Report Title	Proposed Welsh Medium Primary School, Gwersyllt, Wrexham - BREEAM Ecology Report
Client	Wrexham County Borough Council
Date	May 2012

this report was produced by

Unit 23, The Malthouse Business Centre,
Regent Street, Llangollen, Denbighshire, LL20 8HS
01978 860889

Marches Ecology is the trading name of Marches Ecology LLP, Partnership No. OC362423, Registered in England and Wales.
Registered address: Unit 23, The Malthouse Business Centre, Regent Street, Llangollen, Denbighshire, LL20 8HS.

This report has been prepared by Marches Ecology with all reasonable skill, care and diligence within the terms of the Contract with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

Report Title	Proposed Welsh Medium Primary School, Gwersyllt, Wrexham - BREEAM Ecology Report
Client	Wrexham County Borough Council
Marches Ecology Ref	C152/Gwersyllt/BREEAM
Date issued	May 2012
Author	Max Ellson
Checked by	Tom Knight

CONTENTS

1 INTRODUCTION 4

1.1 PROJECT BACKGROUND 4
1.2 BREEAM 5
1.3 PREVIOUS ECOLOGICAL SURVEY 5
1.4 STRUCTURE OF THIS REPORT 7

2 LE3 CREDIT ASSESSMENT 8

2.1 INTRODUCTION 8
2.2 LE3 ECOLOGICAL VALUE OF LAND AND PROTECTION OF ECOLOGICAL FEATURES 8

3 LE4 AND LE5 CREDIT ASSESSMENT 9

3.1 LE4 MITIGATING ECOLOGICAL IMPACT 9
3.2 LE5 ENHANCING SITE ECOLOGY 13

4 LE6 CREDIT ASSESSMENT 25

4.1 LE6 LONG-TERM IMPACT ON BIODIVERSITY 25

5 LE7 CREDIT ASSESSMENT 28

5.1 LE7 CONSULTATION WITH STUDENTS AND STAFF 28

6 LE8 CREDIT ASSESSMENT 30

6.1 LE8 LOCAL WILDLIFE PARTNERSHIPS 30

7 REFERENCES 31

Appendix 1 – LE7; Consultation Questionnaire
Appendix 2 – LE7; Questionnaire Results
Appendix 3 – LE7; Workshop Structure and Questions
Appendix 4 – LE7; Attendance Record for Workshop 1
Appendix 5 – LE7; Consultation Schedule
Appendix 6 – LE8; Advice letter from North Wale Wildlife Trust
Appendix 7 – LE8; On-going support letter from North Wale Wildlife Trust

1 INTRODUCTION

1.1 Project Background

1.1.1 Marches Ecology was commissioned by Wrexham County Borough Council (WCBC) to provide various ecological services with regards a proposed development of a Welsh Medium Primary School on land off Delamere Avenue, Gwersyllt, Wrexham (OS Grid Ref. SJ 319 540).

1.1.2 An outline planning application was submitted in October 2010 with permission (Ref. P/2010/0881) being granted in January 2011 (this being subject to a number of conditions/ reserved matters). The proposed development is to comprise a single storey Primary School of approximately 1,800 m^2. It will comprise a nursery, early years and primary years; there will be a total of 270 pupils and 30 staff.

1.1.3 The development is to be assessed in accordance with the BREEAM[1] Education[2] 2008 assessment procedure. This report is concerned with some of the credits awarded under the Landuse and Ecology category, more specifically to address credits LE3 to LE8 inclusive. Further it presents enhancements/ protection measures for ecological resources in accordance with the BREEAM process. *Table 1* below provides a summary of these credits, the maximum number of credits available in each case and the expected number of credits to be achieved.

Table 1 – Summary of LE3, LE4, LE5, LE6, LE7 and LE8 Credits

Credit Reference	Credits Available	Credit Criteria	Credit Expectation
LE3	1	Assessment of ecological value of construction zone and protection of features.	1
LE4	2	There is no negative change in the site's existing ecological value as a result of development.	2
LE5	3	Report produced on enhancing and protecting the ecological value of the site. Advice is implemented. There is a positive increase in the ecological value of the site.	3
LE6	2	Commitment to achieving mandatory requirements and at least four additional requirements (to minimise long-term impact on biodiversity).	2
LE7	1	Consult students and staff.	1
LE8	1	Establish partnership with a local wildlife group.	1

[1] Building Research Establishment Environmental Assessment Method (BREEAM).
[2] BRE Global Ltd (2009). *BRE Environmental & Sustainability Standard. BES5051: Issue 3.0 – BREEAM Education 2008 Assessor Manual*.

1.2 BREEAM

1.2.1 The BREEAM [Buildings] is the most widely used environmental assessment method for buildings. It can be used to assess the environmental performance of any type of building (new and existing). Credits are awarded in ten categories[3] according to performance. These credits are then added together (subject to an environmental weighting) to produce a single overall score on a scale of Pass, Good, Very Good, Excellent and Outstanding. The aims of BREEAM are:

- To mitigate the impacts of buildings on the environment;
- To enable buildings to be recognised according to their environmental benefits;
- To provide a credible, environmental label for buildings; and
- To stimulate demand for sustainable buildings.

1.3 Previous Ecological Survey

1.3.1 On behalf of WCBC, Marches Ecology completed an ecological background data search in connection with the school proposals in order to provide supplementary information for the (outline) planning application; this was reported in Marches Ecology (2010). Further to provision of the outline planning permission, Marches Ecology subsequently completed an Extended Phase 1 Habitat Survey of the proposed site (henceforth referred to as the 'survey site'); this was reported in Marches Ecology (2011a). This report details the results of an Extended Phase 1 Habitat Survey of the proposed development site; in addition the habitat present was assessed for its potential value to legally protected species. The aim of this report (which referred to information obtained for the ecological background data search) was to inform the design and layout of the proposed new school as well as identifying potential ecological constraints to the proposal. A Great Crested Newt pond-scoping exercise report has also been prepared (Marches Ecology 2011b).

1.3.2 Marches Ecology (2011a) concludes that most of the survey site is dominated by amenity grassland that is of little ecological value; other habitat types present include scrub, trees, neutral grassland and tall-herbs. The proposed scheme will result in the loss of amenity grassland, a small number of young trees/ shrubs towards the eastern end of the site, and a small number of trees along Delamere Road. When considered individually the vegetation communities that comprise the survey site are unlikely to be of any more than site value[4].

1.3.3 The Extended Phase 1 Habitat Survey did not summarise the presence or absence of any locally notable (*e.g*. Locally Scarce[5]) species of plant from the survey site, however the species-list contained within Marches Ecology (2011) does not detail any.

1.3.4 No evidence of Badger activity was recorded although the amenity grassland was considered to provide a potential (high quality) foraging resource. A small bank with scrub vegetation at the western end of the survey site provides habitat of potential value for sett

[3] Management, Health and Well-being, Energy, Transport, Water, Materials, Waste, Landuse and Ecology, Pollution and Innovation.
[4] Site value – areas of habitat that are considered to appreciably enrich the habitat resource within the context of the proposed development site (after IEEM 2006).
[5] In Vice County 50, a scarce plant is described as being recorded in 4-15 10 km squares (Green 2006).

construction, however this area is subject to quite high levels of disturbance. This area won't be directly impacted by the proposals. A slope and plantation immediately adjacent to the northern boundary of the survey site provides a larger area of habitat with opportunities for sett construction.

1.3.5 Eight trees along the boundary with Delamere Road (seven Ash trees and one Sycamore) were considered to provide limited bat roost potential. Trees within a plantation immediately adjacent to the northern boundary were considered unlikely to include features of potential value for roosting bats. Habitat of potential value for foraging/ commuting bats is largely limited to the boundaries of the survey site (for example the edge of the plantation to the north of the site, trees/ shrubs on the eastern boundary and adjacent to Delamere Avenue and the scrub in the western part of the survey site).

1.3.6 There is no aquatic habitat (suitable for Great Crested Newts) within the survey site. The terrestrial habitat throughout most of the survey site was considered of negligible/ low potential value for Great Crested Newts. Although the Extended Phase 1 Habitat Survey concluded that there were no waterbodies within 500 m of the survey site (using OS and internet based mapping. However, the pond-scoping exercise (Marches Ecology 2011b) located two waterbodies/ wetlands, as follows:

- one located approximately 230 m from the site boundary (classed as 'excellent' in terms of its suitability for Great Crested Newts). Marches Ecology (2011a) indicates that there is a 1994 Great Crested Newt record from close to this location (details unknown).
- another located approximately 445 m north of the site boundary (classed as 'average' in terms of its suitability for Great Crested Newts). There is a 2007 Great Crested Newt record believed to be from this location; details unknown (Marches Ecology 2011a).

