



Drax Generation Development Ltd

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# HIRWAUN POWER PLANT

Soil and Groundwater Monitoring Plan





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## Soil and Groundwater Monitoring Plan

**VERSION 3 - PUBLIC**

**PROJECT NO. 2024UK309109**

**OUR REF. NO. 001**

**DATE: SEPTEMBER 2024**

WSP

1 Capital Quarter

Tyndall Street

Cardiff

CF10 4BZ

Phone: +44 2920 769 200

WSP.com

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Signature				
Checked by	██████	██████	██████	
Signature				
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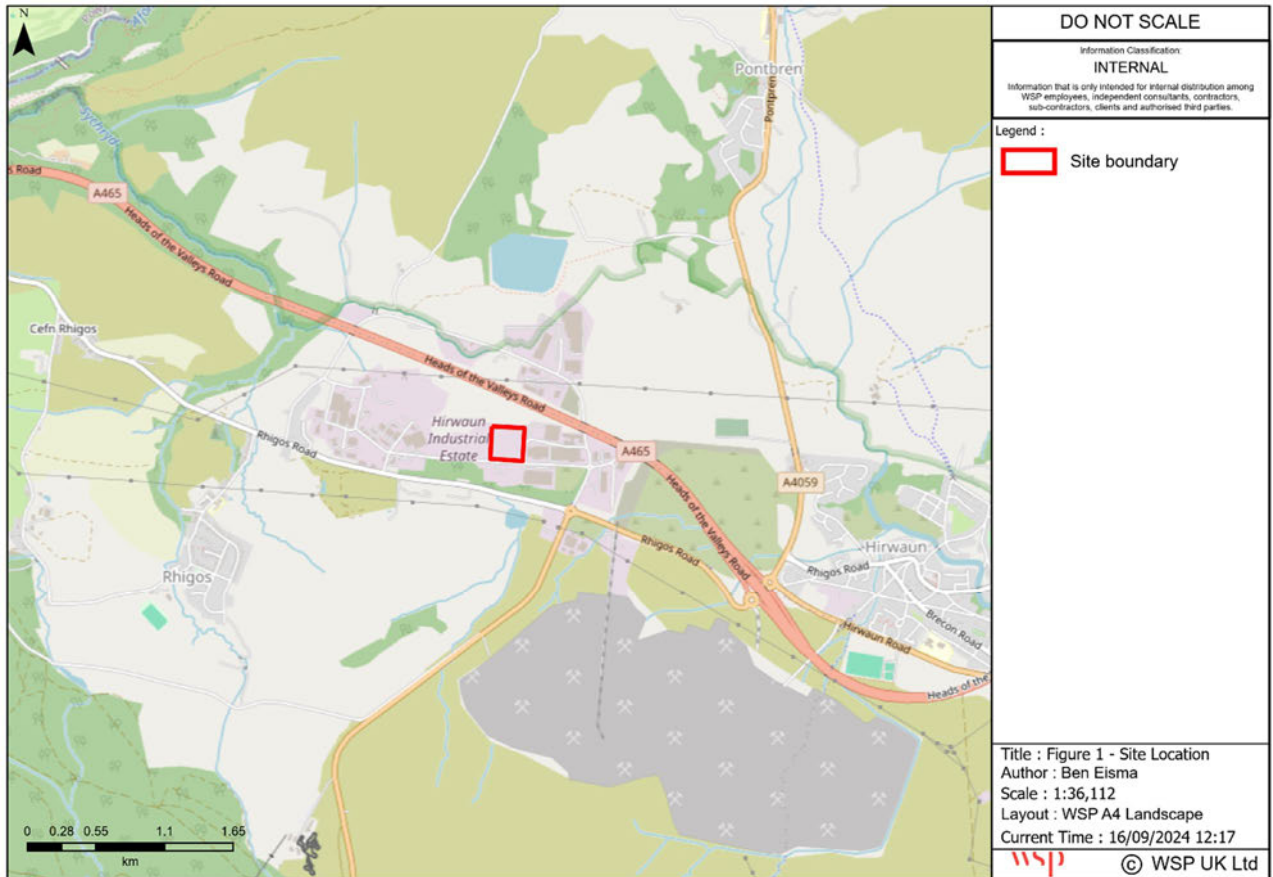
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# 1 INTRODUCTION

## 1.1 AUTHORISATION

1.1.1. Drax Generation Development Limited (Drax) and its affiliate company Hirwaun Power Limited (HPL), are aiming to develop a 299 Mwe gross natural gas fired Open-Cycle Gas Turbine (OCGT) power plant. The Site is located roughly 2km north-west of Hirwaun within the Hirwaun Industrial Estate, Main Avenue, Aberdare, Rhondda Cynon Taf, CF44 9UP. A site location map is presented as **Figure 1**.

**Figure 1 - Site Location**



## 1.2 BACKGROUND

1.2.1. Once the project is completed, the power plant will consist of a single Siemens Energy Gas Turbine SGT5-4000F and a single Siemens Energy Generator SGen5-1200A, installed outside, along with associated auxiliary equipment to enable its operation.

1.2.2. Natural gas will be transported to the installation via pipeline linked to the National Transmission System approximately 0.9km from the Site. The power plant will connect into the local 400 kV transmission system, which is owned and operated by National Grid Electricity Transmission (NGET).



- 1.2.3. The power plant is intended to be operated as required and within its environmental permit limit of 1,500 hours per annum, to support the National Grid during peak times for electricity demand and during stress events.
- 1.2.4. It is anticipated that the power plant will generate for limited periods, with around 300 starts per year, however, the plant will, while on standby, respond to system events at short notice. The power plant will be operated locally with a facility for remote operation.
- 1.2.5. A general plot plan showing the site layout is included as **Appendix A.1**.

## 1.3 OBJECTIVES

- 1.3.1. This report supports an application by HPL to meet one of the pre-operational measures of the Environmental Permit (EPR/BB3297CG) issued by Natural Resources Wales (NRW). The permit applies where operation of a large combustion plant are proposed, having rated thermal input of 50 megawatts (MW) or more.
- 1.3.2. The pre-operational measure P01 associated with the HPL Environmental Permit EPR/BB3297CG states the following:
  - 1.3.3. *At least 1 month prior to the commencement of commissioning, the Operator shall submit the written monitoring plan referenced in Condition 3.1.3 for the monitoring of soil and groundwater for approval by Natural Resources Wales. The monitoring plan shall demonstrate how the Operator will meet the requirements of Articles 14(1)(b), 14(1)(e) and 16(2) of the IED.*
- 1.3.4. The monitoring plan shall be implemented in accordance with the written approval from Natural Resources Wales.
- 1.3.5. The report aims to meet the following objectives:
  - Review and identify potential sources, pathways and receptors associated with the permitted activities;
  - Identify the embedded mitigation measures (in reference to pollution prevention and management); and,
  - Provide a monitoring plan to confirm the location of boreholes to be installed and monitored, outlining the frequency of monitoring and the suite of chemical testing to be undertaken.

## 1.4 SOURCES OF INFORMATION

The following key sources of information have been used in drafting this report:

- *Drax Power Limited – Hirwaun OCGT Plant Decision Document (EPR/BB3297CG)*, Natural Resources Wales;
- *Hirwaun Power Plant Soil and Groundwater Monitoring Plan*, Mott MacDonald, dated June 2024;
  - Drawings have been extracted from this report and presented in **Appendix A**.
- *Environmental Permitting Regulations Guidance for Applicants H5: Site condition report – guidance and templates*, Natural Resources Wales, dated October 2014.



## 1.5 LIMITATIONS

- 1.5.1. This report may be relied upon by Drax Generation Development Limited and Hirwaun Power Limited, as “the Client” with the meaning given to that phrase within the agreement and subject to terms and conditions contained therein.
- 1.5.2. This report has been completed with regard to generally accepted consulting practices and may not be relied upon by any other party without the explicit written agreement of WSP. No other third-party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.
- 1.5.3. Unless WSP has accrual knowledge to the contrary, WSP shall assume the correctness and completeness of, and shall have no liability in respect of any inaccuracy, defect or omission in any information or materials provided, anecdotally or otherwise, by the Client or any other third party to WSP. WSP does not assume any liability for misrepresentation of information or for items not visible, accessible, present or supplied at the time of study.
- 1.5.4. Full details of the limitations are provided in **Appendix B**.

## 2 ENVIRONMENTAL SETTING

### 2.1 SITE SUMMARY

2.1.1. Details related to the site setting are summarised in **Table 2-1** below.

**Table 2-1 – Site Summary**

Detail	Comments
Site Location	Hirwaun Industrial Estate, Main Avenue, Hirwaun, Aberdare, Rhondda Cynon Taf, CF44 9UP.
National Grid Reference	293720, 206260
Historical Land Use	<p>The proposed development site has had some notable historical land uses including:</p> <ul style="list-style-type: none"> <li>▪ Former refuse pit and tramway;</li> <li>▪ Royal Ordnance factory; and,</li> <li>▪ Hitachi electronics factory.</li> </ul> <p>Off-site land uses in the local vicinity also include:</p> <ul style="list-style-type: none"> <li>▪ An historical tank adjacent to the site boundary;</li> <li>▪ Historic landfill;</li> <li>▪ Industrial estate; and,</li> <li>▪ Coal mining/quarries/gravel pits.</li> </ul>
Hydrology	Various land drains and inland rivers are present within 500m of the site. One drain/stream intersects the western half of the site, flowing in a northwest direction. This stream is culverted beneath the site.

### 2.2 GEOLOGY

#### PUBLISHED GEOLOGY

- 2.2.1. Superficial geology varies across the site, with parts of the site being underlain by Glacial Till and other parts underlain by Peat.
- 2.2.2. Bedrock geology across the site is South Wales Lower Coal Measures.
- 2.2.3. According to available mapping, a fault appears to intersect the site in a north-west to south-east orientation.

#### ENCOUNTERED GEOLOGY

- 2.2.4. Geology encountered during numerous phases of ground investigation is summarised in **Table 2-2** below.

**Table 2-2 – Summary of Encountered Geology**

Strata	Depth to Top (m bgl)	Thickness (m)	Typical Description
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Topsoil	0.00	0.30 – 0.60	Brown silty clay with roots.
Made Ground	0.00 – 0.30	1.05 – 4.30	Very soft grey and black organic slightly sandy CLAY with fine and medium gravel and occasional patches of peat / GRAVEL of crushed concrete. Terram membrane and brick tile fragments noted.
Peat	0.00 – 0.60	3.15 – 4.90 (proven to 3.35)	Very soft dark brown fibrous amorphous PEAT.
Glacial Till (granular)	0.30 – 4.60	0.90 – 3.05	GRAVEL with cobbles and boulders with dark grey sandy clay.
Glacial Till (cohesive)	1.40 – 7.65	1.85 – 22.75	GRAVEL with cobbles and boulders with dark grey sandy clay.
South Wales Lower Coal Measures Formation	22.55 – 24.15	<i>Not proven</i>	Weak thinly laminated light grey weathered MUDSTONE.

## 2.3 HYDROGEOLOGY

2.3.1. A summary of the Environment Agency (EA) aquifer designations is provided in **Table 2-3** below.

**Table 2-3 – Summary of Aquifer Designations**

<b>Strata</b>	<b>EA Aquifer Designation</b>
Peat	Unproductive Strata
Glacial Till	Secondary Undifferentiated
South Wales Lower Coal Measures Formation	Secondary A

2.3.2. Secondary A aquifers consist of permeable layers that can support local water supplies and may form an important source of base flow to rivers, according to the EA. Groundwater vulnerability is classified as Low for both superficial and bedrock lithologies.

## 3 SUMMARY OF OPERATIONAL INSTALLATION DESIGN

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### 3.1 OPERATIONS

- 3.1.1. A description of the known site operations involving use of chemical substances, which could present a hazard to the environment are summarised within this section. Drawings associated with operational installation design are summarised in **Appendix A.1**.

#### **Backup Diesel Generators**

- 3.1.2. The installation is to operate emergency backup diesel generators. They will be located above ground on impermeable hardstanding. The backup diesel generators allow for the safe shutdown of the power station and provide electricity to essential building systems during times of power failure. The use of the backup diesel generators would be during emergencies and during maintenance/testing activities to ensure they remain operational in the event of emergencies.

#### **Gas Condensate Collection System**

- 3.1.3. A gas condensate collection tank is to collect all gas condensate from the collection lines. The gas condensate is comprised of water entrained with hydrocarbons and is a waste product. The gas condensate is to be collected within a self-contained system and disposed of offsite by a licensed handler.

#### **Chemical Dosing System**

- 3.1.4. The chemical dosing system recirculates a mixture of potable water stored in the combined raw water tank and sodium hypochlorite, which is a disinfectant. This is used to maintain the desired water properties, that would not otherwise be possible to maintain, due to stagnation of the water in the tank. The mixing is made by a small recirculation line passing through a chemical pot and discharging the fluid up to pump suction.

#### **Service Water System**

- 3.1.5. A service water system will operate throughout the site and will provide on demand use of service water, for the purposes of cleaning during maintenance activities and for firefighting. The system comprises a raw water tank, service water pumps and associated pipework, instrumentation and accessories. The service water is a mixture of potable water and diluted sodium hypochlorite (a disinfectant).

#### **Firefighting System**

- 3.1.6. The firefighting system will use electrically driven pumps and equipment. However, the firefighting system is also designed to be operational during a site loss of power and will utilise a diesel engine pump and associated day tank (situated above ground level). The firewater pipe network will use a mixture of potable water and diluted sodium hypochlorite from the common raw water tank used as part of the service water system.

#### **Closed Circuit Cooling Water (CCCW) System**

- 3.1.7. The CCCW system will be used to provide cooling water for the generator coolers and the gas turbine lube oil cooler. A fin fan cooler (FFC) would dispose of waste heat generated from the infrastructure operating onsite. The CCCW system is equipped with manual vent and drain valves



for ventilation/draining of the piping system at start-up. The cooling medium is a demineralised water treated with carbohydrazide for corrosion protection and ethylene glycol for antifreeze purposes.

### Rainwater Drainage System

3.1.8. Rainwater is to be gathered from surface water runoff from road, paved areas, roofs and puts duly positioned within the plant area through underground collecting pipework to a flow split chamber for separation and treatment (for example by oil separation systems). The first rainwater will be treated and the second rainwater (considered to be clean) will bypass the first rainwater treatment system, in the splitting pit, and enter into the final discharge pit by means of the rainwater network of the plant.

### Fuel Oil System

- 3.1.9. The plant will make use of fuel oil systems. The leakage or spillage of oils for example from electrical transformers and pumps and in other areas where release of oily contaminated water may occur, will be captured in oily wastewater (OWW) discharging pits. The OWW discharging pits are connected to a dedicated underground network of pipes, that collects these effluents in a transfer pit which, by means of pumps, transfers the fluid to the oily wastewater collecting basin (which is also a sludge basin) for temporary accumulation. The final treatment consists of oil separation which is common to the first rainwater system.
- 3.1.10. The potential emission source areas are identified in the Emission Sources Plan in **Appendix A.2**. The Site Drainage Plan has been provided in **Appendix A.4**.

## 3.2 CONTROL MEASURES

3.2.1. The design of the power plant incorporates key design features, using the best available techniques (BAT), to minimise the potential for site operations to result in chemical releases to the environment and potentially impacting soil and groundwater. Control measures include (but are not limited to) the use of containment, treatment, level monitoring instrumentation and alarms, drainage systems and use of impermeable hardstanding area. The design of the control measures, as understood at the time of writing, are detailed further in **Table 3-1**.

**Table 3-1 – Summary of Control Measures**

Aspect	Site operation use	Control measures
Diesel fuel	Back up diesel engines Firefighting pump Associated diesel fuel storage tanks (200L tank for back up diesel generators and 800L tank for firefighting pump)	Bunded to contain at least 110% of capacity. EMS and site operating procedures in place to deal with identification and clean-up of spillages. Level and alarm indicators will be fitted to tanks to assist with identification of loss of fuel containment. Tanks and bunds to be regularly inspected as part of site operating procedures and EMS.
Ethylene Glycol	CCCW system	Concrete floor is located at the most vulnerable location for leakage to occur (FFC area). A blind bund will enable the collection of fluids. Fluid to be disposed of manually offsite.

	Topping up of CCCW system	<p>Demineralised water and ethylene glycol mixture not to be stored and the CCCW system is to be topped up on an as-needed basis.</p> <p>Dosing pot and associated equipment is located within bunded area and spillage will therefore be captured in the blind sump.</p>
	Hot water drains tank Gas Regulating & Metering Station (GRMS)	Hot water drains tank will collect any water drained from the GRMS gas heating water loop. Water will be collected in an atmospheric tank in the same pit as the GRMS condensate collection tank and will be removed offsite for appropriate offsite disposal.
Sodium Hypochlorite	Firefighting System Service Water System	Leakage and use of service water to be collected by site wide drainage system. After which treatment of the water is to be undertaken.
	Firefighting System	System contains alarms to alert operators to any loss of pressure. The piping system is fitted with Victaulic coupling to further minimise any leaks compared, for example, with the typical flange connection.
	Chemical dosing system	<p>Sodium hypochlorite is expected to be transported onto site in its diluted form and poured into the chemical pot, following the prescribed safety measures.</p> <p>Leakage from the sodium hypochlorite dosing is unlikely, however, should this happen, it would be contained on the concrete flooring and blind pit in the area. Operating procedures will describe the safe clean up and disposal of any chemical spill (as part of the approved environmental management system).</p>
Gas condensate (comprising water entrained with hydrocarbons)	Gas condensate collection system	<p>Gas condensate collection lines located on sleeper ways above ground and are equipped with instrumentation to detect pressure reduction in the system, to alert of any leakages.</p> <p>Gas condensate tank to be situated in a fully contained pit and will be covered by a canopy to prevent rainwater ingress.</p> <p>The tank will have level indicators and alarms for when the tank needs to be drained.</p> <p>The pit will be in cast concrete, any spillages and leaks are to be captured on the floor of the condensate collection pit. The EMS and site operating procedures will enable safe identification and clean-up of any leakage.</p> <p>BAT are to be used by the plant to minimise and limit the formation of gas condensate.</p> <p>Collected condensate to be collected and disposed of offsite by licensed handler.</p>
Fuel oils and waste oils	Electrical equipment including Generator Step Up Transformer (GSUT)	The GSUT and UAT are equipped with instrumentation that would detect and signal an alarm due to any malfunction. The GSUT and UAT are both contained in suitable bunds that have been sized to take 110% of the volume of their oil.

	and Unit Auxiliary Transformer (UAT).	<p>Any oily effluents are collected through pits located in the proximity of the equipment such as electrical transformers, pumps and, in general, in the areas where release of oily contaminated water may occur, due to rainfall, spillages or manual washing operations.</p> <p>The oily wastewater (OWW) discharging pits are connected to a dedicated underground network, that collects these effluents in a transfer pit which, by means of pumps, transfers the fluid to the oily wastewater collecting basin for temporary accumulation. The final treatment consists of oil separation which is common to the first rainwater system.</p> <p>Rainwater from GSUT and UAT areas is collected and led to the oil/water separator, which is housed in a concrete basin. Actuated valves are used to drain rainwater, and is controlled by a level sensor. Furthermore, oil sentries inhibit opening of the valves should any oil film be detected on the surface of the water.</p> <p>Oil from the water/oil separator is collected in a tank and disposed of offsite. Suitable pipework with sufficient allowances for corrosion.</p>
Mineral oils	Gas turbine / generator Hydraulic oil systems	All areas containing pipes are bunded with drainage to the oily wastewater system.

