DUST MANAGEMENT PLAN

183125/DMP
January 2020

Broadwater Park Golf Club
Guildford Road
Godalming
GU7 3BU

1. SCOPE OF PLAN AND SITE DETAILS

1.1 This dust emissions management plan sets out how the risk of poor air quality emissions will be managed at the Broadwater Park Golf Club, operated by Knowl Hill Limited (the Operator). The plan supports the application for the proposed works to cap and re-profile the existing golf course. This plan has been written with reference to the Air Quality Assessment by Vanguardia, submitted as part of the Planning Permission.

1.2 The purpose of this plan is to:

- minimise the emissions of dust, particulates and NO_2 produced by site activities, as far as is practicable, using appropriate best practice measures; and
- mitigate the potentially adverse impacts of the residual emissions of dust, particulates and NO_2 after all appropriate control measures have been applied with due regard to the sensitivity of the local surroundings.

1.3 This management plan incorporates industry good practice to ensure the air quality emissions risk remains low during the site's operation. The plan has been developed following the principals set out in the EA dust control guidance, and SPG Mayor of London Guidance and City of London Code of Practice for Deconstruction and Construction Sites. The relevant guidance in these plans relates primarily to construction processes which are consistent with those operated at the manufacturing site and present good industry practice. To note, this is a relatively short-term earthworks construction project anticipated to only take 18 to 24 months to import material.

1.4 The site is located off Guildford Road circa 1.5 km north east of Godalming town centre in Surrey (National Grid Reference - SU981450). The site location plan is presented in drawing 183125/D/001.

1.5 The site will include a temporary material storage area, Soil Management Area (SMA), placement of imported and recovered material area and a quarantine area. The site will be accessed from Guildford Road (A3100). The whole permitted area is secured by fencing and heavy vegetation along the borders. The proposed site layout and access is detailed by drawing 183125/D/004. The proposal involves the import and use of 342,578 tonnes (214,111 m^3) over an 18 to 24 month period. Of which circa 100,000 tonnes per annum of imported inert material will be physically and mechanically recovered in the SMA for on-site use.

1.6 The movement, storage and placement of waste may generate particulates and litter. The sources of emissions and associated controls are described in Section 4 of this plan. The plan sets out the proactive and reactive measures that will be implemented to control the emissions during standard and abnormal operational circumstances. These controls are described in subsequent sections.

1.7 In the event that the implementation of controls fails, corrective actions will be identified and implemented.

1.8 The scope of this management plan follows the Environment Agency's (EAs) requirements set out in the Dust and Emissions Management template. Monitoring is in line with EA Guidance M17.

2. WASTE OPERATIONS

2.1 The operations on site will involve transfer, recovery, placement and storage of inert waste streams originating from construction and demolition waste. The site layout includes access / egress from the south of the site via a wheel wash and site office. Lorries will drive directly to the area of placement (dependent on work programme) or to the SMA. An excavator and/or bull dozer will spread the directly tipped material into the final landform area. Prior to any placement of material, the bull dozer will remove all top soil from the surface. The topsoil will be temporarily stored in four separate areas of the site pending re-instatement following the works. If the material is transferred to the SMA for further processing, an excavator will load the material into a crusher/screener to further recover the material for on-site use.

2.2 Table 1 sets out the waste streams, waste management activities and the potential for fugitive particulate emissions.

Table 1. Waste streams and description of management activities

Description	Activities	Potential for fugitive particulate emissions without mitigation
Haulage and site operation (site wide)	Import of materials (whole site)	Possible exhaust emissions and fugitive dusts from loads from vehicles (NO_x, PM_{10} (<10 µm) and Total Suspended Particulates (TSP)). Possible: Wind entrainment of fines silts and soil on operating surface and haul route.
Movement and placement of inert waste	Tipping of waste and temporary storage	Possible wind entrainment of waste and materials.
	Loading of material onto hoppers or other vehicles and placement into the ground	Possible wind entrainment of lighter waste fraction. As the material is transferred or dropped onto the ground there is the potential for wind entrainment of fines Exhaust emissions and fugitive dusts from the vehicles in operation.
	Transfer of material and manual segregation into stockpiles	Possible emissions from the movement of vehicles if there is significant build-up of mud and waste. Possible emissions during the bulk loading of recovered materials.
Site operations in the Soil Management Area	Tipping of waste and temporary storage	Possible wind entrainment of waste and materials.
	Loading of material onto hoppers or other vehicles	Possible wind entrainment of lighter waste fraction. As the material is transferred or dropped onto the ground there is the potential for wind entrainment of fines Exhaust emissions and fugitive dusts from the vehicles in operation.
	Transfer of material and manual segregation into stockpiles	Possible emissions from the movement of vehicles if there is significant build-up of mud and waste. Possible emissions during the bulk loading of recovered materials.
	Crushing and screening imported waste	Possible wind entrainment of lighter waste fraction. As the material is transferred or dropped onto the ground there is the potential for wind entrainment of fines Exhaust emissions and fugitive dusts from the vehicles and plant in operation.
Storage of material	Storage of material or waste within stockpiles	Possible wind entrainment of waste and litter.

