Permit with introductory note

The Environmental Permitting (England & Wales) Regulations 2010

Padeswood Cement Works

Castle Cement Limited
Padeswood Works
Padeswood
Mold
Flintshire
CH7 4HB

Permit number

EPR/BL1096IB

Padeswood Cement Works
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Introductory note

This introductory note does not form a part of the permit

The main features of the permit are as follows.

DESCRIPTION OF THE PROCESS

The Hanson Cement works at Padeswood manufactures cement from limestone, pulverised fuel ash ("PFA"), shale and sand, together with gypsum, and dispatches it in bulk tankers and as packed cement. The kiln is a modern design dry process kiln, with a nominal capacity of 750,000 tonnes per annum and includes a five-stage cyclone pre-heater and a pre-calciner. Its advanced technology reduces energy consumption and significantly reduces emissions to air.

Manufacturing of cement at Padeswood involves three main steps:

Step 1:
Crushing and blending of raw materials and additives to produce "raw meal". Limestone brought from the nearby Cefn Mawr quarry is delivered to a reception hopper in a purpose–built enclosure from where it is transferred to the Crane Store using a system of conveyor belts. The other raw materials are also stored here. From the Crane Store, all the raw materials (except gypsum) are taken by conveyor to the dry milling equipment.

Step 2:
Clinker Manufacture. The raw meal is transported to the top of the pre-heater tower cyclones. The mixture descends through the cyclones where it is heated to a temperature of about 850°C. (Calcining involves breaking down the carbonates in the limestone to produce oxides). The calcined material is further heated in the rotating kiln to produce clinker at a temperature of 1450°C. The clinker is cooled to about 100°C and discharged from the kiln's cooler and conveyed to a storage building.

The calciner can be heated using Profuel (made from paper, plastic, fibre and textiles), solid recovered fuel (also known as SRF which is similar to Profuel but reclaimed from 'black bag' waste), meat and bone meal, shredded tyres or coal/petcoke. In addition, hot gas from the kiln and the clinker cooler are added to assist combustion and reduce overall energy requirements. It is at this point that the separately-milled shale is introduced. Using the exhaust gas from the kiln in this way means that substances emitted from the kiln undergo gas/solid reactions as they pass through the calciner and many are reduced or incorporated into the clinker product. Similarly introducing the shale separately into the calciner burns off volatile compounds; again eliminating a large range of emissions.

The gases and calcined material then pass to the pre-heater where the calcined raw materials are removed from the gas stream in a cyclone and enter the rotary

kiln where the clinker is formed. The burner for kiln 4 can be fuelled by Cemfuel, Profuel, MBM and the coal/petcoke mix. The hot clinker is cooled in a grate cooler and some heated air from the clinker cooler is used as combustion air in the kiln and calciner with the rest discharging to atmosphere through a bag filter and 35m stack. The clinker is taken to the storage facility by conveyor belts. Clinker can also be exported from site by lorries which are loaded in the clinker loading area.

To control clinker quality and minimise blockages in the preheater tower a kiln bypass is used. Some hot gas from the kiln to the calciner is extracted. This gas passes through a mixing chamber and then into a conditioning tower, before de-dusting in a dedicated electrostatic precipitator. The bypass dust is collected for disposal while a portion of the cooled, de-dusted gas is returned to the mixing chamber to undertake the initial quench. This eliminates the need for fresh cold air making the kiln more efficient. The remainder is returned to the downdraft calciner to take advantage of NO_x reduction within the main calciner.

Step 3:
Cement Milling. Conveyor belts transfer the clinker from the storage facility to the feed hoppers on the cement mills, where it is mixed with gypsum and may be ground with additives such as fillers, grinding aids and strength enhancers to make the final cement product. The four cement mills each have fabric filters to minimise releases of dust to air. The cement produced is pneumatically conveyed to the bulk silos fitted with dust filters on the vents. From these storage silos cement is extracted either directly to bulk road tankers or to the bagging plant.

Fuel
Gas oil or kerosene is used to start up the kiln which is then fuelled by coal and petcoke until stability is achieved. The coal and petcoke are stored in a largely covered stockpile area. The coal and petcoke are transported to the Crane Store, then using a series of conveyor belts, taken to be milled to a fine powder to aid combustion. They are ground in a vertical spindle mill in dry air from the exhaust gas from the cyclone pre-heater. The exhaust air from the mill is passed through its own bag filter to atmosphere via the main stack. (See fuels factsheet for information on alternative fuels).

Waste
Bypass dust is classified as hazardous waste and has to either be disposed of in a suitable facility or recovered in waste management process. Bag filter dust is recycled into the process. Other wastes produced at the Installation are stored in designated storage areas before being taken for recovery or disposal.

Alternative Fuels
Kiln 4 is permitted to use up to 100% of a range of Substitute Fuels (“SFs”) instead of coal and petcoke. These include:

- Shredded used motor vehicle tyres which are delivered to the works by road. The tyres are taken directly from the delivery vehicle and fed by a conveyor into the top of the calciner. They are delivered to the calciner combustion chamber through a system of two screw conveyors and a chute.
- Cemfuel, manufactured to a detailed specification from a range of waste streams including spent solvents, paint and ink residues, spent carbon absorbers and waste oils. The Cemfuel is delivered by road and stored in steel tanks in bunded areas. The tanks are vented to atmosphere through an activated carbon filter system and fitted with level and overflow control

systems. Cemfuel is used only on the main burner of kiln 4 and is not introduced into the calciner.

- Profuel, is manufactured from solid wastes, principally paper, plastics, fibre and textiles. Profuel may be used as a fuel for both the calciner and the kiln although it has only been used on the calciner thus far.
- SRF (Solid Recovered Fuel) is bio-degraded and shredded combustible waste mainly consisting of paper and plastics from household sources. SRF is manufactured off-site using a form of MBT (Mechanical and Biological Treatment). Delivery to the works is by specially designed road vehicles. SRF is fed to the calciner using the same system as for chipped tyres and Profuel. SRF and Profuel are also pneumatically conveyed to the calciner.
- MBM (Meat and Bone Meal) is a non-hazardous bio-fuel produced by sterilising and grinding abattoir waste. MBM is delivered to site in special road vehicles and then transferred to a storage silo equipped with an activated carbon filter system. MBM may be used as a fuel for both the calciner and the kiln. Each of the SFs have a specification and are tested to ensure conformity with that specification and suitability for use.

Emissions Monitoring

Emissions from the kiln stacks are continuously monitored for total particulate matter (TPM), carbon monoxide (CO), sulphur dioxide (SO_2), hydrogen chloride (HCl), oxygen (O_2), moisture (H_2O), nitrogen oxides (as NO_2), ammonia (NH_3) and volatile organic compounds (as TOC). In addition spot samples will be carried out twice per year for metals [cadmium (Cd), thallium (Tl), mercury (Hg), antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni) & vanadium (V)], dioxins and hydrogen fluoride (HF).

The cement mills and clinker cooler are continuously monitored for total particulate matter.

The status log of the permit sets out the permitting history, including any changes to the permit reference number.

Status Log of the permit		
Description	**Date**	**Comments**
Application BL1096	Received 29/08/01	
Notice requiring further information	Request sent 17/12/01	Consolidated application incorporating response received 05/06/02
Notice requiring further information	Request sent 11/04/03	Response received 06/06/03
Notice requiring further information	Request sent 17/07/03	Response dated 11/08/03
Additional information from Applicant: revised site plan and confirmation that landfill is not part of the installation	Received 24/10/03	
Additional information from applicant	Received 10/05/04	
Permit Determined BL1096	17/12/04	
Application for landfill variation	Received 15/04/05	

Status Log of the permit		
Description	**Date**	**Comments**
Notice requiring further information	Request sent 21/07/05	Response received 23/09/05 Response received 09/01/06
Notice requiring further information	Request sent 02/06/06	Response received 03/08/06 Response received 14/08/06 Response received 19/09/06
Variation Determined YP3438	08/11/07	
Application for MBM variation	Duly made 30/03/07	
Notice requiring further information	Request sent 27/06/07	Response received 20/07/07
Additional information from applicant	Received 20/12/07	
Request to amend fuel specification to Standard Waste Derived Fuel Specification for the Cement Sector	Received 21/02/07	
Additional information from applicant	Received 20/02/08	
Variation Determined KP3338UC	03/04/08	
Application for SRF variation	Received 03/07/07	
Notice requiring further information	Request sent 31/07/07	Response received 28/08/07
Additional information from applicant	Received 10/03/08	
Variation Determined AP3134UN	17/04/08	
Application for landfill variation	Duly made 27/05/08	
Additional information from applicant	Received 21/08/08	
Variation Determined EA/EPR/BL1096IB/V005	09/10/08	
Partial surrender application	Received 18/12/09	
Variation Determined EA/EPR/BL1096IB/S007	06/04/10	Partial surrender of permit to remove the operation of a hazardous waste landfill from permit
Environment Agency Cement and Lime Sector Review Variation EPR/BL1096IB/V009	04/08/10	
Environment Agency Variation correcting errors EPR/BL1096IB/V010	15/12/10	

