APPENDIX 6.1
CONSTRUCTION PHASE ASSESSMENT INCLUDING DUST RISK ASSESSMENT

Appendix 6.1 - Construction Phase Assessment

Construction Phase Dust Assessment Methodology

The criteria developed by the Institute of Air Quality Management for the assessment of air quality impacts arising from construction activities was used as the basis for the assessment methodology discussed in the following sections. The assessment is comprised of five steps as discussed below.

Step 1: Identify the need for detailed assessment

An assessment would normally be required where there is:

- A human receptor within 350 metres of the proposed scheme; and/or within 50 metres of the access route(s) used by the construction vehicles on the public highway up to 500 metres from the study area site entrance(s); and/or
- An ecological receptor within 50 metres of the proposed scheme and/or within 50 metres of the access route(s) used by construction vehicles on the public highway up to 500 metres from the site entrance(s).

A human receptor refers to any location where a person or property may experience the adverse effects of airborne dust or dust-soiling, or exposure to particulate matter (PM_{10}) over a period relevant to the ambient air quality objectives.

An ecological receptor refers to any sensitive habitat affected by dust soiling. For locations with a statutory designation, such as a National Nature Reserve (NNR), Ramsar site, Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC) or Special Protection Areas (SPA), consideration should be given as to whether the particular site is sensitive to dust. Some non-statutory sites may also be considered if appropriate, such as a Site of Importance for Nature Conservation (SINC).

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is 'negligible' and any effects would be 'not significant'.

Step 2: Assess the risk of dust impacts

A site is allocated a risk category on the basis of the scale and nature of the works (Step 2A) and the sensitivity of the area to dust impacts (Step 2B). These two factors are combined in Step 2C to determine the risk of dust impacts before the allocation of mitigation measures. Risks are described as low, medium or high for each of the four separate activities (demolition, construction, earthworks and trackout). Site-specific mitigation is required, proportionate to the level of risk.

Step 2A: Define the potential dust emission magnitude

The potential dust emission magnitude is based on the scale of the anticipated works and should be classified as small, medium or large. **Table A-1** presents the dust emission criteria outlined for each construction activity.

Table A-1 Potential dust emission magnitude criteria

Construction activity	Large	Medium	Small
Demolition	Total building volume >50,000 m^3, potentially dusty construction material	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty	Total building volume <20,000 m^3, construction material with low potential

	(e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level.	construction material, demolition activities 10-20 m above ground level.	for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months.
Earthworks	Total site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes.	Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes.	Total site area <2,500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months.
Construction	Total building volume >100,000 m^3, on site concrete batching, sandblasting.	Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching.	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).
Trackout	>50 HDV (>3.5 t) outward movements[a] in any one day[b], potentially dusty surface material (e.g. high clay content), unpaved road length >100 m.	10-50 HDV (>3.5 t) outward movements[a] in any one day[b], moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m.	<10 HDV (>3.5 t) outward movements[a] in any one day[b], surface material with low potential for dust release, unpaved road length <50 m.

A vehicle movement is a one way journey. i.e. from A to B and excludes the return journey.

HDV movements during a construction project vary over its lifetime, and the number of movements is the maximum not the average.

Step 2B: Define the sensitivity of the area

The sensitivity of the area is described as low, medium or high. It takes into account a number of factors:

- The specific sensitivities of the receptors in the area;
- The proximity and number of those receptors;
- The local background PM_{10} concentrations; and
- Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table A-2 presents indicative examples of classification groups for the varying sensitivities of people to dust soiling effects and to the health effects of PM_{10}; and the sensitivities of receptors to ecological effects. A judgement is made at the site-specific level where sensitivities may be higher or lower, for example a

soft fruit business may be more sensitive to soiling than an alternative industry in the same location. Box 6, Box 7 and Box 8 within the IAQM guidance outlines more detailed information on defining sensitivity.

