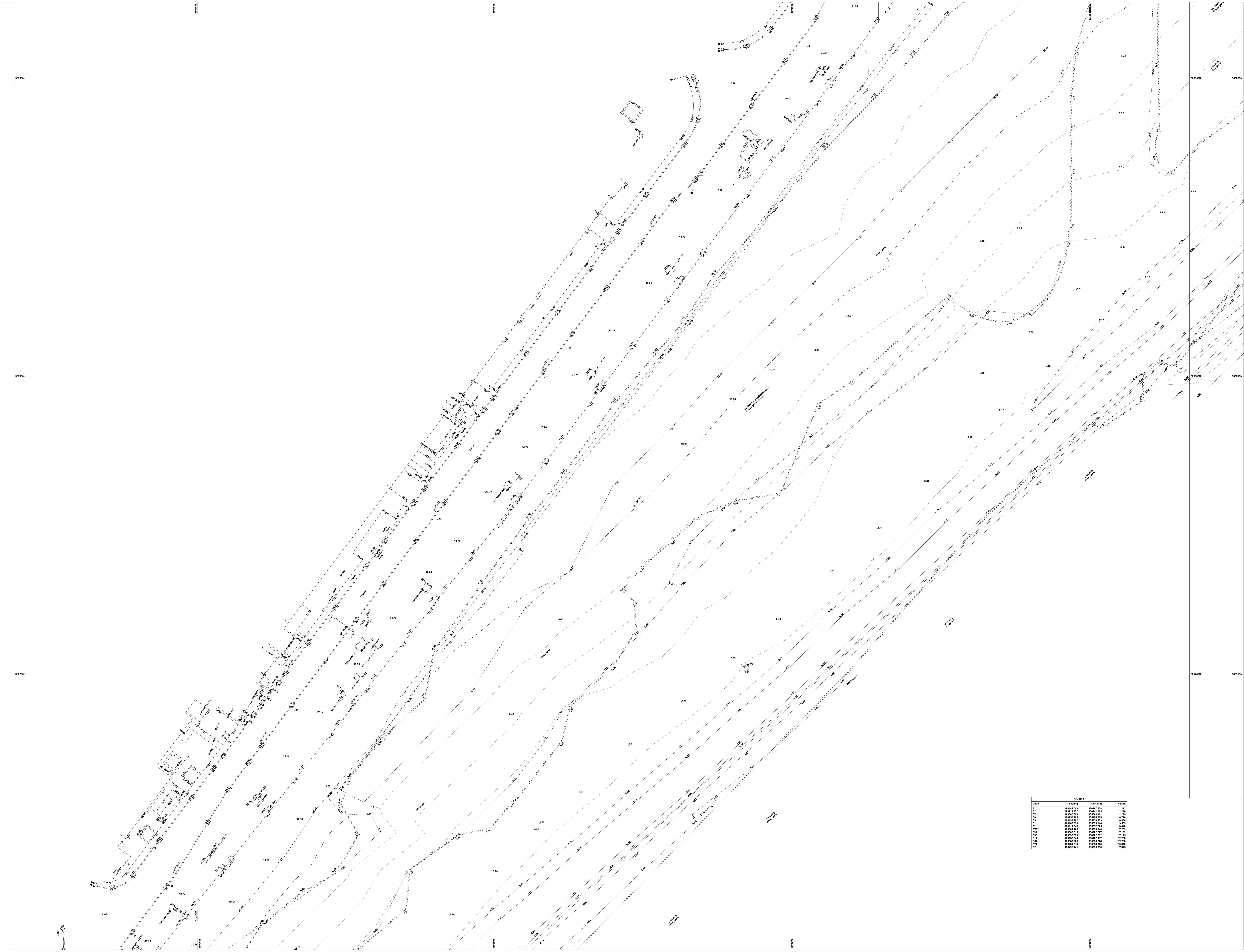
construction line

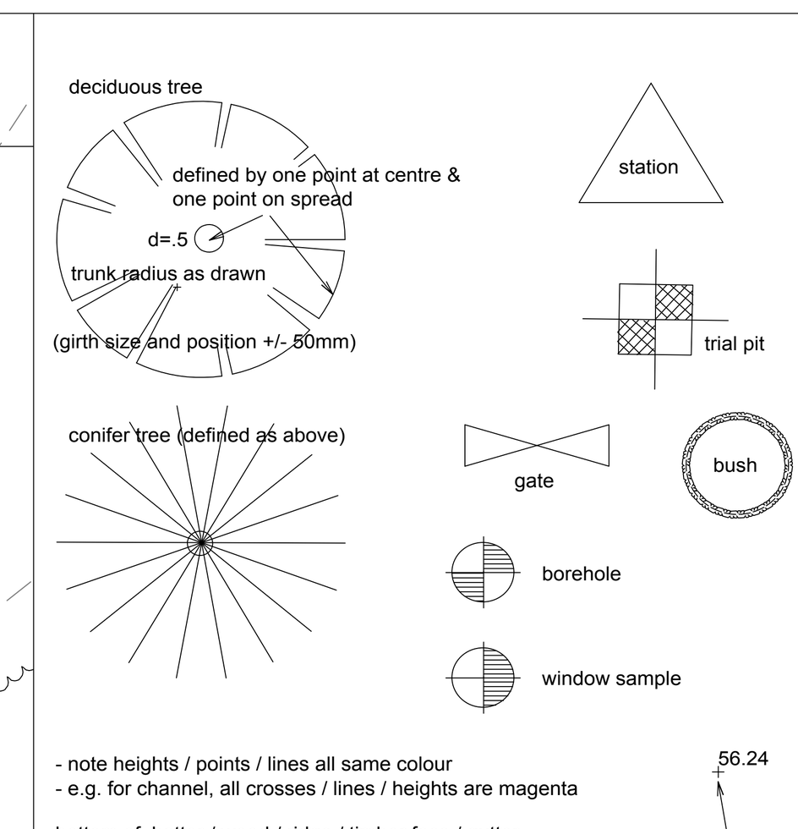
Client / Location: Aecom
West Burton Power Station

THE SURVEY ASSOCIATION

Additional Comments:
To local grid based on ostn15/osgm15 all work to sss specification, some by gps, contact us regarding details

Drawing Number:	sss-7478-West Burton Power Station	Revision: A	
Drawn By:	SS & PS	Checked By:	HW
Date:	06/06/2017	Scale:	1:200 @ A0





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- e.g. for channel, all crosses / lines / heights are magenta

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bottom of batter / wood / ridge / timber face / gutter
top of batter
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wall (see text nearby for height / width / type)
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kerb levels (shown parallel to channel -)
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overhead lines / buildings (not surveyed unless specified)
concrete / ramp
building / stone
face of cladding / flower bed
canopy
verge
fence (see text nearby for height / width / type)
(panel / security / etc.)
columns / gridlines / conveyors / column face
brick
cycle lane / bus lane / white line (see text)
tanks / decking
hedge scaled to width
line may be as above, if just one edge
i.e. for level specific surveys both sides
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bb	belisha beacon
bin	bin
bt	bt line
bt	bt manhole
bt	bt post
bt box	bt box
bm	OSBM
block	blocked manhole
bus shelter	bus shelter
cable	cable
can't lift	can't lift
ctv box	cable tv box
ctv	cable tv manhole
data mh	data manhole
dk	drop kerb
ds&g	down spout (with gulley)
dsr	recessed downspout
ds	building step back not surveyed
el. post	electric post
el.	electric
el. mh	electric manhole
el box	electric box
earth	earth strap/spike
f.hydr	fire hydrant
gas	gas
gas mh	gas man hole
gas box	gas box
gu=5.68	gulley top
guy	guy rope/stay
.5 dia	pipe diameter
light	light
lp	lamp post
lt	left turn arrow
peg	peg
phone box	phone box
post box	post box
pipe	pipe
planter	planter
post	post
rod. eye	rodding eye
rsj	steel rsj
rt	right turn
salt	salt box
security cam	security camera
seat	seat
si	sign - with indicative text
slab=3.19	slab (generally conc.)
st.tap	stop tap
str.	straight on
sv.	sluice valve
tactile paving	tactile paving
ts.	traffic signal
ts. mh	traffic signal manhole
ts.box	traffic signal box
trap	trap
utility	utility (unknown)
utility mh	utility manhole (unknown)
utility box	utility box (unknown)
water	water
water mh	water manhole
water box	water box
wo	wash out valve
tap	tap
parking meter	parking meter
cycle rack	cycle rack
cycle shelter	cycle shelter

STANDARD FENCE ABBREVIATIONS
b/w - barbed wire
c/l - chain link
cl/b - close boarded
c/i - corrugated iron
con/pan - concrete panel
cr/ba - crash barrier
h/r - hand rail
i/r - iron rail
pal - palisade
panel - panel
p/b - public barrier
pick - picket
p/r - post & rail
p/w - post & wire
sec. - security fence
wood - wooden fence

STANDARD ABBREVIATIONS
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windowtop=13.59
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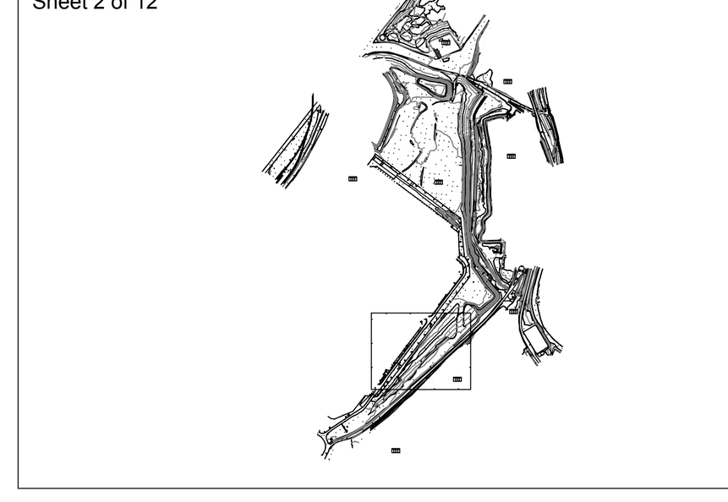
Location Plan
Sheet 2 of 12



SF- TO 1			
Code	Easting	Northing	Height
B1	480181.043	386167.108	12.272
B2	480214.777	386141.965	12.276
B7	480305.609	385863.962	11.299
B8	480253.205	385794.665	10.796
B9	480192.262	385720.809	10.866
E1	480162.059	385673.846	9.553
E2	480114.345	385637.775	8.648
EX62	480501.166	385953.940	7.283
S3A	480508.315	386282.727	7.192
S5B	480536.079	386202.282	7.115
B1A	480167.340	386167.117	12.266
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B7A	480284.314	385834.320	10.810
R2	480498.141	385796.850	7.845

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construction line

Client / Location: Aecom
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All work to our standard terms & conditions (see website)

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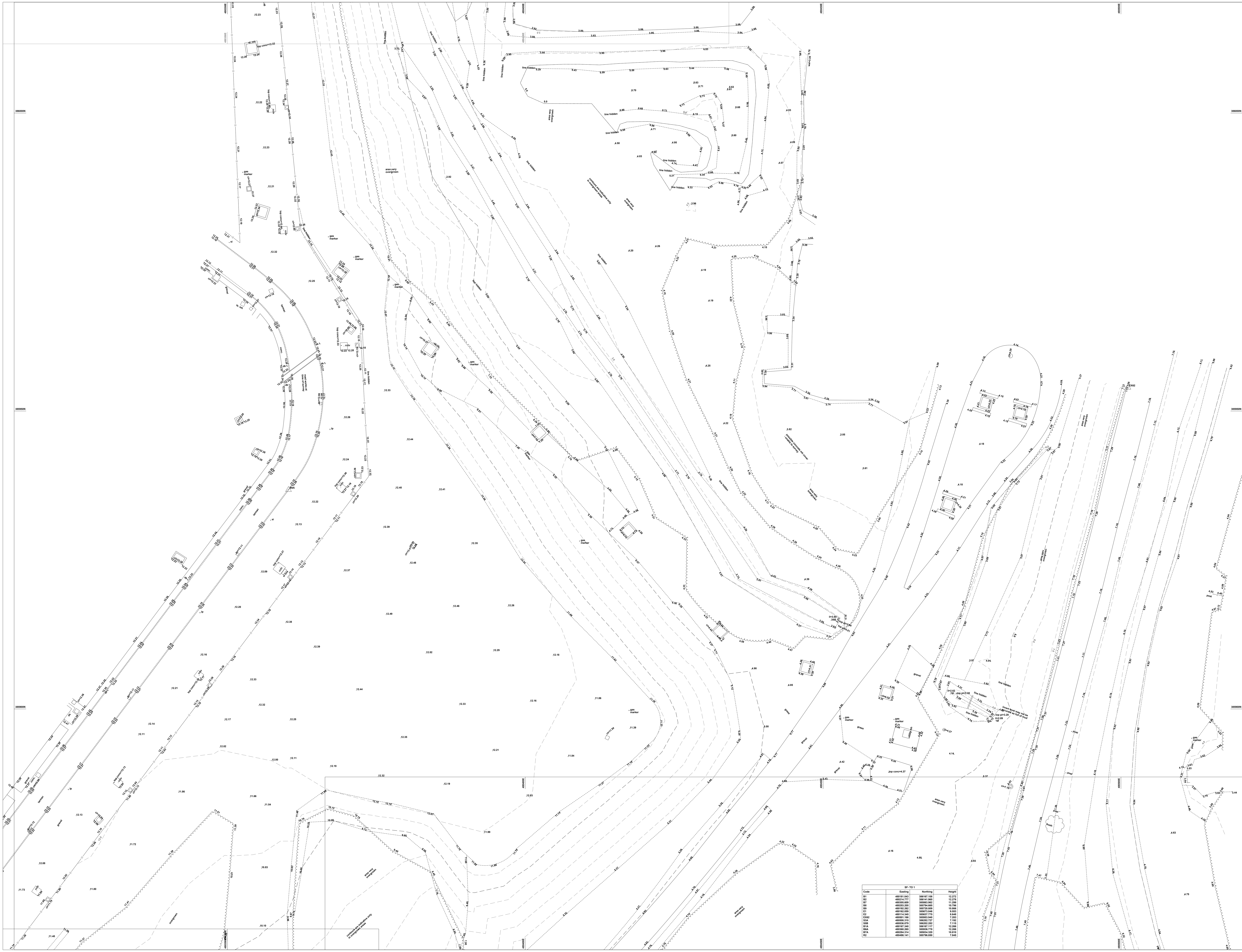
Additional Comments:
To local grid based on ostn15/osgm15 all work to sss specification, some by gps, contact us regarding details

