Non-Technical Summary

Introduction

The TEGCO Immingham Ltd Installation at Netherlands Way, Stallingborough, Grimsby, DN41 8DF is an Energy from Waste (EfW) process. The installation is designed to consume 320,000 Te/yr of Refuse Derived Fuel (RDF) based on 10 MJ/kg (LHV), producing: -

- 12 MW electrical export,
- 51 MW thermal export (60 Te/hr) as steam (no condensate return).

The installation is a Combined Heat & Power (CHP) plant sized and is designed to replace the steam and electricity currently generated by an existing CHP plant on an adjacent industrial plant. The existing CHP plant is reaching the end of its operational life and will be decommissioned when the installation is operational.

The need to continue to take waste in the event that steam and/or electricity cannot be exported (e.g. customer is shutdown), the installation is designed such that all steam generated at normal waste feed can pass through the turbine and condenser resulting in 24 MW electrical export.

A proportion of the RDF is sourced from local waste management companies and transported to the installation by road. The remaining is sourced from further afield and transported by rail to 1 of 2 local railheads and the final transfer from the railhead to the installation is by road.

The installation will operate continuously (24 hr/day & 7 day/week) for >8,000 hr/yr.

The installation consists of 2 off 20 Te/hr incineration lines (combustor, boiler & feed-water system) and a single turbine and air cooled condenser.

The installation is designed not to generate any waste water from the process during normal operation.

The installation is designed to be fully compliant with the 2019 European BREF for Waste Incineration (JRC 118637) and the associated BAT Conclusions published in the Official Journal of the European Union on 3rd December 2019.

Installation

The installation consists of the following main operational areas: -

- Site roadways and yards;
- Fully enclosed RDF Receipt & Storage Hall,
- 2 off combustion lines, each consisting of combustion unit, boiler, flue gas treatment, flue gas recirculation, continuous emissions monitoring systems and exhaust stack,
- 1 off back-pressure turbine (Electricity generation),
- Air cooled steam condenser (ACC) and boiler water system,
- Bottom ash handling system,
- Fly ash handling system,
- Air pollution control (APC) residues handling system,
- Raw material handling systems for liquid & solid emission abatement chemicals,
- Services (Air, Water, etc.),

- Weighbridges, offices, maintenance workshops etc.

There are no discharges to ground or ground water and discharges to surface water (The North Beck Drain) is limited to uncontaminated rainwater runoff, external wash water (from ACC condenser tube cleaning) and treated water from offices.

The installation is on part of the former Immingham Rail freight Terminal (brownfield site) bounded on the: -

- Western and Northern sides by The Stallingborough North Beck Drain,
- Southern side by adjacent commercial/light industrial units between Netherlands Way and Europa Way,
- Eastern side by undeveloped brownfield land.

The installation covers an area of approximately 26,194 m^2.

A site location map and site location plan (Google Maps) showing the location of the Installation are included in Appendix 1.

A site plan showing the installation boundary and process diagram are included in Appendix 1.

The installation is located in an area designated by the local authority for EfW and similar developments.

Process Activities: RDF Sourcing

If individual waste streams are delivered to the installation, there is likely to be significant variability in physical and/or chemical composition on a load by load basis and between the various suppliers depending on the materials they are collecting and processing.

TEGCO require the suppliers to produce an RDF, compliant with a defined specification (i.e. Pre-Treatment) to ensure greater consistency between loads and suppliers. The RDF specification and contractual requirements address: -

- Calorific value (amount of energy per unit mass of the RDF),
- Physical characteristics (e.g. particle sizes, particle shapes & proportions of large particles and dust),
- Chemical characteristics (e.g. content of metals and of chemical species & proportion of non-combustible material),
- Wastes that can be used to produce the RDF (e.g. prohibits the use of any hazardous, radioactive or similar materials),
- Quality control requirements (e.g. sampling and analysis of composition, auditing of suppliers operations and management systems),
- Demonstration that suppliers and their facilities are appropriately registered/permitted by relevant regulatory bodies primarily the Environment Agency,
- Transportation and related requirements (e.g. container type and capacity).

This ensures consistent operating conditions within the combustion furnace giving predictable combustion performance, steam generation and consistent loads on the abatement systems.

A copy of the RDF specification is included in Appendix 2.

Process Activities: RDF Receipt & Storage

The RDF from local suppliers is delivered by road in containers with a “walking floor.”

Entry to the installation is via automatic weighbridge (barriers and traffic lights guiding the vehicle to the appropriate weighbridge) and ANPR cameras record the vehicle registration. Once on the weighbridge, the container RFID barcode is read/entered into the system (confirming the source, contents and other required details of the container). The driver is then directed to the required automatic door to the RDF Receiving & Storage Hall.

On arrival at the RDF Receiving & Storage Hall, RFID barcode is read, the fast acting automatic door opens, the vehicle backs in and the door closes.

At the Receiving Pit, the RDF is discharged into the Receiving Pit using the "walking floor" and is observed from the process control room and/or overhead crane cabin.

When discharge is complete, the vehicle approaches the automatic door (opens allow the vehicle to exit and closes automatically) and leaves the installation via an automatic weighbridge. Prior to leaving the installation the driver is provided with detailed weighbridge ticket identifying the weight and details of the RDF delivery.

The driver interface on the weighbridge includes visual and verbal communication with the both the weighbridge and process control rooms to allow any issues to be resolved and manage any vehicles/loads that are not entered into the computer system, e.g. change of tractor unit due to breakdown/accident or IT communications failure.

The RDF is then transferred from the Receiving Pit (1 of 3) to the main Storage Bunker by overhead crane; the load is systematically spread across the storage bunker. An overhead crane then systematically transfers material to 1 of 2 combustion unit feed chutes as required to sustain combustion. There are 2 cranes, nominally 1 for each combustor however a single crane can support design load operation if required (e.g. during crane maintenance or breakdown). Operating the cranes in this manner ensures further blending of the RDF within the Receiving & Storage Hall.

RDF from further afield is transported by rail to a local railhead and the containers transferred on to tipper wagons for final delivery to the installation. RDF receipt and handling is then as described above except that the containers are not fitted with walking floors and have to be tipped to discharge into the Receiving Pits.

The Storage Bunker and Receiving Pits have a total effective capacity of 10,800 m^3 which is sufficient to support at least 3 days operation at design conditions. If required (e.g. following significant disruption to deliveries) RDF can be transferred directly from the Receiving Pits to the combustion unit feed chutes.

The primary combustion air is drawn from within the RDF Receiving and Storage Hall, maintaining it under reduced pressure preventing the potential escape of odours and dust.

The storage of RDF represents a potential fire risk and the following measures are in place to prevent, detect and control fires within the RDF Receiving & Storage Hall: -

- Turning contents of bunker etc. to prevent/minimise the formation of hot spots,
- Automated hot spot and fire detection systems and alarms,
- Sprinkler systems,
- Water cannon to flood pits, bunker and hoppers,
- Fire barrier with 2 hour fire resistance between RDF Receiving & Storage Hall and the rest of the building,
- Control room window overlooking RDF Receiving & Storage Hall has 2 hour fire resistance,
- Automated/remote operation of fire-fighting systems from control room,
- Electric and diesel fire system pumps,
- Firewater run-off containment (RDF Receiving & Storage Hall floor incorporates a 200mm high cast lip, with sleeping policemen at vehicle access doors) to contain firewater.

Process Activities: Combustion

The combustion control system controls the rate at which the RDF is fed onto the grate to ensure stable combustion conditions. The RDF travels along the length of the grate (the primary combustion zone). The incinerator bottom ash (IBA), i.e. non-combustible residues and slags, travels the full length of the grate through the burnout section and falls into the water filled chute of the bottom ash discharger.

The overhead crane transfers the RDF to the fuel feed system. For each combustion line, this consists of a rectangular feed chute and grate feed unit. Each feed chute incorporates a hydraulic shut-off valve, fire extinguishing steam nozzles (on all sides) with associated temperature monitoring system and level control system. When the process is not operating, the nozzles are fed with water to ensure continued fire protection. The water cooled grate feed unit takes the RDF and spreads it evenly across the width of the grate using stepped reciprocating plates to ensure a steady and consistent flow of RDF across the full width of the grate.

The grate consists of a combination of water and air cooled modules (4 off total) with a total area of $90.7m^2$.

The main combustion zone uses 2 off water cooled grate modules, the first (feed) being angled at 18 degrees, while the second is horizontal, with a total area of $43.2m^2$. The recirculating grate cooling water is cooled in the Condensate Heat Exchanger and returns to the grate (closed circuit). This system also incorporates an additional air cooled emergency cooler drawing air from outside the building.

The burn out zone uses 2 off horizontal air cooled grate modules with a total area of $47.5m^2$.

As the RDF progresses along the grate, there are conceptually 3 sections: -

- 1st section (Heating & Drying): the RDF is heated driving off moisture and volatile components which are then burned in the secondary combustion zone above the grate,
- 2nd section (Combustion): the combustible components of the RDF are burned on/just above the grate,
- 3rd section (Burn Out): the remaining non-combustible components of the RDF travel slowly across this section resulting in full burn out of any remaining combustible components.

Staged combustion is used meaning that the combustion air is injected at 2 locations into the combustion chamber as: -

1. Primary combustion air (creating a primary combustion zone),
   and
2. Secondary combustion air (creating a secondary combustion zone).

Primary combustion air, a mixture of fresh air (drawn from within the RDF Receiving & Storage Hall and Boiler-house via preheaters) and recirculated flue gas (extracted from the flue gas duct between the Induced Draft fan and the stack) enters the combustor via 3 ducts and passes up through the grate is oxygen limited (i.e. sub-stoichiometric requirement) in the primary combustion zone. The combustion control system varies the ratio of fresh air to flue gas to achieve the optimum oxygen concentrations and air flows to each section of the grate. Excess oxygen is supplied to the 3rd section of the grate (ensuring oxygen present is >stoichiometric requirement) ensuring full burn out is achieved.

The gaseous combustion products, un/partially combusted species and any entrained fine particles pass to a secondary combustion zone located above the grate.

Secondary air, drawn from the Boiler-house, is injected into the secondary combustion zone, generating an oxygen rich atmosphere (i.e. oxygen present is >stoichiometric requirement) resulting in full burn out of any combustible gaseous species or fine particles suspended in the flue gas.

Staged combustion is an established BAT technique that reduces peak combustion gas temperatures minimising production of Oxides of Nitrogen (NO_X).

Flue gas recirculation (FGR) is an established BAT technique that reduces excess oxygen concentration present minimising production of Oxides of Nitrogen (NO_X). Secondary benefits of FGR include reduced emissions and improved energy efficiency due to the reduced flue gas volume emitted from the stack.

Natural gas is also injected (automatically by the combustion control system) into the secondary combustion zone (if required) to ensure the required minimum combustion gas temperature (≥850°C) is maintained at all times when RDF is in the Combustor.

Above the secondary combustion zone is the residence time chamber. This has been designed using computational fluid dynamics (CFD) modelling to ensure that all the combustion gases have a residence time of ≥2 s (at ≥850°C). The CFD modelling also ensures that there are no “bypass flow paths” (reducing residence time) or “cold spots” (resulting in local temperatures <850°C).

Urea solution is injected (via 21 nozzles to ensure good distribution and mixing) into the combustion gases before they leave the residence time chamber to reduce oxides of nitrogen present back to nitrogen, i.e. Non Selective Catalytic Reduction (SNCR). SNCR is a standard BAT technology (tried & proven) to reduce emissions of NO_X from combustion and incineration processes.

Carbon Monoxide, Oxygen, pressure and temperature are continuously monitored close to the exit from the combustor as part of the combustion control system. The readings (& alarms) are displayed in the control room and all data is retained.

An optimum fuel/air ratio (excess air ratio 1.45) is used, minimising flue gas volumes and SNCR costs.

The grate bars and plates are powered by hydraulic systems, with drive components mounted outside the grate. Air is drawn across the drive components into the combustors to cool them and prevent ingress of flue gas into mechanical components.

Process Activities: Boiler (Steam Generation)

The flue gases then pass through an 8 pass boiler (incorporating economisers), again designed using CFD modelling to maximise efficiency and minimise dioxin/furan production by “de novo” synthesis. This is achieved by ensuring that: -

- The flue gas temperature is rapidly reduced from ≥450°C to <200°C (the "de novo" synthesis temperature range),
- Areas of low flue gas velocity within the boiler are eliminated as far as practicable, minimising potential deposition of dust on surfaces within the boiler,
- The number/area of surfaces in the boiler within the "de-novo" temperature range is minimised.

