Caulmert Limited

Engineering, Environmental & Planning Consultancy Services

Wasperton Farm Quarry

Smiths Concrete Limited

Environmental Permit Application

Climate Change Risk Assessment Report and Adaptation Plan

Prepared by:

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Climate Change Risk Assessment Report and Adaptation Plan

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1.0 INTRODUCTION

1.1 Background

1.1.1 Caulmert Limited (the operator) has appointed Caulmert Limited to prepare a climate change risk assessment and adaptation plan for the proposed recovery operation at Wasperton Farm Quarry, Barford, Warwickshire, as part of an environmental permit application.

1.1.2 As part of ongoing climate change adaptation within the Environmental Permitting Regulations, it is required to undertake a climate change risk assessment and adapt this into the Environmental Management System for the site to understand if climate change impacts could change the risk the risk of environmental incidence or non-compliance. The risks have been assessed below and any adaptations required will be embedded into the existing Environmental Management System (EMS) for the site.

1.1.3 This climate change risk assessment has been prepared in accordance with the following guidance:

- Climate change: risk assessment and adaptation planning in your management system. GOV.UK guidance web pages. Published April 2023.

1.2 Site Location and climate change risks

1.2.1 Wasperton Farm is located between Barford and Wellesbourne, to the east of the A429. The site is set within predominantly agricultural land. The Site is currently used for arable farming with a mix of crops being grown. To the north of the Site is Wasperton Lane, with Barford village centre being further north of Wasperton Lane. To the east, the land rises to Wasperton Hill. To the south the land is generally flat farmland falling very gently to the Thelsford Brook. The western boundary is formed by the A429 Wellesbourne Road, with Wasperton village sitting to the west of the road between the A429 and the River Avon.

1.2.2 The risk assessment considers the impact on site operations from changing conditions such as higher average air temperatures, more heat waves and hot days, rising sea levels, changes in rainfall patterns and intensity, and more storms. The risk assessment outlines how the site operations are designed to withstand the effects of climate change and any recommendations to improve their design or management.

Ecological Receptors

1.2.3 There are no statutory ecological designations within 1 km of the site boundary. The sensitive receptors within 1km of the site boundary are outlined within the ESSD report (report ref: 5526-CAU-XX-XX-RP-V-0303). The primary site of ecological importance abutting the site is the River Avon, located approximately 90 m from the western boundary, as well as tributaries located within the northern areas of the site itself. The river is designated as a Local Wildlife Site (LWS) and serves an important function as a habitat corridor.

Geology

1.2.4 The superficial deposits in the region are associated predominantly with the River Avon and situated on lower elevations. The superficial deposits comprise Alluvium, River Terrace 1 and River Terrace 2 deposits. The Alluvium generally comprises a mixture of clay, silt, sand and gravel. The River Terrace deposits comprise sand and gravel and local lenses of silt, clay or peat. The site is indicated to be entirely underlain by the River Terrace 2 deposits, which comprises the mineral (sand and gravel) to be extracted.

1.2.5 The bedrock geology comprises marls and mudstones of the Mercia Mudstone Group. The thickness of this unit in the area is indicated to be up to 100m.

Hydrogeology

1.2.6 The superficial deposits (sand and gravel) are designated by the Environment Agency as a Secondary A Aquifer. These are layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

1.2.7 The bedrock underlying the site, the Mercia Mudstone, is designated a Secondary B aquifer. These are defined as mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers.

1.2.8 The site is not located within a groundwater Source Protection Zone (SPZ).

1.2.9 The site will be located sub water table, following rebound of groundwater levels upon completion of the recovery operation, and therefore is not considered to be at risk of groundwater flooding.

Hydrology

1.2.10 The Site comprises a series of farm drains, with the central and southern parts draining to the Thelsford Brook to the south. The northern half of the Site drains north and west to the River Avon.

