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Air Quality Review: Lea Castle Farm

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Quality Assurance

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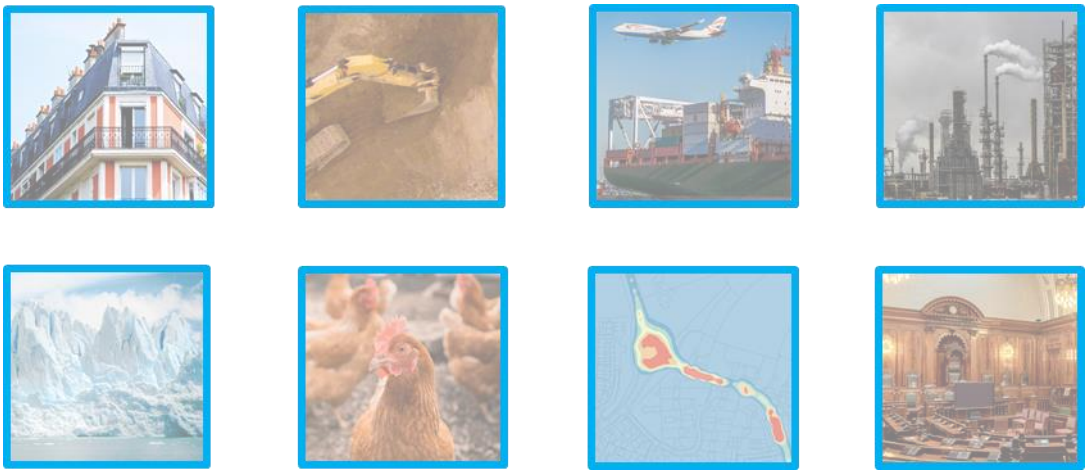

Executive Summary

A review has been carried out of the air quality evidence produced in connection with the proposed development of a sand and gravel quarry at Lea Castle Farm between Wolverley and Cookley.

Several issues have been raised in relation to the assessment of mineral dust impacts and the assessment of impacts of emissions from road traffic associated with the development. Taking account of all the issues raised, the assessment is considered to not accurately represent the air quality or dust impacts of the development. Irrespective of the accuracy, the conclusions claimed are considered to be understated and will result in adverse impacts in the local area. In addition, the assessment does not take account of the impacts on the nearby air quality management area where the effects are likely to be most significant. Without a more accurate and fully considered assessment, the overall significance of the development should thus be considered significant.

Contents

1 Introduction

1.1 Air Pollution Services Ltd (APS) is has been commissioned by SLFQAG to review the air quality evidence produced in connection with the proposed development of a sand and gravel quarry at Lea Castle Farm between Wolverley and Cookley.

1.2 The development involves the extraction of approximately 300,000 tonnes of sand and gravel per year over a 10-year period, plus an additional year for restoration works. The development site location is shown in Figure 1.

Figure 1: Site boundary, AQMA and measured concentrations in 2018 at nearby monitoring sites operated by Wyre Forest District Council

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1.3 An Environmental Statement (herein known as the "ES") was produced in support of the planning application (Kedd Ltd, 2019), which included an air quality and dust chapter. This included a quantitative assessment of the impacts of pollutant emissions from road traffic and a risk assessment of dust from the mineral works. The ES concluded that the air quality and dust effects of the development will be 'not significant'.

2 Scope of Work

2.1 This report discusses the importance of air quality in the local area and raises issues with the air quality evidence produced for the proposed development. This report:

- discusses air quality in the local area and why it is an important consideration;
- discusses the dust risk assessment, raising issues with
    - the receptors;
    - the potential emission magnitudes for on-site transportation and stockpiles;
    - the pathway effectiveness;
    - the risk assessment conclusion;
- discusses the road traffic assessment, raising issues with
    - chemistry;
    - surface roughness;
    - the modelled road network;
    - the model verification;
    - the road traffic assessment conclusion;
- discusses inconsistencies of the meteorology used; and
- discusses how consideration should be given to climate change.

