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17.0 EIA SUMMARY AND RECOMMENDATIONS

Gent Fairhead & Co Ltd has commissioned Golder Associates (UK) Ltd to develop an evolution of the planned Recycling and Composting Facility (the eRCF) at Rivenhall Airfield (the Site). The eRCF develops further the design of the original Recycling & Composting Facility (RCF), which was resolved to be granted planning permission by Essex County Council's Planning Committee on 30 March 2007 for the Site at Rivenhall Airfield.

The eRCF will take integrated waste management to the next stage of sustainable development by reducing the export of recyclable wastes from Essex and recycling wastes locally into marketable products using energy from non-fossil-fuel sources derived from the waste treatment processes. The eRCF will occupy the same area of land identified within the original RCF planning application boundary. This is referred to as the 'Site'.

The new proposals will incorporate improved environmental and technological features that reflect the need for local recycling and waste treatment facilities by incorporating the following waste treatment processes:

- A Materials Recovery Facility (MRF) to sort recyclable materials collected by the Waste Collection Authorities (input capacity of 100,000 tpa);
- An Anaerobic Digestion (AD) plant to generate energy from mixed organic wastes (input capacity of 85,000 tpa);
- A Mechanical Biological Treatment (MBT) to treat a combination of mixed residual Municipal Solid Wastes (MSW) (*i.e. black bag wastes*), and/or Commercial and Industrial (C&I) waste (capable of treating up to 250,000 tpa);
- A Market De-inked Paper Pulp Production Facility (Pulp Facility) to de-ink and recycle paper and card such as newspapers and magazines (combined input capacity of up to 360,000 tpa (*i.e. 331,000 tpa of imported waste paper, magazines and card and 29,000 tpa residual paper and card derived from the MRF & MBT*)); and
- A Combined Heat and Power (CHP) plant to supply energy to the Site and export 33MW of electricity to the national grid (capable of treating up to 197,000 tpa of solid recovered fuel (SRF) plus paper pulp residues).

The following provides a summary of the significant effects that could potentially arise as a result of the proposed development of the eRCF at Rivenhall Airfield, Essex.

17.1 Construction and Operations Assessment

The impact of the eRCF on the surrounding environment has been benchmarked against those established by the RCF.

Standard precautionary measures will be taken on Site to reduce the significance of any potential impacts arising from the construction works. Through the effective management of the

construction process, environmental issues associated with noise, dust, visual impact and traffic will be minimised and controlled. Impacts associated with the proposed construction operations are anticipated to be negligible on the surrounding environment.

Residual MSW (*i.e. black bag wastes*) and/or C&I wastes, imported into the Site will be treated by a '*biodrying*' MBT process to produce a fuel which will be used to generate electricity, heat and steam within the eRCF's CHP. The '*biodrying*' MBT process is different from the existing RCF MBT technology. The change is an evolution in the waste treatment and processing operations at the Site.

Following the biodrying process, the resulting materials will be fed into a MRF to remove recyclable materials such as metals, glass, grit etc for secondary treatment and recycling off-Site. Following processing, treatment and recovery operations at the MRF the remaining residual (or non-recyclable) materials will consist of '*biodried*' residual wastes which will have a relatively high calorific value. This solid residual fuel (or SRF) will be used within the eRCF's CHP.

The CHP will treat the '*biodried*' SRF produced by the eRCF's MBT, together with other '*biodried*' materials that will be imported to the Site from facilities such as the Courtauld Road Plant in South Essex. These MBTs will produce 197,000 tonnes per annum (tpa) of '*biodried*' SRF. In addition the eRCF's Pulp Facility will produce process waste sludge, the residues of which will also be treated by the CHP.

The eRCF will incorporate a wastewater treatment and recycling facility and the Pulp Facility will incorporate autoclaves which will be used to prepare, pre-treat, sterilise and clean the imported waste paper before it is pulped and recycled within the Plant.

The eRCF has been designed to be flexible so that inevitable variances in waste composition over the coming years can be managed.

The Pulp Facility will be capable of recycling up to 360,000 tpa of recovered paper and card arising from Essex and the East of England, into paper pulp. The recycled pulp will be processed within the eRCF and transported off-Site and used to manufacture materials such as tissue paper or writing paper. The Pulp Facility will be flexible in its design to allow the eRCF to manufacture different qualities and quantities of recycled pulp to meet off-Site manufacturing demands.

The effective management and control of the eRCF, and the implementation of industry recognised best operational practice, will assist in the control of litter, scavenging birds, insects and vermin, dust and odour. All waste treatment operations will take place within state of the art environmentally controlled buildings which will minimise and contain nuisances.

