

APPENDIX 7.2 – METHODOLOGY

1 LANDSCAPE AND VISUAL IMPACT ASSESSMENT (LVIA) METHODOLOGY

1.1 Introduction

1.1.1 This methodology for the Landscape and Visual Impact Assessment (LVIA) has been produced in accordance with best practice.

1.1.2 The assessment considers two distinct but closely related areas: landscape character and visual amenity.

- landscape assessment considers the effects of a proposed development on landscape character and the landscape as a resource; and
- Visual assessment considers the views that are available to people who may be affected by a proposed development and their perception and response to changes in those views.

1.2 Assessment Methodology

1.2.1 The primary source of guidance for this chapter is the Landscape Institute with the Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3).

1.2.2 This methodology is consistent with the approach and process set out in GLVIA3, summarised in the following flow diagram taken from page 39 of GLVIA3.

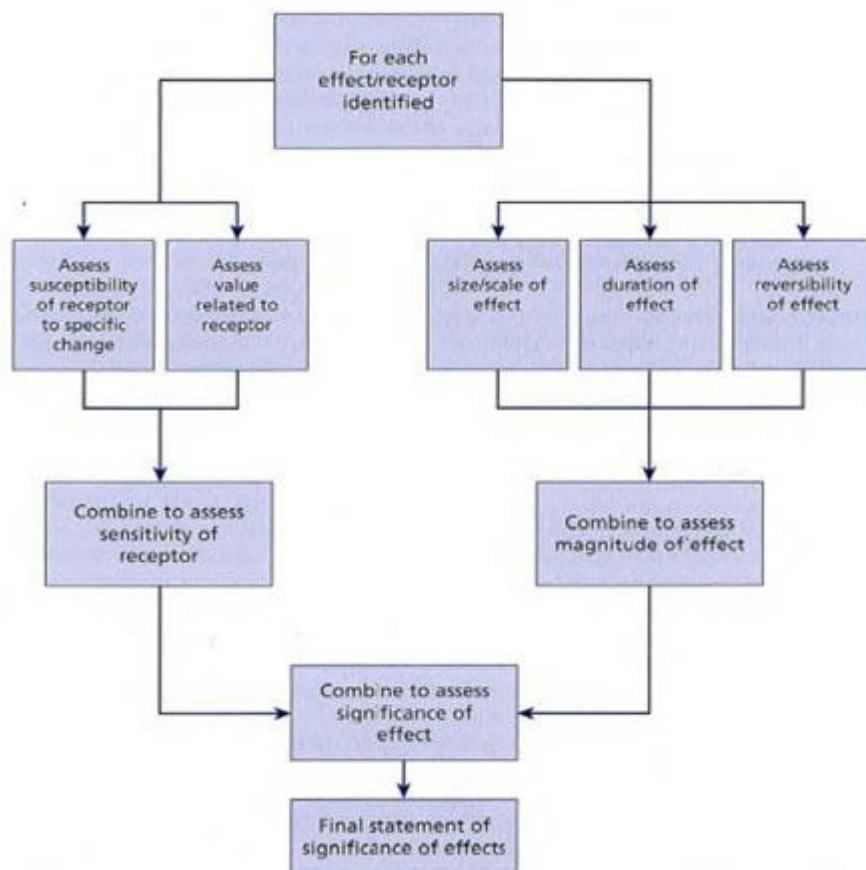
1.2.3 In summary, the assessment involves the following key stages:

- Establish baseline conditions; the landscape character and visual context of the receiving environment and the sensitivity to change of these resources.
- Contribute to the iterative process of design and mitigation based on the understanding of the nature, form and features of the proposed development in relation to the key landscape and visual sensitivities.
- Evaluate the magnitude of change likely to result from the proposed development, both during construction, operation and decommissioning on the visual amenity and landscape.
- Evaluate the cumulative magnitude of change likely to result from the proposed development in conjunction with other similar existing or future developments,

both during construction, operation and decommissioning on visual amenity and the landscape resource.