1.2.11 The nearest named watercourse to the Site is the River Avon, which is located 90 m west of the Site at its closest approach flowing generally south to south-westwards. A tributary of the River Avon, Thelsford Brook, passes 170 m to the south of the Site, flowing westwards towards the River Avon.

1.2.12 Two field ditches originate in the north of the Site near Holloway Farm and Wasperton Farm, respectively. A surface water drainage divide exists close to the southern extent of the proposed Phase 2 extraction. North of the divide the ditches flow northwards, towards Wasperton Farm, and then west past Holloway Farm to the River Avon. To the south the ditches flow southwards and coalesce at a waterbody approximately 130 m north of Glebe Farm. From this point the water flows southwards joining Thelsford Brook 170 m south of the

Site. The water level within these ditches was approximately 0.1 m to 0.2 m deep and at a similar elevation to groundwater. The flow rate within these ditches was generally so slow as to be indeterminable.

1.2.13 There are mitigation measures proposed at the site for the operational and aftercare phases to ensure there is no increased risk of surface water flooding at the site due to heavy rainfall events.

1.2.14 The majority of the Site sits in Flood Zone 1 although the southern part of the Site is within Zones 2 and 3 of the Thelsford Brook floodplain, which extends into phases 1, 7, 8 and 9 of the proposed development at the southern end of the Site. The River Avon flood plain sits close to the western limit of the Site but the topography of the Avon valley means that the Site sits approximately 7m above the river valley flood levels.

1.2.15 During the operational phase surface water run-ff entering the site would be intercepted by the existing ditches. Rainfall incident within the working areas would be accommodated by the proposed surface water management system. Temporary soil storage bunds will be constructed along the southern boundary, which will be located within designated flood zones. Therefore, to mitigate this risk, breaks will be constructed within the bunds to allow the quarry void to be used as temporary storage for flood waters if required. These bunds will be removed once restoration has been completed.

1.2.16 Following the completion of restoration the inert fill will likely be less permeable than the sand and gravel and could result in increased runoff. The lagoons are to be retained post restoration and the storage capabilities within these will be sufficient to account for increases in rainfall due to climate change and ensure that the site will not increase flood risk elsewhere off site.

2.0 CLIMATE CHANGE RISK ASSESSMENT

2.1 Table 1. Climate change risk assessment

Climate Change Impact	Potential Impacts	Risk Assessment	Overall Risk	Comments
Summer daily maximum temperature and drier summers	Increase in dust from daily activities. Increase in airborne dust and reduced air quality. Overheating of equipment during operational phase. Desiccation or cracking of cover soils leading to potential gas emissions from soils, and increased infiltration. Loss of vegetation in restored areas leading to greater erosion risk. Less surface water available for dust suppression.	Nature of waste is low risk/negligible. Unlikely to be significant gas emissions due to inert nature of the waste. Will be completed in a phased manner. Dust suppression will be required during operational phase. Procedures on place to supress dust (see DEMP report ref: 5526-CAU-XX-XX-RP-V-0304). Surface fires not considered to be a risk due to nature of waste. Procedures in place to control dust emissions and therefore no considered to be a risk to local receptors. Site surface will be restored with vegetation to use for	Low – however this will be regularly reviewed due to unpredictable nature of climate change.	No leachate infrastructure considered required due to nature of the waste. Gas infrastructure will be required in the aftercare phase. Unlikely to generate significant amounts of gas. All key items of plant and equipment to be subject to a preventative maintenance schedule.

