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Odour and ammonia screening assessment for Castle farm using the SCAIL model



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Introduction

Castle Farm is a 79.59 ha dairy farm located on the outskirts of the village of Bishton, in Newport, Gwent. The farm business has submitted notification to the Local Planning Authority of Newport City Council for a new covered Farm Yard Manure (FYM) store at Castle farm. A Notice of Decision ref 22/1122 was issued on 9th of February 2023. Condition 2 of the Notice of Decision states that:-

Pre- commencement conditions

No development shall be carried out on site until a detailed odour management plan; waste management plan and a full odour impact assessment have been submitted to and approved in writing by the Local Planning Authority. The approved scheme shall be maintained throughout the lifetime of the development. Reason: To ensure that the amenities of occupiers of other premises in the vicinity are protected in accordance with Policy GP2 and GP7 of the NLDP

In response to this condition an enquiry was submitted to Vicky Quinn, Newport City Council Senior Planning Officer asking if the odour assessment could be completed using the Simple Calculation of Atmospheric Impact Limits (SCAIL) model.

James Holland of Principal Environmental Health Officer of Newport City Council confirmed that the SCAIL model could be used to assess odour emissions from the proposed FYM store.

The farm business runs a dairy herd of 30 dairy cows producing over 9000 litres of milk per year. The dairy herd and the youngstock are loose housed and bedded on straw. The dairy and parlour washings are stored separately in a below ground tank. The dairy and parlour washings are applied to land in accordance with the Water Resources Control of Agricultural Pollution regulations (CoAP).

The FYM from the loose housing is currently stored as temporary field heaps. Storing FYM as temporary field heaps is permissible under CoAP. However, there are restrictions on how the FYM can be stored in the field and these restrictions primarily focus on reducing the risk of pollution to water and groundwater through the leaching of nutrients held in the soiled bedding and forming hotspots of leachate within the soil.

There are several disadvantages of storing FYM as temporary field heaps. The valuable nutrients held in soiled bedding material are leached out as rain that falls onto the open FYM heap. Also access to the temporary field heaps can be difficult during wet winter weather conditions. This is particularly pertinent to Castle farm due to the heavy clay soil conditions of the fields. To avoid damage to the soil and soil structure, and to maximise the nutrient efficiency of the FYM, the farm business will store the FYM in a covered FYM store that is sited adjacent to the existing farm building complex. The FYM store is 28.9 m long by 13.7 m wide and 4.87 m to the plate level and is located in the field adjacent to the farm buildings.

The business owns or has access to approximately 79 hectares of land, split between Castle Farm, Pool Head and 5.5 h of rented ground. The land is predominantly under grass with around 24 ha under arable cultivation of maize and winter wheat.

Mr Webber has had independent advice from Farming Connect for a Manure Management plan and an assessment of the existing farm infrastructure, and a programme of improvements offered to bring the farm into compliance with the Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021 within the schedule of the transition period.

Purpose of this report

The purpose of this report is to undertake a screening exercise for the impact of the farm infrastructure improvements of a new covered FYM store upon odour and ammonia emissions for receptor sites within 5 km of Castle Farm.

The proposed development for a new Farm Yard Manure store at NGR ST 39045 88071 marked on Fig 2.



Figure 1 Proposed site of FYM store at Castle Farm

Farm management system

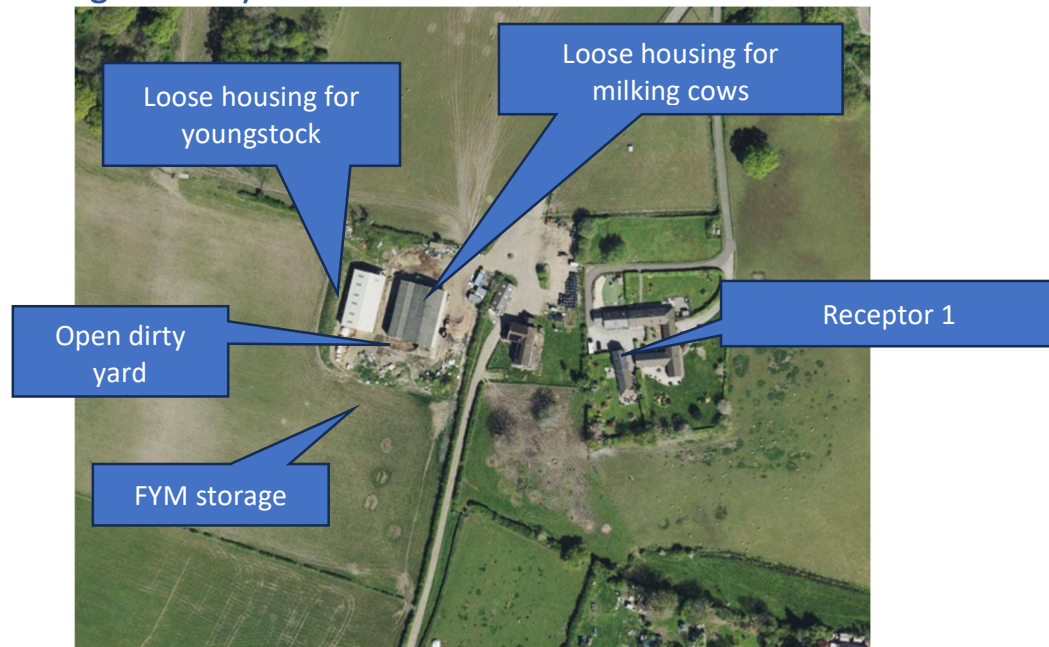


Figure 2 Livestock housing at Castle Farm

Livestock Management

There are around 30 milking cows at Castle farm which are loose housed and bedded on straw for 180 days of the year. The cows have access to an open dirty yard at the front gable end of the loose housing facility. The surface area of the open dirty yard is approximately 110 m² (see fig 3).



Figure 3 Open dirty yard at gable end of livestock housing and proposed site for FYM store



The cows are turned out to grass after the 180 housing period on 121406 m² of grassland.

Around 40 youngstock (aged 6-12 months) are loose housed and bedded on straw all the year round with around 12 yearlings outwintered on 80937 m² of grassland.

Farm yard manure storage

The FYM from the loose housing is currently stored as temporary field heaps. In the future the FYM will be stored in a covered store (see fig 3).

The 30 cows produce approximately 397 m³ of FYM during the housing period.

The youngstock produce approximately 331 m³ of FYM during the housing period.

The estimated volume of FYM is 729 m³ (437 tonnes).

Application of FYM to land

The FYM is surface spread to land in 3 applications in the year.

In June around 229 tonnes of FYM is spread on to 20 ha of grassland.

In the autumn FYM is applied to Maize and winter wheat at an average rate of 104 tonnes per 116400 m². The FYM is incorporated into the soil by plough within 24 hours.

Proposal

The aims for the infrastructure improvements at Castle Farm are:

- To provide covered FYM storage facility that complies with The Control of Agricultural Pollution Regulations.
- Improve resource efficiency by storing organic manures until it can be applied to land during maximum plant uptake and optimum crop/grass growing conditions.

Method

The Simple Calculation of Atmospheric Impact Limits (SCAIL) from Agriculture Sources screening tool has been used to assess atmospheric emissions including odour and ammonia emissions from the existing farm system and the proposed development at Castle farm.

Two SCAIL assessments have been completed for the current & proposed farm infrastructure improvements.

- Information about the **existing** farm practice, based on 30 milking cows and 42 youngstock loose housed and bedded on straw, FYM stored as temporary field heaps, rate and method of applying organic manures to land and livestock grazing platform, was uploaded into the SCAIL model.
- Information about the **proposed** farm practice, based on 30 milking cows and 42 youngstock loose housed and bedded on straw, covered FYM storage



facility, rate and method of applying organic manures to land and livestock grazing platform, was uploaded into the SCAIL model.

The SCAIL model is designed to assess the odour and ammonia emissions for existing sources and new or additional sources of ammonia as referenced in the SCAIL model as “new” sources. However, the SCAIL model does not assess the emissions where existing sources of ammonia are **replaced** or where land spreading activities are changed as a result of the farm improvements. For this reason, the SCAIL model was run twice which allows a comparison between the existing farming system and the new proposed improvements on the farm.

The SCAIL model has been run on Conservative Met Run mode which places which is often used where SCAIL Agriculture results are reported to the relevant regulatory authority. In essence under the Conservative Met Run mode the receptor are rotated into the prevailing winds where the sources are located close together.

In accordance with NRW Ammonia sensitivity mapping the farm building are located outside a SSSI sensitive area. See fig 4.

