Chapter 13: Summary of Effects and Mitigation

Glyn Taff Solar Farm – Environmental Statement

02/11/2015

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Neo Environmental Ltd	
Head Office - Glasgow: Wright Business Centre, 1 Lonmay Road, Glasgow. G33 4EL **T** 0141 773 6262 **E:** info@neo-environmental.co.uk	
Warrington Office: Cinnamon House, Crab Lane, Warrington, WA2 0XP. **T:** 01925 661 716 **E:** info@neo-environmental.co.uk	**Rugby Office:** Valiant Suites, Lumonics House, Valley Drive, Swift Valley, Rugby, Warwickshire, CV21 1TQ. **T:** 01788 297012 **E:** info@neo-environmental.co.uk
Ireland Office: C/O Origin Enterprises PLC, 4-6 Riverwalk, Citywest Business Campus Dublin 24, D24 DCW0, T: 00 353 (1) 5634900 **E:** info@neo-environmental.ie	**Northern Ireland Office:** 83-85 Bridge Street Ballymena, Co. Antrim BT43 5EN **T:** 0282 565 04 13 **E:** info@neo-environmental.co.uk

Prepared For:

Renantis UK Limited

Prepared By:

Russell Buckley MEnvSci MIEnvSc CEnv

	Name	Date
Edited By:	Conor Cochrane	02/11/2015
Checked By:	Russell Buckley	02/11/2015
	Name	**Signature**
Approved By	Paul Neary	

SUMMARY OF EFFECTS AND MITIGATION

Background

13.1. Neo Environmental Ltd has been appointed by Renantis UK Limited (the "Applicant") to undertake an Environmental Impact Assessment for a proposed solar farm (the "Proposed Development") on lands at Bryntail Farm, Bryntail Lane, Pontypridd (the "Application Site"). Please see **Figure 1** for the layout of the Proposed Development.

Development Description

13.2. Installation, operation and subsequent decommissioning of a renewable energy scheme comprising ground mounted photovoltaic solar arrays together with substation compound, transformer stations, internal access track, landscaping, biodiversity measures, boundary fencing, security measures, CCTV posts, monitoring house, storage containers access improvement and ancillary infrastructure. The solar arrays will have a combined capacity of up to 39.9MWp.

Site Description

13.3. The area of the Proposed Development (the "Application Site") lies at an elevation of approximately 140m – 330m AOD and covers a total area of c. 70.9 hectares. It is centred around Bryntail Farm at approximate National Grid Reference (NGR) E 309333, N 189800. It is south of Eglwysilan Road. The site extends west of Bryntail Farm and east of the Bryntail Lane. The site is within the administrative area of Rhondda Cynon Taf Council.

13.4. The site comprises 38 agricultural fields that are currently in use for livestock farming. It is on the east side of the Taff Valley c. 1.6 km east of Ynysangharad War Memorial Park. Access will be gained from the Bryn Tail Lane.

The site is adjacent to the Twyn Hywel Energy Park a consented wind farm including 14 turbines (DNS/3272053).

CUMULATIVE EFFECTS AND INTERACTIONS

13.5. From a legislative perspective, Paragraph 5 of Schedule 4 of the Town & Country Planning (Environmental Impact Assessment) (Wales) Regulations 20171 states that:

"The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development."

13.6. Further policy guidance can be found in Planning Policy Wales, Edition 11, which states in Chapter 5 that when local authorities are setting renewable energy targets, they should:

"take into account the cumulative impact of renewable and low carbon energy development and their associated infrastructure, for example grid connections."

13.7. There is no established, robust methodology for quantitatively assessing complex cross-topic inter-related effects and assigning a level of significance to them, as methodologies and criteria vary across environmental aspects. Therefore, the assessment of inter-related effects between topics is qualitative, relying on professional judgement as to how individual effects would interact.

13.8. As set out in Chapter 2, the layout of the proposed solar farm has gone through multiple iterations to minimise the impacts on environmental receptors where possible. Chapters 4-12 have assessed the revised layout of the proposed solar farm. This chapter will assess the potential for interactions between these effects to determine if in combination, the effects are exacerbated, reduced or remain the same. Please see Table 13-1 and Table 13-2 for an interactions table and matrix key, respectively.