- Assess the significance of landscape and visual effects, considering the sensitivity of the resources and the magnitude of change.
- Assess the cumulative significance of landscape and visual effects considering the sensitivity of the resources and the magnitude of change.

Flow diagram from GLVIA3 Page 39.



Landscape Assessment

- 1.2.4 The level of the effects on landscape character identified as part of the assessment is determined by a consideration of the sensitivity of the landscape receptors and the magnitude of the impacts (change) on the landscape.
- 1.2.5 The nature or sensitivity of a landscape receptor combines judgements of their susceptibility to the type of change or development proposed and the value attached

to the landscape, as defined in the GLVIA¹ glossary and in paragraph 5.39 of GLVIA 3. Paragraph 5.39 of GLVIA 3 also states that LVIA sensitivity is similar to the concept of landscape sensitivity used in landscape planning, but is not the same, as it is specific to the particular project or development proposed and the location in question. Thus, assessment of sensitivity is not strictly part of the initial baseline study of landscape character; it is considered as part of the assessment of the effects of the development.

- 1.2.6 The nature or magnitude of the impacts on the landscape receptors depends upon the size or scale of the changes, the geographical extent of the area influenced, and the duration and reversibility of the impacts.

Susceptibility to the Proposed Change

- 1.2.7 This is defined as the ability of the landscape receptor (whether it be the overall character or quality/condition of a particular landscape type or area, or an individual element and/or feature, or particular aesthetic and perceptual aspects) to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies (see paragraph 5.40 of GLVIA 3).
- 1.2.8 Susceptibility is combined with landscape value (see below) to determine the overall sensitivity of a landscape receptor / receptor landscape to the type of change proposed. Susceptibility and sensitivity are not the same, therefore, in the context of LVIA. 7.2.1, below, explains how criteria are applied to arrive at an assessment of susceptibility to change, in this assessment.

Table 7.2.1: Criteria for the Assessment of Landscape Susceptibility to Change	
Level	Typical Criteria
High	Key characteristics of the landscape are highly vulnerable to change. The nature of the development would result in a substantial change in character.
Medium	Some of the key characteristics of the landscape are vulnerable to change. Although the landscape may have some ability to absorb some development, it is likely to cause some change in character.
Low	Few of the key characteristics of the landscape are vulnerable to change. The landscape is likely to be able to accommodate development with only minor change in character.
Negligible	Key characteristics of the landscape are robust and would not be adversely affected by development.

¹ Guidelines for Landscape and Visual Impact Assessment, Third Edition, by the Landscape Institute and Institute of Environmental Management and Assessment (2013)

1.2.9 Factors influencing the susceptibility of the landscape to change of the sort associated with the development include:

- 1 Enclosure: whether or not the landscape includes enclosing features. The presence of enclosing features may suggest a lower susceptibility.
- 2 Landform: Landform may be undulating, rolling or flat, and may display more or less variation in form / gradient. Featureless, convex or flat landscapes with an absence of strong topographical variety suggests a lower susceptibility, with very complex landforms exhibiting strong topographical variety at the other end of the scale.
- 3 Landscape pattern and complexity: including presence or absence of cultural pattern; time depth; landscape structure/fabric; enclosure patterns; and interplay of colour and texture. Simple, large-scale patterns (large conifer plantations, arable fields), and/or regularly disturbed, fragmented land covers are less susceptible to change. Intricate, varied patterns, and undisturbed consistent patterns of land cover or land use, and historic field patterns are more susceptible to change.
- 4 Settlement and human influence: including time depth, age, nature, form and level of settlement. The following tend to indicate a lower susceptibility to change: concentrated settlement pattern, presence of contemporary structures e.g. utility, infrastructure or industrial elements, and hard or eroded settlement edges. A higher susceptibility to change may be indicated by: dispersed settlement pattern; absence of modern development; presence of small scale, historic or vernacular settlement; and a porous / soft landscape edge with settlement well integrated with the landscape.
- 5 Condition: Landscapes with a low level of intactness with landscape elements in poor state of repair are considered to have a lower susceptibility to change; with, on the other hand, landscapes having a high level of intactness and a very good state of repair having a higher susceptibility to change.
- 6 Typicality and rarity: A lower susceptibility to change is associated with areas which have no rare features or a weak association with the key characteristics of the landscape. Conversely, a higher susceptibility to change is associated with areas which have rare features of regional importance or a very strong correspondence with the key characteristics of the landscape.