1.3.7 The size of the populations supported by these features is not known. Despite the location of these features Marches Ecology (2011b) concludes that the potential risk that Great Crested Newts may access the survey site is considered to be low.

1.3.8 The amenity grassland that dominates the survey site was considered unlikely to be of any particular value for reptiles. A mosaic of rough grassland and scrub on a slope on the western side of the survey site does provide habitat of potential value, although this area is not to be directly impacted by the proposals.

1.3.9 Opportunities for nesting birds within the survey site were considered to be largely limited to the scattered trees and shrubs around the site boundaries, and possibly the stone wall adjacent to Delamere Avenue. The plantation to the north of the survey site is likely to be of greater potential value.

1.3.10 The ecological background data search, Extended Phase 1 Habitat Survey and Great Crested Newt pond-scoping reports included a number of recommendations in relation to protecting the existing biodiversity of the site. These recommendations are reviewed in *Section 3* along with options for enhancement of the ecological resource. These ecological surveys provide a base-line for the BREEAM procedure.

1.4 Structure of this Report

1.4.1 The remainder of this report is structured as follows:

Section 2 presents the LE3 credit assessment;
Section 3 presents the LE4 and LE5 credit assessment;
Section 4 presents the LE6 credit assessment;
Section 5 presents the LE7 credit assessment;
Section 6 presents the LE8 credit assessment; and
Section 7 provides references.

2 LE3 Credit Assessment

2.1 Introduction

2.1.1 The LE3 credit concerns ecological evaluation of the construction zone and protection of retained features. The credit may be awarded where the development will be located on land of 'low ecological value' and that any existing ecological features will be adequately protected from damage during clearance, site preparation and construction activities.

2.2 LE3 Ecological value of land and protection of ecological features

2.2.1 Marches Ecology (2011a) evaluates the ecological resource located within the survey site. The development will largely be located in an area that supports amenity grassland[6] considered of no greater than 'site value'.

2.2.2 The construction zone[7] will also incorporate a small number of young trees/ shrubs towards the eastern end of the survey site as well as three trees along Delamere Avenue. Trees T14 and T19 to T27 (inclusive) as shown on a WCBC drawing entitled '*Proposed Welsh Medium School, Gwersyllt, Wrexham – Existing Tree Layout*' (drawing no. 11701/D/05A) will be directly impacted as part of the proposed development. However, trees T14 (a small Hawthorn) and T21 to T27 (mainly small[8] Poplars, and Birch, and a small area of scrub) were concluded to have no bat roost potential (Marches Ecology 2011) and are of 'site value' only. Trees T19 and T20 were described in Marches Ecology (2011a) as having '*low potential value for roosting bats at most'.* However subsequent to a detailed bat inspection (Marches Ecology 2011c) it was concluded that their '*removal will not result in the loss of a significant level of roost potential';* as such they are also not considered to represent a resource of more than 'site value'. Other trees along Delamere Avenue are to be retained during the development/ protected from works (refer below). It is therefore considered that the construction zone can be assessed as being of 'low ecological value'; one credit can be awarded under LE3.

2.2.3 Retained trees along the boundary with Delamere Road, scrub on a slope in the west of the site, small areas of retained scrub in the east of the site, and the planation immediately adjacent to the north of the site will all be subject to tree protection measures throughout the construction period. Tree protection measures are outlined in the 'Arboricultural Impacts Assessment' (WCBC, 2011). This protection is considered to meet the requirements of Assessment Criteria 2 and 3 under LE3.

[6] Although Marches Ecology (2011a) records a small area of '*comparatively species-rich grassland at* Target Note 17*'* (associated with the Bradley BMX track), this is further noted as having *'developed over previously disturbed ground'* and is therefore *'eminently re-creatable'* and of no more than 'site-value'.
[7] Construction zone – any land on the site which is being developed (and therefore disturbed) for buildings, hard-standing, landscaping, site access, plus a 3 m boundary in either direction around these areas. It also includes any area used for temporary soil storage and buildings (BRE Global Ltd (2009). The proposed development site/ construction zone was not known at the time of the Extended Phase I Habitat Survey. However due to the extensive nature of soft landscaping to be undertaken as part of the scheme it has not been possible to define a specific construction zone. In accordance with BREEAM Education 2008 it has therefore been assumed that the construction zone is the entire (survey) site.
[8] With a maximum diameter at breast height of 0.5 m.

3 LE4 and LE5 Credit Assessment

3.1 LE4 Mitigating Ecological Impact

3.1.1 As detailed in *Section 1.3* an Extended Phase 1 Habitat Survey has been completed for the site. Marches Ecology (2011a) provides a list of plant species prior to any preparatory or construction work. The proposed development site/ construction zone was not known at the time of the Extended Phase 1 Habitat Survey – refer to foot note on Page 8 with regards the 'construction zone'. As such a list of plant species has been compiled (from that provided in Marches Ecology, 2011a).

3.1.2 69 species considered to be native were recorded from the survey site with an additional 9 non-native species considered to be attractive or beneficial to local wildlife. The total number of species recorded from the survey site was therefore 78. The species in the construction zone were recorded from four broad plot/ habitat types as listed in *Table 2* below. In accordance with the BREEAM guidelines following a site survey, *Ecology Calculator 2* has been used to assess the change in ecological value. *Table 2* presents the results of this calculation with regards the LE4 and LE5 credits. Further information required for the LE5 credits is provided in *Section 3.2* below.

3.1.3 Plot types and their existing areas prior to development were calculated by WCBC based on plans provided by Marches Ecology. Post development areas were calculated by the Ark Company: the proposed site layout during construction is illustrated on a WCBC plan; drawing no. PD2009/049/02. Proposed planting/ habitat creation is indicted on three plans prepared by The Ark Company as follows:

- '*Wrexham County Borough Council , Land at Delamere Avenue, Gwersyllt – Proposed New School, Hard and Soft Landscape Layout'* (Drawing No. 02/107/01, v3, dated Feb 2012),
- '*Wrexham County Borough Council , Land at Delamere Avenue, Gwersyllt – Proposed New School, Planting Proposals to Main Entrance Area'* (Drawing No. 02/107/02, v3, dated Feb 2012), and
- '*Wrexham County Borough Council , Land at Delamere Avenue, Gwersyllt – Proposed New School, Planting Proposals Wider Site Area'* (Drawing No. 02/107/03, v3, dated Feb 2012).

Management prescriptions are provided in Marches Ecology (2012).

3.1.4 Other points to note regarding the calculations are as follows (refer to *Table 2* below):

- To simplify the calculations the existing standard trees scattered throughout the survey site (principally along the edge of Delamere Avenue) have been removed from the calculations. Although a small number of these trees will be lost, this is not considered likely to significantly impact the overall calculations.
- Drawing No. 02/107/01 indicates proposed swales which are to be '*sown with wetland wildflower mix*'; this will utilise British Seed Houses RE3 'River flood plain/ water

meadow mix'[9]. This seed mix has been utilised to provide the total number of species included in *Table 2.*

- Drawing No. 02/107/01 indicates an area where '*existing grassland to be infrequently managed and supplemented by introduction of new wildflower plug plants*'. This will utilise BTCV 'Long Season Meadow' wildflower plug collection[10], for which (further to establishment) infrequent management is proposed (Marches Ecology, 2012) in order to maintain an informal wildflower grassland. This plug plant mix includes approximately 29 different species. The number of species included in *Table 2* assumes that a minimum of 25 different species will be utilised. As the plug plants will be planted into existing amenity grassland, the number of species included in *Table 2* also takes into account existing species present. A small number of species have also been added to reflect those that are likely to establish naturally within the short term (due to the proposed infrequency of management), based on a review of nearby habitats.
- Drawing No. 02/107/01 indicates an area where '*existing grassland to be supplemented by introduction of new wildflower plug plants*'. This will utilise BTCV 'Flowering Lawn' wildflower plug collection[11], for which (further to establishment) frequent management, with cessation of mowing for one approximately month in summer to encourage flowering, is proposed (Marches Ecology, 2012). This plug plant mix includes approximately 12 different species, of which two are different to those included in the 'Long Season Meadow'. The number of species included in *Table 2* assumes that all the species which are included in both plug plant mixes, as well as the two different species included in the 'Flowering Lawn' will be utilised. As the plug plants will be planted into existing amenity grassland, the number of species included in *Table 2* also takes into account existing species present.
- Drawing No. 02/107/01 indicates areas for which existing amenity grassland will be subject to non-intervention and allowed to develop into rough grassland/ tall herb vegetation. This is further outlined in Marches Ecology (2012). The species tally included in *Table 2* for this habitat type is considered a realistic number that may naturally develop here in a relatively short period of time, based on review of similar nearby habitats.
- Drawing No. 02/107/01 indicates areas which will be planted with a native tree/ shrubs. The number of species included in *Table 2* assumes use of the 'Plantation Mix' as per Drawing No. 02/107/02, as well as realistic number of native species that may naturally colonise in a relatively short period of time (such as field layer grasses and herbs).
- The species included in *Table 2* for the following plot/ habitat types are as indicated on Drawing No's 02/107/01, 02 and 03: 'ornamental shrub planting' and 'native bulb drifts and trees' (to utilise the 'Bulb Planting' and 'Feathered trees' list as per Drawing No. 02/107/02). All plant species utilised are either native or are considered to have '*a known attraction or benefit to local fauna'* as per the BREEAM requirements.
- The wetland scrape that as indicated on Drawing No. 02/107/01 is not to be planted; the species tally included in *Table 2* is considered a realistic number that may naturally colonise in a relatively short period of time.

