Welsh Government

M4 Corridor around Newport

December 2016 Environmental Statement Supplement Appendix SS10.6 Great Crested Newt Draft Mitigation Strategy

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A Introduction and Background

- A.1 This mitigation strategy sets out the proposals for the mitigation of likely effects on great crested newt during construction and subsequent operation of the new section of motorway proposed as part of the M4 Corridor around Newport (M4CaN) Scheme (the Scheme). It would form the basis of the *Great Crested Newt Method Statement* that would accompany the application to Natural Resources Wales (NRW) for a European Protected Species licence for the Scheme in due course.
- A.2 This strategy has been developed in consultation with NRW, and consultation would continue through the development of the licence method statement.

A.1 Background to Development

- A.1.1 The new section of motorway would be approximately 23 kilometres in length and would provide three lanes in both directions between Junction 29 of the M4 at Castleton and Junction 23 of the M4 at Magor. After leaving the existing M4 motorway at Junction 29, the new section of motorway would pass to the south of Duffryn before crossing the Rivers Ebbw and Usk to the south of the A48 at Newport Docks. The new section of motorway would then continue to the south of the Solutia chemical works and the Tata Steel site at Llanwern before passing to the west of Magor and re-joining the existing M4.
- A.1.2 In addition to the junctions at Castleton and Magor, two new junctions would be provided along the route of the new section of motorway at Newport Docks and at Glan Llyn.
- A.1.3 New or diverted lengths of highway, public rights of way and private means of access would be provided to replace those affected by the Scheme.
- A.1.4 The local highway network would also be realigned at ten locations and new overbridges would be constructed at Church Lane, Lighthouse Road, New Dairy Farm, Nash Road, and North Row.
- A.1.5 Road drainage would discharge into a series of water treatment areas comprising attenuation lagoons and reed beds along the new section of motorway. These water treatment areas would attenuate and treat the collected surface water prior to discharging it into existing watercourses.
- A.1.6 Approximately two thirds of the route for the proposed new section of motorway crosses the Gwent Levels. The Gwent Levels are an area of reclaimed coastal marshes adjoining the Severn Estuary and comprise the Wentlooge Levels and Caldicot Levels to the west and east of Newport respectively. The Gwent Levels are low lying with an elevation typically between 5 6 metres (m) above ordnance datum (AOD).
- A.1.7 The Gwent Levels are dissected by an extensive system of tide-locked freshwater drains, locally known as reens, which in turn are connected to a network of field ditches. The Gwent Levels are designated as a series of Sites of Special Scientific Interest (SSSIs). In addition, the River Usk is designated nationally and internationally for its nature conservation value. At the location of the proposed crossing, the river is designated as a SSSI and Special Area of Conservation (SAC).

Proposed Construction Schedule

- A.1.8 The proposed construction schedule for the Scheme would commence in July 2018 with the construction of the haul road and other enabling works, including preconstruction works described in this mitigation strategy. The main construction programme would commence late 2018.
- A.1.9 It is anticipated that construction works would be completed in autumn 2021.
- A.1.10 Following on from construction, there would be a five-year maintenance period under the contract to summer 2028.

A.2 Proposed Works on Site including those to be Covered by a Licence

- A.2.1 This mitigation strategy relates to the construction works listed below, which could result in an impact on great crested newts:
 - Infilling of watercourses and other waterbodies.
 - Construction of culverts on reens and main watercourses.
 - Site clearance/stripping of topsoil.
 - Establishment of temporary works compounds.
 - Establishment of temporary storage areas (equipment, vehicles, materials including soil etc.).
 - Construction of temporary batching plants.
 - Excavation of temporary borrow pits.
 - Construction of Water Treatment Areas (temporary and permanent).
 - Construction of drainage systems.
 - Construction of temporary access roads (construction).
 - Construction of access/slip roads (permanent).
 - Construction of overbridges.
 - Construction of the new section of motorway.
 - Construction and operational lighting.

A.3 Actions Requiring a Licence

- A.3.1 A European Protected Species licence for great crested newts is required from NRW to disturb, capture (using pitfall traps, refugia and hand searches), handle and translocate great crested newts, and damage, disturb and clear terrestrial habitat of potential and/or known value to great crested newts (predominantly woodland, hedgerows, scrub and rough grass areas including rough grass banks of watercourses/ waterbodies).
- A.3.2 Results of great crested newt surveys undertaken in 2014-2016 confirm the presence of great crested newts within the survey area to the east of the River Usk. Results of the surveys are provided in the survey reports at Annexes 1-3 and summarised in section B below.

- A.3.3 Mitigation measures would be carried out under the instruction and, where necessary, the supervision of an appropriately qualified and experienced ecologist(s), who would be named on the NRW licence. The following actions that would require licencing are proposed in order to help prevent injury, death or significant disturbance of great crested newts:
 - Installation of amphibian exclusion and drift fencing.
 - Trapping and translocation of great crested newts within amphibian fenced areas prior to the clearance of habitat and construction works inside the fence line in order to capture and relocate any great crested newts to appropriate receptor areas outside the construction area.
 - Destructive searches of features of high potential value to hibernating or resting great crested newts, prior to the commencement of the hibernation period and construction.
 - Clearance of vegetation of potential value to great crested newts.
 - Draining down of watercourses and the trapping and translocation of great crested newts from drained watercourses to appropriate pre-prepared receptor sites.
 - Installation of culverts in watercourses.
 - Maintenance of exclusion fencing throughout the construction phase in order to prevent great crested newts from entering working areas and becoming injured or killed as a result of construction.
 - Careful removal of fencing following the completion of construction and any postconstruction works that could result in injury or death of any great crested newts that could be present, including vehicle movements.

B Survey and Site Assessment

B.1 Existing information on Great Crested Newts at the Survey Site

- B.1.1 Records of great crested newts provided by the South East Wales Biodiversity Records Centre (SEWBReC) confirmed the historic presence of great crested newts in ponds at Solutia and Marshfield (approximately 2 km south of the Scheme). Results of the desk study are shown on Figure 1.
- B.1.2 Records of a large population of great crested newts at Ifton Quarry to the east of the Scheme were provided by Hanson Aggregates based on surveys of ponds at and within 500 m of the quarry undertaken by SLR Consulting in 2015.

B.2 Statutory Sites Notified for the Species (SSSIs and SACs) within 10 km

B.3.1 There are no statutory designated sites designated for the presence of great crested newt within 10 km of the Scheme.

B.3 Objectives of the 2014-2016 Surveys

- B.3.1 Great crested newt surveys were undertaken along the route of the new section of motorway by Arup in 2014 (Annex 1). The objectives of these surveys were to:
 - establish whether great crested newts were present in the water bodies included within the survey;
 - provide information on the existing ecological conditions with regards to suitability for great crested newts;
 - identify potential constraints and opportunities that great crested newts may pose to development; and
 - identify further surveys that may be required in order to ensure that great crested newts are fully considered within the development.
- B.3.2 The objectives of the 2015 eDNA survey, reported at Annex 2, were to:
 - inspect water bodies in the survey area in order to assess their suitability for eDNA surveys;
 - determine great crested newt presence or likely absence from water bodies using the eDNA analysis technique; and
 - if great crested newts are found to be present, identify whether or not further surveys would be required in order to determine the size of the great crested newt population.
- B.3.3 The objectives of the 2016 surveys, reported at Annex 3, were to:
 - identify presence/likely absence of great crested newts in waterbodies within 250 m of those watercourses where positive eDNA samples were obtained in 2015 or within 250 m of locations where great crested newts were recorded on land in 2015;

- provide population estimates for great crested newt populations recorded; and
- inform this mitigation strategy and in due course the method statement to accompany the European Protected Species licence application.

B.4 Scaled Plan/Map of the Survey Area

B.4.1 The survey areas for the 2014, 2015 and 2016 surveys are provided in the survey reports at Annexes 1, 2 and 3 respectively. The positive great crested newt records from the surveys are shown on Figure 2.

B.5 Site / Habitat Description

B.5.1 Results of a Phase 1 habitat survey of the route of the new section of motorway and a 250 m wide surrounding area are shown on Figure 3. The survey confirmed that the area either side of the route through the Gwent Levels, outside urban areas, largely comprised agricultural fields (mainly pasture, with some arable land) bordered by reens and field ditches and a network of hedgerows. Scattered ponds and parcels of woodland of various sizes were also recorded across the survey area.

B.6 Field Surveys

2014 and 2015 Surveys

- B.6.1 Results of the field surveys for great crested newts undertaken in 2014 and 2015 are reported at Appendices 10.6 and 10.21 of the Environmental Statement (ES) for the M4CaN Scheme and Annexes 1 and 2 of this Draft Method Statement. The results of the surveys are summarised below and positive records of great crested newt are shown on Figure 2.
- B.6.2 The 2014 survey was undertaken between 24 April 2014 and 29 May 2014 and covered the physical extent of the development proposal as outlined in 2007/2008 plus a 500 m surrounding buffer zone.
- **B.6.3** Initial Habitat Suitability Index (HSI) assessments of water bodies within the 2014 survey area that could be assessed from roads and public rights of way were undertaken during February 2014, prior to issuing Notices of Intention to Enter Land under the Highways Act 1980. These assessments were undertaken using an adapted form of the methodology set out in Advice Note 5 published by the Amphibian and Reptile Group UK (Amphibian and Reptile Group UK, 2010). The HSI methodology was originally developed in order to assess ponds and similar waterbodies and, therefore, was adapted so as to make it more relevant to the reens and other watercourses found across the Gwent Levels, i.e. factors relating to waterfowl and pond densities were removed from the assessment methodology. This adaptation of the methodology was discussed in advance with NRW.
- B.6.4 Results of the HSI assessments were used to identify water bodies considered to have average or better than average suitability for great crested newts. These water bodies were then selected for presence/absence surveys where permission to survey was granted by land owners
- B.6.5 Presence/absence surveys were carried out according to the guidance provided in the *Great Crested Newt Mitigation Guidelines* (English Nature, 2001). Appropriate methods

were used unless site-specific limitations were identified. Access constraints prevented surveys off all watercourses and, therefore, the survey report recommended that surveys of remaining waterbodies be undertaken in 2015.

- B.6.6 Later in 2014, as part of the Extended Phase 1 Habitat Survey (Appendix 10.2 to the ES), a total of 409 waterbodies were identified as of average or above average suitability for great crested newts. Due to the number of waterbodies to be surveyed, it was agreed with NRW that an environmental DNA (eDNA) test for great crested newts would be undertaken in 2015 in order to identify presence/absence.
- B.6.7 Since the proposed route was more closely defined by 2015, a 250 m survey area around the proposed new motorway was chosen instead of the 500 m survey area used by Arup.
- B.6.8 In determining the extent of the survey area, guidance produced by English Nature (now Natural England) and the Highways Agency (in the form of the Highways Agency Design Manual for Roads and Bridges) was consulted. English Nature's Great crested newt mitigation guidelines (2001) explain (4.2) that:

"Great crested newts have been found to move over considerable distances (up to 1.3km from breeding sites). However, the vast majority of newts will inhabit an area much closer to the pond, and the exact distribution and migration patterns of newts on land depends on a variety of factors. The quality of terrestrial habitat near to breeding ponds is important, as are the lack of barriers to dispersal (such as fast-flowing rivers, or very busy roads). The distribution of ponds and hibernation opportunities may also influence movements. Only detailed survey at a given site will reveal the direction and amount of dispersal that occurs. Several studies have been conducted which reveal a great deal of variation, but great crested newts commonly move between ponds that are within around 250m of each other."

B.6.9 A 2003 assessment carried out by English Nature (English Nature 2003) found that in terrestrial captures of great crested newts (5.4.7b):

" by far the most captures were recorded within 50m of ponds and few animals were captured at distances greater than 100m."

B.6.10 Advice in this publication relating to mitigation works for great crested newts suggests that (6.1):

"The most comprehensive mitigation, in relation to avoiding disturbance, killing, or injury is appropriate within approximately 50m of a breeding pond. It will almost always be necessary actively to capture newts 50-100m away. However, at distances greater than 100m, there should be careful consideration as to whether attempts to capture newts are necessary or the most effective option to avoid incidental mortality... At distances greater than 200-250m, capture operations will hardly ever be appropriate.

B.6.11 The Highways Agency Design Manual for Roads and Bridges Volume 10 Section 4 Part 6 Nature Conservation Management Advice in Relation to Amphibians provides similar advice in relation to amphibian movements (4.2):

> "In general amphibians live at the edge of, or away from water features during most of the year (mostly within 250 metres, but sometimes to greater distances in excess of 500 metres). This varies between species and according to the habitat types available. Though the majority limit their movements to distances up to 1.2 km, each year a small number of amphibians may move a distance in excess of 1.5 km to reach adjoining

breeding sites. This process facilitates vital genetic exchange between breeding colonies and can help to maintain healthy amphibian populations."

- B.6.12 Thus great crested newts spend a large proportion of their time in terrestrial habitats, and will move considerable distances (recorded to be in excess of 500m, although more frequently up to 250m) from breeding ponds to seek suitable habitats for foraging, shelter and hibernation. Thus 250m from the Scheme was considered to be an appropriate extent for the survey.
- B.6.13 The collection of eDNA samples followed the guidance for sampling procedures provided in the Analytical and Methodological Development for improved Surveillance of the Great Crested Newt (Biggs et al., 2014).

2016 Presence/Absence Survey

- B.6.14 In 2016 presence/absence survey of the waterbodies and/or eDNA surveys of the following watercourses were carried out as follows (and as shown in the survey report at Annex 3):
 - Presence/absence surveys of waterbodies where eDNA analysis in 2015 identified the presence of great crested newts;
 - Presence/absence surveys of waterbodies within 250 m of waterbodies where eDNA analysis in 2015 identified the presence of great crested newts;
 - Presence/absence surveys of waterbodies located within 250 m of the location where great crested newts were recorded on land within the Tata Steel site;
 - eDNA analysis of waterbodies located elsewhere within the boundaries of the Tata Steel site; and
 - eDNA analysis of waterbodies not surveyed in 2015 (namely waterbodies located on Tata Steel land; adjacent to the M4 to the north of Undy; and within Marshall's land on the eastern bank of the River Usk).
- B.6.15 Presence/absence surveys were carried out as described below and in accordance with best practice guidelines published in the *Great Crested Newt Mitigation Guidelines* (English Nature, 2001). eDNA surveys were undertaken in accordance with the methodology described by Biggs *et al.* (2014).
- **B.6.16** Of the 143 watercourses located within the survey areas:
 - 77 were identified as of potential value to great crested newts;
 - 57 were unsuitable for great crested newts at the time of the survey; and
 - 9 were unsuitable for survey due to a lack of safe access.
- B.6.17 The choice of the eDNA survey technique was made after discussion with NRW. At a Hyder/NRW meeting on 30th January 2015 Hyder explained that a minimum of 327 water bodies had been identified in 2014 as potentially suitable for GCN through Habitat Suitability Index (HSI) surveys, and this did not include those areas of the route corridor that were not accessible. Carrying out four GCN survey visits at each of these locations (possibly in excess of 500 water bodies once the areas not previously accessed are included) would be extremely onerous and costly. It was therefore agreed that a more pragmatic approach could be investigated.

- B.6.18 A discussion was held regarding the most suitable approach. This could either involve wholesale use of eDNA sampling across the scheme (which simply involves taking one water sample during the breeding season to confirm presence or absence), or a sampling approach (whereby GCN surveys would be focussed on key clusters of the most suitable ponds along the route), or some combination of these approaches.
- B.6.19 NRW would need to check with species specialists as to whether the eDNA approach would be acceptable. It was agreed that it is unlikely that significant populations of GCN are likely to be present (given the existing understanding of the species' distribution in the area), and that the simple presence/ absence survey provided by eDNA studies would be appropriate to inform the impact assessment. The intention would then be that any water bodies where GCN presence was confirmed in the spring 2015 survey (note that none were confirmed in 2014) should be surveyed in detail in 2016 to inform any licence application that may be required. Again, this approach would need to be confirmed by NRW. It was agreed that whichever survey approach was adopted, the water bodies to be surveyed could be targeted on those within 250m of the footprint of the proposed scheme. Should the eDNA route be deemed acceptable, the surveys could then be carried out once the alignment had been fixed. If the eDNA method was not considered appropriate, the time constraint would be more significant, as the surveys would need to commence in early April, potentially before the alignment was fixed.
- B.6.20 NRW subsequently issued guidance on 'The use of environmental DNA test for Great crested newt licensing purposes' which confirmed that Natural Resources Wales (NRW) will accept eDNA test results as evidence of presence or absence of GCN for licence purposes.
- B.6.21 In the context of the above recommendations and the NRW guidance, RPS proposed to undertake further survey of waterbodies using the eDNA technique in areas which fall within 250m of the scheme where the Arup Habitat Suitability Index assessments identified a number of waterbodies of average or higher suitability to investigate presence/absence of the species. In any areas where great crested newt presence is indicated by the eDNA technique, population assessment would be carried out by conventional survey techniques to inform any European Protected Species application.
- **B.6.22** Use of the eDNA technique was agreed with NRW at a meeting on 9th April 2015.
- B.6.23 As set out in section B7, in 2016 great crested newt DNA was detected at the same locations as in 2015. In addition, great crested newt eDNA was detected at one location where not previously detected. This was a watercourse adjacent to the location where three individual great crested newts were found underneath reptile survey mats during the 2015 Reptile Survey. This consistency in survey findings between surveys carried out in successive years provides considerable confidence in the suitability of the eDNA method in this environment.

