

Dust Management Plan for Denham Feed Mill

Introduction

1. A dust management plan (DMP) must be provided when applying for a bespoke environmental permit when an installation is located within 500m of sensitive receptors - including any homes, school, hospital or nursing home, food preparation facility or similar.
2. Denham Feed Mill is situated in a rural area approximately 300m east of the village of Denham and 5.0 kilometres east of Eye in Suffolk and covers an area of 0.58 hectares. The installation can be seen outlined in green on the Site Location Plan in Figure 1.
3. Adjacent off-site land includes farm buildings and open fields for growing arable crops, part of a neighbouring arable farming business.
4. According to DEFRA air quality management areas interactive maps online at <https://uk-air.defra.gov.uk/aqma/maps/> the installation is not in an air quality management area.

Operation of the mill

5. The Mill has been operational since the 1970s producing meal for pigs. It was re-purposed and refurbished in 2019 to manufacture compound animal feedstuffs, mostly pellets for poultry. Intensive poultry production is common in the area with poultry farms and processing plants nearby.
6. Capacity has been increased to approximately 600 tonnes per day, so must be operated with an environmental permit.
7. Vehicular access is via a private roadway into the site - off Denham Road to the west. On a daily basis there will be approximately 20 HGVs arriving and leaving to deliver raw materials and a further 20 arriving and leaving with finished feedstuffs for delivery to farms, assuming an average payload of 30 tonnes. Total of 80 HGV movements daily.
8. Raw materials include grain seeds (e.g. wheat), pulses (e.g. flaked soya or proprietary blends of soya, beans, peas and rapeseed), minerals (e.g. salt, dicalcium phosphate and limestone) nutritional supplements (e.g. vitamins, trace elements and coccidiostats) and liquids (e.g. authorised amino acids, and lecithin and preservatives).
9. Grain seeds are delivered daily in bulk covered HGV trailers and tipped into pit intake No1 to be conveyed into storage silos via a grain cleaner to remove dust and chaff. Pulses are tipped into pit intake No.2 for storing in bulk bins. Other bulk powders (e.g. minerals) are delivered by road tankers and blown directly into storage silos inside the mill building.
10. Bulk liquid raw materials (e.g. lecithin and amino acids including methionine and lysine) are delivered by road tankers and pumped into storage vessels outside.
11. Some packaged raw materials (e.g. mineral and vitamin supplements, amino acids) and smaller quantities of liquid ingredients (e.g. enzymes) are delivered and stored in the mill store. Preservatives are delivered and stored in IBCs in the store.
12. Automatically weighing and batching grain for grinding and sieving into a uniform particle size to ensure homogeneity in the finished product and the physical attributes required. Grinder operates within a sealed enclosure vented to atmosphere through a package dust abatement unit trapping any dust for reworking in the grinder. Ground cereal is

conveyed into the mixer via an enclosed screw conveyor and bucket elevator.

13. Ground grain from the grinder, liquids from the storage vessels and packaged ingredients from the store are weighed automatically on load cells into a mixer, producing homogenous batches. Liquids include a preservative where lactic acid is the active ingredient to inhibit mould growth.
14. The mixed homogenous batches are conveyed from the mixer in an enclosed screw conveyor and bucket elevator into the press bin for intermediate storage for the pressing plant.
15. The homogeneous mixture is conveyed by an enclosed screw conveyor and bucket elevator into the pressing plant. Firstly, through a pre-heater where steam from a kerosene-fired boiler is added directly into the mixture so all the energy is used in raising the temperature to 85°C, then conveyed into the steam conditioner. Conditioning improves physical characteristics of the mix for extrusion and pasteurises the mix to destroy pathogenic bacteria (e.g. Salmonella).
16. A screw feed forces the hot mix into the extrusion press to be extruded through a rotating ring die to form a pellet product.
17. Hot pellets are dropped into a counter flow cooler to reduce their temperature and cause them to harden and become durable. Ambient air is blown over the pellets and released back into the atmosphere. Dust from cooling is trapped with a cyclone and returned into the conditioner for reworking.
18. Cooled pellets are sieved to remove any clumps, which are returned by an enclosed screw conveyor into the press bin for reworking.

19. Authorised enzyme digestibility enhancers are batch weighed, mixed with water, and sprayed on the cooled pellets after sieving.
20. Finished product conveyed in an enclosed bucket elevator and screw conveyors into bulk bins above the out-loading bay and loaded into dedicated HGV trailers for distribution and delivery. All of the feedstuffs are distributed in bulk from the Mill, mostly to the companies own farms for rearing poultry intensively.
21. The Mill will be operating 24 hours from Monday to Friday. However, opening hours for raw material delivery and out-loading feedstuffs will be limited to normal working days (excluding bank holidays) and Saturday morning.
22. The Site layout plan is provided in Figure 2.

Sensitive Receptors

23. Sensitive receptors that maybe exposed to airborne dust emissions from the Mill have been identified within 500m - including 46 dwelling houses and 6 agricultural and commercial premises. Their grouped locations are shown in Figure 3 and a comprehensive list of the sensitive receptors and locations are provided in Table 1.
24. Closest sensitive receptors are workers in agricultural offices, workshop, and farm buildings associated with the neighbouring arable farming business within 10m to the north, east and south of the installation boundary and being operated by M.J. & J. A. Easey. Commercial premises are considered to be moderately sensitive receptors compared to dwelling houses which are the most sensitive. In addition, operations in some of the farm buildings are similar to the Mill owing to carrying on grain handling and storage, especially during and after harvesting with fugitive dust emissions.