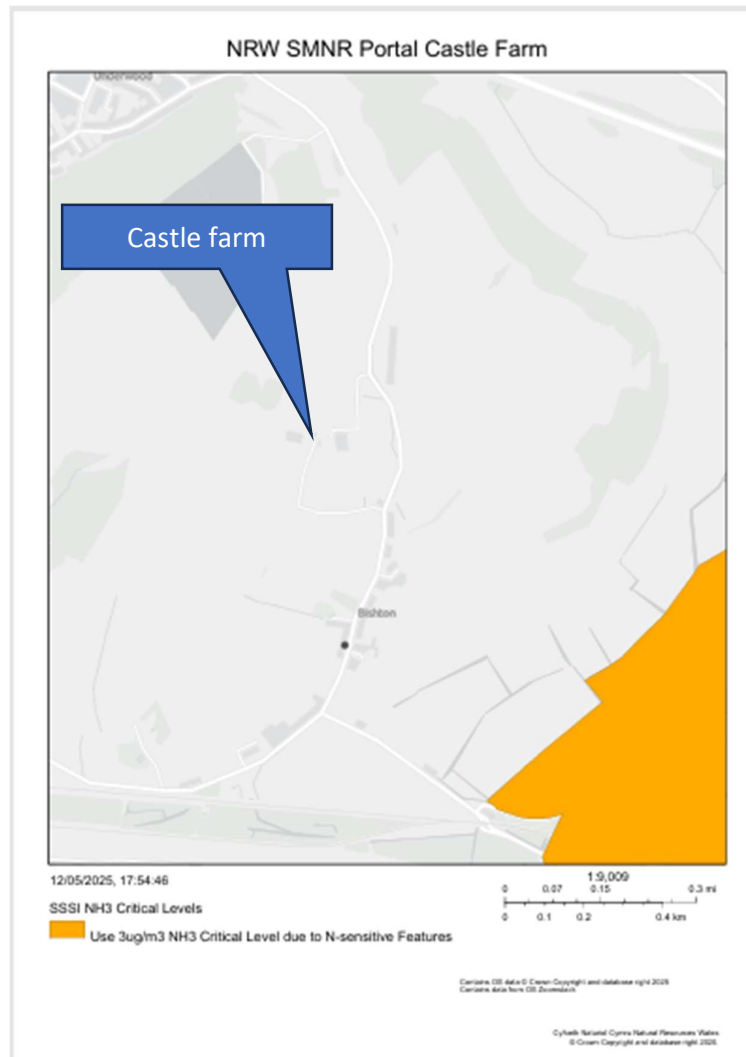


Figure 4 NRW Ammonia sensitivity map

The ammonia screening methodology as advised by NRW has been used as a guide. In this instance the screening distance is set by the number of cows (5 km radius for less than 400 cows and 10 km for over 400 cows). The 5 km search was selected as the number of dairy cows is less than 400 animals.

There are 10 protected sensitive habitat sites with 5 km of Castle Farm (see fig 5). The sites are termed receptors. These 10 receptors range in proximity 0.961 km to 4.3 km from the farm building complex and provide a predicted impact of atmospheric emissions on the wider environment.

Designated Site details:

Search Radius [?](#)

5

km

RUN RECEPTOR SEARCH [?](#)

No. of Designated Sites [?](#)10 found

VERIFY RECEPTOR LOCATIONS [?](#)

Site No.	Name	Distance(km)	Designation	Country	Easting	Northing
1	Gwent Levels - Redwick and Llandeenny	0.961	SSSI	WALES	339786	187500
2	Langstone-Llanmartin Meadows	1.354	SSSI	WALES	338720	189416
3	Gwent Levels - Whitson	2.023	SSSI	WALES	338981	186077
4	Penhow Woodlands	2.985	SSSI	WALES	341576	189666
5	Gwent Levels - Nash and Goldcliff	3.146	SSSI	WALES	336866	185820
6	Magor Marsh	3.508	SSSI	WALES	342316	186855
7	Gwent Levels - Magor and Undy	3.664	SSSI	WALES	342267	186373
8	Parc Seymour Woods	4.111	SSSI	WALES	341041	191688
9	River Usk (Lower Usk) / Afon Wysg (Wysg Isaf)	4.305	SSSI	WALES	337125	191958
10	River Usk / Afon Wysg	4.305	SAC	WALES	337125	191958

Figure 5 there are 10 protected receptors within 5 km search of Castle farm buildings

Within the SCAIL model there is scope to include additional receptors, and in this instance Receptor 1 was included. Receptor 1 is the closest domestic dwelling, outside the farm holding, that is located 124 m from the livestock housing (See fig 2). This receptor is included in the atmospheric impact assessment of the SCAIL model.

As requested by Newport City Council, included in this report are the screenshots for every data input and the impact of that data input on each of the sensitive/protected sites – 11 receptors in total. The data input pages show the atmospheric impact for ammonia odour and particulate matter (PM₁₀).

Data input existing farm infrastructure

Source Details

Source ?

1

Source ?

☐ Pig
☐ Poultry
☒ Cattle
☐ User defined emissions

New or Existing Source ?

Existing

Source Name ?

younstock housing

Source Location ?

Provides a link to GoogleMaps to check the location.

339038,188119
☐ Landranger
☒ x,y

VERIFY LOCATION ?

Source Type ?

Housing

Type ?

Dairy calves (<1 year)

Details ?

Straw-bedded farmyard manure loose housing

Livestock Number ?

40

Housing Floor Area ?

502
m²

Number of days ?

365
days

Naturally Vented ?

☒

Building Height ?

3.6
m

Fan Location ?

please select...

No. of Fans (optional) ?

Fan Diameter ?

m

Fan Flowrate ?

m³/s

Total emissions : ?

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	44	0	(kg)
PM ₁₀ :	2438	0	(kg)
Odour:	11971167800	0	(kOu)

GET EMISSIONS VALUES ?

Source Details

Source [?](#) 2 [x](#)

Source [?](#) ☐ Pig ☐ Poultry ☒ Cattle ☐ User defined emissions

New or Existing Source [?](#) Existing [v](#)

Source Name [?](#) cow housing

Source Location [?](#) Provides a link to GoogleMaps to check the location.

339063,188100

☐ Landranger ☒ x,y

VERIFY LOCATION [?](#)

Source Type [?](#) Housing [v](#)

Type [?](#) Dairy cows [v](#)

Details [?](#) Straw-bedded farmyard manure loose housing [v](#)

Livestock Number [?](#) 30

Housing Floor Area [?](#) 502 m²

Number of days [?](#) 180 days

Naturally Vented ☒

Building Height 3.6 m

Fan Location [?](#) please select... [v](#)

No. of Fans (optional) [?](#)

Fan Diameter [?](#) m

Fan Flowrate [?](#) m³/s

Total emissions : [?](#)

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	232	44	(kg)
PM ₁₀ :	5006	2438	(kg)
Odour:	4427659800	11971167800	(kOu)

GET EMISSIONS VALUES [?](#)

Source Details

Source ?

3 ▼ ✕

Source ?

☐ Pig ☐ Poultry ☒ Cattle ☐ User defined emissions

New or Existing Source ?

Existing ▼

Source Name ?

grazing platform

Source Location ?

Provides a link to GoogleMaps to check the location.

338805,187971

☐ Landranger ☒ x,y

VERIFY LOCATION ?

Source Type ?

Grazing ▼

Type ?

Dairy replacements (>1 year) ▼

Livestock Number ?

12

Field Area for grazing ?

80937

m2

Number of days ?

365

Total emissions : ?

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	31	276	(kg)
PM ₁₀ :	0	7444	(kg)
Odour:	0	16398827600	(kOu)

GET EMISSIONS VALUES ?

Source Details

Source ?

4 ▼

Source ?

☐ Pig ☐ Poultry ☒ Cattle ☐ User defined emissions

New or Existing Source ?

Existing ▼

Source Name ?

grazing cow

Source Location ?

Provides a link to GoogleMaps to check the location.

338738,188037

☐ Landranger ☒ x,y

VERIFY LOCATION ?

Source Type ?

Grazing ▼

Type ?

Dairy cows ▼

Livestock Number ?

30

Field Area for grazing ?

121406 m2

Number of days ?

185

Total emissions : ?

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	83	307	(kg)
PM ₁₀ :	0	7444	(kg)
Odour:	0	16398827600	(kOu)

GET EMISSIONS VALUES ?

Source Details

Source [?]

Source [?] ☐ Pig ☐ Poultry ☒ Cattle ☐ User defined emissions

New or Existing Source [?]

Source Name [?]

Source Location [?] Provides a link to GoogleMaps to check the location.

☐ Landranger ☒ x,y

[?]

Source Type [?]

Type [?]

Livestock Number [?]

Yard Area [?] m2

Number of days [?]

Total emissions : [?]

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	56	390	(kg)
PM ₁₀ :	0	7444	(kg)
Odour:	0	16398827600	(kOu)

[?]

Source Details

Source ?

6 ▼ ✕

Source ?

☐ Pig ☐ Poultry ☒ Cattle ☐ User defined emissions

New or Existing Source ?

Existing ▼

Source Name ?

open FYM store

Source Location ?

Provides a link to GoogleMaps to check the location.

339046,188073

☐ Landranger ☒ x,y

VERIFY LOCATION ?

Source Type ?

Litter / Manure storage ▼

Type ?

Farmyard manure storage ▼

Details ?

Stacked heap ▼

Tonnes Fresh Manure (t) ?

437

Area of Storage (m2) ?

218

Total emissions : ?

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	141	446	(kg)
PM ₁₀ :	0	7444	(kg)
Odour:	0	16398827600	(kOu)

GET EMISSIONS VALUES ?