3 Relevance of Air Quality in the Local Area

Importance of Air Quality

3.1 The ES appears to downplay the potential health effects from air pollution and makes reference to medical studies published over two decades ago. The effects of air pollution upon health is well known. Air pollution has negative impacts on the health of people, especially vulnerable members of the population, such as the elderly, children and people already suffering from pre-existing health conditions. Evidence suggests that it can cause permanent lung damage in babies and young children (Royal College of Paediatrics and Child Health, 2016) and exacerbates lung and heart disease in older people (Simoni, et al., 2015). The main health burden to the population is known to be from the fine $PM_{2.5}$ fraction of dust, there is now evidence that short-term exposure to coarse particles i.e. those between PM_{10} and $PM_{2.5}$, which are typically associated with mineral activities, are also associated with adverse respiratory and cardiovascular effects on health (WHO, 2013). It is therefore extremely important to ensure exposure to quarry dust is avoided (especially for children) and air pollution associated with road traffic emissions are minimised.

Local Air Quality Conditions

3.2 The assessment gives little consideration to existing local air quality and presents measured concentrations for a single monitoring site, where concentrations are below the objective level. The development is located 1.7 km away from an Air Quality Management Area (AQMA) declared by

Wyre Forest District Council in 2009 for exceedences of the annual mean nitrogen dioxide (NO_2) objective. The Council have thus acknowledged for many years that air quality in the local area is poor. Measured concentrations within the AQMA are well above the objective level (see Figure 1 and Table 1) and therefore exposure within the AQMA will be very sensitive to small changes in air pollution.

3.3 Furthermore, Defra's LAQM.TG16 guidance (Defra, 2018) states that exceedences of the nitrogen dioxide 1-hour mean AQO may occur where the annual mean is above 60 µg/m^3. Since annual mean nitrogen dioxide concentrations have been measured above 60 µg/m^3; it is therefore considered likely that the 1-hour mean nitrogen dioxide objective may also be exceeded within the AQMA, primarily due to emissions from road traffic.

Table 1: Measured NO_2 Concentrations in the Local Area [a]

Site ID	Location	Type	2014	2015	2016	2017	2018
SBR121	121 Stourbridge Road	Roadside	32.0	34.0	36.4	29.0	32.2
23HF	23 Horsefair	Roadside	27.5	26.1	26.0	25.5	26.7
HF(K)	Horsefair (lamppost @ Peacock PH, Blackwell Street)	Roadside	**69.0**	**64.0**	**65.3**	**55.2**	**60.9**
HF(K)(F)	Hudson Florists on Horsefair	Roadside	**68.0**	**69.0**	**73.6**	**59.6**	**68.5**
K1	50 Radford Avenue	Roadside	27.0	25.0	26.6	22.4	23.0
K2	34 Leswell Lane	Roadside	27.0	24.0	26.5	20.4	23.2
K3	53 Coventry Street	Roadside	39.0	33.0	**40.9**	29.0	38.0
K4	1 Silver Street	Roadside	28.0	28.0	28.9	24.1	26.6
(F)69COV	69 Coventry Street	Roadside	**51.0**	**49.0**	**53.5**	**43.4**	**50.6**
(F)SGC	6/7 St George's Court	Roadside	34.0	31.0	34.7	31.0	31.6
CSLOC	Flats at top of Coventry Street - Land Oak Court	Roadside	36.0	35.0	36.7	32.1	32.5

[a] Exceedences of the annual mean objective are shown in bold and likely exceedences of the 1-hour mean objective are underlined.

4 Dust Risk Assessment

Receptors

The choice of receptors to include in an assessment is critical to the conclusions of the assessment and all locations of sensitive exposure should be considered and discussed in the assessment. The ES states "*There are several internationally designated ecological and local wildlife sites located <1km within the vicinity of Lea Castle Farm as indicated in the table below, these sites will form part of the assessment".* The assessment has, however, excluded two designated ecological sites within 1 km from the assessment; Hurcott Wood (which is designated as a Local Nature Reserve) and Axborough Wood (which is designated as an Ancient Woodland). There is no justification as to why these ecological sites have been excluded; it may be assumed that this omission is an error.

