

Appendix 9.9

Appendix 10.1

Appendix 10.1: Legislation & Policy

Planning Policy

Planning Policy Wales (2016)

- 1.1 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (including TAN 5, as detailed below). PPW translates the commitment of the Welsh Government to sustainable development into the planning system so that it can play an appropriate role in moving towards sustainability.
- 1.2 Chapter 5 of the document outlines the Welsh Government's objectives for the conservation and improvement of the natural heritage, including:
 - The promotion of conservation of landscape and biodiversity, in particular the conservation of native wildlife and habitats;
 - Ensuring that action in Wales contributes to meeting international responsibilities and obligations for the natural environment;
 - Ensuring that statutorily designated sites are properly protected and managed; and
 - To safeguard protected species.
- 1.3 Chapter 12 details the Welsh Government's commitment to providing adequate and efficient infrastructure, and to *"secure the environmental and telecommunications infrastructure necessary to achieve sustainable development objectives, while minimising adverse impacts on the environment, health and communities."*
- 1.4 The objectives to this effect include ensuring that environmental and telecommunications infrastructure is provided in such a way as to enable sustainable development objectives to be met, avoiding adverse impacts on the environment (including the natural and historic environment), local communities and health.

TAN 5 Nature Conservation and Planning (2009)

- 1.5 TAN 5 supplements PPW and provides advice about how the land-use planning system in Wales *'should contribute to protecting and enhancing biodiversity and geological conservation.'*
- 1.6 Section 2.4 of TAN 5 states that when deciding planning applications that may affect nature conservation, *"local authorities should:*
 - *Contribute to the protection and improvement of the environment...seeking to avoid irreversible harmful effects on the natural environment.*
 - *Ensure that appropriate weight is attached to designated sites of international, national and local importance.*
 - *Protect wildlife and natural features in the wider environment, with appropriate weight attached to priority habitats and species in Biodiversity Action Plans.*
 - *Ensure that all material considerations are taken into account and decisions are informed by adequate information about the potential effects of a development on nature conservation;*
 - *Ensure that the range and population of protected species is sustained*
 - *Adopt a stepwise approach to avoid harm to nature conservation, minimise unavoidable harm by mitigation measures, offset residual harm by compensation measures and look for new opportunities to enhance nature conservation; where there may be significant harmful effects local planning authorities will need to be satisfied that any reasonable alternative sites that would result in less or no harm have been fully considered."*

Environment (Wales) Act 2016

- 1.7 The Environment (Wales) Act received Royal Assent on 21 March 2016. It aims to put in place the legislation needed to plan and manage Wales' natural resources in a more proactive, sustainable and joined-up way. The Act states that:
- 1.8 *"A public authority must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions."*
- 1.9 *"The Welsh Ministers must prepare and publish a list of the living organisms and types of habitat which in their opinion are of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales. Before publishing a list under this section the Welsh Ministers must consult the Natural Resources Body for Wales ("NRW") as to the living organisms or types of habitat to be included in the list."* The list provided in Section 7 of the Act superseded Section 42 of the Natural Environment and Rural Communities Act 2006 (the NERC Act).
- 1.10 The Welsh Ministers must *"take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section"*.
- 1.11 In exercising their functions, *"the Welsh Ministers must apply the principles of sustainable management of natural resources."*

Wrexham County Borough Council Unitary Development Plan (UDP)(2015)

- 1.12 The UDP outlines the Council's broad intention for development in the area and provides a framework for more specific policies and proposals. The UDP sets out strategic policies which provide detailed guidance for the development and use of other land.
- 1.13 Policy EC4 states *"development proposals should provide for the conservation and management of hedgerows, trees, orchards, woodland, wildlife and other natural landscape and water features, and include new planting in order to enhance the character of the landscape and townscape. Development which results in the loss or significant damage to valuable trees, important hedgerows or ancient woodland sites will not be permitted"*.
- 1.14 Policy EC6 states *"development either within or close to sites of biodiversity interest will only be permitted where it can be clearly demonstrated that the need for the development outweighs the need to safeguard the intrinsic nature conservation value of the site. Where such development is permitted, damage should be kept to a minimum, and compensatory measures should be provided. Measures to improve biodiversity value of sites and enhance their natural conservation interest and landscape quality including the establishment of local nature reserves, will be supported"*.

UK Post-2010 Biodiversity Framework

- 1.15 The purpose of this UK Biodiversity Framework is to set a broad enabling structure for action across the UK between now and 2020:
- To set out a shared vision and priorities for UK-scale activities, in a framework jointly owned by the four countries, and to which their own strategies will contribute.
 - To identify priority work at a UK level which will be needed to help deliver the Aichi targets and the EU Biodiversity Strategy.
 - To facilitate the aggregation and collation of information on activity and outcomes across all countries of the UK, where the four countries agree this will bring benefits compared to individual country work.
 - To streamline governance arrangements for UK-scale activity.

- 1.16 The vision for the Convention on Biological Diversity's Strategic Plan for Biodiversity 2011-2020 is *'By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people'*.

Legislative Protection

- 1.17 The following pieces of legislation have been taken into account in this assessment:
- 1.18 The Conservation of Habitats and Species Regulations 2017 (the "Habitats Regulations 2017") consolidate and update the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations 2010") place duties on competent authorities (including Local Authorities and National Park Authorities) in relation to wild bird habitat. These provisions relate back to Articles 1, 2 and 3 of the EC Directive on the conservation of wild birds (2009/147/EC, 'Birds Directive') (Regulation 9A(2) & (3) require that "in the exercise of their functions as they consider appropriate" these authorities must take steps to contribute to the *"preservation, maintenance and re-establishment of a sufficient diversity and area of habitat for wild birds in the United Kingdom, including by means of upkeep, management and creation of such habitat..."*
- 1.19 In relation to the duties placed on competent authorities under the 2012 amendment Regulation 9A (8) states: *"So far as lies within their powers, a competent authority in exercising any function [including in relation to town and country planning] in or in relation to the United Kingdom must use all reasonable endeavours to avoid any pollution or deterioration of habitats of wild birds (except habitats beyond the outer limits of the area to which the new Wild Birds Directive applies)."*
- 1.20 The Wildlife and Countryside Act 1981 (the 1981 Act) as amended provides national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the conservation of wild birds (Birds Directive) in Great Britain. The 1981 Act provides for the notification and confirmation of Sites of Special Scientific Interest (SSSIs), provides protection to all wild birds and special protection for certain species of birds, animals and plants listed in the Schedules of the 1981 Act.
- 1.21 Section 6 of the Environment (Wales) Act 2016 places a duty on public authorities to "seek to maintain and enhance biodiversity" so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to "promote the resilience of ecosystems". The duty replaces the Section 40 duty in the Natural Environment and Rural Communities Act 2006 (NERC Act 2006), in relation to Wales, and applies to those authorities within the previous duty.
- 1.22 Section 7 of the Environment (Wales) Act 2016 replaces the duty in section 42 of the NERC Act 2006. Section 7 includes a list of habitats and species of principal importance considered to be of key significance to sustain and improve biodiversity in relation to Wales. Species listed in Section 7 should be a material consideration in planning decisions, in accordance with TAN 5.

Appendix 10.2

Outcome of Consultation with Wrexham County Borough Council Ecologist

- 1.1 Consultation by telephone was undertaken between Senior Ecologist Liz Rose-Jeffreys MCIEEM and the Wrexham County Borough Council Ecologist, Emma Broad, on 18 April 2017. The purpose of the discussion was to agree the approach and extent of further ecological survey work required to inform the future planning application, based on the initial findings of the desk study and the outcome of the extended Phase 1 habitat survey. The following is a summary of the items discussed relevant to ecology in the context of this report.

Bats

- 1.2 It was discussed that, since no trees with bat roost potential will be affected as part of the proposed works, and given that the majority of the works will be sited within sub-optimal bat foraging habitat (open fields) no further bat survey would be necessary to inform the assessment.

Nesting Birds

- 1.3 Given the range of habitats present within the Site, and the presence of the ground-nesting birds, lapwing and meadow pipit, which were recorded during the extended Phase 1 habitat survey on 28 March 2017, it was agreed that targeted breeding bird surveys would be undertaken to confirm the breeding bird species using the Site. The purpose of the surveys would be to inform any necessary mitigation or compensation, and to identify the location of any proposed enhancements (e.g. hedgerow planting). Emma Broad also advised that barn owl had been previously recorded within the breeding bird survey area; this species had not subsequently been recorded during any of the Site visits undertaken by BSG Ecology.

Great Crested Newt

- 1.4 The approach to great crested newts was discussed, given the known historical presence of this species within ponds in the surrounding landscape from the results of the desk study and BSG Ecology's knowledge of the local area. Given the distance between the proposed development and the ponds, and that the habitats to be affected provide mostly sub-optimal terrestrial habitat, it was considered that the risk of encountering a newt during the course of the development is low and that we did not consider a mitigation licence from Natural Resources Wales would be necessary, provided that a precautionary approach was adopted. No further survey of ponds in the surrounding landscape was considered necessary to inform this approach.
- 1.5 Emma Broad agreed that a method statement approach (i.e. RAMS) would be appropriate in this instance, and suggested that a low presence of great crested newts should be assumed in and around the Site, including within the arable habitats. As part of this approach, Emma Broad advised that additional terrestrial habitat for great crested newt would need to be provided within the scheme (e.g. provision of log/brush piles or hibernacula).

Appendix 10.3

Cinders Farm, Ruabon
Ecological Appraisal Report

January 2018

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1 Introduction

Site Description

- 1.1 The Site is the proposed location of a new poultry unit, located to the east of the town of Ruabon near Wrexham, centred at OS grid reference SJ 3241 4404.
- 1.2 The Site consists of part of an arable field (the western field) and part of a species-poor semi-improved neutral grassland (the eastern field) within Cinders Farm. Species-poor hedgerows with mature trees form three of the field boundaries, and wet ditches are located just outside the northern boundary of the Site and the along southeastern boundary of the Site. The Site is surrounded by further arable fields to the north, south and west, with a minor road located to the east.
- 1.3 Nine ponds are located within 500m of the Site, two of which are located within 250m of the Site. The location of ponds is set out on Figure 1, in Section 6.

Proposed Works

- 1.4 The Wynnstay Estate proposes to submit a planning application to Wrexham Borough Council for the construction of a poultry unit, which will involve the construction of the unit within the centre of the western field, and a new access road to connect this to the minor road which is located to the east of the Site.

Definitions

The Site

- 1.5 The Site is the area within which the proposed development is situated, as defined by the red line boundary shown on Figure 1, in Section 6.

Breeding Bird Survey Area

- 1.6 The breeding bird survey area includes all land within the Site, plus the land surrounding the Site as defined by the purple line boundary on Figure 3, in Section 6.

Aims of Study

- 1.7 BSG Ecology was commissioned in March 2017 by Carter Jonas on behalf of the Wynnstay Estate to undertake an extended Phase 1 habitat survey and a desk study, in order to identify habitats or species that may be affected by the proposed works, and to provide an ecological assessment.
- 1.8 The objectives of the survey were to:
- Identify the existing habitats within the Site.
 - Check for evidence of protected species within the Site.
 - Assess the potential for protected species to be present in the Site.
 - Identify potential ecological impacts relating to the proposed works.
 - Identify any requirements for further survey.
 - Propose measures to avoid or reduce ecological impacts based on currently available design information.

- 1.9 Given the range of habitats present within the Site, and the presence of the ground-nesting birds lapwing *Vanellus vanellus* and meadow pipit *Anthus pratensis* which were recorded during the extended Phase 1 habitat survey on 28 March 2017, recommendations were also made to undertake further targeted survey to confirm the breeding bird species using the Site. BSG Ecology was subsequently commissioned to undertake the further survey work during spring 2017.
- 1.10 The survey methods, results, ecology impact assessment and recommendations are detailed in this report.

2 Methods

Desk Study

- 2.1 A desk study was carried out in March 2017 which included a data search for the presence of any protected species records or designated statutory or non-statutory sites of conservation value (such as Sites of Special Scientific Interest or Local Wildlife Sites) within a 2km radius of the centre of the Site. Cofnod was contacted to supply this information on 24 March 2017.
- 2.2 Searches for nearby ponds were also undertaken using the 1:25,000 OS map (BING Maps, accessed 20 March 2017), on-line aerial photography (Google Maps, accessed 20 March 2017).

Consultation

- 2.3 Consultation by telephone was undertaken between Senior Ecologist Liz Rose-Jeffreys MCIEEM and the Wrexham County Borough Council Ecologist, Emma Broad, on 18 April 2017. The purpose of the discussion was to agree the approach and extent of further ecology survey work required to inform the future planning application, based on the initial findings of the desk study and the outcome of the extended Phase 1 habitat survey.

Field Survey

Extended Phase 1 Habitat Survey

- 2.4 The extended Phase 1 habitat survey was undertaken on two dates:
- 28 March 2017.
- This survey visit included the western field and its boundary habitats, plus an assessment of all ponds within 500m of the Site (where access allowed) to support great crested newt *Triturus cristatus*. The survey was undertaken by Senior Ecologist Liz Rose-Jeffreys MCIEEM between 1115 and 1515 hours. The weather was overcast and dry with a moderate breeze, with mist at the start of the survey.
- 23 May 2017.
- This included the eastern field and its boundary habitats (i.e. the proposed access route). The survey was undertaken by Ecologist Stuart Thomas MCIEEM between 0800 and 0900 hours. The weather was partially overcast and dry.
- 2.5 An additional walkover survey of the Site was undertaken by Senior Ecologist Katy Stiles MCIEEM on 17 January 2018 to record any significant changes to the findings of the surveys undertaken in 2017. Any changes are detailed on within this report. The weather was cold with scattered showers.
- 2.6 During all visits the survey area was walked over and the habitats were described using the Phase 1 habitat survey methodology (JNCC, 2010).
- 2.7 Checks for signs of protected species were made throughout the Site. The trees were inspected from the ground, to assess their potential to support roosting bats and to search for signs of bat activity such as droppings. Searches were also made for evidence of badger *Meles meles* (such as setts, feeding remains, dung pits, hairs and tracks). The wet ditches located within and immediately adjacent to the Site were assessed for their potential to support water vole *Arvicola amphibius*, otter *Lutra lutra* and white-clawed crayfish *Austropotamobius pallipes*, and were searched for any signs indicating the presence of water vole (where access allowed). The Site was assessed for its potential to support dormouse *Muscardinus avellanarius*. Potential nesting habitats for breeding birds were identified and any incidental sightings of birds were noted. The Site was assessed for its

potential to support reptiles and was also searched for the presence of invasive non-native plants such as Japanese knotweed *Fallopia japonica*.

- 2.8 The Site was also assessed for its potential to support great crested newt and, during the survey on 28 March 2017, an assessment was undertaken of three of the ponds (Ponds 1, 8 and 9) located within 500m of the Site for their potential to support this species. No access was available to six further ponds, located between 230-450m from the Site (Ponds 2, 3, 4, 5, 6 and 7). For location of ponds refer to Figure 1, in Section 6. The three ponds were assessed using the Habitat Suitability Index (HSI) scoring method (Oldham *et al.*, 2000), which is a quantitative means of evaluating habitat quality for great crested newt measured over ten indices. The HSI provides a numerical index between 0 and 1 where 0 indicates very poor habitat with minimal probability of great crested newt occurrence, and 1 represents optimal habitat with a high probability of occurrence (ARG UK, 2010).

Breeding Bird Survey

- 2.9 Breeding bird surveys were undertaken by Stuart Thomas MCIEEM, an experienced ornithologist, between April and June 2017. The surveys were conducted early in the morning (i.e. starting between 5:30-6:30am) and typically lasted 2-3 hours. Dates of survey and weather conditions recorded during the surveys are summarised in Table 1.

Table 1: Breeding bird survey conditions and timings

Visit	Date	Duration of survey (hours)	Wind Direction & Speed (Beaufort Scale)	Cloud Cover (Octas)	Precipitation	Temperature
1	23/04/2017	2:10	1NW	2/8 – 5/8	Dry	3°C
2	23/05/2017	3:00	1-2E	5/8 – 6/8	Dry	12-15°C
3	13/06/2017	2:00	Still	6/8 – 8/8	Dry	13-14°C

- 2.10 During each visit the survey area was walked at a slow pace to enable all birds detected to be identified and located. Frequent stops were made to scan suitable habitats and to listen for singing and calling birds. All areas of suitable breeding habitat within the breeding bird survey area boundary were approached.
- 2.11 During the survey the location and activity of each bird detected (including those seen or heard) was recorded and mapped using standard two-letter BTO species codes combined with activity symbols.
- 2.12 Birds exhibiting breeding behaviour were assigned to one of three categories: possible breeding, probable breeding or confirmed breeding. These are defined below (based on BTO criteria):
- Possible breeding: birds heard singing or alarm calling or simply present in suitable breeding habitat on one of the survey visits;
 - Probable breeding: a pair of birds present in suitable breeding habitat; a repeat observation of territorial behaviour (song or alarm calling) on two or more different visits in the same location; courtship behaviour or display in suitable breeding habitat; birds apparently visiting a nest site; or, evidence of nest building (including excavation of a hole);
 - Confirmed breeding: one or more adults undertaking a distraction display; the presence of a used nest or eggshells; the presence of recently fledged or downy young (that are clearly of local origin); apparently incubating adults or adults commuting to and from a nest hole; adult birds carrying faecal sacs or food for young; or, a nest with eggs or young present.

Limitations to Methods

- 2.13 There was no access to six ponds located within 500m of the Site meaning that these ponds could not be assessed for their potential to support great crested newt. This has been taken into account within the ecological appraisal and is not considered to present a significant constraint to the impact assessment, based on the location and nature of the proposed development and due consideration given in respect of reasonable avoidance and mitigation measures for this legally protected species and its habitat.
- 2.14 It was not possible to access the wet ditch along the northern boundary of the survey area, precluding detailed searches for evidence of water vole, otter or white-clawed crayfish. Since the proposed works will attain a minimum standoff of 20m from the banks of the ditch, the proposals are considered unlikely to result in an adverse impact on any of these three species, should they be present within this watercourse. Therefore, the lack of access is not considered to be a significant constraint.

3 Results and Interpretation

Consultation

- 3.1 A summary of the outcome of the consultation by telephone with the Wrexham County Borough Council Ecologist, Emma Broad, is presented in Appendix 1.

Designated Sites

Statutory Designated Sites

- 3.2 One statutory site, Johnstown Newt Sites Special Area of Conservation (SAC) / Stryt Las a'r Hafod Site of Special Scientific Interest (SSSI), is located 1.9km to the northwest of the Site at its nearest point. This is a composite site with a special interest for its amphibians. The waterbodies are known to support one of the largest known breeding populations of great crested newt in Great Britain (JNCC, 2017). The site is managed by Wrexham County Borough Council as a community nature park.

Non-Statutory Designated Sites

- 3.3 There are seven non-statutory Local Wildlife Sites (LWS) located within 2km of the Site, the nearest of which, Caldecott's Wood LWS, is located 920m to the east of the Site. This site is an area of semi-natural, broadleaved woodland.

Habitats

- 3.4 The Site was mapped during the Phase 1 habitat survey and the habitats within the Site are described below. The locations of the habitats are shown on Figure 2 in Section 6. The photographs referred to in the text below are set out in Section 7.
- 3.5 The survey area is part of an arable field sown with wheat in 2017 (Photograph 1), and a section of species-poor semi-improved neutral grassland (Photograph 2), which is grazed by cattle. The arable field is bounded by hedgerows at the northern, eastern and southern boundaries, the majority of which contain occasional mature trees and are species-rich (Photograph 3). Wet ditches are present alongside the northern and eastern Site boundaries.
- 3.6 The species-poor semi-improved grassland is short-grazed with areas of bare ground, with species present including perennial rye-grass *Lolium perenne*, white clover *Trifolium repens*, red clover *Trifolium pratense*, common mouse-ear *Cerastium fontanum*, broadleaved dock *Rumex obtusifolius*, creeping thistle *Cirsium arvense* and common field speedwell *Veronica persica*. The species-poor semi-improved neutral grassland does not conform to the Priority Habitat description "Lowland Meadows" (Maddock, 2011) because it is semi-improved and the plant assemblage is more indicative of fertile soils, and does not suggest a low-input nutrient regime which is characteristic of lowland meadows.
- 3.7 The hedgerows are generally dominated by hawthorn *Crataegus monogyna*, and the majority contain mature oak *Quercus* sp. trees, with other woody species present: blackthorn *Prunus spinosa*, elder *Sambucus nigra*, holly *Ilex aquifolium*, rose *Rosa* sp., hazel *Corylus avellana* and bramble *Rubus fruticosus* agg.. The hedgerows at the northern and eastern boundaries of the arable field are species-rich, and the hedgerow along the southern boundary is species-poor. Hedgerows are listed as Habitats of Principal Importance under the provisions of the Environment (Wales) Act 2016. Although the hedgerows on Site have not been formally assessed under the Hedgerow Regulations 1997, based on the results of the Phase 1 habitat survey, the hedgerow to be affected is considered unlikely to qualify as 'important' under the ecological criteria of the Hedgerow Regulations 1997 due to the limited number of woody shrub and tree species present.

- 3.8 The wet ditch located just beyond the northern boundary of the Site is approximately 50cm wide, had an average water depth of 5cm at the time of survey, appeared relatively clear, and flows in an easterly direction (Photograph 4). The ditch is located outside the land ownership boundary, and is bordered by a hedgerow along the majority of its southern bank, meaning that it was not possible to view the majority of the ditch.
- 3.9 The wet ditch at the northern boundary crosses into the species-poor semi-improved neutral grassland field, and then runs along the eastern boundary of the Site adjacent to the minor road where it passes through the Site (Photograph 5). In this location the ditch is shaded by overhanging tall ruderal vegetation and scrub, with a maximum water depth of 10cm at the time of survey. Species present include bramble and common nettle *Urtica dioica*, with occasional cock's-foot *Dactylis glomerata*, red fescue *Festuca rubra*, meadowsweet *Filipendula ulmaria*, hogweed *Heracleum sphondylium*, great willowherb *Epilobium hirsutum*, rosebay willowherb *Chamerion angustifolium*, broadleaved dock, cleavers *Galium aparine* and common vetch *Vicia sativa*.

Protected Species

Bats

- 3.10 Cofnod provided 18 records for bats within the desk study area. Table 2 below sets out details of the different bat species records and their proximity to the Site; no further details, such as whether these records relate to roosts, were provided by Cofnod. There are no records for bats within the Site.

Table 2: Bat records

Species	Number of records	Date range of records	Closest record to the Site	
			Distance from the Site	Date
Common pipistrelle <i>Pipistrellus pipistrellus</i>	8	1982-2015	1.1km to the north	2015
<i>Myotis</i> bat species	1	2015	1.1km to the northeast	2015
Noctule <i>Nyctalus noctula</i>	1	2015	1.1km to the northeast	2015
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	1	2015	1.1km to the northeast	2015
Unidentified bat species	6	1983-2015	1.5km to the east	2005
Unknown pipistrelle <i>Pipistrellus</i> species	1	2004	1.8km to the west	2004

- 3.11 During the survey all trees situated within the Site were assessed from the ground for any suitable bat roosting features. Twelve trees, located at the boundaries of the Site, are assessed as supporting features that could be utilised by roosting bats. These features include splits in limbs, knot holes, dead wood and lifted bark (Photographs 6 and 7). The location of the trees is set out in Figure 2.
- 3.12 The network of dense hedgerows, trees and ditches at the boundaries of the Site provides suitable foraging and commuting habitats for bats, which connect to further suitable habitat within the wider landscape.

Nesting Birds

- 3.13 Cofnod provided 145 records for notable bird species within the desk study area, relating to 47 species dating from 2005-2017. None of the records relates to the Site. The nearest records are of house sparrow *Passer domesticus*, mistle thrush *Turdus viscivorus*, starling *Sturnus vulgaris* and whitethroat *Sylvia communis*. The location of these records is only accurate to 1km and therefore the precise distance from the Site cannot be determined.

- 3.14 A total of 28 bird species were recorded within the breeding bird survey area during the three survey visits combined, of which 17 are confirmed or probable breeders within the survey area. Of these 17, four occurred within the Site: blackbird *Turdus merula*, great spotted woodpecker *Dendrocopos major*, robin *Erithacus rubecula* and whitethroat *Sylvia communis*. These are summarised in Table 3 together with an estimated number of confirmed breeding territories/nest sites. The indicative central point of each territory for confirmed and probable breeders is shown in Figure 3 in Section 6.
- 3.15 In addition to those species listed in Table 3, the ground-nesting species lapwing (one individual) was also recorded within the eastern field (grazed grassland) to the north of the Site boundary during the extended Phase 1 habitat survey on 28 March 2017. The Wrexham County Borough Council Ecologist, Emma Broad, also advised that barn owl *Tyto alba* is known to roost within one of the mature trees within the breeding bird survey area. Neither lapwing nor barn owl was subsequently recorded within the breeding bird survey area during the targeted breeding bird surveys.

Table 3: Summary results of breeding bird survey

Species	Breeding status within breeding bird survey area			No. of Territories (confirmed breeders only)	Conservation status	Other notes
	Confirmed	Probable	Possible			
Blackbird <i>Turdus merula</i>		✓			-	Numerous singing males
Blackcap <i>Sylvia atricapilla</i>		✓			-	
Blue tit <i>Cyanistes caeruleus</i>	✓			5	-	
Carrion crow <i>Corvus corone</i>			✓		-	
Chaffinch <i>Phylloscopus collybita</i>		✓			-	Numerous singing males
Chiffchaff <i>Phylloscopus collybita</i>		✓			-	3+ singing males
Goldfinch <i>Carduelis carduelis</i>			✓		-	
Grasshopper warbler <i>Locustella naevia</i>		✓			Red list species. Species of Principal Importance.	2 reeling males 25/4/17. Strongly thought to have bred.
Great spotted woodpecker <i>Dendrocopos major</i>		✓			-	Male heard drumming on visit 2

Species	Breeding status within breeding bird survey area			No. Territories (confirmed breeders only)	Conservation status	Other notes
	Confirmed	Probable	Possible			
Great tit <i>Parus major</i>	✓			2	-	
Greenfinch <i>Carduelis chloris</i>			✓		-	
Herring gull <i>Larus argentatus</i>					Red list species. Species of Principal Importance.	Flying over
House sparrow <i>Passer domesticus</i>	✓			2+	Red list species ¹ . Species of Principal Importance ² .	At least 2+ other pairs
Lesser black-backed gull <i>Larus fuscus</i>					Amber list species ³ .	Flying over
Mallard <i>Anas platyrhynchos</i>			✓		Amber list species.	Male flushed from pond
Meadow pipit <i>Anthus pratensis</i>			✓		Amber list species.	
Moorhen <i>Gallinula chloropus</i>	✓			1	-	Family party on pool
Pheasant <i>Phasianus colchicus</i>			✓		-	
Robin <i>Erithacus rubecula</i>		✓			-	Numerous singing males
Sedge warbler <i>Acrocephalus schoenobaenus</i>					-	Migrant species sighting 25/4/17
Skylark <i>Alauda arvensis</i>		✓			Red list species. Species of Principal Importance.	Singing birds 2/3 visits over cereal fields.

¹ Species of high conservation concern (red list species) included in Birds of Conservation Concern 4 (Eaton *et al*, 2015).

² Species of Principal Importance for the Conservation of Biodiversity in Wales as listed in accordance with Section 7 of the Environment (Wales) Act 2016

³ Species of medium conservation concern (amber list species) included in Birds of Conservation Concern 4 (Eaton *et al*, 2015).

Species	Breeding status within breeding bird survey area			No. of Territories (confirmed breeders only)	Conservation status	Other notes
	Confirmed	Probable	Possible			
Song thrush <i>Turdus philomelos</i>		✓			Red list species. Species of Principal Importance.	
Starling <i>Sturnus vulgaris</i>			✓		Red list species. Species of Principal Importance.	
Swallow <i>Hirundo rustica</i>		✓			-	Buildings not examined internally but pairs present
Wheatear <i>Oenanthe oenanthe</i>					-	Migrant species sighting 25/4/17
Whitethroat <i>Sylvia communis</i>	✓			2	-	
Woodpigeon <i>Columba palumbus</i>		✓			-	
Wren <i>Troglodytes troglodytes</i>		✓			-	
28 species	5	12	7	12 confirmed		

Great Crested Newt

- 3.16 Cofnod provided 68 records for great crested newt within the desk study area dating between 1991-1997. The nearest two records originate from Pond 1, located 190m to the west of the Site; these records date from 1992. Records of this species were also provided for Ponds 2, 5 and 8, located 230m to the northwest, 450m to the northeast and 430m to the southeast of the Site respectively.
- 3.17 In addition to the records provided by Cofnod, Johnstown Newt Sites Special Area of Conservation (SAC) / Stryt Las a'r Hafod Site of Special Scientific Interest (SSSI), is located 1.9km to the northwest of the Site at its nearest point. This is a composite site with a special interest for its amphibians, and the waterbodies are known to support one of the largest known breeding populations of great crested newt in Great Britain.
- 3.18 There are no ponds within the Site, and the majority of the Site is formed of sub-optimal terrestrial habitat (arable field and short-grazed grassland). The bases of the hedgerows at the field boundaries, and the vegetated banks of the wet ditch along the eastern edge of the Site, provide some areas of suitable terrestrial habitat for great crested newts, if present.
- 3.19 Access was possible to Ponds 1, 8 and 9, and these three ponds are described below. Access was not possible to the remaining six ponds located within 500m of the Site. The location of ponds is set out in Figure 1.

Pond 1

- 3.20 This pond is located 190m to the west of the Site (Photograph 8), and records of great crested newt have been provided for this pond, dating from 1992. The pond is approximately 30m x 20m, mostly shaded by adjacent trees, and the water was relatively clear. Macrophytes occupy approximately 25% of its surface, with species present including floating sweet-grass *Glyceria fluitans*, pond sedge *Carex* sp. and brooklime *Veronica beccabunga*. Frogspawn was recorded at the southern edge of the pond. The presence of marginal vegetation within the pond provides suitable egg-laying material for newts, and the area of open water provides some suitability as aquatic habitat for great crested newts. The pond is surrounded by trees and scrub, with frequent deadwood and brash, which are considered to present optimal terrestrial habitat for amphibians in the immediate habitat.
- 3.21 The HSI score for Pond 1 is 0.85, which indicates that the pond has “excellent” suitability to support a population of great crested newts (ARG UK, 2010).

Pond 8

- 3.22 This pond is located 430m to the southeast of the Site (Photograph 9), and two records of great crested newt have been provided for this pond, dating from 1992. The pond is approximately 40m x 20m, and approximately 35% of the margin is shaded by adjacent trees. The water was relatively turbid at the time of survey, and macrophytes occupy approximately 1% of its surface. Trees and hedgerows are present in close proximity to the pond, providing some suitable terrestrial habitat for amphibians in the immediate habitat.
- 3.23 The HSI score for Pond 8 is 0.77, which indicates that the pond has “good” suitability to support a population of great crested newts (ARG UK, 2010).

Pond 9

- 3.24 This pond is located 440m to the south of the Site (Photograph 10). No records of great crested newt have been provided for this pond during the data search. The pond is approximately 15m x 8m, and is heavily poached by horses, meaning that the water was very turbid at the time of survey. The pond is set within a field, which provides limited shelter for amphibians in the immediate vicinity of the pond.
- 3.25 The HSI score for Pond 9 is 0.66, which indicates that the pond has “good” suitability to support a population of great crested newts (ARG UK, 2010).

Water Vole

- 3.26 Cofnod provided one record of water vole from 1995, from a location 1.5km to the east of the Site.
- 3.27 Two wet ditches are located within or immediately adjacent to the Site: the wet ditch located just outside the northern boundary of the Site, and the section of this same ditch which is located alongside the minor road, at the eastern boundary of the Site. No evidence to suggest the presence of water vole was recorded within the section of ditch along the eastern edge of the Site. The section of ditch located just beyond the northern Site boundary is mostly obscured from view by the hedgerow along the northern edge of the Site, meaning that a detailed check for evidence of water vole was not possible, and the presence of this species cannot be completely ruled-out.

Otter

- 3.28 Cofnod did not provide any otter records within the desk study area.
- 3.29 No evidence to suggest the presence of otter was recorded within the Site. As set out in Paragraph 3.27, access was not possible to the ditch located just outside the northern Site boundary, meaning that detailed searches for this species were not possible. However, the overall lack of deep water, the lack of cover along the length of the ditch and the lack of connectivity to larger watercourses in

the surrounding area means that this ditch is considered to provide less suitable habitat for otter, and the presence of this species is considered unlikely.

White-Clawed Crayfish

- 3.30 Cofnod did not provide any records of white-clawed crayfish within the desk study area.
- 3.31 The wet ditches located within and just outside the Site boundaries are considered sub-optimal to support this species, due to the lack of rocks or pools, and that the ditches are likely to be ephemeral and dry out during the drier months. Overall the presence of this species is considered to be unlikely.

Dormouse

- 3.32 Cofnod did not provide any records of dormouse within the desk study area.
- 3.33 Although the hedgerows located at the boundaries of the Site are relatively dense, the Site itself is considered to have low potential to support dormouse, given the lack of connectivity between the hedgerows to any optimal dormouse habitat such as mature, well-established and structurally-diverse woodlands in the surrounding landscape. Overall, given the lack of suitable dormouse habitats within and in close proximity to the Site, the presence of this species within the hedgerows at the field boundaries of the Site is considered to be unlikely.

Reptiles

- 3.34 Cofnod provided one record of slow-worm *Anguis fragilis*, from a location 1.8km to the west of the Site and dating from 2008.
- 3.35 The majority of the Site is formed of sub-optimal reptile habitat (arable field and short-grazed grassland). The bases of the hedgerows at the field boundaries, and the vegetated banks of the wet ditch along the eastern edge of the Site, provide some areas of suitable habitat for reptiles, if present.

Badger

- 3.36 Cofnod provided 16 records of badger within the desk study area, dating between 2002-2004. None of the records relates to the Site and the nearest record is located more than 400m from the Site.
- 3.37 A dead badger was recorded at the side of the minor road at the eastern Site boundary during the second breeding bird survey visit on 23 May 2017. No further signs of badger, including setts, were located at any point during the surveys, and it is considered likely that the badger recorded may have been a road casualty.

4 Potential Impacts and Recommendations

- 4.1 Guidance on relevant legislation, policy and Habitats and Species of Principal Importance can be found in Appendix 2.
- 4.2 The proposed work will involve the construction of a poultry unit within the centre of the western field, and a new access road which will cross the eastern field to connect the new poultry unit to the minor road located to the east of the Site.

Designated Sites

Statutory Designated Sites

- 4.3 One statutory site, Johnstown Newt Sites SAC / Stryt Las a'r Hafod SSSI, is located 1.9km to the northwest of the Site at its nearest point. The proposed works are to be restricted to the development Site and therefore given their geographical distance from the SAC/SSSI, no adverse impacts are anticipated on this designated site.

Non-Statutory Designated Sites

- 4.4 Seven non-statutory Local Wildlife Sites are located within 2km of the Site, the nearest of which, Caldecott's Wood LWS, is located 980m to the east of the Site. The proposed works are to be restricted to the Site and therefore given their geographical isolation from this LWS and other non-statutory designated sites, no adverse impacts are anticipated on LWS.

Habitats

- 4.5 It is anticipated that vegetation losses will include 1.5ha of arable field habitat to accommodate the new poultry unit, and up to 0.05ha species-poor semi-improved neutral grassland for the new access road. Up to 10m of species-rich hedgerow will also require removal to facilitate access between the two fields. A new crossing will also be required across the wet ditch at the eastern edge of the Site, which will affect a length of up to 10m.
- 4.6 Arable fields are a ubiquitous feature in the local landscape. The section of arable field to be affected is considered to be of low intrinsic ecological value, and its partial loss is not, therefore, likely to be significant beyond the immediate context of the Site.
- 4.7 The loss of 0.05ha of species-poor semi-improved neutral grassland is not considered to be significant. The wet ditch at the eastern boundary of the Site does not conform to any Priority Habitat types and the loss of up to 10m of ditch habitat to create a new crossing is not considered to be significant. It is recommended that pollution control measures are put in place in advance of Site works to reduce the risk of pollution within the ditch due to, for example, increased sediment load in surface water runoff.
- 4.8 The network of hedgerows at the boundaries of the Site and in the surrounding landscape contributes to local biodiversity and provides habitat connectivity within the Site, and connects the Site to woodland and hedgerows beyond the Site boundary. No hedgerow trees will require removal and the removal of up to 10m of species-rich hedgerow is considered unlikely to result in a significant fragmentation of habitat within the Site.
- 4.9 Under the Hedgerow Regulations 1997, the Local Planning Authority will need to be notified with regards to details of the proposed hedgerow removal, in order to allow them to make a determination as to whether the hedgerow is 'important' under the Hedgerow Regulations 1997. In order to minimise the extent of hedgerow to be removed, it is recommended that the existing gap at the southeastern corner of the arable field is utilised. If any hedgerow removal is required (e.g. to widen this existing gap) then, in order to compensate for this minor loss in hedgerow, it is recommended that at least 10m of additional hedgerow planting is incorporated into the Site, using

locally-appropriate native species. This could include the provision of hedgerow on the fenced section of the northwestern boundary of the eastern field.

Protected Species

Bats

- 4.10 Bats are European Protected Species (EPS) that are fully protected under the Conservation of Habitats and Species Regulations 2017 and under the Wildlife and Countryside Act 1981 (as amended). In summary this legislation means that bats are protected against disturbance, killing or injuring and their roosts are protected against obstruction, damage or destruction. A bat roost may be any structure a bat uses for breeding, resting, shelter or protection. Seven UK bat species are also listed as Species of Principal Importance under the provisions of the NERC Act 2006.
- 4.11 Twelve trees located at the boundaries of the Site are considered to support features with potential to support roosting bats. The proposed works will not directly affect these trees, and all retained trees will be protected from harm throughout the construction phase of the development, therefore no impacts on potential roosts sites are anticipated. It is also recommended that the trees with bat roost potential are not subject to pruning works as part of the development. If impacts to any trees with bat roost potential becomes necessary then it is recommended that a detailed aerial tree survey in relation to bats is undertaken.
- 4.12 No additional lighting is proposed as part of the development, and therefore no indirect adverse impact on roosting bats, as a result of illuminating potential roosts sites, is anticipated. In addition, the majority of habitat losses are within arable field and a small section of the grazed grassland, both of which are considered to provide sub-optimal foraging and commuting habitat for bats. If any hedgerow removal is required then this will involve the loss of up to 10m hedgerow in order to create an access route from the minor road to the new poultry unit. Given the abundance of hedgerow habitat at the boundaries of the Site and in the wider landscape, this loss is considered to be minimal, and unlikely to give rise to an adverse impact on foraging or commuting bats. As compensation for the loss of this small section of hedgerow, it is recommended that at least 10m of hedgerow is planted within the Site. This could include the provision of hedgerow on the fenced section of the northwestern boundary of the eastern field.

Nesting Birds

- 4.13 All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. Further detail in relation to the legal protection afforded to birds is set out in Appendix 1.
- 4.14 The proposed works will not directly affect the locations of any confirmed or probable breeding birds. The four species recorded within the Site (blackbird, great spotted woodpecker, robin and whitethroat) are associated with the boundary habitats (i.e. hedgerows and trees), and therefore the change in habitat from arable field to poultry unit is unlikely to give rise to a reduction of nesting habitat suitability or extent for these species. Within the wider breeding bird survey area, of the confirmed and probable breeders, skylark is the only ground-nesting bird recorded. This species is a probable breeder within the section of arable field approximately 30m to the west of the Site. The provision of poultry units within the Site will give rise to a small reduction in availability of suitable nesting habitat for skylark, although given the abundance of suitable habitat within the surrounding landscape, this reduction is unlikely to be significant and no mitigation or compensation is considered necessary.
- 4.15 The main impact to breeding birds is considered likely to occur should the suitable habitats for birds on Site be cleared during the breeding bird season. As a guide, the bird nesting season is between February and August inclusive; dates vary by species and can be affected by prevailing weather conditions. The majority of species do not start nesting until March and April. It is therefore recommended that the clearance of the arable habitat and the removal of the short section of hedgerow (if required) is undertaken between September and January, in order to avoid the bird breeding season. If any work has to take place during the bird breeding season, then it is

recommended that the habitats to be affected are surveyed for active bird nests by a suitably qualified ecologist before the work is carried out. If active bird nests are present, then works affecting the area supporting the nests would need to be delayed until nesting activity has ceased.