- 7 Perceptual aspects such as tranquillity (including noise and lighting) and sense of remoteness. Areas which are not tranquil, having much human activity, noise and light, are considered to have a lower susceptibility to change and vice versa. Presence or proximity to human activity or modern development or industrial structures (e.g. utilities, infrastructure) decreases susceptibility, whereas areas having a strong sense of remoteness; being either physically remote or having a perception of being remote, are considered to have a higher susceptibility to change.
- 8 Skylines: A visual component of landscape character but obviously interdependent with topography. Where the development has no relationship to the skyline, or the skyline is either not prominent / screened, or developed and/or otherwise cluttered the susceptibility to change is lower. Where there is a strong relationship to prominent, simple and undeveloped skylines, or skyline with important historic landmarks the opposite is the case.
- 9 Intervisibility: As with skylines, this is a visual component of landscape character but obviously interdependent enclosure. As might be expected, landscapes which are self-contained with restricted intervisibility have a lower susceptibility to change than landscapes which are extensively intervisible and part of a wider landscape.
- 10 Views and Landmarks: As with skylines and intervisibility, this is a visual component of landscape character but has some relationship to typicality and rarity. An area which contains no landmarks and is not a feature in local views is considered to have a lower susceptibility. On the other hand, a landscape which includes important landmarks or is important in views across a wide area has a higher susceptibility.

Landscape value

- 1.2.10 Assessment of value is concerned with the relative value attached to different landscapes by society. A consideration of value at the baseline stage informs judgements on the level of effects. Landscapes can be valued by different people for different reasons connected to a range of factors including landscape quality (condition), scenic quality, rarity, representativeness, conservation interests, recreation value, perceptual aspects and associations (see GLVIA 3 Box 5.1 for definitions). This consensus can be recognised at a local, regional or national or

international scale. Table 7.2.1 explains how criteria are applied to arrive at an assessment of landscape value for this project. It is derived from GLVIA 3.

Table 7.2.1: Criteria for the Assessment of Landscape Value			
Value	Typical criteria	Typical scale	Typical examples
High	<ul style="list-style-type: none"> • Excellent condition, high importance, scenic quality, rarity • No or limited potential for substitution 	International, National, regional	<ul style="list-style-type: none"> • World Heritage Site, National Park, Area of Outstanding Natural Beauty (AONB), Registered Historic Parks and Gardens
Medium	<ul style="list-style-type: none"> • Good condition, medium importance, scenic quality, rarity • Some potential for substitution 	Regional, local authority, local community	<ul style="list-style-type: none"> • Local landscape designations • Undesignated but value expressed for instance in demonstrable use
Low	<ul style="list-style-type: none"> • Poor condition, low importance, scenic quality, rarity 	Local community	<ul style="list-style-type: none"> • Areas identified as having some redeeming feature or features and possibly identified for improvement • Areas identified for recovery

Sensitivity of the Landscape Receptors to the Proposed Development

1.2.11 As noted above, landscape sensitivity combines judgements on the susceptibility of landscape receptors to change of the type proposed, with the value attached to the landscape. Generally, a higher sensitivity will be ascribed to landscapes which have a high value, and which are highly susceptible to change, and vice versa.

1.2.12 For the purposes of this assessment, landscape sensitivity is defined through the application of the typical criteria set out in Table 7.2.2, below.

