15 SCHEDULE OF MITIGATION

15.1 Introduction

15.1.1 This chapter summarises the various mitigation measures that have been proposed to offset the potential impacts of the proposed wind farm. These mitigations have been proposed to reduce the level of any impact thus ensuring it is not significant.

15.1.2 Alongside each mitigation measure identified, the proposed mechanism by which it would be adopted, implemented or enforced has been provided as well as the period in which the mitigation measure would be undertaken.

Table Error! No text of specified style in document.**.1 Schedule of Mitigation**

ES Chapter	Potential Effect	Mitigation Proposed	Means of Implementation and timing
Ecology	General	Measures required to address ecological concerns during construction would be detailed within the Construction Environmental Management Plan (CEMP). This would address all embedded (tertiary) mitigation including any preconstruction surveys to update and inform the baseline. A construction phase lighting plan to minimise potential displacement impacts on bats (and nocturnal birds) would be appended to the CEMP / sit alongside it. Proposals to monitor impacts on protected species during construction and operation would be set out in an Ecological Management Plan (EMP), the content of which would be agreed with the planning authority at the preconstruction stage. The EMP would set out broad objectives for species mitigation and monitoring. The Habitat Management Plan (HMP) would set out measures for achieving biodiversity net benefit over the operational life of the wind farm. Overall objectives and how these would be achieved would be broken down and timetabled, and key milestones and review dates identified. The potential benefits of the proposals to reptiles, amphibians, breeding birds and invertebrates, as well as to habitat quality, would be detailed.	A Construction Environmental Management Plan (CEMP), Ecological Management Plan (EMP) and Habitat Management Plan (HMP) would be agreed with the planning authority prior to construction and implemented during construction, operation and decommissioning as proposed.
	Impact on bats during operation	Monitoring would initially comprise fatality searches for bats using dog search teams during year one post-construction. Methods would reflect industry standard guidance (NatureScot *et al.*, 2021), and would include searches for dead bats during both summer and autumn. Searches would be completed at all turbines and would be supplemented by searcher efficiency and carcass removal (scavenging	EMP would be agreed with the planning authority prior to construction and implemented during construction and operation as proposed.

		rate) surveys. The results of monitoring in year one post-construction would be reported to NRW and CCBC and TCBC, and the requirement for further monitoring in subsequent years determined following consultation. A cut in speed for generation of 4 m/s at nacelle height would apply between April and October inclusive, between half an hour before sunset and half an hour after sunrise. Additionally, where the potential for impacts on bats is identified as informed by data on bat activity in relation to weather parameters other measures may be taken to minimise the risk to them. This might include feathering at idle and generation curtailment at all turbines.	
	Impacts on great crested newts during construction and operation	All work within 500 m of ponds that have known use by great crested newts would be completed under licence. Where the access route passes between ponds that have newts present, exclusion fencing would be required to prevent animals accessing the construction area, and bucket traps would be used to capture individuals. These would be moved to ponds or specially-constructed refugia by experienced and licenced ecologists. Pond creation would also minimise the potential for effects to occur and ensure the local favourable conservation status of the species is not affected. The detailed design and location of the ponds will need to be confirmed post consent in consultation with the commoners. Mitigation for impacts on great crested news during construction and operation would be set out in a Great Crested Newt Conservation Plan, which would form a component of the proposed Ecological Management Plan. The response of the great crested newt population to habitat creation would be monitored post construction in accordance with licence requirements.	EMP would be agreed with the planning authority prior to construction and implemented during construction and operation as proposed.
	Impacts on reptiles during construction	All vegetation within the footprint of the proposed wind farm would be managed prior to commencement of the construction phase. All vegetation within the footprint of the proposed Wind Farm infrastructure would be reduced to ground level over a two-stage cutting regime to allow reptiles to disperse from the construction	EMP would be agreed with the planning authority prior to construction and implemented during construction as proposed.

