DPDS CONSULTING

Town Planning
Development
Environment
Architecture
Urban Design
Landscape Design
Project Management

Objection to Planning Application by Midland Pig Producers

for development involving a pig rearing unit together with anaerobic digestion facility and associated infrastructures at land off Uttoxeter Road, Foston, for Midland Pig Producers; Planning Application Code CW9/0311/174

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CONTENTS

I. OBJECTION – PLANNING APPLICATION BY MIDLAND PIG PRODUCERS (REF. CW4/0609/77) – EXECUTIVE SUMMARY

I.1. DPDS Consulting Group are instructed by Foston Community Forum and Farms not Factories to object to the planning application by Midland Pig Producers (ref. CW4/0609/77) for the "**erection of a 2,500 breeding sow pig rearing unit with grain store, feed mill, feed hoppers, mess block, water treatment buildings together with storage buildings feeding an associated anaerobic digestion facility, service building, digestate and methane gas storage tanks supplying an electricity generation facility and incorporating a visitor centre, 4 agriculture workers dwellings with garaging, strategic landscaping, including the formation of bunds, a surface water attenuation pond, and rainwater retention area with site parking facilities, weighbridges, security fencing and associated infrastructure** .

I.2. It is therefore the opinion of Foston Community Forum and Farms not Factories that both the planning application and associated environmental assessment are defective and contain numerous conflicting statements, inaccuracies and omissions, such that, purely on the basis on the information submitted, it is difficult for a Planning Authority to assess its impact.

I.3. In the light of these errors in the planning application, the environmental impact is understated and the application should be refused.

II. CONTRAVENTION WITH NATIONAL PLANNING POLICIES

II.1. It is the opinion of Foston Community Forum and Farms not Factories that the application proposals would be an intrusive development into the open countryside, to the detriment of the character and appearance of the countryside therefore contrary to the overarching aims for the delivery of sustainable development in Planning Policy Statement 1.

II.2. The proposed facility due to its industrial size and appearance would be an incongruous feature in this countryside setting and would in no way be consistent with the surrounding rural location, which would detract from the character of the area contrary to the policies set out in Planning Policy Statement 4.

II.3. It is considered that the development will have a negative impact on the Grade II listed Foston Hall and the Grade II Former Stable Block adjacent to the development boundary contrary to the policies set out in Planning Policy Statement 5.

II.4. The proposed development located in a countryside location does not protect the character of the countryside; therefore it does not comply with this policy strand of PPS7. The objectors contend that the proposals are of an Industrial scale and nature and should therefore be located within areas allocated for industrial uses such as at Dove Valley Industrial Estate where land is available and suitable infrastructure to support the proposed traffic movements is already in place.

II.5. The potential impacts upon the nearby area have not been adequately examined in the submitted Environmental Statement and the proposals are therefore contrary to the Government's policies set out in Planning Policy Statement 10.

II.6. The proposed development will result in an overall significant increase in the number and distance of waste-related journeys for people, materials and waste and will result in a step change in the number and types of vehicles using the junction of the A50 with Uttoxeter Road to the detriment of road safety, not to mention the constant noise caused by the HGV's as the enter or leave the junction, contrary to the policy objectives in Planning Policy Guidance Note 13

II.7. It is considered that noise will be a significant issue associated with the proposal. The development would cause considerable noise nuisance to neighbouring properties by vehicle movements and machinery arising from the transportation of livestock, feed, chemicals and organic waste for digestion to and from the site. Furthermore, significant noise will be generated by the pigs particularly if they become agitated and during feed times. The proposals are therefore in conflict with Planning Policy Guidance Note 24.

II.8. Due to the location of the proposed development in close proximity to Flood Zones 2 and 3 which are adjacent to the southern boundary of the site, an area which floods frequently, it is our opinion that the proposed development would only add to this existing and acknowledged flooding problem contrary to Planning Policy Statement 25.

III. CONTRAVENTION WITH REGIONAL PLANNING POLICIES

III.1. It is our professional opinion that the application proposals run contrary to the requirements regional planning policies prescribed by the published East Midlands Regional Plan. In particular Policy 24 which relates to Regional Priorities for Rural Diversification and encourages Local Authorities, EMDA and Sub-Regional Strategic Partnerships to work together to promote the continued diversification and further development of the rural economy, "**where this is consistent with a sustainable pattern of development and the environmentally sound management of the countryside**" (DPDS emphasis).

IV. CONTRAVENTION WITH ADOPTED LOCAL PLAN POLICIES

IV.1. It is our professional opinion that the Environmental Assessment fails to provide adequate consideration of a number of Saved Local Plan Policies contained within the South Derbyshire Local Plan and the Derby and Derbyshire Waste Local Plan.

V. SITE EVALUATION EXERCISE

V.1. This exercise is flawed in several key aspects; firstly it appears that the location of the site has been predetermined as it is restricted in particular due to financial viability and to land within control of JT Leavesley. Further restrictions to the area of search are stated to be due to existing contracts for feed, customers and workforce. According to EA regulations, alternatives must be assessed on environmental effects. However, it appears that the consideration of alternatives with regards this application has been mainly implemented on landownership and operational issues.

V.2. The consideration of alternative sites in the ES only analyses three sites. This is a very limited evaluation exercise with the three sites including the existing pig unit at Dove Valley Park, land to the south of the application site and the application site itself.

VI. LANDSCAPE AND VISUAL IMPACT

VI.1. It is our concern that the information provided with the application to assess the visual impact of the scheme is limited in scope. Whilst the Landscape and Visual Appraisal (Appendix 8 of the ES) contains photographic viewpoints and photomontage viewpoints of the site from various locations these on their own do not provide the requisite information necessary for getting a full understanding of the parts of the surrounding countryside that will be affected by the development.

VI.2. The objectors contend that the visual impact on those properties at Maidensley and Woodland Drive has not been fully assessed.

VI.3. It is impossible to comprehend in what sense the addition of an industrial type building in the countryside could enhance the landscape character in any shape or form. It is consider that the proposed facility would dominate the countryside landscape to the detriment of its character and appearance.

The industrial scale and character of the development would detract significantly from the area.

VII. IMPACT ON AMENITY OF ADJACENT RESIDENTIAL PROPERTIES

VII.1. It is considered that the proposed development will have a significant effect on the amenity of adjacent properties at Maidensley and on Woodland Drive as well as Foston prison.

VII.2. Although the application proposes a 2 metre bund to be constructed along the western boundary of the application site to increase the visual screening of properties and to reduce the environmental impacts of the plant's construction and operation, it is considered that this will be overbearing and significantly effect the amenity of residents at Maidensley. With the proposed bund only 10m from the boundary of the existing dwelling, it will be oppressive and no doubt it would grossly overbear the view from the properties ground floor windows and curtilage. The quality of life of the residents of this property will be significantly and unacceptably reduced.

VII.3. With particular regard to odour issues it is of note that a 400m "cordon sanitaire" is embodied in Part 6 of the GPDO 1995, however, this does not act to set an official separation distance standard from animal housing to dwellings, but this figure has been used as a rule of thumb. This is particularly relevant with regard to the properties located at Maidensley, Woodland Drive and Foston prison which are all well within 400m of the proposal. It is considered that despite the modern technology espoused in the proposal that some foul smell will affect the above mentioned properties as is evidence in the 'Big Dutchman' MagixX technical information which states that long-term test on the system showed only 'up to 80% separation of odour'.

VIII. TRANSPORT/TRAFFIC ISSUES

VIII.1. Uttoxeter Road already serves Foston prison and several private houses. The original junction layout proved is inadequate to deal safely with the traffic generated by these properties and improvements have been made in recent years. This traffic comprises mostly private cars, LGV's and the occasional HGV. It is our contention that the proposed development would result in a step change in the number and types of vehicles, including slow moving tractors exiting and entering the A50, using this junction to the detriment of road safety, not to mention the constant noise caused by the HGV's as they enter or leave the junction.

VIII.2. It is considered that noise will be a significant issue associated with the proposal. The development would cause considerable noise nuisance to neighbouring properties by vehicle movements and machinery arising from the transportation of livestock, feed, chemicals and organic waste for digestion to and from the site. 25,000 pigs on site at any one time and so there will be a steady flow of HGV's delivering feedstuffs, not to mention transporting pigs away as far as Manchester for slaughter.

IX. PUBLIC FEARS

IX.1. Mere public opposition is not a material consideration in consideration of planning applications. However, genuine public fears, even if not objectively based, are material considerations which can amount to a good reason to justify refusal.

IX.2. Attached at **Appendix A** of this report is a letter from V.A.A D'Elia BSc, MSc Analytical Chemistry, which outlines the potential of pollution of the local area from the application proposal and the impact that it will have on the health of local residents. In summary, the main areas of concerns outlined by Mr D'Elia are:

- Extensive use of antibiotics in intensive farming and the high probability of the production of antibiotic resistant bacteria.
- The undoubted production of aerosols produced from anaerobic digestion and the potential for bio aerosol dispersion of antibiotic resistant bacteria.
- The size of the proposed installation; bearing in mind the following sub points:
    1. Our scientific inexperience of the hazards associated with having such a large installation so close to local residents, in addition to the big unknowns associated with bio aerosols and air quality implications;
    2. The potential spread of disease by vermin (flies, rats etc.);
    3. The potential contamination of local water courses with bio hazardous material whether ammonia gas, hydrogen sulphide gas or ammonium hydroxide;
    4. The traffic problems that is constantly associated with the A50 and the congestion that could arise;
    5. The potential for congestion in the event of an emergency, whether fire, chemical spill or other;
    6. The noise that will be generated by machinery (24 hour generators, pumps etc.), traffic congestion and livestock; and
    7. The potential fire or explosion hazard that the installation could pose.

X. CONCLUSIONS

X.1. It is the objectors concern that the proposed facility due to its size and industrial function, nature and appearance would be an incongruous feature in this countryside setting. We also believe that it is one which would detract from the character of the area and have a severe visual impact on the surrounding countryside as well as affect the amenity of adjacent residential properties within 100 metres of the application site though noise, odour, and potential underground vibration.