4.1 Additionally, the choice of receptors should also consider a range of sensitivities, i.e. low, medium and high. The assessment demonstrates that dust effects occur at close distances to the north of the development and only high sensitivity receptors have been assessed in this area. There is agricultural farmland in this area that is located directly adjacent to the development. Farmland would be considered low sensitivity, but given its close distance, the assessment should demonstrate that no significant effects will occur there.

Potential Emission Magnitude

On-site Transportation

The potential emission magnitude is judged in the ES to be small on the basis that the IAQM guidance (2016) suggests that "*a small potential dust magnitude from on-site transportation may include <100 movements of vehicles per day of material with high moisture content and low dust potential with a maximum speed of 15mph"*. The IAQM guidance referred to states:

"A small potential magnitude may include the employment of covered conveyors used for the majority of the on-site transportation of material, <100 movements of vehicles per day, with surface materials of compacted aggregate, <500 m in length and a maximum speed of 15 mph".

Thus, the authors have potentially taken the 100 movement criteria out of context by ignoring that this is considered true when the vehicles travel over surface materials of compact aggregate, which is unlikely to be the case here, and when the length of travel is <500 m, which may be false for phases 1 and 5.

Stockpiles

The potential emission magnitude in relation to stockpiles is considered to be small in the ES on the basis that they will not be located within 50 m of the site boundary, are shielded from the wind by the quarry and have mitigation measures applied. The IAQM guidance (2016) is clear that if stockpiles are greater than 1,000,000 tpa then the impact may be large even if stockpiles are located over 50 m away from the site boundary. Without details of the tonnage to be stockpiled it is not possible to determine what the emission magnitude would be. If the tonnage is greater than

200,000 tpa then the ES will have underestimated the emission magnitude and the conclusions drawn.

Pathway Effectiveness

The assessment assumes that dust effects will only occur on working days when quarry activities are carried out. The IAQM mineral assessment guidance (2016) states that wind-blown dust is *"Dust which becomes airborne as a result of increased wind speed alone, i.e. could occur when no activity is carried out on site"* and states that:

"High wind speeds increase the likelihood of dust being raised and blown from the site. Dry materials are more easily raised into the air and so rainfall acts as a natural dust suppressant. High-risk meteorological conditions are, therefore, when the wind is coming from the direction of the dust source at a sufficient strength, during periods of little or no rainfall (often taken as <0.2 mm per day) especially during periods when evaporation exceeds rainfall and drying conditions prevail. The threshold wind speeds for initiation of wind blow can range from 2.4 m/s (Force 2, "light breeze") up to gale force, depending on the particle size and the condition of the surface but moderate breeze, 5.5 m/s and above, is sometimes used as a general threshold. It is preferable to use a wind blow initiation wind speed specific to the mineral type".

It is important to realise that dust effects can occur without any onsite activities, as the wind alone can cause disturbance of dust from the ground leading to wind-blown dust effects and any dust already suspended in the air from previous activities can also be blown by the wind.

The assessment has also assumed that dust effects can only occur when the wind speed is greater than 5.6 m/s. While this is often used as a general threshold, dust effects can occur at lower speeds, such as 2.4 m/s, and this is an important consideration when sensitive receptors are located close to the sources, which is the case for this development. The assessment has therefore potentially significantly underestimated the number of dry windy days used in the assessment. The pathway effectiveness for close receptors and their associated impacts are therefore considered to be understated.

Risk Assessment Conclusion

The ES states *"NO. 10 Castle Barns and The Bungalow could potential be Slight Adverse Effect / Moderate Adverse Effect if dust mitigation and control measures are not implemented".*

However, the risk assessment has been based upon mitigation measures being implemented. Hence, with the proposed mitigation measures implemented, the results demonstrate there will be adverse effects at two receptor locations. It should also be noted that these receptors do not represent two properties. The receptor at No. 10 Castle Barns is representative of conditions for all properties in close proximity to it (~13 properties), giving a total of ~14 highly sensitive properties.