Table 7.2.2: Criteria for the Assessment of Sensitivity of Landscape Receptors	
Level	Typical criteria
High	Many of the key characteristics and qualities of the landscape are susceptible to change from the type of development being assessed and/or the value ascribed to the landscape is high.
Medium	Some of the key characteristics and qualities of the landscape are susceptible to change from the type of development being assessed and/or the value ascribed to the landscape is medium
Low	The key characteristics and qualities of the landscape are robust and are less likely to be adversely affected by the type of development being assessed and/or the value ascribed to the landscape is low.

1.2.13 Planning policy is important and relevant to LVIA when it reflects a recognition of the value placed upon a particular landscape, or its attributes, by society. Thus, designations such as National Parks and Areas of Outstanding Natural Beauty (AONB) have relevance, since they identify a consensus about this aforesaid value. Reference

to planning policy can therefore assist in an assessment, in identifying sensitive receptors.

Magnitude of Landscape Impacts

1.2.14 Table 7.2.3 explains how criteria are applied to determine the magnitude of impacts; this has been developed specific to this LVIA and is derived from GLVIA 3. The table gives typical criteria and not all need to be applicable.

Table 7.2.3: Criteria for the Assessment of Magnitude of Landscape Impacts	
Level	Typical criteria (not all of which need be applicable)
High	<ul style="list-style-type: none"> • Total loss of or major alteration to key features or perceptual aspects of the baseline and/or the addition of new features considered to be totally uncharacteristic when set within the attributes of the receiving landscape • The impacts would be of a large scale influencing several landscape character types/areas • The effects would be long term (e.g. over 10 years) and/or irreversible
Medium	<ul style="list-style-type: none"> • Partial loss of or alteration to key features or perceptual aspects of the baseline and/or the addition of new features that may be prominent but may not necessarily be considered to be substantially uncharacteristic when set within the attributes of the receiving landscape • The impacts would be at the scale of the landscape character type/area within which the proposal lies • The effects would be medium term (e.g. 5 to 10 years) and/or partially reversible
Low	<ul style="list-style-type: none"> • Minor loss of or alteration to key features or perceptual aspects of the baseline and/or the addition of new features that may not necessarily be considered to be uncharacteristic when set within the attributes of the receiving landscape • The impacts would be at the level of the immediate setting of the site • The effects would be short term (e.g. 0 to 5 years) and/or reversible
Negligible	<ul style="list-style-type: none"> • Very minor loss of or alteration to key features or perceptual aspects of the baseline and/or the addition of new features that are not uncharacteristic with the surrounding landscape - approximating the 'no change' situation • The impacts would be at the site level, within the development site itself • The effects would be very short term (e.g. less than 1 year) and/or reversible

Visual Effects

General Approach

1.2.15 As with landscape effects, a consideration of the sensitivity of visual receptors (people) and the magnitude of the impact determines the level of the predicted effect on views and visual amenity.

1.2.16 The nature or sensitivity of visual receptor considers their susceptibility to the type of change or development proposed and the value people attach to the affected views (GLVIA 3, paragraph 6.31).

1.2.17 The nature or magnitude of the impacts on visual receptors depends upon the size or scale of the changes, the geographical extent of the area influenced, and the duration and reversibility of the impacts. In visual assessment, the magnitude is also determined by the distance from the viewer, the extent of change in the field of vision, the proportion or number of viewers affected and the duration of activity apparent from each viewpoint, or a sequence of points that may have transient views, for instance along a road.

Visual Susceptibility

1.2.18 As described in the paragraph 6.31 of the GLVIA 3 the susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of:

- *“the occupation or activity of people experiencing the view at particular locations, and;*
- *the extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations”.*

1.2.19 The receptors most susceptible to change are likely to include people engaged in outdoor activities where an appreciation of the landscape is the focus or residents in areas where the landscape setting contribute to the setting of the properties. Conversely, those considered least susceptible to change include (but are not restricted to) people engaged in outdoor sports or recreation where there is no focus on the surrounding landscape/views and people at their place of work where their focus is on the work activity.