X.2. We do not believe that the proposed landscape and planting works would mitigate against the harm created by this large development and its associated activities. The proposals would involve an intrusive development into the open countryside contrary to local, regional and national planning policy. The proposals, by virtue of their scale and siting beyond the built-up limits of a settlement would involve an intrusive development into the open countryside, to the detriment of the character and appearance of the countryside.

X.3. The accuracy of the visual impact assessment carried out by the applicants is compromised by the apparent failure to follow acknowledged best practice guidance.

X.4. It has been demonstrated that the proposals contravene a number of national level Planning Policy Statements in terms of established key policy objectives in particular the protection of the wider countryside and the impact of development on landscape quality.

X.5. The site evaluation exercise is considered inadequate and flawed as according to EA regulations alternatives must be assessed on environmental effects. However, it appears that the consideration of alternatives with regards this application have been mainly implemented on landownership and operational issues.

X.6. There are valid health and scientific concerns regarding proposals to place a large intensive pig farm and associated biogas facility so close to residential properties and indeed the rural village of Foston and surrounding villages.

X.7. The genuine and substantial public fears over the potential long term health impacts on nearby residents are material considerations which amount to a good reason to justify refusal.

1.0. INTRODUCTION

1.1. This report provides objections to the planning application by Midland Pig Producers (ref. CW4/0609/77) for the "**erection of a 2,500 breeding sow pig rearing unit with grain store, feed mill, feed hoppers, mess block, water treatment buildings together with storage buildings feeding an associated anaerobic digestion facility, service building, digestate and methane gas storage tanks supplying an electricity generation facility and incorporating a visitor centre, 4 agriculture workers dwellings with garaging, strategic landscaping, including the formation of bunds, a surface water attenuation pond, and rainwater retention area with site parking facilities, weighbridges, security fencing and associated infrastructure**". It is prepared by DPDS Consulting Group on behalf of Foston Community Forum and Farms not Factories.

1.2. These representations draw upon a range of material planning considerations and wider published information to demonstrate that the proposed development is contrary to a range of planning policy and current best practice.

1.3. The original supporting information submitted as part of the ES was deemed to be insufficient by numerous consultees on grounds such as risks posed to groundwater, protected species surveys, archaeological surveys, landscape and visual impact assessments and details of management plans and contingency arrangements in relation to potential systems failures or environmental hazards. As a result a Regulation 19 request was issued to the applicant. It is acknowledged that further information has been submitted by the applicants in relation to this, however, it is our professional opinion that this new information still fails to sufficiently consider the potential impacts associated with the proposal.

1.4. It is therefore the opinion of the objectors that both the planning application and associated environmental assessment are defective and contain numerous conflicting statements, inaccuracies and omissions, such that, purely on the basis on the information submitted, it is difficult for a Planning Authority to assess its impact.

1.5. In the light of these errors in the planning application, the environmental impact is understated and the application should be refused.

1.6. The grounds of objection below are set out under the following headings:

- Contravention with National Planning Policies;
- Contravention with Regional Planning Policies;
- Contravention with Adopted Local Plan Policies;
- Site Evaluation Exercise;
- Landscape and Visual Impact;
- Amenity of Adjacent Residential Properties;
- Transport/Traffic Issues;
- Public Fears; and
- Conclusions

2.0. CONTRAVENTION WITH NATIONAL PLANNING POLICIES

2.1. This section of the report analyses the application in terms of national, regional and local planning policy.

PPS1 Delivering Sustainable Development

2.2. PPS1 sets out the overarching planning policies on the delivery of sustainable development through the planning system and requires that Planning Authorities considering development proposals. Paragraph 17 states that Local Authorities "**should seek to protect and enhance the quality, character and amenity value of the countryside and urban areas as a whole**".

2.3. Paragraph 2 of PPS1 clarifies that "**Good planning is a positive and proactive process operating in the public interest through a system of plan preparation and control over the development and use of land**". This

proposal is certainly **not** in the interests of the public and the immediately surrounding area as will be demonstrated below.

2.4. Paragraph 19 goes on to state that "**planning decisions should be based on up-to-date information on the environmental characteristics of the area; the potential impacts, positive as well as negative, on the environment of development proposals (whether direct, indirect, cumulative, long term or short term); and, recognition of the limits of the environment to accept further development without irreversible damage**".

2.5. With regards planning authorities exercising their duties, criteria 2 of paragraph 20 states that they are required to take account of "**the protection of the wider countryside and the impact of development on landscape quality**".

2.6. As this report will emphasise further in subsequent sections, it is our professional opinion that the application proposals would be an intrusive development into the open countryside, to the detriment of the character and appearance of the countryside therefore contrary to the overarching aims for the delivery of sustainable development in PPS1.

PPS4 Planning for Sustainable Economic Growth

2.7. Planning Policy Statement 4 (PPS4) sets out the Government's comprehensive policy framework for planning for sustainable economic development in urban and rural areas.

2.8. Policy EC6 is particularly relevant to this application as it deals with planning for economic development in rural areas. EC6.1 states that "**local planning authorities should ensure that the countryside is protected for the sake of its intrinsic character and beauty, the diversity of its landscapes, heritage and wildlife, the wealth of its natural resources and to ensure it may be enjoyed by all**".

2.9. EC6.2 states among other things that in rural areas, local planning authorities should "**strictly control economic development in open countryside away from existing settlements ……**"

2.10. Paragraph 7.6 of the applicant's supporting planning statement refers to Policy EC6 of PPS4 and states in relation to the policy that "**Farm diversification projects should be supported for business purposes**". However, criteria (f) at EC6.2 states that local planning authorities should "**set out the criteria to be applied to planning applications for farm diversification, and support diversification for business purposes <u>that are consistent in their scale and environmental impact with their rural location</u>**" (DPDS emphasis).

2.11. It is our opinion that the proposed facility due to its industrial size and appearance would be an incongruous feature in this countryside setting and would in no way be consistent with the surrounding rural location, which would detract from the character of the area.

PPS5 Planning for the Historic Environment

2.12. Although there has been analysis of the potential impact of the development proposals upon the nearby listed buildings, we consider that the development will have a negative impact on the Grade II listed Foston Hall and the Grade II Former Stable Block adjacent to the development boundary.

2.13. As stated at paragraph 10.49 of the ES that "**Although the landscape is damaged by the Derby Southern Bypass in the north, the field pattern has changed little since the 19th Century, and the landscape is still influenced by Foston Hall and the village of Foston**".

2.14. It is therefore our contention that this development comprising of industrial type buildings will have a detrimental impact on not only the landscape quality of the area but also on Foston Hall which has an influence on the surrounding landscape.

PPS7 Sustainable Development in Rural Areas

2.15. For the purposes of planning policy the site is located in the open countryside and therefore at a national planning policy level PPS7 applies.

2.16. With specific regard to development in the open countryside part iv of Paragraph 1 states that:

"**New building development in the open countryside away from existing settlements, or outside areas allocated for development in development plans, should be strictly controlled; <u>the Government's overall aim is to protect the countryside for the sake of its intrinsic character and beauty, the diversity of its landscapes, heritage and wildlife</u>, the wealth of its natural resources and so it may be enjoyed by all**" (DPDS emphasis).

2.17. The application proposes four agricultural workers dwellings and therefore Paragraph 10 of PPS7 is of particular importance. Paragraph 10 makes it clear that isolated new houses in the countryside require special justification for planning permission to be granted. Where the special justification for an isolated new house relates to the essential need for a worker to live permanently at or near their place of work in the countryside, planning authorities should follow the advice in **Annex A** of PPS7.

2.18. Paragraph 3 of Annex A sets out the criteria to follow in considering new permanent dwellings to support existing agricultural activities on well-established agricultural units. Criteria iii is of particular note, it states that:

"**<u>the unit and the agricultural activity concerned have been established for at least three years</u>, have been profitable for at least one of them, are currently financially sound, and have a clear prospect of remaining so**" (DPDS emphasis).

2.19. The objectors contend that proposed development does not satisfy this guidance. Although the agricultural activity has been established for more than 3 years at

Dove Valley Park, it has not been established at the proposed site (the unit) for at least 3 years. Therefore the proposed four agricultural workers dwellings are contrary to advice contained in PPS7.

2.20. The need for the additional housing is also questioned on the basis that the applicants submitted Planning Statement states at Paragraph 7.13 that "**The plant will also <u>retain and create local jobs</u> helping sustain the rural economy**" (DPDS emphasis). If these employees are living locally then the need for on-site housing is brought into question.

2.21. Paragraph 15 of PPS7 refers to the need to reconcile protection of the countryside with development, it states:

"**Planning policies should provide a positive framework for facilitating sustainable development that supports traditional land-based activities and makes the most of new leisure and recreational opportunities that require a countryside location. <u>Planning authorities should continue to ensure that the quality and character of the wider countryside is protected and, where possible, enhanced</u>. They should have particular regard to any areas that have been statutorily designated for their landscape, wildlife or historic qualities where greater priority should be given to restraint of potentially damaging development**" (DPDS emphasis).

2.22. It is clear in this case that the Planning Authority has an obligation to ensure that the "**the quality and character of the wider countryside is protected and, where possible, enhanced**".

2.23. In relation to farm diversification, paragraph 31 states that:

"**A supportive approach to farm diversification <u>should not result in excessive expansion and encroachment of building development into the countryside</u>. Planning authorities should:**

(i) encourage the re-use or replacement of existing buildings where feasible, having regard to paragraphs 17-21; and

(ii) have regard to the amenity of any nearby residents or other rural businesses that may be adversely affected by new types of on-farm development" (DPDS emphasis).]

2.24. As such on the basis of applying the proposals to the above paragraphs and other development plan policy I consider that the proposed development located in a countryside location does not protect the character of the countryside, therefore it does not comply with this policy strand of PPS7.

2.25. Although it is acknowledged that the existing MPP unit within the Dove Valley Industrial Estate in Foston is of 1970s design the applicants themselves acknowledge that they have kept abreast of industry best practice for environment and animal welfare. The objectors contend that the proposals are of an Industrial scale and nature and should therefore be located within areas allocated for industrial uses such as at Dove Valley Industrial Estate where land is available and suitable infrastructure to support the proposed traffic movements is already in place.