[9] http://www.bshamenity.com/products.php?mc=wild-flowers&cat=regional-environmental-mixtures
[10] http://shop.tcv.org.uk/shop/stock?l=level3;lid=850;sid=947
[11] http://shop.tcv.org.uk/shop/stock?l=level3;lid=850;sid=8875

- The amenity grassland species tally post-development has been assumed to be as per the existing resource (although note that *Table 2* includes for the loss of a small area of relatively species-rich amenity grassland associated with the existing Bradley BMX track). However WCBC have also confirmed that in addition to the planting proposals as indicated on Drawing No's 02/107/01, 02 and 03, that ten different species will be planted (as bulbs) into areas of amenity grassland. As such this number has been added to the amenity grassland total post-development.

3.1.5 The Wrexham Biodiversity Action Plan (WBAP) currently contains 15 action plans covering a range of habitats and species occurring in Wrexham borough which require action to conserve them for the future. One habitat identified as a priority in the Wrexham Biodiversity Action Plan (WBAP[12]) is of potential indirect relevance to the site; Woodland. Arguably this habitat type may apply to the plantation woodland that is located immediately adjacent to the northern boundary of the site. It is proposed to expand this plantation within the site boundary (with native tree/ shrub planting). It is also proposed to create a wetland scrape although this is unlikely to hold sufficient water to be considered a pond. The created habitats within the school grounds may also relate to the priority habitat 'Gardens'. WBAP describes 'Gardens' as including wildlife areas created within school grounds.

The Woodland Habitat Action Plan (HAP) includes the following objectives:

'*Maintain the existing areas of woodlands in Wrexham County Borough*'.
'*Increase the area of woodlands in Wrexham County Borough by 50% before 2050*'.

The Garden HAP includes the following objectives:

'Reduce the use of peat based composts to 20% over the next ten years.'
'Reduce the use of wildlife unfriendly pesticides by 50% over the next ten years.'
'Establish a green network in all new developments.'

The Ecological Management Plan (Marches Ecology 2012) will contribute to these objectives through implementation of appropriate management of the created/ retained habitats.

3.1.6 The WBAP states that 22 UK priority species were selected for Wrexham county borough of which seven currently have Species Action Plans (SAPs). The priority species of potential relevance to the site are Badger, Great Crested Newt, Barn Owl and Song Thrush. The WBAP also includes a 'Provisional List of Locally Important/Endangered Species'. The retained and created habitat will also help to achieve the objectives in these SAPs, as follows:

- The Badger SAP includes an objective to '*enhance Badger habitat*'. Although the proposals will result in the loss of potential foraging habitat – amenity grassland – (although no signs of Badgers were recorded), the planting schedule includes for extending the plantation adjacent to the northern boundary of the site, thereby enhancing sett construction opportunities.

- The Great Crested Newt SAP includes an objective to '*maintain and establish extensive networks of suitable habitat within pond clusters and associated pond landscapes (pondscapes) in Wrexham*'. The proposals include for a wetland scrape to be established within the school grounds as well as the creation/ management of areas of

[12] http://www.wrexham.gov.uk/english/planning_portal/biodiversity/wxmbap.htm

long grassland and native scrub/ trees and the provision of an amphibian hibernacula. These resources will provide potential terrestrial habitat; the wetland scrape is unlikely to provide a suitable aquatic (breeding) resource.

- The Barn Owl SAP includes an objective to '*encourage land owners/managers to make provision for suitable feeding habitats for barn owls…'.* The proposals include for areas of non-intervention grassland that are likely to provide potential hunting grounds for Barn Owls should they be in the area.

- The Song Thrush SAP includes an objective to '*Protect, enhance and extend habitats favoured by the song thrush such as hedgerows, woods and scrub, over the next ten years*'. The proposals include for the planting of trees/ shrubs.

Table 2 – LE4 and LE5 Credits Ecology Calculator 2

Plot/ habitat type	Area before development (m^2)	Total no. of species	Area after development (m^2)	Total no. of species
Amenity grassland – species-poor	39152	9	21900	19
Amenity grassland – species-rich (Bradley BMX track)	200	16	0	0
Native scrub	1463	16	134	16
Habitat mosaic on western slope	1571	21	1571	21
Native tree/ shrub planting	0	0	2450	23
Ornamental shrub planting	0	0	782	24
Rough grassland (non-intervention)	0	0	4196	30
Native bulb drifts and trees	0	0	600	17
Grassland enhanced with native wildflower plug plants	0	0	1695	39
Wetland scrape	0	0	27	10
Swales	0	0	596	17
Hard standing	0	0	6337	0
Buildings	0	0	2098	0
Total site area	42386		42386	
Ecological Value (Area weighted no. plant species)	9.72		17.43	

Total change in plant species diversity	7.71
LE4 Credits achieved	2

LE5 Credits achieved	3

3.1.7 BREEAM calculates the change in ecological value [of a site] by comparing the diversity of plant species pre- and post-construction. The ecological value of the site is expressed as an area weighted average of plant species (BRE Global Ltd 2009). Credits awarded under LE4 are calculated as change in species per unit area of habitat type [of the site pre- and post-development]. *Table 2* above indicates that there will be a net increase of 7.71 species per unit area following completion of all proposed planting associated with the development. In accordance with LE4 two credits are achieved.

3.2 LE5 Enhancing Site Ecology

Credit 1 Part i

3.2.1 The client has appointed Marches Ecology to provide advice on protecting and enhancing the ecological value of the site. This report has been compiled by Max Ellson of Marches Ecology. Max has been a practising consultant ecologist for over ten years. Relevant qualifications and professional memberships[13] are as follows:

- Chartered Environmentalist (Society for the Environment).
- Full Member of the Institute of Ecology and Environmental Management (MIEEM).
- MSc in Vegetation Survey and Assessment (passed with Distinction).
- BSc (Hons) in Environmental Biology (First Class).

3.2.2 As described in *Section 1.3,* three ecology reports have been prepared by Marches Ecology – an ecological background data search (Marches Ecology 2010), an Extended Phase 1 Habitat Survey (Marches Ecology 2011a) and a Great Crested Newt pond-scoping report (Marches Ecology 2011b). These reports include appropriate recommendations for protection and enhancement of the site's ecology.

Credit 1 Part ii

3.2.3 The Ecology Appraisal report (Marches Ecology 2011a) includes a number of measures to protect/ enhance the existing ecological resource as follows:

i. [In relation to the 'Alyn Waters' and 'Woodlands and Fishpond Wood' County Wildlife Sites]. These non-statutory protected sites will not be directly impacted. With regards Alyn Waters Marches Ecology (2011a) concluded the following:

'The Alyn Waters Wildlife Site is located approximately 40 m from the [development site] *at its closest point. This Wildlife Site is largely characterised by areas of woodland and dry grassland along the River Alyn valley. The closest part of the Wildlife Site is located on the opposite side of the sports complex located adjacent to the* [development site] *eastern boundary. As such it is on the other side of a car park, the access road, areas of amenity grassland and hard-standing. It is considered unlikely that there would be any indirect impacts on this protected site due to the proposed development although this may require further consideration when detailed information is available.'*

[13] In accordance with the definition provided under LE3 (BRE Global Ltd 2009).