		area. These areas would be checked by an ecologist prior to ground works taking place. Vegetation in these areas would not be allowed to re-grow once reduced down to ground and cutting should be carried out regularly as required throughout the construction period.	
	Impact on mammals crossing the site	Although no impact on mammals crossing the site is likely, precautionary measures would be put in place to prevent animals falling into open trenches / workings if moving through the works area at night.	EMP would be agreed with the planning authority prior to construction and implemented during construction as proposed.
Ornithology	Impact on ornithology during construction	For any elements of the work that cannot be completed outside the breeding season, construction phase surveys for active nests ahead of ground works would take place. If breeding birds are found within the development footprint, work in the affected area would be re-scheduled until after the young birds have successfully fledged (or breeding has failed). It may be possible to clear areas for subsequent development ahead of the breeding season, and keep these areas cut short to prevent birds from nesting. Maintenance of the sward in these areas would have to be regular and informed by checks by an ecological clerk of works.	EMP would be agreed with the planning authority prior to construction and implemented during construction and operation as proposed.
	Impacts on ornithology during operation	Boxes for kestrel would be sited away from the wind farm footprint to encourage the existing local population to use areas of the common outside of the turbine array for foraging. Measures to improve the heathland habitats on site would be set out in the HMP. These are likely to have a positive effect on red grouse and on ground-nesting passerines.	EMP would be agreed with the planning authority prior to construction and implemented during construction and operation as proposed.
Cultural Heritage	Impact on non-designated historic assets of archaeological interest during construction	Proposed mitigation measures related to permanent physical effects would be proposed to be initially by trial trenching followed by suitable excavation/investigation depending on the results of the trial trenching, along with appropriate recording, reporting, monitoring and archiving of the resource. However, as no significant effects on non-designated historic assets of archaeological interest are anticipated, no specific mitigation measures are proposed.	No significant effects on non-designated historic assets of archaeological interest are anticipated and as such no specific mitigation measures are proposed.
Hydrology and hydrogeology	Pollution of watercourses due to pollution event	A location map of all potential contamination sources would be produced, and would include fuel, oil and chemical storage areas; vehicle compounds, refuelling sites, waste depots and on-site sewage systems. Mitigation is to be incorporated in accordance with NRW's Pollution Prevention guidance notes. Best practice would be adopted for handling potentially polluting substances, such as fuel, oil, cement, and concrete additives, including:	Construction Environmental Management Plan (CEMP), which would be agreed with the planning authority prior to construction and implemented during construction.

		Designated facilities designed and used for storage and refuelling, away from watercourses; A list of emergency procedures, responsive to a risk assessment of areas of high sensitivity; Site induction of all personnel on emergency spillage procedures and staff trained in emergency procedures. A contact list for emergency services, the relevant environmental regulators, the local water supply and sewerage undertakers, the Health and Safety Executive and specialist clean up contractors, if required; and Emergency response equipment available at appropriate locations. Specific measures for the mitigation of a pollution event include: • The placement of drip trays under plant/vehicles when not in use; • The regular inspection and maintenance of plant to prevent leakage of fuel or oil; • The use of interceptors to prevent oil/fuel/grit discharging into watercourses; • The bunding of any fuel or oil store to at least 110 % of the volume of the contaminant being stored (or to contain 125 % of the largest tank's capacity in the case of multiple storage tanks); • The siting of potentially polluting activities such as refuelling and vehicle maintenance within the identified construction compounds/parking area; • The use of impermeable membranes wherever there is a risk of a potentially polluting substance infiltrating the ground.	
		A set of procedures to be adopted in the case of a pollution event occurring would be kept on site at all times. All construction staff would be made aware of these procedures and the location where they are kept. The procedures would detail the location(s) of potential sources of contamination, the responsible person on site to deal with any contamination event, emergency contacts in the event of a spill and initial actions to be taken should any spill occur. Spill kits would be kept on site at all times and staff would be made aware of their location and procedures for use.	CEMP to be agreed with the planning authority prior to construction and implemented during construction.