Drawing Number:	sss-7478-West Burton Power Station	Revision: A	
Drawn By:	SS & PS	Checked By:	HW
Date:	06/06/2017	Scale:	1:200 @ A0



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deciduous tree
defined by one point at centre & one point on spread
trunk radius as drawn
d=0.5
(girth size and position +/- 50mm)
station
trial pit
conifer tree (defined as above)
gate
bush
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window sample

- note heights / points / lines all same colour
- e.g. for channel, all crosses / lines / heights are magenta

56.24 spot level

bottom of batter / wood / ridge / timber face / gutter
top of batter
break line / discontinuity
wall (see text nearby for height / width / type)
retaining wall (see text nearby for height / width / type)
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ds&g	down spout (with gulley)
dsr	recessed downspout
ds	building step back not surveyed
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gas box	gas box
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guy	guy rope/stay
.5 dia	pipe diameter
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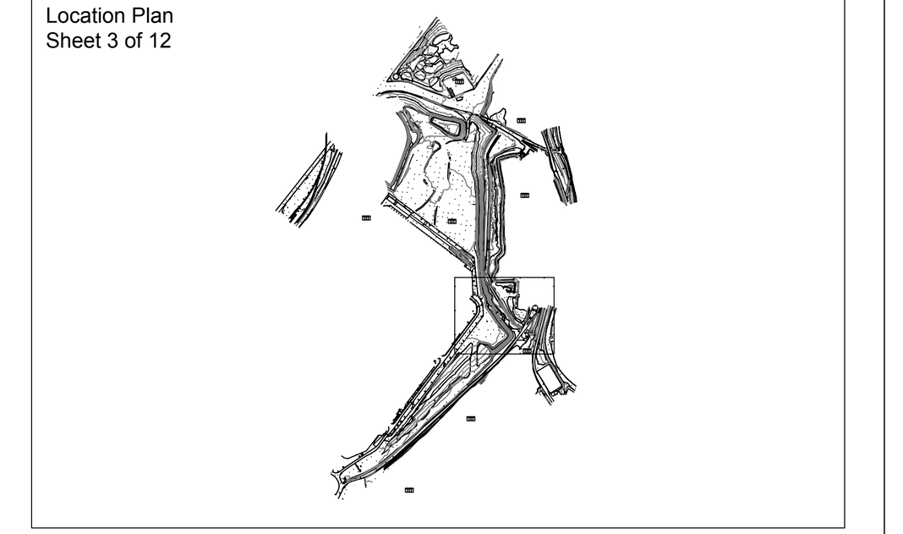
Location Plan
Sheet 3 of 12



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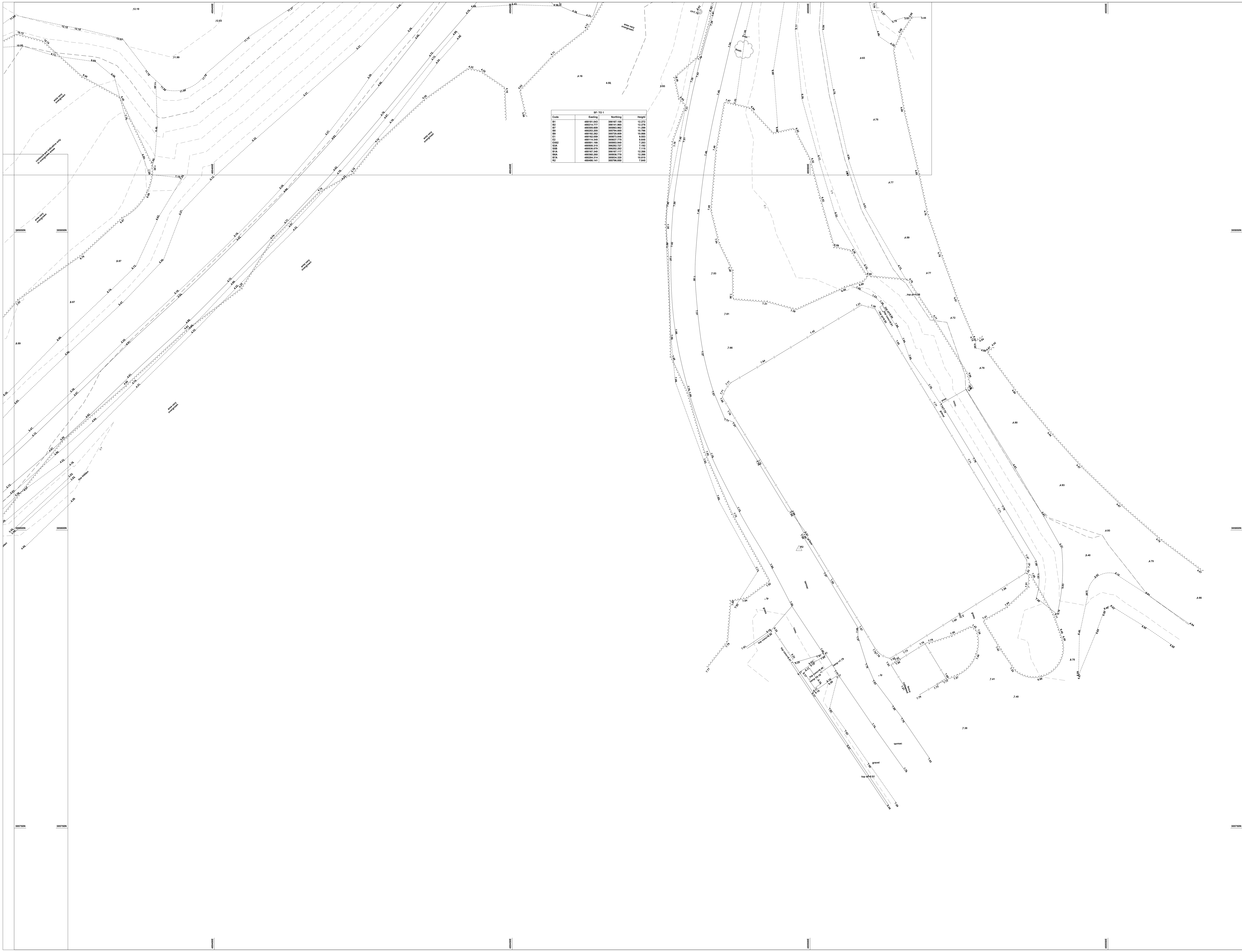

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gas mh	gas man hole
gas box	gas box
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guy	guy rope/stay
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light	light
lp	lamp post
lt	left turn arrow
peg	peg
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post box	post box
pipe	pipe
planter	planter
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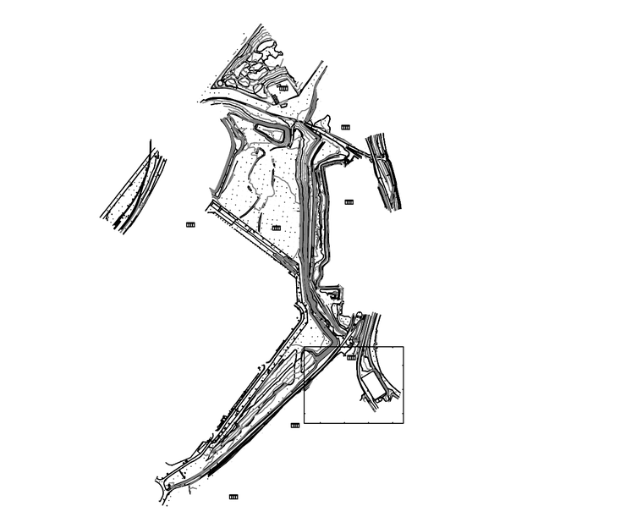
Location Plan
Sheet 4 of 12



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- unable to survey accurately due to vegetation and instability of slope

area very overgrown

no data for bottom of bank on this stretch - area too overgrown and slope deemed too unstable contours have been interpolated

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S07	480058.279	386202.252	7.115
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twl=56.72 (top of wall)
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cfl=5.67 (cellar floor level)
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windowtop=13.59
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Location Plan
Sheet 5 of 12

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construction line

Client / Location: Aecom
West Burton Power Station

All work to our standard terms & conditions (see website)

THE SURVEY ASSOCIATION

Additional Comments:
To local grid based on ostn15/osgm15 all work to sss specification, some by gps, contact us regarding details

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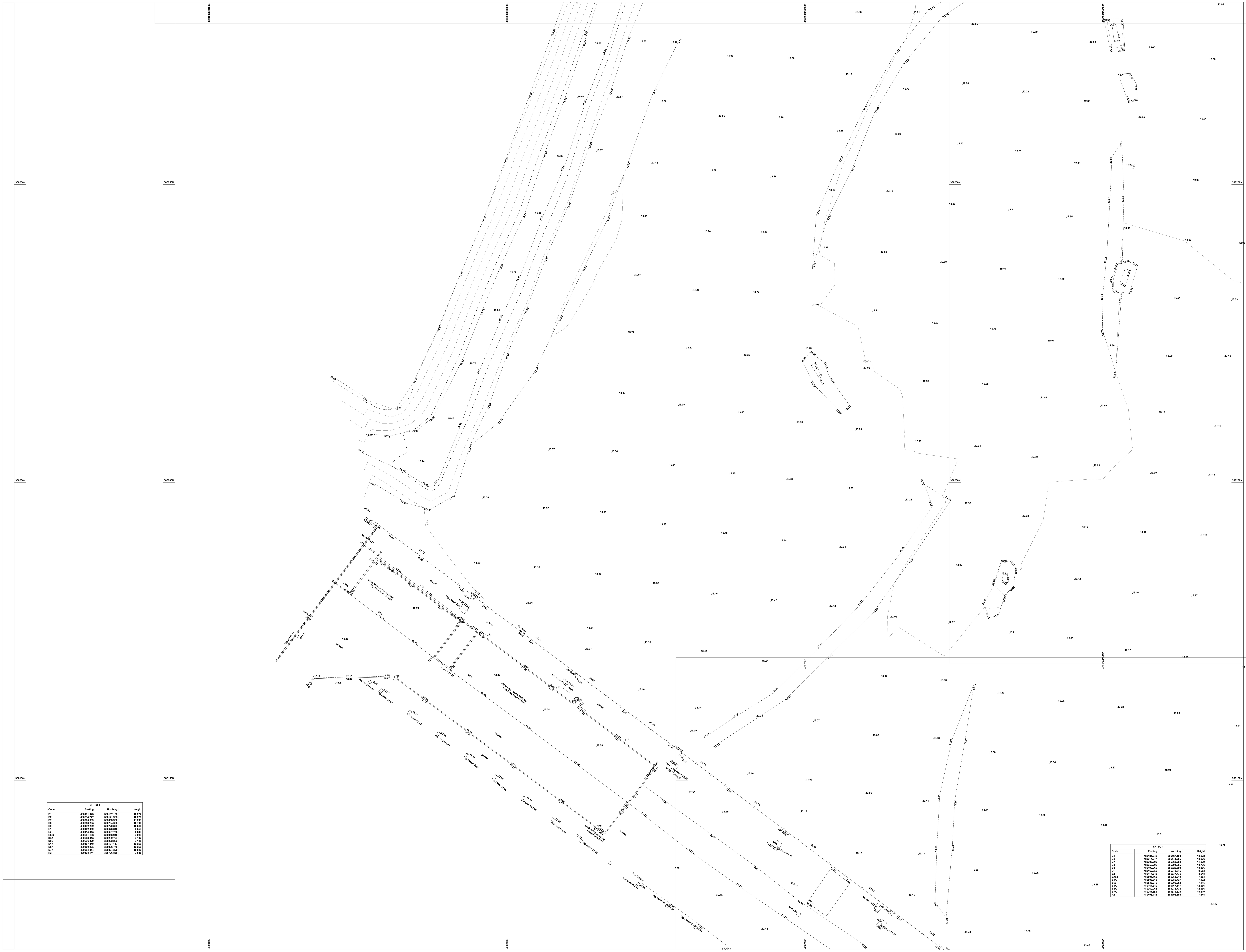

deciduous tree
defined by one point at centre & one point on spread
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trunk radius as drawn
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trial pit
conifer tree (defined as above)
gate
bush
borehole
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- note heights / points / lines all same colour
- e.g. for channel, all crosses / lines / heights are magenta