With regards Woodlands and Fishpond Wood Marches Ecology (2011a) concluded the following:

'*The Woodlands and Fishpond Wood Wildlife Site is located approximately 65 m from the* [development site] *at its closest point. This Wildlife Site is largely characterised by areas of woodland, grassland and wetland. As it supports important areas of wetland any potential impact on the hydrology of the site should be assessed. However this Wildlife Site is located on the opposite side of Delamere Avenue and as such it is considered unlikely that the proposed development would result in any indirect impacts on the site hydrology. This should be confirmed once detailed information is available for the proposed development*.'

ii. [In relation to habitats/ flora]. The report stated that '*wherever possible the following features are retained: all the trees/ shrubs adjacent to Delamere Avenue, other trees within the site and the scrub/ grassland at* Target Notes 14 *and* 15*'.* In addition it concluded that '*consideration (where possible) should be given to enhancing the ecological value of the survey site in association with any proposed development. Potential enhancements (with regards habitat and flora) could include the following: provision of areas of unmanaged rough grassland/ wildflower-rich grassland; enhancement of the amenity grassland resource (where appropriate) through plug planting (for example of low growing flowering forbs); provision of a pond/ wetland feature; and or planting of native shrubs/ hedges/ trees*'.

iii. [In relation to Badgers]. No signs of Badger activity were recorded within the site. However the report stated that '[there is] *potential opportunities for sett construction within the site* (Target Note 15) *and directly adjacent to it* (Target Note 16)' and further that '*it is recommended that an update check for Badger setts is undertaken prior to any future development proceeding. The results of this pre-construction check would inform any requirement for mitigation at that time*.'

iv. [In relation to bats]. It was concluded that the eight individual trees that have been identified as having limited bat roost potential (*Target Notes 5, 10* and *10a-c*) should be '*retained within the development. If it is not possible to retain these trees then a detailed daytime inspection by a suitably experienced and licensed bat surveyor and or tree-climber in order to determine whether they are used by roosting bats should be completed*.'

v. [In relation to bats]. Trees which were identified as providing bat roost potential but which are not to be directly impacted by any proposed development were concluded as being '*unlikely to require further survey*'. However the report stated that '*the construction footprint of any scheme should ideally be located further than 10 m from each tree. In addition, prior to construction, site personnel should be made aware of their location, which will be fenced off and appropriately signed for the duration of works. This will reduce or avoid any potential disturbance. Where possible, the use of heavy machinery should be limited adjacent to the buffer zone, especially in the main bat breeding season (June to July).'*

vi. [In relation to bats]. Lighting at the proposed development site should follow guidance provided by The Bat Conservation Trust and Institution of Lighting Engineers (2008). Should security/ external lighting be installed on any building it should utilise low pressure sodium lamps or similar, be fitted with baffles if necessary and point straight down into the site or to where it is needed to avoid light spillage. The brightness of these lamps should be as low as legally possible and they should be placed as low as possible on the new buildings. The

following features should be kept as dark as possible with no lighting located nearby: the edge of the plantation at *Target Note 16* and the line of trees adjacent to Delamere Avenue.

vii. [In relation to bats]. The report noted that as part of any proposed development, 'enhancement measures for bats could be considered….'. '*These could include the provision of artificial bat roosts within the structure/ or externally to any new building and/ or bat boxes to be installed on existing mature trees…*'.

viii. [In relation to Great Crested Newts]. The report concluded that a scoping exercise should be initially conducted to identify any waterbodies/ ponds within 500 m of the site. Based on the findings of this exercise any requirement for further survey/ or avoidance/ mitigation measures could be established. Marches Ecology (2011b) provides the results of this pond scoping exercise, which concludes that '*the likelihood of Great Crested Newts utilising terrestrial habitat within the proposed development site is low.*' As such Marches Ecology (2011b) also provides a Reasonable Avoidance Measures (RAMs) Method Statement. As part of this method statement, the requirement for the construction of a single amphibian hibernacula (to be constructed prior to the end of construction) is outlined.

ix. [In relation to reptiles]. The grassland/ scrub mosaic at *Target Notes 14* and *15* is the only area of potentially suitable habitat within the site. The report concluded that '*The presence/ absence of reptiles within the site cannot be confirmed without further survey. At the present time it appears that this area would not be impacted by the proposed development. It is recommended that this habitat is retained within any site layout. If this area is retained and not impacted in any way by the proposed development then no further survey would be* required.' As the area at *Target Notes 14* and *15* is to be retained there are no further requirements with regards reptiles.

x. [In relation to birds]. The destruction of any bird nests that are in use is illegal. The simplest option to avoid issues arising from the presence of nesting birds is to schedule work that affects nesting habitat (*e.g*. removal of trees, shrubs and other vegetation) outside the nesting period. If it is not possible to undertake vegetation clearance outside the nesting season all such areas should be checked by a suitably qualified ecologist prior to commencement of works. If a nest is found a buffer zone of no less than 5 m should be retained and fenced off around the nest until any chicks have fledged. At present no further survey is envisaged, however should any vegetation clearance or other preparatory work be scheduled for the nesting period (March to August inclusive) further survey may be required.

xi. [In relation to birds]. The report outlines that to '*compensate for any loss of potential nesting sites (associated with the scrub/ trees) a new area(s) of scrub should be created and maintained within any proposed development*'. It also outlines that the site '*presents the opportunity to enhance nesting opportunities and target particular species of conservation concern such as the House Sparrow* (Passer domesticus). *It is recommended that the design of the building includes features that could be utilised by this species or alternatively Sparrow-terrace nest-boxes are erected on the building*.'

3.2.4 In addition to those recommendations listed above it is further suggested that the site could be enhanced for wildlife through:

xii. Planting of bulbs (Daffodils, Crocuses, Tulips) in an area of amenity grassland. Such early-flowering species can provide an important nectar source for a range of invertebrates during the early spring.

xiii. Appropriate procedure for the protection of retained trees. Protection should be in accordance with *Local Planning Guidance Note 17* (WCBC 2006).

3.2.5 As detailed in *Section 3.1*, proposed planting/ habitat creation is indicted on three plans prepared by the Ark Company (Drawing No's 02/107/01, 02 and 03). The planting/ habitat creation has been developed by the Ark Company in consultation with Marches Ecology and WCBC. Marches Ecology has had particular involvement in the design of the following habitats as indicated on Drawing No. 02/107/01:

a) proposed swales where these are to be sown with a wetland wildflower mix,
b) non-intervention grassland,
c) the area of existing grassland that is to be infrequently managed and supplemented by the introduction of new wildflower plug plants,
d) the area of existing grassland that is to be supplemented by the introduction of new wildflower plug plants and maintained as a 'flowering lawn',
e) the wetland scrape (to be left to colonise naturally), and
f) (to a lesser extent) the areas of proposed native shrub and tree planting.

3.2.6 Further details with regards a), c), d), e) and f), along with the proposed amphibian hibernacula, are provided in *Tables 3* to *7* below. Further detail regarding the provision and maintenance of bat [6 No.] and bird nest-boxes [6 No.] is provided in Marches Ecology (2012).

Table 3 – Proposed Swales – Wetland Wildflower Mix

Swale Wildflower Establishment	
Methodology	Drawing No. 02/017/01 indicates two lengths of swale that, once constructed, are to be sown with a wetland wildflower mix. The swales are primarily being provided to manage surface water across the site and carry it into soakaways; details of their design/ construction are provided in plans by Atkins (drawing no's 5104033-WA-109 & 110). The lengths of swale concerned will be sown with British Seed Houses mix RF3 'River Flood Plain/ water meadow mix'. Advice contained with the UK Native Wild Flora Mixtures manual[14] will be followed for the establishment of this grassland. This manual indicates that RF3 seed mix should be sown at between 3 and 5g/m^2. Sowing should take place in calm weather during late summer/ early autumn (September to October) in 2012 or early spring (March/ April) in 2013 as applicable. Prior to sowing the ground should be suitably prepared. Further to the swale construction, topsoil should not be added. The ground should be free of weeds (particularly docks and thistle) and comprise of a medium tilth. It may be necessary to either rotovate the soil (during a period of dry weather and not when the soil is waterlogged) and or use a suitable herbicide prior to seeding. As the grassland areas that are to be established are small, it is likely to be possible to hand broadcast the seed (using a carrier to bulk up the seed, and stirring regularly). The seed should be lightly raked in with a spring-tined rake. **First Year's Maintenance:** If autumn sown the sward should be cut once the height exceeds 10 cm (late March/ early April) reducing the height to between 4-7 cm according to the evenness of the ground. A second cut could be required if regrowth exceeds 10cm by the end of April/early May. A 3rd cut should be undertaken in September (to 4cm) after flowering. If spring sown, the sward should be cut approximately 6 weeks after sowing (to 4-7 cm if there is sufficient material) and then again in

[14] http://www.bshamenity.com/files/Wildflower-brochure.pdf

	September (as above). After each cut the clippings should be removed.
Purpose	**Where?**
To provide an area of diverse wildflower grassland associated with the swales to benefit a range of wildlife.	Refer to The Ark Company plan entitled '*Wrexham County Borough Council , Land at Delamere Avenue, Gwersyllt – Proposed New School, Hard and Soft Landscape Layout'* (Drawing No. 02/107/01, v3, dated Feb 2012).
Responsibility	**Timing**
WCBC/ Contractor	To be agreed by Contractor and Ecologist.