Table 0--1: Interactions of Environmental Parameters

	Population & Human Health	Ecology	Hydrology	Noise	LVIA	Transport	Glint and Glare	Cultural Heritage	Air Quality & Climate	Mining
Population & Human Health	N/A	X	X	X	X	X	O	O	X	O
Ecology	X	N/A	O	X	X	O	X	O	X	O
Hydrology	X	O	N/A	O	O	O	O	O	X	O
Noise	X	X	O	N/A	X	X	O	O	O	O

LVIA	X	X	O	X	N/A	O	X	X	X	O
Transport	X	O	O	X	O	N/A	O	O	X	O
Glint and Glare	O	X	O	O	X	O	N/A	X	O	O
Cultural heritage	O	O	O	O	X	O	X	N/A	O	O
Air Quality & Climate	X	X	O	O	X	X	O	O	N/A	O
Mining	O	O	O	O	O	O	O	O	O	N/A

Table 0--2: Matric Key for Interactions Table

Symbol	Description
N/A	Not Applicable
O	No Interaction
X	Major Positive Interaction
X	Moderate Negative Interaction
X	Minor Positive Interaction
X	Minor Negative Interaction
X	Moderate Negative Interaction
X	Major Negative Interaction

Interactions with Population and Human Health:

Ecology

13.9. The Proposed Development will result in an increase in biodiversity as set out in the Biodiversity Net Gain Assessment. There is considered to be an overall **minor positive interaction** between Population and Human Health and Ecology.

Hydrology

13.10. The potential to impact on groundwater through contamination during the construction phase is considered to be **minor to negligible** during the operational period. Therefore, potential impacts on the population and human health due to contaminated ground water are considered the same. However, mitigation measures and best practise pollution prevention measures will be in place to minimise any potential for this to occur. There is a **minor negative interaction** between Population and Human Health and Land, Soil and Water.

Noise and Vibration

13.11. Noise emanating from the Proposed Development is limited to the inverter/transformer units. These have been located a significant distance from noise sensitive receptors (residential dwellings/local businesses) therefore reducing any potential noise impacts from the Proposed Development during the operational period. There is a **minor to negligible negative** albeit imperceptible interaction between Population and Human Health and Noise and Vibration.

LVIA

13.12. The Proposed Development will add a long-term renewable energy feature to the rural landscape and will have visual impacts on residential receptors, recreational and transport routes, and from heritage assets in the surrounding landscape resulting in a **moderate negative** interaction, primarily for uses of the footpaths that intersect the site.

Transport

13.13. The construction and decommissioning period will result in a temporary increase in traffic in the local area and an imperceptible increase is anticipated for the operational period. There is the potential for injury to workers during the construction stage. The potential impact could be of a high magnitude and therefore result in a significant effect of long-term duration, if standard health and safety and best practice measures are not adhered to. However, with the

implementation of appropriate health and safety procedures, including risk assessments, method statements and on-site management, the residual potential for injury to workers during the construction stage is considered to indicate a **minor negative** interaction and no significant impacts upon worker safety are anticipated.

Air Quality and Climate

13.14. Air Quality in general will be improved due to the generation of clean renewable energy thus, reducing the dependence on fossil fuels which contribute to Green House Gas (GHG) emissions. The reduction in GHGs will have a **Long-Term Positive effect** on climate change therefore **a minor positive interaction** is considered between Population and Human Health and Air Quality and Climate.

Interactions with Ecology:

Hydrology

13.15. In relation to hydrology a **minor to negligible interaction** is anticipated between ecology and hydrology due to minor changes in the baseline hydrological characteristics.

Noise and Vibration

13.16. During the construction phase, noise and vibration is anticipated from additional traffic, plant machinery and piling of the PV mounted frames into the ground potentially causing temporary displacement of fauna in the area. **No noise or vibration effects** are anticipated during the operational phase with a **minor negative interaction** considered for the construction and decommissioning phases.

LVIA

13.17. Biodiversity will be enhanced in the area due to the addition of the mitigation planting proposed for the Application Site

13.18. Grazing of sheep between and under panels is also anticipated which will maintain the agricultural use of the land. This will result in a **minor positive effect;** thus, a **minor positive interaction** between Biodiversity and landscape and visual amenity.

Air Quality and Climate

13.19. There will be a **Long-Term Positive effect** on air quality due to the increase in Carbon Dioxide (CO_2) absorption by the additional tree and vegetation planting in the area. thus, a **minor positive interaction** between Biodiversity and Air Quality and Climate.