Status Log of the permit		
Description	**Date**	**Comments**
Variation Application EPR/BL1096IB/V011 received	03/05/13	Variation to reduce monitoring requirements following results of a public health study.
Variation Application EPR/BL1096IB/V011 issued	06/09/2013	Variation issued
Regulation 60(1) Notice of request for more information	06/03/14	Regarding Implementation of BAT conclusions under IED
Regulation 60(1) response received	30/01/15	Regarding Implementation of BAT conclusions under IED
Variation Application EPR/BL1096IB/V012	Duly made 23/02/15	Variation to add in 2 docking stations and pneumatic conveyer
Variation Application EPR/BL1096IB/V012 issued	09/06/15	Variation issued
Request for additional information to support Regulation 60(1) response	26/06/15	
Response to request for additional information received	29/07/15	Clarification on techniques employed in respect of the following BAT conclusions: 2, 5(g), 8, 9, 14, 15, 16, 19 and 20.
Additional information received	02/03/16	Updated site plan
Additional information received	14/03/16	Assessment of background ammonia emissions
Natural Resources Wales Cement Sector Review 2015 Permit EPR/BL1096IB Variation issued EPR/BL1096IB/V013	19/07/16	Varied and consolidated permit issued in modern IED condition format.

End of introductory note

Permit

The Environmental Permitting (England and Wales) Regulations 2010

Permit number
EPR/BL1096IB

The Natural Resources Body for Wales ("Natural Resources Wales") authorises, under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2010

Castle Cement Limited ("the operator"),

whose registered office is
Hanson House
14 Castle Hill
Maidenhead
Berkshire
United Kingdom
SL6 4JJ

company registration number **02182762**

to operate an installation at
Padeswood Works
Padeswood
Mold
Flintshire
CH7 4HB

to the extent authorised by and subject to the conditions of this permit.

Name	Date
	**19 July 2016**

Eirian Macdonald, Principal Permitting Team Leader

Authorised on behalf of Natural Resources Wales

Conditions

1 Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances ,closure and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

1.2 Energy efficiency

1.2.1 The operator shall:

(a) take appropriate measures to ensure that energy is used efficiently in the activities;

(b) review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and

(c) take any further appropriate measures identified by a review.

1.3 Efficient use of raw materials

1.3.1 The operator shall:

(a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;

(b) maintain records of raw materials and water used in the activities;

(c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and

(d) take any further appropriate measures identified by a review.

1.4 Avoidance, recovery and disposal of wastes produced by the activities

1.4.1 The operator shall take appropriate measures to ensure that:

(a) the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste by the activities; and

(b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 of the Waste Framework Directive; and

(c) where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.

1.4.2 The operator shall review and record at least every four years whether changes to those measures should be made and take any further appropriate measures identified by a review.

2 Operations

2.1 Permitted activities

2.1.1 The operator is only authorised to carry out the activities specified in schedule 1 table S1.1 (the "activities").

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.

2.3 Operating techniques

2.3.1 (a) The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by Natural Resources Wales.

(b) If notified by Natural Resources Wales that the activities are giving rise to pollution, the operator shall submit to Natural Resources Wales for approval within the period specified, a revision of any plan or other documentation ("plan") specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan , and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

2.3.2 Any raw materials or fuels listed in schedule 2 table S2.1 shall conform to the specifications set out in that table.

2.3.3 Waste shall only be accepted if:

(a) it is of a type and quantity listed in schedule 2 tables S2.1; and

(b) it conforms to the description in the documentation supplied by the producer and holder.

2.3.4 The operator shall ensure that where waste produced by the activities is sent to a relevant waste operation, that operation is provided with the following information, prior to the receipt of the waste:

(a) the nature of the process producing the waste;

(b) the composition of the waste;

(c) the handling requirements of the waste;

(d) the hazardous property associated with the waste, if applicable; and

(e) the waste code of the waste.

2.3.5 The operator shall ensure that where waste produced by the activities is sent to a landfill site, it meets the waste acceptance criteria for that landfill.

2.3.6 The operator shall burn only those waste derived fuels at the locations specified in table S2.2 of schedule 2 and within the usage ranges specified in that table.

2.3.7 All waste derived fuels used at the installation are subject to the following conditions:

(a) No radioactive materials or radioactive wastes (as defined by sections 1 and 2 of the Radioactive Substances Act 1993) shall be included.

(b) No substances with PCB concentrations greater than 10mg/kg shall be included.

(c) No substances with PCP concentrations greater than 100mg/kg shall be included.

(d) No pharmaceutical products, pesticide products, biocide products and iodine compounds shall be included except as constituents of other materials and at levels that are minimised as far as reasonably practicable.

(e) No dioxins or furans shall be included except as constituents of other materials and at levels that are minimised as far as reasonably practicable.

(f) No medical/clinical waste shall be included.

2.3.8 No new waste derived fuels shall be used for the purposes of carrying out a feasibility trial without obtaining Natural Resources Wales's prior written approval in each case. Any such feasibility trials will be limited to a maximum of 100 tonnes of the fuel and a maximum duration of 14 days.

2.3.9 No new waste materials shall be used as raw materials in the process except with the prior written approval of Natural Resources Wales, and shall be subject to the specification in table S2.1 of schedule 2 or otherwise agreed in writing with Natural Resources Wales.

2.3.10 The operator shall ensure that prior to accepting waste derived fuels subject to condition 2.3.2 at the site, it has obtained sufficient information about the wastes to be burned as fuel to demonstrate compliance with the characteristics described in condition 2.3.2.

2.3.11 The operator shall take representative samples of all waste derived fuels delivered to the site unless otherwise agreed in writing with Natural Resources Wales and test a representative selection of these samples to verify conformity with the information obtained as required by condition 2.3.7. These samples shall be retained for inspection by Natural Resources Wales for a period of at least 1 month after the material is burned and results of any analysis made of such samples will be retained for at least 2 years after the material is burned.

2.3.12 Waste derived fuels shall not be burned, or shall cease to be burned, if:

(a) the kiln is in start-up (or as otherwise agreed in writing with Natural Resources Wales); or

(b) the kiln is in the process of shutting down (or as otherwise as agreed in writing with Natural Resources Wales); or

(c) Kiln feed rate is less than 120 tonnes/hr; or

(d) the calciner temperature is below, or falls below, 850^{o}C when using non-hazardous waste or hazardous waste where the content of halogenated organic substances (as chlorine) does not exceed 1%; or

(e) The kiln temperature is below, or falls below, 1100°C when using hazardous waste where the content of halogenated organic substances (as chlorine) exceeds 1%; or

(f) any continuous emission limit value in schedule 3 table S3.1 is exceeded due to disturbances or failures of the abatement systems, other than under "Chapter IV abnormal operating conditions"; or

(g) monitoring results required to demonstrate compliance with any continuous emission limit value in schedule 3 table S3.1 are unavailable other than under "Chapter IV abnormal operating conditions".

2.3.13 The operator shall record the beginning and end of each period of "Chapter IV abnormal operating conditions", and shall restore normal operation of the failed equipment or replace the failed equipment as rapidly as possible.

2.3.14 Where, during "Chapter IV abnormal operating conditions", any of the following situations arise, the operator shall, as soon as is practicable, cease the burning of waste derived fuels until normal operation can be restored:

(a) continuous measurement shows that an emission exceeds any emission limit value in schedule 3 table S3.1 due to disturbances or failures of the abatement systems, or continuous emission monitor(s) are out of service, as the case may be, for a total of four hours uninterrupted duration;

(b) the cumulative duration of "Chapter IV abnormal operating conditions" periods over one calendar year exceeds 60 hours on each kiln.

