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Emissions Assessment for Proposed new Slurry Lagoon on Land at Horton Pasture Farm, Horton, Skipton, BD23 3JP.

Prepared for:

Wignalls Chartered Surveyors
311 Hesketh Lane
Tarleton
Preston
PR4 6RJ.

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1. Introduction

1.1. Martin Environmental Solutions has been commission to conduct an assessment of the likely emissions from one proposed new slurry lagoon at Horton Pasture Farm, Horton, Skipton, BD23 3JP.

Site Location and Context

1.2. Horton Pasture Farm is located approx. 2Km east of the Horton Village, surrounded by agricultural land. Additional existing farms are located in the area in all directions the nearest being to the southwest ~1.2Km away.

1.3. An aerial Photograph is included within Figure 1 with a proposed layout in Figure 2.

1.4. Concerns over the potential air quality impact of the development on the surrounding land uses, in particular the release of ammonia on nearby designated Environmental Sensitive sites and as such require an assessment to be undertaken.

1.5. This report considers the impacts from the potential emissions from the proposed development on the wider environment.

2. Planning and Policy Guidance

2.1. The Government sets out its policy on air quality in relation to planning in the National Planning Policy Framework (NPPF). The NPPF states that planning policies and decisions should "preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability"; and "In preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment"

2.2. It is this provision of planning guidance that dictates the appropriateness of any development and the standard to which the proposed development must comply with.

2.3. Natural England have recommended the use of the SCAIL model to assess the impact of the proposed development on sensitive receptors.

3. The Proposed Site

3.1. The farm currently has around 460 head of diary cows and the development will see the creation of a new slurry lagoon to hold the waste produced as part of new government legislation on storage capacity.

3.2. The proposed new development is to consist of a new lagoon covered by a portal frame building measuring 60m x 35m and 8.5m dep. The proposed lagoon will hold a working volume of 7901m^3 and it has been presumed this will be year-round; however, cattle will be in the fields for ~6 months of the year and so no additional slurry will be produced.

3.3. To minimise emissions from the lagoon and to prevent disturbance by the wind and additional rainwater infiltration, the design encompasses a steel framed portable building over the lagoon. Thus, reducing the generation and release of odours, ammonia, nitrogen and particulates.

3.4. The lagoon will also be designed to allow fresh slurry to be deposited via a below surface pump, eliminating the need to disturb the surface and thus reducing emissions.

3.5. In order to assess the impact of the proposed site on identified sensitive areas two crucial pieces of information are required. The first is the level of pollutant produced by the site and the second the acceptable level of pollutants deposited on the identified sensitive sites, also known as the critical level.

3.6. The first, a quantification of the emissions from the site can be calculated based on the size and surface area of the housing.

3.7. While the critical levels can be obtained from the APIS (air pollution information system) website.

3.8. These values can then be used to model the expected emission and pollutant deposition rates of the proposed slurry lagoon. In addition, identification of the sensitive designated receptors is required.

The Assessment

3.9. A simple screening tool for assessing the deposition of ammonia, nitrogen and dust, odour, and acid on sensitive receptor sites from the slurry staorage units has been development. The Simple Calculation of Atmospheric Impacts Limits or SCAIL model has been used in this case to assess the impacts from the proposed development. The model has been recommended by Natural England for the assessment.

3.10. The model has been set-up in a conservative mode which presumes all identified designated receptors are downwind of the site.

3.11. The model has identified 5 sensitive receptor's locations within a 10Km radius of the site.

3.12. The identified receptors are shown in the table below followed by modelled contribution from the development at each site. with the contribution from the proposed slurry storage at each site, the current background level and the percentage of the relevant standards.

RECEPTORS			
Number	Name	Habitat Type	x;y
1	Pan Beck Fen	SSSI	384839;455795
2	Haw Crag Quarry	SSSI	391209;456232
3	River Ribble (Long Preston Deeps)	SSSI	382494;457232
4	White Moss	SSSI	379364;454276
5	New Ing Meadow	SSSI	378897;450593

Process contribution at each receptor site.