B.7 Survey Results

- B.7.1 No great crested newts were located during the 2014 presence/absence survey. However, results of the eDNA analysis in 2015 identified the presence of great crested newts in four watercourses shown on Figure 2.
- B.7.2 None of the water bodies found to support great crested newts were located within the footprint of the new section of motorway but all were located within 250 m of it.

- B.7.3 Great crested newts were observed in terrestrial habitat on three occasions during a reptile survey of the Tata Steelworks site to the south of Queen's Way (A4810) in 2015, as shown on Figure 2. Sightings were of a female great crested newt, recorded on one occasion, and juveniles recorded on two occasions.
- B.7.4 In 2016 positive eDNA samples were recorded for five watercourses as shown on Figure 2. In addition to the watercourses where positive results of eDNA analysis were recorded in 2015, a positive eDNA result was recorded for the watercourse located immediately to the north of the site on Tata Steel land where great crested newts were recorded on land in 2015.

B.8 Interpretation / Evaluation of Survey Results

- B.8.1 Results of the eDNA analysis and incidental sightings recorded during 2015 confirmed the presence of great crested newts in five locations over a relatively restricted section of the M4CaN survey corridor to the east of the River Usk, as shown on Figure 2.
- B.8.2 The following constraints were encountered during the 2016 survey, which prevented a survey of all the watercourses in the survey area:
 - dense emergent and bank vegetation preventing access to the watercourse;
 - hedge preventing access;
 - dense floating vegetation preventing torchlight surveys;
 - high turbidity preventing torchlight surveys;
 - high water levels preventing bottle trapping;
 - steep banks preventing access to bottle trap, egg search and net; and
 - presence of water shrew preventing bottle trapping of all watercourses.
- B.8.3 Recognising these constraints, in order to increase the likelihood of identifying the presence of breeding great crested newt, egg-laying strips were placed throughout all safely accessible watercourses at intervals of 10 m at each of the survey locations. Where sections of watercourse were not accessible, then egg laying strips were concentrated in areas that were accessible.
- B.8.4 The *Great Crested Newt Mitigation Guidelines* (English Nature, 2001) suggest a population size estimate can be calculated utilising the maximum count of newts recorded on any one survey visit and using a single survey method. A small population size could be inferred by a count of <10 newts, a medium size from a count of between 11 and 100, and a large size from a count of >100.
- B.8.5 No great crested newts were recorded during the 2016 presence absence survey and, therefore, no population size estimate could be deduced based on the English Nature (2001) methodology. However, as described above, the survey was subject to a range of constraints. Taking into account the limited number of watercourses where great crested newt eDNA was recorded in 2015 and 2016, and the absence of other signs of great crested newt activity (i.e. no positive results from egg strips or sightings during torchlight surveys), it is considered likely that the populations are small and have restricted ranges. However, as a precautionary measure, this mitigation strategy assumes the populations to be up to medium size. This precautionary approach was agreed with NRW during a consultation meeting held on the 21 June 2016.

Pre-construction Surveys

B.8.6 Taking into account the mobile nature of great crested newts, in order to inform the final Great Crested Newt Method Statement and NRW licence application, a repeat of the eDNA sampling assessment will be undertaken in 2017 in order to determine the presence or likely absence of great crested newts. The survey will cover watercourses located along the Scheme and within a 100 m buffer zone that are also located within 500 m of a watercourse/location on land where positive records of eDNA have been recorded to date.

C Impact Assessment - potential impact of proposed works in the *absence* of mitigation/compensation

C.1 Short-term Impacts: Disturbance

- C.1.1 Works would result in the potential short-term disturbance of great crested newts as a result of an increase in noise and vibration during construction. The potential effects of light spill from construction compounds would be minimised by design of lighting to minimise light spill outside the compound areas. Normal weekday working hours would normally be 0700 to 1900 so lighting would only be required during the winter months when great crested newts would not be active.
- C.1.2 The movement of great crested newts between waterbodies and terrestrial habitat could be temporarily obstructed by construction works and, should access to breeding sites be affected, breeding success could be also be impacted upon during the construction phase.
- C.1.3 There is the potential for great crested newts to enter working areas and become trapped in excavations (as well as the potential for injuries and fatalities to occur in the construction areas).
- C.1.4 Temporary short-term impacts on habitats of value to great crested newts by run-off of pollutants and dust deposition could also occur during the construction period.

C.2 Long-term Impacts: Site Modification

C.2.1 The junction and link road across the Tata Steel site would be lit during the operational phase of the scheme (as shown on Figure 2). Lighting columns would be located alongside the reen where positive results from the eDNA analysis were recorded in 2016. Lighting could have an effect on the behaviour of newts on land as well as in water, e.g. newts could abandon lit areas in favour of more sheltered areas where the risk of predation may be reduced. Should these lit areas be favoured breeding sites, this could potentially affecting breeding success. However, lighting would be designed to modern standards minimising light spill outside the carriageway which, therefore, would mitigate potential effects on great crested newts.

C.3 Long-term Impacts: Site Loss

- C.3.1 A total of 2568 m of reens and 9136 m of field ditches would be infilled or culverted during the construction of the new section of motorway as described in *Chapter 16: Road Drainage and the Water Environment* and in the *Reen Mitigation Strategy* (Appendix 2.3 of the ES). The Gwent Levels as a whole contain a total of some 229 km of reens (including main rivers) and 1400 km of field ditches. The extent of loss or culverting thus amounts to some 1.1% of reens and 0.6% of field ditches.
- C.3.2 One watercourse (within the Tata Steel site) from which positive eDNA samples were obtained in 2016 would be lost during construction. All remaining watercourses from which positive eDNA samples were recorded, would be retained.

- C.3.3 The development would also result in the loss of terrestrial habitat of potential value to great crested newts, including bank-side rough grass margins, hedgerows, scrub and wooded areas near to watercourses known to support great crested newts as follows:
 - Area A (Figure 2a): Results of the eDNA surveys undertaken in 2015 and 2016 indicate the likely breeding site for the population of great crested newts in Area A is located to the south of the new section of motorway and, therefore, would not be lost to development. However, as shown on Figure 2a, the new section of motorway would be located within 250 m of this watercourse and, therefore, waterbodies and terrestrial habitat (hedgerows and rough grass margins) of potential use to great crested newts that are located within 250 m of the new road would be lost to the development.
 - Area B (Figure 2b): The watercourse and terrestrial habitat within the Tata Steelworks site, where great crested newts were recorded in 2015 and 2016, would be lost to development, as well as other habitats of potential value to newts within the immediately surrounding area (i.e. aquatic habitats, including reed beds and open waterbodies, and terrestrial habitats including areas of dense scrub, hedgerows and rough grass areas).
 - Area C (Figure 2b): The watercourse from which positive eDNA results were obtained is located to the south of the proposed new section of motorway and, therefore, would not be lost to development. However, as shown on Figure 2b, the new road would be located within 250 m of this watercourse and, therefore, waterbodies and terrestrial habitat of potential use to great crested newts located within 250 m of the new road (i.e. primarily rough grass field margins, bankside habitat along watercourses and hedgerows) would be lost to the development.
 - Areas D and E (Figure 2c): The watercourses from which positive results of eDNA results were obtained are located to the north of the proposed new section of motorway and, therefore, would not be lost to development. As shown in Figure 2c, the new road would be located within 250 m of these watercourse; however, it is considered that the presence of Queen's Way between the new road and the watercourses where newts have been recorded, already presents a considerable barrier to the movement of newts and, therefore, the likelihood of a significant impact of habitat loss to newts in this area would be minimal.
- C.3.4 The extent of habitat loss within survey areas A, B, C and D would be as set out in Table 1.

Habitat	Area A	Area B	Area C	Area D	Total
Broad leaved plantation woodland		0.98 ha	1.24 ha		2.22 ha
Broad leaved semi-natural woodland		0.08 ha		0.03 ha	0.11 ha
Mixed semi-natural woodland		0.01 ha			0.01 ha
Total area of woodland to be lost		1.07 ha	1.24 ha	0.03 ha	
Scrub dense continuous		13.05 ha		0.72 ha	13.25 ha
Scrub scattered		19.81 ha	0.51 ha		20.32 ha
Total area of scrub to be lost (considering the entire Tata Steelworks site to the south of		32.86 ha	0.51 ha	0.72 ha	

Table 1: Habitat loss within great crested newt survey areas A, B, C and D.

Habitat	Area A	Area B	Area C	Area D	Total
Queen's Way)					
Improved grassland			0.97 ha	4.36 ha	5.33 ha
Poor semi-improved grassland		7.03 ha			7.03 ha
Semi-improved neutral grassland	2.71 ha	7.84 ha	0.14 ha	1.49 ha	12.18 ha
Unimproved neutral grassland		1.42 ha			1.42 ha
Marsh/marshy grassland		1.88 ha		0.34 ha	2.22 ha
Marginal/inundation		0.07 ha			0.07 ha
Swamp		5.79 ha		0.01 ha	5.80 ha
Tall ruderal	0.07 ha	1.95 ha		0.16 ha	2.18 ha
Total area of grassland to be lost	2.78 ha	25.98 h a	1.11 ha	6.36 ha	
G2 - watercourse	486 m	3904 m	266 m	731 m	5387 m
Dry ditch	176 m	1263 m			1439 m
Total length of watercourses (incl.	486 m	3904 m	266 m	731 m	
dry ditches) to be lost	(662 m)	(5167 m)			
Intact Hedge (Species Rich)	26 m	705 m			731 m
Intact Hedge (Species Poor)	19 m	65 m			84 m
Defunct Hedge (Species Poor)	50 m	418 m			468 m
Hedge and Trees (Species Rich)	45 m	281 m		61 m	387 m
Hedge and Trees (Species Poor)	422 m	794 m		459 m	1675 m
Total length of hedgerows to be lost	562 m	2263 m		520 m	

C.4 Long-term Impacts: Fragmentation and Isolation

- C.4.1 The Scheme would result in the creation of a barrier to the movement of great crested newts between habitats to the north and south of the new section of motorway, which could result in reductions in home ranges and/or adversely affect dispersal patterns, which in turn could impact upon a population's viability.
- C.4.2 However, with regard to:
 - Area A (Figure 2a) the watercourse where positive eDNA records were recorded is located to the south of the proposed new section of motorway and access to the Gwent Levels to the south of this watercourse would retained, thereby reducing the potential impact of fragmentation.
 - Area B (Figure 2b) the watercourse where positive eDNA records were reported and alongside which newts were recorded on land in 2015, would be lost due to construction. However, access to terrestrial and aquatic habitat to the north of the proposed new section of motorway within the Tata Steel site would be retained.
 - Area C (Figure 2b) the watercourse where positive eDNA records were reported is located to the south of the proposed new section of motorway and access to the Gwent Levels and a good hedgerow network would be maintained, thereby minimising any fragmentation impact.
 - Areas D and E (Figure 2c) the watercourses where positive eDNA records were reported are located to the north of Queen's Way, which already provides a considerable barrier to the movement of newts to the south and towards the proposed new section of the motorway. Access to areas of dense scrub, rough

grass and hedgerows around these watercourses would be maintained and, therefore, the impact of fragmentation in this area would be minimised.

C.5 **Post-development Interference Impacts**

- C.5.1 Pollution impacts during the operational phase could have an adverse effect on watercourses utilised by great crested newts.
- C.5.2 The new section of motorway would be lit at junctions, which would include the Glan Llyn junction in the central part of the Tata Steel site (Figure 2). Lighting could affect the movement and breeding activity of newts. Lighting would be designed to modern standards minimising light spill outside the carriageway and this would mitigate potential effects on great crested newts.
- C.5.3 Amphibians will cross roads and there is a risk of great crested newt traffic casualties.

C.6 Predicted Scale of Impact

- C.6.1 Favourable conservation status is defined in the Habitats and Species Directive (Article 1(i)); as when:
 - "population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats, and
 - the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
 - there is, or would probably continue to be, a sufficiently large habitat to maintain its populations on a long term basis."
- C.6.2 Taking into account the results of great crested newt surveys, the location and extent of the new section of motorway and the potential for habitat loss and severance, in the short-term and without mitigation, the conservation status of great crested newt populations could be significantly affected.
- C.6.3 Considering the limited number of great crested newt populations recorded in the survey area and the apparently limited size of each population (i.e. based on the number of waterbodies where positive great crested newt eDNA results have been recorded), any adverse impact on great crested newts could be of county-level significance.
- C.6.4 However, with mitigation measures described below, the impact would likely be of a temporary (short-term) minor adverse significance at a local level, which would not have a significant effect on the great crested newt conservation status, primarily due to the fact that measures would be set in place to minimise the likelihood of harm and help ensure that great crested newts located within the construction area are translocated to adjacent appropriate habitat areas with open access to breeding sites.

D Delivery Information – Mitigation, Compensation and Monitoring

- D.1 The works described in this section would be carried out under an NRW issued great crested newt European Protected Species licence. No licensable works would commence until the licence has been issued by NRW. Licenced works would be completed by or carried out under the on-site supervision of the great crested newt licenced ecologists named on the NRW licence application.
- D.2 Health and safety measures relating to all works described in this section and the licence method statement would be the primary responsibility of the Contractor. The great crested licenced ecologist(s) would produce a risk assessment which recognises and addresses as a minimum the potential risks from the following issues:
 - risk of slips, trips, falls and other dangers from accidents at the site;
 - risks associated with working near water-bodies;
 - risks associated with the use of machinery, including mowers, brush-cutters and other management machinery;
 - risks associated with use of chemicals including (but not limited to) herbicides; and
 - risks of management activities upon any populations of protected species (particularly great crested newts, but also recognising the potential for others to occur, as appropriate).
- D.3 In addition, the biosecurity risk assessment and safe system of works attached at Annex 4 would be signed and adhered to by the Contractor and ecologists. The documents would be up-dated as necessary in response to changing site conditions and/or requirements.

D.1 GCN Capture and Exclusion

D.1.1 Taking into account the results of the 2014, 2015 and 2016 surveys (Annexes 1, 2 and 3) the following measures would be undertaken in advance of construction in order to capture any great crested newts that might be located in working areas and relocate them to suitable receptor sites outside working areas.

Installation of Temporary Culverts

- D.1.2 In order to gain access for the construction of the haul road and to undertake other enabling works, temporary culverts (up to 12 m in length) would be installed in watercourses along the route of the new road from July 2018.
- D.1.3 Prior to the installation of the temporary culverts, the ECoW and/or an ecologist named on the NRW licence would survey the locations where culverts would be installed in order identify any potential constraints, e.g. potential amphibian resting sites such as log piles or accessible root networks, or other species issues such as water vole burrows.
- D.1.4 Results of this pre-installation ecology survey would be reported to the Contractor and NRW by the ECoW and would inform the final culvert installation methodology. Methods detailed in any other protected species licences or method statements would be taken fully into account (i.e. the NRW hazel dormouse and bat licences, the *Water*

Vole Method Statement and measures described under *Other Protected Species* below). The Contractor would amend method statements as advised by the ecologist.

D.1.5 Should features of potential value to newts be located during the survey, reasonable avoidance measures would be set in place so as to help ensure the protection of newts during the installation of the temporary culvert. These measures are detailed under *Destruction of existing habitat* below.

Method of Newt Exclusion

- D.1.6 Great crested newts would be excluded from entering the works area by the use of purpose built exclusion fencing or a half pipe method.
- D.1.7 Specifications for fencing and half pipe barriers are provided at Annex 5. The final method of exclusion would be agreed in advance with NRW and may vary depending on location and site conditions.
- D.1.8 Consideration would also be given to use of semi-permanent newt fencing in areas where the fencing would be in place for the full duration of the construction works, or in particularly exposed locations.

Installation of Exclusion Fencing / Half Pipe Barrier

- D.1.9 Prior to the installation of exclusion fencing/half pipe barriers, the ECoW and/or an ecologist named on the NRW licence would survey the proposed line of the fence/half pipe in order identify any potential constraints, e.g. potential amphibian resting sites or other species issues such as water vole burrows. Hedgerows, scrub and areas of rough grassland are of potential value to newts and, therefore, these would be recorded along the route.
- D.1.10 As described above for the installation of temporary culverts, results of this preinstallation ecology survey would be reported to the Contractor by the ECoW and would inform the final installation methodology. Requirements of any other protected species licences or method statements (other protect species licence or method statement requirements (i.e. the NRW hazel dormouse and bat licences, the *Water Vole Method Statement* and measures described under *Other Protected Species* below) would also be taken fully into account. The Contractor would amend method statements as advised by the ecologist.
- D.1.11 The method of clearance of vegetation and other features of potential value to newts would be include reasonable avoidance measures to help minimise the potential for newt injury or fatality, as described under *Destruction of existing habitat* below.
- D.1.12 Once the ecologist or ECoW has confirmed areas are clear of ecology constraints, newt exclusion and drift fencing and half pipe barriers would then be installed under the watching brief of the licenced ecologist. Installation would be carried out by hand, although below-ground channels into which fencing or pipes would be inserted would be created using low ground-pressure machinery.
- D.1.13 With regard to fencing, fFence posts would be installed inside the site boundary so as to enable any newts that might be located within the construction site to climb over the fence and leave the site using the fence posts as ladders but to prevent newts from climbing over the fence into the site.