2.3.15 The operator shall interpret the end of the period of "Chapter IV abnormal operating conditions" as the earliest of the following:

(a) when the failed equipment is repaired and brought back into normal operation;

(b) when the operator initiates a shut down of the waste derived fuels, as described in the application or as agreed in writing with Natural Resources Wales;

(c) when a period of four hours has elapsed from the start of the "Chapter IV abnormal operating conditions";

(d) when, in any calendar year, an aggregated period of 60 hours "Chapter IV abnormal operating conditions" has been reached.

2.3.16 Hazardous waste derived fuels containing more than 1% Halogenated organic substances (as chlorine) shall only be burnt in the main burner of the kiln.

Waste storage and treatment

2.3.17 Hazardous waste shall not be mixed, either with a different category of waste or with other waste, substances or materials, unless it is authorised by Schedule 1 table S1.1 and appropriate measures are taken.

2.4 Improvement programme

2.4.1 The operator shall complete the improvements specified in schedule 1 table S1.3 by the date specified in that table unless otherwise agreed in writing by Natural Resources Wales.

2.4.2 Except in the case of an improvement which consists only of a submission to Natural Resources Wales, the operator shall notify Natural Resources Wales within 14 days of completion of each improvement.

2.5 Pre-operational conditions

2.5.1 The activities shall not be brought into operation until the measures specified in schedule 1 table S1.4 have been completed.

3 Emissions and monitoring

3.1 Emissions to water, air or land

3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1, S3.2, S3.3 and S3.4.

3.1.2 The limits given in schedule 3 shall not be exceeded.

3.1.3 Periodic monitoring shall be carried out at least once every 5 years for groundwater and 10 years for soil to the protocol agreed with Natural Resources Wales under Improvement Condition 6, unless such monitoring is based on a systematic appraisal of the risk of contamination.

3.1.4 Process Wastes produced at the site shall, as a minimum, be sampled and analysed in accordance with schedule 3 table S3.6. Additional samples shall be taken and tested and appropriate action taken, whenever:

(a) disposal or recovery routes change; or

(b) it is suspected that the nature or composition of the waste has changed such that the route currently selected may no longer be appropriate.

3.2 Emissions of substances not controlled by emission limits

3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.

3.2.2 The operator shall:

(a) if notified by Natural Resources Wales that the activities are giving rise to pollution, submit to Natural Resources Wales for approval within the period specified, an emissions management plan which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;

(b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

3.3 Odour

3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

3.3.2 The operator shall:

(a) if notified by Natural Resources Wales that the activities are giving rise to pollution outside the site due to odour, submit to Natural Resources Wales for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;

(b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

3.4 Noise and vibration

3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

3.4.2 The operator shall:

(a) if notified by Natural Resources Wales that the activities are giving rise to pollution outside the site due to noise and vibration, submit to Natural Resources Wales for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;

(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by Natural Resources Wales.

3.5 Monitoring

3.5.1 The operator shall, unless otherwise agreed in writing by Natural Resources Wales, undertake the monitoring specified in the following tables in schedule 3 to this permit:

(a) point source emissions specified in tables S3.1, S3.2 and S3.3;

(b) emissions to sewer as specified in table S3.4;

(c) process monitoring specified in table S3.5;

(d) process waste as specified in table S3.6;

3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

3.5.3 Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.5.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by Natural Resources Wales. Newly installed CEMs, or CEMs replacing existing CEMs, shall have MCERTS certification and have an MCERTS certified range which is not greater than 1.5 times the daily emission limit value (ELV) specified in schedule 3 table S3.1. The CEM shall also be able to measure instantaneous values over the ranges which are to be expected during all operating conditions. If it is necessary to use more than one range setting of the CEM to achieve this requirement, the CEM shall be verified for monitoring supplementary, higher ranges.

3.5.4 Permanent means of access shall be provided to enable sampling/monitoring to be carried out in relation to the emission points specified in schedule 3 tables S3.1, S3.2 and S3.3 unless otherwise agreed in writing by Natural Resources Wales.

3.5.5 Where Continuous Emission Monitors are installed to comply with the monitoring requirements in schedule 3 tables S3.1 and S3.2; the Continuous Emission Monitors shall be used such that;

(a) the values of the 95% confidence intervals of a single measured result at the daily emission limit value shall not exceed the following percentages:

- Carbon monoxide 10%
- Sulphur dioxide 20%
- Oxides of nitrogen (NO & NO_2 expressed as NO_2) 20%
- Particulate matter 30%
- Total organic carbon (TOC) 30%
- Hydrogen chloride 40%
- Ammonia 40%

(b) valid half-hourly average values shall be determined within the effective operating time (excluding the start-up and shut-down periods) from the measured values after having subtracted the value of the confidence intervals in condition 3.5.5;

(c) where it is necessary to calibrate or maintain the monitor and this means that data are not available for a complete half-hour period, the half-hourly average shall in any case be considered valid if measurements are available for a minimum of 20 minutes during the half-hour period. The number of half-hourly averages so validated shall not exceed 5 per day;

(d) Daily average values shall be determined as the average of all the valid half-hourly average values within a calendar day. The daily average value shall be considered valid if no more than five half-hourly average values in any day have been determined not to be valid;

(e) no more than ten daily average values per year shall be determined not to be valid.

3.5.6 Where Continuous Emission Monitors are installed to comply with the monitoring requirements in schedule 3 table S3.1:

(a) a QAL2 test as specified in BS EN 14181 shall be performed at least every three years or whenever there are significant changes to either the process, the fuel used or to the CEMs themselves;

(b) an Annual Surveillance Test (AST) shall be performed at least annually, as specified within BS EN 14181;

(c) the operator shall have a procedure to apply the QAL3 requirements of EN 14181.

4 Information

4.1 Records

4.1.1 All records required to be made by this permit shall:

(a) be legible;

(b) be made as soon as reasonably practicable;

(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and

(d) be retained, unless otherwise agreed in writing by Natural Resources Wales, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:

(i) off-site environmental effects; and

(ii) matters which affect the condition of the land and groundwater.

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by Natural Resources Wales.

4.2 Reporting

4.2.1 The operator shall send all reports and notifications required by the permit to Natural Resources Wales using the contact details supplied in writing by Natural Resources Wales.

4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to Natural Resources Wales by 31 January (or other date agreed in writing by Natural Resources Wales) each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of that data;

(b) the performance parameters set out in schedule 4 table S4.2 using the forms specified in table S4.3 of that schedule.

(c) the functioning and monitoring of the plant involved with the burning of waste derived fuels, in a format agreed with Natural Resources Wales. The report shall, as a minimum requirement (as required by Chapter IV of the Industrial Emissions Directive (IED)) give an account of the running of the process and the emissions into air and water compared with the emission standards in the IED.

4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by Natural Resources Wales, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:

(a) in respect of the parameters and emission points specified in schedule 4 table S4.1;

(b) for the reporting periods specified in schedule 4 table S4.1 and using the forms specified in schedule 4 table S4.3; and

(c) giving the information from such results and assessments as may be required by the forms specified in those tables.

4.2.4 The operator shall, unless notice under this condition has been served within the preceding four years, submit to Natural Resources Wales, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.

4.2.5 Within 1 month of the end of each quarter, the operator shall submit to Natural Resources Wales using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter, if during that quarter the total amount accepted exceeds 100 tonnes of non-hazardous waste or 10 tonnes of hazardous waste.

4.3 Notifications

4.3.1 (a) In the event that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—

(i) inform Natural Resources Wales,

(ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and

(iii) take the measures necessary to prevent further possible incidents or accidents;

(b) in the event of a breach of any permit condition the operator must immediately—

(i) inform Natural Resources Wales, and

(ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;

(c) in the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.

4.3.2 Any information provided under condition 4.3.1(a)(i), or 4.3.1 (b)(i) where the information relates to the breach of a limit specified in the permit, shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.

4.3.3 Where Natural Resources Wales has requested in writing that it shall be notified when the operator is to undertake monitoring and/or spot sampling, the operator shall inform Natural Resources Wales when the relevant monitoring and/or spot sampling is to take place. The operator shall provide this information to Natural Resources Wales at least 14 days before the date the monitoring is to be undertaken.

4.3.4 Natural Resources Wales shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

(a) any change in the operator's trading name, registered name or registered office address; and

(b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

(a) any change in the operator's name or address; and

(b) any steps taken with a view to the dissolution of the operator.