Source Details

Source ?

7 ▼ ✕

Source ?

☐ Pig ☐ Poultry ☒ Cattle ☐ User defined emissions

New or Existing Source ?

Existing ▼

Source Name ?

landspreading to grassland

Source Location ?

Provides a link to GoogleMaps to check the location.

339159,188391

☐ Landranger ☒ x,y

VERIFY LOCATION ?

Source Type ?

Landspreading ▼

Type ?

Farmyard manure to grassland ▼

Details ?

Old FYM spread after storage ▼

Tonnes Fresh Manure (t)

229

Field Area of Application (m2)

200000

Number of Applications / year

1

Total emissions : ?

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	114	587	(kg)
PM ₁₀ :	0	7444	(kg)
Odour:	0	16398827600	(kOu)

GET EMISSIONS VALUES ?

Source Details

Source [?](#) [✖](#)

Source [?](#) ☐ Pig ☐ Poultry ☒ Cattle ☐ User defined emissions

New or Existing Source [?](#) [▼](#)

Source Name [?](#)

Source Location [?](#) Provides a link to GoogleMaps to check the location.

☐ Landranger ☒ x,y

[VERIFY LOCATION](#) [?](#)

Source Type [?](#) [▼](#)

Type [?](#) [▼](#)

Details [?](#) [▼](#)

Tonnes Fresh Manure (t)

Field Area of Application (m2)

Number of Applications / year

Total emissions : [?](#)

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	68	701	(kg)
PM ₁₀ :	0	7444	(kg)
Odour:	0	16398827600	(kOu)

[GET EMISSIONS VALUES](#) [?](#)

SCAIL Assessment for protected sites existing farm practice



Results

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Content Specific Help Text

Site Information
Neighbouring property

Country:
Site Name: Neighbouring property
Site Code: N/A
Designation Status: Human Health Receptor
Distance from Installation (m): 124
Receptor Type: N/A
Grid Reference: 339159,188091
Met Site: NEWP
Run Mode: Conservative
PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOUs/a)	Conc NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (OU/m ³)
1	Castle farm existing farm practice	8	0	7.4	-	16396827.6	-	-	-	29.33	169.81

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (OU/m ³)
Process Contribution (PC) at receptor edge	-	-	-	29.33	169.81
Background concentration at receptor edge	-	-	-	23.7	0
Predicted Environmental Concentration/Deposition (PEC)	-	-	-	53.03	169.81
Environmental Assessment Level or Critical Load / Level	-	-	-	50	3
USE OWN THRESHOLDS? ALTERNATIVE CRITICAL LOAD INFO					
% of relevant standard PC	-	-	-	59%	5660%
% of relevant standard PEC	-	-	-	106%	5660%
EXCEEDANCE	-	-	-	3.03	166.81

Project Notes

Castle Farm existing farm practice

SCAIL

Simple Calculation of Atmospheric Impact Limits



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Content Specific Help Text

Site Information Gwent Levels - Redwick and Llandeenny (SSSI)

Country: WALES
 Site Name: Gwent Levels - Redwick and Llandeenny
 Site Code: 33WDN
 Designation Status: SSSI
 Distance from Installation (m): 961
 Receptor Type: Habitat
 Grid Reference: 339786,187500
 Met Site: NEWP
 Run Mode: Conservative
 PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOu/a)	Cono NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Cono PM ₁₀ (µg/m ³)	Cono Odour (Ou/m ³)
1	Castle farm existing farm practice	8	0	-	0.77	-	0.03	0.16	0.011	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Ou/m ³)
Process Contribution (PC) at receptor edge	0.03033	0.16	0.011	-	-
Background concentration at receptor edge	1.53	12.92	1.075 (N: 0.952S: 0.123)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.56	13.08	1.09	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	Standing water (Ditch/ditches)	No sensitive habitat or species at this site	-	-
ALTERNATIVE CRITICAL LOAD INFO					
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 3% Upper: 1%	n/a	n/a	-	-
% of relevant standard PEC	Lower: 156% Upper: 52%	n/a	n/a	-	-
EXCEEDANCE	Lower: 0.56 Upper: No exceedance	n/a	n/a	-	-

Project Notes

Castle Farm existing farm practice

SCAIL

Simple Calculation of Atmospheric Impact Limits



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Content Specific Help Text

Site Information Langstone-Llanmartin Meadows (SSSI)

Country: WALES
 Site Name: Langstone-Llanmartin Meadows
 Site Code: 33WCX
 Designation Status: SSSI
 Distance from Installation (m): 1354
 Receptor Type: Habitat
 Grid Reference: 338720,189416
 Met Site: NEWP
 Run Mode: Conservative
 PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOu/a)	Cons. NH ₃ (µg/m ³)	Dep. N (kg/ha/yr)	Dep. Acid (kEq H ⁺ /ha/yr)	Cons. PM ₁₀ (µg/m ³)	Cons. Odour (Ou/m ³)
1	Castle farm existing farm practice	8	0	-	0.77	-	0.02	0.08	0.006	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Ou/m ³)
Process Contribution (PC) at receptor edge	0.01635	0.09	0.006	-	-
Background concentration at receptor edge	1.33	13.01	1.089 (N: 0.958/S: 0.131)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.35	13.1	1.1	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	15.0 Marshy grassland (Juncus effusus/acutiflorus-Galium polustre rush-pasture: Juncus acutiflorus subcommunity)	No sensitive habitat or species at this site	-	-
ALTERNATIVE CRITICAL LOAD INFO					
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 2% Upper: 1%	1%	n/a	-	-
% of relevant standard PEC	Lower: 135% Upper: 45%	87%	n/a	-	-
EXCEEDANCE	Lower: 0.35 Upper: No exceedance	-1.90	n/a	-	-

Project Notes

Castle Farm existing farm practice

SCAIL

Simple Calculation of Atmospheric Impact Limits



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Content Specific Help Text

Site Information
Gwent Levels - Whitson (SSSI)

Country: WALES
Site Name: Gwent Levels - Whitson
Site Code: 33WAV
Designation Status: SSSI
Distance from Installation (m): 2023
Receptor Type: Habitat
Grid Reference: 338981, 186077
Met Site: NEWP
Run Mode: Conservative
PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kO _u /a)	Conc NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (O _u /m ³)
1	Castle farm existing farm practice	8	0	-	0.77	-	0.01	0.04	0.003	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (O _u /m ³)
Process Contribution (PC) at receptor edge	0.00613	0.04	0.003	-	-
Background concentration at receptor edge	1.52	12.69	1.067 (N: 0.934)S: 0.123	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.53	12.73	1.06	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	Standing water (Ditch/ditches)	No sensitive habitat or species at this site	-	-
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 1% Upper: 0%	n/a	n/a	-	-
% of relevant standard PEC	Lower: 153% Upper: 51%	n/a	n/a	-	-
EXCEEDANCE	Lower: 0.53 Upper: No exceedance	n/a	n/a	-	-

Project Notes

Castle Farm existing farm practice

SCAIL

Simple Calculation of Atmospheric Impact Limits



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Content Specific Help Text

Site Information [Penhow Woodlands \(SSSI\)](#)

Country: WALES
 Site Name: Penhow Woodlands
 Site Code: 33WGW
 Designation Status: SSSI
 Distance from Installation (m): 2985
 Receptor Type: Habitat
 Grid Reference: 341576, 189666
 Met Site: NEWP
 Run Mode: Conservative
 PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOu/a)	Cono NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Cono PM ₁₀ (µg/m ³)	Cono Odour (Ou/m ³)
1	Castle farm existing farm practice	8	0	-	0.77	-	0	0.03	0.002	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Ou/m ³)
Process Contribution (PC) at receptor edge	0.00414	0.03	0.002	-	-
Background concentration at receptor edge	1.30	24.43	1.969 (N: 1.799)(S: 0.169)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.3	24.46	1.97	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	10.0 Semi-natural woodland	maxN: 1.747 maxS: 1.605 minN: 0.142 Semi-natural woodland	-	-
ALTERNATIVE CRITICAL LOAD INFO					
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 0% Upper: 0%	0%	0%	-	-
% of relevant standard PEC	Lower: 130% Upper: 43%	245%	113%	-	-
EXCEEDANCE	Lower: 0.30 Upper: No exceedance	14.46	0.22	-	-

Project Notes

Castle Farm existing farm practice

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Content Specific Help Text

Site Information

Gwent Levels - Nash and Goldcliff (SSSI) ▼

Country: WALES

Site Name: Gwent Levels - Nash and Goldcliff

Site Code: 33WDB

Designation Status: SSSI

Distance from Installation (m): 3146

Receptor Type: Habitat

Grid Reference: 336866, 185820

Met Site: NEWP

Run Mode: Conservative

PM₁₀ Percentile: 90

Installation Information

?

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOu/a)	Cono NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Cono PM ₁₀ (µg/m ³)	Cono Odour (Ou/m ³)
1	Castle farm existing farm practice	8	0	-	0.77	-	0	0.02	0.001	-	-

Total Depositions/Concentrations and Exceedances ?

