Supporting Documents to the Application for an Environmental Permit

Document Name: HLC Upwood – Permit Information v3

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Section B3 – Site Maps

See Appendix 1

Section C1 - How the Installation Operates

The HLC (Wood Products) site at Upwood Air Park near Bury, Cambridgeshire PE26 2RA, manufactures timber pallets for the storage and distribution industry. The company produces approximately 45,000 new and reconditioned pallets per week from a site of approximately 3.25 hectares (8 acres), which occupies part of a disused RAF base. The site currently employs 106 people. Production consumes in total around 60,000m^3 of virgin timber per annum, which is delivered to site by road transport. The majority of this timber is pre-sawn to designated lengths for the production of new, standard sized, pallets but approximately 15,000m^3 must be sawn to length on site. This is mainly used for the production of custom pallets.

The main building on site, known as Hanger 3, is a former aircraft storage and maintenance facility. This building measures approximately 90m x 50m in area and is 14.5m high. Installed within this building are three automated pallet production lines. These mechanised lines manufacture standard sized pallets from the pre-sawn timber components. Hanger 3 also contains nine custom manufacturing stations on which bespoke timber pallets are constructed, largely by hand. As these pallets often require timber to be sawn to an appropriate length during construction, the process creates off-cuts of timber too short to be of use. In a separated area, within the same building, damaged timber pallets are repaired and refurbished. Used pallets may have been collected from customers or purchased on the open market. Repairing pallets which have only suffered minor damage in use offers both environmental and economic benefits to customers but also creates an amount of off-cut timber, although this is small in comparison to the custom pallet process.

Each of the pallet construction lines and all the wood working machines are connected to a comprehensive dust extraction system, in which a network of metal ducts remove any airborne particles to a central cyclonic filter unit. The filter unit is located outside, adjacent to Hanger 3.

Separate administrative offices are located within the main building as well as staff facilities and a small enclosed area is used for paint spraying and marking. Pallets are only occasionally required to be painted, usually when supplied to pallet rental companies, and only water based, low VOC stains are used.

Adjacent to Hanger 3 is a pallet drying building, which contains four separate ‘kilns’. These are sealed rooms, approximately 10m x 6m in area, where ambient air is warmed and blown over a stack of pallets to reduce the overall moisture content. For drying pallets the air is usually heated to approximately 45^oC. On occasions pallets are heated to higher temperatures (max 70^oC) to both dry and help preserve the timber. The heat is supplied by radiators fed with low temperate hot water (LTHW) from a nearby boiler. The warm, moist air from the drying process exits the building via a series of exhaust fans located on the roof. The same LTHW system provides space heating and domestic hot water to Hanger 3 and the administrative offices therein.

The water boiler is installed within a dedicated building, located between Hanger 3 and the drying shed. This boiler is of a dual-pass design with a single blown grate and was manufactured and installed in 2015 by ELBH-CZ sro, a company headquartered in the Czech Republic. The plant is rated at 930kW maximum output and operates exclusively on chipped wood and sawdust as fuel, for which it is certified as WID (Waste Incineration Directive) compliant. A fuel silo, of 6m diameter x 8m high, is located immediately above the boiler house and this is used to store dust from the cyclonic filter and wood chips arising from any timber off-cuts produced during pallet manufacture. The maximum capacity of the silo in operation is around 175m^3 of wood fuel. The total height of

the boiler house and silo is 14m. The double skin, stainless steel, boiler exhaust flue is 16m in height and is supported on the side of the silo (see photographs Appendix 1). The flue gases are passed through a system of screen filters before reaching the atmosphere.

The boiler plant operates continuously, excluding maintenance periods, and consumes around 800 tonnes of wood fuel per annum on average. A small amount of ash is produced from the combustion process and this is removed from site by a licenced waste contractor.

All the wood fuel for the boiler is generated on site from the pallet production process. The majority of this comes from new bespoke pallet manufacture as timber for these products timber components has to be cut on-site. The remainder is sawdust generated on site. No imported wood fuel is used. Off-cuts from the manufacturing process are placed in fork-lift skips at the workstation and, when full, these are removed for chipping. Off-cuts of unused wood from the pallet refurbishment stations are sorted by each operator and clean timber material is also placed in skips for chipping. A diesel powered wood chipper is used to shred the timber off-cuts and this is located adjacent to the boiler house building. Chipped wood is blown into the top of the silo by a system of ducts.

Combusting unused wood does not require permitting (EA Guidance 43_17) but it is now proposed that the boiler will also combust used timber from the repair of pallets. This timber will be sorted by the operator of the pallet repair station into visibly clean, uncontaminated wood for combustion and all other material for disposal by a licenced waste contractor.

HLC already operates a pre-selection system for used pallets, as purchase contracts specifically exclude any pallets that has been heavily contaminated through use or any pallet that does not have visible markings showing the treatments used in original manufacture. Heat treated or Kiln dried pallets are acceptable but any that have been treated with chemical preservative are excluded. Pallets marked MB (methyl bromide banned since 2010) will not be collected for refurbishment as these must be treated as hazardous waste.

Pallets are moved around the manufacturing building and site by forklift truck. The site has a policy of using only electric powered forklifts within the manufacturing area with diesel / gas powered forklifts used for loading / unloading outside. All the timber for pallet manufacture and all completed pallets are moved on and off site by road transport. Much of the facility outside the main buildings is given over to open storage of pallets waiting for collection. Various open-sided buildings are used for storage of kiln dried pallets.

Section C2 – Emissions Techniques and Monitoring

Emissions to Atmosphere

A risk assessment of the activities on-site has been undertaken (see Section C4) and this concluded that the only significant emissions are likely to be airborne. There are no activities that may impact on ground or surface water and no processes that generate significant amounts of waste, hazardous or otherwise, except the wood combusted on-site. In accordance with the published guidance for environmental permitting in England, four likely sources of emissions, which may have an impact on the local environment, were identified. These are:

1. The 930kW boiler flue (potential of gaseous emissions to air)
2. The extract from the drying kilns (potential of gaseous emissions to air)
3. The wood sawing processes and wood chipper (potential of dust)
4. The paint spray booth (potential of droplets or odour)

Of these sources, any emissions from items 2, 3 and 4 are considered insignificant, as they are too small to be measured accurately and therefore very unlikely to impact on the local environment (see Table B). Item 1 may have a broader impact and emissions from the flue have been assessed in accordance with the Environment Agency Monitoring Certification Scheme (MCERTS). The report from this emissions test is included in a separate file entitled: *HLC Upwood – Emissions Report.pdf*.

The significant emissions from the boiler flue have been measured as:

Oxides of Nitrogen (as NO_2) – 165.9 mg/Nm^3
Total Particulate Matter – 13.9 mg/Nm^3 (test average)
Carbon Monoxide (CO) – 250 mg/Nm^3 (boiler manufacturer data)

As the boiler is fuelled exclusively on uncontaminated wood, it is reasonable to assume that no other contaminants will be present in the exhaust gas stream, in significant quantities. Substances that are likely to be absorbed by the soil or plants have been specifically considered. These are:

- Arsenic
- Cadmium
- Chromium
- Copper
- Fluoride
- Lead
- Mercury
- Molybdenum
- Nickel
- Selenium
- Zinc

Other substances, for which specific environmental limits apply, have also been considered including:

- Ammonia

- Sulphur dioxide
- Hydrogen Sulphide

None of these elements are likely to be present in the exhaust gas stream as rigorous assessment of the biomass fuel before it is chipped will ensure that only clean wood is combusted.

At start-up the combustion plant is heated to operating temperature by a light oil fuelled burner. This type of initial heating system minimises emissions and although specific measurements are not available for a start-up from cold scenario, it is reasonable to assume that the levels of NO_2, CO and especially Particulate Matter will be lower than those measured during the test period. On normal shut-down of the plant the wood fuel supply is stopped and any unburnt material on the grate is allowed to combust as normal. Exhaust velocity is maintained and emissions gradually reduce without exceeding the levels calculated during normal operation.

Emissions levels may be increased, over the short-term, following a plant failure or an accident (such as failure of the exhaust filtration system or air supply fans). However, comprehensive and automatic safety measures should ensure that the plant is quickly shut-down.

The risk assessment indicates that the height of the flue above Hanger 3 may be insufficient to prevent a higher than acceptable ELV (Emission Limit Value) for NO_2 close to the building. This is due to the downdraft effect in certain wind conditions. Increasing the flue height by 2m will reduce the NO_2 ELV to an insignificant level. This could be achieved by simply installing a cowl of sufficient height on top of the flue, which may also increase exhaust velocity, reducing NO_2 levels further.