	Pollution of watercourses due to sedimentation or erosion event	A Sustainable Drainage Management Plan (SDMP) (included in Appendix 9.1) would be issued to the Contractor and would form part of the Contract documents. The mitigation measures identified in the SDMP would inform the final wind farm sustainable drainage strategy. The specific mitigation measures against sedimentation and erosion outlined in the SDMP would be implemented by the Contractor.	Sustainable drainage management plan, to be agreed as part of the CEMP with the planning authority prior to construction and implemented during construction.
	Pollution of watercourses due to runoff event	The implementation of the controlling runoff measures identified in the SDMP would maintain the existing flow regime as far as practicably possible. Runoff from tracks and hardstands would be attenuated in swales and settlement ponds. Attenuated flows would be discharged over existing vegetation prior to discharging into receiving watercourses, as per the existing drainage regime for the site.	Sustainable drainage management plan, to be agreed as part of the CEMP with the planning authority prior to construction and implemented during construction.
	Impacts on peat hydrology	Measures to preserve site hydrology identified in the SDMP would be implemented during the construction phase to prevent changes to peat hydrology. Good construction practice and methodologies would be incorporated into the CEMP and monitored during the construction phase. They would include but not be limited to the following: • Measures to include the identification and demarcation of zones of sensitive drainage or hydrology in areas of construction; • Measures to ensure that accelerated degradation and erosion of exposed peat deposits does not occur as the break up of the peat top mat has significant implications for the morphology, and thus hydrology, of the peat (e.g. the minimisation of off-track plant movements within areas of peat); and • The development of robust drainage systems that would not create areas of concentrated flow and that would require minimal maintenance. Where hydrological impacts are possible, designing and emplacing mitigation measures which would reproduce upslope hydrological processes downslope of the infrastructure, through: a. Excavation of necessary upslope drainage ditches, including upslope interception ditches at construction sites and upslope trackside drains where needed. b. Routing intercepted upslope runoff and seepage through the infrastructure in regular culverts.	Sustainable drainage management plan, to be agreed as part of the CEMP with the planning authority prior to construction and implemented during construction.

		c. Excavation of downslope, contour-parallel recharge trenches as close to the infrastructure as possible. The intercepted water would flow into and pond evenly along the recharge trench, and either infiltrate into the ground downslope or overtop diffusely during significant rainfall events, the result being to reproduce the cross-slope distribution and nature of the hillslope hydrology. It is important to note that under this approach, the previous practice of directing intercepted clean water into nearby streams, or discharging it at discrete points on the downslope hillside, would not be used. d. Designing, excavating and maintaining a dirty water system, with appropriate treatment, within the infrastructure hydrological envelope, defined by a-c above.	
	Pollution from borrow pits	Cut-off drainage and / or face crest bunding would divert surface flow around the operational areas and leave only incident rainfall to collect in the borrow pit. All cut-off drains would be constructed in advance of any operations occurring within the site. Borrow pit floor levels would slope gently down to the rear of the areas forming a natural pool to retain any surface water and enable suspended sediments to settle out. Water collected in a sump in the low point of the borrow pit would then be pumped to a settlement pond (located within the proposed borrow pit areas). No water from excavations and dewatering activities would be allowed to enter surface waters directly. Stockpiles (of superficial deposits and aggregate) would be located in suitable locations to ensure that there is no risk of material washing out and contaminating watercourses.	Sustainable drainage management plan, to be agreed as part of the CEMP with the planning authority prior to construction and implemented during construction.
	Pollution from foul drainage	There are no public sewers in proximity to the site. Disposal of sewerage from temporary and permanent facilities on the site would be designed prior to construction commencing in accordance with the methods outlined in GPP4: Treatment and Disposal of Sewage where no Foul Sewer is available, and treatment systems would be sized in accordance with British Water Code of Practice – Flows & Loads. Permanent welfare facilities would be located within the control building and substation compound, in the form of one toilet and two sinks. The preferred option for treatment is via a septic tank with	CEMP, to be agreed with the planning authority prior to construction and implemented during construction and operation. Obtaining necessary permits prior to installation.