- D.1.14 Should exclusion fencing need to be installed immediately adjacent to stock fencing, the newt exclusion fencing would be buried at an increased depth of 500 mm since a below-ground turn back would not be possible.
- D.1.15 Where grazing is required, stock fencing or temporary electric fencing would be installed around the exclusion fence or half pipe so as to prevent stock from entering the fenced areas and/or damaging the fencing or half pipe.
- D.1.16 The half pipe would be installed with the back of the pipe facing the works area, so as to enable newts to climb over this to leave the area.
- D.1.17 Traps would be installed along the fence or half pipe line as described under *Trapping* below.
- D.1.18 Access for contractors would be via clearly defined routes that would be agreed in advance with the ECoW.

Location of Exclusion Fencing / Half Pipe Barrier

- D.1.19 The exclusion fencing or half pipe would be installed around working areas located within 250 m of any watercourse or area where great crested newts were recorded during the 2015 and 2016 surveys (as shown on Figure 2). In addition, due to the potential value of terrestrial habitat within the Tata Steelworks site, fencing or the half pipe barrier would also be installed along the boundaries of the works area in the Tata Steelworks site to the east of Monks Ditch as shown on Figure 2.
- D.1.20 Due to the potential value of scrub and hedgerows to newts, newt fencing would also be installed through areas of dense scrub and across hedgerows located inside the working area. This internal drift fencing would be installed in large crosses within the scrub or at approximate right angles across hedgerows and would extend approximately 2 m into open grassland areas either side of the scrub or at hedge inside the exclusion fence line in order to help intercept any newts moving through the area.
- D.1.21 Watercourses would be excluded from the fence or half pipe barrier as shown in Text Figure 1 below; however, fencing or the half pipe barrier would be installed as close to the edge of the watercourse as practicable.

Text Figure 1: Installation of exclusion fencing/half pipe along the banks of a watercourse



Removable section of amphibian exclusion fencing / suitable alternative, such as a grid covered gully to enable the movement of vehicles but prevent newts from entering the works corridor. The final solution, to be agreed with NRW, would be dependent on ground conditions.

Aquatic habitat

D.1.22 Watercourses would remain outside the line of the exclusion fencing or half pipe barrier until they have been bunded prior to pumping dry. Once bunded, additional sections of exclusion fencing/half pipes would be installed across the bunds in order to connect to adjacent sections of fencing/half pipe.

Access

Construction site access

- D.1.23 Any section of newt fence or half pipe barrier installed alongside the banks of a watercourse could have a removable section that could be lifted out of the way/dropped at the start of the construction day so as to enable construction traffic to access the site. This removable section would then be reinstated across the gap in the fence line at the end of the working day in order to prevent newts from entering working areas overnight. If no access is required to that section of the route on any one day, the fence would be retained *in situ*.
- D.1.24 An alternative solution could be the installation of a structure similar to a cattle grid, which would allow vehicles to drive across the grid but would prevent the movement of newts. The structure could comprise a shallow metal trough (e.g. approximately 5-7 cm deep) profiled so as to enable any great crested newt that might fall into the trough to escape into unfenced areas but not adjacent fenced areas (e.g. the edge closest to unfenced watercourses could be gently sloped for escape, and the edge closest to the fenced construction corridor could have an overhanging lip to prevent escape).
- D.1.25 The final solution for vehicle access across the newt fence/half pipe barrier would be determined on a site-by-site basis and would take into account ground conditions. The solution would be agreed in advance with NRW.
- D.1.26 Detailed drawings and specifications for fencing/half pipe arrangements, including locations, would be included in the Method Statement which would accompany the licence application.

Public access

Farm access

- D.1.27 It may be necessary to provide farm access across some fence lines in advance of the construction period. Should this be necessary, the locations of access points would be agreed in advance between the farmer, Contractor and great crested newt licenced ecologist. The locations would be confirmed with NRW. Where practicable, access points along the exclusion fence/half pipe barrier would be located in central parts of fields (i.e. away from field boundary habitats including watercourses and hedgerows, of relatively greater potential value to great crested newts). Gaps in fencing or along the half pipe barrier would be kept to the minimum required size. In order to prevent great crested newts from entering the working areas via these access gaps, measures would be set in place to enable them to be closed when not in use. Such measures may include:
 - removable newt exclusion fence panels or heavy duty plastic panels positioned across access gaps, which can flex under the weight of vehicles and then spring back, which at the end of each working day can be resealed tightly against adjacent fence posts so as to prevent gaps at the joins; or

- excavation of cattle grid structures, or shallow troughs/installation of metal troughs (approximately 5-7 cm deep) across access gaps, which would be profiled so as to enable any great crested newts that may fall into the troughs to escape into unfenced areas but not into adjacent fenced areas (noting that the excavation of troughs would not be suitable for wet ground conditions as vehicle tracking could result in the collapse of the sides of the troughs).
- D.1.28 As above, the methodology for each access point would be informed by site conditions and would be agreed with NRW prior to the commencement of works.

Footpaths

• A stile would be provided over the great crested newt fence line/half pipe barrier with a single post for hand support.

Bridleways

- A gap would be left open across the bridleway so as to allow continued access, and sections of turned back fence/half pipe would be installed at either end of the fence line in order to deflect any newts that might be moving along the fence/pipe away from the opening, or
- Fencing/the half pipe barrier would be left open and measures to prevent great crested newts entering the fenced area would be set in place across the opening. Measures would take into account ground conditions at the time but could include the sinking of metal grids into the ground, that are profiled so as to only enable trapped newts to leave the grid in the direction away from the opening in the fence line.
- Marker posts would be installed either side of the gap in the fence/half pipe barrier in order to make the fence/pipe more visible to horse riders. Posts would be painted (e.g. red and white) in order to enhance their visibility.

Public information

 Signs would be attached to fence posts/posts along the half pipe line close to PRoWs in order to inform members of the public about the fence/barrier and its purpose.

Timing of Exclusion Fence / Half Pipe Installation

- D.1.29 New exclusion fence, internal drift or half pipe would be installed on land as soon as practicable after land owner permission has been obtained (i.e. from July 2018). This would ensure fencing/half pipe installation is completed outside the main great crested newt hibernation period (considered to be between (October/)November and mid-February inclusive, although dependent on local weather conditions) and in time to enable any great crested newts that might be present to be trapped out (as described below) prior to the commencement of the hibernation in late autumn/winter 2018. In addition, exclusion fencing/half pipes would not be installed during periods of low night time temperatures (i.e. less than 5^o C, as confirmed by the on-site weather station) and periods of prolonged or heavy rain
- D.1.30 With regard to watercourses that would be pumped dry prior to in-filling or installing permanent culverts, exclusion fencing/half pipe would be installed across the bunds as soon as practicable after the bunds have been constructed, from July 2018.

- D.1.31 The timing of fence/half pipe installation would enable newts to have open access to breeding areas in 2018, thereby helping to reduce the duration of any potential impact of construction on breeding.
- D.1.32 Newt exclusion fencing/half pipes would be retained throughout the construction phase.

Other Protected Species

Breeding birds

D.1.33 Fence or half pipe installation would require the clearance of scrub and hedgerows of potential value to nesting birds. Where this is required, and if installing between mid-February and August inclusive, immediately prior to the installation of fencing such habitats would be surveyed by an appropriately experienced ecologist in order to confirm the absence of active bird nests. If present, works would be delayed and measures set in place as instructed by the ecologist in order to protect the nest and any young until they have fully fledged and left the nest. Measures are likely to include the establishment of a works-free buffer zone around the nest.

Hazel dormice

D.1.34 Results of the 2015 survey of the Tata Steelworks site to the south of Queen's Way (A4810) (RPS 2015) indicate the presence of hazel dormice. Therefore, any habitat clearance here would be undertaken in accordance with the requirements of the M4CaN hazel dormouse licence and associated method statement.

Water voles

- D.1.35 Due to the presence of water voles in the area, works affecting watercourses along the route would be undertaken in accordance with the requirements of the *Water Vole Method Statement*, which would be agreed in advance with NRW. The method statement would detail measures to be set in place to protect both water voles and their burrows.
- D.1.36 Water voles would be displaced or translocated from watercourses along the route between the 15 September 2018 and 30 November 2018. Therefore, prior to this, measures to protect water voles and their burrows described in the *Water Vole Method Statement* would need to be adhered to. Protective measures would include those summarised below.
- D.1.37 The installation of exclusion fencing or half pipes below ground could result in damage to water vole burrows and, therefore, fence installation alongside watercourses inhabited by water voles should take into account the need for a protective buffer zone (i.e. 5-6 m from the top of the banks around any burrow) as detailed in the *Water Vole Method Statement*.
- D.1.38 In addition, water voles would need to have been displaced or translocated from a watercourse prior to pumping out and in-filling or installing permanent culverts.

Inspection and Maintenance of Exclusion Fencing / Half Pipe

D.1.39 Exclusion fencing or the half pipe barrier would be inspected regularly so as to ensure any damaged could be repaired as soon as practicable. Records of inspections and repairs would be maintained by the ECoW.

- D.1.40 Should sections of fencing/half pipe need to be replaced, works would be completed under the instruction of, and where considered necessary by the ECoW, under an ecological watching brief provided by a great crested newt licenced ecologist. Where required, soil backfill would be removed carefully by hand so as to ensure any great crested newts that might be resting in cracks in the soil are not injured. If newts are located, the great crested newt licenced ecologist would capture and translocate them to an appropriate receptor area (as described under *2018 Receptor* below).
- D.1.41 Significant damage to fencing/half pipes that could result in great crested newts entering working areas may result in the need to carry out an additional trapping survey and possible amendments to this method statement and NRW licence.
- D.1.42 In order to prevent great crested newts from using tall vegetation as a means to climb over newt fencing or the half pipe, vegetation within 50 cm of a newt fence would be strimmed to a height of approximately 15 cm above ground-level (so as to minimise the potential to injury to any great crested newt or other species that could be present). Care would be taken using strimmers to prevent damage to fencing. Vegetation would be managed as described for as long as the fencing remained in place.
- D.1.43 Should construction works be halted in an area, for whatever reason, fences/half pipe would be maintained and adjacent vegetation would be managed (as described above) throughout the period of delay, so as to prevent great crested newts from entering fenced areas.
- D.1.44 Although fencing/half pipe barriers would largely be located across farmland or on the Tata Steelworks site, which is not open to the public, they would be monitored for signs of vandalism and if considered necessary, construction site fencing (e.g. Heras fencing) would be installed so as to prevent public access.

Trapping

Trapping Period

- D.1.45 A trapping survey of great crested newts would be undertaken in areas contained by exclusion fencing or half pipe barriers.
- D.1.46 Trapping would commence as soon as practicable after the installation of exclusion and drift fencing and/or half pipe barriers and pitfall traps, i.e. from July 2018. (Trapping would depend on land owner permission and, therefore, with regard to the trapping of Area A (Figure 2a), which is owned by Welsh Government, it may be possible to commence trapping in March 2018.
- D.1.47 Trapping would not be undertaken during unfavourable weather conditions, i.e. trapping would avoid extreme temperatures (including night time air temperatures less than 5^oC) and very dry ground conditions (e.g. due to the absence of rain for several days). Trapping would not be undertaken during the newt hibernation period, (e.g. October/November 2018, although this depends on local weather conditions, i.e. night time air temperatures less than 5^oC). An on-site weather station would be used to confirm local temperature between September and April inclusive.

Aquatic habitat

D.1.48 With regard to watercourses that would be bunded prior to pumping out and in-filling or installation of permanent culverts, an intensive period of trapping would be undertaken immediately following the installation of fencing/half pipe across the bunds.

Trapping Effort

- D.1.49 In order to ensure as much of the population is captured as practicable, trapping densities would be set at above average rates. On the precautionary assumption that populations are medium sized, the minimum trapping effort that would be undertaken in each trapping area would be 80 traps / hectare of suitable habitat for a period of 60 nights of suitable weather conditions (as described above), continuing until no great crested newts are trapped for a period of 5 consecutive days of suitable weather.
- D.1.50 In order to achieve the above trapping density, pitfall traps would be installed at 5 m intervals along the interior boundary of the exclusion fence/half pipes in or adjacent to habitats of high potential value to newts i.e. areas of rough grassland, scrub, woodland and hedgerows. Where exclusion fencing/half pipes cross open fields with limited ground cover, which are of low potential value to great crested newts, pitfall traps would be installed along the interior boundary of the exclusion fencing at 10 m intervals. Where the fence crosses hedgerows, traps would be installed immediately adjacent to the hedge, on both sides of the crossing point.
- D.1.51 In addition, traps would be installed along both sides of internal drift fencing, at 5m intervals.
- D.1.52 Artificial refugia (i.e. carpet tiles and/or sheets of roofing felt cut to 50 cm x 50 cm) would also be located between pitfall traps and flush to fence lines (i.e. one refugia positioned between two traps). In addition, artificial refugia would be set out in habitat of potential value to newts elsewhere within fenced areas (e.g. in areas of rough grass and scrub). Where considered necessary by the licenced ecologist(s), refugia would be pegged in place.
- D.1.53 In areas of dense scrub, where necessary, an initial hand clearance would be carried out along fence lines to permit fence installation, and to clear scrub for access to install and survey of traps and refugia.

Aquatic habitat

D.1.54 With regard to bunded watercourses to be in-filled or permanently culverted, pitfall traps would be set at least one every 5 m, and refugia would be installed between, as described above.

Increasing trapping effort to meet construction schedules

- D.1.55 Trapping would be undertaken until capture data indicates trapped areas have been cleared of great crested newts as far as is practicable and the ECoW has confirmed to the Contractor that trapping is complete.
- D.1.56 Should the trapping period need to be reduced to meet construction schedules, with NRW approval, the trapping effort would be increased through the use of a greater number of pitfall traps and/or artificial refugia. Habitat manipulation (i.e. strimming or above ground vegetative cover) could also be undertaken in order to displace newts into smaller trapping areas in which an increased trapping effort could be undertaken. In addition, extra sections of drift fencing could be installed in order to divide trapping areas into smaller sections so that trapping could be halted in sections where captures are no longer being recorded.

Installation of Traps

D.1.57 As shown in Text Figure 2 below, pitfall traps and artificial refugia (shown as carpet tiles on Text Figure 2) would be fitted flush to the line of the exclusion or drift fence/half pipe barrier. Pitfall traps would be buried so that the upper edge is located just below ground-level. Immediately following installation, soil would be replaced to fill any gaps around the edge of the traps. Turf would be placed downwards to suppress any regrowth of grasses. The turves and soil would be firmed in to eliminate lumps or gaps.

Text Figure 2: Positioning of pitfall traps adjacent to fencing/half pipe



Exclusion / drift fence

D.1.58 Each pitfall trap would be supplied with a mammal ladder (e.g. twig no more than 1 cm diameter), a floating raft such as tree bark and a clump of vegetation (grasses/moss). Each trap would be sealed with a secure lid whilst not in use. The lid would be removed during trapping when traps would be checked on a daily basis. Otherwise the lid would be resealed so that no animals would spend more than 24 hours in a trap.

Checking of Traps and Refugia

- D.1.59 Pitfall traps would be checked by an ecologist named on the NRW licence on a daily basis during trapping. If they move in any way (e.g. due to rising ground water following heavy rain) they would be put back into place. If necessary, traps would be pegged into place. If traps need to be replaced or repaired, or soil needs to be refirmed, care would be taken so as to ensure any newt (or other species) that could be present in cracks in the soil are not injured.
- D.1.60 In order to minimise the period of disturbance to great crested newts, pitfall trapping would be undertaken on a daily basis throughout the trapping period unless weather conditions are unfavourable for great crested newt movement, as above.
- D.1.61 Each evening of the survey period, lids would be lifted off the pitfall traps. Pitfall traps would then be checked by an ecologist(s) named on the NRW licence prior to 11:00 am the subsequent day. Once trapped animals had been captured, lids would be replaced in order to prevent accidental trapping of animals during the day. Lids would then be lifted again the following evening. When not in use, lids would be kept on the traps to prevent accidental trapping of animals.
- D.1.62 Refugia would be left for at least one week before the commencement of the refugia checking so as to enable them to settle and create a suitable refuge beneath. Refugia

would be checked (above and below) on a daily basis by an ecologist named on the NRW licence at the same time as the pitfall traps.

- D.1.63 Any amphibians captured overnight in the pitfall traps or captured resting on/below refugia would be moved to a receptor area as soon as practicable after collection the following morning. They would be transported in appropriate containers with lids with air-holes and ample moist vegetation. Different species would not be translocated in the same container.
- D.1.64 The receptor sites (described under 2018 Receptor below) would consist of areas of rough grass along ditch/reen banks and/or hedgerows and/or areas of scrub or woodland connected to ditches/reens by areas of hedgerow, scrub and/or rough grassland.
- D.1.65 Translocated newts would be placed under suitable refugia within the receptor site. Suitable refugia would provide good cover and protection from the elements and potential predators, such as piles of bark, leaf litter, or areas of rough grassland, and where possible refugia would be located at the edge of woodland, scrub or hedgerows for additional cover.
- D.1.66 The ecologist named on the NRW licence would maintain a record of all newt captures and releases. Records would include the location of capture, method of trapping, sex, life-stage, apparent health or condition of the newt, average night temperature, occurrence of rain and/or dampness of soil. The ecologist would collate all records in order to assess trapping progress and determine the need for changes in the method e.g. if large numbers of trapped newts are being recorded in an area, it may be considered necessary to increase the effort in that area, or if very low numbers of traps are recorded in an area, it may be considered that vegetation should be mowed to an above-ground height of approximately 15 cm in order to help deter any remaining animals from the area.
- D.1.67 A report of all trapping records would be submitted to NRW at the end of the licence period or as required under the licence or requested by NRW.