Best Available Techniques (BAT) – Wood Combustion

Process Guidance Note 1/12(13) establishes a framework for BAT in waste wood combustion and the key techniques applicable to the HLC site are reproduced in Table A below. The operator's procedures for meeting each requirement is also explained.

Table A: Best Available Techniques		
	Requirement from PG 1/12(13)	Operators Policy / Procedure
1. Techniques to control emissions from contained sources		
1.1	Good combustion	
	Good combustion needs management and control of a number of parameters: • fuel content and its rate of feed; • primary and secondary air; • temperature in the chamber and the heat exchanger; • oxygen levels. Controls that also use levels of carbon monoxide and inflammables are possible but uncommon. Continuous feed produces better combustion than stop-start burning. Furnace design, combustion controls and operation are as important as fuel control to produce low levels of emissions. Efficient chimney ventilation maintains performance of the appliance and will reduce the accumulation of soot or particles in the chimney.	The biomass boiler is of modern design with a continuous fuel feed auger and automatic control system (SCADA). This system controls all the parameters necessary to ensure good combustion. The boiler operates continuously, excluding maintenance periods, and the fuel supplied is of uniform size and quality. The flue is fan assisted to ensure soot accumulation is minimised.
1.2	Design	
	Modern boilers may have: • Re-circulated flue gases to ensure optimum combustion, with minimum excess air;	The boiler does not recirculate flue gases but does have electronic controls to achieve stoichiometric combustion of the biomass fuel.

	• Sophisticated electronic control systems that monitor all the components of the flue gas, and make adjustments to fuel and air flows to maintain conditions within specified parameters; • Greatly improved turndown ratios (the ratio between maximum and minimum firing rates) which enable efficiency and emission parameters to be satisfied over a greater range of operation. Matching the heat requirement with the waste load promotes good control. When the heat requirement is low and the waste load is high, a heat dump will be needed to dissipate unwanted heat. A multi-compartment combustor might be set up for different fuels in the separate compartments. Separate stokers could handle different sized fuels. Leakage of gases in or out of the combustion and flue systems is undesirable and inefficient. Combustion chambers, casings, ductwork and ancillary equipment should be made and maintained as gas tight as is practicable. The furnace should be designed with the aim of minimising the period of time during which the operator needs to gain access to the combustion space for the purpose of de-ashing. For existing processes, automatic de-ashing systems should be used wherever practicable with regard to combustion plant design. For new processes above 1MW automatic de-ashing systems should be used.	The boiler operates continuously at optimum output and with the drying kilns used as a heat dump for periods when requirement is low. The boiler has an automatic de-ashing system.
1.3	Oxygen Trim	
	Accurate control of the amount of air is essential to boiler efficiency. More air than the theoretical minimum requirement for complete combustion is usually supplied for the following reasons. • Ensure stable combustion and prevent the formation of carbon monoxide (CO); • Allow for variations in the required air-to-fuel ratio due to combustion air temperature, pressure and humidity changes; • Allow for slight variations in the chemical composition of the fuel gas and its supply pressure; • Allow for operating range inconsistencies of fuel-to-air ratio control equipment such as valves, linkages and regulators; • Provide good air-fuel mixing in order to ensure complete combustion over the operating range of the burner. Although it may be possible to monitor and adjust the burner on a daily basis, it is not practical. Automatic oxygen systems continuously monitor the flue gases and adjust the burner air supply. They are generically called 'Oxygen Trim Systems'.	The boiler has an oxygen trim system and as the fuel is consistent in particle size, moisture content and calorific value, accurate control is achievable.
1.4	Burners and burner control systems	
	Burners are the devices responsible for: • Proper mixing of fuel and air in the correct proportions, for efficient and complete combustion; • Determining the shape and direction of the flame. An important function of burners is turndown. This is usually expressed as a ratio and is based on the maximum firing rate divided by the minimum controllable firing rate. Burner control systems range from very simple on/off types to complex modulating systems capable of matching boiler load across the whole turndown ratio, thereby saving energy and increasing efficiency.	The boiler is designed with a blown grate and variable speed fans. This type of design has a good modulation with relatively small quantities of fuel able to be combusted without any change in the emissions per m^3 of exhaust gas.
1.5	Temperature	
	On start-up from cold, prior to the introduction of waste wood into the furnace, the combustion zone temperature needs to be raised, using an ancillary burner fired by gas, oil or virgin wood.	A light-oil fired burner is used to raise the refractory chamber temperature before any wood fuel is introduced.

	The emission limits values given in Table 4.1 of PG1/12(13) should be met from the point when waste wood is introduced into the process. Waste wood should not be burnt during the start-up from cold.	
1.6	Carbon monoxide	
	Carbon monoxide (CO) is a good indicator of poor combustion, formed by the incomplete combustion of carbonaceous fuels. No techniques are available for its removal, but good combustion will minimise it. Maintaining adequate oxygen levels is the main technique. With too much excess air, however, there will be considerable particulate carryover, a drop in temperature and thermal efficiency, and increased production of PAH (polyaromatic hydrocarbons). When the burner is idling, carbon monoxide concentrations can rise significantly. In many cases it is technically feasible to prevent idling, but in a few cases it may only be possible to minimise it. Operators should justify to the regulator if this is not technically feasible. • Idling should not be permitted, or • Idling should be minimised	The burner is never allowed to idle
1.7	Particulate Matter (PM10 and PM2.5)	
	Good combustion techniques minimise emissions of uncombusted gaseous and solid carbon emitted as particulate matter (PM10). Significantly greater quantities of PM10 are emitted by poor combustion, when ash plus black or brown carbon is emitted. PM2.5 is produced when there is poor combustion. When there is too high a temperature and insufficient oxygen, soot is formed (black carbon). When the temperature is too low, then combustion is incomplete and tarry matter is emitted that contains polyaromatic hydrocarbons (brown carbon).	Control of the combustion process minimises particulate emissions, helped by the uniform nature of the biomass fuel. In addition filters in the exhaust gas stream capture a significant portion of any PM.
1.8	Polyaromatic Hydrocarbons (PAH)	
	Polyaromatic hydrocarbon emissions (PAH) are minimised by good combustion. PAH is emitted principally at start up from cold, and also during ordinary combustion. Cool-down produces very little PAH. Fuel with a narrow size and moisture distribution burns much better than mixed-size fuels or fuel of variable moisture level. Limiting chlorine in the fuel, good combustion and low particulate emissions minimise the emission of PCDD/F (polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans).	No wood fuel is used on start-up and during ordinary combustion the uniform fuel used reduces the possibility of PAH formation. Chlorine represents less than 0.1% of most biomass and is also usually concentrated in bark, green matter or brash (source Forest Research). None of this material is used in pallet manufacture and all the fuel is clean, 'white stem' wood.
1.9	Fuel control	
	Variation in fuel size and moisture content limits the ability of combustion control systems to produce good combustion. Uncovered storage of fuels should be avoided to keep fuel dry. The separate storage and feeding of offcuts, briquettes, woodchips and dust allows improved control if there are difficulties in complying with the emission limits. Part of the chlorine in the material burnt becomes hydrogen chloride during combustion. Control is by preventing the burning of PVC material and other chlorine-containing materials. PVC wrappings should not be burnt.	The wood off-cuts are chipped to a uniform size (max 40mm) and blown into an enclosed fuel silo, together with sawdust. No PVC material is allowed to enter the fuel silo.
1.10	Fuel feed	
	Automatic fuel feed systems prevent the emission of smoke fumes and other substances during charging and promote better combustion by charging little and often. For existing processes, automatic feed systems should be used wherever practicable with regard to combustion plant design. For new processes automatic fuel feed systems should be used.	An automatically controlled auger delivers discrete quantities of wood fuel to the grate and is controlled by the SCADA system.