In any other case:

(a) the death of any of the named operators (where the operator consists of more than one named individual);

(b) any change in the operator's name(s) or address(es); and

(c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

4.3.5 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

(a) Natural Resources Wales shall be notified at least 14 days before making the change; and

(b) the notification shall contain a description of the proposed change in operation.

4.3.6 Natural Resources Wales shall be given at least 14 days notice before implementation of any part of the site closure plan.

4.3.7 Where the operator has entered into a climate change agreement with the Government, Natural Resources Wales shall be notified within one month of:

(a) a decision by the Secretary of State not to re-certify the agreement;

(b) a decision by either the operator or the Secretary of State to terminate the agreement; and

(c) any subsequent decision by the Secretary of State to re-certify such an agreement.

4.4 Interpretation

4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.

4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "immediately", in which case it may be provided by telephone.

Schedule 1 - Operations

Table S1.1 activities			
Activity reference	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity and WFD Annex I and II operations**	**Limits of specified activity and waste types**
A1	3.1 A(1)a	Producing cement clinker in a rotary kiln with a production capacity exceeding 500 tonnes per day. **R01** – Use principally as a fuel or other means to generate energy **R05** – Recycling / Reclamation of other inorganic materials **R11** – Use of waste obtained from any other operations numbered R01 – R10 **R13 –** Storage of wastes pending recovery operations R01 – R12 (excluding temporary storage, pending collection, on the site where it is produced).	Receipt and storage of raw materials (including substitute raw materials) through crushing, blending, other processing and feeding to the kiln system. Mixing of hazardous waste (approved alternative raw materials) with raw materials for the production of clinker. Receipt and storage of fuels (including substitute fuels) and feeding to the kiln system. This includes the use of coal and gas oil as a start-up & shutdown fuel Discharge of clinker from the cooler to the clinker store or export facility and discharge of emissions from the chimney or other process vents.
A2	3.1 A(2)(a)	Grinding cement clinker in cement mills 1, 2, 3 & 4.	Receipt of clinker from the kiln and import facility through storage and transfer to the cement mills. Receipt, on site of all other raw materials (e.g. gypsum), through storage, blending and feeding, to the cement mills through to discharge of cement to storage silos. Emissions to air from process vents.
A3	Section 3.1 part B (a)	Storing, loading or unloading cement or cement clinker in bulk prior to further transportation in bulk.	Cement & clinker storage, bulk loading, unloading and dispatch. Emissions to air from process vents.
A4	Section 3.1 part B (b)	Blending cement in bulk or using cement in bulk other than at a construction site, including the bagging of cement and cement mixtures, the batching of ready-mixed concrete and the manufacture of concrete blocks and other cement products.	Blending and bagging of cement products. Emissions to air from process vents.
Directly Associated Activities			
A5	Waste storage and handling		From waste generation, storage and monitoring to waste despatch.

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Consolidated response to Information Notice dated 17/12/01	Sections 2.1 to 2.11	05/06/02
Response to Information Notice dated 11/04/03	The response given to questions 6 to 18, 23, 25 to 29 & 39	06/06/03
Additional Information May 2004	Sections 3,4, 7 to 18	10/05/04
Variation application YP3438s	The response to questions 2.1 to 2.5 in part B of the variation application form	15/04/05
Response to Information Notice dated 21/07/05	The response to questions A19, A20, A23, A29, A65, A66,A70, A79 and A81	23/09/05
Response to Information Notice dated 02/06/06	The response to questions B4, B8, B21 and B23	03/08/06 & 14/08/06
Variation Application KP3338UC	C2.1 to C2.9, C2.10 (except 2.10.17 to 2.10.20, 2.10.23 and table 2.10.2), C2.11	30/03/07
Response to Information Notice dated 27/06/07	The response given to questions 1,2 and 3	20/07/07
Variation Application AP3134UN	C2.1 to C2.9, C2.10 (except 2.10.18 to 2.10.21, 2.10.24 and table 2.10.2), C2.11	03/07/07
Response to information Notice dated 31/06/07	The response given to questions 1 & 4 to 7	28/08/07
Additional Information August 2008	Use of SNCR (selective non-catalytic reduction)	21/08/08
Supporting information to variation application EA/EPR/BL1096IB/V012, document reference Pad1-2015	All	23/02/15
Information received in support of Natural Resources Wales Cement Sector Permit Review 2014	All parts of operator response to Regulation 60 (1) notice sent 06/03/14	30/01/15
Information received in support of Natural Resources Wales Cement Sector Permit Review 2014	All parts of operator response to Regulation 60 (1) notice sent 26/06/15	29/07/15

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC1	Particulate emission data (Continuous Emissions Monitors) for emission points A3, A4, A5, A6 & A9 shall be corrected to standard reference conditions (as detailed in Schedule 6) from 09/04/17 onwards. Pre-determined correction factors for each emission point may be acceptable as an alternative to upgraded CEMS where the operator can demonstrate that these parameters are stable and consistent, providing historical data as evidence. In line with BS EN 15259, historic moisture and temperature measurements would need to be shown to not vary above or below 10%, (as a guide value), of the statistical mean from available data derived from periodic measurements. The Operator shall provide a report to Natural Resources Wales confirming (for agreement) how particulate emissions data will be corrected.	31/10/16
IC2	The Operator shall provide a written report detailing the proposed monitoring technique to be employed to demonstrate compliance with the particulate matter ELV of 10 mg/Nm^3 at emission points A11 & A12. If the Operator proposes the use of an alternative technique (i.e. not extractive or continuous measurement in accordance with recognised standards), then evidence must be provided to prove the technique will demonstrate compliance with the ELV to an equivalent level of certainty.	31/10/16
IC3	In order for Natural Resources Wales to set the appropriate emission limit values, the Operator shall submit a report detailing the operational capability (expressed as mg/Nm^3 of particulate released) of each bag filter plant associated with emission points A3, A4, A5, A6, A7 & A9. The report shall include: I. A statistical analysis of at least two years of particulate monitoring data for each emission point with supporting graphs demonstrating individual values, averages and standard deviations. II. Design specification of each bag plant. III. Details on all maintenance (including filter bag changes) carried out for each bag filter plant during the monitoring period, including dates and times of each maintenance	30/11/16

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC4	If storing Priority Hazardous Substances on site, the Operator must carry out the following assessments with reference to the Environment Agency's guidance "How to carry out a risk assessment if you're applying for a bespoke permit that includes discharging hazardous pollutants to surface water": Phase 1 Part A screening tests for mercury, cadmium, nickel, lead, benzene, polyaromatic hydrocarbons and any other relevant priority hazardous substances. Phase 1 Part B screening tests for mercury, cadmium, polyaromatic hydrocarbons and any other relevant priority hazardous substances. For any substance which is not screened out by the Phase 1 Part A or Part B screening tests the Operator will also need to carry out Phase 2 modelling, as described in "How to carry out a risk assessment if you're applying for a bespoke permit that includes discharging hazardous pollutants to surface water". The Operator must provide Natural Resources Wales with the results of the emissions monitoring, the results from the screening tests and the results from any Phase 2 modelling. The Operator may use the Environment Agency's H1 electronic screening tool to present the emissions data and to carry out the Phase 1 screening tests. Note: With regard to the Phase 1 Part A screening - a full list of priority hazardous substances is provided in the Environment Agency guidance "How to carry out a risk assessment if you're applying for a bespoke permit that includes discharging hazardous pollutants to surface water" under the section entitled "Screening test: priority hazardous pollutants". The Operator must review the list and carry out the screening for any substances, in addition to those specified above, that may be present in the installations discharges to surface water. With regard to the Phase 1 Part B screening for priority hazardous pollutants, the section entitled "Screening test: priority hazardous pollutants" provides a full list of relevant priority hazardous substances and their associated annual significant loads.	30/06/17
IC5	The Operator shall submit a report on the baseline conditions of soil and groundwater at the installation. The report shall contain the information necessary to determine the state of soil and groundwater contamination so as to make a quantified comparison with the state upon definitive cessation of activities provided for in Article 22(3) of the IED. The report shall contain information, supplementary to that already provided in the application Site Condition Report, needed to meet the information requirements of Article 22(2) of the IED.	30/09/17
IC6	The Operator shall submit the written protocol referenced in condition 3.1.3 for the monitoring of soil and groundwater for approval by Natural Resources Wales. The protocol shall demonstrate how the Operator will meet the requirements of Articles 14(1) (b), 14(1) (e) and 16(2) of the IED. The procedure shall be implemented in accordance with the written approval from Natural Resources Wales.	31/12/17

Table S1.4 Pre-operational measures for future development		
Reference	**Operation**	**Pre-operational measures**
PO1	Use of SRF & Profuel® as alternative fuels on the main kiln burner	The Operator shall provide details of the transport system to the main burner and monitoring programmes for agreement by Natural Resources Wales.