Pumping Out of Watercourses

- D.1.68 Pumps would be fitted with a fine (e.g. <1.5 mm) mesh to prevent any newts (or other wildlife) from being drawn through the pump.
- D.1.69 Water would be pumped directly into replacement watercourses where these have been constructed in advance or onto adjacent land, or into the Scheme's water treatment system, as detailed in the *Buildability Report*.
- D.1.70 In some cases the use of a pump could be avoided where water could be diverted by gravity, although due to the nature of the Gwent Levels it is expected that this would not be practicable for most watercourses.
- D.1.71 Ecologists named on the NRW licence would be present on site during the pumping out of water in order to capture any newts from the watercourse by net and to hand search plants, debris and silts for newts.
- D.1.72 Care would be taken when working in watercourses, particularly where thick layers of fine silts are spread across the base of channels; a risk assessment would be set in place for all works.

- D.1.73 Any captured newts (and other animals) would be immediately translocated to receptor sites, described under 2018 Receptor below.
- D.1.74 Subject to NRW agreement, and informed by surveys undertaken prior to construction, turfs with aquatic and bank side vegetation and a quantity of silts could be translocated to replacement watercourses and mitigation ponds in order to help encourage the early establishment of habitats. Surveys would be undertaken in order to identify invasive plant species that should be avoided. The ecologist would be present in order to ensure care is taken so as to prevent the transfer of invasive plants.
- D.1.75 Vegetation and silts would be moved using a low ground pressure digger. No tracking on waterlogged soils would be undertaken and works would avoid periods of heavy or prolonged rainfall, frost or snow. If use of bog mats was necessary, these would not be left in place overnight so as to deter great crested newts from using them for shelter.

Removal of Fencing and Pitfall Traps

- D.1.76 Once the trapping has been completed (as described under *Trapping* below), internal drift fencing would be removed under the watching brief of an ecologist named on the NRW licence. Soil backfill would be removed carefully by hand so as to ensure any newts that might be resting in cracks in the soil are not injured. If present, the licenced ecologist would capture and translocate the newts to a suitable receptor area (as described under *2018 Receptor Areas* below).
- D.1.77 Additional precautionary measures to be implemented when clearing vegetation within fenced areas as part of the site clearance works are described under *Other Protected Species*.
- D.1.78 Once construction works had been completed in an area and ongoing works elsewhere on site, including vehicle movements, were no longer a risk to great crested newts, remaining newt exclusion fencing would be removed under the watching brief of a licenced ecologist, as described for drift fencing.

2018 Receptor Areas

- D.1.79 The in-filling of ditches in an area would commence after the construction of the haul road. The installation of permanent culverts along reens would not commence until late 2018. Therefore, the loss of watercourses of potential value to newts would not occur until after the 2018 newt breeding season, when the majority of newts will have left the water.
- D.1.80 The creation of ponds surrounded by rough/marshy grassland of potential value to newts in the newt mitigation areas (Figures 2a and 2c) would also commence as soon as practicable from July 2018, as described is section D.2 below. Therefore, it is considered that receptor ponds could be in favourable condition in 2019.
- D.1.81 Taking the above into account, newts captured in 2018 would be relocated into like for like habitat as close to the area of trapping and outside the line of the newt exclusion fence or half pipe as practicable, i.e. newts captured from areas of hedgerow, scrub or rough grassland would be moved to similar terrestrial habitat located immediately outside the line of exclusion fencing or half pipe barrier with good cover and habitat connectivity to nearby watercourses and terrestrial habitat of potential value; and newts captured from watercourses would be relocated to an adjacent section of the same or an adjoining watercourse located outside of the newt exclusion fence or half pipe barrier.

D.1.82 With regard to each trapping area, captured newts would be relocated as described below:

Area A, Figure 2a

D.1.83 Taking into account the location of the watercourse in Area A from which positive eDNA results were obtained in 2015 and 2016, any newts captured in the area would be relocated to the south of the new road, where there are greater opportunities for long-term dispersal than to the north of the new road, where suitable habitat is relatively land-locked by areas of hard-standing and development. This area would be enhanced by the provision of the new ponds within the Tatton Farm SSSI Mitigation Area.

Area B, Figure 2b

D.1.84 Taking into account the location of the watercourse in Area B from which positive eDNA results were obtained and the area of land where newts were located in 2015, any newts captured would be relocated to the south of the new road, where there are greater opportunities for long-term dispersal across the Levels and to newt mitigation areas to the west and east (Figures 2a and 2c), since it is considerably less built-up than land immediately to the north of the road and land to the north of the road is likely to be developed in the future.

Area C, Figure 2c

D.1.85 Taking into the location of the watercourse in Area C from which positive eDNA results were obtained, any newts captured would also be relocated into the area of new ponds to be provided in marshy grassland to the south of the new section of motorway. This would ensure continued open access to the watercourse where great crested newt eDNA has been recorded and to the rest of the Levels.

Area D, Figure 2c

D.1.86 Any newts captured in Area D would be relocated to the new ponds and surrounding habitat to be created to the south of the new section of motorway. This would enable newts to access watercourses across the rest of the Levels.

Recording and Reporting

- D.1.87 Ecologists named on the NRW licence would maintain a daily record of all captures. Records would include location, species, sex, life-stage, method of trapping and conditions (average night temperature, occurrence of rain and/or dampness of soil).
- D.1.88 The principal great crested newt licenced ecologist named on the NRW licence (who could be the ECoW) would collate all records from the assisting ecologists in order to assess trapping progress and determine the need for changes in the method i.e. if large numbers of trapped great crested newts are being recorded in an area it may be considered necessary to increase the survey effort in that area, or if very low numbers are captured in an area it may be considered that habitat manipulation should be undertaken (e.g. strimming of ground cover to approximately 15 cm above ground) in order to help focus remaining animals into smaller trapping areas for a more intensive survey effort.
- D.1.89 A report of all trapping records would be submitted to NRW at the end of the licence period or as otherwise required under the licence or requested by NRW.

D.2 GCN habitat

Habitat Modification, Enhancement or Creation.

- D.2.1 As part of the Scheme, new ponds, replacement and additional watercourses, and areas of rough/marshy grassland would be created alongside the route of the new road, as described below, in order to mitigate the loss of watercourses and terrestrial habitat of potential value to great crested newts.
- D.2.2 These habitats would be constructed in accordance with an NRW approved method statement as early as practicable following access to the site. Taking into account the time it would take for habitats to become established, it is expected that they could be in favourable condition in 2019.
- D.2.3 The detailed programme and methodology for habitat construction would be provided in the *Great Crested Newt Method Statement* submitted to NRW in support of the final NRW licence application.

Mitigation Areas (Figures 2a and 2c)

- D.2.4 Additional habitat of potential value to great crested newts would be provided in the form of new ponds and rough/marshy grassland in the area to the south of the new section of motorway in survey areas C and D (Figures 2a and 2c). This would comprise four ponds each of some 100 m² and surrounding rough/marshy grassland covering an area of approximately 4.2 hectares.
- D.2.5 Additional habitat would also be created within the Tatton Farm SSSI Mitigation area (Figure 2a). This would comprise four ponds each of some 100 m² in a 3.5 hectare area of hedged fields adjacent to the south of the proposed new section of motorway, close to the watercourse where great crested newt DNA was recorded in Survey Area A.
- D.2.6 Habitat management measures would also be undertaken in areas surrounding the newt mitigation areas and across the rest of Tatton Farm (the "*Ecological Mitigation Area*", Figure 2a) in order to enhance the favourability of the areas to great crested newts. These measures would include, where necessary:
 - the coppicing and stump treating or uprooting* of bank-side hedgerow and scrub on the southern bank of a watercourse so as to enable sun light to reach the banks and margins of the watercourse to encourage the development of a good cover of aquatic, semi-aquatic and bank-side ground vegetation of value to great crested newts; and/or
 - the mowing of ground vegetation to encourage the development of good ground cover along the banks of waterbodies.

*Any uprooting of bankside vegetation would take into account the potential for disturbance to banks and where the impact is considered too great, i.e. where disturbance of bank profiles could result in more damage to ground vegetation or considerable pollution to the watercourse by disturbed soil, hedgerow and scrub plants would be coppiced and may be stump treated with an approved herbicide suitable for working near water (e.g. Roundup Biactive). Applications would be made by an appropriately experienced professional in accordance with manufacturer's guidelines.

D.2.7 Habitat enhancement measures to be undertaken across Tatton Farm (including the newt mitigation area to the south of the new road, shown on Figure 2a) are detailed in

the revised SSSI Mitigation Strategy. The final SSSI Mitigation Strategy would be agreed with NRW and measures would form part of the tenancy agreement for the farm. Measures would include those described above along with the management of grassland with very low to no inputs, so as to protect adjacent watercourses of value to newts from the potential impacts of agricultural pollutants. The final SSSI Mitigation Strategy would also include permitted times for any works along watercourses, which where practicable, would take into account the need to prevent disturbance of watercourses during the great crested newt breeding season, in addition to the breeding seasons of other species such as water voles (which overlap with that of great crested newts).

D.2.8 In order to help establish good ground cover along the banks of new ponds and replacement watercourses along the Scheme, where practicable silts and turfs would be carefully lifted from the banks of watercourses to be in-filled and spread across the banks of new ponds and replacement watercourses. Where ground and aquatic vegetation is not required so quickly, natural establishment would be favoured. The incorporation of berms along replacement watercourses, and the absence of scrub and hedgerows along the banks of new ponds and replacement watercourses would help to encourage natural establishment of vegetation and aquatic macrophytes.

Remaining Habitat Areas

- D.2.9 In the longer term the wetland habitats within the water treatment areas would also become suitable for great crested newts.
- D.2.10 In addition to new and replacement waterbodies, replacement/additional terrestrial habitat of potential value to great crested newts would be created as shown on the Environmental Master Plan (EMP ES Supplement Figure R2.6 attached as Figure 4), including:
 - rough grass areas;
 - areas of woodland and scrub; and
 - areas of scrub and rough grassland associated with Water Treatment Areas.
- D.2.11 It should be noted that the landscape requirements of the Gwent Levels SSSI limit the ability to plant hedgerows and areas of scrub or woodland. In addition, replacement watercourses have been limited by the need to maintain water levels and flows across the Levels and proposals to excavate ponds have been balanced against the need to maintain and manage SSSI grassland habitat.
- D.2.12 Table 2 below summarises the areas of habitat loss:replacement or enhancement along the Scheme.

Table 2: Areas of habitat loss:replacement or enhancement along the Scheme.

Habitat	Area A	Area B	Area C	Area D				
Shrub, trees and woodland								
Habitat Loss: woodland, scrub (ha) and hedgerows (consider hedges to be 1.5m width) (Table 1)	- 562 m (0.08 ha)	33.93 ha 2263 m (0.34 ha)	1.75 ha -	0.75 ha 520 m (0.08 ha)				
Broadleaved woodland		3.92 ha						
Linear belts of trees and	0.02 ha	2.34 ha	0.10 ha	1.30 ha				

Habitat	Area A	Area B	Area C	Area D				
shrub								
Shrubs with intermittent trees		0.73 ha						
Shrubs		1.17 ha		0.03 ha				
Ornamental shrubs		0.86 ha						
Habitat replacement: woodland, trees and shrubs	0.02 ha	9.02 ha	0.10 ha	1.33 ha				
Change in woodland, scrub and hedge habitat areas	-0.06 ha	-25.25 ha	-1.65 ha	+0.85 ha				
	Grass	sland						
Habitat Loss: grassland (Table 1)	2.78 ha	25.98 ha	1.11 ha	6.36 ha				
Amenity grassland		0.11 ha						
Open grassland	1.53 ha	10.09 ha	0.05 ha	2.68 ha				
Species-rich grassland		10.43 ha	0.37 ha	0.61 ha				
Wet/marshy grassland	1.20 ha	0.97 ha	1.22 ha	0.38 ha				
Rough/marshy grassland in additional newt mitigation area	3.50 ha		4.20 ha					
Low input rough grassland on remaining parts of Tatton Farm SSSI Mitigation Area	13.50 ha							
Habitat replacement: grassland	6.23 ha (19.73 ha incl. Tatton Farm)	21.60 ha	1.64 ha plus 4.20 ha mitigation areas	3.67 ha plus 4.20 ha mitigation areas				
Change in grassland areas	+3.45 ha	-4.38 ha	+4.73 ha (if incl. mitigation area)	+1.51 ha (if incl. mitigation area)				
Waterbodies								
Habitat Loss: watercourses (incl. dry ditches) (Table 1)	662 m	5167 m	266 m	731 m				
Replacement reens	9 m	646 m		220 m				
Replacement ditches	929 m	809 m	203 m	668 m				
Reed beds		4.02 ha		0.56 ha				
Total area of ponds to be constructed	400 m ²		200 m ^{2*}	200 m ^{2*}				
Habitat replacement: waterbodies	938 m plus 0.04 ha	1455 m plus 4.02 ha	203 m 0.02 ha	888 m plus 0.58 ha				
Change in waterbody areas	+276 m plus +0.04 ha	-3712 m plus +4.02 ha	-63 m 0.02 ha	+157 m plus +0.58 ha				

*Four ponds each of approximately 100 m2 would be created in the mitigation area that overlaps the boundaries of Areas C and D (Figure 2c). The final location of these ponds would be determined based on ground conditions and ponds could be closer to one Area than the other; however, due to the proximity of Areas C and D, for the

purpose of the calculations above, the pond areas have been divided equally between Areas C and D.

D.2.13 Taking the above into account, the following habitat changes of importance to newts would occur.

Area A, Figure 2a

- D.2.14 A negligible decrease (0.06 hectares) in woodland, tree, scrub and hedgerow habitats would result from the Scheme.
- D.2.15 With regard to hedgerows, hedgerow replacement is not proposed due to the landscape requirements of the SSSI. In addition, hedgerow removal is proposed along the southern banks of watercourses on Tatton Farm in order to open up the watercourses and encourage the development of good bankside, marginal and aquatic vegetation, which would be of benefit to great crested newts. Due to the value of hedgerows to newts (as well as other species), hedgerows along the northern banks of watercourses would be retained and managed as part of the requirements of the Tatton Farm Management Plan.
- D.2.16 Taking into account the potential value of timber piles and root balls to resting/hibernating newts, sections of timber and uprooted scrub/hedge plants taken from the construction site would be stacked in suitable areas along the Scheme as replacement resting/hibernation sites (as described under *Terrestrial Habitat* below). Suitable areas would include the newt mitigation area shown on Figure 2a and at the base of hedgerows on Tatton Farm.
- D.2.17 There would be a considerable increase in grassland habitat in Area A (i.e. an increase of 3.45 hectares). The change would include 4.70 hectares of marshy/wet grassland to replace semi-improved grassland, and the enhancement of 13.5 hectares of grassland on Tatton Farm SSSI Mitigation Area, which would be managed as very low/no input grassland.
- D.2.18 In addition, proposals would result in an increase of 0.04 hectares of waterbodies (ponds) and 276 m of watercourses. Ponds would be disconnected from the surrounding network of watercourses and, therefore, would not be accessible by predatory fish using the adjacent waterways.

Area B, Figure 2b

- D.2.19 The Scheme would result in a considerable decrease in the cover of woodland, tree, scrub and hedgerow habitat (i.e. 25.25 hectares). However, much of this loss (i.e. 19.81 hectares of 33.93 hectares) would comprise scattered scrub. Proposed woodland and shrub planting would cover an area of 9.02 hectares, which would replace 1.07 hectares of woodland and mitigate the loss of 13.05 hectares of dense scrub.
- D.2.20 As above, due to the potential value of root balls and timber piles for resting/hibernating newts, timber and uprooted scrub/hedge plants taken from the construction site would be stacked as described under *Terrestrial Habitat* below as replacement resting/hibernation sites in suitable locations in Area B, such as in areas of woodland planting.
- D.2.21 There would be a decrease in the area of grassland (i.e. a decrease of 4.38 hectares). However, proposals would include the creation of 10.43 hectares of species-rich

grassland and 0.97 hectares of marshy grassland, of potential value to newts, which are currently not found on site.

D.2.22 Although proposals would result in a decrease in 3712 m of watercourses, this loss would be mitigated by the creation of 4.02 hectares of reed bed habitat and 1455 m of replacement reens or ditches.

