03 June 2014

Our Reference – S30030P028/FC/dcf
Your Reference – EPR/GP3536NB/A001

Natural Resources Wales
Wales Permitting Centre
Cambria House
29 Newport Road
Cardiff
CF24 0TP

FOR THE ATTENTION OF KEVIN ASHCROFT

Dear Sirs

PARRYS QUARRY LANDFILL PERMIT APPLICATION

On behalf of the applicant RJS Civil Engineering Limited we respond to the Schedule 5 Notices dated 3rd March 2014 and 9th April 2014. Responses are made in the attached documents titled Parrys Quarry Permit Application Schedule 5 Questions and Responses, AMEC reference 30030P029. In the document NRW's questions and reproduced in normal text and the AMEC response in italics. There are a number of attachments, revised drawings and figures which are listed at the rear of the document.

Do not hesitate to contact us if you have any queries on the document and supporting information or if you require any of the information to be submitted as hard copy.

Yours faithfully

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Enc: Schedule 5 Questions & Responses

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Parrys Quarry Permit Application Schedule 5 Questions and Responses

A. Schedule 5 Notice dated 3rd March 2014

Environmental Setting Installation Design (ESID)

1. In section 2.1.3 Proposed Development, 4 cells are described, although cells 1 – 3 will undergo two separate phases of filling. These cells will be temporarily capped until the second phase of filling starts. **What engineering or structural properties differentiate the waste into the different cells? How will odour, leachate and gas be contained/controlled?**

   Installation engineering is described in section 2.2 of the ESID although it is expected that full details will be agreed as part of the CQA programme to be agreed at a later date. The ESID does state that temporary capping for Cells 1 to 3 will be used along with a sacrificial gas extraction system. Leachate management is described in Section 2.3 and Landfill gas management in section 2.4. Odour will be managed as part of the Odour Management Plan (AMEC report ref: 30030/rr033i1).

2. It also states that on the Eastern flanks of cells 1 and 2 to ensure that putrescible wastes are not landfilled within 100 metres of the adjacent hotel and service area. **If this is not engineered as a separate cell what measures will be in place to prevent non-hazardous properties from contaminating the inert waste? Furthermore what will prevent ingress of water and air from the inert cell into the non-hazardous cell? Further to this please explain how this inert waste will act as a buffer.**

   The 100 metre buffer zone of inert waste is a requirement of the planning permission for the site (ref: 042468; Planning Inspectorate ref. APP/A6835/A/08/2068136) after objections were made by the businesses at the Gateway Services Complex on the A55 with respect to amenity issues associated with infilling of non-inert waste in close proximity to the complex. The distance of 100m is provided in minerals planning guidance (Mineral Technical Advice Note 1 (Wales) 2004 as minimum buffer zone distances are not defined in the Landfill Directive. It is to provide a suitable distance between the complex and any landfilling of putrescible waste as opposed to being for any engineering requirement.

3. In the section on Leachate Management Design Philosophy it is suggested that leachate monitoring boreholes will be 300 mm in diameter. EPR 5.02, How to comply with your environmental permit: Additional guidance for: Landfill suggest 600mm diameter boreholes to allow for secondary fitting or re-drilling. **Please justify why you are not following regulatory guidance?**

Full details will be agreed as part of the CQA programme to be agreed at a later date and will comply with EA/NRW guidance.

4. 2.2.6 Restoration and aftercare. The low permeability cap will be covered by a minimum of 0.75 metre of soil. The Landfill Directive, annex 1 paragraph 3.3, recommends at least a metre of 'soil cover' at landfills for hazardous and non-hazardous waste as part of surface sealing. **Please revise in accordance with Landfill Directive. Please revise drawing 30030/ESID/05.**

   Full details will be agreed as part of the CQA programme to be agreed at a later date and will comply with the requirements of the Landfill Directive. Please find attached revised drawings 30030/ESID/05. 30030/ESID/06 and 30030/ESID/11B.

5. 2.4.5 Landfill Gas Monitoring Infrastructure - Monitoring boreholes are spaced at every 50 metres. **As there is development within 150 metres Table 8.1 of LFTGN03 suggests borehole spacing at every 10 metres. Please justify alternative methodology / ways of working?**

   The spacing of the monitoring boreholes will be agreed with NRW as part of the CQA plan and will be based on risk and having regard for EA/NRW guidance.

6. 2.5.5 states that it is not necessary to sign up to NRW's Flood Alert to reduce discharge rate when discharging into Altami Brook to ensure that there is not an increased risk of flooding to properties downstream, despite acknowledging that this is a flood risk area. **Please explain.**

   RJS will register to receive flood alerts from Natural Resources Wales' service as stated in the Accident Management Plan (AMEC Report reference 30030/rr030i1).

<u>Odour Management Plan</u>

7. Odour Management Plan has not been done in accordance with H4 guidance. The odour assessment was the one carried out for the planning application in 2007. The GASSIM modelling results included in the odour assessment report were significantly different from those predicted by the submitted GASSIM modelling files. Furthermore, AERMOD air dispersion model was used in the odour assessment. **Please confirm that GASSIM run S:\Project Files\07-2011 PROJECTS/30030 – 10131 – Robin Jones – Parrys (WRDG)\X-Calculations\GasSim\Parrys Quarry – two engines – calc moisture.gss, model date 30/09/2011 16:47:48 is the final run. Please provide the corresponding AERMOD and GASSIM modelling files used for the odour assessment for auditing. Please explain why the GASSIM modelling results are significantly different between planning and permit application**. **Furthermore please re-submit OMP using H4 guidance.**

A revised Odour Management Plan (OMP) (AMEC report ref: 30030/rr033i1) has been compiled and submitted, which is compliant with the recommendations of the recent SNIFFER Report ER31. In addition, the odour model for the site has been re-compiled, using ADMS Version 5 (Service Pack 1) and Cell-specific odour emission rates based upon data contained in the above SNIFFER report.

8. Odour Risk Assessment refers to the risk of odour as being insignificant. This cannot be adequately quantified and is dismissive to local receptors. NRW cannot support your assessment that odour will be an insignificant issue. **Please revise your Odour Risk Assessment and provide details of appropriate measures that can mitigate against the inevitable odour that will be produced at a landfill.**

   As indicated in the response to Q.7 above, a revised OMP has been compiled and submitted, incorporating a revised odour risk assessment and mitigation measures(AMEC report ref: 30030/rr033i1).

Habitats Management Plan

9. No consideration has been made for the risks of failures from the landfill or generally from runoff from the landfill. **Please explain why this has not been considered or provide appropriate details.**

   Section 3 'Toxic Contamination' and Table 2 of the report (ref 30030/R4179) detail the risks and control measures from run-off. Although the report primarily notes leachate rather than run-off but the report provides enough information to demonstrate that run-off etc will be managed.

   Details on failure of the landfill are covered in the Accident Management Plan (Ref 30030/4164) and the Stability Risk Assessment (ref 30030/R4155). Although specific ecological input is not specified, the control measures and remedial actions specified are in place to reduce the impact on the identified sensitive receptors which includes such features.