PPS10 Planning for Sustainable Waste Management

2.26. Paragraph 24 of PPS 10 refers to **"Unallocated Sites"** for waste management facilities; the site subject to the application is not allocated in any statutory or non-statutory development plan. PPS10 states in relation to this:

"Planning applications for sites that have not been identified, or are not located in an area identified, in a development plan document as suitable for new or enhanced waste management facilities should be considered favourably when consistent with:

i. the policies in this PPS, including the criteria set out in paragraph 21;

ii. the waste planning authority's core strategy."

2.27. As the Waste Planning Authority's core strategy is not significantly advanced, Paragraph 21 of PPS10 is particularly important, it states that "**In deciding which sites and areas to identify for waste management facilities, waste planning authorities should:**

(i) assess their suitability for development against each of the following criteria:

- **the extent to which they support the policies in this PPS;**
- **the physical and environmental constraints on development, including <u>existing and proposed neighbouring land uses</u> (see Annex E);**
- **the cumulative effect of previous waste disposal facilities on the well-being of the local community, including any significant adverse impacts on environmental quality, social cohesion and inclusion or economic potential;**
- **the capacity of existing and potential transport infrastructure to support the sustainable movement of waste, and products arising from resource recovery, seeking when practicable and beneficial to use modes other than road transport.**

(ii) give priority to the <u>re-use of previously-developed land</u>, and redundant agricultural and forestry buildings and their curtilages" (DPDS emphasis).

2.28. As stated above in Paragraph 2.25 previous developed land is available within the existing Dove Valley Industrial Estate, where the existing MPP premises in located, that could be utilised for a development if this nature and scale.

2.29. Further to this Annex E of PPS10 sets out the factors which waste planning authorities should consider when testing the suitability of sites and areas against the criteria set out above. With regard to the application site, parts f relating to traffic and access, g air emissions, including dust, h odours and i vermin and birds. These are as follows:

f. traffic and access

Considerations will include the suitability of the road network and the extent to which access would require reliance on local roads.

g. air emissions, including dust

Considerations will include the proximity of sensitive receptors and the extent to which adverse emissions can be controlled through the use of appropriate and well-maintained and managed equipment and vehicles".

h. odours

Considerations will include the proximity of sensitive receptors and the extent to which adverse odours can be controlled through the use of appropriate and well-maintained and managed equipment".

And

i. vermin and birds

Considerations will include the proximity of sensitive receptors. Some waste management facilities, especially landfills which accept putrescible waste, can attract vermin and birds. The numbers, and movements of some species of birds, may be influenced by the distribution of landfill sites ……"

2.30. It is our professional opinion that the potential impacts upon the nearby area have not been adequately examined in the submitted Environmental Statement and the proposals are therefore contrary to the above sections of PPS10. In addition Foston Community Forum and Farms not Factories consider that evidence of at least 2 years of background monitoring of Bio-Aerosols on site should be presented with the planning application before being considered by the County Council.

PPG13 Transport

2.31. Planning Policy Guidance 13 (PPG13) sets out the Government's objectives to integrate planning and transport at the national, strategic and local level and to promote more sustainable transport choices both for carrying people and for moving freight.

2.32. It is our contention that the proposed development will result in an overall significant increase in the number and distance of waste-related journeys for people, materials and waste and will result in a step change in the number and types of vehicles using the junction of the A50 with Uttoxeter Road to the detriment of road safety, not to mention the constant noise caused by the HGV's as the enter or leave the junction.

2.33. The transport issues associated with the application will be dealt with in greater detail later in this statement.

PPG24 Planning and Noise

2.34. Planning Policy Guidance 24 (PPG24) guides local authorities in England on the use of their planning powers to minimise the adverse impact of noise. It outlines the considerations to be taken into account in determining planning applications both for noise-sensitive developments and for those activities which generate noise.

2.35. It is considered that noise will be a significant issue associated with the proposal. The development would cause considerable noise nuisance to neighbouring properties by vehicle movements and machinery arising from the transportation of livestock, feed, chemicals and organic waste for digestion to and from the site. Furthermore, significant noise will be generated by the pigs particularly if they become agitated and during feed times.

PPS25 Development and Flood Risk

2.36. Planning Policy Statement 25 (PPS25) sets out Government policy on development and flood risk. Its aims are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas of highest risk.

2.37. Due to the location of the proposed development in close proximity to Flood Zones 2 and 3 which are adjacent to the southern boundary of the site, an area which floods frequently, it is our opinion that the proposed development would only add to this existing and acknowledged flooding problem.

2.38. Furthermore, it is noted that the Environment Agency objected to the proposal on the grounds that "**the applicant has not supplied adequate information to demonstrate that the risks posed to groundwater can be satisfactorily managed**". However, while it is acknowledged that the Environment Agency have subsequently withdrawn this objection following the submission of additional material, we are still concerned that due to the close proximity of the proposal to flood zones 2 & 3, there is a distinct possibility the proposed development may pose an unacceptable risk of causing a detrimental impact to the water system.

3.0. CONTRAVENTION WITH REGIONAL PLANNING POLICIES

3.1. On 10th November 2010, the High Court upheld a challenge by CALA Homes that the powers relied on by the Secretary of State could not be used to revoke all Regional Spatial Strategies in their entirety. The effect of the High Court's judgment is that the Secretary of State's decision to revoke the SEP (amongst other Regional Spatial Strategies) has been quashed. Therefore Regional Guidance has been restored, and is once again part of the Development Plan.

3.2. A further challenge was lodged by CALA with the Court of Appeal and the decision was issued on 27th May 2011. In effect this decision confirms that the Regional Strategies are part of the development plan until revoked but that the Secretary of State's intention to abolish is also capable, as a matter of law, of being a material consideration.

3.3. Therefore, at present, the East Midlands Regional Plan policies form part of the Development Plan, although, the weight to be attached to those policies as part of the overall planning balance will be reduced to reflect the Government's stated intention to lawfully revoke Regional Strategies. As further progress is made in the passage of the Localism Bill through Parliament, the weight to be accorded to the Regional Plan policies will diminish even further.

3.4. It is our professional opinion that the application proposals run contrary to the requirements regional planning policies prescribed by the published East Midlands Regional Plan.

3.5. Of particular relevance is Policy 24 which relates to Regional Priorities for Rural Diversification. The policy encourages Local Authorities, EMDA and Sub-Regional Strategic Partnerships to work together to promote the continued diversification and further development of the rural economy, "**where this is consistent with a sustainable pattern of development and the environmentally sound management of the countryside**" (DPDS emphasis).

3.6. It is considered that this has not been demonstrated through the submitted Environmental Statement that development proposals comply with this policy, especially given the lack of compliance with a range of other policies.

4.0. CONTRAVENTION WITH ADOPTED LOCAL PLAN POLICIES

South Derbyshire Adopted Local Plan 1998

4.1. The South Derbyshire Local Plan was adopted in May 1998 and covers the period 1987 to 2001. In January 2002 South Derbyshire District Council published, and consulted upon, the First Deposit Draft Local Plan. A Revised Deposit Draft Replacement Local Plan was placed on deposit for further consultation in January 2003.

4.2. An Inquiry into objections to the Replacement Local Plan was held between June 2003 and February 2004. However, due to ill health following closure of the Inquiry the Inspector was unable to complete his report and a Joint Inspector was appointed to complete the Report. This was submitted to the Council in 17 September 2004 and made public in November 2004. The Proposed Modifications were then published in January 2005.

4.3. A claim seeking judicial review was subsequently filed in the High Court and on 19 May 2005 the Council resolved to withdraw the Revised Deposit Draft Local Plan. As a result of this withdrawal the Council published a Planning Policy Position Statement on 11 August 2005.

4.4. Under the Planning and Compulsory Purchase Act 2004 and as part of the transition from Local Plan to Local Development Framework, local planning authorities were allowed to 'save' existing adopted Local Plan policies for a period of three years from the date of their adoption. Accordingly, in September 2007 South Derbyshire District Council received a direction from the Secretary of State in accordance with the 2004 Act stipulating the policies to be 'saved' for a further three years. South Derbyshire District Council state on their website that these policies are saved until such time they are superseded by relevant Local Development Framework documents. It is these saved policies that we consider the proposals against.

4.5. It is our professional opinion that the Environmental Assessment fails to provide adequate consideration of a number of Saved Local Plan Policies contained within the South Derbyshire Local Plan. These policies are set out in detail below.

4.6. With regard to employment, one of the principal aims of the District Council is to secure the economic prosperity of South Derbyshire in a manner which is sympathetic to the aspirations of local communities and respects the environment. Although the proposal may be considered in law as agricultural, it is essentially an agricultural operation on an industrial scale and this is why we consider the following policies relevant.

4.7. Paragraph 4.21 sets out the objectives of the Local Plan with regards employment. One of the objectives is:

(iii) To meet the needs of industrial users on sites which:

i. minimise the impact upon the countryside, agricultural land and local communities

4.8. Employment Policy 5 deals with industrial and business development in rural areas. Part A of this policy states that:

"**Within or on the edge of existing villages, the development of small industrial units and the conversion of existing buildings to industrial and business use will be permitted provided the proposal is compatible with the scale and character of the settlement and is acceptable on environment and traffic grounds, elsewhere, other than as provided for in policies E2, E3 and E6, new industrial and business development will not be permitted**".

4.9. The reasoned justification for this policy states that Central Government advice places emphasis on the promotion of small firms, and has indicated that such activities are acceptable in rural areas, provided their operations do not give rise to an unacceptable level of disturbance or cause intrusion into open countryside.

4.10. Employment Policy 6 deals with large firms and states that:

"**The development of sites to accommodate large firms, in addition to those allocated in Employment Policy 2, will not normally be permitted, unless it can be demonstrated that such firms cannot be accommodated within the general provision and the proposal is acceptable on environmental and traffic grounds**".