2.3 The waste types are all mineral / soil based. The associated risk with these waste types are the finer fraction of the matrix drying out and becoming mobile via wind or site disturbance. This is most likely during drier, summer months.

3. BASELINE CONDITIONS

3.1 The frequency of exposure and likelihood of any fugitive emissions on sensitive land uses is determined by the magnitude of release, proximity of receptors and prevailing meteorological conditions. Meteorological wind data from Farnborough Airport from 2015, located circa 15.7 km north-west of the site, is presented in Appendix A in an Air Quality Assessment report carried out by Vanguardia in July 2017 (doc ref: VC-170613-AQ-RP-0001). The data shows that the prevailing wind direction is from the south-west quadrant. This location is deemed appropriate to use as it has similar surrounding land uses and less than 20 km away. The nearest and most sensitive receptors are the residential properties to the west of the site, and are considered upwind of the prevailing wind direction.

3.2 The land immediately to the west and south of the site is used primarily for residential land purposes whereas the land to the north and west and of the site is used primarily recreational purposes. The sensitive receptors are shown in drawing 183125/D/002. Godalming Town Football Club is located immediately to the south-west of the site. The A4100 is immediately to the south of the site.

3.3 The nearest sensitive receptors susceptible to dust emissions will be the residents in the properties immediately to the west and the south of the site; as well as the recreational areas located to the north and east of the site. Godalming Town Football club is located adjacent to the south western boundary of the site.

3.4 The site is not located within an Air Quality Management Area (AQMA). The nearest AQMA is located circa 1.7 km to the south west of the site.

3.5 Detailed information about the site's environmental context are given in the Environmental Setting and Site Design Report (183125/ESSD).

4. SOURCES OF FUGITIVE PARTICULATES AND CONTROL PROCESSES

4.1 The potential dusts include fine particulate matter which consist of inhalable fractions (total suspended particulates (<100 µm) and the more dangerous respirable fraction (less than PM10). Such dust types are termed as friable. Friable dusts may occur in hardcore and in crushed aggregate waste.

4.2 There will be no point source emissions of air pollutants. Any release will be fugitive. Operations at the site will ensure the suppression of dust and fugitive emissions. The following controls will be implemented:

1. Potential material streams will be reviewed prior to being transported to site and inspected at the gate in line with the Importation Protocol. The pre-acceptance procedure will ensure no dusty loads are imported to the site. All dusty loads will be dealt with in accordance with the Quarantine procedure, in accordance with the Operational Plan;
2. Wheel wash will be in operation for HGVs leaving the site. The wheel wash will be designed to remove tyre mud / dust and will be supplemented by a road sweeper to limit risk of dust from residual waste and dust picked up on the tyres;
3. Dust on highway will be monitored visually by the Site Manager and/or nominated site operative on a daily basis. There will be a dedicated dust brush on site to deal with larger detritus and the road sweeper will remove the finer particles afterwards;
4. The access point will be swept and maintained daily;
5. All lorries will be 8-wheel enclosed, sheeted lorries or vehicle with equivalent dust controls. Vehicles will be sheeted upon arrival. Vehicles will temporarily uncover for visual inspection, then recover on internal haul route. Vehicles will finally uncover at placement location;
6. Material will be placed directly or placed as soon as possible, and immediately bladed in by a bulldozer. This process helps reduce double handling and potential dust mobilisation;
7. Material will be placed as soon as possible to minimise potential for mobilisation;
8. Double handling will be minimised by tipping at location of placement and minimising need for temporary storage;
9. Haul route will be constructed and surfacing compacted to minimise mobilisation of finer fraction. The internal haulage route and SMA will be constructed from compacted hardstanding and will be maintained to ensure a suitable surface for driving along. It should always be maintained in good working condition. Any repairs to the haul route or SMA can be made within 24 hours using a dumper and roller. The compacted hardstanding haul route will operate a sprinkler system during dry conditions to dampen the surface;
10. The SMA is to be located downwind of the prevailing wind direction to the most sensitive residential properties located to the west and south of the site reducing the impact of potential fugitive dust emissions;
11. During dry conditions, crushing and screening operations in the SMA will be undertaken while dust suppression systems are active to reduce fugitive dust emissions;
12. If material cannot be directly placed, temporary stockpiles smaller than 3 m high will be constructed away from the prevailing wind direction and compacted to minimise wind entrainment. The compaction of aggregate will decrease the pore space between particles and increasing the bonds between soil particles, in turn reducing the potential for wind entrainment. The compaction method is solely by the excavator tidying up the perimeter of the stockpile and compacting with the bucket to minimise debris rolling down the slopes and will minimise mobilisation by wind or rain;
13. In the event stockpiles are identified as a source of dust, alternative measures will be reviewed, including but not limited to, the use of calcium magnesium acetate (CMA) as a stockpile surface dust suppressant. In the event CMA is used, any surface water drainage will be contained by temporary swale and/or lined lagoon. Any use of CMA will be in liaison and approval with the EA;
14. Temporary stockpiled material (including topsoil) will be no greater than 3 m in height to allow for dust suppression systems to dampen down the whole stockpile. Stockpiles will also be constructed at safe angles of repose (typically 1:3), to minimise the risk of instability that can lead to a greater risk of wind entrainment;
15. Topsoil stockpiles will be temporary and will be left to vegetate to provide additional screening during the main infilling works;
16. Misting systems will be implemented on operations and stockpiles if dust emissions identified. The misting systems will be mobile: one by tractor and bowser; and one by vehicle and mobile water