Table 4 – Proposed Wildflower Plug Plants

Wildflower Plug Planting	
Methodology	Two areas within the school grounds are to be planted native wildflower plug plants. These are indicated on Drawing No. 02/107/01 as follows: • An area of existing grassland that is to be infrequently managed and supplemented by the introduction of new wildflower plug plants. • An area of existing grassland that is to be supplemented by the introduction of new wildflower plug plants maintained as a 'flowering lawn'. The area that is to be infrequently managed is to be supplemented with the BTCV 'Long Season Meadow' wildflower plug collection, refer to http://shop.tcv.org.uk/shop/stock?l=level3;lid=850;sid=947. This plug planting mix contains approximately 29 species of native meadow flowers. It has been assumed that at least 25 species will be utilised. It is proposed that the plug plants will be planted into existing amenity grassland and, further to successful establishment, the whole resource then being subject to infrequent management (further detailed in Marches Ecology (2012)). It is hoped that this will create an informal wildflower grassland area. Paths should be retained unplanted – these will be subject to regular mowing in the future. The other area is to be supplemented with BTCV 'Flowering Lawn' wildflower plug collection, refer to http://shop.tcv.org.uk/shop/stock?l=level3;lid=850;sid=8875. This plug planting mix contains 12 species of wildflowers which will tolerate close mowing to a height of approximately 5 cm for much of the year. This area can therefore be managed for much of the year as an amenity lawn, but the wildflower species will provide added benefits to a range of wildlife, in particular invertebrates. It is proposed that the plug plants will be planted into existing amenity grassland, and, further to successful establishment, subject to frequent close-mowing (as with the remainder of the amenity grassland) for much of year, but with a cessation of mowing for one month in summer to encourage flowering. The management will be further detailed in Marches Ecology (2012). In total the two areas equate to approximately 1695 m^2. This would require around 4200 to 8400 plants. They are to be planted between 2.5 and 5 plants per m^2 depending on plant size, impact required and budget; care should be taken to spread the plug plants across the planting area to emulate a natural wildflower grassland. Wildflower plug plants should be planted as soon as they arrive. On Arrival: • Keep plants in a sheltered, cool location preferably in a light shade to await planting. • Keep plant roots moist, but not soaked (do not let them dry out). • If you have more than one species separate them for easy identification. • Do not plant in frosty conditions.

	Before Planting: • Water well before planting. • Excessive foliage may be removed with shears. • If in a plant tray pull the plant out gently by holding the leaves. If there is any resistance or the plant is small pinch the base of the cell underneath. • Remove turf from planting locations by hand or the grass should be mown down to 10 cm and the clippings removed before planting. Planting: • The planting hole should be the same shape and size as the module i.e. an inverted pyramid. The planting hole can be quickly created with a suitable shaped dibber. • Do not compact the sides of the planting hole as the roots will not penetrate. • The plants can be planted into cultivated soil or into an established grass sward. • Emulate natural wildflowers by planting in drifts and clumps. Avoid grid planting, as it looks unnatural. Try planting more densely at the centre of a clump becoming less dense towards the edges. • Try to match the location to the plant – wildflowers grow best when conditions suit them. For example Ragged-robin prefers damp conditions while Red Campion grows well under shrubs and trees. • Ideally soak the plants with water after planting. • If planting after April, be prepared to spot irrigate in dry spells while the plants establish themselves. • When planting into existing grass, success is improved by reducing immediate competition while the wildflower establishes itself (the adjacent grass should not be allowed to overshadow or swamp the seedlings). This can be achieved either chemically or mechanically. First Year's Maintenance: During the first spring and early summer keep the grass short – whenever the adjacent grass reaches a maximum height of 20 cm cut back to 10 cm around the plants up to late May. Another cut should be taken in July. Remove or disperse cuttings. If planted after April, the plants should be spot irrigated in dry spells during the first year whilst they establish themselves.
Purpose	**Where?**
To provide a species-rich informal wildflower grassland and flowering lawn, to the benefit of wildlife.	Refer to The Ark Company plan entitled '*Wrexham County Borough Council , Land at Delamere Avenue, Gwersyllt – Proposed New School, Hard and Soft Landscape Layout'* (Drawing No. 02/107/01, v3, dated Feb 2012).
Responsibility	**Timing**
WCBC/ Contractor	To be agreed by Contractor and Ecologist.

Table 5 – Proposed Wetland Scrape

Wetland Scrape Construction	
Methodology	The location of the proposed wetland scrape is indicated on Drawing No. 02/017/01. Wetland scrapes are shallow depressions with gently sloping edges, which seasonally hold water. Such

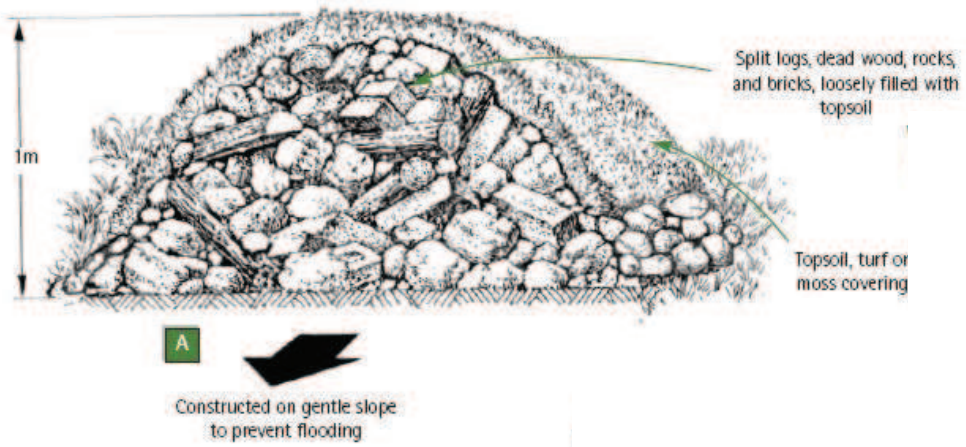
	features are very attractive to wildlife, including a wide variety of aquatic, terrestrial and aerial invertebrates, as well as a variety of birds. Detailed design information is available from the following publication: RSPB 'Farming for Wildlife' leaflet entitled 'Scrape Creation for Wildlife' and available at http://www.rspb.org.uk/Images/Scrape_creation_tcm9-255102.pdf. The scrape will be approximately 27m^2. Its edges should be very gently sloping with irregular and varied outlines. It should be shallow though not with a uniform depth across the whole area; deeper areas towards the middle of the scrape should be around 30 cm deep, with humps and hollows throughout to provide as many niches for plants and animals as possible. Due to requirements related to the scrape being located within a school grounds, there will be no sudden changes in depth (*i.e.* shelves); rather the varying depths will be gently graded. The aim is to allow seasonal standing water within the scrape, along with muddy edges. This will provide ideal conditions for wetland invertebrates and plants. The scrape should ideally hold water (from rainfall) from March through to the end of June, and as such consideration will need to be given to the substrate. Should the existing substrate be of low permeability soils, for example clays and silts with poor structure, it should be possible to retain rain water. Should such soils not be present, consideration should be given to importing such substrate from either elsewhere within the development site, or if necessary off site. It is proposed that the scrape will be allowed to completely dry up at the end of the summer; this will benefit some invertebrates by limiting larger predators and maintaining early successional habitat stages. The scrape is not to be subject to planting/ sowing – rather it will be allowed to colonise naturally. As detailed in Marches Ecology (2012), the scrape will be reviewed in the first and second summers after construction; should it be considered necessary for the scrape to be adapted (for example to ensure it holds water) this will be undertaken as required.
Purpose	**Where?**
To provide an enhanced wetland habitat suitable for a range of invertebrates, plants and feeding birds.	Refer to The Ark Company plan entitled '*Wrexham County Borough Council , Land at Delamere Avenue, Gwersyllt – Proposed New School, Hard and Soft Landscape Layout'* (Drawing No. 02/107/01, v3, dated Feb 2012).
Responsibility	**Timing**
WCBC/ Contractor	To be agreed by Contractor and Ecologist.