An essential component of the eRCF's operational assessment and control will be the establishment of a total environmental monitoring and management system which would consider, *inter alia*, surface and groundwater, air quality and the analysis of waste types, waste volumes, Site conditions, dust, noise, odour, etc.

17.1.1 Effects on Individual Farm Holdings

With the exception of Bradwell South Field (which is owned by the Bradwell Hall Estate) the holding most affected by the construction of the access road and eRCF is Woodhouse Farm which is owned by GFC and farmed under the terms of a farm business tenancy by neighbouring farmers.

The Bradwell Hall Estate and Bradwell Spring covers an area of 170 ha, which includes all of the areas covered by the existing access road corridor and Bradwell Quarry. It is farmed by a single arable unit by a tenant farmer based at Bradwell Hall.

The eRCF proposals will result in the loss of 0.3% of the existing agricultural operations on the holding, comprising the construction of the new access road from Bradwell Quarry across Bradwell Field South. While the new access road will divide the field, the resulting units can continue to be cropped, albeit with an increased headland length.

Woodhouse Farm is a block of arable land extending to 97 ha of which 92 ha is the subject of a farm business tenancy to an adjoining farm. Approximately 67 ha lies within Bradwell Quarry. Following the restoration of Bradwell Quarry, 11.5 ha of agricultural land within New Field (non arable), Hangar Field, and Woodhouse Field will be lost by the construction of the access road and eRCF. Woodhouse Farm currently lies derelict and unoccupied. There are a number of Farm buildings serving the land and the holding is worked by contractors rather than employed staff. The unit could not form a 'commercial unit of agriculture' under the present arable cropping regime.

There are currently no staff dependent entirely upon this land for their income. Therefore the disruption of the holding associated with the eRCF development is not significant and will not prejudice the continued management of the unit during the construction and operation of the eRCF.

17.2 Ground and Surface Water Assessment

Following the construction of the eRCF, groundwater levels within 300m of the Site will be drawn down forming a localised cone of depression around the Site. Groundwater levels will be monitored monthly throughout the excavation and construction phases of the Site, to ensure that dewatering impacts from the Site are as expected. The long term monitoring of the water levels

will also allow any increasing water level trends to be identified early and any mitigation measures needed for the Site will be identified and put into practice.

The reduction in groundwater levels and the associated changes in groundwater distribution and flow are expected to have a minor adverse negative residual impact following the implementation of the mitigation proposals, should groundwater continue to be pumped from the eRCF's French Drain system.

The eRCF will follow the Environment Agency's Pollution Prevention Guidelines (EA PPG). Therefore, through the implementation of best practice and compliance to the Site's Environmental Permit, the eRCF will not pose a risk to ground or surface water quality from pollution.

Upper Lagoon will be designed to provide flood risk control. Any overflow from Upper Lagoon will be discharged under control to New Field Lagoon, which ultimately will be able to discharge under controls to Bradwell Pond at a rate deemed to be acceptable by the Environment Agency.

The overall environmental impact associated with the development and operation of the eRCF on the quality and quantity of the surrounding ground and surface water environment is not considered to be significant.

17.3 Ecological Impact & Ecological Risk Assessment

17.3.1 Habitats

None of the habitats present at the Site are EU Habitats Directive Annex I habitats. UK BAP priority habitats present include: hedgerows, lowland mixed deciduous woodlands, and ponds. In addition three species-rich hedgerows and one hedgerow that are '*important*' under the Hedgerow Regulations 1997, were found at the Site.

17.3.2 Protected Species

There were no recent signs of otter or water vole present on the River Blackwater in the vicinity of the proposed access route crossing, although both species have historical records at the river in this area.

Although suitable reptile habitat is present around the existing airfield hanger and around Woodhouse Farm, reptiles are not present at the Site.

A small population of Great Crested Newts were found within the moat at Woodhouse Farm and a nearby pond. Several species of bats are known to use the Site including common pipistrelle, soprano pipistrelle, an unidentified *Myotis* species, and brown long eared bat.

A wide range of bird species use and breed within the Site; one Schedule 1 species (little ringed plover) was found to breed at the Site in 2008 (in Bradwell Quarry). Nine red-listed species (including European turtle dove, skylark, song thrush, spotted flycatcher, common starling, linnet, bullfinch, yellowhammer, and reed bunting) and ten amber-listed species (including kestrel, stock dove, green woodpecker, sand martin, barn swallow, meadow pipit, yellow wagtail, dunnock, mistle thrush, and willow warbler) were found to breed at the Site in 2008. These include the following UK BAP priority species: European turtle dove, common cuckoo, skylark, yellow wagtail, dunnock, song thrush, spotted flycatcher, common starling, common linnet, common bullfinch, yellowhammer, and reed bunting. Barn owl is reported to have roosted in buildings at Woodhouse Farm in 2006 and 2007, but was not encountered at the Site during the 2008 survey, although buildings at Woodhouse Farm still offer potential roosting sites.