Great Crested Newt

- 4.16 Great crested newts and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended), and by the Conservation of Habitats and Species Regulations 2017. Great crested newt and common toad are also listed as listed as Species of Principal Importance under the provisions of the Environment (Wales) Act 2016
- 4.17 There are nine ponds located within 500m of the Site, four of which (Ponds 1, 2, 5 and 8) have historical records of great crested newt.
- 4.18 The Site layout has not been finalised however it is anticipated that the new poultry unit will be sited within the centre of the western (arable) field, and that the new access route will bisect the eastern grazed (species-poor semi-improved neutral grassland) field. These fields are both considered to provide sub-optimal habitat for amphibians including great crested newt, due to the lack of cover that they provide. The most suitable terrestrial habitat which will be affected is the base of the hedgerow between the two fields and the vegetated banks of the wet ditch, up to 10m of which will require removal to facilitate access. These features are located 380m and 280m from the nearest ponds respectively.
- 4.19 The aerial photographs show that the land immediately surrounding Ponds 1-9 typically comprises hedgerows or areas of trees, which provide suitable terrestrial habitat for great crested newt, and it is considered unlikely that newts would travel over 250m to enter the suitable habitats within the proposed development Site. Natural England guidelines (2001) state that suitable terrestrial habitat within 250m of a great crested newt breeding pond is likely to be used most frequently, and more recent studies (Natural England, 2007) have shown that great crested newt densities are very low over 100m from a breeding pond. The chance of encountering a newt during the course of the works is, therefore, considered unlikely.
- 4.20 The presence of great crested newts within the proposed working area is considered to be unlikely. It is recommended however that, as a precaution, and taking into account the advice from Emma Broad, the Wrexham County Borough Council Ecologist (18 April 2017), the following Reasonable Avoidance Measures (RAMs) are adopted throughout the construction phase:

1. Toolbox talk

- 4.21 A toolbox talk should be delivered to contractors prior to the start of works, to advise contractors of the possible presence of great crested newt in the local area, to explain the legal protection afforded to this species, and to explain the proposed RAMS set out below.

2. Hand searches

- 4.22 Prior to any hedgerow removal or works affecting the banks of the wet ditch, these areas should be hand-searched for the presence of great crested newts by a suitably qualified and licenced ecologist. Although the open fields provide sub-optimal habitat, a hand search of these areas should also take place. This search should take place immediately prior to the start of works. The vegetation should then be removed by contractors using hand tools or light machinery.

3. Storage of materials

- 4.23 A designated area should be established for material, equipment and machinery storage prior to the start of works. This will be clearly defined and will be set back from any boundary features, i.e. hedgerows and wet ditches. Materials should be stored above ground-level e.g. on pallets.

4. Cover excavations

- 4.24 Any excavations or trenches should be covered overnight to prevent amphibians (and any other wildlife) from entering excavations or from becoming trapped. Excavations should be checked at the start of each working day to confirm that no great crested newts are present.

If a great crested newt is found

- 4.25 In the unlikely event that a great crested newt is found during the course of the works then works should cease and advice should be sought from a suitably qualified and licensed ecologist as to the appropriate way forward. An example photograph of a great crested newt recorded terrestrially is set out in Appendix 3.
- 4.26 It is also recommended that, as an enhancement, additional terrestrial habitat for great crested newt is incorporated into the Site. This could include, for example, provision of hibernacula adjacent to the retained hedgerows or the creation of log piles/brash at the base of the hedgerows.

Water Vole

- 4.27 Water vole is protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to kill, injure or take any water vole, damage, destroy or obstruct access to any place of shelter or protection that the animals are using, or disturb voles while they are using such a place. Water vole is also listed as a Species of Principal Importance under the provisions of the Environment (Wales) Act 2016.
- 4.28 No evidence of water vole was recorded within or adjacent to the Site, and the proposed works will be sited a minimum of 30m from the wet ditch to the north of the Site, which could not be thoroughly surveyed due to access constraints. No adverse impact on water vole is anticipated as a result of the proposals and no further survey or mitigation measures are considered necessary in relation to this species.

Otter

- 4.29 Otter is fully protected under the Conservation of Habitats and Species Regulations 2017 and under the Wildlife and Countryside Act 1981 (as amended). In summary, this legislation means that otter is protected against disturbance, killing or injuring and their holt and laying-up sites are protected against obstruction, damage or destruction. Otter is also listed as a Species of Principal Importance under the provisions of the Environment (Wales) Act 2016.
- 4.30 No evidence of otter was located during the survey. The majority of the Site does not provide suitable habitat for otter and, given the lack of connectivity to larger, more suitable waterbodies in the wider landscape, the presence of this species is considered unlikely. No mitigation measures or further survey work are required.

White-Clawed Crayfish

- 4.31 White-clawed crayfish receives partial protection under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to take or sell any white-clawed crayfish.
- 4.32 The wet ditch to be affected is considered to present sub-optimal habitat for white-clawed crayfish, and the presence of this species within the Site is considered unlikely. No further survey or mitigation is considered necessary in relation to this species.

Dormouse

- 4.33 Dormouse is fully protected under the Conservation of Habitats and Species Regulations 2017 and under the Wildlife and Countryside Act 1981 (as amended). In summary this legislation means that dormouse is protected against disturbance, killing or injuring and their nests are protected against

obstruction, damage or destruction. Dormouse is also listed as a Species of Principal Importance under the provisions of the Environment (Wales) Act 2016.

- 4.34 Given the lack of habitat connectivity between the hedgerows at the boundaries of the Site and woodlands in the surrounding landscape, the presence of this species within the Site is considered unlikely. The removal of up to 10m of hedgerow is, therefore, considered unlikely to result in an adverse impact on this species. No further survey or mitigation is considered necessary in relation to dormouse.

Reptiles

- 4.35 All British reptiles are protected under the Wildlife and Countryside Act 1981 (as amended) against intentional killing or injury and against sale. In addition, all British reptiles are Species of Principal Importance under the provisions of the Environment (Wales) Act 2016.
- 4.36 The majority of the Site is formed of sub-optimal reptile habitat (arable field and short-grazed grassland). Although the presence of reptiles within the hedgerow bases and the wet ditch is unlikely, their presence cannot be completely ruled-out. In the unlikely event that any reptiles are found during the precautionary RAMS set out in Paragraphs 4.21-4.26 above, it is recommended that they are moved by the ecologist to an area of similar adjacent habitat which is to be retained. A written record should be kept of any reptiles which are moved.

Badger

- 4.37 Badger is protected under the Protection of Badgers Act 1992. This makes it an offence to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so; or to intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. A badger sett is defined in the legislation as "*a structure or place, which displays signs indicating current use by a badger.*"
- 4.38 No badger setts were found within or adjacent to the Site therefore no impacts on badger setts are anticipated as a result of the proposals. Since badger is known to be present in the area, it is recommended that any excavations are covered overnight or that a collapsed side or ramp is installed, to allow any trapped badgers (or other fauna) to escape. Badger is a highly mobile species therefore if there is a significant delay before works commence on Site, it is recommended that a pre-construction badger survey is undertaken, to re-confirm the status of badger setts prior to the start of works.

5 Photographs

Photograph 1: View northeast across arable field



Photograph 2: View east across species-poor semi-improved neutral grassland



Photograph 3: View east along species-rich hedgerow with occasional trees at northern Site boundary



Photograph 4: Wet ditch adjacent to northern survey area boundary



Photograph 5: Wet ditch within eastern part of the Site



Photograph 6: Oak trees with bat potential located at southern boundary of the Site



Photograph 7: Oak tree with bat potential located at eastern boundary of the Site



Photograph 8: Pond 1



Photograph 9: Pond 8



Photograph 10: Pond 9



6 **Figures**



BSG

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PROJECT T
CINDERS

DRAWING T
Figure 1: F

DATE: 20.06
DRAWN: LR



7 References

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Pers. comm. Emma Broad, Wrexham County Borough Council Ecologist, 18 April 2017.

Appendix 1: Outcome of Consultation with Wrexham County Borough Council Ecologist

- 7.1 Consultation by telephone was undertaken between Senior Ecologist Liz Rose-Jeffreys MCIEEM and the Wrexham County Borough Council Ecologist, Emma Broad, on 18 April 2017. The purpose of the discussion was to agree the approach and extent of further ecological survey work required to inform the future planning application, based on the initial findings of the desk study and the outcome of the extended Phase 1 habitat survey. The following is a summary of the items discussed relevant to ecology in the context of this report.

Bats

- 7.2 It was discussed that, since no trees with bat roost potential will be affected as part of the proposed works, and given that the majority of the works will be sited within sub-optimal bat foraging habitat (open fields) no further bat survey would be necessary to inform the assessment.

Nesting Birds

- 7.3 Given the range of habitats present within the Site, and the presence of the ground-nesting birds, lapwing and meadow pipit, which were recorded during the extended Phase 1 habitat survey on 28 March 2017, it was agreed that targeted breeding bird surveys would be undertaken to confirm the breeding bird species using the Site. The purpose of the surveys would be to inform any necessary mitigation or compensation, and to identify the location of any proposed enhancements (e.g. hedgerow planting). Emma Broad also advised that barn owl had been previously recorded within the breeding bird survey area; this species had not subsequently been recorded during any of the Site visits undertaken by BSG Ecology.

Great Crested Newt

- 7.4 The approach to great crested newts was discussed, given the known historical presence of this species within ponds in the surrounding landscape from the results of the desk study and BSG Ecology's knowledge of the local area. Given the distance between the proposed development and the ponds, and that the habitats to be affected provide mostly sub-optimal terrestrial habitat, it was considered that the risk of encountering a newt during the course of the development is low and that we did not consider a mitigation licence from Natural Resources Wales would be necessary, provided that a precautionary approach was adopted. No further survey of ponds in the surrounding landscape was considered necessary to inform this approach.
- 7.5 Emma Broad agreed that a method statement approach (i.e. RAMS) would be appropriate in this instance, and suggested that a low presence of great crested newts should be assumed in and around the Site, including within the arable habitats. As part of this approach, Emma Broad advised that additional terrestrial habitat for great crested newt would need to be provided within the scheme (e.g. provision of log/brush piles or hibernacula).

Appendix 2: Summaries of Relevant Policy, Legislation and Other Instruments

This section briefly summarises the legislation, policy and related issues that are relevant to the main text of the report. The following text does not constitute legal or planning advice.

Planning Policy Wales (Chapter 5 - Conserving and Improving Natural Heritage and the Coast)

- 7.6 The Welsh Government publishes Planning Policy Wales, which is amended periodically.
- 7.7 The Welsh Government's objectives for conserving and improving the natural environment are as follows:
 - 'Promote the conservation of landscape and biodiversity, in particular the conservation of native wildlife and habitats
 - Ensure that action in Wales contributes to meeting international responsibilities and obligations for the natural environment
 - Ensure that statutorily designated sites are properly protected and managed
 - Safeguard protected species
 - Promote the functions and benefits of soils, and in particular their function as a carbon store'
- 7.8 There is a clear requirement for pre-planning consent consultation with Natural Resources Wales (NRW) (formerly Countryside Council for Wales) where a planning application or proposal may be 'likely to have a significant effect on sites of more than local importance or on a designated area' or would be 'likely to result in disturbance or harm to a protected species.'
- 7.9 Pre-application discussions are recommended for any development proposal likely to have an effect on the wildlife of a given area whether designated or not. For example, paragraph 5.5.1 identifies that the effect of a development proposal on the wildlife 'of any area can be a material consideration' and that 'in such instances and in the interests of achieving sustainable development it is important to balance conservation objectives with the wider economic needs of local business and communities.' There is a requirement for development proposals to include reasonable steps to safeguard or enhance the environmental quality of the land should development take place.
- 7.10 Planning Policy Wales requires local planning authorities to 'have regard to the relative significance of international, national and local designations in considering the weight to be attached to nature conservation interests and should take care to avoid placing unnecessary constraints on development.' Statutory designations do not necessarily prohibit development taking place, however, paragraph 5.5.5 states that development proposals 'must be carefully assessed for their effect' on the interests for which the designation is made.
- 7.11 There is a presumption against development that is likely to damage a SSSI and it is noted that SSSIs can be damaged by developments that lie either within or beyond the SSSI boundaries and that this could be 'some distance away.' There is specific reference to the duty on all public bodies under the Wildlife and Countryside Act 1981 (as amended by the Countryside Rights of Way Act 2000) to further conserve and enhance the features and reasons for a SSSI being of special interest in the exercise of public body functions which includes local planning authorities.
- 7.12 Paragraph 5.4.4. acknowledges that non-statutory designations carry less weight than statutory designations and that at a policy level local authorities are required to be clear that a non-statutory designation does not 'preclude appropriate socio-economic activities' and if certain features or

component characteristics of sites specifically need to be conserved and, as such, require additional protection, this should be explained at a policy level.

- 7.13 Species protected under European or UK legislation are identified as a material consideration when considering a development proposal where protected species are present and if the development would 'be likely to result in disturbance or harm to the species or its habitat.' The potential need for ecological survey and assessment of likely impact of a proposed development on a protected species to inform planning decisions is highlighted in paragraph 5.5.11.
- 7.14 Trees, woodlands and hedgerows are identified as being of 'great importance' and that local planning authorities should seek their protection where they have natural heritage value. 'Ancient and semi-natural woodlands' are specifically highlighted as "irreplaceable habitats of high biodiversity value which should be protected from development that would result in significant damage." Consultation with NRW and/or the Forestry Commission is required if a site is recorded on the inventory of ancient woodland before authorising potentially damaging operations.

TAN 5 Nature Conservation and Planning (Wales only)

- 7.15 Technical Advice Note (TAN) 5 supplements Planning Policy Wales and provides advice about how the land use planning system in Wales 'should contribute to protecting and enhancing biodiversity and geological conservation.'
- 7.16 The TAN provides guidance to local planning authorities on: 'the key principles of positive planning for nature conservation; nature conservation and Local Development Plans; nature conservation in development management procedures; development affecting protected internationally and nationally designated sites and habitats; and, development affecting protected and priority habitats and species.'
- 7.17 In section 2.4 when deciding planning applications that may affect nature conservation, 'local authorities should:
- contribute to the protection and improvement of the environment...seeking to avoid irreversible harmful effects on the natural environment;
 - ensure that appropriate weight is attached to designated sites of international, national and local importance;
 - protect wildlife and natural features in the wider environment, with appropriate weight attached to priority habitats and species in Biodiversity Action Plans;
 - ensure that all material considerations are taken into account and decisions are informed by adequate information about the potential effects of a development on nature conservation;
 - ensure that the range and population of protected species is sustained;
 - adopt a stepwise approach to avoid harm to nature conservation, minimise unavoidable harm by mitigation measures, offset residual harm by compensation measures and look for new opportunities to enhance nature conservation; where there may be significant harmful effects local planning authorities will need to be satisfied that any reasonable alternative sites that would result in less or no harm have been fully considered.'
- 7.18 At section 3.3.2 regarding Local Development Plans policies the guidance states that a policy should be included in respect of the application of the precautionary principle.
- 7.19 Section 4 includes specific and detailed guidance, expanding on the principles set out in 2.4, in respect of the development control process including pre-application discussions, preparing planning applications, requests for further information and ecology in respect of Environmental Impact Assessment (EIA). The broad principles of development control requirements are set out as follows:

- ‘adopting the five-point approach to decision-making – information, avoidance, mitigation, compensation and new benefits;
- ensuring that planning applications are submitted with adequate information, using early negotiation, checklists, requiring ecological surveys and appropriate consultation;
- securing necessary measures to protect, enhance, mitigate and compensate through planning conditions and obligation;
- carrying out effective planning enforcement; and
- identifying ways to build nature conservation into the design of new development.’

Environment (Wales) Act 2016

- 7.20 The Environment (Wales) Act 2016 passed into law in March 2016. Part 1 of the Act sets out Wales' approach to planning and managing natural resources at a national and local level with a general purpose linked to statutory 'principles of sustainable management of natural resources' defined within the Act.
- 7.21 Section 6 of the Act places a duty on public authorities to '*seek to maintain and enhance biodiversity*' so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to '*promote the resilience of ecosystems*'. The duty replaces the section 40 duty in the Natural Environment and Rural Communities Act 2006 in relation to Wales, and applies to those authorities that fell within the previous duty.
- 7.22 Public authorities will be required to report on the actions they are taking to improve biodiversity and promote ecosystem resilience. This is expanded on in sub-section (2):
- 7.23 In complying with subsection (1), a public authority must take account of the resilience of ecosystems, in particular the following aspects—
- diversity between and within ecosystems;
 - the connections between and within ecosystems;
 - the scale of ecosystems;
 - the condition of ecosystems (including their structure and functioning);
 - the adaptability of ecosystems.
- 7.24 Section 7 concerns biodiversity lists and the duty to take steps to maintain and enhance biodiversity. It replaces the duty in section 42 of the NERC Act 2006. The Welsh Ministers will publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales.
- 7.25 The Welsh Ministers must also take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section, and encourage others to take such steps.

European protected species (Animals)

- 7.26 The Conservation of Habitats and Species Regulations 2017 (the "Habitats Regulations 2017") consolidate and update the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations 2010") and the various amendments that have been made to the original (1994) Regulations which transposed the EC Habitats Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC) into national law.
- 7.27 "European protected species" (EPS) of animal are those which are present on Schedule 2 of the Conservation of Habitats and Species Regulations 2010 (as amended). They are subject to the

provisions of Regulation 41 of those Regulations. All EPS are also protected under the Wildlife and Countryside Act 1981 (as amended). Taken together, these pieces of legislation make it an offence to:

- a. Intentionally or deliberately capture, injure or kill any wild animal included amongst these species
- b. Possess or control any live or dead specimens or any part of, or anything derived from a these species
- c. deliberately disturb wild animals of any such species
- d. deliberately take or destroy the eggs of such an animal, or
- e. intentionally, deliberately or recklessly damage or destroy a breeding site or resting place of such an animal, or obstruct access to such a place

7.28 For the purposes of paragraph (c), disturbance of animals includes in particular any disturbance which is likely—

- a. to impair their ability—
 - i. to survive, to breed or reproduce, or to rear or nurture their young, or
 - ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
- b. to affect significantly the local distribution or abundance of the species to which they belong.

7.29 Although the law provides strict protection to these species, it also allows this protection to be set aside (derogated) through the issuing of licences. The licences in England are currently determined by Natural England (NE) for development works and by Natural Resources Wales in Wales. In accordance with the requirements of the Regulations (2010), a licence can only be issued where the following requirements are satisfied:

- a. The proposal is necessary ‘to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment’
- b. ‘There is no satisfactory alternative’
- c. The proposals ‘will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.’

Definition of breeding sites and resting places

7.30 Guidance for all European Protected Species of animal, including bats and great crested newt, regarding the definition of breeding and of breeding and resting places is provided by The European Council (EC) which has prepared specific guidance in respect of the interpretation of various Articles of the EC Habitats Directive.⁴ Section II.3.4.b) provides definitions and examples of both breeding and resting places at paragraphs 57 and 59 respectively. This guidance states that ‘The provision in Article 12(1)(d) [of the EC Habitats Directive] should therefore be understood as aiming to safeguard the ecological functionality of breeding sites and resting places.’ Further the guidance states: ‘It thus follows from Article 12(1)(d) that such breeding sites and resting places also need to be protected when they are not being used, but where there is a reasonably high probability that the species concerned will return to these sites and places. If for example a certain cave is used every year by a number of bats for hibernation (because the species has the habit of returning to the same winter roost every year), the functionality of this cave as a hibernating site should be protected in summer as well so that the bats can re-use it in winter. On the other hand, if a certain cave is used only occasionally for breeding or resting purposes, it is very likely that the site does not qualify as a breeding site or resting place.’

⁴ Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. (February 2007), EC.

Birds

- 7.31 All nesting birds are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. In addition to this, for some rarer species (listed on Schedule 1 of the Act), it is an offence to disturb them whilst they are nest building or at or near a nest with eggs or young, or to disturb the dependent young of such a bird.
- 7.32 The Conservation of Habitats and Species (Amendment) Regulations 2012 has placed new duties on competent authorities (including Local Authorities and National Park Authorities) in relation to wild bird habitat. These provisions relate back to Articles 1, 2 and 3 of the EC Directive on the conservation of wild birds (2009/147/EC, 'Birds Directive'⁵) (Regulation 9A(2) & (3) require that 'in the exercise of their functions as they consider appropriate' these authorities must take steps to contribute to the 'preservation, maintenance and re-establishment of a sufficient diversity and area of habitat for wild birds in the United Kingdom, including by means of upkeep, management and creation of such habitat...'
- 7.33 In relation to the duties placed on competent authorities under the 2012 amendment Regulation 9A (8) states: 'So far as lies within their powers, a competent authority in exercising any function [including in relation to town and country planning] in or in relation to the United Kingdom must use all reasonable endeavours to avoid any pollution or deterioration of habitats of wild birds (except habitats beyond the outer limits of the area to which the new Wild Birds Directive applies).'

Badger

- 7.34 Badger is protected under the Protection of Badgers Act 1992. This makes it an offence to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so; or to intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. A badger sett is defined in the legislation as "a structure or place, which displays signs indicating current use by a badger".
- 7.35 ODPM Circular 06/2005⁶ provides further guidance on statutory obligations towards badger within the planning system. Of particular note is paragraph 124, which states that "The likelihood of disturbing a badger sett, or adversely affecting badgers' foraging territory, or links between them, or significantly increasing the likelihood of road or rail casualties amongst badger populations, are capable of being material considerations in planning decisions."
- 7.36 Natural England provides Standing Advice⁷, which is capable of being a material consideration in planning decisions. Natural England recommends mitigation to avoid impacts on badger setts, which includes maintaining or creating new foraging areas and maintaining or creating access (commuting routes) between setts and foraging/watering areas.

Water vole

- 7.37 Water vole is protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to kill, injure or take any water vole, damage, destroy or obstruct access to any place of shelter or protection that the animals are using, or disturb voles while they are using such a place. Water vole is listed as a Species of Principal Importance under the provisions of the NERC Act 2006.

⁵ 2009/147/EC Birds Directive (30 November 2009. European Parliament and the Council of the European Union.

⁶ ODPM Circular 06/2005. *Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impacts within the Planning System* (2005). HMSO Norwich.

⁷ <http://www.naturalengland.org.uk/ourwork/planningdevelopment/spatialplanning/standingadvice/specieslinks.aspx>

White-clawed crayfish

- 7.38 The white-clawed crayfish is scheduled under the Wildlife and Countryside Act 1981 (as amended), listed under the EC Habitats Directive (Annexe II and V) and is on the IUCN Red Data List for endangered and threatened species. It is also a Species of Principal Importance under the provisions of the NERC Act 2006.
- 7.39 Under the Wildlife and Countryside Act 1981 (as amended) it is illegal to take or sell white-clawed crayfish. Whilst it is not an offence under the Act to disturb or kill white-clawed crayfish or to damage or destroy their habitat, both Natural England and the Environment Agency recommend that anyone carrying out any form of management or development work on suitable watercourses take into account the conservation of this species.
- 7.40 Signal crayfish and several other invasive non-native crayfish species are listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). Strictly speaking, this makes it an offence to return to the wild any signal crayfish, even if inadvertently captured. Any signal crayfish or other non-native crayfish captured should be humanely destroyed (once their identification has been confirmed by a suitably qualified and experienced ecologist).

Wild mammals in general

- 7.41 The Wild Mammals (Protection) Act 1996 (as amended) makes provision for the protection of wild mammals from certain cruel acts, making it an offence for any person to intentionally cause suffering to any wild mammal. In the context of development sites, for example, this may apply to rabbits in their burrows.

Hedgerows

- 7.42 Article 10 of the Habitats Directive⁸ requires that 'Member States shall endeavour...to encourage the management of features of the landscape which are of major importance for wild fauna and flora. Such features are those which, by virtue of their linear and continuous structure...or their function as stepping stones...are essential for the migration, dispersal and genetic exchange of wild species'. Examples given in the Directive include traditional field boundary systems (such as hedgerows).
- 7.43 The aim of the Hedgerow Regulations 1997⁹, according to guidance produced by the Department of the Environment¹⁰, is "to protect important hedgerows in the countryside by controlling their removal through a system of notification. In summary, the guidance states that the system is concerned with the removal of hedgerows, either in whole or in part, and covers any act which results in the destruction of a hedgerow. The procedure in the Regulations is triggered only when land managers or utility operators want to remove a hedgerow. The system is in favour of protecting and retaining 'important' hedgerows.
- 7.44 The Hedgerow Regulations set out criteria that must be used by the local planning authority in determining which hedgerows are 'important'. The criteria relate to the value of hedgerows from an archaeological, historical, wildlife and landscape perspective.

⁸ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

⁹ Statutory Instrument 1997 No. 1160 – The Hedgerow Regulations 1997. HMSO: London

¹⁰ The Hedgerow Regulations 1997: a guide to the law and good practice, HMSO: London

Appendix 3: Example Photograph of Great Crested Newt Recorded Terrestrially



Appendix 10.4

Cinders Farm, Ruabon

Ecology Report: Off-site Highways
Improvements

January 2018

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Client	Wynnstay Home Farm Partnership
Project	Cinders Farm, Ruabon, Cinders Farm, Ruabon
Version	FINAL
Project number	P17-277 Cinders Farm Ecology Report: Off-site Highways Improvements

	Name	Position	Date
Originated	Katy Stiles	Senior Ecologist	22 January 2018
Reviewed	Kirsty Kirkham	Partner	29 January 2018
Approved for issue to client	Kirsty Kirkham	Partner	29 January 2018
Issued to client	Katy Stiles	Senior Ecologist	29 January 2018

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Nothing in this report constitutes legal opinion. If legal opinion is required the advice of a qualified legal professional should be secured. Observations relating to the state of built structures or trees have been made from an ecological point of view and, unless stated otherwise, do not constitute structural or arboricultural advice.

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1 Introduction & Methods

- 1.1 An extended Phase 1 habitat survey was undertaken on 17 January 2018 by Senior Ecologist Katy Stiles MCIEEM of the locations of off-site highways improvements that are planned in relation to the Proposal. The survey area includes land from Ordnance Survey Grid Reference SJ32281 43277 to SJ32465 43655 along Cinders Lane and from Ordnance Survey Grid Reference SJ32456 43250 to SJ32217 43254 along the A539.
- 1.2 The weather during the survey was dry and cold with moderate winds, and a temperature of approximately 5°C.
- 1.3 The aim of the survey was to identify the habitats to be affected by the off-site improvements and to assess the suitability of the habitats to support protected species and to search for evidence of protected species. In particular this included badger *Meles meles*, nesting birds, bats and great crested newt *Triturus cristatus*.
- 1.4 The off-site highway improvements are:
 - The provision of two passing bays (shown on SK21685-06 REVC, approximately 0.02ha each) on Cinders Lane, the northern bay to be located within an existing grass verge with no hedgerow removal or translocation required; and the southern bay which will require the translocation of 25m of hedgerow.
 - Hard trimming of the existing hedgerow along the A539 to create an adequate eastern visibility splay.
- 1.5 A high level impact assessment is undertaken within this report. A more detailed assessment of the potential impacts of the off-site highways improvements (where appropriate) is included within the Ecology Chapter of the Environmental Statement.

2 Results & Interpretation

Habitats

- 2.1 Cinders Lane is bordered by an intact species-poor hedgerow (dominated by blackthorn *Prunus spinosa*) with mature oak *Quercus robur* trees along the eastern side and a species-rich hedgerow without trees along the western side (Photographs 1 and 2). The species-rich hedgerow is characterised by elder *Sambucus nigra*, holly *Ilex aquifolium*, blackthorn *Prunus spinosa*, crab apple *Malus sylvestris*, hazel *Coryllus avellana*, wild privet *Ligustrum vulgare* and common hawthorn *Crataegus monogyna*. The hedgerow is approximately 2m in height and is regularly cut.
- 2.2 A narrow strip of grassland is present along the base of the hedgerows. On the western side this becomes wider at a gateway entrance where the northern passing bay is proposed (Photograph 3). The grassland margin is characterised by Yorkshire fog *Holcus lanatus*, cock's foot *Dactylis glomerata*, cow parsley *Anthriscus sylvestris*, common nettle *Urtica dioica* and ribwort plantain *Plantago lanceolata*.
- 2.3 To the east and west of Cinders Lane are improved grassland fields some of which are horse grazed and arable fields.
- 2.4 An intact species-poor hedgerow dominated by common hawthorn is located to the north of the A539 (Photograph 4).

Nesting birds

- 2.5 Given the timing of the survey, no active nests were recorded. The hedgerows (and mature trees within the hedgerows) that border Cinders Lane and the northern side of the A539 offer suitable bird nesting habitat.
- 2.6 There will be no loss of mature trees or hedgerow habitat as a result of the off-site highways improvements.

Bats

- 2.7 The hedgerows that border Cinders Lane and the north side of the A539 may be used by foraging bats.
- 2.8 The majority of the mature trees located within the hedgerow that borders the eastern side of Cinders Lane offer suitable features for roosting bats.
- 2.9 There will be no loss of mature trees or hedgerow habitat as a result of the off-site highways improvements.

Great crested newt

- 2.10 One pond, Pond 9 (Photograph 5), is located 214m to the south of the northern passing bay location. There are no other ponds within 250m of the northern passing bay location. Given the distance of the pond from this location, the lack of structural diversity with the grassland sward and the assessment in relation to great crested newt in the Ecological Appraisal Report (BSG Ecology, January 2018), it is considered unlikely that great crested newt will be utilising the grass verge. There are extensive hedgerow habitats to the east of Cinders Lane that could offer more suitable terrestrial habitat for great crested newt in closer proximity to the pond. The risk of encountering a newt during the course of the work to construct a passing bay is therefore considered to be low. No further survey work is proposed.
- 2.11 Four ponds are present within 250m of the southern passing bay location. These are Ponds 8 (Photograph 6) and 9, located 228m and 85m respectively from the southern passing bay location.

An additional two ponds, one located immediately adjacent to the hedgerow located to the north of the A539 (a distance of 135m from the southern passing bay location) and one located to the south of the A539 (a distance of 238m from the southern passing bay location). The A539 is considered likely to present a significant barrier to movement of amphibians from the south to the north of the A539. This pond was therefore not surveyed.

- 2.12 The pond located adjacent to the hedgerow to the north of the A539 is considered to offer suitable breeding habitat for great crested newt. The pond offers areas of open water with willow trees *Salix* sp. around the pond margins and rushes within the pond *Juncus* sp. The water quality appeared to be good with clear water and no algal blooms. There is suitable terrestrial habitat for great crested newt within the proximity of the pond, where there is an existing hedgerow.
- 2.13 There are historical records of great crested newt for Pond 8 from 1992. There are no known records for the other ponds.
- 2.14 Natural England guidelines (2001) state that suitable terrestrial habitat within 250m of a great crested newt breeding pond is likely to be used most frequently, and more recent studies (Natural England, 2007) have shown that great crested newt densities are very low over 100m from a breeding pond. Again the presence of great crested newt within the working area associated with the provision of the southern passing bay is considered unlikely. However, as a precaution Reasonable Avoidance Measures (RAMs) will be adopted through the construction phase.

Badger

- 2.15 No evidence of badger was recorded in association with the hedgerows that border Cinders Lane or the A539.
- 2.16 The off-site highways improvements are not anticipated to result in an impact on badger.

3 Photographs

Photograph 1: Cinders Lane hedgerows



Photograph 2: Cinders Lane hedgerows



Photograph 3: Location of northern passing bay



Photograph 4: Hedgerow to the north of the A539



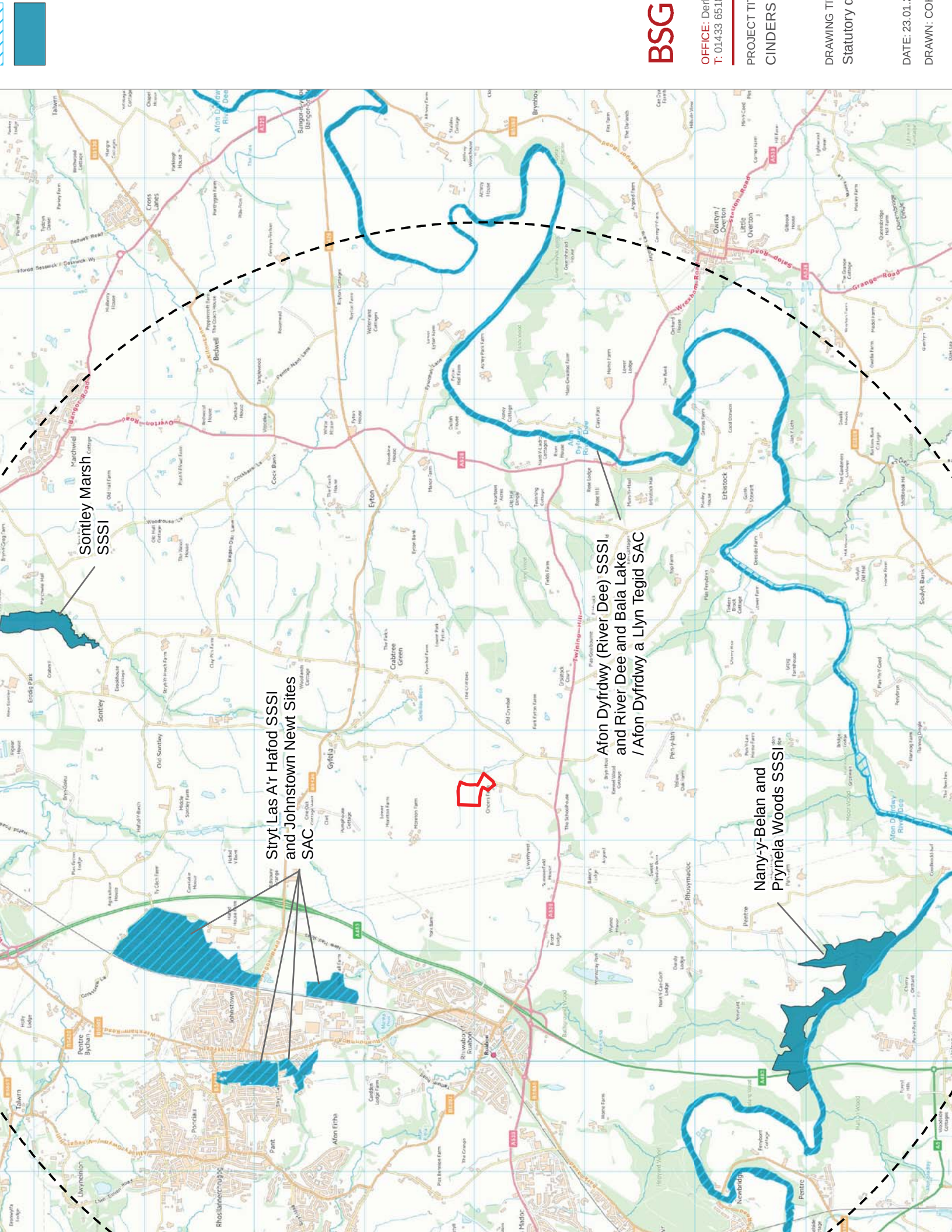
Photograph 5: Pond 9



Photograph 6: Pond 8



Appendix 10.5



Appendix 10.6

A Report on the Modelling of the Dispersion and Deposition of Ammonia from the Proposed Broiler Chicken Rearing Houses at Cinders Farm, near Ruabon in Wrexham

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25th October 2017

1. Introduction

AS Modelling & Data Ltd. has been instructed by Steve Raasch, on behalf of the applicant, to use computer modelling to assess the impact of ammonia emissions from the proposed broiler chicken rearing houses at Cinders Farm, near Ruabon in Wrexham. LL14 6HL.

Ammonia emission rates from the proposed poultry houses have been assessed and quantified based upon the Environment Agency's standard ammonia emission factors. The ammonia emission rates have then been used as inputs to an atmospheric dispersion and deposition model which calculates ammonia exposure levels and nitrogen and acid deposition rates in the surrounding area.

This report is arranged in the following manner:

- Section 2 provides relevant details of the farm and potentially sensitive receptors in the area.
- Section 3 provides some general information on ammonia; details of the method used to estimate ammonia emissions, relevant guidelines and legislation on exposure limits and where relevant, details of likely background levels of ammonia.
- Section 4 provides some information about ADMS, the dispersion model used for this study and details the modelling procedure.
- Section 5 contains the results of the modelling.
- Section 6 provides a discussion of the results and conclusions.

2. Background Details

The site of the existing and proposed broiler rearing houses at Cinders Farm is in a rural area, approximately 1.5 km to the east of the town of Ruabon, in Wrexham. The surrounding land is used largely for arable and livestock farming, but there are also some wooded areas nearby. The site is at an altitude of around 100 m with the land falling towards the River Dee to the south and rising towards mountains to the west.

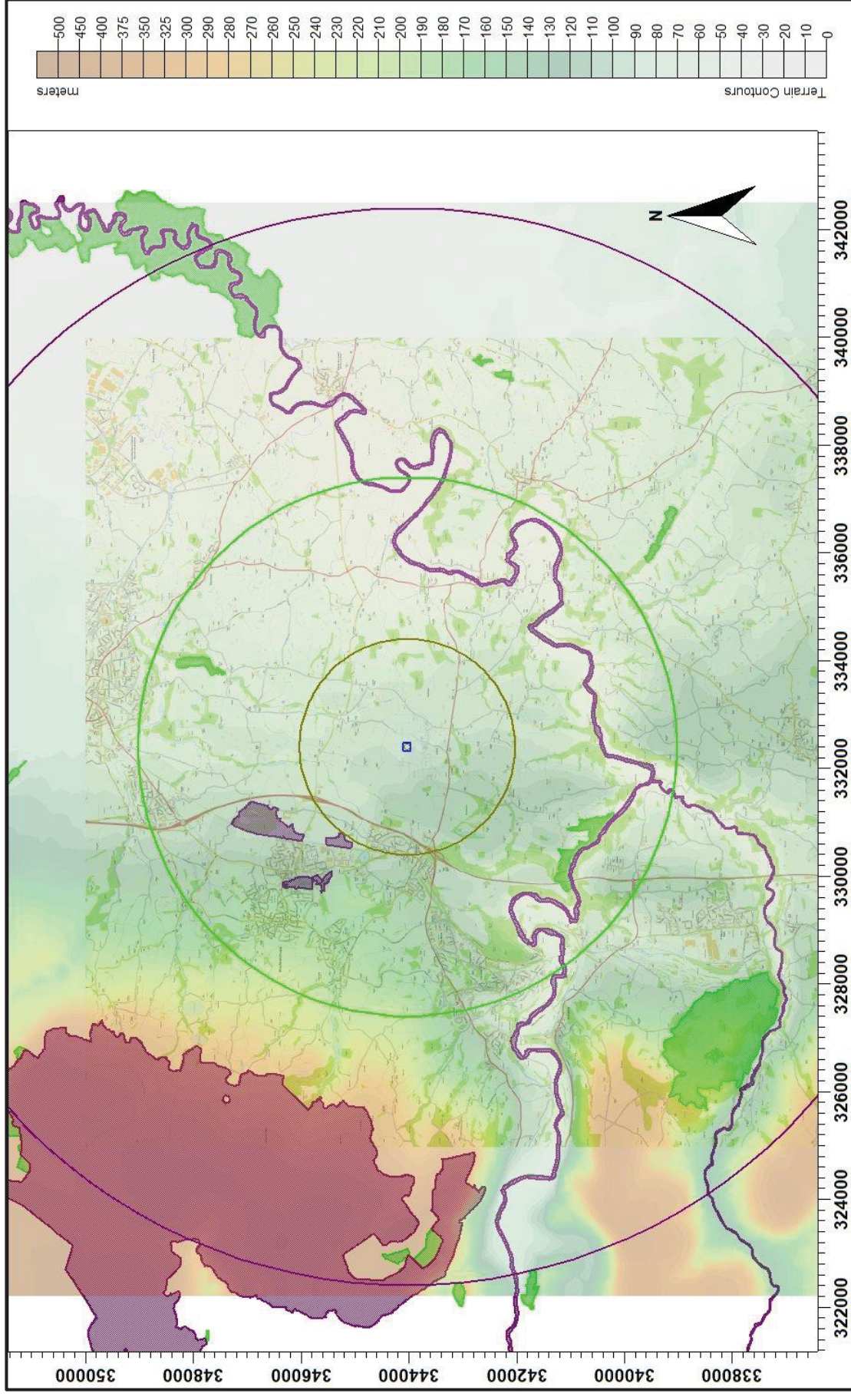
Under the proposal, four new poultry houses would be constructed on a green-field site approximately 150 m to the north of the existing farm buildings at Cinders Farm. The new poultry houses would provide accommodation for up to 225,000 broiler chickens and would be ventilated via high speed ridge fans with side inlets.