4.11. It is our contention that the applicant failed to carry out a proper Site Evaluation Exercise which is designed to consider alternative sites – a key requirement within Environmental Impact Assessments. This is discussed further in Section 5 of this statement.

4.12. Employment Policy 8 states that:

"**New industrial or business development will not be permitted unless provision is made for car parking, commercial vehicle manoeuvring, servicing, screening and landscaping and the control of pollutants into the air and water and of noise, commensurate with preventing danger and congestion on the highway, unacceptable damage to the environment and undue loss of amenity to local residents**".

4.13. Paragraph 4.59 states that new industrial and business developments can have a considerable impact on adjoining areas, unless they are properly located and their siting and scale is properly controlled. Paragraph 4.59 goes on to state that the siting of installations handling hazardous substances will be subject to planning controls aimed at keeping them separated from housing and other land uses with which they might be incompatible from a safety viewpoint.

4.14. Environment Policy 1 deals with development in the countryside. It states that:

A. Outside settlements new development will not be permitted unless:

(i) It is essential to a rural based activity; or

(ii) Unavoidable in the countryside; and

(iii) The character of the countryside, the landscape quality, wildlife and historic features are safeguarded and protected.

B. If development is permitted in the countryside it should be designed and located so as to create as little impact as practicable on the countryside.

4.15. In the case of the current application, it fails on all three criteria of part A of Environment Policy 1. Although the proposal may be considered in law as agricultural, it is essentially an industrial use with a significant waste processing element; it therefore cannot be considered to be essential to a rural based activity or is it unavoidable in the countryside. Furthermore the application will have a negative impact on the interests of preserving the countryside and protecting the best and most versatile agricultural land.

4.16. We consider that a proposal of this scale is a use not appropriate to such a location or is it one that is in keeping with the character of the countryside. In essence this application proposes a development of an industrial scale, which in the context of established planning practice is not appropriate in a countryside location.

4.17. Environment Policy 5 provides criteria for acceptable new agricultural development. It states that development will be permitted that:

(i) The development is of an appropriate scale and is sited in proximity to existing buildings, wherever possible;

(ii) The proposal does not significantly detract from views across the countryside and does not have an adverse impact on the landscape or features of natural history or heritage interest;

(iii) The visual effect of the proposals is minimised by appropriate attention to design, materials, screening and landscaping;

(iv) The proposal does not give rise to an excessive level of vehicular movements, noise or smell".

4.18. Contrary to the detail contained in the applicant's supporting material, we are of the opinion that the proposal will have a significant effect on the countryside and the buildings associated with the development will in no way assimilate into the landscape.

4.19. The proposal would also give rise to extensive vehicular movements, noise and smell which will significantly affect the amenity of nearby residents. The need to protect the countryside should over ride any potential benefits that are suggested from the proposed development.

Derby and Derbyshire Waste Local Plan March 2005

4.20. The submitted Environmental Statement and Planning Statement assess a number of Derby and Derbyshire Waste Local Plan policies. As this Local Plan was adopted in 2005 it is subject to the 'saved' policy legislation brought in by the 2004 Planning and Compulsory Purchase Act.

4.21. Of particular importance within the Environmental Statement is analysis of Policy W1a of the Waste Local Plan - the ES and Planning Statement note that waste developments will be assessed in accordance with sustainability criteria. Policy W1a states:

"Proposals for waste development will be assessed against sustainability considerations.

The assessment will include consideration of Best Practicable Environmental Option and other sustainable development principles and will take account of the key considerations which are:

- the waste hierarchy
- the proximity principle
- self sufficiency

Waste development will be permitted if in the light of the assessment the applicant has shown that the development would accord with the principles of sustainable development. Waste development would not be permitted if it would not so accord."

4.22. The Environmental Statement and Planning Statement conclude that the development accords with this policy. However this policy has not been "saved" by the legislative powers of the 2004 P&CP Act. Therefore it carries no weight in the planning process and has been superseded by other material considerations such as PPS10.

4.23. Policy W1b states that waste development should only be permitted "**if the development would help to cater for the needs of the local area**". The anaerobic digester associated with the application will process up to 80,000 tonnes of waste matter per annum with 35,000 of this comprising of pig slurry linked to the on site farming enterprise, with the remaining 45,000 tonnes coming from other sources.

4.24. However, the Planning Statement at paragraph 6.4 states that no waste providers have entered into agreements and although potential local sources of waste have been identified there is no guarantee that most of the waste would come from a source which is within the waste management sub-area. Therefore, as well as not meeting the needs of the local area, the transporting of waste from other areas would be contrary to the principles of sustainable development.

4.25. Policy W2 highlights that waste development should aim to reduce transport movements or provide alternative methods of transport. However, this proposal will result in an overall significant increase in the number and distance of waste-related journeys for people, materials and waste.

4.26. As highlighted above, 45,000 tonnes of waste will potentially be brought into the site annually, combined with the various HGV movements associated with the pig breeding which will lead to a significant increase in traffic movements in the area. Furthermore local transport plans promote the use of transport modes, such as

rail and water, which do not burden the local road network and, for equivalent energy consumption, carry greater loads. The location of this site means that road travel is the only transport option available.

4.27. The Planning Statement identifies a potential 45,000 tonnes of waste being available for use within 12.5 miles of the site. However, as stated above, the applicant has not entered into any agreements with waste providers and the companies identified with the 12.5 mile radius are tied to existing contracts. Therefore, it is likely that a large quantity of the waste imported to the site will come from areas outside the locality and will lead to long distance journeys in many cases, contrary to policies W2 and W1b.

4.28. Policy W7 deals with landscape and other visual impacts. Contrary to this policy it is our opinion that the appearance of the development would materially harm the local landscape and would not respect the character and local distinctiveness of the area.

4.29. Policy W8 refers to the impact of the transport of waste on the existing road network, local communities and the environment. As highlighted previously when discussing Policy W2, it is our professional opinion that the proposal will cause significant disturbance both at the site access and along its route.

4.30. Policy W9 Protection of Other Interests highlights that waste development will only be permitted "**if the development would not affect other land uses to the extent that it would materially impede or endanger the social or economic activities or interests of the community**".

4.31. This proposal is of significant concern to the local community as can be seen by the significant number of objections submitted on the application. Of particular concern to the community are the potential traffic, pollution, noise, odour, effects on the countryside and other issues that are highlighted in this statement. It is considered that these issues along with the failure to comply with national and local policy should result in a refusal of planning permission.

5.0. SITE EVALUATION EXERCISE

5.1. The Environmental Statement makes reference to a Site Evaluation Exercise which is designed to consider alternative sites – a key requirement within Environmental Impact Assessments.

5.2. As highlighted by Paragraph 2 of Part 1 of Schedule 4 of The Town and country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999, an EIA should include:

"**An outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects**".

5.3. However, paragraph 6.2 of the applicant's ES, which is repeated at paragraph 9.21 of the Planning Statement, states that:

"**The area of search was restrained to the Foston/Scropton area due to existing contracts for feed, customers and workforce. Due to the new green farming concept and the technology required there was a minimum land requirement of 70 acres. For financial viability it was necessary for land to be within the ownership of JT Leavesley**".

5.4. This exercise is flawed in several key aspects; firstly it appears that the location of the site has been predetermined as it is restricted in particular due to financial viability and to land within control of JT Leavesley. Further restrictions to the area of search are stated to be due to existing contracts for feed, customers and workforce. According to EA regulations, alternatives must be assessed on environmental effects. However, it appears that the consideration of alternatives with regards this application has been mainly implemented on landownership and operational issues.

5.5. The consideration of alternative sites in the ES only analyses three sites. This is a very limited evaluation exercise with the three sites including the existing pig unit at Dove Valley Park, land to the south of the application site and the application site itself.

5.6. Examining the criteria of the analysis of site selection (ES Figure 21) reveals a number of inconsistencies and inaccuracies. With regard to Site 3 (the application site), one of the criteria "**Buildings/Structures on site or adjacent**" receives a positive tick while another criteria "**No restrictive land uses**" receives a negative X. It is our professional opinion that the adjacent properties at Maidensley and Woodland Drive should be considered as restrictive land uses where an industrial process such as the proposal is going to be developed next to them.

5.7. Furthermore it is difficult to understand the penultimate criteria of Figure 21 which is "**Residential properties greater than 100m from the site**" which in the case of Site 3 receives a negative X. With regards the application site there are residential properties at Maidensley and Woodland Drive which are **less than 100m from the site**.

5.8. On the basis of this flawed and very limited site evaluation exercise the site cannot be considered the most appropriate location for this proposal.

6.0. LANDSCAPE AND VISUAL IMPACT

6.1. It is our concern that the information provided with the application to assess the visual impact of the scheme is limited in scope. Whilst the Landscape and Visual Appraisal (Appendix 8 of the ES) contains photographic viewpoints and photomontage viewpoints of the site from various locations these on their own do not provide the requisite information necessary for getting a full understanding of the parts of the surrounding countryside that will be affected by the development.

6.2. The 'Guidelines for Landscape and Visual Impact Assessment, second edition' (GLVIA), produced by the Institute of Environmental Management & Assessment, Spon Press 2002 sets out the best practice for carrying out a visual assessment.

6.3. Paragraph 1.4 of the submitted Landscape and Visual Appraisal, states that "**This report sets out the assessment methodology and describes the baseline landscape character and visual resources, identifying key viewpoints from <u>publically accessible locations</u>**" (DPDS emphasis).

6.4. However, paragraph 6.29 of the GLVIA advises that assessors should identify representative viewpoints during site visits, "**which may include walking public footpaths and bridleways (making an allowance for the height of horse riders) and visiting areas of open public access. Public viewpoints are clearly important, but private <u>viewpoints may also be relevant and should be considered on site</u>**" (DPDS emphasis).

6.5. As stated above viewpoints in the applicants assessment have been restricted to those available "**from publically accessible locations**". There is no evidence provided that any 'private' viewpoints were considered, such as those within nearby residential curtilages. The GLVIA is clear that "**public viewpoints are clearly important, but private viewpoints may also be relevant and should be considered on site**".