	Receptor	PC NH3 (ug m-3)	PC NDEP (kg/ha/yr)	PC ACID_DEP (kEqH+/ha/yr)	PC PM10 (ug m-3)
1	Pan Beck Fen	0.0229	0.12	0.009	0
2	Haw Crag Quarry	0.01287	0.07	0.005	0
3	River Ribble (Long Preston Deeps)	0.01074	0.06	0.004	0
4	White Moss	0.00853	0.04	0.003	0
5	New Ing Meadow	0.00808	0.04	0.003	0

RECEPTORS	1	2	3	4	5
PC NH3 (ug m-3)	0.0229	0.01287	0.01074	0.00853	0.00808
NH3 EAL (ug m-3)	1-3	1-3	1-3	1-3	1-3
% of NH3 PC to CLevel	0.7633333	0.429	0.358	0.28433333	0.26933333
PC NDEP (kg/ha/yr)	0.12	0.07	0.06	0.04	0.04
NDEP CLOAD (kg/ha/yr)	15	0	15	5	10
% of Ndep PC to CLoad	0.8		0.4	0.8	0.4
PC ACID_DEP (kEqH+/ha/yr)	0.009	0.005	0.004	0.003	0.003
ACID_DEP CLOAD (kEqH+/ha/yr)	0	0	0	0.732	5.071
% of Adep PC to CLoad				0.40983607	0.05915993
PC PM10 (ug m-3)	0	0	0	0	0
PM10 EAL (ug m-3)	40	40	40	40	40
PM10 %PC of EAL	0	0	0	0	0

3.13. The results of the model show that the impact from the proposed development on each of the identified receptors is negligible and for Ammonia emissions less than 1% of the critical level for all receptor sites. The prevailing wind direction for the area being southwest/westerly, Appendix C, and therefore are not downwind from the site when considered against the prevailing wind direction for the area.

3.14. It is noted that Natural England had recently reviewed their position on ammonia deposition and now *applies a 1% of ammonia Critical Level significance screening threshold alone and in combination.* Although this stance has since been withdrawn. It is noted from the model results that all background concentrations of Ammonia at all identified receptors are above this 1% critical level being applied. In effect sterilising the area from all agricultural development.

3.15. Natural England's standard consultation response letter details its approach to their assessment of impacts from developments. It details their approach of using a combined 1% of the critical level, criteria for triggering a LSE (Likely Significant Effect) and requiring a more detailed and costly appropriate assessment. The guidance continues by acknowledging the conservative approach of the SCAIL model and states that no threshold value will be applied to the appropriate assessment, the focus being on the modelling and a case-by-case judgement. Empirical evidence suggests Detailed modelling results are typically several times lower than screening assessment predictions.

3.16. Given the above information, the modelled low contribution results from the proposed development and the additional measures to be included within the development to reduce Ammonia emissions. The actual emissions from the site are likely to be significantly lower than those predicted and therefore the impact upon the identified receptors lower still.

3.17. Thus, the development combined with the additional measures identified will not have a significant adverse impact on the identified receptors. This situation would not materially alter through the use of further assessments.