1.11	Abatement of Particulate Matter	
	Manufacturers are developing primary measures to reduce emissions of particulate matter. Where primary measures are not sufficient to meet the requirements of Table 4.1 of PG1/12(13), secondary measures will be needed. Available techniques for reduction of particulate matter emissions from the exhaust gases are: • Cyclones (multicyclones) • Electrostatic precipitators (ESP) • Fabric filters (baghouses) • Ceramic filters Most new, automatic boilers are fitted with some form of flue gas cleaning device to remove particulate matter from the flue gas before release to the atmosphere. The dust collection system has to be chosen with respect to the required emission limit value (ELV) and the actual operating conditions. Cyclones are often used as a first stage gas cleaning device but cyclones alone are not expected to be able to meet the compliance requirements of Table 4.1 of PG1/12(13) with regard to particulate matter. Precipitators function by electrostatically charging the dust particles in the gas stream. The charged particles are then attracted to and deposited on plates or other collection devices. When enough dust has accumulated, the collectors are shaken to dislodge the dust, causing it to fall with the force of gravity to hoppers below. The dust is then removed by a conveyor system for disposal or recycling. Fabric filters would need the gases to be cooled before filtration. Ceramic filters are able to filter gases at raised temperatures. Boilers operated at part load should still meet the emission limits in Table 4.1 of PG1/12(13).	Close boiler control is the primary method of reducing emissions with filters to address any PM.
1.12	Manufacturers' guarantee for fabric or ceramic filters	
	Regulators should be provided with a guarantee from the filter manufacturer that a newly-installed set of filters will meet this emission concentration limit, and the guarantee should be supported by emission test data for the filter type that the guarantee relates to. Where existing filter arrestment plant is upgraded to achieve the above emission concentration limit in respect of particulate matter, a guarantee should be obtained either from the filter manufacturer or the company which carries out the upgrading, that the upgraded plant will meet the emission concentration limit. The guarantee should be supported by emission test data for the abatement plant type fitted with the filter media, to which the guarantee relates. Arrestment plant should be serviced and maintained in accordance with the manufacturers" recommendations so as to maintain the validity of the guarantee of emission concentration limit. Where no such guarantee is obtainable, either for new arrestment plant fitted with filters or for existing plant which has been upgraded, emission testing from that plant should be required, to demonstrate compliance with the emission concentration limit for particulate matter.	Banks of mechanical screen filters are used to reduce emissions. These were installed by the manufactures and are inspected annually to ensure performance is maintained. There is an automatic alarm given if the filter performance falls below a set level. Filters are automatically vibrated to remove a build-up of PM and replaced when necessary. Manufacturer's guarantees for filter performance are available.
2.	Techniques to control fugitive emissions	
	Stocks of dusty, or potentially dusty, materials can be stored, for example, with covering and screening that prevent wind whipping. Ash and abatement plant dust can be kept enclosed and bag filters can prevent emissions to air at transfer points. Covering stocks of offcuts and bales of wood will prevent wind whipping of dust and rain increasing the moisture content. All woodchips and sawdust should be stored in covered containers or purpose-built silos.	Ash is automatically collected in a sealed container and transferred to waste skips for disposal off site. On transfer, ash is wetted to reduce dust. All fuel is stored in an enclosed silo located above the boiler house. Wood chip and

	Where the wood waste is delivered to the silo automatically from the production process, displacement air should be discharged through suitable arrestment plant, for example a bag filter. Attention is drawn to the fire and explosion risks associated with moving wood dust and wood waste. All waste fuels and all dusty or potentially dusty materials should be stored in covered containers, purpose-built silos or undercover. Normally, when producing woodchips or shredding bales, a machine under negative pressure will minimise the emission of particulate matter. Shredding of offcuts and bales should be done in a machine under negative pressure vented to suitable arrestment plant - for example a bag filter. Dusty or potentially dusty spillages can be cleaned up promptly, without dry sweeping. Major spillages need vacuum cleaning which can be brought to site the same day. A high standard of housekeeping is needed. Prevention is preferable but external dust on structures and roofs is prone to wind entrainment, and needs clearing up. Loading to and from stockpiles should be carried out so as to minimise emissions to the air. • All spillages should be cleared up promptly by vacuum cleaning, wet methods, or other appropriate techniques. Dry sweeping of dusty spillages should not be permitted. Wet material from spillages should be dried before being burnt. • All ductwork and piping used to deliver fuel to the storage system and combustion plant should be leak-proof to prevent the emission of particulate matter. • A high standard of housekeeping should be maintained. • Silos and supply hoppers to baling, shredding or combustion plant should be fitted with a high level alarm or volume indicator to warn of overfilling. • The delivery system should be provided with an interlock to prevent the silo or supply hopper being overfilled. The interlock mechanism should cause the material to be discharged to an alternative storage container, where necessary vented to suitable arrestment plant.	sawdust are blown into the top of the silo and displacement air is filtered. The wood chipper is enclosed and chipped material is extracted under vacuum to be blown into the fuel silo. The chipper is manually operated and the available storage capacity of the silo is checked before any new fuel is added.
3.	Air Quality	
3.1	Dispersion & dilution	
	Pollutants that are emitted via a stack require sufficient dispersion and dilution in the atmosphere to ensure that they ground at concentrations that are deemed harmless. This is the basis upon which stack heights are calculated using HMIP Technical Guidance Note (Dispersion) D1. The stack height so obtained is adjusted to take into account local meteorological data, local topography, nearby emissions and the influence of plant structure. The calculation procedure of D1 is usually used to calculate the required stack height but alternative dispersion models may be used in agreement with the regulator. An operator may choose to meet tighter emission limits in order to reduce the required stack height.	TGN D1 no longer in print. Lakes Environmental SCREEN3 software used for simple dispersion and downwash calculations. These calculations indicate that the stack height should be increased by 2m to minimise downwash caused by Hanger 3. An additional cowl / cone on the chimney will provide the necessary height and properly designed will usefully increase the exhaust exit velocity and the dispersion of emissions.
3.2	Ambient air quality management	
	In areas where air quality standards or objectives are being breached or are in serious risk of breach and it is clear from the detailed review and assessment work under Local Air Quality Management that the permitted process itself is a significant contributor to the problem, it may be necessary to impose tighter emission limits. If the standard that is in danger of being exceeded is not an EC Directive requirement, then industry is not expected to go beyond BAT to meet it. Decisions should be taken in the context of a local authority's Local Air Quality Management action plan. For example, where a permitted process is only responsible to a very small extent for an air quality problem, the authority should	The installed plant and operating procedures can meet the Local Air Quality standard.

	not unduly penalise the operator of the process by requiring disproportionate emissions reductions.	
3.3	Stacks, vents and process exhausts	
	Liquid condensation on internal surfaces of stacks and exhaust ducts might lead to corrosion and ductwork failure or to droplet emission. Adequate insulation will minimise the cooling of waste gases and prevent liquid condensation by keeping the temperature of the exhaust gases above the dewpoint. A leak in a stack/vent and the associated ductwork, or a build-up of material on the internal surfaces may affect dispersion so flues and ductwork should be cleaned to prevent accumulation of materials, as part of the routine maintenance programme. When dispersion of pollutants discharged from the stack (or vent) is necessary, the target exit velocity should be 15m/s under normal operating conditions, (but see paragraph below regarding wet plumes). In order to ensure dispersion is not impaired by either low exit velocity at the point of discharge, or deflection of the discharge, a cap, or other restriction, should not be used at the stack exit. However, a cone may sometimes be useful to increase the exit velocity to achieve greater dispersion. An exception to the above is where wet arrestment is used as the abatement. Unacceptable emissions of droplets could occur from such plant where the linear velocity in the stack exceeds 9m/s. To reduce the potential of droplet emissions a mist eliminator should be used. Where a linear velocity of 9m/s is exceeded in existing plant, consideration should be given to reducing this velocity as far as practicable to ensure such droplet entrainment and fall-out does not happen.	A twin wall stack is installed, manufactured from stainless steel. The space between the inner and outer walls is insulated.
4.	Management	
4.1	Management techniques	
	Important elements for effective control of emissions include: • proper management, supervision and training for process operations; • proper use of equipment; • effective preventative maintenance on all plant and equipment concerned with the control of emissions to the air; and • ensuring that spares and consumables – in particular, those subject to continual wear – are held on site, or available at short notice from guaranteed local suppliers, so that plant breakdowns can be rectified rapidly. This is important with respect to arrestment plant and other necessary environmental controls. It is useful to have an audited list of essential items.	The plant is operated and maintained by appropriately trained staff, with comprehensive records kept of emissions performance. Exhaust filters are monitored automatically and the filter media is replaced as required. Only OEM approved parts are used.
4.2	Appropriate management systems	
	Effective management is central to environmental performance; it is an important component of BAT and of achieving compliance with permit conditions. It requires a commitment to establishing objectives, setting targets, measuring progress and revising the objectives according to results. This includes managing risks under normal operating conditions and in accidents and emergencies. It is therefore desirable that installations put in place some form of structured environmental management approach, whether by adopting published standards (ISO 14001 or the EU Eco Management and Audit Scheme [EMAS]) or by setting up an environmental management system (EMS) tailored to the nature and size of the particular process. Operators may also find that an EMS will help identify business savings.	The operator has a well-developed, company-wide, environmental management system; to the standard of ISO 14001:2015.
4.3	Training	
	Staff at all levels need the necessary training and instruction in their duties relating to control of the process and emissions to air. In order to minimise risk of emissions, particular emphasis should be given to control procedures during start-up, shut down and abnormal conditions. Training may often sensibly be addressed in the EMS referred to above.	Clear, written procedures are in place for the operation and management of the boiler plant and the control of emissions from the flue. See summary of HLC Integrated Management System in file *HLC Upwood – Summary EMS.pdf*

	• All staff whose functions could impact on air emissions from the activity should receive appropriate training on those functions. This should include:
	  ○ awareness of their responsibilities under the permit;
	  ○ steps that are necessary to minimise emissions during start-up and shutdown;
	  ○ actions to take when there are abnormal conditions, or accidents or spillages that could, if not controlled, result in emissions.
	• The operator should maintain a statement of training requirements for each post with the above mentioned functions and keep a record of the training received by each person. These documents should be made available to the regulator on request.	