10. Habitats assessment suggests that pests would not cause a problem for newts. According to the Great Crested Newt Conservation handbook provided by frog life, rats are likely to predate on Great Crested Newt, furthermore Gulls and corvids could predate on newts, but this does not seem to have been considered. **Please justify.**

    Table 2 of the report (ref 30030/R4179) and Chapter 11 of the Environmental Statement (Vol I) consider the risks and control measures for Gulls / Corvids at the site.

Amenity Risk Assessment

11. Risk Assessment with regard to odour continually refers to the probability of exposure as low and the consequence as low. The consequence will not be considered low by the receptors. The residual risk is considered as negligible. This cannot be adequately quantified and is dismissive to local receptors. NRW cannot support your assessment that odour will be negligible. Please revise your Amenity Risk Assessment and provide details of appropriate measures that can mitigate against the inevitable odour that will be produced by putrescent waste.

    Please see response to Q.8 above.

12. Risk Assessment with regard to Air (operational phases) for the risk management states that no additional measures needed based on Environment Agency guidance. Site specific measures should always be used where necessary. This suggests that if there is an issue with dust emissions no further mitigation will be necessary because work is done according to guidance. **Please clarify and revise to show remedial measures. Furthermore such measures should form part of your Fugitive Emissions Monitoring Plan. Please revise.**

    Amenity Risk Assessment revised to include measures (Ref 30030/rr031i1).

13. Table 5.3 on the risk management for prevention of contamination of groundwater – says waste types inert? This application is for a non hazardous landfill. **Please revise risk management as this will not be the case.**

    Amenity RA revised now refers to non hazardous waste (Ref 30030/rr031i1).

14. Pests – action taken refers to Fugitive Emissions Monitoring Plan (FEMP) - Risk Assessment needs to provide specific actions that will be taken. Similarly the section on contamination of surrounding surface water, groundwater and land refers to the Surface Water Management Plan (SWMP). Again the risk assessment needs to refer to specific actions that will be taken. **Please clarify or revise.**

    Amenity Risk Assessment revised to include measures (Ref 30030/rr031i1).

Accident Management Plan

15. Accident Management Plan put together using How to Comply version 2. Version 5 should have been used. Section 2.1 on flooding refers to the Surface Water Management Plan elsewhere. Similarly Section 2.2 on Subsidence and Landslides states that the risk of subsidence, settlement and landslip and the consequence of any slope failure is dealt with in the Stability Risk Assessment. The Accident Management Plan should be a “go to”

document in the event of **any** accident, referral to other documents is inefficient for knowing what to do in the event of an accident and could waste valuable time in the event of an accident. **Please revise to include this in the Accident Management Plan.**

The additional information regarding the flooding and the surface water management system has been added to Section 2.1:

Surface water runoff within the site will be managed to provide for controlled release to the wider water environment thus the site will not contribute to any increase in flood risk outside the site. The overall drainage at the site will generally drain towards the north into the modified existing northwest stormwater management pond via the perimeter drainage ditching system which will run all around the capped landfill. The main purpose of this pond is to detain the stormwater during a severe rain event, for flood and erosion control, and to improve surface water quality through sediment control.

The surface water management system has been designed to provide adequate freeboard for exceedence events. However, during such an extreme rainfall event there could be a flood risk in the surrounding area, completely irrespective of the site discharges. The Environment Agency flood risk map indicates that there are few receptors located downstream of the site and therefore, the proposed increase in flows in Alltami Brook as a result of the increased discharge rates would be unlikely to cause an significant increase in flood risk downstream. However, Natural Resources Wales has designated a Flood Alert Area for Alltami Brook (Llangollen to Chester Flood Alert Area).

In order to reduce the risk and minimise the potential impact of flooding offsite, RJS will employ the following measures:

- *RJS would register to receive flood alerts from Natural Resources Wales' existing service.*
- *Check weather conditions daily for any adverse weather conditions, storm events;*
- *Make weekly inspections of the surface water management system for any signs of damage or blockages and clear where necessary.*

In the event of an incident or event that could potential lead to flooding offsite or in the event of receiving a flood alert from Natural Resources Wales, RJS will employ the following measures:

- *Pumping from the attenuation lagoon will be reduced to the existing consented rate of 14 l/s for the duration of the Flood Alert or event, or*

- *Reduced to zero if Natural Resources Wales deemed it necessary to ensure the safety of people located downstream.*

Section 2.2 does contain information on proposed measures to take in the event of detecting subsidence and landslides but the section has been updated as follows:

The risk of subsidence, settlement or landslip could impact on the lining system for the site causing a breach of the lining system. The stability of both the substrata and the engineered lining system has been assessed in a quantitative manner in the Stability Risk Assessment (ref 30030/R4155) submitted in support of the Environmental Permit application and all necessary precautions incorporated into the design to ensure that the risk of a breach of the lining system as a result of instability in the substrata or the engineered lining system is low.

During the construction phase, the lining system will be subject to third party accredited construction quality assurance (CQA) scheme and monitoring of the compaction of any fill required to form the final side slope sub-grade will be an integral element of the CQA monitoring programme. The monitoring will include for layer thickness, number of passes of the roller and material type. The construction specification will define the specific details, based on the available construction materials.

During the operational phase of the site, in order to reduce the risk and minimise the potential impact of subsidence, settlement or landslip, RJS will employ the following measures:

- *Regular topographical surveys will be carried out at least annually to assess settlement and compare the results against design assumptions.*

- *Visual inspection will also be carried out weekly to look for signs of instability or differential settlement.*

- *Leachate levels will be monitored at least monthly to check for any sudden unexplained drop in levels.*

In the event that stability or settlement problems are discovered, appropriate remedial action will be taken. Measures will include:

- *reducing leachate heads,*
- *reduction of waste gradients,*
- *adjustment of phasing to allow slopes to be remediated,*
- *engineering work to increase factors of safety,*
- *supporting earthworks,*
- *design revisions.*

Accident Management Plan revised (Ref 30030/rr030i1) and attached.

16. Accident Management Plan does not include a site plan which identifies location of any emergency kits or equipment for fire, spill kits and drain caps. **Please revise.**

    Full details of the site infrastructure have yet to be finalised. It would therefore be more prudent to complete the drawing once all the infrastructure is in place to ensure the drawing accurately reflects the location of all required equipment. AMEC suggests this is addressed in a pre operational condition.

17. Section 2.9.1 on transfer of substances says that any accidental deposits of difficult wastes will immediately be covered with general waste. **What wastes are these difficult wastes likely to be and what are the associated risks of these difficult wastes? Furthermore how will covering with general wastes help to mitigate against this?**

    Footnote added to clarify what is meant by difficult waste:

    the term 'difficult waste' has no statutory definition but for the purposes of this application it covers non hazardous wastes, the handling or disposal of which calls for additional procedures because of their physical characteristics, for example wastes with the potential to generate excessive amount of litter or dust.