## ENVIRONMENTAL MANAGEMENT SYSTEMS

- 3.2.2. The power plant is intended to be operated as needed and within its environmental permit limit of 1,500 hours per annum, to support the National Grid at times of peak electricity demand and during stress events. It is anticipated that the power plant will generate for only limited periods, with around 300 starts per year, however, the plant will, when on standby, respond to system events at short notice.
- 3.2.3. Operation of the site will follow the approved site Environmental Management System (EMS) which outlines the site's procedures in place to minimise the frequency of accidents or incidents occurring and outlines procedures in place to minimise the risk in the event of an accident or incident occurring. These are summarised below:
- Regular visual, annual inspections of impermeable surfaces, bunds and pipe work will be carried out and repairs and maintenance undertaken as necessary;
  - Regular visual inspections of tanks will be undertaken every five years;
  - All plant and equipment will be inspected and maintained in accordance with legal requirements and the manufacturer's recommendations and maintenance records will be kept by site management;
  - Any complaints received about site activities will be recorded and investigated in accordance with complaints log and investigation procedures;
  - A mechanism will be in place to fully investigate any environmental incidents and non-conformances in both normal and abnormal conditions and to record and remedial actions that might be taken and how to prevent reoccurrence;
  - A site-specific emergency contingency and accident management plan will be in place; and,



- All relevant staff will receive environmental training related to environmental best practice on induction and are required to follow safe working procedure.

3.2.4. While generation on the site will be infrequent, there will be a robust and approved ISO 14001:2015 certified EMS in place. The EMS is to include management of spillages and leakages and inspection and maintenance activities for example to ensure embedded design mitigation measures are operational as per their design. Inspection activities would include regular asset condition inspections of plant/systems. The inspections would cover reviewing conditions of tanks, fuel bunds, drainage systems and condition of hardstanding and collection pits. Defects would be remediated to minimise the potential formation of direct pathways to soil and groundwater.

### **3.3 IDENTIFICATION OF HAZARDOUS SUBSTANCES**

3.3.1. The Hazardous Substances defined herein, which are to be used as part of the site operations, are those that are substances or mixtures defined in Article 3 of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on Classification, Labelling and Packaging of substances and mixtures (the “CLP Regulations”).

3.3.2. Based on the site operations, Hazardous Substances are defined below within **Table 3-2**.



**Table 3-2 – Hazardous Substances Inventory**

Relevant Hazardous Substance	Storage Location	Storage Container	Maximum Amount Stored	Annex 1, CLP Hazard Classification	CLP Hazard Statement
Diesel Fuel Oil	Back-up diesel engines Firefighting pump	Above ground storage tanks	Associated diesel fuel storage tanks:  2000 L tank for backup diesel generators and 800 L tank for firefighting pump.	Part 2, Physical Hazard: corrosive to metals  Part 3, Health Hazard, Aspiration Hazard, Skin Hazard, Skin Corrosion/irritation, acute toxicity and carcinogenicity.  Part 4, Environmental Hazard, Hazardous to the Aquatic Environment.	H226: Flammable liquid and vapour.  H351: causes skin irritation.  H332: Harmful if swallowed or inhaled.  H351: Suspected of causing cancer.  H373: May cause damage to organs through prolonged or repeated exposure.
Transformer Oil (containing Fischer-Tropsch distillates C18-50 – branched, cyclic and linear) and butylated hydroxytoluene)	Electrical equipment including Generator Step Up Transformer (GSUT) and Unit Auxiliary Transformer (UAT).	Contained within GSUT and UAT.	None stored.	Part 3: Health Hazard, Aspiration Hazard	H304: May be fatal if swallowed and enters airways.
Ethylene Glycol	Not stored onsite. To be used on as needed basis for topping up the CCCW.	Contained within CCCW as diluted mixture with demineralised water.	None stored.	Part 3: Acute Toxicity	H302: Harmful if swallowed.



Sodium Hypochlorite	Firefighting System Service Water System Chemical Dosing System	Only stored as a diluted (14-15% NaOCL) mixture In 20L containers.	Stored as diluted mixture with service water	Part 3, Health Hazard: Skin Corrosion/irritation Part 4, Environmental Hazard: Hazardous to the Aquatic Environment.	H314: Causes severe skin burns and eye damage H400: Very toxic to aquatic life.
Mineral Oil	Gas Turbine Generator Hydraulic oil systems	Contained within gas turbine, generator and hydraulic oil systems.  Barrels stored on bunded pallets.	17,000L total stored within systems onsite.  Additional 208L drums for maintenance.	Part 3, Health Hazard, Aspiration Hazard, acute toxicity and carcinogenicity.	H304: May be fatal if swallowed and enters airways H332: Harmful if inhaled H335: May cause respiratory irritation



- 3.3.3. It should be noted that gas condensate (comprising water entrained with hydrocarbons) may result as a by-product but is not stored or used onsite. Refer to **Section 3.3.13** for further information.

### **DIESEL, LUBRICATING AND TRANSFORMER OIL**

- 3.3.4. The presence of diesel and oils used as part of the site operations are capable of contaminating soil and groundwater should they be released into the environment. In particular, these substances are toxic to the water environment.
- 3.3.5. Whilst diesel is biodegradable, in sufficient quantities it is likely to be persistent within the environment, if released. The quantity of diesel stored onsite is sufficient enough to be considered further as a Relevant Hazardous Substance (RHS).
- 3.3.6. Approximately 17,000L of mineral oil will be present onsite in the gas turbine/generator for lubrication and in hydraulic oil systems. Additional mineral oil used for plant/machinery may be stored onsite for maintenance purposes. This will be stored in containers not exceeding 208L on bunded pallets. The quantities detailed above are considered sufficient to be classified in this report as a RHS.
- 3.3.7. Transformers are anticipated to have limited operation times given the planned frequency of energy generation of the power plant. The main source of large volumes of oil would be expected from the Generator Step Up Transformer (GSUT) or the auxiliary transformer (UAT) which are permanently energised regardless of whether the plant is fully operational or in standby. The quantities are considered to be sufficient where a potential release to the environment is considered further. Therefore, transformer oils are considered further as a RHS.

### **ETHYLENE GLYCOL**

- 3.3.8. Ethylene Glycol is to be used as an additive to form a diluted mixture within the CCCW. At the commissioning stage the CCCW will be filled with the ethylene glycol and demineralised water mixture. It will also be used along with corrosion inhibitor in the GRMS gas heating water loop which connects the boilers to the tube and shell gas heaters.
- 3.3.9. During operation of the plant, the cooling water will be topped up on an as needed basis and will not be stored onsite. The potential for the substance to enter soil and groundwater is therefore extremely limited and when considered with the embedded design mitigation. On this basis, ethylene glycol has been discounted as a RHS.

### **SODIUM HYPOCHLORITE**

- 3.3.10. Initial dosing of sodium hypochlorite will be done during the commissioning stage of the project and topped up, thereafter, as required.
- 3.3.11. Sodium hypochlorite is expected to be transported onto site in its diluted form (14-15% concentration) in containers not exceeding 20L for the purposes of manual handling. It will be poured into the chemical dosing system, following the prescribed safety measures. The potential for the substance to enter soil and groundwater is extremely limited, given the lack of onsite storage.
- 3.3.12. The service water and firefighting system will make use of the combined raw water tank, which contains a mixture of potable water and diluted sodium hypochlorite. The site will have areas of impermeable hardstanding (as shown in **Appendix A.4**) and will have a drainage system to capture surface water runoff. The use of the water will be infrequent given the limited operation of the plant. Furthermore, its use will be limited to maintenance cleaning operations and under emergencies only.



Sodium Hypochlorite will be present as a diluted mixture only and should not be stored onsite. The potential for the substance to enter soil and groundwater is therefore limited and when considering the embedded design mitigation. On this basis, sodium hypochlorite has been discounted as a RHS.

### **GAS CONDENSATE**

- 3.3.13. Gas condensate will be captured if formed during the limited periods of operation of the power plant. The collection system will be a standalone system and any gas condensate will be removed from site for offsite disposal by a licensed handler. Given the potentially small quantities and self-contained collection system and other embedded design mitigation, it has not been considered further as a RHS.

## **3.4 POSSIBILITY OF POLLUTION TO THE ENVIRONMENT**

- 3.4.1. The Relevant Hazardous Substances considered further are diesel fuel, transformer and mineral oils which are stored onsite. The circumstances under which emissions to soil and groundwater could occur may include:

- Accidents and / or incidents; and
- Routine operations.

- 3.4.2. It should be noted there are no planned emissions to soil and groundwater at this site.

### **DIESEL**

- 3.4.3. Diesel tanks will be above ground and bunded to contain at least 110% of the capacity. All pipework will be above ground and there be no diesel fuel connection/transfer to other areas of the site. The EMS and site operating procedures in place would deal with identification and clean-up of spillages (for example during leaks or refuelling operations). Level and alarm indicators will be fitted to tanks to assist with identification of loss of fuel containment. The tanks and bunds would also be regularly inspected as part of site operating procedures and EMS.

### **TRANSFORMER OIL**

- 3.4.4. The main source of transformer oils are associated with the GSUT and UAT. However, any leakages are collected via pits located in the proximity of the equipment such as electrical transformers, pumps and, in general, in areas where release of oily contaminated water may occur, due to rainfall, spillages or manual washing operations.
- 3.4.5. The oily wastewater (OWW) discharging pits are connected to a dedicated underground network, which collects these effluents in a transfer pit, which is then pumped to the oily wastewater collecting basin for temporary accumulation. The final treatment consists of oil separation which is common to the first rainwater system.
- 3.4.6. Rainwater from GSUT and UAT areas is collected and led to the oil/water separator, which is housed in a concrete basin.
- 3.4.7. Oil from the water/oil separator is collected in a tank and disposed offsite.

### **MINERAL OILS**

- 3.4.8. Primarily associated with gas turbine/generator lubrication and hydraulic oil systems. Approximately 17,000L will be onsite at any given time, with 208L containers stored onsite for the purposes of manual addition to required systems which will be stored on bunded pallets.



- 3.4.9. All areas containing pipes are bunded with drainage to the oily wastewater system. In areas where manual addition is required, spill kits should be available in the case of spillages and spill nappies in place to avoid spillage to ground.

## 4 CONCEPTUAL SITE MODEL

### 4.1 INTRODUCTION

- 4.1.1. For risk of pollution or environmental harm to occur due to ground contamination, a source-pathway-receptor linkage (SPRL) must be proven. Thus, a viable source, pathway, and receptor must be present. If one of these is absent, there can be no significant risk. If all are present, then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptors and the nature of the migration pathway.
- 4.1.2. The below CSM assesses chronic (mid to long-term) risk only. Acute risks (short term) associated with accidents/spills are not assessed as part of the risk assessment and will be managed by the site's operations Environmental Management Plan (EMP) and Health and Safety plans.

**Table 4-1 – Conceptual Site Model**

Sources	Pathways	Receptors	Risk
RHS: Diesel Fuel Transformer Oils (released during site operations and potential incidents/accidents)	Direct contact/ingestion Inhalation of volatiles Airborne migration of soil or dust	Future site users Off-site users	Very Low
Mineral Oils	Leaching of mobile contaminants Direction contact/ingestion Inhalation of volatiles Vertical and lateral migration in permeable strata.	Secondary A Aquifer, Secondary Undifferentiated Aquifer Future Site users Off-site users	Very Low

### 4.2 HUMAN HEALTH

- 4.2.1. The installation site will be covered by buildings and in part by areas of hardstanding. Site users would employ use of personal protective equipment (PPE), (which is to be informed by task specific risk assessment method statements(RAMS)) in order to mitigate potential exposure to RHS via the pathways of dermal contact, ingestion and dust inhalation.
- 4.2.2. For offsite human health receptors, the presence of surface cover in the form of buildings and hardstanding will mitigate the risk to off-site human health receptors from soil dust. No significant sources of ground gas or vapours are known to be present onsite for offsite migration.

### 4.3 CONTROLLED WATERS

- 4.3.1. The site will comprise of some areas of impermeable hardstanding and buildings throughout. This will significantly reduce the possibility of any downward migration to the subsurface environment and



with it significantly reduce the potential for leaching and migration of any new or pre-existing residual soil and shallow groundwater contamination.

- 4.3.2. The site overlies Glacial Till deposits which is a Secondary Undifferentiated Aquifer. Groundwater exists within the site as perched and discontinuous water bodies based on the previous findings of ground investigations. The Secondary A aquifer of the South Wales Lower Coal Measures Formation is present beneath a significant thickness of cohesive clays of Glacial Till.
- 4.3.3. There is not considered to be a significant potential for any new form of release to have a discernible impact on the overall quality of the Secondary A Aquifer or Secondary Undifferentiated Aquifer beyond the site boundary.

#### **4.4 SITE SPECIFIC POLLUTION POSSIBILITY**

- 4.4.1. Given the embedded design mitigation and the EMS that will be in place, the release of RHS as a result of routine operations and/or accidents/incidents are considered to represent a Very Low to Low risk in terms of contaminating soil or groundwater.

## 5 RATIONALE FOR THE SOIL MONITORING

---

### 5.1 OBJECTIVES

- 5.1.1. The purpose of the boreholes is to allow HPL to demonstrate that they are complying with the requirements of the environmental permit with regards to monitoring the soils and groundwater for RHS that are stored, used or produced onsite.
- 5.1.2. The purpose of the monitoring is to identify possible soil and groundwater pollution associated with RHS as early as possible and allow corrective measures to be adopted before the pollutions impacts sensitive receptors.

### 5.2 SAMPLING SITING

- 5.2.1. Soil samples will be collected during the formation of the groundwater monitoring locations (i.e. drilling of boreholes). Given the sensitivity of the Site and its uses, no soil sampling outside these proposed locations is deemed to be required.
- 5.2.2. The locations of the monitoring boreholes have taken into consideration the following:
- Existing site conditions;
  - The conceptual site model;
  - The layout of the site and the location where RHS are present onsite;
  - The location of sensitive receptors; and,
  - The layout of the site and the site operations with regards to access and health and safety for installing the boreholes and undertaking monitoring.

### 5.3 MONITORING INTENSITY AND FREQUENCY

- 5.3.1. The monitoring frequency has been determined based on the possibility of soil or groundwater contamination occurring. The permit requires soil monitoring to be completed at a frequency of every 10 years.
- 5.3.2. The proposed frequency for soil monitoring is as follows:
- Soil sampling and testing to be undertaken during ground investigation works for the installation of the groundwater monitoring points;
  - At a frequency of every 10 years following completion of the installation of the monitoring points. Locations to be determined with consideration to the following parameters:
    - The results of the previous set of completed soil laboratory analyses (10 yearly locations adjacent to initial locations);
    - Any visual or olfactory evidence of contamination highlighted during pre-monitoring site walkovers;
    - Any relevant records of spills/leaks that have taken place onsite since the previous round of soil monitoring;
  - At the point of site decommissioning/permit surrender.

#### RATIONALE FOR SOIL MONITORING FREQUENCY

- 5.3.3. The likelihood of soil contamination occurring has been assessed as very low as the potential emission source areas will be contained within buildings and will have the required containment or

site drainage to limit the potential for source emissions to soil. The completion of soil monitoring at the start of site operations, every 10 years thereafter and at the stage of decommissioning is considered appropriate for the following reasons:

- The embedded mitigation and EMS are considered effective control measures to minimise the occurrence of transmission to subsurface soils; and
- The completion of soil monitoring at the RHS locations during the site operation would likely increase the overall risk of migration through any areas of hardstanding. This is because once the hardstanding is compromised, reinstatement is likely to create weak points in the surface and increase likelihood of downward migration.

5.3.4. This will be updated should there be any identified environmental incidents (such as losses to ground) which may result in adverse effects on the underlying soil and groundwater. Incidents such as losses of chemicals outside of bunded areas, on areas of soft standing or on areas of bunds/hardstanding which are compromised / cracked. Should there also be adverse impacts noted to groundwater quality then soil sampling will be completed to identify potential source areas if not apparent.

## MONITORING LOCATIONS

5.3.5. The proposed locations are shown in **Appendix A.3**. The locations are indicative only and the exact location will depend on constraints such as underground services, obstructions etc. however, the rationale for each location will be adhered to.

5.3.6. As detailed above, soil sampling is to be undertaken during the initial ground investigation works for the formation of the groundwater monitoring wells. At 10 year intervals and at the point of decommissioning/permit surrender soil sampling is to be undertaken at positions collocated with the groundwater monitoring standpipe positions.

## 5.4 SOIL SAMPLING SPECIFICATION

5.4.1. The initial ground investigation at the start of site operation and at site decommissioning/permit surrender should be undertaken in accordance with the following:

- BS5930: 2015+A1:2020: Code of practice for ground investigations; and,
- BS10175: 2011+A2:2017: Investigation of potentially contaminated sites – Code of Practice.

5.4.2. The Contractor shall ensure that soil sampling is supervised by a competent person and the soil samples are representative of each of the materials encountered. As a minimum, soil samples shall be taken as follows:

- The samples should be taken under the supervision of an environmental scientist with at least 5 years' experience.
- The first sample shall be taken at varying depths between the surface and 0.5m (at the instruction of the Investigation Supervisor).
- Subsequent samples should occur at approximately 1.0m intervals thereafter as required.
- A sample shall also be taken where colour, odour or consistency indicate a change in the nature of the strata and/or the potential presence of contamination.



## SUITE OF CHEMICAL TESTING FOR SOIL SAMPLES

The suite of chemical testing for groundwater samples is based on the RHS used, stored or produced at the site. All chemical analyses to be completed by a UKAS and MCERTS accredited Laboratory. Testing requirements are summarised below in **Table 5-1**.

**Table 5-1 – Soil Sample Testing Requirements**

Determinand	Units	Detection Level required/offered	Test Method required/offered	Accreditation required/offered
pH	pH units	-	Electrode / pH meter	UKAS / MCERTS
Organic matter	%	0.35	Combustion IR	UKAS
Hardness	mg/L	15.0	Calculation from Mg and Ca	-
TPH CWG <sup>1</sup>	mg/kg	10	GC FID	UKAS / MCERTS
BTEX	mg/kg	7.0	GCMS	UKAS
USEPA 16 Polyaromatic hydrocarbons	mg/kg	118	GCMS	UKAS
Semi-Volatile Organic Compounds (SVOCs) <sup>2</sup>	mg/kg	0.5	GCMS	UKAS
Volatile Organic Compounds (VOCs) <sup>2</sup>	mg/kg	0.5	GCMS	UKAS

<sup>1</sup> Aliphatic: >C5-C6, >C6-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C35, >C35-C44.

Aromatic: >EC6-EC7, >EC7-EC8, >EC8-EC10, >EC10-EC12, >EC12-EC16, >EC16-EC21, >EC21-EC35, >EC35-EC44.

<sup>2</sup> Testing of SVOCs and VOCs to be undertaken during the first round. Should CSM change then additional testing may be required.

## 6 RATIONALE FOR THE MONITORING BOREHOLE NETWORK

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### 6.1 OBJECTIVES

- 6.1.1. The purpose of the boreholes is to allow HPL to demonstrate that they are complying with the requirements of the environmental permit with regards to monitoring the soils and groundwater for Relevant Hazardous Substances (RHS) that are stores, used or produced onsite.
- 6.1.2. The purpose of the monitoring is to identify possible soil and groundwater pollution associated with RHS as early as possible and allow corrective measures to be adopted before the pollutions impacts sensitive receptors.

### 6.2 BOREHOLE SITING

- 6.2.1. The locations of the monitoring boreholes have taken into consideration the following:
- Existing site conditions;
  - The conceptual site model;
  - The layout of the site and the location where RHS are present onsite;
  - The location of sensitive receptors; and,
  - The layout of the site and the site operations with regards to access and health and safety for installing the boreholes and undertaking monitoring.