There are several areas of Ancient Woodlands (AWs) within 2 km of the proposed poultry houses at Cinders Farm. There are also four Sites of Special Scientific Interest (SSSIs) within 5 km; two of the SSSIs are also designated as Special Areas of Conservation (SACs). There is also one other SAC within 10 km. Further details of the SSSIs and the SAC are listed below:

- Stryt Llas a'r Hafod SSSI/Johntown Newt Sites SAC – approximately 2.0 km to the north-west.
- River Dee SSSI/ River Dee & Bala Lake SAC – approximately 3.2 km to the south-east, south and south-west.
- Nant-Y-Belan & Prynella Woods SSSI – approximately 3.2 km to the south-south-west.
- Sontley Marsh SSSI – approximately 3.7 km to the north-north-east.
- Berwyn & South Clwyd Mountains SAC – 6.5 km to the west-north-west.

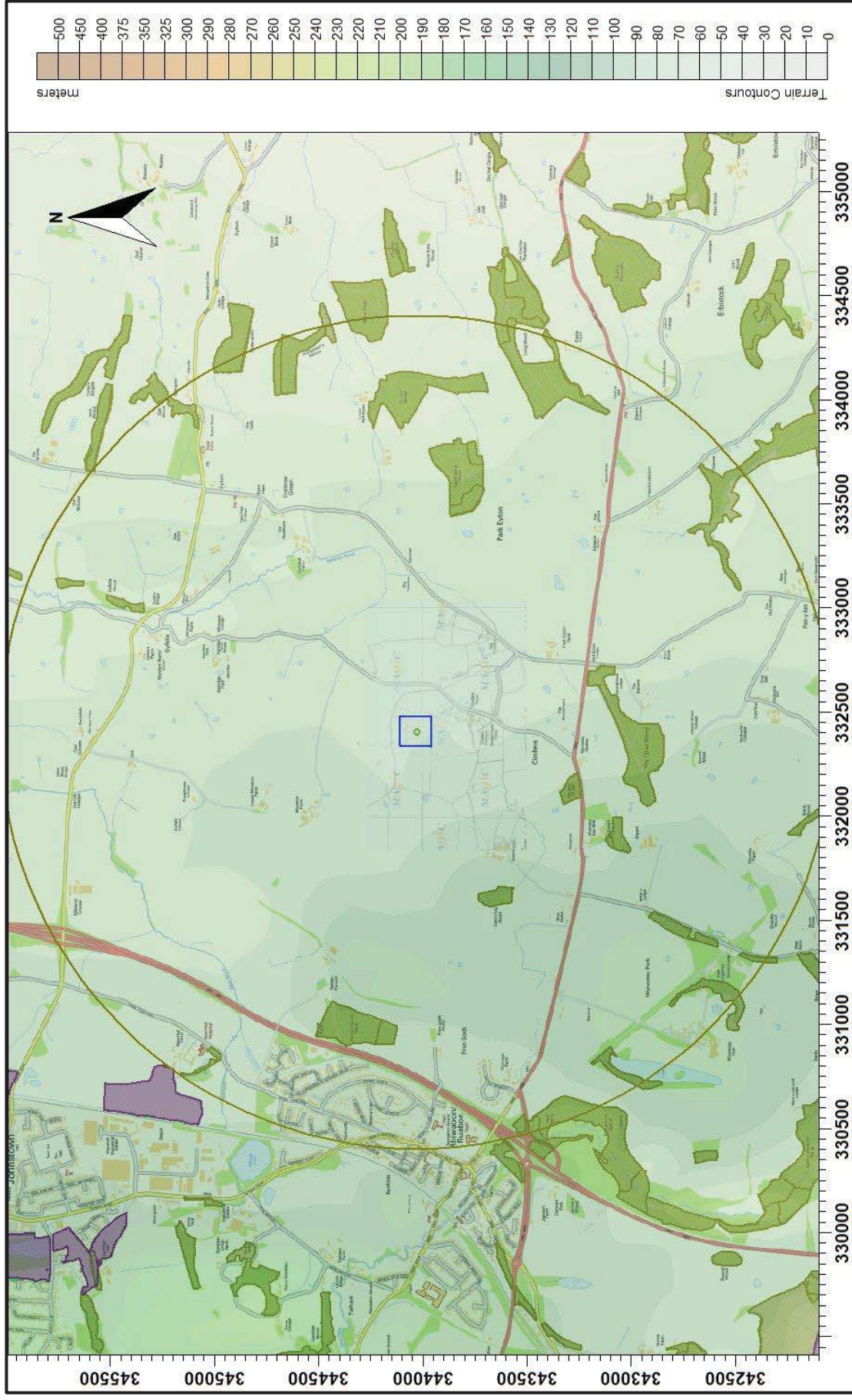
Maps of the surrounding area showing the position of the proposed poultry houses, the AWs, the SSSIs and the SACs are provided in Figures 1a and 1b. Figure 1a is a broad scale view, showing the positions of the SSSIs and the SACs and Figure 1b is a closer view, also showing the AWs. In these figures, the AWs are shaded in olive, the SSSIs are shaded in green, the SACs are shaded purple and the site of the proposed poultry houses is outlined in blue.

Figure 1a. The area surrounding Cinders Farm – concentric circles radii 2.0 km (olive), 5.0 km (green) and 10 km (purple)



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Figure 1b. The area surrounding Cinders Farm – a closer view with AWs shown



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3. Ammonia, Background Levels, Critical Levels & Loads & Emission Rates

3.1 Ammonia concentration and nitrogen and acid deposition

When assessing potential impact on ecological receptors, ammonia concentration is usually expressed in terms of micrograms of ammonia per metre cubed of air ($\mu\text{g-NH}_3/\text{m}^3$) as an annual mean. Ammonia in the air may exert direct effects on the vegetation, or indirectly affect the ecosystem through deposition which causes both hyper-eutrophication (excess nitrogen enrichment) and acidification of soils. Nitrogen deposition, specifically in this case the nitrogen load due to ammonia deposition/absorption is usually expressed in kilograms of nitrogen per hectare per year (kg-N/ha/y). Acid deposition is expressed in terms of kilograms equivalent (of H^+ ions) per hectare per year (keq/ha/y).

3.2 Background ammonia levels and nitrogen and acid deposition

The background ammonia concentration (annual mean) in the area around Cinders Farm is $2.37 \mu\text{g-NH}_3/\text{m}^3$. The background nitrogen deposition rate to woodland is 36.26 kg-N/ha/y and to short vegetation is 22.54 kg-N/ha/y . The background acid deposition rate to woodland is 2.74 keq/ha/y and to short vegetation is 1.76 keq/ha/y . The source of these background figures is the Air Pollution Information System (APIS, October 2017).

3.3 Critical Levels & Critical Loads

Critical Levels and Critical Loads are a benchmark for assessing the risk of air pollution impacts to ecosystems. It is important to distinguish between a Critical Level and a Critical Load. The Critical Level is the gaseous concentration of a pollutant in the air, whereas the Critical Load relates to the quantity of pollutant deposited from air to the ground.

Critical Levels are defined as, "concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge". (UNECE)

Critical Loads are defined as, "a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge". (UNECE)

For ammonia concentration in air, the Critical Level for higher plants is $3.0 \mu\text{g-NH}_3/\text{m}^3$ as an annual mean. For sites where there are sensitive lichens and bryophytes present, or where lichens and bryophytes are an integral part of the ecosystem, the Critical Level is $1.0 \mu\text{g-NH}_3/\text{m}^3$ as an annual mean.

Critical Loads for nutrient nitrogen are set under the Convention on Long-Range Transboundary Air Pollution. They are based on empirical evidence, mainly observations from experiments and gradient studies. Critical Loads are given as ranges (e.g. 10-20 kg-N/ha/y); these ranges reflect variation in ecosystem response across Europe. The Critical Levels and Critical Loads at the wildlife sites assumed in this study are provided in Table 1. N.B. Where the Critical Level of 1.0 µg-NH₃/m³ is assumed, it is usually unnecessary to consider the Critical Load as the Critical Level provides the stricter test. Normally the Critical Load for nitrogen deposition provides a stricter test than the Critical Load for acid deposition.

Table 1. Critical Levels and Critical Loads at the wildlife sites

Site	Critical Level (µg-NH ₃ /m ³)	Critical Load - Nitrogen Deposition (kg-N/ha/y)	Critical Load - Acid Deposition (keq/ha/y)
AWs	1.0 ¹	-	-
Stryt Llas a'r Hafod SSSI/Johntown Newt Sites SAC and Sontley Marsh SSSI	3.0 ²	10.0 ³	-
Nant-Y-Belan & Prynella Woods SSSI	1.0 ¹	-	-
River Dee SAC (bankside vegetation)	1.0 ¹	-	-
River Dee SAC (floating/aquatic vegetation)	3.0 ²	3.0 ⁴	-
Berwyn & South Clwyd Mountains SAC	1.0 ¹	-	-

1. A precautionary figure used where the citation for the site contains reference to lichens or bryophytes, or no details of the ecology of the site are available.
2. Based on the citation for the site.
3. The lower bound of the range of Critical Loads for the site/species, obtained from APIS.
4. The lower bound of the range of Critical Load for Floating Water-plantain (*Luronium natans*).

3.4 Guidance on the significance of ammonia emissions

3.4.1 Environment Agency Criteria

The following are obtained from the Environment Agency's horizontal guidance, H1 Environmental Risks Assessment, H1 Annex B - Intensive Farming.

"An emission is insignificant where Process Contribution (PC) is <4% of Critical Levels for SACs, SPAs and Ramsars, <20% for SSSIs, and <50% for local and national nature reserves (LNRs & NNRs), ancient woodland and local wildlife sites."

"Where modelling predicts a process contribution >20% of the Critical Level/Load at a SAC, SPA or Ramsar, >50% at a SSSI or >100% at a NNR, LNR, ancient woodland or local wildlife site, your proposal may not be considered acceptable. In such cases, your assessment should include proposals to reduce ammonia emissions."

This document was withdrawn February 1st 2016 and replaced with a web-page titled "Intensive farming risk assessment for your environmental permit", which contains essentially the same criteria. It is assumed that the upper threshold and lower threshold on the web-page refers to the levels that were previously referred to as levels of insignificance and acceptability in Annex B– Intensive Farming.

Within the range between the lower and upper thresholds; 4% to 20% for SACs, SPAs and Ramsars; 20% to 50% for SSSIs and 100% to 100% for other non-statutory wildlife sites, whether or not the impact is deemed acceptable is at the discretion of the Environment Agency. In making their decision, the Environment Agency will consider whether other farming installations might act in combination with the farm and the sensitivities of the wildlife sites. N.B. In the case of LWSs and AWs, the Environment Agency do not usually consider other farms that may act in combination and therefore a PC of up to 100% of Critical Level or Critical Load is usually deemed acceptable for permitting purposes and therefore the upper and lower thresholds are the same (100%).

3.4.2 Natural Resources Wales Criteria

In March 2017, Natural Resources Wales (Regulation and Permitting Department, EPP) published Operational Guidance Note 41 (OGN 41), "Assessment of ammonia and nitrogen impacts from livestock units when applying for an Environmental Permit or Planning Permission". This guidance was intended to update the way Natural Resources Wales (NRW) assessed emissions, in particular by changing the thresholds of insignificance and the upper threshold process contributions for designated sites. These designated sites include European sites, such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites as well as Sites of Special Scientific Interest (SSSIs).

Table 1 in OGN 41 describes the revised screening distance and thresholds for livestock developments; the threshold of insignificant percentage of the designated site Critical Level or Load is given as 1%; the upper threshold percentage of the designated site Critical Level or Load is given as 8%.

Table 2 in OGN 41 describes the possible outcomes of assessment and for detailed modelling of the application alone, where process contributions, considered in isolation, are up to 1% of the designated site Critical Level or Load, then it should be determined that there is no significant environmental effect/no likely significant effect/damage to scientific interest.

Where process contributions, considered in isolation, are between 1% and 8% of the designated site Critical Level or Load, an in-combination assessment is required. Should the in-combination process contributions be between 1% and 8% of the designated site Critical Level or Load then it should be determined that the application would cause no significant environmental effect/likely significant effect/damage to scientific interest.

When considering process contributions, in isolation or in-combination, if they exceed 8% of the designated site Critical Level or Load it is necessary to consider background concentrations and whether the designated site Critical Level or Load is breached and whether additional controls may be necessary. The application will then be determined based on whether there will be significant environmental effect/adverse effect/damage to scientific interest.

Please note that as far as AS Modelling & Data Ltd. is aware, currently, there is no publicly available ledger or database of sites with extant planning permission, or other proposed sites in planning, that would provide sufficient information to make an in-combination modelling assessment. Therefore, if Natural Resources Wales, or the Local Authority concerned do not consider the details of the modelling of ammonia emissions from this site provided by this study as sufficient information to fulfil the requirements of their appropriate assessment, then in most cases, it would not be possible for AS Modelling & Data Ltd. to provide this information.

For Local Nature Reserves (LNRs), Local Wildlife Sites (LWSs) and Ancient Woodlands (AWs), the current assessment procedure usually applied is based on the Environment Agency's horizontal guidance, H1 Environmental Risks Assessment, H1 Annex B - Intensive Farming. The following are taken from this document.

"An emission is insignificant where Process Contribution (PC) is <50% for local and national nature reserves (LNRs & NNRs), ancient woodland and local wildlife sites." And "Where modelling predicts a process contribution >100% at a NNR, LNR, ancient woodland or local wildlife site, your proposal may not be considered acceptable. In such cases, your assessment should include proposals to reduce ammonia emissions."

This document was withdrawn February 1st 2016 and replaced with a web-page titled "Intensive farming risk assessment for your environmental permit", which contains essentially the same criteria. It is assumed that the upper threshold and lower threshold on the web-page refers to the levels that were previously referred to as levels of insignificance and acceptability in Annex B– Intensive Farming.

Within the range between the lower and upper thresholds, whether or not the impact is deemed acceptable is at the discretion of the Environment Agency. N.B. In the case of LWSs and AWs, the Environment Agency do not usually consider other farms that may act in-combination and therefore

a PC of up to 100% of Critical Level or Critical Load is usually deemed acceptable for permitting purposes and therefore the upper and lower thresholds are the same (100%).

3.5 IAQM Position Statement on the use of the 1% criterion

A Position Statement issued by the Institute of Air Quality Management (IAQM) in January 2016 further clarifies the use of the 1% criterion for the determination of an ‘*insignificant*’ effect of air quality impacts on sensitive habitats. The Position Statement states: “*the use of a criterion of 1% of an environmental standard or assessment level in the context of habitats should be used only to screen out impacts that will have an insignificant effect. It should not be used as a threshold above which damage is implied.*” Furthermore, if the impacts are plainly above 1% then this should be regarded as potentially significant; where impacts are just slightly greater than 1% then a degree of professional judgement should be applied with regards to the theoretical risk.

3.6 Quantification of Ammonia Emissions

Ammonia emission rates from poultry houses depend on many factors and are likely to be highly variable. However, the benchmarks for assessing impacts of ammonia and nitrogen deposition are framed in terms of an annual mean ammonia concentration and annual nitrogen deposition rates. To obtain relatively robust figures for these statistics, it is not necessary to model short term temporal variations and a steady continuous emission rate can be assumed. In fact, modelling short term temporal variations might introduce rather more uncertainty than modelling continuous emissions.

The Environment Agency provided an Intensive farming guidance note which lists standard ammonia emission factors for a variety of livestock, including broiler chickens and other sources, such as poultry manure. The emission factor for broiler chickens is 0.034 kg-NH₃/bird place/y; this figure is used as the basis of the calculation of the emissions from the proposed poultry unit.

Details of the poultry numbers and types and emission factors used and calculated baseline ammonia emission rates are provided in Table 2.

Table 2. Details of poultry numbers and baseline ammonia emission rates

Source	Animal numbers/ Tonnes	Type or weight	Emission factor (kg-NH ₃ /place/y)	Emission rate (g-NH ₃ /s)
Proposed Housing	225,000	Broiler Chickens	0.034	0.242414

4. The Atmospheric Dispersion Modelling System (ADMS) and model parameters

The Atmospheric Dispersion Modelling System (ADMS) ADMS 5 is a new generation Gaussian plume air dispersion model, which means that the atmospheric boundary layer properties are characterised by two parameters; the boundary layer depth and the Monin-Obukhov length rather than in terms of the single parameter Pasquill-Gifford class.

Dispersion under convective meteorological conditions uses a skewed Gaussian concentration distribution (shown by validation studies to be a better representation than a symmetrical Gaussian expression).

ADMS has a number of model options including: dry and wet deposition; NO_x chemistry; impacts of hills; variable roughness; buildings and coastlines; puffs; fluctuations; odours; radioactivity decay (and γ -ray dose); condensed plume visibility; time varying sources and inclusion of background concentrations.

ADMS has an in-built meteorological pre-processor that allows flexible input of meteorological data both standard and more specialist. Hourly sequential and statistical data can be processed and all input and output meteorological variables are written to a file after processing.

The user defines the pollutant, the averaging time (which may be an annual average or a shorter period), which percentiles and exceedance values to calculate, whether a rolling average is required or not and the output units. The output options are designed to be flexible to cater for the variety of air quality limits which can vary from country to country and are subject to revision.

4.1 Meteorological data

Computer modelling of dispersion requires hourly sequential meteorological data and to provide robust statistics the record should be of a suitable length; preferably four years or longer.

The meteorological data used in this study is obtained from assimilation and short term forecast fields of the Numerical Weather Prediction (NWP) system known as the Global Forecast System (GFS). Observational meteorological data from Hawarden and Shawbury is also considered.

The GFS is a spectral model and data are archived at a horizontal resolution of 0.25 degrees, which is approximately 25 km over the UK (formerly 0.5 degrees, or approximately 50 km). The GFS resolution adequately captures major topographical features and the broad-scale characteristics of the weather over the UK. Smaller scale topological features may be included in the dispersion modelling by using the flow field module of ADMS (FLOWSTAR). The use of NWP data has advantages over traditional meteorological records because:

- Calm periods in traditional observational records may be over represented, this is because the instrumentation used may not record wind speeds below approximately 0.5 m/s and start up wind speeds may be greater than 1.0 m/s. In NWP data, the wind speed is continuous down to 0.0 m/s, allowing the calms module of ADMS to function correctly.
- Traditional records may include very local deviations from the broad-scale wind flow that would not necessarily be representative of the site being modelled; these deviations are difficult to identify and remove from a meteorological record. Conversely, local effects at the site being modelled are relatively easy to impose on the broad-scale flow and provided horizontal resolution is not too great, the meteorological records from NWP data may be expected to represent well the broad-scale flow.
- Information on the state of the atmosphere above ground level which would otherwise be estimated by the meteorological pre-processor may be included explicitly.

The wind rose for the raw GFS data at the site of Cinders Farm is shown in Figure 2a.

Wind speeds are modified by the treatment of roughness lengths (see Section 4.7) and where terrain data is included in the modelling, the raw GFS wind speeds and directions will be modified. The terrain and roughness length modified wind rose for the location of the proposed poultry houses at Cinders Farm is shown in Figure 2b. Note that elsewhere in the modelling domain the modified wind roses may differ more, or less, markedly and that the resolution of the wind field is approximately 300 m.

Data from the meteorological recording stations at Hawarden and Shawbury have also been considered; these are the closest stations to Cinders Farm. However, neither Hawarden nor Shawbury is considered to have an aspect that in any way could be considered similar to that at Cinders Farm; therefore, it should be noted that the frequency of winds from a particular direction in the Hawarden or Shawbury data may be either high or low in comparison to what might occur at Cinders Farm, which means mean concentrations downwind may be either over or under predicted. Additionally, periods of light winds and calms cannot be properly modelled. Therefore, it is the opinion of AS Modelling & Data Ltd. that the results obtained using the GFS data, particularly when modified by using FLOWSTAR¹, are less likely to have gross errors than the results obtained using the observational data and should be given more weight when interpreting the results of the modelling. The wind rose for Hawarden is shown in Figure 2c and the wind rose for Shawbury is shown in Figure 2d.

1. When modelling complex terrain with ADMS, by default, the minimum turbulence length has 0.1 m added to the flat terrain value (calculated from the Monin–Obukhov length). Whilst this might be appropriate over hill/mountain tops in terrain with slopes > 1:10 in lesser terrain, it introduces model behaviour that is not desirable where FLOWSTAR is simply being used to modify the upwind flow. Specifically, the parameter sigma z of the Gaussian plume model is overly constrained, which for point sources emissions, may cause over prediction of ground level concentrations in stable weather conditions and light winds (Steven R. Hanna & Biswanath Chowdhury, 2013). Note that this becomes particularly important if calm and light wind conditions are not being ignored as they often are when using traditional observational meteorological datasets. To reduce this behaviour, where terrain is modelled, AS Modelling & Data Ltd. have set a minimum turbulence length of 0.025 m in ADMS. This approximates the normal behaviour of ADMS with flat terrain.

Figure 2a. The wind rose. Raw GFS derived data, for 52.987 N, 3.007 W, 2013-2016

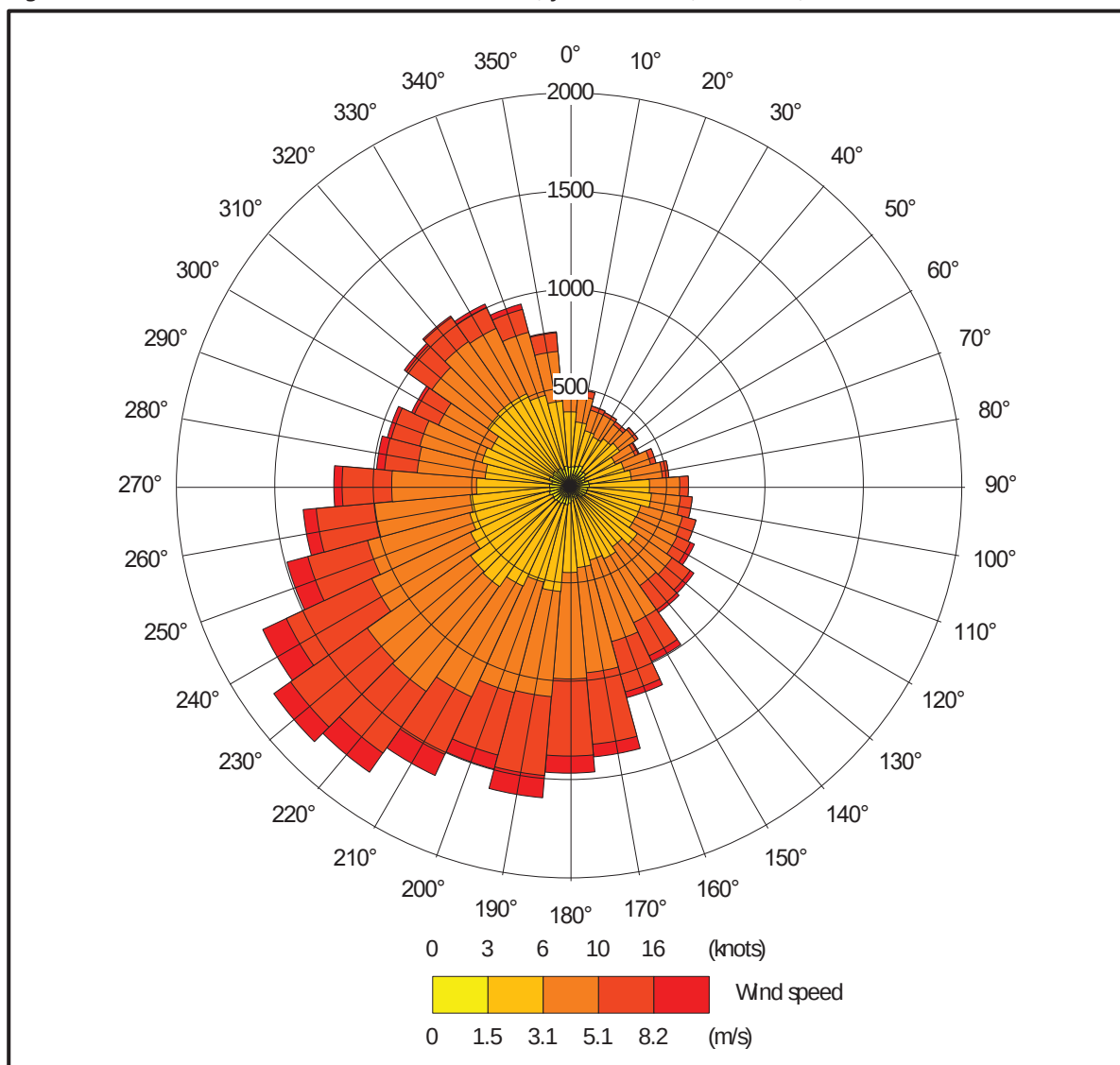


Figure 2b. The wind rose. FLOWSTAR modified GFS derived data for NGR 322400, 343850, 2013-2016

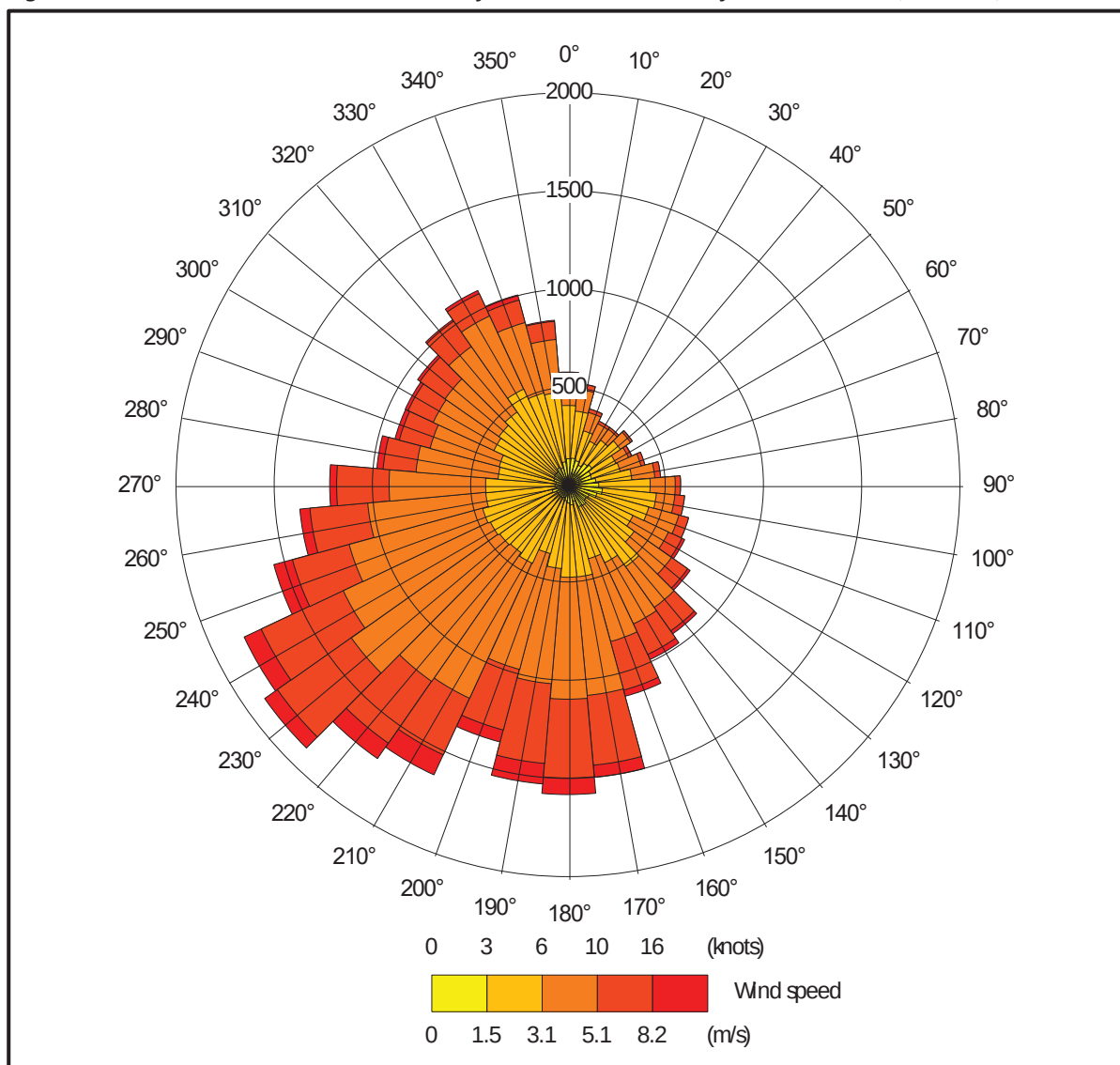


Figure 2c. The wind rose. Recorded meteorological data at Hawarden, 2013-2016

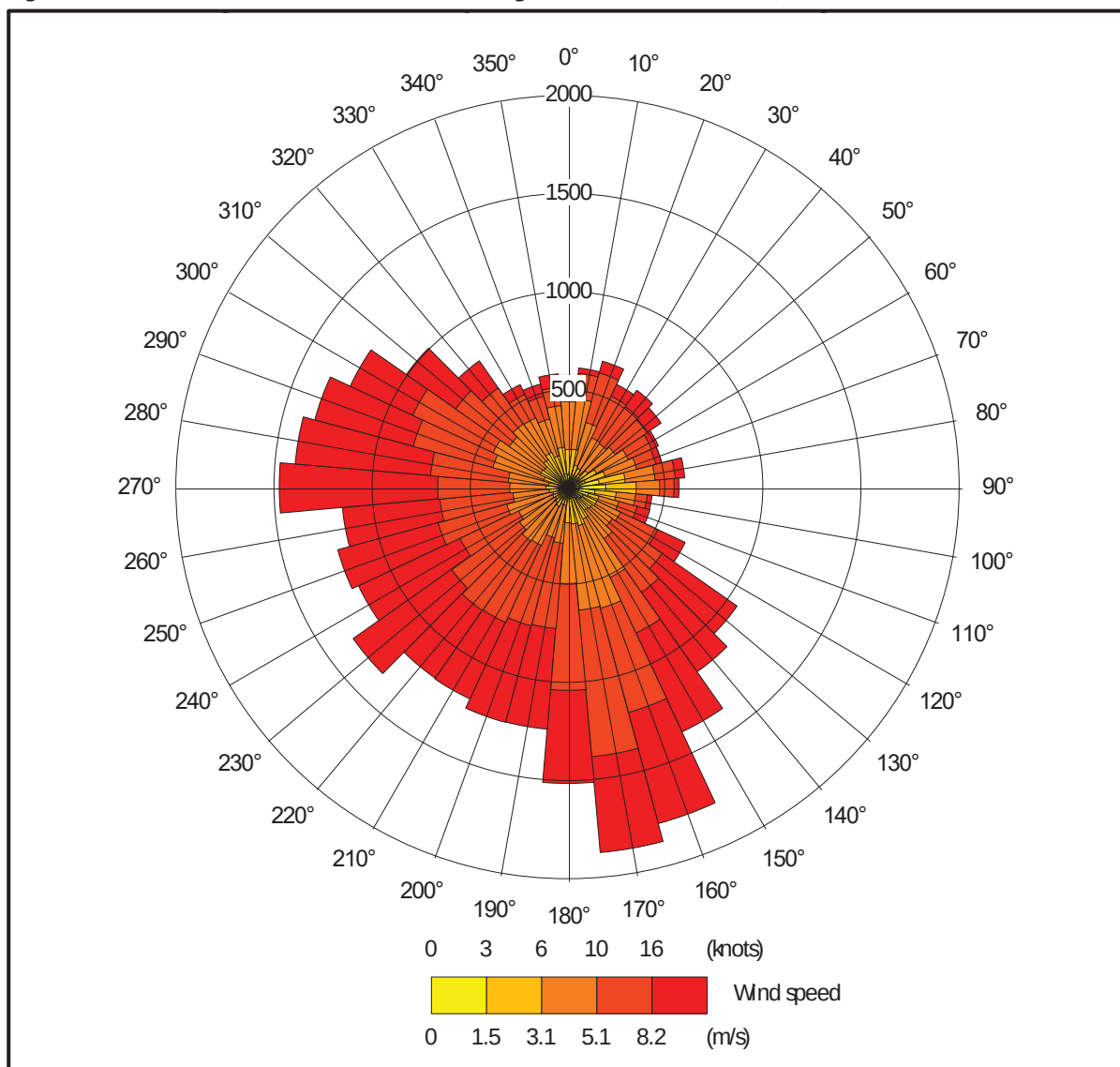
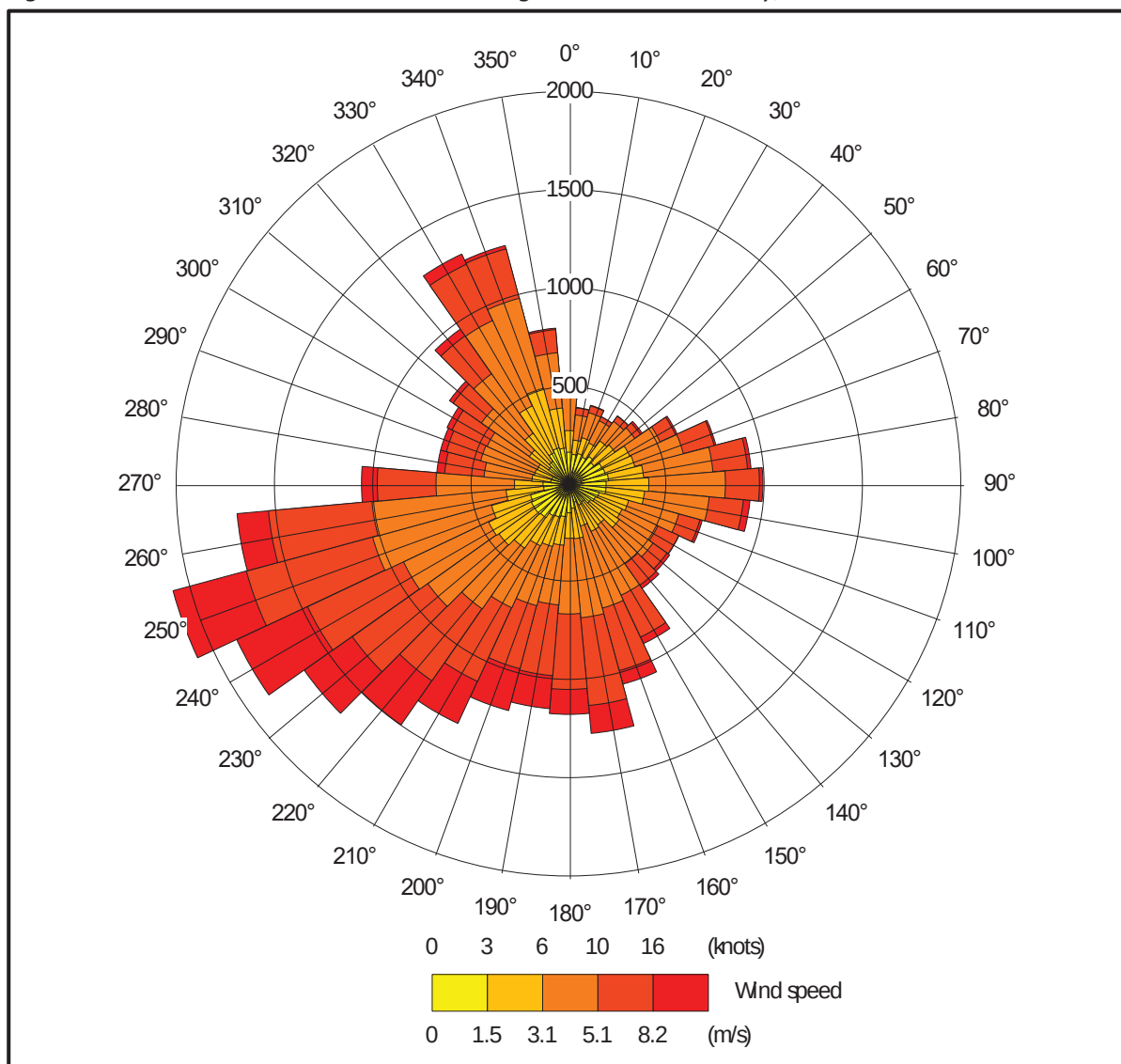


Figure 2d. The wind rose. Recorded meteorological data at Shawbury, 2013-2016



4.2 Emission sources

Emissions from the chimneys of uncapped high speed ridge fans on the proposed poultry houses are represented by three point sources per house within ADMS (PR1 to PR4; a, b & c). Details of the point source parameters are shown in Table 3 and the positions of the point sources may be seen in Figure 3.

Table 3. Point source parameters

Source ID	Height (m)	Diameter (m)	Efflux velocity (m/s)	Emission temperature (°C)	Baseline emission rate per source (g-NH ₃ /s)
PR1 and PR2; a, b & c	6.0	0.8	11.0	21.0 ¹	0.020201 ¹

1. Or ambient temperature, if >21 Celsius.

4.3 Modelled buildings

The structure of the proposed poultry houses and other nearby farm buildings may affect the plumes from the point sources. Therefore, the buildings are modelled within ADMS. The positions of the modelled buildings may be seen in Figure 3, where they are marked by grey rectangles.

4.4 Discrete receptors

Fifty-five discrete receptors have been defined: twenty at the AWs (1 to 20); five at the SSSIs (21 to 25) and thirty at the SACs/SSSIs (26 to 55). These receptors are defined at ground level within ADMS. The positions of the discrete receptors may be seen in Figures 4 and 4b, where they are marked by enumerated pink rectangles.

4.5 Cartesian grids

To produce the contour plots presented in Section 5 of this report and to define the spatially varying deposition fields used in the detailed modelling, a regular Cartesian grid has been defined within ADMS. The individual grid receptors are defined at ground level within ADMS. The position of the Cartesian grid may be seen in Figures 4a and 4b, where it is marked by grey lines.