Area C, Figure 2c

- D.2.23 The Scheme would result in a slight decrease in the cover of woodland and scrub in Area C (i.e. 1.65 hectares); however, due to the linear nature of replacement tree and shrub planting, proposals would create a potential newt habitat corridor that would connect to areas of tree and shrub planting to the east.
- D.2.24 As above, timber and uprooted scrub/hedge plants taken from the construction site would be stacked as potential newt resting/hibernation sites in areas of tree and shrub planting as described under *Terrestrial Habitat* below.
- D.2.25 Proposals would result in an increase in grassland habitat of 4.73 hectares including the marshy grassland in the surrounding newt mitigation area. Within Area C, the change in grassland habitat would include the creation of 0.37 hectares of species-rich grassland and 1.22 hectares of marshy grassland of greater potential value to newts than the improved and semi-improved grassland that it would replace.
- D.2.26 There would be a slight decrease in wetland habitat (i.e. a decrease of 63 m of watercourses); however, access to replacement watercourses in the adjacent Area D would provide an increase in wetland habitat available (as described below). In addition, four ponds (each of 400 m²) would be constructed in the surrounding mitigation area. Ponds would be disconnected from the surrounding network of watercourses and, therefore, would not be accessible by fish using these waterways.

Area D, Figure 2c

- D.2.27 The Scheme would result in an increase in the cover of woodland and scrub in Area D (i.e. 1.33 hectares, including linear corridors of tree and scrub planting that would provide habitat corridors of value to newts).
- D.2.28 As above, timber and uprooted scrub/hedge plants taken from the construction site would be stacked as potential newt resting/hibernation sites in areas of tree and shrub planting as described under *Terrestrial Habitat* below.
- D.2.29 Proposals would result in an increase in grassland habitat of 1.51 hectares including the marshy grassland in the surrounding newt mitigation area. Within Area C, the change in grassland habitat would include the creation of 0.61 hectares of species-rich grassland and 0.38 hectares of marshy grassland of value to newts.
- D.2.30 There would be an increase in wetland habitat of 157 m of replacement watercourses and 0.56 hectares of reed beds. In addition, four ponds (each of 400 m²) would be constructed in the surrounding mitigation area. Ponds would be disconnected from the surrounding network of watercourses and, therefore, would not be accessible by fish using these waterways.

Timing of Habitat Enhancement and Creation

D.2.31 Habitat creation would be undertaken as soon as practicable after it can be confirmed that ongoing works would not present a risk to the establishment of new plants.

Temporary loss of breeding sites, resting places – reasonable avoidance measures

- D.2.32 Some habitat loss would be temporary (i.e. habitat on land marked as temporary construction land on Figure 2). This habitat would either be replaced when the land is returned to the land owners following the completion of construction and re-instatement of habitat, or it would be replaced by new habitat to be created as part of the Scheme's mitigation strategy.
- D.2.33 Taking into account the scale of the temporary habitat loss, it would be subjected to the same reasonable avoidance measures as would be set in place for areas of permanent habitat loss, as described under Destruction of existing habitat below.

Destruction of existing habitat

Terrestrial Habitat

- D.2.34 The works below would be undertaken during suitable weather conditions prior to hibernation, considered to be between November and mid-February inclusive, although this is dependent on local weather conditions, which would be confirmed by the on-site weather meter. Suitable weather conditions would be night time temperatures of at least 5^oC and avoiding periods of prolonged or heavy rain.
- D.2.35 Works would be undertaken in accordance with the biosecurity risk assessment and safe system of work attached at Annex 4.
- D.2.36 Following the completion of the trapping survey and removal of internal drift fencing, an ecologist(s) named on the NRW licence would survey areas within the line of the exclusion fencing or half pipe in order to locate any remaining features of potential value to resting or hibernating newts. These features could include root networks of mature hedgerows, scrub or trees that are accessible from ground-level and could provide underground cavities suitable for resting/hibernating newts; or piles of logs, rubble or other materials that could provide suitable above-ground cavities for resting/hibernating newts.
- D.2.37 A destructive search of these features would be carried out by or under the watching brief of an ecologist(s) named on the NRW licence. The destructive search would entail:
 - coppicing of any above ground vegetation above the features of interest to a height of approximately 15 cm above ground and hand search of the area by the ecologist; and
 - careful uprooting of vegetation/clearance of the feature by hand or, if necessary, using a small excavator with a wide toothed bucket. Excavated material would be carefully lifted in the bucket and the licensed ecologist would search for any amphibians amongst it; or
 - a thorough hand search of the cleared area by the licenced ecologist for any great crested newt that might still be present.
- D.2.38 Any newts located during the above clearance works would be relocated to the receptor sites (described under *2018 Receptor Areas*) immediately after capture.
- D.2.39 Timber and other arisings would be carefully removed from the area so as to minimise the risk of injury to any potentially remaining animals and damage to soils, and to

prevent the creation of features that any remaining newts could hide in. Extraction routes would be kept to minimum in order to limit the area of disturbance.

- D.2.40 Some felled timber and in particular dead wood, would be stacked in great crested newt mitigation areas (Figures 2a and 2c) close to ponds and/or at the base of hedgerows or scrub, or in areas of proposed woodland planting. Brash would be stacked in tight piles; small sections of timber and branches would be stacked into small piles (e.g. approximately 4 m² x up to 0.5 m in height); and large branches or sections of trunks would be positioned in open stacks to enable good air flow between timber pieces. Up to 3 stacks of timber would be created per hectare of woodland.
- D.2.41 Remaining arisings would be removed from the site and dealt with appropriately at an approved off-site facility and in accordance with the biosecurity risk assessment (Annex 4).

Aquatic Habitat

- D.2.42 Within the great crested newt survey areas shown on Figure 2 (Areas A-D), where practicable, prior to the installation of bunds either end of the watercourses to be infilled or culverted, ecologists named on the Scheme's NRW great crested newt licence would travel the length of the watercourse (on foot or by boat) in order to disturb the water and help encourage any remaining newts to leave the area.
- D.2.43 The licenced ecologists would then oversee the installation of bunds and pumping out of the watercourses in order to capture and relocate any newts that might still be present in the water.
- D.2.44 Once pumped dry the ecologists will carry out a visual search and netting survey of the watercourses (including the silts) and any aquatic/marginal vegetation in order to locate any remaining newts.
- D.2.45 Any newts located during the above clearance works would be relocated to the receptor sites (described under *2018 Receptor Areas*) immediately after capture.
- D.2.46 Methods of infilling would be detailed in the *Construction Environment Management Plan (CEMP)* and would include measures to prevent and minimise the impact of any potential pollution events.

Measures to Protect Other Species

- D.2.47 With respect to other protected species:
 - All works would be undertaken in accordance with any other NRW protected species licences, i.e. licences for hazel dormice and bats. In addition works would take into account the requirements of the *Water Vole Method Statement*. This may require several licenced ecologists to be present on site (i.e. including ecologists named on several licences).
 - Vegetation clearance would be undertaken in accordance with measures described under *Other Protected Species* above, in order to protect any potential nesting birds and hazel dormice that might be present.
 - Prior to the commencement of works the ECoW would survey the area in order to confirm no new protected species issues are present in the area.
 - Should any trees require felling, these would be assessed by the scheme's ECoW in order to identify their potential value to roosting bats. Should they be of potential

value a bat roost survey would be undertaken. Should a roost be located or should the trees be known to support bat roosts, works would be undertaken in accordance with an NRW licence for bats.

Scaled Maps

- D.2.48 Figure 1 shows the location of the scheme and great crested newt records from a desk study of the area.
- D.2.49 Figure 2 shows the location of the scheme; locations where great crested newts have been recorded during surveys undertaken in 2014, 2015 and 2016; and mitigation measures proposed, including areas to be fenced with newt exclusion fencing, or a suitable alternative such as a half pipe barrier.
- D.2.50 Figure 3 shows existing habitats present along the M4CaN route and in the immediately surrounding area.
- D.2.51 Figure 4 is the Landscape Environmental Masterplan for the parts of the Scheme shown on Figure 2.

D.3 Mechanisms for ensuring delivery of mitigation and compensation measures

Measures to ensure compliance with the licence and associated method statement

- D.3.1 The Contractor would be responsible for commissioning an appropriately qualified and experienced great crested newt licenced ecologist(s) to co-ordinate, supervise and undertake all works described in the final method statement and required by the NRW licence.
- D.3.2 If additional or alternative great crested newt licenced ecologists are required a change of ecologist form (available at: http://naturalresourceswales.gov.uk/apply-buyreport/apply-buy-grid/protected-species-licensing/european-protected-specieslicensing/great-crested-newt-licensing/?lang=en) would be completed as required.
- D.3.3 The Contractor would ensure all authorised great crested newt licenced ecologists are made fully aware of the requirements of any licence and associated method statement by provision of all necessary paperwork to the ecologist and pre-works instruction by the managing great crested newt licenced ecologist.
- D.3.4 A copy of the NRW development licence for great crested newts along with the associated method statement would be provided to the ECoW and ecologists named on the licence and a copy would be kept on site and made available to all site workers as required or requested.
- D.3.5 Site inductions and toolbox talks provided to all personnel on site would cover the requirements of the licence and associated method statement. All contractors would be informed of the need to notify the ECoW or great crested newt licenced ecologist as soon as practicable if a great crested newt is located during site works, to not handle any newt, and to await instruction from the ECoW before continuing works in the area.
- D.3.6 A daily record of all licenced works undertaken would be produced by the licenced ecologist(s). Records would include a description of works undertaken, great crested newts captured, locations of receptor areas and any new instructions provided to contractors in response to site conditions.
- D.3.7 The principal ecologist named on the licence would be responsible for collating daily records and for ensuring works are monitored according to the licence and method statement (directly and through the team of licenced ecologists named in the licence application).
- D.3.8 The principal ecologist named on the licence would be responsible for ensuring all works required under the licence are undertaken as required by the licence.
- D.3.9 The Welsh Government would be responsible for commissioning an appropriately qualified and experienced great crested newt licenced independent ecologist. The ecologist would be responsible for undertaking an independent compliance audit of all licenced works detailed in the NRW licence and associated method statement. This would be included in the Commitments Register.
- D.3.10 The compliance audit would include those checks listed in Annex 6.
- D.3.11 The compliance auditing ecologist would undertake site visits as considered necessary to monitor compliance with the licence and associated method statement. Auditing site visits would be carried out unannounced.
- D.3.12 The ECoW would report the findings of licenced works and the compliance auditing ecologist would report the findings of the audit to the Welsh Government, the contractor and NRW, in an agreed format. Reports would be provided on a fortnightly basis, or as requested or required, and within 24 hours of any potential major non-compliance.
- D.3.13 Compliance audit reports would include: a completed and signed copy of Table 1; details regarding work areas and works audited; confirmation of compliance/non-compliance with any NRW licence and associated method statement plan; and any required/recommended actions to be taken. Any actions required (and where necessary approved by NRW) would be audited as part of the ongoing compliance audit.
- D.3.14 The principal great crested newt licenced ecologist named on the NRW licence would complete a licence return form after the completion of licenced works as required under the NRW licence.
- D.3.15 Regular progress updates would be provided by the ECoW to the contractor and Welsh Government and, as requested or required, to NRW. Regular meetings (which could be the Environmental Liaison Group meetings) would be held between the contractor and NRW throughout the pre-construction and construction phase during which the progress of great crested newt licenced works would be discussed. The principal ecologist named on the NRW licence would be available to attend these meetings as required.

Ensure that sufficient land has been acquired for compensation purposes

- D.3.16 The Welsh Government would own the freehold of the footprint of the M4CaN Scheme and associated land required for mitigation.
- D.3.17 During construction and the aftercare period for the first 5 years (month of opening + 5 years) management would be the responsibility of the Contractor and would be covered by the Environmental, Landscape and Ecology Aftercare Plan (ELEAP). Thereafter responsibility for the ongoing long term maintenance would transfer to Welsh Government's highway maintenance contractor (currently SWTRA). The Handover Environmental Management Plan (HEMP) would set out the proposed strategy for the future maintenance and management of the environmental mitigation measures for the following 10 year period (month of opening + 15 years). NRW would be consulted on both the ELEAP and the HEMP.
- D.3.18 The Welsh Government would be responsible for ensuring appropriate long term management of new habitats, planting, replacement and watercourses located within the boundaries of the Scheme. Provisions would also be made so as to ensure NRW could continue to manage the reen system as appropriate.
- D.3.19 Areas which would be managed for the specific requirements of great crested newt would comprise the area of new ponds within Tatton Farm to the south of the new section of motorway, and the area of marshy grassland to the south of the Euro Park Industrial Estate and new road.
- D.3.20 Once established, habitat located outside the scheme boundary, such as restored construction sites, would be returned to land owners for on-going management.

Ensure that designs of subsequent development are newt friendly and do not include features likely to result in incidental capture or killing

Measures to Minimise Habitat Loss

D.3.21 Reens and field ditches to be lost to construction would be replaced with 2657 m of reens and 9771 m of field ditches across the Levels. This would ensure there would be no reduction in the extent of the freshwater ecosystem within the Gwent Levels SSSIs. In addition, the provision of berms within the replacement reens, and lack of shading hedgerows, would provide enhanced opportunities for the growth of aquatic macrophytes compared to some of the reens which they would replace. This would in turn benefit great crested newts and encourage greater diversity of aquatic invertebrates.

Measures to Minimise Fragmentation

D.3.22 In order to help reduce the potential impacts of fragmentation and disruption to movement of great crested newts across the new road, reens along the route would be retained and culverted and dry pipe crossings (located close to the culverts) and dry underpasses would be constructed along the route, as shown on Figure 2 and summarised below with regard to those locations where great crested newts have been recorded.

- D.3.23 Culverts would be relatively large box culverts (1800 mm in height by 1800 mm in width, or as otherwise required in response to findings of hydrological analysis). The locations of relevant culverts are shown on Figure 2. Mammal passes (900 mm diameter pipes) with invert at/above Summer Penning Levels will be installed adjacent to the permanent culverts.
 - Area A (Figure 2a): the following culverts with adjacent dry pipe crossings would be located within or close to this area where a positive eDNA results was recorded and within which a great crested newt receptor site would be established:

SMN-1300 Julian's Reen Culvert

SMN-1330 Tatton Farm Culvert

SMN-1350 Field Culvert

• Area B (Figure 2b): the following culverts with adjacent dry pipe crossings would be located along the new section of motorway through this area:

SMN-1430 Ellen's Reen Culvert

SMN-1480 Black Wall Reen Culvert

SMN-1480 Monk's Ditch Bridge

SBR-1640 Steelworks Dedicated Reen Bridge

SMN-1655 Elver Pill Reen Culvert

SMN-1720 New Cut Reen Culvert

SBR-1780 Middle Road Reen Diversion M4 Bridge

• Area C (Figure 2b): the following culvert with adjacent dry pipe crossing would be located along the new section of motorway through this area:

SMN-1850 Cock Street Reen Culvert

 Area D (Figure 2c): the locations where great crested newt eDNA was recorded are separated from the proposed new section of motorway by the A4810 (Queen's Way). Queen's Way is likely to present an existing significant barrier to the movement of newts southwards towards the new section of motorway. However, the following the following culvert with adjacent dry pipe crossing would be located along the new section of motorway through this area:

SMN-1925 Petty Reen Culvert

- D.3.24 Constructing the culverts early in the construction programme would maintain connectivity of the reen and ditch network and reduce potential disruption to ecology and the risk of flooding in the area. Typically, there are two types of permanent culvert, pre-cast concrete box culverts, founded on driven pre-cast concrete piles and in-situ constructed culverts, with permanent sheet piled walls and in-situ concrete base slabs and roofs.
- D.3.25 Culverts under the proposed motorway carriageways would be installed following the trapping out of newts from the watercourses, as described in the Construction Environment Management Plan. Construction would be on a half and half basis at each

culvert crossing. This would ensure that the haul route is maintained for passage of construction plant traffic.

Pollution Prevention Measures

General run-off pollution control

- D.3.26 The operational drainage strategy described in the *Drainage Strategy Report* (Appendix 2.2 of the ES) has been designed to manage the drainage of water from the new carriageway in terms of volume of water and pollution control.
- D.3.27 Operational surface water run-off would be directed through grassed verge channels, water treatment areas (WTAs) and reedbeds (*Chapter 16: Road Drainage and the Water Environment* of the ES). Run-off from grassed channels would discharge into desilting catch pits before flowing into WTAs and attenuation basins/lagoons.
- D.3.28 The flow would be slowed through the grass channels. Run-off would then flow from grassed channels into desilting catch pits before flowing into attenuation basins/lagoons. Water from these lagoons would pass through reedbeds for final treatment before discharging into reens with sufficient capacity to accommodate the increase in flow. Discharges would be above summer penning levels, with flap valves at outfall pipes preventing water returning to the lagoons.
- D.3.29 Discharge rates into the reen system would be within limits agreed with NRW. No water would be discharged into any ponds in the vicinity of the Scheme.
- D.3.30 The drainage system would cater for a 1 in 100 year storm event, plus a 30% allowance for climate change. It is considered that any storm greater in magnitude would dilute pollutants to tolerable levels.
- D.3.31 The grassed channels would be dry during dry weather, thus enhancing their pollution removal capability; the channels would be lined with a geo-synthetic clay liner below 50 mm of topsoil to prevent pollutants seeping into the underlying ground. The slow flow of run-off through grass would allow the filtration of sediment, and hydrocarbon residues and organic material would be retained and broken down in the vegetation and upper layers of soil.