56.24
spot level

bottom of batter / wood / ridge / timber face / gutter
top of batter
break line / discontinuity
wall (see text nearby for height / width / type)
retaining wall (see text nearby for height / width / type)
channel (all levels at channel unless noted)
kerb levels (shown parallel to channel -)
railway
drain / river / canal
overhead lines / buildings (not surveyed unless specified)
concrete / ramp
building / stone
face of cladding / flower bed
canopy
verge
fence (see text nearby for height / width / type) (panel / security / etc.)
columns / gridlines / conveyors / column face
brick
cycle lane / bus lane / white line (see text)
tanks / decking
hedge scaled to width
line may be as above, if just one edge
i.e. for level specific surveys both sides
measured not to show level change
(see text for type / height / width / etc)
path / window / door
track
contours
143
142.5
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gas
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M
can't lift - can't lift
cl=65.23
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ac box	air conditioning box
av	air valve
bb	belisha beacon
bin	bin
bt	bt line
bt	bt manhole
bt	bt post
bt box	bt box
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block	blocked manhole
bus shelter	bus shelter
cable	cable
can't lift	can't lift
ctv box	cable tv box
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data mh	data manhole
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ds&g	down spout (with gulley)
dsr	recessed downspout
ds	building step back not surveyed
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el box	electric box
earth	earth strap/spike
f.hydr	fire hydrant
gas	gas
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gas box	gas box
gu=5.68	gulley top
guy	guy rope/stay
.5 dia	pipe diameter
light	light
lp	lamp post
lt	left turn arrow
peg	peg
phone box	phone box
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planter	planter
post	post
rod. eye	rodding eye
rsj	steel rsj
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salt	salt box
security cam	security camera
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si	sign - with indicative text
slab=3.19	slab (generally conc.)
st.tap	stop tap
str.	straight on
sv.	sluice valve
tactile paving	tactile paving
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ts.box	traffic signal box
trap	trap
utility	utility (unknown)
utility mh	utility manhole (unknown)
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water mh	water manhole
water box	water box
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STANDARD FENCE ABBREVIATIONS
b/w - barbed wire
c/l - chain link
cl/b - close boarded
c/i - corrugated iron
con/pan - concrete panel
cr/ba - crash barrier
h/r - hand rail
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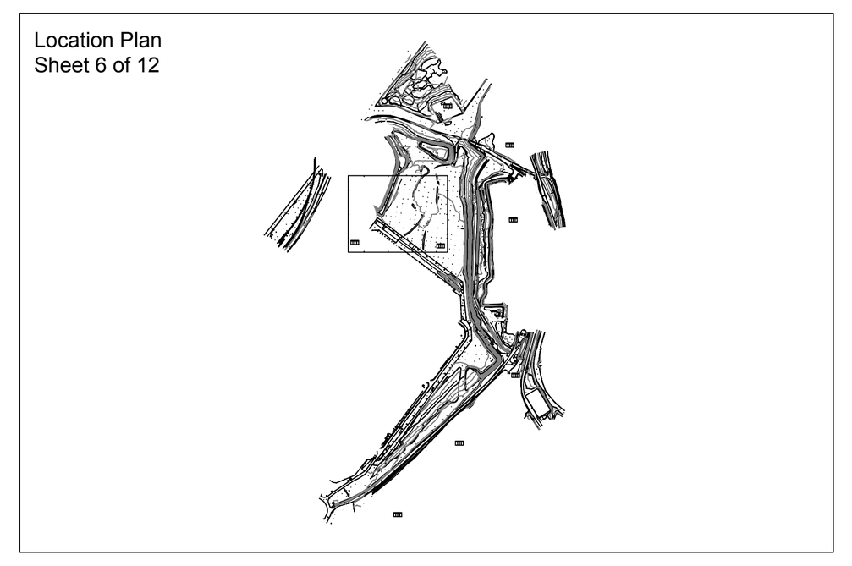
Location Plan
Sheet 6 of 12



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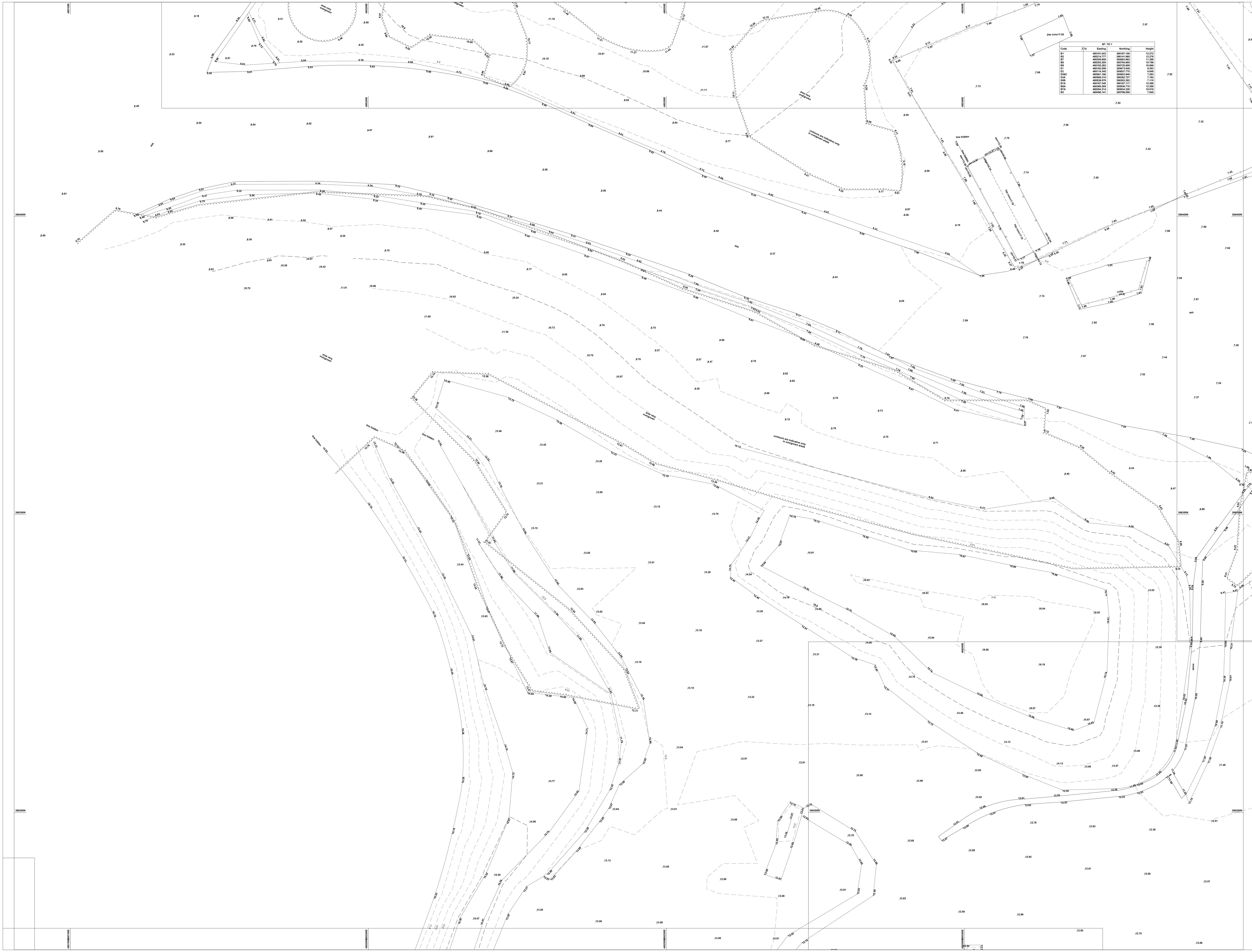

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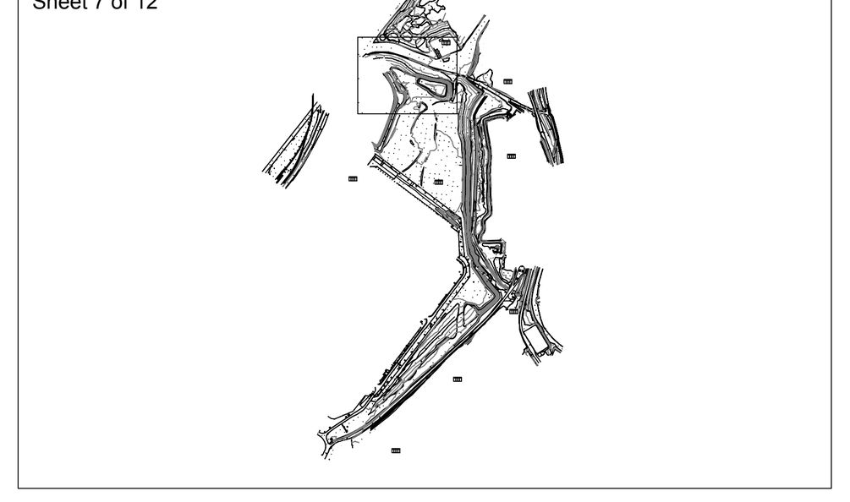
Location Plan
Sheet 7 of 12



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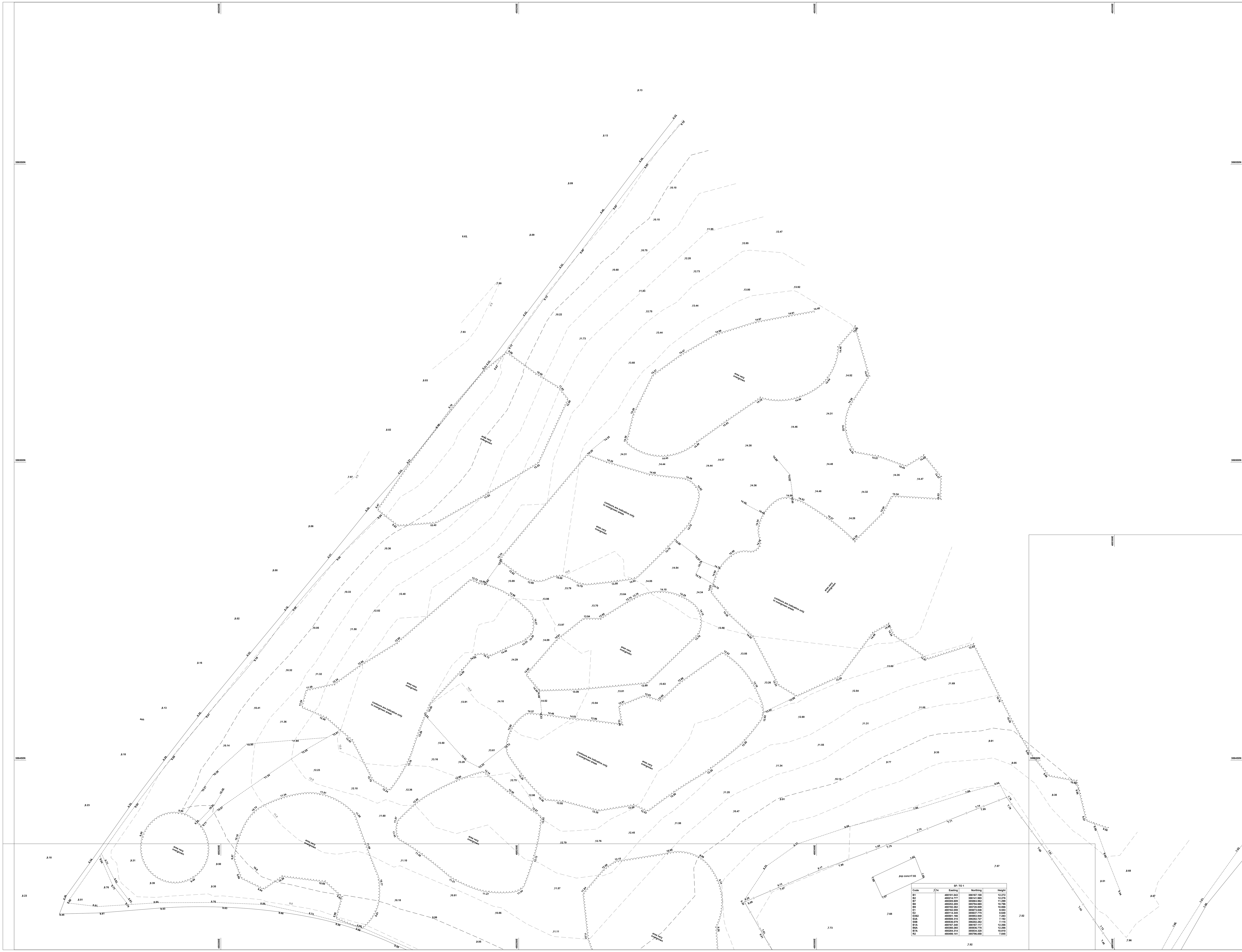