Climate Change Impact	Potential Impacts	Risk Assessment	Overall Risk	Comments
		agricultural use, which will protect the soils from cracking/drying out and generating dust following restoration. Vegetation will be monitored as part of site inspections to ensure still healthy and remedial works carried out if required. The use of water for dust suppression will be managed to ensure excessive water is not used.		
Winter daily maximum temperature and colder winters	Higher winter temperatures could lead to dust and odour complaints in the spring and autumn due to warmer temperatures throughout the winter. Effects on plant and equipment such as freezing over, iced to a base or risk of diesel gelling.	The nature of the wastes indicates the risk of odour is low and procedures are in place supress dust. Plant and equipment will be stored on hard ground to ensure no freezing to the base. Limited operations on site requiring diesel.	Very Low – however this will be regularly reviewed due to unpredictable nature of climate change.	
Daily Extreme Rainfall and average winter rainfall	Potential for increased leaching of contaminants within recovery soils.	Groundwater will be pumped during operational phase, whilst extraction and infilling is undertaken. The site will be	Low – however this will be regularly reviewed due to unpredictable nature of climate change.	Regular monitoring will be undertaken in the surrounding groundwater to ensure no contamination of groundwater.

Climate Change Impact	Potential Impacts	Risk Assessment	Overall Risk	Comments
	Overloading of surface water management system, leading to flooding or silt run-off. Flooding of access roads leading to temporary closure of the site. Increase in operational difficulties. Increased risk of erosion of cover soils leading to exposure and erosion which may lead to increase infiltration.	restored progressively to agricultural land using imported inert fill and site derived overburden, deposited into the dewatered voids. No materials will be deposited into water. The potential of imported restoration material to degrade water quality is considered to be minor due to the strict adherence to Waste Acceptance Criteria (WAC) to regulate the waste placed at the site. Attenuation layer will be engineered and constructed on the sides of the quarry void for the attenuation of any contaminants. Surface water management plan in place at the site, where surface water run-off is contained and abstracted as part of the quarrying operations and attenuated on site within surface water lagoons. These will contain sufficient capacity to account		Anticipated that groundwater levels will rebound following completion of the site and therefore site will be subwater table. Increase in rainfall is unlikely to cause a rise on groundwater levels due to shallow nature of deposits and continuity with surface water features in the area. No leachate infrastructure is considered to be required. Staff trained to identify any cracks, settlement or erosion of cover soils. Surface water lagoons and surrounding ditches should be regularly inspected to ensure adequate storage capacity is maintained to cope with any increased run-off.

Climate Change Impact	Potential Impacts	Risk Assessment	Overall Risk	Comments
		for any increase in rainfall due to heavier rainfall and extreme rainfall events. The site is not considered to be at an increased risk of flooding due to mitigation measures proposed for both the operational phase and aftercare phases. Maintenance procedures for access roads will be reviewed to ensure drainage capacity is adequate.		
Sea level rise and coastal erosion	Increased risk of flooding Increased salinity in the waste mass which may lead to mobility of contaminants.	Site is not located near the coast and therefore not at risk.	Negligible.	
River flow	Increased risk of flooding and erosion. Impact on the volumes permitted in discharge consents to local watercourses.	Southern area of the site is located within a zone 2 and 3 of the Thelsford Brook floodplain, however majority of the site is in a flood zone 1. Mitigation measures are proposed on site for both the operational phase and	Low – however this will be regularly reviewed due to unpredictable nature of climate change.	Groundwater levels will rebound following completion of recovery operation and be in continuity of the surface water. The final restoration scheme is not considered to increase surface water flow rates, or have a cumulative adverse effect on

Climate Change Impact	Potential Impacts	Risk Assessment	Overall Risk	Comments
		aftercare phases for surface water management to ensure the site does not increase the risk of flooding. No discharge consents in place at the site.		surface water drainage in the area, due to the land being restored back to agricultural land use. Any increase in run-off due to the inert fill will be managed by the retained lagoons to offset the increase in run off.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusion

3.1.1 The risk assessment presented above indicates that the overall risk from effects of climate change at Wasperton Farm Quarry for the proposed recovery operation are low. There are procedures and maintenance plans in place at the site to ensure any impacts from climate change are limited where possible, and any remediation or actions required can be undertaken in a timely manner to ensure the site continues to be operated appropriately.

3.1.2 Due to the unpredictable nature of climate change, it is recommended that the potential risks will be reviewed regularly, and any changes required to the procedures required will be updated in the Environmental Management System for the site.

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