Schedule 2 - Waste types, raw materials and fuels

Table S2.1 Raw materials and fuels		
Raw materials and fuel description	**Specification**	
Coal / Petcoke mix	Sulphur Content	2.5% w/w
Chipped Tyres	EWC Number	16 01 03
	Gross CV	15 – 40 MJ/kg
	Sulphur	2.0% w/w
Meat & Bone Meal	EWC Number	02 02 03
	Gross CV	10 – 40 MJ/kg
	Sulphur	2.0% w/w
	Chlorine	2.0% w/w
Profuel® & SRF	EWC Number	19 12 10 & 19 02 10
	Gross CV	10 – 40 MJ/kg
	Sulphur	2.0% w/w
	Chlorine	2.0% w/w
	Total Fluorine, Bromine & Iodine	1.5% w/w
	Mercury	10 mg/kg
	Group II Metals :- (Total Cadmium & Thallium)	30 mg/kg
	Group III Metals :-	
	Copper	500 mg/kg
	Lead	300 mg/kg
	Total Group III Metals	800 mg/kg
Cemfuel®	EWC Number	19 02 08*
	Gross CV	10 – 42 MJ/kg
	Sulphur	2.0% w/w
	Chlorine	2.0% w/w
	Total Fluorine, Bromine & Iodine	1.5% w/w
	Mercury	20 mg/kg
	Group II Metals :- (Total Cadmium & Thallium)	40 mg/kg
	Group III Metals :-	
	Copper	1000 mg/kg
	Lead	800 mg/kg
	Total Group III Metals	1800 mg/kg
New waste derived fuel for feasibility trials	Specification to be agreed in writing with Natural Resources Wales	
Wastes used as raw materials (not as fuels)	Minimum Mineral content	At least 80% dry weight (w/w)
	Organic Materials	Organic materials as measured by net CV should be <10MJ/kg dry weight (w/w)
	No materials which are defined as carcinogens for the purposes of the COSHH Regulations 2002 (as amended) shall be used	
Waste generated on-site in connection with the handling and storing of waste derived fuels	Burnt with Cemfuel® at a rate that constitutes less than 1.0% by mass of the Cemfuel® feed rate.	

Table S2.2 Permitted waste types and quantities		
Waste Fuel Type	**Where used and % of Total Thermal Input**	**Total Usage Rates**
Cemfuel®	Main burner only 40%	0 - 40% thermal input 0 – 14.80 tonnes/hour
Chipped Tyres	Calciner only 25%	0-25% thermal input 0-6.17 tonnes/hour
MBM	Calciner 60% Main burner 24%	0-84% thermal input 0-31.08 tonnes/hour
Profuel®	Calciner 45% Main burner	0-55% thermal input 0-20.35 tonnes/hour
SRF	Calciner 60% Main burner 8%	0-68% thermal input 0-25.2 tonnes/hour

Schedule 3(a) – Emissions and monitoring until 8th April 2017

Table S3.1 Kiln Exhaust Emissions to air – emission limits and monitoring requirements					
Emission point ref.& location	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A8 – Kiln 4	Particulate matter	10 mg/Nm^3	Daily average	Continuous measurement	BS EN 14181
	Total Organic Carbon (TOC)	50 mg/Nm^3			
	Hydrogen chloride	10 mg/Nm^3			
	Carbon monoxide	1200 mg/Nm^3			
	Sulphur dioxide	200 mg/Nm^3			
	Oxides of nitrogen (NO & NO_2 expressed as $NO_{2)}$	500 mg/Nm^3			
	Ammonia	No limit set			
	Hydrogen fluoride	1mg/Nm^3	Periodic over minimum 30 minute, maximum 8 hour period	6 monthly	ISO 15713
	Cadmium & thallium and their compounds (total)	0.05 mg/Nm^3	Periodic over minimum 30 minute, maximum 8 hour period		BS EN 14385
	Mercury and its compounds	0.05 mg/Nm^3	Periodic over minimum 30 minute, maximum 8 hour period		BS EN 13211
	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/Nm^3	Periodic over minimum 30 minute, maximum 8 hour period		BS EN 14385
	Dioxins / furans (I-TEQ)	0.1 ng/Nm^3	Periodic average value over minimum 6 hours, maximum 8 hour period		BS EN 1948 Parts 1, 2 and 3
	Dioxins / furans (WHO-TEQ) Humans / Mammals / fish / birds.	No limit set	Periodic average value over sample period of between 6 and 8 hours.		BS EN 1948-4

Table S3.2 Non-kiln point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A3	Particulate matter	Cement Mill 1	30 mg/m^3	Daily average	Continuous measurement and annual periodic (as CEMs check)	BS EN 15267-3
A4	Particulate matter	Cement Mill 2	30 mg/m^3			
A5	Particulate matter	Cement Mill 3	30 mg/m^3			
A6	Particulate matter	Cement Mill 4	30 mg/m^3			
A7	Particulate matter	Cement Mill 4 Classifier	30 mg/m^3			
A9	Particulate matter	Kiln 4 Cooler Exhaust	50 mg/m^3			
A10	No parameter set	MBM Storage Vessel	No limit set	Permanent sampling access not required	None	None
Vents on storage silos and conveyor lines	No parameter set	Storage silos and conveyor lines	No limit set			

Table S3.3 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (incl. unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
W1 on drawing number 401.00-11-0016-P00 emission to tributary of Black Brook	Suspended solids	Site surface water drainage via the settlement lagoon	50 mg/l	Spot sample	Monthly	BS EN 872
W1 on drawing number 401.00-11-0016-P00 emission to tributary of Black Brook	pH	Site surface water drainage via the settlement lagoon	6 min 9.5max	Instantaneous	Continuous Note 1	MCERTS approved instrumentation.
W1 on drawing number 401.00-11-0016-P00 emission to tributary of Black Brook	Temperature	Site surface water drainage via the settlement lagoon	23^{o}C	Instantaneous	Continuous Note 1	MCERTS approved instrumentation
W1 on drawing number 401.00-11-0016-P00 emission to tributary of Black Brook	Oil or grease	Site surface water drainage via the settlement lagoon	None visible	Spot Sample	Weekly	Visual Check
W2 Western Outfall WC01 / Grid reference SJ288622	No parameters set	Uncontaminated site surface water drainage	No limit set	-	-	-

Note 1: Continuous monitoring during discharge.

Table S3.4 Point source emissions to sewer, effluent treatment plant or other transfers off-site– emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (incl. Unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
S1 on drawing number 401.00-11-0016-P.00	No parameters set	Vehicle wash water via catch pit and oil/water separator	No limit set	-	-	-

Table S3.5 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Weather Station Cement Silo 6	Wind speed and direction	Continuous	-	-
Calciner	Temperature	Continuous	Traceable to National Standards	-
A8 (Kiln 4 stack)	Temperature, pressure, oxygen and water vapour content	Continuous	As described in the application	-
Kiln exhaust (close to the combustion chamber inner wall)	Temperature	Continuous	Traceable to National Standards	-

Table S3.6 Process Waste				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Cement Kiln 4 by-pass dust.	Total soluble fraction for free lime content and metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds	Before use of a new disposal or recycling route	Environment Agency Ash Sampling Protocol for Cement	-
Cement Kiln 4 by-pass dust.	Metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds.	6 Monthly	Environment Agency Ash Sampling Protocol for Cement	-
	Dioxins/furans and dioxin-like PCBs			
	Halides (chloride, bromide and fluoride)			