Conclusion

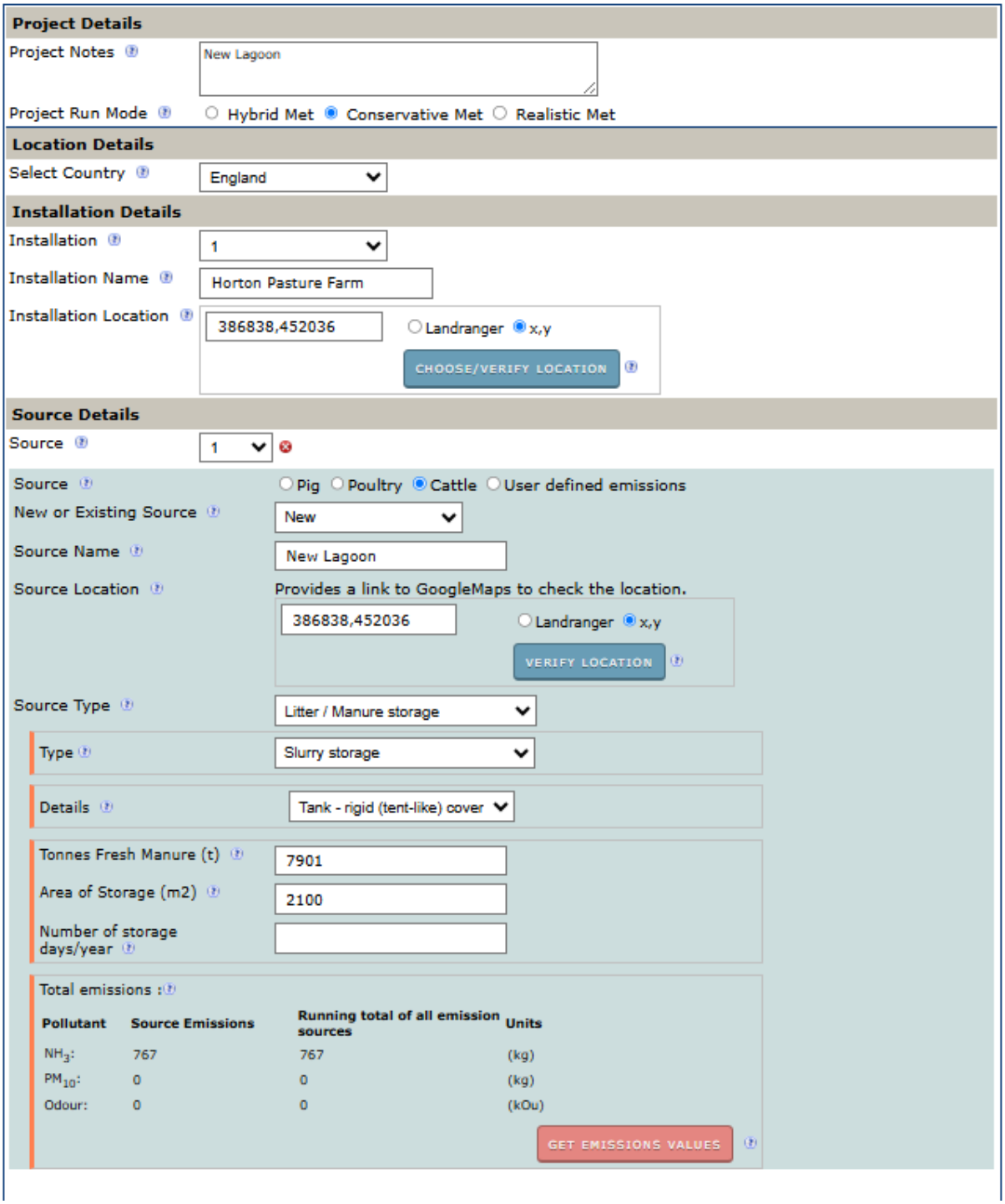
3.18. A review of the SCAIL modelling has now identified 5 receptor locations within a 10Km radius of the site. The model has identified the process contribution from the proposed site, pre control measures, to be minimal and significantly below the critical levels for pollutants including Ammonia emissions (<0.76%), and upwind of the development.

3.19. Background concentrations in the area have however been identified by the model as above the lower of the two critical load values. Recent comments from Natural England suggest that this would trigger a further assessment of the development, however Natural England have confirmed the conservative nature of the SCAIL modelling and that typically detailed further assessments result in a lower concentration being emitted and deposited at the receptor sites.

3.20. As such, with no exceedance of the upper criterion value, a further assessment is likely to determine an even lower impact on the receptor locations and as such the proposed development will not have any significant adverse impact as required by the National Planning Policy Framework and is acceptable.

Figure 1 Aerial Photograph

Appendix A – Screen Shots of SCAIL Model input screens



Designated Site details:

Search Radius 10 km — RUN RECEPTOR SEARCH

No. of Designated Sites 5 — VERIFY RECEPTOR LOCATIONS

Site No.	Name	Distance(km)	Designation	Country	Easting	Northing
1	Pan Beck Fen	4.258	SSSI	ENGLAND	384839	455795
2	Haw Crag Quarry	6.059	SSSI	ENGLAND	391209	456232
3	River Ribble (Long Preston Deeps)	6.773	SSSI	ENGLAND	382494	457232
4	White Moss	7.803	SSSI	ENGLAND	379364	454276
5	New Ing Meadow	8.071	SSSI	ENGLAND	378897	450593