Table 6 – Proposed Shrub/ Tree Planting

SHRUB/ TREE PLANTING	
Methodology	Areas of proposed 'native shrub and tree planting' are indicated on Drawing No. 02/017/01. A planting schedule is provided on Drawing No. 02/017/01 – refer to 'Plantation Mix' and a planting/ aftercare specification on Drawing No. 02/017/03. The 'Plantation Mix' includes the following species: *Betula pendula* (Silver Birch), *Corylus avellana* (Hazel), *Crataegus monogyna* (Hawthorn), *Fraxinus excelsior* (Ash), *Ilex aquifolium* (Ash), *Ligustrum ovalifolium* (Garden Privet), *Populus tremula* (Aspen), *Prunus avium* (Wild Cherry), *Quercus robur* (Pedunculate Oak), *Salix caprea* (Goat Willow), *Salix cinerea* (Grey Willow), *Sorbus aucuparia* (Rowan), and *Viburnum opulus* (Guelder-rose). Native trees (ideally of local provenance) will be planted. Where possible, trees and shrubs will be notch planted. Each tree or shrub should ideally be protected with a tree-shelter attached to a stake. Frosty periods will be avoided as this may

	harm the individual plants. As detailed on Drawing No. 02/017/03 all trees/ shrubs are to be planted into suitable mulch. Once the trees/ shrubs have been planted, an area of at least 1 m^2 around them should be kept weed-free. Any losses should be replaced in the first five years after planting during the first planting season (October to March) following failure. Further information is provided in Marches Ecology (2012).
Purpose	**Where?**
To provide scrub/ woodland for wildlife including breeding birds.	Refer to The Ark Company plan entitled '*Wrexham County Borough Council , Land at Delamere Avenue, Gwersyllt – Proposed New School, Hard and Soft Landscape Layout'* (Drawing No. 02/107/01, v3, dated Feb 2012).
Responsibility	**Timing**
WCBC/ Contractor	To be agreed by Contractor and Ecologist.

Table 7 – Proposed Amphibian Hibernacula

Hibernacula Creation	
Methodology	A single hibernacula is to be constructed to the specifications outlined below. As Great Crested Newts are known to spend a considerable proportion of their terrestrial phase either underground or just above ground under refuge sites, it is of great benefit to provide artificial sites, known as hibernacula, which they can utilise. Aside from Great Crested Newts, these will be used by other amphibians e.g. other newts, Common Toads and Common Frogs. Suitable rubble and soil (and/or other materials, refer below) will be used to create a single hibernacula. Dimensions should not be below 2 m length x 1 m width x 1m height. The construction is straightforward – a mixture of hard-core, brick rubble, logs, sleepers etc, and loose topsoil is piled into a mound which is then covered with a topsoil cap and, ideally, a turf covering. The lower margins of the mound should be exposed to facilitate access. The following diagram is from page 31 of Langton *et al* (2001). 
Purpose	**Where?**
To enhance the site for amphibians and	The location of this will be agreed with the project team,

Hibernacula Creation	
mitigate for the loss of any refugia/ hibernacula from the site due to the proposed development.	however it would ideally be located on the edge of native scrub/ non-intervention grassland.
Responsibility	**Timing**
WCBC/ Contractor	To be agreed by Contractor and Ecologist.

3.2.7 *Table 8* below briefly describes what measures have been taken to date to achieve the above recommendations/ enhancements. Detailed requirements included in the preliminary contractual documentation will ensure that the recommendations of the ecology report (that have not yet been met) will be implemented.

Table 8 – LE5 Credit 1 Part ii; implementation of recommendations for ecological protection and enhancement

Item	Implementation	Completed
	Recommendations	
i.	• Appropriate measures included in construction contractor's site working procedure documents. Myles Taylor (WCBC Principal Architectural Assistant) confirmed (by email dated 12/04/12) that the boundary close to the Alyn Waters and Woodlands and Fishponds Woods County Wildlife Sites will be fenced to exclude construction traffic, etc and further that best practice measures will be implemented. The fencing is indicated on the tender/ contract drawing no. PD2009/049/30. • A report by Atkins entitled 'Gwersyllt Primary, Wrexham – Geo-Environmental Report' (Ref: 5104033) provides some information on the hydrology of the development site/ surrounding areas – this report does not appear to suggest any (in)direct linkage with potential wetland features associated with the Woodlands and Fishpond Wood Wildlife Site. • Potential indirect impacts on the Alyn Waters and Woodlands and Fishponds Woods County Wildlife Sites should be avoided/ minimised through construction site best practice with regards noise and dust control.	✓ Contract Preliminaries Clause 1/25 item 150B states hat that all recommendations within the ecology report for enhancement and protection of site ecology will be adhered to in full.
ii.	• In relation to the recommendation to *'wherever possible'* retain '*all the trees/ shrubs adjacent to Delamere Avenue and other trees within the site'*. Further to provision of an Arboricultural Implications Assessment report (WCBC 2011), and an associated drawing entitled '*Proposed Welsh Medium School, Gwersyllt, Wrexham – Existing Tree Layout*' (Drawing No. 11701/D/05A), a meeting was held with WCBC on 11/11/11, to discuss the proposals. During this meeting it was confirmed that trees T14 and T19 to T27 (inclusive) as shown on drawing no. 11701/D/05A would be felled as part of the development. Initial proposals had been to fell T18 (*Target Note 7*) – a mature Wych Elm; further to discussions highlighting the ecological value of this tree, the plans were revised. Of the trees to be lost, T14 is a small Hawthorn, T19/ 20 comprise two semi-mature Ash and T21 to 27 are mainly small Poplars, and Birch. Due to their species-type/ ages *etc* and because of the ability to replace them in the short-medium term, it	✓ (March 2012)

	was considered acceptable to lose these trees. Drawing No. 02/107/01 indicates a large number of individual trees will be planted as part of the proposals. • In relation to the recommendation to retain '*the scrub/ grassland at* Target Notes 14 *and* 15*'* the Ark Company plan entitled '*Wrexham County Borough Council , Land at Delamere Avenue, Gwersyllt – Proposed New School, Hard and Soft Landscape Layout* (drawing No 02/107/01, v3, dated Feb 2012) indicates that this will be retained and protected. • Drawing No 02/107/01 shows areas of non-intervention (rough) grassland, areas of amenity grassland to be enhanced with wildflower plug plants (partly to create a 'flowering lawn' and partly an informal wildflower grassland), a wetland scrape and native shrub/ tree planting. Marches Ecology (2012) details appropriate on-going management of these new habitats.	
iii.	• Badger pre-construction survey to be undertaken and appropriate working protocol developed as necessary.	✓ (Commissioned and to be completed pre-construction)
iv.	• Refer to ii) above which details that trees T14 and T19 to T27 (inclusive) as shown on drawing no. 11701/D/05A would be felled as part of the development. Trees T14 and T21 to T27 (inclusive) were concluded to have no bat roost potential (Marches Ecology 2011). Trees T19 and T20 refer to two semi-mature *Fraxinus excelsior* (Ash) trees located on the Delamere Road frontage (*Target Note 5* within Marches Ecology (2011)) and were described as being of '*low potential value for roosting bats at most.'* • A subsequent day-time bat inspection of these two trees was completed on 01st December 2011. The aim of the survey was to ascertain if, in the two trees, potential existed for bat roosts and if any obvious evidence of use was present. A letter report (Marches Ecology 2011c) was subsequently prepared and issued to WCBC on 13/12/11. This report concluded the following: '*the two Ash trees (T19 and T20) which are scheduled for removal do not contain high value roost opportunities for bats. As such their removal will not result in the loss of a significant level of roost potential; therefore their removal is unlikely to impact upon local bat populations.'* And further that *'As a precautionary measure it is recommended that before felling takes place the Ivy vines are severed at the base of T19 to allow the foliage to die back. Alternatively, the Ivy could be carefully cut/ stripped off the tree manually by a tree climber, who should also subject the tree to an inspection for cavities that may have been out of reach of the ladder. If following die back/ manual stripping of Ivy, holes or crevices are observed then it is recommended that a licensed bat ecologist conducts a further site visit to check if roosting potential is present prior to the tree being felled. In addition should a bat(s) be located during any of the above work then all works should stop and a licensed bat ecologist contacted for advice*.' • Myles Taylor (WCBC) has confirmed (by email dated 12/04/12) that the Ivy on T19 was severed and allowed to die back and further inspected	✓ (February 2012)