Furthermore, given that adverse effects are predicted to occur at both of these receptors, which are located north to northeast of the application site, consideration should be given as to whether adverse effects would also occur at Keepers Cottage which is located slightly northeast of The

Bungalow (where moderate adverse effects are predicted). The ES has not considered Keepers Cottage as a receptor, despite it clearly being a sensitive location that may be exposed to adverse effects.

5 Road Traffic Assessment

Chemistry

5.1 There is some confusion regarding how chemistry has been taken account of within the assessment, which forms a crucial process in determining the predicted NO_2concentrations and thus conclusions. In Section 4.7 of the road traffic assessment in Technical Appendix E of the ES it states:

"The chemical reaction scheme option was utilised in the assessment so that the model took into account photochemical reactions between NO, NO_2 and O_3. The model was run using the 2018 annual average 0_3 concentration for Alston Hill. The respective value is 65.7."

5.2 In Section 5.1 it then states:

"As atmospheric nitrogen dioxide (NO_2) is produced as a result of reactions of nitric oxide (NO) and ozone it is most appropriate to verify the model for atmospheric NO_x which is a combination of NO and NO_2.

The model was therefore run to predict annual mean road NO_x concentrations at the diffusion tube sites, as outlined in Table 4-5, with the resultant NO_2 concentrations then determined by inputting the predicted road NO_x concentration into the DEFRA NO_x to NO_2 calculator".

5.3 When using the Chemical Reaction Scheme in the ADMS-Roads model it is important to not only include background ozone (O_3) concentrations, but also background nitrogen oxides (NOx) and nitrogen dioxide (NO_2) concentrations, to allow the chemical reactions to be correctly modelled (CERC Ltd, 2017). It appears this has not been done.

5.4 Furthermore, using a single O_3 value is not appropriate; ozone varies both diurnally and seasonally and thus hourly O_3 concentrations should have been used in the model. Using a single value will give inaccurate results.

5.5 When using the Chemical Reaction Scheme, it is also important to specify the fraction of primary NO_2 (f-NO_2) to be assumed in the reaction, this being the amount of NO_2 released directly from exhausts before any chemical reactions take place in the atmosphere. Either a specific value or model default has could have been used, but either would have been inaccurate. F-NO_2 varies depending on vehicle type and thus the average f-NO_2 for a road will be dependent upon the combination of vehicles using the road, which will vary from road to road. Road specific f-NO_2 values could have been taken from Defra's Emission Factor Toolkit (EFT) (Defra, 2020a), which takes account of the variation in vehicle types. Defra has also provided a tool (Defra's NOx to NO_2 Calculator (Defra, 2020b)) to take account of f-NO_2 values specific to each receptor location. The use of the Chemical Reaction Scheme thus appears to have been carried out inaccurately and does not follow best practice.

5.6 It is also unclear why the Chemical Reaction Scheme has even been used, since the predicted NOx concentrations were apparently then converted to NO_2 using Defra's NOx to NO_2 Calculator, which is the recommended approach for accounting for chemistry in Defra's LAQM (TG16) guidance (Defra, 2018). Using both will have led to inaccurate or inconsistent results.

Surface Roughness

5.7 The ES states:

"A surface roughness length is used in the dispersion modelling study to characterise the land use of the surrounding area in terms of the frictional effect that will occur due to the interaction of wind with the surface; this is a key component in the generation of atmospheric turbulence, which influences dispersion. A surface roughness length of 0.5 was used to characterise the proposed development site which is representative of Parkland and Open Suburbia with a surface roughness of 0.3 utilised to characterise the meteorological site which is representative of Agricultural areas (max)."

5.8 Most of the modelled receptors are, however, located within a rural setting where a surface roughness value representative of agricultural areas would be appropriate, rather than a value representative of open suburbia. Given the urban fringe setting of the study area, where some receptors are clearly in a rural location and others are in an urban location, it would have been more appropriate to incorporate variable surface roughness values within the model. This functionality is available in the model.