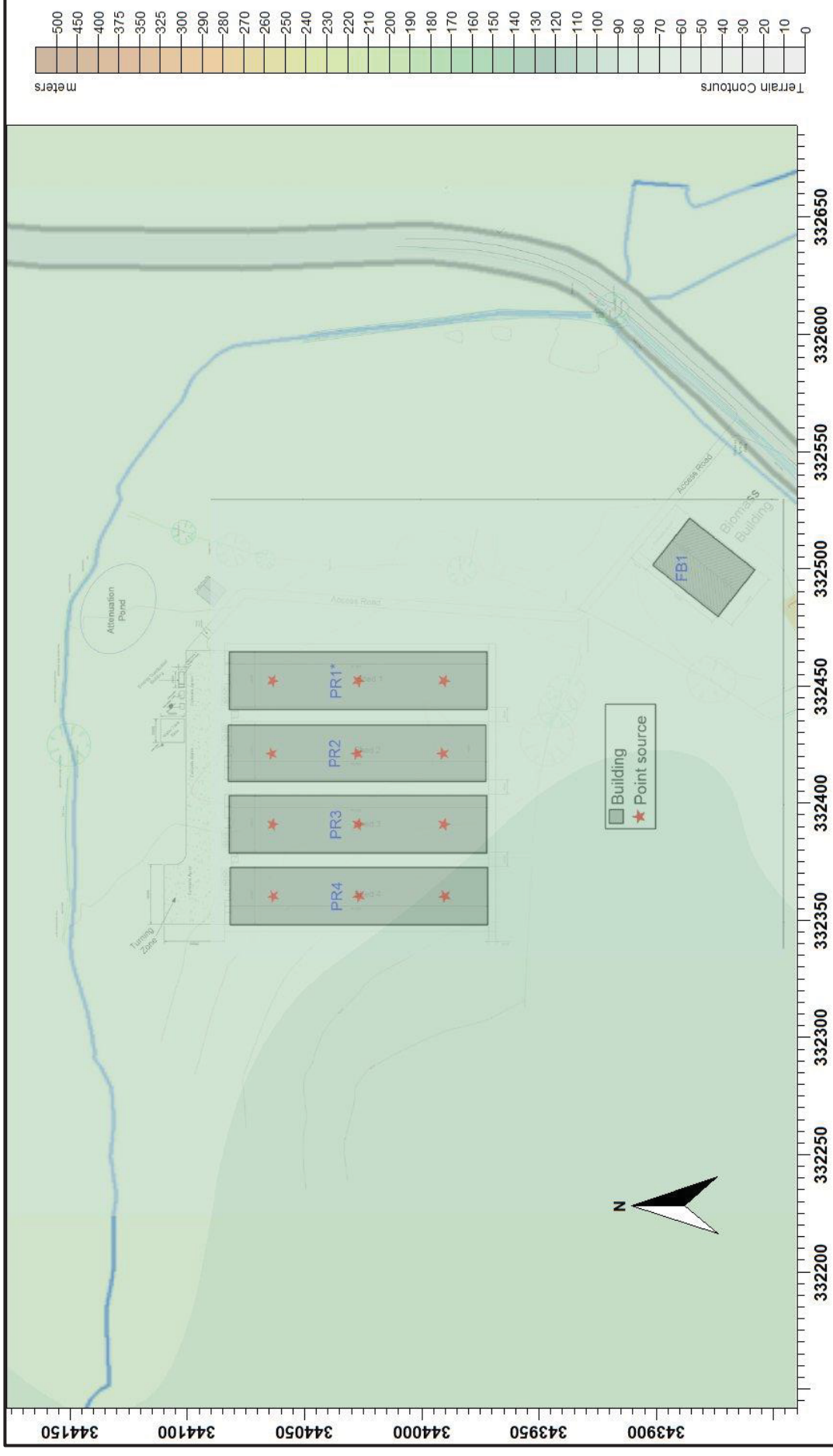
4.6 Terrain data

Terrain has been considered in the modelling. The terrain data are based upon the Ordnance Survey 50 m Digital Elevation Model. A 20.0 km x 20.0 km domain has been resampled at 100 m horizontal resolution for use within ADMS. N.B. The resolution of FLOWSTAR is 64 x 64 grid points; therefore, the effective resolution of the wind field is approximately 300 m.

4.7 Roughness Length

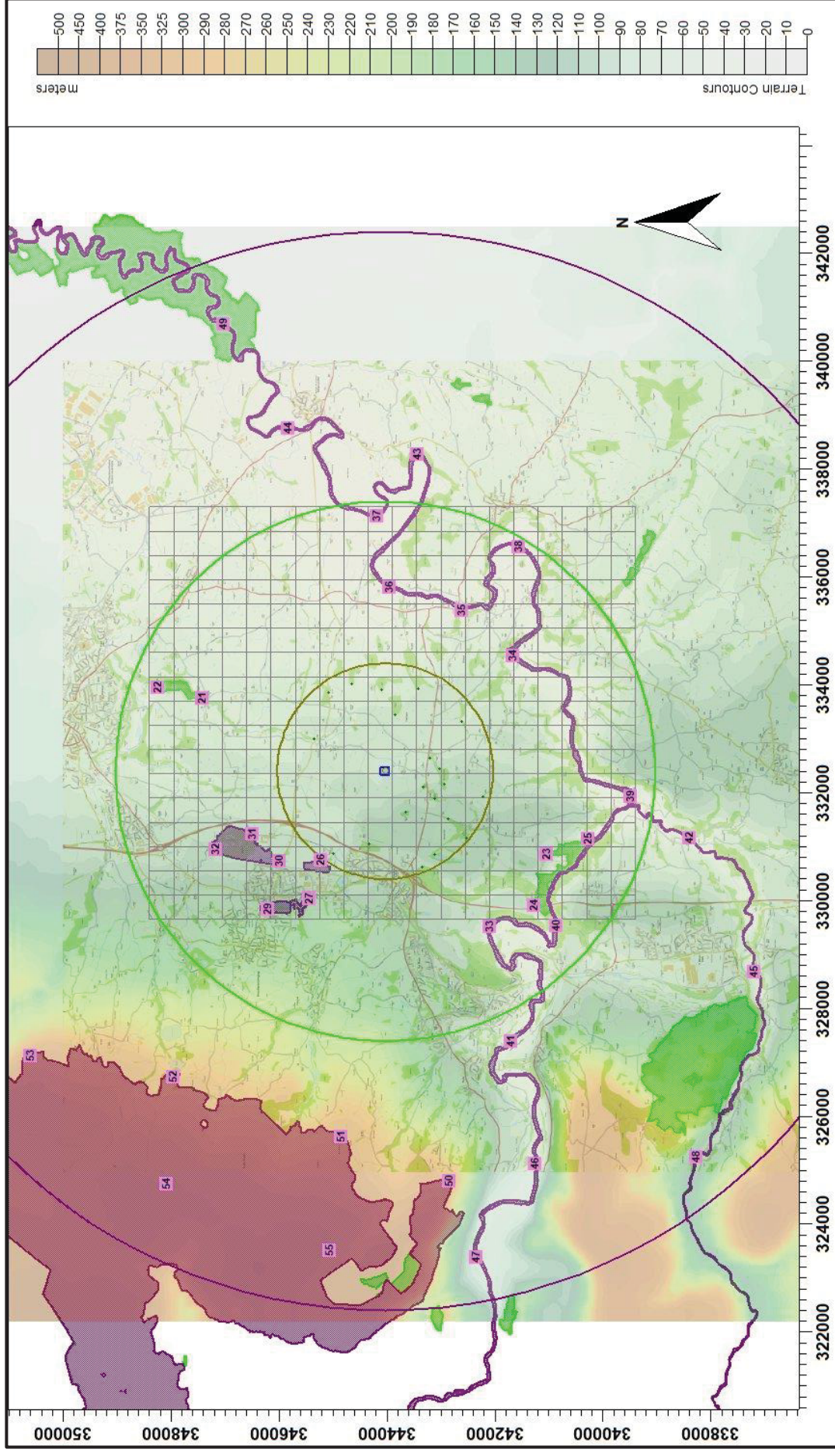
A fixed surface roughness length of 0.3 m has been applied over the entire modelling domain. As a precautionary measure, the GFS meteorological data is assumed to have a roughness length of 0.275 m. The effect of the difference in roughness length is precautionary as it increases the frequency of low wind speeds and the stability and therefore increases predicted ground level concentrations.

Figure 3. The positions of modelled buildings and sources



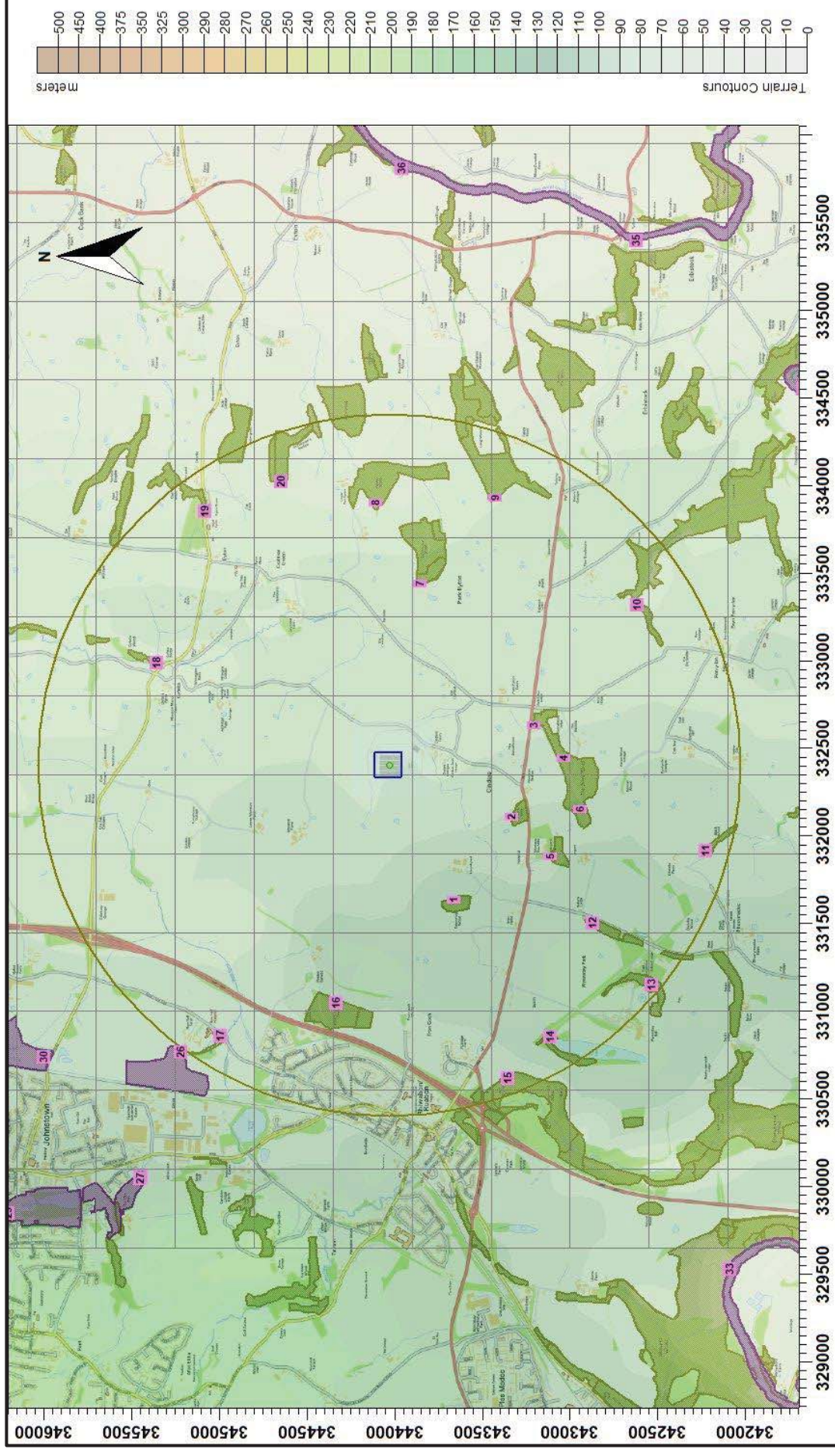
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Figure 4a. The discrete receptors and Cartesian grid receptors – a broad scale view



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Figure 4a. The discrete receptors and Cartesian grid receptors – a closer view



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4.8 Deposition

The method used to model deposition of ammonia and consequent plume depletion is based on a document titled “Guidance on modelling the concentration and deposition of ammonia emitted from intensive farming” from the Environment Agency’s Air Quality Modelling and Assessment Unit, 22 November 2010. N.B. AS Modelling & Data Ltd. has restricted deposition over arable farmland and heavily grazed and fertilised pasture; this is to compensate for possible saturation effects due to fertilizer application and to allow for periods when fields are clear of crops (Sutton), the deposition is also restricted over areas with little or no vegetation and the deposition velocity is set to 0.002 m/s where grid points are over the poultry housing and 0.015 m/s over heavily grazed grassland. Where deposition over water surfaces is calculated, a deposition velocity of 0.005 m/s is used.

In summary, the method is as follows:

- A preliminary run of the model without deposition is used to provide an ammonia concentration field.
- The preliminary ammonia concentration field, along with land usage, has been used to define two deposition velocity fields. The deposition velocities used are provided in Table 4.

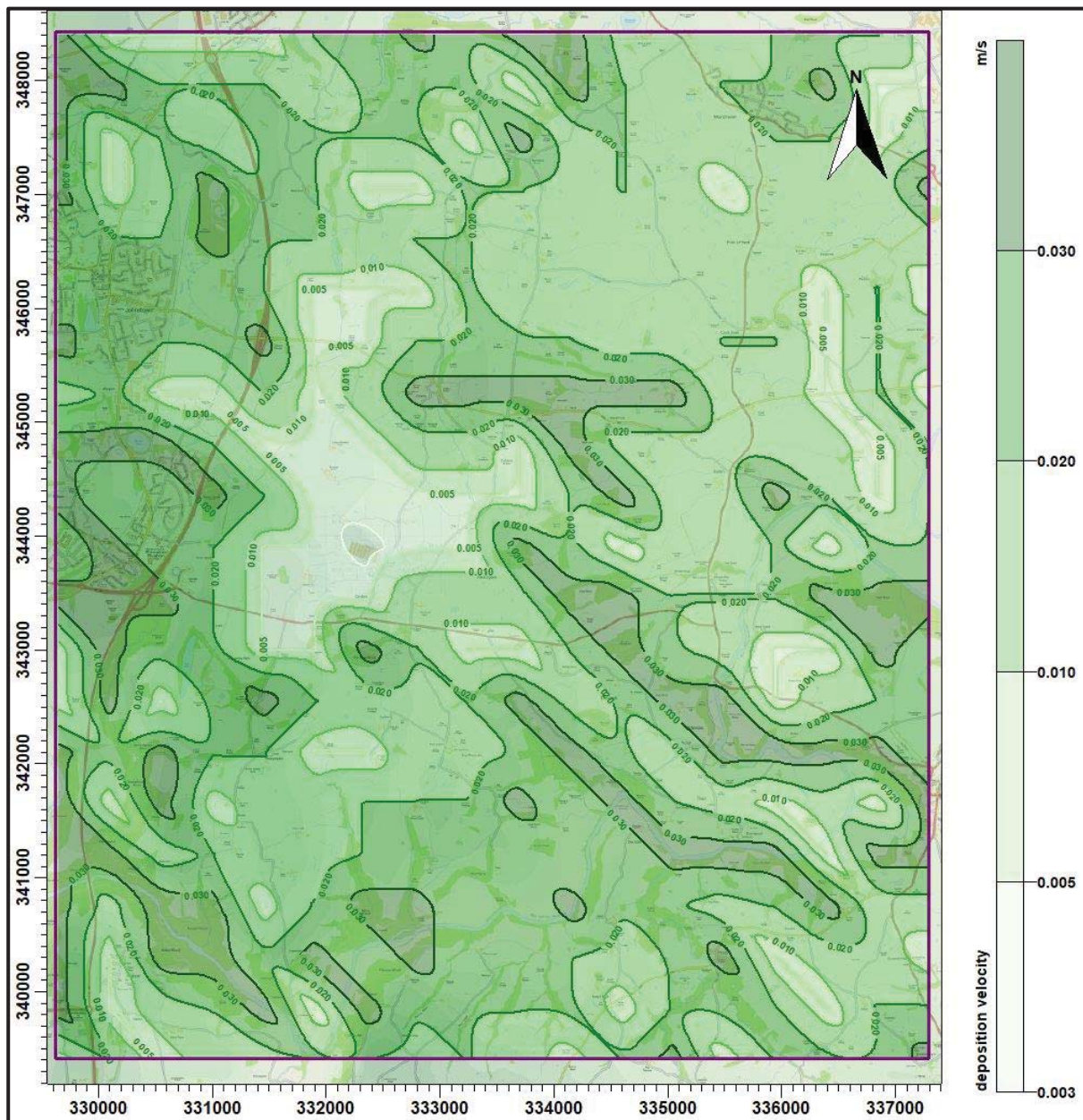
Table 4. Deposition velocities

NH ₃ concentration (PC + background) (µg/m ³)	< 10	10 - 20	20 - 30	30 – 80	> 80
Deposition velocity – woodland (m/s)	0.03	0.015	0.01	0.005	0.003
Deposition velocity – short vegetation (m/s)	0.02 (0.015 over heavily grazed grassland)	0.015	0.01	0.005	0.003
Deposition velocity – arable farmland/rye grass (m/s)	0.005	0.005	0.005	0.005	0.003

- The model is then rerun with the spatially varying deposition module.

A contour plot of the spatially varying deposition field is provided in Figure 5.

Figure 5. The spatially varying deposition field



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5. Details of the Model Runs and Results

5.1 Preliminary modelling

ADMS was run a total of twenty-four times, once for each year of the meteorological record in the following six modes:

- In basic mode without calms, or terrain – GFS data.
- With calms and without terrain – GFS data.
- Without calms and with terrain – GFS data.
- Without calms, with terrain and with a fixed deposition velocity of 0.003 m/s – GFS data.
- In basic mode without calms, or terrain – Hawarden data.
- In basic mode without calms, or terrain – Shawbury data.

For each mode, statistics for the maximum annual mean ammonia concentration at each receptor were compiled.

Details of the predicted annual mean ammonia concentrations at each receptor are provided in Table 6. In the Table, predicted ammonia concentrations that are in excess of the Natural Resources Wales upper threshold (8% of Critical Level or Load for a SSSI or SAC and 100% of Critical Level or Load for an AW) are coloured red. Concentrations in the range between the Natural Resources Wales upper threshold and lower threshold (1% to 8% for a SAC or SSSI and 50%¹ of Critical Level or Load for an AW) are coloured blue. Ammonia concentration equivalence to nitrogen deposition rates are shown in Tables 5a and 5b below.

1. The pre February 2016 figure is retained.

Table 5a. Equivalent ammonia concentrations (with deposition rates representative of those over terrestrial vegetation)

Deposition Velocity (m/s)	Concentration equivalent to X % of Critical Load of 10 kg/ha (µg/m ³)					
	100%	50%	20%	8%	4%	1%
0.03	1.284	0.642	0.257	0.103	0.051	0.013
0.02	1.925	0.963	0.385	0.154	0.077	0.019

Table 5b. Equivalent ammonia concentrations (with deposition rates representative of those over water surfaces/aquatic vegetation)

Deposition Velocity (m/s)	Concentration equivalent to X % of Critical Load of 3 kg/ha (µg/m ³)					
	100%	50%	20%	8%	4%	1%
0.005	2.310	1.155	0.462	0.185	0.092	0.023

Table 6. Predicted maximum annual mean ammonia concentration rate at the discrete receptors

Receptor number	X(m)	Y(m)	Maximum annual mean ammonia concentration - ($\mu\text{g}/\text{m}^3$)					
			GFS No Calms No Terrain	GFS Calms No Terrain	GFS No Calms Terrain	GFS No Calms Terrain Fixed Depo	Shawbury No Calms No Terrain	Hawarden No Calms No Terrain
1	331639	343660	0.079	0.079	0.102	0.074	0.120	0.090
2	332114	343335	0.095	0.094	0.138	0.103	0.085	0.114
3	332637	343204	0.149	0.147	0.186	0.164	0.169	0.072
4	332447	343034	0.091	0.090	0.111	0.092	0.093	0.069
5	331888	343114	0.062	0.062	0.141	0.088	0.059	0.064
6	332154	342942	0.060	0.059	0.110	0.067	0.050	0.063
7	333442	343854	0.123	0.123	0.091	0.080	0.091	0.085
8	333902	344109	0.094	0.092	0.073	0.059	0.083	0.047
9	333931	343427	0.064	0.064	0.045	0.037	0.038	0.044
10	333324	342618	0.075	0.074	0.068	0.053	0.070	0.033
11	331919	342230	0.033	0.033	0.077	0.039	0.027	0.030
12	331508	342872	0.043	0.042	0.098	0.059	0.044	0.037
13	331156	342537	0.031	0.031	0.067	0.039	0.033	0.024
14	330861	343115	0.028	0.028	0.034	0.023	0.046	0.033
15	330624	343352	0.030	0.030	0.028	0.021	0.049	0.035
16	331052	344335	0.078	0.078	0.086	0.060	0.073	0.048
17	330867	344994	0.066	0.066	0.074	0.048	0.039	0.038
18	332994	345358	0.112	0.110	0.126	0.108	0.078	0.046
19	333856	345080	0.096	0.095	0.094	0.077	0.087	0.034
20	334023	344647	0.097	0.095	0.145	0.113	0.094	0.033

Table 6. (continued)

Receptor number	X(m)	Y(m)	Maximum annual mean ammonia concentration - ($\mu\text{g}/\text{m}^3$)					
			GFS No Calms No Terrain	GFS Calms No Terrain	GFS No Calms Terrain	GFS No Calms Terrain Fixed Depo	Shawbury No Calms No Terrain	Hawarden No Calms No Terrain
21	333768	347433	0.032	0.032	0.037	0.027	0.025	0.011
22	333972	348249	0.025	0.024	0.028	0.020	0.019	0.008
23	330871	341046	0.018	0.018	0.027	0.013	0.017	0.013
24	329932	341270	0.016	0.016	0.014	0.010	0.017	0.010
25	331149	340277	0.016	0.016	0.014	0.008	0.013	0.011
26	330773	345219	0.060	0.060	0.076	0.047	0.033	0.034
27	330052	345450	0.042	0.041	0.056	0.032	0.024	0.023
28	330060	345444	0.042	0.041	0.057	0.032	0.024	0.023
29	329856	346209	0.034	0.034	0.044	0.024	0.019	0.019
30	330741	345997	0.043	0.043	0.079	0.046	0.025	0.027
31	331240	346487	0.038	0.038	0.048	0.030	0.029	0.032
32	330967	347184	0.028	0.028	0.056	0.031	0.021	0.022
33	329534	342090	0.014	0.014	0.010	0.008	0.022	0.014
34	334551	341673	0.033	0.032	0.026	0.018	0.024	0.014
35	335398	342624	0.029	0.029	0.020	0.014	0.015	0.015
36	335814	343959	0.033	0.032	0.022	0.016	0.025	0.013
37	337149	344195	0.024	0.023	0.017	0.011	0.018	0.008
38	336573	341565	0.018	0.018	0.013	0.009	0.010	0.008
39	331941	339497	0.014	0.014	0.016	0.010	0.013	0.010
40	329546	340858	0.014	0.014	0.011	0.008	0.015	0.008
41	327413	341709	0.009	0.009	0.008	0.005	0.015	0.009
42	331176	338406	0.011	0.011	0.010	0.006	0.009	0.007
43	338295	343444	0.016	0.016	0.008	0.006	0.011	0.006
44	338771	345826	0.018	0.018	0.029	0.016	0.017	0.004
45	328694	337202	0.008	0.008	0.008	0.004	0.007	0.004
46	325134	341263	0.006	0.006	0.013	0.006	0.011	0.007
47	323404	342341	0.006	0.006	0.004	0.002	0.010	0.010
48	325259	338280	0.006	0.006	0.007	0.003	0.007	0.004
49	340702	347029	0.013	0.012	0.023	0.012	0.013	0.003
50	324808	342843	0.008	0.008	0.007	0.003	0.012	0.013
51	325635	344848	0.014	0.014	0.004	0.003	0.013	0.012
52	326738	347957	0.014	0.014	0.006	0.003	0.009	0.008
53	327139	350614	0.010	0.010	0.011	0.004	0.006	0.006
54	324758	348082	0.011	0.011	0.003	0.001	0.007	0.006
55	323530	345074	0.010	0.010	0.002	0.001	0.009	0.009

5.2 Detailed deposition modelling

The detailed modelling was carried out over a restricted domain that covers the proposed poultry houses at Cinders Farm; Stryt Llas a'r Hafod SSSI/Johntown Newt Sites SAC; closer parts of River Dee SSSI/River Dee & Bala Lake SAC; Nant-Y-Belan & Prynela Woods SSSI and Sontley Marsh SSSI, the area where the preliminary modelling indicated that annual mean ammonia concentrations and nitrogen deposition rates could potentially exceed the Natural Resources Wales lower threshold percentage of the Critical Level or Critical Load for the site. At the other discrete receptors, the preliminary modelling indicated that ammonia levels (and nitrogen deposition rates) would be below the Natural Resources Wales lower threshold percentage of Critical Level/Load for a SAC.

The detailed deposition modelling run was made with terrain included. Calms cannot be used with terrain or spatially varying deposition; however, the results of the preliminary runs demonstrate that the effect of calms upon the modelling is not significant.

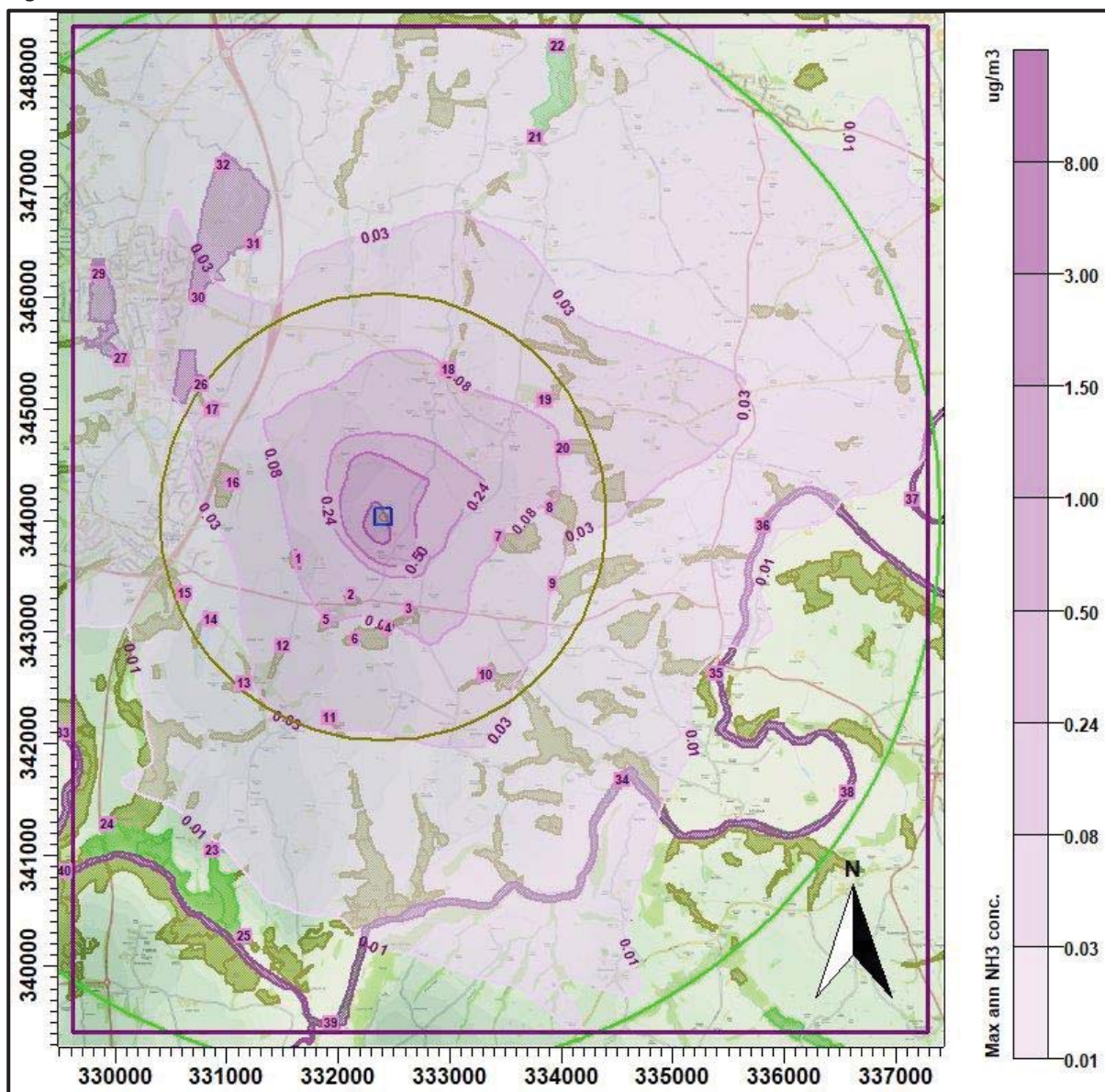
The results of the predicted maximum annual mean ground level ammonia concentrations and nitrogen deposition rates at the discrete receptors within the restricted detailed modelling domain are shown in Table 7. In the Table, predicted ammonia concentrations that are in excess of the Natural Resources Wales upper threshold (8% of Critical Level or Load for a SSSI or SAC) are coloured red. Concentrations in the range between the Natural Resources Wales upper threshold and lower threshold (1% to 8% for a SAC or SSSI) are coloured blue.

A contour plot of the predicted ground level maximum annual mean ammonia is shown in Figure 6a and a contour plot of the predicted nitrogen deposition rates is shown in Figure 6b.

Table 7. Predicted maximum annual mean ammonia concentrations and nitrogen deposition at the discrete receptors – detailed modelling

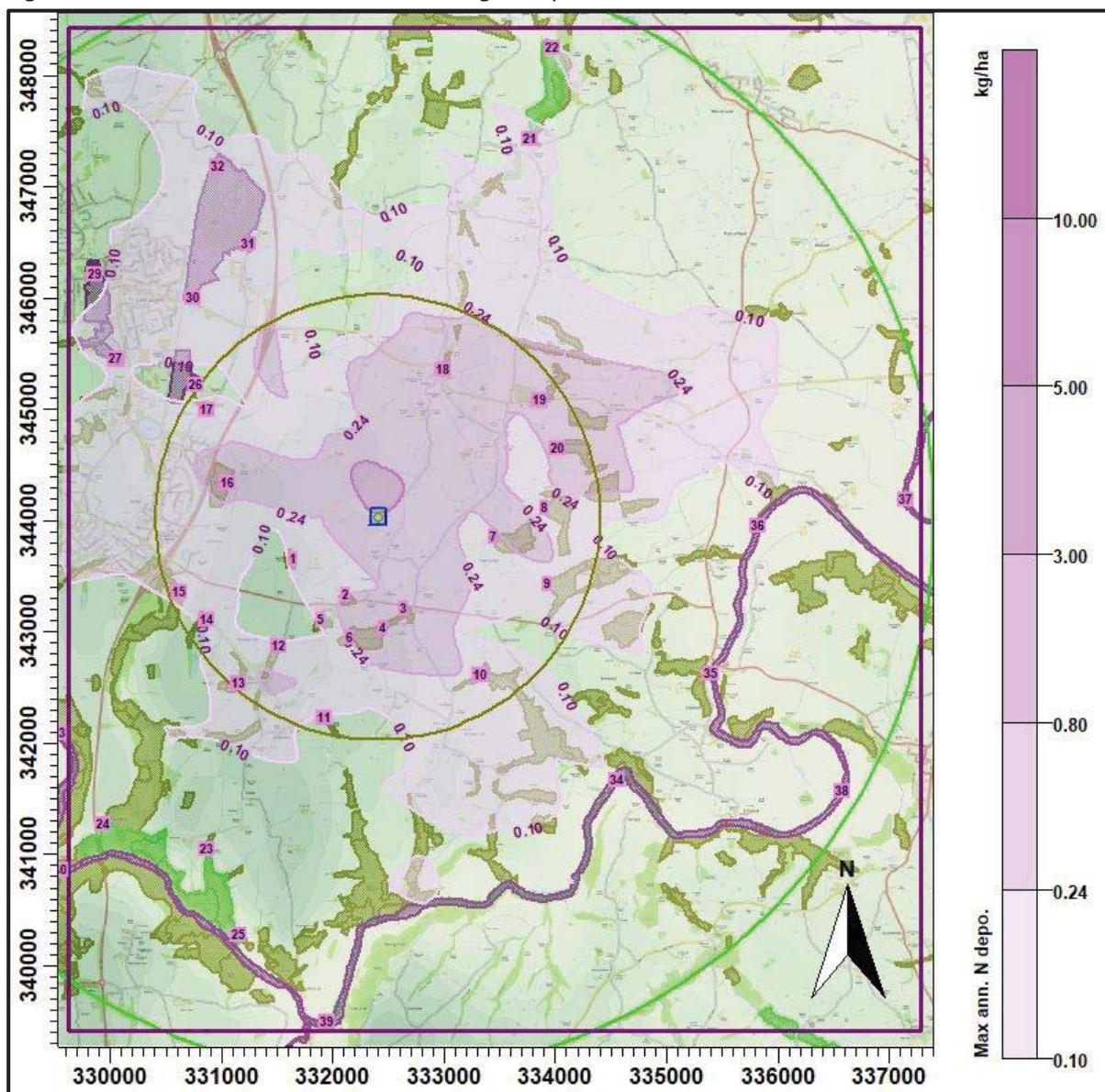
Receptor number	X(m)	Y(m)	Site	Site Parameters			Maximum annual ammonia concentration		Maximum annual nitrogen deposition rate	
				Deposition Velocity	Critical Level (µg/m³)	Critical Load (kg/ha)	Process Contribution (µg/m³)	%age of Critical Level	Process Contribution (kg/ha)	%age of Critical Load
21	333768	347433	Sontley Marsh	0.030	3.0	10.0	0.018	0.6	0.14	1.4
22	333972	348249	Sontley Marsh	0.030	3.0	10.0	0.013	0.4	0.10	1.0
23	330871	341046	Nant-Y-Belan & Prynella Woods	0.030	1.0	10.0	0.009	0.9	0.07	0.7
24	329932	341270	Nant-Y-Belan & Prynella Woods	0.030	1.0	10.0	0.006	0.6	0.05	0.5
25	331149	340277	Nant-Y-Belan & Prynella Woods	0.030	1.0	10.0	0.005	0.5	0.04	0.4
26	330773	345219	Johnstown Newt Sites	0.030	3.0	10.0	0.040	1.3	0.31	3.1
27	330052	345450	Johnstown Newt Sites	0.030	3.0	10.0	0.023	0.8	0.18	1.8
28	330060	345444	Johnstown Newt Sites	0.030	3.0	10.0	0.023	0.8	0.18	1.8
29	329856	346209	Johnstown Newt Sites	0.030	3.0	10.0	0.017	0.6	0.13	1.3
30	330741	345997	Johnstown Newt Sites	0.030	3.0	10.0	0.034	1.1	0.26	2.6
31	331240	346487	Johnstown Newt Sites	0.030	3.0	10.0	0.023	0.8	0.18	1.8
32	330967	347184	Johnstown Newt Sites	0.030	3.0	10.0	0.022	0.7	0.17	1.7
33	329534	342090	River Dee (bankside)	0.030	1.0	10.0	0.005	0.5	0.04	0.4
34	334551	341673	River Dee (bankside)	0.030	1.0	10.0	0.012	1.2	0.09	0.9
35	335398	342624	River Dee (bankside)	0.030	1.0	10.0	0.009	0.9	0.07	0.7
36	335814	343959	River Dee (bankside)	0.030	1.0	10.0	0.011	1.1	0.09	0.9
37	337149	344195	River Dee (bankside)	0.030	1.0	10.0	0.007	0.7	0.06	0.6
38	336573	341565	River Dee (bankside)	0.030	1.0	10.0	0.006	0.6	0.05	0.5
39	331941	339497	River Dee (bankside)	0.030	1.0	10.0	0.006	0.6	0.05	0.5
33	329534	342090	River Dee (aquatic)	0.005	3.0	3.0	0.005	0.2	0.01	0.2
34	334551	341673	River Dee (aquatic)	0.005	3.0	3.0	0.012	0.4	0.02	0.5
35	335398	342624	River Dee (aquatic)	0.005	3.0	3.0	0.009	0.3	0.01	0.4
36	335814	343959	River Dee (aquatic)	0.005	3.0	3.0	0.011	0.4	0.01	0.5
37	337149	344195	River Dee (aquatic)	0.005	3.0	3.0	0.007	0.2	0.01	0.3
38	336573	341565	River Dee (aquatic)	0.005	3.0	3.0	0.006	0.2	0.01	0.3
39	331941	339497	River Dee (aquatic)	0.005	3.0	3.0	0.006	0.2	0.01	0.3

Figure 6a. Predicted maximum annual mean ammonia concentrations



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Figure 6b. Predicted maximum annual nitrogen deposition rates



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6. Summary and Conclusions

AS Modelling & Data Ltd. has been instructed by Steve Raasch, on behalf of the applicant, to use computer modelling to assess the impact of ammonia emissions from the proposed broiler chicken rearing houses at Cinders Farm, near Ruabon in Wrexham. LL14 6HL.

Ammonia emission rates from the proposed poultry houses have been assessed and quantified based upon the Environment Agency's standard ammonia emission factors. The ammonia emission rates have then been used as inputs to an atmospheric dispersion and deposition model which calculates ammonia exposure levels and nitrogen and acid deposition rates in the surrounding area.

- At the nearby AWs, there are no predicted exceedances of the upper and lower threshold percentage of Critical Level or Load (100% for AWs).
- At Sontley Marsh SSSIs, there are small predicted exceedances of 1%, the lower threshold percentage, of the Critical Load of 10 kg-N/ha/y. Note that this assumes a deposition velocity of 0.03 m/s for wooded areas; if a deposition velocity of 0.02 m/s for short vegetation is assumed there are no predicted exceedances.
- At the Nant-Y-Belan & Prynela Woods SSSI, there are no predicted exceedances of the lower threshold percentage of the Critical Level or the Load (1% for SSSIs).
- At the Stryt Llas a'r Hafod SSSI/Johntown Newt Sites SAC; there are small predicted exceedances of 1% of the Critical Level of 3.0 $\mu\text{g-NH}_3/\text{m}^3$ and larger exceedances of the lower bound of the Critical Load of 10 kg-N/ha/y. However, there are no predicted exceedances of 8% of either the Critical Level or Critical Load.
- At River Dee SSSI/River Dee & Bala Lake SAC there are small predicted exceedances of 1%, the lower threshold percentage, of the strictest Critical Level of 1.0 $\mu\text{g-NH}_3/\text{m}^3$ along parts of the River to the south and east of Cinders Farm. Note, however, that it is not known if sensitive lichens and/or bryophytes are present along these stretches of the river and that if they are not present, then there would be no predicted exceedances of 1% of the Critical Level of 3.0 $\mu\text{g-NH}_3/\text{m}^3$ for higher plants.

Where predicted process contributions to ammonia concentrations and nitrogen deposition rates are between the lower and upper thresholds at a SSSI or SAC, whether or not the impact is deemed acceptable is at the discretion of Natural Resources Wales. In making their decision, Natural Resources Wales will consider whether other farming installations might act in combination with the proposed poultry houses and the sensitivities of the wildlife sites.