	by a tree-climber for any holes or crevices that may have been obscured. No such holes were located and the trees were felled between 6th and 9th February 2012.	
v.	• Appropriate measures included in construction contractor's site working procedure documents; confirmed by WCBC (Myles Taylor), by email dated 12/04/12.	✓ (Included in Civil's External Works tender documentation)
vi.	• Details of external lighting are indicated on an Atkins plan entitled 'Gwersyllt CP School, Wrexham – External Electrical Services' (drawing no. 5104033/E/P/6006/A). This plan indicates that building mounted luminaires are LEDs (with minimal UV output) and are downward pointing; the car park and path lighting are of a similar design. The lighting will follow guidance provided by The Bat Conservation Trust and Institution of Lighting Engineers (2008). The edge of the plantation to the north and the trees along Delamere Avenue will be kept as dark as possible (with no lighting located nearby).	✓ (March 2012)
vii.	• Myles Taylor (WCBC) has confirmed (by email dated 24/01/12) that six bat boxes (1No. 1FQ and 5No. 2FN) will be provided as part of the scheme. The locations of these boxes will be agreed with teaching staff and pupils after the school is occupied; one is to be attached to a building/ structure and five to trees. Further detail is provided in Marches Ecology (2012).	✓ (Confirmed by WCBC and appropriate clause in construction contract)
viii.	• Myles Taylor (WCBC) has confirmed (by email dated 12/04/12) that an amphibian hibernacula will be constructed. As outlined in *Table 7* above, the location of this will be agreed with the project team, however it would ideally be located on the edge of native scrub/ non-intervention grassland.	✓ (Confirmed by WCBC and ✓ included in Civil's External Works tender documentation)
ix.	• The Ark Company plan entitled '*Wrexham County Borough Council , Land at Delamere Avenue, Gwersyllt – Proposed New School, Hard and Soft Landscape Layout'* (Drawing No. 02/107/01, v3, dated Feb 2012) indicates that '*the scrub/ grassland at* Target Notes 14 *and* 15*'* will be retained and protected. Furthermore Myles Taylor (WCBC) has confirmed (by email dated 12/04/12 that this area will be fenced during construction activities (as indicated on the tender/ contract drawing no. PD2009/049/30).	✓ (As i) above).
x	• Vegetation removal to be completed outside nesting season. Myles Taylor (WCBC) has confirmed (by email dated 12/04/12) that all shrub/ trees to be removed as part of the project were felled between 6th and 9th February 2012.	✓ February 2012.
xi.	• Drawing No 02/107/01 shows areas of native shrub/ tree planting that will be of benefit to nesting birds. Marches Ecology (2012) details appropriate on-going management of this new habitat. • Myles Taylor (WCBC) has confirmed (by email dated 12/04/12) that six bird boxes (1No. Sparrow Terrace, 3No. 3S Starling Box, and 2No.1B General Nest Box) will be provided as part of the scheme. The locations of these boxes will be agreed with teaching staff and pupils	✓ (Confirmed by WCBC and appropriate clause in construction contract – all as bill item Q50/350 A, B and C.)

	after the school is occupied; the Sparrow Terrace is to be attached to a building/ structure, and the other five boxes to trees. Further detail is provided in Marches Ecology (2012).	
xii.	• Myles Taylor (WCBC) has confirmed (by email dated 12/04/12) that bulbs (of ten species) are to be planted within an area of amenity grassland.	✓ (Confirmed by WCBC and appropriate clause in construction contract)
xiii.	• Tree protection measures are outlined in the 'Arboricultural Impacts Assessment' (WCBC, 2011); Myles Taylor (WCBC) has confirmed (by email dated 12/04/12) that these will be implemented.	✓ (Included in Civil's External Works tender documentation)

Credit 2/ 3

3.2.8 The change in ecological value of the site has been assessed using *Ecology Calculator 2* (See *Table 2*). The results of this assessment are presented in *Section 3.1* above. The total change in plant species diversity has been calculated as +7.71 and therefore two credits can be awarded from Credits 2 and 3, and a total of three credits in accordance with LE5.

4 LE6 Credit Assessment

4.1 LE6 Long-term Impact on Biodiversity

4.1.1 The client is committed to achieving all of the mandatory requirements and four of the additional requirements. This commitment is included within the preliminary contractual documentation. *Tables 9* to *12* below describe how these requirements have been/ will be met. As such two credits are achievable under LE6.

Mandatory Criteria

Table 9 – Mandatory Criterion 1

Criterion	A suitably qualified ecologist (SQE) has been appointed prior to commencement of activities on site.
Compliance	See *Section 3.2* of this report. Marches Ecology was appointed prior to the commencement of activities on site.

Table 10 – Mandatory Criterion 2

Criterion	The suitably qualified ecologist confirms that all relevant UK and EU legislation relating to protection and enhancement of ecology has been complied with during the design and construction process.
Compliance	Confirmed by design team ecologist (Max Ellson) to date. Appropriate clause included in construction contract; main contractor is required to maintain records of compliance.

Table 11 – Mandatory Criterion 3

Criterion	A landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion. This is to be handed over to the building occupants and includes: a) Management of any protected features on site, b) Management of any new, existing or enhanced habitats, c) A reference to the current or future site level or local Biodiversity Action Plan (BAP).
Compliance	An Ecological Management Plan (EMP) has been produced (Marches Ecology 2012).; as required by Condition 8 of the outline planning permission, this document is for 10 years. The EMP incorporates advice and prescriptions with regards site biodiversity and therefore is considered to provide a site level Biodiversity Action Plan as well. It also relates to the Wrexham Biodiversity Action Plan as detailed in *Section 3.1* of this report.

Additional Criteria

Table 12 – Additional Criterion 1

Criterion	The contractor nominates a 'Biodiversity Champion' with the authority to influence site activities and ensure that detrimental impacts on site biodiversity are minimised in line with the recommendations of a suitably qualified ecologist.
Compliance	Appropriate clause included in construction contract; main contractor to nominate Biodiversity Champion [WCBC has confirmed this is in Contract Preliminaries, A32/150B/ item 1).

Table 13 – Additional Criterion 2

Criterion	The contractor trains the site workforce on how to protect site ecology during the project. Specific training should be carried out for the entire site workforce to ensure they are aware of how to avoid damaging site ecology. Training should be based on the findings and recommendations for protection of ecological features highlighted within a report prepared by a suitably qualified ecologist.
Compliance	Appropriate clause included in construction contract; main contractor is required to provide training in accordance with the ecology reports (Marches Ecology 2011a&b and 2012) [WCBC has confirmed this is in Contract Preliminaries, A32/150B/ item 1).

Table 14 – Additional Criterion 4

Criterion	Where a new ecologically valuable habitat, appropriate to the local area, is created. This includes habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself; including any habitat listed in the UK Biodiversity Action Plan (UK BAP), Local Biodiversity Action Plan (LBAP), those protected within statutory sites (*e.g.* SSSIs), or those within non-statutory sites identified in local plans.
Compliance	Drawing No. 02/107/01 shows areas of native shrub/ tree planting, in particular an area that will be planted adjacent to existing plantation woodland along the northern boundary of the site. This planting will develop into woodland in due course; woodland is a Wrexham Biodiversity Action Plan habitat. Drawing No 02/107/01 also indicates areas of non-intervention (rough) grassland, areas of amenity grassland to be enhanced with wildflower plug plants and a wetland scrape. The enhancement of the amenity grassland is being undertaken to create a 'flowering lawn' and partly infrequently managed wildflower grassland. The habitats are considered appropriate to the area, and if subject to the correct long-term management will provide a significant enhancement to the existing resource. All these habitats have the potential to support species of nature conservation interest (including *NERC Act 2006* species of principal importance) such as the Common Toad and various invertebrates.

Table 15 – Additional Criterion 5

Criterion	Where flora and/or fauna habitats exist on the site, the contractor to programmes site works to minimise disturbance to wildlife. For example, site preparation, groundworks, and landscaping have been, or will be, scheduled at an appropriate time of year to minimise disturbance to wildlife. Timing of works may have a significant impact on, for example, breeding birds, flowering plants, seed germination, amphibians *etc*. Actions such as phased clearance of vegetation may help to mitigate ecological impacts. This additional requirement will be achieved where a clear plan has been produced detailing how activities will be timed to avoid any impact

	on site biodiversity in line with the recommendation of a suitably qualified ecologist.
Compliance	The vast majority of trees and shrubs within the site have been avoided. As detailed in *Table 8* (x) Myles Taylor (WCBC) has confirmed (by email dated 12/04/12) that the small numbers of shrub/ trees to be removed as part of the project were felled in February 2012, outside the nesting bird season. Two trees with low bat roost potential were subject to detailed inspections prior to felling in January 2012 (refer to *Table 8*, *iv*). Marches Ecology (2011c) includes a method statement with regards a Great Crested Newt Reasonable Avoidance Measures scheme. This is also a requirement of Condition 9 of the outline planning permission and will be implemented before and during the construction period. The method statement includes for a tool-box talk, hand-/ visual- searches (and controlled vegetation removal if considered to be required by an ecologist), and provision of a working protocol and watching brief. WCBC (2011) includes a Tree Protection Plan to be implemented during the construction phase. An appropriate procedure for the protection of retained trees is included as a requirement in the preliminary contractual documentation (WCBC have confirmed that this has been included in the Civil's External Works tender documentation). Protection will be provided in accordance with *Local Planning Guidance Note 17* (WCBC 2006).