Each boiler is fitted with cleaning systems to prevent the build-up of deposits on internal surfaces, these are: -

- "Shower-cleaning system" in 2nd pass evaporators,
- Pneumatic rapping systems in 3rd, 4th & 5th pass super-heaters and 6th pass evaporators,
- Soot blowers in 7th & 8th passes (economisers)

The "Shower-cleaning system" uses mobile rotary cleaning heads that periodically wash the relevant heat transfer surfaces. In the event of heavy slagging or when intensive cleaning is required jet nozzles can be employed.

The pneumatic rapping system uses pneumatic rams to cause oscillation of the relevant vertically suspended heat transfer surfaces.

The steam driven soot blowers are suspended in the gas path, their internal hydraulic flow path and nozzles are designed to direct steam onto the relevant surfaces.

These systems cause any impinged dust to become detached and fall into the hoppers in the base of the boiler. The dust is removed from the base of the hoppers by rotary valves to the fly ash handling system for export for reuse/disposal.

The frequency of boiler cleaning is largely driven by RDF properties and is initiated by the operator based on process performance.

Boiler feed water is pumped from the Feed Water Tank, enters the boiler system through the economiser and exits as steam (64.1 Te/hr @ 421°C & 56 bar$_{(a)}$) per line (128.2 Te/hr total from both boilers).

Process Activities: Emissions Abatement (Flue Gas Cleaning (FGC))

The flue gas then enters the reaction chamber or Gas Suspension Absorber (GSA) tower with a residence time of 1.5 seconds. Hydrated lime powder is injected into the venturi section at the base of the GSA tower. The lime is distributed throughout the flue gas by the turbulent flow they exit the venture and expand into the reactor body. A proportion of the filter bag residues are recirculated and injected, using a metering screw, into the reactor at the top of the venture diffuser cone to maintain a high solids loading within the reactor. The rate of recirculation is controlled by the flue gas flowrate and increases efficiency of raw material usage.

The lime reacts with any acid gases (e.g. Hydrogen Chloride & Sulphur Dioxide), neutralising them (forming calcium chlorides & sulphates respectively) that are solid.

Activated carbon is injected into the reactor body and starts to adsorb any volatile species present (e.g. Mercury, other similar volatile metals & any organics present including dioxins/furans).

Any solids too dense or large to remain entrained in the flue gas flow fall back into the venturi and are broken down by attrition until re-entrained or pass through the venturi and exit via an airlock from the base of the GSA tower.

The flue gas then passes into the bottom of the bag filter unit past baffles to distribute flow evenly between and across each chamber. The flue gas flows up around and through the bags, exiting through the (open) top entering the bags and exiting the unit from the top. The activated carbon, any unreacted hydrated lime, reaction products, activated carbon and other solids remain on the outer surface of the bags and are removed from the flue gas.

The cleaned flue gas passes to the Induced Draft (ID) fan and to a 65m stack, passing the MCERTS certified continuous emission monitors (CEMs) prior to discharge to atmosphere. The flue gas for recirculation to the combustor is extracted from the flue gas duct between the ID fan and the stack at a rate determined by the combustion control system.

The bag filter unit (containing 1024 PTFE bags) is subdivided into 4 compartments, each of which can be individually isolated from the flue gas flow while allowing the process to continue to operate at design conditions. This design means that each individual compartment section in the bag filter is fitted with: -

- Pressure drop detection: the pressure drop across the bags rise as the dust builds up on the inner surfaces resulting in reduced gas flow and/or greater load on the various fans,
- Burst bag detection: continuous dust monitors that detect dust in the section after the bags providing indication of potential issues such as damaged or poorly fitted bags.

Routine bag cleaning is “online” minimising disruption to flue gas flows across the bag filter and within the system. A pulse of air (in reverse direction to normal flue gas flow) enters the top of bags causing them to lift off the support cages (i.e. expand) dislodging the solids from the outer surface of the bags. The dislodged material falls into the hopper under each line of bags and is removed by rotary valve into the FGC residues handling system. This system transfers the majority of the residues to FGC residues silos (1 per line) and the remainder to the GSA recirculation box. From the GSA recirculation box, FGC residues are recirculated (via screw) into the GSA tower. Residues from the FGC residues silos are exported for reuse/disposal

The cleaning cycle is normally activated when a specified pressure drop is measured across the bag filter unit. One row of bags in each compartment is subjected to a reverse pulse of air in a pre-set sequence. The pressure drop (across the compartments) falls as each group of rows is cleaned and when it falls to a specified level the sequenced pulsing stops. When the pressure drop rises again, the system continues the pulsing sequence, starting from the next row after the last cleaned row. This ensures minimum disruption to flue gas flows across the bag filter compartments and pressure changes within the flue gas system. All bags experience the same number of cleaning cycles resulting in more consistent wear and operational life.

The system includes a number of alternative cleaning routines for specific purposes (e.g. cleaning a compartment for maintenance). In the event of failure of the pressure measurement across the bag filter, the system automatically defaults to a time based cleaning cycle. Bag cleaning can also initiated by the process operators.

Burst bag detectors initiate automatic isolation of the relevant compartment of bags from the flue gas flow preventing increased dust emissions.

Hydrated lime and activated carbon are injected into the reaction chamber (slightly > stoichiometric requirement) to ensure maximum abatement is achieved. The solids in the flue gas form a porous layer on the inner surface of the bags as it is filtered out of the flue gas. The flue gas passes through the layer meaning that any contaminant species are bought into intimate and extended contact with the reagents resulting in efficient abatement and efficient reagent use.

The use of FGR, by recirculating 18.5% of the cleaned flue gas to the combustor, further reduces the mass emissions of all pollutants emitted from the stacks.

NO_X release abatement is achieved using the following BAT techniques, applied in the combustor: -

- Advanced combustion control system,
- FGR,
- Staged Combustion,
- SNCR (using urea in the combustor)

Process Activities: Back pressure turbine (Electricity generation & steam export)

115.3 Te/hr of steam (@ 419°C & 54 $bar_{(a)}$) of steam is fed to a single back pressure turbine connected to a generator.

In normal extraction operation (i.e. CHP mode), 60 Te/hr of steam (consisting of 12.9 Te/hr (@421°C & 55 $bar_{(a)}$) that bypasses the turbine, and 47.1 Te/hr (@ 314.7°C & 22 $bar_{(a)}$) extracted from the turbine) is sent for export. A further 23.8 Te/hr of steam is extracted from the turbine for parasitic loads (e.g. deaerator, combustion air preheating and soot blowing etc.) and the remaining 44.4 Te/hr (@ 33°C & 0.052 $bar_{(a)}$) exits the turbine and is condensed in the air cooled condenser (ACC).

In the event that there is no export load, the full 128.2 Te/hr of steam is fed to the turbine of which 20.3 Te/hr of steam is extracted from the turbine for parasitic loads (e.g. deaerator, combustion air preheating and sot blowing etc.). The remaining 107.9 Te/hr (@ 52.8°C & 0.15 $bar_{(a)}$) exits the turbine and is condensed in the ACC allowing the incineration process to continue to operate at full RDF feed capacity.

Process Activities: Air Cooled Condenser (ACC) and boiler feed water system

Condensate from the ACC is collected in the ACC Condensate Tank and pumped through the Condensate Polishing Plant, Feed Water Pre-heaters (supplied from the low pressure steam system) and other heat recovery units (e.g. turbine gland steam condenser) to the 2 Feed Water Tanks (1 per boiler).

The ACC is of “A Frame” design. The steam to be condensed enters via a duct along the ridge of the ACC and enters the 2 off sloping banks of condensing tubes. Within the tubes, the steam condenses, producing a low pressure zone sucking further steam into the ACC. Fans, mounted below the banks of tubes, blow ambient cooling air upwards, through the tube banks, cooling the tubes.

There is no direct condensate return from the exported steam. However, in either operational mode, the customer supplies the installation with the required volume of suitably treated boiler feed, irrespective of steam off-take. In the event that the off-taker cannot supply water, the combination of treated water stored and a small treatment plant fed from mains water will allow operation at full waste throughput to continue.

Other condensate streams and flashed boiler blowdown are also recovered to the Feed Water Tanks, maximising thermal efficiency.

Provision is made for the periodic cleaning of the outside of the ACC condensing tubes with demineralised water. The runoff from cleaning is directed to the surface water drainage system.

Process Activities: Incinerator bottom ash (IBA) handling system

The IBA (non-combustibles materials and any associated slags) reaches the end of the grate (after passing through the burnout section) and drop (via a chute) into the wet quench (essentially a trough of water), cooling the IBA. The quenched IBA is pushed using a hydraulic ram through an underflow weir (creating a water seal) into the bottom ash discharger. A submerged drag chain conveyor runs under the combustor collecting any material that drops through the grate and provides an air seal between the various grate sections. The bottom ash discharger feeds a mechanical conveyor system that transfers the cooled IBA to the single shared 500m^3 IBA storage bunker.

The discharged IBA contains ≤ 15% water, resulting in a cool dust free material.

IBA generation is 3.1 Te/hr (3.44 m^3/hr) per combustor or (6.2 Te/hr or 6.88 m^3/hr total) meaning the bunker has capacity for 3 days operation at design conditions.

This activity takes place within an enclosed building to minimise potential for emission of dust arising from handling, spillage or IBA drying out during periods of low throughput and/or shutdowns.

When the bunker requires emptying, a vehicle with a suitable closed trailer comes to the site (via a weighbridge as described above) and enters the IBA handling building via a quick acting roller door. A crane transfers IBA from the bunker to the trailer. When the trailer is full, the trailer is sheeted/closed (to prevent emissions during transport); exits the building (via a fast acting roller door) and leaves the site via a weighbridge collecting relevant documentation.

The IBA is transported to suitably regulated recovery, treatment or disposal facilities.

Details for IBA storage, i.e. generation rates, inventories, capacities, location and containment (primary, secondary & tertiary) are included in Appendix 3

Process Activities: Fly ash handling system

The fly ash is removed from the boiler/flue gas system via rotary valves into mechanical (screw and drag chain) conveyor systems. There are 2 systems, (1 for the boiler and 1 for the economiser) per line, each feeding dense phase pneumatic conveyor via a buffer hopper.

The pneumatic conveyor systems transfer the fly ash to the single 120 m^3 export silo that serves both lines. Fly ash generation is about 0.48 Te/hr (0.8 m^3/hr) per combustor or 0.96 Te/hr (1.6 m^3/hr) total meaning the silo has capacity for 3 days operation at design conditions.

When required, a suitable transport vehicle (powder handling trailer) arrives at the site (as described above), parks below the silo and connects to the silo discharge. The fly ash is transferred by gravity to the trailer and discharge rate is controlled by a rotary valve. To ensure consistent and reliable discharge: -

- The silo cone is fitted with a vibrating discharge aid,
- Fluidisation pads are installed immediately above the vibrating discharge aid to prevent ash bridging,
- The cone is trace heated and the silo lagged preventing formation of lumps etc.

An extraction system is incorporated in the discharge system which together with the tanker is vented back into the silo, preventing dust emissions. When loaded, the vehicle leaves the site via a weighbridge collecting relevant documentation.

The silo is vented to atmosphere via a dust filter unit mounted on the top of the silo fitted with burst bag detection. The silo is mounted on load cells to provide continuous monitoring of contents, is fitted addition level detection and the discharge system incorporates level detection to prevent overfilling of the trailer.

The fly ash is transported to suitably regulated recovery, treatment or disposal facilities.

Details for Fly ash storage, i.e. generation rates, inventories, capacities, location and containment (primary, secondary & tertiary) are included in Appendix 3.

Process Activities: FGC residues handling system

On each combustion line, there are 2 off mechanical conveyors (each serving 2 bag filter compartments), each one transfers FGC residues to a dense phase pneumatic conveying vessel (i.e. 2 off).

The dense phase pneumatic conveying system transfers the FGC residues to the storage silo (1 per combustion line) via a diverter valve (to enable FGC residues to be diverted to the bag filter recirculation box) which has sufficient capacity to hold the FGC residues generated over >3 days operation at design point. The silo is vented to atmosphere via a bag filter, fitted with burst bag detection, to atmosphere. The dust removed by the bag filter on the vent is returned to the silo.

