ENVIRONMENTAL PERMIT VARIATION APPLICATION
NON-TECHNICAL SUMMARY

CROFT QUARRY
MARION'S WAY
CROFT
LEICESTERSHIRE
LE9 3GP

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ENVIRONMENTAL PERMIT VARIATION APPLICATION: NON-TECHNICAL SUMMARY
CROFT QUARRY, MARIONS WAY, CORFT, LEICESTERSHIRE

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Prepared for : Aggregate Industries UK Limited

Prepared by : Sirius Environmental Limited
The Beacon Centre for Enterprise
Dafen
Llanelli
SA14 8LQ

Written by :

David Rowe
Environmental Consultant

Reviewed by :

Dylan Thomas
Principal Environmental Consultant

Approved by :

Mark Griffiths
Environmental Director

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1.0 INTRODUCTION

Application Details

1.1 Aggregate Industries UK Limited ('AI') is seeking to vary Environmental Permit EPR/EB3708GW. The variation seeks the following principle aims

- Extension of the environmental permit boundary;
- Vary the operational area of the existing permitted waste treatment activities
- Extend the scope of the existing physical waste treatment activities to include soil washing to produce various grades of secondary aggregates;
- Extension of associated waste codes and annual waste throughput limits for the physical waste treatment activity;
- Addition of waste recovery activity involving the permanent deposit of non-degradable non-hazardous wastes to support the restoration of the quarry void, including the operation of railhead delivery, associated temporary storage and overhead conveyor delivery systems.

Site Setting

1.2 Croft Quarry is a long-established granite quarry with extraction occurring since 1886. Croft Quarry is currently worked in accordance with planning permission granted by Leicestershire County Council in February 1995. The planning permission was subject to a Review of Mineral Planning Permissions (ROMP) by Leicestershire County Council in 2010. The Croft Quarry complex occupies an area of c. 111.5ha, in which the current quarry footprint occupies c. 33Ha. Associated ancillary operations, mineral/waste processing and construction product manufacturing activities are currently carried out to the south/southeast of the current extraction footprint.

1.3 Mineral Planning Consent has recently been acquired that allows the lateral extension of the quarry void footprint to the south/southeast, which will increase the main quarry footprint to a total of ~48Ha. The extension of the extraction void will require the reorganisation of the layout of the ancillary activities carried out to the south/southeast of the current quarry extents. The ancillary operations area is set behind mature vegetation (including perimeter hedgerows) and developed woodland.

1.4 The operational extents of Croft Quarry are located to the immediate north of the village of Croft and ~350m southwest of the village of Huncote. Residential properties are also located beyond the western boundary of the quarry - along Huncote Road, Thurlaston Lane, Stanton Lane and Marston Road. Located to the south of the landfill site are the South Leicester railway branch and the B4114 (Coventry Road) and a few light industrial units. Both the South Leicester Railway and B4114 run southwest-northeast along the quarry's southern boundary.

1.5 Three Sites of Special Scientific Interest (SSSIs) within 650m of the application site boundary. One of these SSSIs; Croft Pasture, is located approximately 620m to the southwest of the application site and comprises of acidic mixed grassland; which has been identified as containing Bullhead fish; designated as a protected species, within the stretch of the River Soar that traverses Croft Pasture SSSI. The remaining two SSSIs are located within the application site boundary, the first; Croft Hill, is located adjacent to the north-western corner of the proposed landfill void and has been designated a SSSI due to the presence

of rare grasses; designated as a protected habitat under Lowland dry acid grassland. The second SSSI within the application site boundary contains the quarry void itself which forms the Croft and Huncote Quarry SSSI. This site was awarded SSSI status due to the exposures of Ordovician tonalitic igneous rock, attendant zeolite mineralisation and younger manganese mineralisation of Triassic age.

Regulated Facilities

1.6 The regulated facilities to be operated at Croft quarry will include:-

- waste treatment operations to produce soils, soil substitutes and secondary aggregates; and
- Waste recovery activity involving the permanent deposits of non-degradable non-hazardous wastes to support quarry restoration, including rial head deliveries, temporary storage pending verification and transfer to the quarry void.

1.7 The waste treatment activities will treat up to 340,000 tonnes per year with a maximum on site storage capacity of ??,000 tonnes. The treatment of slags and ashes will also continue to the limited to less than 75 tonnes per day.