1.2.20 Table 7.2.5 below includes a range of criteria for identified levels of susceptibility: high, medium, low and very low. Susceptibility may be reduced in relation to the proposed development of lesser incongruity for the identified receptors.

Table 7.2.5: Criteria for the Assessment of Visual Susceptibility to change	
Level	Typical Descriptions
High	<p>Typical Receptors include:</p> <ul style="list-style-type: none"> Residents at home, where views contribute to the landscape setting enjoyed by the resident; People engaged in outdoor recreation, whose attention/interest is likely to be focused on the landscape or particular views, including strategic/popular public rights of way; Visitors to heritage assets or other attractions, where views of the surroundings are an important contributor to the experience; Communities where views contribute to the landscape setting enjoyed by residents; Travellers on identified scenic routes which people take to experience or enjoy the view.
Medium	<p>Typical Receptors include:</p> <ul style="list-style-type: none"> Travellers on road, rail, or other transport routes who anticipate some enjoyment of landscape as part of the journey but where the attention is not primarily focused on the landscape; Users of local, and less used Public Rights of Way or where the attention is not focused on the landscape; People staying at schools, hotels and healthcare institutions have periods of time when their attention may be focused on the landscape, whilst at other times attention is more likely to be focused on other activities.
Low	<p>Typical Receptors include:</p> <ul style="list-style-type: none"> Travellers on road, rail or other transport routes not focused on the landscape/particular views e.g. on motorways and “A” road or commuter routes; People engaged in outdoor sport/recreation which does not involve/depend upon the appreciation of views of the landscape.
Very Low	<p>Typical Receptors include:</p> <ul style="list-style-type: none"> People at their place of work whose attention may be focused on their work/activity and not their surroundings.

Visual Value

1.2.21 GLVIA3 paragraph 6.37 provides a list of indicators of the value of views:

- *“Appearance in guidebooks our tourist maps;*
- *Provision of facilities, such as parking places, signboards and interpretive materials; and*
- *References in literature or art”.*

1.2.22 The assessment of the value of views will also be informed by the location of the viewing place and the quality or designation of the existing elements in the view, set out in **Table 7.2.6** below.

Table 7.2.6: Criteria for Visual Value	
Level	Typical Descriptions
High	<p>A recognised high-quality view, well-frequented and/or promoted as a beauty spot/visitor destination.</p> <p>A view with cultural associations (recognised in art, literature or other media).</p> <p>A view that relates to the experience of other features, for example, heritage assets in which landscape or visual factors are a consideration.</p> <p>A view that is likely to be an important part of or primary reason for the receptors being there</p>
Medium	<p>A view, whilst it may be valued locally, is not widely recognised for its quality or has low visitor numbers. The view has no strong cultural associations.</p> <p>An attractive view which is however unlikely to be the receptor’s primary reason for being there.</p>
Low	<p>An ordinary, but not necessarily unattractive view, with no recognised quality which is unlikely to be visited specifically to experience the views available. Although the view may be appreciated by receptors, it is typically incidental to the receptor’s reason for being there.</p>
Very low	<p>A poor quality or degraded view which is unvalued or discordant and is unlikely to be the receptor’s reason for being there.</p> <p>A view that detracts from the receptors experience of being there.</p>

Sensitivity of Visual Receptors

1.2.23 Visual receptors include the public or community at large, residents, visitors, workers and people travelling through the landscape. As stated above, the sensitivity of the visual receptors considers their susceptibility to the type of change or development proposed and the value people attach to the affected views. The susceptibility of receptors is a function of the occupation or activity of people experiencing the view and the extent to which their attention or interest is focused on the view. The value attached to views takes account of recognition of the value, for example in relation to heritage assets or through planning designations, and indicators of value by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment and references to them in literature or art.

1.2.24 In the context of this development, the scale of the sensitivity of the visual receptors is as outlined in Tabel 7.2.7 and is derived from the GLVIA 3.