To maintain adequate material in the bag filter recirculation box, the diverter valve is automatically activated, diverting the flow of FGC residues to the recirculation box and then back to the silo when the recirculation box is filled to design level. FGC residues from the recirculation box are injected into the GSA reactor, optimising dust loading in the flue gas passing through the bag filter and optimising raw material use.

When required, a suitable transport vehicle (powder handling trailer) arrives at the site (as described above), parks below the relevant silo and connects to the silo. The FGC residues are transferred by gravity to the trailer and discharge rate is controlled by a rotary valve. To ensure consistent and reliable discharge: -

- The silo cone is fitted with a vibrating discharge aid,
- Fluidisation pads are installed immediately above the vibrating discharge aid to prevent ash bridging,
- The cone is trace heated and the silo lagged preventing formation of lumps etc.

An extraction system is incorporated in the discharge system which together with the tanker is vented back into the silo, preventing dust emissions. When loaded, the vehicle leaves the site via a weighbridge collecting relevant documentation.

The silo is vented to atmosphere via a dust filter unit mounted on the top of the silo fitted with burst bag detection. The silo is mounted on load cells to provide continuous monitoring of contents, is fitted addition level detection and the discharge system incorporates level detection to prevent overfilling of the trailer.

The FGC residues are transported to suitably regulated recovery, treatment or disposal facilities.

Details for FGC residue storage, i.e. generation rates, inventories, capacities, location and containment (primary, secondary & tertiary) are included in Appendix 3.

Process Activities: Raw materials systems

The main raw materials used at the installation are: -

- Urea solution: used for NO_X abatement,
- Hydrated Lime: used for acid gas abatement,
- Powdered activated carbon: used for abatement of organics and volatile metal species.

<u>Urea Solution (40% wt/wt)</u>

Urea solution is delivered to the installation by road tanker (accessing the site over weighbridges as outlined above).

The Urea storage tank is located in a bund within a building to ensure that the Urea is maintained above 15°C, preventing "salting" or freezing (formation of a solid phase). The tank is fitted level indication and alarms/interlocks to prevent overfilling (high level) and has sufficient capacity to provide circa 6 days operation at design point.

The road tanker discharge is connected to the storage tank inlet via a flexible hose. The solution is blown into the tank using the road tanker transfer compressor. When off-load is complete, the air pressure in the tanker is vented through the discharge pipework and tank, blowing the line clear. The road tanker leaves the site via a weighbridge collecting relevant documentation.

The Urea system consists of: -

- 1 off 50 m^3 Urea storage tank (40% solution),
- 2 off Urea solution feed pumps (Duty & Standby),
- 1 off 1 m^3 Demin Water feed tank,
- 2 off Demin Water feed pumps (Duty & Standby),
- 2 off mixing and metering module (1 per line),
- 2 off injection modules (1 per line) with 21 injection lances into the combustor (arranged in 3 rows of 7),
- Compressed air supply,
- Process control system that is linked to the combustion control system.

In the event of failure of any part of the above system, the controlled emergency shutdown sequence for the affected line automatically is initiated.

The Urea solution feed pump feeds a constant pressure recirculation line with a bleed to the 2 mixing & metering modules. The Demin water feed system operates on the same principle. In both cases, in the event of failure of the duty pump, the standby pump starts automatically to maintain system performance.

Each mixing & metering module measures and controls the flow (& pressure) of Urea solution, Demin water and injection air used and their distribution across the 21 injection nozzles.

Approximately 211 m^3/hr (190 kg/hr) of Urea solution, and 0.72 m^3/hr of Demin water are used by each mixing & metering module. The process control system adjusts the concentration, flowrate rate and distribution (across the lances) of the reagent solution injected into the combustor based on the combustion control system including monitoring of combustion chamber conditions, emissions and other process parameters.

The 21 injection lances are arranged in 3 groups of 7 along the flue gas flow path reflecting the chamber geometry. The compressed air is added via an external mixing chamber to fully atomise the reagent. The resultant air/reagent-water mix passes via flexible connections injection lances and discharges via nozzles into the flue gas ensuring consistent mixing and reaction with the flue gas. The flue gas temperatures close to the injection lances are monitored allowing the control system to ensure injection occurs at the optimum temperature, flowrates and distribution.

Details for Urea solution storage, i.e. usage rates, inventories, capacities, location and containment (primary, secondary & tertiary) are included in Appendix 3.

Hydrated Lime

Hydrated Lime is delivered to the installation by road in a powder handling trailer (accessing the site over weighbridges as outlined above).

The trailer discharge is connected to the relevant storage silo inlet via a flexible hose and the Hydrated Lime is blown into the silo using the road trailer transfer compressor. When off-load is complete, the air pressure in the trailer is vented through the discharge pipework and silo, blowing the line clear. The silo vent passes through a bag filter and discharges to atmosphere.

The silo is mounted on load cells to provide continuous monitoring of contents and is fitted with addition level detection.

When the delivery is complete the vehicle leaves the site via a weighbridge collecting relevant documentation.

There are 2 off Hydrated Lime systems, 1 per combustion line. Each system consists of: -

- 1 off 120 m^3 lime storage silo with each silo having 2 off aerated outlets,
- 2 off fixed speed screw conveyor (1 per outlet),
- 2 off surge hopper (1 per outlet),
- 2 off metered surge hopper discharge (conveyor and rotary valve) system (1 per outlet),
- 2 off lean phase conveying system (1 per outlet),
- 1 off Injection system into the venturi stage of the GSA reaction chamber.

The surge hopper is fitted with level control to ensure that there is always adequate Hydrated Lime present to ensure reliable feed to the injection system.

The surge hopper discharges, (via metering screw & rotary valve), into a lean phase pneumatic conveyor using a low pressure blower. The rate of injection is controlled by the combustion control system based on monitoring of combustion chamber conditions, emissions and other process parameters.

The handling systems operate in duty/standby mode, in the event of failure of any part of the duty system the standby system is started automatically and/or activates an alarm so the operator starts the standby system. If both systems fail, the controlled emergency shutdown sequence for the affected combustion line is automatically initiated.

Each silo is on load cells, has level indication and separate alarms/interlocks preventing the silo being overfilled (high level) and initiating the controlled emergency shutdown sequence for the affected line (low level). Each silo has sufficient capacity to provide > 4 days operation at design point.

Details for Hydrated lime storage, i.e. usage rates, inventories, capacities, location and containment (primary, secondary & tertiary) are included in Appendix 3.

Activated Carbon

Activated Carbon is delivered to the installation by road in a powder handling trailer (accessing the site over weighbridges as outlined above).

The trailer discharge is connected to the storage silo inlet via a flexible hose. The Activated Carbon is blown into the silo using the road trailer transfer compressor. When off-load is complete, the air pressure in the trailer is vented through the discharge pipework and silo, blowing the line clear. The silo vent passes through a bag filter.

When the delivery is complete the vehicle leaves the site via a weighbridge collecting relevant documentation.

The silo has 2 off outlets, (1 per line), each connected to a handling system consisting of: -

- A fixed speed screw conveyor,
- A surge hopper with variable speed agitator,
- Metered surge hopper discharge (screw conveyor and educator or “jet pump”),
- Injection system (pneumatic conveyor) into the venture stage of the reaction chamber).

The surge hopper discharges, (via metering screw & eductor), into a lean phase pneumatic conveyor using a low pressure blower. The rate of injection is controlled by the combustion control system based on monitoring of combustion chamber conditions, emissions and other process parameters.

In the event of failure of any part of the system, the controlled emergency shutdown sequence for the affected line automatically is initiated.

The silo is on load cells, has level indication and separate alarms/interlocks preventing the silo being overfilled (high level) and initiating the controlled emergency shutdown sequence for both combustion lines (low level). The silo has sufficient capacity to provide > 6 days operation at design point.

Details for Activated Carbon storage, i.e. usage rates, inventories, capacities, location and containment (primary, secondary & tertiary) are included in Appendix 3.

Diesel

Diesel is used to ensure that emergency back-up equipment can continue to function effectively the event of loss of power, the relevant equipment is: -

- 1 off diesel powered fire-water pump,
- 1 off diesel generator set.

These are proprietary packaged units with internal bunded diesel tanks.

Process Activities: Water Systems

Towns Water System

A schematic of Towns Water system is included in Appendix 4.

Towns water is provided by regional water company via their potable distribution system under an industrial tariff and feeds the site Break tank to ensure compliance with relevant bye-laws protecting the potable distribution system from possible back flow.

In addition to the above the Break tank also acts as: -

- Buffer tank to balance short term water usage and available maximum Towns water supply flow,
- Firewater storage.

Conceptually the tank is split into 2 sections, the bottom being the firewater storage tank and the top being the buffer tank.

The process Towns water system draws, via 2 lines, from a tray located approximately 7.6 m up the tank giving a buffer capacity of circa 600 m^3. These 2 lines supply: -

- Duty & Standby Reverse Osmosis Water Treatment Plant (WTP-RO) (via 2 off pumps).
- Process water system (as required) and other process demands (via 2 pumps)

In addition to the Break tank, the Towns Water system also supplies: -

- Potable water uses (Drinking water etc.),
- Welfare facilities (e.g. showers, toilets etc.) via local head tanks etc,
- Safety showers, eyewash stations and similar via local head tanks etc.

<u>Fire Water System</u>

A schematic of the Fire Water system is included in Appendix 4.

The bottom 1,000 m^3 of the Break tank functions as the firewater tank and the break tank design ensures that this minimum volume is always available. In normal operation, the Towns water mains supply means that the Break tank is essentially maintained full, meaning that actual firewater availability is nearer 1,600 m^3. The Firewater system is supplied via 3 off firewater pumps, connected in parallel. There are 2 off electric firewater pumps (duty & standby, with automated start) and 1 off diesel powered firewater.

The firewater system is based on a pressurised ring main supplying entire installation. The installation is split into areas, with the installed equipment in each area reflecting the local fire risks. The main areas are -

- Combustion Line 1 (including feed hopper),
- Combustion Line 2 (including feed hopper),
- Tipping Hall,
- Other process areas (including control room etc?),
- Offices and other ancillary areas.

More detailed information on the firewater system is included in the Fire Prevention Plan.

<u>Demin Water System</u>

The water supply to the Demin system varies depending on the operational mode of the plant as outlined below: -

1. <u>Operation mode 1 (CHP mode):</u>
   In normal operation, (i.e. steam offtake), the treated water (Permeate) supplied by the off-taker, passes through a condensate polishing plant (proprietary packaged ion exchange unit) which supplies the 200 m^3 Demin water tank. The “brine” generated by the condensate polishing plant goes to the Process Wastewater Pit.
2. <u>Operation mode 2 (condensing mode)</u>
   In condensing mode operation, Towns water supplied from the break tank passes through the WTP-RO, which supplies the 200 m^3 Demin water tank. The “brine” generated by the WTP-RO goes to the Process Wastewater Pit.

The process cannot operate in Operation mode 1 (CHP mode) without the treated water supply from the off-taker. The Demin water tank provides buffer capacity to: -

- Operation to continue in the event of transient loss of treated water supply (e.g. pump trip),
- Allow plant to switch to Operation mode 2 (condensing mode),
- Allow safe shutdown of the plant.

The Demin water tank feeds the following: -

- Boiler feedwater system (Demin water as Boiler Make-Up),
- SNCR (mixing with urea),
- ACC (vacuum pumps and surface washing),
- Boiler sampling system.

- Closed circuit cooling water (intermittent filling demand)

The Boiler feedwater tanks are fed via 2 off feed pumps with spillback to the Demin tank to ensure that the system remains full and pressurised at all times. The 2 pumps operate as duty & standby with automated start of standby pump if required.

The other users are supplied via a common distribution system via 2 off feed pumps. The 2 pumps operate as duty & standby with automated start of standby pump if required.

As part of commissioning (and after relevant maintenance activities etc.) the closed cooling water system is filled or topped up with Demin water from this common distribution system.

<u>Process Water System</u>

A schematic of the Process Water system is included in Appendix 4.