6.6. The visual envelope of a site is the area of land from which all or part of the site can be seen. The visual envelope of a site is normally greater in winter (when trees have no leaves) and the best practice guidance recommends that visual assessments are carried out in the winter months when deciduous vegetation is not in leaf.

6.7. However, it is unclear from the methodology in the Landscape and Visual Appraisal when the visual assessment impact of the proposed development was undertaken, but when the photo viewpoints A-L are studied it is clear that these have been taken at a time when the trees are in full leaf, and in particular in Figure 7 showing Photo Viewpoint E Cont'd there is the presence of hay bales in

the field, indicating that the photos have been taken in the Summer. Therefore it is our opinion that this is contrary to 'the best practice guidance' and potentially compromises the accuracy of the visual impact assessment.

6.8. With regard to photographic evidence, the principles recommended in the GLVIA and advice notes subsequently issued 01/11 'Photography and photomontage in Landscape and visual impact assessment' seeks to ensure that appropriate combination of lens types are chosen to reflect as closely as possible to what can be seen by the human eye and take into account key visual receptors within each view, generally 50mm fixed focal lens. It is unclear from the applicant's ES what combination and type of lenses were used and therefore further compromises the accuracy of the visual impact assessment.

6.9. To guide the visual assessment of a site, and in line with best practice, a 'zone of visual influence' (ZVI) can be carried out which is used to identify the parts of a landscape that will be affected by a development. However, this has not been carried out as part of the Landscape and Visual Appraisal and therefore the visual influence of the proposed development and its proposed landscaping measures on the surrounding countryside and the significance of the effects that may arise as a result of this proposal are difficult to understand.

6.10. Figure 5 of the Landscape and Visual Appraisal shows the photographic viewpoint locations with the furthest being from the Sudbury Roundabout. It IS our professional opinion that this is insufficient in order to consider the impact on the wider countryside. It is considered that in terms of visual impact there would be significant potential impact arising from this development as it would be highly visible in the wider landscape from surrounding locations.

6.11. It is considered that the site would be seen as a significant addition in the landscape of the Dove Valley. There is no evidence provided in the assessment of consideration having been given to viewpoints at a greater distance from the site than shown at figure 5. The exclusion of more distant views will have the effect of underestimating the extent of the potential impact of the proposed development on the visual amenity of the landscape.

6.12. The proposed development would be highly visible from Tutbury and Hanbury, from the A50 heading east from Sudbury and on footbridge over the A50 at Foston. From these locations, there would be views of the service building with its 3 associated exhaust stacks with some views of the feed mill and other smaller buildings. Furthermore there would be views of the 25m high flues and the roof of the services building from Foston and Scropton Villages and houses north of the A50. In addition there would be significant visual impact on the properties and areas in close proximity to the site i.e. Maidensley, Woodland Drive and Foston prison.

6.13. The objectors contend that the visual impact on those properties at Maidensley and Woodland Drive has not been fully assessed and Figures 1 to 2 below illustrate the views of the site from these properties.

Figure 1 – View from Maidensley of Application Site

Figure 2 – View from curtilage at Woodland Drive of Application Site

6.14. Paragraph 13.18 of the ES states that, development of the site would inevitably alter the local landscape character. However, interestingly, paragraph 13.20 of the ES states with regards the proposed development that "**the change of land use would result in opportunities to enhance landscape character, including providing a more appropriate transition between the built form of Foston Prison and the wider rural landscape to the west**". It is impossible to comprehend in what sense the addition of an industrial type building in the countryside could enhance the landscape character in any shape or form.

6.15. I consider that the proposed facility would dominate the countryside landscape to the detriment of its character and appearance. The industrial scale and character of the development would detract significantly from the area.

7.0. IMPACT ON AMENITY OF ADJACENT RESIDENTIAL PROPERTIES

7.1. It is considered that the proposed development will have a significant effect on the amenity of adjacent properties at Maidensley and on Woodland Drive as well as Foston prison.

7.2. Although the application proposes a 2 metre bund to be constructed along the western boundary of the application site to increase the visual screening of properties and to reduce the environmental impacts of the plant's construction and operation, it is considered that this will be overbearing and significantly effect the amenity of residents at Maidensley.

7.3. With regards the visual effects on Maidensley, the ES states that "**the development could be viewed from the upper floors, however the development would be 100m away and buffered by woodland planting and the bund**". However, the proposed 2 metre high bund will be within some 10 metres of Farm and it is considered that this will have a significant effect on the amenity of the residents of Maidensley. Therefore it is considered the bund would be overbearing and over-dominant and thus adversely affect the amenity of Maidensley.

7.4. With the proposed bund only 10m from the boundary of the existing dwelling, it will be oppressive and no doubt it would grossly overbear the view from the properties ground floor windows and curtilage. The quality of life of the residents of this property will be significantly and unacceptably reduced.

7.5. The South Derbyshire Housing Design & Layout supplementary planning guidance seeks to protect existing dwellings from over bearing and to protect outlook, it states that "**the blank/non-habitable elevation of a proposed adjacent property should not breach the minimum distance within the sector of view of the relevant ground floor primary windows of the existing property**". Although this guidance refers to residential development, in this case, the proposed bund will affect the view from the ground floor of Maidensley and prevent any view from here. It is accepted that there is no private "right to a

view", that the planning system should protect. However, there is little doubt that loss of an attractive view from a public vantage point, as the result of a new development, is very much a material consideration.

7.6. Furthermore, in this case the matter goes far beyond the issue of a view as the land is an integral part of the visual character of the area. This proposal will have a detrimental effect on the living conditions of adjoining residents at Maidensley and Woodland Drive. Existing properties will lose much of the views that they currently enjoy, although as stated above there is no right to a view, there would be harm to outlook because of the proximity of the proposal. There would be some loss of light and a great reduction in the quality of life for the occupants of Maidensley and Woodland Drive.

7.7. With particular regard to odour issues it is of note that a 400m "cordon sanitaire" is embodied in Part 6 of the GPDO 1995, however, this does not act to set an official separation distance standard from animal housing to dwellings, but this figure has been used as a rule of thumb. This is particularly relevant with regard to the properties located at Maidensley, Woodland Drive and Foston prison which are all well within 400m of the proposal. It is considered that despite the modern technology espoused in the proposal that some foul smell will affect the above mentioned properties as is evidence in the 'Big Dutchman' MagixX technical information which states that long-term test on the system showed only 'up to 80% separation of odour'.

8.0. TRANSPORT/TRAFFIC ISSUES

8.1. Increased traffic serving such a large facility is an issue as is the ease of access along Uttoxeter Road especially with the need to maintain clear and unfettered access to HM Prison Foston Hall 24 hours per day and 365 days per year. Access along Uttoxeter Road and Woodland Drive already suffers due to the problem of prison parking, with numerous cars parked along these roads daily in addition to unofficial overnight parking by HGVs. The addition of HGV and

tractor movements on Uttoxeter Road will clearer compromise the safety of pedestrians and other road users.

8.2. Uttoxeter Road already serves Foston prison and several private houses. The original junction layout proved is inadequate to deal safely with the traffic generated by these properties and improvements have been made in recent years. This traffic comprises mostly private cars, LGV's and the occasional HGV. It is our contention that the proposed development would result in a step change in the number and types of vehicles, including slow moving tractors exiting and entering the A50, using this junction to the detriment of road safety, not to mention the constant noise caused by the HGV's as they enter or leave the junction.

8.3. Congestion is also a major concern, with traffic jams being common-place along the local section of the A50 associated with the Sudbury roundabout. The proposals will inevitably generate an impact on the Sudbury Roundabout, which will exacerbate the current situation.

8.4. It is considered that noise will be a significant issue associated with the proposal. The development would cause considerable noise nuisance to neighbouring properties by vehicle movements and machinery arising from the transportation of livestock, feed, chemicals and organic waste for digestion to and from the site. 25,000 pigs on site at any one time and so there will be a steady flow of HGV's delivering feedstuffs, not to mention transporting pigs away as far as Manchester for slaughter.

9.0. PUBLIC FEARS

9.1. Mere public opposition is not a material consideration in consideration of planning applications. However, genuine public fears, even if not objectively based, are material considerations which can amount to a good reason to justify refusal.

9.2. In '**Newport Borough Council v Secretary of State for Wales (1998)**' the local planning authority refused planning permission for a chemical waste treatment plant against a background of substantial public opposition. Although experts' and consultees' opinions provided no valid basis for health fears, one of the grounds for refusal was the local community's perception that the development would be contrary to the public interest generally and their interest in particular.

9.3. The Secretary of State granted permission on appeal and awarded costs against the local planning authority on the basis that public concern without substantial supporting evidence does not warrant refusal or permission. The local planning authority challenged the award of costs.

9.4. The Court of Appeal held that the Secretary of State had made an error of law. Perceived fears, even if not soundly based upon scientific or logical fact, are relevant planning considerations as they may affect the amenity of an area. Therefore they can amount, perhaps rarely, to a good reason for refusal of planning permission.

9.5. This has particular relevance to this application considering the substantial public fears and opposition to the application proposal. However, one major difference is that there is a valid basis for health fears based on a myriad of issues related to intensive farming and the anaerobic digestion process of faeces and other organic based media. Attached at **Appendix A** is a letter from V.A.A D'Elia BSc, MSc Analytical Chemistry, which outlines the potential of pollution of the local area from the application proposal and the impact that it will have on the health of local residents.

9.6. In summary, the main areas of concerns outlined by Mr D'Elia are:

- Extensive use of antibiotics in intensive farming and the high probability of the production of antibiotic resistant bacteria.
- The undoubted production of aerosols produced from anaerobic digestion and the potential for bio aerosol dispersion of antibiotic resistant bacteria.