	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Ou/m ³)
Process Contribution (PC) at receptor edge	0.00377	0.02	0.001	-	-
Background concentration at receptor edge ?	1.27	12.50	1.054 (N: 0.921 S: 0.133)	-	-
Predicted Environmental Concentration/Deposition (PEC) ?	1.27	12.52	1.06	-	-
Environmental Assessment Level or Critical Load / Level ?	Lower: 1 Upper: 3 ?	Standing water (Ditch/ditches)	No sensitive habitat or species at this site	-	-
ALTERNATIVE CRITICAL LOAD INFO					
USE OWN THRESHOLDS?					
% of relevant standard PC ?	Lower: 0% Upper: 0%	n/a	n/a	-	-
% of relevant standard PEC ?	Lower: 127% Upper: 42%	n/a	n/a	-	-
EXCEEDANCE ?	Lower: 0.27 Upper: No exceedance	n/a	n/a	-	-

Project Notes

?

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Content Specific Help Text

Site Information: Gwent Levels - Major and Undy (SSSI)

Country: WALES
Site Name: Gwent Levels - Major and Undy
Site Code: 33WEC
Designation Status: SSSI
Distance from Installation (m): 3664
Receptor Type: Habitat
Grid Reference: 342267, 186373
Met Site: NEWP
Run Mode: Conservative
PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOu/a)	Conc NH ₃ (µg/m ³)	Dep N (kg N/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (Ou/m ³)
1	Castle farm existing farm practice	8	0	-	0.77	-	0	0.01	0.001	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Ou/m ³)
Process Contribution (PC) at receptor edge	0.00288	0.01	0.001	-	-
Background concentration at receptor edge	1.61	12.89	1.065 (N: 0.949(S: 0.116))	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.61	12.9	1.07	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	Standing water (Ditch/ditches)	No sensitive habitat or species at this site	-	-
ALTERNATIVE CRITICAL LOAD INFO					
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 0% Upper: 0%	n/a	n/a	-	-
% of relevant standard PEC	Lower: 161% Upper: 54%	n/a	n/a	-	-
EXCEEDANCE	Lower: 0.61 Upper: No exceedance	n/a	n/a	-	-

Project Notes

Castle Farm existing farm practice

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Content Specific Help Text

Site Information ▼

Country: WALES
 Site Name: Parc Seymour Woods
 Site Code: 33WHC
 Designation Status: SSSI
 Distance from Installation (m): 4111
 Receptor Type: Habitat
 Grid Reference: 341041, 191688
 Met Site: NEWP
 Run Mode: Conservative
 PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOUs/a)	Conc NH ₃ (µg/m ³)	Dep N (kg N/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (OUs/m ³)
1	Castle farm existing farm practice	8	0	-	0.77	-	0	0.02	0.001	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (OUs/m ³)
Process Contribution (PC) at receptor edge	0.00237	0.02	0.001	-	-
Background concentration at receptor edge	1.23	24.73	2.002 (N: 1.821)S: 0.180	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.23	24.75	2	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	10.0 Semi-natural woodland	maxN: 1.304 maxS: 1.161 minN: 0.142 Semi-natural woodland	-	-
ALTERNATIVE CRITICAL LOAD INFO					
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 0% Upper: 0%	0%	0%	-	-
% of relevant standard PEC	Lower: 123% Upper: 41%	248%	153%	-	-
EXCEEDANCE	Lower: 0.23 Upper: No exceedance	14.75	0.70	-	-

Project Notes

Castle Farm existing farm practice

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Content Specific Help Text

Site Information
River Usk (Lower Usk) / Afon Wysg (Wysg Isaf) (SSSI)

Country: WALES
Site Name: River Usk (Lower Usk) / Afon Wysg (Wysg Isaf)
Site Code: 33WEA
Designation Status: SSSI
Distance from Installation (m): 4305
Receptor Type: Habitat
Grid Reference: 337125,191958
Met Site: NEWP
Run Mode: Conservative
PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOu/a)	Conc NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (Ou/m ³)
1	Castle farm existing farm practice	8	0	-	0.77	-	0	0.01	0.001	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Ou/m ³)
Process Contribution (PC) at receptor edge	0.00219	0.01	0.001	-	-
Background concentration at receptor edge	1.25	12.90	1.086 (N: 0.950(S: 0.136))	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.25	12.91	1.09	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	Alosa alosa	No sensitive habitat or species at this site	-	-
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 0% Upper: 0%	n/a	n/a	-	-
% of relevant standard PEC	Lower: 125% Upper: 42%	n/a	n/a	-	-
EXCEEDANCE	Lower: 0.25 Upper: No exceedance	n/a	n/a	-	-

Project Notes

Castle Farm existing farm practice

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Content Specific Help Text

Site Information River Usk / Afon Wysg (SAC)

Country: WALES
 Site Name: River Usk / Afon Wysg
 Site Code: UK0013007
 Designation Status: SAC
 Distance from Installation (m): 4305
 Receptor Type: Habitat
 Grid Reference: 337125, 191958
 Met Site: NEWP
 Run Mode: Conservative
 PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOu/a)	Conc NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (Ou/m ³)
1	Castle farm existing farm practice	8	0	-	0.77	-	0	0.02	0.001	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Ou/m ³)
Process Contribution (PC) at receptor edge	0.00219	0.02	0.001	-	-
Background concentration at receptor edge	1.25	23.55	1.913 (N: 1.734(S: 0.179)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.25	23.57	1.91	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	5.0 Bog woodland	maxN: 0.601 maxS: 0.280 minN: 0.321 Bog woodland	-	-
ALTERNATIVE CRITICAL LOAD INFO					
USE OWN THRESHOLD?					
% of relevant standard PC	Lower: 0% Upper: 0%	0%	0%	-	-
% of relevant standard PEC	Lower: 125% Upper: 42%	471%	318%	-	-
EXCEEDANCE	Lower: 0.25 Upper: No exceedance	18.57	1.31	-	-

Project Notes

Castle Farm existing farm practice

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[BACK](#)

Data input future farm infrastructure

Source Details

Source 1

Source

☐ Pig
☐ Poultry
☒ Cattle
☐ User defined emissions

New or Existing Source

Existing

Source Name

Youngstock housing

Source Location

Provides a link to GoogleMaps to check the location.

339038,188119

☐ Landranger
☒ x,y

VERIFY LOCATION

Source Type

Housing

Type

Dairy calves (<1 year)

Details

Straw-bedded farmyard manure loose housing

Livestock Number

40

Housing Floor Area

502

m²

Number of days

365

days

Naturally Vented

☒

Building Height

3.6

m

Fan Location

please select...

No. of Fans (optional)

Fan Diameter

m

Fan Flowrate

m³/s

Total emissions :

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	44	44	(kg)
PM ₁₀ :	2438	2438	(kg)
Odour:	11971167800	11971167800	(kOu)

GET EMISSIONS VALUES

Source Details

Source [?](#) 2 [x](#)

Source [?](#) ☐ Pig ☐ Poultry ☒ Cattle ☐ User defined emissions

New or Existing Source [?](#) Existing [v](#)

Source Name [?](#) cow housing

Source Location [?](#) Provides a link to GoogleMaps to check the location.

339065,188100

☐ Landranger ☒ x,y

VERIFY LOCATION [?](#)

Source Type [?](#) Housing [v](#)

Type [?](#) Dairy cows [v](#)

Details [?](#) Straw-bedded farmyard manure loose housing [v](#)

Livestock Number [?](#) 30

Housing Floor Area [?](#) 502 m²

Number of days [?](#) 180 days

Naturally Vented ☒

Building Height 3.6 m

Fan Location [?](#) please select... [v](#)

No. of Fans (optional) [?](#)

Fan Diameter [?](#) m

Fan Flowrate [?](#) m³/s

Total emissions : [?](#)

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	232	44	(kg)
PM ₁₀ :	5006	2438	(kg)
Odour:	4427659800	11971167800	(kOu)

GET EMISSIONS VALUES [?](#)

Source Details

Source ?

3

Source ?

☐ Pig
☐ Poultry
☒ Cattle
☐ User defined emissions

New or Existing Source ?

Existing

Source Name ?

Youngstock outwintered

Source Location ?

Provides a link to GoogleMaps to check the location.

338805,187971

☐ Landranger
☒ x,y

VERIFY LOCATION ?

Source Type ?

Grazing

Type ?

Dairy replacements (>1 year)

Livestock Number ?

12

Field Area for grazing ?

80937

m2

Number of days ?

365

Total emissions : ?

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃	31	276	(kg)
PM ₁₀	0	7444	(kg)
Odour	0	16398827600	(kOu)

GET EMISSIONS VALUES ?

Source Details

Source [?](#)

4 [v](#) [x](#)

Source [?](#)

☐ Pig
 ☐ Poultry
 ☒ Cattle
 ☐ User defined emissions

New or Existing Source [?](#)

Existing [v](#)

Source Name [?](#)

open yard

Source Location [?](#)

Provides a link to GoogleMaps to check the location.

