

will be used to restrict access to these features. This planting will be specially designed to fulfil both landscape and access- restriction functions, and will therefore comprise thorny, thicket-forming species such as Gorse and Blackthorn in order to create impenetrable barriers (see Section 11 for details). It is intended that, for Health & Safety reasons, these barriers will be created as early in the development process as possible, in order to prevent residents from Phases 1 and 2 from accessing these areas.

- 16.10.24 In addition, the locations of viewing points across the Bog have specifically been selected with a view to minimising potential disturbance effects, with limited access instead provided to the new wetland features to be created in the former tip/containment area (this is likely to comprise a perimeter path around the area, plus viewing points/bird hides).

Treatment of Temporarily Undeveloped Areas

- 16.10.25 It has been agreed with the statutory and non-statutory consultees (Ref. Meeting of 29th November, 2004) that there will be a need to keep these areas free of significant ecological constraints to development, but that there was a desire to achieve this without precluding potential short-term ecological gains (such as providing nesting areas for lapwings, scrub for other nesting birds, and valuable habitat for reptiles).

- 16.10.26 However, given that the consultees have suggested that emerging European legislation may be an obstacle to pragmatic agreements of this nature being made, it will be necessary to develop this element of the landscape proposals with caution. For the purposes of this impact assessment, however, the worst case scenario has been assumed (i.e. that these areas will be lost), and attempts will be made as the project develops to resolve the issue for the benefit of nature conservation. However, it is probably more likely that these areas will be allowed to develop into scrub, a habitat that is unlikely to represent a significant constraint in the future, however stringent European legislation and regulation may become.

Protection, Restoration and Enhancement in Retained Areas

- 16.10.27 Given that it will not be necessary to remediate the soils in the majority of the more valuable habitats across the site (as contamination levels in these areas are generally very low), it will be important to retain and protect as much as possible of Zones 1-4 (see Figure 16.3), as well as other retained habitats within the application area.

- 16.10.28 A buffer zone, comprising a combination of dense planting and protective fencing, will be created around the edge of all retained areas of Zones 1 to 4 to help protect the important habitats. A detailed description of these barriers is provided in Section 11: Landscape. It is intended that these buffer zones are created early in the re-development of the site, not only to discourage access during the early phases, but also to provide protection from potential dust deposition associated with the earthworks operations. Other dust suppression measures, including the use of bowsters across the site to spray water on dry earth, will also be employed (and implemented through the EMP), and these are described in detail in Section 9: Air Quality. In combination, it is anticipated that these measures will ensure that sensitive habitats are not adversely affected by dust.

- 16.10.29 It will also be important to make provision for the short- and longer-term management of these retained areas, since some of their elements represent transitional habitats (which would degrade without intervention), and others require remedial management. This will be undertaken through the development and implementation

of an ecological management plan for the site that will form part of the overall Environmental Management Plan (see Section 16.10.54 below).

16.10.30 In addition, all engineering works in the vicinity of the wet woodland that comprises Zone 1, the wet woodland in Zone 4, and the wet woodland and marshy grassland along the route of the Southern Access, will be designed to ensure that the hydrological regimes in these areas are protected, and natural catchments within these areas will be re-instated (see Sections 4 and 15).

16.10.31 Opportunities exist to deliver on UKBAP commitments by extending existing areas of Priority Habitat within the refinery fence, or enhancing the value of areas of habitat that, with careful management, could attain UKBAP status. For example, much of the hillside in the centre of the application area has the potential (through targeted scrub removal) to become high quality heathland habitat, while the potential also exists to create more wet woodland around the periphery of the site as part of the site drainage and remediation proposals. Furthermore, the plans to create reedbeds as part of the remediation of surface water across the site would result in the creation of entirely new areas of UKBAP habitat.

16.10.32 Similarly, expansion, or improved management, of existing habitats could also serve to improve the value of the site for a variety of UKBAP Priority Species, in particular birds such as linnet (which will benefit from the use of Gorse in the landscape buffers), bullfinch and reed bunting (which will benefit from the extensive wetland creation proposed). Within retained areas, management will ensure that an appropriate mosaic of open grassland and scrub habitat is maintained to maximise their value for reptiles, while new wetland areas will be created specifically to benefit great crested newts. For more details on species-specific mitigation see Sections 16.10.34 to 16.10.52 below.

Site Drainage

16.10.33 Mitigation measures integrated in the Project to minimise potential adverse impacts associated with the site drainage on Protected Habitats in the Bog are discussed in Section 15 of the ES.