Collisions/Other Traffic Incidents on the New Road

- D.3.32 Where pollutants resulting from collisions or other road traffic incidents cannot be contained at source by best practice containment techniques such as sand bags, bunding/booms, absorption or *in situ* treatment/neutralisation, they would runoff into the drainage system of grassed channels, WTAs and attenuation lagoons. These would provide opportunities for the removal or treatment of pollutants before discharge into the reen network.
- D.3.33 As explained in *Chapter 16: Road Drainage and the Water Environment* of the ES, each WTA would provide sufficient treatment capacity to ensure the discharge would meet Design Manual for Roads and Bridges (DMRB) requirements and regulatory requirements for the protection of the Gwent Levels SSSIs, most notably with respect to heavy metals, organic contaminants and major ions associated with de-icing.

Salt from De-icing Operations

- D.3.34 Salt would be used in the winter months for de-icing of the carriageway. Rock salt used would comply with BS3247 and be stored according to PPG10. Application rates would adhere to Highways Agency guidelines (Highways Agency, 2009).
- D.3.35 Saline dilution would occur rapidly during the flow of run-off along grassed channels, WTAs and attenuation basins and reed beds. By the time saline run-off enters attenuation lagoons, salt concentrations would be likely to be very low.
- D.3.36 As explained in *Chapter 16: Drainage and the Water Environment* of the ES, short term episodic breaches of chloride concentrations may occur during severe winters where thaws after freezing conditions can release high loads of dissolved road salt to the WTAs. However, under such extreme conditions, dilution from the thawing of snow and ice is likely to dilute in-channel concentrations to negligible levels.
- D.3.37 The application of Highways Agency guidelines and surface water run-off management would mean the salt concentration of water discharging into the reen network would be unlikely to be sufficiently high to cause adverse effects on aquatic ecosystems.

Lighting

- D.3.38 As described in *Chapter 2: Scheme Description* of the ES and shown on Figure 2, lighting would be installed at junctions, including the Glan Llyn junction and link road that would cross the Tata Steel site. Lighting design would include measures to reduce light spill.
- D.3.39 Construction lighting would be inward facing at all construction compounds and located so as to ensure required areas are lit with minimal light spill to surrounding habitats. Details of the implementation of these measures would be included in the Construction Environmental Management Plan (CEMP).
- D.3.40 Operational lighting would be designed so as to minimise light spill. Lighting columns would likely be aluminium with LED luminaires that can be directed more precisely, thereby reducing light spill. Warm white LEDs would be favoured where practicable.

Provide sufficient resources to ensure effective site management and associated wardening and monitoring where relevant

- D.3.41 The Contractor would be responsible for commissioning an appropriately qualified ecologist (to be named on the licence application) in order to monitor, manage and undertake the licenced ecology works detailed in the licence and associated method statement. The ecologist would manage the team of ecologists named on the licence.
- D.3.42 Due to the scale of the works, it is expected that several great crested newt licenced ecologists would be required to undertake works described in the method statement and these would be named in the licence.
- D.3.43 In addition, the Welsh Government would be responsible for commissioning an appropriately qualified, independent ecologist in order to undertake an independent compliance audit of works covered by the licence and method statement.

D.4 Mitigation contingencies

- D.4.1 Licenced works prior to construction and habitat enhancement and creation would be undertaken and/or supervised by great crested newt licenced ecologists named on the licence. Great crested newt licenced ecologists would be present on site during habitat clearance or disturbance works as described in this mitigation strategy in order to safely capture and translocate newts to receptor sites any newts that might be disturbed during the works.
- D.4.2 Licenced works would be undertaken outside of the great crested newt hibernation period (i.e. works would be undertaken between late February/March and September/October) or during appropriate weather conditions as confirmed by the onsite weather station (i.e. night time temperatures have been 5°C or higher for several nights and forecasts suggest temperatures would remain at those levels for the period of works).
- D.4.3 Records of trapping results would be monitored regularly so as to enable trapping effort to be adapted as necessary, e.g. should numbers of newts being captured in an area be high, the licenced ecologist might consider it necessary to increase the trapping effort by increasing the number of traps.
- D.4.4 Trapping in an area would continue after the minimum trapping period until 5 days of suitable weather conditions have been recorded without a great crested newt capture. Vegetation/habitat clearance works would not commence until this time.
- D.4.5 Amphibian exclusion and drift fencing would be monitored by the Contractor and great crested newt licenced ecologists on a regular basis throughout the trapping and construction periods so that repairs and/or replacements could be undertaken as soon as practicable. Should construction be delayed following the completion of trapping and vegetation/habitat clearance, fencing would be checked throughout the delay period so as to ensure any repairs are undertaken as soon as practicable and as required.
- D.4.6 Great crested newt licenced ecologists named on the licence would oversee fence and pitfall trap removal so as to capture and translocate any great crested newts that might be disturbed by the works.
- D.4.7 Site induction and toolbox talks would include the requirements of the final method statement and NRW licence. Personnel would be informed of the need to halt works in an area if a great crested newt is located and to contact the ECoW for instruction. NRW would be consulted with regard to mitigation measures required. It should be noted that if great crested newts are recorded in an area then an additional translocation exercise may be required. Should this occur, an amendment to, or additional licence application would be submitted to NRW. No works requiring a further licence would commence until such a licence had been obtained.
- D.4.8 With regard to habitat reinstatement, enhancement and creation of habitats, habitats would be monitored as described in this mitigation strategy throughout the establishment period in order to ensure successful establishment. Contingency measures would include the replacement of failed plants as necessary to prevent a significant gap in planting or vegetation cover, or failure of new habitats.
- D.4.9 In the unlikely event that large numbers of great crested newts were captured, as a contingency, the new ponds and wetland habitat which would be constructed to the north of the Caldicot Moor SSSI Mitigation Area as habitat for Cetti's warbler would be used as a receptor site.

Biosecurity Risk Assessment

D.4.10 Works would be undertaken in accordance with the biosecurity risk assessment and safe system of works attached at Annex 4.

E Post-Development Site Safeguard

- E.1 On completion of the construction phase, the Contractor would be responsible for ensuring landscaping (including new and enhanced waterbodies) is monitored and maintained for a period of five years in order to ensure successful establishment. Monitoring and maintenance works are not expected to result in any significant disturbance impact.
- E.2 Following the five year monitoring and establishment period Welsh Government would be responsible for management of landscaped areas within the highway boundary, the water treatment areas and the SSSI and other mitigation areas. Management is currently carried out by Welsh Governments' contractor, the South Wales Trunk Road Agent (SWTRA).
- E.3 It is likely that NRW would undertake management of the new reens and ditches, and this would include rotational clearance of vegetation and silts, and management of vegetation along channels and banks of the watercourse using methods sympathetic to the vegetation so as to minimise the impact on biodiversity. The detailed methods of management would be agreed with NRW.
- E.4 Due to the nature of management works, no significant disturbance impact is expected.
- E.5 Where habitats have been specifically created for great crested newt, e.g. the new ponds at Tatton Farm, and in the wet grassland south of the Euro Park Industrial Estate, management would take into account the specific requirements of the species and would ensure that there was good connectivity between breeding ponds and watercourses and suitable terrestrial habitat such as rough grassland, scrub and woodland. If ponds became choked with vegetation, they would be cleared out as necessary during the winter months.

Habitat/Site Management and Maintenance

- E.6 The Contractor would be responsible for ensuring the successful establishment of all areas of new planting and habitat creation until the completion of the aftercare period (five years post-completion).
- E.7 The Welsh Government would be responsible for ensuring appropriate long term management of new habitats, planting, replacement and culverted watercourses located within the boundaries of the scheme. Provisions would also be made so as to ensure NRW could continue to manage the reen system as appropriate.
- E.8 Habitat located outside the scheme boundary, including construction sites at Duffryn, Tata Steel and Magor, would be returned to land owners for on-going management.

Population Monitoring

E.9 Following the completion of translocation/displacement of great crested newts, watercourses and ponds into which great crested newts had been displaced or translocated would be surveyed for a period to be agreed with NRW as under the licence. Surveys would be undertaken where practicable in accordance with the presence/absence survey methodologies described in the *Great Crested Newt Mitigation Guidelines* (English Nature, 2001) and the *Herpetofauna Workers Manual* (Gent and Gibson, 2003). Should site conditions prevent all survey methodologies

being utilised, an adapted method of survey would be agreed in advance with NRW and the effectiveness would be monitored so as to inform ongoing surveys.

- E.10 A Habitat Suitability Index (HSI) assessment of the watercourses where great crested newts are displaced/translocated to and adjoining watercourses would also be undertaken as part of annual site monitoring requirements. This survey would be carried out in accordance with Oldham *et al.* (2000).
- E.11 Surveys would be completed by appropriately experienced NRW great crested newt licenced ecologists and results would be reported on an annual or as depending on the frequency of the survey to the Welsh Government and NRW, in a pre-approved format. Records would also be provided to the local biological records centre as a requirement of NRW great crested newt survey licences.

Post Development Mitigation Contingencies

- E.12 Results of the population monitoring surveys would inform the on-going management of watercourses. Management measures relating to the establishment and long-term management of new or replacement watercourses would be designed to be flexible so as to enable management to adapt to changing baseline conditions in order to meet the objectives of the method statement.
- E.13 The appropriately experienced great crested newt licenced ecologist(s) who would complete population monitoring and habitat surveys would report survey findings and management recommendations for the year ahead to Welsh Government and NRW, whose responsibility it would be to ensure recommendations are undertaken as practicable. If measures recommended by the ecologist are significantly different to those described in the licence method statement, NRW would be consulted and their agreement sought prior to carrying out those measures.

Mechanisms for Ensuring Delivery of Post-Development Works

- E.14 Welsh Government would be responsible for securing necessary funding and adhering to the requirements of the licence and method statement, which will include post-development works.
- E.15 The final *Great Crested Newt Method Statement* that would be submitted to NRW in support of the licence application would include all post development measures that would form part of the licenced works.
- E.16 Post-development works would be instructed and/or supervised as necessary by the principal ecologist named on the NRW licence and reported on by the ECoW or principal licenced ecologist.
- E.17 All ecology works detailed in the final *Great Crested Newt Method Statement* would be audited by an independent ecologist.
- E.18 All land related permissions would be agreed and secured prior to the commencement of works.
- E.19 The Welsh Government would be responsible for ensuring the management of new habitats.
- E.20 Provisions would also be made so as to ensure NRW could continue to manage the reen system within the boundaries of the development site until the completion of the

five year establishment period and within the operational boundaries of the site following the establishment period.

F

Table 3: Timing of Works

Works	Timing	Description of Works
	2018	
Creation of new ponds in great crested newt mitigation areas.	From July 2018	Ponds to be constructed on Welsh Government land at Tatton Farm and on land to the south of Euro Park as soon as practicable following the Contractor's access to the site.
Installation of amphibian exclusion fencing/half pipe barrier.	From July 2018 (depending on suitable weather conditions i.e. at least 5 ⁰ C night time temperatures).	Includes exclusion and drift fencing. To be installed prior to the commencement of trapping surveys.
Pitfall trap installation. Setting out of artificial refugia.	From July 2018 (with regard to pitfall traps, depending on suitable weather conditions i.e. at least 5 ⁰ C at night)	Installation of pitfall traps and setting out of artificial refugia alongside exclusion and drift fencing and/or half pipe barrier. Could be undertaken alongside fence installation.
Great crested newt trapping survey of areas within exclusion fenced line/half pipe barrier (pitfall traps and refugia).	July - October/November (or longer should weather conditions remain favourable i.e. night time temperatures at least 5 ⁰ C)	Minimum 30/60 nights trapping to extend until 5 consecutive trap nights with no capture achieved.
Hand search and destructive search.	Summer/autumn 2018 and prior to main construction works in the area. Following above trapping survey (and during suitable weather conditions i.e. night time temperatures of at least 5° C)	Hand-search and destructive search of any features within the construction site of potential value to resting/hibernating newts. To undertake simultaneously with drift fence removal where practicable.
Installation of temporary culverts for construction of the haul road.	From July 2018	Installation of temporary culverts (up to 12 m in length) so as to enable access to construct the haul road. Pre-installation survey to confirm no ecology constraints/advise as to necessary methodology to avoid ecology impacts.
Construction of replacement watercourses.	As soon as practicable following construction of the haul road (from July 2018)	Construction of replacement or diversion watercourses, where practicable expected to be prior to pumping out watercourses to be in-filled/permanently culverted. Translocation of soils and aquatic plants from watercourses to be in- filled/culverted to replacement watercourses.
Planting of trees, scrub and hedgerows.	November – February, depending on local weather conditions, as soon as practicable and when it can be confirmed ongoing works would not	Planting as detailed in the EMP.

Works	Timing	Description of Works	
	2018		
	create a potential risk to establishment.		
Removal of internal drift fencing/pitfalls under ecological supervision.	Summer/autumn 2018 and prior to main construction works in the area. Following the completion of trapping in the area and during suitable weather conditions i.e. whilst night time temperatures remain at or over 5 ^o C).	Not to be carried out during hibernation period, ensure perimeter exclusion fence / pipe remains intact and in good order.	
Installation of permanent culverts across retained watercourses.	Late 2018	Installation of permanent culverts in late 2018.	
Monitoring and maintenance of exclusion fencing / half pipe.	Until removal of fence / exclusion half pipe.	Monitor as part of ecologists' daily site checks during the active season for newts (i.e. mid-February until October/November or whilst night temperatures remain at least 5 ^o C).	
2019 – 2021 (until com	pletion of construction)		
Monitoring and maintenance of exclusion fencing / half pipe.	Until removal of fence / exclusion pipe line.	Monitor as part of ecologists' daily site checks during the active season for newts (i.e. mid-February until October/November or whilst night temperatures remain at least 5 ^o C).	
Management of new/replacement habitats	Throughout the year	In accordance with the Great Crested Newt Method Statement, ELEAP and SSSI Mitigation Strategy.	
Post-construction			
Removal of external exclusion fencing/half pipe barrier and reinstatement of soils where appropriate.	March- September/October depending on local weather conditions.	Removal of fencing under watching brief of NRW licenced ecologists.	
Remaining planting of trees, hedgerows and scrub.	November - February	Planting as early as practicable during the planting season.	
Management of new/replacement habitats	Ongoing	In accordance with the Great Crested Newt Method Statement, ELEAP and SSSI Mitigation Strategy.	

G Land ownership – Mitigation Site/Compensation Site

G.1 Mitigation Site/Compensation Site Ownership - construction

G.1.1 The Welsh Government would own the freehold of the footprint of the M4CaN Scheme and all land acquired for mitigation works.

G.2 Mitigation Site/Compensation Site Ownership - postconstruction

G.2.1 The Welsh Government would own the freehold of the footprint of the M4CaN Scheme and all land acquired for mitigation works during the operational phase.

H References

Amphibian and Reptile Group UK (2010) Advice Note 5

Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Griffiths, R.A., Foster, J., Wilkinson, J., Arnett, A., Williams, P. and Dunn, F. (2014) Analytical and Methodological Development for improved Surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford.

English Nature (2001) Great Crested Newt Mitigation Guidelines. English Nature.

Gent, T. and Gibson, S. (2003) Herpetofauna Workers Manual.

Highways Agency (2009) DMRB Volume 11, Section 3, Part 10. HD 45/09 Road Drainage and the Water Environment

Oldham, R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M. (2000) Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10(4), 143-155.

Figures

Figure 1: Site Location and Results of Desk Study



Legend

Limit of Permanent and Temporary Works for New Section of Motorway

- 1km Search Area
- 🔁 2km Search Area
- F: Common Frog
- T: Common Toad
- GCN: Great Crested Newt
- PN: Palmate Newt
- SN: Smooth Newt

 Ifton Quarry Ecology Survey: Pond Locations

Note: * highlights records with a four-figure grid reference (records have been plotted at the centre of the 1 km by 1km grid square they were recorded within). All other records fall within a 100 m by 100 m grid square or less and have also been plotted within the centre of the grid square they were recorded in.

Counts are not presented and therefore locations should only be used to infer presence. The scheme and search are shown reflects the design at time of survey.

Llywodraeth Cymru Welsh Government

Appendix SS10.6 GCN Mitigation Strategy

Amphibian Records

Figure: 1a	Revision: -	
Date: December 2016	Status: AT ISSUE	
Drawn: CR	Checked: KJ	
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Note: * highlights records with a four-figure grid reference (records have been plotted at the centre of the 1 km by 1km grid square they were recorded within). All other records fall within a 100 m by 100 m grid square or less and have also been plotted within the centre of the grid square they were recorded in. Counts are not presented and therefore locations should only be used to infer presence. The scheme and search are shown reflects the design at time of survey. Llywodraeth Cymru

Appendix SS10.6 GCN Mitigation Strategy

Amphibian Records

Figure: 1b	Revision: -			
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Figure 2: Survey Results (2015, 2016) and Mitigation







Permanent highway land within fenceline, including water treatment areas

Other permanent land take e.g. mitigation planting.