1.8 The restoration of Croft Quarry will require the importation and deposit of a total of ~14 million cubic metres of inert waste, with a further 3.17 million cubic metres being sourced from the lateral extension area (i.e. overburden). It is anticipated that waste will be imported at a rate of 750,000m³ (or ~1.35 million tonnes per year) over an anticipated period of 20 years. These figures exclude any suitable non-recyclable fractions produced via the treatment operations that may also be used to support the restoration.

The Operator

1.9 The landfill operator is Aggregate Industries Limited whose registered office and installation addresses are below:

Registered Office:	Site Address:
Bardon Hall Copt Oak Road Markfield Leicestershire LE67 9PJ	Croft Quarry Marion's Way Coventry Road Croft Leicestershire, LE9 3GP

2.0 TECHNIQUES FOR POLLUTION CONTROL

Management Techniques

2.1 Management Techniques

2.2 Aggregate Industries Limited will operate the landfill facility in accorded with an Environmental Management System accredited to ISO14001.

The Main Activities

Site Construction and Engineering

Waste Treatment Operations

2.3 With the exception of and slag and ashes, all other waste accepted at the site will be stored and treated over areas of hardstanding. Slag and ashes will be continue to be stored over areas of impermeable pavement with a sealed drainage.

2.4 An 3.5m (min) high acoustic fence will be constructed along the southern and western boundaries of the ancillary operations area to minimise potential noise emissions from waste handling and treatment activities conducted at surface level impacting on adjacent residential properties. A 3.5m (min.) high acoustic wall will also erected around the screening an crushing plant to be operated in the westernmost section of the ancillary operations area for further reduce noise emission at the nearest noise sensitive receptors.

Quarry Restoration

2.5 The basal areas of the quarry and lateral extension area of the quarry will be engineered with a 500mm thick Artificially Established Geological Barrier (AEGB) to a maximum permeability of $1x10^{-8}$m/s. The AEGB thickness will be extended to a minimum thickness of 1000mm on the near vertical sidewalls.

2.6 The AEGB will prevent the potential direct discharge of hazardous substances to groundwater whilst providing attenuation to the diffusion of potential Hazardous Substance and Non-Hazardous Pollutants to protect groundwater quality within the surrounding aquifer systems.

2.7 The final surface of the waste deposits will be engineered with a 500mm thick capping system with a maximum permeability of $1x10^{-8}$m/s. This capping system will provide physical separation and attenuation to any potential pollutants that may rise up through the waste deposits due the rebounded groundwater levels surrounding the waste and minimise pollution of water with the wetland habitats that will be formed in the restored quarry

2.8 All basal, sidewall and capping systems will be engineered with suitable uncontaminated cohesive materials, including site-won and imported clays.

2.9 The capping system will be covered with up to 1000mm of suitable uncontaminated restoration soils to protect the capping system and form a topsoil horizon for establishing vegetative growth.

Waste Acceptance and Delivery

2.10 Waste deliveries to the installation will take place via the following infrastructure:

- Metalled Access and Internal Haul Roads;
- Weighbridge;
- Wheel cleaning equipment;
- Dedicated Railway Spur;
- Rail Unloading Shed; and
- Enclosed Conveyor.

2.11 The site will be undergoing redevelopment within the next five years (approx.) in line with current planning consent. During this initial period waste deliveries

will mainly made by road. Once the rail sidings and Rail Handling Shed are constructed, the majority of the wastes to support the quarry restoration operations will be delivered via rail.

2.12 An enclosed conveyor system will also be construction during the initial redevelopment phase which will become the principal mode of transferring the wastes materials from the waste reception and temporary stocking area to the active tipping area within the quarry void. Pending it construction and during periods of maintenance, these material transfers will be made by dumpers along internal haul routes.

2.13 Road delivery vehicles will access the facility via the dedicated quarry access road of Marion's Way. This access road known as Marions Way is junctioned with Coventry Lane (B4114). The internal roadway is metalled and will leads to weighbridge. Upon inspection of the load and duty of care documents the vehicles will be directed to the waste reception and storage area for discharge, where the wastes will be further inspected and undergo verification testing as appropriate. Delivery vehicles will subsequently exit the site using the wheel wash facilities that will be located near the site entrance.

2.14 Upon construction, the rail siding and handling shed will form an enclosed environment for the delivery and discharge of waste materials from the rail carts. Most of the materials that arrive by rail will be transferred from AIs own rail handling yards, at which appropriate characterisation testing will have already been performed. The duration that these wastes will be stored at the reception and temporary stocking area will therefore be reduced.