18. Section 2.9.2 on Failure of containment has a sentence missing. The sentence states "*the emplacement of waste will be in layers a*". **Please complete the sentence.**

    The waste will be deposited in max 2.0m lifts and compacted using a purpose designed waste compactor vehicle. A maximum waste slope of 1v:3h will be formed at the working face.

19. Section 2.9.4 states that no non stable hazardous waste will be accepted. What is meant by non stable hazardous waste? Waste types applied for are non hazardous waste. **Please clarify.**

    Revised to read:

    In accordance with the requirements of the Landfill Directive, the landfill will be permitted to accept non hazardous waste only.

20. Generally no assessment of consequences into high, low, medium? **There should be an assessment of accident risks using source, pathway, receptor model as in H1 Annex A or Annex I.**

    The Amenity Risk Assessment does include this. That part of the RA has been added as an appendix to the AMP.

    Surface Water Management Plan (SWMP)

21. Table 7.3 – doesn't adequately describe risks. E.g. Suspended solids in run off – Negative, Direct, Local, Short term, Reversible. Impact should be smothering of riparian bed or aquatic plants etc. This theme is repeated for each impact table. **Please clarify and quantify.**

    The Surface Water Management Plan (SWMP) addresses the impacts of the site on surface water quality and flow (Alltami and Wepre Brooks). Table 7.3 summarises the predicted impacts. These include increase of suspended solids in runoff and oils/other organic contaminants introduced in surface water. How these impacts then affect ecology/habitat has been included and the revised table is set out below

Table 7.3 Surface Water Impacts - Construction Phase

Project Activity	Environmental Sensitivity	Impact	Description	Probability	Value of Receptor	Impact Rating (before mitigation)
Earthmoving and construction activities	Surface water system (Alltami and Wepre Brooks)	Suspended solids in runoff, temporary smothering of riparian bed or aquatic plants.	• Negative • Direct • Local • Short term • Reversible	Low to Medium	High	Medium
Earthmoving and construction activities – plant management	Surface water system (Alltami and Wepre Brooks)	Oils and other organic contaminants reaching surface waters; potential impacts on aquatic fauna.	• Negative • Direct • Local • Short term • Reversible	Low to Medium	High	Medium
Dewatering	Surface water system (Alltami and Wepre Brooks)	High volume flows and suspended solids introduced to surface waters; high volume flows could flush faunal life-stages downstream (although flows would need to be substantially above those experienced naturally); suspended solids may smother the bed or plants, depending on deposition rates associated with the high flows.	• Negative • Direct • Local • Medium-long term (could continue into operational phase) • Reversible	Medium to High	High	Medium to High

Table 7.3 (continued) Surface Water Impacts - Construction Phase

Project Activity	Environmental Sensitivity	Impact	Description	Probability	Value of Receptor	Impact Rating (before mitigation)
Dewatering	Groundwater system	Derogation	• Negative • Direct • Local • Medium-long term (could continue into operational phase) • Reversible	Medium to High	Medium	Medium

22. Permit limits – request Ammoniacal N and Chloride limit be temporary as effects of agricultural runoff and winter road runoff is unknown. **Why isn't there sufficient monitoring carried out of Altami Brook to establish background levels?**

The water quality monitoring data for the Alltami Brook is discussed in Section 1.2.4 of the Hydrogeological Risk Assessment (HRA). It is considered that the available data is limited to appropriately define baseline conditions due to the potential influence of adjacent agricultural land and the use of de-icing salts in winter in nearby roads (i.e. from the A55). On this basis it is proposed that:

- *Interim compliance limits are set for chloride and ammoniacal at the downgradient monitoring locations in the Alltami Brook as discussed in the SWMP (Section 5.1.4)*
- *A Pre-operational condition is included in the Permit for collection and review of additional monitoring data for the Alltami Brook and derivation of appropriate compliance limits.*

Closure and Aftercare Plan

23. There is no mention of when closure is predicted. Nor is there mention of prediction of gas production and leachate production to support this. **Please provide further details.**

Closure Plan has been revised to include the required information and is attached – AMEC report Reference 30030/rr032i1.

24. No mention of final landform, whether this is required through planning permission, what the landfill is to be restored to. No mention of capping or, capping materials. Will waste be required for restoration? **Please clarify.**

Section 2.1 of the ESID (ref 30030/R4150) states the site will be restored to provide new woodland, grassland and wildflower meadow habitats and the site is intended for public amenity open space post closure in a domed shape, consistent with the topography to the south west of the site. Planning permission (ref 042468 dated 3 Feb 2009) requires the submission of an aftercare scheme to restore the site to a condition suitable for nature conservation and public open green space. It also restricts deposit of waste to the approved pre-settlement contours and levels shown on the 'Final Contour Plan (Drawing No 3 Revision A) dated August 2006 (part of ES Vol 2, Appendix 2.3). Capping materials are covered in section 2.2.5 of the ESID (ref 30030/R4150).

Closure Plan has been revised to include the required information and is attached – AMEC Report Reference 30030/rr032i1.

25. Environmental monitoring should mention minimum landfill directive requirements not just stating that monitoring will be done on a site specific basis. **Please revise.**

    Amended. Closure Plan has been revised to include the required information and is attached – AMEC Report Reference 30030/rr032i1.

26. EPR 5.02 lists the minimum required in a closure and aftercare plan. This minimum should be in place at permit application. **Please revise Closure and Aftercare plan to reflect minimum requirements of EPR 5.02. How to comply with your environmental permit, additional guidance for: Landfill.**

    Amended. Closure Plan has been revised to include the required information and is attached – AMEC Report Reference 30030/rr032i1.

GASSIM Modelling

27. When the submitted modelling files are loaded in the GASSIM software, an error message prompts due to the cells overlaps. **Please amend this error and confirm the GASSIM model run version S:\Project Files\07 – 2011 PROJECT\30030 – 10131 – Robin Jones – Parry's (WRDG)\X – Calculations\GasSim\Parrys Quarry – two engines – cal moisture.gss is the correct model to use.**

    An updated version of the GasSim model is provided with this response with this error amended.

28. The GASSIM modelling files show that the total bulk landfill gas (including surface emission) produced from the site will be about 200 m^3/hour in 2016, and the maximum landfill gas production will be about 600 m^3/hour in 2028. However both the applicant's report and GASSIM modelling file indicate that two gas engines will be installed, one in 2016 and the other in 2021. The designed capacity of the landfill gas engines is 350 – 600 m^3/hour. This means that not enough landfill gas will be produced in 2016 (200 m^3/hour) for one engine (capacity 300 – 600 m^3/hour) and from 2021 onwards (maximum landfill gas production 600 m^3/hour) for two engines (capacity 700 – 1200 m^3/hour). **Please clarify this discrepancy.**

    With a peak modelled maximum bulk landfill gas production rate of 600 m^3/hr in 2028 we accept that there will be insufficient gas production to run two 300-600 m^3/hour capacity landfill gas engines. Therefore, a revised version of the GasSim model has been produced and is included with this response, which considers a single 300-600 m^3/hour capacity landfill gas engine, installed in 2016, along with a single landfill gas flare of 50-500 m^3/hr capacity installed in 2014.