Table A-2 Indicative examples of the sensitivity of different types of receptors

Sensitivity of receptor	Sensitivities of people and ecological receptors		
	Dust soiling effects [a]	**Health effects of PM_{10}** [b]	**Ecological effects** [c]
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.	Residential properties, hospitals, schools and residential care homes.	Locations with an international or national designation and the designated features may be affected by dust soiling (e.g. SAC/SPA/Ramsar). Locations where there is a community of a species particularly sensitive to dust such as vascular species included in the Red Data list for Great Britain.
Medium	Parks, places of work.	Office and shop workers not occupationally exposed to PM_{10}.	Locations where there is a particularly important plant species, where dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition (e.g. SSSIs).
Low	Playing fields, farmland, footpaths, short-term car parks and roads.	Public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition (e.g. Local Nature Reserves).

People's expectations would vary depending on the existing dust deposition in the area.

This follows the Department for Environment, Food and Rural Affairs (Defra, 2016) guidance as set out in Local Air Quality Management Technical Guidance (LAQM.TG (16)). Notwithstanding the fact that the ambient air quality objectives and limit values do not apply to people in the workplace, such people can be affected to exposure of PM10. However, they are considered to be less sensitive than the general public as a whole because those most sensitive to the effects of air pollution, such as young children are not normally workers. For this reason workers have been included in the medium sensitivity category.

Only if there are habitats that might be sensitive to dust. A Habitat Regulation Assessment of the site may be required as part of the planning process if the site lies close to an internationally designated site i.e. Special Conservation Areas (SACs), Special Protection Areas (SPAs) designated under the Habitats Directive (92/43/EEC) and Ramsar sites.

The IAQM guidance advises consideration of the risk associated with the nearest receptors to construction activities.

Where there are multiple receptors in a single location, a worst-case representative receptor location is considered and the highest risk applicable is allocated.

The receptor sensitivity and distance are then used to determine the potential dust risk for each dust effect for each construction activity as shown in **Table A-3**, **Table A-4** and **Table A-5**. It is noted that distances are to the dust source and so a different area may be affected by trackout than by on-site works.

Table A-3 Sensitivity of the area to dust soiling effects on people and property [a]

Receptor sensitivity	Number of Receptors[b]	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

a. Estimate the total number of receptors within the stated distance. Only the highest level of area sensitivity from the table needs to be considered. For example, if there are 7 high sensitivity receptors <20 metres of the source and 95 high sensitivity receptors between 20 and 50 m, then the total of number of receptors <50 metres is 102. The sensitivity of the area in this case would be high.

b. Exact counting of number of human receptors not required. It is instead recommended that judgement is used to determine the approximate number of receptors within each distance band. For example, a residential unit is one receptor. For receptors which are not dwellings, professional judgement should be used to determine the number of human receptors. For **example,** a school or hospital is likely to be within the >100 receptor category.

Table A-4 Sensitivity of the area to human health impacts [a b c]

Receptor sensitivity	Annual Mean PM_{10} Concentrations	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m^3	>10	High	Medium	Low	Low	Low

Receptor sensitivity	Annual Mean PM_{10} Concentrations	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

Estimate the total within the stated distance (e.g. the total within 350 metres and not the number between 200 and 350 m), noting that only the highest level of area sensitivity from the table needs to be considered. For example, if there are 7 high sensitivity receptors <20 metres of the source and 95 high sensitivity receptors between 20 and 50 m, then the total of number of receptors <50 metres is 102. If the annual mean PM_{10} concentration is 29 µg/m^3, the sensitivity of the area would be high.

Annual mean PM_{10} concentrations are most straightforwardly taken from the national background maps but should also take account of local sources. The values are based on 32 µg/m^3 being the annual mean concentration at which an exceedance of the 24-hour objective is likely in England, Wales and Northern Ireland.

In the case of high sensitivity receptors with high occupancy (such as schools or hospitals) approximate the number of people likely to be present. In the case of residential dwellings, simply include the number of properties.