2.15 Waste acceptance procedures have been developed to ensure that only non-degradable non-hazardous wastes are deposited at the quarry.

Water Management

2.16 Surface water runoff from all waste reception, stocking and treatment areas will continue to be collected via a network of drains and settlement lagoons pending use as process water or for dust suppression. Treated process waters will continue to be discharged to the River Soar via the current consented discharge point following testing.

2.17 Surface water and groundwaters collecting in the base of the quarry void will continue to be pumped to a storage lagoon located in the southern ancillary operational area for use as process waters or for dust suppression. Excess waters will be discharged to the River Soar following testing via the current consented discharge point.

3.0 RISK ASSESSMENTS

Overview

3.1 As part of the Application for the landfill Environmental Permit, the following Risk Assessments were prepared in order to determine whether any of the permitted activities would have an unacceptable impact on the environment:-

- Environmental Risk Assessment
- Stability Risk Assessment
- Hydrogeological Risk Assessment
- Gas Risk Assessment

Environmental Risk Assessment

3.2 The potential impact from the following emissions from the facility on the surrounding receptors has been considered:

- Dust and Particulate Matter
- Odour
- Dirt and Mud on Highway
- Litter
- Birds, Vermin and Insects
- Noise and Vibration
- Accidents

3.3 All potential risks to nearby receptors have been considered and mitigated in that all residual risks are of a low magnitude.

3.4 Due to the elevated potential for fugitive dust emissions to be generated by the waste activities a Dust Emissions Management Plan has been prepared. Similarly, due to the proximity of residential properties to the site boundary, a Noise Management Plan has also been prepared.

Stability Risk Assessment

3.5 This Stability Risk Assessment (SRA) has addressed the stability and integrity issues pertaining to the proposed quarry lining system construction, and infilling of waste, at Croft Quarry. The stability risk assessment (SRA) has addressed stability relating to the following:-

- Stability and integrity of the basal and sidewall AEGBs
- Any temporary, unconfined waste slopes proposed to be constructed during the infilling of the quarry.

3.6 The stability assessments undertaken have shown that the stability of the quarry lining system construction and waste infilling is likely to be maintained if the following restrictions on construction are followed:

- The quarry lining system (AEGB) must be constructed in 2m high lifts (not higher), with each lift being buttressed with waste as the quarry is infilled, prior to the construction of the lift above;
- The waste infill must be placed in layers across the quarry in conjunction with the AEGB construction, temporary waste flanks shall not exceed 2m high, or a gradient of 1 in 2.5;
- The infill in the middle of the quarry may be placed up to 2m higher than the lining system, as long as a lower bench is left near the edge of the lining system at the same level as top of the AEGB construction; and
- Where the gradient of the lining system will be steeper than 60° (1 in 0.58), the 2m high lifts shall be buttressed with waste during their construction, such that no more than a 1m height of AEGB is unconfined at any time.

3.7 There is some risk of loose rock falling into the construction area from the quarry faces above. To mitigate this risk, it is proposed that the area immediately adjacent to the lining system (the lower bench in the waste modelled in this SRA) will be used as a rock trap to contain any falling material. The use of remote-controlled or reinforced armoured compaction plant for the AEGB should also be considered, to avoid the requirement for construction workers in the area immediately below the rock faces. A pedestrian exclusion zone should

be maintained. Risk mitigation measures shall be put in place in line with the quarry regulations and AI's safe methods of work.

3.8 For the temporary waste slopes the assessment concludes that appropriate factors of safety can be achieved for the temporary unconfined slopes can be achieved based on the construction of slope gradient of 1 in 5. This assessment is based on a worst-case assumption that that all wastes will comprise low permeability materials, which will result in the can significant impede the dissipation of pore water pressures.

3.9 The requirement to construct the temporary slope assessed is based on predicted mineral extraction and infilling rates. Should changes in either of these rates result in the infilling across the lateral extension area commencing earlier than anticipated, the slope height, and requirement or the period for which the temporary slopes will be present may be significantly reduced, resulting in greater factors of safety.

3.10 Prior to the construction of the temporary flank above -20mAOD, this stability risk assessment shall be reviewed and updated where necessary to take into account the characteristics of the imported material, utilising the information gathered from visual inspection and laboratory testing, the actual input rate compared with the predicted input rate assumed in this assessment and the extraction rates of the extension area, to reflect site conditions at the time of construction to ensure the modelling remains valid.