Modelled Road Network

5.9 When undertaking an air quality assessment, it is important to fully consider where potential impacts might occur and to ensure the road network modelled within the assessment includes all potential sensitive locations, such as nearby AQMAs. The ES states that:

"the transport assessment indicates that only 16% of the HGV's will enter into the Kidderminster Air Quality Management Area. This equates to ~19 vehicles AADT. Based upon the criteria for proceeding to an Air Quality Assessment as outlined in Table 6.2 of the EPUK & IAQM 2017 guidance document the impact of the development on the AQMA will not be considered within the assessment as HGV numbers entering into the AQMA are below 25 AADT criteria that would require assessment".

5.10 Traffic data for 2020 with and without the development are presented as hourly flows in Appendix B of the ES and are re-presented in Table 2 below as daily flows (i.e. hourly values multiplied by 24). Table 2 also presents the daily flows associated with the development (i.e. by taking the difference between the two scenarios). This shows that the development will lead to 48 HGV movements per day along the A449 towards Kidderminster. Of these HGVs, 24 are said to travel along Stourbridge Road and 24 along Chester Road North. Thus, there will be 24 HGVs entering the AQMA, not 19 as stated in the ES.

5.11 The distribution of vehicles on the local road network is based upon what the transport consultants consider to be most likely, but there is uncertainty in this and may in reality be different. According to the traffic data presented, the distribution of HGVs has been assumed to be a 50:50 split between Stourbridge Road and Chester Road North, which is clearly arbitrary. Given the uncertainty in the distribution of HGVs, there is a very high risk that the number of HGVs that will travel along Stourbridge Road and through the AQMA, will be more than 24 movements per day, and thus greater than the EPUK & IAQM screening criteria.

5.12 Additionally, the EPUK & IAQM guidance (2017) states:

"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".

5.13 Thus, appropriate professional judgement should have been used; this should have considered the sensitivity of local conditions irrespective of the screening criteria. Measured annual mean NO_2 concentrations were over 60 µg/m^3 in 2018 at two monitoring locations within the AQMA (60.9 µg/m^3 at monitoring site HF(K) and 68.5 µg/m^3 at monitoring site HF(K)(F)), well above the objective level of 40 µg/m^3. The AQMA is therefore considered to be hypersensitive to changes in air quality and any changes in vehicle movements, even below the EPUK & IAQM screening criteria, should have been assessed to ensure that no significant effects occur within the AQMA.

5.14 Furthermore, as mentioned in paragraph 3.3, exceedences of the NO_2 1-hour mean objective may occur where the annual mean is above 60 µg/m^3. Since annual mean NO_2 concentrations have been measured above 60 µg/m^3; it is therefore considered likely that the 1-hour mean objective may also be exceeded within the AQMA, primarily due to emissions from road traffic. Any change in HGV movements through the AQMA may therefore also lead to adverse impacts of the 1-hour mean objective.

5.15 The EPUK & IAQM guidance (2017) also states: *"the presence of an AQMA that may be affected by a proposed development will increase the sensitivity of the application and any accompanying assessment".* It is therefore judged that the assessment has not fully taken account of the sensitivity of the local air quality and has not considered all potential impacts; the conclusions are therefore not valid.

Table 2: Daily traffic flows

Road Name	2020 Baseline + Committed (Daily)		2020 Baseline + Committed + Development (Daily)		2020 Development Only (Daily)	
	LGV	HGV	LGV	HGV	LGV	HGV
Wolverley Road	9,672	264	9,696	384	24	120
A449 Wolverhampton Road North of Wolverly Road	14,184	888	14,184	912	0	24
Park Gate Road	5,952	120	5,952	168	0	48
A449 Wolverhampton Road South of Wolverly Road	10,440	768	10,440	816	0	48
A451 Stourbridge Road North East of A449	7,032	168	7,032	168	0	0
A449 Stourbridge Road	19,416	600	19,416	624	0	24
A449 Stourbridge Road SW	12,000	240	12,000	264	0	24
A449 Chester Road North	12,624	432	12,648	456	24	24
Wolverley Road West of Access	11,784	96	11,784	96	0	0

Model Verification

5.16 Guidance on how to verify models is given in Defra's LAQM (TG16) guidance (2018), which states:

"For the verification and adjustment of NOx/NO_2, a combination of continuous monitoring and diffusion tubes is recommended. As described above, some types of sites can perform differently, and it is considered better to have multiple sites at which to verify results rather than just one continuous monitor. The use of one continuous monitor alone to derive the adjustment factor for a model is not recommended as the monitoring site may not be representative of other locations modelled, and the adjustment factor derived will be heavily dependent on the source to receptor relationship as represented by the meteorological data file used in the dispersion model".