Schedule 3 (b) – Emissions and monitoring from 9th April 2017

Table S3.1 Kiln Exhaust Emissions to air – emission limits and monitoring requirements					
Emission point ref.& location	**Parameter**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A8 – Kiln 4	Particulate matter	10 mg/Nm^3	Daily average	Continuous measurement	BS EN 14181
	Total Organic Carbon (TOC)	50 mg/Nm^3			
	Hydrogen chloride	10 mg/Nm^3			
	Carbon monoxide	1200 mg/Nm^3			
	Oxides of Sulphur expressed as SO_2	200 mg/Nm^3			
	Oxides of nitrogen (NO and NO_2 Expressed as NO_2)	450 mg/Nm^3			
	Ammonia	70 mg/Nm^3			
	Hydrogen fluoride	1 mg/Nm^3	Periodic over minimum 30 minute, maximum 8 hour period	6 monthly	ISO 15713
	Cadmium & thallium and their compounds (total)	0.05 mg/Nm^3			BS EN 14385
	Mercury and its compounds	0.05 mg/Nm^3			BS EN 13211
	Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V and their compounds (total)	0.5 mg/Nm^3			BS EN 14385
	Dioxins / furans (I-TEQ)	0.1 ng/Nm^3	Periodic average value over minimum 6 hours, maximum 8 hour period		BS EN 1948 Parts 1, 2 and 3
	Dioxins / furans (WHO-TEQ) Humans / Mammals / fish / birds	No limit set	Periodic average value over sample period of between 6 and 8 hours.		BS EN 1948 Parts 1, 2 and 3

Table S3.2 Non-kiln point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A3	Particulate matter	Cement Mill 1	20 mg/Nm^3 Note1	Daily average	Continuous measurement	BS EN 14181 Note 2
A4	Particulate matter	Cement Mill 2	20 mg/Nm^3 Note1			
A5	Particulate matter	Cement Mill 3	20 mg/Nm^3 Note1			
A6	Particulate matter	Cement Mill 4	20 mg/Nm^3 Note1			
A7	Particulate matter	Cement Mill 4 Classifier	20 mg/Nm^3 Note1			
A9	Particulate matter	Kiln 4 cooler Exhaust	20 mg/Nm^3 Note1			

Table S3.2 Non-kiln point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (including unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
A10	Particulate matter	MBM Storage Vessel Bag Filter	10 mg/Nm^3	The frequency of measurements or performance checks shall be based on a maintenance management system.		
A11	Particulate matter	Clinker Dome Filter	10 mg/Nm^3	Periodic over a minimum 30 minute period Note 3	6 monthly Note 3	BS EN 13284-1 Note 3
A12	Particulate matter	Arodo Packer Filter	10 mg/Nm^3	Periodic over a minimum 30 minute period Note 3	6 monthly Note 3	BS EN 13284-1 Note 3
A13	No parameters set	Ammonia Storage Tank Scrubber	No limit set	-	-	-
A14	No parameters set	Cemfuel tanks carbon adsorbers.	No limit set	-	-	-
Vents as listed in document reference: Hanson Cement Padeswood Works Regulation 60 BAT Conclusions notice 2 Response.	Particulate Matter	Small sources of particulate matter <10,000 Nm^3/hr) from dusty operations other than cooling and the main milling processes e.g. silo vents and conveyer lines.	10 mg/Nm^3	The frequency of measurements or performance checks shall be based on a maintenance management system.		

Note 1: Subject to the completion of IC3 and as agreed in writing with Natural Resources Wales.

Note 2: The principles of EN 14181 shall be applied (subject to agreement with Natural Resources Wales). See NRW Guidance Note "Application of BS EN 14181 to CEMs on non-IED Installations" for further information.

Note 3: Monitoring requirements subject to the completion of IC2 and as agreed in writing with Natural Resources Wales..

Table S3.3 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (incl. unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
W1 on drawing number 401.00-11-0016-P00 emission to tributary of Black Brook	Total Suspended solids as defined by Directive 91/271/EEC	Site surface water drainage via the settlement lagoon	50 mg/l	Spot sample	Monthly	BS EN 872
W1 on drawing number 401.00-11-0016-P00 emission to tributary of Black Brook	pH	Site surface water drainage via the settlement lagoon	6 min 9 max	Instantaneous	Continuous Note 1	MCERTS approved instrumentation

Table S3.3 Point Source emissions to water (other than sewer) and land – emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (incl. unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
W1 on drawing number 401.00-11-0016-P00 emission to tributary of Black Brook	Temperature	Site surface water drainage via the settlement lagoon	23ºC	Instantaneous	Continuous Note 1	MCERTS approved instrumentation
W1 on drawing number 401.00-11-0016-P00 emission to tributary of Black Brook	Oil or grease	Site surface water drainage via the settlement lagoon	None visible	Spot sample	Weekly	Visual Check
W2 Western Outfall WC01/ Grid reference SJ288622	No parameters set	Uncontaminated site surface water drainage.	No limit set.	-	-	-

Note 1: Continuous monitoring during discharge.

Table S3.4 Point source emissions to sewer, effluent treatment plant or other transfers off-site– emission limits and monitoring requirements						
Emission point ref. & location	**Parameter**	**Source**	**Limit (incl. Unit)**	**Reference period**	**Monitoring frequency**	**Monitoring standard or method**
S1 on drawing number 401.00-11-0016-P.00	No parameters set	Vehicle wash water via catch pit and oil/water separator	No limit set	-	-	-

Table S3.5 Process monitoring requirements				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Weather Station cement silo 6	Wind speed and direction	Continuous	-	-
Calciner	Temperature	Continuous	Traceable to National Standards	-
A8 (Kiln 4 stack)	Temperature, pressure, oxygen and water vapour content	Continuous	As described in the application	-
Kiln exhaust (close to the combustion chamber inner wall)	Temperature	Continuous	Traceable to National Standards	-

Table S3.6 Process Waste				
Emission point reference or source or description of point of measurement	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
Cement Kiln 4 by-pass dust.	Total soluble fraction for free lime content and metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds	Before use of a new disposal or recycling route	Environment Agency Ash Sampling Protocol for Cement	-
Cement Kiln 4 by-pass dust.	Metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds.	6 Monthly	Environment Agency Ash Sampling Protocol for Cement	-
	Dioxins/furans and dioxin-like PCBs			
	Halides (chloride, bromide and fluoride)			

Schedule 4(a) – Reporting until 8th April 2017

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Table S4.1 Reporting of monitoring data			
Parameter	**Emission or monitoring point/reference**	**Reporting period**	**Period begins**
Emissions to air Parameters as required by condition 3.5.1	A3, A4, A5, A6, A7, A8 & A9	Continuous monitoring: Every 3 Months Periodic: Every 6 months	1 January 1 April 1 July 1 October
Functioning and monitoring of the plant involved in the burning of waste derived fuels, as required by condition 4.2.2	As required by condition 4.2.2	Every 12 months	1 January
Emissions to water (other than sewer) and land Parameters as required by condition 3.5.1	W1	Every 3 Months	1 January 1 April 1 July 1 October
Process Waste Parameters as required by condition 3.5.1	Cement Kiln 4 by-pass dust	Every 6 months	1 January 1 July
Process Waste Total soluble fraction for free lime content and metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds	Cement Kiln 4 by-pass dust	Before use of a new disposal or recycling route	-

Table S4.2 Performance Parameters		
Parameter	**Frequency of assessment**	**Units**
Total substitute fuels burned	Annually	Tonnes
Total hazardous substitute fuels burned	Annually	Tonnes
Potable water used	Annually	Cubic metres
Non potable water used	Annually	Cubic metres

Table S4.3 Reporting forms		
Media/parameter	**Reporting format**	**Date of form**
Air: 6 monthly periodic monitoring for A8	Form: S4 / A1	03/08/10
Air: Continuous monitoring of particulate matter for A8	Form: S4 / A2	03/08/10
Air: Continuous monitoring of TOC for A8	Form: S4 / A3	03/08/10
Air: Continuous monitoring of hydrogen chloride for A8	Form: S4 / A4	03/08/10
Air: Continuous monitoring of carbon monoxide for A8	Form: S4 / A5	03/08/10
Air: Continuous monitoring of sulphur dioxide for A8	Form: S4 / A6	03/08/10

Table S4.3 Reporting forms		
Media/parameter	**Reporting format**	**Date of form**
Air: Continuous monitoring of oxides of nitrogen for A8	Form: S4 / A7	03/08/10
Air: Continuous monitoring of particulate matter for A3	Form: S4 / A8	03/08/10
Air: Continuous monitoring of particulate matter for A4	Form: S4 / A9	03/08/10
Air: Continuous monitoring of particulate matter for A5	Form: S4 / A10	03/08/10
Air: Continuous monitoring of particulate matter for A6	Form: S4 / A11	03/08/10
Air: Continuous monitoring of particulate matter for A7	Form: S4 / A12	03/08/10
Air: Continuous monitoring of particulate matter for A9	Form: S4 / A13	03/08/10
Water: pH, Temperature, & Suspended Solids for W1	Form: M / W1	06/09/13
Other Performance Indicators	Form: Performance 1 or other form as agreed in writing by Natural Resources Wales	19/07/16
Process Waste	Form: Process Waste 1 or other form as agreed in writing by Natural Resources Wales	19/07/16
Waste subject to Condition 4.2.5	Waste tonnage return form from the Natural Resources Wales website or other form as agreed in writing by Natural Resources Wales	n/a