25. Messrs Easey are owners of Denham Feed Mill and reside in Town Farm farmhouse, nearest dwelling house within 10m of the boundary.
26. There are no European Sites, Sites of Special Scientific Interest (SSSI), Local Wildlife Sites (LWS) Ancient Woodlands (AW) or other nature conservation sites within 500m of the installation boundary. Nearest is Hoxne Meadow LWS 525m north-east of the installation boundary.

Effects on Health

27. According to a HSE Guidance Note⁴ – The complex and variable nature of grain dust means that it may cause a variety of health effects. There is evidence that as well as the dust from the grain, the other plant and animal contaminants within the grain dust may also have a potential for effects on health.
28. Eye and skin irritation are frequent reactions to grain dust exposure and include symptoms such as conjunctivitis (water or prickly eyes) and itchy skin and skin rashes.
29. Grain dust is a respiratory sensitiser. This means it can trigger an allergic reaction in the respiratory system. Once this reaction has taken place, further exposure, even to very, small amounts, may produce symptoms. Once people are sensitised (i.e. they have developed the allergic reaction), they can suffer symptoms either immediately they are exposed, or as is more common several hours later.

Local Wind Speeds and Directions

30. The generation of fugitive dust is particularly dependent on the weather conditions and the nature of the operations, unlike other atmospheric

pollutants. Wind speed and direction will significantly affect how sensitive receptors are affected.

31. According to the Met Office Eastern England climate report - as Atlantic depressions pass by the UK the wind typically starts to blow from the south or south-west, but later comes from the west or north-west as the depression moves away. Directions between south and north-west account for the majority of occasions and the strongest winds nearly always blow from this range.
32. The wind rose for the Mill, provided with the assessment using dispersion modelling¹, shows prevailing wind direction across 2016-2019 was from the south-west - blowing dust away from sensitive receptors in Figure 4.
33. According to the Beaufort wind force scale, winds exceeding 11 knots (classified as moderate breeze) are taken to be capable of raising dust. Winds from the east exceeding 11 knots are the least prevalent at Denham Fed Mill - blowing only 7% of the time, and mostly in winter when people are least likely to be outside or have windows open.
34. Consequences of fugitive dust emissions at ground level (e.g. from HGV movements, trailers, grain and soya delivery, waste storage are limited to intermittent and only slight cause of annoyance – dust on cars, clothes, and vegetation and are only likely 7% of the time.
35. Continuous, high-level, point source emissions from the extraction fans and stacks on the roof of the Mill – from the grinder dust abatement system and cyclone to remove dust from the air from the cooler are the most significant. Emissions from the grinder and cyclone have been measured and used as inputs to an atmospheric dispersion model to calculate exposure levels in the surrounding area.

36. The assessment by A S Modelling & Data Ltd in April 2020 summarised the results and concluded that at the maximum point, closest to point source emissions the impact would be described as negligible & at all of the discrete receptors outside of the site boundary, the impact would be described as negligible.
37. In summary, owing to the infrequency of wind speeds capable of raising dust from intermittent ground level sources and the infrequency of easterly winds to convey both them and the high level continuous dust emissions towards the sensitive receptors, the overall risk of exposure is considered to be insignificant and negligible, respectively.

Other Local Sources of Dust Emissions

38. Other local sources of dust have been identified within 500m of the sensitive receptors. Includes grain silos and flat floor grain stores (e.g. tipping from trailers, aerating grain heaps, loading into trailers, etc); intensive poultry houses (e.g. ventilation fans, pneumatic delivery of feedstuffs, removing poultry litter, etc); and harvesting cereals, oilseed rape and pulses grown in the surrounding fields (e.g. combine harvesters, transferring grain into trailers, etc). A list of the other sources is provided in Table 2.

Dust Management Plan

39. A DMP has been prepared in accordance with Environment Agency's guidance on what to include in a dust management plan at <https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit#emissions-management-plan-for-dust>.
40. Point source emissions from the grinder and cooler and fugitive emissions of dust have been assessed in accordance with the Environment Agency's principle of source, pathway receptor model at <https://www.gov.uk/guidance/risk-assessments-for-your-environmental->

[permit](#), in planning the site, operations and use of abatement to minimise emissions.

41. Searched DEFRA Process Guidance Note² and European Commission Best Available Techniques (BAT) Reference Document³ for relevant risk management techniques and risk mitigation techniques for animal feed compounding at Denham Feed Mill.
42. In completing the assessment, risk management and mitigation techniques have been assumed to be in place and are presented in the assessment below.

Training

43. Staff at all levels whose functions could impact on air emissions from the Mill will be provided appropriate training and instruction in their duties relating to the control of the process and emissions to air, including:
- awareness of their responsibilities under the permit
 - steps that are necessary to minimise risk of emissions during start-up and shut-down
 - actions to take when there are abnormal conditions, or accidents or spillages that could, if not controlled, result in emissions.

Maintenance

44. All aspects of the process including all plant, buildings and the equipment concerned with the control of emissions to air will be properly maintained by workers and professional contractors in accordance with a written maintenance plan and records.