User specified site: Select — Add site

Site Name

Site Location — Landranger / x,y — VERIFY LOCATION

Habitat within site: please select... — CHECK BACKGROUND LEVELS

Human Health Receptor Details

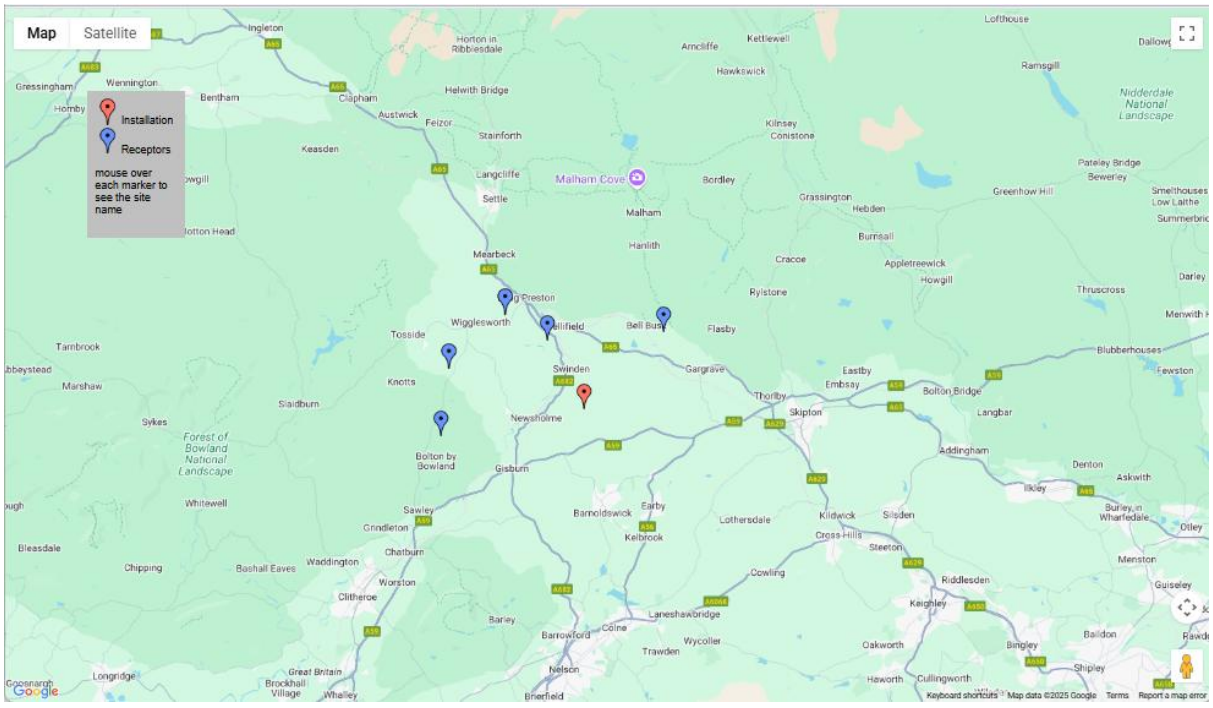
Receptor: Select — Add Receptor

PM_{10} percentile: Annual mean

Receptor Name

Receptor Location — Landranger / x,y — VERIFY LOCATION

CHECK BACKGROUND PM10 LEVELS



Appendix B – SCAIL Results

Content Specific Help Text

Site Information Pan Beck Fen (SSSI)

Country:	ENGLAND
Site Name:	Pan Beck Fen
Site Code:	1002971
Designation Status:	SSSI
Distance from Installation (m):	4258
Receptor Type:	Habitat
Grid Reference:	384839,455795
Met Site:	HIGH
Run Mode:	Conservative
PM_{10} Percentile:	Average

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/m3)	Dep N (kg/ha/yr)	Dep Acid (kEq H+/ha/yr)	Conc PM_{10} (µg/m3)	Conc Odour (Ou/m3)
1	Horton Pasture Farm	1	1	-	0.77	-	0.02	0.12	0.008	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH_3 (µg/m3)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H+/ha/yr)	PM_{10} (µg/m3)	Odour (Ou/m3)
Process Contribution (PC) at receptor edge	0.02290	0.12	0.009	-	-
Background concentration at receptor edge	1.81	20.39	1.637 (N: 1.456|S: 0.180)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.83	20.51	1.65	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	15.0 Carex Dioica - Pinguicula Vulgaris Mire ALTERNATIVE CRITICAL LOAD INFO	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: 183% Upper: 61%	137%	n/a	-	-
EXCEEDANCE	Lower: 0.83 Upper: No exceedance	5.51	n/a	-	-