17.3.3 Ecological Mitigation

The route of the site access road from the A120 incorporates a c.1.5 km length of existing Bradwell Quarry site access road and two existing open lattice bridges over the River Blackwater. The proposed eRCF development will not involve any works to this road or the lattice bridges.

Refurbishment, improvement and redevelopment works will be carried out in and around Woodhouse Farm. The ecological environment in and around Woodhouse Farm will be improved and maintained by pumping water from Upper Lagoon to recharge and maintain waters in the existing moat as and when necessary, and the implementation of a woodland management plan. Existing trees and structures will be managed and maintained to provide suitable habitats for the existing amphibians, birds and mammals. In addition, planting and landscaping works will be carried out along Woodhouse Farm's western boundary to improve and reinforce the existing tree and hedge line to screen the proposed visitor and coach park.

The derelict moat system at Woodhouse Farm, the pond adjacent to Woodhouse Farm Lane and the proposed eRCF, has been identified for sensitive restoration for the purpose of enhancing its value for biodiversity.

Upper Lagoon will be a large freshwater storage lagoon located in front of the eRCF. The lagoon will be constructed below ground level to collect and store water from a combination of sources, namely: rainfall and surface water collected from the roofs of the eRCF and areas of hardstanding around the Site; groundwater pumped from beneath the Site either during the construction phase of the works, or during the operation and management of the eRCF; water which has been cleaned and treated from the eRCF processes *i.e. liquids arising from the MBT's bio-drying*

operation; water transferred from Bradwell Quarry into Upper Lagoon; and water which will be pumped from licensed surface water abstraction points held by GFC from the River Blackwater, or possibly from the local utility water supply network. The margins of the lagoon will be widened in order to create an area of planted wetland habitat.

Screening will be provided to the south east of the Site by the retention of a strip of existing woodland 30 m wide and the construction of a low level bund. In the areas of proposed woodland planting, the existing ground levels would be raised a maximum of 4 m using overburden excavated from beneath the area of the proposed buildings topped with topsoil also stripped from the Site.

The eRCF development proposals also include 2.2 hectares of scrub/woodland and 350 linear metres of hedgerow. The newly planted areas would be maintained for 5 years. The proposals would also include habitat management of existing resources such as the retained woodland, to promote its long term well-being and to enhance its existing ecological diversity.

Although Great Crested Newts are of international status, the potential impacts will be indirect and of short duration (*during refurbishment and redevelopment of Woodhouse Farm*), with long term beneficial impacts. Therefore, the overall impact assessment for this species is considered to be significant only at a localised scale. Similarly, all British bat species are internationally protected, but with the evidence of low use of the area and no evidence of roosts, impacts are considered to be low and not significant.

The majority of impacts will be on species and habitats of local significance, and generally of minor impact. The majority of impacts can be mitigated, and compensation will take the form of habitat restoration and creation. Residual impacts are few and indirect, and cumulative impacts similarly low.

An Ecological Risk Assessment (EcoRA) was completed for the Site and surrounding land. A tiered (*Tier 0, Tier I and Tier III*) assessment was completed to assess the risk posed by the eRCF on the surrounding ecological environment.

Conservative values and assumptions for risk estimation were purposely selected such that exposures and associated risks to ecological receptors would be overestimated rather than underestimated. Based on the results of the EcoRA, risks for terrestrial wildlife (e.g. ring-necked pheasant and water vole) living in the vicinity of the eRCF and ingesting soil and food (invertebrates and plants) were considered negligible in both the cases of baseline and future conditions.

The ecological impact and ecological risk associated with the proposed development and operation of the eRCF is considered to be low on a generally low value wildlife resource.

Emissions from the eRCF will not result in significant harm to any ecological receptors residing at the Site or surrounding land.