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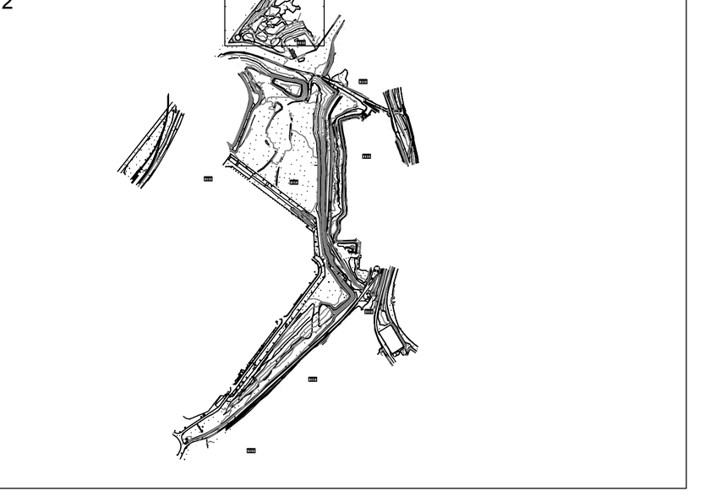

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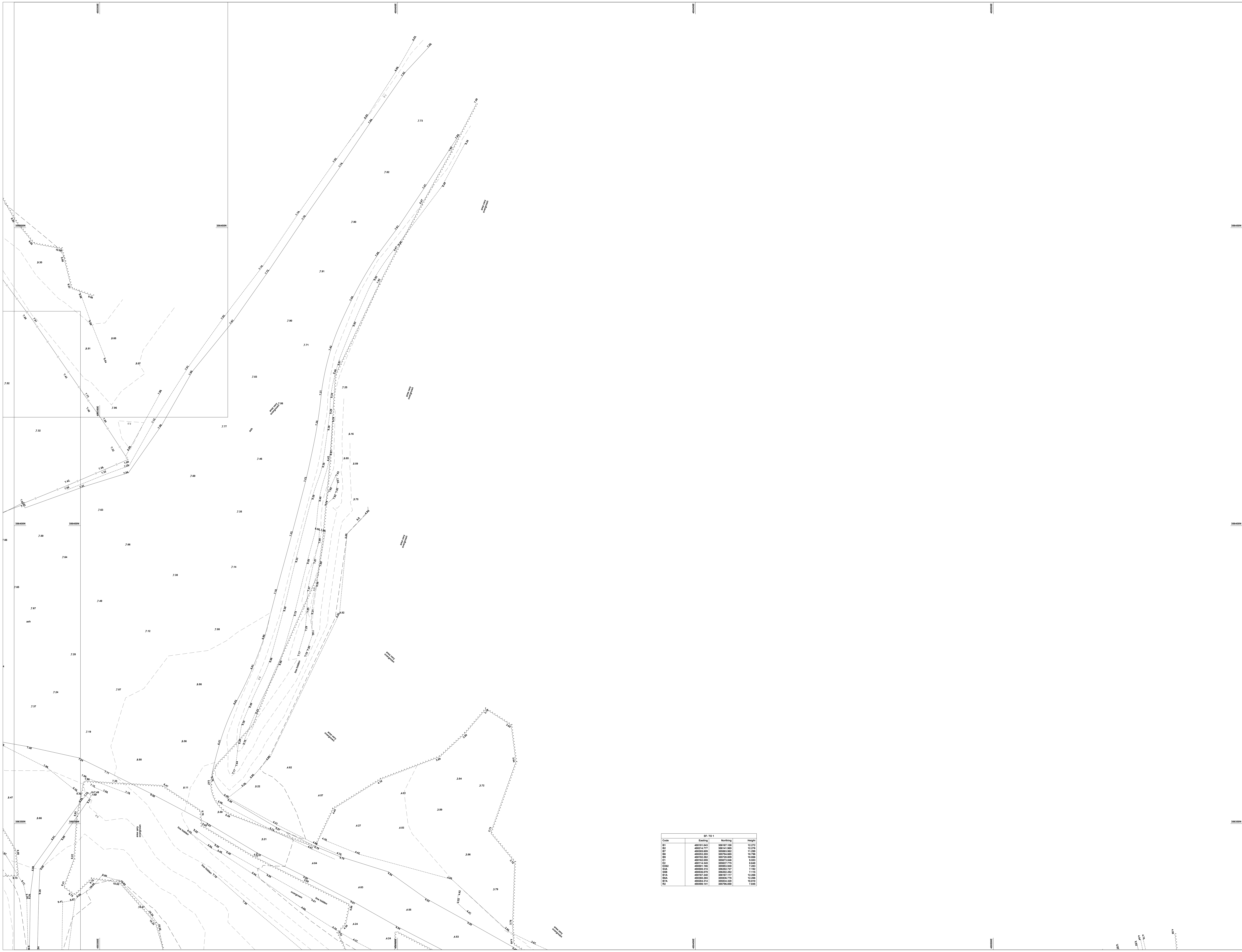

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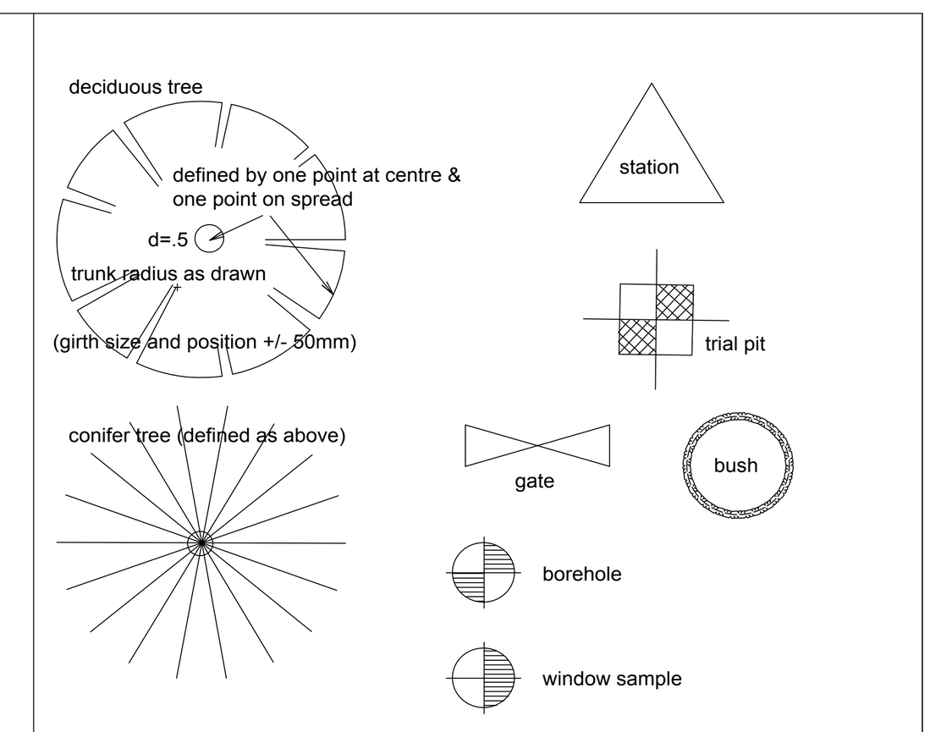

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retaining wall (see text nearby for height / width / type)
channel (all levels at channel unless noted)
kerb levels (shown parallel to channel -)
railway
drain / river / canal
overhead lines / buildings (not surveyed unless specified)
concrete / ramp
building / stone
face of cladding / flower bed
canopy
verge
fence (see text nearby for height / width / type)
(panel / security / etc.)
columns / gridlines / conveyors / column face
brick
cycle lane / bus lane / white line (see text)
tanks / decking
hedge scaled to width
line may be as above, if just one edge
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path / window / door
track
contours
143
142.5
pipe line
bt cable
electric cable
E(R)
gas
tarmac
footpath

M
can't lift - can't lift
cl=65.23
il=59.78

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?	unknown cover
ac box	air conditioning box
av	air valve
bb	belisha beacon
bin	bin
bt	bt line
bt	bt manhole
bt	bt post
bt box	bt box
bm	OSBM
block	blocked manhole
bus shelter	bus shelter
cable	cable
can't lift	can't lift
ctv box	cable tv box
ctv	cable tv manhole
data mh	data manhole
dk	drop kerb
ds&g	down spout (with gulley)
dsr	recessed downspout
ds	building step back
	not surveyed
el. post	electric post
el.	electric
el. mh	electric manhole
el box	electric box
earth	earth strap/spike
f.hydr	fire hydrant
gas	gas
gas mh	gas man hole
gas box	gas box
gu=5.68	gulley top
guy	guy rope/stay
.5 dia	pipe diameter
light	light
lp	lamp post
lt	left turn arrow
peg	peg
phone box	phone box
post box	post box
pipe	pipe
planter	planter
post	post
rod. eye	rodding eye
rsj	steel rsj
rt	right turn
salt	salt box
security cam	security camera
seat	seat
si	sign - with indicative text
slab=3.19	slab (generally conc.)
st.tap	stop tap
str.	straight on
sv.	sluice valve
tactile paving	tactile paving
ts.	traffic signal
ts. mh	traffic signal manhole
ts.box	traffic signal box
trap	trap
utility	utility (unknown)
utility mh	utility manhole (unknown)
utility box	utility box (unknown)
water	water
water mh	water manhole
water box	water box
wo	wash out valve
tap	tap
parking meter	parking meter
cycle rack	cycle rack
cycle shelter	cycle shelter

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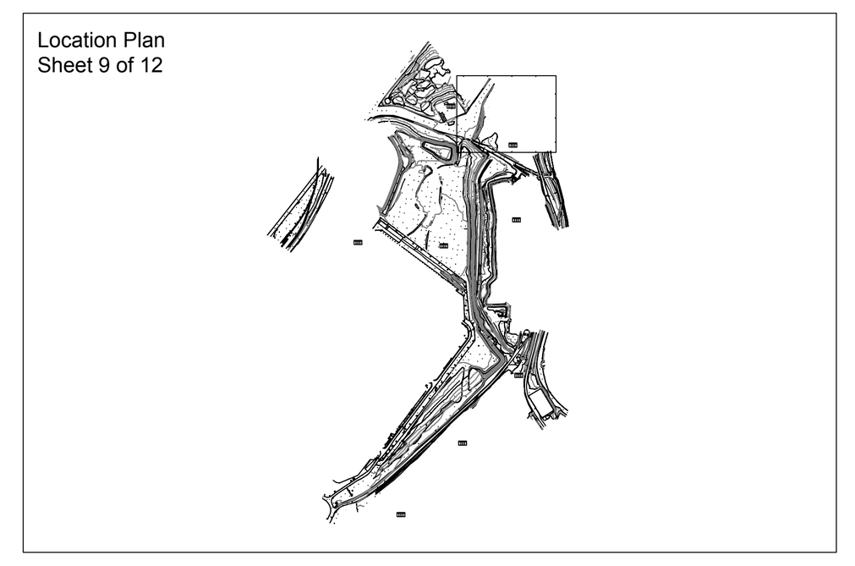
Location Plan
Sheet 9 of 12



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construction line

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All work to our standard terms
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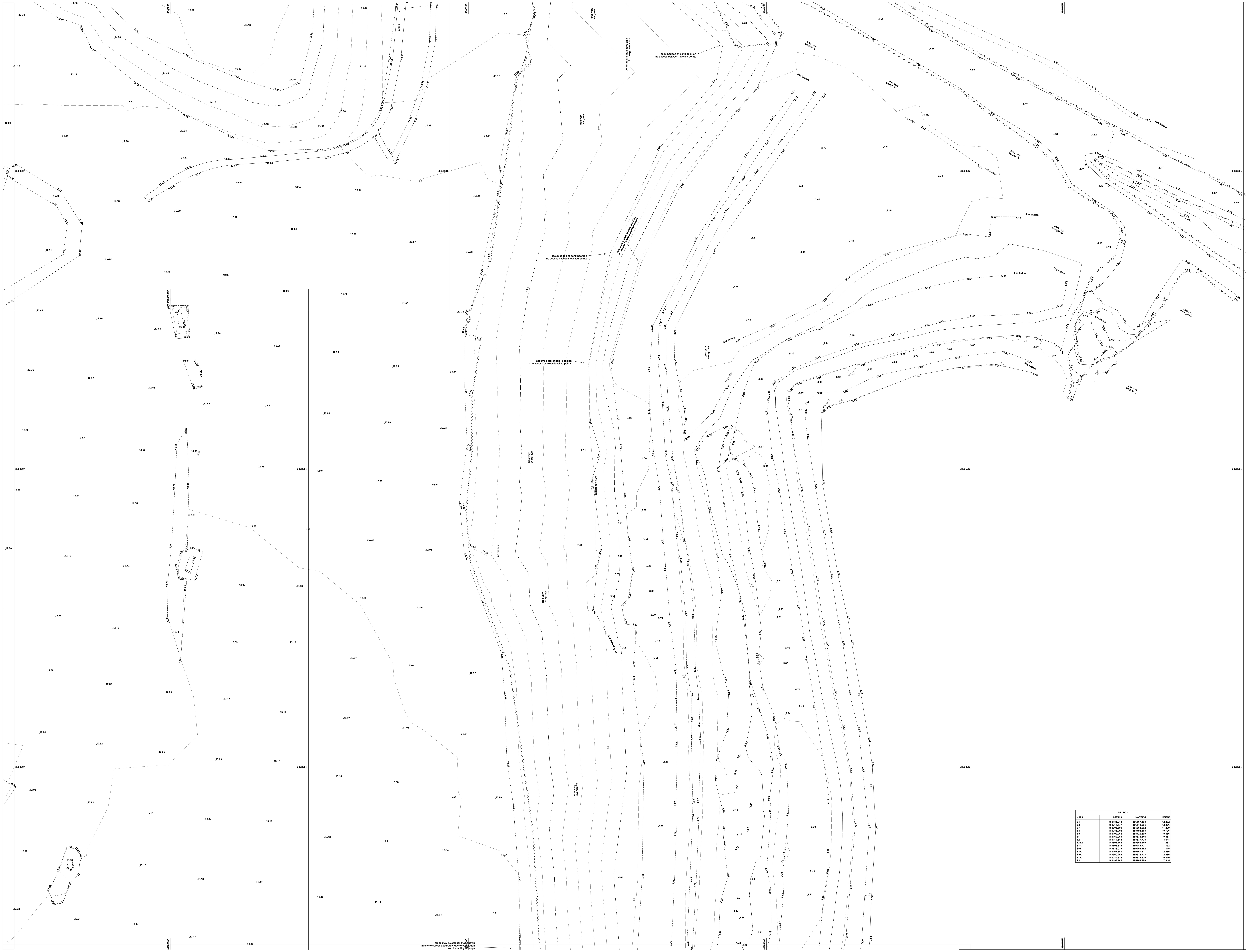