A graph is included with this response showing the total bulk landfill gas generation along with the total combusted landfill gas in both the engine and flare. A printed output of the model is also provided for reference.

The revised output shows that theoretically there will be sufficient bulk landfill gas generated to run the engine from approximately 2016 through to 2035, with the flare operating at times when the engine is down or the gas generation rate falls below the minimum capacity of the engine.

29. The air quality dispersion modelling assessment is based on the predicted landfill gas volume. If the suggested gas plant (two gas engines and one flare) was valid, then the volume of the landfill gas produced would be underestimated. Consequently, the air quality impact will also be underestimated. **Please revise.**

See response to Q28. The air dispersion modelling has been revised to take account of a single gas engine of 300-600 m^3/hour capacity and a single landfill gas flare of 50-500 m^3/hr capacity.

Air Dispersion Modelling

30. Emission from the proposed flare was not included in the dispersion modelling. **Please provide an air quality assessment for the flare.**

    A revised air quality impact assessment has been carried out, incorporating the assessment of emissions from one landfill gas engine and one enclosed landfill gas flare.

31. On page 10 (the last paragraph) The applicant's report states "From examination of 1:25,000 Ordnance Survey maps it can be seen that within 2 km of the plant, land use is mainly open farm and suburban. A composite surface roughness length of 0.75 m has been used to take account of the respective land use categories in the model domain." However, the US EPA AERMOD Implementation Guide, revised on 19 March 2009 http://www.epa.gov/ttn/scram/dispersion_prefrec.htm#aermod, recommends "upwind distance for processing land cover data to determine the effective surface roughness for input to AERMET is 1 kilometer". We agree with the US EPA's recommendation of 1 km. Within 1 km from the plant, there are open agriculture lands. According to CERC ADMS, surface roughness of 0.2 - 0.3 m should be used in this case. **Please amend the modelling or justify the use of .75 metres.**

    In the revised air quality impact assessment (see response to Q.30 above), we have re-considered the surface roughness value used in the modelling and have amended this to 0.5 metres, based upon the combined presence in the model domain of landfill features, pastureland, trees, hedges and scattered properties, with the developed area of Buckley to the south and south-east.

32. Table 2.10 on page 23. 2010 Background Map should be used. This is because 2008 Background Map may underestimate NO_2 concentration. **Please revise.**

    The 2010-based background map baseline values have been used in the revised air quality impact assessment.

Landfill Gas Risk Assessment

33. In section 1.3 "Sources – Landfill Gas Generation and Management", subsection landfill gas collection systems, it states that *'Waste will accumulate within cell1 until sufficient waste has been deposited to justify commencement of the installation of the landfill gas collection system for the site'* this needs to be rationalised and more detailed with regard to phasing and landfill gas collection. Cell 1 is approximately 2.5 hectares (25,000 m2) at an average input rate of 105,000t/yr this would mean that if waste was spread evenly across cell 1 for example then the site would fill at a rate of 4m of depth per

year. This would be unacceptable to NRW. Although this issue is referred to in the documentation, NRW contends that for best practice early odour and gas control then phasing must be adopted within cells to ensure enough depth of waste is present in an acceptable time frame. **What will be the phasing plan within each cell to ensure that the depth of waste enabling gas extraction is reached as soon as possible in line with LFTGN03?**

It is anticipated that waste will be tipped in each cell against a sidewall of the lining system and the tipping face will progress across the cell as it is filled in progressive 'lifts', as opposed to wastes being placed evenly across the entire basal extent of the cell. This approach will ensure that a sufficient thickness of waste to justify commencement of the installation of the landfill gas collection system for the site will be reached as soon as possible.

As stated in the ESID Report, typically landfill gas extraction will commence when approximately 10m of waste have been deposited, although this varies on a site specific basis (only 4-6m may be sufficient in this case as discussed in our response to Q35). Appropriate daily cover materials will be placed to a depth of 150mm over the waste after tipping to control odour and landfill gas during landfilling prior to placement of the cap.

Also note that, as stated in the Landfill Gas Risk Assessment, routine monitoring will identify if there is sufficient gas volume generated that would require management controls to be implemented at an earlier date.

34. **Drawing 30030/GRA/02** shows trenches and horizontal extraction pipe-work illustrated to 15-20m depth of waste from the base with wells retro-drilled from final profiles to this depth. **How will an even suction pressure be applied to horizontal pipework? Please provide justification for the use of horizontal pipe-work.**

Horizontal pipework has been proposed as a 'sacrificial' system that will allow gas to be collected from the entire waste mass as soon as practicable during landfilling as the thickness of waste in each cell increases. This will be achieved by installation of a minimum of three 'levels' of horizontal pipework in each cell (i.e. lower, middle and upper as shown on drawings 30030ESID/08 and 30030/GRA/01). As noted, the horizontal pipework will be supplemented by retro-drilled vertical extraction wells, spaced between the horizontal trenches, to enhance landfill gas capture. This should ensure that there will be only a horizontal distance of approximately 20m between a horizontal and vertical gas collection well.

Suction on the horizontal pipework will be controlled via valves located on the risers at each end of the horizontal pipework where they intersect the landfill gas header pipe, as shown on drawings 30030ESID/08 and 30030/GRA/01. The horizontal pipework will be subject to gas field balancing, in much the

same way that vertical wells are balanced, both during, and after, landfilling to optimise gas extraction from the entire waste mass.

35. It states that 'spacing *of the trenches at 40m horizontally and 10m vertically to achieve* the *optimal zone of influence over the entire waste mass therefore achieving 95% collection efficiency'* In the experience of NRW, 95% extraction efficiency is never achieved on an operational landfill and only with the most assiduous attention to detail and large ongoing capital expenditure can this efficiency be achieved on a finally capped landfill achieving close to best practice. At 40m centres, the overlap to achieve such efficiencies would have to reach 20m equidistant between the 40m centres. High extraction pressures are required to achieve this. This creates a risk of drawing in too much oxygen and causing landfill fire. **How would the Operator stop air being sucked in through the few metres of waste in the vertical section? Please justify how the 95% collection efficiency has been derived?**

    The Landfill Gas Risk Assessment states that a 4 to 6m waste depth should be maintained over the expected capture zone of the trench prior to initiating landfill gas extraction to prevent air intrusion into the system. This should be viewed as the minimum thickness required and it is accepted that perhaps as much as 10m waste thickness may be required to prevent air ingress. Note that placed wastes will be compacted and appropriate daily cover will be applied to a depth of 150mm, both of which should serve to reduce the possibility of atmospheric air being drawn into the gas extraction system. Furthermore, the gas collection system will be balanced on a regular basis, as described previously, to ensure that excessive amounts of air are not being drawn into the gas utilisation plant and/or waste mass.