5 LE7 Credit Assessment

5.1 LE7 Consultation with students and staff

5.1.1 As the proposed Welsh Medium Primary School at Gwersyllt is a new build, there was no existing school with which to directly consult with staff and pupils with regards LE7. As such, the consultation process was undertaken at Plas Coch Welsh Medium Primary School in Wrexham. Both staff and pupils have been consulted during the pre-construction period, to determine the educational and social requirements for the new school grounds and their ideas for the new school ground's design. Staff and students have been kept informed of how their ideas are built into the design (refer below).

5.1.2 The BREEAM guidance notes the consultation should seek

'*to determine: a) How the grounds could best be designed to facilitate learning b) How the grounds could best be designed to provide a range of social spaces appropriate to pupils' and other users' needs'*. And furthermore that it should '*consider the range of needs for both social and educational use of the outdoor space. A range of sizes and types of space should be designed to facilitate different types of social interaction. Consideration should be given to how the space can facilitate learning in the range of subjects, including science, drama, maths, geography, art, physical education, history, etc*.'

5.1.3 The consultation process was designed to with this guidance in mind. As such, the consultation comprised a pre visit discussion with the head teacher and delivery and review of four workshops and associated questionnaires. This process was led by Mr Gwyndaf Jones (a retired head teacher) in the medium of Welsh. *Appendix 1* provides a copy of the questionnaire – as the pupils concerned were of primary age it was considered more appropriate to use this questionnaire within the actual workshops; as such they were completed in supervised class-groups. A summary of the results (*Appendix 2*) of these questionnaires was provided to the school for dissemination to pupils (by email 11/04/12; refer above).

5.1.4 The four workshops were held on a single day in November 2011 (see photos below). The workshop structure during each session is reproduced as *Appendix 3*. The attendance record for the 1st workshop is reproduced as *Appendix 4*. In total 107 key stage 2 pupils and associated staff (including teachers and teaching assistants) attended the workshops.

Workshops at Plas Coch Primary School, 17th November 2011.

5.1.5 *Appendix 5* provides a consultation schedule (a summary of the above) and details key outcomes of each stage in this process. From the results of the questionnaires/ workshops the four most important aspects for the children were; (1) a wetland area, (2) a possible poultry set-up, (3) a football / Rugby pitch and (4) benches and tables. Least important features were; (1) a wildflower paddock, (2) growing flowers from seed and (3) a basketball pitch. Other significant suggestions that were made in addition to the ones on the questionnaire included; (a) a running track, (b) a log house, (c) a rack for cycles, (d) a bird look-out and (e) an all-weather pitch.

5.1.6 Based on the results outlined above, the wetland scrape could clearly be linked in with the pupil's aspirations, as could the inclusion of a football/ Rugby pitch; WCBC have also confirmed that benches and tables are to be provided in the wider grounds. With regards the 'other significant suggestions' the proposals include for an all-weather MUGA, and cycle storage also forms part of the scheme (as indicated on Drawing No. 02/107/01). A timber cabin is also to be provided near the wetland scrape, which is to also be utilised as a bird look-out. Myles Taylor (WCBC) provided an email to the Plas Coch head teacher on 11/04/12,which included a copy of the consultation 'results' and confirmation of the pupils suggestions that have been included in the scheme.

5.1.7 Based on the above it can be concluded that the findings of the workshops have influenced the design of the landscaping/ habitat creation/ wider grounds. In an email to the head teacher of Plas Coch from Myles Taylor (WCBC), dated 11/04/12, it was also outlined that the pupils of Plas Coch who took part in the consultation '*could visit the new school once it is complete to see how and where their suggestions have been incorporated*'.

5.1.8 The consultation process detailed above is considered sufficient to meet the requirements of LE7; one credit may be achieved.

6 LE8 Credit Assessment

6.1 LE8 Local Wildlife Partnerships

6.1.1 LE8 requires a partnership to be set up with a local group that has wildlife expertise and further that the group has: a) provided advice early in the design process regarding protecting and/or providing habitat for species of local importance on the site, b) provided advice to ensure the design is in keeping with the local environment, and c) provided or will continue to provide on-going support and advice to the school to help them manage, maintain and develop the outdoor space in the longer term.

6.1.2 North Wales Wildlife Trust[15] (NWWT) was engaged to provide the advice as per a) and b) above – a copy of a letter from Iwan Edwards (NWWT) is provided as *Appendix 7.* This letter provides some background information to the ecology of the area, and then provides comments on the proposed landscaping/ habitat provision (as per an early draft of Drawing No. 02/107/01) many of which have been included in the final landscape design (such as native shrub and tree planting, wildflower grassland and non-intervention rough grassland). It should be noted that the early draft of the landscaping proposals included a 'wetland feature' and as such NWWT provided comments with regards to creation of a pond. The 'wetland feature' has since been confirmed as a wetland scrape.

6.1.3 NWWT has also provided a letter of on-going support (replicated as *Appendix 8*) with a view to establishing a long-term working partnership with Gwersyllt Primary School once it is established. As Gwersyllt Primary School has not yet been established, NWWT outline that they will '*currently move ahead to establish a relationship with Ysgol Plas Coch staff as it is envisaged there will be a close working relationship between these two schools once the new school is built. This is done in the hope of establishing a more permanent association with the new school once key staff are appointed*.' NWWT also state that they would *'actively seek to develop a long term association with the school either through steering the Wildlife Watch Group, working with the school Eco group / committee, PTA or engaging with other external groups'* and furthermore would '*seek to further develop effective habitats for increased biodiversity on the site, and provide advice, guidance or on-going assistance in maintaining the site through our network of sub-contractors, volunteers and associated groups'.*

6.1.4 It is considered that sufficient contact with a local group that has wildlife expertise has been established in order to meet the requirements of LE8; one credit may be achieved.

[15] http://www.northwaleswildlifetrust.org.uk/

7 REFERENCES

BRE Global Ltd (2009). *BRE Environmental & Sustainability Standard. BES5051: Issue 3.0 – BREEAM Education 2008 Assessor Manual*.

Bat Conservation Trust & Institution of Lighting Engineers. (2008). *Bats and Lighting in the UK – Bats and the Built Environment Series*.

Green, J.A. (2006). *The Flowering Plants of Denbighshire – A Botanical Checklist for VC50*. Powlsons Ltd, Colwyn Bay.

HMSO (2006). *The Natural Environment and Rural Communities Act 2006*. HMSO, London.

http://shop.btcv.org.uk/shop/stock?l=level3;lid=850;sid=947

http://shop.btcv.org.uk/shop/stock?l=level3;lid=850;sid=8875

http://www.bshamenity.com/files/Wildflower-brochure.pdf

http://www.bshamenity.com/products.php?mc=wild-flowers&cat=regional-environmental-mixtures

http://www.biodiversitywales.org.uk/admin/upload/docs/english/Section%2042%20Priority%20List.doc

http://www.northwaleswildlifetrust.org.uk/

http://www.rspb.org.uk/Images/Scrape_creation_tcm9-255102.pdf.

http://www.wrexham.gov.uk/english/planning_portal/biodiversity/wxmbap.htm

Institute of Ecology and Environmental Management (2006). *Guidelines for Ecological Impact Assessment in the United Kingdom (Approved Version: 26 June 2006)*. Unpublished.

Langton, T, Beckett, C. & Foster J. (2001). Great Crested Newt Conservation Handbook. Froglife, Halesworth.

Marches Ecology (2010). *Proposed Welsh Medium School, Gwersyllt, Wrexham – Ecological Background Data Search*. Unpublished report produced on behalf of Wrexham County Borough Council.

Marches Ecology (2011a). *Proposed Welsh Medium Primary School, Gwersyllt, Wrexham – Extended Phase 1 Habitat Survey*. Unpublished report produced on behalf of Wrexham County Borough Council.

Marches Ecology (2011b). *Proposed Welsh Medium Primary School, Gwersyllt, Wrexham – Great Crested Newt Pond-Scoping Exercise*. Unpublished letter report produced on behalf of Wrexham County Borough Council.

Marches Ecology (2011c). *Proposed Welsh Medium Primary School, Gwersyllt, Wrexham – Daytime Bat Inspection of Two Trees*. Unpublished letter report produced on behalf of Wrexham County Borough Council.

Marches Ecology (2012). *Proposed Welsh Medium Primary School, Gwersyllt, Wrexham – Ecological Management Plan*. Unpublished report produced on behalf of Wrexham County Borough Council.

Wrexham County Borough (2003). *Wrexham Biodiversity Action Plan (Edition 2 – September 2003)*. The Planning Department, WCBC.

WCBC (2011). *Delamere Avenue, Gwersyllt – Arboricultural Implications Assessment.* Unpublished report by the Environment Department, Arboricultural Section.

WCBC (2006). *Local Planning Guidance Note 17: Trees and Development*.