339055,188096

☐ Landranger
 ☒ x,y

VERIFY LOCATION [?](#)

Source Type [?](#)

Outdoor yards [v](#)

Type [?](#)

Dairy - yard scraped daily [v](#)

Livestock Number [?](#)

30

Yard Area [?](#)

110

m2

Number of days [?](#)

180

Total emissions : [?](#)

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	54	307	(kg)
PM ₁₀ :	0	7444	(kg)
Odour:	0	16398827600	(kOu)

GET EMISSIONS VALUES [?](#)

Source Details

Source [?](#)

5 [v](#) [x](#)

Source [?](#)

☐ Pig ☐ Poultry ☒ Cattle ☐ User defined emissions

New or Existing Source [?](#)

Existing [v](#)

Source Name [?](#)

grazing cow

Source Location [?](#)

Provides a link to GoogleMaps to check the location.

338738,188037

☐ Landranger ☒ x,y

VERIFY LOCATION [?](#)

Source Type [?](#)

Grazing [v](#)

Type [?](#)

Dairy cows [v](#)

Livestock Number [?](#)

30

Field Area for grazing [?](#)

121406 m2

Number of days [?](#)

185

Total emissions : [?](#)

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	83	361	(kg)
PM ₁₀ :	0	7444	(kg)
Odour:	0	16398827600	(kOu)

GET EMISSIONS VALUES [?](#)

Source Details

Source [?](#) 6 ▼ ✖

Source [?](#) ☐ Pig ☐ Poultry ☒ Cattle ☐ User defined emissions

New or Existing Source [?](#) New ▼

Source Name [?](#) Covered FYM store

Source Location [?](#) Provides a link to GoogleMaps to check the location.

339046,188073

☐ Landranger ☒ x,y

[VERIFY LOCATION](#) [?](#)

Source Type [?](#) Litter / Manure storage ▼

Type [?](#) Farmyard manure storage ▼

Details [?](#) Stacked heap - covered with sheeting ▼

Tonnes Fresh Manure (t) [?](#) 437

Area of Storage (m2) [?](#) 395

Total emissions : [?](#)

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	56	444	(kg)
PM ₁₀ :	0	7444	(kg)
Odour:	0	16398827600	(kOu)

[GET EMISSIONS VALUES](#) [?](#)

Source Details

Source [?] 7 [✖]

Source [?] ☐ Pig ☐ Poultry ☒ Cattle ☐ User defined emissions

New or Existing Source [?] Existing [▼]

Source Name [?] FYM to grass

Source Location [?] Provides a link to GoogleMaps to check the location.

339159,188391

☐ Landranger ☒ x,y

VERIFY LOCATION [?]

Source Type [?] Landspreading [▼]

Type [?] Farmyard manure to grassland [▼]

Details [?] please select... [▼]

Tonnes Fresh Manure (t) 229

Field Area of Application (m2) 200000

Number of Applications / year 1

Total emissions : [?]

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	228	500	(kg)
PM ₁₀ :	0	7444	(kg)
Odour:	0	16398827600	(kOu)

GET EMISSIONS VALUES [?]

Source Details

Source ?

8

Source ?

☐ Pig
☐ Poultry
☒ Cattle
☐ User defined emissions

New or Existing Source ?

Existing

Source Name ?

FYM to arable

Source Location ?

Provides a link to GoogleMaps to check the location.

339209,188520

☐ Landranger
☒ x,y

VERIFY LOCATION ?

Source Type ?

Landspreading

Type ?

Farmyard manure (old) to arabl

Details ?

Soil incorporation within 4h - by plough

Tonnes Fresh Manure (t)

104

Field Area of Application (m2) ?

116400

Number of Applications / year ?

2

Total emissions : ?

Pollutant	Source Emissions	Running total of all emission sources	Units
NH ₃ :	30	728	(kg)
PM ₁₀ :	0	7444	(kg)
Odour:	0	16398827600	(kOu)

GET EMISSIONS VALUES ?

SCAIL Assessment for protected sites after farm infrastructure improvements are put in place

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Content Specific Help Text

Site Information ▼ ⓘ

Country: Receptor 1 domestic dwelling

Site Name: Receptor 1 domestic dwelling

Site Code: ⓘ N/A

Designation Status: ⓘ Human Health Receptor

Distance from Installation (m): ⓘ 124

Receptor Type: N/A

Grid Reference: 339159, 188091

Met Site: ⓘ NEWP

Run Mode: ⓘ Conservative

PM₁₀ Percentile: ⓘ 90

Installation Information ⓘ

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kO _u /a)	Conc NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (O _u /m ³)
1	Castle Farm Future Farm practice	8	1	7.4	-	16396627.6	-	-	-	23.65	137.45

Total Depositions/Concentrations and Exceedances ⓘ

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (O _u /m ³)
Process Contribution (PC) at receptor edge	-	-	-	23.65	137.45
Background concentration at receptor edge ⓘ	-	-	-	23.7	0
Predicted Environmental Concentration/Deposition (PEC) ⓘ	-	-	-	47.35	137.45
Environmental Assessment Level or Critical Load / Level ⓘ	-	-	-	50	3
ALTERNATIVE CRITICAL LOAD INFO					
USE OWN THRESHOLDS?					
% of relevant standard PC ⓘ	-	-	-	47%	4582%
% of relevant standard PEC ⓘ	-	-	-	95%	4582%
EXCEEDANCE ⓘ	-	-	-	2.65	134.45

Project Notes

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Content Specific Help Text

Site Information

Country: WALES
Site Name: Gwent Levels - Redwick and Llanvenny (SSSI)
Site Code: 33WON
Designation Status: SSSI
Distance from Installation (m): 971
Receptor Type: Habitat
Grid Reference: 339786,187500
Met Site: NEWP
Run Mode: Conservative
PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOu/a)	Conc NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (OU/m ³)
1	Castle Farm Future Farm practice	8	1	-	0.76	-	0.03	0.16	0.011	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (OU/m ³)
Process Contribution (PC) at receptor edge	0.03039	0.16	0.011	-	-
Background concentration at receptor edge	1.55	13.05	1.075 (N: 0.952(S: 0.123))	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.58	13.21	1.09	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	Standing water (Ditch/ditches)	No sensitive habitat or species at this site	-	-
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 3% Upper: 1%	n/a	n/a	-	-
% of relevant standard PEC	Lower: 158% Upper: 53%	n/a	n/a	-	-
EXCEEDANCE	Lower: 0.58 Upper: No exceedance	n/a	n/a	-	-

Project Notes

Castle Farm Future Farm practice

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Content Specific Help Text

Site Information

Langstone-Llanmartin Meadows (SSSI)

Country: WALES

Site Name: Langstone-Llanmartin Meadows

Site Code: 33WCX

Designation Status: SSSI

Distance from Installation (m): 1335

Receptor Type: Habitat

Grid Reference: 338720,189416

Met Site: NEWP

Run Mode: Conservative

PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kO _u /a)	Cono NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Cono PM ₁₀ (µg/m ³)	Cono Odour (O _u /m ³)
1	Castle Farm Future Farm practice	8	1	-	0.76	-	0.02	0.09	0.006	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (O _u /m ³)
Process Contribution (PC) at receptor edge	0.01690	0.09	0.006	-	-
Background concentration at receptor edge	1.34	13.14	1.089 (N: 0.958(S: 0.131))	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.36	13.23	1.1	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	15.0 Marshy grassland (Juncus effusus/acidiflorus-Galium palustre rush pasture: Juncus acutiflorus subcommunity)	No sensitive habitat or species at this site	-	-
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 2% Upper: 1%	1%	n/a	-	-
% of relevant standard PEC	Lower: 138% Upper: 45%	88%	n/a	-	-
EXCEEDANCE	Lower: 0.36 Upper: No exceedance	-1.77	n/a	-	-

Project Notes

Castle Farm Future Farm practice

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Content Specific Help Text

Site Information
Gwent Levels - Whitson (SSSI)

Country: WALES
Site Name: Gwent Levels - Whitson
Site Code: 33WAV
Designation Status: SSSI
Distance from Installation (m): 2043
Receptor Type: Habitat
Grid Reference: 338981, 186077
Met Site: NEWP
Run Mode: Conservative
PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOu/a)	Cono NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Cono PM ₁₀ (µg/m ³)	Cono Odour (Ou/m ³)
1	Castle Farm Future Farm practice	8	1	-	0.76	-	0.01	0.04	0.003	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Ou/m ³)
Process Contribution (PC) at receptor edge	0.00797	0.04	0.003	-	-
Background concentration at receptor edge	1.54	12.82	1.057 (N: 0.934/S: 0.123)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.55	12.86	1.06	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	Standing water (Ditch/ditches)	No sensitive habitat or species at this site	-	-
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 1% Upper: 0%	n/a	n/a	-	-
% of relevant standard PEC	Lower: 155% Upper: 52%	n/a	n/a	-	-
EXCEEDANCE	Lower: 0.55 Upper: No exceedance	n/a	n/a	-	-

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Content Specific Help Text

Site Information
Penhow Woodlands (SSSI)