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Appendix 10.7

- 1: V
- 2: W
- 3: V
- 4: W
- 5: W
- 6: V
- 7: W

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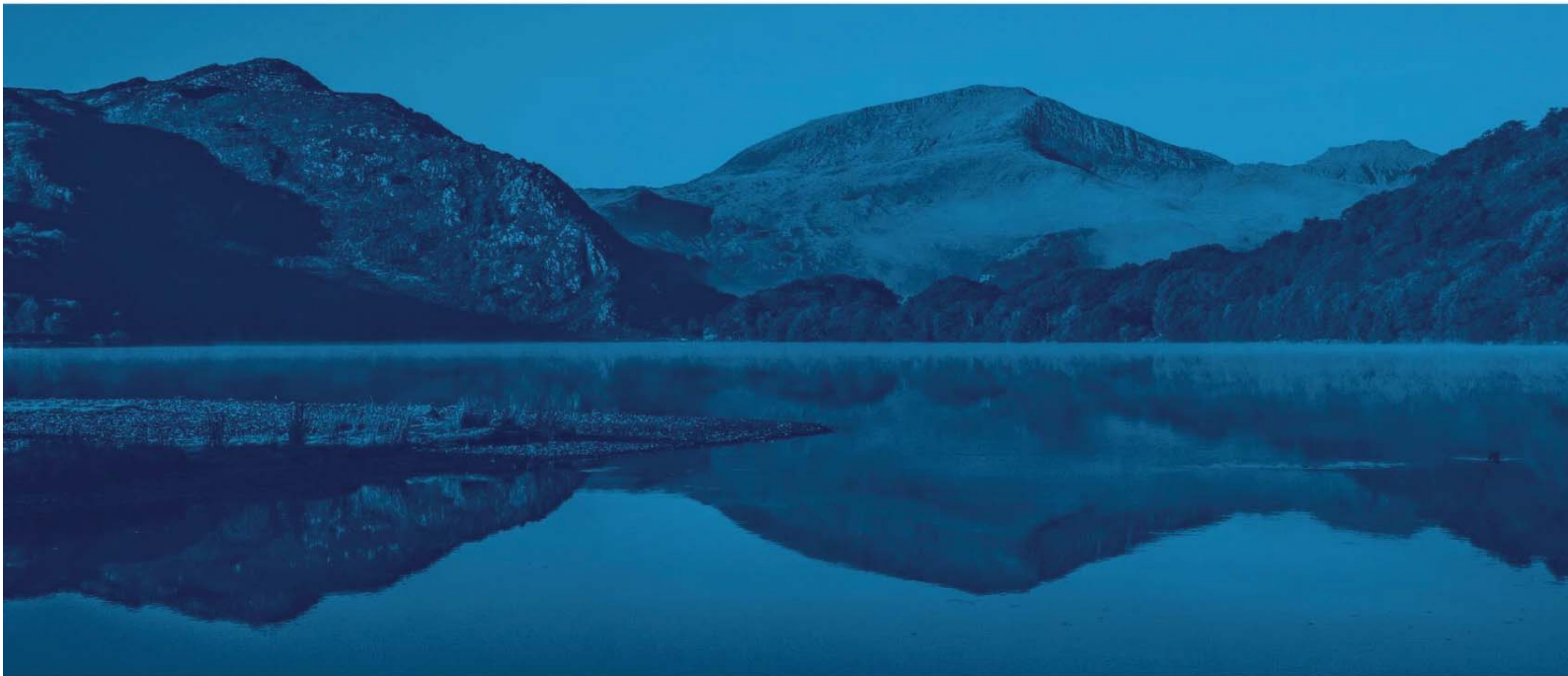


Appendix 11.1

Cinders Farm, Wrexham

Flood Consequences Assessment & Drainage Strategy

January 2018



Assessment / Modelling / Design

DOCUMENT VERIFICATION RECORD

CLIENT:	Wynnstay Home Farm Partnership
SCHEME:	Proposed agricultural development at Cinders Farm, Ruabon, Wrexham – Flood Consequences Assessment & Drainage Strategy.
INSTRUCTION:	The instruction to carry out this Flood Consequences Assessment & Drainage Strategy was received from Mr Harry Williams-Wynn of Wynnstay Home Farm Partnership.

DOCUMENT REVIEW & APPROVAL

AUTHOR:	Jordan Jones BSc (Hons) MCIWEM
CHECKER:	Aled Williams BSc (Hons) MCIWEM
APPROVER:	Victoria Griffin BSc (Hons) MSc CEnv MEnvSc

ISSUE HISTORY

ISSUE DATE	COMMENTS
05/12/2017	First issue
30/01/2018	Second issue – report updated to account for client comments

Registered office: Waterco Ltd, Eden Court, Lon Parcwr Business Park, Ruthin, Denbighshire LL15 1NJ

01824 702220

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Appendix 11.1.2 – Topographical Data
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Appendix 11.1.4 – WCBC Correspondence
Appendix 11.1.5 – NRW Correspondence
Appendix 11.1.6 – ReFH2 Runoff Rates
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Introduction

Waterco Consultants have been instructed to prepare a Flood Consequences Assessment (FCA) and Drainage Strategy in respect of a proposed agricultural development at Cinders Farm, Ruabon, Wrexham, LL14 6HL.

The purpose of this report is to outline the potential flood risk to the site, the impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified flood risk. This report has been prepared in accordance with the guidance contained in Planning Policy Wales (PPW) and Technical Advice Note 15 (TAN15): Development and Flood Risk. Reference has also been made to the Wrexham County Borough Council (WCBC) Preliminary Flood Risk Assessment (PFRA) (June 2011).

From April 2015, WCBC as the Lead Local Flood Authority (LLFA) is a statutory consultee for major planning applications in relation to surface water drainage, requiring that all planning applications are accompanied by a Sustainable Drainage Strategy. The aim of the Sustainable Drainage Strategy is to identify water management measures, including Sustainable Drainage Systems (SuDS), to provide surface water runoff reduction and treatment.

Existing Conditions

The 5.1hectare (ha) site is located at National Grid Reference: 332382E 344047N. A location plan and an aerial image are included in Appendix 11.1.1.

The site is greenfield and is bordered by agricultural land on all sides. Notable features in the area include an unnamed road to the south-east and Cinders Farm to the south. There are also unnamed watercourses located immediately north and south-east of the site. Access to the site is provided from the unnamed road to the south-east.

Local Topography

A Topographical Survey has been undertaken by A.R.M. Surveys Ltd in July 2017 and is submitted with the planning application pack (drawing reference: 755-0717-T). The Topographical Survey shows that the site slopes from 102.25 metres Above Ordnance Datum (m AOD) in the west to 95.79m AOD in the east.

Topographic levels to m AOD have also been derived from a 2m resolution Natural Resources Wales (NRW) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). LiDAR data only covers the north-western extent of the site. A review of LiDAR data shows that the topography of the site generally slopes from south-west to north-east. A LiDAR extract is included in Appendix 11.1.2.

Ground Conditions

Reference to the British Geological Survey online mapping (1:50,000 scale) indicates that the majority of the site is underlain by superficial deposits of Devensian Till, generally comprising Diamicton. The eastern extent of the site is underlain by Devensian Glaciofluvial Deposits generally comprising Sand and Gravel.

The superficial deposits are identified as being underlain by the Salop Formation consisting of Mudstone, Sandstone and Conglomerate.

According to the Environment Agency's online Groundwater Vulnerability Mapping, the superficial Devensian Till is classified as unproductive strata having low permeability and negligible significance for water supply or river base flow. The Devensian Glaciofluvial Deposits are classified as a Secondary A aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases form an important source of base flow to rivers. The underlying bedrock is also described as a Secondary A aquifer.

The Cranfield University 'Soilscapes' map indicates that the site is underlain by 'slowly permeable seasonally wet loamy and clayey soils' with 'impeded drainage'.

Local Drainage

The Dwr Cymru Welsh Water sewer records show that there are no public sewers within the vicinity of the site.

Development Proposals

The proposed development is for the erection of four agricultural buildings for rearing livestock (table fowl); ancillary buildings and plant; associated infrastructure; and landscaping. It is proposed to form a level development platform in the location of the four agricultural buildings. The development platform will be set at 98.5m AOD. A Biomass Building is proposed in the south-eastern extent of the

site. The Biomass Building will be situated on land at approximately 98m AOD. An access road will be provided off the unnamed road to the east, culverting a section of the unnamed watercourse. A proposed site layout plan and site cross sections are submitted with the planning application (drawing references GM-MZ228-181 and GM-MZ228-301 respectively).

The proposed development will introduce hardstanding areas in the form of buildings, an access road and concrete aprons. Hardstanding will comprise 1.52ha or 30% of the total site area. The remaining permeable, soft landscaped areas, including stone surrounds to the buildings will occupy 3.58ha or 70% of the total site area.

Flood Zone Category and Policy Context

Flood Zone Category

The Welsh Government Development Advice Map included in Appendix 11.1.3 shows that the site is located within Flood Zone A – an area considered to be at little / no risk of fluvial or tidal flooding, with a less than 0.1% (1 in 1000) annual probability of flooding.

The NRW ‘Flood Map for Planning’ included in Appendix 11.1.3 shows that the site is located within an area outside of the extreme flood extent (Flood Zone 1), meaning it has a less than 0.1% annual probability of flooding.

National Planning Policy

The proposed agricultural development is considered to be ‘less vulnerable’ in accordance with Figure 2 of the Welsh Government’s Technical Advice Note 15 – Development and Flood Risk (TAN15).

The site will be located wholly within Flood Zone A. In accordance with Section 9 of TAN15, ‘less vulnerable’ development is considered acceptable in Flood Zone A subject to demonstrating no increase in flood risk elsewhere.

Local Planning Policy

The Wrexham Unitary Development Plan (UDP) 1996 – 2011 was adopted in February 2005 and is the current UDP for the area. The UDP contains the following policies in relation to flood risk and sustainable drainage:

Development and Flood Risk

Policy EC12 Development (including the raising of land) within defined flood plains will only be permitted if it:-

- a) would not be subject to an unacceptable risk of flooding on-site; and/or
- b) does not result in an unacceptable risk of flooding on or off-site; and/or
- c) does not adversely affect flood management or maintenance schemes.

Surface Water Run-off

Policy EC13 Development which would result in an unacceptable adverse impact on the water environment due to additional surface water run-off will not be permitted.

5.18 Development on green field sites usually results in an increase in the amount of impermeable land. This can alter the natural water cycle as rates and volumes of surface water reaching a watercourse generally increase. Drains and sewers generally convey surface water from impermeable areas directly, or via a sewerage system, to a watercourse. Such arrangements not only reduce the natural recharge of groundwater, which wastes a valuable resource and increases pollution risk (for example from contaminated urban run-off and combined sewage overflows) but can also increase river flows. Increased river flows can cause physical damage to the banks and bed of a watercourse, and increase the risk of flooding.

5.19 Wherever practicable surface water should be disposed of as close to the source as possible. Where potential risks are identified appropriate flow attenuation facilities or mitigation measures may be a pre-requisite for development. Consideration should be given to the use of softer engineering structures referred to as Sustainable Urban Drainage Systems (SUDS). SUDS is a concept that focuses decisions about drainage design, construction and maintenance on the quality of the receiving environment and people. SUDS are physical structures built to receive surface water runoff. They typically include swales, ponds, infiltration basins and porous surfaces and should be considered as alternatives to conventional drainage where appropriate. The Environment Agency Wales can provide guidance on the design of SUDS and have produced a document entitled "Protecting the Quality of Our Environment, Sustainable Urban Drainage Systems – An Introduction". The Council will require the developer to demonstrate, both financially and practically, how the long term maintenance of any attenuation facilities or mitigation measures will be achieved.

Protection of Controlled Waters

Policy EC14 *Development which would have an unacceptable adverse impact upon the capacity, flow, quality or availability of controlled waters and associated land will not be permitted.*

The WCBC Preliminary Flood Risk Assessment (PFRA) (June 2011) has been reviewed for site specific flooding information.

Consultation

WCBC as the LLFA have been consulted to establish any site-specific requirements in relation to flood risk and surface water drainage. WCBC correspondence, dated 12th October 2017, is included in Appendix 11.1.4 and states:

‘We hold no specific information in relation to the local drainage network or recorded incidents of flooding in the vicinity.

The attached guidance note will provide details of the information we would normally expect to see included within any drainage strategy for the proposed development and expected flows/discharge. Consideration of a 30% increase in rainfall is normally accepted to represent the impacts of climate change unless better evidence becomes available.’

The guidance note referred to in the above response comprises the ‘WCBC Management of Surface Water Generated from New Development’, adopted September 2015. The guidance states:

Protection of Controlled Waters

Wrexham County Borough Council advocates that surface water run-off should be controlled as near to its source as possible. Preferably sustainable drainage systems (SuDS) should be utilised. The variety of SuDS techniques available means that virtually any development should be able to include a scheme based around these principles. Surface water should be disposed of to the receptors listed in order of priority below:

- a) infiltrated to ground;*
- b) to a watercourse;*
- c) to a surface water sewer;*
- d) other*

Undeveloped (Greenfield) Sites:

Discharge rates and volumes are normally required to be limited to the equivalent greenfield runoff rate (with on-site attenuation for all events up to the 1% (1 in 100 year) rainfall event with an appropriate allowance for climate change) ...

Storage of Water on Site:

The drainage system should be designed so that flooding does not occur on any part of the development for the 3.33% (1 in 30 year) rainfall event other than in those areas/systems designated to store or convey water. It may be acceptable to allow some on-site flooding of roads etc. for rainfall events beyond this. However flooding within the development site should not occur in any part of a building or utility plant susceptible to water during a 1% (1 in 100 year) + climate change rainfall event.

Practicable Minimum Limit of Discharge:

A practicable minimum limit on the discharge rate from a flow attenuation device is often a compromise between attenuating to a satisfactorily low flow rate while keeping the risk of blockage to an acceptable level. It is suggested that this is 5 litres per second, using an appropriate vortex flow control device or other technically acceptable flow control device. The minimum size of pipe discharging from a flow attention device should be 150mm laid at a gradient not flatter than 1 in 150, which meets the requirements of Sewers for Adoption 7th Edition.'

NRW have also been contacted for a pre-planning opinion. Correspondence dated 26th October 2017 is included in Appendix 11.1.5. In relation to flood risk, NRW state:

'A watercourse flows along part of the site boundary. The watercourse is classified as that of an 'ordinary' watercourse (rather than a main river) and as such there may be a local flood risk associated with the watercourse. Due to the relative small catchment size of the watercourse (less than 3km²), it has not been captured by our nationalised modelling technique to generate our flood zones. We would advise that you approach Wrexham Council's Flood and Water management team who may be able to advise on possible flood risk from the adjacent watercourse along with requirements for any surface water drainage design/strategy associated with the proposal.

Surface water drainage should mimic existing runoff rates/volumes and post development rates should not be increased. The use of Sustainable drainage systems would be supported.'

Following NRW correspondence, Waterco Consultants contacted WCBC with regards to the scope of assessment required to determine the flood risk from adjacent watercourses. The following scope was put forward by Waterco:

'Each watercourse originates within 470m of the site. Therefore, it can be assumed that the watercourses do not serve a significant catchment and would not convey significant flow. The NRW 'Flood Map for Surface Water' shows the flood risk from surface water and minor watercourses. The map identifies flow routes should the unnamed watercourses exceed their capacity. As you can see from the map, flooded areas are confined to land immediately adjacent to the watercourses during all events including the 1 in 1000 year event. No flooding is estimated in areas where development is proposed. The LiDAR plan shows that site levels are elevated above watercourse levels.'

Please can you advise if you are happy with the above approach to assessing flood risk from these watercourses and confirm that a more detailed (modelling) assessment will not be required.'

WCBC responded on 10th November 2017, with correspondence included in Appendix 11.1.4 stating 'I have reviewed your suggested proposal and would agree with the approach proposed. I would suggest considering the impact of any structures on the watercourse and implications of blockage/failure.'

Sources of Flooding and Probability

Fluvial

The site is bordered to the north and south-east by unnamed watercourses. The unnamed watercourse in the south-east flows north-east along the south-eastern boundary before crossing under the unnamed road east of the site and continuing south-east. The unnamed watercourse adjacent to the northern boundary of the site flows south-east and converges with the watercourse along the south-eastern boundary before crossing under the unnamed road. There are no other watercourses in the immediate vicinity of the site.

The PFRA contains no records of flooding at the site. The NRW 'Historic Flood Map' included in Appendix 11.1.3 confirms that there have been no recorded flooding incidents at or near to the site.

Detailed flood level data is not currently available for the unnamed watercourses. Therefore, as agreed with the council, an assessment of fluvial flood risk has been made using NRW mapping and topography. The NRW 'Flood Map for Surface Water' (Appendix 11.1.3) shows the flood risk from

surface water and minor watercourses. The map identifies flow routes should the unnamed watercourses exceed their capacity.

The flood extent from the watercourse to the north is shown to be minimal and contained immediately adjacent to the watercourse. The flood extent of the watercourse to the south-east is confined to the south-eastern extent of the site. No flooding is estimated in the location of the proposed buildings. The NRW 'Flood Risk Map' included in Appendix 11.1.3 shows that potential flood depths in the south-eastern extent of the site are estimated to be less than 150mm during the 1 in 1000 annual probability event.

Both watercourses originate within 470m of the site and do not serve a large catchment. As such, the watercourses would not convey significant flow. It is therefore unlikely that the watercourses would exceed their channel capacity.

The development platform containing the four agricultural buildings will be set at 98.5m AOD and approximately 2m above the watercourse to the north and 2.5m above the watercourse to the south-east. The Biomass Building in the south-east will be situated at 98m AOD and a minimum of 2m above the watercourse on the south-eastern boundary. Any potential flooding from these watercourses would therefore not affect the proposed buildings.

A residual risk arises from a blockage of the existing culvert under the unnamed road to the east. In the event of a blockage, flows would back up behind the culvert with flood water behind the culvert inlet reaching a level of 96.27m AOD before spilling over the unnamed road and to the channel downstream. Flooding would be localised to areas immediately upstream of the culvert and the majority of the site, including the location of the proposed buildings, is not at risk should blockage of the culvert occur.

Access to the site will be provided from the unnamed road to the east, which will result in culverting a section of the unnamed watercourse which borders the south-eastern extent of the site. Similar to the existing culvert, in the event of a blockage, flows would back up behind the culvert, before spilling over the unnamed road and to the channel downstream.

The majority of the site, including the proposed buildings, is considered to be at low risk of fluvial flooding.

Tidal

The site is situated at a minimum of 95.79m AOD and is significantly above sea level. The site is therefore not at risk of tidal flooding.

Surface Water

Surface water flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground. It is usually associated with high intensity rainfall events, but can also occur with lower intensity rainfall or melting snow where the ground is saturated, frozen or developed, resulting in overland flow and ponding in depressions in topography. Surface water flooding can occur anywhere without warning. However, flow paths can be determined by consideration of contours and relative levels.

The NRW 'Flood Map for Surface Water' map (Appendix 11.1.3) shows that the majority of the site is at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding. The northern boundary and south-eastern extents of the site are identified at low risk of surface water flooding. Low risk is defined as between a 1% and 0.1% annual probability of flooding. An isolated topographical low in the southern extent of the site is identified at high risk of surface water flooding, meaning it has a greater than 3.3% annual probability of flooding.

The surface water flood risk identified by NRW mapping is associated with the unnamed watercourses to the north and south-east of the site. The associated risk has been reviewed under fluvial flooding. The flood risk to the majority of the site, including the proposed buildings, is low.

The PFRA contains no records of flooding at the site. Any potential surface water flooding arising at or near to the site would be directed east, away from the site, following the local topography.

It can be concluded that the site is at low risk of surface water flooding.

Sewer Flooding

Flooding from sewers can occur when a sewer is overwhelmed by heavy rainfall, becomes blocked, is damaged, or is of inadequate capacity. Flooding is mostly applicable to combined and surface water sewers.

The site is located in a rural area and there are no public sewers in the immediate vicinity of the site. As such, there is no risk of flooding from public sewers.

Groundwater Flooding

Groundwater flooding occurs when water levels underneath the ground rise above normal levels. Prolonged heavy rainfall soaks into the ground and can cause the ground to become saturated. This results in rising groundwater levels which leads to flooding above ground.

The PFRA states that *'there were no records of past groundwater flooding within WCBC; this is due to the topography and geology of the area'*. There are no records of groundwater flooding at or near to the site.

It can therefore be concluded that the risk of groundwater flooding is low.

Artificial Sources of Flooding

There are no canals in the immediate vicinity of the site. The NRW online 'Risk of Flooding from Reservoirs' map shows that the site is not at risk of flooding from reservoirs. It can therefore be concluded that there is no risk of flooding from artificial sources.

Summary of Potential Flooding

It can be concluded that the majority of the site, including the location of the proposed buildings, is at low risk of flooding from all sources. Therefore, no flood risk mitigation measures are considered necessary.

Surface Water Management

The site is currently greenfield and is not served by a formal drainage system.

The proposed development will introduce 1.81ha of hardstanding in the form of buildings, concrete aprons and an access road.

The introduction of hardstanding area will result in an increase in surface water runoff rates and volumes. In order to ensure the proposed development will not increase flood risk elsewhere, surface water discharge from the site will be controlled.

In accordance with TAN15, new development should not create additional runoff when compared with the undeveloped situation.

The WBCB 'Management of Surface Water Generated from New Development' states that for undeveloped (greenfield) sites '*discharge rates and volumes are normally required to be limited to the equivalent greenfield runoff rate.*'

Existing greenfield runoff rates have been estimated using the Revitalised Flood Hydrograph (ReFH2) method (see Appendix 11.1.6). The greenfield 1 in 2-year (equivalent to QMED) runoff rate for the 1.81ha developable area is 13.6 l/s.

Discharge Method

Section 3 of the Welsh Government: 'Recommended non-statutory standards for sustainable drainage (SuDS) in Wales' (2017) includes Standard S1 which sets out the following hierarchy of surface water drainage options:

1. Surface water runoff is collected for use;
2. Surface water runoff is infiltrated to ground;
3. Surface water runoff is discharged to a surface water body;
4. Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;
5. Surface water runoff is discharged to a combined sewer.

The first consideration for surface water drainage is collection for re-use. The development will seek opportunities for water re-use i.e. re-use of water for the wash down procedure. However, the development only has limited potential for water re-use (wash downs are typically infrequent) and the runoff generated by the development will exceed the water supply requirement. Therefore, the following surface water disposal techniques have been considered:

Infiltration

The first consideration for the disposal of surface water is infiltration (soakaways). As described above, the site is underlain by Devensian Till and Devensian Glaciofluvial Deposits. The Cranfield University 'Soilscapes' map indicates that the site is underlain by 'slowly permeable seasonally wet loamy and clayey soils' with 'impeded drainage'.

Given the identified ground conditions, soakaways may not be suitable for surface water disposal. Infiltration tests should be undertaken in accordance with the BRE 365 specification to determine the suitability of soakaways. Soakaways should be located a minimum of 5m from buildings.

Watercourse

Where soakaways are not suitable, a connection to watercourse is the next consideration. There are unnamed watercourses located adjacent to the south-eastern and northern boundaries of the site.

In order to avoid a pumped solution and to mimic the existing greenfield runoff regime, it is proposed to have two separate outfalls to watercourse. An outfall will be formed to the watercourse at the northern boundary and will serve the four proposed agricultural buildings and adjoining hard-standing. A second outfall will be formed to the watercourse on the south-eastern boundary and will serve the proposed Biomass Building, adjoining concrete apron and part of the proposed access road. Gravity discharge appears feasible based on utilising two outfalls.

The greenfield runoff rate of 13.6 l/s has been divided between the two proposed outfall structures.

Discharge to the watercourse north of the site will be restricted to 8.6 l/s. Discharge to the watercourse south-east of the site will be restricted to 5 l/s.

Sewer

There are no public surface water or combined sewers within the vicinity of the site. Therefore, a connection to the public sewer network is not possible.

Attenuation Storage

In order to achieve a greenfield discharge rate, attenuation storage will be required. Attenuation storage estimates are included in Appendix 11.1.7.

Northern Watercourse

Discharge to the northern watercourse will be restricted to 8.6 l/s. To achieve a discharge rate of 8.6 l/s, an estimated storage volume of 984m³ will be required to accommodate the 1 in 100 year plus 30% Climate Change (CC) event. The storage estimate is based on storage within a tank or pond structure, an impermeable drainage area of 13,522m², a design head of 0.6m and hydro-brake flow control.

South-eastern Watercourse

Discharge to the south-eastern watercourse will be restricted to 5 l/s. To achieve a discharge rate of 5 l/s an estimated storage volume of 85m³ will be required to accommodate the 1 in 100 year plus

30% CC event. The storage estimate is based on storage within a tank or pond structure, an impermeable drainage area of 1,709m², a design head of 0.6m and hydro-brake flow control.

The attenuation volumes are provided for indicative purposes only and will be verified during the detailed design stage.

Sustainable Drainage Systems

Attenuation storage should be provided in the form of Sustainable Drainage Systems (SuDS) where practical. The following SuDS options have been considered:

Soakaways

As described above, the use of soakaways should be determined by carrying out infiltration tests in accordance with the BRE 365 specification.

Detention basins and ponds

Sufficient space is available on site to utilise a pond or basin as an above ground attenuation feature. Attenuation ponds are identified on the Site Layout Plan (drawing reference GM-MZ228-181) in the northern extent of the site (serving the agricultural buildings) and in the south-eastern extent of the site (serving the Biomass Building).

Porous / Permeable Paving

The site includes an access road and concrete aprons. These areas would not be suitable for the use of permeable paving due to the movement of heavy goods vehicles on site.

French Drains

The proposed development includes french drains (perforated pipe with stone surround to allow for infiltration and treatment of runoff) located between the four agricultural buildings. The french drains will allow for partial infiltration (subject to infiltration test results) and will provide additional attenuation storage. The amount of attenuation storage offered by french drains will be investigated at the detailed design stage. The size of the downstream attenuation pond could be reduced subject to the storage volume and infiltration capacity of the french drains.

Concept Surface Water Drainage Scheme

Where soakaways are not feasible, surface water runoff will be discharged to the unnamed watercourses located adjacent to the northern and south-eastern boundaries of the site. An outfall

will be formed to the watercourse at the northern boundary and will serve the four proposed agricultural buildings and adjoining hard-standing. A second outfall will be formed to the watercourse on the south-eastern boundary and will serve the proposed Biomass Building, adjoining concrete apron and part of the proposed access road. Runoff will be restricted to the greenfield runoff rate of 13.6 l/s, split between the two discharge points (at 8.6 l/s and 5 l/s respectively).

Surface water runoff up to the 1 in 100 year plus 30% climate change allowance event will be attenuated on site. Attenuation storage will be provided in the form of attenuation ponds. There is also potential for infiltration and attenuation storage through the use of french drains.

A concept drainage sketch, based on attenuation storage within attenuation ponds, is included in Appendix 11.1.8. Full drainage details are to be provided as under a suitably worded planning condition.

The proposed development will not increase flood risk elsewhere and is compliant with TAN15.

Exceedance Event

Storage will be provided for the 1 in 100 year plus 30% CC event. Storm events in excess of the 1 in 100 year plus 30% CC event should be permitted to produce temporary shallow depth flooding within landscaped areas.

Surface Water Treatment

In accordance with the CIRIA C753 publication 'The SuDS Manual' (2015), other roofs and low traffic roads have a 'low' pollution hazard level. Furthermore, dust extraction fans from the roof area have potential to direct high levels of ammonia to the surface water drainage system. Table 1 overleaf shows the pollution hazard indices for each land use.

Table 1 – Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Other Roofs (typically commercial/industrial roofs)	Low	0.3	0.2	0.05
Low Traffic Roads (eg general access roads)	Low	0.5	0.4	0.4

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2

** Indices values range from 0-1.*

Runoff from agricultural roofs will be direct to french drains and attenuation ponds. Runoff from the yard areas, the Biomass Building and the access road will be directed to attenuation ponds. Table 2 below shows the amount of treatment provided by french drains and attenuation ponds.

Table 2 – SuDS Mitigation Indices

	Mitigation Indices		
Type of SuDS	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Filter drain (French drain)	0.4	0.4	0.4
Pond	0.7	0.7	0.5

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.3

It can be concluded that the inclusion of french drains and attenuation ponds will provide a sufficient level of treatment.

Maintenance

Maintenance of drainage features such as the french drains and the attenuation ponds will be the responsibility of the site owner.

Maintenance schedules for ponds and french drains (filter drains) are included in Appendix 11.1.9.

Maintenance of the proposed culvert to form part of the new access will be the responsibility of the site owner.

Foul Drainage

Foul water from the shed wash-down will be directed to a dirty water tank. The waste product generated by the wash-down procedure will be collected and spread on agricultural land. The frequency of emptying is subject to the frequency of the wash-down procedure. It is recommended that the dirty water tank has an audible and visual high-level alarm system.

Conclusions

The proposed development is for the erection of four agricultural buildings for rearing livestock (table fowl); ancillary buildings and plant; associated infrastructure; and landscaping. Access to the site will be provided from the unnamed road to the east.

The site is located within Flood Zone A on the Welsh Government Development Advice Map – an area considered to be at little or no risk of fluvial or tidal flooding, with a less than 0.1% (1 in 1000) annual probability of flooding.

The principal source of flooding at this site is fluvial flooding from the unnamed watercourses adjacent to the site.

Detailed flood level data is currently not available for the unnamed watercourses. Therefore, an assessment of flood risk has been made based on NRW mapping and topography, as agreed with Wrexham County Borough Council.

From a review of NRW surface water mapping, which shows the flood risk from surface water and minor watercourses, the flood extent from the watercourse to the north is shown to be minimal and contained immediately adjacent to the watercourse. The flood extent of the watercourse to the south-east is confined to the south-eastern extent of the site. No flooding is estimated in the location of the proposed buildings. Flood depths within the southern extent are estimated to be less than 150mm during the 1 in 1000 annual probability event.

The proposed buildings will be set approximately 2m above the unnamed watercourses that border the site.

A residual risk arises from a blockage of the existing and proposed culverts. In the event of a blockage, flows would back up behind the culverts and flood land below 96.27m AOD. Flows reaching a level above 96.27m AOD would overspill over the unnamed road to the east and to the channel downstream.

Flooding would be localised to areas immediately upstream of the culverts and the majority of the site, including the location of the proposed buildings, is not at risk should blockage of the culverts occur.

It can be concluded that the majority of the site is at low risk of flooding from all sources. Areas immediately adjacent to the watercourses are identified at risk of flooding, however, no development is proposed within the flood extent. Therefore, no mitigation measures are considered necessary.

The proposed development will introduce impermeable drainage area in the form of buildings and access. This will result in an increase in surface water runoff. In order to ensure the increase in surface water runoff will not increase flood risk elsewhere, flow control will be used and attenuation provided on site to accommodate storm events up to and including the 1 in 100 year plus 30% climate change event.

All methods of surface water discharge have been assessed. Where soakaways are not feasible, surface water runoff will be discharged to the unnamed watercourses located adjacent to the northern and south-eastern boundaries of the site. An outfall will be formed to the watercourse at the northern boundary and will serve the four proposed agricultural buildings and adjoining hard-standing. A second outfall will be formed to the watercourse on the south-eastern boundary and will serve the proposed Biomass Building, adjoining concrete apron and part of the proposed access road. Runoff will be restricted to the greenfield runoff rate of 13.6 l/s, split between the two discharge points (at 8.6 l/s and 5 l/s respectively).

Attenuation storage will be provided in the form of attenuation ponds. There is also potential for infiltration and attenuation storage through the use of french drains.

Treatment of surface water will be provided by french drains and ponds. The site owner will be responsible for the maintenance of the drainage system.

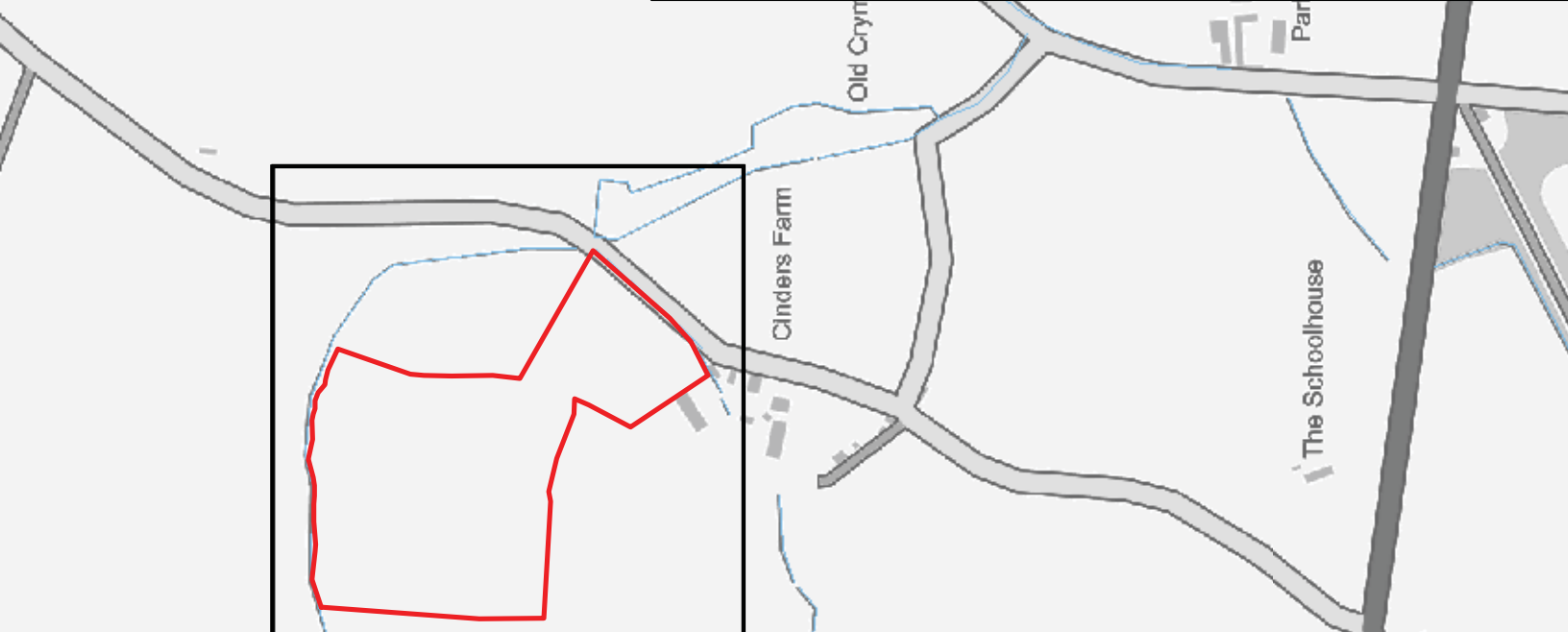
The proposed drainage system will ensure that the proposed development will not increase flood risk elsewhere and is compliant with TAN15.

Foul water from the shed wash-down should be directed to a dirty water tank. The waste product generated by the wash-down procedure will be collected and spread on agricultural land. The frequency of emptying is subject to the frequency of the wash-down procedure.

Recommendations

1. Submit this Flood Consequences Assessment and Drainage Strategy to the Planning Authority in support of the Planning Application;
2. Undertake infiltration testing to determine the suitability of infiltration techniques;
3. Verify the attenuation volumes included in this report when undertaking detailed drainage design;
4. Install an audible and visual high-level alarm system on the dirty water tank.

Appendix 11.1.1 – Location Plan & Aerial Image



CLIENT:



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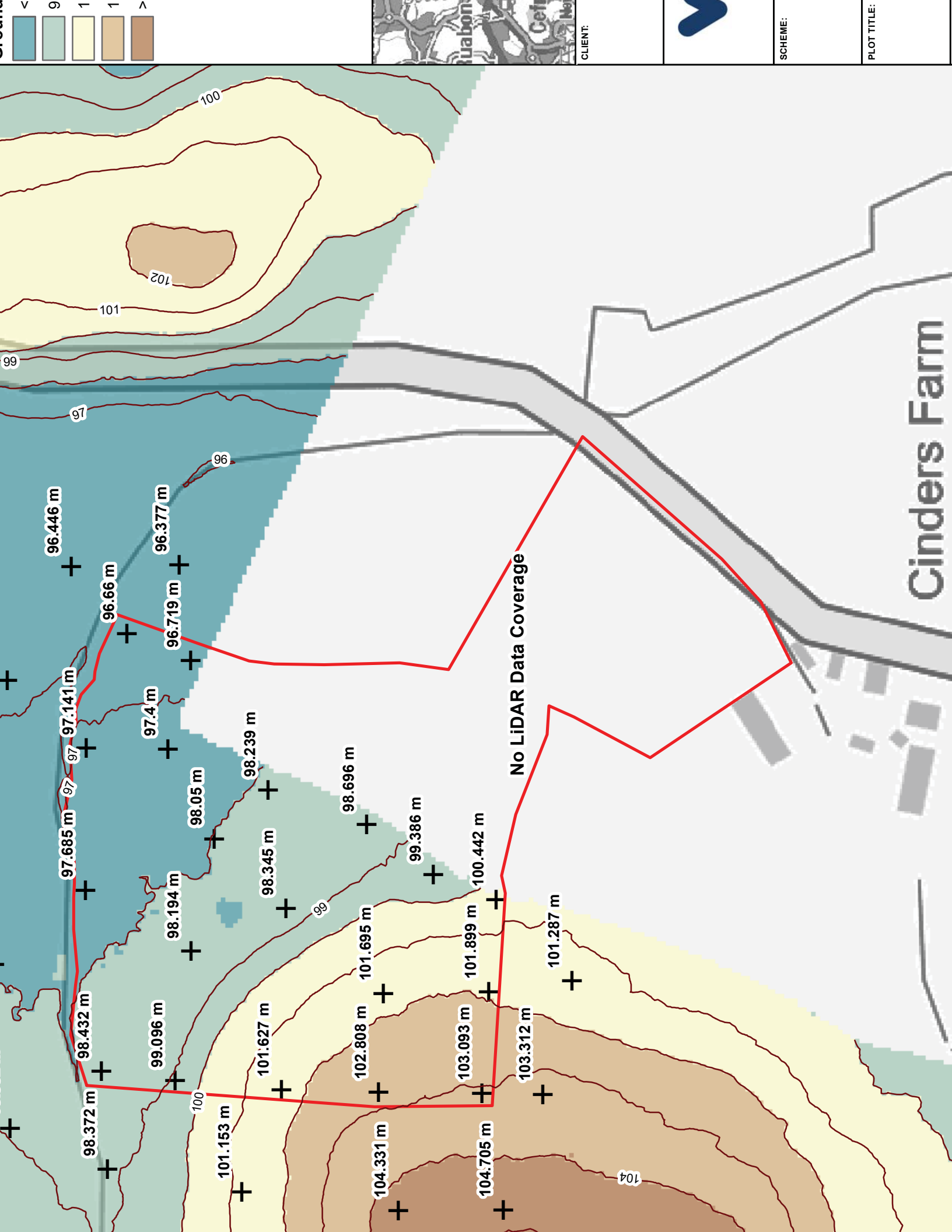
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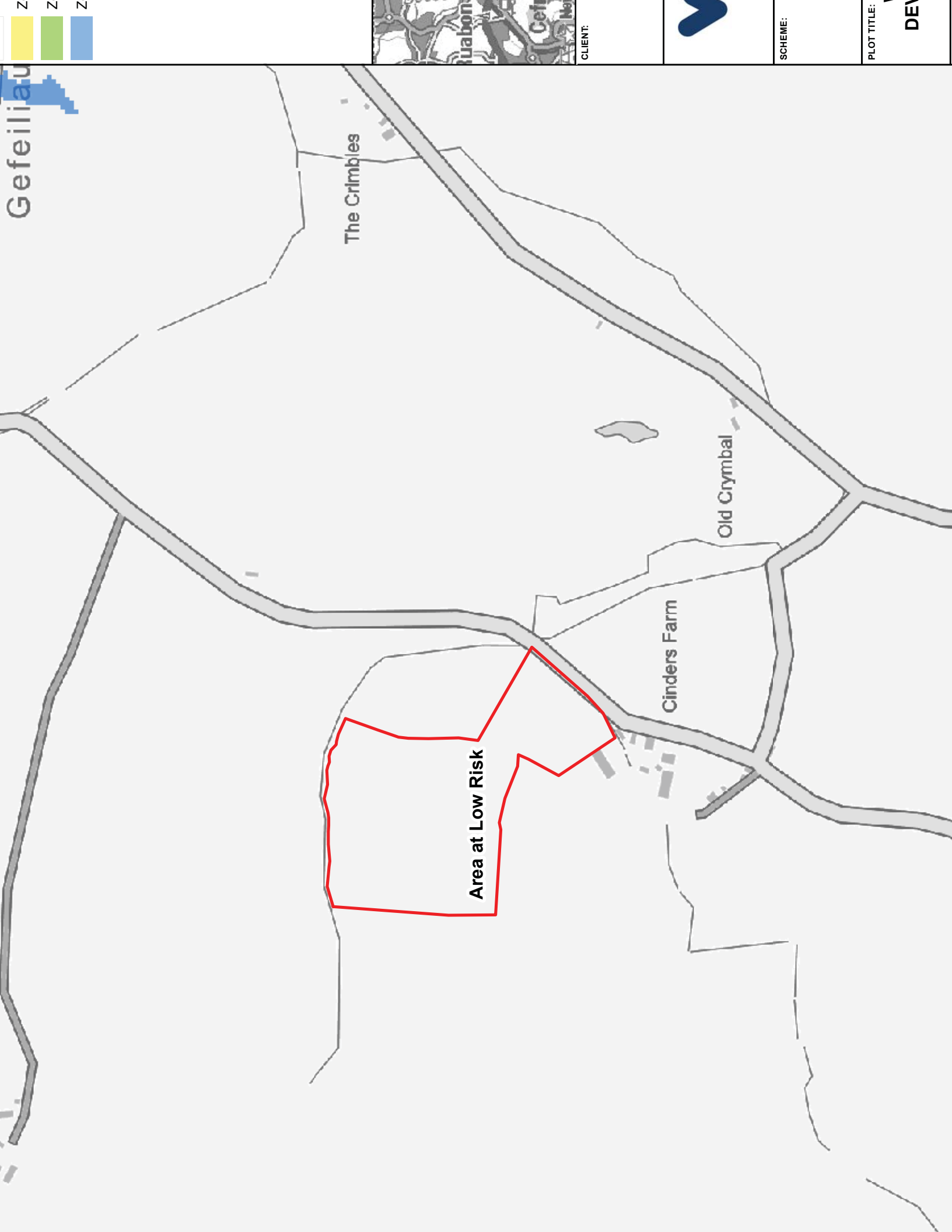
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Appendix 11.1.2 – Topographical Data