    With regard to collection efficiency, the point made in the Landfill Gas Risk Assessment is that the trenches should be spaced close enough both vertically and horizontally to achieve an optimal zone of influence over the entire waste mass. We accept that the 95% collection efficiency quoted in the Landfill Gas Risk Assessment is perhaps optimistic, and note that a figure of 85% collection efficiency is quoted in the ESID Report. From the EA guidance on the management of landfill gas best practice is for an active gas extraction system to achieve the maximum practicable collection efficiency, and that the annual collection efficiency for methane should be compared against a value of 85%. Therefore, collection efficiency will be compared against an 85% value but the intention is to achieve the maximum practicable collection efficiency.

36. Drawing 30030/ESID/13A appears to only show perimeter gas monitoring points. **Please provide a drawing with the waste gas monitoring points. Please justify your use of trenches by providing detailed operating parameters, zones of influence and any balancing rationale or evidence of such trenches successful operation in other landfills other than in a scavenger capacity**.

In-waste landfill gas monitoring will be via gas manifolds fitted with sampling valves and in gas sampling valves fixed to leachate wells, as described in Section 3.2 of the Landfill Gas Risk Assessment. The location of the leachate wells (2 per cell) are shown on drawing ESID13A provided in response to the original Schedule 5 notice.

The use of horizontal gas collection wells in trenches is widely documented, notably within the United States (refer to the Global Methane Initiative's 'International Best Practices Guide for Landfill Gas Extraction Projects' https://www.globalmethane.org/documents/toolsres_lfg_ibpgch3.pdf . The EA's guidance on the management of landfill gas notes in Section 7.3.1 (Collection Wells) that: "some use has also been made of horizontal collection wells installed within the waste mass and in trenches" and that: "constructing collection wells vertically or horizontally during landfilling allows gas to be collected before a particular phase is completed, this providing greater flexibility in the control of landfill gas at an earlier stage in the site's development".

In terms of spacing, EA guidance suggests that gas wells should be typically no more than 40m apart, and Global Methane Initiative's best practice guidance states that "Common spacing of horizontal wells is 30 to 40 meters apart". Again, note that the horizontal wells will be supplemented by vertical extraction wells with 40m spacing placed between the horizontal trenches. Therefore, there will be only a horizontal distance of approximately 20m between a horizontal and vertical gas collection well.

37. In section 1.3 "Sources – Landfill Gas Generation and Management", The design of the containment collection ***and treatment system*** should be included in the LFG risk assessment report as recommended in the LFG risk assessment report template. The operation gas treatment compound should comply with certain standards in terms of equipment monitoring and maintenance, standby action in the event of mains failure, provision of a generator if there is a catastrophic failure and the out of hours provisions for staff. **What will be the out of hour's minimum response time and will this be linked to telemetry? Please submit design details of the booster sizing the rationale for flare sizing and technical details of de-watering points, and details of the gas train.**

Section 3.3 (Action Plan) of the Landfill Gas Risk Assessment provides details of the actions to be taken in a variety of scenarios, including malfunctions in the gas flare and utilisation plant. At this stage of the application, the arrangements regarding the out of hours response time are yet to be agreed in detail, although it is anticipated that the response time would vary depending on the severity of the incident but in any case should not be any later than the next working day. Modern landfill gas utilisation plants

incorporate telemetry to warn operators of plant failures/outages and it is anticipated that such a system would be installed at the plant.

Design details of the booster sizing and gas train have not been provided at the application stage because the detailed design of the landfill gas plant has yet to be carried out. The detailed design of the landfill gas plant would be agreed in advance with NRW prior to construction. However, and for the purpose of this response, the booster(s) would be sized to allow increase of the landfill gas pressure to ~3-15 kPa in accordance with EA guidance for monitoring enclosed landfill gas flares.

Indicative locations of landfill gas condensate chambers, manholes and traps are shown on drawing 30030/GRA/01, with condensate chambers located at low points within the landfill gas abstraction system to ensure effective condensate management. Although design details of condensate drainage points are not included with the application, it is anticipated that these will be designed as per Figure 7.5 in the EA's guidance on the management of landfill gas.

38. The Gassim analysis predicts a peak production of approximately 700m3/hr LFG at 50% CH4. The LFG Risk Assessment submitted in support of the application states that 'a number of engines' increasing in line with gas production will be installed as required. Site control will largely depend on the engine demand when it is not flare led, and therefore the size of engine installed, which is different to a simple flare led regime. The wrong sized engine (or booster) can lead to fluctuations in the pressure delivered into the gas extraction field which in turn affects control, emissions and system performance. **Please clarify what size and type of engine(s) would be deemed suitable to meet the demand from Gassim predictions and ensure correct pressure distribution across the site.**

    Refer to our response to Q28. A single spark ignition engine of 300-600m^3 capacity is proposed, equating to a power output of approximately 1MW.

39. 'Lateral seepage' through coal measures does not provide an adequate description of the migration scenarios that will be encountered at the landfill. Considering lateral migration through the mudstone to be of least concern is not acceptable to NRW as there is direct evidence from other sites in the area with very similar geology that landfill gas readily migrates through mudstone. **Please provide a more detailed assessment to include the different geologies encountered around the landfill, the risk of diffusion and advection, the location of ducts and services, adits and tunnels which may form conduits for lateral migration.**

    The comment regarding lateral migration through the mudstone as being of least concern is made relative to vertical migration during the period over which groundwater management will be undertaken. It is acknowledged that

localised higher permeability strata are present which could provide a conduit, although the site will be operated under a hydraulic containment system, restricting the depth over which sub-surface migration could occur once groundwater levels recover. More importantly, the engineered containment and active gas abstraction system proposed will significantly reduce the likelihood of the lateral migration of landfill gas from the landfill.

A detailed assessment of the regional and local site geology is provided within Section 8.2 of the ESID Report and the stratigraphy and lithology of the relevant Coal Measures strata in which the site is situated are shown in Table ESID14 and Drawings 30030/ESID/09A-C. Details of site investigations carried out are also provided in the ESID Report, which generally confirm the dominance of mudstone and siltstone lithologies below the site, with some sandstone at or near the surface, particularly in the eastern/central part of the site.

With regard to lateral migration, and if it were to occur, then we anticipate that this would be dominated by slower advective flows, which are driven by concentration differentials, and could be detected by the network of perimeter monitoring boreholes installed. Faster advective flows, which are driven by pressure differentials, would be even less likely (i.e. as a result of a sudden containment breach) and the pressure differential induced by the active gas extraction system would likely draw gas into, rather than allow migration from, the waste mass in such an unlikely scenario.

Manmade subsurface pathways are discussed in Section 8.3 of the ESID Report. These include two shafts, now sealed, and a third shaft, with the workings now likely to be flooded and located some 60m below ground level.

40. Emissions from point sources are usually raw gas emissions from individual features such as cracks in the waste, sidewall risers, up the side of gas wells, around leachate chambers and where pressure pockets build. **What mechanisms does the Operator propose to use to detect and prevent such emissions?**

The landfilled wastes will have 150mm of appropriate daily cover applied, which will serve to reduce fugitive emissions. Infrastructure penetrating the waste mass (pipes, wells, etc.) will be installed with annular seals to reduce/ eliminate such emissions.