bowser fitted with a high-pressure sprayer to suppress surfaces. Both systems can access all parts of the site. The mobile bowser will allow misting > 3 m coverage. The high-pressure sprayer is handheld allowing 360° coverage;

17. Site operatives are to be briefed on minimising drop heights during daily briefings and tool box talks by the Site Manager. By undertaking direct placement and compaction, the need for any double-handling and further dropping will be removed;
18. Prior to acceptance the waste will be reviewed to determine its characteristics including dusty load check. This may include photograph checks or review of geology (silty / clay fraction may cause greater dust potential). In the event a check is positive, the Operator will contact the waste Producer and arrange load to be transported back to the producer. In the event the non-compliant material must be tipped (cannot be returned immediately), the waste will be placed in the quarantine area under dust suppression measures. The load will be isolated. All recording and normal controls will be in accordance with the Operational Plan;
19. Site wide speed limit set at 5 mph for all HGVs; All drivers delivering waste will be subject to signage reminders of speed limit, dust controls and by the operator at the ticket office. Driver's under the Operator's primary control will be subject to a site induction and toolbox talks;
20. All staff receive air emissions awareness training at site induction and through regular toolbox talks;
21. All plant and equipment will be routinely serviced in line with manufacturers' guidance to help reduce NO_2 emissions;
22. Plant and equipment will be switched off when not in use. There will be an anti-idling policy and 3 strike system implemented to repeat operative offenders; and
23. Daily site inspection recorded in Site Diary. In the event visual dust emissions are identified mobilising beyond site boundary, a non-conformance report will be implemented, and corrective/preventative actions prescribed.

4.3 During dry conditions, mobile tractor with water bowser will be deployed at dust generating site operations at ground level including blading, compaction and deposition of material to ensure there is effective suppression in all wind directions at surface.

4.4 All site operatives will receive internal dust and emissions training. Training is included within the site induction (upon the start of employment), during daily site briefings, and through tool box talks.

4.5 As a minimum, this plan will be reviewed on an annual basis to ensure that it is up to date, addressing the dust risks of the operations at any time. The plan will be reviewed by Senior Management either following an emissions incident quantified by a substantiated complaint, a monitoring threshold exceedance or observed emissions over the boundary. The review procedure will be undertaken within 1 month of the incident to allow any further data to be interpreted. The review will ensure mistakes are learnt from and new/improved methods will be integrated.

4.6 For infrastructure requiring constant power, which are not on main electric power, Tier 4 compliant generators will be used. For short term operations, as a minimum, Tier 2 or 3 will be used (where electricity cannot be provided). Any procurement of generators will be aware of the classification and the need for the more suitable Tier 4 standard, where practically possible.

4.7 Water for suppression will be sourced from onsite mains potable source (conservatively assessed as 50 m^3 however typically it is much more given it has been a golf course); and off site third party (circa 10,000L tanker 2 times a day giving 20 m^3). The total possible water capacity is estimated to 70 m^3. The Operator would have access to the onsite sources. The Operator will promote rainwater harvesting, where possible. There is no discharge to surface waters during the importation phase.