Monitoring the Dust Management Plan

45. Mill Supervisors are responsible for monitoring dust releases and emissions daily, ensuring the management and mitigation techniques are being adhered to and managing any complaints.
46. Recording in the mill diary a dust nuisance at sensitive receptors which was expected or substantiated and any actions or mitigating techniques to minimise risk of causing annoyance as quickly as possible.
47. The Environment Agency shall be notified without delay of any incident or accident, which is causing or may cause significant pollution including any dust causing annoyance.

Following a Complaint

48. Complaints must be recorded and investigated immediately including checking the management and mitigation techniques to minimise dust are being adhered to. If the dust is no longer apparent the investigation must still be completed and recorded on a Dust Complaint Report form (below) on the same day.
49. Tell the complainant and anyone else likely to have been affected what you have done.
50. Details of the complaint and the actions taken must be recorded on the Dust Complaint Report form and kept in the control room. A copy must be sent to the Director of Milling at Crown Chicken Ltd immediately.

Review the Dust Management Plan

51. Review the effectiveness of the DMP actions to minimise dust risks annually. Maybe sooner if there have been complaints or relevant changes to any operations or infrastructure.

References

1. A S Modelling & Data Ltd: An Assessment using Dispersion Modelling of Airborne Emissions from the Boiler, Grinder and Cyclone Scrubber at Denham Feed Mill, Town Farm, Denham Road, near Denham in Suffolk; 27th April 2020.
2. DEFRA (2013); Process Guidance Note 6/26(13); Statutory guidance for animal feed compounding.
3. European Commission (2019); Best Available Techniques (BAT) reference Document for the Food, Drink and Milk Industries.
4. Health and Safety Executive (2013); Grain Dust; Guidance Note EH66 (Third Edition).

Fig.1 - Denham Feed Mill site location plan



Fig.2 - Denham Feed Mill site layout plan

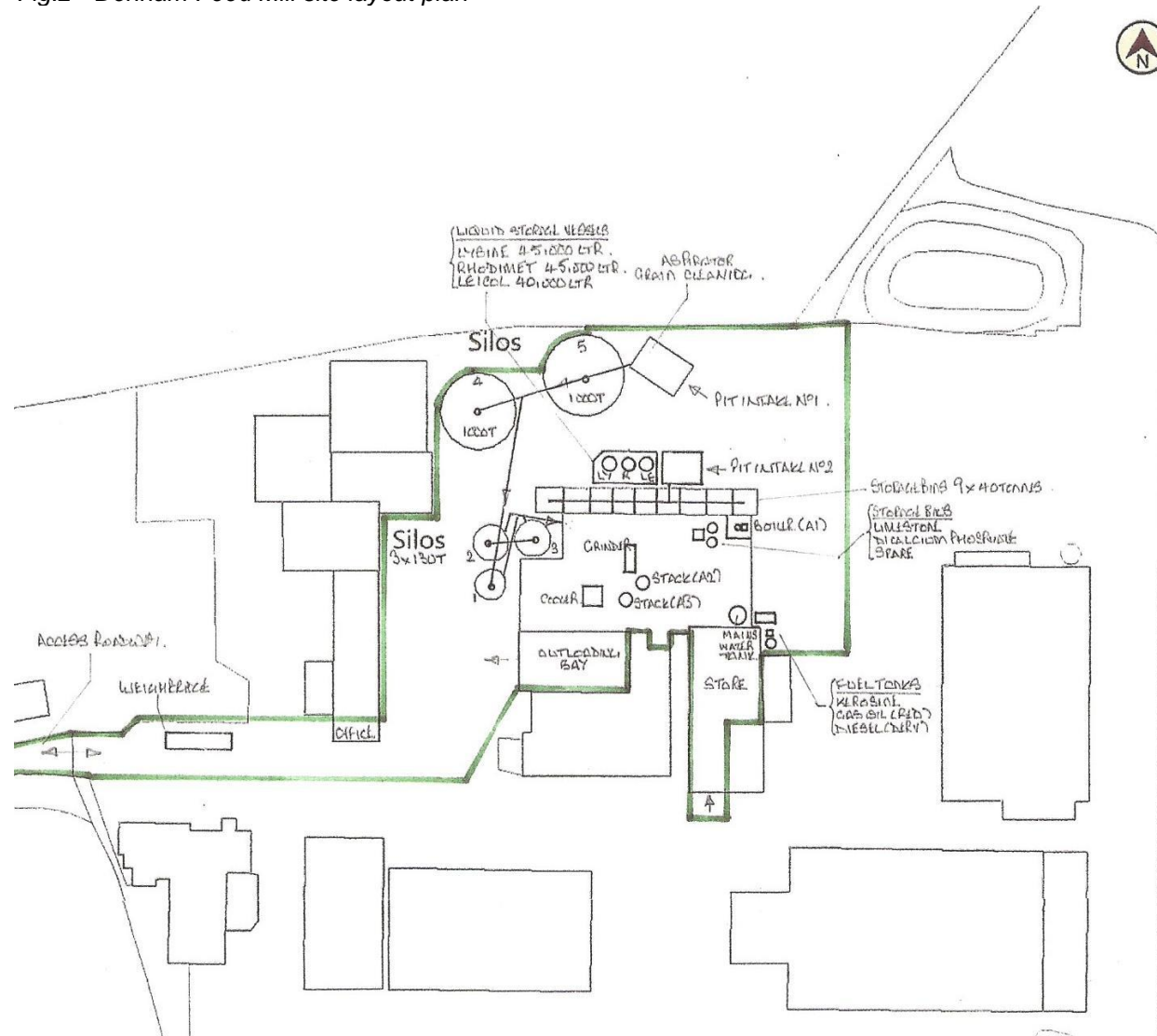
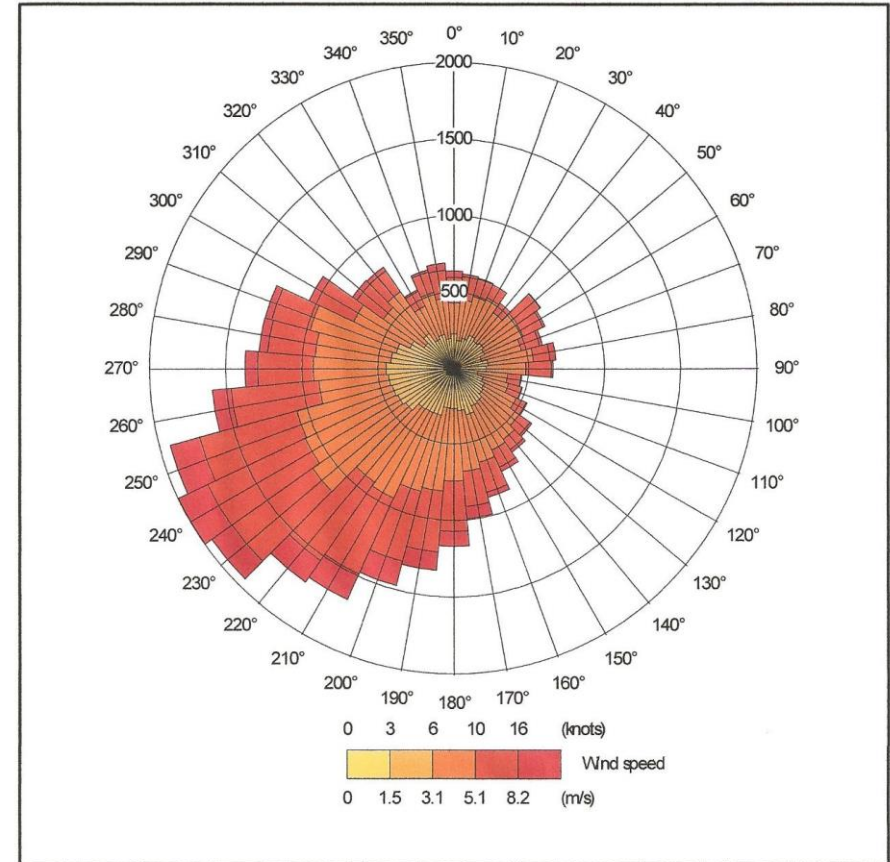