Point source emissions will be minimised through regular inspections and routine maintenance. As per Section 3.2 of the Landfill Gas Risk Assessment, surface emissions will be monitored via annual walkover surveys using a flame ionisation detector (FID), or at other strategic times as identified by supporting subjective odour monitoring.

41. **Paragraph 3** of this section states *'localised higher permeability strata are present, which could provide a conduit (for landfill gas migration). However, the site will be operated under a hydraulic containment system restricting the depth over which subsurface migration could occur once groundwater levels recover.'* This is a vague statement which provides no detail of the mechanisms which would prevent gas migrating and no detail of the timescales of aquifer recovery or the likely available headspace above the confining aquifer. The confining of headspace above the aquifer surrounding the landfill may result in migration further from the site depending on ground conditions. Gas production in the site will not reduce under a recovering aquifer and where there is still headspace of any kind there is a potential for migration. It is not acceptable to use recovering groundwater levels as a risk mitigating factor for migration in this instance. **Please provide further details and justify your position.**

    Section 3.1 of the ESID Report provides information on the active groundwater management system already in place at the site. It is anticipated that groundwater levels will have fully recovered towards the end of filling operations and that that recovered groundwater levels will be approximately 90-100 mAOD. Detailed geological cross sections, including groundwater levels, are provided as Drawings HRA02 and HRA03 in the Hydrogeological Risk Assessment Report.

    With regard to using recovering groundwater levels as a lateral migration risk mitigating factor, it is possible, although unlikely, that landfill gas will escape through the containment system and will then migrate laterally through unsaturated strata above the recovered groundwater levels. However, the predominant mechanisms for preventing gas migration are the engineered lining system, constructed with appropriate construction quality assurance (CQA) and an effectively managed active landfill gas extraction system. A network of perimeter monitoring boreholes will be installed at 50m spacing around the perimeter of the landfill, as described in the Landfill Gas Risk Assessment, to monitor any potential off-site migration of landfill gas. Furthermore, and during the operational stages of each cell, vertical migration would form a preferential pathway compared to lateral migration over the period when groundwater management will be undertaken.

42. It has been stated that a coal seam has been identified between 67 and 83 metres AOD. It then goes on to state that this coal seam could provide conflicting information and false indication of methane migration which will have to be screened during interpretation of monitoring data. To define the background levels of methane and carbon dioxide NRW requires representative perimeter monitoring boreholes to be drilled 12 months prior to the commencement of landfilling as illustrated in Table 5.3 of LFTGN03. **Has this background monitoring been undertaken?**

Refer to Section 8.6 of the ESID Report. At the time of application, off-site baseline landfill gas monitoring has not been undertaken as the site is an active quarry prior to development of the site a programme of surveillance monitoring will be submitted to NRW for approval. Currently the open void space would prevent gas accumulation within the near-surface sediments. Similarly, given that the monitoring locations are within the footprint of the landfill and the host material will be excavated, background monitoring data is of limited value.

Notwithstanding the above, recent monitoring demonstrates that methane and carbon dioxide are at negligible levels in the groundwater monitoring infrastructure (refer to Table ESID22 within the ESID Report).

43. In the section on Receptors, the sentence that starts with "the latter potential routes are from a combination of point sources..." We are unsure what is meant by this sentence. **Please clarify.**

The 'latter potential routes' referred to are:

- *Surface emissions, particularly prior to capping of the site and the installation of the gas management controls; and*
- *Emissions from point sources, primarily the flare / engine stack.*
- *Fugitive emissions from gas wells and pipework.*

Under the section entitled "Impacts relating to Landfill Gas Generation and Lateral Migration" it states that one of the main bulk components is Carbon Monoxide. Carbon Monoxide is a component of incomplete combustion and is only ever considered to be one of the components of Landfill gas. **Please revise**

This statement should read: 'The main bulk components of landfill gas are methane and carbon dioxide with minor quantities of oxygen, nitrogen, hydrogen, water vapour and a wide variety of trace components including carbon monoxide'.

44. Lateral migration will be limited by a combination of containment and active abstraction and its impacts are described as negligible. Even in the best controlled sites such impacts are never negligible. **Please provide evidence to qualify this statement. Furthermore what resources will be allocated to such a system so that NRW will be satisfied that the requirements of the landfill directive will be met and harm to the environment and human health is not compromised?**

Please refer to our responses to Q41 regarding the risk of lateral migration.

We maintain that the Landfill Gas Risk Assessment has demonstrated that landfill gas can be controlled to an acceptable level which would not cause a detrimental impact to health, amenity or the environment.

Appropriate measures have been incorporated within the site's design and management practices, as detailed in the ESID Report and Landfill Gas Risk Assessment, to:

- *Utilise the landfill gas as a renewable energy source for electricity generation;*
- *Prevent the accumulation and migration of landfill gas by collecting and treating the landfill gas by combustion;*
- *Prevent amenity loss through odour nuisance or risk to health by active gas collection.*

As explained in the ESID Report, lateral sub-surface migration will be monitored by a series of perimeter wells, located between 10 and 30 m from the waste mass, dependent on local features such as balancing lagoons and the proximity of sensitive receptors. The wells will be spaced on a 50 m grid and installed as a minimum as part of the completion of engineering works for each cell (Drawing 30030/ESID/13A). Well spacing will be decreased where a sensitive receptor is identified or in the event that sub-surface gas is located.

45. Flaring of landfill gas at 10m of waste depth is a stated aim of the LFG risk assessment. Table 2.1 of LFTGN03 suggests that gas utilisation should begin from a waste depth of 4 metres onwards. The sensitivity of this site in terms of migration and odour to local receptors and release of greenhouse gas to atmosphere is such that the most exacting standards must be applied to containment and extraction. **Please justify how this figure was derived?**

    The EA guidance on the management of landfill gas (LFTGN03) says that landfill gas utilisation should be considered when the depth of waste is equal to, or greater than, 4m and the values provided in Table 2.1 of the guidance are quoted as 'indicative benchmarks'. The Landfill Gas Risk Assessment states that a 4 to 6 metre waste depth should be maintained over the expected capture zone of the trench prior to initiating landfill gas extraction to prevent air intrusion into the system. This should be viewed as the minimum thickness required and we accept that perhaps as much as 10m waste thickness may be required to prevent air ingress, although daily cover materials will be used on the active cell during tipping to control odour and landfill gas during landfilling prior to placement of the cap.

46. Drawings show anticipated groundwater levels at 94.5m AOD. The groundwater head here is important as it forms (approximately) a 10m head space either side of the quarry as a route for potential migration. The inert barrier may afford some protection from migration in the short term on this boundary but as filling progresses this effect will be less evident and the chance of migration into the surrounding geology will increase with increasing waste depth and cover, this will further increase post capping. There are

many other receptors within 250m of the site boundary which also represent a risk of migration. **Please consider these risks and quantify in terms of the Geology at each boundary (including any layers of coal) taking into account the life cycle of the site and the phasing and filling regime at the site.**

Refer to our responses to Q39 and Q41 regarding the site geology at each boundary, recovered groundwater levels and the risk of lateral migration of landfill gas.