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defined by one point at centre & one point on spread
d=.5
trunk radius as drawn
(girth size and position +/- 50mm)

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gate

bush

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window sample

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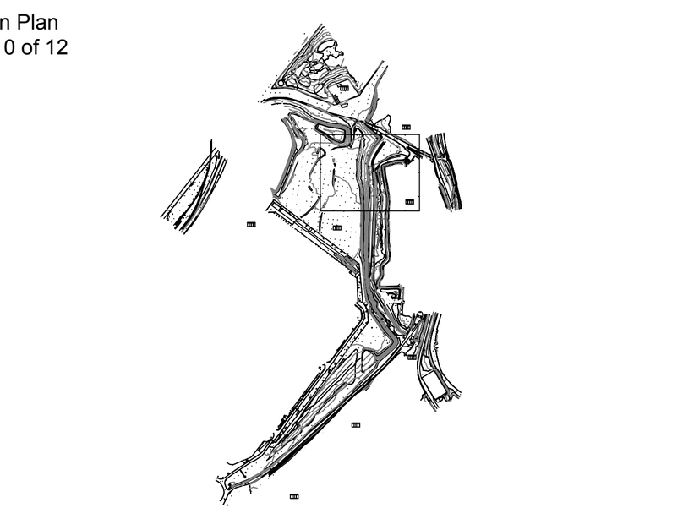
Location Plan
Sheet 10 of 12



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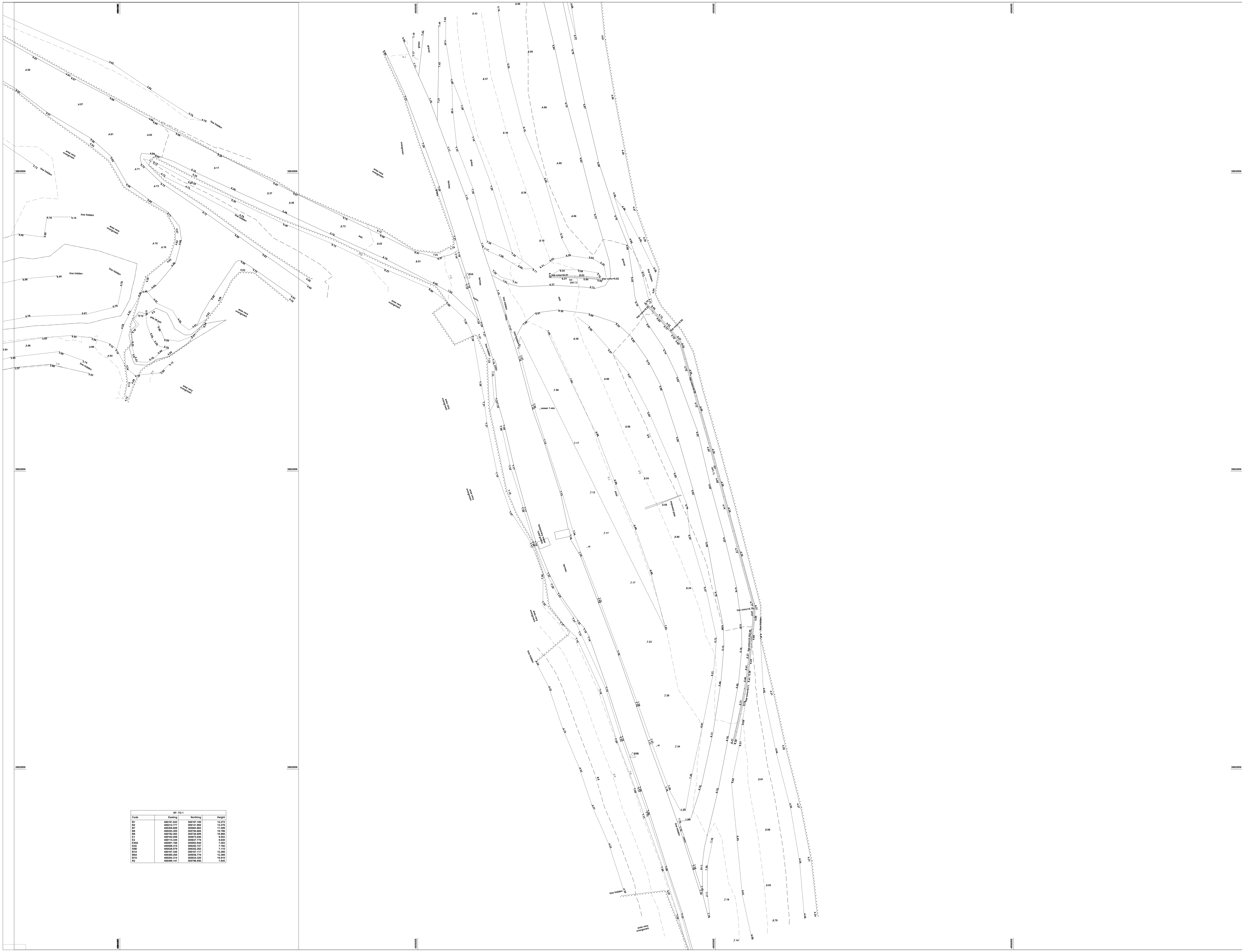

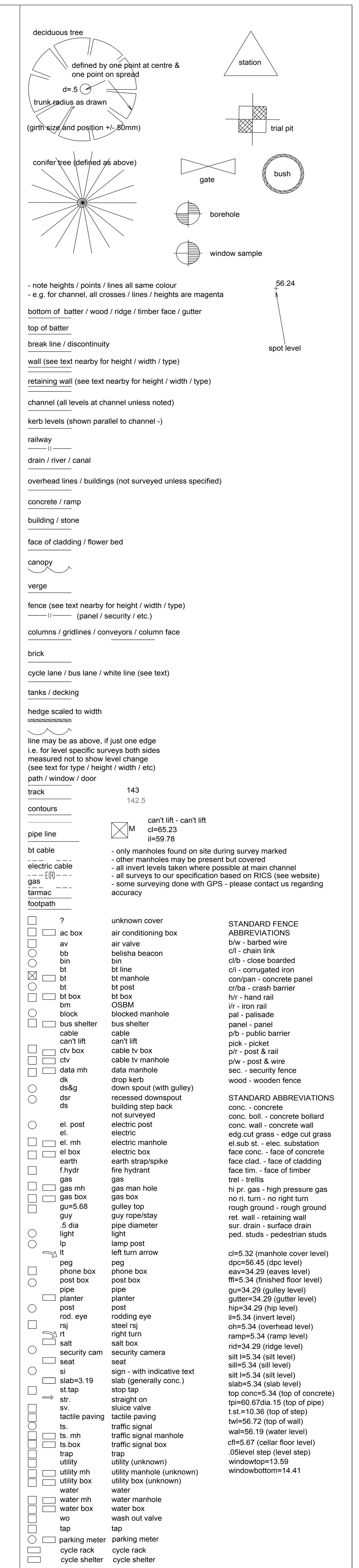

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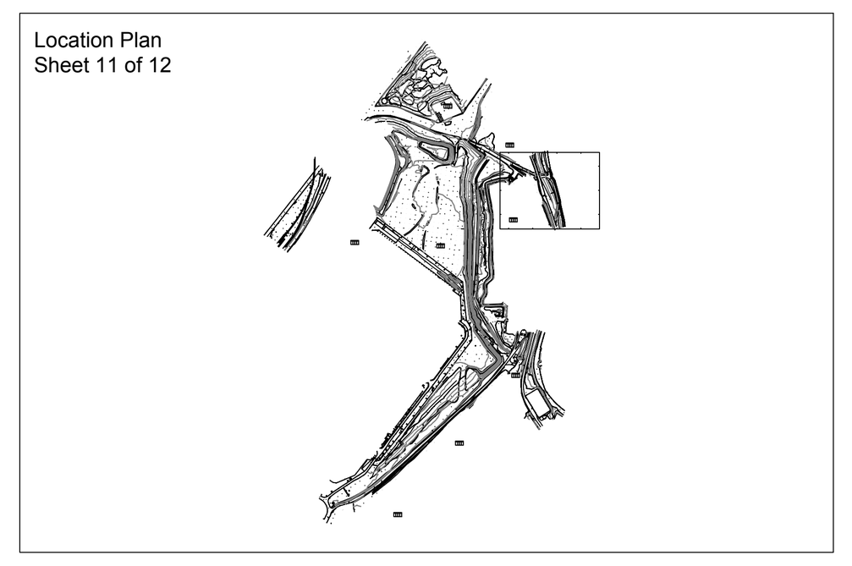
Location Plan
Sheet 11 of 12



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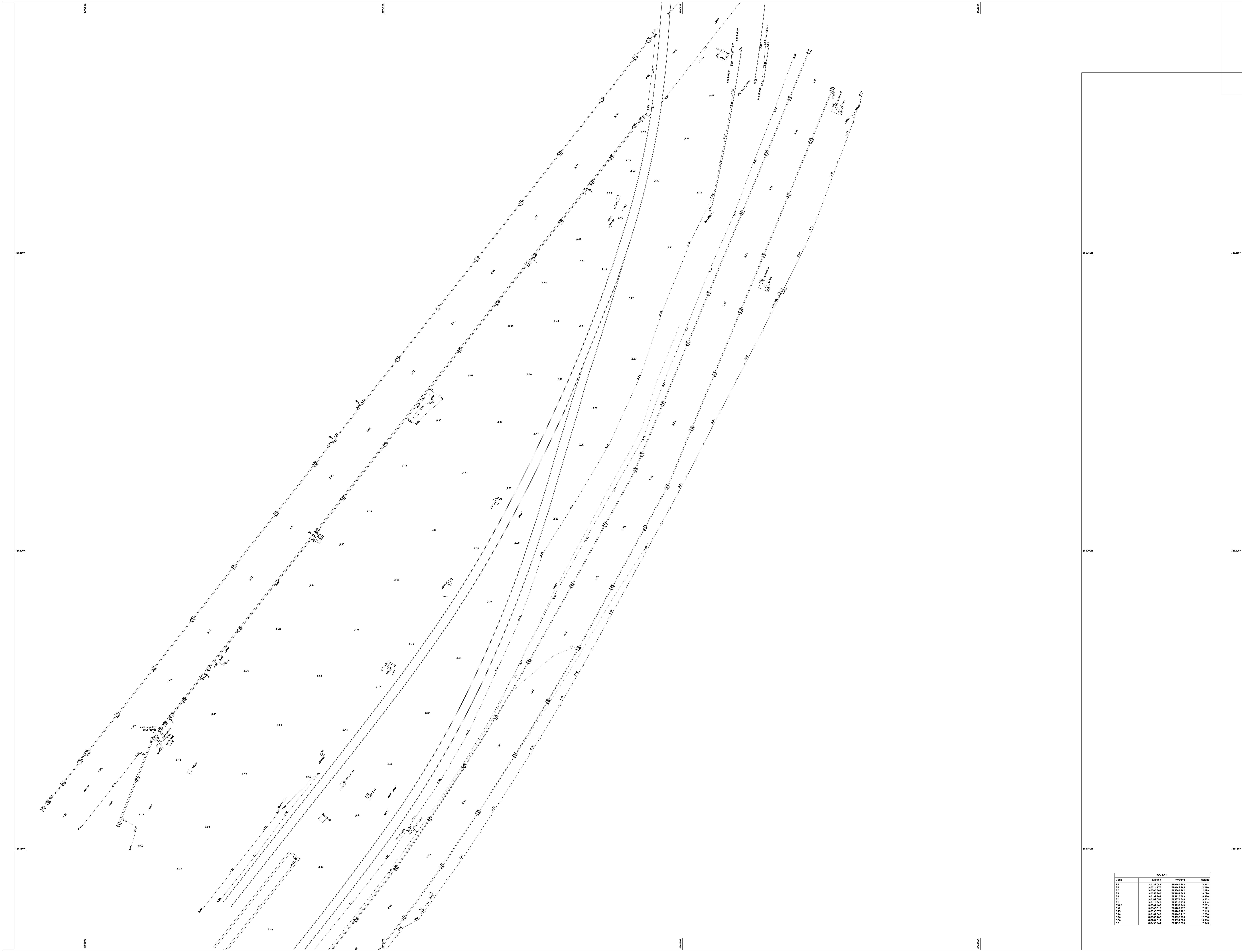