Country: WALES
Site Name: Penhow Woodlands
Site Code: 33WGW
Designation Status: SSSI
Distance from Installation (m): 2972
Receptor Type: Habitat
Grid Reference: 341576, 189666
Met Site: NEWP
Run Mode: Conservative
PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOu/a)	Conc NH ₃ (µg/m ³)	Dep N (kg N/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (Ou/m ³)
1	Castle Farm Future Farm practice	8	1	-	0.76	-	0	0.03	0.002	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Ou/m ³)
Process Contribution (PC) at receptor edge	0.00408	0.03	0.002	-	-
Background concentration at receptor edge	1.31	24.69	1.969 (N: 1.799(S: 0.169))	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.31	24.72	1.97	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	10.0 Semi-natural woodland	maxN: 1.747 maxS: 1.605 minN: 0.142 Semi-natural woodland	-	-
USE OWN THRESHOLDS? ALTERNATIVE CRITICAL LOAD INFO					
% of relevant standard PC	Lower: 0% Upper: 0%	0%	0%	-	-
% of relevant standard PEC	Lower: 131% Upper: 44%	247%	113%	-	-
EXCEEDANCE	Lower: 0.31 Upper: No exceedance	14.72	0.22	-	-

Project Notes

Castle Farm Future Farm practice

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Content Specific Help Text

Site Information Gwent Levels - Nash and Goldcliff (SSSI)

Country: WALES
 Site Name: Gwent Levels - Nash and Goldcliff
 Site Code: 33WDB
 Designation Status: SSSI
 Distance from Installation (m): 3162
 Receptor Type: Habitat
 Grid Reference: 336866, 185820
 Met Site: NEWP
 Run Mode: Conservative
 PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOus/a)	Conc NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (Ous/m ³)
1	Castle Farm Future Farm practice	8	1	-	0.76	-	0	0.02	0.001	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Ous/m ³)
Process Contribution (PC) at receptor edge	0.00365	0.02	0.001	-	-
Background concentration at receptor edge	1.28	12.63	1.054 (N: 0.921)S: 0.133	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.28	12.65	1.06	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	Standing water (Ditch/ditches)	No sensitive habitat or species at this site	-	-
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 0% Upper: 0%	n/a	n/a	-	-
% of relevant standard PEC	Lower: 128% Upper: 43%	n/a	n/a	-	-
EXCEEDANCE	Lower: 0.28 Upper: No exceedance	n/a	n/a	-	-

Project Notes

Castle Farm Future Farm practice

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Content Specific Help Text

Site Information

Magor Marsh (SSSI)

Country:

Wales

Site Name:

Magor Marsh

Site Code:

33WHB

Designation Status:

SSSI

Distance from Installation (m):

3513

Receptor Type:

Habitat

Grid Reference:

342316,186855

Met Site:

NEWP

Run Mode:

Conservative

PM₁₀ Percentile:

90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (OU/a)	Conc NH ₃ (µg/m ³)	Dep N (kg N/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (OU/m ³)
1	Castle Farm Future Farm practice	8	1	-	0.76	-	0	0.02	0.001	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (OU/m ³)
Process Contribution (PC) at receptor edge	0.00302	0.02	0.001	-	-
Background concentration at receptor edge	1.63	13.02	1.065 (N: 0.949(S: 0.116))	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.63	13.04	1.07	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	6.0 Marshy grassland (Other marshy grassland)	No sensitive habitat or species at this site	-	-
ALTERNATIVE CRITICAL LOAD INFO					
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 0% Upper: 0%	0%	n/a	-	-
% of relevant standard PEC	Lower: 163% Upper: 54%	217%	n/a	-	-
EXCEEDANCE	Lower: 0.63 Upper: No exceedance	7.04	n/a	-	-

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Castle Farm Future Farm practice

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Content Specific Help Text

Site Information

Gwent Levels - Major and Undy (SSSI)

Country:

Wales

Site Name:

Gwent Levels - Major and Undy

Site Code: (i)

33WEC

Designation Status: (i)

SSSI

Distance from Installation (m): (i)

3670

Receptor Type:

Habitat

Grid Reference:

34267, 186373

Met Site: (i)

NEWP

Run Mode: (i)

Conservative

PM₁₀ Percentile: (i)

90

Installation Information (i)

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOa/a)	Cono NH ₃ (µg/m ³)	Dep N (kg N/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Cono PM ₁₀ (µg/m ³)	Cono Odour (OU/m ³)
1	Castle Farm Future Farm practice	8	1	-	0.76	-	0	0.01	0.001	-	-

Total Depositions/Concentrations and Exceedances (i)

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (OU/m ³)
Process Contribution (PC) at receptor edge	0.00279	0.01	0.001	-	-
Background concentration at receptor edge (i)	1.63	13.02	1.065 (N: 0.949(S: 0.116))	-	-
Predicted Environmental Concentration/Deposition (PEC) (i)	1.63	13.03	1.07	-	-
Environmental Assessment Level or Critical Load / Level (i)	Lower: 1 Upper: 3 (i)	Standing water (Ditch/ditches)	No sensitive habitat or species at this site	-	-
USE OWN THRESHOLDS? ALTERNATIVE CRITICAL LOAD INFO					
% of relevant standard PC (i)	Lower: 0% Upper: 0%	n/a	n/a	-	-
% of relevant standard PEC (i)	Lower: 163% Upper: 54%	n/a	n/a	-	-
EXCEEDANCE (i)	Lower: 0.63 Upper: No exceedance	n/a	n/a	-	-

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Castle Farm Future Farm practice

SAVE RESULTS (i)

SAVE INPUTS (i)

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Content Specific Help Text

Site Information

Country: WALES

Site Name: Parc Seymour Woods

Site Code: 33WHC

Designation Status: SSSI

Distance from Installation (m): 4092

Receptor Type: Habitat

Grid Reference: 341041,191688

Met Site: NDWP

Run Mode: Conservative

PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kOu/a)	Conc NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (Ou/m ³)
1	Castle Farm Future Farm practice	8	1	-	0.76	-	0	0.02	0.001	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Ou/m ³)
Process Contribution (PC) at receptor edge	0.00232	0.02	0.001	-	-
Background concentration at receptor edge	1.24	24.99	2.002 (N: 1.821/S: 0.180)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.24	25.01	2	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	10.0 Semi-natural woodland	maxN: 1.304 maxS: 1.161 minN: 0.142 Semi-natural woodland	-	-
ALTERNATIVE CRITICAL LOAD INFO					
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 0% Upper: 0%	0%	0%	-	-
% of relevant standard PEC	Lower: 124% Upper: 41%	250%	153%	-	-
EXCEEDANCE	Lower: 0.24 Upper: No exceedance	15.01	0.70	-	-

Project Notes

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Content Specific Help Text

Site Information
River Usk (Lower Usk) / Afon Wysg (Wysg Isaf) (SSSI)

Country: WALES
Site Name: River Usk (Lower Usk) / Afon Wysg (Wysg Isaf)
Site Code: 33WEA
Designation Status: SSSI
Distance from Installation (m): 4289
Receptor Type: Habitat
Grid Reference: 337125, 191958
Met Site: NEWP
Run Mode: Conservative
PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (OU/a)	Conc NH ₃ (µg/m ³)	Dep N (kg N/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (OU/m ³)
1	Castle Farm Future Farm practice	8	1	-	0.76	-	0	0.01	0.001	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (OU/m ³)
Process Contribution (PC) at receptor edge	0.00214	0.01	0.001	-	-
Background concentration at receptor edge	1.26	13.03	1.086 (N: 0.95(S: 0.136))	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.26	13.04	1.09	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	Alosa alosa	No sensitive habitat or species at this site	-	-
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 0% Upper: 0%	n/a	n/a	-	-
% of relevant standard PEC	Lower: 126% Upper: 42%	n/a	n/a	-	-
EXCEEDANCE	Lower: 0.26 Upper: No exceedance	n/a	n/a	-	-

Project Notes

Castle Farm Future Farm practice

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Content Specific Help Text

Site Information River Usk / Afon Wysg (SAC)

Country: WALES
 Site Name: River Usk / Afon Wysg
 Site Code: UK0013007
 Designation Status: SAC
 Distance from Installation (m): 4289
 Receptor Type: Habitat
 Grid Reference: 337125, 191958
 Met Site: NEWP
 Run Mode: Conservative
 PM₁₀ Percentile: 90

Installation Information

No.	Name	No. of sources	No. of new sources	PM ₁₀ (t/a)	NH ₃ (t/a)	Odour (kDu/a)	Conc NH ₃ (µg/m ³)	Dep N (kg/ha/yr)	Dep Acid (kEq H ⁺ /ha/yr)	Conc PM ₁₀ (µg/m ³)	Conc Odour (Oum ³)
1	Castle Farm Future Farm practice	8	1	-	0.76	-	0	0.02	0.001	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH ₃ (µg/m ³)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H ⁺ /ha/yr)	PM ₁₀ (µg/m ³)	Odour (Oum ³)
Process Contribution (PC) at receptor edge	0.00214	0.02	0.001	-	-
Background concentration at receptor edge	1.26	23.79	1.913 (N: 1.734/S: 0.179)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.26	23.81	1.91	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	5.0 Bog woodland	maxN: 0.601 maxS: 0.280 minN: 0.321 Bog woodland	-	-
ALTERNATIVE CRITICAL LOAD INFO					
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 0% Upper: 0%	0%	0%	-	-
% of relevant standard PEC	Lower: 126% Upper: 42%	476%	318%	-	-
EXCEEDANCE	Lower: 0.26 Upper: No exceedance	18.81	1.31	-	-