5.17 The ES states that only one monitoring site was used for the model verification. There are other monitoring sites nearby which could have been included, thus it is considered that the assessment goes against the approach recommended by Defra. Furthermore, the assessment used meteorological data for the year of 2017 to verify the model against a measurement recorded in 2018. As mentioned by Defra, the verification will be heavily dependent on the meteorological data used and using data for a different year will not provide the correct source to receptor relationship.

The model verification is therefore not considered to be accurate; the predicted concentrations, impacts and significance of the development is therefore also not considered to be accurate.

Conclusions

5.18 When making a judgement on the significance of the development upon local air quality it is important to take account of relevant guidance. The ES states:

"As per IAQM guidance impact descriptors relate to individual receptors and are not representative of the impact of the whole development (See Table 6.3, point 4). Therefore, due to the fact that the predicted impact of the development at the majority of the assessed receptors is negligible and that the development will not result in increases in target pollutants that will lead to breaches of relevant objective levels the overall impact of the development is considered to be Negligible".

5.19 Firstly, when describing the impacts at each receptor the EPUK & IAQM guidance (2017) is clear that the impact descriptors are used to reflect the degree of potential harm:

"The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL".

5.20 It thus follows that even though the predicted concentrations will not breach the relevant objective levels, the development will still result in harm. Since the concentration is predicted to be greater than 75% of the AQAL value where the slight adverse impact is predicted, the degree of harm would be considered greater than small. This also, does not take account of potential impacts within the AQMA, where concentrations are well above the AQAL and hence the degree of harm would be significantly increased.

5.21 Secondly, when considering the overall significance, it is important to take account of what the EPUK & IAQM guidance (2017) states:

"Any judgement on the overall significance of effect of a development will need to take into account such factors as:

- *The existing and future air quality in the absence of the development;*
- *the extent of current and future population exposure to the impacts; and*
- *the influence and validity of any assumptions adopted when undertaking the prediction of impacts".*

5.22 Although the predicted impact at most receptors is predicted to be negligible, these receptors represent approximately 20 highly sensitive properties (these being residential properties at a similar distance away from the roads as the modelled receptors). The slight adverse impact predicted represents at least 43 highly sensitive properties; there will therefore be more than double the number of slight adverse impacts at properties than negligible impacts.

5.23 While normally slight adverse impacts would often be considered not significant, given the numbers of adversely affected residential properties and the hypersensitivity of the AQMA, the overall significance of the development, based upon the results presented, should be considered significant.

5.24 It is also important to note the influence of any assumptions adopted; the assessment has assumed no improvement in background or engine emissions, providing a conservative assessment. In reality, there will be little change in backgrounds and engine emissions between 2018 and 2020 and any change is unlikely to alter the conclusions of the assessment. It is also imperative to acknowledge that the assessment has screened out significant impacts within the AQMA without using appropriate professional judgement; impacts within the AQMA have therefore not been demonstrated and may drastically alter the conclusions of the assessment.

6 Meteorology

6.1 Meteorology plays a critical role in both the dust risk assessment and the road traffic assessment. Yet, oddly, the road traffic assessment has used different meteorological data to the dust risk assessment, taking meteorological data from the Coleshill meteorological station instead of Pershore. The predominant wind direction measured at the Coleshill meteorological station was from the south, while at Pershore was from the southwest. No justification has been given to why inconsistent data has been used between the assessments. If consistent data had been used, then the results of either the dust risk assessment or the road traffic assessment would be different from that presented, and the conclusions may be different.