Appendix 11.1.3 – Flood Maps



Gefeiliad

The Crimbles

Old Crymbal

Cinders Farm

Area at Low Risk

The Crimbles

Old Crymbal

Cinders Farm

Area at Low Risk



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The Crimbles

Old Crymbal

Cinders Farm

Area at Low Risk



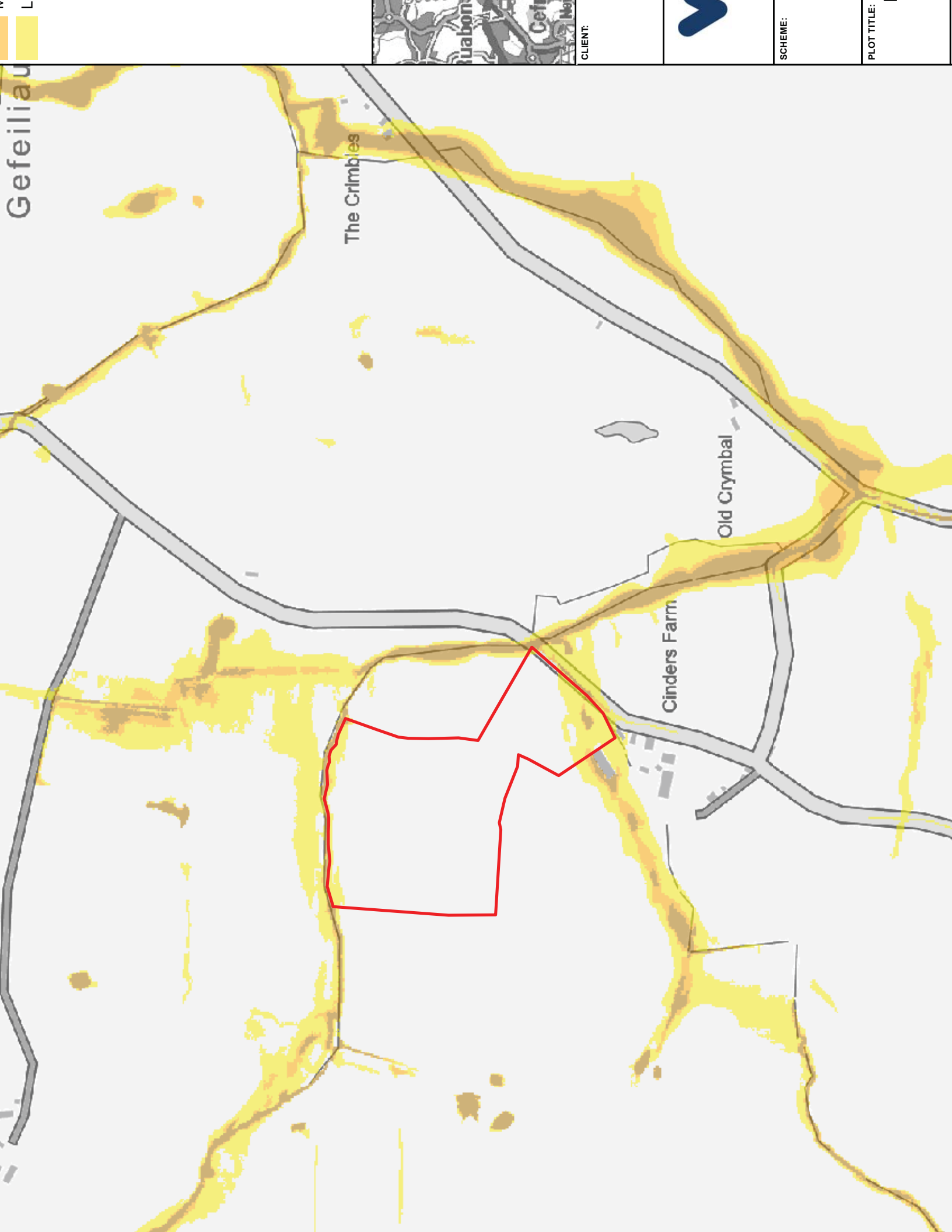
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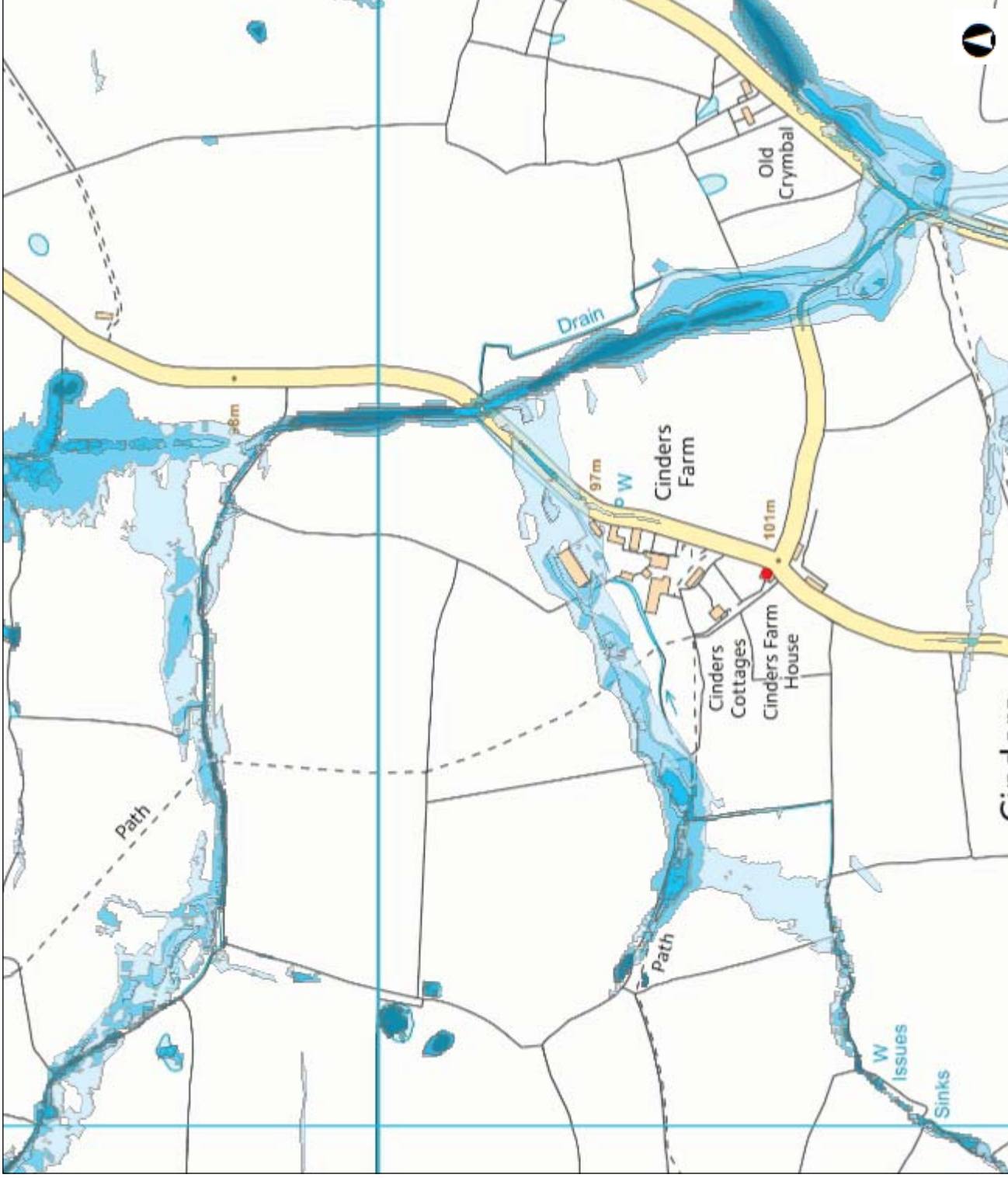


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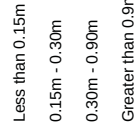


Map Title

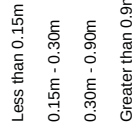
Map Perygl Llifogydd / Flood Risk Map

Allwedd / Map Key

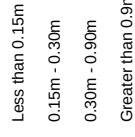
High Surface Water Flood Risk - Depth (m)



Medium Surface Water Flood Risk - Depth (m)



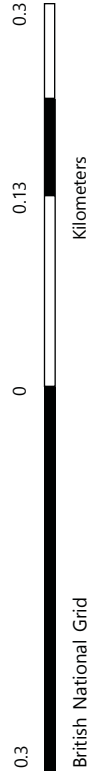
Low Surface Water Flood Risk - Depth (m)



Graddfa / Scale 1: 5,001

Dyddiad / Date
13/11/2017

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Appendix 11.1.4 – WCBC Correspondence

Jordan Jones

From: Neil Taunt <Neil.Taunt@wrexham.gov.uk>
Sent: 10 November 2017 10:53
To: Jordan Jones
Subject: RE: w10493-Cinders Farm, Ruabon-LLFA Pre-Planning Opinion

Follow Up Flag: Follow up
Flag Status: Completed

Hi Jordan,

Apologies for the delay in responding.

I have reviewed your suggested proposal and would agree with the approach proposed. I would suggest considering the impact of any structures on the watercourse and implications of blockage/failure.

As mentioned below, you should already have a copy of our surface water guidance document that outlines the level of information required.

Many thanks

Neil

From: Jordan Jones [mailto:jordan.jones@waterco.co.uk]
Sent: 26 October 2017 17:42
To: Neil Taunt
Subject: w10493-Cinders Farm, Ruabon-LLFA Pre-Planning Opinion

This email's attachments were cleaned of potential threats by Wrexham Council's Security Gateway.
Click [here](#) if the original attachments are required (justification needed).

Hi Neil,

Further to your recent correspondence with my colleague Ifan, we have received the attached correspondence from Natural Resources Wales, who have advised that we contact you in relation to the ordinary watercourses adjacent to the site.

Each watercourse originates within 470m of the site. Therefore, it can be assumed that the watercourses do not serve a significant catchment and would not convey significant flow. The NRW 'Flood Map for Surface Water' (attached) shows the flood risk from surface water and minor watercourses. The map identifies flow routes should the unnamed watercourses exceed their capacity. As you can see from the attached map, flooded areas are confined to land immediately adjacent to the watercourses during all events including the 1 in 1000 year event. No flooding is estimated in areas where development is proposed. The attached LiDAR plan shows that site levels are elevated above watercourse levels.

Please can you advise if you are happy with the above approach to assessing flood risk from these watercourses and confirm that a more detailed (modelling) assessment will not be required.

Kind regards,



Assessment, Modelling, Design

Ruthin - Chester - Manchester - Hyderabad



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From: Neil Taunt [<mailto:Neil.Taunt@wrexham.gov.uk>]

Sent: 12 October 2017 10:35

To: Ifan Jones <Ifan.Jones@waterco.co.uk>

Subject: FW: w10493-Cinders Farm, Ruabon-LLFA Pre-Planning Opinion

Dear Mr Jones,

Thanks you for your recent enquiry.

We hold no specific information in relation to the local drainage network or recorded incidents of flooding in the vicinity.

The attached guidance note will provide details of the information we would normally expect to see included within any drainage strategy for the proposed development and expected flows/discharge. Consideration of a 30% increase in rainfall is normally accepted to represent the impacts of climate change unless better evidence becomes available.

If you have any queries please let me know.

Regards

Neil

Neil Taunt MCIWEM C.WEM CEnv CSci

Uwch Swyddog Rheoli Llifogydd / Senior Flood Management Officer



01978 729734 / 07808 787632



Amgylchedd a Chynllunio, Cyngor Bwrdeistref Sirol Wrecsam, De Ffordd yr Abaty, Ystad Ddiwydiannol Wrecsam, Wrecsam LL13 9PW



Environment & Planning, Wrexham County Borough Council, Abbey Road South, Wrexham Industrial Estate, Wrexham LL13 9PW



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From: Ifan Jones [<mailto:Ifan.Jones@waterco.co.uk>]

Sent: 11 October 2017 14:05

To: highwaymaintenance <highwaymaintenance@wrexham.gov.uk>; contact-us <contact-us@wrexham.gov.uk>

Subject: w10493-Cinders Farm, Ruabon-LLFA Pre-Planning Opinion

Proposed poultry units at Cinders Farm, Ruabon, Wrexham, LL14 6HL. Grid Reference: 332382E 344047N.

Dear Sir / Madam,

Please can you provide me with a pre-planning opinion for the proposed development at the above site. I have attached Location/Development plan for reference.

The proposed development is for four poultry units.

Please could you advise if there will be any specific requirements for a Flood Consequence Assessment & Surface Water Drainage Strategy at this site i.e. specify any flow rate requirements and attenuation storage requirements (i.e. should 20%, 30% or 40% climate change be applied when sizing attenuation features).

Please could you also advise if you have any records of historical flooding in this area?

If you have any questions or require any further information to process my request please don't hesitate to contact me.

Kind regards,

Ifan Jones BSc (Hons) MSc
Environmental Consultant

01824 702220



Assessment, Modelling, Design

Ruthin - Chester - Manchester - Hyderabad



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Rydym yn croesawu gohebiaeth yn Gymraeg. Byddwn yn ymateb i unrhyw ohebiaeth yn Gymraeg ac ni fydd hyn yn arwain at unrhyw oedi.

Ewch i weld - mi fedrwch chi dalu, rhoi gwybod, gwneud cais, dweud eich dweud, a dod o hyd i wybodaeth ar-lein yn www.wreccsam.gov.uk. Arbedwch bapur - meddyliwch cyn argraffu!

Mae'r neges e-bost hon ac unrhyw atodiadau wedi eu bwriadu ar gyfer yr unigolyn neu'r sefydliad y?i cyfeirir atynt yn unig. Am yr amodau llawn yngl?n ? chynnwys a defnyddio'r neges e-bost hon, ac unrhyw atodiadau, cyfeiriwch at www.wreccsam.gov.uk/top_navigation/disclaimersw.htm

We welcome correspondence in Welsh. We will respond to any correspondence in Welsh and this will not lead to any delay.

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Rydym yn croesawu gohebiaeth yn Gymraeg. Byddwn yn ymateb i unrhyw ohebiaeth yn Gymraeg ac ni fydd hyn yn arwain at unrhyw oedi.

Ewch i weld - mi fedrwch chi dalu, rhoi gwybod, gwneud cais, dweud eich dweud, a dod o hyd i wybodaeth ar-lein yn www.wreccsam.gov.uk. Arbedwch bapur - meddyliwch cyn argraffu!

Mae'r neges e-bost hon ac unrhyw atodiadau wedi eu bwriadu ar gyfer yr unigolyn neu'r sefydliad y'i cyfeirir atynt yn unig. Am yr amodau llawn ynglŷn ? chynnwys a defnyddio'r neges e-bost hon, ac unrhyw atodiadau, cyfeiriwch at www.wreccsam.gov.uk/top_navigation/disclaimersw.htm

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Appendix 11.1.5 – NRW Correspondence



26/10/2017

Dear Ifan Jones,

PRELIMINARY PRE-APPLICATION ADVICE

PROPOSAL: Commercial development consisting four poultry units
LOCATION: Land North-West of Cinders Farm, Ruabon, Wrexham.

Thank you for consulting Natural Resources Wales about the above proposed development at pre-application stage.

We have considered your enquiry in relation to our Development Planning [checklist](#). We advise that the following matters are relevant to your site / proposed development and suggest you consider these further prior to the submission of any planning application:

Any statutory Major application to NRW or a planning application would need to be submitted with the relevant information provided within NRW's Quick Guide 9 – Poultry Units: planning permission and environmental assessment (attached).

Air Quality & Protected Sites

The planning application will need to demonstrate acceptable levels of atmospheric ammonia concentrations and nitrogen deposition on nearby protected sites. This can be done using the free online tool – SCAIL (Simple Calculation of Ammonia Impact Limits) available at <http://www.scail.ceh.ac.uk/>

Applications need to include a report from SCAIL or another air quality modelling package that includes:

- The input data
- Background levels.
- Process Contributions (PC).
- The predicted new environmental concentrations (PEC) of ammonia/nitrogen

In cases where SCAIL indicates that thresholds of insignificance are exceeded further detailed modelling may be required to support the application.

We will apply the new (post-April 2017 guidance) screening distance of 5km (that would exclude the SSSIs, SACs and Ramsar which are further than 5km). We would apply the new thresholds of 1% for initial screening for both ammonia emissions and nitrogen deposition.

The site lies within 5km of River Dee SAC/SSSI and Johnstown Newt SAC

Special Area of Conservation

The Local Planning Authority is a Competent Authority for the purposes of the *Conservation of Habitats and Species 2010 Regulations (as amended)*. As such, they must not agree to any plan or project unless they are certain that it will not adversely affect the integrity of a Special Area of Conservation (SAC).

The Local Planning Authority should carry out a test of likely significant effects (TLSE) for the SAC, which is required under Regulation 61 of the *Conservation of Habitats and Species Regulations 2010 (as amended)*. This test applies to impacts on the SACs from the proposed works, either alone or in combination with other plans and projects.

If the test concludes there is likely to be a significant effect then an appropriate assessment of the impacts on the SAC from the proposed works, either alone or in combination with other plans and projects, will be required. We would be able to assist with that assessment in our role as the statutory nature conservation body under the above Regulations.

Site of Special Scientific Interest

The site lies within 5km of Stryt Las a'r Hafod SSSI, Nant y Belan and Prynela SSSI, Sontley Marsh SSSI

The Wildlife and Countryside Act 1981 (as amended) places a duty on public authorities in exercising their functions, so far as this is likely to affect the flora, fauna, geological or physiographical features of a SSSI, to take reasonable steps consistent with the proper exercise of their functions to further the conservation and enhancement of those features.

By satisfying the requirements regarding the SACs, as indicated above, it is likely the requirements for the SSSIs will also be met.

We refer you to our [website](#) for further advice

Flood Risk

A watercourse flows along part of the site boundary. The watercourse is classified as that of an 'ordinary' watercourse (rather than a main river) and as such there may be a local flood risk associated with the watercourse. Due to the relative small catchment size of the watercourse (less than 3km²), it has not been captured by our nationalised modelling technique to generate our flood zones. We would advise that you approach Wrexham Council's Flood and Water management team who may be able to advise on possible flood risk from the adjacent watercourse along with requirements for any surface water drainage design/strategy associated with the proposal.

Surface water drainage should mimic existing run off rates/volumes and post development rates should not be increased. The use of Sustainable drainage systems would be supported.

Protected Species

Our records show there may be bats in the vicinity of the site. We advise liaison with the LPA ecologist to discuss and agree the scope of any surveys required.

We refer you to our [website](#) for further advice.

Environmental Management

Applications need to include details of the livestock range area in order to assess the risk of runoff polluting nearby watercourses.

Applications need to include a manure management plan.

Applications need to include a plan of the proposed site that indicates all of the new and existing features that will control pollution from the development.

Due to the proximity of the site to watercourses, all works at the site must be carried out in accordance with GPP5 and PPG6: 'Works in, near or over watercourses' and 'Working at construction and demolition sites' which are available on the following website:

<http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>

The activity of importing waste into the site for use as, for example hardcore, must be registered with Natural Resources Wales as an exempt/permittable activity under Environmental Permitting Regulations 2010. The developer should contact Natural Resources Wales to discuss the necessity for an exemption/permit for any material imported to and exported from the site.

If during construction/excavation works any contaminated material is revealed, then the movement of such material either on or off site should be done in consultation with Natural Resources Wales. Any waste excavation material or building waste generated in the course of the development must be disposed of satisfactorily and in accordance with Section 34 of the Environmental Protection Act 1990. Carriers transporting waste from the site must be registered waste carriers and movement of any Hazardous Waste from the site must be accompanied by Hazardous waste consignment notes.

Environmental Permitting

If the proposal accommodates in excess of 40,000 birds, an Environmental Permit under the Environmental Permitting Regulations 2010 will be required from Natural Resources Wales.

We advise that you engage with NRW's Permitting Service as early as possible and at pre-application stage, by calling 0300 065 3000 or sending an enquiry to: enquiries@naturalresourceswales.gov.uk

Please note the view expressed in this letter is a response to a pre-planning enquiry only. We trust these comments will prove helpful but they should not set a precedent for any future Natural Resources Wales' response to any formal application for planning permission or other legal consent. Such applications shall be assessed on the information submitted and regulations of relevance at that time. The details contained in this letter are based on the information available to date.

Yn gywir / yours faithfully

Sion M Williams

Siôn M. Williams

Ymgynghorydd Cynllunio Datblygu / Development Planning Advisor

Cyfoeth Naturiol Cymru / Natural Resources Wales

Appendix 11.1.6 – ReFH2 Runoff Rates

Job number: w10493	Author: JJ
Scheme name: Cinders Farm, Wrexham	Checked: AW
ReFH2 Runoff Rates	Date: 14/11/2017

Return period (yrs)	As-rural peak flow (m ³ /s)	As-rural peak flow (l/s)
1	0.01170353	11.70353
2	0.013634329	13.634329
5	0.020460765	20.460765
10	0.026039899	23.039899
30	0.03677526	36.77526
50	0.042779769	42.779769
75	0.04798372	47.98372
100	0.051901871	51.901871
200	0.062107865	62.107865
1000	0.089043613	89.043613

Appendix 11.1.7 – MicroDrainage Storage Volumes

Waterco Ltd				Page 1	
Eden Court Lon Parcwr Business Park Denbighshire LL15 1NJ		Cinders Farm Wrexham 0.17ha			
Date 27/11/2017 File w10493-171127-Attenuati...		Designed by JJ Checked by AW			
XP Solutions		Source Control 2017.1.2			
<u>Summary of Results for 100 year Return Period (+30%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.755	0.355	5.0	44.9	Flood Risk
30 min Summer	9.849	0.449	5.0	59.3	Flood Risk
60 min Summer	9.927	0.527	5.0	72.3	Flood Risk
120 min Summer	9.934	0.534	5.0	73.4	Flood Risk
180 min Summer	9.919	0.519	5.0	70.9	Flood Risk
240 min Summer	9.902	0.502	5.0	68.0	Flood Risk
360 min Summer	9.866	0.466	5.0	62.1	Flood Risk
480 min Summer	9.830	0.430	5.0	56.4	Flood Risk
600 min Summer	9.791	0.391	5.0	50.2	Flood Risk
720 min Summer	9.753	0.353	5.0	44.6	Flood Risk
960 min Summer	9.684	0.284	5.0	34.7	O K
1440 min Summer	9.584	0.184	5.0	21.4	O K
2160 min Summer	9.515	0.115	4.7	13.0	O K
2880 min Summer	9.494	0.094	3.8	10.5	O K
4320 min Summer	9.474	0.074	2.8	8.2	O K
5760 min Summer	9.464	0.064	2.3	7.0	O K
7200 min Summer	9.457	0.057	1.9	6.3	O K
8640 min Summer	9.453	0.053	1.7	5.8	O K
10080 min Summer	9.450	0.050	1.6	5.4	O K
15 min Winter	9.793	0.393	5.0	50.5	Flood Risk
30 min Winter	9.896	0.496	5.0	67.0	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	149.792	0.0	48.0	16	
30 min Summer	102.231	0.0	65.5	31	
60 min Summer	66.719	0.0	85.5	60	
120 min Summer	38.982	0.0	99.9	116	
180 min Summer	28.203	0.0	108.5	144	
240 min Summer	22.354	0.0	114.6	176	
360 min Summer	16.071	0.0	123.6	244	
480 min Summer	12.723	0.0	130.5	312	
600 min Summer	10.602	0.0	135.9	378	
720 min Summer	9.124	0.0	140.4	440	
960 min Summer	7.168	0.0	147.0	560	
1440 min Summer	5.125	0.0	157.7	792	
2160 min Summer	3.641	0.0	168.1	1108	
2880 min Summer	2.857	0.0	175.8	1472	
4320 min Summer	2.038	0.0	188.1	2204	
5760 min Summer	1.618	0.0	199.2	2936	
7200 min Summer	1.379	0.0	212.1	3672	
8640 min Summer	1.221	0.0	225.4	4344	
10080 min Summer	1.109	0.0	239.0	5136	
15 min Winter	149.792	0.0	53.7	16	
30 min Winter	102.231	0.0	73.4	30	
©1982-2017 XP Solutions					

Waterco Ltd		Page 2
Eden Court Lon Parcwr Business Park Denbighshire LL15 1NJ	Cinders Farm Wrexham 0.17ha	
Date 27/11/2017 File w10493-171127-Attenuati...	Designed by JJ Checked by AW	
XP Solutions		Source Control 2017.1.2

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	9.984	0.584	5.0	82.2	Flood Risk
120 min Winter	9.997	0.597	5.0	84.6	Flood Risk
180 min Winter	9.979	0.579	5.0	81.3	Flood Risk
240 min Winter	9.959	0.559	5.0	77.7	Flood Risk
360 min Winter	9.912	0.512	5.0	69.8	Flood Risk
480 min Winter	9.863	0.463	5.0	61.6	Flood Risk
600 min Winter	9.806	0.406	5.0	52.6	Flood Risk
720 min Winter	9.748	0.348	5.0	43.8	Flood Risk
960 min Winter	9.645	0.245	5.0	29.3	O K
1440 min Winter	9.525	0.125	4.9	14.1	O K
2160 min Winter	9.490	0.090	3.6	10.0	O K
2880 min Winter	9.475	0.075	2.9	8.3	O K
4320 min Winter	9.460	0.060	2.0	6.6	O K
5760 min Winter	9.452	0.052	1.6	5.6	O K
7200 min Winter	9.447	0.047	1.4	5.1	O K
8640 min Winter	9.444	0.044	1.2	4.7	O K
10080 min Winter	9.441	0.041	1.1	4.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	66.719	0.0	95.8	60
120 min Winter	38.982	0.0	111.9	116
180 min Winter	28.203	0.0	121.5	164
240 min Winter	22.354	0.0	128.4	186
360 min Winter	16.071	0.0	138.5	264
480 min Winter	12.723	0.0	146.1	340
600 min Winter	10.602	0.0	152.2	410
720 min Winter	9.124	0.0	157.2	470
960 min Winter	7.168	0.0	164.7	586
1440 min Winter	5.125	0.0	176.6	778
2160 min Winter	3.641	0.0	188.2	1124
2880 min Winter	2.857	0.0	196.9	1468
4320 min Winter	2.038	0.0	210.7	2204
5760 min Winter	1.618	0.0	223.1	2936
7200 min Winter	1.379	0.0	237.6	3672
8640 min Winter	1.221	0.0	252.5	4368
10080 min Winter	1.109	0.0	267.6	5096

Waterco Ltd		Page 3
Eden Court Lon Parcwr Business Park Denbighshire LL15 1NJ	Cinders Farm Wrexham 0.17ha	
Date 27/11/2017	Designed by JJ	
File w10493-171127-Attenuati...	Checked by AW	
XP Solutions	Source Control 2017.1.2	

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 332382 344057	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.171

Time (mins)		Area
From:	To:	(ha)

0	1	0.171
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Waterco Ltd		Page 4
Eden Court Lon Parcwr Business Park Denbighshire LL15 1NJ	Cinders Farm Wrexham 0.17ha	
Date 27/11/2017	Designed by JJ	
File w10493-171127-Attenuati...	Checked by AW	
XP Solutions		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.400

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	106.0	0.600	181.0

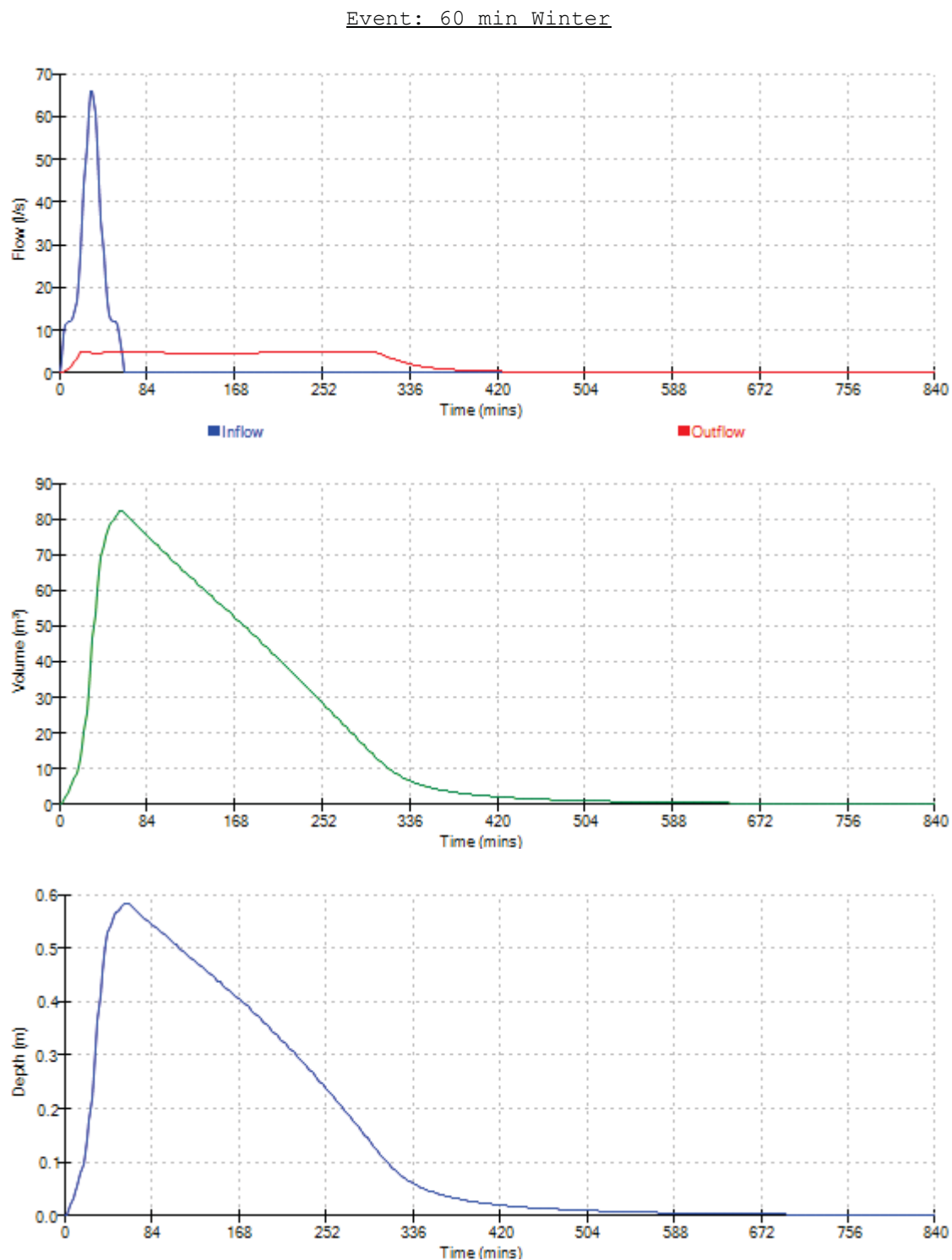
Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0111-5000-0600-5000
Design Head (m)	0.600
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	111
Invert Level (m)	9.395
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

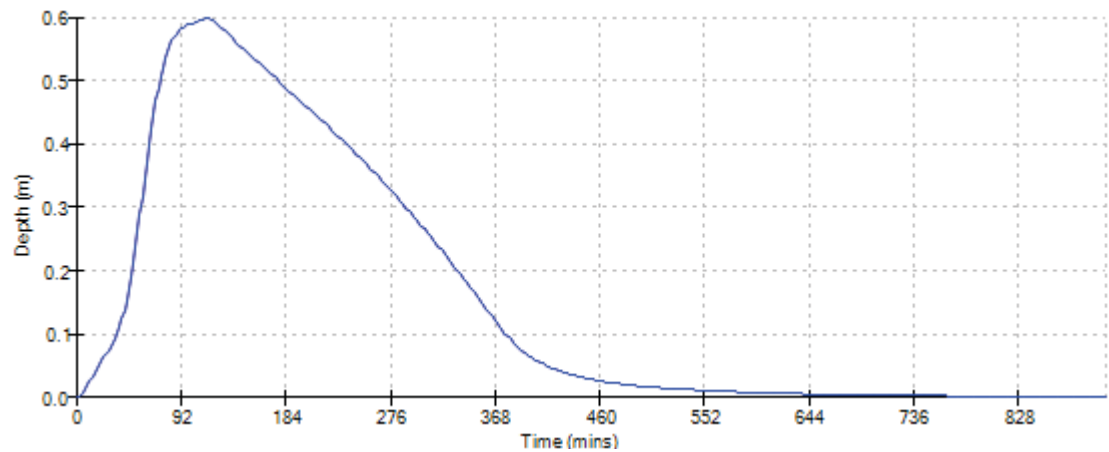
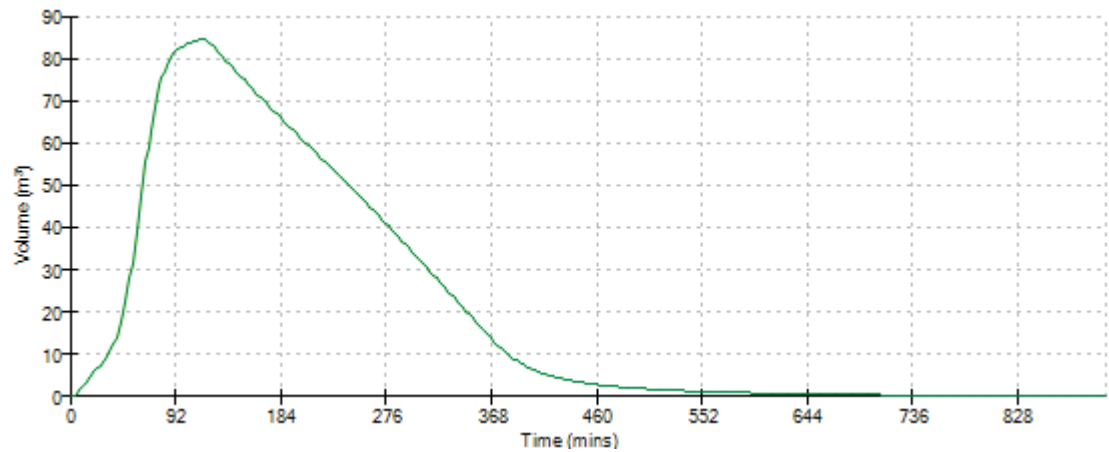
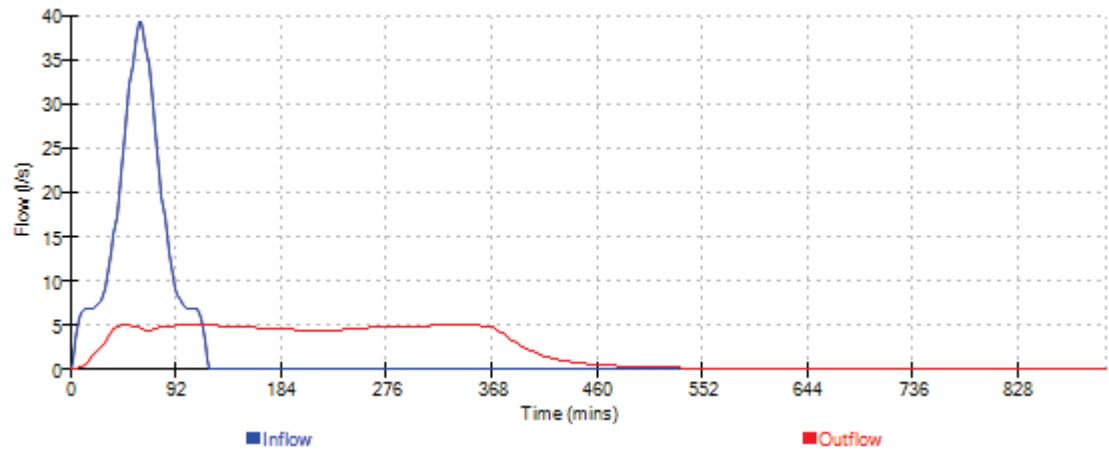
Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	5.0
Flush-Flo™	0.193	5.0
Kick-Flo®	0.428	4.3
Mean Flow over Head Range	-	4.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

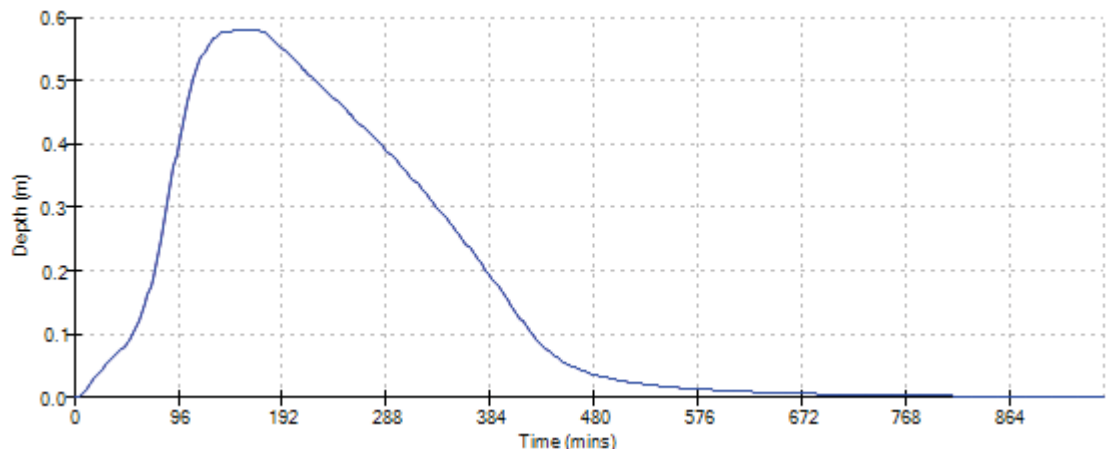
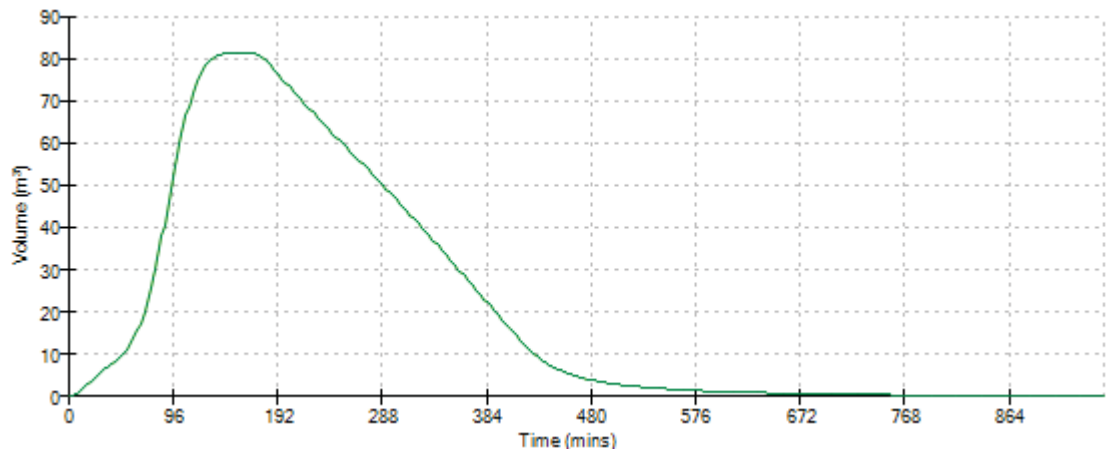
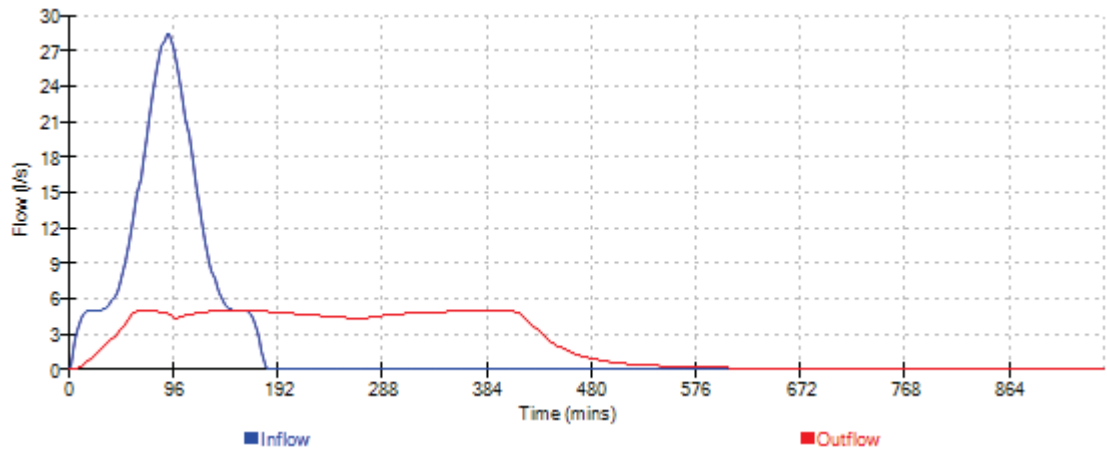
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.9	1.200	6.9	3.000	10.6	7.000	15.9
0.200	5.0	1.400	7.4	3.500	11.4	7.500	16.5
0.300	4.9	1.600	7.9	4.000	12.2	8.000	17.0
0.400	4.5	1.800	8.4	4.500	12.9	8.500	17.6
0.500	4.6	2.000	8.8	5.000	13.6	9.000	18.1
0.600	5.0	2.200	9.2	5.500	14.2	9.500	18.6
0.800	5.7	2.400	9.6	6.000	14.8		
1.000	6.3	2.600	9.9	6.500	15.3		