4.4	Maintenance	
	Effective preventative maintenance plays a key part in achieving compliance with emission limits and other provisions. All aspects of the process including all plant, buildings and the equipment concerned with the control of emissions to air should be properly maintained. In particular: • The operator should have the following available for inspection by the regulator: • a written maintenance programme for all pollution control equipment; and • a record of maintenance that has been undertaken.	Specialist contractors are employed for regular maintenance of the plant in accordance with OEM recommendations. Written maintenance logs are available as is a service program for regular checking of key plant functions.

Section C3 – Environmental Management

HLC Wood Products have developed an Integrated Management System Manual that meets the requirements of ISO 14001:2015. The summary section of this manual, including the relevant environmental management procedures and policies, is included in the file: *HLC Upwood – EMS Summary.pdf*.

Section C4 – Impact on the Environment

Risk Assessment

A qualitative risk assessment for the installation is presented in Table B below. The assessment identifies the potential risks that may arise on site, the potential receptors and the possible pathways through which the receptors may be impacted. The table also provides details of the risk management techniques, including preventing the risk at source, or by providing measures to break the pathway and prevent pollution migrating towards receptors.

In practice, all identified hazards that could cause harm, are subject to strict preventative or control measures at the site to ensure that all risks are minimised. A high level of operational control will be achieved through good management, staff training and adherence to the written management system.

Site pollution control systems will be inspected on a regular basis and maintained to ensure their integrity and proper operation. The site will be monitored on a regular basis and formal compliance audits will be carried out to inform and ensure continual improvement.

Table B: Risk Assessment

Source of Risk	Receptor	Pathway	Assessment of Risk before preventative measures:		Risk Management	Residual Risk
			Probability and Magnitude	Potential Consequence		
Releases of Oxides of Nitrogen (NOx)	Nearby workforce and residential / commercial occupiers	Air transport then inhalation	High	Harm to human and animal health; respiratory irritation and illness	Emissions of NOx are a consequence of combustion and so will be restricted to the boiler exhaust. The boiler is equipped with combustion controls to reduce NOx emissions and the flue gases will be regularly sampled to confirm levels do not increase. In the initial H1 assessment, the potential impact of NOx emissions required further analysis using Screen3 dispersion software. This indicated a 2m increase in chimney height would enable NOx to be screened out. (see separate file)	Low
Releases of Carbon Monoxide (CO)	Nearby workforce and residential / commercial occupiers	Air transport then inhalation	High	Harm to human and animal health; respiratory irritation and illness	A product of poor combustion, CO is only likely to occur in the boiler flue gases. Close boiler regulation through electronic control, together with the consistency of the wood fuel, reduces the impact of CO to an insignificant level.	Low
Releases of Total Particulate Matter (PM10 and PM2.5)	Nearby workforce and residential / commercial occupiers	Airborne	High	Harm to human and animal health; respiratory irritation and illness	Only present in the boiler exhaust gases. The plant is fitted with filters to remove particulate matter before it reaches the atmosphere.	
Releases of Oxides of Sulphur (SOx)	Nearby workforce and residential / commercial occupiers	Air transport then inhalation	Low	Harm to human and animal health; respiratory irritation and illness	A potential product of combustion but as the wood fuel has a low sulphur content (probably less than 0.1%) the amount of SOx expected in the exhaust gases will be insignificant.	Low

Table B: Risk Assessment						
Source of Risk	**Receptor**	**Pathway**	**Assessment of Risk before preventative measures:**		**Risk Management**	**Residual Risk**
			Probability and Magnitude	**Potential Consequence**		
Emissions from the drying kiln exhaust fans.	Nearby workforce and residential / commercial occupiers	Airborne	Low	Minor	The kilns are used to reduce the moisture content of completed timber pallets at relatively low temperatures only. Some heat treatment occurs but at a temperature less than 70°C, which means decomposition of the constituents of the wood is likely to be minimal. This is an accelerated natural drying process rather than a treatment so emissions of all kinds are expected to be low.	Low
Emissions from the paint spray booth.	Nearby workforce and residential / commercial occupiers	Air transport then inhalation	Low	Harm to human and animal health; respiratory irritation and illness	The spraying area is very small, enclosed with a dedicated air extract system. Filters on the extract air remove any mist and odour caused by spraying and only water based, low VOC stains are used.	
Airborne particles from the dust extraction system, the wood chipper and other dust.	Nearby workforce and residential / commercial occupiers	Airborne	Medium	Annoyance. Potential for irritation to respiratory tract.	All machinery which might be the source of airborne dust are fitted with dedicated extract or filters. Filter media is changed regularly in accordance with a written maintenance procedure. The cyclone is regularly serviced to maintain efficiency.	Low
Other airborne contaminants; heavy metals, ammonia, sulphur dioxide, hydrogen sulphide.	Nearby workforce and residential / commercial occupiers	Air transport then inhalation or ground deposition	Low	Harm to human and animal health; respiratory irritation and illness	Due to the nature of the manufacturing process and the type of plant located on site, none of these contaminants will be emitted in any measurable quantity.	Low
Noise	Nearby workforce and residential / commercial occupiers	Airborne	Medium	Annoyance for nearby receptors. Potential for damage to hearing for on-site employees.	There are a number of potential sources for noise including delivery vehicles, forklift trucks, the dust extract system, other fans and mechanical plant. There are a number of business premises nearby and, at greater distance, residential areas. However, neighbours are shielded from main sources of noise by Hanger 3 and all external plant have acoustic enclosures. The machinery within Hanger 3 does produce higher noise levels and staff / visitors are require to wear ear protection.	Low
Arson or other kinds of deliberate vandalism	Nearby workforce and residential / commercial occupiers possibly local watercourses groundwater and soil.	Various	Medium	Risk of emissions and of contamination to surface water	The site is be surrounded by a suitable security fence and any entrances are fitted with security gates. The gates are locked if the site is ever unattended. Stacks of timber pallets awaiting delivery to customers are vulnerable to fire and a separation system is operated to reduce the possibility of fire spreading from stack to stack.	Low
Accidental Fires	Nearby workforce and residential / commercial occupiers	Airborne	Low	Health impact of smoke inhalation	A no smoking policy is enforced on site. Permits to work are required in relation to any hot work in order to ensure there are no potential sources of ignition close to stored timber or dust. All plant and equipment will be properly maintained with a view to	Low

Table B: Risk Assessment						
Source of Risk	**Receptor**	**Pathway**	**Assessment of Risk before preventative measures:**		**Risk Management**	**Residual Risk**
			Probability and Magnitude	**Potential Consequence**		
					reducing fire risk; notably the dust extraction system, cyclone and sawdust storage. The dust extraction and silo have explosion doors to vent smoke and gas in the event of a fire.	
Operator error	Local surface water courses, nearby workforce, soils.	Airborne or surface water drains depending on emission	Medium	Emissions to air or water	The site is managed by a technically competent operator. All staff receive training and an induction is provided for contractors so that they are aware of health and safety and environmental issues. The site will be operated in accordance with written procedures. The company's own environmental management system will be audited and reviewed annually to ensure compliance and to implement changes where required.	Low
General onsite hazards: operation of machinery, exposure to hazardous materials etc.	On site workforce and visitors	None	Medium	Bodily injury	Machinery will only be operated by qualified and trained staff as set out in an accident prevention plan.	Low
Vermin and pests	Nearby workforce and residential / commercial occupiers	Airborne or over land	Medium	Annoyance potential for spread of disease	The site does not process any material that is likely to attract pests.	Low
Litter	Nearby workforce and Residential / commercial occupiers	Airborne	Medium	Annoyance. Potential for minor injury	For general litter the site will be inspected on a regular basis and any loose materials lying around the site will be collected and placed in an appropriate container.	Low

Air Dispersion

The Environment Agency H1 software indicated that the levels of NO_2 in the exhaust gases may result in a higher than acceptable ELV close to Hanger 3 in certain weather conditions. An increase in flue height by 2m gives a maximum calculated ELV of 20.07 micrograms per m^3 of air. This may be considered insignificant (see separate file *HLC Upwood – H1 extracts.pdf* and *HLC Upwood – Screen3 output.pdf*).