17.4 Landscape

The 25.3 ha Site lies within the South Suffolk and North Essex Clayland landscape character area (as defined by the Natural England) in a predominantly agricultural landscape. The Site itself does not lie in a designated or nationally protected landscape area but the access road passes through a Special Landscape Area which lies to the north of the Site. The landscape immediately around the Site is relatively unremarkable, though it has a high proportion of existing woodland, which assists in visually containing the proposed eRCF Site particularly from the south. The construction of the eRCF will be sympathetic to the surrounding landscape and Rivenhall's World War II heritage. The removal of the existing hangar and the excavation of a minimum of 11 m of overburden soils will ensure that the eRCF would be largely constructed below existing ground level thereby screening and reducing the overall visual impact of the eRCF from wide scale views. The arched roofs of the eRCF would be visible 9.75 m above surrounding ground levels. The proposed chimney would be the most visible feature of the development but it would be finished in polished stainless steel to reflect surrounding lighting conditions.

The area of the proposed development (approximately 6 ha for the eRCF within a 25.3 ha Site) would be relatively small compared to the adjacent approved sand and gravel extraction on Bradwell Quarry (67 ha). The existing Hangar No 2 already has an urbanising influence on the rural character of the area, and though the new building would be sixteen times bigger, its impact would be relatively localised. The loss of existing woodland to accommodate the building and minimise its expansion northwards would cause a relatively small impact on the landscape resource. The overall impact on the landscape caused by the proposed development is predicted to be negligible.

Visual impacts would be limited to a few residential properties though none are in close proximity to the Site. Where the new building would project north beyond the confines of the existing woodland screen, it would be perceived as an increased industrial presence. The potential impact, however, is minimised through the implementation of mitigation measures, which would lead to improved screening provision around the Site.

The major element of the proposed development which would project above this tree screen would be the chimney. This would stand 35 m above surrounding ground level (*approximately 15 m above the surrounding tree line*) and would act as a visual waymarker. To minimise this effect, the chimney would be constructed of stainless steel, with the top of the chimney, for example, that part which would be visible above the adjacent existing tree line, being of a polished finish to mirror and reflect the surrounding weather conditions and environment, making its appearance as unobtrusive as possible.

Visual impact has been assessed as minor adverse during construction and the early stages of operation, but once the mitigation measures have started to mature in these areas (10 to 15 years), the impact on views from the main receptors would be negligible. The mitigation measures will indeed, if successfully implemented, result in an improvement in landscape quality.

17.5 Cultural Heritage

An archaeological evaluation was carried out on the Site by Essex County Council's Field Archaeology Unit (ECC FAU), during September and October 2006.

The evaluation revealed archaeological features and deposits dating to the Middle Iron Age, medieval and post-medieval to modern periods. Fifty-three evaluation trenches were excavated across 10.3 ha of the 25.3 ha Site. A variety of features and deposits dating to the prehistoric, medieval and post-medieval to modern periods were excavated and recorded.

Disturbance and truncation associated with the airfield was more apparent beneath and to the east of the secondary runway. In comparison, the western half of the evaluation area seemed little disturbed which may at least in part explain the greater incidence of archaeological remains in this area of the Site.

17.5.1 Historic Building Survey

A Level 3 survey of the existing World War II hangar will be completed before it is dismantled and removed. The survey should comprise a photographic record of the structure within its current setting and supplemented by drawings of the main elevations and detailed descriptions of the interior and exterior structure.

A Level 3/Level 4 survey will be carried out at Woodhouse Farm of the existing Grade II listed buildings. The survey works will be completed before an application is made for Listed Buildings Consent to refurbish and redevelop the derelict buildings. The survey will comprise of a photographic record of the structures, supplemented by drawings of all elevations, detailed descriptions of the exterior of each building, detailed descriptions of each room, as well as an analysis of the development and history of each building and the building complex. Provision will also be made to examine the internal and exterior building fabric.

This methodology is in accordance with the recent guidelines for building recording issued by English Heritage. The survey work would however be subject to the approval of ECC.

17.5.2 Historic Building Monitoring

The physical impact of the eRCF upon the historic buildings at Woodhouse Farm is considered to be *negligible*. However the condition of the timber-framed farmhouse and associated 'bakehouse' will be monitored throughout the refurbishment and redevelopment works. The methodology for monitoring would be subject to approval by ECC.

17.5.3 Conservation of the Moat

The moat occurs within the Boulder Clay deposits, receiving surface water runoff and direct precipitation. It is not considered to be a direct expression of groundwater and often dries out in the summer months. Therefore, the proposed eRCF will not cause dewatering of the ground that may influence the moat.

Following construction of the eRCF, water levels within the moat will be managed and maintained from Upper Lagoon. Groundwater monitoring, in the form of a simple borehole local to the moat, will be carried out prior to and during the development of the eRCF as part of the overall conservation management plan for the moat. The management plan would be subject to the approval of ECC.

17.5.4 Woodhouse Farm Screening

A scheme of tree and shrub planting will be implemented in order to screen views of the eRCF from Woodhouse Farm.