Event: 120 min Winter



Event: 180 min Winter



Waterco Ltd		Page 1
Eden Court Lon Parcwr Business Park Denbighshire LL15 1NJ	Cinders Farm Wrexham 1.3ha	
Date 04/12/2017	Designed by JJ	
File w10493-171204-Attenuati...	Checked by AW	
XP Solutions	Source Control 2017.1.2	

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Summer	9.639	0.239	8.6	375.0	O K
30 min Summer	9.720	0.320	8.6	508.6	Flood Risk
60 min Summer	9.809	0.409	8.6	656.4	Flood Risk
120 min Summer	9.864	0.464	8.6	750.7	Flood Risk
180 min Summer	9.891	0.491	8.6	797.5	Flood Risk
240 min Summer	9.907	0.507	8.6	825.1	Flood Risk
360 min Summer	9.923	0.523	8.6	853.5	Flood Risk
480 min Summer	9.930	0.530	8.6	864.8	Flood Risk
600 min Summer	9.930	0.530	8.6	864.8	Flood Risk
720 min Summer	9.926	0.526	8.6	857.4	Flood Risk
960 min Summer	9.912	0.512	8.6	833.7	Flood Risk
1440 min Summer	9.889	0.489	8.6	794.3	Flood Risk
2160 min Summer	9.851	0.451	8.6	727.7	Flood Risk
2880 min Summer	9.809	0.409	8.6	657.3	Flood Risk
4320 min Summer	9.739	0.339	8.6	539.2	Flood Risk
5760 min Summer	9.684	0.284	8.6	448.2	O K
7200 min Summer	9.646	0.246	8.6	386.9	O K
8640 min Summer	9.618	0.218	8.6	341.1	O K
10080 min Summer	9.597	0.197	8.6	306.8	O K
15 min Winter	9.667	0.267	8.6	420.4	O K
30 min Winter	9.758	0.358	8.6	570.4	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	149.792	0.0	339.9	16
30 min Summer	102.231	0.0	465.2	31
60 min Summer	66.719	0.0	655.8	62
120 min Summer	38.982	0.0	765.6	122
180 min Summer	28.203	0.0	829.8	182
240 min Summer	22.354	0.0	875.7	242
360 min Summer	16.071	0.0	941.7	360
480 min Summer	12.723	0.0	990.9	480
600 min Summer	10.602	0.0	1028.6	600
720 min Summer	9.124	0.0	1058.2	720
960 min Summer	7.168	0.0	1098.7	826
1440 min Summer	5.125	0.0	1143.8	1068
2160 min Summer	3.641	0.0	1317.2	1472
2880 min Summer	2.857	0.0	1376.2	1872
4320 min Summer	2.038	0.0	1464.5	2636
5760 min Summer	1.618	0.0	1574.1	3400
7200 min Summer	1.379	0.0	1674.1	4104
8640 min Summer	1.221	0.0	1775.1	4832
10080 min Summer	1.109	0.0	1872.6	5544
15 min Winter	149.792	0.0	381.9	16
30 min Winter	102.231	0.0	519.0	31

Waterco Ltd		Page 2
Eden Court Lon Parcwr Business Park Denbighshire LL15 1NJ	Cinders Farm Wrexham 1.3ha	
Date 04/12/2017 File w10493-171204-Attenuati...	Designed by JJ Checked by AW	
XP Solutions	Source Control 2017.1.2	

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
60 min Winter	9.856	0.456	8.6	737.1	Flood Risk
120 min Winter	9.918	0.518	8.6	843.7	Flood Risk
180 min Winter	9.948	0.548	8.6	897.2	Flood Risk
240 min Winter	9.967	0.567	8.6	929.6	Flood Risk
360 min Winter	9.987	0.587	8.6	964.4	Flood Risk
480 min Winter	9.996	0.596	8.6	980.4	Flood Risk
600 min Winter	9.998	0.598	8.6	984.1	Flood Risk
720 min Winter	9.995	0.595	8.6	979.8	Flood Risk
960 min Winter	9.981	0.581	8.6	954.4	Flood Risk
1440 min Winter	9.950	0.550	8.6	900.6	Flood Risk
2160 min Winter	9.901	0.501	8.6	813.9	Flood Risk
2880 min Winter	9.847	0.447	8.6	721.3	Flood Risk
4320 min Winter	9.738	0.338	8.6	538.0	Flood Risk
5760 min Winter	9.656	0.256	8.6	402.4	O K
7200 min Winter	9.602	0.202	8.6	314.9	O K
8640 min Winter	9.566	0.166	8.5	257.9	O K
10080 min Winter	9.545	0.145	8.3	224.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
60 min Winter	66.719	0.0	734.4	62
120 min Winter	38.982	0.0	856.5	120
180 min Winter	28.203	0.0	927.7	180
240 min Winter	22.354	0.0	978.4	238
360 min Winter	16.071	0.0	1050.8	354
480 min Winter	12.723	0.0	1104.0	468
600 min Winter	10.602	0.0	1144.0	582
720 min Winter	9.124	0.0	1174.4	692
960 min Winter	7.168	0.0	1212.7	904
1440 min Winter	5.125	0.0	1232.6	1126
2160 min Winter	3.641	0.0	1474.9	1596
2880 min Winter	2.857	0.0	1540.5	2048
4320 min Winter	2.038	0.0	1641.2	2812
5760 min Winter	1.618	0.0	1763.2	3568
7200 min Winter	1.379	0.0	1875.5	4248
8640 min Winter	1.221	0.0	1989.3	4840
10080 min Winter	1.109	0.0	2100.3	5440

Waterco Ltd		Page 3
Eden Court Lon Parcwr Business Park Denbighshire LL15 1NJ	Cinders Farm Wrexham 1.3ha	
Date 04/12/2017 File w10493-171204-Attenuati...	Designed by JJ Checked by AW	
XP Solutions	Source Control 2017.1.2	

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 332382 344057	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 1.352

Time (mins) Area
From: To: (ha)

0 1 1.352

Waterco Ltd		Page 4
Eden Court Lon Parcwr Business Park Denbighshire LL15 1NJ	Cinders Farm Wrexham 1.3ha	
Date 04/12/2017 File w10493-171204-Attenuati...	Designed by JJ Checked by AW	
XP Solutions		Source Control 2017.1.2

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.400

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1520.0	0.600	1778.0

Hydro-Brake® Optimum Outflow Control

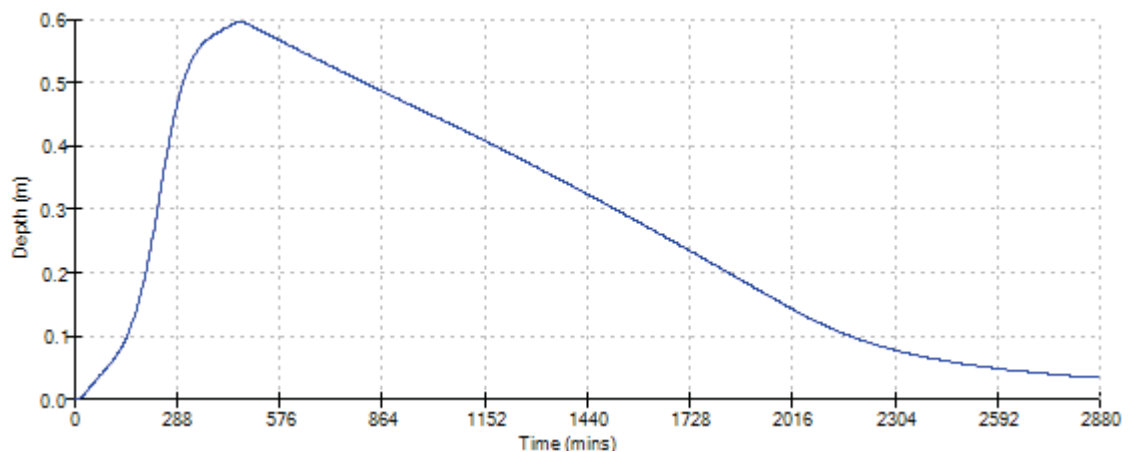
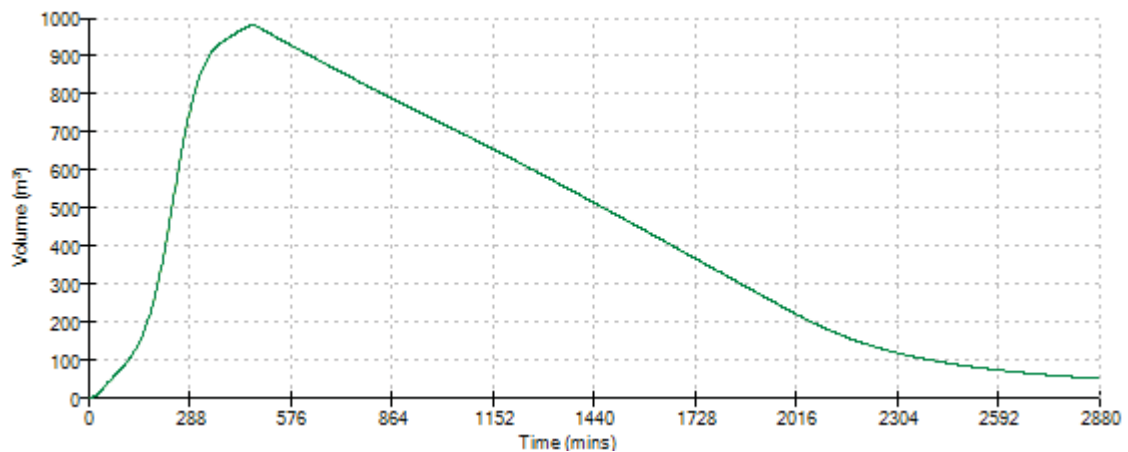
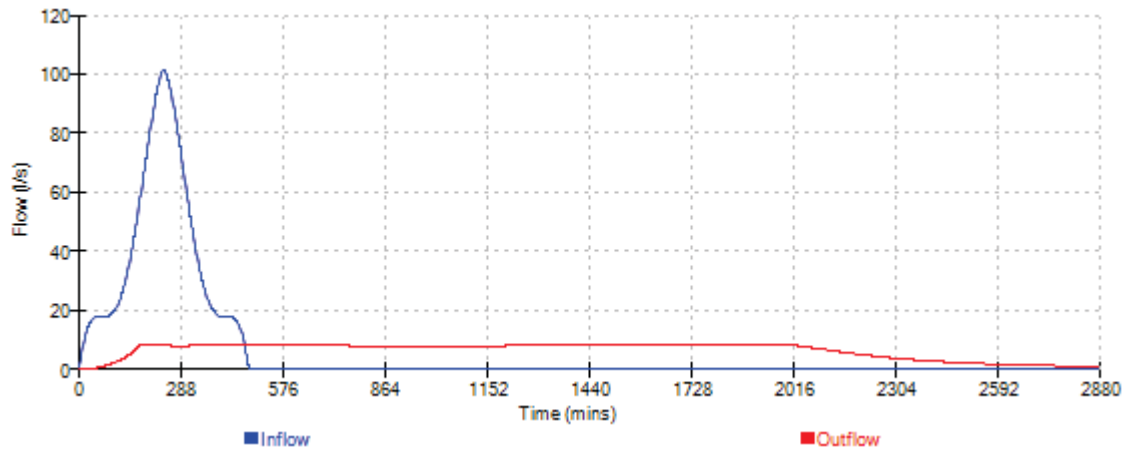
Unit Reference	MD-SHE-0141-8600-0600-8600
Design Head (m)	0.600
Design Flow (l/s)	8.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	141
Invert Level (m)	9.395
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	8.6
Flush-Flo™	0.224	8.6
Kick-Flo®	0.448	7.5
Mean Flow over Head Range	-	7.1

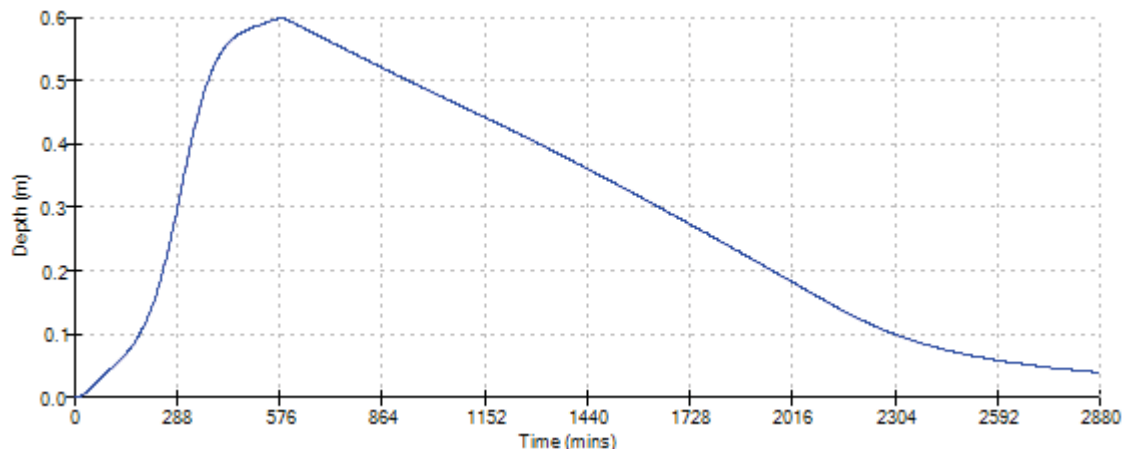
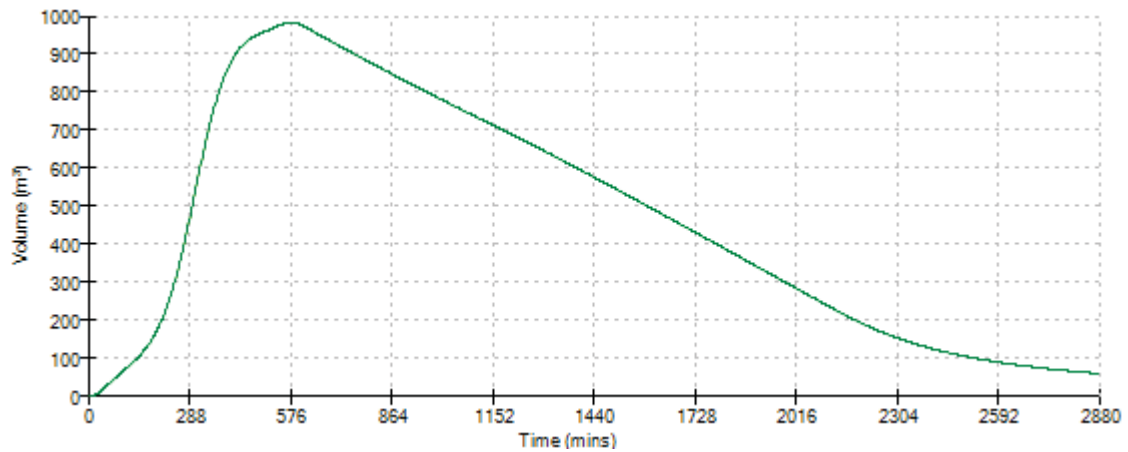
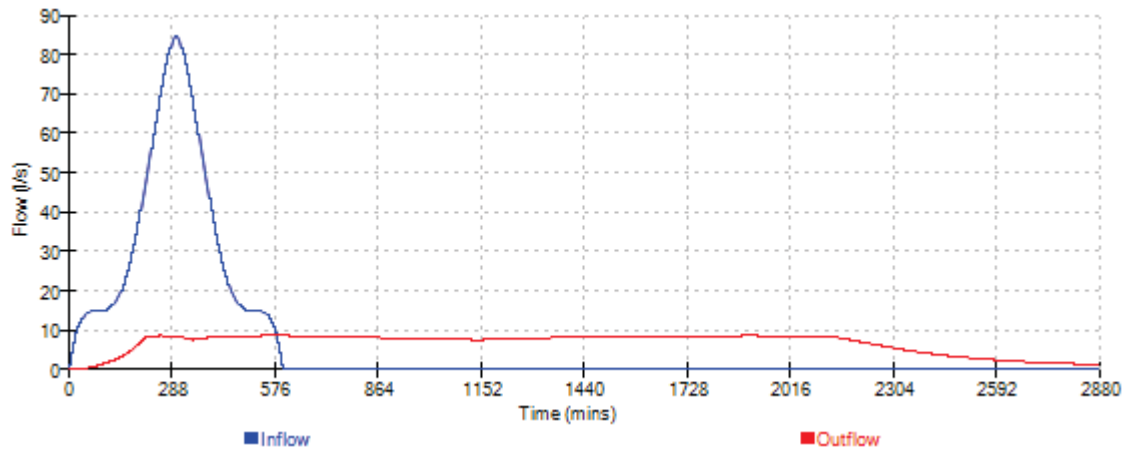
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.1	1.200	11.9	3.000	18.4	7.000	27.6
0.200	8.5	1.400	12.8	3.500	19.8	7.500	28.6
0.300	8.4	1.600	13.6	4.000	21.1	8.000	29.6
0.400	8.0	1.800	14.4	4.500	22.4	8.500	30.5
0.500	7.9	2.000	15.2	5.000	23.5	9.000	31.4
0.600	8.6	2.200	15.9	5.500	24.6	9.500	32.2
0.800	9.8	2.400	16.6	6.000	25.7		
1.000	10.9	2.600	17.2	6.500	26.6		

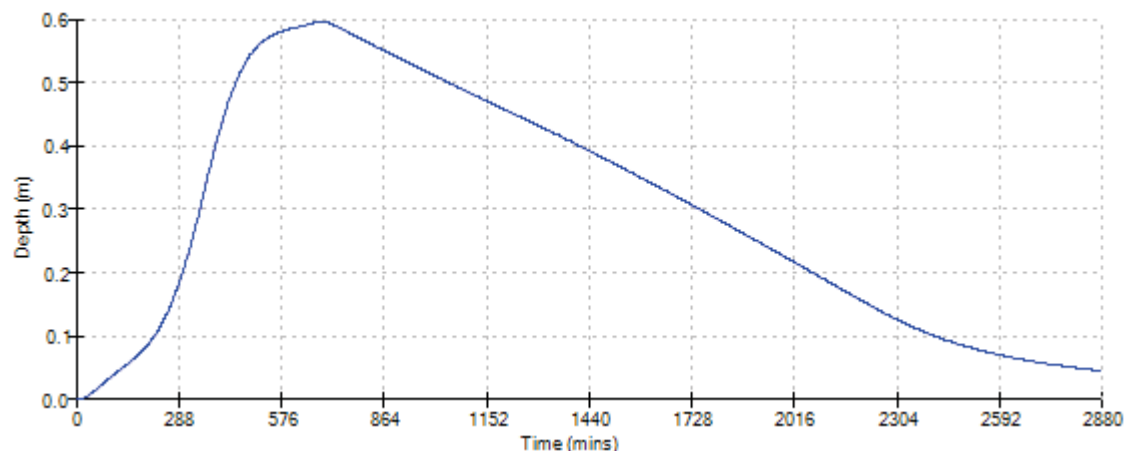
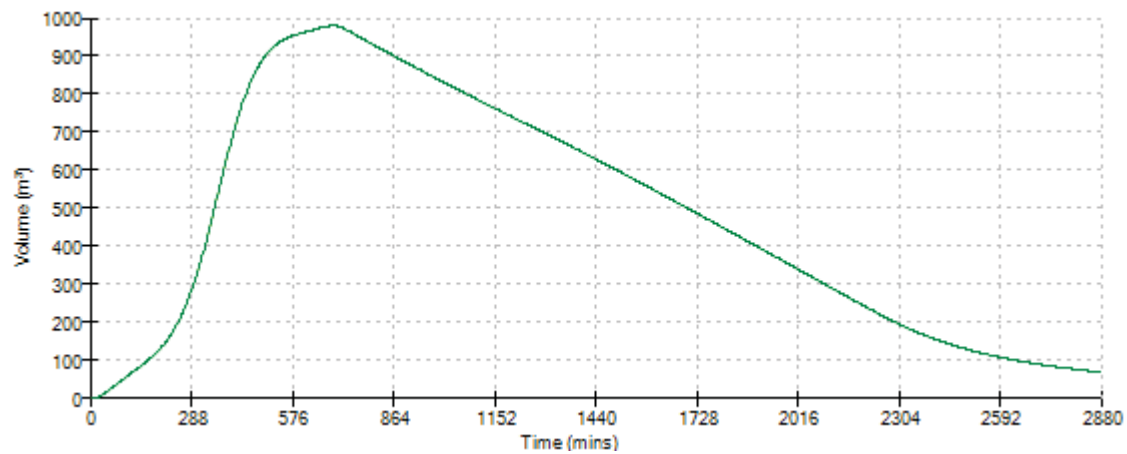
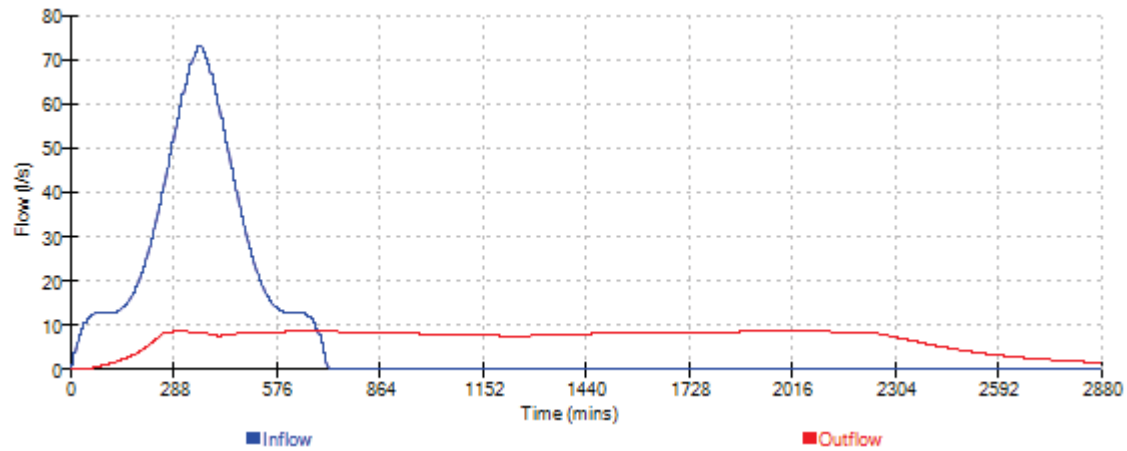
Event: 480 min Winter



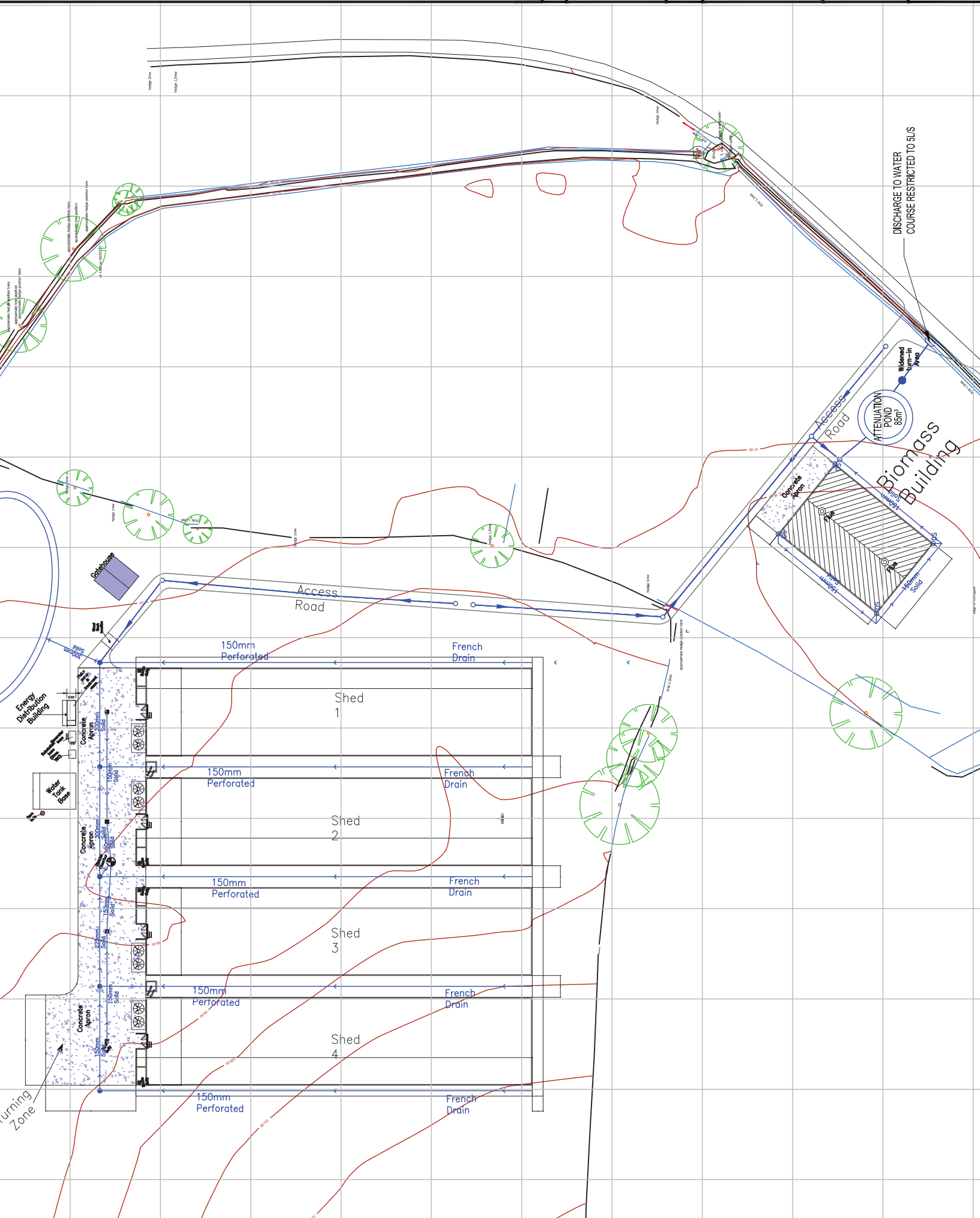
Event: 600 min Winter



Event: 720 min Winter



Appendix 11.1.8 – Concept Drainage Sketch



Appendix 11.1.9 – Maintenance Schedules

Operation and Maintenance Requirements for Filter Drains

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet / outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (e.g. NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

Ref. Table 16.1, CIRIA C753 'The SuDS Manual'

The maintenance requirements detailed above are to be undertaken by the site owner.

Name:

Position:

Date:

**Signed on behalf
Of the site owner**

Operation and Maintenance Requirements for Ponds and Wetlands

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass – public areas	Monthly (during growing season), or as required
	Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc for evidence of blockage, and / or physical damage.	Monthly
	Inspect water body for signs of poor water quality	Monthly (May – October)
	Inspect silt accumulation rates in any forebay and in main body of the pond and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options.	Half yearly
	Check any mechanical devices e.g. penstocks	Half yearly
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above pond base; include max 25% of pond surface)	Annually
	Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level	Annually
	Remove sediment from any forebay	Every 1 – 5 years, or as required
Occasional maintenance	Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays	Every 5 years, or as required
	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	With effective pre-treatment, this will only be required rarely, e.g. 25-50 years
Remedial actions	Repair erosion or other damage	As required
	Replant where necessary	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair/rehabilitate of Inlets, outlets and overflows	As required

Ref. Table 23.1 CIRIA C753 'The SuDS Manual'

The maintenance requirements detailed above are to be undertaken by the site owner

Name:

Position:

Date:

**Signed on behalf
of site owner**

Appendix 11.2

Water Framework Directive (WFD) 2000/60/EC¹

Published in December 2000, the directive aims to preserve, restore and improve the water environment. It is a legal requirement within England and Wales, transposed into law through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 to record data within River Basin Management Plans. River Basin Planning is managed in six-year cycles.

The environmental objectives of the WFD for surface waters include:

- Prevent deterioration in the status of all bodies of surface water;
- Protect, enhance and restore all bodies of surface water, with the aim of achieving good surface water status at the latest 15 years after the date of entry into force of this Directive (2015);
- Protect and enhance all artificial and heavily modified bodies of surface water, with the aim of achieving good ecological potential and good surface water chemical status at the latest 15 years after the date of entry into force of this Directive (2015). There are five classes of rating which are; high, good, moderate, poor or bad. The ecological and chemical status of the waterbody is assessed, and the overall status is reflective of which of these is worst rated.
- Implementation of necessary measures, with the aim of progressively reducing pollution from priority substances and ceasing or phasing out emissions, discharges and losses of priority hazardous substances.

Flood and Water Management Act 2010²

Provides details on the management of risks associated with flooding and coastal erosion.

Environmental Protection Act 1990³

Provides details for identifying and dealing with waste, emissions, contaminated land and water resources.

Environment (Wales) Act 2016⁴

Provides details on how to manage natural resources within Wales in a sustainable way.

The Land Drainage Act 1991⁵

Establishes the regulation of ordinary watercourses by Local Authorities and Internal Drainage Boards.

Outlines that a watercourse should be maintained by its owner so that the flow of water is not impeded.

¹ European Commission (2000), 'Directive 2000/60/EC – Water Framework Directive', available at: http://ec.europa.eu/environment/water/water-framework/index_en.html [Date accessed: 02/11/2017]

² UK Government (2010), 'Flood and Water Management Act 2010', available at: <https://www.legislation.gov.uk/ukpga/2010/29/contents> [Date accessed: 02/11/2017]

³ UK Government (1990), 'Environmental Protection Act 1990', available at: <http://www.legislation.gov.uk/ukpga/1990/43/contents> [Date accessed: 02/11/2017]

⁴ UK Government (2016), 'Environment (Wales) Act 2016', available at: <http://www.legislation.gov.uk/anaw/2016/3/contents/enacted> [Date accessed: 02/11/2017]

⁵ UK Government (1991), 'The Land Drainage Act 1991', available at: <https://www.legislation.gov.uk/ukpga/1991/59/contents> [Date accessed: 02/11/2017]

The riparian owner must accept the natural flow from upstream but does not need to carry out works to cater for increased flows which may result from works carried out upstream.

The Groundwater (England and Wales) Regulations 2009⁶

Outlines the requirements for the protection of groundwater against pollution and deterioration from hazardous substances and non-hazardous pollutants.

Environmental Permitting (England and Wales) Regulations 2010⁷

Provides a consolidated system of environmental permitting including the discharge of water and groundwater activities.

The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2015⁸

Aims to prevent and remedy damage to a protected species, natural habitat, a site of special scientific interest, water or land.

Water Resources Act (Control of Pollution) (Silage Slurry and Agricultural Fuel Oil) (Wales) Regulations 2010⁹

Outlines the regulations and standards for the storage of silage, slurry and agricultural fuel oil.

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003¹⁰

Transposes 2000/60/EC into law in Wales.

The SuDS Manual¹¹

Provides guidance on how to design and construct Sustainable Drainage Systems (SuDS). Also provides information on how to maintain SuDS, the level of surface water treatment provided by SuDS and other benefits including amenity, biodiversity and flood risk reduction.

⁶ UK Government (2009), 'The Groundwater (England and Wales) Regulations 2009', available at: <https://www.legislation.gov.uk/ukdsi/2009/9780111480816/contents> [Date accessed: 02/11/2017]

⁷ UK Government (2010), 'Environmental Permitting (England and Wales) Regulations 2010' No. 675, available at: <https://www.legislation.gov.uk/ukdsi/2010/675/contents/made> [Date accessed: 02/11/2017]

⁸ UK Government (2015), 'The Environmental Damage (Prevention and Remediation) (Wales) (Amendment) (No.2) Regulations 2015', available at: <http://www.legislation.gov.uk/wsi/2015/1937/contents/made> [Date accessed: 02/11/2017]

⁹ UK Government (2010), 'The Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oil) (Wales) Regulations 2010', available at <http://www.legislation.gov.uk/wsi/2010/1493/contents/made> [Date accessed: 02/11/2017]

¹⁰ UK Government (2003), 'The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003', available at: <http://www.legislation.gov.uk/ukdsi/2003/3242/contents/made> [Date accessed: 02/11/2017]

¹¹ B Woods Ballard, S Wilson, H Udale-Clarke, S Illman, T Scott, R Ashley, R Kellagher (2015), 'The SuDS Manual', London, CIRIA.

Recommended non-statutory standards for sustainable drainage (SuDS) in Wales¹²

Outlines advisory principles for SuDS design and standards in Wales for developments which comprise more than one dwelling, or 300m² floor space. Also included is a hierarchy for the disposal of surface water runoff, guidance on surface water runoff rates and restrictions, water quality, amenity and biodiversity.

Planning Policy Wales¹³

Planning Policy Wales (PPW) is national planning policy used in Wales which sets out land use planning policies. Technical Advice Notes (TANs) are supplementary documents to PPW which provide further technical detail on a number of topics related to development planning.

Technical Advice Note 15: Development and Flood Risk¹⁴

TAN15 provides technical guidance which supplements the policy set out in PPW. It advises on development and flood risk as this is related to sustainability principles (section 2.2 PPW), and provides a framework within which risks arising from both river and coastal flooding, and from additional runoff from development in any location, can be assessed.

Paragraph 6.2 of TAN15 states that 'new development should be directed away from zone c and towards suitable land in zone A, otherwise to zone B where river or coastal flooding will be less of an issue.'

In accordance with Figure 2 of TAN15: Development and Flood Risk, agricultural developments are considered to be 'less vulnerable'.

The site will be located wholly within Flood Zone A, as shown on the Welsh Government Development Advice Map. In accordance with Section 9 of TAN15, 'less vulnerable' development is considered acceptable in Flood Zone A subject to demonstrating no increase in flood risk elsewhere.

Wrexham Unitary Development Plan 1996 – 2011¹⁵

The Wrexham Unitary Development Plan (UDP) 1996 – 2011 was adopted in February 2005 and is the current UDP for the area. The UDP contains the following policies in relation to flood risk and sustainable drainage:

Development and Flood Risk

¹² Welsh Government (2017), 'Recommended non-statutory standards for sustainable drainage (SuDS) in Wales – designing, constructing, operating and maintaining surface water drainage systems', available at: <http://gov.wales/topics/environmentcountryside/epq/flooding/drainage/?lang=en> [date accessed 27/11/2017]

¹³ Welsh Assembly Government (2016), 'Planning Policy Wales (Edition 9)', available at <http://gov.wales/topics/planning/policy/ppw/?lang=en> [Date accessed: 02/11/2017]

¹⁴ Welsh Assembly Government (2004), 'Technical Advice Not 15: Development and Flood Risk', available at: <http://gov.wales/topics/planning/policy/tans/tan15/?lang=en> [Date accessed: 02/11/2017]

¹⁵ Wrexham County Borough Council (2005), 'Wrexham Unitary Development Plan 1996-2011', available from: http://www.wrexham.gov.uk/english/planning_portal/plan_policy/wxm_udp.htm [Date accessed: 02/11/2017]

Policy EC12 Development (including the raising of land) within defined flood plains will only be permitted if it:-

- a) would not be subject to an unacceptable risk of flooding on-site; and/or
- b) does not result in an unacceptable risk of flooding on or off-site; and/or
- c) does not adversely affect flood management or maintenance schemes.

Surface Water Run-off

Policy EC13 Development which would result in an unacceptable adverse impact on the water environment due to additional surface water run-off will not be permitted.

5.18 Development on green field sites usually results in an increase in the amount of impermeable land. This can alter the natural water cycle as rates and volumes of surface water reaching a watercourse generally increase. Drains and sewers generally convey surface water from impermeable areas directly, or via a sewerage system, to a watercourse. Such arrangements not only reduce the natural recharge of groundwater, which wastes a valuable resource and increases pollution risk (for example from contaminated urban run-off and combined sewage overflows) but can also increase river flows. Increased river flows can cause physical damage to the banks and bed of a watercourse, and increase the risk of flooding.

5.19 Wherever practicable surface water should be disposed of as close to the source as possible. Where potential risks are identified appropriate flow attenuation facilities or mitigation measures may be a pre-requisite for development. Consideration should be given to the use of softer engineering structures referred to as Sustainable Urban Drainage Systems (SUDS). SUDS is a concept that focuses decisions about drainage design, construction and maintenance on the quality of the receiving environment and people. SUDS are physical structures built to receive surface water runoff. They typically include swales, ponds, infiltration basins and porous surfaces and should be considered as alternatives to conventional drainage where appropriate. The Environment Agency Wales can provide guidance on the design of SUDS and have produced a document entitled "Protecting the Quality of Our Environment, Sustainable Urban Drainage Systems – An Introduction". The Council will require the developer to demonstrate, both financially and practically, how the long term maintenance of any attenuation facilities or mitigation measures will be achieved.

Protection of Controlled Waters

Policy EC14 Development which would have an unacceptable adverse impact upon the capacity, flow, quality or availability of controlled waters and associated land will not be permitted.

Wrexham County Borough Council (WCBC) produced this document as a guidance note for developers when designing the surface water management system. It contains the following guidance:

Protection of Controlled Waters

Wrexham County Borough Council advocates that surface water run-off should be controlled as near to its source as possible. Preferably sustainable drainage systems (SuDS) should be utilised. The variety of SuDS techniques available means that virtually any development should be able to include a scheme based around these principles. Surface water should be disposed of to the receptors listed in order of priority below:

- a) infiltrated to ground;*
- b) to a watercourse*
- c) to a surface water sewer*
- d) other*

Undeveloped (Greenfield) Sites:

Discharge rates and volumes are normally required to be limited to the equivalent greenfield runoff rate (with on-site attenuation for all events up to the 1% (1 in 100 year) rainfall event with an appropriate allowance for climate change)...

Storage of Water on Site:

The drainage system should be designed so that flooding does not occur on any part of the development for the 3.33% (1 in 30 year) rainfall event other than in those areas/systems designated to store or convey water. It may be acceptable to allow some on-site flooding of roads etc. for rainfall events beyond this. However flooding within the development site should not occur in any part of a building or utility plant susceptible to water during a 1% (1 in 100 year) + climate change rainfall event.