		effluent to discharge to a soakaway. Infiltration tests would be carried out to confirm the infiltration properties of the existing ground in the vicinity of the compound. The necessary approvals would be sought prior to the installation of any sewage treatment system.	
	Pollution from earthworks stockpiles	The CEMP would prescribe methods and timing involved in excavating, handling and storing topsoil and subsoil for use in reinstatement. A plan to govern the process would be produced and would be based on the following principles: • Careful consideration would be given to the location of topsoil and subsoil storage areas for all facilities during construction, either by siting in a flat dry area away from watercourses or by the addition of cut-off drains above the storage, which would help to maintain a buffer from streams. The areas would be regularly inspected to ensure that erosion of the material is not taking place. • The size and location of storage areas would be carefully assessed to prevent the risk of rainwater moving storage materials. In areas where there is a risk of high rainwater and erosion potential, cut off drains would be employed on the ground above storage areas to divert flow away. • Settlement lagoons and silt traps would be inspected regularly especially after a period of heavy rainfall. This inspection period would be agreed during the development of the Construction Method Statement. Maintenance would be carried out in periods of dry weather where possible.	CEMP, to be agreed with the planning authority prior to construction and implemented during construction.
	Pollution from excavated peat	The CEMP would prescribe methods involved in excavating, handling and storing peat for use in reinstatement. A plan to govern the process would be produced and would be based on the following principles: • Where present, the surface layer of peat and vegetation would be stripped separately from the subsoil. This would involve an excavation depth generally between 0.3 m and 0.5 m. • Peat would be stored temporarily, separate from the subsoil material. • Careful handling is essential to retain any existing structure and integrity of the excavated materials and thereby maximise the potential for excavated material to be used. To minimise handling and transportation of peat, peat would be	CEMP, to be agreed with the planning authority prior to construction and implemented during construction.

		replaced, as far as is reasonably practicable, in the location from which it was removed. • Additional peat required to address local deficits for track verges should be taken from the closest possible source of peat excavation. • Temporary storage of peat would be minimised. Temporary stockpiles may be sprayed with water if necessary during particularly dry periods of weather to prevent the peat drying out. • Suitable temporary storage areas would be sited in areas with shallow peat depths and shallow gradient. • Reinstatement would, in all instances, be undertaken at the earliest opportunity to minimise storage of turves and other materials. • Timing the construction work as much as possible to avoid periods when peat materials are likely to be wettest. • Temporary storage and replacement of peat excavated from borrow pits should where possible occur adjacent to and within the source pit.	
Traffic, transport and access	Construction Traffic Management Plan (CTMP)	A Construction Traffic Management Plan would be agreed with the relevant Highways Authorities and the police prior to any works being carried out and would be implemented during the construction phase in consultation with the relevant authorities. To include the following: proposals for transporting AILs from their point of entry to the Welsh trunk road network to the site that minimise any impact on the safety and free flow of trunk road traffic; management and maintenance of layover areas, junctions, passing places, public rights of way and welfare facilities while AIL deliveries take place; details of temporary signage; details of any alterations to any works that are carried out to enable AIL movements; evidence of trial runs that mimic the movement of the worst case AILs along the access route; number and size of AILs, including loaded dimensions and weights; number and composition of AIL convoys, including anticipated escort arrangements;	Construction Traffic Management Plan (CTMP) to be agreed with the relevant authorities prior to construction / turbine delivery. Timing: Construction

		methodology for managing trunk road traffic during AIL deliveries, including identification of passing places and holding areas as necessary; convoy contingency plans in the event of incidents or emergencies; estimated convoy journey durations and timings along the route, including release of forecast traffic queues; swept path analysis modelling the movement of the worst case AILs at all potential horizontal and vertical constraints along the access route; proposals for the temporary or permanent modifications required to the highway or its associated infrastructure along the access route and details of how this would be managed; plans for the reinstatement of any temporary works after completion of the construction phase; land ownership must be clarified on all drawings showing proposed highway modifications. The developer shall be responsible for the acquisition and reinstatement of all third party land including re-instatement of boundary features; proposals to liaise with all relevant stakeholders (including the relevant highway and planning authorities, Police, members of the public and local communities, hauliers, developers and landowners) prior to the submission of notifications for AIL deliveries and applications for special orders for AIL deliveries; consideration of the cumulative impact of other wind farm schemes proposing to use all of part of the same access route and coordination with those schemes where possible; the appointment and role of a transport coordinator to administer the abnormal indivisible load delivery strategy; means of control of timing of delivery of AIL movements; temporary traffic diversions and traffic hold points; details of banksmen and escorts for abnormal loads; full details of any highway works associated with the construction of layover areas, passing places and highway improvements including: the detailed design of any works; geometric layout; construction methods; drainage; and street lighting	