The setting and local environment in and around Woodhouse Farm will remain largely unchanged and unaltered. The approach to Woodhouse Farm and view from the farmhouse will be screened from the eRCF by areas of existing woodland, planting and vegetation. The eRCF and particularly the CHP chimney will be screened from view. In addition, further planting and landscaping works will be carried out along the farm's western boundary to screen the proposed visitor and coach park from Woodhouse Farm.

17.5.5 Archaeological Fieldwork

Due to the presence of archaeological deposits and features of possible *local* or *regional* significance, in consultation with ECC, it has been agreed that two open area excavations are to be centred on the two concentrations of archaeological features discovered during the ECC FAU evaluation. This work should be carried out prior to construction, in order to achieve 'preservation by record' of these archaeological sites, whilst causing minimal disruption to the construction programme.

The Site would be subject to a '*Monitoring and Recording Brief*' to run concurrent with the phased stripping of the Site.

The archaeological excavation and monitoring, as well as the post-excavation programme, would be subject to a Written Scheme of Investigation that has been agreed with ECC.

17.6 Travel and Transport

17.6.1 Access Roads

Access to the eRCF will only be permitted via the existing A120. Therefore, road barriers will be installed at strategic locations around the perimeter of the Site which will only permit authorised or emergency vehicles to enter the Site from the surrounding road network. Furthermore, to avoid HGVs using local roads as a means of access to the Site, the GPS post code used in navigation systems will give the site access junction along the A120, not the eRCF's position on the airfield.

A comprehensive range of safety measures and proposals are proposed for the existing Church Road and Ash Lane junctions with a signing and lining revision. The package of proposed measures was established in consultation with ECC during the determination period of the RCF planning application. Given that the current eRCF proposal is likely to attract a similar level of traffic to the approved RCF proposal, it is considered that the improvements proposed at the Church Road and Ash Lane junctions with the Site access road, at the time of the RCF planning application, should be regarded as sufficient to mitigate the perceived impact of the eRCF development proposal at the junctions.

The transport assessment has considered the potential impact of construction and operational traffic movement to and from the Site. It is concluded that there are unlikely to be adverse highway and transportation impacts arising from the revised development of the Site. The proposed eRCF would fulfil an important role in the region's overall waste management strategy in the longer term and possibly in the wider context. As such, the proposal to provide the eRCF should be regarded as acceptable from a highway and transportation perspective.

It should be noted that although the eRCF will be taking more waste and mixed recyclables than the originally proposed for the RCF application, less will be transported off site. The eRCF produces a fuel which will be used on-site (within the CHP) to produce electricity and offers a '*closed loop*' waste management solution. A comparison of the proposed eRCF and approved RCF transport movements are presented below:

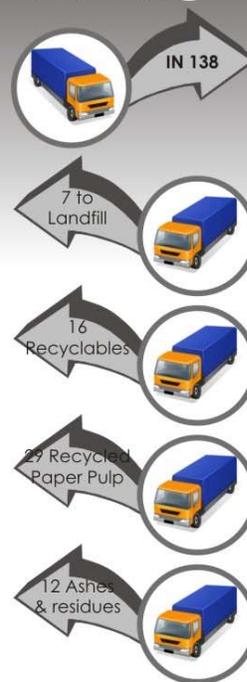
| | | |
|------------|-----------------------------------|-----|
| RCF | Trucks IN (In full, Out empty) | |
| | Municipal Solid Waste | 107 |
| | Trucks OUT (Out full, in empty) | |
| | Landfill | 33 |
| | Solid Recovered Fuel | 35 |
| | Recyclables | 16 |
| | Aggregates | 11 |
| | Total One-way Movements | 202 |
| | Total Movements | 404 |



COMPARISON

TRANSPORT MOVEMENTS

| | | |
|-------------|--|-----|
| eRCF | Trucks IN (In full, Out empty) | |
| | Municipal Solid Waste | 38 |
| | Mixed Dry Recyclables | 24 |
| | Garden & Kitchen Waste | 13 |
| | Solid Recovered Fuel | 15 |
| | Mixed Paper Inputs | 48 |
| | Trucks OUT (Out full, in empty) | |
| | Landfillable rejects from MBT & MRF | 7 |
| | Recyclables | 16 |
| | Ashes & Residues (some of which can be used as aggregates) | 12 |
| | Recycled Paper Pulp | 29 |
| | Total One-way Movements | 202 |
| | Total Movements | 404 |



17.6.2 Footpaths

During the course of the refurbishment, improvement and redevelopment works to Woodhouse Farm, it may be necessary to seek appropriate orders for the temporary diversion of Footpath 8. The timing and need for this diversion will be largely dependent upon the scale of the works required to the derelict Grade II listed buildings. However, the existing rights of way will remain open and available for as long as possible. If necessary, footpath 8 will be temporarily diverted around the eastern edges of Woodhouse Farm and the existing moat. Consideration will be given to permanently diverting Footpath 8 if considered appropriate by ECC Public Rights of Way, possibly to the eastern side of the Woodhouse Farm complex along the western side of the moat with a spur off to the proposed Education Centre.