13.20. Interactions with Population and Human Health have been discussed above.

Glint and Glare

13.21. It is possible that the change in lighting at the site may affect the local biodiversity, however any changes would be expected to be a **minor to negligible** interaction.

Interaction with Noise and Vibration

Transport

13.22. The construction and decommissioning period will result in a temporary increase in traffic in the local area and an imperceptible increase is anticipated for the operational period. These additional transport movement would be expected to have a minor adverse effect on local noise level and as such a **minor adverse** interaction has been identified.

LVIA

13.23. An increase in noise during the construction phase has the potential to adversely affect the peace and tranquillity of the local landscape. Any such interaction would be short term and as such a **minor adverse** interaction has been identified.

Interactions with Glint and Glare

Cultural Heritage

13.24. Changes to the lighting in the local area may affect views to or from cultural heritage assets, however given the location oof the historic assets this is considered unlikely and a **minor to negligible** interaction

Interactions with LVIA:

Cultural Heritage

13.25. Proposed mitigation planting in the form of native trees and native species rich hedgerow to impede views of the Proposed Development will indirectly benefit the setting of, and visitor experience of these heritage assets. Views from the assets in the direction of the Proposed Development will be impeded by the existing and screen planting which will help absorb the solar farm into the surrounding landscape. Likewise, composite views which comprise the heritage asset and the Proposed Development together will not be significantly interrupted due to this additional screen planting. Interactions between LVIA and heritage assets are anticipated to be **minor positive**.

Air Quality and Climate

13.26. The addition of screen planting in the form of trees and hedgerows can absorb CO_2 and trap toxins in the atmosphere thus providing a beneficial effect on the local air quality and therefore interactions are considered to be **minor positive**.

13.27. Interactions with Population and Human Health, Biodiversity, Noise and Vibration are discussed above in their relevant categories.

Interactions with Transport

Air Quality and Climate

13.28. As mentioned, the construction period will result in an increase in traffic utilising the local road network. However, this will be just for the temporary construction phase. During the operational phase of the Proposed Development only intermittent maintenance and servicing visits will be required, with the vehicles used being no larger than a Transit type van. During this temporary construction period, the additional traffic will result in a negligible but negative effect on local air quality. However, the long-term beneficial effects on air quality and climate brought about by the additional screen planting and the generation of clean renewable energy during the 35-year operational period will far outweigh the temporary presence of additional traffic in the area during the construction period.

Interactions with Air Quality and Climate

Hydrology

13.29. A key climate change risk is increased severe storms leading to increased flood risk. The Proposed Development will mitigate the effects of climate change by providing enough renewable energy to power approximately 12,000 homes. As such it is considered to have a **minor positive** interaction with flood risk.

Mitigation and Residual Impacts

13.30. Chapters 4-12 outline measures to reduce and minimise any potential negative impacts during the construction/decommissioning and operational phases of the Proposed Development. With the implementation of these measures and best practise pollution prevention measures as well as best practise measures during the operational phase, any impacts and their significance outlined above will be reduced or averted.

Summary of Effects and Mitigation

13.31. **Table 13-3** outlines residual effects and proposed mitigation all phases of the project. Note that this is a summary of the mitigation and individual chapters should be reviewed for the full details. The residual effects are the final or intended effects which occur after the proposed mitigation measures have been implemented.

13.32. Assessments are carried out to identify likely significant effects and to integrate mitigation measures into the fundamental design to address potential adverse effects. As can be seen in

the table, the residual effects to relevant receptors are described following the implementation of suitable mitigation measures.

13.33. Whilst the cable route to the substation falls out with the application, it was considered as a part of the ES and found not have any significant environmental effects.