	Pre-Construction Phase	Video footage of the pre-construction phase condition of public roads agreed with the Highways Authorities would be recorded around the site entrance and access routes to provide a baseline record of the state of the road prior to any construction work commencing. This would enable any repairs and maintenance work required to the road due to any damage caused by the passing of heavy vehicles associated with the wind farm construction to be identified following the construction phase. The roads would be returned at least to the baseline condition at the end of the construction phase. Any damage caused by wind farm traffic during the construction period that would be hazardous to public traffic would be repaired immediately.	Construction Traffic Management Plan (CTMP) to be agreed with the relevant authorities prior to construction / turbine delivery. Timing: Pre-construction
	Dust Management Plan (DMP)	A DMP would be agreed with the relevant County Borough Council(s) to ensure appropriate dust and dirt mitigation is in place during the construction phase.	Dust Management Plan (DMP) to be agreed with the relevant authorities prior to construction / turbine delivery. Timing: Construction
	Site Entrance	Works necessary to upgrade the site entrance to accommodate AIL, and HGV, delivery would be agreed in consultation with Caerphilly County Borough Council.	Timing: Construction
	Traffic Flow	Various mitigation measures have been included in the design to reduce the anticipated traffic generated from the construction works. It is proposed to source stone from one or more of the borrow pit search areas on-site, significantly reducing the number of stone deliveries to the site. Detailed design of the tracks and hardstandings would aim to achieve a cut/fill balance; any excess spoil would be retained rather than removed from site, thereby avoiding the need for additional HGV trips.	Timing: Construction
	Component Replacement	In the unlikely event of a component failure in the operational phase, a replacement would be brought to the site. This movement would be handled in the same manner as during the construction phase.	Construction Traffic Management Plan (CTMP) to be agreed with the relevant authorities prior to construction / turbine delivery. Timing: Operation
	Decommissioning	During decommissioning traffic to and from the site would be managed in the same way as during the construction phase. A traffic management plan would be agreed with the relevant Highways	Decommissioning Traffic Management Plan, to be agreed with

		Authorities and the police prior to any works being carried out and would be implemented during the decommissioning phase in consultation with the relevant authorities.	the relevant authorities prior to decommissioning. Timing: Decommissioning
Acoustic	Noise impact during wind farm operation	Predicted operational noise levels are below noise limits derived in accordance with ETSU-R-97 The Assessment & Rating of Noise from Wind Farms and its associated Good Practice Guide at all properties when the Proposed Development is considered on its own and cumulatively provided that an appropriate operational noise mitigation strategy is implemented. If planning permission is granted for the proposed wind farm the accompanying decision notice would contain a planning condition specifying limits relating to operational noise and tonality at residential locations. Volume 4 Appendix 11.8 provides an operational noise condition that RES considers appropriate. Any final conditions attached to the proposal, if accepted, would be according to the discretion of the decision maker.	Planning condition
	Noise impact during construction	There are many strategies to reduce construction noise by the limitation of activities that would result in predicted noise levels being lower than the specified target. Any such measures should be considered adequate and the mitigation adopted should not be limited to the following: For all activities, measures would be taken to reduce noise levels with due regard to practicality and cost as per the concept of 'best practicable means' as defined in Section 72 of the Control of Pollution Act 1974. BS 5228-1:2009 states that the 'attitude of the contractor' is important in minimising the likelihood of complaints and therefore consultation with the local authority along with letter drops are advised to inform residents of intended activity. Non-acoustic factors, which influence the overall level of complaints such as mud on roads and dust generation, would also be controlled. Consideration would be given to noise emissions when selecting plant and equipment to be used on-site.	Construction Environmental Management Plan (CEMP), to be agreed with the planning authority prior to construction and implemented during construction.