- The size of the proposed installation; bearing in mind the following sub points:
    1. Our scientific inexperience of the hazards associated with having such a large installation so close to local residents, in addition to the big unknowns associated with bio aerosols and air quality implications;
    2. The potential spread of disease by vermin (flies, rats etc.);
    3. The potential contamination of local water courses with bio hazardous material whether ammonia gas, hydrogen sulphide gas or ammonium hydroxide;
    4. The traffic problems that is constantly associated with the A50 and the congestion that could arise;
    5. The potential for congestion in the event of an emergency, whether fire, chemical spill or other;
    6. The noise that will be generated by machinery (24 hour generators, pumps etc.), traffic congestion and livestock; and
    7. The potential fire or explosion hazard that the installation could pose.

9.7. Included at **Appendix B** is a paper by Jens Seedorf on 'Emissions and dispersion of livestock-related biological aerosols' which reviews some selected environmental effects cased by emittable bioaerosols.

10.0. CONCLUSIONS

10.1. It is the objectors concern that the proposed facility due to its size and industrial function, nature and appearance would be an incongruous feature in this countryside setting. We also believe that it is one which would detract from the character of the area and have a severe visual impact on the surrounding countryside as well as affect the amenity of adjacent residential properties within 100 metres of the application site though noise, odour, and potential underground vibration.

10.2. We do not believe that the proposed landscape and planting works would mitigate against the harm created by this large development and its associated

activities. The proposals would involve an intrusive development into the open countryside contrary to local, regional and national planning policy. The proposals, by virtue of their scale and siting beyond the built-up limits of a settlement would involve an intrusive development into the open countryside, to the detriment of the character and appearance of the countryside.

10.3. The accuracy of the visual impact assessment carried out by the applicants is compromised by the apparent failure to follow acknowledged best practice guidance.

10.4. It has been demonstrated that the proposals contravene a number of national level Planning Policy Statements in terms of established key policy objectives in particular the protection of the wider countryside and the impact of development on landscape quality.

10.5. The site evaluation exercise is considered inadequate and flawed as according to EA regulations alternatives must be assessed on environmental effects. However, it appears that the consideration of alternatives with regards this application have been mainly implemented on landownership and operational issues.

10.6. There are valid health and scientific concerns regarding proposals to place a large intensive pig farm and associated biogas facility so close to residential properties and indeed the rural village of Foston and surrounding villages.

10.7. The genuine and substantial public fears over the potential long term health impacts on nearby residents are material considerations which amount to a good reason to justify refusal.

10.8. If any points require further clarification or if I can be of further assistance please do not hesitate to contact me.

Appendix A

Miry Cottage
Miry Lane
Church Broughton Road
Foston
Derbyshire
DE65 5PW

9th July 2011

Strategic Director
Environmental Services Department
Derbyshire County Council
Shand House
Dale Road South
Matlock
Derbyshire
DE4 3RY

Dear Mr Stephenson

Dear Sir/Madam

RE: Proposed development involving a pig rearing unit together with anaerobic digestion facility and associated infrastructures at land off Uttoxeter Road, Foston, for Midland Pig Producers; Planning Application Code CW9/0311/174

I wish to express my objection and concerns associated with the aforementioned proposal by Midland Pig Producers. My main area of concern lies within the potential of pollution of the local area and the impact that it will have on the health of local residents.

Being a Petroleum Analytical Geochemist I understand the need to diversify into renewable energy sources in addition to the potential problems associated with "Peak Oil", I do however have grave concerns about proposing to place a relatively large intensive pig farm and associated biogas facility so close to the rural village of Foston without being in full possession of the scientific facts associated with such an undertaking. I understand that many large facilities are currently in existence in the USA, however their location is generally not in close proximity to populated areas; a distinct advantage of having wide open spaces, something that we are not privy to in the UK.

If I may refer you to the position statement issued by the Health Protection Agency (HPA) in conjunction with intensive farming. There are a myriad of issues related to intensive farming (eg animal welfare) and the anaerobic digestion process of faeces and other organic based media.

I would however like to concentrate on the following points;

- Air emissions related to bio aerosols
- Air emissions related to particulates
- Leakage of toxic chemicals into local water courses
- Noise, congestion and other issues

Air emissions related to bio aerosols

As you are undoubtedly aware, bio aerosols are airborne particles that carry living organisms, waste material and potential toxins that conceivably lead to respiratory problems, allergic reactions and infectious diseases. There is widespread research proving that intensive farming produces bio aerosols and to quote the HPA **"recent research in the US has found that those living up to 150 metres downwind of an intensive swine farming installation could be exposed to multi-drug resistant bacteria"** The HPA go on to highlight **"current information is limited and the public health issues arising from bio aerosols from intensive farming needs further evaluation".**

We need not look too far in the distant past to look at the devastating effect that the E-Coli outbreak in Germany has had, and may I add that this particular outbreak represents a new strain never seen before. In such large intensive farms and composting facilities I believe that the Composting Association and Health & Safety Laboratory have recommended that large facilities should be a minimum distance of 250 metres away from local communities; this proposed site would therefore be in contravention of such guidelines when you consider the proximity of the facility to both Foston Village and the local prison. The HPA also "**anticipate that further information on the potential of intensive farming to produce bio aerosols will become available over the next few years".**

Reading some of the scientific literature on bacteria resistance to antibiotics is rather alarming, since the process of resistance does not necessarily arise from microbial reproduction and mutation. There is a process where bacteria can pass the ability to develop resistance via their plasmids. Plasmids provide a mechanism for horizontal gene transfer within a population of microbes and typically provide a selective advantage under a given environmental state. Therefore plasmids may carry genes that provide resistance to naturally occurring antibiotics in a competitive environment. This goes some way to explain why there is such a significant problem in our hospitals with MRSA and associated antibiotic resistant bacteria in addition to our dwindling stocks of antibiotics that are able to fight the "super bugs"

I am particularly unhappy with the ability of the anaerobic digester to kill off any harmful pathogens that may arise during the day to day running of the facility. From my time as a Petroleum Geochemist, I understand that different species of bacteria are able to survive at different temperature ranges; I was privy to this when looking at biodegraded oils in reservoirs at temperatures of up to 80 ^{o} C. Bacteria living at optimal temperatures between 35–40 °C are called mesophilic bacteria, whereas some bacteria can survive at the hotter and more hostile conditions; these are called thermophillic bacteria. One of my main concerns is the ability of some bacteria to survive the thermophillic temperatures that are designed to destroy them during anaerobic digestion. I am also aware that in nature some methanogenic bacteria can grow in the hostile conditions of hydrothermal vents at mid ocean ridges; we call these extremophiles. These species are more resistant to heat and can, therefore, operate at high temperatures, a property that is unique to them. If such extremophilic bacteria became established in the soil via the anaerobically decomposed organics laced with antibiotics is rather alarming to say the least. I do understand, however, that antibiotics will breakdown over time in the open air; but what happens with any surviving bacteria between spreading on the land and antibiotic breakdown is unknown.

Air emissions related to particulate matter

Obviously any potential health issues are related not only to the size of the particles blowing around in the wind but also their aero-dynamicity. It is commonly known that intensive farming and anaerobic digestion produces significant quantities of dust. Not only do these dust particles have the ability to carry dangerous pathogens (see above) but when at a certain diameter they can penetrate the respiratory system leading to many respiratory and cardiovascular diseases, particularly in the elderly with pre-existing heart and lung conditions and children with asthma. We should also consider the added impact that particulates may have in an area which already has the main A50 dual carriageway passing through the surrounding area. If I again refer to the position statement of the HPA they quote **"We would expect further data on the impact of intensive farming on local air quality to become available over the next few years, particularly when these processes become regulated under the PPC"**

(PPC=Pollution Prevention Control). Does this statement not suggest that we could be using the residents of Foston as guinea pigs if the proposed development goes ahead?

Emissions into water

Since the whole of the Foston area suffers from a rather high water table, this issue I feel is also very real concern. There are many potential areas of contamination of local water courses via liquid fed, slurry, anaerobically digested organic matter, hydrogen sulphide gas and ammonium hydroxide (the latter is formed assuming that all ammonia gas is passed through scrubbers and dissolved in water). The ammonium hydroxide is an alkali that has a very strong smell of "wet nappies"; a very unpleasant odour in itself and a huge danger to the environment if spilled. The potential for nitrogen based compounds to be released into the natural environment is a real worry to many local residents; eutrophication being a major concern in aquatic habitats.

Noise, congestion and other issues

Noise could be a significant issue that arises from transportation of livestock, feed, chemicals and organic matter waste for digestion to and from the site. Congestion is also a major worry, with traffic jams being common place along the local section of the A50 associated with the Sudbury roundabout. Increased traffic serving such a large facility is an issue as is the ease of access to the site especially in the event of a fire hazard or bio-hazard spillage. Other issues include insect and vermin infestations which I am all too aware of in my own part of Foston where we have an abattoir which does attract flies in the summer months and I feel is also a major contributor to our vermin problem that occurs in our area periodically. I can only imagine the impact of a large intensive farm and biogas plant would have in terms of local fly and vermin populations and the spreading of disease.

In summary, my main areas of concern are;

- Extensive use of antibiotics in intensive farming and the high probability of the production of antibiotic resistant bacteria.

- The undoubted production of aerosols produced from anaerobic digestion and the potential for bio aerosol dispersion of antibiotic resistant bacteria.

- The size of the proposed installation; bearing in mind the following sub points:

    1. Our scientific inexperience of the hazards associated with having such a large installation so close to local residents, in addition to the big unknowns associated with bio aerosols and air quality implications.
    2. The potential spread of disease by vermin (flies, rats etc.)
    3. The potential contamination of local water courses with bio hazardous material whether ammonia gas, hydrogen sulphide gas or ammonium hydroxide
    4. The traffic problems that is constantly associated with the A50 and the congestion that could arise.
    5. The potential for congestion in the event of an emergency, whether fire, chemical spill or other.
    6. The noise that will be generated by machinery, traffic congestion and livestock.
    7. The potential fire hazard that the installation could pose.

I am appalled that such a development has the potential to go ahead with so many unanswered questions about the process of intensive farming and anaerobic digestion in a confined populated area. It is for this reason that I am opposed to the development in an area that has had many developments imposed upon it over the last 60 years (Foston Prison, the A50 dual carriageway and the J.C.B industrial site).