Table A-5 Sensitivity of the area to ecological impacts

Receptor Sensitivity	Distance from the Source (m)[a]	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Only the highest level of area sensitivity from the table needs to be considered.

Step 2C: Define the risk of impacts

The dust emission magnitude is then combined with the sensitivity of the area to determine the overall risk of impacts with no mitigation measures applied. The matrices in **Table A-6** provide a method of assigning the level of risk for each activity. These can then be used to determine the level of mitigation that is required.

Table A-6 Risks of dust impacts

Receptor Sensitivity	Dust Emission Magnitude		
	Large	**Medium**	**Small**
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Low risk	Negligible
Low	Low risk	Low risk	Negligible

Step 3: Site-specific mitigation

Step three of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to whether the site is a low-, medium- or high-risk site. The highest risk category of a site (of all activities being undertaken) is recommended when considering appropriate mitigation measures for the site. Where risk is assigned as 'negligible', no mitigation measures beyond those required by legislation are required. However, additional mitigation measures may be applied as good practice.

A selection of these measures is specified as suitable to mitigate dust emissions from activities, based on professional judgement.

Step 4: Determine significant effects

Following Step 2 (definition of the proposed scheme and the surroundings and identification of the risk of dust effects occurring for each activity), and Step 3 (identification of appropriate site-specific mitigation),

the significance of the potential dust effects can be determined. The recommended mitigation measures should normally be sufficient to reduce construction dust impacts to a not significant effect.

The approach in Step 4 of the IAQM dust assessment guidance has been adopted to determine the significance of effects with regard to dust emissions. The guidance states the following:

"For *almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'."*

IAQM guidance also states that:

"*Even with a rigorous DMP* [Dust Management Plan] *in place, it is not possible to guarantee that the dust mitigation measures will be effective all the time, and if, for example, dust emissions* occur *under adverse weather conditions, or there is an interruption to the water supply used for dust suppression, the local community may experience occasional, short-term dust annoyance. The likely scale of this would not normally be considered sufficient to change the conclusion that with mitigation the effects will be 'not significant'*."

Step 4 of IAQM guidance recognises that the key to the above approach is that it assumes that the regulators ensure that the proposed mitigation measures are implemented. The management plan would include the necessary systems and procedures to facilitate on-going checking by the regulators to ensure that mitigation is being delivered, and that it is effective in reducing any residual effect to 'not significant' in line with the guidance.

A.2 Construction Phase Assessment

Step 1: Identify the need for detailed assessment

As there are human receptors within 350 m of the site boundary of the Proposed Development, a dust risk assessment was undertaken.

Based on a review of the MAGIC Maps website, there is one site designated for ecological protection (such as SSSIs, Ramsar Sites, SACs, SPAs, Ancient Woodlands, or National or Local Nature reserves) within 50m of the site boundary, Bramblefields Local Nature Reserve (LNR), triggering the first stage screening criteria. As this ecological receptor is an LNR, it is considered a low sensitivity ecological receptor, as outlined in **Table A-2**, and has not been designated due to dust sensitive flora. As such, this receptor has been screened out of detailed assessment.

Step 2A: Define the potential dust emission magnitude

Potential dust emission magnitudes from construction activities associated with the Proposed Development were determined in accordance with IAQM 2014 guidance and are detailed below. At the time of writing, the scale and nature of construction related activities expected to take place at site are unknown and it is assumed some details of site setup whilst construction activities take place will only be

determined following planning consent. Consequently, the information shown in **Table A-7** are predominantly assigned by Temple, using professional judgment.