Fig.3 - Sensitive Receptors Within 500m Denham Feed Mill



Fig.4 - Wind Rose for Denham Feed Mill

Figure 2a. The wind rose. Raw GFS derived data, for 52.326 N, 1.225 E, 2016 - 2019



What do you do that can harm and what could be harmed				Managing the risk		Assessing the risk		
Hazard	Source	Receptor	Pathway	Risk management techniques	Risk mitigation techniques	Probability of exposure	Consequences	Overall risk
What has the potential to cause harm		What is at risk? What do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? If it occurs – who is responsible for what?	What measures will you take to reduce the risks if they are too high?	How likely is this contact	What is the harm that can be caused?	What is the risk that remains? The balance of probability and consequence
Dust from HGVs	Arriving, leaving & manoeuvring on site	Sensitive receptors in Church Rd, Hoxne Rd, Denham Rd Watering Rd	Wind whipping	Concrete hard standing installed across the site and tarmac roadway, as opposed to unmade ground, reducing amount of dust generated at ground level. Site speed limit 10mph with signage on entrance roadway & planned HGV routes around the site - reducing re-suspension of particulates by vehicle wheels. Regularly inspecting integrity of the concrete hardstanding areas for cracking / pitting. HGVs will not run on unmade ground, but there will be agricultural vehicles passing through the Site, between the adjacent fields and off-site farm buildings, occasionally tracking dirt on the concrete hardstanding.	Weighbridge operator advising new drivers of speed limit & the route around the site. Deteriorating concrete which appears to be increasing dust & noise will be repaired. A road sweeper is available to remove any tracked dirt on the hardstanding.	Somewhat unlikely	Slight cause of annoyance - dust on cars, clothes & vegetation	Not significant
Dust from bulk trailers	Raw material delivery	Sensitive receptors in Church Rd, Hoxne Rd, Denham Rd Watering Rd	Wind whipping	Drivers responsible for trailers being covered/ sheeted to prevent dust escaping when vehicles are travelling into and out of the site	Reminding drivers	Somewhat unlikely	Slight cause of annoyance - dust on cars, clothes & vegetation	Not significant