Section D – Additional Information

Fires on Site

Fire is a particular hazard for the site as a considerable quantity of combustible material is stored at any one time. A fire of any kind will be regarded as a priority incident and immediate action will be taken to extinguish it. The site will be temporarily closed. Records of any fire will be kept in a site log held in the site office. The site log will be available for inspection to authorised officers of the Local Authority Environmental Health Department.

If a fire occurs at the site, a Technically Competent Manager or other suitably trained person will assess the extent of the problem. If the site staff cannot properly deal with the fire, the incident will be regarded as an emergency and treated as described below:

- The Fire Brigade will be notified immediately
- Management staff will instigate evacuation of the site to designated fire muster points;
- Equipment will be turned off;
- A member of staff will be sent to the site entrance for the purpose of guiding in the emergency services;
- Adjacent sites will be notified; and
- Details of the incident will be recorded and a report made available to the Local Authority / HSE / Environment Agency.

Protected Habitats

The nearest protected habitat is Upwood Meadows (SSSI) which is over 2km to the south-west. Warboys and Wistow Wood (SSSI) is around 3km to the south-east and the Woodwalton Fen (Ramsar and National Nature Reserve) is over 4km to the west. None of these sites are likely to be impacted by emissions from the HLC Wood Products site. The location of these sites is indicated on the map extract attached in Appendix 5.

Activities on site are for the most part carried out within buildings, sealed ducts or the silo. Chemicals are used on in only very small quantities (e.g. paints, cleaning materials, diesel for forklift operations etc). All are stored in appropriate containers within bunds. There is little potential for migration of contaminants into soils or surface water.

Emissions to air from the site have been assessed and have been shown to be within statutory air quality limits. Due to the enclosed nature of the processes and the types of materials used at the site, activities will not generate dust or litter or attract vermin, which might impact on protected habitats.

Noise Assessment

A specific Noise Assessment report has not been commissioned as this was considered unnecessary. However the major sources of noise identified are:

- The pallet production lines, with associated sawing and nailing operations.
- The site air compressors
- The dust extraction system, notably the cyclone.

- The wood chipper.
- The wood fuelled boiler, specifically the fans and pumps associated with heat production.
- The drying kiln extract fans
- Forklift trucks and other vehicle movements around the site.

In normal operations, none of these sources are audible outside the site boundary, either because of specific acoustic shielding or because the source is within a building.

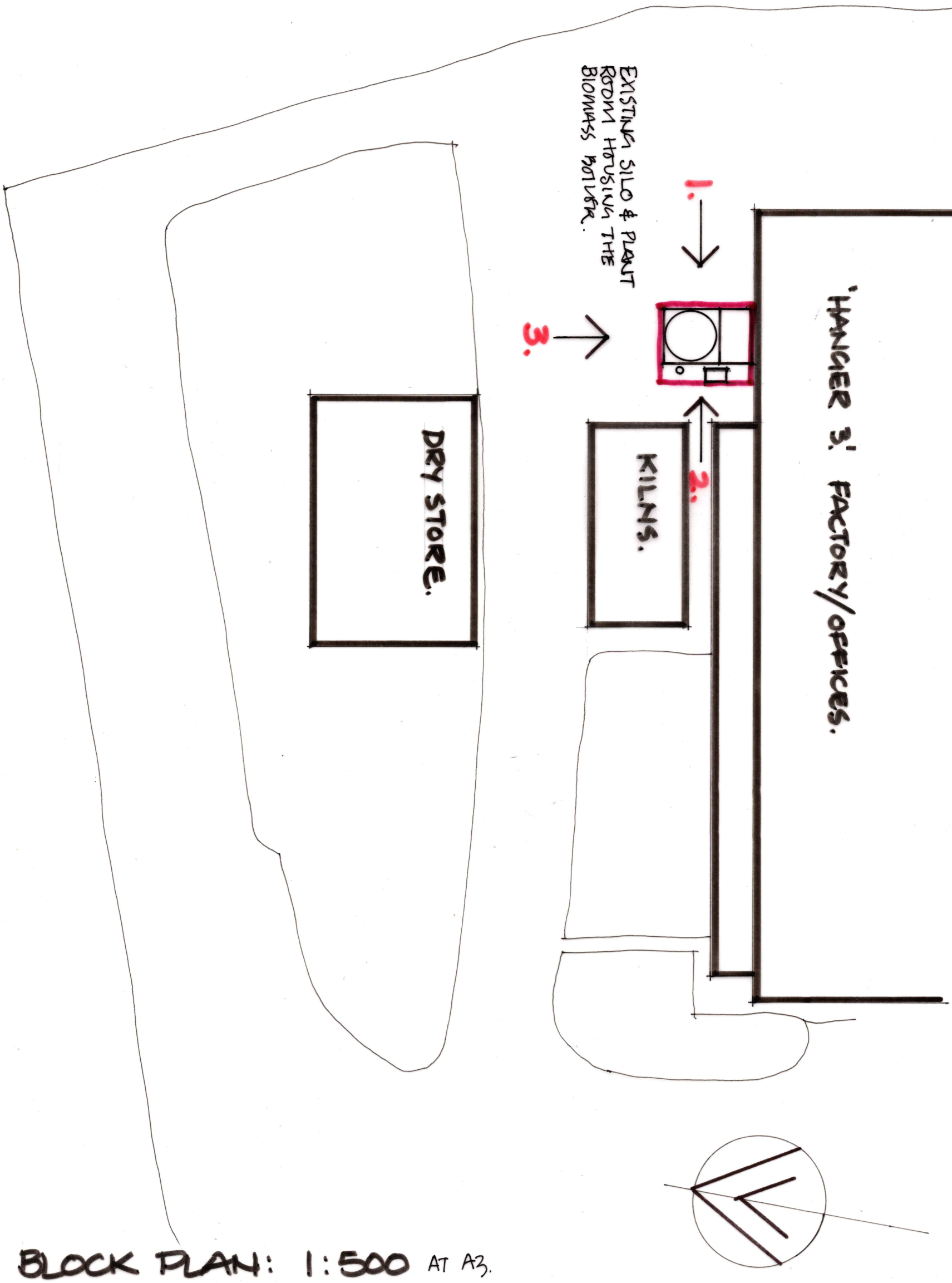
Emissions Monitoring

The operator will arrange for annual monitoring of the boiler flue gases for NOx (expressed as NO_2), CO and Particulate Matter in order to measure compliance with the relevant ELVs and, in the case of NO_2, the values used in the simple air dispersion modelling. The operator will insure that the techniques, personnel and equipment used have either MCERTS certification or MCERTS accreditation as appropriate.

Combustion monitoring control will continue to be utilised to ensure stable operation of the boiler and to minimise any variations in emissions.

Daily visual monitoring of plant and equipment will pre-empt failures which may also cause rogue emission levels. A visual inspection of the stack plume for smoke will be undertaken and the result recorded.

Appendix 1 – Site Plans and Photographs



BLOCK PLAN: 1:500 AT A3.

0 10 20 30 METRES.

EXISTING 930 Kw BIOMASS BOILER, FLUE AND ASSOCIATED EQUIPMENT

AT: 'HANGAR 3' UPWOOD AIR PARK, RAMSAY ROAD, BURY, CAMBRIDGESHIRE.

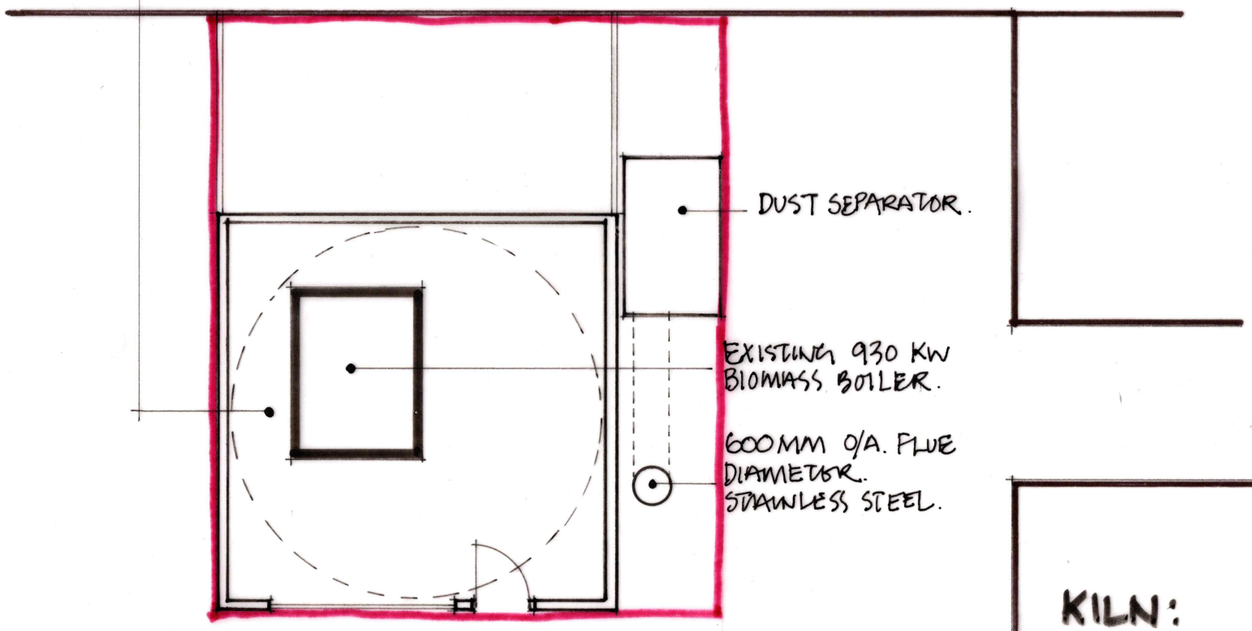
FOR: H.L.C. (WOOD PRODUCTS) LTD.