Hydrogeological Risk Assessment

3.11 Croft quarry consists of a void worked to a depth of over 200m to a basal elevation of ~136mBOD. The restoration of Croft Quarry will involve the placement of up to ~14Million cubic metres of non-degradable non-hazardous wastes into to an elevation of between ~14-18mAOD. The final restoration levels will remain over 50m below that of surrounding and original surface levels.

3.12 The final restored levels within the quarry will be at least 40m below from the base of the superficial aquifer units, which are designated as Secondary A Aquifer. Consequently there will be no direct hydraulic connectivity to this aquifer system or the rivers to which they provide base flow locally.

3.13 The restoration materials will largely fill the void created with the Diorite Secondary B aquifer, with a small section of the Merica Mudstone Secondary B Aquifer system likely to be exposed along the eastern sidewall of the lateral extension areas below final restoration levels.

3.14 Groundwater levels within the Diorite and Mercia Mudstone aquifers are currently suppressed by the presence of active water management operations within the void. As infilling of the quarry void progresses, water levels within the Diorite will progressively rebound at a similar pace as the infilling operations. Similar rebounding of groundwater is anticipated to occur in the Mercia Mudstone Aquifer when restoration operations extend into the lateral extension area.

3.15 As is evidenced at other abandoned quarries that the South Leicestershire Diorite Complex, prior to the working of the quarry groundwater levels within the diorite and Mercia Mudstone Aquifers are assumed to have been close to that of surface levels. Following restoration of the quarry, groundwater levels will continue to be drawn down with these aquifers, albeit at a higher elevations than

currently recorded. The long-term management of groundwater ingress and surface waters with the restored quarry will therefore be required.

3.16 Throughout the active filling and post-completion phase, groundwater levels within the surrounding aquifers systems will be higher than any potential head of water that could form in the waste mass, thus generating hydraulic containment of the waste mass.

3.17 To prevent the direct discharge of hazardous substance into groundwater the base and sidewalls of the quarry will be engineered with a low permeability (>$1x10^{-8}$m/s) AEGB. This lining system will also provide attenuation to the outward diffusive flux of potential pollutants from the wastes. In accordance with the requirements of Schedule 22 to the Environmental Permitting (England & Wales) Regulations 2016 (EPR2016), steady state hydraulic containment modelling has determined that the proposed restoration scheme will prevent the discharge of hazardous substance to groundwater and limit the discharge of non-hazardous pollutants to prevent pollution.

3.18 In accordance with the requirements of Schedule 22 to the EPR2016, groundwaters within the diorite aquifer will be monitored through the active infilling phases (and post-completion phase) of the quarry restoration scheme, with compliance limits derived to identify any significant impact on groundwater quality.

3.19 A risk screening assessment has also been carried out on the discharge of waters collected within the void to the River Soar. Based on the potential worst-case source term concentrations of potential contaminants within the wastes, the dilution factors within the River Soar will prevent a significant deterioration in water quality.

Gas Risk Assessment

3.20 The restoration of Croft Quarry will be completed with non-degradable non-hazardous wastes which present a low potential for the generation of greenhouse and other hazardous gases. Stringent waste acceptance procedures will be implemented to ensure that only suitable wastes will be accepted for deposit at the site.

3.21 Monitoring for any significant increases in hazardous gases concentrations above baseline within the diorite bedrock will be carried out during the active infilling phase (and post-completion phase) via a number of monitoring borehole installations. These monitoring installations largely focus on the boundaries of the site within which sensitive receptors are located within 250m of the edge of the waste deposits.

4.0 ENVIRONMENTAL MONITORING

4.1 During the operation and post closure period, the site will be subjected to environmental monitoring covering the following areas:

- Waste Composition (Operational Phase Only)
- Ground Gas
- Surface Water
- Groundwater
- Site Topography
- Particulate Matter/Dust (Operational Phase Only)
- Noise (Operational Phase Only)

4.2 Monitoring results will be submitted to the Environment Agency in accordance with the Permit conditions and records will be kept in order that monitoring trends can be reviewed and appropriate actions taken if necessary.

4.3 All monitoring systems will be maintained and calibrated by trained technicians and the equipment manufacturers to ensure that the equipment and infrastructure is maintained in good working order.