Table 0--3 Summary of effects and mitigation

Landscape and Visual Impact Assessment	
Mitigation	The existing tress and hedgerows around the Application Site will be retained as far as is practicable. Trees will be introduced along sections of the north-western and southwestern boundaries. Hedgerows and infill planting will also be introduced along open sections of the boundaries to help screen inward views and provide additional biodiversity opportunities. While the mitigation screens aspects of the development, it also is mindful not to screen views of the surrounding landscape, therefore it has been designed to allow the receptor to see over and not limit views to many scenic aspects of this landscape. As the mitigation planting becomes established it will help contain elements of the Proposed Development at lower elevation.
Residual effects	Given the scale and location of the Proposed Development, the main landscape and visual mitigation measures focus on mitigation planting to screen views towards the Proposed Development. Hence measures will be implemented immediately and come into effect following the completion of construction works. The vegetation, which currently provides screening to the development and will not change from the baseline conditions through the introduction of the Proposed Development. The existing vegetation, while retained (i.e. it is off-site and outside the control of the applicant), will screen the lower parts of the existing and Proposed Development. Considering the possible often localised nature of available views, landscape mitigation will further reduce landscape and visual effects. There may be a slight increase in visual effects during the winter season due to the absence of foliage. The majority of differences in visibility will be experienced locally within an approximate 250m radius, depending on the pruning status of intervening hedgerows as well as the amount of other intervening vegetation. Overall, the difference in visibility is considered not material. In considering the nature of residual effects, it should be recognized that large scale renewable energy projects are likely to generate significant effects on landscape character and visual amenity. In particular, a change in landscape character at a local level is inevitable as a result of the change in land-use and the introduction of solar panels. Visual effects from the Proposed

	Development at specific locations have been mitigated as a result of measures within the Landscape and Ecological Management Plan, with significant effects reducing in nature as mitigation is established.
Hydrology	
Mitigation	*Construction Phase* - The design and implementation of the construction works will be undertaken in accordance with ISO 14001 and industry and regulatory procedures. As such, it is envisaged that the following documents will be prepared and, where appropriate, agreed with the regulatory bodies: o Construction Environmental Management Plan (CEMP); o Drainage Strategy; o Incidence Response Plan (IRP); o Environmental training for personnel; o Record keeping; and, o The identification, mitigation and remediation of contaminated land. Excavated and Exposed Ground - To limit the volume of runoff reaching the exposed ground, runoff diversion or interception devices can be placed upstream. To help prevent pollution from entering a watercourse, silt fences, hay bales or stilling ponds can be placed downstream. • The extent of all excavations would be minimised as far as is reasonably practicable. During construction activities, surface water flows would be captured through a series of cut-off drains to prevent water entering excavations or eroding exposed surfaces. If dewatering of excavations is required, pumped discharges would be passed through a washout area, settlement/attenuation ponds and silt fences to capture sediments before release to a watercourse/drain. Stockpiles - Stockpiles will be located away from a watercourse or site drainage system to prevent leaching of contaminants. Protective coverings will help prevent runoff stripping a stockpile. Concrete should also be stored to prevent release into drains.

	• Topsoil/subsoil would be stored away from watercourses and on flat lying land (minimum 20 m on flat land). Where this is not possible and it is to be stockpiled for longer than a two-week period, the material would, as soon as possible either be covered with geotextile mats, seeded to promote vegetation growth, or drainage provided to a suitable settlement area. Plant and Wheel Washing - Plant wheel washing will take place in designated locations. The area will be tanked and will not be allowed to discharge into a watercourse or infiltrate to groundwater. Some proprietary vehicle washing systems offer a recycling facility, which filter and settle solids, with effluent being pumped back into the system. The solid waste materials from this process need to be treated as contaminated waste due to the high hydrocarbon content. Oils and Hydrocarbons Simple measures can be taken to prevent oil and hydrocarbons becoming pollutants, such as: o Maintenance of machinery and plant; o Drip trays; o Regular checking of machinery and plant for oil leaks; o Correct storage facilities; o Check for signs of wear and tear on tanks; o Care with specific procedures when refuelling; o Designated areas for refuelling; o Emergency spill kit located near refuelling area; o Regular emptying of bunds; and o Tanks located in secure areas to stop vandalism. *Construction Phase* • A Drainage Strategy is proposed as part of the Proposed Development. The Drainage Strategy proposes to construct soakaway channels/filter drains within the Site. The location of the channels has been chosen to intercept flows before they enter the existing drainage system surrounding the site. These will be in working order before the construction phase commences.