4.8 The estimated worst-case water consumption of on-site operations is calculated below:

Table 2. Onsite worst-case water consumption

Dust suppression Activity	Worst Case Water Consumption (per day)
Road sweeper	35L/min x 8 hours = 16.8 m^3
Drive-on wheel wash	94L/wash x 50 off site movements = 4.7 m^3
Mobile high-pressure misting system	13.2L/min x 8 hours x 1 system on site = 6.3 m^3
Mobile tractor and bowser suppression	2,200 L tank emptied x 8 trips (1 per hour) = 17.6 m^3
Maintenance (cleaning, washing down)	Estimated at 0.5 m^3
Total	**45.9 m^3**
1. Water consumptions taken from WRAP 'Case Study: Water Efficiency on construction site'. 2. Calculations based on a 10-hour day.	

4.9 Based on the worst-case scenario in Table 2, the water capacity at the site can comfortably deal with site operations. The surplus in capacity can be used during contingency measures.

4.10 To note, temporary buildings were investigated as part of the temporary works design for this scheme however not deemed financially viable based on this being a two-year construction project.

5. FUGITIVE EMISSIONS MONITORING

5.1 A daily site inspection will be undertaken by the Operator including potential sources that day, the control of dusts, conditions of haulage routes and the provision of controls. This information will be recorded in the Site Diary. To note, any site operative can report incidents to their line manager and appropriate actions will be taken immediately. The inspection will be undertaken by the Site Manager and/or a nominated site operative. In the event the Manager is not at the site, the On-Duty Manager and/or nominated site operative will be expected to undertake the site inspection. The Site Diary is kept in the site office / welfare unit. Corrective actions are outlined in Section 6 and will be recorded in the Site Diary and effectiveness monitored.

5.2 The visual monitoring locations are shown on drawing 183125/D/005. In line with the EA guidance, the daily inspections will have a trigger threshold of visual dust (in the form of a dust plume) leaving the boundary identified. This trigger threshold is an internal site action threshold only and not a compliance threshold. There is no severity to visual dust: if it is seen, a response procedure must be implemented.

5.3 In the event this threshold is breached, the Site Manager or nominated site operative will notify the Site Team and the response procedure will be initiated. The response procedure actions are set out below:

- When a visual dust plume is identified leaving the site boundary, the Site Manager and/or nominated site operative will assess the operations, waste type being handled and deliveries immediately prior to an alert being raised;
- If the source cannot be ascertained with certainty, the Site Team will temporarily cease the most likely operation;
- If the source is within the site's control, the Site Team will take appropriate action in terms of dust/particulate abatement to ensure further observations do not encounter the same emissions for a similar activity. Actions will include:
  - Review of the activity's dust control measures;
  - Increased frequency of the existing control measures; and
  - Temporarily suspending likely works until suitable abatement can be introduced.
- If an effective control measure cannot be identified and the action observation level is exceeded again within 30 minutes of the first alert raised; and the wind direction indicates it could be from the site; the source activity will be suspended until sufficient controls can be achieved. Visual

inspection frequency will be every half an hour during the response procedure, until incident is closed out.

- If there are more than three incidents within a month, quantitative dust monitoring will be undertaken to establish source and effective control measures.

5.4 The action observation exceedance will be logged in the Site Diary and a report of the exceedance and corrective action response to the local EA officer via email. Any exceedance which is not from the site but from an adjacent third-party activity, will be noted in the Site Diary. All complaints will be logged and dealt with appropriately in accordance with the Operator's complaint procedure (attached in Appendix B).

5.5 If numerous complaints (≥ 5 substantiated complaints from separate receptors) are received within one week or less, operations will be ceased temporarily until the issue is discussed and resolved by taking appropriate measures.

5.6 All monitoring data will be made available to the Local Authority and Environment Agency, upon request or as specified within the Environmental Permit.

6. CONTROLS IN THE EVENT OF ABNORMAL FUGITIVE EMISSIONS

6.1 In the event that abnormal fugitive particulate emissions are identified during site inspections the following controls should be applied:

- take immediate action to cease operations;
- investigate the incident; and
- record the incident and the remedial site action in the Site Diary.

6.2 Remedial actions are dependent on the source but may include, but not limited to:

- Increase the frequency of road sweeping along the haul route and public roads;
- Reconfiguration of the soil management area to minimise certain activities near to receptors;
- Deploy more misting systems, specifically targeting certain locations; and
- Limit placement activities to fewer hours each day and/or during wet periods (in addition to the standard controls being implemented).

6.3 In the event that these controls do not resolve fugitive particulate emissions at the site, key source activities will be suspended until suitable arrestment systems are implemented. These systems will be implemented in agreement with the Local Authority and the EA. The systems may include permanent use of remedial actions or alternative measures, as agreed.

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Drawings

Appendix A
Vanguardia Air Quality Assessment (July 2017)

Appendix B
Complaints Form & Procedure