The installation is designed to ensure that, in normal operation all wastewater is collected from all process areas, treated and recovered for use within the process resulting in no discharges to the environment. The Process Water system is made up of the following sub-systems: -

- Process Drains sub-system,
- Process Wastewater Pit
- Process Water distribution sub-system

The Process drains sub-system is gravity drainage system (i.e. no pumped lines) that transfers process wastewaters from the following parts of the process to the Process Wastewater Pit: -

- The WTP-RO Plant;
- The Condensate Polishing Unit;
- IBA quench and water seal (grate);
- Steam turbine gland seals;
- Boiler Blowdown condensate;
- Other “hot drains”;
- Process Drains (including process buildings, storage buildings)
- Boiler & Steam System (drain down for maintenance etc.).

The heart of the Process Water system is the Process Wastewater Pit, this consists of 2 main sections:-

1. Sedimentation (or Filter) Chamber,
2. Neutralisation Chamber.

The process drains sub-system discharges into the sedimentation chamber. The sedimentation chamber is sized to ensure that turbulence is low allowing any solids present to settle into the sump in the base of the pit. The resulting sludge is periodically removed and sent (after sampling and analysis) for disposal at a suitably licensed facility.

The “solid free” water overflows into the neutralisation chamber. An automatic control system doses sulphuric acid and/or sodium hydroxide solutions to the chamber to maintain a neutral pH.

The neutralisation chamber also serves as a “buffer” tank ensuring there is always adequate process water available to meet short-term variations in water demand of the EfW process.

The Wastewater Pit is sized to allow for maintenance activity or emergency situation that involves draining a boiler. In the event that an excessive volume of water builds up in the wastewater pit, the excess water can be pumped, via dedicated pipework to a road tanker for off-site disposal (after sampling and analysis) at a suitably licensed facility.

Provision has been made in the plant layout and design to ease the installation of pipework & monitoring equipment etc. to allow the Wastewater pit to be discharged to the site surface water drainage system. No actual connection will be installed without agreement in writing (e.g. permit variation) from the Environment Agency defining the relevant quality, monitoring and other (e.g. Penstock valve) requirements.

The Process Water distribution sub-system supplies the following process activities: -

- Quench and water seal on each combustor,
- Boiler "Shower" cleaning system,
- Bag filter reagent recirculation (slaking),
- Cooling duties (e.g. condensate streams from boiler blowdown, turbine gland seals & steam/condensate sampling stations).

In both operating modes, the quantity of process wastewater generation is less than the required process water use: -

- Operation mode 1 (CHP mode): 3.3 m^3/hr,
- Operation mode 2 (condensing mode): 0.5 m^3/hr.

To ensure that adequate process water is always available Towns water is added to the wastewater pit to maintain a minimum buffer volume.

<u>Surface Water Drains System</u>

A plan of the Surface Water drains is included in Appendix 4.

The surface water drainage system collects: -

- Rain water from all hard surfaced areas (e.g. roads, concrete aprons, gravelled external (clean) process areas and roofs),
- External wash water from the ACC.

These streams are directed to 2 detention lagoons, one located on the Western side of the site and the other on the Eastern side, connected by 450mm diameter balance line. The pumped site discharge to the North Beck Drain is located close to the north east corner of the site (from the eastern detention lagoon) via a sampling station, penstock and flap valve.

The sampling station collects a 24 hr composite sample and this will be collected and analysed each day to demonstrate compliance.

The surface water drainage system is based on ICP SUDs methodology and the maximum discharge rate of 8.1 l/s (predicted greenfield discharge for the site) represents a 62% reduction on the current partly urbanised QBAR runoff rate and a 84% reduction in the 1 in 100 year runoff rate. The contribution to local flood risk is therefore significantly reduced compared to the present position by the installation.

The surface water drainage system is split into 3 zones based on pollution risk (as per CIRIA C753, "the SUDs Manual) as below: -

- Low Risk (roofs and gravelled/clean process areas e.g. around ACC etc),
- Medium Risk (roadways),
- High Risk (yard area outside Receiving & Storage Hall and the raw material/export loading/unloading areas).

A plan showing the risk zones is included in Appendix 4.

In the low risk areas, the drains consist of filter drains (gravelled areas) and detention lagoons to achieve a "mitigation index" ≥ the "pollution hazard Index" as defined in C753 for suspended solids, metals and hydrocarbons.

In the medium risk areas, the drains consist of trapped gullies, filter drains and detention lagoons to achieve a "mitigation index" ≥ the "pollution hazard Index" as defined in C753 for suspended solids, metals and hydrocarbons.

Considering the high risk areas: -

- The yard drains consist of Class 1 interceptor and detention lagoon to achieve a "mitigation index" ≥ the "pollution hazard Index" as defined in C753 for suspended solids, metals and hydrocarbons,
- The raw material/export loading/unloading areas are physically isolated (valves close automatically) during transfer operations. In the event of a spillage, the relevant discharge valve is kept closed until the spillage is addressed. Once all potential polluting material is removed, the relevant valve is manually reopened and returned to automatic operation allowing discharge into the drainage system,
- The Process Wastewater Pit is isolated from the surface water drainage system however provision is included to allow this to be discharged to tankers for disposal at off-site facilities or (subject suitable testing), operational procedures and permit variation etc.) via the surface water drainage system subject to suitable permit conditions.

The external surfaces of the ACC condenser tubes are periodically sprayed with demin water to remove any atmospheric dust and other debris that has been deposited by the cooling air flowing through the radiators. The excess water discharges directly to the surface water system. Demin water contains lower levels of contaminants of all types than rain water and this run off is considered to be "very low risk."

<u>Foul Drains System</u>

The office drains (foul sewage and grey water) are treated in a Klargestor BioDisc commercial sewage treatment plant into the Eastern Detention Lagoon.

The discharge from the Klargestor to the detention lagoon is via a sampling point to allow the treated foul sewage to be monitored to demonstrate compliance with relevant permit conditions and monitor performance.

Compressed Air System

Compressed air is generated in a centralised compressor room by 2 compressors feeding a common air receiver and then distributed via the following systems: -

- Combustion Line 1 Instrument air;
- Combustion Line 1 Service air;
- Combustion Line 2 Instrument air;
- Combustion Line 2 Service air;
- Instrument air for rest of installation;
- Service air for rest of installation.

The compressors are of oil free air cooled screw type design to maximise reliability and minimise cooling water requirements.

Instrument air needs to be clean and dry for pneumatic instrumentation such as control valve positioners & instruments where nozzle can be blocked by dirt. Therefore, it passes through a drier and filter to remove any moisture and dirt.

Service air is for equipment that requiring larger volumes of air (e.g. rams) and do not have any specific requirement for clean or dry air.

Process Activities: Natural Gas

Natural gas supply is available at the installation boundary at 7 $Bar_{(a).}$ The pressure reducing station (also commonly referred to as "Above Ground Installation" or AGI) is located within the installation boundary and reduces the pressure to 3 $bar_{(g)}$. The gas is then distributed to the combustor burners.

In the event of failure of gas supply, the control system will initiate an emergency shutdown of the combustion lines (i.e. the installation).

Process Activities: Electricity

The grid connection allows about 24 MW (after considering parasitic loads of 6 MW) to be exported to the grid. This can only be achieved when the installation is operating in full condensing mode.

In normal operation, electrical export is around 12 MW direct to the off-taker.

The emergency generator is sized to provide essential power in the event of a simultaneous turbine trip and electrical disconnection of the Site to ensure safe, controlled & complete shutdown of the installation.

Drainage & discharges to water

There is a discharge to the adjacent beck from the surface water drainage system however in normal operation there will be no discharge. This is a pumped discharge, via a sampling station, penstock and flap valve.

The sampling station collects a 24 hr composite sample and this will be collected and analysed each day to demonstrate compliance.

Emissions monitoring

Emissions to air

A site plan showing the point emissions to air is included in Appendix 4.

The main emissions to air from the process are from the main stacks (release points A1 & A2). The design and location of the sampling points (including access etc.) is consistent with Environment Agency Monitoring Guidance.

Continuous monitoring systems are installed for: -

- Dust,
- Oxides of Nitrogen (as NO_2),
- Dinitrogen Oxide (N_2O)
- Oxides of Sulphur (as SO_2),
- Ammonia (NH_3),
- Hydrogen Chloride HCl),
- Carbon Dioxide (CO_2),
- Organics as (TVOC),
- Oxygen (O_2),
- Moisture (H_2O),
- Gas flow rate,
- Pressure, velocity & temperature.

All continuous monitors are: -

- MCERTS certified for the species measured and expected range of emissions (i.e. meet BS EN 14181 QAL1 requirements),
- Commissioned, calibrated and maintained in accordance with BS EN 14181,
- Connected to a MCERTS certified data management & reporting system.

Dinitrogen Oxide (N_2O) is to be continuously monitored (EA requirement) as Urea is being used for in the SNCR system to abate NO_X.

A “hot standby CEMS” is installed to provide continued monitoring of emissions if the primary CEMS on either emission point fails. In normal operation this CEMS alternates monitoring between the 2 emission points (A1 & A2) allowing the system to calibrate this against the 2 primary units. In the event of an issue with one of the primary units, the standby will switch to continuously monitor the affected emission point.

Additional ports installed to allow periodic extractive sampling for the following species: -

- Hydrogen Fluoride (HF) (as do not propose continuous monitoring),
- Mercury (Hg) (as do not propose continuous monitoring),
- Metals and metalloids except mercury (As, Cd, Co, Cr, Cu, Mn, Ni, Pb, Sb, Tl, V),
- Dixons & Furans (PCDD/F),
- Brominated Dixons & Furans (PBDD/F),
- Dixon like PCBs,
- PAHs (as Benzo (α) Pyrene),
- Flue gas flow correction (Pressure, flow, temperature, H_2O & O_2)

Periodic sampling is to be undertaken on a 6 monthly basis (yearly basis for Benzo (α) Pyrene) and in line with EA guidance by MCERTS certified monitoring contractors with sample analysis undertaken by UKAS accredited laboratory.

In the first year of operation, periodic sampling will be completed 4 times, again in line with EA guidance.

Provision (ports, space and services) has been made to allow long term monitoring for Hg, PCDD/F and PCBs if required.

TEGCO propose that periodic sampling of HF, Hg, PCDD/F and PCBs is appropriate given that non-hazardous RDF is being burned.

Considering Hg, all wastes containing Hg are classified hazardous and are therefore effectively excluded from use in the production of non-hazardous RDF. The historical and increasing restrictions relating to the use of Hg in new products etc. mean that the risk of Hg inadvertently entering the RDF production process is very low and will continue to reduce. Powdered activated carbon is very effective at removing Hg while the stable operating conditions result in consistent abatement performance. Hg emissions are expected to be very low and not subject to significant short-term variation or spikes.

Considering PCDD/F and PCBs, wastes containing these are classified and are therefore effectively excluded from use in the production of non-hazardous RDF. The increasing segregation of waste streams means that the risk of PCDD/F and PCBs inadvertently entering the RDF production process is low. Powdered activated carbon is very effective at removing Hg while the stable operating conditions result in consistent abatement performance. PCDD/F and PCB emissions are expected to be very low and not subject to significant short-term variation or spikes.

In order to demonstrate this, "accelerated testing" (twice per month with a minimum of 6 results) in the first year of operation will be undertaken, as per EA protocols: -

- 210716 draft mercury CEMS protocol V0.17 (or subsequent protocol extant at commencement of operation);
- 210716 draft PCDD-F CEMS protocol V0.10 (or subsequent protocol extant at commencement of operation);

TEGCO propose periodic monitoring of HF is appropriate given that RDF is being burned. The levels of fluorides in RDF are very low and Hydrated Lime is effective at abating HF emissions. The similarity in chemistry means that HCl emissions correlate with HF emissions and HCl can be used as a surrogate for HF, i.e. if HCl is adequately abated, HF will also be adequately abated.

The only other potentially significant emissions are dust from the various raw materials and waste/by product silos.

These discharges to air via bag filters and are all fitted with "burst bag" detection systems to alert the operators to increased emissions allowing the process to allow repairs to be completed or initiate process shutdown if repairs are not practicable?

The discharges vents from the silos are compliant with the relevant EA guidance to allow representative sampling of emissions to be undertaken.

<u>Emissions to water</u>

A site plan showing the point emissions to water is included in Appendix 4.

In normal operation the discharges to water arise from: -

- Packaged sewerage plant treating foul and grey water effluent from the offices and welfare facilities onsite,
- Rainwater runoff (Surface water),
- ACC condenser tube cleaning water (demin water) runoff.