DATE: MAY 2020.

DRAWING: 376:3.

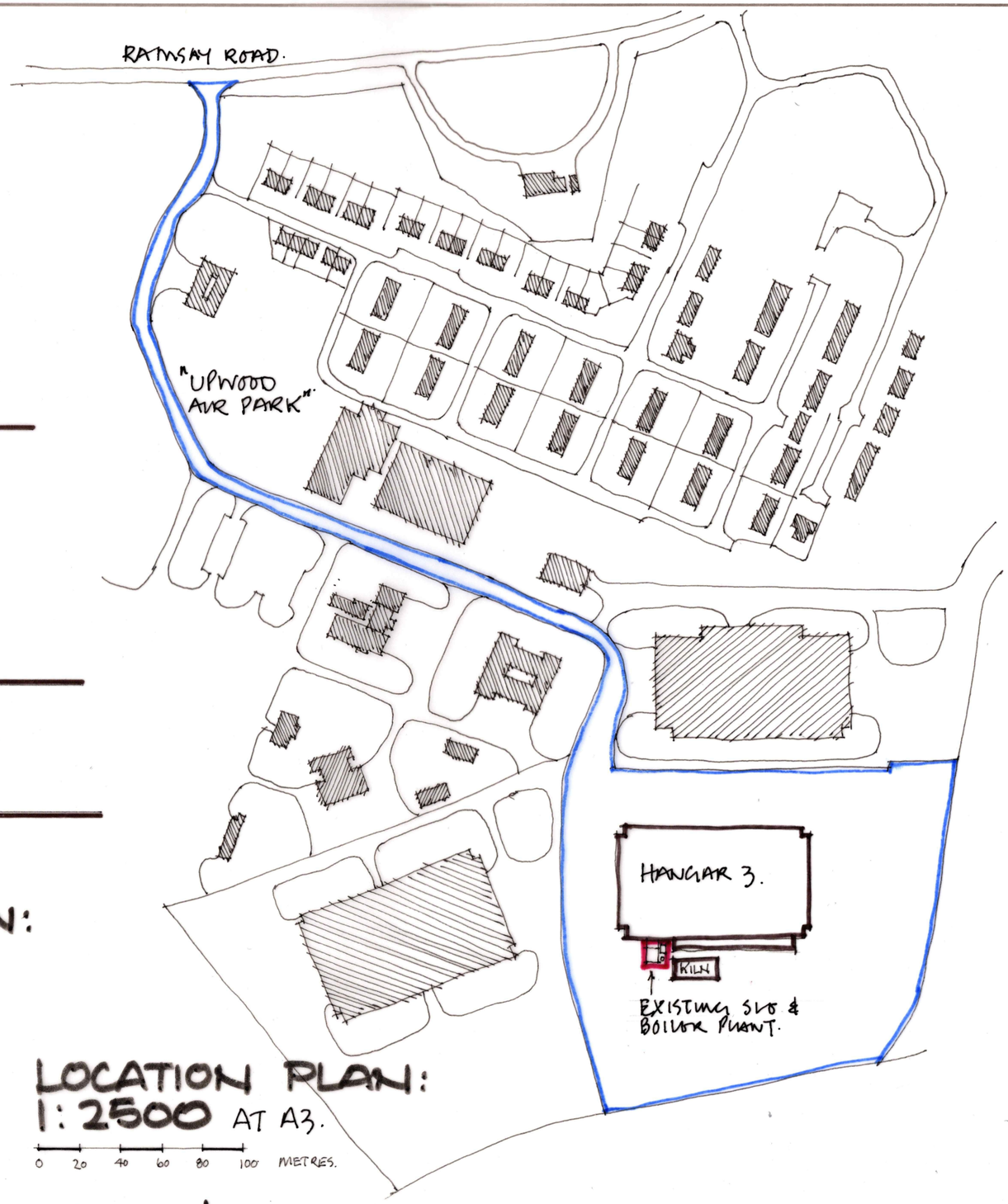
EXISTING WOODCHIP SILO AND BIOMASS BOILER HOUSING AS APPROVED WITH PLANNING PERMISSION: 1400946 FUL.

HANGAR 3:



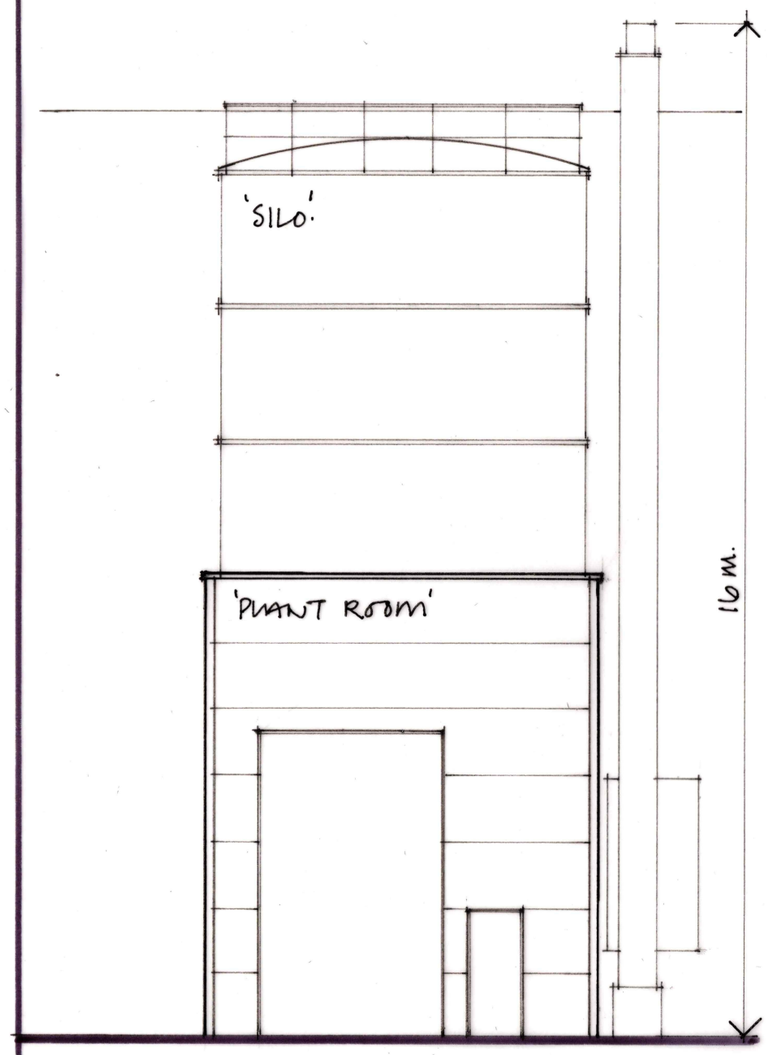
SITE PLAN: 1:100 AT A3.