All sensitive receptors are defined in Table 1 of the Landfill Gas Risk Assessment within the distances defined, which range from 50m up to several kilometres. Drawing 30030/ESID/02 identifies all of these receptors within 250m of the site boundary.

The Landfill Gas Risk Assessment has accounted for the changing landfill gas generation and emissions throughout the lifetime of the site and has evaluated the worst-case (i.e. peak emissions) scenario for all relevant pathways identified. The likelihood of landfill gas escaping through the containment system from the waste mass is assessed as unlikely, and therefore the risks to the receptors identified around the site are assessed as insignificant.

47. With regards to Table 2, Quantitative Assessment of Accidents and their consequences. Column 1 of this table – Type of Accident/Failure, categorises the escape of gas through the liner or cap as unlikely. Evidence gleaned from all other Non Hazardous Landfill shows that this is not the case and the escape of gas either diffusively or as a point source through the cap or liner is in-fact very likely. Similarly gas abstraction system failure is recorded as unlikely. In the experience of NRW dealing with Landfills across Wales this is not the case and failure is highly likely. **Please revise the risk phrases and responses accordingly or justify why the escape of gas through the liner or cap is considered unlikely.**

Escape of gas through the liner or cap is considered unlikely because the placement of both shall be carried out in accordance with a detailed engineering specification and shall be subject to a thorough program of QA/QC control. Furthermore, collection and destruction or utilisation of gas will ensure that gas pressure does not build up within the waste mass, a factor that could otherwise enhance the risk of lateral gas migration.

The installation engineering is described in detail in Section 3 of the ESID Report. A CQA Plan will be provided to NRW for agreement, prior to each phase of works. The construction will be undertaken under third Party Quality Assurance and a report will be submitted to NRW for approval prior to any element becoming operational.

As an additional measure, the site will be operated under a hydraulic containment system, restricting the depth over which sub-surface migration

could occur once groundwater levels recover, with recovery anticipated towards the end of filling operations.

48. Although it may be considered unlikely for a fire to be the cause of an incident at this site, this is not necessarily the case. Many landfill sites have caused deep seated fires to start due to pulling excessive air through waste resulting in initial sub-stiochiometric combustion and in some cases a deep seated landfill fire that is extremely difficult to extinguish. (See Industry Code Of practice for Landfill Fires) An extraction regime involving purely horizontal extraction (until final levels are reached at over 40m waste depth) is more likely to introduce excess air and therefore increase the likelihood of a landfill fire. **Please provide justification for the likelihood of fire being unlikely.**

    The key preventative measure that will be adopted, as described in the ICoP for landfill fires, is to ensure that penetrations into the upper layer of the site/waste must be sealed. The other prevention measures set out in the ICOP will also be adopted, i.e. by not extracting waste too soon after placement, with extraction from the horizontal wells will only begin when there is a sufficient thickness of waste above them, as described in our response to Q35.

    The horizontal gas wells proposed will be fitted with valves at each end where they meet the landfill gas header pipe, which will allow the gas field to be carefully balanced in accordance with the ICoP and in much the same way as a 'conventional' landfill with vertical landfill extraction boreholes. Gas field balancing will take place on a regular basis and if it were determined that atmospheric air was being entrained into a particular well, it would be closed off using the relevant valve(s), thus reducing the risk of a landfill fire to 'unlikely' as stated in the application. The network of vertical wells that will be retro-drilled should ensure that gas extraction can continue across the entire waste mass, even if particular horizontal wells have had to be closed off due to air ingress.

    Note that Table 2 (quantitative assessment of accidents and their consequences) within the Landfill Gas Risk Assessment considers high concentrations of oxygen within the abstraction pipework as part of the 'gas abstraction system/flare failure' scenario, and Table 7 (gas management action plan) of the same document sets out the actions to adopt in case of landfill fire.

49. With regards to Table 5 – Model Parametisation, Moisture content in this table is quoted as 'average' for modelling purposes. All Gassim models run for landfills in North Wales should be run with 'wet' moisture content. **Please justify.**

    There is an error in Table 5 with regard to moisture content; this should read 'calculated' rather than 'average'. As shown in the GasSim model output

submitted as part of the permit application, specific parameters such as infiltration, leachate head and leachate recirculation were input allowing a site-specific waste moisture content to be calculated and it is this 'calculated' waste moisture content on which the model has been run.

We assume that NRW's comment related to modelling landfills in North Wales with 'wet' moisture content is related to infiltration, although we are not aware of any guidance that specifically states that all GasSim models run for landfills in North Wales should be run with 'wet' moisture content. As stated in Table 5, the 30 year average rainfall (i.e. uncapped infiltration) for the Moel y Crio station, some 8.8km north-west of the site, is 896 mm/year. This is much lower than the average (1981-2010) rainfall measured in other parts of North Wales where there are Met Office stations, such as Capel Curig (2612.2mm/yr average) or Bala (1295.2 mm/yr average). On inspection of average rainfall data mapping provided on the Met Office website (http://www.metoffice.gov.uk/public/weather/climate/hawarden-flintshire#?tab=climateMaps) it appears that the site is located in an area that receives rainfall typical of lowland England and Wales and therefore the site receives rainfall typical of much of the rest of England and Wales. Infiltration is an important factor in the calculation of waste moisture content, and given the above justification, we maintain that our approach of using a 'calculated' waste moisture content is appropriate for this site.

Financial Provision

50. Costs provided for engineered clay cap, restoration soils and cultivation and seeding are very low. **Please explain how these costs are so low.**

The costs for the capping and restoration have been amended to £3.00/m^3 as it will be a clay cap from onsite stockpiles. The restoration and seeding costs have been removed as these are a requirement of Condition 6 of the Planning Permission.

51. **Please explain how you calculated long term disposal costs for leachate.**

The leachate disposal costs have been amended to £2.50/m^3 which comprises £1.00/m^3 treatment cost and £1.50/m^3 disposal cost based on table in A1.3 of the EA Guidance on Financial Provision for Landfill and AMEC's experience from other landfill operations.

52. The one off leachate treatment plant provision is set at £2000. Presumably this a typographical error? **Please provide actual capital costs for the leachate treatment plant set up.**

This has been corrected to provide a lump sum of £300,000 for the rebuilding of the Leachate Treatment Plant (LTP). The LTP will be built during the operational phase of the landfill and will be rebuilt during the 60 year aftercare

period assuming a 30 year design life in line with the EA Guidance on Financial Provision for Landfill.

53. The total length of drains in metres is given as 1,200 metres. One would expect surface water drains to run along the perimeter of the site, thus one would expect the total length of drain to be greater than 1200 meters and to actually match the perimeter length nor does there seem to be any consideration for drains running outward from the landfill to the perimeter of the landfill. **Please explain your measurements.**

    The length of the surface water perimeter drain is correct at 1,200m. The surface water drains constructed within the cap will be stone filled "French" drains which will not be accessible for cleaning. The steep gradient of the final restoration slopes will result in the fines from the French drains washing into the perimeter drain from where they can be removed. As a result we have not allowed for clearing of the French drains within the Surface Water Management Provision.