Species-specific Mitigation

Great Crested Newts

16.10.34 Surveys both within the site and in the surrounding areas indicate that the great crested newts occurring in the triangular pond are isolated, and possibly represent either a relict or introduced population. At present, this population is therefore vulnerable to local extinction. The creation of a more substantial, and varied, network of ponds and other wetland features, along with additional areas of potentially valuable terrestrial habitat and 'links' to other newly created or retained features throughout the site, will ensure the long-term preservation (and potentially expansion) of the population.

16.10.35 In particular, a number of new ponds, as well as extensive areas of foraging habitat, will be created in the area of the former tip/containment area. In addition, Llandarcy Bog (to the northeast of the existing contractors' yard) will also be enhanced for newts, largely through the opening up of existing overgrown ponds to create suitable breeding habitat. These two areas would be linked to each other by the heathland hillside (which will be retained and enhanced as part of the development proposals; see Zone 2 on figure 16.3) and to the habitats in the south-eastern corner of the site by the 'green corridor' (see Figure 11.10).

- 16.10.36 Newts from the existing pond will need to be captured and relocated to the new ponds. Fencing will be erected around the triangular pond during the spring, when the majority of the adult newts will be in the pond, then emerging newts will be captured in pitfall traps set alongside the fence and transported to the receptor areas. This will probably need to take place over the course of at least two years, to ensure that the whole population is moved. It will also need to be carried out under licence to the Welsh Assembly Government, with a clear justification of the reasons for removing the pond.
- 16.10.37 The longer the new ponds have to develop in advance of this translocation process the better, as it will be important to move the newts into a relatively mature habitat. Furthermore, at least one of the new ponds would need to be designed to be as similar as possible to the existing pond in order to replicate the conditions. This will be important not only for the newts but also for the rare caddis fly and for the hairy dragonfly, both of which are also known to breed in the pond. Consideration will also be given to translocating caddis fly and dragonfly larvae from the pond, or indeed seeding the new features with water extracted from the existing pond by bowser.
- 16.10.38 Measures will also be implemented to protect the newts from future mortality associated with infrastructure roads (for example, underpasses), although the relocation of the population away from the main body of the site (i.e. to the new wetlands on the site of the former containment area) would minimise the likelihood of road mortality. In the interim, measures to avoid the incidental mortality of great crested newts would need to continue to be employed in the vicinity of the triangular pond. Any activities likely to kill or injure great crested newts, or to damage or destroy their habitat (in particular, site clearance and earth works), would need to be carried out under licence to the Welsh Assembly Government, and at the time of year when the majority of newts will be in the pond (i.e. April/May).

Reptiles

- 16.10.39 Many of the most valuable areas and features for reptiles would persist within the retained areas of Zones 1-4. However, reptiles are present throughout the site, and measures to avoid their incidental mortality will need to be employed. Where necessary, individuals will be relocated to selected parts of these retained zones. Maximising the current and future value of these zones for reptiles, through targeted habitat management, will be an important element of their short- and longer-term management.
- 16.10.40 Works likely to affect reptiles do not currently need to be carried out under licence. However, there is a legal requirement to take all reasonable care to avoid the incidental mortality of reptiles, and it is recommended that works in areas of suitable habitat are undertaken during the summer months, when reptiles are active and thus able to escape. Significant impacts on reptile habitat may require areas to be fenced and individual reptiles captured and relocated; likely impacts would therefore need to be reviewed to determine where capture/ relocation exercises are necessary, and this will be implemented through the EMP.
- 16.10.41 Measures will also be implemented to protect the reptiles from future mortality associated with infrastructure roads and drainage features. This could include underpasses under roads (where appropriate), and reptile- (and newt-) friendly road drainage structures. In addition, ramps will be installed in interception trenches to allow reptiles (as well as small mammals and other species) to escape.