Temporary construction land

Ecological mitigation

Great Crested Newts Recorded on Land in 2015

Great Crested Newt Survey Area

Great Crested Newt Exclusion Fencing

eDNA Analysis – Positive Results Obtained in 2015, 2016

Great Crested Newt Mitigation

Indicative location of proposed culvert to include a minimum of 200 mm free board above the summer penning level of reens

Appendix SS10.6 GCN Mitigation Strategy

Great Crested Newt Survey Results (2015, 2016) and Mitigation

Figure: 2C	Revision: -
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Figure 3: Phase 1 Habitat Plan



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		prary Works for New Section of
	Motorway	
	250m Buffer area	
n	Target note	× Scrub
	Watercourse	Species-poor hedge with trees
	Species-rich intact hedge	Fence
	Species-poor intact hedge	Wall
New Plantation	HAVH Species-rich defunct hedge	Dry ditch
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Irack	Unimproved neutral grassland	SI Poor semi-improved grassland
	Caravan site	Tall ruderal
	Introduced shrub	Swamp
aunshonb	Scattered saltmarsh	Inundation vegetation
n 🔪	Broad leaved semi-natural Woodland	Marginal vegetation
A sues	Broad leaved plantation	Standing water
	Coniferous plantation	Intertidal mud/sand
31 Ysgubory La	woodland	Saltmarsh dense/continuous
A 34	Wixed semi-natural Woodland	Hardstanding
32 + 35	Mixed plantation Woodland	Arable
AV AV AV	Scrub dense continuous	Amenity grassland
Myrtle Nouse	Scrub scattered	Ephemeral/short perennial
29 29 29 29 29 29 29 29 29 29 29 29 29 2	Broadleaved plantation woodland	Building
33	Mixed parkland	Other behitet
A A	SI Semi-improved Neutral	
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	Caravar	n site		Tall ruderal
	Introduc	ed shrub		Swamp
	× × Scattere	ed saltmarsh		Inundation vegetation
	Broad le Woodla	eaved semi-natural		Marginal vegetation
	Broad le	eaved plantation		Standing water
	Woodla	nd		Intertidal mud/sand
	woodlar	nd		Saltmarsh dense/continuous
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	Mixed p	Mixed parkland		Other habitat
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	250m Buffer area	
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	Hedge Species-rich defunct	
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	Broad leaved semi-natural Marginal vegetation	
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	\$	Species-poor	r intact	hedge		Wall
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	₩₩₩₩ r	Species poor nedge with fe	r defun ence	ict	* * *	Boundary removed
D	₩₩₩ ⁸ t	Species-rich rees	hedge	with		Later bank
rain	g l	Jnimproved i rassland	neutral		SI	Poor semi-improved grassland
Drain	XXX (Caravan site				Tall ruderal
	li 🏹	ntroduced sh	nrub			Swamp
DRIGHT	्रू, S	Scattered sal	tmarsh	ı	$\langle / / \rangle$	Inundation vegetation
	E V	Broad leaved Voodland	semi-	natural		Marginal vegetation
SI		Broad leaved Voodland	planta	ation	8333	Standing water
		Coniferous pl voodland	antatio	on		Saltmarsh dense/continuous
See.	N V	/lixed semi-n Voodland	atural			Hardstanding
		/lixed plantat Voodland	tion			Arable
SI	<u> </u>	Scrub dense	contin	uous		Amenity grassland
107	×××× S	Scrub scatter	ed		^	Ephemeral/short perennial
	E e v	Broadleaved voodland	planta	tion		Building
	N	/lixed parklar	nd		····	Other babitat
2º	SI s	Semi-improve rassland	ed Neu	ıtral	+ +	Orchard
	li li	mproved gra	ssland	I		No access
M ²	N	/larsh/marsh	y gras	sland		Allotment
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	Legend		
	Limit of Permanent and Temporary Works for New Section of		
	Motorway		
	250m Buffer area		
11.12	 Target note Tree 	× Scrub	
	Watercourse	trees	
	Species-non intact hedge	+++ Fence	
	Species-rich defunct	Wall	
	₩₩ hedge	Dry ditch	
	hedge with fence	Earth bank	
	₩₩₩ Species-rich hedge with trees		
	Unimproved neutral grassland	Poor semi-improved grassland	
	Caravan site	Tall ruderal	
	Introduced shrub	Swamp	
D Cha	$\mathbb{E}_{\mathbf{x}}^{\mathbf{x}}$ Scattered saltmarsh	Inundation vegetation	
	Broad leaved semi-natural Woodland	Marginal vegetation	
	Broad leaved plantation Woodland	Standing water	
	Coniferous plantation	Saltmarsh	
Middle	Mixed semi-natural	dense/continuous	
A	Mixed plantation	A Arable	
	Woodland	Amenity grassland	
	Scrub scattered	Ephemeral/short perennial	
	Broadleaved plantation	Building	
	woodland	Bare Ground	
SI	Mixed parkland	Other habitat	
	Semi-improved Neutral grassland	+ + Orchard	
	Improved grassland	No access	
	Marsh/marshy grassland	Allotment	
SI SI	Note: 2015 survey area includes l area	Peter Sturgess 2015 NVC survey	
	N.C.		
The suffer is	Llywodraeth Cymru		
10	Welsh Government		
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112	Legend	
	Limit of Permanent and Ten Motorway	nporary Works for New Section of
	250m Buffer area	
AT T	 Target note Tree 	× Scrub
7	Watercourse	Species-poor hedge with trees
	Species-rich intact hedge	+++ Fence
	Species-poor intact hedge	Wall
HT Bar Cor	Species-rich defunct hedge	Dry ditch
A STATE	Species poor defunct hedge with fence	× × × Boundary removed
SI F	Species-rich hedge with trees	● ● ● Earth bank
• 113	Unimproved neutral grassland	SI Poor semi-improved grassland
	Caravan site	Tall ruderal
	Introduced shrub	Swamp
1	Scattered saltmarsh	Inundation vegetation
1 BE	Broad leaved semi-natural Woodland	Marginal vegetation
10.	Broad leaved plantation	Standing water
	Woodland	Intertidal mud/sand
- Star	woodland	Saltmarsh dense/continuous
gitter ter V satter	Mixed semi-natural Woodland	Hardstanding
	Mixed plantation Woodland	A Arable
<u>``</u>	Scrub dense continuous	Amenity grassland
	Scrub scattered	$\frac{1}{2} \frac{1}{2} \frac{1}$
	Broadleaved plantation	Building
		Bare Ground
	Semi-improved Neutral	Other habitat
Reen	grassland	+ + Orchard
	Improved grassland	No access
	Marsh/marshy grassland Note: 2015 survey area includes F	Allotment Peter Sturgess 2015 NVC survey
	area	
T	Ilywodraeth Cymru	
ns	Welsh Government	
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	Legend	Townson Warks for New Castion of	
Eq.	Motorway	Temporary Works for New Section of	
	250m Buffer area		
	Target note Tre	ee × Scrub	
	watercourse	trees	
	VVV Species-rich intact hed	ge	
ed vads	Species-poor intact here	dge Wall	
	AVA Species-rich defunct hedge	Dry ditch	
28m	Species poor defunct hedge with fence	$\times \times \times$ Boundary removed	
	Species-rich hedge wit trees	← ← Earth bank h	
J I	Unimproved neutral grassland	SI Poor semi-improved grassland	
A	Caravan site	Tall ruderal	
1	Introduced shrub	Swamp	
×,	Scattered saltmarsh	Inundation vegetation	
+++	Broad leaved semi-nate	ural Marginal vegetation	
	Broad leaved plantation	Standing water	
V W W AV V	Woodland	Intertidal mud/sand	
X	Coniferous plantation woodland	Saltmarsh	
SI I	Mixed semi-natural Woodland	Hardstanding	
	Mixed plantation	A Arable	
	Woodland	A Amenity grassland	
ly/	Scrub dense continuou	s	
	$x_{x} x_{x}$ Scrub scattered	Building	
TI-I	woodland	Bare Ground	
	Mixed parkland	Other habitat	
	Semi-improved Neutral grassland	+ + Orchard	
	Improved grassland	No access	
I	Marsh/marshy grasslar	Allotment	
	Note: 2015 survey area includ area	es Peter Sturgess 2015 NVC survey	
Hallinu			
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th			
PW PW	Llywodraeth Cymru		
House Cross	Welsh Government		
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	Leg	end					
	Limit of Permanent and Temporary Works for New Section of Motorway						
*		250m Buffer area					
	• 1	Farget note Tree	×	Scrub			
4		Watercourse	HH	Species-poor hedge with trees			
3	₩₩-	Species-rich intact hedge	+++	Fence			
	—	Species-poor intact hedge		Wall			
	₩₩	Species-rich defunct hedge		Dry ditch			
	+++11+++	Species poor defunct hedge with fence	× × ×	Boundary removed			
on 👫	₩₩₩	Species-rich hedge with trees	•••	Earth bank			
Wks		Unimproved neutral grassland	SI	Poor semi-improved grassland			
	\boxtimes	Caravan site		Tall ruderal			
A at 1	\bigotimes	Introduced shrub		Swamp			
*	× ,	Scattered saltmarsh		Inundation vegetation			
tle }		Broad leaved semi-natural Woodland		Marginal vegetation			
irness Castle		Broad leaved plantation		Standing water			
(disused) $\hat{\varphi}$		Woodland		Intertidal mud/sand			
4 .v.		Coniferous plantation woodland		Saltmarsh dense/continuous			
		Mixed semi-natural Woodland		Hardstanding			
Path		Mixed plantation Woodland		Arable			
	\boxtimes	Scrub dense continuous		Amenity grassland			
	× × ×	Scrub scattered	×× ×	Ephemeral/short perennial			
PPOTE		Broadleaved plantation		Building			
		Mixed parkland		Bare Ground			
	SI	Semi-improved Neutral		Other habitat			
		grassland		Orchard			
		Improved grassland		No access			
	Note: 2 area	Marsh/marshy grassland 015 survey area includes F	Peter Stu	Allotment rgess 2015 NVC survey			
Sev Station							
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	Legend						
	Motorway						
		250m Buffer area					
	-	Vatercourse	×	Scrub Species-poor hedge with			
	VAAL	Species-rich intact hedge		trees			
	~~~	Species non intact hedge	+++	Fence			
1-1 1-1		Species-rich defunct		Wall			
Pav	₩.	hedge		Dry ditch			
y Ground	+++11+++	Species poor defunct hedge with fence	* * *	Boundary removed			
Path	<del>₩₩₩</del>	Species-rich hedge with trees		Earth Dank			
,ηΨ. - ¹ ,		Unimproved neutral grassland	SI	Poor semi-improved grassland			
	$\boxtimes$	Caravan site		Tall ruderal			
7m	$\otimes$	Introduced shrub		Swamp			
	× × × ×	Scattered saltmarsh		Inundation vegetation			
-B		Broad leaved semi-natural Woodland		Marginal vegetation			
		Broad leaved plantation		Standing water			
\$		Woodland		Intertidal mud/sand			
		woodland		Saltmarsh dense/continuous			
		Mixed semi-natural Woodland		Hardstanding			
		Mixed plantation Woodland		Arable			
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		Broadleaved plantation		Building			
		Woodland		Bare Ground			
	SI	Semi-improved Neutral		Other habitat			
		grassland	+ +	Orchard			
		Improved grassland		No access			
	Note: 2	Marsh/marshy grassland	Deter Stu	Allotment			
HEIE	area	ond survey area includes r	eter Stu	igess 2013 NVC survey			
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# Figure 4: Landscape Environmental Masterplan (Extracts)
















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# Annex 1: 2014 Great Crested Newt Survey

[March 2016 ES Appendix 10.6]

# Annex 2: 2015 Great Crested Newt Survey

[March 2016 ES Appendix 10.22]

# Annex 3: 2016 Great Crested Newt Survey

[September 2016 ES Supplement Appendix S10.6]

# Annex 4: Biosecurity Risk Assessment and Safe Systems of Work

### M4CAN

### BIOSECURITY RISK ASSESSMENT AND SAFE SYSTEM OF WORKS

Note: The content of this document should be updated as required in order to take into account potential changes to best practice recommendations and potential new records of ecological constraints on site.

# Contents

1	Biosecurity safe system of works	1
2	Summary of Biosecurity safe systems of work and risk assessment	0

# **1** Biosecurity safe system of works

#### 1.1 Ecologist Contact Details

(a) Project Manager contact:

[Name] Tel.: Email:

(b) Principal Ecologist contact:

[Name] Tel.: Email:

#### 1.2 General Good Practice

- 1.2.1 General good practice to be followed during all site visits:
  - Arrive at the site with clean footwear, equipment and vehicle(s).
  - Before leaving the site remove mud, plants and other materials from boots, vehicles and equipment using a stiff brush where necessary.
  - Keep access routes to a minimum and whenever practicable, follow existing tracks.
  - Whenever practicable, park on areas of hard-standing.
  - Restrict the amount of equipment you take onto site to the minimum required.
  - Whenever practicable, avoid:
    - o driving through wooded areas;
    - areas with known plant disease;
    - o livestock areas;
    - contact with potentially infectious material e.g. *Rhododendron*, a primary host plant of *Phytophthora* diseases, especially when wilted/dying (i.e. showing signs of infection); and
    - areas of known *Chytridiomycosis* infection, known crayfish plague and other diseases or pathogens.
  - Schedule multiple site visits so that sites of greatest risk with regard to invasive species, diseases or pathogens are visited at the end of the day.
  - If you do come into contact with potentially infectious material (e.g. dead amphibians, crayfish, dying *Rhododendron*) you must:
    - make a note of findings and the location of material (take photographic records of plant material);

- o notify the Managing/Project Ecologist of findings as soon as practicable;
- o dispose of or thoroughly disinfect with an appropriate disinfectant* all external clothing and footwear (e.g. Virkon ® broad spectrum disinfectant (1% solution or 10g/l)*, or Propeller[™] disinfectant if addressing a *Phytophthora* infection); and
- dispose of powder-free disposable gloves appropriately.

* Virkon [®] broad spectrum disinfectant (1% solution or 10g/l)* or, for Phytophthora infections, Propeller[™] disinfectant. All disinfectants should be used and disposed of in accordance with manufacturer and product label instructions and should not be disposed of in waterbodies. Take care to ensure all soil is removed prior to treatment and disinfectant has dried/evaporated before leaving or entering site. Take care so as to ensure no disinfectant enters a waterbody.

- 1.2.2 When carrying out a survey of ponds and watercourses:
  - clean boots (using a hard bristle brush if necessary) and disinfect (away from waterbodies to prevent potential pollutant incidents) all equipment that might come into contact with water using Virkon ® suitable for wetland habitat (1% solution or 10g/l) prior to each survey visit and at the end of the survey, or appropriately dispose of equipment between sites;
  - appropriately dispose of powder-free disposable gloves between site visits; and
  - ensure vehicle tyres and wheel arches are cleared of mud, plants and other organic material before leaving each site and at the end of the survey. Leave removed material on site.

#### 1.3 **Detailed Survey Requirements**

#### Amphibian - Chytridiomycosis disease

- 1.3.1 Amphibian *Chytridiomycosis* disease is caused by a fungus called *Batrachochytrium dendrobatidis*. It is generally considered that the fungus can be transported to new locations via the movement of materials that have come into contact with waterbodies or the movement of amphibians themselves. The disease can also be transferred between amphibians.
- 1.3.2 Therefore, when handling animals the following measures should be set in place.
  - Avoid contact with dead or dying amphibians or other fauna.
  - Wear appropriate protective clothing which can be easily disinfected or disposed of at the end of each survey visit.

- If disinfecting, equipment and boots that might come in contact with water should be thoroughly treated with Virkon ® suitable for aquatic habitats before leaving each site and allowed to dry completely before being re-used. Prior to disinfectant, equipment and boots should be cleaned of mud, plants and other materials using a hard bristled brush.
- When surveying waterbodies using bottle traps, consider using different bottle traps for each waterbody or between each waterbody, take care to remove all organic material and disinfect with Virkon 
   ß for aquatic habitats and allow to dry.
- Avoid using bottle traps in waterbodies with *Chytridiomycosis*.
- Equipment to be re-used should be wrapped in plastic bags and stored in plastic boxes in vehicles.
- Wear disposable, powder-free gloves that should be disposed at the end of each survey visit.
- Hands should be wiped thoroughly with disinfectant alcohol wipes or 70% alcohol solution between each site visit.
- Field clothes can be disinfected by washing at 50°C.
- 1.3.3 Should any dead or dying animals be located, their symptoms and location should be reported to the Managing/Project Ecologist as soon as practicable.
- 1.3.4 Where practicable captured animals should be temporarily kept in individual containers so as to minimise the potential spread of disease and individuals from different water bodies should never be kept together, to prevent the potential spread of disease between different groups or populations.

#### **Invasive Plant Species**

#### Invasive aquatic plant species

- 1.3.5 The following invasive plant species are potential risk species in Wales (those in bold have been recorded in M4CaN surveys):
  - Canadian pondweed (Elodea Canadensis)
  - Curly waterweed (*Lagarosiphon major*)
  - Floating pennywort (Hydrocotyle ranunculoides)
  - Least duckweed (Lemna minuscula)
  - New Zealand pygmy weed (Crassula helmsii)
  - Nuttall's waterweed (Elodea nuttallii)

- Parrot's-feather (*Myriophyllum aquaticum*)
- Water fern (Azolla filiculoides)
- Water primrose (Ludwigia peploides)
- Waterweeds (other Elodea) (*Elodea* spp.)
- 1.3.6 All surveyors should be made aware of the identification of the above species. Identification sheets are available at:

#### https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=47.

- 1.3.7 Should any invasive plant species be located, where necessary, a photographic record should be taken to confirm identification and details of the location (preferably as a global positioning system (GPS) location reference) should be recorded. Findings should be reported to the Principal Project Ecologist as soon as practicable.
- 1.3.8 Avoid surveying waterbodies containing invasive plant species using a net. Where this cannot be avoided take care to remove plant material from the net and disinfect with Virkon ß suitable for aquatic habitats and allow to dry at the end of each site visit. Keep nets wrapped in plastic bags between site visits. Where practicable, use different nets for those affected waterbodies.
- 1.3.9 When surveying using bottle traps, consider using different bottle traps for each waterbody or take care to remove all organic material and disinfect with Virkon ® for aquatic habitats and allow to dry between waterbodies. Whenever practicable avoid using bottle traps in waterbodies containing *Crassula*.

#### Invasive terrestrial plants

- 1.3.10 The following invasive terrestrial plant species are known to be present in Wales (those in bold have been recorded in M4CaN surveys):
  - American skunk cabbage (Lysichiton americanus)
  - Giant hogweed (Heracleum mantegazzianum)
  - Himalayan balsam (Impatiens glandulifera)
  - Japanese knotweed (Fallopia japonica)
  - Montbretia (Crocosmia x crocosmifolia)
  - Rhododendron (*Rhondendom ponticum*)
  - Russian vine (*Fallopia baldschuanica*)
  - Turkey oak (Quercus cerris)

#### Various cotoneaster species (Cotoneaster sp)

1.3.11 All surveyors should be made aware of the identification of the above species. Identification sheets are available at:

#### https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=47.

1.3.12 If any of the above species are located on site, or any other invasive (or potentially invasive) species are located, a photographic record of the plant should be taken for later confirmation of identification and the location of the plant (preferably as a global positioning system (GPS) location reference) should be recorded. Findings should be forwarded to the Principal Project Ecologist as soon as practicable.

#### Signs of plant diseases

- 1.3.13 All surveyors should be made aware of signs that could indicate plants are infected by the following diseases:
  - Ash dieback disease (*Chalara fraxinea*). Symptoms guide:

#### http://www.forestry.gov.uk/pdf/Symptoms guide Chalara dieback of ash 2012.pdf/\$FILE/ Symptoms guide Chalara dieback of ash 2012.pdf

• *Phythopthora ramorum*. Symptoms guide:

http://www.fera.defra.gov.uk/plants/publications/documents/factsheets/phytophthoraRamor umFactsheet.pdf.

• Alder disease (*Phytophthora alni*). Symptoms guide:

#### http://www.forestry.gov.uk/website/forestresearch.nsf/ByUnique/INFD-737HZD.

- 1.3.14 Photographic evidence of any potential signs of plant disease should be taken along with a record of the plant species and location (preferably as a global positioning system (GPS) location reference). Findings should be forwarded to the Principal Project Ecologist as soon as practicable and an updated safe system of works will be produced by the Project Ecologist. The Principal Ecologist should notify the Forestry Commission and/or AshTag project of the location of any new signs of disease.
- 1.3.15 Should signs of disease be recorded, the following actions should be taken.
  - Where practicable, alternative access routes should be used so as to avoid disturbance of infected ground.
  - Vehicle access and parking should be off-site or away from infected areas.
  - Avoid driving through wooded areas.

- If plant samples are collected to aid identification, equipment should be disinfected using an appropriate disinfectant** immediately after cuttings are taken and each sample should be stored in a separate well-sealed plastic container/bag. Disposable powder-free gloves should be disposed of between sites.
- Prior to leaving the site, extra vigilance should be practiced when cleaning vehicles (tyres and wheel arches), equipment, boots and clothing.

** Virkon [®] broad spectrum disinfectant (1% solution or 10g/l)* or, for Phytophthora infections, Propeller[™] disinfectant. All disinfectants should be used and disposed of in accordance with manufacturer and product label instructions and should not be disposed of in waterbodies. Take care to ensure all soil is removed prior to treatment and disinfectant has dried/evaporated before leaving or entering site. Take care so as to ensure no disinfectant enters a waterbody

## 2 Summary of biosecurity safe systems of work and risk assessment

### Table 1: Risk Assessment for Ecologists.

Risk activity				Risk level after	Measures set in place
reference	Risk activity	<b>Risk level</b>	Measures to set in place	measures	(Y/N)
NOTE: All disinfectants should be used and disposed of in accordance with manufacturer and product label instructions and she disposed of in waterbodies. Take care so as to prevent run-off into waterbodies. Virkon ® is a suitable broad spectrum disinfect solution or 10g/l)* for general use and for use when likely to come into contact with water. Use Propeller [™] disinfectant for in are known Phytophthora infections. Take care to ensure all soil is removed and disinfectant has dried/evaporated before leaving or Take care so as to ensure no disinfectant run-off into a waterbody.					ld not be t (1% s with ntering site.
	General	Low	Safety boots (sturdy walking boots) will be worn on site walkovers. Ensure clothes, boots and equipment are clean before arriving on site/leaving site - remove organic material with a stiff brush/water and disinfect with an appropriate disinfectant. COSHH assessment will be provided for the disinfectant. Use disposable, <u>powder-free</u> gloves. Hands should be wiped thoroughly with disinfectant alcohol wipes or 70% alcohol solution between each site visit Field clothes can be disinfected by washing at 50-60°C.	Low	
1	Use of vehicles	Low- medium (no risk recorded to date)	Ensure tyres are clean before arriving on site/leaving site and when moving from one off-road site to another - remove organic material with a stiff brush/water and disinfect tyres and wheel arches with Virkon ®. If <i>Phytophthora</i> infection has been identified disinfect with Propeller [™] . Whenever practicable follow hard-standing roads and tracks and use hard-standing parking areas. When off-road/track driving or parking is required remove soils and organic material from tyres using a hard bristle brush prior to leaving site.	Low	

Risk activity				Risk level after	Measures set in place	
reference	Risk activity	<b>Risk level</b>	Measures to set in place	measures	(Y/N)	
			Do not drive through wooded areas.			
			Avoid livestock areas where practicable.			
			Avoid driving across areas where invasive plant species are located or plant diseases are recorded.			
			Take only the equipment required onto site.			
		Low-	Avoid contact with invasive plant species. Photograph plants for identification purpose and report presence and locations (including GPS refs if possible) to Project's Principal Ecologist as soon as practicable.*			
2	Terrestrial m surveys re to	2 Terrestrial surveys medium (no risk recorded to date)	medium (no risk recorded	Avoid noticeably diseased plants, note symptoms (photograph) and record locations (including GPS refs if possible). Report presence to Principal Project Ecologist as soon as practicable.*	Low	
			to date) If come into contact with diseased plant – dispose of powder-free gloves in an appropriate way, disinfect be equipment with Virkon ® broad spectrum disinfectan 10g/l)* or, for <i>Phytophthora</i> infections, Propeller™ di from waterbodies.	If come into contact with diseased plant – dispose of disposable powder-free gloves in an appropriate way, disinfect boots and equipment with Virkon ® broad spectrum disinfectant (1% solution or 10g/l)* or, for <i>Phytophthora</i> infections, Propeller [™] disinfectant away from waterbodies.		
		Low	Consider using different bottle traps per waterbody <u>or</u> between each waterbody, take care to remove all organic material and disinfect with Virkon ® for aquatic habitats and leave to dry completely before re-use. Equipment to be re-used should be wrapped in plastic bags and stored in plastic boxes in vehicles.			
3	Aquatic surveys Aquatic to date	no risk recorded to date)	If practicable, avoid using bottle traps in waterbodies with <i>Chytridiomycosis</i> . Consider using different bottle traps per waterbody or take care to remove all organic material and disinfect with Virkon ® and leave to dry between surveys. Where practicable, avoid using bottle traps in ponds containing <i>Crassula</i> .	Low		
			Avoid surveying waterbodies containing invasive plants with a net. If unavoidable thoroughly disinfect with Virkon ® and leave to dry between waterbodies. Where practicable, use a different net for the pond containing invasive species.			

Risk activity reference	Risk activity	Risk level	Measures to set in place	Risk level after measures	Measures set in place (Y/N)
			Inform the Project Ecologist as soon as practicable if invasive plants are located, provide photographic records if possible and details regarding the location (including GPS ref if possible)*.		
			Avoid contact with dead or dying amphibians or other fauna. Report any dead or dying amphibians to the Project Ecologist as soon as practicable*.		
			If required, captured animals from one waterbody should not be kept in temporary storage together with individuals from another waterbody.		

* To update risk assessment and safe system of works in response to site conditions.

### Table 2: Overall risk levels – to complete per survey type.

ECOLOGY SURVEY:						
Factor	Number of sites/ponds	Risk level	Risk score	Score ("X")		
Number of sites visited	1-10	Low	1			
	11-100	Medium	2			
	101+	High	3			
Area covered	0-10km ²	Low	1			
	11-100km ²	Medium	2			
	100km ² +	High	3			
Value of habitat feature surveyed	Local/district	Low	1			
value of habitat feature surveyed	County	Medium	2			
	Regional-UK	High	3	)		
Overall Score		Low	3-4			
		Medium	5-7			
		High	8-9			
Undertake measures described above and risk will be decreased	d to low.					

Completed by:

Verified on site by:

[Signature]

[Signature]

Verified on site by:

[Signature]

[Name] [Date]

[Name] [Date]

[Name] [Date]

### Annex 5: Specifications for Great Crested Newt Fencing and Half Pipe Barriers

Specification for Great Crested Newt Fencing (from English Nature, 2001)

#### Figure 4: Fence and pitfall trap design

Recommended design for exclusion fence (temporary amphibian fence), drift fence, and pitfall trap placement. This design can be used for a variety of capture and exclusion/retention purposes (see text and <u>Figure 5: Common fencing and trapping patterns</u>).



### Specification for a Half Pipe Barrier



# Annex 6: Compliance Audit

### Annex 6: Compliance Audit

Ref.	Performance Indicator	Evidence Required	Compliant (Yes/No) / comments and actions to be taken – to be completed and initialled by the auditing ecologist
1	NRW GCN licence is available for inspection by any authorised persons on demand.	Licence is available for inspection on site.	
2	Prior to the commencement of licenced work, the licensee will advise the relevant NRW Species Officer of the date when the works will start.	Written or electronic documentation of notification of start of works.	
3	No accredited agent of the licensee shall act under licence unless they are in possession of a letter signed by the licensee appointing them by name as a duly accredited agent of the licensee for the purposes of the licence. All accredited agents shall carry with them the said letter and a copy of the licence when working on site. Accredited agents shall produce the letter and a copy of the licence to any police constable or NRW Officer or other authorised person on demand.	All relevant accredited agents have copies of licence holder's letter of authorisation and the licence. The letter and licence is available for inspection.	
4	No assistant of the licensee or the licensee's accredited agents shall act under the licence unless under the direct supervision at all times of an accredited agent. The assistant shall carry with them at all times a letter signed by the licensee and/or accredited agent appointing them by name as an assistant for the purpose of the licence.	All relevant assistants have copies of licensee's/accredited agent's letter of authorisation and the licence. The letter and licence is available for inspection.	

Ref.	Performance Indicator	Evidence Required	Compliant (Yes/No) / comments and actions to be taken – to be completed and initialled by the auditing ecologist
5	A suitably experienced GCN licensed ecologist will be appointed in order to manage the team of named accredited agents/assistant ecologists and provide guidance and instruction.	Letter, contract or other document confirming the appointment of a project managing ecologist. Log (end of project) shows that a project managing ecologist has been retained during lifetime of licence.	
6	If any of the above-mentioned ecologists are replaced for whatever reason, or if additional ecologists are commissioned to work under the licence, the necessary NRW change of ecologist form will be completed and submitted to NRW.	Appropriate forms are available for review within 48 hours. Confirmation of approval from NRW for the new licenced ecologist is available for review.	
7	Pre-commencement inductions and toolbox talks will include the requirements of the GCN licence and associated method statement. The induction will cover the legal status of GCNs and actions to be taken if GCNs are encountered.	Induction and toolbox talks available for review – confirm relevant content. List of induction attendees available.	
8	Preparation and implementation of the bio-security risk assessment and safe system of works.	<ul> <li>Bio-security risk assessment and safe system of works is available for inspection.</li> <li>Required signatures are included on risk assessment and safe system of works confirming implementation of biosecurity measures.</li> <li>Field observations shows evidence of biosecurity measures e.g. foot washes / vehicle cleaning / limited access routes / awareness by all on site.</li> </ul>	

Ref.	Performance Indicator	Evidence Required	Compliant (Yes/No) / comments and actions to be taken – to be completed and initialled by the auditing ecologist
9	Licenced works monitoring to be undertaken as required under the method statement pre, during and post construction.	Log of monitoring activities is available for inspection within 48 hours. Log confirms monitoring of licenced works and works described in the licence method statement has been implemented pre, during and post construction.	
10	Amphibian fencing to be installed in accordance with the locations and specifications provided in the GCN licence method statement;	<ul> <li>Log and field observations show fencing has been installed:</li> <li>in correct locations; and</li> <li>in accordance with the licence method statement.</li> </ul>	
11	Amphibian fencing to be inspected every 24 hours and repairs completed within 12 hours. Fence inspection and maintenance will be required throughout the duration of construction works.	A suitable log has been maintained of all of inspections and required repairs. Log is available for inspection within 48 hours. Log confirms that amphibian fencing has been inspected every 24 hours and repairs completed within 12 hours. Fences have been kept clear of vegetation/other material that may enable newts to climb over the fence.	
12	Pitfall traps to be installed as described in the GCN licence method statement. Trapping only undertaken when dusk air temperature is	<ul> <li>Log of activities, including use of pitfall traps, is available for inspection within 48 hours.</li> <li>Log and field observations - confirm</li> </ul>	

Ref.	Performance Indicator	Evidence Required	Compliant (Yes/No) / comments and actions to be taken – to be completed and initialled by the auditing ecologist
	expected to exceed 5°C.	traps/refugia:	
	Traps set overnight to be emptied by 11 a.m. the following morning.	- are as described in the method statement; and	
	Should for any reason, pitfall traps be left open during	- were installed in the correct locations.	
	the day they must include features to avoid distressing any protected species caught.	Logs confirm:	
	Traps to be emptied at least once every 24 hours.	<ul> <li>pitfall traps used only on nights when dusk air temperature expected to exceed 5°C;</li> </ul>	
	Refugia to be set out in appropriate habitat and as described in the licence method statement.	<ul> <li>traps set overnight were emptied by 10 a.m. the following morning;</li> </ul>	
		<ul> <li>pitfall traps left open in the day include measures to avoid distressing species trapped;</li> </ul>	
		- traps emptied at least once every 24 hours.	
13	Different species of amphibians to be held and transported in separate containers.	<ul> <li>Log of activities, including use of containers, is available for inspection within 48 hours.</li> </ul>	
		<ul> <li>Log shows different amphibian species transported in separate containers. Containers available for inspection.</li> </ul>	
14	All newts to be released within 2 hours of removal from traps.	<ul> <li>Log of activities is available for inspection within 48 hours.</li> </ul>	
		<ul> <li>Log shows newts released within 2 hours.</li> </ul>	

Ref.	Performance Indicator	Evidence Required	Compliant (Yes/No) / comments and actions to be taken – to be completed and initialled by the auditing ecologist
15	A daily log of all newts trapped or found to be kept and made available to NRW at 48 hours' notice.	<ul> <li>A daily log of all newts trapped or found is available for inspection within 48 hours.</li> </ul>	
16	Drift fencing inside exclusion fencelines to be removed under watching brief of GCN licenced ecologist.	<ul> <li>Log confirms licensed ecologist provided permission to commence fence removal.</li> <li>Log of works available to review within 48 hours.</li> <li>Log provides details of GCN captures and translocations.</li> <li>Log and site observations confirmed: <ul> <li>ecological watching brief provided for all fence removal; and</li> <li>captured animals translocated in appropriate containers, different species in separate containers and within 2 hours of capture.</li> </ul> </li> </ul>	
17	Destructive searches not to commence until the GCN licensed ecologist confirms translocation survey in any given area has been completed in accordance with the licence method statement and grants permission to commence the destructive search in an area.	<ul> <li>Log available for review within 48 hours.</li> <li>Written/email sign-off by GCN licensed ecologist available for review within 48 hours.</li> <li>Log confirms destructive search undertaken after permission granted by GCN licensed ecologist.</li> </ul>	
18	Destructive searches to be undertaken in accordance with the GCN licence method statement.	<ul> <li>Log of destructive searches, including GCN captured, is available for inspection within 48</li> </ul>	

Re	f. Performance Indicator	Evidence Required	Compliant (Yes/No) / comments and actions to be taken – to be completed and initialled by the auditing ecologist
19	Habitat clearance and construction works in areas fenced with amphibian exclusion fencing not to commence until the GCN licenced ecologist confirms the translocation survey and habitat destructive searches have been completed in accordance with the GCN licence method statement and has provided permission to commence.	<ul> <li>hours.</li> <li>Log and site observations confirm: <ul> <li>species translocated in appropriate containers, different species/container, within 2 hours of capture.</li> <li>destructive searches completed as required and supervised by a GCN licenced ecologist.</li> </ul> </li> <li>Log of activities, including clearance activities, is available for inspection within 48 hours.</li> <li>Log confirms works did not commence until the project managing ecologist confirmed satisfactory completion of translocation and searches and gave permission to commence.</li> <li>Log and site observations confirm: <ul> <li>GCN licenced ecologists provided watching brief as required.</li> <li>Works undertaken in accordance with method statement – soft-felling, limited access/extraction routes, retention of some timber/dead wood.</li> </ul> </li> </ul>	