What do you do that can harm and what could be harmed				Managing the risk		Assessing the risk		
Hazard	Source	Receptor	Pathway	Risk management techniques	Risk mitigation techniques	Probability of exposure	Consequences	Overall risk
What has the potential to cause harm		What is at risk? What do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? If it occurs – who is responsible for what?	What measures will you take to reduce the risks if they are too high?	How likely is this contact	What is the harm that can be caused?	What is the risk that remains? The balance of probability and consequence
Delivery of grain and pulses	Pit intakes	Sensitive receptors in Church Rd, Hoxne Rd, Denham Rd Watering Rd	Wind whipping	<p>Pit intakes located on northern side of site, farthest away from sensitive receptors. Also benefit from high silos & buildings which provide a screen to sensitive receptors.</p> <p>Pit intake No1 is a conventional pit intake with an enclosure. Pit intake No2 was newly installed during refurbishment of the mill in 2019. In addition to enclosure - dust from tipping flaked soya and other pulses will be arrested with a pneumatic negative-pressure system with cartridges, & trapped dust drops into the pit. Workers visually inspecting the pit intakes and abatement plant daily.</p> <p>Grain hatches in HGV trailer tail boards used to control flow & minimise dust plumes during tipping. Most hatches also fitted with grain socks to further lessen the fall height & dust plume.</p> <p>Workers sweeping up daily around edges of the pits to remove grain & soya residues to avoid dust, soilage or attracting pests. Cleaning off the settled dust on the inside of the pit intake enclosure as required.</p>	<p>If emissions or defects are detected, then corrective action should be taken promptly and before another delivery takes place.</p> <p>Advise haulage contractors to fit grain socks wherever possible.</p>	Somewhat unlikely	Slight cause of annoyance - dust on cars, clothes, vegetation	Not significant

What do you do that can harm and what could be harmed				Managing the risk		Assessing the risk		
Hazard	Source	Receptor	Pathway	Risk management techniques	Risk mitigation techniques	Probability of exposure	Consequences	Overall risk
What has the potential to cause harm		What is at risk? What do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? If it occurs – who is responsible for what?	What measures will you take to reduce the risks if they are too high?	How likely is this contact	What is the harm that can be caused?	What is the risk that remains? The balance of probability and consequence
Grain cleaning	Aspirator for cleaning grain delivered into Pit intake No1	Sensitive receptors in Church Rd, Hoxne Rd, Denham Rd Watering Rd	Emission to air	<p>Installed package aspirator & bag filters using professional contractors to blow dust, chaff, insects, etc off the grain during delivery. Dust arrested in tubular fabric bag filters. Bag filters are Best Available Technique to reduce dust emission from compound feed manufacturing. Totally enclosed the open bags (unenclosed socks) in a building & keeping door closed.</p> <p>Workers visually inspecting the bag filter daily, ensuring it is kept clean by shaking to release any adhering material. The dust cleaned off the filter falls into the outlet base into plastic bags.</p> <p>Workers changeover the plastic bags when filled & securely tied for waste disposal.</p> <p>Workers sweeping up daily inside the building at the bottom of the bag filters & sweeping up any spillage immediately.</p>	If emissions or defects are detected, then corrective action should be taken promptly and before another delivery takes place	Somewhat unlikely	Slight cause of annoyance - dust on cars, clothes, vegetation	Not significant

What do you do that can harm and what could be harmed				Managing the risk		Assessing the risk		
Hazard	Source	Receptor	Pathway	Risk management techniques	Risk mitigation techniques	Probability of exposure	Consequences	Overall risk
What has the potential to cause harm		What is at risk? What do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? If it occurs – who is responsible for what?	What measures will you take to reduce the risks if they are too high?	How likely is this contact	What is the harm that can be caused?	What is the risk that remains? The balance of probability and consequence
Silos & bins	High level vents	Sensitive receptors in Church Rd, Hoxne Rd, Denham Rd Watering Rd	Emission to air	<p>Installed package silos, storage bins, bucket elevators and screw conveyors using professional contractors.</p> <p>Installed package instrumentation using professional contractors in silos & automated monitoring in the control room including volume indicators & high-level alarms when filled & interlocked to automatically shut-down bucket elevators and screw conveyors. The correct operation of alarms will be checked in accordance with manufacturer's instructions.</p>	<p>If emissions or defects are detected, then corrective action should be taken promptly and before another delivery takes place.</p> <p>Any failure of the silo management system (e.g. high-level alarms) will lead to full investigation of the plant and equipment.</p>	Somewhat unlikely	Slight cause of annoyance - dust on cars, clothes, vegetation	Not significant