		All equipment should be maintained in good working order and fitted with the appropriate silencers, mufflers or acoustic covers where applicable. Stationary noise sources would be sited as far away as reasonably possible from residential properties and where necessary and appropriate, acoustic barriers could be used to screen them. The movement of vehicles to and from the site would be controlled and employees instructed to ensure compliance with the noise control measures adopted.	
		Site operations would be limited to 07:00 to 19:00 Monday to Friday and 07:00 to 13:00 on Saturdays except during turbine erection and commissioning or during periods of emergency work. Should it be considered necessary to reduce noise levels in order to adhere to the 55 dB(A) target level for Saturdays 13:00 – 19:00, the following mitigation measures would be considered: A reduction in the number of construction activities occurring simultaneously. Restricting the distance of construction activity from nearby residences. A reduction in construction traffic as appropriate.	CEMP, to be agreed with the planning authority prior to construction and implemented during construction.
		With specific regard to blasting, good practice measures would be followed, and it is proposed that the following mitigation is implemented: The vibration and air overpressure reduction methods outlined in Section 8.6.9.2 of BS 5228-2 shall be adhered to where appropriate; Advance warning shall be given to nearby residents; Blasting should only occur between the hours of 08:00 – 18:00 on Mondays-Fridays and 08:00 – 13:00 on Saturdays; and No more than three blasts per day should occur. Depending upon the charge sizes required it may be prudent to perform trial blasts with smaller amounts of explosive and measure vibration magnitudes at various distances to more accurately determine how vibration propagates at the site.	CEMP, to be agreed with the planning authority prior to construction and implemented during construction.
Shadow flicker & Reflected Light	Impact on amenity	Mitigation measures can be incorporated into the operation of the proposed wind farm to reduce the instance of shadow flicker. Mitigation measures range from planting tree belts between the affected dwelling and the responsible turbine(s) or shutting down	Following notification of shadow flicker, further investigation would be carried out and appropriate measures implemented.

		individual turbines during periods when shadow flicker could theoretically occur.	
Aviation	Impact on primary radar	Mitigation measures to alleviate problems caused by wind turbines to aviation and radar are highly specific to the effect in question. Consultation with relevant consultees is key to establishing the appropriate method of mitigation. A Radar Mitigation Scheme (RMS) would be agreed with Cardiff and Bristol Airports for their primary radars, and with NATS for the NERL Clee Hill radar that would remove or reduce the impact of the proposed wind farm to an acceptable level. An infrared lighting scheme would be agreed with the DIO prior to the proposed wind farm becoming fully operational if necessary.	A Radar Mitigation Scheme (RMS) and/or infrared lighting scheme would be agreed prior to the proposed wind farm becoming fully operational.
Socioeconomics	Impact on public rights of way during construction and operation.	There are several public rights of way crossing the site. There is potential for users of these routes to be affected by the construction activities as their safety could be compromised by the movement of heavy machinery. In order to mitigate or reduce such effects, it may be necessary to divert some of these rights of way either permanently or temporarily during construction of the wind farm. Applications for rights of way diversions cannot be submitted with a DNS application and, where necessary, these applications would be submitted following determination of the DNS application. Should planning permission for the proposed wind farm be granted, RES would lodge an application to divert the rights of way under the Town and Country Planning Act 1990, and any other consents that may be necessary, in consultation with Caerphilly County Borough Council and Torfaen County Borough Council.	Application for consent under Town and Country Planning Act 1990.
	Impact on common land due to wind farm infrastructure during construction and operation.	As a result of the proposed wind farm RES would seek to de-register 14.69 ha of common land to make way for the proposed wind farm infrastructure. To off-set this RES has secured 14.82 ha of replacement land directly bordering the existing common, which would be available from the start of construction. During construction 41.1 ha of common land may be affected on a temporary basis by construction activities. RES has reached agreements with each of the active commoners to compensate them for any temporary disturbance during construction.	Application for consent under section 16 and section 38 of the Common Land Act 2006.

		An application to cover the proposed changes to the common land would be submitted along with the planning application in accordance with section 16 of the Common Land Act (2006).	
	Impact on existing infrastructure on site.	RES would ensure that access to the existing communications masts is maintained during construction and throughout the lifetime of the proposed wind farm.	RES would ensure that access to the existing communications masts is maintained during construction and throughout the lifetime of the proposed wind farm.