	- Storage and handling of fuels and oils at the Site would comply with the Environment Agency PPGs, Natural Resources Wales guidance and CIRIA guidance. Standard pollution prevention procedures to mitigate the risks to surface water quality would be implemented throughout operation of the Proposed Development. Examples of some of the measures that would be adopted at the Site are: bunded fuel storage; provision of spill kits etc.; and minimising the amount of exposed ground. - Best practice measures would be undertaken when refuelling plant and machinery. Where fuelling of large machinery is required, drip trays and absorbent mats or pellets would be utilised. General maintenance would also be undertaken in a designated area and similar contamination prevention measures would be adopted. - There will be no detriment to the flood storage capacity of the Site. The overall direction of the movement of water will be maintained within the Proposed Development and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed. The Proposed Development will have no impact on the movement of floodwater across the Site. There will be no increase in the floodwater levels due to the Proposed Development. There will be no loss in flood storage capacity and no change in the on-site and off-site flood risk.
Residual effects	- All residual effects were found to be negligible.
Transport	
Mitigation	- A dedicated Site Manager will be appointed for the management of the delivery booking system during the construction stage. It will also be this person's duty to make sure haulage companies use the chosen haul route (See Figure 3.1: Appendix 3A of Annex 3: Volume 3), without fail. - Temporary construction gates will be in place to stop vehicles passing over the PRoWs freely and a banksman will be required to make sure there are no members of the public in the vicinity when vehicles are passing through. - The Applicant will conduct a pre- and post-construction condition survey of Bryntail Lane from the access points to its junction with Masefield Way, with the Applicant liable to repair any damage to the road attributed to the construction of the Proposed Development. - Traffic movements will be limited to 07:30 - 18:00 on Monday to Friday and 07:00 – 13:00 on Saturdays, unless otherwise agreed in writing with the Council. Deliveries will be scheduled to avoid morning and evening peak hours. This will avoid HGV traffic arriving during the morning peak hours, creating conflict with local residents' commute or school run. Construction personnel will be encouraged to car-pool, or to travel to site in minibuses.

	- During the construction phase, clear construction warning signs will be placed on the local access road leading to the Proposed Development access, as well as on the B4598 in accordance with Chapter 8 of the Traffic Signs Manual. The Site Entrance will also be appropriately signed. Access to the construction site will be controlled by onsite personnel and all visitors will be asked to sign in and out of the site by security/site personnel. Site visitors will receive a suitable Health and Safety site induction and Personal Protective Equipment (PPE) will be worn. - To control, prevent and minimise dirt on the access route and emissions of dust and other airborne contaminants during the construction works, the following mitigation measures will also be implemented: o Wheel washing equipment will be available and used onsite within the construction compound, as required, to prevent the transfer of dirt and stones onto the public highway. All drivers will be required to check that their vehicle is free of dirt, stones and dust prior to departing from the site; ▪ Wheel washing facilities will consist of a water bowser with pressure washer. ▪ The bowser will contain water only and no other additives. ▪ Run-off from this activity will be directed to the drainage situated on the lower boundary of the construction compound. ▪ Dampening of site roads to minimise dust emissions; • Any soil stockpiles will be covered and/or lightly tracked when left for extended periods of time; o Drivers will adopt driving practices that minimise dust generation including a 5m/h internal access road speed limit; and, o Any dust generating activities will be avoided or minimised, wherever practical, during windy conditions. - Once construction of the Proposed Development is completed, all portacabins, machinery and equipment will be removed and hard standing excavated. The area will be regraded with the stockpiled topsoil to a natural profile.
Residual effects	- During the construction phase, despite the proposed mitigation measures to minimise disruption on the local highway network, there will necessarily still be a negligible residual impact upon the local highway network. - During the operational phase the site is largely unattended with periodic inspection and maintenance visits from the relevant staff. Therefore, residual impacts are negligible.
Glint and Glare	