What do you do that can harm and what could be harmed				Managing the risk		Assessing the risk		
Hazard	Source	Receptor	Pathway	Risk management techniques	Risk mitigation techniques	Probability of exposure	Consequences	Overall risk
What has the potential to cause harm		What is at risk? What do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? If it occurs – who is responsible for what?	What measures will you take to reduce the risks if they are too high?	How likely is this contact	What is the harm that can be caused?	What is the risk that remains? The balance of probability and consequence
Road tanker deliveries	Powdered limestone & dicalcium phosphate	Sensitive receptors in Church Rd, Hoxne Rd, Denham Rd Watering Rd	Emission to air	<p>Only use road tankers with on board relief valves & filtration systems – venting air from the tanker at the end of delivery & not through the silos.</p> <p>Transfer lines will be securely connected to the silo delivery inlet points & the tanker discharge point, in that order. Tanker drivers will be informed of the correct procedures to be followed.</p> <p>Installed package instrumentation using professional contractors in silos & automated monitoring in the control room including volume indicators & high-level alarms when filled. The correct operation of alarms will be checked in accordance with manufacturer's instructions.</p>	<p>If emissions are visible from pipework, or dust arrestment plant during filling, the delivery shall be stopped; the cause should be rectified before any further delivery takes place. Any spillage cleared up immediately using brushes & shovels.</p>	Somewhat unlikely	Slight cause of annoyance - dust on cars, clothes, vegetation	Not significant
Additives	High level mill ventilation fans or low- level entrainment to the outside	Sensitive receptors in Church Rd, Hoxne Rd, Denham Rd Watering Rd	Emission to air	<p>Potentially dusty raw materials will be unloaded by fork lift truck & stored in original packaging inside the mill store until required. Will be transferred directly from the store up to the tipping floor as required for processing.</p> <p>Bags tipped by hand into a package, pneumatic transfer system into the mixing process.</p>	<p>Any spillage cleared up immediately using brushes & shovels</p>	Somewhat unlikely	Slight cause of annoyance - dust on cars, clothes, vegetation	Not significant

What do you do that can harm and what could be harmed				Managing the risk		Assessing the risk		
Hazard	Source	Receptor	Pathway	Risk management techniques	Risk mitigation techniques	Probability of exposure	Consequences	Overall risk
What has the potential to cause harm		What is at risk? What do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? If it occurs – who is responsible for what?	What measures will you take to reduce the risks if they are too high?	How likely is this contact	What is the harm that can be caused?	What is the risk that remains? The balance of probability and consequence
				Sealed joints & leakage points around powder handling equipment to prevent escape and accumulation of dust inside the building and onto surrounding plant.				
Transfer equipment	Elevators & screw conveyors	Sensitive receptors in Church Rd, Hoxne Rd, Denham Rd Watering Rd	Emission to air	<p>Professional contractors have designed and installed package reverse-jet polyethylene fabric filters for decentralised filtration of dust on elevators and screw conveyors inside the mill. Separated dust is returned directly to the material flow. According to manufacturer's specifications emission will not be more than 20mg/m³. Workers visually inspecting the reverse jet filters monthly</p> <p>Professional contractors designed & Installed package explosion relief vents at the head of the elevators and as close as practicable to the boots. Fitted with index switches to close down the plant in event of being triggered.</p>	If defects are detected, then corrective action should be taken immediately. Any failure of the fabric filters or explosion relief vents will require full investigation of the plant and equipment before restarting.	Somewhat unlikely	Slight cause of annoyance - dust on cars, clothes, vegetation	Not significant

What do you do that can harm and what could be harmed				Managing the risk		Assessing the risk		
Hazard	Source	Receptor	Pathway	Risk management techniques	Risk mitigation techniques	Probability of exposure	Consequences	Overall risk
What has the potential to cause harm		What is at risk? What do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? If it occurs – who is responsible for what?	What measures will you take to reduce the risks if they are too high?	How likely is this contact	What is the harm that can be caused?	What is the risk that remains? The balance of probability and consequence
Grinding	Stack from the grinder dust abatement unit Exhaust stack A2 above the roof and shown on the site layout plan	Sensitive receptors including mill workers & workers in adjacent farm offices, workshop & local residents in Church Rd, Hoxne Rd, Denham Rd & Watering Rd	Continuous emission to air	<p>Installed in-line dust recovery using a package, Andritz filter. Fully automatic, continuously operating, bag filter cleaned with compressed air. Installed above the grinder to arrest fine particles out of airstream and recycled into the process. Bag filters are Best Available Technique to reduce dust emissions from compound feed manufacturing.</p> <p>Dust emissions measured < 2-5 mg/Nm3 during commissioning new plant. Emissions less than the Best Available Technique – Associated Environmental Limit (BAT+AEL) for new plants.</p> <p>Instrumentation in the grinder and automated monitoring in the control room provide audible/visual alarm which activates on filter malfunction; interlocked to shutdown process.</p> <p>Permit will include conditions for compliance monitoring and reporting annually, using MCERTS certified technicians & equipment.</p>	Any failure of the grinder / filter management system will lead to full investigation of the plant and equipment	Somewhat unlikely	<p>Human health effects (respiratory and cardiovascular illness & mortality) associated with PM₁₀ & PM_{2.5}.</p> <p>Detailed computer modelling concluded that at the maximum point, closest to point source emissions the impact would be described as negligible & at all of the discrete receptors outside of the site boundary, the impact would be described as negligible.</p>	Negligible