Schedule 4(b) – Reporting from 9th April 2017

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Table S4.1 Reporting of monitoring data			
Parameter	**Emission or monitoring point/reference**	**Reporting period**	**Period begins**
Emissions to air Parameters as required by condition 3.5.1	A3, A4, A5, A6, A7, A8 & A9	Continuous monitoring: Every 3 Months	1 January 1 April 1 July 1 October
	A8, A11 & A12	Periodic: Every 6 months	1 January 1 July
Functioning and monitoring of the plant involved in the burning of waste derived fuels, as required by condition 4.2.2	as required by condition 4.2.2	Every 12 months	1 January
Emissions to water (other than sewer) and land Parameters as required by condition 3.5.1	W1	Every 3 Months	1 January 1 April 1 July 1 October
Process Waste Parameters as required by condition 3.5.1	Cement Kiln 4 by-pass dust	Every 6 months	1 January 1 July
Process Waste Total soluble fraction for free lime content and metals (Antimony, Cadmium, Thallium, Mercury, Lead, Chromium, Copper, Manganese, Nickel, Arsenic, Cobalt, Vanadium, Zinc) and their compounds	Cement Kiln 4 by-pass dust	Before use of a new disposal or recycling route	-

Table S4.2 Performance Parameters		
Parameter	**Frequency of assessment**	**Units**
Total substitute fuels burned	Annually	Tonnes
Total hazardous substitute fuels burned	Annually	Tonnes

Table S4.3 Reporting forms		
Media/parameter	**Reporting format**	**Date of form**
Air: 6 monthly periodic monitoring for A8	Form: Air 1	19/07/16
Air: Continuous monitoring of particulate matter for A8	Form: Air 2	19/07/16
Air: Continuous monitoring of TOC for A8	Form: Air 3	19/07/16
Air: Continuous monitoring of hydrogen chloride for A8	Form: Air 4	19/07/16
Air: Continuous monitoring of carbon monoxide for A8	Form: Air 5	19/07/16
Air: Continuous monitoring of sulphur dioxide for A8	Form: Air 6	19/07/16

Table S4.3 Reporting forms		
Media/parameter	**Reporting format**	**Date of form**
Air: Continuous monitoring of oxides of nitrogen for A8	Form: Air 7	19/07/16
Air: Continuous monitoring of ammonia for A8	Form: Air 8	19/07/16
Air: Continuous monitoring of particulate matter for A3	Form: Air 9	19/07/16
Air: Continuous monitoring of particulate matter for A4	Form: Air 10	19/07/16
Air: Continuous monitoring of particulate matter for A5	Form: Air 11	19/07/16
Air: Continuous monitoring of particulate matter for A6	Form: Air 12	19/07/16
Air: Continuous monitoring of particulate matter for A7	Form: Air 13	19/07/16
Air: Continuous monitoring of particulate matter for A9	Form: Air 14	19/07/16
Air: Periodic monitoring of particulate for A11 & A12	Form: Air 15	19/07/16
Water: pH, Temperature, & Suspended Solids for W1	Form: M / W1	19/07/16
Other Performance Indicators	Form: Performance 1 or other form as agreed in writing by Natural Resources Wales	19/07/16
Process Waste	Form: Process Waste 1 or other form as agreed in writing by Natural Resources Wales	19/07/16
Waste subject to Condition 4.2.5	Waste tonnage return form from the Natural Resources Wales website or other form as agreed in writing by Natural Resources Wales	n/a

Schedule 5 - Notification

These pages outline the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.

Part A

Permit Number	
Name of operator	
Location of Facility	
Time and date of the detection	

(a) Notification requirements for any activity that gives rise to an incident or accident which significantly affects or may significantly affect the environment	
To be notified Immediately	
Date and time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

(b) Notification requirements for the breach of a permit condition	
To be notified immediately	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

Time periods for notification following detection of a breach of a limit	
Parameter	**Notification period**

(c) In the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment:	
To be notified immediately	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B - to be submitted as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 - Interpretation

"abatement system" means equipment dedicated to the removal of polluting substances from releases from the installation to air.

"accident" means an accident that may result in pollution.

"Annex I" means Annex I to Directive 2008/98/EC of the European Parliament and of the Council on waste.

"Annex II" means Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste.

"application" means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations. "annually" means once every year.

"*ARM"* means Alternative Raw Materials (waste derived materials that replace virgin materials in the manufacture of clinker)

"authorised officer" means any person authorised by Natural Resources Wales under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

"Chapter IV abnormal operating conditions" means any technically unavoidable stoppages, disturbances, or failures of the abatement systems or the measurement devices, during which the concentrations in the discharges into air or waste water of the regulated substances may exceed the normal emission limit values, IED article 45 1(f).

"daily average" unless otherwise specified within the permit, for releases of substances to air means the average of valid half-hourly averages over a calendar day during normal operation.

"dioxin and furans" means polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans.

"disposal". Means any of the operations provided for in Annex I to Directive 2008/98/EC of the European Parliament and of the Council on waste.

"emissions to land" includes emissions to groundwater.

"EP Regulations" means The Environmental Permitting (England and Wales) Regulations SI 2010 No.675 and words and expressions used in this permit which are also used in the Regulations have the same meanings as in those Regulations.

"emissions of substances not controlled by emission limits" means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission or background concentration limit**.**.

"groundwater" means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

"Hazardous Waste" has the meaning given in the Hazardous Waste (England & Wales) Regulations 2005 (as amended)

"Industrial Emissions Directive" means DIRECTIVE 2010/75/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 24 November 2010 on industrial emissions

"ISO" means International Standards Organisation.

"MCERTS" means the Environment Agency's Monitoring Certification Scheme.

"MBM" means Meat and Bone Meal. It is produced at animal rendering plants during the high temperature processing of animal remains comprising mainly abattoir waste arising in the course of preparing meat for consumption. It is a granular solid residue that is left after extracting fat (tallow) during the rendering process. The waste for rendering may contain Specified Risk Material (SRM) such as brain and spinal cords from animals. MBM is classified as a non-hazardous waste by the waste code 02 02 03, defined as "Wastes from the preparation and processing of meat, fish and other foods of animal origin" and the sub-clause "Materials unsuitable for consumption or processing". MBM cannot contain raw or unprocessed meat, bones or animal parts, or any other waste of agricultural, horticultural or industrial origin.

"MPA Code of Practice" means the Mineral Products Association Code of Practice for the use of waste materials in Cement and Dolomitic Lime Manufacture

"PCB" means Polychlorinated Biphenyl

"*PCP"* means Pentachlorophenol

"permitted installation" means the activities and the limits to those activities described in Table S1.1 of this Permit.

"PFA" means Pulverised Fuel Ash and is the fine ash recovered from the gas stream from combustion of pulverised coal in coal fired power stations.

"PSP" means Processed Sewage Pellets.

"quarter" means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

"R" means a recovery operation provided for in Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste.

"recovery" means any of the operations provided for in Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste.

"RFO" means Recovered Fuel Oil.

"shut down" means (a) any period when the kiln is being returned to a non-operational state and no waste is being burned. Emission limit values do not apply during shutdown once the raw meal feed rate falls below 120 tonnes per hour, or (b) as otherwise agreed in writing with Natural Resources Wales.

"Six monthly periodic monitoring" means periodic monitoring in each 6 month period, January to June & July to December with at least 4 months between sampling dates.

"SRF" means Solid Recovered Fuel

"start-up" means (a) the process of bringing the kiln into normal operation. Start-up commences when raw meal is introduced into the kiln and may continue until the kiln feed rate reaches 120 tonnes per hour and the kiln is stable, or (b) as otherwise agreed in writing with Natural Resources Wales

"TOC" means Total Organic Carbon. In respect of releases to air, this means the gaseous and vaporous organic substances, expressed as TOC.

"Waste code" means the six digit code referable to a type of waste in accordance with the list of wastes established by Commission Decision 2000/532/EC as amended from time to time (the "List of Wastes Decision") and in relation to hazardous waste, includes the asterisk.