7 Consideration of Climate Change

7.1 The ES does not address the effect of climate change on air quality or vice-versa. Directive 2014/52/EU was transposed into UK law in 2017 and states:

"Climate change will continue to cause damage to the environment and compromise economic development. In this regard, it is appropriate to assess the impact of projects on climate (for example greenhouse gas emissions) and their vulnerability to climate change".

7.2 Consideration should be given to the effects of climate change on air quality impacts. For example, based on current climate trends, temperatures are likely to increase at the application site in the future, leading to drier ground conditions which may lead to increased dust potential during quarry works.

7.3 It is also important to consider the impacts of air quality on climate change; on-site plant/vehicles and traffic associated with the site will release greenhouse gas emissions and aerosols, which will affect climate change, and there may also be carbon released into the atmosphere during the excavation of soil. The development is required to demonstrate that it will not affect the UK's carbon budgets nor the compliance of the UK's net-zero emission target.

8 Summary and Conclusions

8.1 This report has reviewed the air quality evidence submitted in support of the planning application for the proposed development of a sand and gravel quarry at Lea Castle Farm. A number of concerns have been raised regarding the validity of the air quality and dust chapter of the ES.

Importance of Local Air Quality

8.2 The ES has downplayed the health effects of dust and the local air quality conditions. Recent evidence demonstrates that dust (PM_{10} and $PM_{2.5}$) associated with mineral activities are also associated with adverse respiratory and cardiovascular effects on health. Local air quality conditions are poor in the local area with an AQMA declared nearby due to concentrations being measured well above the objective level.

Dust Risk Assessment

8.3 For the dust risk assessment, issues have been raised regarding receptor choice, the potential emission magnitude, the pathway effectiveness and conclusions. The ES concludes that there will be slight/moderate adverse effects at two receptors if dust mitigation and control measures are not implemented. However, the assessment was based upon the measures being implemented, hence mitigation will not remove these adverse effects. These effects are considered to be understated and to be representative of 14 highly sensitive properties.

Road Traffic Assessment

8.4 For the road traffic assessment, issues have been raised regarding chemistry, surface roughness, the modelled road network, the model verification and the conclusions. The approach used does not follow best practice and will result in incorrect results. The AQMA is hypersensitive to changes in air quality and any changes in vehicle movements, even below the EPUK & IAQM screening criteria, should have been assessed to ensure that no significant effects occur within the AQMA. Poor professional judgement has thus been relied upon, resulting in likely significant effects being omitted; the conclusions are therefore not valid.

8.5 The development will likely result in harm and the degree of harm would be significantly increased within the AQMA. Based on the information presented in the assessment (which has been demonstrated to likely underestimate the impacts), there will be slight adverse impacts at more than 43 highly sensitive properties, double the number of negligible impacts. Taking account that there will be many more adverse impacts than negligible at properties and there will be harm caused, the overall significance of the development, based upon the results presented, may be considered significant.

Meteorology

8.6 The dust risk assessment and road traffic assessment have used different meteorological data with no justification as to why inconsistent data has been used. If consistent data had been used, then

the results of either the dust risk assessment or the road traffic assessment would be different than presented, and the conclusions may be different.

Climate Change

8.7 The ES does not address the effect of climate change on air quality or vice-versa. The development is required to demonstrate that it will not affect the UK's carbon budgets nor the compliance of the UK's net-zero emission target.

Overall Conclusion

8.8 Given the poor professional judgement used in the assessment, the competence of the persons undertaking the assessment should be questioned. There is a clear focus of the authors being environmental consultants with little evidence of air quality experience. In particular, the road traffic assessment was prepared by Bryan Cassidy who has six years of environmental management experience. He does not appear to be a member of any professional institution, including the IAQM, which is the professional institution for air quality professionals.

8.9 Taking account of all the issues raised, the assessment is considered to not accurately represent the air quality or dust impacts of the development which will result in adverse impacts in the local area. In addition, the assessment does not take account of the impacts on the nearby AQMA where the effects are likely to be most significant. Overall, the assessment is too uncertain to be relied upon.