The only emission to water from the installation is into the adjacent beck from the surface water drainage system and TEGCO understand that as such this does not require a specific impact assessment but may require standard generic monitoring (with criteria set by the EA) similar to that indicated below: -

- Flow rate & daily total flow
- Collection & analysis of a 24 hr flow related composite sample for the following: -
    - pH,
    - Oil & Grease,
    - Suspended Solids/Turbidity,
    - Chemical Oxygen Demand/Biological Oxygen Demand.

TEGCO do not propose to monitor the cleaning water from the ACC. The cleaning water is boiler feed quality demin water (i.e. very pure water) and the materials washed off (the outside of) the condenser tubes are atmospheric pollutants. This stream is therefore essentially the same a rain water runoff.

TEGCO believe that discharge from the packaged sewage plant is not subject to specific impact risk assessment. TEGCO have included provision to monitor the discharge from this plant into the surface water system to demonstrate its effective operation and aid investigations in the event of compliance issues with the main site discharge.

<u>Other Emissions/Wastes & By-products</u>

IBA is sampled and analysed for Total Organic Carbon (TOC) on a 3 monthly basis, as outlined in EA "Technical Guidance Note (Monitoring) M4 Guidelines for Ash Sampling and Analysis" (V7 or subsequent revision extant at commencement of operation).

Fly ash and FGC residues are sampled and analysed on a regular basis as required internal procedures to ensure compliance with the Waste Management Regulations and the requirements of the receiving permitted waste facility. Internal procedures will reflect the requirements of Technical Guidance Note M4.

Filter bags from the FGC system are routinely changed (approximately 342 bags/year) and are analysed prior to disposal to ensure compliance with the Waste Management Regulations and the requirements of the receiving permitted waste facility. Proposed disposal is by incineration (with energy recovery if practicable).

Emissions: Impacts

<u>Emissions to air</u>

The ground level air quality impacts have been assessed (as per Environment Agency guidance) and the results are summarised in the following tables.

This assessment is precautionary as: -

- The model using the "worst" year (2015) from a 5 year data set (2015-2019),
- The model assumes that emissions from all emission points are at the permit emission limits at all times, in practice this is impossible while still complying with the permit (i.e. actual emissions will be lower),
- The model assumes the installation is operational for every hour of the year (8760 hrs) while actual expected operation is circa 8,000 hrs.

Considering potential impact at point of greatest ground level concentration and the worst impacted human health receptor: -

Pollutant	Avg. Period	Max. Ground Level Conc.[1]		Receptor Max. Ground Level Conc.[1]	
		PC[2]	PEC[3][4]	PC[2]	PEC[3][4]
NO_2	99.8th %ile 1 hr	8.3	-	2.9	-
	Annual	1.9	15.4	0.22	-
CO	1 hr	13.0	-	5.3	-
	Running 8 hr	10.8	-	3.4	-
PM_{10}	90.4th %ile 1 hr	0.4	-	0.065	-
	Annual	0.13	-	0.016	-
$PM_{2.5}$	Annual	0.13	-	0.016	-
SO_2	99.7th %ile 1 hr	7.1	-	2.5	-
	99.2th %ile 24 hr	4.8	-	1.1	-
	99.9th %ile 15 min	7.6	-	2.7	-
TOC[5]	Annual (1,3-Butadiene)	0.26	0.37	0.031	0.141
	24hr (Benzene)	1.9	2.4	0.48	-
HCl	1 hr	1.6	-	0.64	-
HF	1 hr	0.26	-	0.11	-
	Monthly(Weekly)	0.093	-	0.018	-
PAHs	Annual	0.0024	-	0.0003	-
PCBs	1 hr	<0.001	-	<0.001	-
	Annual	<0.0001	-	<0.0001	-
NH_3	1 hr	2.6	-	1.1	-
	Annual	0.26	-	0.031	-

Notes:
1. Expressed as $\mu g/m^3$,
2. Process Concentration (PC) is the concentration resulting from the emission alone, figures in green indicate impact is screened out (i.e. "insignificant") and no further assessment is required (1st test): -
   a. Annual average standards: PC ≤ 1% of standard;
   b. Other standards: PC ≤ 10% of standard.
3. Predicted Environmental Concentration (PEC) is the sum of the PC and the existing background, figures in green indicate (assuming PC is not "insignificant") that no further assessment is required (2nd test): -
   a. Annual average standards: PEC ≤ 70% of standard,
4. PEC not quoted if screened out on PC (1st test),
5. TOC assessed as 100% 1,3 Butadiene (Annual) and Benzene (24 hr) as these substances have the most stringent environmental standards.

The maximum ground level concentration occurs to the north-east of the installation (between the installation and the railway) and is not a sensitive receptor location (human or environmental habitat).

The impact has been assessed at the 7 off human health receptor locations (5 off residential, 1 off leisure & 1 off commercial) closest to the installation. The Receptor results quoted is for the receptor (the commercial receptor for all species/standards) that experiences the greatest impact from the installation.

The assessment concludes that the air quality impacts are considered: -
- "Insignificant" at all residential and leisure receptors,
- "Insignificant" or "not requiring further assessment" at the point of maximum impact.

The assessment also shows that impacts of other species are very low and of negligible significance.

The assessment concludes that in the event of elevated emissions (i.e. operating at ½ hr ELVs or failure of abatement equipment) combined with maximum permitted periods of such operation and worst case metrological conditions, the impacts on air quality are: -

- Long term: “not significant,
- Short term: “not result in adverse impacts.”

Assessment of impacts at environmentally sensitive sites (Special Protection Areas (SPAs), Special Areas of Conservation (SACs), and Site of Special Scientific Interest (SSSIs) within 2 km of the installation is “not significant.”

The Human Health Risk Assessment concludes that for the theoretical individual living (and eating only food produced) at the location of maximum ground level concentration the “exposure to dioxins, furans and dioxin-like PCBs is not significant.” At residential receptors, the exposure is at least a factor of 10 lower.

The assessment of noise emissions concludes that the impact at residential receptors is “not significant.”

Emissions to water

TEGCO understand that the discharges to the beck will have no direct environmental impact on the water quality in terms of chemical species.

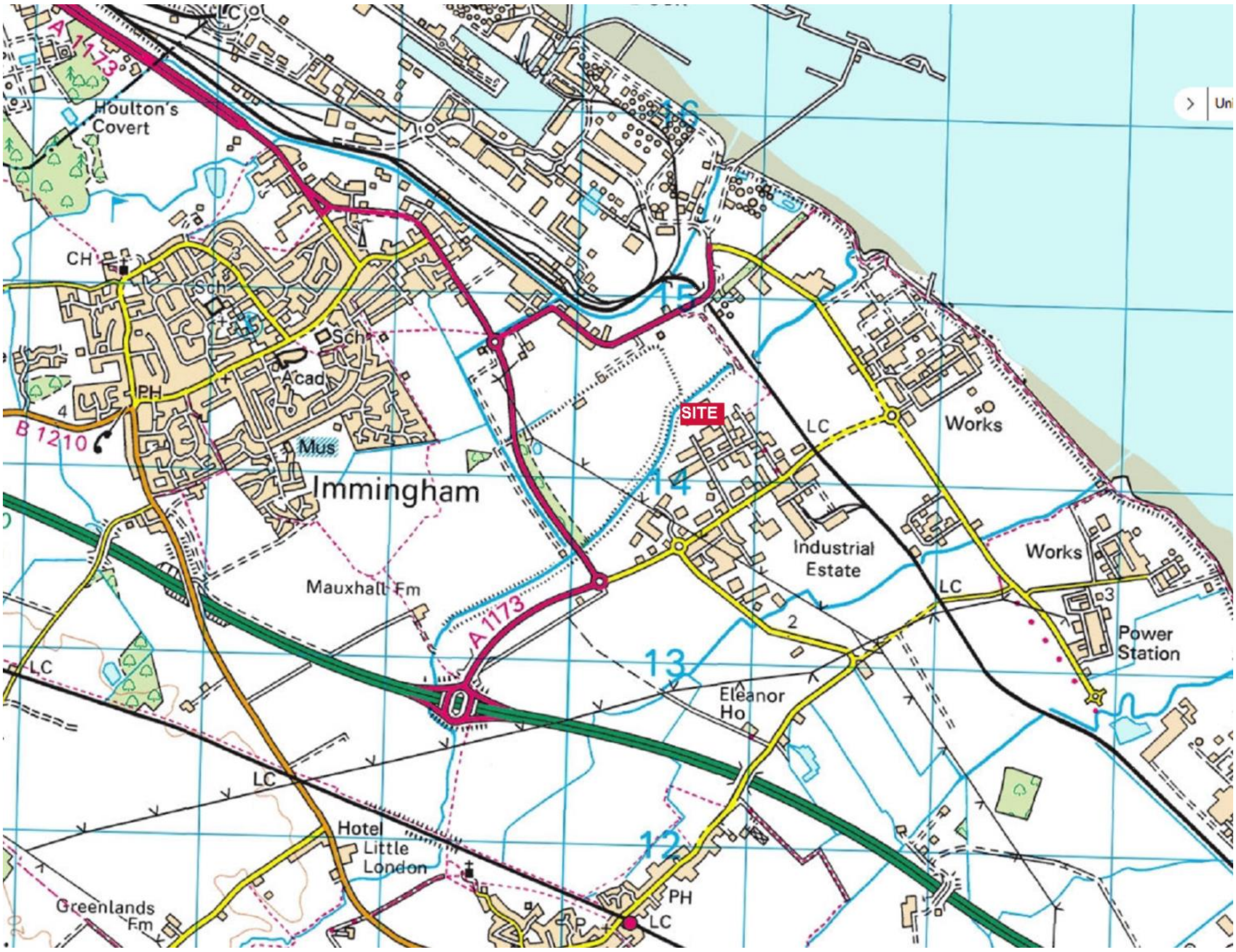
However the SUDs system will result in reduced discharge flows (with lower entrained materials) than the current arrangement (direct discharge from roof and yard areas) during periods of high rainfall.

Non-Technical Summary

Appendix 1

1. **Site Location Map**
2. **Site Location Plan**
3. **Site Plan showing Installation Boundary**
4. **Process Diagram**

1. **Site Location Map**



2. Site Location Plan

.3.2022 14.44.23

LEGEND:

1. Weight bridges, 2pcs
   - operation to both directions, IN and OUT
2. Truck waiting area
3. Waste receiving
4. RDF Bunker, approx. 21.5 * 48m
   - bottom -10m
   - V=~10800m3
   - grab cranes, 2 pcs Hall ~31 * 61m
   - top of the rane`s rail ~+28.00m

4.1 Grab crane`s maintenance shaft access on level 0,00

5. Hopper
   - concrete platform ~+22.50
6. Boilers, ~38 * 37m, h=40m
   - 2 lines. Total 320 000 t/a
7. Flue gas treatment, ~40 * 27m h=40m
   - 2 lines
8. Stack. 2pcs
9. Pumping building, ~13 * 8m h=6m
   - Tank V=1600m3
   - Firewater pumps
   - Rainwater pumps
10. IBA storage bunker. ~9 * 15m
    - Storage capacity, V=500m3
    - bottom -2m
    - Grabcrane loading to trucks
11. Turbine building ~25 * 16m
    - ~32Mwe
12. Water treatment plant (RO) ~22 * 9m
13. Admin building h=~27m
    - partly under hopper level

13.1 Grabcrane operating point
-on level *24,70

14. Space reservation (SCR)
15. Container unloading
    - space reservation only
16. Deminwater tank V=200m3
17. ACC ~15 * 50m
18. Rainwater retention Lagoon
    see document DRAINAGE TECHNICAL NOTE
    PROJECT NO. JAGNGA/44466-TN001-Rev A
19. Main stair case ~9 * 11m h=43m
    - Lift
    - Stairs
20. Ash handling
    - Silos FGCR 2 pcs.
    - Silo Fly ash 1pc
21. Chemical unloading slab and tank
    - Safety basin bottom, -1.2m
22. FGT`s chemical unloading
    - Hydrated Lime
    - Activated Carbon
23. Staircase. 0,00m to roof
24. Turbine and generator installation
25. Gate house
26. Tipping hall 22 * 46m h= 11 to 18m

PRELIMINARY

A/M	ÄNDERUNG/MODIFICATION	DATUM/DATE	NAME	GEPR./CHECK	GES./APPR.
J	Boundary line (South) adjusted	20230622	KA		
Ap	Fortum VAR2 (TEG1) plus Fortum modified (TEG2)	20220324	AK	RC	AD
G	Tipping Hall footprint	20220809	AK	RC	MT
H	Lagoon added, Substation updated	20230523	AK	AD	RC