Project Notes

Castle Farm Future Farm practice

Table to show comparative study of farm infrastructure improvements on odour emissions on 11 sensitive sites within 5 km of Castle Farm

		EXISTING FARM PRACTICE				FUTURE FARM PRACTICE						
		PC ODOUR (Ou m-3)	ODOUR Background (Ou m-3)	ODOUR PEC (Ou m-3)	ODOUR EAL (Ou m-3)	ODOUR PC ODOUR (Ou m-3)	ODOUR Background (Ou m-3)	ODOUR PEC (Ou m-3)	ODOUR EAL (Ou m-3)	Change in Process Odour (Ou m-3)		
1	Neighbouring property	169.81		0	169.81	3	137.45		0	137.45	3	32.36
2	Gwent Levels - Redwick and Llandeenny	3.75		0	3.75	3	3.62		0	3.62	3	0.13
3	Langstone-Llanmartin Meadows	2.15		0	2.15	3	2.23		0	2.23	3	-0.08
4	Gwent Levels - Whitson	0.95		0	0.95	3	0.94		0	0.94	3	0.01
5	Penhow Woodlands	0.49		0	0.49	3	0.5		0	0.5	3	-0.01
6	Gwent Levels - Nash and Goldcliff	0.45		0	0.45	3	0.45		0	0.45	3	0
7	Magor Marsh	0.37		0	0.37	3	0.37		0	0.37	3	0
8	Gwent Levels - Magor and Undy	0.34		0	0.34	3	0.34		0	0.34	3	0
9	Parc Seymour Woods	0.28		0	0.28	3	0.27		0	0.27	3	0.01
10	River Usk (Lower Usk) / Afon Wysg (Wysg Isaf)	0.25		0	0.25	3	0.25		0	0.25	3	0
11	River Usk / Afon Wysg	0.25		0	0.25	3	0.25		0	0.25	3	0

Table to show comparative study of farm infrastructure improvements on ammonia emissions on 11 sensitive sites within 5 km of Castle Farm

RECEPTORS	NAME	EXISTING FARM PRACTICE						FUTURE FARM PRACTICE						Change in Process Contributions ammonia(ug m-3)
		PC NH3 (ug m-3)	NH3 Background (ug m-3)	NH3 PEC (ug m-3)	NH3 EAL (ug m-3)	% of NH3 PC to CLevel	% of NH3 PEC to CLevel	PC NH3 (ug m-3)	NH3 Background (ug m-3)	NH3 PEC (ug m-3)	NH3 EAL (ug m-3)	% of NH3 PC to CLevel	% of NH3 PEC to CLevel	
1	Neighbouring property	1.10954	1.36	2.46954	1-3	36.9846667	82.318	1.10288	1.37	2.47288	1-3	36.76267	82.42933	0.007
2	Gwent Levels - Redwick and Llandeenny	0.03033	1.53	1.56033	1-3	1.011	52.011	0.03039	1.55	1.58039	1-3	1.013	52.67967	0.000
3	Langstone-Llanmartin Meadows	0.01635	1.33	1.34635	1-3	0.545	44.87833333	0.0169	1.34	1.3569	1-3	0.563333	45.23	-0.001
4	Gwent Levels - Whitson	0.00813	1.52	1.52813	1-3	0.271	50.93766667	0.00797	1.54	1.54797	1-3	0.265667	51.599	0.000
5	Penhow Woodlands	0.00414	1.3	1.30414	1-3	0.138	43.47133333	0.00408	1.31	1.31408	1-3	0.136	43.80267	0.000
6	Gwent Levels - Nash and Goldcliff	0.00377	1.27	1.27377	1-3	0.12566667	42.459	0.00365	1.28	1.28365	1-3	0.121667	42.78833	0.000
7	Magor Marsh	0.00311	1.61	1.61311	1-3	0.10366667	53.77033333	0.00302	1.63	1.63302	1-3	0.100667	54.434	0.000
8	Gwent Levels - Magor and Undy	0.00288	1.61	1.61288	1-3	0.096	53.76266667	0.00279	1.63	1.63279	1-3	0.093	54.42633	0.000
9	Parc Seymour Woods	0.00237	1.23	1.23237	1-3	0.079	41.079	0.00232	1.24	1.24232	1-3	0.077333	41.41067	0.000
10	River Usk (Lower Usk) / Afon Wysg (Wysg Isaf)	0.00219	1.25	1.25219	1-3	0.073	41.73966667	0.00214	1.26	1.26214	1-3	0.071333	42.07133	0.000
11	River Usk / Afon Wysg	0.00219	1.25	1.25219	1-3	0.073	41.73966667	0.00214	1.26	1.26214	1-3	0.071333	42.07133	0.000

Summary

The objective of this atmospheric emission screening assessment is to predict the potential impact of a **new covered Farm Yard Manure(FYM) store only** on receptors within 5 km of Castle Farm only, as requested in condition 2 of the Notice of Decision from Newport City Council.

The impacts of identified emissions, at receptors within 5 km of Castle Farm, have been predicted using the SCAIL dispersion model for Agriculture, which utilises the AERMOD dispersion model. The values derived from the SCAIL model can be used as a screening tool by Newport City Council to assess whether impact limits for human health or habitats are exceeded or not. The SCAIL model is not designed to capture the impact of changes in farm practice and for this reason a comparative study of existing and future farm practices was undertaken with the view to identify the changes in atmospheric emissions as a result of the change in farm infrastructure i.e. the new FYM store.

The findings of the comparative SCAIL assessment for existing and future emissions from Castle Farm highlights that storing Farm Yard Manure in a covered store will reduce the odour emissions and the ammonia emissions for the nearest sensitive site referred to as receptor 1. Receptor 1 is considered the closest sensitive site to Castle Farm and is a domestic property 124 m away from the farm building complex. The comparison study of existing and future farm practice offers a predicted reduction in odour emissions is 32.36 OU m-3

The SCAIL assessment highlights that the primary sources of odour are derived from the livestock housing for the cows and youngstock. Whilst odour production is a common feature of animal husbandry, at Castle Farm the livestock are loose housed and bedded on straw which provides a lower moisture content within the litter and tends to result in lower emissions when compared to other housing system such as cubicle housing. The Code of good agricultural practice guidance on reducing ammonia emissions advises that keep organic manure dry and housing livestock on a straw based housing system are recognised abatement techniques for reducing the ammonia emissions for livestock housing ([code-of-good-agricultural-practice-guidance-on-reducing-ammonia-emissions.pdf](#)). Reducing the infiltration of rainwater into FYM will minimise the production of intense odours which tend to arise from anaerobic conditions within the organic manure. By covering the FYM, the ammonia emissions are reduced from 141 kg of ammonia to 56 kg of ammonia for 437 tonnes of FYM (See screenshot for source 6 FYM storage existing and future farm practice) Further atmospheric emission abatement can be achieved by planting a shelter belt as trees and shrubs provide an excellent filter to absorb ammonia.

As an example:

Consider increasing the height and width of all hedges that border the field in which the FYM store is to be sited.

Consider planting a shelter belt of trees and shrubs which can absorb and filter the ammonia derived from the existing housing, open dirty yards and FYM storage area.

Further guidance on a shelter belt can be found on the Farmtreeair website (the weblink is <https://farmtreeair.ceh.ac.uk/>)