Where the new access road crosses footpaths No. 56 and 31/35, a crossing point will be established to reduce conflict between the road, public footpath and bridleway network. This will include the installation of wooden barriers consistent with the rural nature of the surrounding countryside and restored landscape of Bradwell Quarry. The barriers will be designed in accordance with recognised standards such as those of The British Horse Society, Advisory Statement No 5. In addition, signage and road markings will be installed along the road and footpath.

The existing access road from the A120 into Bradwell Quarry is already well established and provides suitable crossing points for the public footpath and bridleway network. However, in line with best practice, improvements will be made to these crossing points by installing further signage and road markings.

The development of the eRCF on the surrounding public footpath and bridleway network is therefore considered to be low; however, the final arrangement and general detail of the proposed crossing points will be agreed with ECC in advance of any construction works.

17.7 Air Quality

17.7.1 eRCF Emissions

An assessment of the impact of the proposed eRCF on air quality in the surrounding area has been carried out. The assessment considered receptors in the vicinity of the proposed development, including identified residential properties within 2.6 km of the Site, footpaths and nature conservation sites. The emissions were assessed both qualitatively and quantitatively.

The potential air quality impacts of engine and flare exhaust gases and emission from the CHP have been assessed by means of atmospheric dispersion modelling using AERMOD modelling software. The assessment considered combustion emissions of NO₂, CO, PM₁₀ and SO₂ from the

proposed CHP stack, engines and flares; and HCL, HF, dioxins and furans and metals from the CHP stack. The findings were assessed under the following scenarios: Scenario 1 assessed emissions from 4 engines and the CHP Plant (full utilisation of biogas for electricity generation); Scenario 2 assessed emissions from 5 engines and the CHP plant; Scenario 3 assessed additional emissions from the CHP plant; and scenario 4 assessed emissions from the flare and CHP (in the unlikely event of failure of all engines). All atmospheric dispersion modelling was based on a peak waste throughput at the eRCF, and the assumption that all engines included in the scenario would be required at peak biogas generation.

The modelling results for Scenario 1 indicate that the predicted environmental concentrations of short term NO₂, CO and PM₁₀ and long term NO₂ and PM₁₀ are predicted to be below the relevant adopted Environmental Standards at all locations in the model domain including all discrete receptors and County Wildlife Sites. Predicted environmental concentrations of SO₂ averaged over 1 hour and 24 hour time periods were also within the relevant EALs at all locations in the model domain including all discrete receptors and County Wildlife Sites. The predicted maximum short term 15 minute averaged SO₂ concentration was found to be primarily affected by the emissions from the gas engines. The stack height analysis predicted that if the gas engine stack were 22m, this would result in no predicted exceedences of the relevant EAL at any points within the modelled domain, including the Site boundary. Further analysis identified no exceedences at any of the identified discrete receptor locations or CWS Sites within the modelled domain.

Similarly to Scenario 1, the modelling results for Scenario 2 indicate that the predicted environmental concentrations of short term NO₂, CO and PM₁₀ and long term NO₂, and PM₁₀ are predicted to be below the relevant EALs at all locations in the model domain including all discrete receptors and County Wildlife Sites. The predicted maximum short term 15 minute averaged SO₂ concentration was found to be primarily affected by the emissions from the gas engines. The stack height analysis predicted that if the gas engine stack were 22m, this would result in no predicted exceedences of the relevant EAL at any points within the modelled domain, including the Site boundary. Further analysis identified that there were no exceedences at any of the discrete receptor locations or CWS Sites within the modelled domain.

The modelling results for Scenario 3 indicate that the predicted environmental concentrations of both short term and long term HCl, Hf, Dioxins and Furans, Heavy Metals Group 1 and Heavy Metals Group 2 are predicted to be below the relevant EALs at all locations in the model domain including all discrete receptors and County Wildlife Sites.