Practicable Minimum Limit of Discharge:

A practicable minimum limit on the discharge rate from a flow attenuation device is often a compromise between attenuating to a satisfactorily low flow rate while keeping the risk of blockage to an acceptable level. It is suggested that this is 5 litres per second, using an appropriate vortex flow control device or other technically acceptable flow control device. The minimum size of pipe discharging from a flow attention device should be 150mm laid at a gradient not flatter than 1 in 150, which meets the requirements of Sewers for Adoption 7th Edition.'

¹⁶ Wrexham County Borough Council (2015), 'Management of Surface Water Generated from New Development', available at http://www.wrexham.gov.uk/english/planning_portal/publications/surface_water.htm [Date accessed: 12/10/2017]

Appendix 11.3

Management of Surface Water Runoff during Construction

During construction, surface water management will be carried out in accordance with the national pollution prevention guidelines and the CIRIA publication 'The SuDS Manual' (2015). The groundworks for the surface water drainage system should be undertaken prior to occupation of the development and during initial infrastructure construction phases to ensure that there will be provision for surface water drainage immediately. In summary, guidance states that the following methods of surface water management should be put in place during the construction phase to ensure pollution, sediment and erosion control:

Excavated ground and exposed ground

Recently disturbed and vegetation free ground allows for relatively low velocity runoff to erode the surface. To limit the volume of runoff reaching the exposed ground, runoff diversion or interception devices can be placed upstream. To help prevent pollution from entering a watercourse, silt fences, hay bales or stilling ponds can be placed downstream.

Stockpiles

The effects of erosion on a stockpile will depend on the type of material being stored. Fine sand and topsoil stockpiles will be eroded far more readily than heavy granular materials. Stockpiles should be located away from a watercourse or site drainage system. Protective coverings will help prevent runoff stripping the stockpile.

Plant and wheel washing

Plant and wheel washing should take place in designated locations. The area should be tanked and should not be allowed to discharge into a watercourse or infiltrate groundwater. Some proprietary vehicle washing systems offer a recycling facility, which filter and settle solids, with the effluent being pumped back into the system. The solid waste materials from this process need to be treated as contaminated waste due to the high hydrocarbon content.

Haul roads

The runoff from haul roads contains a large amount of suspended solids as well as hydrocarbons. Haul roads should be designed so that the length is kept to a minimum, but still serves its purpose. The gradient should be shallow to prevent increasing runoff velocity and, if possible, bunds and/or discrete ditches constructed to intercept the runoff. Haul roads should be sprayed regularly to keep down dust. If any section of a haul road is hard surfaced, then it should be swept on a regular basis to prevent the accumulation of dust and mud. Gullies should be covered when not in use before the final bituminous running surface is laid.

Oils and hydrocarbons

The use of oils and hydrocarbons on construction sites provide a risk of leakages and spillages leading to pollution incidents. Simple measures can be taken to prevent oil and hydrocarbons becoming pollutants, such as:

- maintenance of machinery and plant
- drip trays
- regular checking of machinery and plant for oil leaks
- correct storage facilities

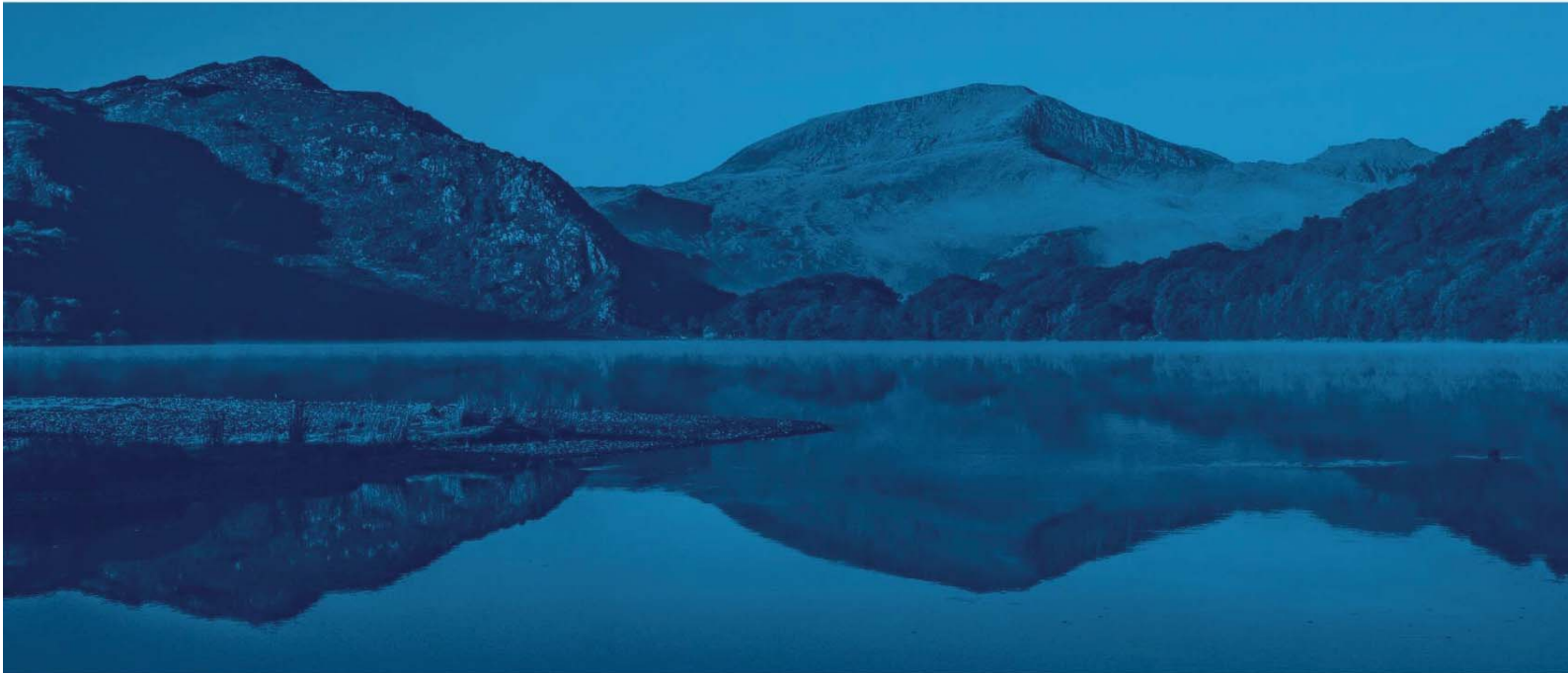
- check for signs of wear and tear on tanks
- care with specific procedures when refuelling
- designated areas for refuelling
- emergence spill kit located near refuelling area
- regular emptying of bunds
- tanks located in secure areas to stop vandalism
- booms installed on watercourses

Appendix 11.4

Cinders Farm, Wrexham

Pollution Prevention Plan

May 2018



Assessment / Modelling / Design

DOCUMENT VERIFICATION RECORD

CLIENT:	Wynnstay Home Farm Partnership
SCHEME:	Proposed agricultural development at Cinders Farm, Ruabon, Wrexham – Pollution Prevention Plan.
INSTRUCTION:	The instruction to carry out this Pollution Prevention Plan was received from Mr Harry Williams-Wynn of Wynnstay Home Farm Partnership.

DOCUMENT REVIEW & APPROVAL

AUTHOR:	Johanne Williams LLB (Hons) PgDip MCIWEM
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ISSUE HISTORY

ISSUE DATE	COMMENTS
30/05/2018	First issue

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- Appendix A – NRW Correspondence
- Appendix B – Location Plan and Aerial Image
- Appendix C – Topographical Data
- Appendix D – Concept Drainage Sketch

Introduction

Waterco Consultants have been instructed to prepare a Pollution Prevention Plan (PPP) in respect of a proposed agricultural development at Cinders Farm, Ruabon, Wrexham, LL14 6HL.

Correspondence from Natural Resources Wales (NRW), dated 16th March 2018 (Appendix A), recommends the preparation of a Pollution Prevention Plan and states that: *‘Appropriate pollution prevention measures must be in place, to ensure that the water environment (both surface and groundwater) are not polluted during excavation, construction and landscaping. When working near watercourses, work must be carried out in a manner so as not to cause pollution to controlled waters. It is an offence under Regulations 38 of the Environmental Permitting Regulations 2010 to cause or knowingly permit a water discharge activity.*

All works at the site must be carried out in accordance with Guidance for Pollution Prevention GPP5 “Works and maintenance in or near water” has recently been updated (January 2017) ... Also, the work must be carried out in accordance with PPG6: ‘Working at construction and demolition sites’... Although this document is withdrawn, the advice it provides is still relevant.

Runoff water from the ranging area should not be allowed to flow directly into surface water drains or watercourses as this can contain polluting nutrients and sediments.

Effluent tanks or manure stores will need to be constructed to meet the SSAFO Regulations (Wales) 2010.

The Pollution Prevention Plan should include NRW’s incident response telephone number. Should any contaminated water or materials enter or pollute the watercourse or groundwater, Natural Resources Wales must be notified on 03000 65 3000’.

The purpose of this report is to detail the pollution prevention measures required to ensure that surface water and groundwater sources are not polluted during the excavation, construction and landscaping phases of the development.

The plan has been prepared with reference to the following regulations and guidance documents:

- Control of Pollution (Oil Storage) (Wales) Regulations 2016
- Groundwater Regulations 2009
- Silage, Slurry and Agricultural Fuel Oil (SSAFO) Regulations (Wales) 2010

- Pollution Prevention Guidelines (PPG) 1 – Understanding Your Environmental Responsibilities – Good Environmental Practices (July 2013)
- Guidance for Pollution Prevention (GPP) 2 – Above Ground Oil Storage Tanks (January 2017)
- GPP 4 – Treatment and Disposal of Wastewater Where There Is No Connection to the Public Foul Sewer (November 2017)
- GPP 5 – Works and Maintenance In or Near Water (January 2017)
- PPG 6 – Working at Construction and Demolition Sites (2012) – (withdrawn but still relevant)
- PPG 7 – The Safe Operation of Refuelling Facilities (July 2011)
- PPG 18 – Managing Fire Water and Major Spillages (June 2000)
- GPP 21 – Pollution Incident Response Planning (July 2017)
- PPG 22 – Incident Response - Dealing with Spills (April 2011)
- PPG 26 – Safe Storage – Drums and Intermediate Bulk Containers (March 2011)

Existing Conditions

The 5.1hectare (ha) site is located at National Grid Reference: 332382, 344047. A location plan and an aerial image are included in Appendix B.

The site is greenfield and is bordered by agricultural land on all sides. Notable features in the area include an unnamed road to the south-east and Cinders Farm to the south. There are also unnamed watercourses located immediately north and south-east of the site. Access to the site is provided from the unnamed road to the south-east.

Local Topography

A topographical survey has been undertaken by A.R.M. Surveys Ltd in July 2017 and is submitted with the planning application pack (drawing reference: 755-0717-T). The topographical survey shows that the site slopes from 102.25 metres Above Ordnance Datum (m AOD) in the west to 95.79m AOD in the east.

Topographic levels to m AOD have also been derived from a 2m resolution Natural Resources Wales (NRW) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). LiDAR data only covers the north-western extent of the site. A review of LiDAR data shows that the topography of the site generally slopes from south-west to north-east. A LiDAR extract is included in Appendix C.

Ground Conditions

Reference to the British Geological Survey online mapping (1:50,000 scale) indicates that the majority of the site is underlain by superficial deposits of Devensian Till, generally comprising Diamicton. The eastern extent of the site is underlain by Devensian Glaciofluvial Deposits generally comprising sand and gravel.

The superficial deposits are identified as being underlain by the Salop Formation consisting of mudstone, sandstone and conglomerate.

According to the Environment Agency's online Groundwater Vulnerability Mapping, the superficial Devensian Till is classified as unproductive strata having low permeability and negligible significance for water supply or river base flow. The Devensian Glaciofluvial Deposits are classified as a Secondary A aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases form an important source of base flow to rivers. The underlying bedrock is also classified as a Secondary A aquifer.

The Cranfield University 'Soilscales' map indicates that the site is underlain by 'slowly permeable seasonally wet loamy and clayey soils' with 'impeded drainage'.

Local Drainage

The Dwr Cymru Welsh Water sewer records show that there are no public sewers within the vicinity of the site.

Development Proposals

The proposed development is for the erection of four agricultural buildings for rearing livestock (table fowl); ancillary buildings and plant; associated infrastructure; and landscaping. It is proposed to form a level development platform in the location of the four agricultural buildings. The development platform will be set at 98.5m AOD. A Biomass Building is proposed in the south-eastern extent of the site. The Biomass Building will be situated on land at approximately 98m AOD. An access road will be provided off the unnamed road to the east, culverting a section of the unnamed watercourse. A proposed site layout plan and site cross sections are submitted with the planning application (drawing references GM-MZ228-181 and GM-MZ228-301 respectively).

The proposed development will introduce hardstanding areas in the form of buildings, an access road and concrete aprons. Hardstanding will comprise 1.52ha or 30% of the total site area. The remaining permeable, soft landscaped areas, including stone surrounds to the buildings will occupy 3.58ha or 70% of the total site area.

Construction Phase

The works to be undertaken during the construction phase shall comprise the following primary activities:

- Enabling works, including site clearance
- Foundation excavation and construction
- Installation of drainage and ducting
- Access and yard construction
- Enhancement of landscape buffer

It is assumed that a sprinkler tank will also be installed onsite during the construction phase.

The potential effects relating to the construction phase have been identified as follows:

Chemical spillages and leaks to ground, groundwater and the unnamed watercourses from plant and machinery, and from chemicals and other potential pollutants stored onsite.

The construction phase of the work would require the use of mobile plant including excavating machinery, lorries, diesel generators and diesel pumps etc. There is a possibility that the plant may leak or spill oil and/or fuel. Leaks and spillages could occur in any area of the site in which the plant is operating but is most likely to occur during refuelling. Additionally, it is possible that spills and drips could occur associated with stored chemicals brought onto the site to facilitate development. It is also possible that such spillages could enter the underlying soils and contaminate groundwater. However, the unproductive superficial deposits would provide a measure of protection to the underlying Secondary A aquifer.

There is a possibility that spillages/leaks could enter the unnamed watercourses given the sloping topography of the site.

Disturbance of contaminated soils and groundwater during earthworks creating potential pollutant linkages.

Given that the site has no known previous uses, contaminated soils and groundwater are not anticipated on the site but cannot be fully discounted. Potentially contaminated soils and/or groundwater can be identified by some or all of the following:

- Unusual colours which are different to the surrounding or expected material
- Evidence of anthropogenic influence e.g. oily sheen, ashy material and asbestos
- Unusual and/or unexpected odours and or vapours

The excavation and disturbance of the soils during the excavation of foundations, installation of drainage and ducting, construction of access and a yard, and the enhancement of the landscape buffer may lead to a number of effects primarily associated with contaminated soils and groundwater.

Vehicles tracking over potentially contaminated soils have the potential to spread contamination and carry it off-site. Lorries carrying contaminated soils could also spill contaminated material if not covered.

Disturbance of soils may alter the chemical conditions within the site soils resulting in mobilisation of potential contaminants. Hazardous and non-hazardous contaminants, as classified by the Groundwater Regulations (2009), may leach both directly and indirectly from any contaminated material to the groundwater.

Surface water runoff over potentially contaminated soils may result in contaminated runoff entering the unnamed watercourses.

Arisings from the excavation of soil could result in the stockpiling of potentially contaminated soils on the site, and possible reuse of soils onsite. The exposed soils may lead to increased migration of potential contaminants to underlying groundwater and the unnamed watercourses through leaching and surface water runoff.

Operational Phase

During the operational phase, it has been assumed that:

- no chemicals or bulk materials will be stored onsite
- manure will be collected and disposed of offsite / on agricultural land
- the drainage strategy recommended by Waterco Consultants (report ref: w10493-180130-FCA & Drainage Strategy) will be fully implemented

The potential effects relating to the operational phase have been identified as follows:

Migration of contaminants.

Sources of potentially contaminating materials during the operational phase, e.g. manure, if stored incorrectly may leach into the underlying soils and present a risk to the underlying Secondary A Aquifer. Although where present and continuous the relatively low permeability superficial deposits (Devensian Till), are likely to provide a measure of protection to the underlying aquifer by minimising downward percolation of contamination.

Surface water runoff may mobilise potential contaminants, which may migrate along preferential pathways in permeable material surrounding new service trenches and within the Glaciofluvial Deposits to uncontaminated soils.

Presence of dust with high levels of ammonia.

There is potential for extracted dust from the roof area to be contaminated with high levels of ammonia. Surface water runoff could mobilise the potentially contaminated dust through the drainage system and discharge into the unnamed watercourses.

Oil leaks and hydrocarbons to ground, groundwater and the unnamed watercourses from heavy goods vehicles frequenting the site.

During the operation of the site, it is understood that there will be regular traffic movements from deliveries and collections onsite. There is potential for elevated level of hydrocarbons and oils associated with traffic movements onsite to migrate to the underlying Secondary A aquifers and to the unnamed watercourses.

Mitigation

Construction Phase

General Mitigation

The main mitigation measure to prevent any adverse effects on groundwater and surface water sources, during all phases of the development, is to ensure good site practice and management. Construction works should be undertaken in accordance with best practice. A Construction Management Plan (CMP) or similar should be prepared to include measures and procedures to be followed if a spillage or other pollution event occurs onsite.

Storage and Spillage Emergency Response

The storage and use of potentially polluting chemical substances, including fuel and other oils will be in accordance with good practice guidance and would include as a minimum the following measures:

- The storage and use of fuel and oils (excluding uncut bitumen) onsite will be in accordance with the Control of Pollution (Oil Storage) (Wales) Regulations 2016;
- Oil and other potentially polluting chemicals will be stored a minimum 10m away from the unnamed watercourses, and outside areas where spilt oil could soak into the ground or run over hard ground into the unnamed watercourses;
- Oil and other chemicals will not be stored in an area at risk of flooding;
- A secondary containment system, designed to hold at least 110% of the volume of the oil tank, will be installed around any oil tank and its equipment to ensure the containment of any oil spillages within the designated area;
- The oil tank will be fitted with an automatic overfill protection device to prevent overspill during re-fuelling;
- Staff who have been trained in fuel delivery and emergency spill procedures will supervise fuel deliveries;
- Refuelling of plant and maintenance of vehicles and equipment would take place in a designated area;
- The area for the oil storage tank, re-fuelling and surrounding yard will be impermeable to prevent oil and other contaminants migrating through the soil into groundwater;

- Mobile plant will be in good working order, kept clean and fitted with drip trays where appropriate;
- Waste contaminated with oil will be treated as hazardous waste. Waste will be stored in appropriate containers until they can be correctly and legally disposed of;
- Spillage kits and oil absorbent material will be carried by mobile plant and located at vulnerable locations;
- All stockpiles of excavated land and materials will be covered to prevent silt accumulation within the unnamed watercourses. The attenuation ponds shown on the Concept Drainage Sketch, provided as Appendix D, should also be excavated prior to undertaking works onsite to allow suspended solids to settle prior to discharging into the unnamed watercourses;
- There will be a designated area for plant and wheel washing on an area of hardstanding located a minimum of 10m away from any watercourses. Contaminated water from washing activities will be collected and tankered offsite by a licensed contractor;
- Concrete/cement mixing and washing areas will be located a minimum 10m away from the unnamed watercourses and within a designated impermeable area. Washout areas will be contained to prevent contaminated water entering the unnamed watercourses and/or groundwater. Contaminated water will be collected and tankered offsite by a licensed contractor;
- Trade materials, chemicals and hazardous substances will be stored safely and securely, separately where possible, a minimum 10m away from any watercourse, and within an impermeable bunded area;
- Waste will be stored appropriately in suitable containers and in a designated area. Waste will be transferred to an authorised waste carrier for appropriate disposal;
- A Pollution Incident Response Plan will be produced in accordance with GPP 21 and construction workers will be trained on how to respond to spillages. Any environmental incidents should be reported to the Incident Hotline in Wales (0300 065 3000);
- The site will be appropriately secured to prevent vandalism;
- Provision should be made for containment systems e.g. portable tanks, during an emergency e.g. during an incident where firewater needs to be contained;

- Primary storage containers will have sufficient strength and structural integrity so that they don't leak or burst under normal circumstances;
- Individual storage containers will be clearly labelled, with appropriate warning signs;
- Keep only the minimum required quantity of materials onsite.

Groundwater Contamination

- Should dewatering activities be required, consideration will be given to settlement tanks prior to discharging to the unnamed watercourses;
- During construction works and where contamination is identified or suspected, appropriate sampling, analysis and risk assessment will be undertaken and suitable measures put in place to prevent the creation of contaminant linkages;
- Any material imported, such as soils/stone to increase ground levels or soils for growing medium, would undergo chemical testing to a suite of contaminants and assessed against site use criteria agreed with regulatory authorities. This would be undertaken to demonstrate that the material is suitable for its intended use and does not pose a risk to human health or the environment;
- Dust suppression and leachate control measures will be implemented to prevent against excessive dust generation, for example impermeable covers spread over mounds of bare soil and wetting of bare soil during dry conditions. Implementation of these measures would reduce the effects on construction workers and adjacent site users from potentially contaminated dusts;
- Where contamination is encountered onsite during initial excavation, all vehicles leaving the site would go through a wheel wash to prevent spreading of potential contamination onto off-site roads. Furthermore, vehicles carrying contaminated soils off-site would only to be loaded up to appropriate levels and be covered to prevent soils dropping onto roads. Any soils removed from site would be disposed of at a suitably licensed facility.

Operational Phase

- During the operational phase, dirty water will be disposed of via a dirty water tank and taken offsite via a licensed contractor;
- Pesticides used onsite should be approved for use in or near water, and will be used by a competent person holding a Health and Safety Executive (HSE) recognised specified certificate for pesticide use (or under the direct supervision of a certificate holder);
- As identified on the drainage plan (Appendix D), french drains will be utilised to provide treatment to and partial infiltration of surface water runoff from roof areas, prior to storage within an attenuation pond, which will provide additional treatment prior to restricted discharge to watercourse. Runoff from the Biomass Building will be attenuated within a separate pond prior to controlled release to watercourse. This will ensure surface water runoff receives an appropriate level of treatment and will not affect surface water or groundwater sources;
- Slot/linear drains will be placed at entrance points to the agricultural and ancillary buildings to prevent any dirty/contaminated water escaping and polluting surrounding groundwater/surface water. The slot/linear drains will direct dirty water to SSAFO compliant dirty water tanks;
- During yard wash down, flow diverter valves will direct dirty water to dirty water tanks. The dirty water tanks will be emptied frequently by an appropriate tanker. Dirty water will be spread on agricultural land and / or disposed offsite by a licensed contractor. It is recommended that the dirty water tank has an audible and visual high-level alarm system.

Appendix A – NRW Correspondence



Email: comment@indigoplanning.com

Annwyl / Dear Sabrina Bagarella,

**Town and Country Planning (Development Management Procedure) (Wales)
(Amendment) Order 2016 Notice Pre-Application Consultation under Article 2D**

Proposal: Erection of four agricultural buildings for broiler poultry rearing; ancillary buildings and plant; associated infrastructure; and landscaping. (Approx. 225,000 birds)

Location: Cinders Farm, Ruabon, Wrexham

Thank you for referring the above application, which we received on 16/02/2018.

Please note that our comments are without prejudice to any comments we may wish to make when consulted on any subsequent planning applications or permit (either at pre-application or application stage) for the proposed development. At that time, there may be new information available which we will need to take into account in making a formal response.

Based on the information submitted to us, we have significant concerns with the proposed development. On this basis, we would recommend to the local planning authority that they should only grant planning permission if the scheme can meet the following requirements and the conditions listed below are attached to the planning permission. Otherwise, we would object to this planning application.

Requirement 1 - Site Drainage Plan

Requirement 2 – Manure Contingency Plan

Requirement 3 – Pollution Prevention Plan

Condition 1: EPS: The submission of a detailed great crested newt avoidance and mitigation measures.

Condition 2: Biosecurity: No development shall take place until a Biosecurity Risk Assessment has been submitted and approved to the satisfaction of the LPA.

Site Drainage Plan

The proposal will need to be accompanied by a Site Drainage Plan, to detail the proposed site drainage methods and to detail the design features of preventing pollution occurring.

Requirement 1 - Site Drainage Plan

Clean, uncontaminated surface waters should be disposed of by means of sustainable drainage principles. Any soakaways should be directed away from existing surface waters. The development must be drained by a separate system of foul and surface water drainage, with all clean roof and surface water being kept separate from foul water.

Runoff water from the ranging area should not be allowed to flow directly into surface water drains or watercourses as this can contain polluting nutrients and sediments.

Applications need to include a plan of the proposed site that indicates all the new and existing features that will control pollution from the development, including:

- Clean and foul drains (with direction of flow)
- Effluent containment (including capacity)
- Provision for decontamination and collection of disinfectant in event of disease control
- Any constructed soakaway
- French drains and
- New or existing sustainable drainage building including swales, reed beds or ponds.

Any relevant management controls should also be indicated.

Manure Management Plan

We note the submission of the manure management plan (Appendix 3.1 of the ES Vol 3.) We are generally satisfied with the manure management plan. One thing to note is that it states 200,000 birds in this section rather than the 225,000 that has been stated elsewhere in the consultation documentation. We have taken this to be an error and, therefore, advise that this should be amended prior to submitting the application to the local authority.

- Manure Contingency Plan

Applications need to demonstrate that there is contingency for storing any manure, slurry and dirty water produced at times where the usual method of manure disposal is not possible.

Requirement 2 – Manure Contingency Plan

Contingency for storing wash water during and after disease outbreak must be detailed as this is classified as hazardous waste and depending on the severity and type of outbreak may need to be stored for longer than normal and separate from other manures and slurry. The contingency plan can be included into the Manure Management Plan.

Pollution Prevention Plan – Construction and Management

The proposal should incorporate appropriate pollution control measures to ensure that the water environment (both groundwater and surface water) is not polluted.

Requirement 3 – Pollution Prevention Plan

Appropriate pollution prevention measures must be in place, to ensure that the water environment (both surface and groundwater) are not polluted during excavation, construction and landscaping. When working near watercourses, work must be carried out in a manner so as not to cause pollution to controlled waters. It is an offence under Regulations 38 of the Environmental Permitting Regulations 2010 to cause or knowingly permit a water discharge activity.

All works at the site must be carried out in accordance with Guidance for Pollution Prevention GPP5 “Works and maintenance in or near water” has recently been updated (January 2017) and can be found at:

<http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>.

Also, the work must be carried out in accordance with PPG6: ‘Working at construction and demolition sites’ which are available on the Gov.uk website:

<https://www.gov.uk/government/collections/pollution-prevention-guidance-ppg>.

Although this document is withdrawn, the advice it provides is still relevant.

Runoff water from the ranging area should not be allowed to flow directly into surface water drains or watercourses as this can contain polluting nutrients and sediments.

Effluent tanks or manure stores will need to be constructed to meet the SSAFO Regulations (Wales) 2010.

The Pollution Prevention Plan should include NRW’s incident response telephone number. Should any contaminated water or materials enter or pollute the watercourse or groundwater, Natural Resources Wales must be notified on 03000 65 3000.

Protected Species

The pre-application Environmental Statement includes an ecological assessment completed by BSG Ecology.

- Great crested newt (GCN)

NRW consider the survey and assessment has been completed to a satisfactory standard

The Pondscape of Wrexham is considered to be of European importance for its populations of great crested newt (GCN). This species and its breeding and resting places are protected under the Conservation of Habitats and Species Regulations 2017 and they are classed as a material consideration for planning under the provisions of Technical Advice Note 5: Nature Conservation and Planning (TAN5).

The Regulations allow the approval of a scheme that would be likely to result in disturbance or harm to GCN, but only if it satisfies an appropriate Habitats Directive derogation purpose and two tests before a licence can be issued from Natural Resources Wales.

In the case of development, the applicable derogation purpose is:

“Preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature, and beneficial consequences of primary importance for the environment.”

Furthermore, the licence can only be issued by NRW on condition that there is:

“no satisfactory alternative”, and that

“the development will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range”

Paragraph 6.3.7 of TAN5 states that the local planning authority should not grant planning permission without having satisfied itself that the proposed scheme either would not impact adversely on any GCN on the site or that, in its opinion, all three conditions for the eventual grant of a licence are likely to be satisfied.

Based on both the submitted assessment and spatial location of the proposal, we consider that the development is not likely to be detrimental to the maintenance of the favourable conservation status of the local population of GCN. However, we advise the formal application includes the following:

Condition 1: EPS: The submission of a detailed great crested newt avoidance and mitigation measures.

The submission of detailed great crested newt avoidance and mitigation measures. We anticipate that appropriate mitigation measures will entail the implementation of Reasonable Avoidance Measures (RAMs), such as the erection of a 1-way amphibian fence, prior to and throughout the duration of construction operations; together with the clearance of individuals from working areas. Statements should also be in place confirming that works will immediately stop if, in the unlikely event, that one or more individuals are found.

This advice applies to the proposal in its present form. If the plans are changed in ways that may affect GCN on this site, you would need a revised ecology report that takes account of such changes. Please consult us again if any updated or revised ecology report concludes that the proposal is more likely to have an adverse impact on the GCN population and/or alters the detail or implementation of mitigation or compensation measures.

- Invasive non-native species

NRW note that no invasive non-native plants have been found.

However, we consider biosecurity to be a material consideration owing to the nature and location of the proposal. In this case, biosecurity issues concern invasive non-native species (INNS) and diseases. The Chytrid fungus, which is known to affect amphibian populations has been recorded at Johnstown.

Condition 2: Biosecurity: No development shall take place until a Biosecurity Risk Assessment has been submitted and approved to the satisfaction of the LPA.

We therefore advise that any future consent includes the imposition of a condition requiring the submission and implementation of a Biosecurity Risk Assessment to the satisfaction of the LPA.

We consider that this assessment must include (i) appropriate measures to control any INNS on site; and (ii) measures or actions that aim to prevent INNS being introduced to the site for the duration of construction and operational phases of the scheme.

- Bats

NRW consider the survey and assessment has been completed to a satisfactory standard

It is NRW's view that the proposal is not likely to be detrimental to the maintenance of the Favourable Conservation Status (FCS) of any local populations of bat

- White-clawed crayfish

NRW consider the assessment to be satisfactory for the purposes of informing the planning decision making process

It is NRW's view that the white-clawed crayfish will not be affected by the proposed scheme

- Dormouse

NRW consider the survey and assessment has been completed to a standard that is satisfactory for the purposes of informing the planning decision making process

It is NRW's view that the proposal is not likely to be detrimental to the maintenance of the FCS of any local populations of dormouse

- Otter

NRW note that no evidence of otter was found within the site,

It is NRW's view that the proposal is not likely to be detrimental to the maintenance of the FCS of the local population of otters

- Water vole

NRW consider the survey and assessment has been completed to a satisfactory standard

It is NRW's view that the water vole is not likely to be affected by the proposed scheme

Flood Risk

We have reviewed the Flood Consequences Assessment (FCA) (Waterco Limited, w10493-180130-FCA & Drainage Strategy.docx, 30 January 2018) in Appendix 11.1 Volume III of the Environment Statement. We consider that the contents of the FCA are generally commensurate to the scale and nature of the development proposals. We are generally supportive of the proposed flood risk mitigation measures set out in the FCA.

In relation to the management of surface water runoff, we confirm that we have not undertaken a technical review of the surface water management contents of the FCA. We would therefore strongly advise that the Lead Local Flood Authority, who in this instance are Wrexham County Borough Council, are consulted at this pre-application stage so that they have the opportunity to comment on the acceptability of the proposed surface water drainage strategy.

Air Quality

The ammonia and nitrogen impacts from the operation of this development are best dealt with through the Habitats Regulation Assessment (HRA) that NRW permitting will complete. Any mitigation measures that may be required will be taken into account in the HRA and SSSI assessments.

The screening distance for a combustion process of this size, 0.5 – 2MWth, is 0.2km. There are no designated sites within this screening radius and no air quality assessment is required for impacts on designated sites.

Permitting

The permit application was received by the NRW Permitting Service on 10 November 2017.

The permit application as well as the poultry unit includes two biomass boilers with a combined thermal input of 2176kwh which be housed in a separate building within the proposed boundary of their environmental permit.

NRW Permitting Service are assessing the proposals under The Environmental Permitting (England and Wales) (Amendment) Regulations 2013. As such, the impacts relating to the permit process should be assessed within that legal framework and will not be addressed within this response. Our Permitting Service may require further detailed modelling carried out; you are advised to contact them for further advice. As such, NRW cannot confirm whether or not the proposals will be acceptable from a permit perspective at this stage.

We strongly advise that the formal submission of your planning application to the Local Authority should be deferred until you have a decision on the permit application with NRW.

Please do not hesitate to contact us if you require further information or clarification on any of the above.

Our comments above only relate specifically to matters that are included on our checklist “Natural Resources Wales and Planning Consultations” (March 2015) which is published on our website: (<https://naturalresources.wales/planning-and-development/planning-and-development/?lang=en>). We have not considered potential effects on other matters and do not rule out the potential for the proposed development to affect other interests, including environmental interests of local importance. The applicant should be advised that, in addition to planning permission, it is their responsibility to ensure that they secure all other permits/consents relevant to their development.

Yn gywir / Yours sincerely,

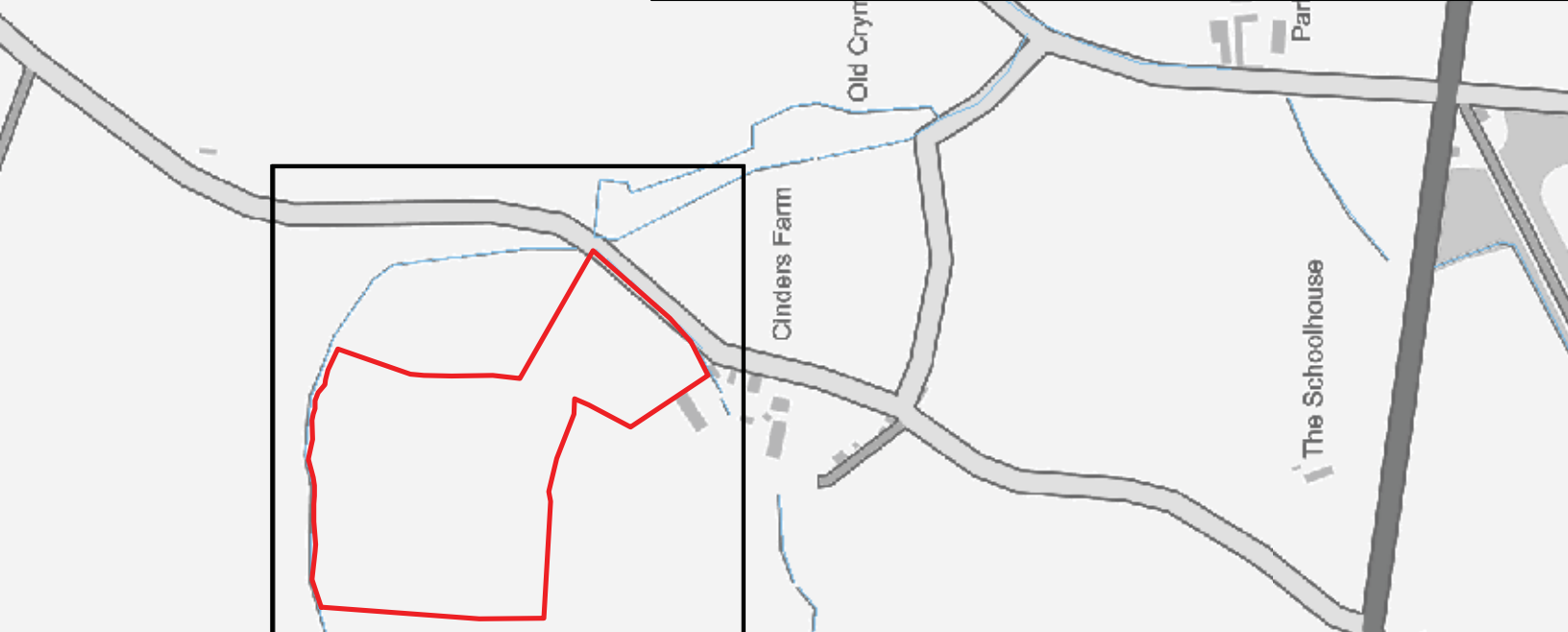
Siôn M. Williams

Siôn M. Williams

Cynghorydd Cynllunio Datblygu / Development Planning Advisor

Cyfoeth Naturiol Cymru / Natural Resources Wales

Appendix B – Location Plan and Aerial Image



CLIENT:



SCHEME:

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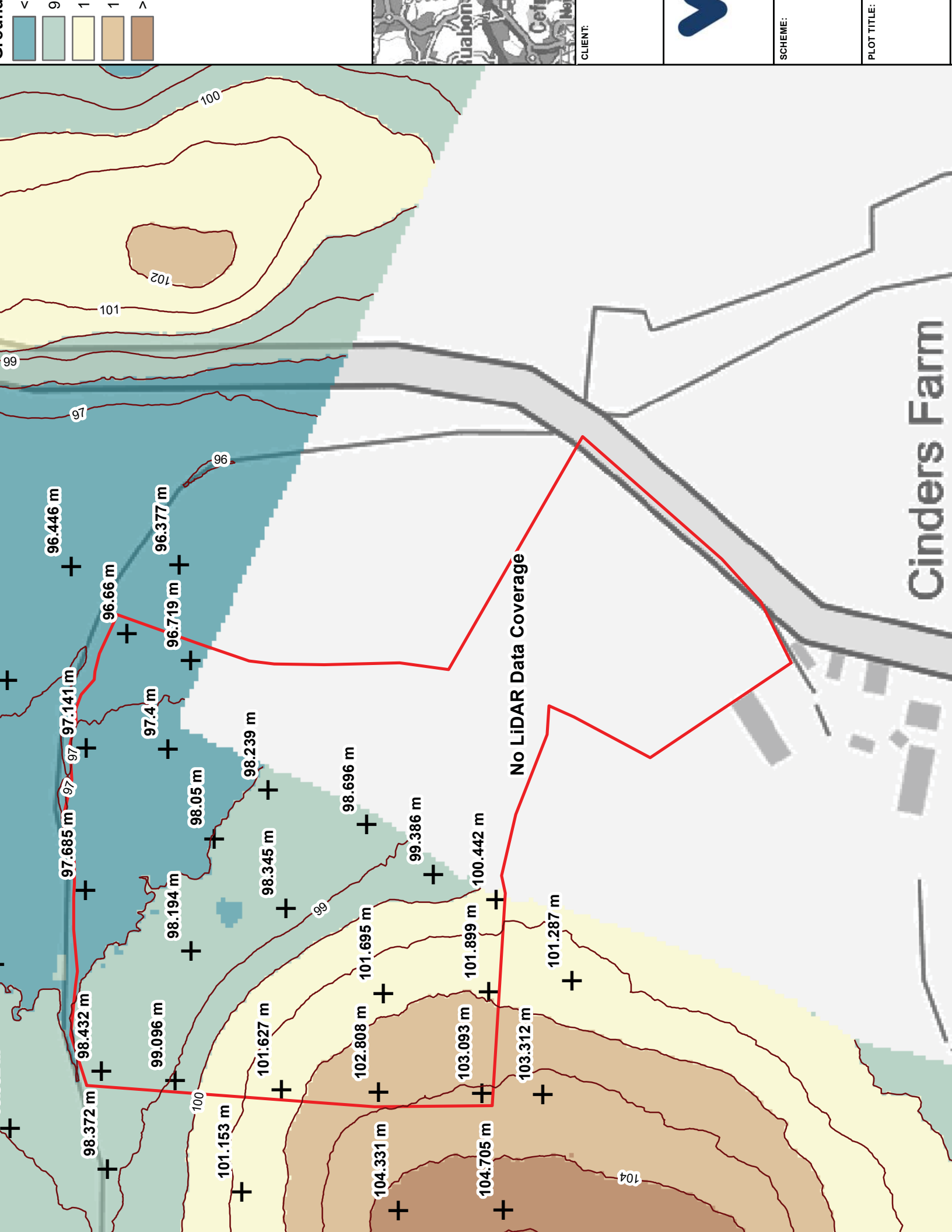
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Appendix C – Topographical Data



Appendix D – Concept Drainage Sketch