Table 7.2.7: Criteria for the Assessment of Sensitivity of Visual Receptors	
Level	Typical criteria
High	<ul style="list-style-type: none"> Public views within areas of protected landscapes such as National Parks and ANOB Users of outdoor recreational facilities including public rights of way, or visitors to heritage assets or other attractions whose attention or interest is focused on the landscape and where tolerance to change is likely to be low Communities where the development results in changes in the landscape setting or valued views enjoyed by the community Occupiers of residential properties with views affected by the development Tourists travelling through or past the affected landscape in cars, on trains or other transport routes whose attention or interest is focused on the landscape and where tolerance to change is likely to be low
Medium	<ul style="list-style-type: none"> People, such as commuters and hauliers (not tourists) travelling through or past the affected landscape in cars, on trains or other transport routes Users of outdoor recreation facilities whose attention or interest will include some views of the wider landscape and where there is some tolerance of change
Low	<ul style="list-style-type: none"> People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape so that the tolerance to change is high People at their place of work, or engaged in similar activities, whose attention may be focused on their work or activity, not their surroundings, and where setting is not important to the quality of working life Views from urban roads, footways, railways and industrial areas whose attention may be focused away from the landscape and where tolerance to change is likely to be high

Magnitude of Visual Impacts

1.2.25 Table 7.2.8 explains how criteria are applied in the assessment of magnitude and is derived from GLVIA 3. The table gives typical criteria and not all need to be applicable.

Table 7.2.8: Criteria for the Assessment of Magnitude of Visual Impacts	
Level	Typical criteria (not all of which need be applicable)
High	<ul style="list-style-type: none"> Total loss of or major alteration to views and/or the addition of new features that would be very prominent, and/or would greatly contrast with the existing view Full, open views, experienced for the majority of a journey or full duration of an activity The views would be close, direct and/or totally occupied by the proposed development The impacts would be long term (e.g. over 10 years) and/or irreversible

Table 7.2.8: Criteria for the Assessment of Magnitude of Visual Impacts	
Level	Typical criteria (not all of which need be applicable)
Medium	<ul style="list-style-type: none"> • Partial loss of or alteration to views and/or the addition of new features that would be prominent, and/or would contrast with the existing view • Partial views, experienced for part of a journey or activity • The views would be middle distance, partially oblique and/or partially occupied by the proposed development • The impacts would be medium term (e.g. 5 to 10 years) and/or partially reversible
Low	<ul style="list-style-type: none"> • Minor loss of or alteration to views and/or the addition of new features that would not be prominent, and/or would not contrast with the existing view • Glimpsed views, experienced for a small part of a journey or activity • The views would be distant, oblique and/or only a small part of the view would be occupied by the proposed development • The impacts would be short term (e.g. 0 to 5 years) and/or reversible
Negligible	<ul style="list-style-type: none"> • Very minor loss of or alteration to views and/or the addition of new features that would be almost imperceptible - approximating the 'no change' situation • Very brief glimpsed views • The views would be very distant, very oblique and/or only a tiny part of the view would be occupied by the proposed development • The impacts would be very short term (e.g. less than 1 year) and/or reversible

1.2.26 Magnitude of impact is influenced by distance, which can influence how a development is perceived, but the extent of the development seen is also important. Magnitude can vary greatly in differing weather conditions. The LVIA has to take into account a worst case scenario and the time duration it is experienced.

Landscape and Visual Level of Significance and Effect

1.2.27 Professional judgement is used to combine sensitivity and magnitude to gauge the level of effect and determine whether it is significant or not with a clear rationale for the overall judgement.

1.2.28 Table 7.2.9 provides general guidance on the inter-relationship between magnitude of change and sensitivity of receptor. However, this matrix is used as a framework and guide for consistency, not as a prescriptive formula: the level of effect (and thus significance) will vary depending on the circumstances, the type and scale of development proposed, the baseline context and other factors as set out in the previous sections. Table 7.2.10 and 7.2.11, below, gives typical descriptors of the levels of landscape and visual effects.