Table A-7 Potential dust emission magnitude criteria

Type of work	Description of potential site characteristics with reference to IAQM 2014 guidance	Dust emissions magnitude
Demolition	No buildings to be demolished. Some potentially dusty materials such as block paving may be removed. No crushing on site and demolition activities only occurring below 10m above ground.	Small
Earthworks	Total site area is >10,000m^2, with total materials to be moved on Site <20,000 tonnes. Temporary stockpiles on site and spoils to be removed at the earliest possible opportunity.	Medium
Construction	Total building volume >100,000m^3. No concrete batching proposed, no sandblasting proposed. Potentially dusty construction materials.	Large
Trackout	<10 outward HDV movements in any one day. <50m of unpaved road used by construction vehicles on site.	Large

Notes: A vehicle movement is a one-way journey. i.e., from A to B and excludes the return journey. HDV movements during a construction project vary over its lifetime, and the number of movements is the maximum not the average.

Step 2B: Define the sensitivity of the area

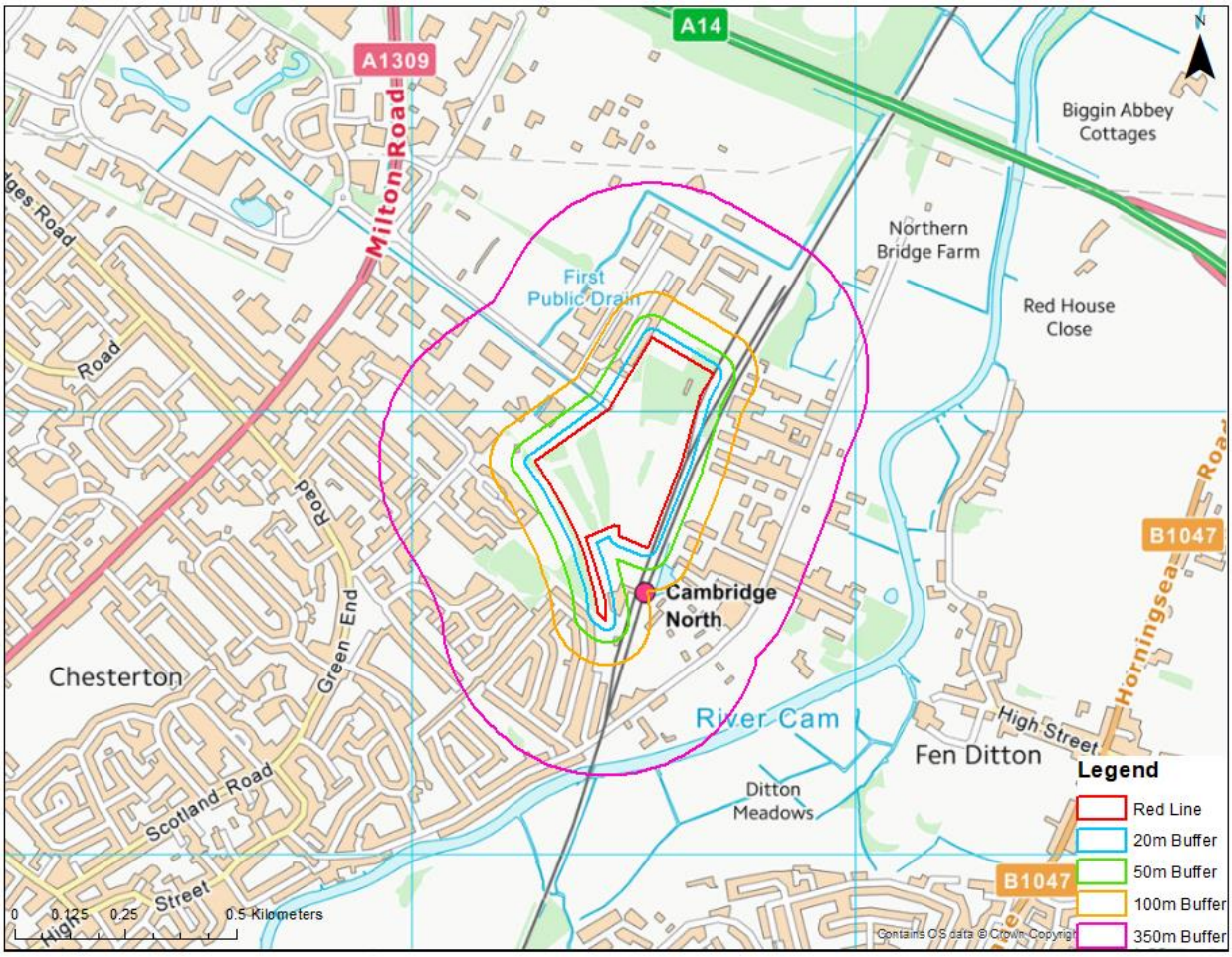
Regarding demolition, earthworks and construction, the surrounding area has a relatively low concentration of residential properties, which have a high sensitivity to dust soiling and health effects. The threshold of >100 high sensitivity receptors within 100m of the site boundary is unlikely to be exceeded. The threshold of >100 high sensitivity receptors within 350m is exceeded, but this results in the area having a Low sensitivity to dust soiling effects on people and property. Potential trackout impacts could occur up to 50m from the edge of roads used by vehicles during the construction period up to 500m from the site entrance/exit. **Table A-8** summarises the sensitivity of the area to dust soiling and human health impacts. **Figure A-1** shows the distance buffers from the site.