The modelling results for Scenario 4, the flaring of the peak biogas production, indicate that that the short term impacts of NO₂, CO, PM₁₀ and SO₂ are below the relevant EAL at all locations in the model domain with a 10 m flare stack height. Flaring of the biogas is likely to be a rare

occurrence. However, the inclusion of an assessment of flare emissions has allowed an assessment of the emissions from full utilisation compared to full flaring.

In summary, the Process Environmental Contributions (PECs) of NO₂, CO, PM₁₀ and SO₂ have been assessed from the combustion of biogas in the engines flare and CHP; and the additional Process Environmental Contributions of HCl, Hf, dioxins and furans and heavy metals from the CHP have been assessed within the model domain and at the identified discrete receptors. The short term and long term PECs of NO₂, CO, PM₁₀, SO₂, HCl, Hf, dioxins and furans and heavy metals from the combustion of biogas, in all four scenarios do not exceed the relevant environmental standards.

There were no predicted exceedences of any of the relevant EALS for any of the modelled scenarios at any of the discrete receptors identified within the modelled domain.

Sensitivity levels for odour, bioaerosol and dust emissions at nearby receptors are considered to be negligible. Emissions will be minimised by collecting and ducting air within the eRCF buildings directly to the CHP unit where it will provide combustion air that will eventually be scrubbed and cleaned before discharge to the atmosphere (*via the CHP stack*).

17.7.2 Road Traffic Emissions

The assessment of the potential local air quality impacts associated with a change in local road traffic emissions brought about by the development proposals has been carried out following DETRs DMRB assessment guidance.

Predicted AADT flows likely to be generated by the eRCF were provided for 2012. These flows were assessed for the A120 on both sides of the site access road junction and on the site access road itself. The predicted increase in flow along the A120 was not greater than the DMRB screening criteria. Vehicle emission rates resulting from the eRCF traffic will affect existing conditions along the A120.

For the site access road, the increase in HGVs was predicted to exceed the DMRB screening criteria. However, the location and route of the proposed site access road is more than 200 m from any residential receptor. At distances greater than 200 m from a road, it is assumed that pollutant concentrations from vehicles do not significantly contribute to background air quality concentrations. Therefore, it is highly unlikely that vehicle emissions will affect off-site receptors along the route of the proposed site access road.

17.8 Noise

A survey of the area of the proposed Rivenhall eRCF and environs has been made and existing noise levels measured at four residential locations.

A series of worst case noise predictions based on BS 5228 have been made to 12 potentially noise sensitive receptors around the proposed Site and these have been assessed against criteria in BS 8233 and current WHO guidelines.

It is likely that longer term noise levels will be significantly lower than those predicted, however, the predictions represent the worst case noise level that a particular property may be exposed to at some point during the works.

During the construction phase of the proposed eRCF the worst case predicted noise levels do not exceed the proposed noise criterion of 60 dBL_{Aeq,1h} at any of the considered sensitive receptors.

The predicted operational noise levels from the eRCF are within the criteria adopted for this study, hence it is anticipated that there will be no significant impact in terms of noise at the closest noise sensitive properties.

During night-time operations the predicted noise levels from the eRCF at all of the considered locations are below the design criterion, which is rated as being 'good' in BS 8233 when an attenuation of 10 dB is assumed for partially open windows.

The predicted daytime noise levels at all of the considered locations are below the design criterion which is rated as being 'good' in BS 8233 when an attenuation of 10 dB is assumed for partially open windows.

The associated traffic movements along the A120 are predicted to result in a less than 1% change in AAWT flows. The resulting change in noise level associated with the operation of the eRCF will be considerably lower than 1 dB(A). The change in road traffic noise level would be imperceptible and is therefore considered to be insignificant.

The predicted noise levels due to the proposed eRCF operations are well below the existing Site noise limits, as shown in Tables 12-19 and 12-20. Therefore it is concluded that the eRCF can operate alongside existing quarrying activities without exceeding the existing Site noise limits. Furthermore, the eRCF will not influence the existing noise climate in the villages of Bradwell (northwest 2.6 km), Silver End (southwest 1.1 km), Rivenhall (south 2.3 km), Coggeshall (northeast 2.8 km) and Kelvedon (southeast 3.4 km).

The Environmental Permitting (EP) Regulations came into force on 6 April 2008. These new regulations will make existing legislation more efficient by combining Pollution Prevention and Control (PPC) and Waste Management Licensing (WML) regulations.

It is important to note that the proposed development falls under the remit of the Environmental Permitting Regulations (England and Wales) 2007 (EP Regulations). The eRCF will not operate without an Environmental Permit (EP), irrespective of any valid planning permission being received from Essex County Council.