### 6.3 MONITORING FREQUENCY

- 6.3.1. The monitoring frequency has been largely determined by the conditions of the permit (EPR/BB3297CG) issued by Natural Resources Wales.
- 6.3.2. The permit requires groundwater monitoring to be undertaken every 5 years, with soil monitoring undertaken every 10 years.
- 6.3.3. The permit conditions, development proposals, and geo-environmental data concerning the proposed development have been evaluated, with the following frequency of monitoring proposed:
- Groundwater monitoring to be undertaken every five years. This aligns with the permit conditions, with a supporting rationale provided below;
  - Soil sampling and testing to be undertaken at completion of monitoring wells, every 10 years thereafter and at decommissioning or permit surrender. This is based on the appraisal of embedded environmental management procedures and geo-environmental information, with a supporting rationale provide in **Section 7**.

#### RATIONALE FOR GROUNDWATER MONITORING FREQUENCY

The likelihood of groundwater contamination occurring has been assessed as very low as the potential emission source areas will be contained within buildings and will have the required containment or site drainage to limit the potential for source emissions to groundwater. The completion of monitoring at 5-year intervals is further justified as:

- The site will operate infrequently and for a limited period of time, which reduces the potential of a release to the environment;
- The embedded mitigation and EMS are considered effective control measures to minimise the occurrence of transmission to subsurface soil and groundwater.

## 6.4 GROUND INVESTIGATION TO INSTALL GROUNDWATER MONITORING STANDPIPES

- 6.4.1. A ground investigation should be undertaken to install groundwater monitoring standpipes. This ground investigation shall be undertaken in accordance with the following:
- BS5930:2015+A1:2020: Code of practice for ground investigations; and,
  - BS10175: 2011+A2:2017: Investigation of potentially contaminated sites – Code of Practice.
- 6.4.2. Samples for contamination testing shall be taken under the supervision of an environmental scientist with at least 5 years' experience.
- 6.4.3. The design of standpipes for the purposes of groundwater monitoring should meet the design provided in **Appendix A.5**.
- 6.4.4. It should be noted that the locations of installed standpipes may be altered slightly subject to encountering buried services and/or utilities. Measures to identify buried infrastructure may include (but not be limited to) review of as-maintained service plans, or the use of cable avoidance tool and signal generator.

### IN-SITU MONITORING

- 6.4.5. The following field tests and measurements shall be carried out on groundwater samples obtained from standpipes:
- **pH** – The test equipment and procedures shall be in accordance with *The measurement of electrical conductivity and the laboratory determination of the pH value of natural, treated and waste waters* (1978);
  - **Temperature** – The test equipment and procedure shall be in accordance with *Standard Methods of the Examination of Water and Waste-Water* 18<sup>th</sup> Edition (1992) Section 2550. The ambient temperature at the time of testing shall be measured and recorded;
  - **Dissolved Oxygen** – The test equipment and procedure shall be in accordance with *Dissolved Oxygen in Natural and Waste Waters* (1980) – Method B – Instrument Method;
  - **Electrical Conductivity** – The test equipment and procedure shall be in accordance with *The measurement of electrical conductivity and the laboratory determination of the pH value of natural, treated and waste waters* (1978) Method A; and,
  - **Redox Potential** – The contractor shall submit to the Investigation Supervisor for their consent, a statement detailing the proposed procedure for the measurement of Redox Potential of groundwater.
- 6.4.6. The information will be submitted as follows in **Table 5-1** below:

**Table 6-1 – In-Situ Monitoring Analytes**

Test	Units	Detection Limit	Degree of Accuracy
pH	pH units	0.1	±0.1
Temperature	°C	0.1	±0.1
Dissolved Oxygen	mg/L	0.1	±0.1

Electrical Conductivity	µS/cm	10	±20
Redox Potential	mV	±1	±0.1

6.4.7. Once low flow pumping of groundwater from the standpipe has been achieved, readings should be taken at three minute intervals for a minimum of five readings. In-situ monitoring can cease when all analytes have reached stability (three consecutive readings within 10% of each other).

### WATER SAMPLES FROM STANDPIPES

6.4.8. Samples from standpipe shall only be taken after purging standing water from the installation. Well development or purging shall be undertaken using low flow sampling techniques (in accordance with BS EN ISO 5667-11:2009 – Guidance on sampling of groundwaters). The water level shall be measured prior to purging.

6.4.9. A minimum of three well volumes of water shall be purged from sampling wells, or until the well is dry, unless otherwise specified by the Investigation Supervisor.

6.4.10. During purging pH and conductivity levels shall be monitored when the following approximate well volumes of water have been removed: 0.5, 1.0, 2.0 and 3.0 times well volume.

6.4.11. Sufficient water samples shall be taken to allow laboratory testing of the parameters and to the detection limits. The investigation contractor will liaise directly with the testing laboratory to ensure they are aware of any of specific sampling requirements.

## 6.5 SUITE OF CHEMICAL TESTING FOR GROUNDWATER SAMPLES

6.5.1. The suite of chemical testing for groundwater samples is based on the RHS used, stored or produced at the site. All chemical analyses to be completed by a UKAS and MCERTS accredited laboratory. Refer to **Table 6-2** for testing requirements.

**Table 6-2 – Groundwater Sample Testing Requirements**

Determinand	Units	Detection Level required/offered	Test Method required/offered	Accreditation required/offered
pH	pH units	-	Electrode / pH meter	UKAS / MCERTS
Hardness	mg/L	15.0	Calculation from Mg and Ca	-
TPH CWG <sup>3</sup>	µg/L	0.1	GC x GC-FID	UKAS / MCERTS

<sup>3</sup> Aliphatic: >C5-C6, >C6-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C35, >C35-C44.  
 Aromatic: >EC6-EC7, >EC7-EC8, >EC8-EC10, >EC10-EC12, >EC12-EC16, >EC16-EC21, >EC21-EC35, >EC35-EC44.



BTEX	µg/L	1.0	GCMS	UKAS
USEPA 16 Polyaromatic hydrocarbons	µg/L	0.1	GCMS	UKAS
SVOCs <sup>4</sup>	µg/L	0.5	GCMS	UKAS
VOCs <sup>4</sup>	µg/L	0.5	GCMS	UKAS

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<sup>4</sup> Testing of SVOCs and VOCs to be undertaken during the first round. Should CSM change then additional testing may be required.

## 7 PROPOSED BOREHOLES

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### 7.1 MONITORING LOCATIONS

- 7.1.1. To conduct the groundwater monitoring required by the Natural Resources Wales permit (EPR/BB3297CG), groundwater monitoring standpipes will need to be installed.
- 7.1.2. It is proposed to install seven groundwater monitoring standpipes. The proposed locations and schedule of depths are provided in **Table 7-1** and **Appendix A.3**. The groundwater monitoring standpipes are to be permanent features and their upkeep are to be maintained. Initial soil sampling to be undertaken during ground investigation for groundwater monitoring standpipes.
- 7.1.3. Note, soil sampling is to be collocated with groundwater monitoring standpipe positions (at 10 year intervals and the point of site decommissioning).

### 7.2 BOREHOLE DESIGN

- 7.2.1. Boreholes are to be made to the below specifications, with the design summarised in **Appendix A.5**.
- 7.2.2. Standpipes to allow groundwater shall be installed in new exploratory holes, targeting granular deposits of the Glacial Till.
- 7.2.3. The standpipe shall consist of HDPE tubing and shall be not less than 50mm in diameter.
- 7.2.4. The base of the tubing shall be capped and the tubing perforated or slotted to provide an open area of between 10% and 15% of the surface area of the tubing.
- 7.2.5. Holes shall not be greater than 5mm in diameter and slots shall not be greater than 5mm width. The filter shall be pea gravel, or similar material, as approved by the Investigation Supervisor, 6-10mm in diameter. The pea gravel shall be quartz based and shall have been washed prior to use.
- 7.2.6. Where the depth of the exploratory hole is greater than the depth to which the filter and tubing are to be installed then the exploratory hole shall be backfilled below the base of the filter with cement/bentonite grout and a 1m plug of cement/bentonite paste in bags, or compressed bentonite pellets. If compressed bentonite pellets are used as an alternative to grout balls, they shall be partially saturated before being added to the borehole, and further clean water added to the borehole to complete saturation.
- 7.2.7. Arrangements to prevent the ingress of surface water and to protect the top of the tubing and tap valves shall be the use of a 150mm raised steel lockable cover which shall be set in a sufficiently stiff concrete mix standing proud of the surrounding ground.
- 7.2.8. The response zone shall be provided with well-formed bentonite seals above and below. The construction of the standpipe shall prevent any cross-contamination from potentially contaminated surface strata or from above ground emissions. The actual depth and length of the response zone shall be instructed by the Investigation Supervisor.
- 7.2.9. In addition to the above, the slotted section shall be wrapped in a sewn sleeve or geotextile sock having a pore size of between 100 and 250 microns. The fabric wrapping material shall be to the approval of the Investigation Supervisor. The slotted and wrapped section of pipe shall be surrounded by an inert filter material.

## 7.3 SCHEDULE OF GROUNDWATER AND SOIL MONITORING LOCATIONS

7.3.1. Seven monitoring standpipes will be installed across the site. Monitoring standpipes are to be maintained throughout the duration of the permit, with regular integrity inspections undertaken every six months. The schedule of monitoring locations is provided in **Table 7-1**. Refer to indicative locations in **Appendix A.3**.

**Table 7-1 – Details of groundwater monitoring standpipe locations**

Borehole ID	Location	Purpose	Proposed depth (m bgl)	Proposed Response Zone	Targeted Strata
BH01	Generator step-up transformers and Unit Auxiliary Transformers	Hydraulically downgradient of potential emission source.	10	TBC	Granular Glacial Till
BH02	Gas pressure reducing station	Perimeter monitoring well. Hydraulically downgradient of potential emission source.	10	TBC	Granular Glacial Till
BH03	Emergency backup diesel generator	Hydraulically downgradient of potential emission source.	10	TBC	Granular Glacial Till
BH04	Gas turbine and generator	Hydraulically upgradient of potential emission source.	10	TBC	Granular Glacial Till
BH05	Power Control Centre	Hydraulically downgradient of potential emission source.	10	TBC	Granular Glacial Till
BH06	Oil water transfer pit	Hydraulically downgradient of potential emission source.	10	TBC	Granular Glacial Till
BH07	Fire Water Storage Tank	Perimeter monitoring well. Hydraulically upgradient of potential emission sources.	10	TBC	Granular Glacial Till

7.3.2. The locations of the proposed monitoring wells are proposed to be sited at close proximity of the potential emission point sources and at positions which are inferred to be either hydraulically upgradient or downgradient of the potential emission sources, based on the findings of previous ground investigations. The granular Glacial Till has been targeted, which underlies the Made Ground.

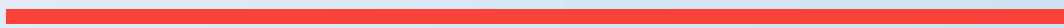
## 8 REPORTING

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- 8.1.1. On completion of each round of 5-yearly monitoring, a Monitoring Report will be submitted to NRW. The report will present the factual information from the monitoring including the following:
- Standpipe condition surveys;
  - Results of in-situ monitoring;
  - Results of laboratory chemical analysis data;
  - Details of any changes to the sampling strategy.
- 8.1.2. Additionally, every 10 years the Monitoring Reporting submitted to NRW will include reporting on the soil monitoring and laboratory analysis undertaken.
- 8.1.3. The results of the chemical analysis on both the soils and groundwater will be reviewed and assessed for presence of the RHS in particular and in reference to previous ground investigation data from the site.
- 8.1.4. If the results show a deterioration in the quality of either the soil or groundwater that is deemed to pose a significant risk to the either human health or the water environment, possible remedial measures will be identified and discussed with NRW prior to being implemented on-site.

# Appendix A

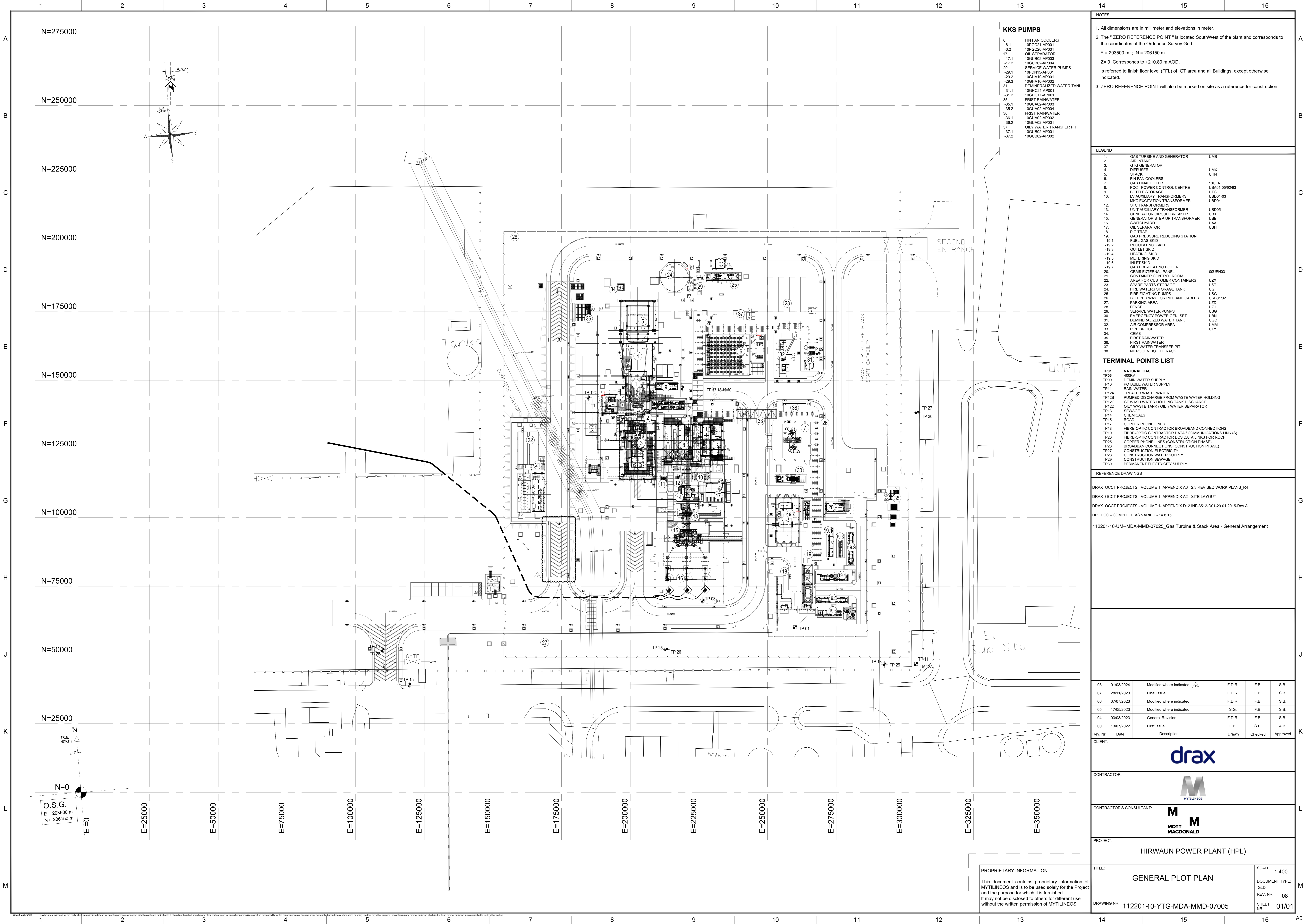
DRAWINGS



# Appendix A.1

GENERAL PLOT PLAN





**KKS PUMPS**

6.	FIN FAN COOLERS
-6.1	10PGC21-AP001
-6.2	10PGC22-AP001
17.	OIL SEPARATOR
-17.1	10GUB02-AP003
-17.2	10GUB02-AP004
29.	SERVICE WATER PUMPS
-29.1	10PDN15-AP001
-29.2	10GHA10-AP001
-29.3	10GHA10-AP002
31.	DEMINERALIZED WATER TANK
-31.1	10GHC21-AP001
-31.2	10GHC11-AP001
35.	FRIST RAINWATER
-35.1	10GUA02-AP003
-35.2	10GUA02-AP004
36.	FRIST RAINWATER
-36.1	10GUA02-AP002
-36.2	10GUA02-AP001
37.	OILY WATER TRANSFER PIT
-37.1	10GUB02-AP001
-37.2	10GUB02-AP002

**NOTES**

- All dimensions are in millimeter and elevations in meter.
- The "ZERO REFERENCE POINT" is located SouthWest of the plant and corresponds to the coordinates of the Ordnance Survey Grid:  
E = 293500 m ; N = 206150 m  
Z = 0 Corresponds to +210.80 m AOD.  
Is referred to finish floor level (FLL) of GT area and all Buildings, except otherwise indicated.
- ZERO REFERENCE POINT will also be marked on site as a reference for construction.

**LEGEND**

1.	GAS TURBINE AND GENERATOR	UMB
2.	AIR INTAKE	
3.	GTG GENERATOR	
4.	DIFFUSER	UMX
5.	STACK	UMN
6.	FIN FAN COOLERS	IOUEN
7.	GAS FINAL FILTER	UBM01-05/2/93
8.	FCC - POWER CONTROL CENTRE	UTG
9.	BOTTLE STORAGE	UBD01-03
10.	LV AUXILIARY TRANSFORMERS	UBD04
11.	MKC EXCITATION TRANSFORMER	UBD05
12.	SFC TRANSFORMERS	UBX
13.	UNIT AUXILIARY TRANSFORMER	UBE
14.	GENERATOR CIRCUIT BREAKER	UBA
15.	GENERATOR STEP-UP TRANSFORMER	UBH
16.	SWITCHYARD	
17.	OIL SEPARATOR	
18.	PIG TRAP	
19.	GAS PRESSURE REDUCING STATION	
-19.1	FUEL GAS SKID	
-19.2	REGULATING SKID	
-19.3	OUTLET SKID	
-19.4	HEATING SKID	
-19.5	METERING SKID	
-19.6	INLET SKID	
-19.7	GAS PRE-HEATING BOILER	
20.	CRANE EXTERNAL PANEL	00UEN03
21.	CONTAINER CONTROL ROOM	UZK
22.	AREA FOR CUSTOMER CONTAINERS	UST
23.	SPARE PARTS STORAGE	UGF
24.	FIRE WATERS STORAGE TANK	USG
25.	FIRE FIGHTING PUMPS	URB0102
26.	SLEEPER WAY FOR PIPE AND CABLES	UZD
27.	PARKING AREA	UZJ
28.	FENCE	USG
29.	SERVICE WATER PUMPS	UBN
30.	EMERGENCY POWER GEN. SET	UMM
31.	DEMINERALIZED WATER TANK	UTY
32.	AIR COMPRESSOR AREA	
33.	PIPE BRIDGE	
34.	CEMS	
35.	FRIST RAINWATER	
36.	FRIST RAINWATER	
37.	OILY WATER TRANSFER PIT	
38.	NITROGEN BOTTLE RACK	

**TERMINAL POINTS LIST**

TP01	NATURAL GAS
TP03	400KV
TP09	DEMIN WATER SUPPLY
TP10	POTABLE WATER SUPPLY
TP11	RAIN WATER
TP12A	TREATED WASTE WATER
TP12B	PUMPED DISCHARGE FROM WASTE WATER HOLDING TANK
TP12C	GT WASH WATER HOLDING TANK DISCHARGE
TP12D	OILY WASTE TANK / OIL / WATER SEPARATOR
TP13	SEWAGE
TP14	CHEMICALS
TP15	ROAD
TP17	COPPER PHONE LINES
TP18	FIBRE-OPTIC CONTRACTOR BROADBAND CONNECTIONS
TP19	FIBRE-OPTIC CONTRACTOR DATA / COMMUNICATIONS LINK (S)
TP20	FIBRE-OPTIC CONTRACTOR DCs DATA LINKS FOR ROOF
TP25	COPPER PHONE LINES (CONSTRUCTION PHASE)
TP26	BROADBAND CONNECTIONS (CONSTRUCTION PHASE)
TP27	CONSTRUCTION ELECTRICITY
TP28	CONSTRUCTION WATER SUPPLY
TP29	CONSTRUCTION SEWAGE
TP30	PERMANENT ELECTRICITY SUPPLY

**REFERENCE DRAWINGS**

DRAX OCCT PROJECTS - VOLUME 1- APPENDIX A6 - 2.3 REVISED WORK PLANS\_R4  
 DRAX OCCT PROJECTS - VOLUME 1- APPENDIX A2 - SITE LAYOUT  
 DRAX OCCT PROJECTS - VOLUME 1- APPENDIX D12 INF-3512-D01-29.01.2015-Rev A  
 HPL DCO - COMPLETE AS VARIED - 14.8.15

112201-10-UM-MDA-MMD-07025\_Gas Turbine & Stack Area - General Arrangement

Rev. Nr.	Date	Description	Drawn	Checked	Approved
08	01/03/2024	Modified where indicated	F.D.R.	F.B.	S.B.
07	28/11/2023	Final Issue	F.D.R.	F.B.	S.B.
06	07/07/2023	Modified where indicated	F.D.R.	F.B.	S.B.
05	17/05/2023	Modified where indicated	S.G.	F.B.	S.B.
04	03/03/2023	General Revision	F.D.R.	F.B.	S.B.
00	13/07/2022	First Issue	F.B.	S.B.	A.B.