9 Glossary, References and Appendices

Glossary

AADT	Annual Average Daily Traffic
AQAL	Air Quality Assessment Level
Air Quality Standards	Concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment.
An exceedence	A period of time (defined for each standard) where the concentration is higher than that set out in the Standard.
An objective	The target date on which exceedances of a Standard must not exceed a specified number.
APS	Air Pollution Services Ltd
AQMA	Air Quality Management Area
EPUK	Environmental Protection UK
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
$\mu g/m^3$	Microgrammes per cubic metre
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles, more specifically particulate matter less than 2.5 micrometres in aerodynamic diameter
WHO	World Health Organization

References

CERC Ltd. (2017). *ADMS-Roads Air Quality Management System Version 4.1 User Guide.*

Defra. (2018). *Local Air Quality Management Technical Guidance (TG16).* Retrieved from https://laqm.defra.gov.uk/technical-guidance/

Defra. (2020a). *Emissions Factor Toolkit*. Retrieved from Defra: https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html

Defra. (2020b). *Background Maps*. Retrieved from Defra: https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc

EPUK/IAQM. (2017). *Land-Use Planning & Development Control: Planning For Air Quality.*

IAQM. (2016). *Guidance on the Assessment of Mineral Dust Impacts for Planning.*

Kedd Ltd. (2019). *ES Volume 1, Environmental Statement, Proposed Sand & Gravel Quarry with Progressive Restoration Using Site Derived & Imported Inert Material to Agricultural Parkland, Public Access & Nature Enhancement, Lea Castle Farm, Wolverley.*

Royal College of Paediatrics and Child Health. (2016). *Every breath we take - The lifelong impact of air pollution*. Retrieved from https://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-air-pollution)

Simoni, et al. (2015). *Adverse effects of outdoor pollution in the elderly, Journal of Thoracic Disease*. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4311079/

WHO. (2013). *World Health Organisation, 'Review of evidence on health aspects of air pollution - REVIHAAP Project'*. Retrieved from http://www.euro.who.int/__data/assets/pdf_file/0004/193108/REVIHAAP-Final-technical-report-final-version.pdf?ua=1

A1 Professional Experience

Dr Austin Cogan, MPhys (Hons) PhD MIEnvSc MIAQM

Dr Cogan is a Director of APS and has over eleven years' experience in environmental sciences. Austin has extensive experience of air quality, dust and odour assessments for a range of industries as well as services for local authorities, including Clean Air Zone and micro-simulation modelling. He is also an international expert in the field of climate change, having monitored greenhouses gases globally, published numerous scientific papers and presented at conferences internationally.

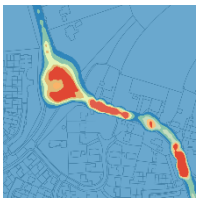
Dr Claire Holman, BSc (Hons), PhD, CSci, CEnv, FIEnvSc, FIAQM

Dr Holman is an associate of APS, has nearly 40 years of experience and has advised national governments in Europe, Asia and Africa, as well as the European Commission on a range of strategic air quality and climate change issues. Claire has contributed to the development of IAQM and EPUK professional guidance, is currently the chair of the institute, has been a member of a Government air quality review group, and advised the Department for Transport on their cleaner vehicles and fuels research programme. She is an experienced expert witness for planning and CPO inquiries and litigation.

AIR POLLUTION SERVICES

Experts in Air Quality, Odour and Climate Change

- Air Quality Assessments for Planning Applications
- Air Quality Neutral
- Pre-application Feasibility



- LAQM Support
- Feasibility Studies
- Local Plan Modelling

- Construction Dust
- Mineral Dust
- Dust Management

- Odour Risks
- Odour Modelling
- Odour Management

- Transport Schemes
- Industrial and Energy
- Agriculture and Waste

- EIA Air Quality Chapters
- Greenhouse Gas Assessments
- Climate Vulnerability

- Air Risk Assessments
- MCPD Permits
- Specified Generator Permits

- Litigation Services
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