Below is an example of a shelter belt comprising of mixed tree species

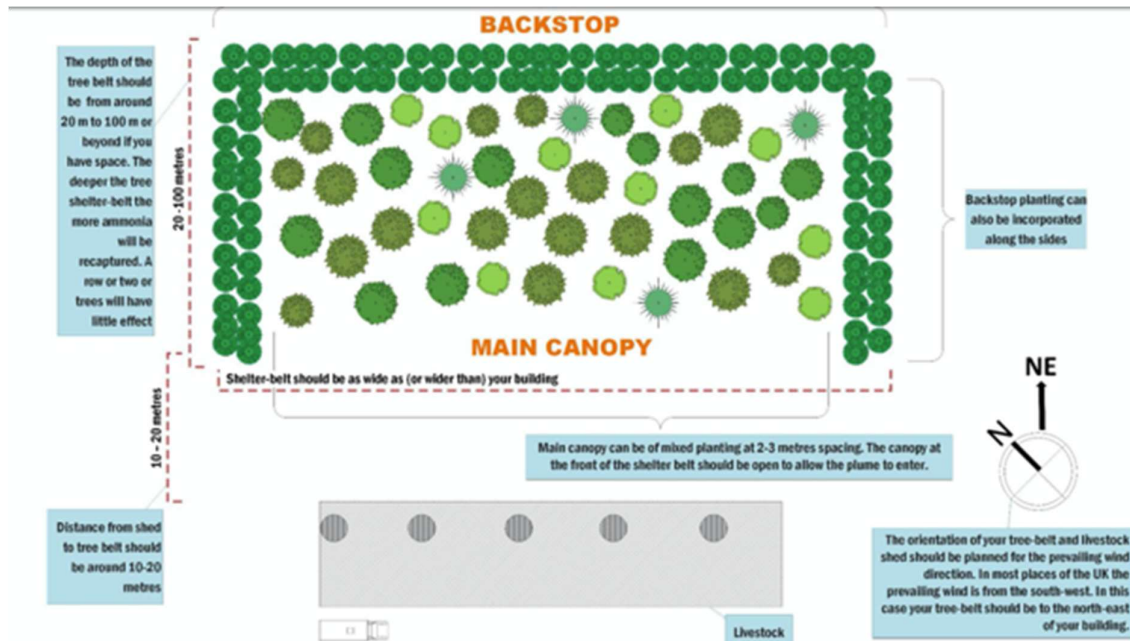
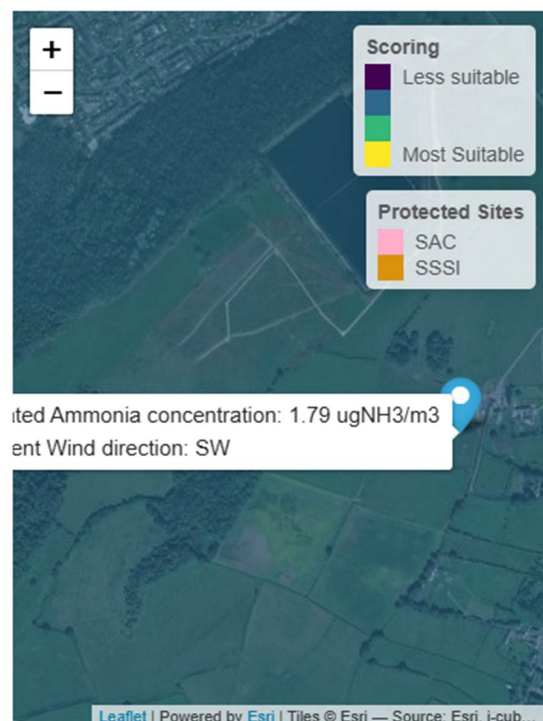


Figure 11 Shelter belt design

Targeted Planting Map

The map below shows the suitable areas to plant a treebelt for ammonia mitigation 5Km around protected sites (SAC and SSSI). This is based on i) how close your location is to a protected site, ii) the level of ammonia emissions in your locality and iii) wind direction. If your location sits on a 'Most suitable' square that is great news and your treebelt planting will help reduce effects of ammonia on nearby protected sites. Even if you plant a treebelt outside the most suitable squares, it will help capture ammonia emissions from sources of ammonia upwind of the planting location and improve overall air quality.

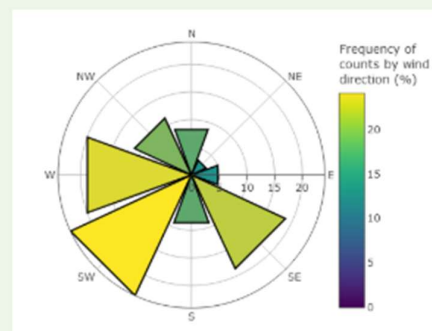


You can change your location by clicking on the map. The marker also gives information on ammonia concentration (data from the year 2019) at this location. The resolution of the ammonia concentration layer is 1Km2.

Windrose

[Click here for more information on the windrose](#)

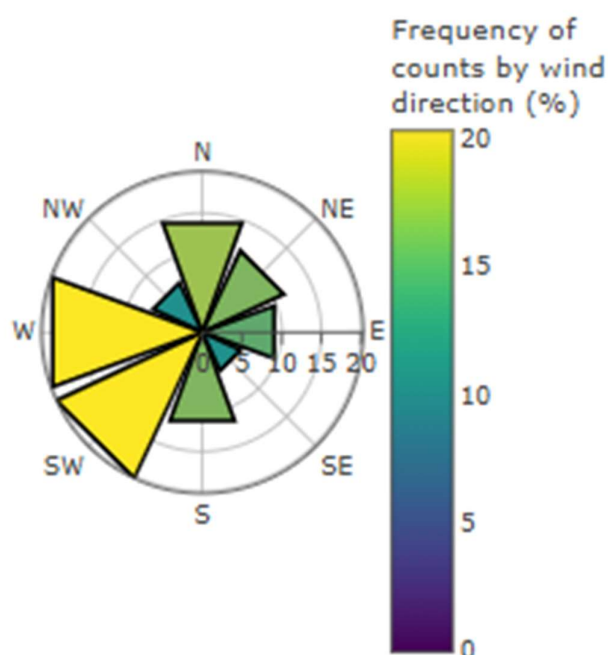
Your treebelt should be planted within 10-20m of the source to maximise capture of ammonia and downwind of the source of ammonia emissions e.g. a livestock shed/slurry store to be most effective at capturing ammonia.



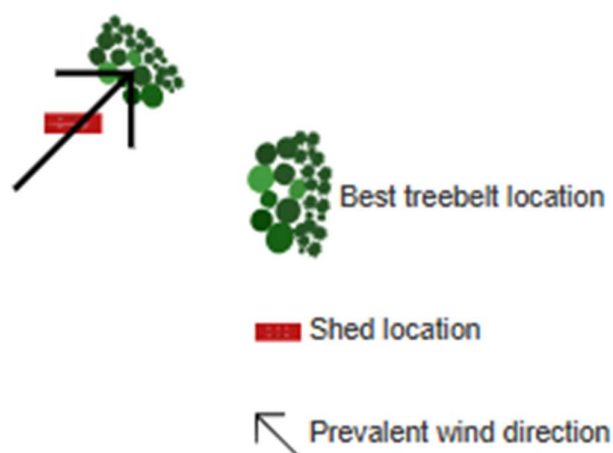
The Windrose above shows the predominant directions that the wind is coming from at your location. A yellow segment shows the prevailing wind direction e.g. If the base of the yellow triangle is in the South West segment this indicates that the wind is most frequently coming from the South West and the treebelt should be planted to the North East of the ammonia source i.e. the opposite direction. Windroses are available for every 2km grid square in the UK cell and is created from five years of wind direction data from 2016-2021.

In the windrose above the prevalent wind direction is coming from the South West (as indicated by the arrow above), however the wind is also frequently coming from the West and the South East. In order to increase the protection of close by habitats in this example, trees in the East and North West can be also planted.

In the example over leaf the shelter belt comprises of beech and holly but there are many species of trees that can be planted within the shelter belt as shown. The treestoair model predicts the optimum planting site based on the prevailing winds. For Castle Farm the model predicts that over 20% of the winds are from the southwest. The best location for the tree belt is on the northeast of the livestock housing. The shelter belt is predicted to offer a 10% reduction in ammonia over a 50 year period. However, the shelter belt is also likely to reduce particulate matter and odour emissions.



The bottom diagram below indicates the best area(s) to plant a treebelt for ammonia capture from the ammonia source (centre) and based on the prevailing wind direction. Where there are more than one dominant wind directions then a larger or more than one treebelt planted in an arc downwind of the source would be more effective.





Tree calculator for Ammonia Mitigation : α Alpha Version

Enter British National Grid reference
(Landranger grid or Easting, Northing) ?

339036, 188067

Select location from map

Choose a soil type: ?

Brown earth

Main Canopy ?

Species are sorted by suitability

Choose the species of your main canopy:

Beech

Choose the depth of your main canopy (in metres):

20

Backstop Canopy ?

Species are sorted by suitability

Choose the species of your backstop canopy:

Holly

Choose the depth of your backstop (in metres):

10

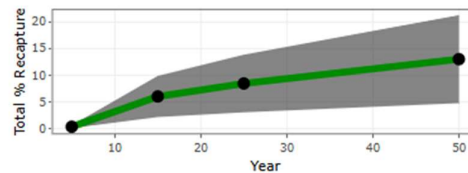
Recapture Information [Map Information](#)

Site Characteristics

Eastings: 339036
Northings: 188067
OS Grid reference: ST390880
Soil moisture regime: Fresh
Soil nutrient regime: Medium
Site description: The site has a warm, sheltered and moist climate. The soils are fresh moisture status and medium nutrient status. Tree species recommendations in ESC do not take account of each country's regulatory approval process, so prior to including species in a forest plan advice should be sought from relevant forestry authorities.

Percentage Ammonia recapture

As main canopy species you have selected: Beech
As backstop species you have selected: Holly
The grey shading represents just uncertainty due to parameters in the model used to recapture ammonia having uncertain values. There are other sources of uncertainty such as those in the tree growth model and other significant uncertainties in quantities that are inputs to the model which are not included in this uncertainty estimation. Future measurement campaigns will make it possible to compare the predictions against observational data and hence reduce uncertainties in these predictions.



Year	Main Canopy Depth (m)	Backstop Depth (m)	Main Canopy Height (m)	Backstop Height (m)	Total % Recapture	Backstop % Recapture	Main Canopy % Recapture
5	20	10	2.5	1.5	0.43	0.17	0.27
15	20	10	8	5	6.07	1.61	4.45
25	20	10	13	8	8.49	3.47	5.01
50	20	10	20	14	13.01	2.77	10.24

Showing 1 to 4 of 4 entries