Waste Framework Directive" or "WFD" means Waste Framework Directive 2008/98/EC of the European Parliament and of the Council on waste.

"*WLF"* means Waste Liquid Fuels

"year" means calendar year ending 31 December.

Unless otherwise stated, up until (and including) 08/04/17,any references in this permit to concentrations of substances in emissions into air means:

(a) in relation to emissions from the kiln, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 10% dry for all fuels;

(b) in relation to emissions from non-combustion sources, no correction is required for temperature, pressure, oxygen or water vapour content.

Unless otherwise stated, from 09/04/17, any references in this permit to concentrations of substances in emissions into air means:

(a) in relation to emissions from the kiln, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with an oxygen content of 10% dry for all fuels;

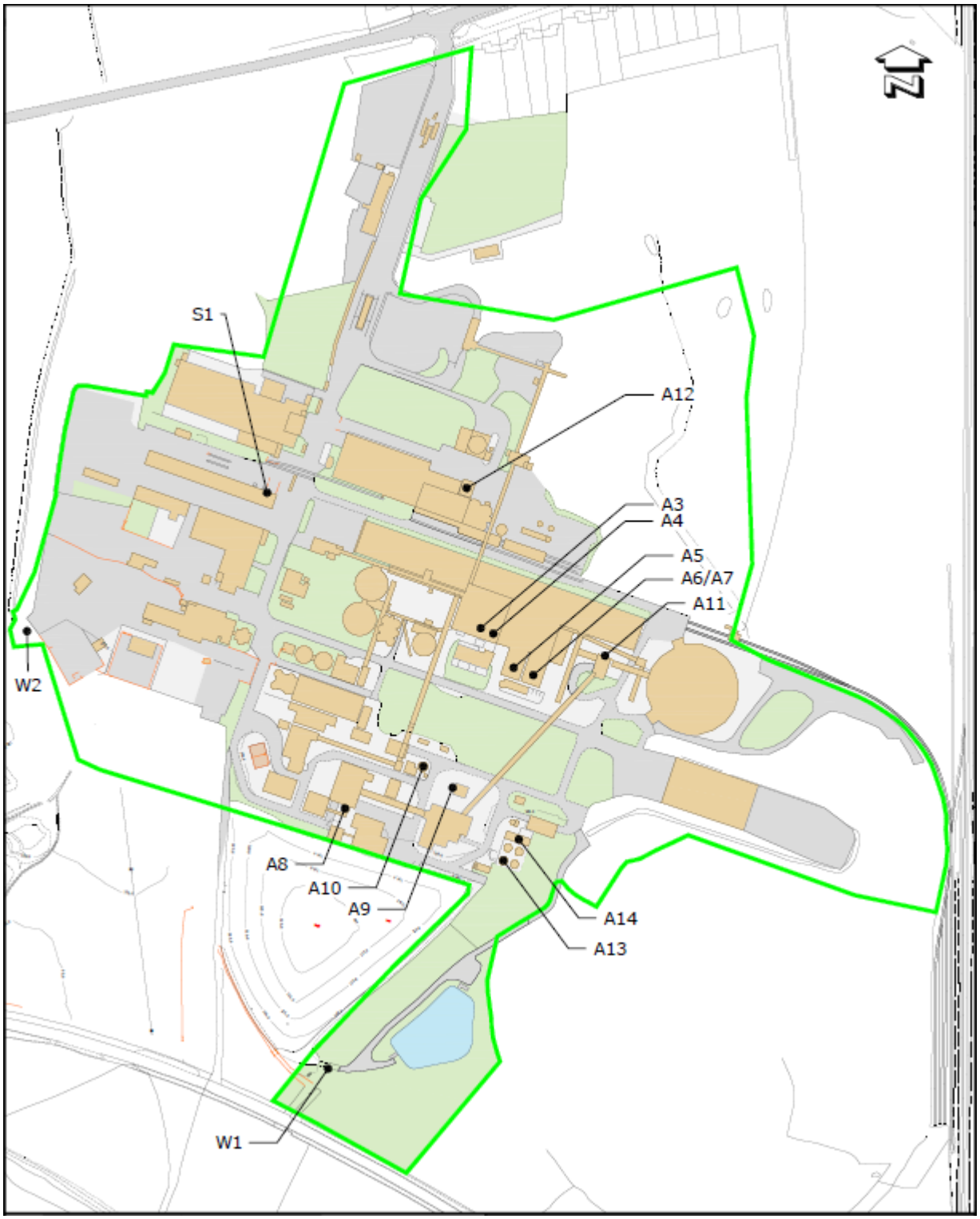
(b) in relation to emissions from non-kiln sources, the concentration in dry air at a temperature of 273K, at a pressure of 101.3 kPa and with no correction for oxygen.

For dioxins/furans and dioxin-like PCBs the determination of the toxic equivalence concentration (I-TEQ, & WHO-TEQ for dioxins/furans, WHO-TEQ for dioxin-like PCBs) stated as a release limit and/ or reporting requirement, the mass concentrations of the following congeners have to be multiplied with their respective toxic equivalence factors before summing. When reporting on measurements of dioxins/furans and dioxin-like PCBs, the toxic equivalence concentrations should be reported as a range based on: all congeners less than the detection limit assumed to be zero as a minimum, and all congeners less than the detection limit assumed to be at the detection limit as a maximum. However the minimum value should be used when assessing compliance with the emission limit value in table S3.1.

TEF schemes for dioxins and furans				
Congener	***I-TEF***	***WHO-TEF***		
	1990	**2005**	**1997/8**	
		Humans / Mammals	***Fish***	***Birds***
Dioxins				
2,3,7,8-TCDD	*1*	*1*	*1*	*1*
1,2,3,7,8-PeCDD	*0.5*	*1*	*1*	*1*
1,2,3,4,7,8-HxCDD	*0.1*	*0.1*	*0.5*	*0.05*
1,2,3,6,7,8-HxCDD	*0.1*	*0.1*	*0.01*	*0.01*
1,2,3,7,8,9-HxCDD	*0.1*	*0.1*	*0.01*	*0.1*
1,2,3,4,6,7,8-HpCDD	*0.01*	*0.01*	*0.001*	*<0.001*
OCDD	*0.001*	*0.0003*	*-*	*-*
Furans				
2,3,7,8-TCDF	*0.1*	*0.1*	*0.05*	*1*
1,2,3,7,8-PeCDF	*0.05*	*0.03*	*0.05*	*0.1*
2,3,4,7,8-PeCDF	*0.5*	*0.3*	*0.5*	*1*
1,2,3,4,7,8-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
1,2,3,7,8,9-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
1,2,3,6,7,8-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
2,3,4,6,7,8-HxCDF	*0.1*	*0.1*	*0.1*	*0.1*
1,2,3,4,6,7,8_HpCDF	*0.01*	*0.01*	*0.01*	*0.01*
1,2,3,4,7,8,9-HpCDF	*0.01*	*0.01*	*0.01*	*0.01*
OCDF	*0.001*	*0.0003*	*0.0001*	*0.0001*

TEF schemes for dioxin-like PCBs			
Congener	***WHO-TEF***		
	2005	**1997/8**	
	Humans / mammals	***Fish***	***Birds***
Non-ortho PCBs			
3,4,4',5-TCB (81)	*0.0001*	*0.0005*	*0.1*
3,3',4,4'-TCB (77)	*0.0003*	*0.0001*	*0.05*
3,3',4,4',5 - PeCB (126)	*0.1*	*0.005*	*0.1*
3,3',4,4',5,5'-HxCB(169)	*0.03*	*0.00005*	*0.001*
Mono-ortho PCBs			
2,3,3',4,4'-PeCB (105)	*0.00003*	*<0.000005*	*0.0001*
2,3,4,4',5-PeCB (114)	*0.00003*	*<0.000005*	*0.0001*
2,3',4,4',5-PeCB (118)	*0.00003*	*<0.000005*	*0.00001*
2',3,4,4',5-PeCB (123)	*0.00003*	*<0.000005*	*0.00001*
2,3,3',4,4',5-HxCB (156)	*0.00003*	*<0.000005*	*0.0001*
2,3,3',4,4',5'-HxCB (157)	*0.00003*	*<0.000005*	*0.0001*
2,3',4,4',5,5'-HxCB (167)	*0.00003*	*<0.000005*	*0.00001*
2,3,3',4,4',5,5'-HpCB (189)	*0.00003*	*<0.000005*	*0.00001*

Schedule 7 - Site plan



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