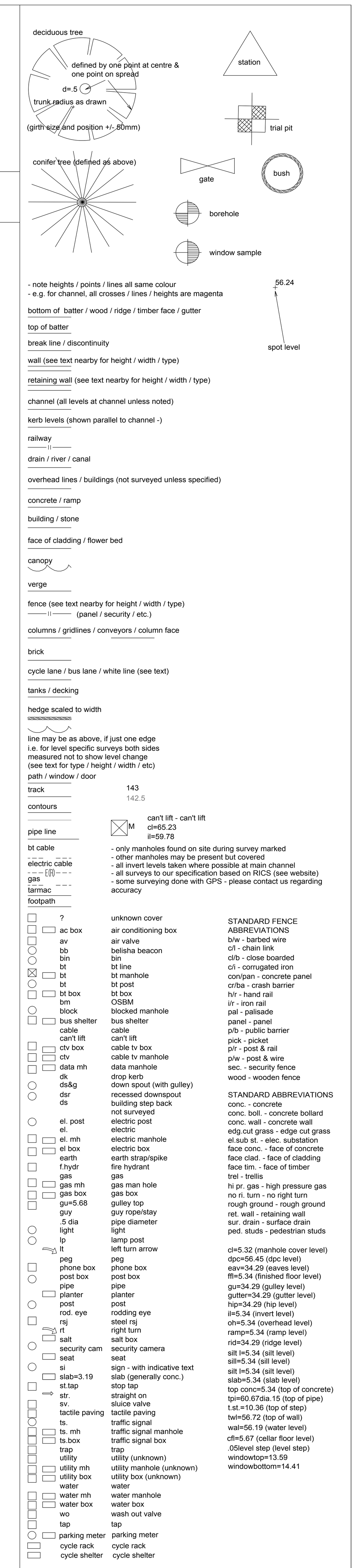

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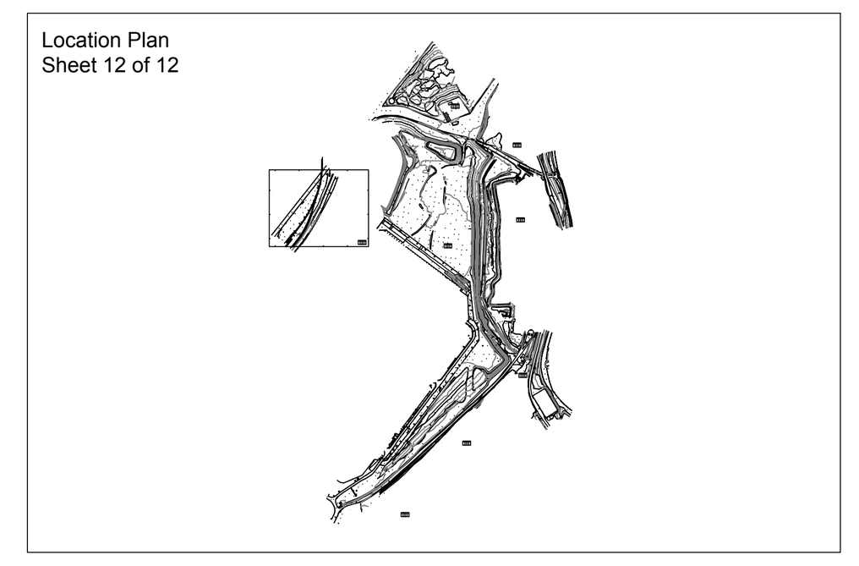

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Annex B: Environment Agency Consultation

A. Environment Agency Correspondence

B. Environment Agency Product 4 Data

Anna Gee
AECOM
5th Floor
City Walk
Leeds
LS11 9AR

Our Ref: EMD-56727

Your Ref:

Date: 17/08/2017

Dear Anna

Enquiry regarding data clarification – West Burton Power Station

Thank you for your enquiry which was received on 10/08/2017.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

I enclose Product 4 data for the above site as per your enquiry.

Please refer to Open Government Licence which explains the permitted use of this information.

Further details about the Environment Agency information supplied can be found on the GOV.UK website:

https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments

https://www.gov.uk/planning-applications-assessing-flood-risk
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely

June Rolland
Customers & Engagement Officer
East Midlands

For further information please contact the Customers & Engagement Team on 02084 747770

Direct e-mail:- EMDenquiries@environment-agency.gov.uk

EMD56727 – additional questions

Please see below the answers to the included questions

If you could answer / confirm the following I would be most grateful.

1. Can you please confirm the Sites zoning as per the attached pdf (WBC_FloodZones.pdf) – the flood zones shown on this pdf and on the interactive flood map for planning differ significantly to those shown in the flood extent mapping provided in response to this RFI (see attached EMD52917_FM.pdf)

As you know the details provided to you under the previous request (EMD52917) were for the incorrect site. The flood zones from the interactive flood map for planning should now correlate with the new map provided.

2. Modelled flood nodes have been included for the 2013 Tidal Trent model. As mentioned above it would appear that the model has since been updated (I understood that the new model was completed in 2015) – do you have any up to date modelled levels for this site (including the 100 year, 200 year, 200 year plus climate change (based on 2016 CC guidance) and the 1000 year flood)?

The most up to date model we currently have is still the Tidal Trent 2013 model (including the 2014 interim water levels). There are plans to fully update the current model but this has not yet been formalised. As such the current model does not include the new 30% and 50% climate change guidance. The current model currently only has 20% CC forecasts included.

The included maps are based on fluvial flows incorporating a 1 in 5 year tidal flow. Although the model is the tidal Trent the watercourse is fluvially influenced at this location.

3. Do you have any information on breach and/or overtopping assessments undertaken for the flood defences (appropriate to the location of the site) and associated extent, hazard, depth and velocity maps? The main risk to the site is the residual risk of flooding as a result of overtopping / breach of the flood embankments along the tidal Trent and we need to understand the potential impact (including flood depths and extent) that this could have on the Site.

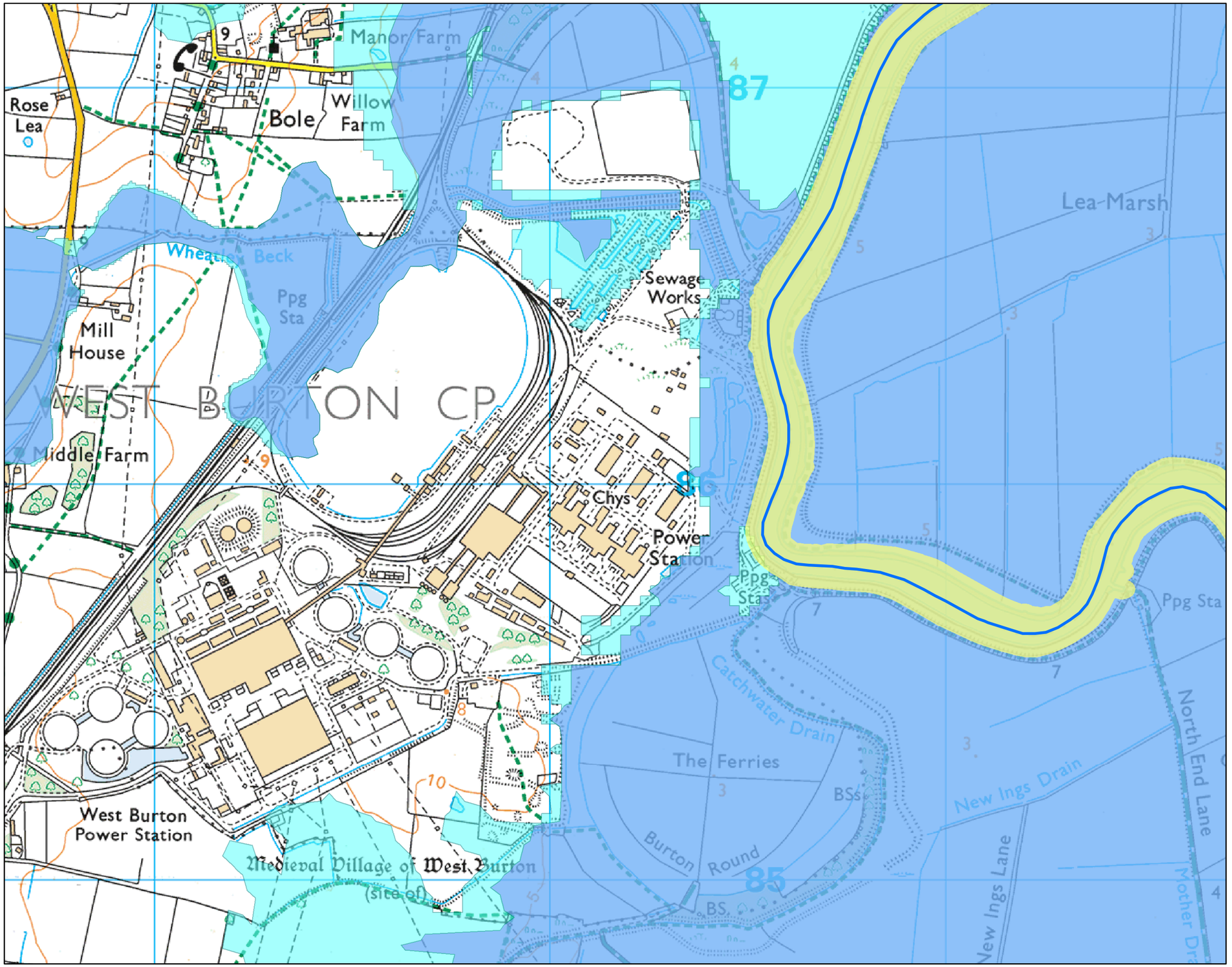
I have included the breach maps that we currently hold for this model. These are the floodplain heights and depths 2D maps as well as the hazard map.

4. Could you please outline any mitigation measures that will be expected at the site to inform the site master plan and allocation of land use within the site (bearing in mind that the majority of the proposed development is located entirely in FZ1)

As the current modelling does not include updated 30% and 50% climate change forecasts it may be prudent to assess these and carry out a site specific breach analysis using the FD2320 document to ensure the site is not affected. As the site lies predominantly within FZ1 there are no specific mitigation measures that would be suggested but for any structure that does fall fully or partially within FZ2 or FZ3 it may be prudent to raise finished floor levels at least 300mm above the 1 in 100 year + CC breach floodplain height. If this is not possible then flood resilient design is suggested to lessen the impact and reduce disruption to the business. Establishing the potential impact on site from breach of the defences during a 30% climate change forecast event and setting FFL or increasing flood resilient design to 300mm above this height would future proof the development.

Please note that if any new outfalls need to be constructed to the River Trent then, dependant on their size and scale, these may need a Flood Risk Permit in addition to any planning permission. Guidance on whether a permit is needed and how to apply can be found by visiting https://www.gov.uk/guidance/flood-risk-activities-environmental-permits#check-if-you-can-get-a-standard-rules-permit-for-your-activity

Detailed FRA/FCA Map centred on West Burton Power Station, West Burton - created 16 August 2017 Ref: [EMD56727]