Mitigation	- Native hedgerows/woodland to be planted/infilled along the eastern boundaries of Fields 32 and 34 and along the northeast boundaries of Fields 4, 7 and 11 and the northern boundary of Fields 12, 13 and 14 to a height of at least 3m.
Residual effects	- No residual effects are identified for any of the receptors.
Noise	
Mitigation	- The measures set out below will be implemented as part of the Proposed Development: o Core working hours are proposed to be between 08.00 until 18.00, Monday to Friday and 08.00 until 16.00 on a Saturday (unless in exceptional circumstances where need arises to protect plant, personnel or the environment). In addition to this, a start-up and close down period for up to an hour before and after the core working hours is proposed. This does not include the operation of plant or machinery likely to cause a disturbance. Deliveries of plant and materials by HGV to site shall only take place by designated routes and within times as set out in the Construction Traffic Management Plan (CTMP); and o Where practicable, the work programme will be phased, which would help to reduce the combined effects arising from several noisy operations. o A dedicated person will be appointed for the management of the delivery booking system during the construction stage. - Due to the impacts being Low and temporary at all noise sensitive receptors, acoustic barriers will not be required to mitigate noise impacts, however a temporary acoustic barrier is recommended to mitigate noise from construction of the access track near the landowner property. - In addition, standard industry good practice measures will be followed as identified in Chapter 8.
Residual effects	The magnitude of the effect at all receptors is negligible, however as the sensitivity of the receptors is high the overall effect is considered minimal in all receptors.
Ecology	
Mitigation	- Habitat loss beneath the development footprint has been considered, and whilst the Application Site is predominantly of low ecological value, compensatory planting in excess of loss is proposed within the Landscape and Ecological

	Management Plan. The recommended wildlife enhancements designed into the Proposed Development identifies habitat creation and enhancement opportunities comprised of: o Creation of 46.09ha of shade tolerant wildflower grassland o Creation of 1.16ha of native species rich scrub o Creation of 8.70ha of acid favouring wildflower grassland o Creation of 2.65ha of Welsh species diverse wildflower grassland o Enhancement of 1.41km of existing hedgerow habitat with native species rich planting o Creation of 3.85km of native species rich hedgerow o Creation of 0.53km of native species rich hedgerow and tree screening habitat - This will ensure the Proposed Development's compliance with Section 6.4 of the Planning Policy for Wales, by securing a significantly proportionate net benefit for biodiversity in the local area. - With the exception of the aforementioned habitats of higher ecological value (Due to the considerate site design and best practice pollution prevention measures following Ciria guidelines, there will be no requirements to mitigate impacts to habitats, further information on appropriates measure can be found within the OCEMP. - Areas of habitat of high ecological value should be demarcated with robust brightly coloured waist high fencing under supervision by a suitably experienced Ecological Clerk of Works (ECoW) prior to construction. This will prevent accidental impacts relating to resting materials or movement of large vehicles which may have a 'crush effect' upon the habitat. Additional measures to mitigate potential impacts relating to dust, noise, and vibration are included within the OCEMP. - It is recommended that the presence of an is provided to supervise the initial groundbreaking and commencement of construction activities and any vegetation removal activities. The ECoW presence would provide a suitable qualified and experienced resource to monitor the ongoing work and provide advice to the contractor onsite in a timely manner, if required. - A 'Toolbox Talk' would be conducted with the contractors onsite to raise awareness of the potential presence of badgers, nesting birds, reptiles, and dormouse and highlight the dangers the work may present and any additional mitigation measures that may need implementing, should their presence be confirmed or suspected. - Such additional mitigation measures may include minor alterations to the methods, equipment used, or timing of ground clearance works, which would be determined in-situ by the ECoW. • Due to the scope and scale of the Proposed Development it is also recommended that a Non-Licence Protected and Notable Species Method Statement is created. This document should be suitably robust to

	cover protocol relating to precautionary measures for; badgers, bats (including an appropriate lighting plan in line with the Institute of Lighting Professionals guidelines), breeding birds, dormouse, noteworthy habitats, invasive species, and reptiles. This document should be submitted and agreed in writing by the relevant stakeholders and secured by a suitably worded planning condition.
Residual effects	- With the measures outlined within the OCEMP, LEMP, and Net Benefit for Biodiversity Report implemented during the construction phase, and application of the Proposed Development's design measures, best practice pollution prevention measures, and the proposed biodiversity enhancement, there will be lasting beneficial effects to habitats and biodiversity on a local scale.
Cultural Heritage and Archaeology	
Mitigation	*Prior to Construction Phase* - The desk-based assessment, site walkover survey and geophysical survey of the Application Site indicated that the potential of the Proposed Development to encounter or disturb sub-surface archaeological remains is expected to be limited to the post-medieval agricultural and quarrying usage of the fields. - As with all greenfield land within a general area of archaeological potential, there is a small chance that significant sub-surface archaeology is present within the Application Site and has not been detected by the various surveys and analyses. As such, it is recommended that a pre-construction programme of archaeological test trenching be undertaken within the Application Site in the event that planning permission is obtained. - Any further evaluation or fieldwork should be done in accordance with a Written Scheme of Investigation (WSI) to be agreed with Heneb. The primary objective of any test trenching should be to verify the positive and negative/'blank' results of the geophysical survey and further confirm the absence or potential presence of any sub-surface archaeology, while the results of the work would also inform any further investigative or mitigative measures in advance of the construction phase. *Construction Phase* - As previously mentioned, there is no expectation for significant archaeology to be encountered during the construction stage of the development. However, the implementation of an appropriate archaeological Written Scheme of Investigation (WSI) for archaeological monitoring throughout the ground disturbance elements of the construction