KUNDE/PURCH.: ---
ANLAGE/PLANT: EfW IMMINGHAM TEG1
BENENNUNG/TITLE: GENERAL ARRANGEMENT DRAWING TIPP)ING HALL footprint and access TOP VIEW & PLAN VIEW ±0.00

ORDER NR.: 1900100
Refer to protection notice ISO 16016
Schutzvermerk ISO 16016 beachten !
=10UEA &MLD
+10UEA10
MASSSTAB/SCALE approx 1:300

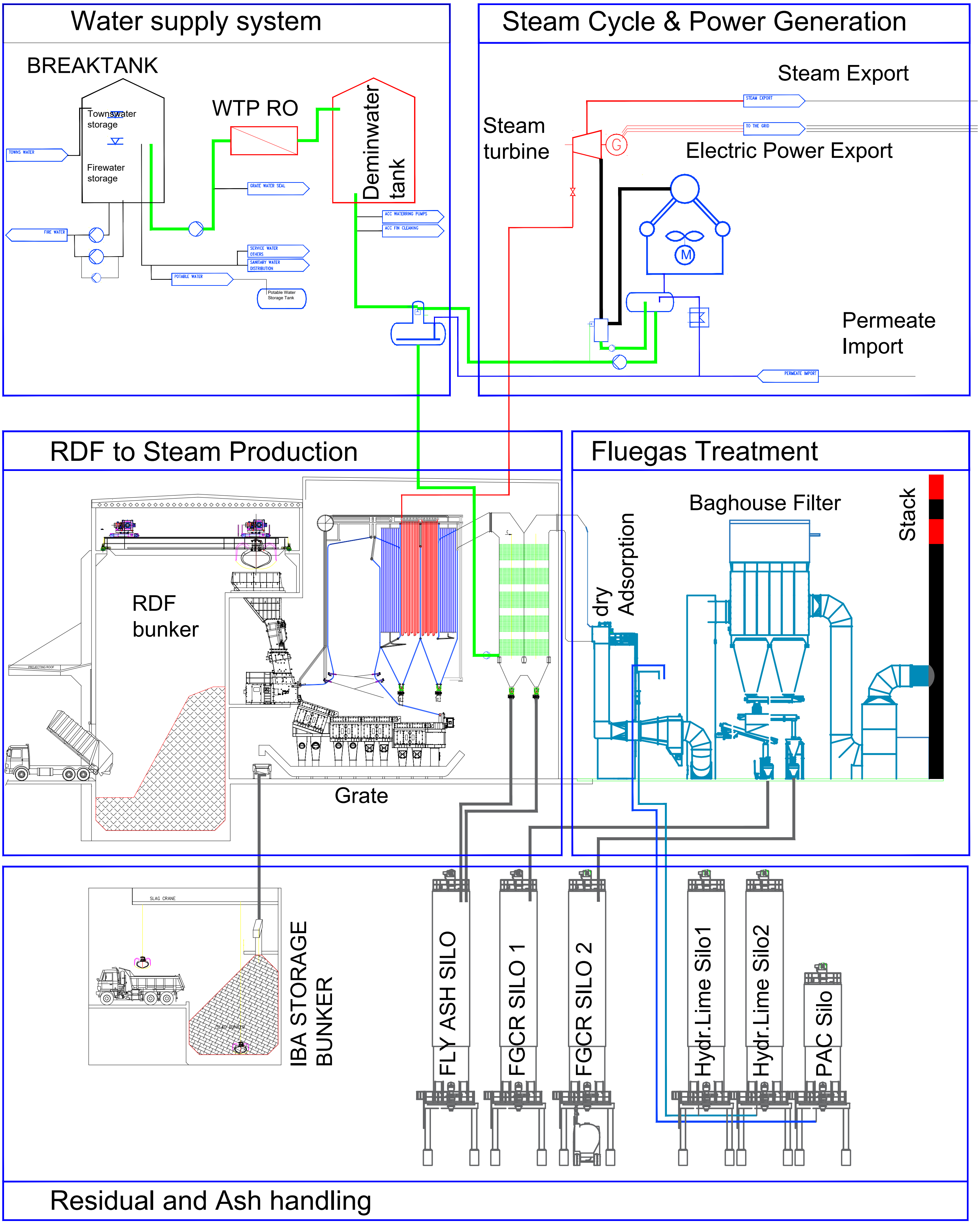
TEGCO
THE ENERGY GENERATION COMPANY GMBH
COMBUSTION
GASIFICATION

	DATUM/DATE	NAME
GEZ./DRAWN	20211210	Kraft
GEPR./CHECK	../../..	ADu
GES./APPR.	../../..	HagerEO

ISO / R 128 EUROPA

KKS DAS/DCC: UEA & MLD
ZEICHNUNGSNR./DRAWING No.: TEG1 TEB 220905 REV. J
BL./SH. VON/OF: 001/001
A0

Energy from Waste (EfW) Immingham - SCHEMATIC



Non-Technical Summary

Appendix 2

1. RDF Specification

1. RDF Specification

The Fuel shall not contain any hazardous, clinical or radioactive waste, shall be delivered in accordance with a relevant European Waste Catalogue (EWC) codes for refuse derived fuel listed below, in accordance with the nominated RDF supplier's Consent and shall fall within the parameters below: -

Table 1: EWC Codes Accepted

EWC Code	**Description of Waste**
wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified	
19 12 10	combustible waste (refuse derived fuel)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11

Table 2: Fuel specification

Fuel type	**RDF from Comm. and Ind. Waste, Food Waste**			
	Unit	**Design point**	**Range**	**Max.**
Net CV (Lower Heating Value)	MJ/kg	10	8 - 12	14[1]
Particle size (length x width x height) Oversized grain Rods (length x calibre) Foils (length x width) Tapes Dust percentage/Grain size	mm		90 Ma% < 500 Max 10 Ma% < 800 Max 5% Ma% - 700 x 70 Max 400 x 400 Max 1.200 Max 10 Ma% Dry mass < 1 Max 5 Ma% Dry mass < 0.5	
Moisture content	% wt. ar	25	10 - 35	45[1]
Ash content	% wt.ds	15	< 25	25[1]
Nitrogen content	% wt.ds	0.8	0.5 - 0.8	0.8
Sulphur content	% wt.ds	0.2	<0.6	0.8[1][2]
Chlorine content	% wt.ds	0.6	<0.8	1.0[1][2]
Fluorine content	% wt.ds	0.005		0.01[1]
Bulk density	kg/m^3	300	200 - 400	
Non combustibles/Contaminants etc.: -	% wt.ds			
Ceramic, stones porcelain, sand, ferrous metal, non-ferrous metals			Max. 1 Ma% Dry Mass	
Metallic aluminium (foils, composite films)			Max. 0.8 Ma% Dry Mass	
Metals: -	mg/kg			
Total Cd & Tl			<30	
Hg			<10	
Total: As, Co, Cr, Cu, Mn, Ni, Sb & V			<1,000	
Cu			<500	
Pb			<300	

Notes: -
1. Greater than supply specification but within the operational envelope defined by the equipment supplier,
2. Not to occur simultaneously.

Ma%:	Percentage by mass
% wt. ar	Percentage by weight as received
% wt. ar	Percentage by weight dry

Non-Technical Summary

Appendix 3

1. **Raw Materials**
2. **By-Products & Waste Produced**

1. Raw Materials (Basis 8,000 hrs/year)

Material	Usage	Inventory	Storage & Containment					Location
	Annual	(Max)	Primary	Secondary		Tertiary		Plan Ref:
RDF	320,000 Te/yr	≈2,880 Te[3] OR 10,800 m^3	3 off 1,001 m^3 Receiving Pits[1]	Air Water Ground	In building In building In building	Air Water Ground	N/A Drains N/A	Plan A1.3 4
			1 off 6230/8455 m^3 Storage Bunker[2]	Air Water Ground	In building In building In building	Air Water Ground	N/A Drains N/A	Plan A1.3 4
Urea Solution (40%$_{wt}$)	3,360 Te/yr	≈55 Te (50 m^3)	1 off 50 m^3 GRP Tank within building	Air Water Ground	N/A Bund Bund	Air Water Ground	N/A In building In building	Plan A1.3 21
Hydrated Lime	7,200 Te/yr	≈54 Te per silo 108 Te total	2 off 120 m^3 silo (with bag filter)	Air Water Ground	N/A Drains Yard/Road	Air Water Ground	N/A Drains Drains	Plan A1.3 22
Activated Carbon	180 Te/yr	0.5 Te	1 off 10 m^3 Silo (with bag filter)	Air Water Ground	N/A Drains Yard/Road	Air Water Ground	N/A Drains Drains	Plan A1.3 22
Diesel: Emergency Generator	N/A	1 m^3	1 off 1 m^3 internal bunded tank	Air Water Ground	N/A Int. Bund Int. Bund	Air Water Ground	N/A Drains Drains	Plan A1.3 ??
Diesel: Fire Pump	N/A	0.3 m^3	1 off 0.3 m^3 internal bunded tank	Air Water Ground	N/A Int. Bund Int. Bund	Air Water Ground	N/A Drains Drains	Plan A1.3 9
Water:[4]		1,600 m^3	1 off 1,600 m^3 combined tank	Air Water Ground	N/A Drains Drains	Air Water Ground	N/A N/A N/A	Plan A1.3 BreakTank
Towns Water	36,000 m^3/yr[5] 144,000 m^3/yr[6]	600 m^3						
Fire Water[7]	N/A	1,000 m^3						
Water: Demineralised Water[8]	585,504 m^3/yr 108,704 m^3/yr	200 m^3	1 off 200 m^3 Demin water tank[5] 2 off 1 m^3 SNCR tanks	Air Water Ground	N/A Drains Drains	Air Water Ground	N/A N/A N/A	Plan A1.3 16

Material	Usage	Inventory	Storage & Containment			Location
	Annual	**(Max)**	**Primary**	**Secondary**	**Tertiary**	**Plan Ref:**

Notes:

1. Hydraulic volume to floor, operational volume is less to allow offloading and ullage for firefighting.
2. Bunker capacities calculated on hydraulic basis and piled basis :-
   a. 6,230 m^3 is hydraulic volume to top of front wall
   b. 8,455 m^3 assumes RDF piled against back wall at 45 degrees.
3. Operational maximum RDF inventory (pits and bunker combined) is greater of 3 days or 10,800 m^3, equating to: -
   a. 9,600 m^3 at RDF design density,
   b. 7,200 m^3 at RDF maximum specified density,
   c. 54 hours at RDF minimum specified density.
4. Break tank is combined Towns water and Fire water Tank.
5. Assuming normal (CHP) mode and permeate for 8,000 hrs with first filling of break tank. Towns water required to achieve required process water mass flow and first filling of potable water break tank. .
6. Assuming condensing mode and only Towns water for 8,000 hrs
7. Maximum inventory quoted is worst case (i.e. volume reserved for fire water use only and “design basis”), in normal operation additional volume in Break tank is available.
8. Higher figure is normal (CHP) mode @ 60 T/hr steam export for 8,000 hrs, lower figure is condensing mode for 8,000 hrs.