Project Notes

New Lagoon

Content Specific Help Text

Site Information Haw Crag Quarry (SSSI)

Country:	ENGLAND
Site Name:	Haw Crag Quarry
Site Code:	1002031
Designation Status:	SSSI
Distance from Installation (m):	6059
Receptor Type:	Habitat
Grid Reference:	391209,456232
Met Site:	HIGH
Run Mode:	Conservative
PM_{10} Percentile:	Average

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/m3)	Dep N (kg/ha/yr)	Dep Acid (kEq H+/ha/yr)	Conc PM_{10} (µg/m3)	Conc Odour (Ou/m3)
1	Horton Pasture Farm	1	1	-	0.77	-	0.01	0.07	0.005	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH_3 (µg/m3)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H+/ha/yr)	PM_{10} (µg/m3)	Odour (Ou/m3)
Process Contribution (PC) at receptor edge	0.01287	0.07	0.005	-	-
Background concentration at receptor edge	1.87	19.62	1.583 (N: 1.401|S: 0.181)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.88	19.69	1.59	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	No sensitive habitat or species at this site	No sensitive habitat or species at this site	-	-
		ALTERNATIVE CRITICAL LOAD INFO			
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 1% Upper: 0%	n/a	n/a	-	-
% of relevant standard PEC	Lower: 188% Upper: 63%	n/a	n/a	-	-
EXCEEDANCE	Lower: 0.88 Upper: No exceedance	n/a	n/a	-	-

Project Notes

New Lagoon

Content Specific Help Text

Site Information River Ribble (Long Preston Deeps) (SSSI)

Country:	ENGLAND
Site Name:	River Ribble (Long Preston Deeps)
Site Code:	1003025
Designation Status:	SSSI
Distance from Installation (m):	6773
Receptor Type:	Habitat
Grid Reference:	382494,457232
Met Site:	HIGH
Run Mode:	Conservative
PM_{10} Percentile:	Average

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/m3)	Dep N (kg/ha/yr)	Dep Acid (kEq H+/ha/yr)	Conc PM_{10} (µg/m3)	Conc Odour (Ou/m3)
1	Horton Pasture Farm	1	1	-	0.77	-	0.01	0.06	0.004	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH_3 (µg/m3)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H+/ha/yr)	PM_{10} (µg/m3)	Odour (Ou/m3)
Process Contribution (PC) at receptor edge	0.01074	0.06	0.004	-	-
Background concentration at receptor edge	1.65	19.47	1.566 (N: 1.391|S: 0.175)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.66	19.53	1.57	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	15.0 Lowland fen without open water	No sensitive habitat or species at this site	-	-
		ALTERNATIVE CRITICAL LOAD INFO			
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 1% Upper: 0%	0%	n/a	-	-
% of relevant standard PEC	Lower: 166% Upper: 55%	130%	n/a	-	-
EXCEEDANCE	Lower: 0.66 Upper: No exceedance	4.53	n/a	-	-

Project Notes

New Lagoon

Content Specific Help Text

Site Information White Moss (SSSI)

Country:	ENGLAND
Site Name:	White Moss
Site Code:	1002735
Designation Status:	SSSI
Distance from Installation (m):	7803
Receptor Type:	Habitat
Grid Reference:	379364,454276
Met Site:	HIGH
Run Mode:	Conservative
PM_{10} Percentile:	Average

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/m3)	Dep N (kg/ha/yr)	Dep Acid (kEq H+/ha/yr)	Conc PM_{10} (µg/m3)	Conc Odour (Ou/m3)
1	Horton Pasture Farm	1	1	-	0.77	-	0.01	0.04	0.003	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH_3 (µg/m3)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H+/ha/yr)	PM_{10} (µg/m3)	Odour (Ou/m3)
Process Contribution (PC) at receptor edge	0.00853	0.04	0.003	-	-
Background concentration at receptor edge	1.57	20.39	1.649 (N: 1.456|S: 0.193)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.58	20.43	1.65	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	5.0 Erica Tetralix - Sphagnum Papillosum Raised And Blanket Mire ALTERNATIVE CRITICAL LOAD INFO	maxN: 0.732 maxS: 0.411 minN: 0.321 Erica Tetralix - Sphagnum Papillosum Raised And Blanket Mire	-	-
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 1% Upper: 0%	1%	0%	-	-
% of relevant standard PEC	Lower: 158% Upper: 53%	409%	225%	-	-
EXCEEDANCE	Lower: 0.58 Upper: No exceedance	15.43	0.92	-	-