Table A-8: Assessed sensitivity of area around development site

Type of work	Demolition	Earthworks	Construction	Trackout
Dust soiling	**Medium**: 1-10 medium sensitivity receptors within 20m of the existing building. There is Novotel hotel and some commercial developments adjacent to the proposed development	**Medium**: 1-10 medium sensitivity receptors within 20m of site boundary. There is Novotel hotel and some commercial developments adjacent to the proposed development	**Medium**: 1-10 medium sensitivity receptors within 20m of site boundary. There is Novotel hotel and some commercial developments adjacent to the proposed development	**Medium**: More than 100 medium sensitivity receptors within 20m of roads along which track out could arise (up to 500m of site since it is a major development)

Type of work	Demolition	Earthworks	Construction	Trackout
Human health impacts	**Low**: 1-10 high sensitivity receptors within 20m of the existing building and annual mean PM_{10} concentrations are likely to be below 24µg/m^3 the vicinity of the Application Site.	**Low**: 1-10 high sensitivity receptors within 20m of the site boundary and annual mean PM_{10} concentrations are likely to be below 24µg/m^3 the vicinity of the Application Site.	**Low**: 1-10 high sensitivity receptors within 20m of the site boundary and annual mean PM_{10} concentrations are likely to be below 24µg/m^3 the vicinity of the Application Site.	**Low**: Less than 100 high sensitivity receptors within 50m of the roads used by construction traffic PM_{10} concentrations are likely to be below 24µg/m^3 the vicinity of the Application Site.
Ecological	**Negligible:** According to the MAGIC Maps website, there is one LNR roughly 50m to the south-west of the site. However, LNRs are considered Low sensitivity receptors and the site was not designated due to dust sensitive flora species. Additional, as the prevailing wind is south-westerly, dust generated on site will be blown away from the LNR. With these points considered, the impacts are considered negligible.			

Figure A-1: Construction Distance Bands around the Proposed Development site boundary



Step 2C: Define the risk of impacts

The construction dust risks were assigned based on the IAQM 2014 guidance assessment process, which assigns risks against the dust emission magnitude (assigned in Step 2a) and the area sensitivity (assigned in Step 2b). The risk of dust impacts derived from the different on-site activities is shown in **Table A-9**.

Table A-9 Summary of the Dust Risk from Proposed Development site activities

Potential Impact	Dust Risk Summary			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Soiling	Low Risk	Medium Risk	Medium Risk	Medium Risk
Health Effects	Negligible Risk	Low Risk	Low Risk	Low Risk
Ecological	Negligible Risk – none expected			