Yours sincerely

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Appendix B

Emissions and dispersion of livestock-related biological aerosols – an overview

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Abstract

Livestock-related airborne pollutants such as dust and microorganisms have been identified as disease-causing components for animals and humans within livestock buildings. Therefore, it is assumed that emitted particulate matters may also play a role in environmental hygiene. Due to the complexity of these so-called bioaerosols current topics are under discussion such as expectable transmission distances after emission, intake of antibiotic resistant bacteria in the environment or the ability of infectious pathogens to be spread among animal confinement facilities. This paper will give an overview of common sampling methods for bioaerosols based on filtration, impaction or impingement and present data of particle-related emission rates of cattle, pig and poultry buildings. For example, beef barns emitted 0.131 g inhalable dust per hour and livestock unit (LU), while broiler houses have even shown emission rates of nearly 3 g h^{-1} LU^{-1}. Apart from emissions, a figure demonstrates field measurements in the vicinity of a broiler house in order to assess the potential travel distance of released staphylococci. In this context literature-based findings are highlighted to indicate the variability of transmittable distances of microorganisms.

Keywords: bioaerosols, transmission distance, livestock farming, plume measurement, environmental hygiene

Introduction

Environmental impacts from agriculture are partly caused by released airborne pollutants. Ammonia, methane, nitrous oxide and odour are well-known components, which can be related to effects such as eutrophication, acidification, climate change and annoying perception. In recent years public interest has increasingly focused on released particulate matter from animal production facilities. Apart from PM_{10} and $PM_{2.5}$, biological aerosols (so-called bioaerosols) are regarded as a risk to the environmental health. This assumption is mainly based on experiences cited in occupational health studies, in which persons have been exposed to bioaerosols with subsequent deterioration of their health status (Douwes et al. 2003). Bioaerosols can be generally characterised as a heterogeneous mixture of airborne dust and microorganisms with an allergic, toxic and infectious potential (Seedorf and Hartung 2002).

Quantitative and qualitative determinations of bioaerosols require proper measurement techniques and strategies. Only then can potential causalities among particulates and receptor reactions be verified or at least properly assessed. This does not only apply for occupational purposes indoors, since bioaerosols are additionally released into the atmosphere via ventilation systems. Dilution effects and different decay mechanisms (e.g. sedimentation, desiccation, and radiation) decrease the outdoor concentration and stability of emitted bioaerosols during the dispersion process. The traceability of such 'manipulated' particles therefore poses a challenge under field conditions, but is necessary in order to build up data pools which may serve as decision and prediction tools for environmental health issues.

This paper reviews some selected environmental effects caused by emittable bioaerosols. Furthermore, common measurement techniques are briefly characterized, supported by the latest German guidelines for appropriate sampling and detection methods of bioaerosols. Details of calculated emission strengths are shown and a literature-based overview of transmission distances of bioaerosol is highlighted. A more in-depth overview of all aspects of bioaerosol emission and dispersion was recently given by Seedorf (2006):

Environmental hygiene of biological aerosols

Bioaerosols are natural ingredients of the atmosphere, since sources like soil and surface water release significant amounts of particulate matter with biological properties. Due to their considerable amounts in the air the influence of bioaerosols on physical and chemical atmospheric processes (e.g. cloud condensation nucleation, ice nucleation) are of topical interest among scientists (Ariya and Amyot 2004, Jaenicke 2005).

Long-range dispersion of biological aerosols can occur in conjunction with desert storms, causing trajectories for the intercontinental transport of particulates and of windborne microorganisms, too. Bacteria, fungi or viruses with a great biodiversity may therefore travel across countries. From this point of view, it cannot be ruled out that also allergens and pathogens are part of such transmitted bioaerosols, which may cause public health concerns (Kellogg and Griffin 2006) and epizootic important diseases in livestock animals. Kar and Takeuchi (2004) cited news articles in which it was suggested that dusty winds from the Gobi desert had transported viruses of the foot-and-mouth disease (FMD) from China to South Korea; that means a distance of approximately 1,500 km or greater. Cases of FMD outbreaks also occurred in Europe a couple of years ago and an airborne infection route among livestocks was assumed in several cases. Finally, airborne transmissions over many kilometres could be epidemiologically demonstrated (e.g. Christensen et al. 2005, Gloster et al. 2005). Other relevant diseases such as pseudorabies or the Porcine Respiratory and Reproductive Syndrome (PRRS) can also be spread from herd to herd via the atmosphere (Seedorf and Hartung 2002). This also includes zoonotic pathogens like *Coxiella burnetii*, released from ruminants and transmitted to humans who can contract Q fever (Lyytikäinen et al. 1998).

Experiences cited in occupational health studies on livestock production led to the assumption that emitted bioaerosols would increase the particle concentration in the ambient air and therefore may also play a role in public health. Orientated investigations have shown that the germ content of the surrounding air in areas with high animal densities can be distinctly higher than in non-livestock regions (Hartung 1992). Concerning environmental impacts caused by swine feeding operations Cole et al. (2000) reviewed community health effects, which may be also affected by released bioaerosols. A recent epidemiological study concluded that community members exposed to a high number of livestock operations show an impairment of lung function (Radon et al. 2005).

The therapeutic use of antibiotics is an essential measure to treat diseased animals and humans successfully. However, the establishment of antibiotic resistant bacteria strains has become a considerable problem in human and veterinary medicine, because the genetic transfer of antibiotic resistance to still susceptible bacteria causes increasing treatment failures. Due to resistant bacteria being partially excreted into the environment, Chapin et al. (2005) were able to isolate multi-drug-resistant bacteria from the air within a piggery. Once released via the ventilation system antibiotic-resistant bacteria can be also detected in the air plume downwind of livestock operations (Gibbs et al. 2006). This observation highlights the question whether deposited resistant bacteria may act as important vehicle for the distribution of resistant genes in the environment.

Typical measurement techniques for bioaerosol emissions

Measurement principles of biological aerosols can be divided into sampling and detection methods (SEEDORF 2005). In aeromicrobiology most sampling procedures can be related to impaction on solid surfaces (agar plates), impingement and filtration. Cyclones and centrifuges are further devices for aerosol sampling (HENNINGSON and AHLBERG 1994).

The *Andersen* 6-stage cascade impactor is a well known impactor, which additionally allows particle size fractionation to indicate the potential penetration depth of aerosols into the respiratory tract. The impaction principle is also realized in airborne bacteria and fungi samplers like the *Casella* slit sampler. Impaction in fluid medium can be observed in an impinger. The All-Glas Impinger 30 (AGI-30) is typical for this group of sampling units. Filtration is primarily used for sampling of dust and dust components (e.g. endotoxins). In contrast to the other techniques filtration can cause significant losses of microbial vitality, because desiccation of deposited cells occurs. Shorter sampling times and the use of gelatine filters, for example, can overcome this problem to some extent. Sampling stress is less significant for airborne fungi which can be accumulated on filter discs with specific pore sizes.

Laboratory based detection methods refer to cultivations, biochemical characterizations, molecular or immunological procedures. Identification of microorganisms by mass spectrometry is also possible for determining fatty acid and protein patterns. Organic compounds can be identified by commonly known chemical analysis methods like chromatography. In case of endotoxins, bioassays such as the Limulus-Amebocyte-Lysate (LAL) test are additionally available.

The determined airborne pollutant concentrations have to be combined with the ventilation rate of the livestock building in order to calculate the emissions. Ventilation rates can be measured directly (e.g. fan wheel anemometer), indirectly (e.g. Prandtl tube) and by balance methods (e.g. CO_2, SF_6).

Dispersion of released bioaerosols from livestock buildings

Apart from meteorological and topographical conditions the expected receptor concentrations and deposition rates outdoors are mainly dependent on the source strength. Due to the existing variety of quite different emitters, intercomparions of emission rates is useful for identifying high and low polluters (Table 1). Furthermore, emission rates are the basis for the definition of emission inventories, which are tools for helping to describe released amounts of specific airborne pollutants in a spatial and temporal context (SEEDORF 2004). Emission factors are also necessary input data for numerical dispersion models in order to predict receptor

concentrations in the vicinity of emitting facilities. For North European livestock operations SEEDORF et al. (1998) and TAKAI et al. (1998) published emission data for dust, microorganisms and endotoxins.

As outlined above, the field application of suitable measurement techniques can help to assess the transmission distances of emitted bioaerosols. With increasing distances from the emission source sampling devices are located downwind so as to take the decrease of concentrations into account, should a 'cloud' of airborne particles travel along their trajectories under a stable wind direction. From a theoretical point of view an exponential decline of concentrations can then be expected. Finally, data from the downwind sampling positions are compared with reference data, which are synchronically recorded at positions on the upwind side. Under optimal conditions downwind data will be identical with the upwind data in a certain distance to the source. At this point the maximum travel distance is achieved. It has to be ensured that the sampled particles originated from the target building. Otherwise, it would be difficult to relate the findings to a specific emitting livestock building. The more specific an indicator particle is, the better its differentiation in comparison to ambient aerosols. SEEDORF et al. (2005) used staphylococci emitted by a broiler barn to determine the exponential fate of staphylococci concentrations in the surrounding downwind air (Fig. 1). The upwind sampling location showed no staphylococci at all. Additional investigations on potential travel distances of emitted bioaerosols are summarized in Table 2.

Due to the immense number of different measurement principles, it is obvious that a conformity of measurement techniques and strategies is useful for gathering confidential data in terms of transmission distances and dispersion dynamics of biological aerosols. Furthermore, most of the traditional used PM samplers and sampling strategies are not suitable for airborne microorganisms outdoors (e.g. sampling stress). Therefore, the Association of German Engineers (Verein Deutscher Ingenieure, VDI) has published guidelines for measuring biological aerosols in ambient air (Table 3). For plume measurements a calculation procedure is proposed in order to determine the maximum transmission distance (see VDI 4251, Part 1).