CLIENT: **drax**

CONTRACTOR: **MYTILINEOS**

CONTRACTOR'S CONSULTANT: **MOTT MACDONALD**

PROJECT: **HIRWAUN POWER PLANT (HPL)**

**PROPRIETARY INFORMATION**

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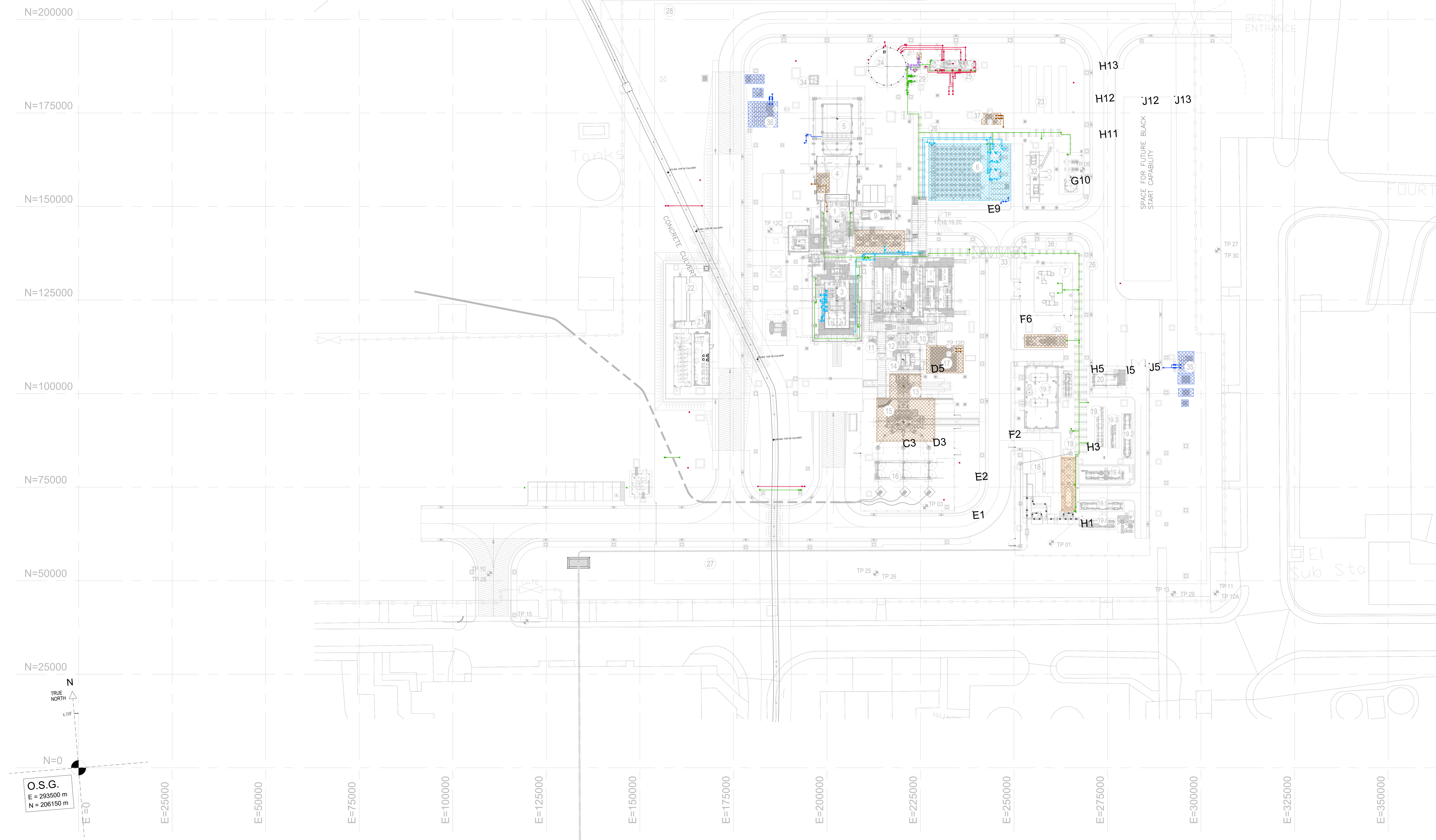
TITLE: <b>GENERAL PLOT PLAN</b>	SCALE: <b>1:400</b>
DRAWING NR.: <b>112201-10-YTG-MDA-MMD-07005</b>	DOCUMENT TYPE: <b>GLD</b>
	REV. NR.: <b>08</b>
	SHEET NR.: <b>01/01</b>

# Appendix A.2

SITE EMISSION SOURCES PLAN



Test Locations	X	Y	Z
D5	293736,047	206238,495	210,687
D3	293734,9	206218,855	210,699
C3	293726,768	206219,279	210,708
E2	293745,421	206208,81	210,551
E1	293743,852	206198,617	210,532
H1	293772,478	206194,043	210,523
H3	293775,79	206214,211	210,511
H5	293778,566	206234,906	210,593
I5	293788,05	206233,848	210,6
J13	293806,638	206304,769	210,521
J12	293797,991	206305,191	210,556
H11	293785,998	206297,229	210,628
H12	293785,772	206306,817	210,535
H13	293787,443	206315,453	210,434
G10	293777,285	206285,545	210,608
E9	293754,617	206279,83	210,631
F6	293760,813	206249,768	210,575
F2	293755,319	206219,286	210,5
J5	293794,041	206234,146	210,654



LEGEND		
1.	GAS TURBINE AND GENERATOR	UMB
2.	AIR INTAKE	
3.	GT GENERATOR	
4.	DIFFUSER	UMX
5.	STACK	UHN
6.	FIN FAN COOLERS	
7.	GAS FINAL FILTER	10UEN
8.	PCC - POWER CONTROL CENTRE	UBA01-05/92/93
9.	BOTTLE STORAGE	UTG
10.	LV AUXILIARY TRANSFORMERS	UBD01-03
11.	MKC EXCITATION TRANSFORMER	UBD04
12.	SFC TRANSFORMERS	
13.	UNIT AUXILIARY TRANSFORMER	UBD05
14.	GENERATOR CIRCUIT BREAKER	UBX
15.	GENERATOR STEP-UP TRANSFORMER	UBE
16.	SWITCHYARD	UAA
17.	OIL SEPARATOR	UBH
18.	PIG TRAP	
19.	GAS PRESSURE REDUCING STATION	
-19.1	FUEL GAS SKID	
-19.2	REGULATING SKID	
-19.3	OUTLET SKID	
-19.4	HEATING SKID	
-19.5	METERING SKID	
-19.6	INLET SKID	
-19.7	GAS PRE-HEATING BOILER	
20.	GRMS EXTERNAL PANEL	00UEN03
21.	CONTAINER CONTROL ROOM	
22.	AREA FOR CUSTOMER CONTAINERS	UZX
23.	SPARE PARTS STORAGE	UST
24.	FIRE WATERS STORAGE TANK	UGF
25.	FIRE FIGHTING PUMPS	USG
26.	SLEEPER WAY FOR PIPE AND CABLES	URB01/02
27.	PARKING AREA	UZD
28.	FENCE	UZJ
29.	SERVICE WATER PUMPS	USG
30.	EMERGENCY POWER GEN. SET	UBN
31.	DEMINERALIZED WATER TANK	UGC
32.	AIR COMPRESSOR AREA	UMM
33.	PIPE BRIDGE	UTY
34.	CEMS	
35.	FIRST RAINWATER	
36.	FIRST RAINWATER	
37.	ONLY WATER TRANSFER PIT	
38.	NITROGEN BOTTLE RACK	

TERMINAL POINTS LIST	
TP01	NATURAL GAS
TP03	400KV
TP09	DEMIN WATER SUPPLY
TP10	POTABLE WATER SUPPLY
TP11	RAIN WATER
TP12A	TREATED WASTE WATER
TP12B	PUMPED DISCHARGE FROM WASTE WATER HOLDING
TP12C	GT WASH WATER HOLDING TANK DISCHARGE
TP20	OIL WASTE TANK / OIL / WATER SEPARATOR
TP13	SEWAGE
TP14	CHEMICALS
TP15	ROAD
TP17	COPPER PHONE LINES
TP18	FIBRE-OPTIC CONTRACTOR BROADBAND CONNECTIONS
TP19	FIBRE-OPTIC CONTRACTOR DATA / COMMUNICATIONS LINK (S)
TP20	FIBRE-OPTIC CONTRACTOR DCS DATA LINKS FOR ROOF
TP25	COPPER PHONE LINES (CONSTRUCTION PHASE)
TP26	BROADBAND CONNECTIONS (CONSTRUCTION PHASE)
TP27	CONSTRUCTION ELECTRICITY
TP28	CONSTRUCTION WATER SUPPLY
TP29	CONSTRUCTION SEWAGE
TP30	PERMANENT ELECTRICITY SUPPLY

KEY OF THE SYMBOLS
<b>FUEL GAS SYSTEM:</b>
Containment Basin
<b>SERVICE WATER SYSTEM:</b>
Potential of Leakage
Pipe line
Containment Basin
<b>RAIN WATER DRAINAGE SYSTEM:</b>
Potential of Leakage
Pipe line
Containment Basin
<b>CHEMICAL SYSTEM:</b>
Potential of Leakage
Pipe line
Containment Basin
<b>CLOSED COOLING WATER SYSTEM:</b>
Potential of Leakage
Pipe line
Containment Basin
<b>FIRE FIGHTING SYSTEM:</b>
Potential of Leakage
Pipe line
Containment Basin
<b>FUEL OIL SYSTEM:</b>
Containment Basin

CLIENT:

CONTRACTOR:

CONTRACTOR'S CONSULTANT:

PROJECT: HIRWAUN POWER PLANT (HPL)

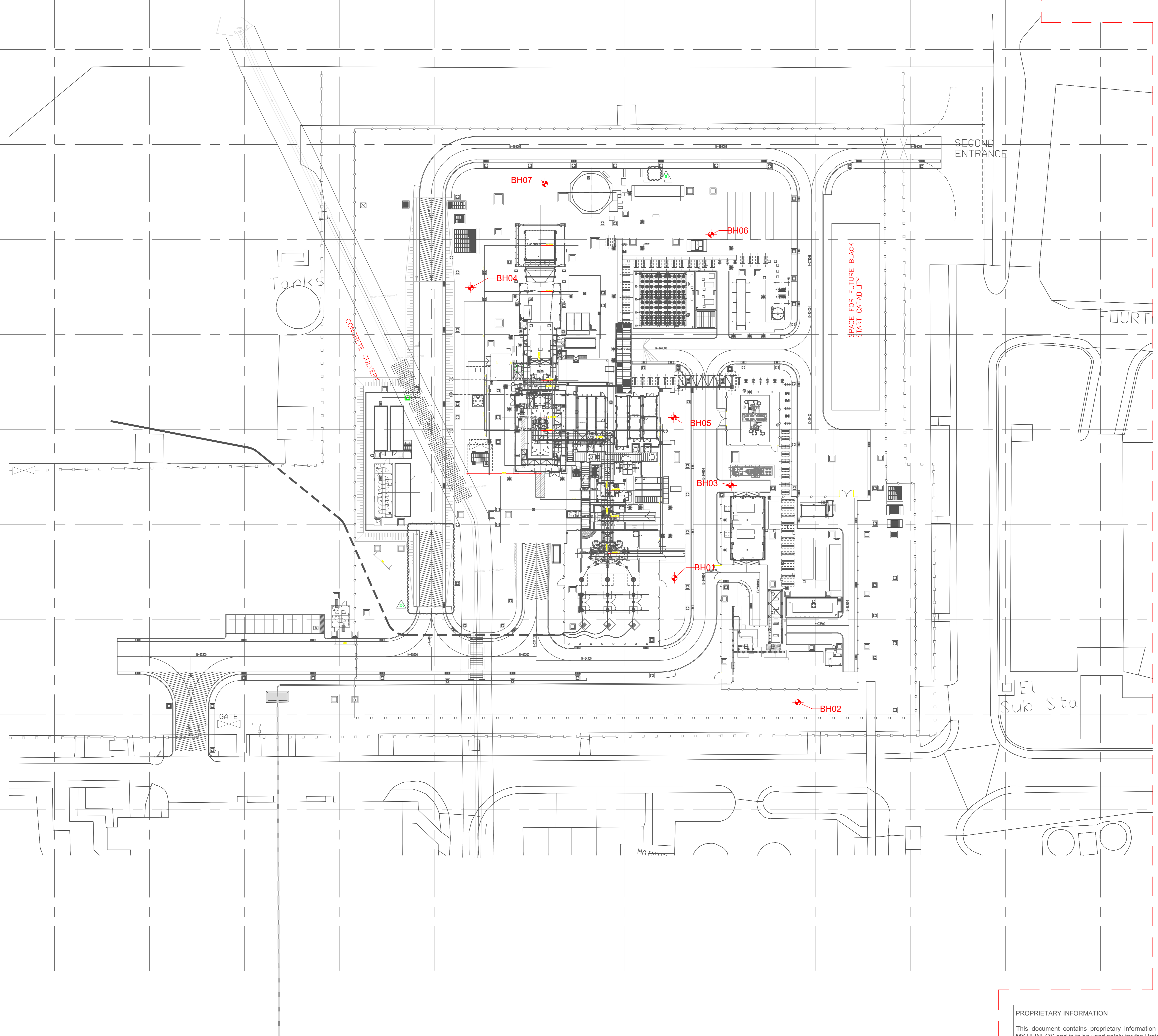
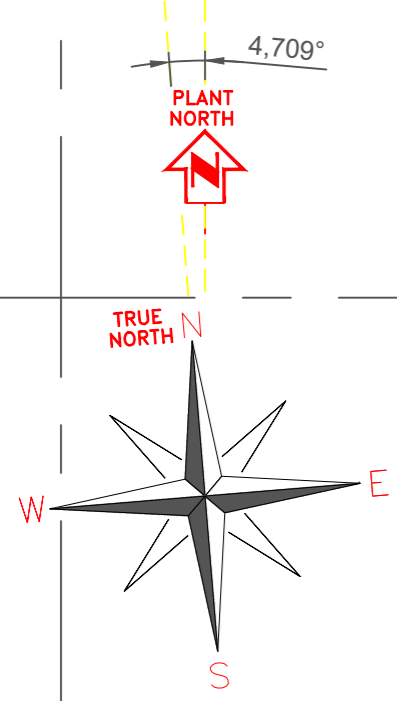


PROPRIETARY INFORMATION	TITLE: ANNEX A LAYOUT EMISSION SOURCES	SCALE: 1:400
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# Appendix A.3

PROPOSED EXPLORATORY HOLE  
LOCATIONS





REFERENCE DRAWINGS

DRAX OCCT PROJECTS - VOLUME 1- APPENDIX A6 - 2.3 REVISED WORK PLANS\_R4  
 DRAX OCCT PROJECTS - VOLUME 1- APPENDIX A2 - SITE LAYOUT  
 DRAX OCCT PROJECTS - VOLUME 1- APPENDIX D12 INF-3512-D01-29.01.2015-Rev A  
 HPL DC0 - COMPLETE AS VARIED - 14.8.15  
 112201-10-UM-MDA-MMD-07025\_Gas Turbine & Stack Area - General Arrangement

Rev. Nr.	Date	Description	Drawn	Checked	Approved
08	17/09/24	Proposed Boreholes Added	M.G.	-	-
08	01/03/2024	Modified where indicated	F.D.R.	F.B.	S.B.
07	28/11/2023	Final Issue	F.D.R.	F.B.	S.B.
06	07/07/2023	Modified where indicated	F.D.R.	F.B.	S.B.
05	17/05/2023	Modified where indicated	S.G.	F.B.	S.B.
00	13/07/2022	First Issue	F.B.	S.B.	A.B.