Birds

- 16.10.42 A significant proportion of the more important habitat for breeding birds would also be retained within Zones 1-4, and protection of these habitats from disturbance during the operational phase of the development (see Sections 16.10.27 to 16.10.32, above) will be particularly important for birds, whose breeding can readily be disrupted. However, much of the remainder of this 'mosaic' site will be lost, and this has also been found to be valuable for birds. All new landscape planting will therefore be created with a view to optimising its value for birds, and seasonal constraints will need to be placed on site clearance activities.
- 16.10.43 Wherever it is unavoidable that trees have to be felled, or areas of scrub have to be cleared, this will be undertaken outside the bird breeding season (that is, not between mid-March and mid-August), wherever possible. Where works in this season are unavoidable, the site would need to be cleared or the material cut down during the preceding winter. It is also possible that site clearance or ground remediation works could affect ground-nesting birds. For this reason, work involving the clearance of any established vegetation will need to be reviewed.
- 16.10.44 Seasonal restrictions may also be necessary and/or measures proposed to dissuade birds from nesting in the affected areas. Works associated with the construction of the Crymlyn Bog viaduct should ideally commence before the onset of the bird nesting season, so that birds that have already started breeding are not disrupted by the commencement of construction activities. As has taken place to date (during the decommissioning process), it will be necessary to review and resolve the potentially competing seasonal constraints associated with birds and reptiles on a case by case basis.
- 16.10.45 It would also be appropriate to take every opportunity to retain existing trees and scrub within the structural landscaping of any new scheme, and this is a principal component of the Landscape Strategy. In addition, any new planting schemes will be designed to be of optimum value to birds, whilst minimizing mortality 'hot-spots' on new infrastructure roads. In an attempt to mitigate the loss of breeding habitat for a range of species, developers will be encouraged, through the town code, to incorporate a bird-box scheme into their proposals, and home-owners will also be encouraged to make their gardens bird-friendly.

Bats

- 16.10.46 Specific mitigation and licence applications (to the Welsh Assembly Government) may be required before works to, or demolition of, any of the structures identified as having been used by bats, should it be confirmed that they represent roosts. A pipistrelle roost was confirmed in the derelict farm alongside the proposed Southern Access, and a licence would be required should it be necessary to demolish this building. However, it appears unlikely that any of the structures within the refinery site in which horseshoe bat droppings were recorded would be classified as roosts, given that they appeared only to represent night-feeding perches used for a short period in 2001, and that no further evidence of the species has been recorded. Nevertheless, further surveys of these structures would need to be carried out prior to any demolition works to ensure that this remains the case.
- 16.10.47 The majority of the mature trees within the application area that could support roosting bats would be retained within the landscape areas/habitat zones. However, wherever such trees would be lost (for example, within the woodland part of Zone 4 due for development), it will be necessary to carry out climbing inspections and/or emergence surveys to confirm the presence or absence of bats. This also applies to

the two trees within the corridor of the proposed Southern Access identified as being potentially suitable for roosting bats. Should bats be recorded, any felling of these trees would again need to be carried out under licence, preferably in October, when neither hibernating bats nor females with dependant young would be present. A detailed method statement for the removal of these features would need to be agreed with CCW and submitted with the licence application.

- 16.10.48 Although few features of value for roosting bats were recorded across the application area (due to the relative unsuitability of most of the buildings, and the immaturity of much of the woodland, particularly in those areas that would be developed), consideration should be given to the provision of artificial roosting and/or hibernating sites to enhance the value of the site for these protected species.
- 16.10.49 With regard to foraging, much of the best quality habitat for bats would be retained within Zones 1-4, and high quality additional habitat would be provided through the wetland creation proposed, particularly in the containment area and around the South site Reservoir. In addition, habitat 'linkages' between the retained and newly-created areas will be created (for example, the 'green corridor'), and it will be particularly important to optimise the value of these features for bats. This would involve not only creating habitats with an optimal invertebrate diversity and biomass, but also ensuring that a dark corridor is created to encourage both foraging and commuting.
- 16.10.50 Along the route of the proposed Southern Access, hedgerows will be planted alongside the road. These will not only discourage bats from flying directly across the road (encouraging them instead to fly parallel to the road, and guiding them towards favourable foraging habitats away from the road), but will also provide a valuable additional linear foraging feature.

Badgers

- 16.10.51 The results of the badger survey would need to be used to inform site clearance, remediation or demolition proposals in those areas identified as containing badger setts (i.e. in the far north and the south-east of the refinery site, and along the Southern Access). In general, work involving heavy machinery and/or excavation within 30m of a sett may require a licence, as may work involving light machinery within 20m, and work with hand tools within 10m of the nearest entrance hole of a sett. Particularly extensive or potentially disruptive operations (blasting, pile-driving etc.) at greater distances may also require a licence. Given the proximity of a sett to the proposed Southern Access (see Box 4, Figure 16.2b), it may be necessary to close this sett under licence, and replace it with an artificial structure nearby.
- 16.10.52 The need for badger-proof fencing (and, potentially, an underpass) along the proposed Southern Access will need to be reviewed, in consultation with CCW.