54. The percentage of surface water drains cleared per annum is given as 2 percent. **We do not consider this to be an acceptable amount. Please revise this figure upwards. As a minimum we would expect 15 percent to be cleared per annum.**

    The % has been increased to 20% ie 240m per annum.

55. **Please explain how you calculated how much it costs to clear each metre of drain.**

    The cost per metre has been amended to £5.00/m and this has been calculated on the basis of clearing 240m in a day at a cost of £1000 based on using an excavator at £600/day with £400 disposal costs.

56. Only 1 percent of construction costs has been allowed for maintenance of fences and gates. We would expect a fence to need replacing at least twice over a 60 year period. Therefore we would expect this percentage to be revised to at least 5 percent. **Please revise accordingly.**

    The maintenance of the fences and gates has been increased to 5% of the construction costs.

    A revised expenditure plan is attached.

B. Schedule 5 Notice dated 3rd March 2014

We have been unable to assess your noise modelling and have requested that you re-submit your noise and vibration risk assessment to include the following information.

General Requirements

- Description of site location and layout, proposed activities.
- Map showing site and surrounding area including receptors.
- Site plan with installation boundary.
- If BS 4142 assessment carried out provide full noise survey report (see section 10, BS 4142).
- Proposed noise mitigation measures and supporting evidence.

Noise data

- Noise Sources (all fixed and mobile plant plus noise emitting buildings) – grid references, referenced sound power levels (octave band preferably), heights, directivities, operating times.
- For noise emitting buildings give corner grid references, heights, octave band reverberant sound pressure calculations or measurements, referenced octave band transmission coefficients and façade emissions. Include roof emissions. Account for building aperture emissions (grid references, sound power levels, dimensions, opening times).
- For site traffic include grid references for site roads and estimates for vehicle sound power levels, traffic numbers and speed.
- Site buildings (whether acoustically emitting or not) – grid references of corners, heights. Also off-site buildings that may affect sound propagation to receptors. This data is required to calculate acoustic screening and reflections.
- Site acoustic barriers - grid references of ends, thicknesses, heights.
- Terrain data – where screening by buildings or barriers is relied on for noise attenuation it can be important to have accurate heights for sources, barrier/ buildings and receptors. Use high resolution spot heights or contours. The terrain data should be incorporated into the model, do not submit separate copyrighted terrain files.
- Receptors- give reason for selections, grid references, addresses or other identification, number of storeys (estimate sound pressure levels for each storey), BS 4142 LA90 and estimated/ measured specific and rating LAeq values for site activities. Rationale for non-application of+ 5 dBA penalty if not used. Background measurements provided on page 125 of Environmental Statement.

AMEC, on behalf of the applicant RJS Civil Engineering Limited, has considered the request for additional information regarding the noise assessment submitted with the permit application. However, AMEC would point out that the site has already been through the planning system. Indeed it was subject to examination at Public Inquiry commencing on 18th November 2008 where many subjects were examined, including noise.

The Inspector's Report for the appeal (Appeal Ref APP/A6835/A/08/2068136), dated 3rd February 2009, states in paragraph 30 that the "Statement of Common Ground

agreed between the Council and the appellants states that the findings of each of the technical areas of the ES are not part of the Council's putative reason for refusal". Notwithstanding this, paragraphs 31-36 of the Inspector's Report goes on to discuss the noise aspects of the application. The Inspector considered that the predicted noise levels for the construction phase were effectively a worst case scenario where "all items of plant operating simultaneously at the closets distance to the receptor. In reality, construction activities taking place within the immediate vicinity would be short-term in comparison to the duration of the entire site preparation and construction phase. The construction phase noise management plan would ensure that noise disturbance to customers of these outlets (Gateway Services Complex) would be minimised as far as reasonably practicable reducing the likelihood of complaints."

The Inspector, Mr E Jones, concludes in paragraph 36 that: "Keeping residents informed of the stage of landfilling operations and the likely timing and duration of noisy events would also minimise the likelihood of complaints. A local Liaison Group could be a means for disseminating such information. Subject to conditions relating to noise mitigation, working hours, noise limits and a Local Liaison Group, I conclude that the impact of noise generated from the site could be contained within acceptable limits".

The concluding paragraph of the Inspectors Report states that "For the reasons given above and having regard to the ES and addenda thereto together with comments thereon from statutory consultees and interested parties, and the likely environmental effect of the proposal, I conclude that the appeal should be allowed". One of the "likely environmental effects of the proposal" was noise which was considered to be able to be "contained within acceptable limits".

As a result of the above Public Inquiry and the Inspector's decision, the site now benefits from an extant planning consent which includes several conditions relating to noise (conditions 10 & 11 – assuming the same numbering as that within the annex to the Inspector's Report).

Condition 10 refers to the submission of a "written scheme to control noise" which, from the subsequent description of the requirements for inclusion is effectively a Noise Management Plan.

Condition 11 states "Notwithstanding the requirements of condition 10 above, the noise levels at any neighbouring noise sensitive properties or land uses shall not exceed:

- *55dB LAeq (1 hour) free field measurement in the periods 07:30-18:00 Mondays to Fridays and 08:00-13:00 Saturdays other than during the construction of screen mounds and acoustic barriers designed to reduce the impact of the development and approved under condition 6 above.*

- *50dB LAeq (1 hour) free field at the A55 service area and 40dB LAeq (1 hour) free field elsewhere where night-time, Saturday afternoon after 1300, Sunday, Public or Bank Holiday working is authorised under condition 9 above.*
- *70dB LAeq (1 hour) free field measurement in the periods 0730-1800 Mondays to Fridays and 0800-1300 Saturdays during the construction of the screen mounds and other earthwork barriers designed to reduce the impact of the development and approved under condition 6 above".*

In the light of the above, AMEC do not consider that re-examination of the ES is required for the purposes of the permit application as it has already been examined in public during the PI in 2008. The extant noise conditions granted at appeal are in line with those found on other similar developments, ie noise limits based on exceedance of no more than 10dB over the measured background up to a maximum of 55 dB $L_{Aeq, 1h}$. They are entirely in line with Planning Policy Wales (2014), Technical Advice Note 21 (February 2014) and Towards Zero Waste: The Overarching Waste Strategy Document for Wales (June 2010).

Additional Information submitted in support of the response:

Drawings

30030/ESID/05 Rev 3

30030/ESID/06 Rev 4

30030/ESID/11B Rev 4

Reports

Accident Management Plan (Ref 30030/rr030i1)

Odour Management Plan (Ref 30030/rr033i1)

Amenity Risk Assessment (Ref 30030//rr031i1)

Closure Plan (Ref 30030/rr032i1)

Models

Odour Assessment Model

GasSim Model (electronic .gss file)

GasSim Model Printout (.pdf)

Air Quality Impact Assessment (Ref 30030/rr034i1)

Graphs

Output Graph from revised GasSim model (.pdf)

Spreadsheet

Financial Provision Expenditure Plan (.xls)