Environment Agency

Scale 1:10,000

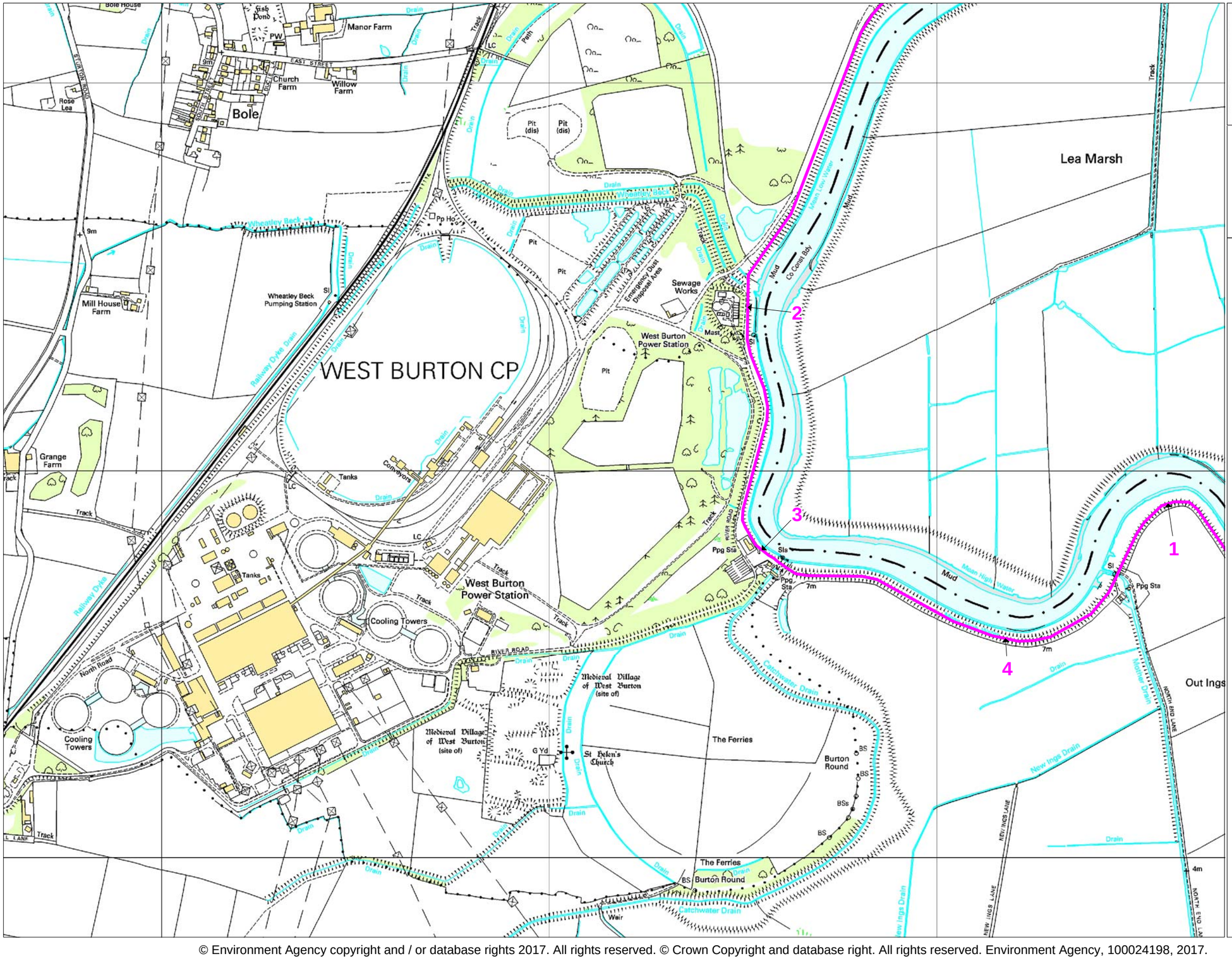
N W E S

Legend

- Main River
- Bank Top Eplanning Tool
- 1% (1 in 100 year) floodplain
- 0.1% (1 in 1000 year) floodplain

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Defences Map centred on West Burton Power Station, West Burton - created 16 August 2017 Ref: [EMD56727]



Environment Agency

Scale 1:10,000

N W E S

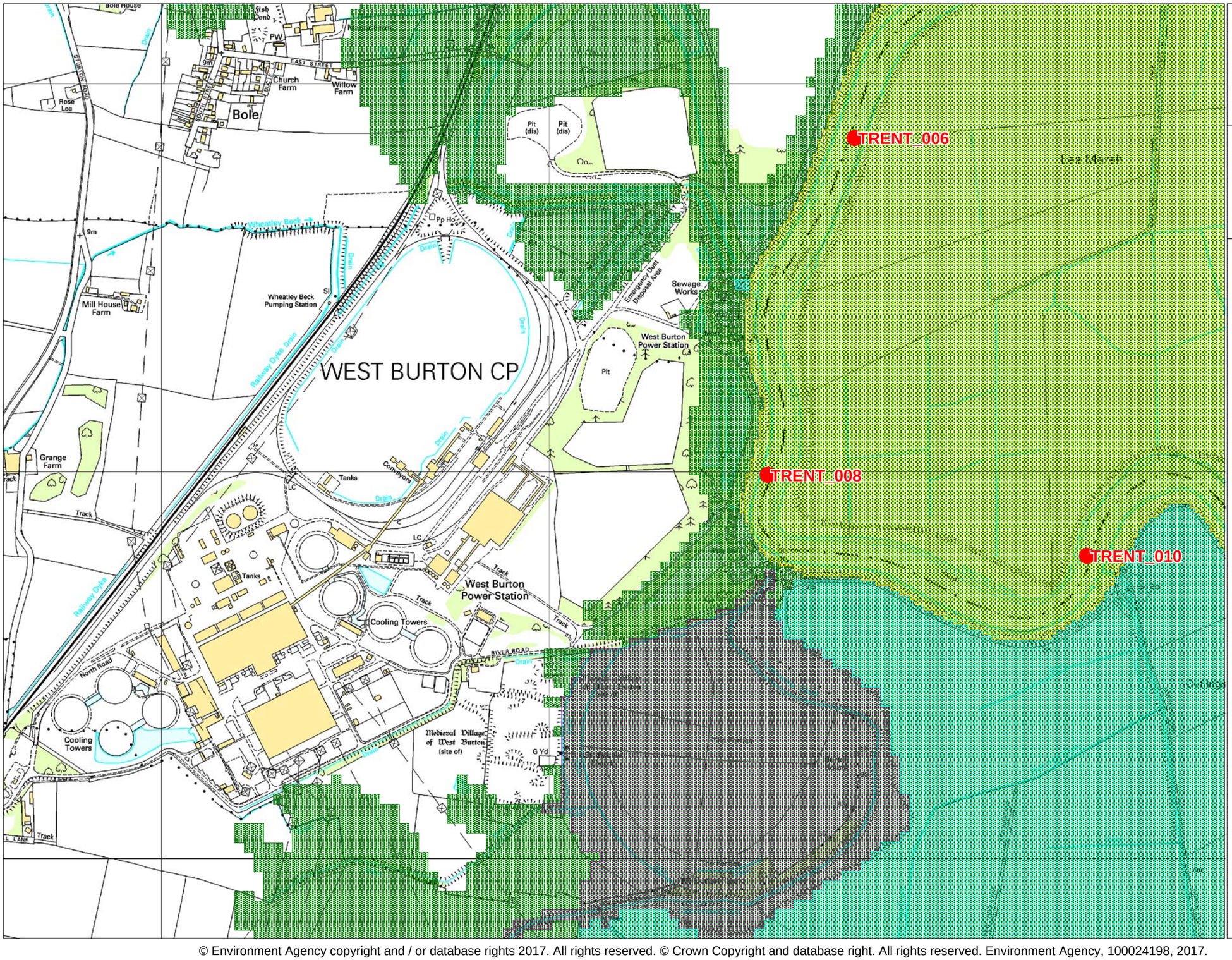
Legend

Flood Defence Locations

A Strategic Flood Risk Assessment may be available, providing further information for this site. Please contact your Local Planning Authority to access this information as it will need to be considered within any Flood Risk Assessment submission.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Modelled Extents Map centred on West Burton Power Station, West Burton - created 16 August 2017 Ref: [EMD56727]



Scale 1:10,000

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Legend

- 1 in 5 year Modelled Extent (with 5 year Tidal flow)
- 1 in 10 year Modelled Extent (with 5 year Tidal flow)
- 1 in 20 year Modelled Extent (with 5 year Tidal flow)
- 1 in 50 year Modelled Extent (with 5 year Tidal flow)
- 1 in 75 year Modelled Extent (with 5 year Tidal flow)
- 1 in 100 year Modelled Extent (with 5 year Tidal flow)
- 1 in 100 year Modelled Extent including climate change forecast (with 5 year Tidal flow)
- 1 in 200 year Modelled Extent (with 5 year Tidal flow)
- 1 in 1000 year Modelled Extent (with 5 year Tidal flow)
- Modelled Node Location and Reference

Source:
Tidal Trent SFRM, Mott Macdonald, 2013 (includes updated 2014 interim water levels)

A Strategic Flood Risk Assessment may be available, providing further information for this site. Please contact your Local Planning Authority to access this information as it will need to be considered within any Flood Risk Assessment submission.

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EMD56727
The following information, including the modelled extents mapping, has been produced including the effect of any local defences.

Node point reference	Location	20% (1 in 5 year) modelled level (mAOD)	20% (1 in 5 year) modelled flow (m^3/s)	10% (1 in 10 year) modelled level (mAOD)
TRENT_010	SK 81387 85781	5.67	571.16	5.73
TRENT_008	SK 80563 85990	5.66	572.80	5.71
TRENT_006	SK 80787 86859	5.67	574.07	5.68

Source: Tidal Trent SFRM Model, Mott Macdonald, 2013 (includes updated 2014 interim water levels)

Node point reference	Location	10% (1 in 10 year) modelled flow (m^3/s)	5% (1 in 20 year) modelled level (mAOD)	5% (1 in 20 year) modelled flow (m^3/s)
TRENT_010	SK 81387 85781	576.79	5.86	603.24
TRENT_008	SK 80563 85990	578.24	5.84	603.15
TRENT_006	SK 80787 86859	581.45	5.82	613.13

Source: Tidal Trent SFRM Model, Mott Macdonald, 2013 (includes updated 2014 interim water levels)

Node point reference	Location	2% (1 in 50 year) modelled level (mAOD)	2% (1 in 50 year) modelled flow (m^3/s)	1% (1 in 100 year) modelled level (mAOD)
TRENT_010	SK 81387 85781	6.30	683.91	6.62
TRENT_008	SK 80563 85990	6.30	669.67	6.62
TRENT_006	SK 80787 86859	6.29	667.20	6.62

Source: Tidal Trent SFRM Model, Mott Macdonald, 2013 (includes updated 2014 interim water levels)

Node point reference	Location	1% (1 in 100 year) modelled flow (m^3/s)	0.5% (1 in 200 year) modelled level (mAOD)	0.5% (1 in 200 year) modelled flow (m^3/s)
TRENT_010	SK 81387 85781	735.16	6.93	785.33
TRENT_008	SK 80563 85990	696.09	6.94	706.05
TRENT_006	SK 80787 86859	677.21	6.93	687.15

Source: Tidal Trent SFRM Model, Mott Macdonald, 2013 (includes updated 2014 interim water levels)

Node point reference	Location	0.1% (1 in 1000 year) modelled level (mAOD)	0.1% (1 in 1000 year) modelled flow (m^3/s)	1% + 20% flow (1 in 100 year plus climate change) modelled level (mAOD)
TRENT_010	SK 81387 85781	7.09	839.10	6.94
TRENT_008	SK 80563 85990	7.10	747.32	6.95
TRENT_006	SK 80787 86859	7.09	704.26	6.95

Source: Tidal Trent SFRM Model, Mott Macdonald, 2013 (includes updated 2014 interim water levels)

Node point reference	Location	1% + 20% flow (1 in 100 year plus climate change) modelled flow (m^3/s)
TRENT_010	SK 81387 85781	790.53
TRENT_008	SK 80563 85990	716.11
TRENT_006	SK 80787 86859	687.46

Source: Tidal Trent SFRM Model, Mott Macdonald, 2013 (includes updated 2014 interim water levels)

Please note: The flows provided represent **in channel flow only** and do not take into account flow on the floodplain.

On 19th February 2016, the Flood risk assessments: climate change allowances' was published on www.gov.uk website. It has replaced previous guidance Climate Change Allowances for Planners.

The climate change guidance can be found at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

If your RFI is to assist with a Flood Risk Assessment (FRA) for a future planning application, please review this guidance to consider which allowances should be used for your site. The climate change allowance provided with this RFI is a 20% increase in the peak river flow for the 1% Annual Exceedance Probability (1 in 100 year) scenario.

It should be noted that the breach location used to produce the modelled breach heights/depths maps is approximately 580m to the north of the site and therefore does not give a true indication of the effect on the site. It is recommended that a site specific breach analysis is carried out for the site using the joint Defra/Environment Agency document Flood Risk Assessment Guidance for New Development (FD2320). This document can be downloaded directly using the following link (FD2320.pdf).

EMD56727 Defence Information

Defence ID	Asset Reference	Design Standard	D/S Crest Level (mAOD)	U/S Crest Level (mAOD)	Overall Condition Grade
1	25020	100	7.727	7.301	2
2	24484	100	7.285	7.23	3
3	24485	100	7.225	7.292	3
4	25019	100	7.293	7.729	3

EMD56727 Historic Information

We have records of historic fluvial flooding at this location in 1932 and 1947. Please note that we may or may not hold the original records in question. We do not make any claim as to the reliability of recorded flood extents or that all flood events in the area have been recorded. Please also be aware that flood defences may have been built subsequent to these historic flood events. Note - This information relates to the area the above named property is in, and is not specific to the property itself - it ***does not*** provide an indicator of flood risk ***at individual property level***.

EMD56727 Surface Water

Enclosed is a map showing the risk of flooding from surface water for this area, produced in partnership with Local Authorities.

Surface water flood risk is widely distributed and can happen far from rivers and the sea. It's sometimes hard to say whether you're in an area at risk of flooding from surface water because surface water flooding can follow many more paths and can be affected by very small features such as kerb height and even speed bumps. We recommend you consider not only whether your property is shown in or near an area at risk, but also the broader scale and pattern of surface water flooding shown in the area. You may also wish to view this and other flood risk maps on our website.

Whether your property is at risk will depend on the accuracy of the mapping in this area, and on the details of your property – for example, how waterproof the structure is, the levels of doors and airbricks, and whether you have installed any flood resilience measures such as airbrick covers and flood boards.