KILN:

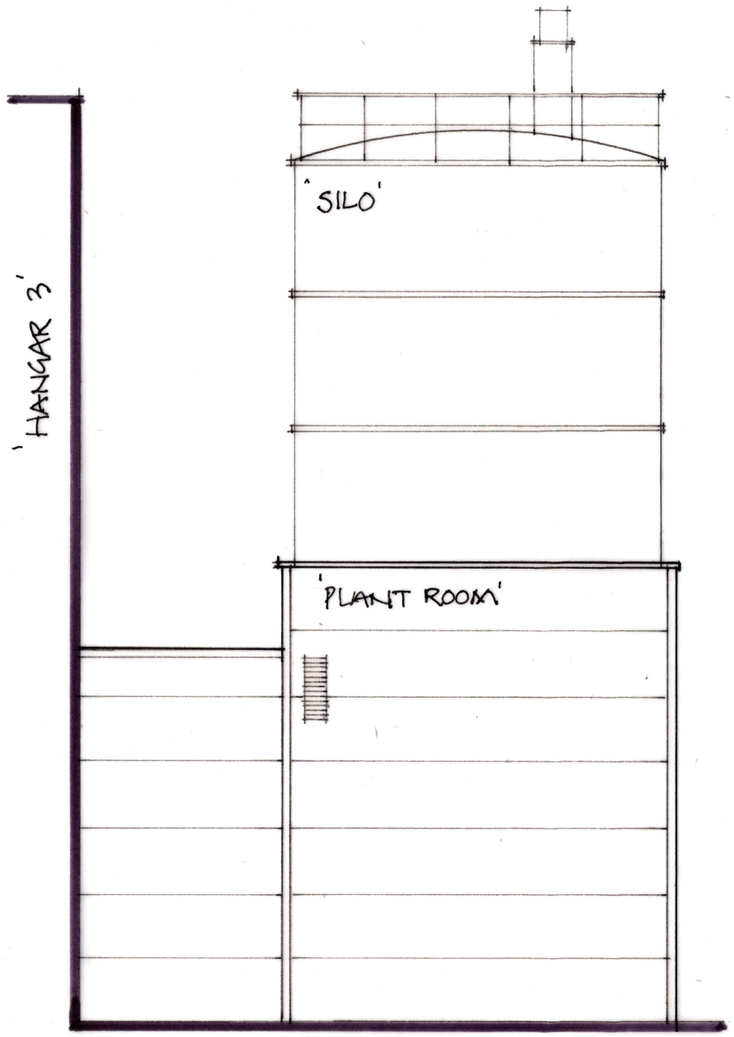


EXISTING 930 KW BIOMASS BOILER, FLUE & ASSOCIATED EQUIPMENT:
AT: 'HANGAR 3' UPWOOD AIR PARK, RAMSAY ROAD, BURY, CAMBRIDGESHIRE.
FOR: H.L.C. (WOOD PRODUCTS) LTD.
DATE: MAY 2020.

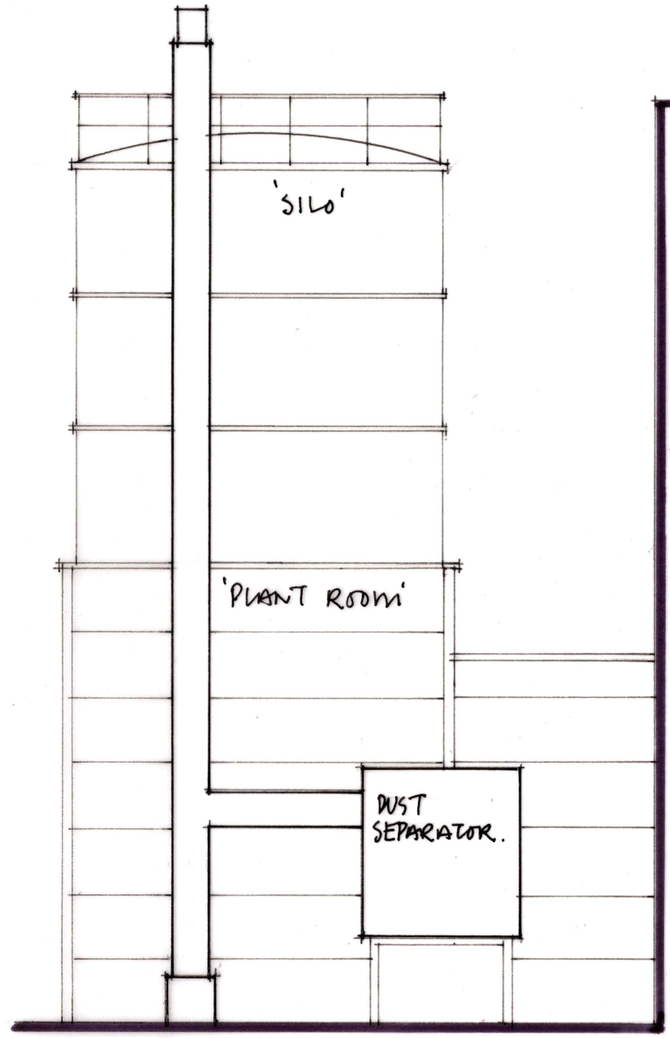
DRAWING: 376:1.



NORTH ELEVATION:



EAST ELEVATION:



WEST ELEVATION:

EXISTING 930 Kw BIOMASS BOILER, FLUE & ASSOCIATED EQUIPMENT:
AT: 'HANGAR 3' UPWOOD AIR PARK, RAMSAY ROAD, BURY, CAMBRIDGESHIRE:
FOR: H.L.C. (WOOD PRODUCTS) LTD.

DATE: MAY 2020 SCALE: 1:100 AT A3. (DO NOT SCALE.) DRAWING: 376:2.

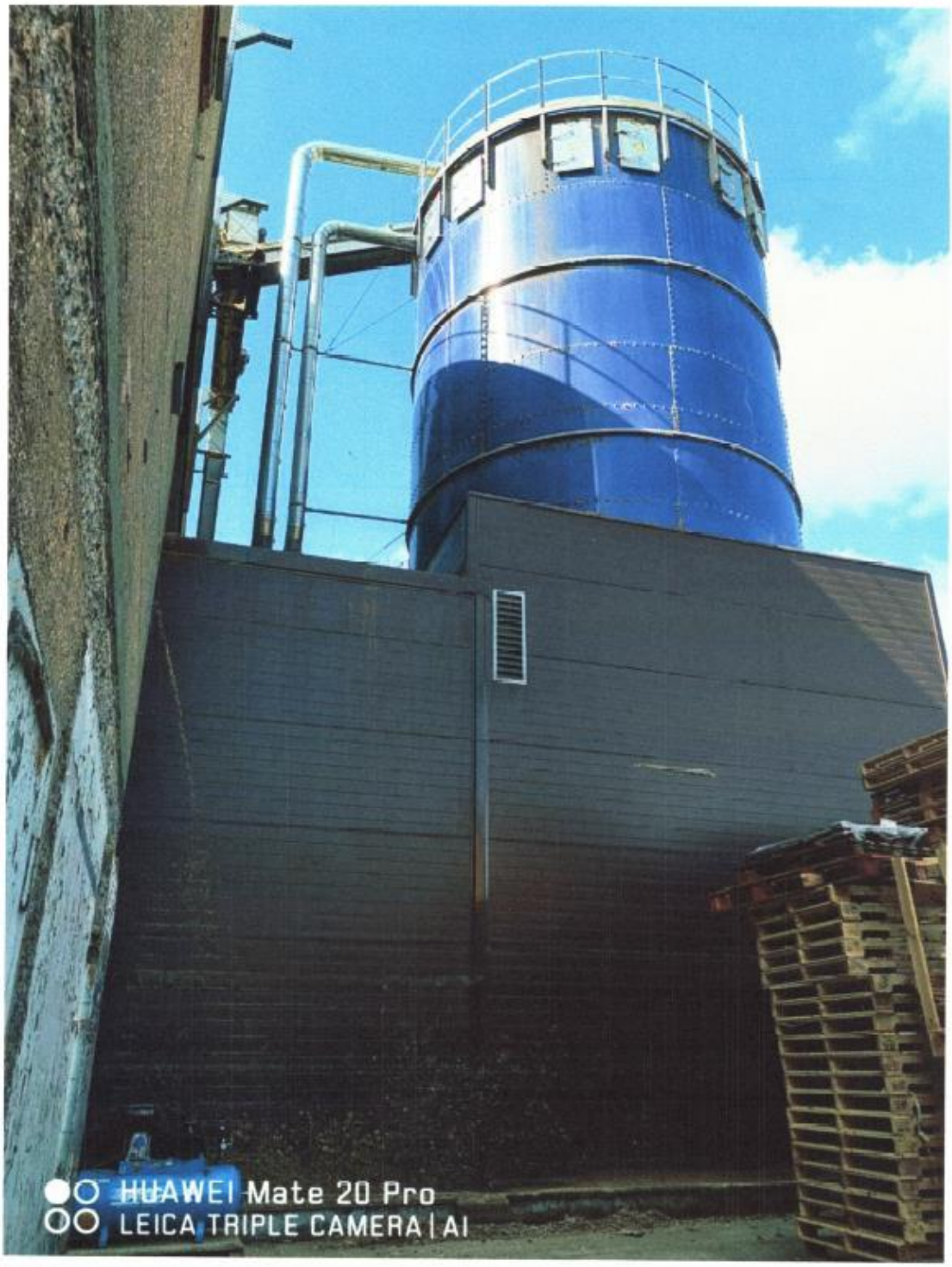


PHOTO. 1.