However, an unsolved problem is related to the tenacity of airborne microorganisms to predict their temporary and spatial appearance in the atmosphere, both relevant for the planning of measurement campaigns and the application of dispersion models. Temperature, humidity, oxygen and its radicals, radiation or the so-called *Open-air factors* determine the survival time of aerially dispersed microbes (COX 1995). Due to the complexity of these influencing factors survival rates of microorganisms in the airborne state can not sufficiently described yet. Only experimental data are available, which were mainly revealed by standardized lab-scale procedures. Therefore, it is very difficult to approximate these data to atmospheric conditions (LIGHTHART and FRISCH 1976). Bioaerosol survival times of different types of

microorganisms are particularly related to temperature and humidity (MÜLLER and WIESER 1987).

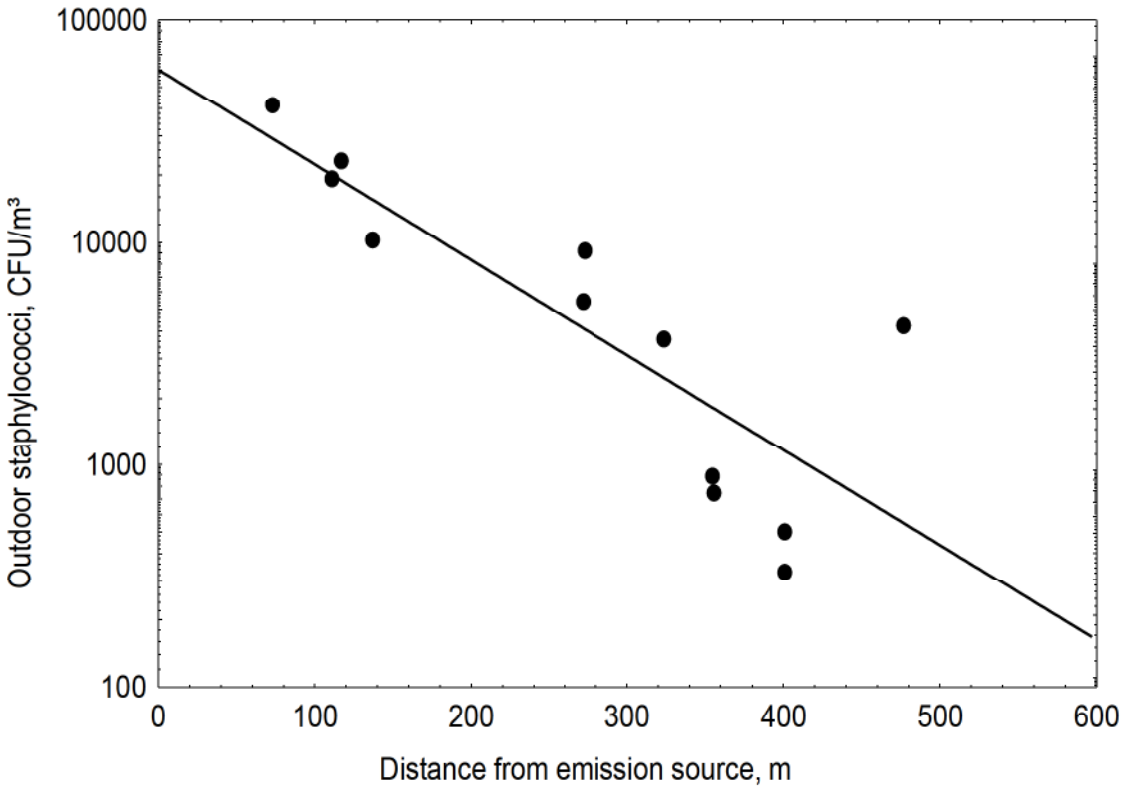

Figure 1: Fate of staphylococci concentrations at a height of 1.5 m on the downwind side of a broiler barn with approximately 30,000 animals. Curve fit by exponential regression (SEEDORF et al. 2005).

Outlook

Livestock buildings are the most potent bioaerosol emitting units, but relatively little is known about the transmission distance of specific components within the bioaerosol family. Only for FMD epidemiological-based reports about long-distance transports are available. It seems to be advisable to gain more information on other major compounds which were emitted and which distinctly show other properties. Depending on the prevailing wind conditions and the nature of emitted bioaerosols, livestock buildings in close proximity to other animal confinement facilities may cause a mutual risk for herd health, because originally released airborne pathogens invade the interior of barns in the vicinity. This scenario highlights the question of biosecurity and 'safe distances' among susceptible livestocks; an important issue in densely populated animal areas in particular.

Airborne bacteria could be carriers of antibiotic resistance. Such groups of bacteria have been found downwind of swine confinement houses. It should be assessed if outdoor concentrations of antibiotic resistant bacteria are able to pose a hazard to human health. This scientific target should be extended to environmental media, as emitted resistant bacteria are deposited and come into contact with the microflora of soil and water. This microflora may then enhance the distribution of resistant genes in the environment. But, not only by means of resistant bacteria; particle-associated antibiotics (and chemotherapeutical agents in general) introduced into the environment may also induce the establishment of antibiotic resistance in parts of the ubiquitous microflora.

The application of measurement guidelines presents the opportunity to plan and to perform field measurement campaigns comprehensively. This would certainly extend our knowledge about the dispersion behaviour of bioaerosols and may help to close some scientific gaps in this field.

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Table 1: Calculated emission factors for livestock-related bioaerosols in Lower Saxony, Germany (SEEDORF 2004)

Per LU[1)] livestock class	Inh.[2)] dust [g h^{-1}]	Resp.[3)] dust [g h^{-1}]	Inh. etox[4)] [µg h^{-1}]	Resp. etox [µg h^{-1}]	mBact.[5)] [CFU[8)] h^{-1}]	Enterobact.[6)] [CFU h^{-1}]	Fungi[7)] [CFU h^{-1}]
Dairy cows	0.216	0.018	0.877	0.023	1.823E+06	1.000E+04	1.073E+06
Beef	0.131	0.009	2.082	0.075	2.480E+06	1.000E+04	6.130E+05
Calves	0.216	0.038	4.082	0.220	6.815E+06	2.750E+04	2.285E+06
Sows	0.235	0.029	4.216	2.257	5.720E+07	2.800E+05	1.829E+06
Weaners	0.625	0.058	4.806	1.160	1.653E+07	7.342E+06	5.625E+05
Fattening pigs	0.678	0.045	2.917	0.470	3.073E+07	1.446E+06	6.630E+05
Laying hens	0.676	0.027	5.624	0.260	8.273E+06	2.610E+05	1.013E+06
Broilers	2.988	0.477	88.875	19.971	3.435E+09	1.414E+06	3.628E+07

1) livestock unit (= 500 kg body weight)

2) inhalable

3) respirable

4) endotoxins

5) mesophilic bacteria

6) *Enterobacteriaceae*

7) mesophilic fungi

8) colony forming units

Table 2: Literature-based data of transmission distances of different aerosol compounds from livestock buildings. Data indicate distances where the influence of the emitting plant was still detectable, or the downwind concentration was not distinguishable from the upwind concentration.

Species	Number of animals	Investigated component	Distance to source [m]	Reference
Pigs	Stall 1: 600 Stall 2: 12,000	Dust, endotoxins, DNA	600	CLEAVE et al. (2002)
Pigs	1,000	Multi-resistant bacteria	150	GIBBS et al. (2006)
Pigs	1,000	Total bacteria	150	GREEN et al. (2006)
Pigs	1,000	Endotoxins	115	HARTUNG et al. (1998)
Pigs	6,000	Total bacteria	610 (800[1)])	HEBER et al. (2001)
Pigs	500	Total bacteria	200	HOMES et al. (2000)
Pigs	2,000	Total bacteria n	420[2)]	KÖLLNER und HELLER (2005)
Pigs	2,000	Total bacteria, staphylococci	270 (400[2)])	KÖLLNER und HELLER (2006)
Laying hens	120,000	Micrococci	250 (500[1)])	PLATZ (1979)
Pigs	737 [3)]	Total bacteria	50	PLATZ et al. (1995)
Pigs	2,140–4,030	Dust, endotoxins	60	REYNOLDS et al. (1997)
Laying hens	234–4,000	Total bacteria, staphylococci, streptococci	100	SARIKAS (1976)
Broilers	39,900	Staphylococci	333	SCHULZ et al. (2005)
Broilers	30,000	Staphylococci	477 (530[4)])	SEEDORF et al. (2005)

[1)] Findings from single measurements

[2)] Distance calculated according to VDI 4251, Part 1 (see Table 3)

[3)] Average herd size of 13 investigated barns with 360 to 2,500 animals

[4)] Distance calculated by exponential extrapolation to the detection limit (300 CFU/m³) of the used measurement technique

Table 3: VDI guidelines relating to emissions and measurements of biological aerosols (publisher: Beuth Verlag, Berlin, Germany)

Name	Title	Date of publication	Status[1)]
VDI 4251 Part 1	Measurement of airborne microorganisms and viruses in ambient air - planning of plant-related measurements - Plume measurement of ambient air	10/2004	D
VDI 4252 Part 2	Measurement of airborne microorganisms and viruses in ambient air - active sampling of bioaerosols - separation of airborne mould on gelatine/polycarbonate filters	06/2004	F
VDI 4252 Part 3	Measurement of airborne microorganisms and viruses in ambient air - active sampling of bioaerosols - separation of airborne bacteria in liquids using the principle of critical orifice	06/2006	D
VDI 4253 Part 2	Measurement of airborne microorganisms and viruses in ambient air - culture based method for determining the concentration of mould in air - indirect method after sampling with gelatine/polycarbonate filters	06/2004	F
VDI 4253 Part 3	Measurement of airborne microorganisms and viruses in ambient air - culture based method for the quantitative determination of bacteria in air - method after separation in liquids	06/2006	D
VDI 4255 Part 1	Bioaerosols and biological agents - sources of emissions and control measures - overview	10/2005	F
VDI 4256 Part 1	Determination of airborne microorganisms and viruses - determination of performance characteristics - counting methods based on detection by cultivation	07/2006	D

[1)] D: Draft, F: Final version

Source: www.vdi.de; date: 11/01/2007