The eRCF will follow EP guidance with regard to noise and will utilise appropriate noise control measures to ensure that the noise from the proposed recycling, treatment and processing operations does not give rise to cause for annoyance.

17.9 Socio Impact Assessment

The proposed eRCF at Rivenhall will contribute positively to the regional targets and strategies for economic development and waste management. In addition, by embracing ideas and proposals as to how to best utilise the refurbished Woodhouse Farm as a Visitor and Education Centre, as well as a mini-museum for local (and airfield) artefacts, the impact is positive on the regional rural policy and action plan and at the local level.

The eRCF will have some positive impacts on local socio-economic development, district rural and/or local community plans; it will contribute positively to some elements of these local development strategies. In addition, GFC is prepared to adopt a series of commitments to support regional learning and local development and empowerment, through a pro-active community engagement programme, to ensure that the eRCF has a positive impact on the local socio-economic environment.

17.10 Nuisance

The Nuisance Assessment was prepared in accordance with a source-pathway-receptor methodology. The potential sources of air emissions, dust and particulate matter, bioaerosols, litter, insects, vermin and birds and light pollution from the Site were assessed.

For each aspect (*dust, litter etc*) identified, a number of potential sources at the Site were identified. Proposed operational practices and principles to prevent, minimise and control these sources were detailed. The potentially sensitive receptors in the locality, together with the potential pathways by which any identified sources could travel were identified. The prevailing wind direction is southwesterly with the wind blowing towards the northeast. The closest receptor in this direction is the currently unused Woodhouse Farm. This is the location of the proposed Visitor and Education Centre and as such, this receptor was not considered sensitive to

nuisances from the eRCF. Other receptors in the northeast direction are Deeks Cottage and Haywards, at a distance of over 800 m from the eRCF.

Assessment of each potential source concluded that the operational measures to be employed at the eRCF are extensive enough to minimise and control the sources. As such, the risk assessment concluded that the identified potentially sensitive receptors are unlikely to be at risk from nuisances from the Site. It is recommended that the risk screening and assessment process is reviewed (*and revised if necessary*) following commencement of operations at the eRCF.

17.11 Human Health Risk Assessment

The Human Health Risk Assessment (HHRA) follows an internationally recognised risk based protocol developed by the United States Environmental Protection Agency for the recovery of energy from waste or waste derived products (including Solid Recovered Fuel) by any technology (including Combined Heat and Power) which has been tailored to allow UK specific receptor variables and risk interpretation to be incorporated.

The objectives of the HHRA were to identify the potential contaminants of concern with respect to human health and estimate the potential exposure of identified receptors to these contaminants via various ingestion (soil and human food chain) and inhalation pathways and determine whether these predicted exposures are likely to result in unacceptable health risks.

These objectives were achieved by using atmospheric dispersion modelling to predict deposition terms and soil concentrations within the area surrounding the Site. These results were used in a multi-pathway risk assessment to estimate contaminant concentrations and their accumulation in different media appropriate to the Site (soil, ambient air, pasture, fruit, vegetables, poultry, eggs and breast milk). Receptor specific intakes of each media type by potential receptors were then used to estimate the ‘total intake’. Finally, this estimated ‘total intake’ was compared with a published health based value to determine whether risks to health are unacceptable.

A review of the local area revealed areas of farming and residential land that may be used for growing crops and rearing poultry that may be consumed by humans. Consequently, Golder have assumed for this purpose the extreme case that the receptors assessed via the food chain and inhalation pathways are a local family that consumes only locally grown below ground and above ground vegetables, milk, poultry and eggs, and an infant within the family consuming breast milk.

The results show that in accordance with the US EPA protocol (as tailored for the UK environment) no exposure scenario results in an “unacceptable risk” to such a family of identified receptors and therefore to any local resident or visitor. The impact of potential nuisances such as dust and particulate matter, bioaerosols, litter, insects, vermin and birds and light pollution from the Site is anticipated to be low or negligible. The proposed operational practices and principles

are considered sufficient to prevent, minimise and control nuisance associated with the construction and operation of the RCF.

It is recommended that the risk screening and assessment process is reviewed (and revised if necessary) following commencement of operations at the RCF to ensure that any potential nuisance is controlled, contained and minimised.

17.12 Summary

The development of the eRCF is unlikely to have a significant environmental impact. Through detailed design and the implementation of targeted control and mitigation measures, the overall impact of the eRCF is considered to be low to negligible on the surrounding environment.

Air quality standards are derived for the protection of human health and as such the potential impact to human receptors via inhalation of emissions within ambient air has been assessed and demonstrates that the eRCF does not pose an 'unacceptable risk' to the surrounding human and ecological environment.