Ecological Monitoring and Long-term Management

- 16.10.53 Given the significant ecological constraints associated with much of the site and its surroundings, it is very important that a formal environmental management framework is established so that there is continual ecological input to all on-going and future phases of the site's re-development (including demolition, remediation, construction and subsequent operational activities). This would ensure that potential impacts on valuable habitats and species continue to be either avoided or effectively mitigated, and would also allow for the continued input of positive biodiversity enhancement measures throughout the whole development process.

- 16.10.54 A system of ecological survey, monitoring, supervision and advice has already been set in place, and this will continue to be undertaken in full consultation with, and support from, the relevant consultees, through the development of a detailed Environmental Management Plan (EMP) for the scheme. An effective relationship between the appointed developer(s) and contractor(s), the specialist ecologist, the environmental manager and the statutory and non-statutory consultees is essential to ensure that impacts continue to be monitored and minimised. Such a framework will also facilitate compliance with the Welsh Development Agency's Biodiversity Guidelines, which aim to 'guide WDA staff and its consultants towards best practice in the avoidance, minimisation and management of biodiversity impacts, and to promote positive biodiversity gains in all of their project work'.
- 16.10.55 Specialist ecological input and advice throughout the re-development process is particularly important for ensuring that legal obligations and best practice requirements are met. It will continue to be necessary, for example, to update ecological surveys, to implement measures to avoid or at least minimize the incidental mortality of reptiles during the remaining demolition, site clearance and remediation works. As has already been the case through the decommissioning of the refinery, this would involve some elements of supervision, setting limits to working areas, fencing off the most valuable features and, where necessary, carrying out translocation and relocation operations, where necessary.
- 16.10.56 During the operational phases of the development, it is envisaged that a Management Company will be established. One of the responsibilities of this organisation will be to manage the common open spaces, including the retained areas of valuable habitat, in accordance with a detailed habitat management plan. It is anticipated that an Ecology Liaison Officer will be appointed by the Developer to manage this ecological input throughout the development. This will include monitoring progress against the ecological objectives set in the management plan, and ensuring that corrective action is taken wherever objectives are not being met.
- 16.10.57 Given the scale of the site, it is likely that monitoring would focus on a photographic record of the relevant areas to ensure that large-scale habitat objectives are being achieved (such as the maintenance of valuable heathland habitat on the hillside in the centre of the site, or ensuring that the wet woodland to either side of the viaduct does not become degraded). However, more detailed monitoring of habitats and species may be required (such as monitoring the great crested newt population within the former containment area, or monitoring lichens on trees adjacent to the Southern Access viaduct), and this would need to be developed in consultation with CCW and other relevant consultees.
- 16.11 Assessment of Significance of Residual Impacts**
- 16.11.1 A summary of the ecological impact assessment for the Coed Darcy Urban Village development is presented in Table 16.5, below. The significance of the residual impacts (i.e. those remaining following mitigation) is shown in the final column of the table; this is the result of considering the value/sensitivity of the receptor and the magnitude of the impact, as shown on Table 16.3.
- 16.11.2 Overall, the careful incorporation of ecological considerations into the development of the Masterplan, the RAP, the Remediation Strategy, the Landscape Strategy and proposals for the long-term management of the site, has meant that the residual impacts are small given the considerable size of the project and the sensitivity of the ecological receptors. This is particularly important in the case of Crymlyn Bog SAC, a site of international importance for nature conservation, for which the residual impacts following mitigation would be 'negligible'.

- 16.11.3 There would be a number of residual benefits as a result of the proposals. In particular, the long-term beneficial effect on wetland habitats will be of 'slight to moderate' significance for nature conservation, with many existing water bodies being cleaned up and others created, along with other wetland habitat such as reedbed. There will also be a beneficial residual effect in the wet woodland of Zone 1; this has been classified as being of 'negligible to slight' significance.
- 16.11.4 Loss of some local habitats across the application area will be inevitable, with knock-on effects on resident species. This will result in residual impacts of 'moderate' significance on Zones 3 and 4, as well as on the scrubby grassland habitats occupying much of the refinery site. The residual adverse impact of the proposals on the heathland hillside in the centre of the site, Zone 2, will be of 'slight' significance.
- 16.11.5 With regard to species of conservation importance, the loss of so much of the scrub and species-rich grassland habitat across the site will represent a cumulative residual impact on local bird and reptile populations of 'moderate' significance. The residual impacts on great crested newts will depend on the effectiveness of the mitigation, although relocation would be expected to be successful if undertaken in accordance with best practice. An improvement in the status of the population is therefore expected as a result of the extensive wetland habitat creation proposed.
- 16.11.6 Bats are unlikely to be significantly affected by the re-development of the site, since no known roosts are to be lost, and many of the better foraging areas will be retained within the landscape design. The maintenance of habitat connectivity, through dark 'green corridors' will also allow light-sensitive bat species to access all of the more valuable areas of the site.