CLIENT:

CONTRACTOR:

CONTRACTOR'S CONSULTANT:

PROJECT: HIRWAUN POWER PLANT (HPL)

TITLE: GENERAL PLOT PLAN

DRAWING NR.: 112201-10-YTG-MDA-MMD-07005

SCALE: 1:400  
 DOCUMENT TYPE: GLO  
 REV. NR.: 08  
 SHEET NR.: 01/01

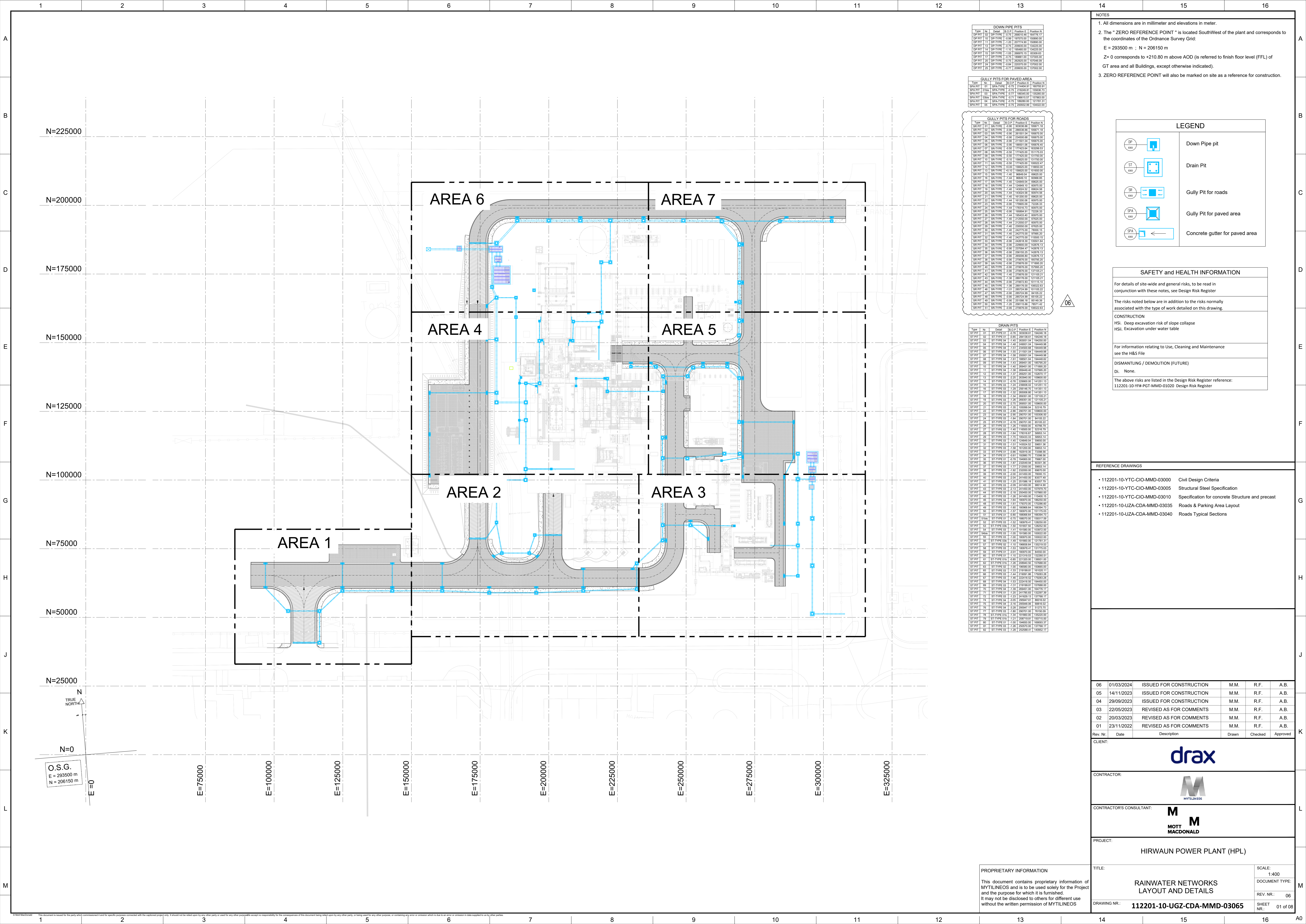
O.S.G.  
 E = 293500 m  
 N = 206150 m

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# Appendix A.4

SITE DRAINAGE PLAN





Type	No.	Code	B.O.P.	Position E	Position N
DP	01	DR	2.32	191715.00	152467.18
DP	02	DR	2.32	191715.00	152467.18
DP	03	DR	2.32	191715.00	152467.18
DP	04	DR	2.32	191715.00	152467.18
DP	05	DR	2.32	191715.00	152467.18
DP	06	DR	2.32	191715.00	152467.18
DP	07	DR	2.32	191715.00	152467.18
DP	08	DR	2.32	191715.00	152467.18
DP	09	DR	2.32	191715.00	152467.18
DP	10	DR	2.32	191715.00	152467.18
DP	11	DR	2.32	191715.00	152467.18
DP	12	DR	2.32	191715.00	152467.18
DP	13	DR	2.32	191715.00	152467.18
DP	14	DR	2.32	191715.00	152467.18
DP	15	DR	2.32	191715.00	152467.18
DP	16	DR	2.32	191715.00	152467.18
DP	17	DR	2.32	191715.00	152467.18
DP	18	DR	2.32	191715.00	152467.18
DP	19	DR	2.32	191715.00	152467.18
DP	20	DR	2.32	191715.00	152467.18
DP	21	DR	2.32	191715.00	152467.18
DP	22	DR	2.32	191715.00	152467.18
DP	23	DR	2.32	191715.00	152467.18
DP	24	DR	2.32	191715.00	152467.18
DP	25	DR	2.32	191715.00	152467.18

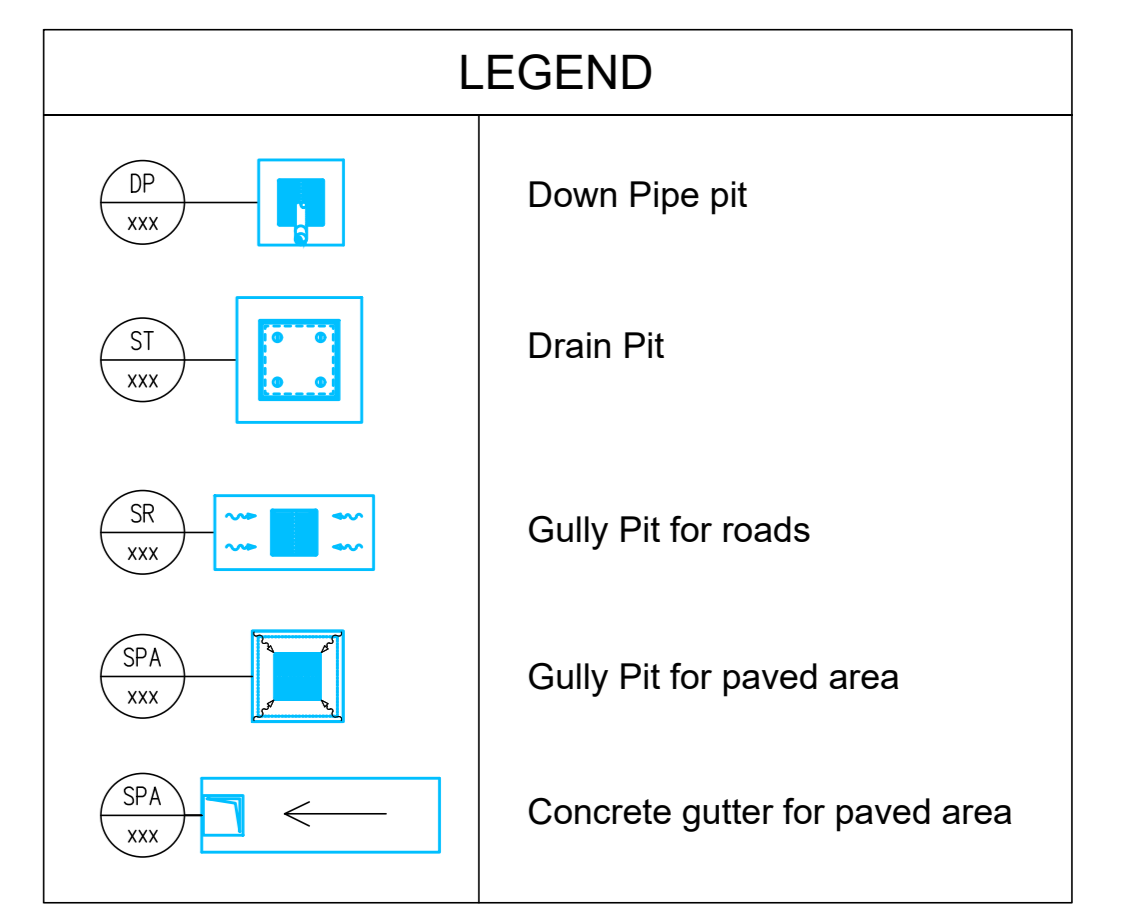
Type	No.	Code	B.O.P.	Position E	Position N
SR	01	SR	2.32	191715.00	152467.18
SR	02	SR	2.32	191715.00	152467.18
SR	03	SR	2.32	191715.00	152467.18
SR	04	SR	2.32	191715.00	152467.18
SR	05	SR	2.32	191715.00	152467.18
SR	06	SR	2.32	191715.00	152467.18
SR	07	SR	2.32	191715.00	152467.18
SR	08	SR	2.32	191715.00	152467.18
SR	09	SR	2.32	191715.00	152467.18
SR	10	SR	2.32	191715.00	152467.18
SR	11	SR	2.32	191715.00	152467.18
SR	12	SR	2.32	191715.00	152467.18
SR	13	SR	2.32	191715.00	152467.18
SR	14	SR	2.32	191715.00	152467.18
SR	15	SR	2.32	191715.00	152467.18
SR	16	SR	2.32	191715.00	152467.18
SR	17	SR	2.32	191715.00	152467.18
SR	18	SR	2.32	191715.00	152467.18
SR	19	SR	2.32	191715.00	152467.18
SR	20	SR	2.32	191715.00	152467.18
SR	21	SR	2.32	191715.00	152467.18
SR	22	SR	2.32	191715.00	152467.18
SR	23	SR	2.32	191715.00	152467.18
SR	24	SR	2.32	191715.00	152467.18
SR	25	SR	2.32	191715.00	152467.18

Type	No.	Code	B.O.P.	Position E	Position N
SR	01	SR	2.32	191715.00	152467.18
SR	02	SR	2.32	191715.00	152467.18
SR	03	SR	2.32	191715.00	152467.18
SR	04	SR	2.32	191715.00	152467.18
SR	05	SR	2.32	191715.00	152467.18
SR	06	SR	2.32	191715.00	152467.18
SR	07	SR	2.32	191715.00	152467.18
SR	08	SR	2.32	191715.00	152467.18
SR	09	SR	2.32	191715.00	152467.18
SR	10	SR	2.32	191715.00	152467.18
SR	11	SR	2.32	191715.00	152467.18
SR	12	SR	2.32	191715.00	152467.18
SR	13	SR	2.32	191715.00	152467.18
SR	14	SR	2.32	191715.00	152467.18
SR	15	SR	2.32	191715.00	152467.18
SR	16	SR	2.32	191715.00	152467.18
SR	17	SR	2.32	191715.00	152467.18
SR	18	SR	2.32	191715.00	152467.18
SR	19	SR	2.32	191715.00	152467.18
SR	20	SR	2.32	191715.00	152467.18
SR	21	SR	2.32	191715.00	152467.18
SR	22	SR	2.32	191715.00	152467.18
SR	23	SR	2.32	191715.00	152467.18
SR	24	SR	2.32	191715.00	152467.18
SR	25	SR	2.32	191715.00	152467.18
SR	26	SR	2.32	191715.00	152467.18
SR	27	SR	2.32	191715.00	152467.18
SR	28	SR	2.32	191715.00	152467.18
SR	29	SR	2.32	191715.00	152467.18
SR	30	SR	2.32	191715.00	152467.18
SR	31	SR	2.32	191715.00	152467.18
SR	32	SR	2.32	191715.00	152467.18
SR	33	SR	2.32	191715.00	152467.18
SR	34	SR	2.32	191715.00	152467.18
SR	35	SR	2.32	191715.00	152467.18
SR	36	SR	2.32	191715.00	152467.18
SR	37	SR	2.32	191715.00	152467.18
SR	38	SR	2.32	191715.00	152467.18
SR	39	SR	2.32	191715.00	152467.18
SR	40	SR	2.32	191715.00	152467.18
SR	41	SR	2.32	191715.00	152467.18
SR	42	SR	2.32	191715.00	152467.18
SR	43	SR	2.32	191715.00	152467.18
SR	44	SR	2.32	191715.00	152467.18
SR	45	SR	2.32	191715.00	152467.18
SR	46	SR	2.32	191715.00	152467.18
SR	47	SR	2.32	191715.00	152467.18
SR	48	SR	2.32	191715.00	152467.18
SR	49	SR	2.32	191715.00	152467.18
SR	50	SR	2.32	191715.00	152467.18
SR	51	SR	2.32	191715.00	152467.18
SR	52	SR	2.32	191715.00	152467.18

Type	No.	Code	B.O.P.	Position E	Position N
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ST	02	ST	2.32	191715.00	152467.18
ST	03	ST	2.32	191715.00	152467.18
ST	04	ST	2.32	191715.00	152467.18
ST	05	ST	2.32	191715.00	152467.18
ST	06	ST	2.32	191715.00	152467.18
ST	07	ST	2.32	191715.00	152467.18
ST	08	ST	2.32	191715.00	152467.18
ST	09	ST	2.32	191715.00	152467.18
ST	10	ST	2.32	191715.00	152467.18
ST	11	ST	2.32	191715.00	152467.18
ST	12	ST	2.32	191715.00	152467.18
ST	13	ST	2.32	191715.00	152467.18
ST	14	ST	2.32	191715.00	152467.18
ST	15	ST	2.32	191715.00	152467.18
ST	16	ST	2.32	191715.00	152467.18
ST	17	ST	2.32	191715.00	152467.18
ST	18	ST	2.32	191715.00	152467.18
ST	19	ST	2.32	191715.00	152467.18
ST	20	ST	2.32	191715.00	152467.18
ST	21	ST	2.32	191715.00	152467.18
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ST	23	ST	2.32	191715.00	152467.18
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ST	25	ST	2.32	191715.00	152467.18
ST	26	ST	2.32	191715.00	152467.18
ST	27	ST	2.32	191715.00	152467.18
ST	28	ST	2.32	191715.00	152467.18
ST	29	ST	2.32	191715.00	152467.18
ST	30	ST	2.32	191715.00	152467.18
ST	31	ST	2.32	191715.00	152467.18
ST	32	ST	2.32	191715.00	152467.18
ST	33	ST	2.32	191715.00	152467.18
ST	34	ST	2.32	191715.00	152467.18
ST	35	ST	2.32	191715.00	152467.18
ST	36	ST	2.32	191715.00	152467.18
ST	37	ST	2.32	191715.00	152467.18
ST	38	ST	2.32	191715.00	152467.18
ST	39	ST	2.32	191715.00	152467.18
ST	40	ST	2.32	191715.00	152467.18
ST	41	ST	2.32	191715.00	152467.18
ST	42	ST	2.32	191715.00	152467.18
ST	43	ST	2.32	191715.00	152467.18
ST	44	ST	2.32	191715.00	152467.18
ST	45	ST	2.32	191715.00	152467.18
ST	46	ST	2.32	191715.00	152467.18
ST	47	ST	2.32	191715.00	152467.18
ST	48	ST	2.32	191715.00	152467.18
ST	49	ST	2.32	191715.00	152467.18
ST	50	ST	2.32	191715.00	152467.18
ST	51	ST	2.32	191715.00	152467.18
ST	52	ST	2.32	191715.00	152467.18

NOTES

- All dimensions are in millimeter and elevations in meter.
- The "ZERO REFERENCE POINT" is located SouthWest of the plant and corresponds to the coordinates of the Ordnance Survey Grid.  
E = 293500 m ; N = 206150 m  
Z = 0 corresponds to +210.80 m above AOD (is referred to finish floor level (FFL) of GT area and all Buildings, except otherwise indicated).
- ZERO REFERENCE POINT will also be marked on site as a reference for construction.



**SAFETY and HEALTH INFORMATION**

For details of site-wide and general risks, to be read in conjunction with these notes, see Design Risk Register

The risks noted below are in addition to the risks normally associated with the type of work detailed on this drawing.

**CONSTRUCTION**  
HS1: Deep excavation risk of slope collapse  
HS1: Excavation under water table

For information relating to Use, Cleaning and Maintenance see the H&S File

**DISMANTLING / DEMOLITION (FUTURE)**  
DI: None.

The above risks are listed in the Design Risk Register reference: 112201-10-YH-PGT-MMD-01020 Design Risk Register

**REFERENCE DRAWINGS**

- 112201-10-YTC-CIO-MMD-03000 Civil Design Criteria
- 112201-10-YTC-CIO-MMD-03005 Structural Steel Specification
- 112201-10-YTC-CIO-MMD-03010 Specification for concrete Structure and precast
- 112201-10-UZA-CDA-MMD-03035 Roads & Parking Area Layout
- 112201-10-UZA-CDA-MMD-03040 Roads Typical Sections

Rev. No.	Date	Description	Drawn	Checked	Approved
06	01/03/2024	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
05	14/11/2023	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
04	29/09/2023	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
03	22/05/2023	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.
02	20/03/2023	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.
01	23/11/2022	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.

CLIENT: **drax**

CONTRACTOR: **MYTILINEOS**

CONTRACTOR'S CONSULTANT: **MOTT MACDONALD**

PROJECT: **HIRWAUN POWER PLANT (HPL)**

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TITLE: **RAINWATER NETWORKS LAYOUT AND DETAILS**

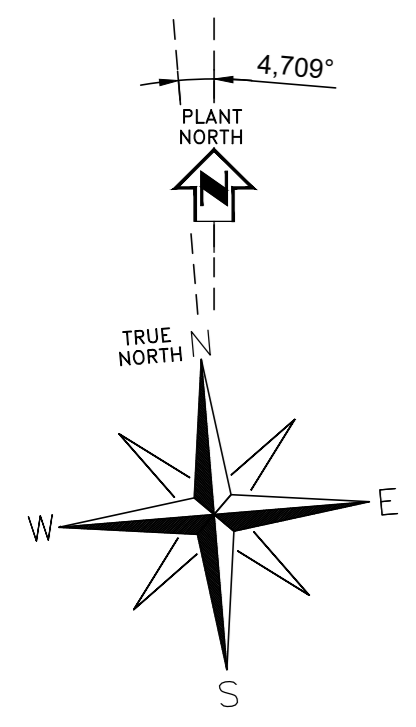
DRAWING NR.: **112201-10-UGZ-CDA-MMD-03065**

SCALE: 1:400

DOCUMENT TYPE: **REV. NR.: 06**

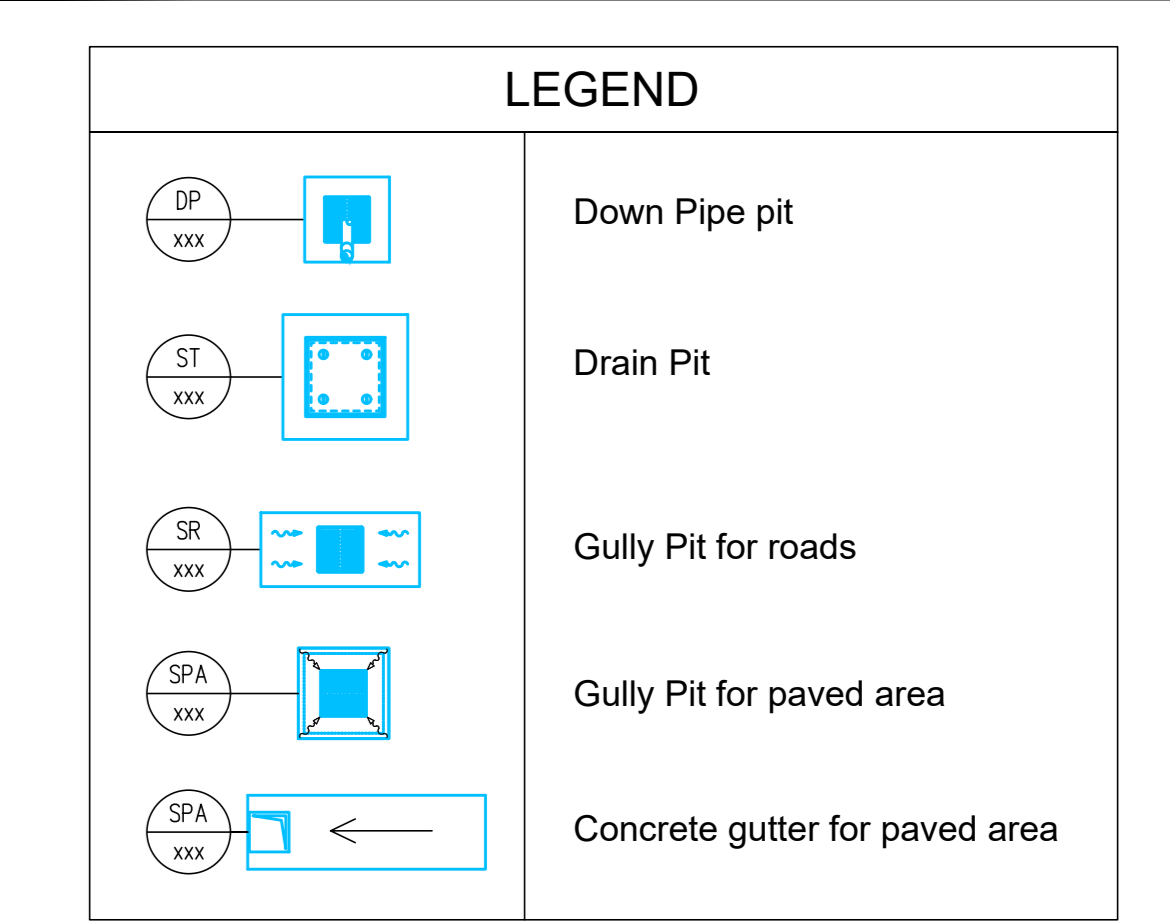
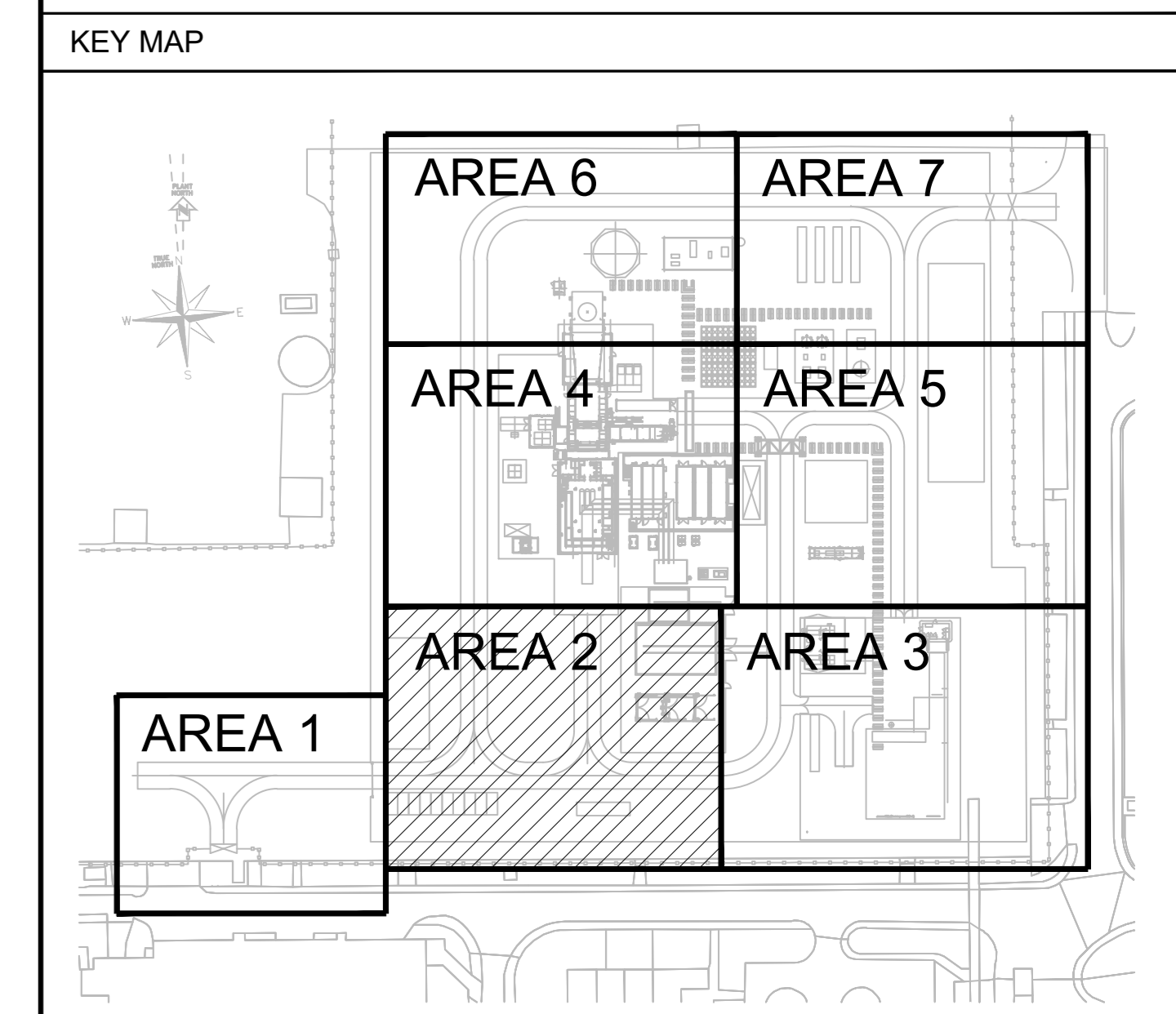
SHEET NR.: 01 of 08