2. By-Products & Wastes Produced

Material	Generation	Inventory	Storage & Containment						Location
	Annual	(Max)	Primary	Secondary		Tertiary			Plan Ref:
IBA	49,760 Te/yr	450 Te	1 off 500 m^3 bunker	Air Water Ground	In building In building In building	Air Water Ground	N/A Drains Drains		Plan A1.3 Storage Bunker (Adjacent to 12)
Fly Ash	7,680 Te/yr	69 Te	1 off 120 m^3 silo (with bag filter)	Air Water Ground	N/A Drains Yard/Road	Air Water Ground	N/A Drains Drains		Plan A1.3 20
FGC Residues	8,912 Te/yr	96 Te per silo 192 Te total	2 off 192 m^3 silo (with bag filter)	Air Water Ground	N/A Drains Yard/Road	Air Water Ground	N/A Drains Drains		Plan A1.3 20
Used Filter Bags	684 bags/yr (2.3 kg each)	684 bags/yr (2.3 kg each)	684 bags/yr (2.3 kg each)	Air Water Ground	N/A N/A N/A	Air Water Ground	N/A N/A N/A		
Process Water (Reused)	72,000 m^3/yr[(1)]	120 m^3	120 m^3 Wastewater Pit[(2)]	Air Water Ground	N/A N/A N/A	Air Water Ground	N/A N/A N/A		Plan A4.4 Process Water Waste Pit
Boiler Drain down	1,760 m^3/yr[(3)]	120 m^3	120 m^3 Wastewater Pit	Air Water Ground	N/A Swales N/A	Air Water Ground	N/A N/A N/A		Plan A4.4 Process Water Waste Pit
Surface Water Runoff	161,280[(4)] m^3/yr	1,440 m^3	970 m^3 Eastern detention lagoon 470 m^3 Western detention lagoon	Air Water Ground	N/A Penstock N/A	Air Water Ground	N/A N/A N/A		Plan 4.4

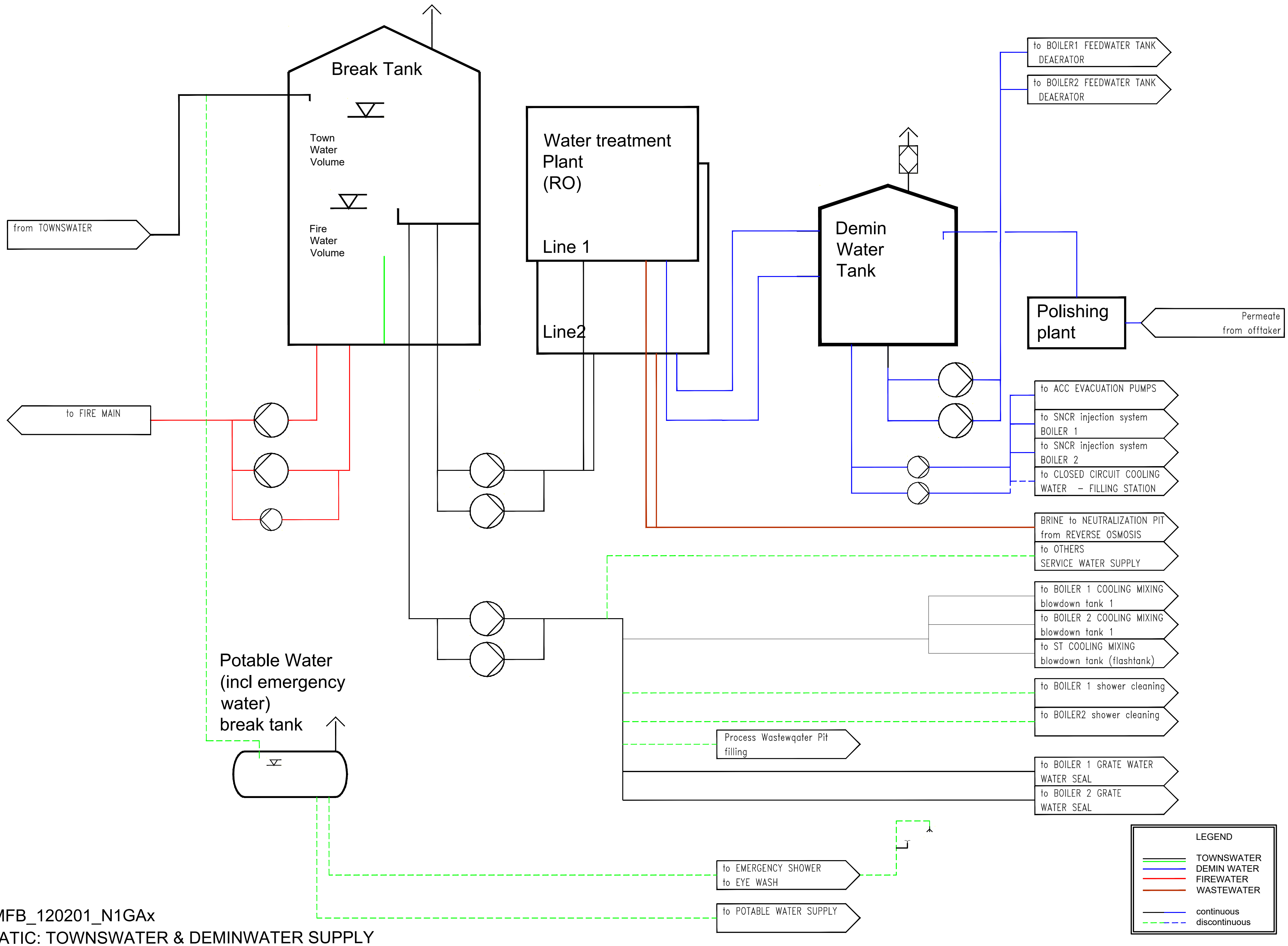
Notes:

1. Maximum allowance for process water drainage. Process water usage greater than generation for both operational modes, therefore no discharge.
2. Process wastewater pit of 120 m^3 capacity consisting of filter and neutralisation chamber designed to allow complete drain down of a boiler unit.
3. Boiler water drain 3 times during commissioning and one major overhaul every year for each boiler.
4. Maximum allowance for surface water drainage.

Non-Technical Summary

Appendix 4

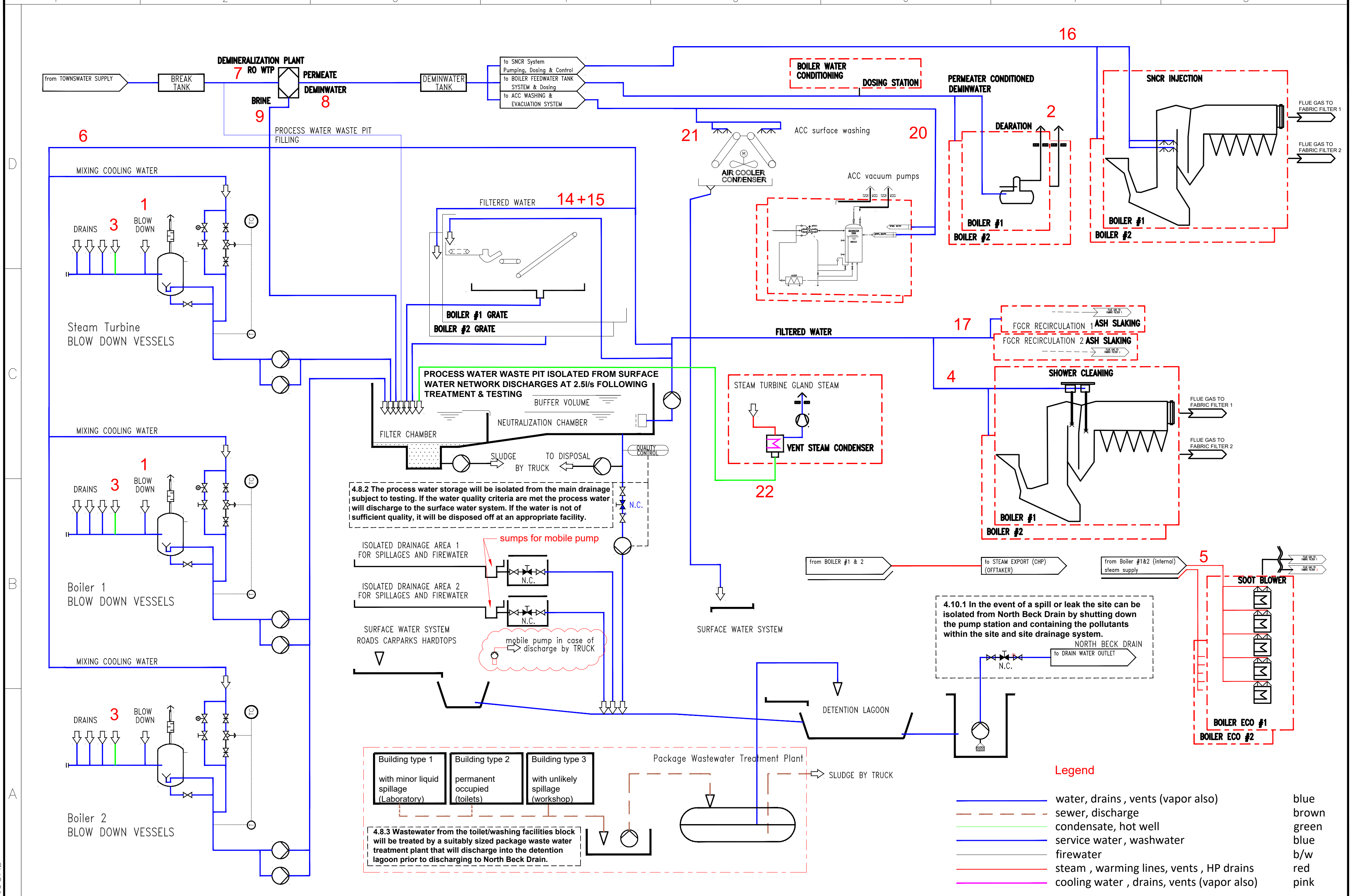
1. **Schematic of Towns Water System**
2. **Schematic of Fire Water System**
3. **Schematic of Process Water System**
4. **Plan of Surface Water Drains**
5. **Plan of Surface Water Risk Zones**
6. **Plan of Point Source Emissions to Air**
7. **Plan of Point Source Emissions to Water**



TEG1_MFB_120201_N1GAx
SCHEMATIC: TOWNSWATER & DEMINWATER SUPPLY


EFW SITE NO.1
Service Trench
H1
H2
H3
H4
H5
H6
H7
H8
F1
F2
WR
DR
BREAKTANK
DEMINWATER TANK
ATTENUATION POND
Turbine building
ACC
NETHERLANDS WAY
SCANDINAVIAN WAY
23.3.2022 14.44.23
Legend
Fire Main Ring underground
Fire Water Supply underground outdoor wall mounted indoor
H1 .. H8 Hydrants
F1 .. F2 Foam Stations
RDF Bunker
Turbine Oil
WR ... Wet Riser
for Building Sprinkler System
DR .. Dry Riser
Transformer Bay Deluge Valve station
PRELIMINARY
ANLAGE/PLANT: EFW IMMINGHAM TEG1
GENERAL ARRANGEMENT DRAWING
Fire Main & Fire Water Supply
PLAN VIEW ±0.00
approx 1:300
TEGCO
UEA & MLD
TEG2 TEB 220905 H
001/001

Blowdown (condensing mode 2), 16.03.2023 15:14:19



Refer to protection notice ISO 16016
Schutzvermerk ISO 16016 beachten !

TEGCO — THE ENERGY GENERATION COMPANY GMBH — COMBUSTION GASIFICATION

				GEZ./DRAWN	20230324	AD	KUNDE/PURCH.	.
				GEPR./CHECK	20230314	RC	ANLAGE/PLANT	EfW Immingham
D1	Review	20230313	AK / RC / AD	GES./APPR.		Engg.	ORDER-NR.	1900110
A/M	REVISION/MODIFICATION	DATUM/DATE	NAME / GP/CH / GS/AP	MASSSTAB/SCALE		n/a	MODEL	TEG1_PFB_TEB110008_F