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What has the potential to cause harm		What is at risk? What do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? If it occurs – who is responsible for what?	What measures will you take to reduce the risks if they are too high?	How likely is this contact	What is the harm that can be caused?	What is the risk that remains? The balance of probability and consequence
Cooling	Stack from the cooler Exhaust stack A3 above the roof and shown on the site layout plan	Sensitive receptors including mill workers & workers in adjacent farm offices, workshop & local residents in Church Rd, Hoxne Rd, Denham Rd & Watering Rd	Continuous emission to air	<p>Installed in-line solid recovery using a package cyclone above the cooler to remove fine particles >10 micron out of transporting airstream. Cyclones are a Best Available Technique to reduce dust emissions from compound feed manufacturing.</p> <p>Dust emissions measured < 2-20 mg/Nm³ during commissioning new plant. Emissions less than the Best Available Technique – Associated Environmental Limit (BAT+AEL) for new plants.</p> <p>Instrumentation in the cooler and automated monitoring in the control room provide audible/visual alarm which activates on cooler malfunction; interlocked to shutdown process.</p> <p>Permit will include conditions for compliance monitoring and reporting annually, using MCERTS certified technicians & equipment.</p>	Any failure of the cooler / cyclone management system will lead to full investigation of the plant and equipment	Somewhat unlikely	Human health effects (respiratory and cardiovascular illness & mortality) associated with PM ₁₀ & PM _{2.5} . Detailed computer modelling concluded that at the maximum point, closest to point source emissions the impact would be described as negligible & at all of the discrete receptors outside of the site boundary, the impact would be described as negligible.	Negligible

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What has the potential to cause harm		What is at risk? What do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? If it occurs – who is responsible for what?	What measures will you take to reduce the risks if they are too high?	How likely is this contact	What is the harm that can be caused?	What is the risk that remains? The balance of probability and consequence
Out-loading bay	Loading trailers	Sensitive receptors including workers in adjacent farm offices, workshop & local residents in Church Rd, Hoxne Rd, Denham Rd & Watering Rd	Wind whipped	Drivers responsible for trailers being covered/ sheeted to prevent dust escaping when vehicles are travelling into and out of the site, covers only rolled open for loading. Installed socks to the bottom of the out-lading hoppers to control flow & lessen the fall height & any dust but loading trailers only takes a few minutes each time. The trailers will be sheeted before drawing forwards outside. Keeping the roller door closed at other times.	Any spillage cleared up immediately using brushes & shovels to prevent entrainment outside	Somewhat unlikely	Slight cause of annoyance - dust on cars, clothes, vegetation	Not significant
Waste storage	Waste skips	Sensitive receptors in Church Rd, Hoxne Rd, Denham Rd Watering Rd	Wind whipped	Provided closed skips or other covered secure containers for storing empty packaging, sweepings, and waste feedstuffs, etc to prevent dust escaping & avoid attracting pests	Workers visually checking daily skips or other containers are covered	Somewhat unlikely	Slight cause of annoyance - dust on cars, clothes, vegetation	Not significant

Table 1 Sensitive receptors within 500 metres of Denham Feed Mill

Location	Name	Postcode	Receptor	Direction	Distance from boundary	Grid reference
Denham Road, Denham	Detached cottage	IP21 5DB	Dwelling	NE	320m	TM 19914 75035
Watering Road, Reading Green	Oak Cottage	IP21 5DJ	Dwelling	SE	420m	TM 20100 74482
Watering Road, Reading Green	Broome Farm	IP21 5DH	Dwelling	SE	430m	TM 20024 74364
Watering Road, Reading Green	Reading Green Farmhouse	IP21 5DJ	Dwelling	SE	500m	TM 20107 74351
Watering Road, Reading Green	Semi-detached house	IP21 5DJ	Dwelling	SE	435m	TM 20018 74349
Watering Road, Reading Green	Meadow Barn	IP21 5DH	Dwelling	SE	455m	TM 20017 74330
Watering Road, Reading Green	Threeways Cottage	IP21 5DH	Dwelling	SE	490m	TM 20002 74277
Watering Road, Reading Green	Green Fields	IP21 5DH	Dwelling	SE	485m	TM 19972 74264
Watering Road, Reading Green	Standard Cottage	IP21 5DH	Dwelling	SE	450m	TM 19979 74308
Watering Road, Reading Green	Apple Tree Cottage	IP21 5DH	Dwelling	SE	450m	TM 19957 74289
Watering Road, Reading Green	Brook Cottage	IP21 5DH	Dwelling	SE	420m	TM 19931 74313
Hoxne Road, Denham	Standwell Farmhouse	IP21 5DF	Dwelling	SW	495m	TM 19433 74163
Hoxne Road, Denham	Standwell Farm	IP21 5DF	Agricultural	SW	400m	TM 19438 74251
Hoxne Road, Denham	High House	IP21 5DF	Dwelling	SW	370m	TM 19436 74289
Hoxne Road, Denham	The Gables	IP21 5DF	Dwelling	SW	345m	TM 19436 74316
Hoxne Road, Denham	Haven House	IP21 5DF	Dwelling	SW	320m	TM 19452 74340
Hoxne Road, Denham	Hareview	IP21 5DF	Dwelling	SW	300m	TM 19443 74363
Hoxne Road, Denham	Honeysuckle Cottage	IP21 5DF	Dwelling	SW	270m	TM 19420 74385
Hoxne Road, Denham	Southview	IP21 5DF	Dwelling	SW	255m	TM 19489 74415
Hoxne Road, Denham	Crofters Cottage	IP21 5DF	Dwelling	SW	255m	TM 19420 74402
Hoxne Road, Denham	Manor Farmhouse	IP21 5DF	Dwelling	SW	230m	TM 19385 74424
Hoxne Road, Denham	Mill Farm bungalow	IP21 5DF	Dwelling	SW	185m	TM 19397 74466
Hoxne Road, Denham	Mill Farm	IP21 5DF	Agricultural	SW	175m	TM 19317 74474
Hoxne Road, Denham	Asted	IP21 5DF	Dwelling	SW	150m	TM 19373 74503
Hoxne Road, Denham	Detached house	IP21 5DF	Dwelling	SW	125m	TM 19360 74525
Hoxne Road, Denham	Flaundon	IP21 5DF	Dwelling	SW	105m	TM 19355 74545
Hoxne Road, Denham	Dovecote	IP21 5DF	Dwelling	SW	85m	TM 19348 74564
Hoxne Road, Denham	Vicarage Farmhouse	IP21 5DF	Dwelling	W	70m	TM 19325 74583
Hoxne Road, Denham	Vicarage Farm	IP21 5DB	Agricultural	W	70m	TM 19307 74597
Hoxne Road, Denham	Denham House	IP21 5DB	Dwelling	W	80m	TM 19278 74611
Hoxne Road, Denham	Chanada	IP21 5DB	Dwelling	W	30m	TM 19324 74642
Hoxne Road, Denham	Larima House	IP21 5DB	Dwelling	W	30m	TM 19321 74660
Hoxne Road, Denham	Mulberry House	IP21 5DB	Dwelling	W	40m	TM 19333 74690