**NOTES**

- All dimensions are in millimeter and elevations in meter.
- The "ZERO REFERENCE POINT" is located SouthWest of the plant and corresponds to the coordinates of the Ordnance Survey Grid:  
E = 293500 m ; N = 206150 m  
Z = 0 corresponds to +210.80 m above AOD (is referred to finish floor level (FFL) of GT area and all Buildings, except otherwise indicated).
- ZERO REFERENCE POINT will also be marked on site as a reference for construction.



**SAFETY and HEALTH INFORMATION**

For details of site-wide and general risks, to be read in conjunction with these notes, see Design Risk Register

The risks noted below are in addition to the risks normally associated with the type of work detailed on this drawing.

**CONSTRUCTION**  
HSI. Deep excavation risk of slope collapse  
HSII. Excavation under water table

For information relating to Use, Cleaning and Maintenance see the H&S File

**DISMANTLING / DEMOLITION (FUTURE)**  
Di. None.

The above risks are listed in the Design Risk Register reference: 112201-10-YF#-PGT-MMD-01020 Design Risk Register

- REFERENCE DRAWINGS**
- 112201-10-YTC-CIO-MMD-03000 Civil Design Criteria
  - 112201-10-YTC-CIO-MMD-03005 Structural Steel Specification
  - 112201-10-YTC-CIO-MMD-03010 Specification for concrete Structure and precast
  - 112201-10-UZA-CDA-MMD-03035 Roads & Parking Area Layout
  - 112201-10-UZA-CDA-MMD-03040 Roads Typical Sections

Rev. Nr.	Date	Description	Drawn	Checked	Approved
06	01/03/2024	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
05	14/11/2023	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
04	29/09/2023	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
03	22/05/2023	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.
02	20/03/2023	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.
01	23/11/2022	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.

**CLIENT:**

**CONTRACTOR:**

**CONTRACTOR'S CONSULTANT:**

**PROJECT:** HIRWAUN POWER PLANT (HPL)

**PROPRIETARY INFORMATION**  
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**TITLE:** RAINWATER NETWORKS LAYOUT AND DETAILS AREA 2

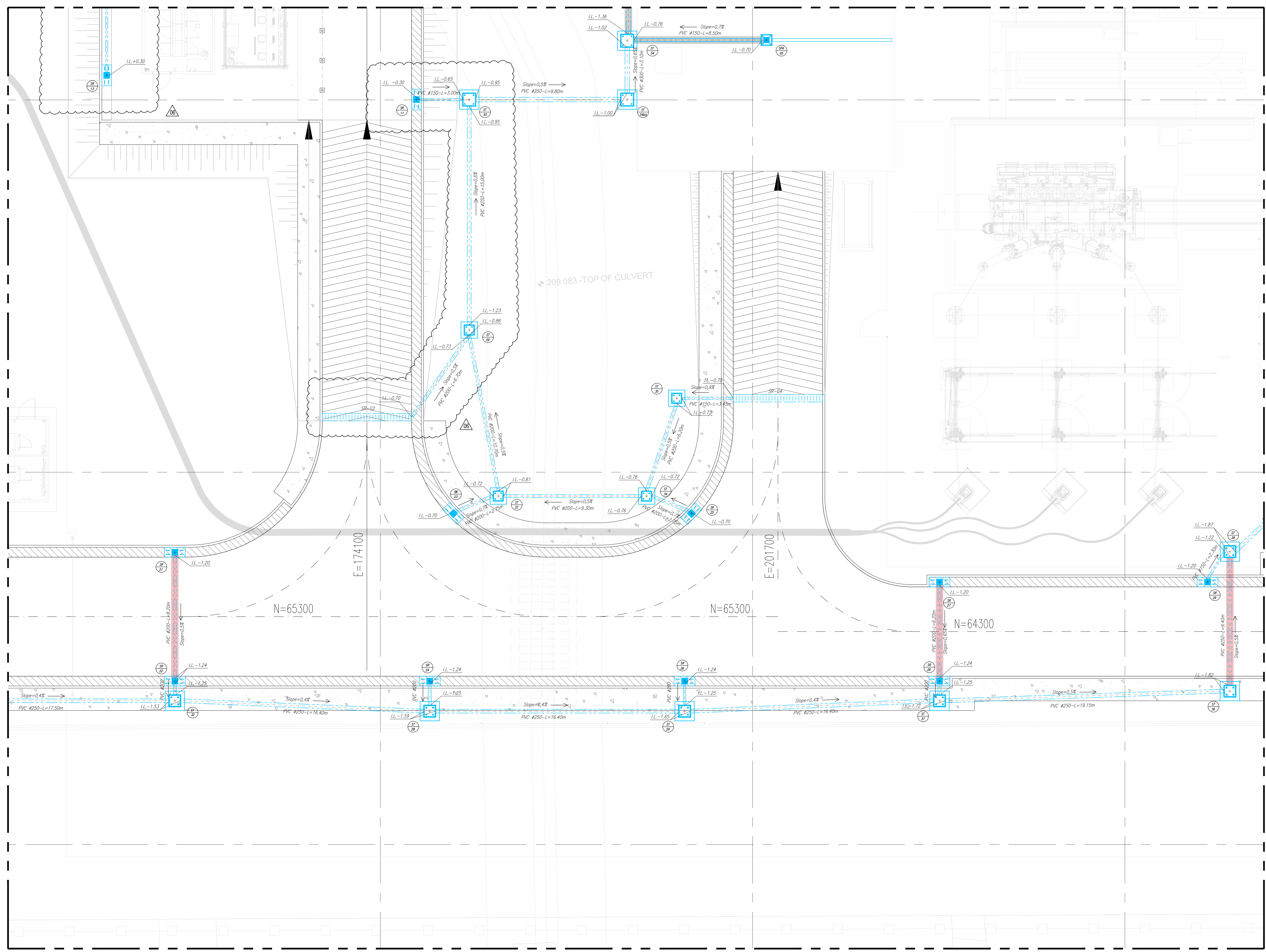
**DRAWING NR.:** 112201-10-UGZ-CDA-MMD-03065

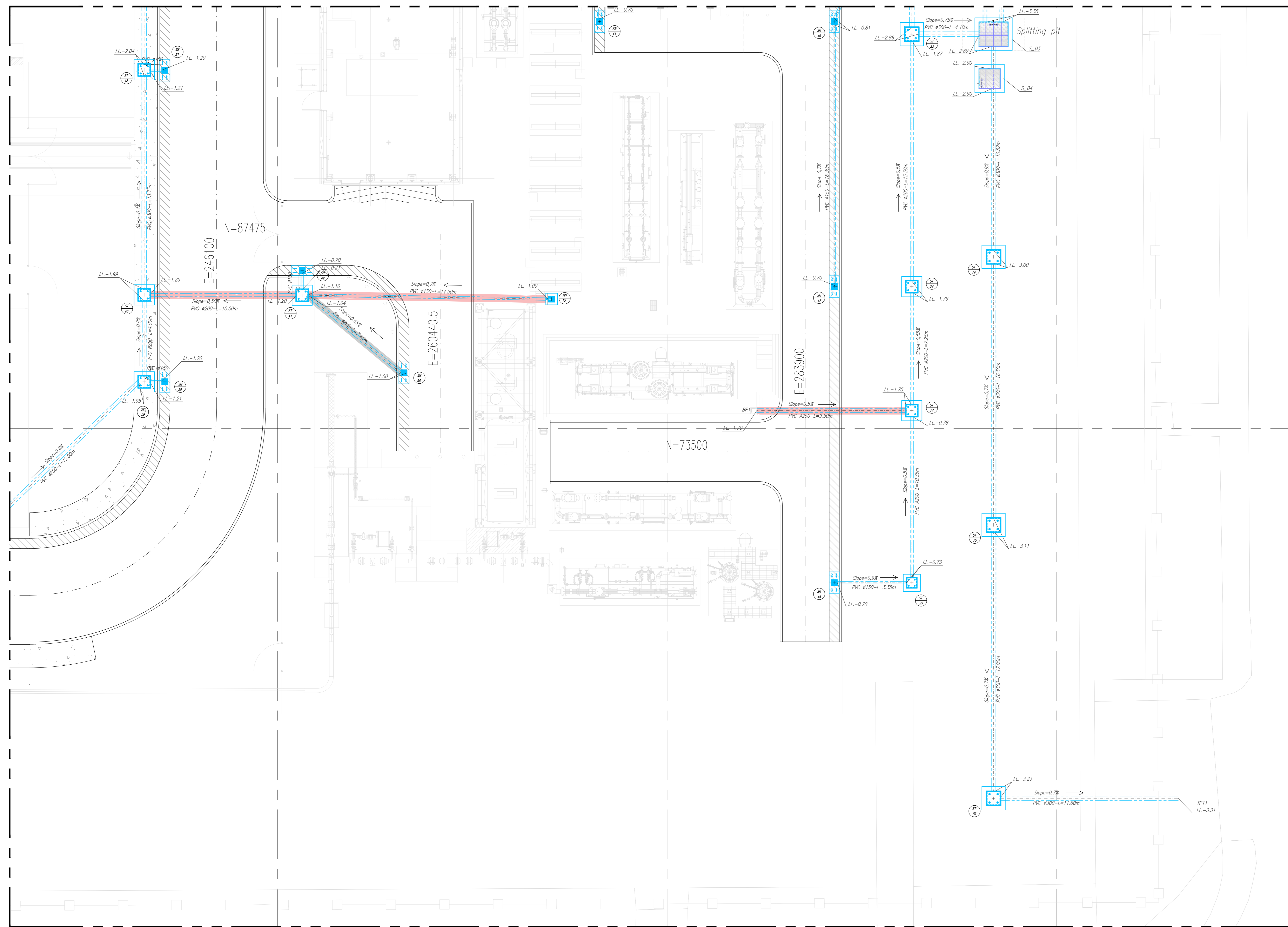
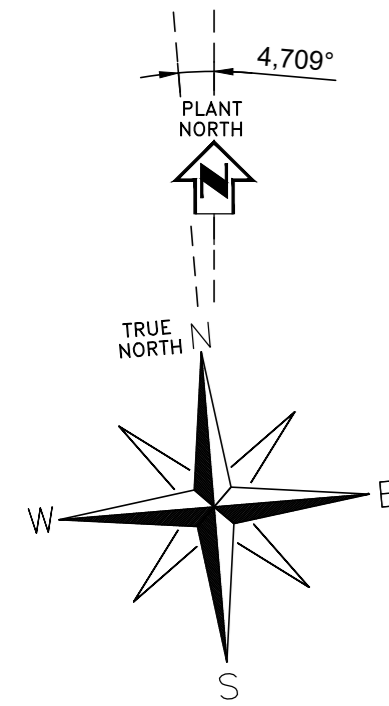
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**DOCUMENT TYPE:**

**REV. NR.:** 06

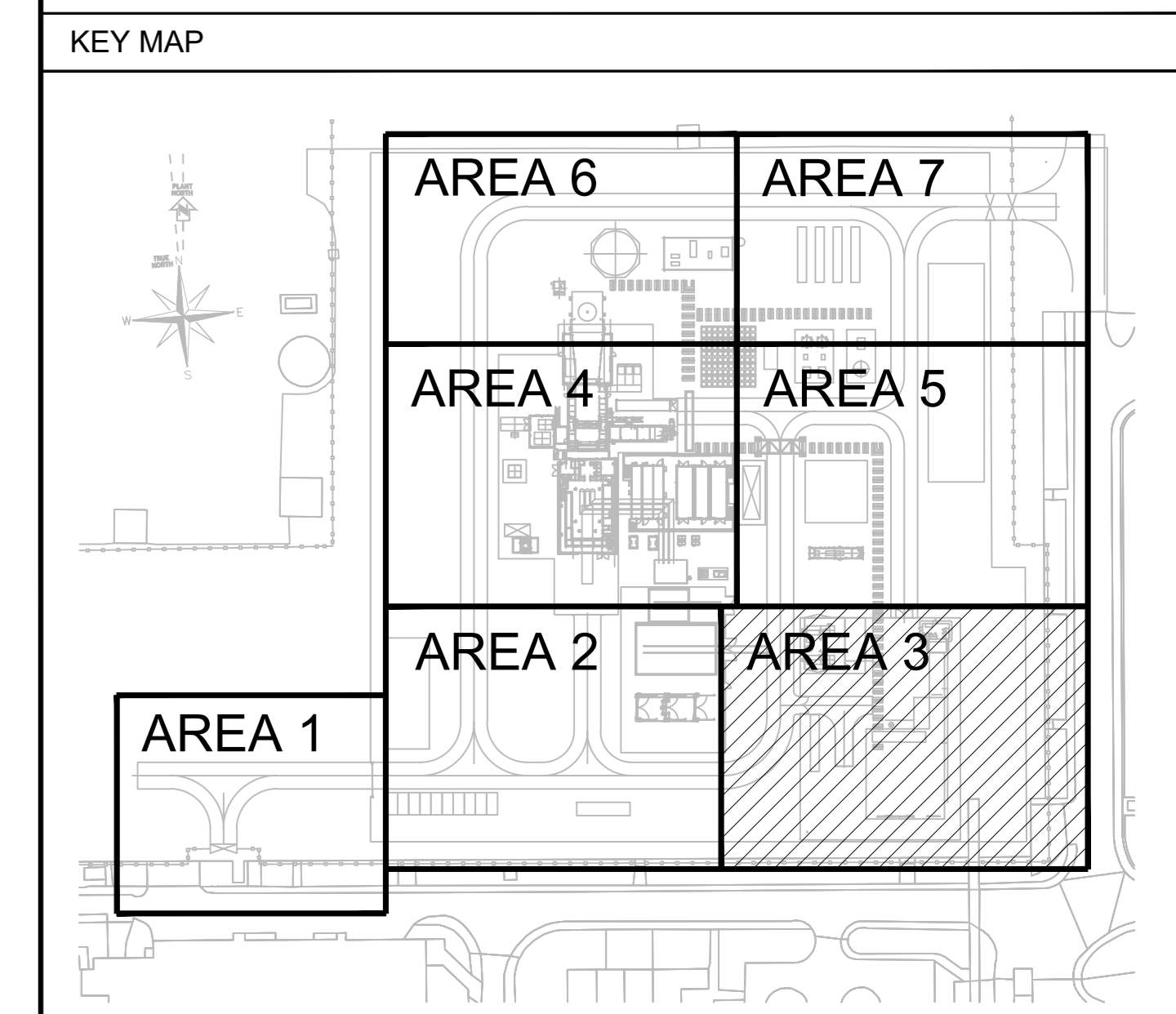
**SHEET NR.:** 03 of 08





**NOTES**

- All dimensions are in millimeter and elevations in meter.
- The "ZERO REFERENCE POINT" is located SouthWest of the plant and corresponds to the coordinates of the Ordnance Survey Grid:  
E = 293500 m ; N = 206150 m  
Z= 0 corresponds to +210.80 m above AOD (is referred to finish floor level (FFL) of GT area and all Buildings, except otherwise indicated).
- ZERO REFERENCE POINT will also be marked on site as a reference for construction.



**LEGEND**

	Down Pipe pit
	Drain Pit
	Gully Pit for roads
	Gully Pit for paved area
	Concrete gutter for paved area

**SAFETY and HEALTH INFORMATION**

For details of site-wide and general risks, to be read in conjunction with these notes, see Design Risk Register

The risks noted below are in addition to the risks normally associated with the type of work detailed on this drawing.

**CONSTRUCTION**  
 HSI. Deep excavation risk of slope collapse  
 HSI. Excavation under water table

For information relating to Use, Cleaning and Maintenance see the H&S File

**DISMANTLING / DEMOLITION (FUTURE)**  
 Di. None.

The above risks are listed in the Design Risk Register reference: 112201-10-YF#-PGT-MMD-01020 Design Risk Register

**REFERENCE DRAWINGS**

• 112201-10-YTC-CIO-MMD-03000	Civil Design Criteria
• 112201-10-YTC-CIO-MMD-03005	Structural Steel Specification
• 112201-10-YTC-CIO-MMD-03010	Specification for concrete Structure and precast
• 112201-10-UZA-CDA-MMD-03035	Roads & Parking Area Layout
• 112201-10-UZA-CDA-MMD-03040	Roads Typical Sections

Rev. Nr.	Date	Description	Drawn	Checked	Approved
06	01/03/2024	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
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01	23/11/2022	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.