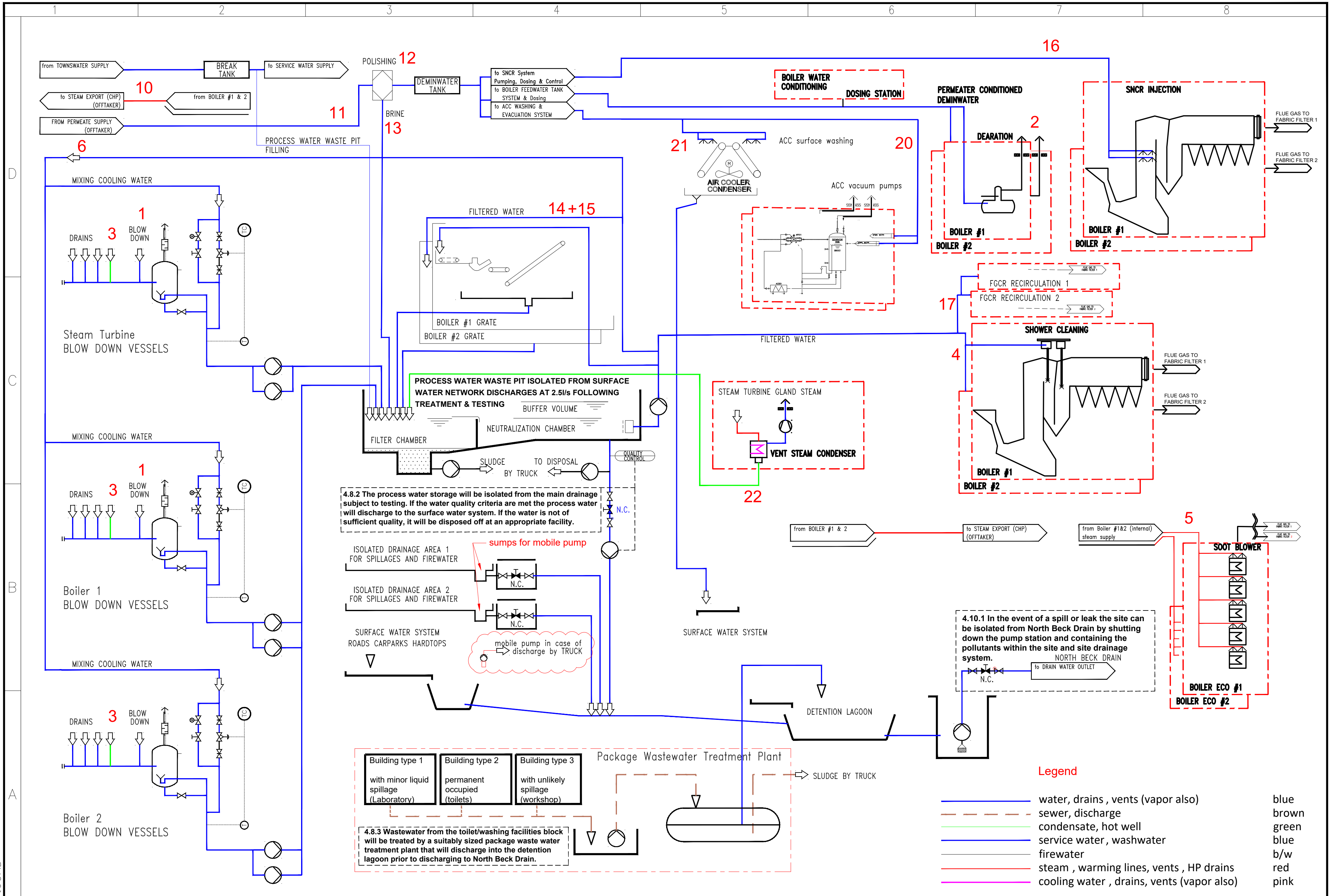
BENENNUNG/TITLE
PROCESS WASTE WATER & SURFACE WATER PFD
Operation Mode 2 (condens.)

TEGCO = 1NGA_ & PFB + 1NU__

KKS: 1NGA_ & PFB — DAS/DCC — Z. NR./DWG. NR: TEG1 TEB 110008 — REV.: D1 — BL./SH. VON/OF: 001/001 — A3

TEGCO AutoCAD

Blowdown (mode 1 CHP), 16.03.2023 15:14:20



Refer to protection notice ISO 16016
Schutzvermerk ISO 16016 beachten !

TEGCO THE ENERGY GENERATION COMPANY GMBH COMBUSTION GASIFICATION

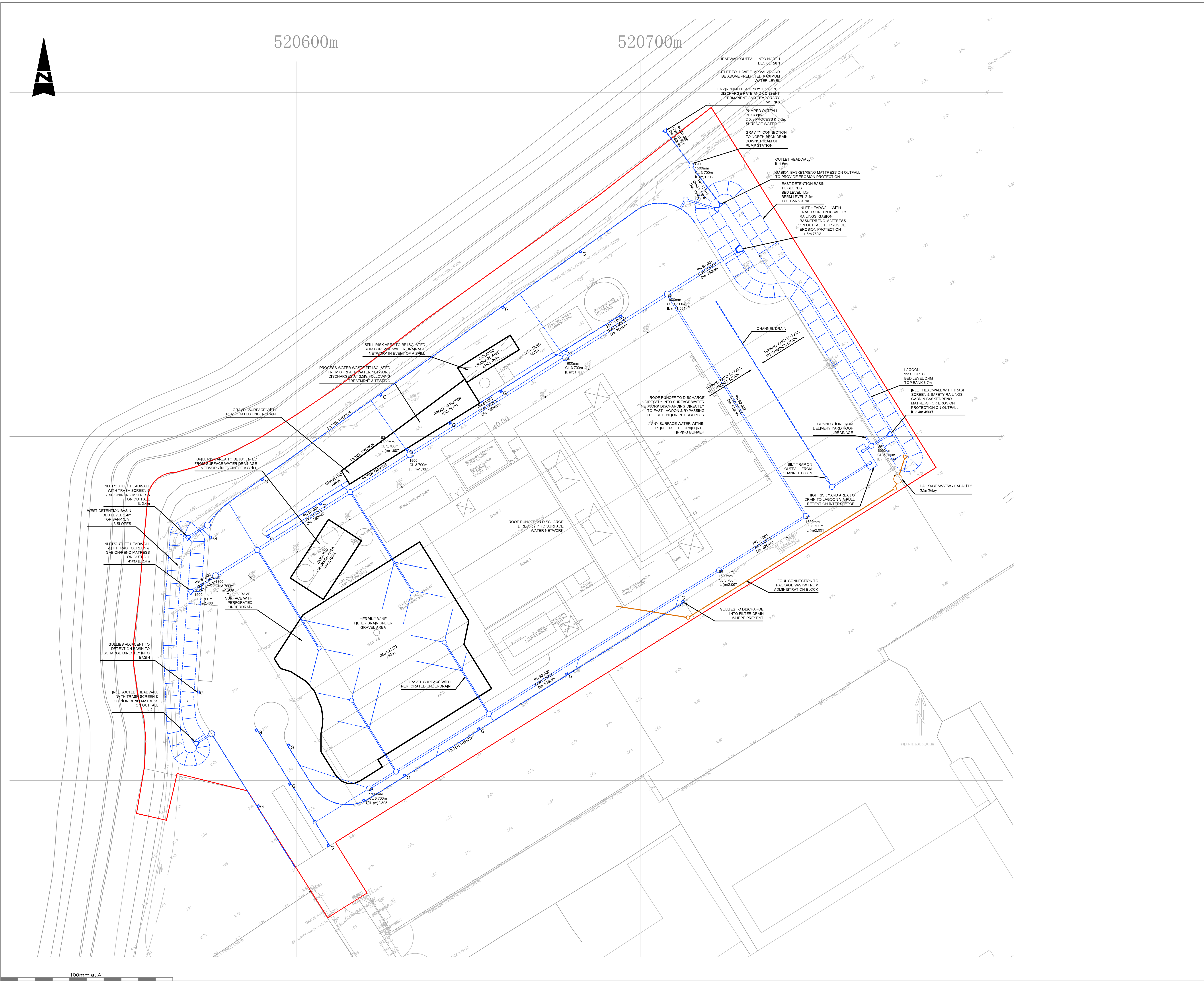
TEGCO AutoCAD

						GEZ./DRAWN	20230324	AD	KUNDE/PURCH. .
						GEPR./CHECK	20230314	RC	ANLAGE/PLANT EfW Immingham
D1	Review	20230313	AK	RC	AD	GES./APPR.		Engg.	ORDER- NR. 1900110
A/M	REVISION/MODIFICATION	DATUM/DATE	NAME	GP/CH	GS/AP	MASSSTAB/SCALE		n/a	MODEL TEG1_PFB_TEB110008_F

BENENNUNG/TITLE
PROCESS WASTE WATER & SURFACE WATER PFD Operation Mode 1 (CHP)

TEGCO | = 1NGA_ & PFB | + 1NU__

KKS 1NGA_ & PFB | DAS/DCC | Z. NR./DWG. NR TEG1 TEB 110010 D1 | REV. | BL./SH. VON/OF 001/001 | A3



NOTES:

1. THESE NOTES ARE INTENDED TO AUGMENT DRAWINGS AND SPECIFICATIONS. WHERE CONFLICT OF REQUIREMENTS EXIST THE ORDER OF PRECEDENCE SHALL BE AS SHOWN IN THE SPECIFICATION. OTHERWISE THE STRICTEST PROVISION SHALL GOVERN.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS AND ARCHITECTS DRAWINGS.
3. DRAWINGS NOT TO BE SCALED. ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY DISCREPANCIES TO BE NOTIFIED TO THE ENGINEER AND FURTHER INSTRUCTIONS OBTAINED BEFORE WORK IS COMMENCED.
4. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE BUILDING IS FULLY COMPLETED. IT IS THE CONTRACTORS SOLE RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND SEQUENCE AND ENSURE THAT THE BUILDING AND ITS COMPONENTS ARE SAFE DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE-DOWNS WHICH MAY BE NECESSARY. SUCH MATERIAL REMAINING THE THE PROPERTY OF THE CONTRACTOR ON COMPLETION, AND FOR ENSURING THAT THE WORKS AND ANY ADJACENT PROPERTIES ARE SAFE IN THE TEMPORARY CONDITION.

FOR GENERAL NOTES PLEASE REFER TO AWP DRAWING No. IWEF-AWP-ZZ-XX-DR-C-3700

- SURFACE WATER SEWER
- CHANNEL DRAIN
- PERFORATED UNDERDRAIN
- ROADSIDE FILTER DRAIN
- SURFACE WATER ACCESS CHAMBER
- SURFACE WATER PUMP STATION
- ROAD GULLY
- HEADWALL
- FULL RETENTION INTERCEPTOR

Rev	Description	Date	By	Chk	App
P3	UPDATED TIPPING HALL DRAINAGE NOTES	13.03.23	NA	-	-
P2	REVISED SITE LAYOUT	31.01.23	NA	JC	JAG
P1	FIRST ISSUE	18.12.20	NA	--	--

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Project: IMMINGHAM WASTE TO ENERGY FACILITY
EUROPA WAY
STALLINGBOROUGH

Client: TEGGO UK Ltd

Drawing: PRELIMINARY SURFACE & FOUL WATER DRAINAGE LAYOUT

Role: CIVIL ENGINEER

Drawing Status: FOR APPROVAL

Suitability Code:

Job. no. 44466 | Scale@ A1 1:500 | Rev. P3

Project - Originator - Volume - Level - Type - Role - Number

IWEF - AWP - ZZ - XX - DR - C - 3001

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FOR GENERAL NOTES PLEASE REFER TO AWP DRAWING No. IWEF-AWP-ZZ-XX-DR-C-3700

Rev	Description	Date	By	Chk	App
P3	REVISED TIPPING YARD DRAINAGE AREA	16.03.23	NA	JC	JAG
P2	REVISED SITE LAYOUT	31.01.23	NA	JC	JAG
P1	FIRST ISSUE	08.12.20	NA	--	--

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Project: IMMINGHAM WASTE TO ENERGY FACILITY
EUROPA WAY
STALLINGBOROUGH

Client: TEGCO UK Ltd

Drawing: DRAINAGE IMPERMEABLE AREAS

Role: CIVIL ENGINEER

Drawing Status: FOR APPROVAL

Suitability Code:

Job. no. 44466 | Scale@ A1: 1:500 | Rev. P3

Project - Originator - Volume - Level - Type - Role - Number

IWEF - AWP - ZZ - XX - DR - C - 3000

AIR coords, 17.03.2023 12:53:32

SITE PLAN 1:500

TEG1_MLD_TEB292004


W 1
Main discharge point into Beck
maximum 8.1 l/s (29.16 m3/h)
W 3
Process Water
maximum 2.5 l/s (9.0 m3/h) (part of W1)
W 2
Karlgestor
(part of W1)
PRELIMINARY
A | 1st Issue | 20221222 | AK | RC | AD
KUNDE/PURCH.: ---
ANLAGE/PLANT: EfW IMMINGHAM
ORDER NR.: 1900100
Refer to protection notice ISO 16016
Schutzvermerk ISO 16016 beachten !
BENENNUNG/TITLE
Plot Plan
Emissions to water
= &MLD
+N1
MASSSTAB/SCALE
approx 1:500
TEGCO
THE ENERGY GENERATION COMPANY GMBH
COMBUSTION
GASIFICATION
DATUM/DATE NAME
GEZ./DRAWN 20221222 Kraft
GEPR./CHECK RC
GES./APPR. Engg. AD
ISO / R 128
EUROPA
KKS DAS/DCC 1N & MLD
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BL./SH. VON/OF 002/003
A0