	schedule may be prudent during the construction stage of the Proposed Development, due to its location within a landscape containing general archaeological potential. The specific need for such an approach should be informed by the aforementioned pre-construction test trenching programme. - Any such WSI should include for the presence of a qualified archaeologist at the Application Site during the construction phase, to monitor the groundworks of highest disturbance (such as access tracks, cable trenching, compound areas and infrastructure foundations such as transformers, substation and other units. - The implementation of archaeological monitoring as above would ensure measures are in place for the full identification, recording and/or preservation of any hitherto-unknown sub-surface remains within the Application Site. However, any requirements for these measures and the previous recommendations are at the discretion of Heneb, while any WSI for such work would similarly be subject to their approval. *Operational Phase* - During the operational lifetime of the Proposed Development, it is anticipated that the measures proposed as part of the development design and the landscape planting will ensure indirect effects upon the settings and views of the surrounding heritage assets are kept minimal. - Specifically, additional planting along the northern and eastern boundaries of the Application Site will help to reduce indirect effects upon the Cross Ridge Dyke & Earthwork on Cefn Eglwysilan (NA11) scheduled monument to the northeast and the listed buildings at the Church of St Ilan (NB18, NB31 & NB59 – 60) to the southeast. - This requires the implementation and maintenance of the hedgerow proposed, as well as the maintenance of the existing vegetative screening throughout the operational phase. A landscape and environmental management plan has also been developed in order to outline these measures and reduce the overall potential visual impact.
Residual effects	- During the construction phase the residual effects would be negligible. During the operational phase, with the growth of the additional proposed vegetative screening, indirect effects are expected to reduce slightly over time for certain heritage assets, but the worst-case residual indirect effects are nonetheless anticipated to remain minor adverse, lasting for the duration of the operational phase.
Climate change	
Mitigation	- No mitigation is proposed.

Residual effects	- The residual effect on climate change is considered to be a major positive.
Mining	
Mitigation	- A Toolbox Talk will be delivered to the site construction team by Engineering Geologists to highlight the features and typical manifestations that can occur. The matter shall be recorded on the construction phase Geotechnical Risk Register, within the Construction Environmental Management Plan (CEMP), and observational monitoring procedures of unrecorded mineworkings will be included to check for any evidence of potential mining related subsidence or features. In the event of any such features being discovered, appropriate investigation would be undertaken and stand-off zones and/ or remedial action would be determined, as stipulated in the CEMP. - Standard construction practice measures to be implemented to minimise the risk of detrimental effect on the mining environment. The elements of this relating to mining are as follows: o Developing a visual monitoring regime to check for signs of unexpected / unrecorded mining features, such as surface subsidence or cracks. Any such features to be reported to a specialist engineering geologist and duly investigated. Appropriate remedial measures to be designed and implemented if necessary.
Residual effects	- There is considered to be a low residual risk of ground instability disruption impacts during construction works. However, based upon our research this is considered to be nominal based upon the mining features found underneath the Site. • There is considered to be a low residual risk of ground instability disruption impacts during operation, again relating to the fact that unrecorded mining features can never be completely ruled out. However, based upon our research this is considered to be nominal based upon the mining features found underneath the Site.

CONCLUSION

13.34. Overall, the Proposed Development is anticipated to have some minor negative effects on the surrounding environment and receptors during the construction period, but this is just temporary in nature during the build out phase. However, as the solar PV panels themselves do not generate noise or toxins and the site is considered unmanned during the operational phase (35 years), the long-term positive effects of increased air quality, biodiversity and renewable energy generation far outweigh the temporary negative effects and negative impacts on the landscape from certain viewpoints.