**CLIENT:**

**CONTRACTOR:**

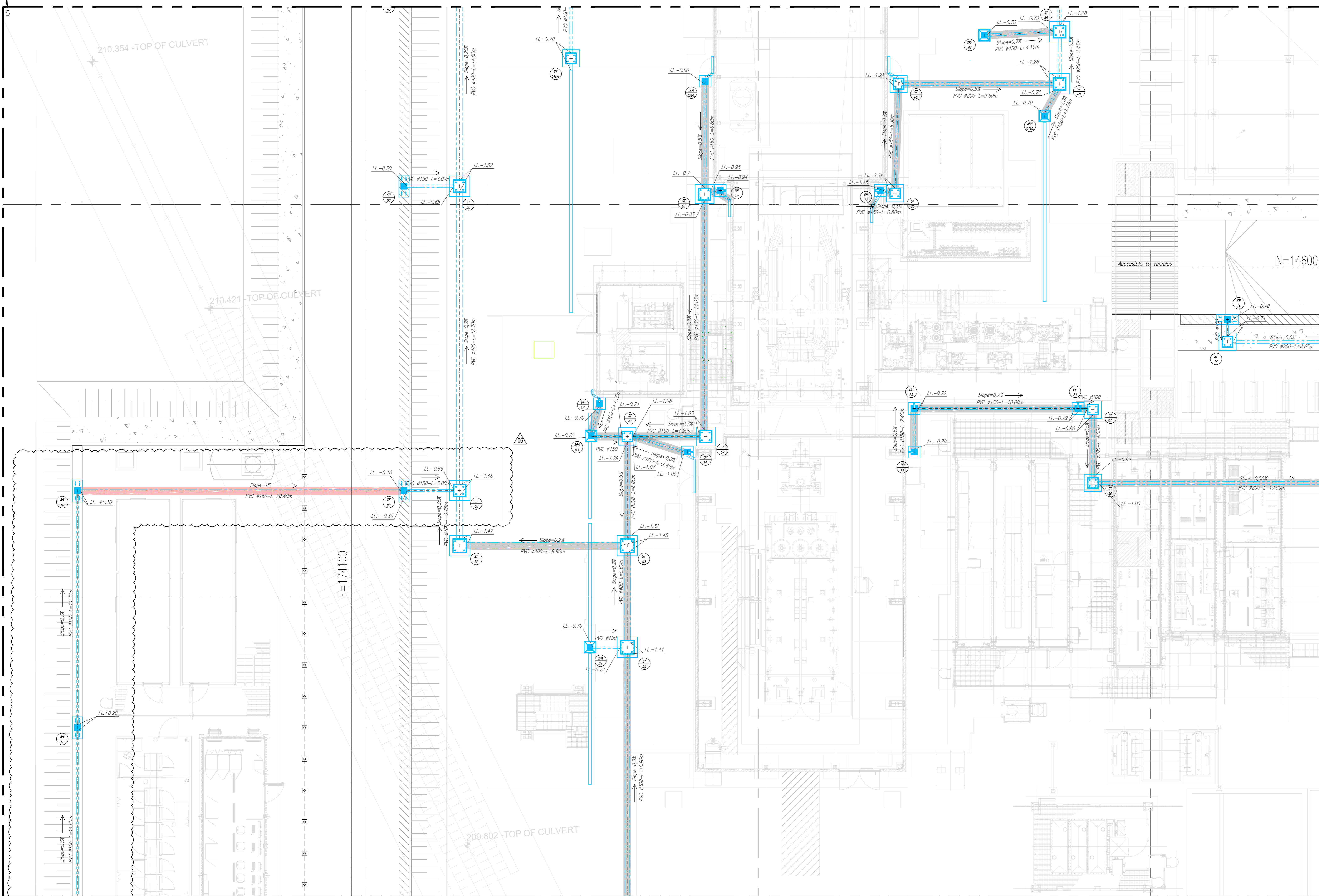
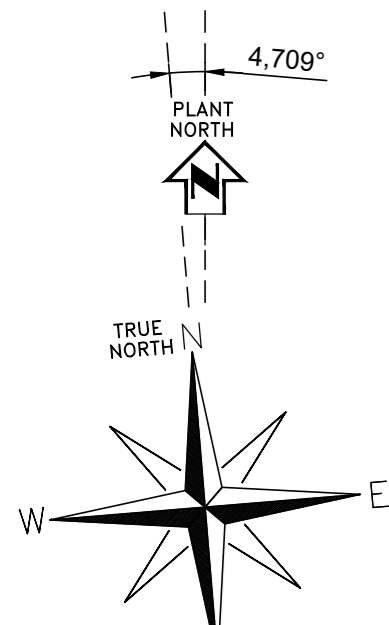
**CONTRACTOR'S CONSULTANT:**

**PROJECT:** HIRWAUN POWER PLANT (HPL)

**PROPRIETARY INFORMATION**

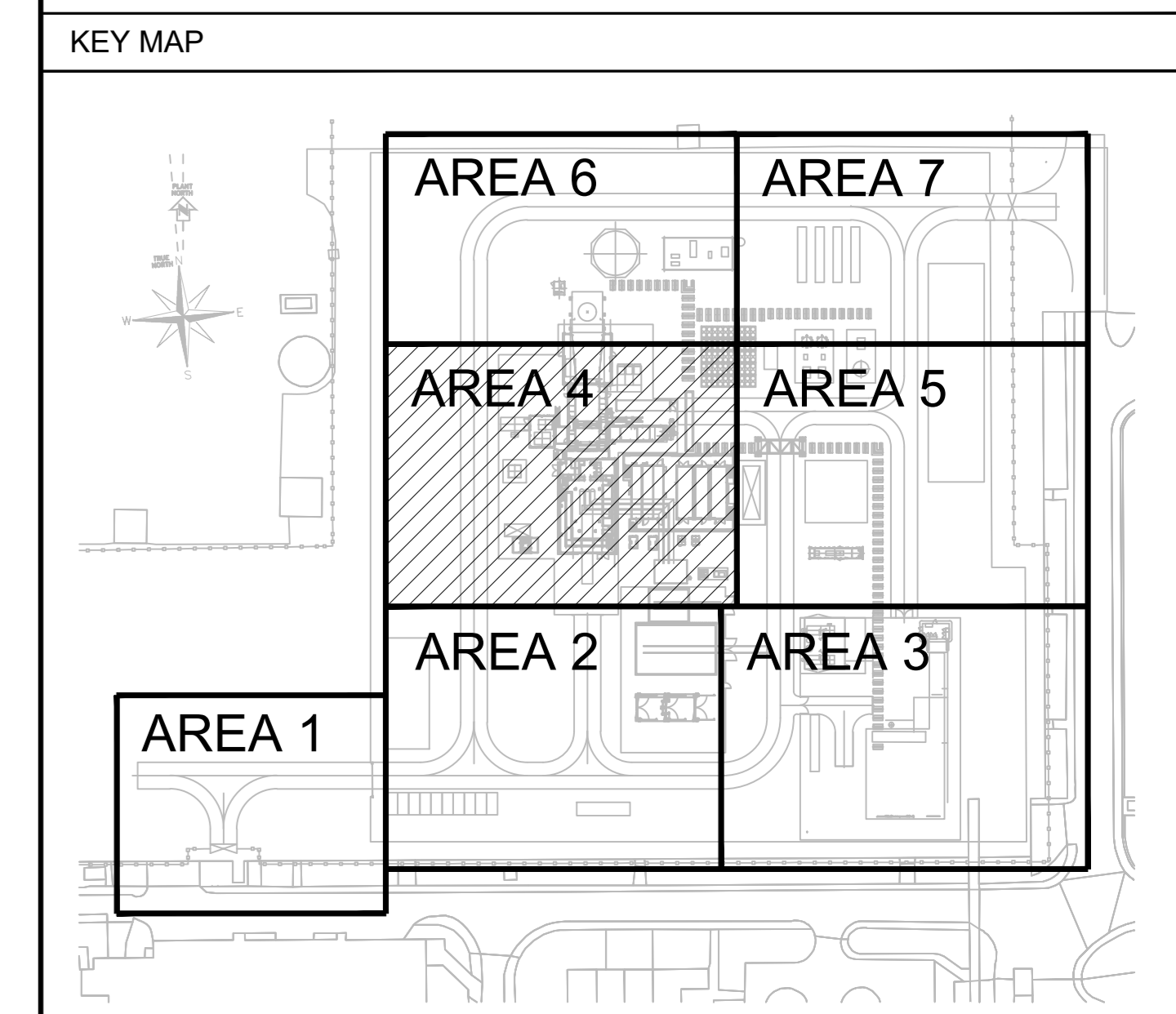
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<b>TITLE:</b>	RAINWATER NETWORKS LAYOUT AND DETAILS AREA 3	<b>SCALE:</b>	1:100
<b>DRAWING NR.:</b>	112201-10-UGZ-CDA-MMD-03065	<b>DOCUMENT TYPE:</b>	
		<b>REV. NR.:</b>	06
		<b>SHEET NR.:</b>	04 of 08



**NOTES**

- All dimensions are in millimeter and elevations in meter.
- The "ZERO REFERENCE POINT" is located SouthWest of the plant and corresponds to the coordinates of the Ordnance Survey Grid:  
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Z= 0 corresponds to +210.80 m above AOD (is referred to finish floor level (FFL) of GT area and all Buildings, except otherwise indicated).
- ZERO REFERENCE POINT will also be marked on site as a reference for construction.



**LEGEND**

	Down Pipe pit
	Drain Pit
	Gully Pit for roads
	Gully Pit for paved area
	Concrete gutter for paved area

**SAFETY and HEALTH INFORMATION**

For details of site-wide and general risks, to be read in conjunction with these notes, see Design Risk Register

The risks noted below are in addition to the risks normally associated with the type of work detailed on this drawing.

**CONSTRUCTION**  
 HSI. Deep excavation risk of slope collapse  
 HSIi. Excavation under water table

For information relating to Use, Cleaning and Maintenance see the H&S File

**DISMANTLING / DEMOLITION (FUTURE)**  
 Di. None.

The above risks are listed in the Design Risk Register reference: 112201-10-YF#-PGT-MMD-01020 Design Risk Register

**REFERENCE DRAWINGS**

• 112201-10-YTC-CIO-MMD-03000	Civil Design Criteria
• 112201-10-YTC-CIO-MMD-03005	Structural Steel Specification
• 112201-10-YTC-CIO-MMD-03010	Specification for concrete Structure and precast
• 112201-10-UZA-CDA-MMD-03035	Roads & Parking Area Layout
• 112201-10-UZA-CDA-MMD-03040	Roads Typical Sections

Rev. No.	Date	Description	Drawn	Checked	Approved
06	01/03/2024	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
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04	29/09/2023	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
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02	20/03/2023	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.
01	23/11/2022	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.

**CLIENT:**

**CONTRACTOR:**

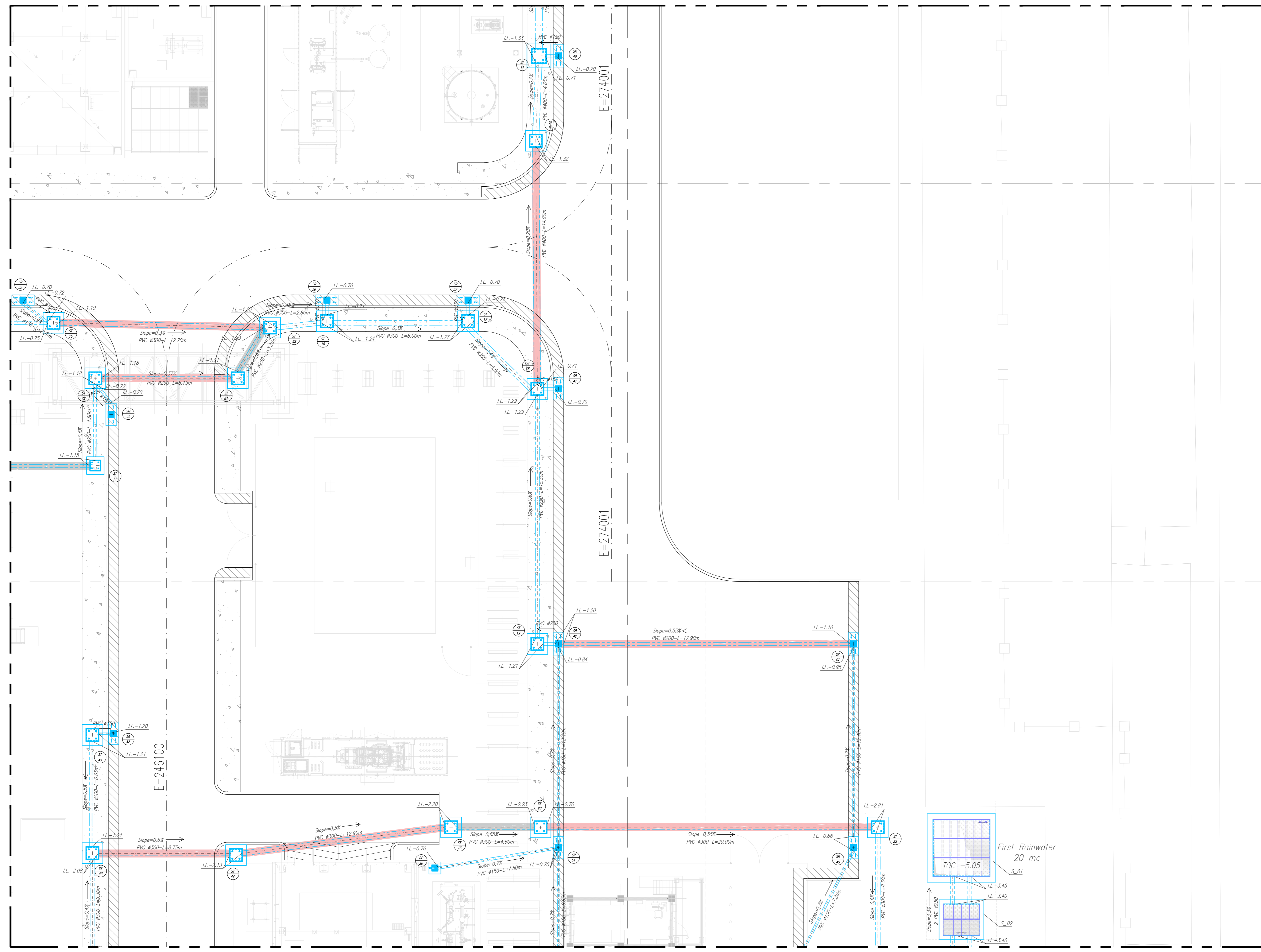
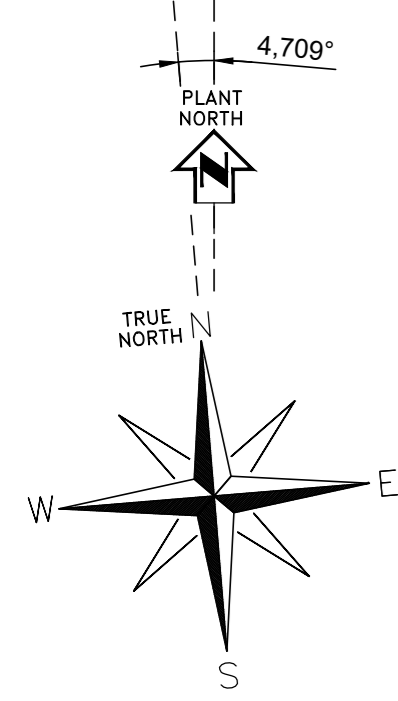
**CONTRACTOR'S CONSULTANT:**

**PROJECT:** HIRWAUN POWER PLANT (HPL)

**PROPRIETARY INFORMATION**

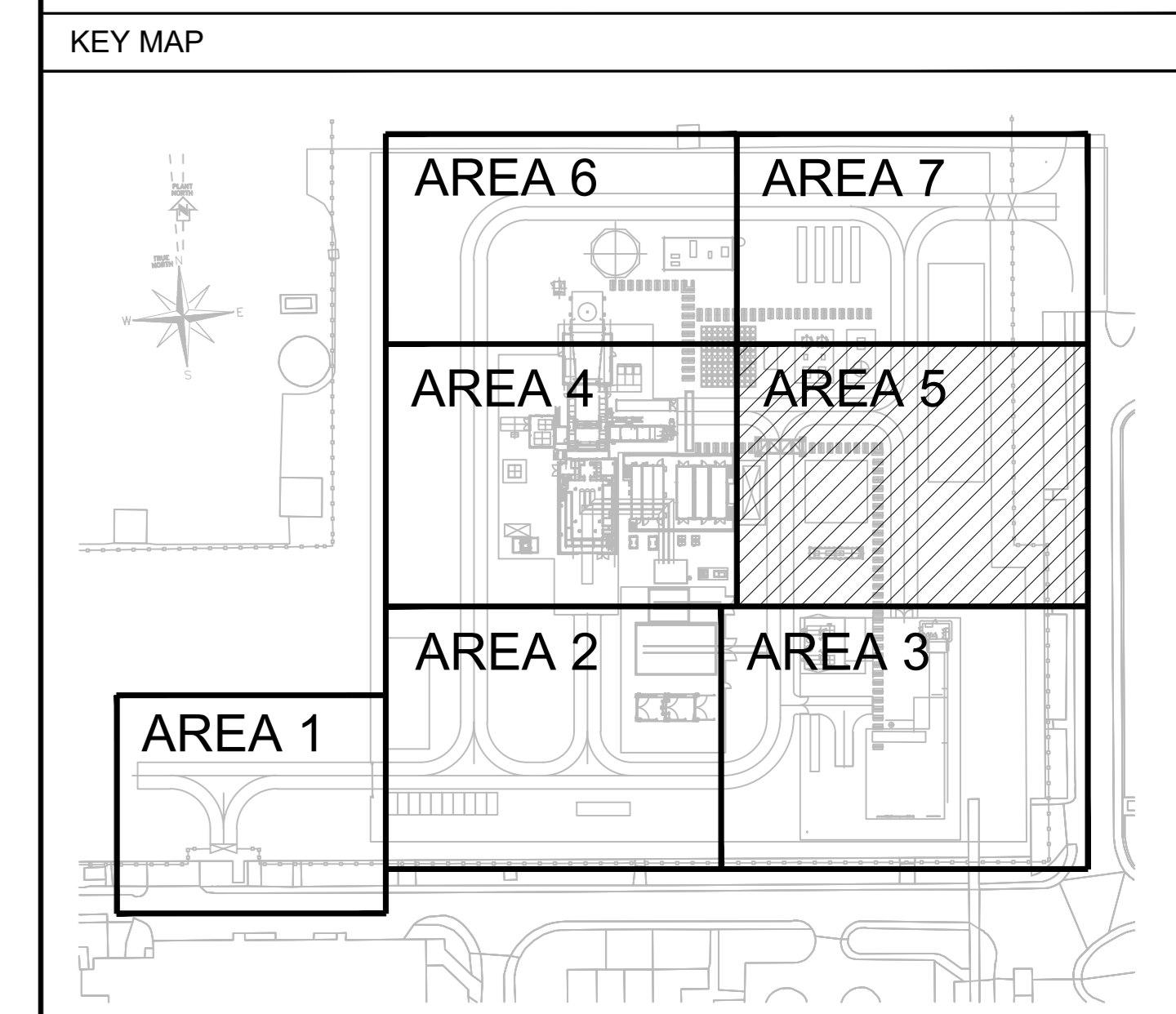
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<b>TITLE:</b>	RAINWATER NETWORKS LAYOUT AND DETAILS AREA 4	<b>SCALE:</b>	1:100
<b>DRAWING NR.:</b>	112201-10-UGZ-CDA-MMD-03065	<b>DOCUMENT TYPE:</b>	REV. NR.: 06
		<b>SHEET NR.:</b>	05 of 08



**NOTES**

- All dimensions are in millimeter and elevations in meter.
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- ZERO REFERENCE POINT will also be marked on site as a reference for construction.