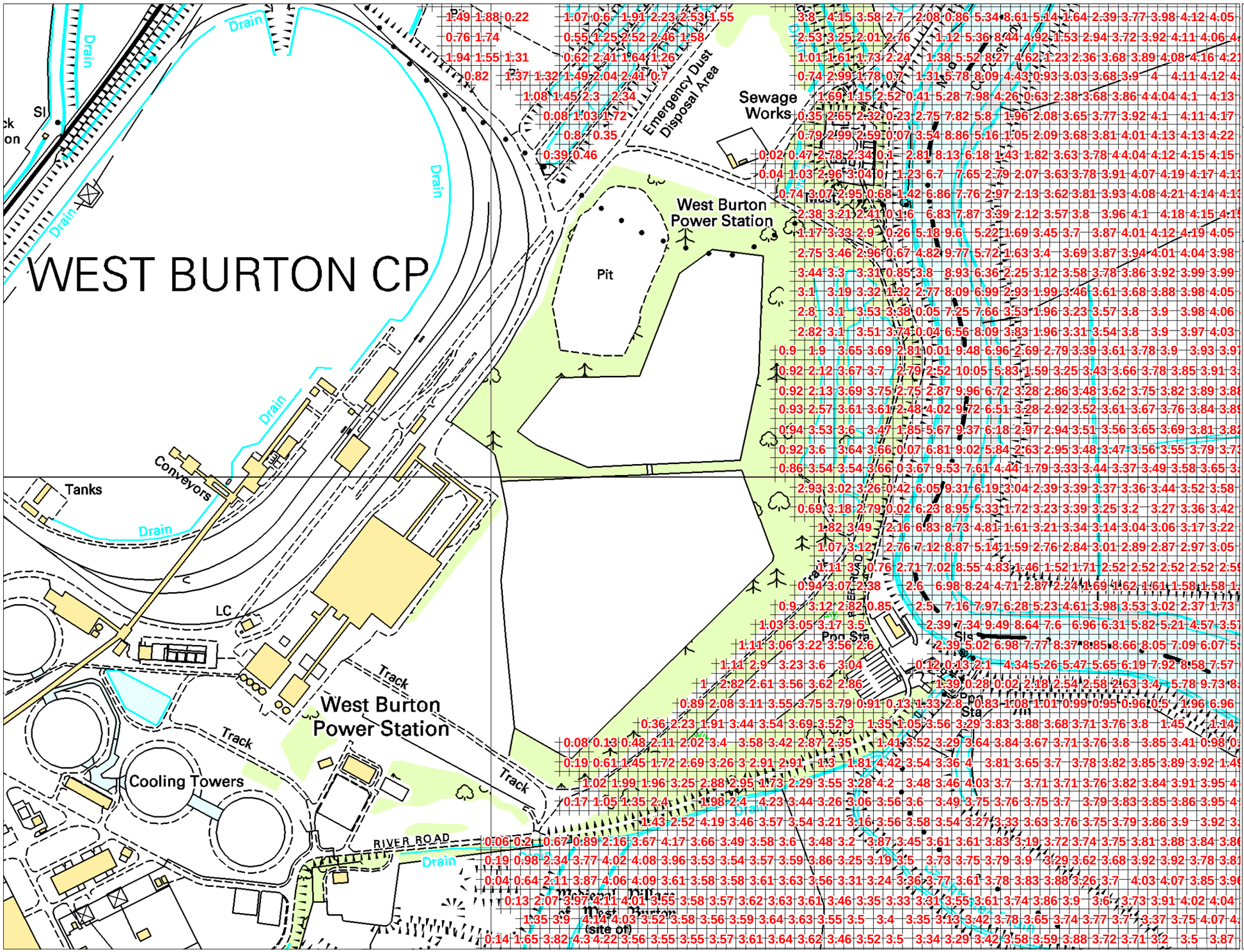
If you require information on what is being done to manage surface water flood risk in the local area, please contact Nottinghamshire County Council.

Information Warning

Please note:

- It is not possible to say for certain what the flood risk is but we use the best information available to provide an indication so that people can make informed choices about living with or managing the risks. The information we supply does **not** provide an indicator of flood risk at **an individual property / site level**.
- The flood risk information provided on the attached Surface Water map does not cover other sources of flooding such as from rivers and sea.

Floodplain Depths Map centred on West Burton Power Station, West Burton - created 16 August 2017 Ref: [EMD56727]



Environment Agency

Scale 1:5,000

N W E S

Legend

x.xx — 1 in 1000 year Floodplain depth (m)

Source:
Tidal Trent SFRM, Mott Macdonald, 2013 (includes updated 2014 interim water levels)

A Strategic Flood Risk Assessment may be available, providing further information for this site. Please contact your Local Planning Authority to access this information as it will need to be considered within any Flood Risk Assessment submission.

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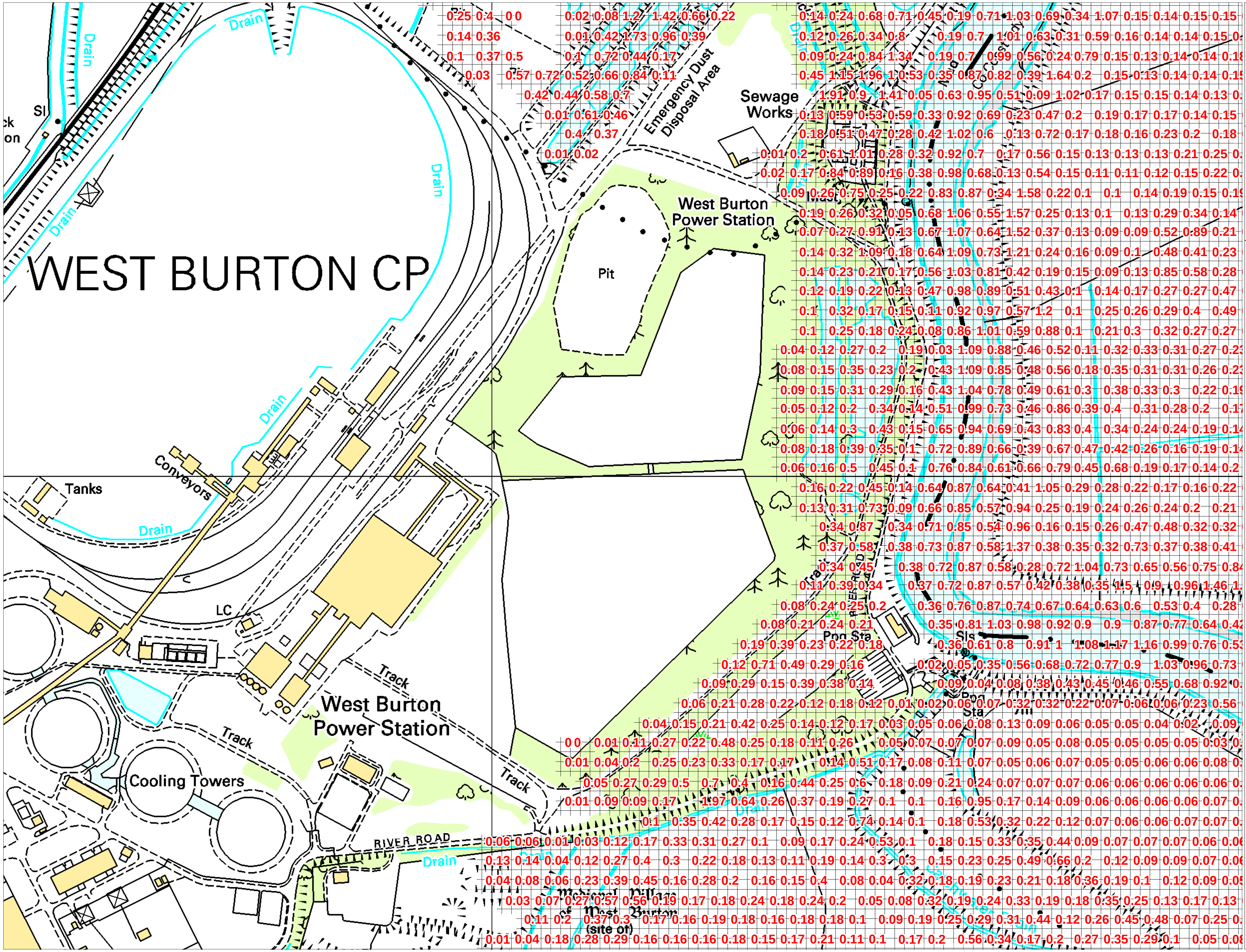
Floodplain Velocity Map centred on West Burton Power Station, West Burton - created 16 August 2017 Ref: [EMD56727]



Environment Agency

Scale 1:5,000

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Legend

x.xx 1 in 1000 year Floodplain velocity (m/s)

Source:
Tidal Trent SFRM, Mott Macdonald, 2013 (includes updated 2014 interim water levels)

A Strategic Flood Risk Assessment may be available, providing further information for this site. Please contact your Local Planning Authority to access this information as it will need to be considered within any Flood Risk Assessment submission.

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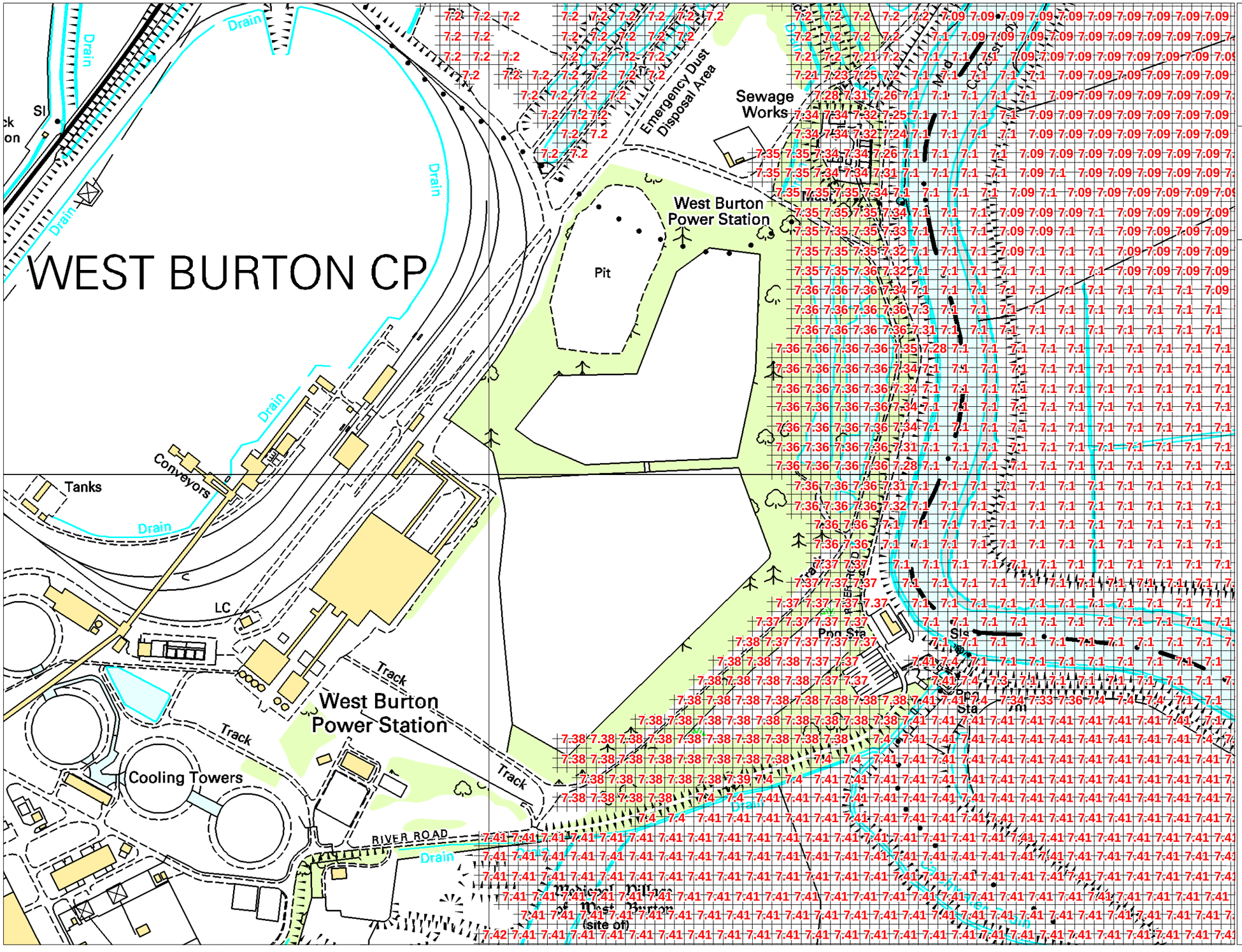
Floodplain Heights Map centred on West Burton Power Station, West Burton - created 16 August 2017 Ref: [EMD56727]



Environment Agency

Scale 1:5,000

N W E S

Legend

x.xx — 1 in 1000 year Floodplain Level (mAOD)

Source:
Tidal trent SFRM, Mott Macdonald, 2013 (includes updated 2014 interim water levels)

A Strategic Flood Risk Assessment may be available, providing further information for this site. Please contact your Local Planning Authority to access this information as it will need to be considered within any Flood Risk Assessment submission.

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