Location	Name	Postcode	Receptor	Direction	Distance from boundary	Grid reference
Church Road, Denham	The Brambles	IP21 5DE	Dwelling	W	55m	TM 19315 74695
Church Road, Denham	Ash Cottage	IP21 5DE	Dwelling	W	60m	TM 19303 74699
Church Road, Denham	Oak Tree House	IP21 5DE	Dwelling	W	105m	TM 19309 74755
Church Road, Denham	1 Church Road	IP21 5DE	Dwelling	W	100m	TM 19275 74724
Church Road, Denham	2 Church Road	IP21 5DE	Dwelling	W	95m	TM 19277 74712
Church Road, Denham	3 Church Road	IP21 5DE	Dwelling	W	90m	TM 19278 74707
Church Road, Denham	East Anglian Fruit Farm	IP21 5DE	Agricultural	W	160m	TM 19197 74707
Church Road, Denham	Orchard View	IP21 5DE	Dwelling	W	240m	TM 19114 74711
Church Road, Denham	College Farm	IP21 5DE	Agricultural	W	300m	TM 19071 74761
Church Road, Denham	College Farmhouse	IP21 5DE	Dwelling	W	305m	TM 19120 74857
Denham Road, Denham	Town Farm Farmhouse	IP21 5DB	Dwelling	N	10m	TM 19605 74705
Denham Road, Denham	M J & J A Easey	IP21 5DB	Agricultural	S	10m	TM 19640 74680
Denham Road, Denham	Clubbs House (a)	IP21 5DB	Dwelling	W	85m	TM 19338 74740
Denham Road, Denham	Clubbs House (b)	IP21 5DB	Dwelling	W	105m	TM 19310 74755
Denham Road, Denham	South House (a)	IP21 5DB	Dwelling	W	125m	TM 19323 74775
Denham Road, Denham	South House (b)	IP21 5DB	Dwelling	W	140m	TM 19337 74794
Denham Road, Denham	Rose Cottage	IP21 5DB	Dwelling	NW	280m	TM 19363 74941
Denham Road, Denham	Chestnut Tree Farm	IP21 5DB	Dwelling	NW	440m	TM 19439 75123
Denham Road, Denham	Oak Grange	IP21 5DB	Dwelling	NW	460m	TM 19399 75126

Distances measured on MAGIC Maps

Table 2 Other contributors to dust emissions locally

Location	Name	Postcode	Source	Direction	Distance from boundary	Grid reference
Denham Road, Denham	M J & J A Easey	IP21 5DB	Grain store	N	10m	TM 19715 74773
Denham Road, Denham	M J & J A Easey	IP21 5DB	Grain store	E	15m	TM 19768 74702
Denham Road, Denham	M J & J A Easey	IP21 5DB	Grain store	S	0m	TM 19699 74696
Denham Road, Denham	M J & J A Easey	IP21 5DB	Grain store	S	15m	TM 19691 74663
Hoxne Road, Denham	Standwell Farm	IP21 5DF	Grain store	SW	400m	TM 19438 74251
Hoxne Road, Denham	Mill Farm	IP21 5DF	Poultry houses	SW	175m	TM 19317 74474

Distances measured on MAGIC Maps

Dust Complaint Report

Date	
Reference number	
Name and address of complainant	
Telephone number of complainants	

Time and date of complaint	
Date, time, and duration of offending dust	
Weather conditions <i>(e.g. dry, rain. Fog, snow)</i>	
Wind strength and direction <i>(e.g. light, steady, strong, gusting)</i>	
Callers description of dust	
Has the caller any other comments about the offending dust?	
Any other previous known complaints relating to the installation (all aspects, not just dust)	
Any other relevant information	
Potential dust sources that could give rise to the complaint	
Operating conditions at the time offending dust occurred	
Actions taken	

Final outcome		
Complainant visited		
Complainant contacted with explanation Yes/No Date By whom		
Form completed by	Date:	Signed:

Complaints and the results of the investigation must be recorded on the Dust Complaint Report form and kept in the Complaints Log in the site office. A copy must be sent to the Director of Milling at Crown Chicken Ltd immediately.