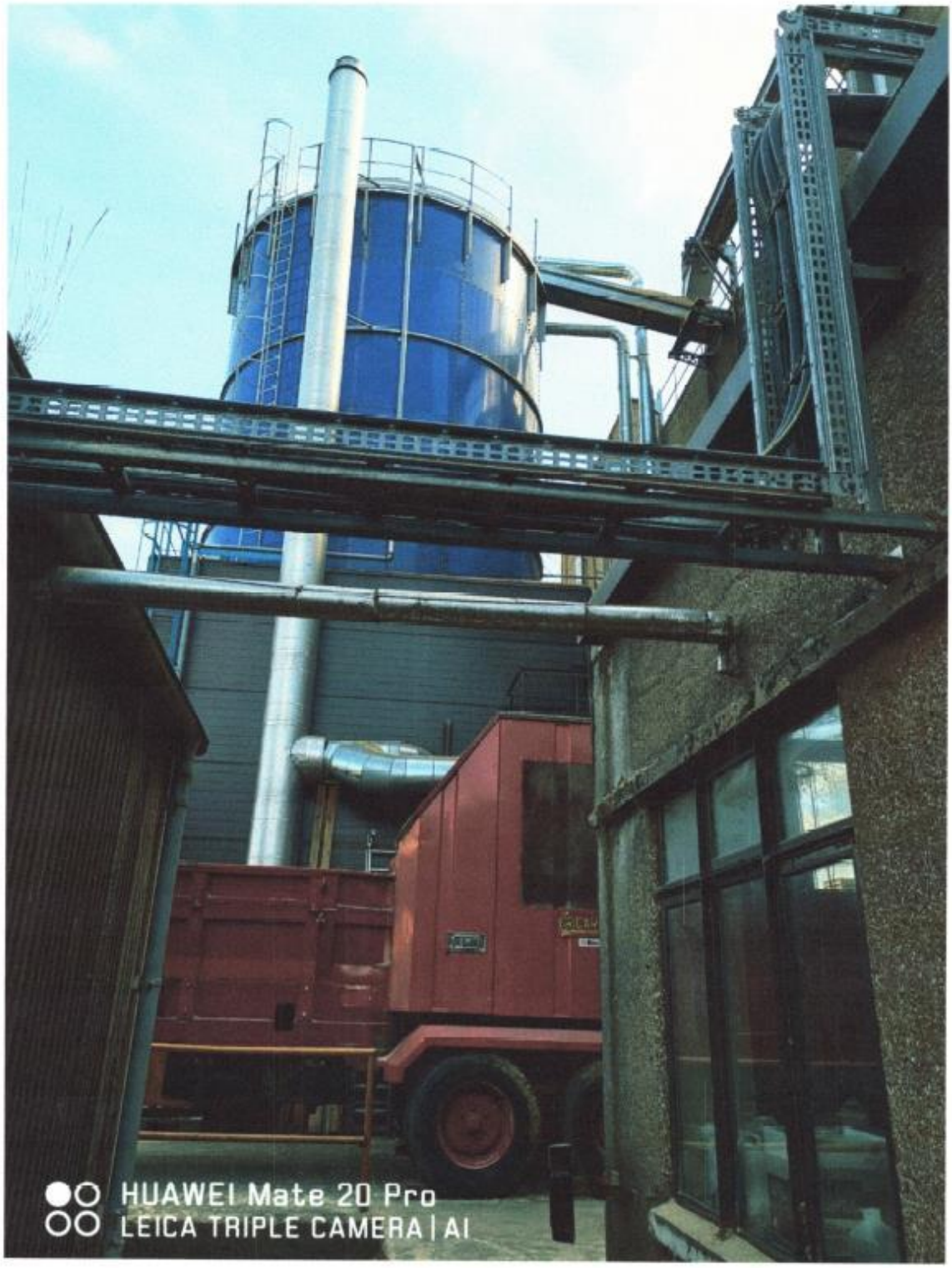
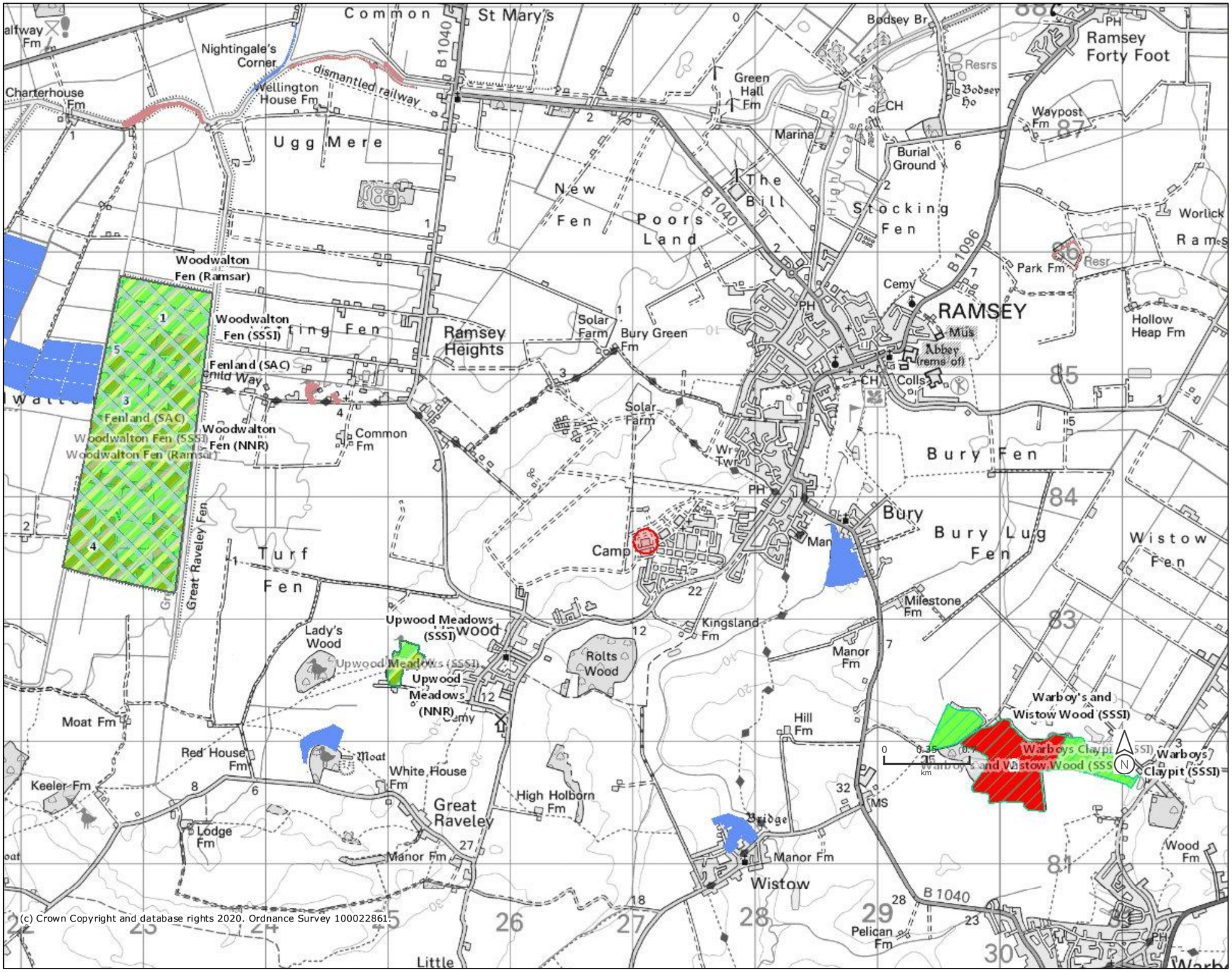


PHOTO. 2.

PHOTO 3.

Appendix 2 – Map indicating SSSI and Protected sites

HLC Upwood



Legend

- Ramsar Sites (England)
- Sites of Special Scientific Interest (England)
- Special Areas of Conservation (England)
- Special Protection Areas (England)
- Local Nature Reserves (England)
- National Nature Reserves (England)
- Ramsar Sites (England)
- Proposed Ramsar Sites (England)

Projection = OSGB36
xmin = 521300
ymin = 281400
xmax = 532500
ymax = 286800

0 0.6 1.2
km

Map produced by MAGIC on 14 May, 2020.