Table 16.5 Summary Impact Assessment Table

Ecological Receptor	Value of Receptor	Description of Potential Impacts	Mitigation Measures	Impact Magnitude after Mitigation	Significance of Residual Impacts
Crymlyn Bog SAC	International	Construction: Re-design of site drainage could result in reinstatement of natural drainage regime. Potential pollution and sedimentation of water discharging into the Bog as a result of construction activities. Potential disturbance to nesting birds. Operational: Limited increase in disturbance/damage to habitats and species from public, cats, dogs etc. Disturbance, air pollution, shading, vehicle strike etc. associated with the new bridge for the Southern Access.	Development of RAP and remediation strategy in consultation with EA and CCW. Interception trenches will prevent free-phase hydrocarbons contaminating the Bog. Diffuse discharge to replace the existing point discharge. Reed beds to be used. Water quality protection measures during construction and operational phases (see Section 15). Operational surface water drainage to be designed to maintain current discharge rates into bog. Public access to the Bog to be restricted. Viaduct for the Crymlyn Bog crossing to be 7-8m above Bog. Construction methodology for viaduct carefully designed to minimise impacts, including those on hydrology, bats reptiles and amphibians.	Negligible adverse	Negligible
Zone 1 - Wet woodland and scrub	County/Unitary Authority	Construction: No loss of habitat. Limited disturbance of nesting birds. Operational: Disturbance effects very limited due to difficult terrain and access.	Area to be retained with very restricted access to the public. Habitat to be left to bioremediate through the RAP; should lead to increases in biodiversity. Hydrological protection measures during construction and operational phases (see Sections 4 and 15).	Small/negligible benefit	Negligible/slight
Zone 2 - Heathland hillside and species-rich grassland	County/Unitary Authority	Construction: Approx 5-10% of the species-rich grassland would be lost; some effects on reptiles possible. Disturbance of nesting birds in retained habitats.	Over 90% of the area is to be retained and managed to enhance its nature conservation value (e.g. removal of birch scrub). Public access will be restricted to minimise disturbance. Site clearance will be sensitive to reptile, bird and other species issues.	Small adverse	Slight

SECTION 16 ECOLOGY AND NATURE CONSERVATION

COED DARCY URBAN VILLAGE ENVIRONMENTAL STATEMENT

Ecological Receptor	Value of Receptor	Description of Potential Impacts	Mitigation Measures	Impact Magnitude after Mitigation	Significance of Residual Impacts
		Operational: Likely increase in disturbance/damage to habitats and species in retained areas from public, cats, dogs etc.			
Zone 3 – Mosaic of oak woodland, heathland, scrub and species-rich grassland	County/Unitary Authority	Construction: Loss affecting over 50% of the habitat, including habitats of importance for invertebrates, reptiles and birds. Disturbance of nesting birds in retained habitats. Operational: Likely increase in disturbance/damage to habitats and species in retained areas from public, cats, dogs etc.	The retained areas will not need to be remediated, so there will be no loss/ disruption to the remaining habitats. Site clearance will be sensitive to reptile, bird and other species issues. Public access will be restricted to minimise disturbance.	Large adverse	Moderate
Zone 4 - Mosaic of oak/wet woodland, heathland, scrub and species-rich grassland	County/Unitary Authority	Construction: Loss affecting 20-50% of the habitat, including habitats of importance for lower plants, invertebrates, reptiles and birds. Operational: Likely increase in disturbance/damage to habitats and species in retained areas from public, cats, dogs etc.	The retained areas will not need to be remediated, so there will be no loss/ disruption to the remaining habitats. Site clearance will be sensitive to reptile, bird and other species issues. Public access will be restricted to minimise disturbance. Hydrological protection measures during construction and operational phases (see Section 15).	Medium adverse	Moderate
Zone 5 – Great crested newt pond and foraging habitat	County/Unitary Authority	Construction: Loss affecting over 50% of the existing habitat, including the breeding pond. Extensive areas of replacement habitat to be created. Operational: Significantly larger areas of breeding habitat will become available. Likely increase in mortality in retained /new areas from cats, dogs etc.	Extensive areas of replacement newt habitat to be created on the site of the former tip, including a significant increase in the amount of potential breeding habitat (in the form of new ponds). Translocation to take place over several seasons.	Depends on the success of any translocation	Depends on the success of any translocation