Project Notes

New Lagoon

Content Specific Help Text

Site Information New Ing Meadow (SSSI)

Country:	ENGLAND
Site Name:	New Ing Meadow
Site Code:	1006296
Designation Status:	SSSI
Distance from Installation (m):	8071
Receptor Type:	Habitat
Grid Reference:	378897,450593
Met Site:	HIGH
Run Mode:	Conservative
PM_{10} Percentile:	Average

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/m3)	Dep N (kg/ha/yr)	Dep Acid (kEq H+/ha/yr)	Conc PM_{10} (µg/m3)	Conc Odour (Ou/m3)
1	Horton Pasture Farm	1	1	-	0.77	-	0.01	0.04	0.003	-	-

Total Depositions/Concentrations and Exceedances

Concentrations/Depositions and Critical Loads/Levels	NH_3 (µg/m3)	N Dep. (kg N/ha/yr)	Acid Dep. (kEq H+/ha/yr)	PM_{10} (µg/m3)	Odour (Ou/m3)
Process Contribution (PC) at receptor edge	0.00808	0.04	0.003	-	-
Background concentration at receptor edge	1.66	19.95	1.612 (N: 1.425|S: 0.187)	-	-
Predicted Environmental Concentration/Deposition (PEC)	1.67	19.99	1.62	-	-
Environmental Assessment Level or Critical Load / Level	Lower: 1 Upper: 3	10.0 Anthoxanthum odoratum - Geranium sylvaticum Grassland	maxN: 5.071 maxS: 4.000 minN: 1.071 Anthoxanthum odoratum - Geranium sylvaticum Grassland	-	-
		ALTERNATIVE CRITICAL LOAD INFO			
USE OWN THRESHOLDS?					
% of relevant standard PC	Lower: 1% Upper: 0%	0%	0%	-	-
% of relevant standard PEC	Lower: 167% Upper: 56%	200%	32%	-	-
EXCEEDANCE	Lower: 0.67 Upper: No exceedance	9.99	-3.46	-	-

Project Notes

New Lagoon

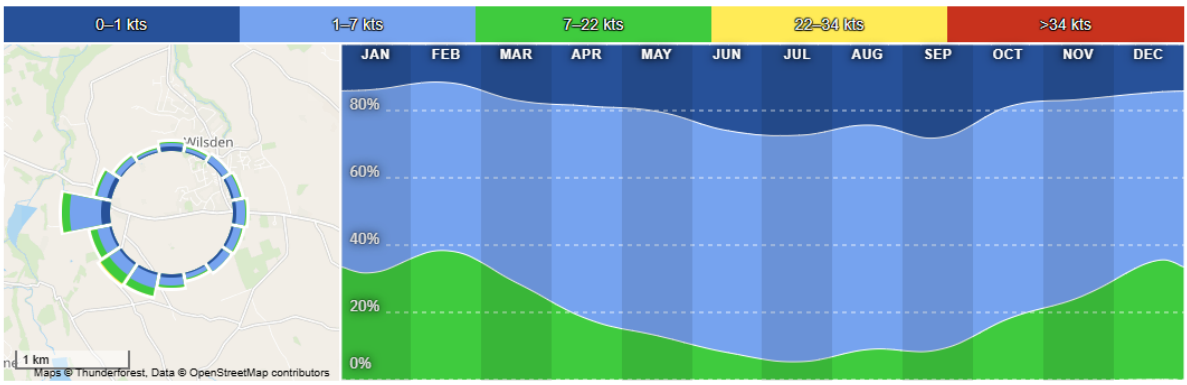
Appendix C – Prevailing Wind Direction

Monthly wind speed statistics and directions for Bingley

Dominant wind direction

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
WSW	SW	SW	W	W	WSW	WSW	WSW	WSW	SW	WSW	WSW

Monthly wind direction and strength distribution



Monthly wind speed statistics and directions for Leeds Bradford International Airport

Dominant wind direction

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
WSW	WSW	WSW	W	W	W	WSW	WSW	W	WSW	WSW	WSW

Monthly wind direction and strength distribution