**LEGEND**

	Down Pipe pit
	Drain Pit
	Gully Pit for roads
	Gully Pit for paved area
	Concrete gutter for paved area

**SAFETY and HEALTH INFORMATION**

For details of site-wide and general risks, to be read in conjunction with these notes, see Design Risk Register

The risks noted below are in addition to the risks normally associated with the type of work detailed on this drawing.

**CONSTRUCTION**  
 HSi. Deep excavation risk of slope collapse  
 HSiil. Excavation under water table

For information relating to Use, Cleaning and Maintenance see the H&S File

**DISMANTLING / DEMOLITION (FUTURE)**  
 Di. None.

The above risks are listed in the Design Risk Register reference: 112201-10-YF#-PGT-MMD-01020 Design Risk Register

**REFERENCE DRAWINGS**

• 112201-10-YTC-CIO-MMD-03000	Civil Design Criteria
• 112201-10-YTC-CIO-MMD-03005	Structural Steel Specification
• 112201-10-YTC-CIO-MMD-03010	Specification for concrete Structure and precast
• 112201-10-UZA-CDA-MMD-03035	Roads & Parking Area Layout
• 112201-10-UZA-CDA-MMD-03040	Roads Typical Sections

Rev. Nr.	Date	Description	Drawn	Checked	Approved
06	01/03/2024	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
05	14/11/2023	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
04	29/09/2023	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
03	22/05/2023	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.
02	20/03/2023	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.
01	23/11/2022	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.

**CLIENT:**

**CONTRACTOR:**

**CONTRACTOR'S CONSULTANT:**

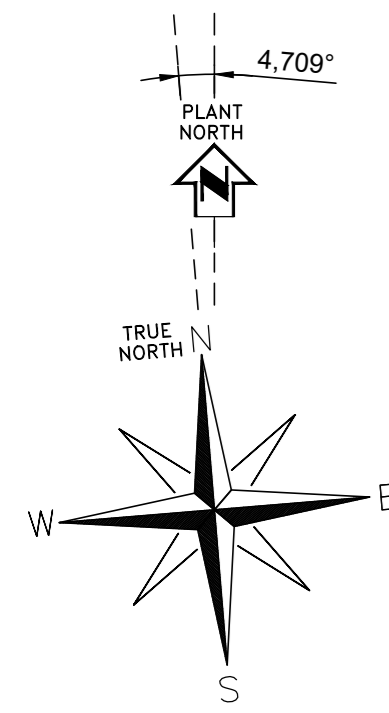
**PROJECT:**

HIRWAUN POWER PLANT (HPL)

**PROPRIETARY INFORMATION**

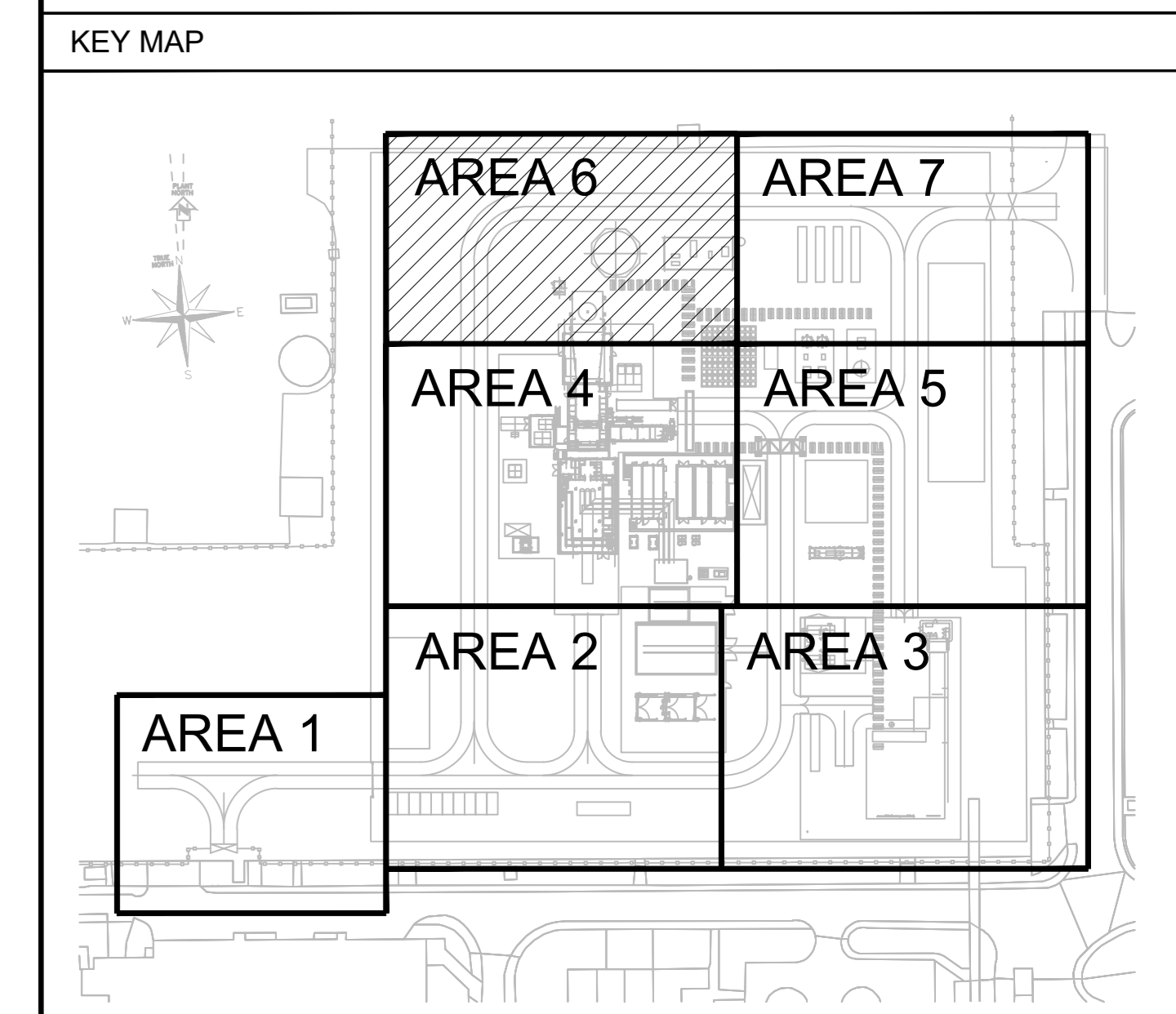
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<b>TITLE:</b>	<b>RAINWATER NETWORKS LAYOUT AND DETAILS AREA 5</b>	<b>SCALE:</b>	1:100
<b>DRAWING NR.:</b>	<b>112201-10-UGZ-CDA-MMD-03065</b>	<b>DOCUMENT TYPE:</b>	
		<b>REV. NR.:</b>	06
		<b>SHEET NR.:</b>	06 of 08



NOTES

- All dimensions are in millimeter and elevations in meter.
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Z= 0 corresponds to +210.80 m above AOD (is referred to finish floor level (FFL) of GT area and all Buildings, except otherwise indicated).
- ZERO REFERENCE POINT will also be marked on site as a reference for construction.



LEGEND

	Down Pipe pit
	Drain Pit
	Gully Pit for roads
	Gully Pit for paved area
	Concrete gutter for paved area

SAFETY and HEALTH INFORMATION

For details of site-wide and general risks, to be read in conjunction with these notes, see Design Risk Register

The risks noted below are in addition to the risks normally associated with the type of work detailed on this drawing.

CONSTRUCTION  
 HSI: Deep excavation risk of slope collapse  
 HSI: Excavation under water table

For information relating to Use, Cleaning and Maintenance see the H&S File

DISMANTLING / DEMOLITION (FUTURE)  
 Di: None.

The above risks are listed in the Design Risk Register reference: 112201-10-YF#-PGT-MMD-01020 Design Risk Register

REFERENCE DRAWINGS

• 112201-10-YTC-CIO-MMD-03000	Civil Design Criteria
• 112201-10-YTC-CIO-MMD-03005	Structural Steel Specification
• 112201-10-YTC-CIO-MMD-03010	Specification for concrete Structure and precast
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06	01/03/2024	ISSUED FOR CONSTRUCTION	M.M.	R.F.	A.B.
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03	22/05/2023	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.
02	20/03/2023	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.
01	23/11/2022	REVISED AS FOR COMMENTS	M.M.	R.F.	A.B.

Rev. Nr.	Date	Description	Drawn	Checked	Approved
CLIENT:					

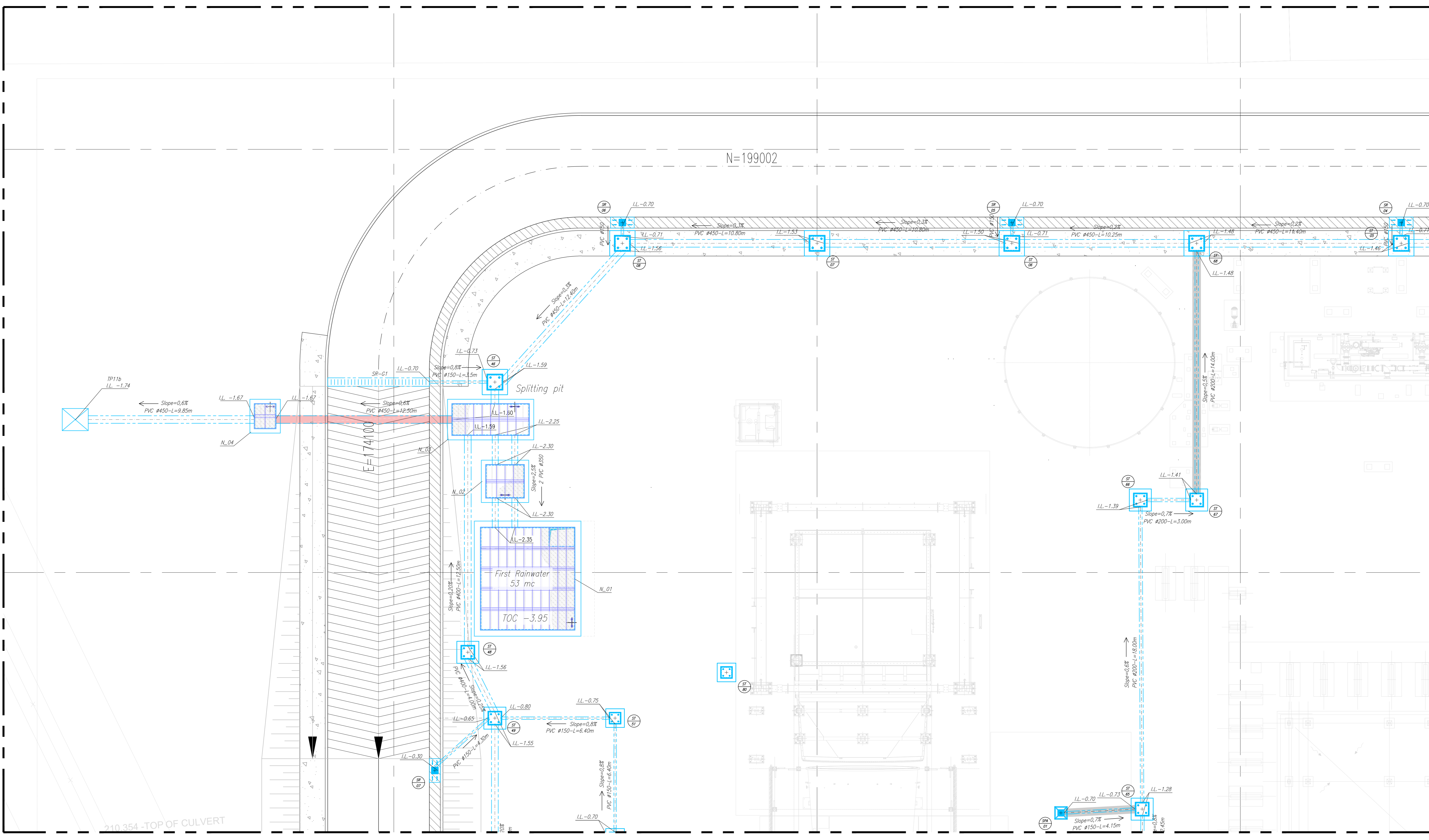
CONTRACTOR:

CONTRACTOR'S CONSULTANT:

PROJECT:

HIRWAUN POWER PLANT (HPL)

TITLE:	RAINWATER NETWORKS LAYOUT AND DETAILS AREA 6	SCALE:	1:100
DRAWING NR.:	112201-10-UGZ-CDA-MMD-03065	DOCUMENT TYPE:	
		REV. NR.:	06
		SHEET NR.:	07 of 08



PROPRIETARY INFORMATION

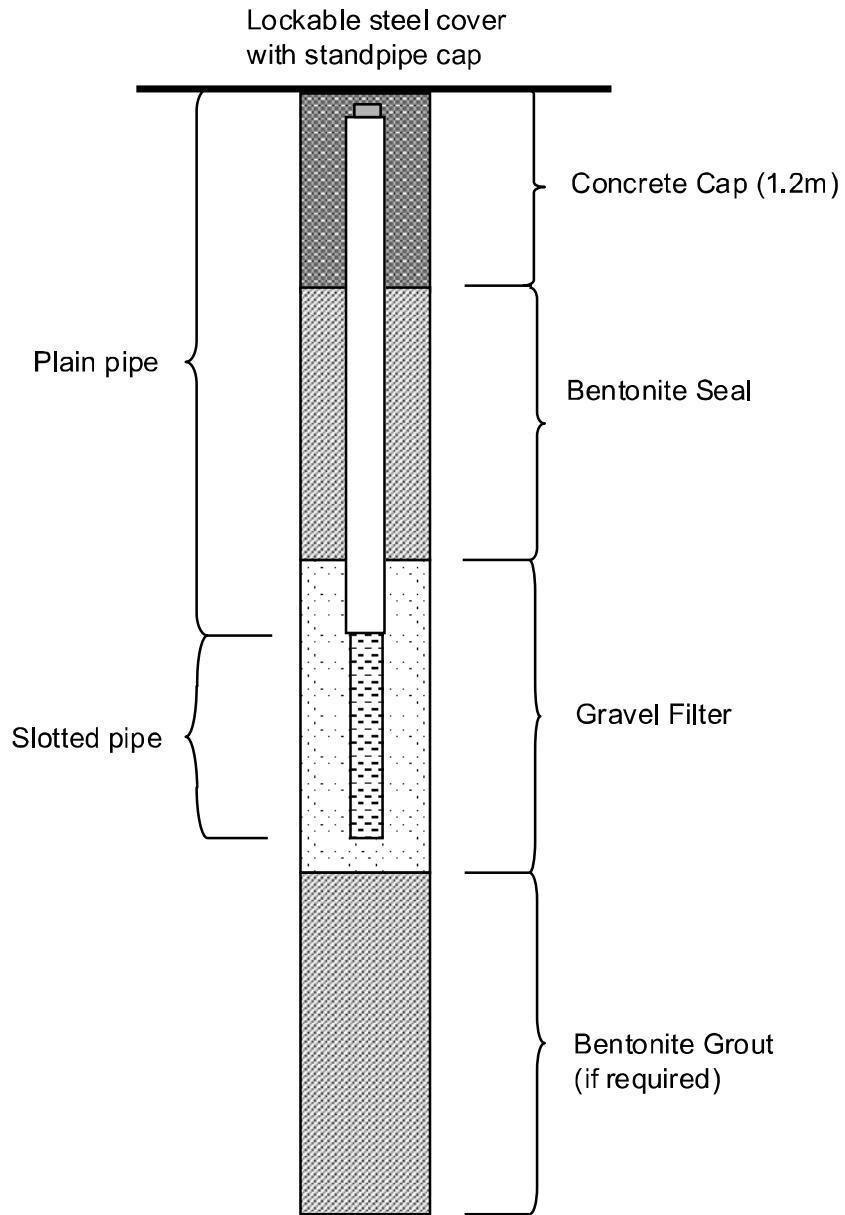
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# Appendix A.5

GROUNDWATER MONITORING  
STANDPIPE DESIGN

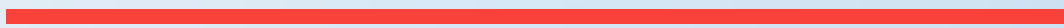




<p>Status</p> <p style="text-align: center;">Final</p>	<p>Project</p> <p style="text-align: center;">Hirwaun Power Monitoring Plan</p>	
<p>Project Code</p> <p style="text-align: center;">2024UK309109</p>	<p>Title</p> <p style="text-align: center;">Single Borehole Installation Design</p>	

# Appendix B

REPORT LIMITATIONS



## REPORT LIMITATIONS - GROUND AND WATER

### GENERAL

1. WSP UK Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.
2. Unless explicitly agreed otherwise, in writing, this report has been prepared under WSP UK Limited standard Terms and Conditions as included within our proposal to the Client.
3. Project specific appointment documents may be agreed at our discretion and a charge may be levied for both the time to review and finalise appointments documents and also for associated changes to the appointment terms. WSP UK Limited reserves the right to amend the fee should any changes to the appointment terms create an increase risk to WSP UK Limited.
4. The report needs to be considered in the light of the WSP UK Limited proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

### PHASE 1 GEO ENVIRONMENTAL AND PRELIMINARY RISK ASSESSMENTS

**Coverage:** *This section covers reports with the following titles or combination of titles: phase 1; desk top study; geo environmental assessment; development appraisal; preliminary environmental risk assessment; constraints report; due diligence report; geotechnical development review; environmental statement; environmental chapter; project scope summary report (PSSR), program environmental impact report (PEIR), geotechnical development risk register; and, baseline environmental assessment.*

5. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. WSP UK Limited cannot be held responsible for any disclosures that are provided post production of our report and will not automatically update our report.
6. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP UK Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.
7. It should be noted that any risks identified in this report are perceived risks based on the information reviewed. Actual risks can only be assessed following intrusive investigations of the site.
8. WSP UK Limited does not warrant work / data undertaken / provided by others.



## REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

### INTRUSIVE INVESTIGATION REPORTS

**Coverage:** *The following report titles (or combination) may cover this category of work: geo environmental site investigation; geotechnical assessment; GIR (Ground Investigation reports); preliminary environmental and geotechnical risk assessment; and, geotechnical risk register.*

9. The investigation has been undertaken to provide information concerning either:
  - i. The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or
  - ii. Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.
10. The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.
11. For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.
12. For geotechnical investigations the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.
13. The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.
14. The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.
15. The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, WSP UK Limited has used reasonable skill and care to extrapolate conditions between these points based upon assumptions to develop our interpretation and conclusions. The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation. Conditions can change between investigation points and these interpretations should be considered indicative.
16. The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values. Specific assumptions associated



## REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

with the WSP UK Limited risk assessment process have been outlined within the body or associated appendix of the report.

17. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.
18. Where soil contamination concentrations recorded as part of this investigation are used for commentary on potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed.
19. The results of the asbestos testing are factually reported and interpretation given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and / or trace loose asbestos fibres within the soil matrix at the site.
20. If costs have been included in relation to additional site works, and / or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

## EUROCODE 7: GEOTECHNICAL DESIGN

21. On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.
22. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

## DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIAL STRATEGY REPORTS

23. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected on the basis of the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.



## REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

24. The outputs of the Detailed Quantitative Risk Assessments are based upon WSP UK Limited manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.
25. Prior to adoption on site they will need discussing and agreeing with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatory Authority engagement are not within the control of WSP UK Limited. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.

### **GEOTECHNICAL DESIGN REPORT (GDR)**

26. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.

### **MONITORING (INCLUDING REMEDIATION MONITORING REPORTS)**

27. These reports are factual in nature and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of an earthworks or remedial works.
28. The data is presented and will be compared with assessment criteria.



1 Capital Quarter  
Tyndall Street  
Cardiff  
CF10 4BZ

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