Table 7.2.9 Significance matrix					
		Magnitude			
		High	Medium	Low	Negligible
Sensitivity	High	Server or Substantial	Substantial to Moderate	Moderate	Slight to Imperceptible or Imperceptible
	Medium	Substantial to Moderate	Moderate	Moderate to Slight	Imperceptible
	Low	Moderate	Moderate to Slight	Slight	Imperceptible
	Negligible	Imperceptible	Imperceptible	Imperceptible	Imperceptible

1.2.29 Using professional judgement and with reference to the Guidelines for Environmental Impact Assessment (IEMA 2004), the assessments within this chapter consider effects of moderate and greater level of effect to be significant (blue boxes in Table 7.2.9), while those less than moderate to be non-significant

Level of Landscape Effects

1.2.30 The criteria in Table 7.2.10 are provide typical examples for landscape effects. Intermediate levels, such as slight to moderate and moderate to substantial, may also apply.

Table 73.2.10: Criteria for Determining Scale of Landscape Effects	
Level	Typical criteria
Severe	The proposals are wholly out of character with the existing situation, both locally and on the wider scale, and/or the landscape receptors are of high sensitivity
Substantial	The proposals have a large effect within the context of the wider area, and/or the landscape receptors are of high sensitivity
Moderate	The proposals have a noticeable effect within the context of the wider area, and/or the landscape receptors are of medium sensitivity
Slight	The proposals have some, but only a limited effect within the mainly local context, and/or the landscape receptors are of low sensitivity
Imperceptible	The degree of change is so small as to have little or no effect, and/or the landscape receptors are of low sensitivity

Level of Visual Effects

1.2.31 The criteria in Table 7.2.11 are provide typical examples for visual effects. Intermediate levels, such as slight to moderate and moderate to substantial, may also apply.

Table 7.2.11: Criteria for Determining the Overall Level of Visual effects	
Level	Typical criteria
Severe	The proposals would dominate views and would be wholly out of character with the existing situation, the changes would be experienced by a very large number of people, and/or the visual receptors would be of high sensitivity to the changes.
Substantial	The proposals would be prominent and contrasting with the existing views, the changes would be experienced by a large number of people, and/or the visual receptors would be of high sensitivity to the changes.
Moderate	The proposals would be noticeable in views but not dominating, the changes would be experienced by a medium number of people, and/or the visual receptors would be of medium sensitivity to the changes.
Slight	The proposals would result in small changes to the views, the changes would be experienced by a small number of people, and/or the visual receptors would be of low sensitivity to the changes.
Imperceptible	The proposals would be imperceptible in views, the changes would be experienced by a very small number of people, and/or the visual receptors would be of low sensitivity to the changes.

Nature of Effects

1.2.32 Effects can be either beneficial or adverse and, in some cases, neutral (neither beneficial nor adverse).

1.2.33 The nature of effect of wind turbines and Solar PV on landscape character and visual amenity is very subjective, with a broad spectrum of opinion on the appearance of wind turbines in particular in the landscape. Some people see turbines as sculptural features positively addressing the effects of climate change, whilst others regard them as alien and an industrialisation of the countryside.

1.2.34 The aim of the LVIA is to provide an objective assessment of the relationship between the proposed development and the landscape in which it would be located and seen. As part of this it is also important to consider the nature of the proposed change in the context of the key characteristics of the landscape. As large, engineered

structures being added to the landscape, it is unlikely that a beneficial nature of effect would be found, but neutral effects could occur where it is considered the proposed development does not change the defining characteristics of the landscape.

1.2.35 For the purposes of this LVIA, and to ensure this LVIA assesses the worst-case scenario, the nature of all effects will be considered as adverse, unless otherwise identified.

1.2.36 Other aspects of the proposed development may have opportunities for beneficial landscape and visual effects, for example, where improvements are made to access and public rights of way or mitigation planting relating to the windfarm infrastructure and Solar PV increasing biodiversity.

2 METHODOLOGY FOR THE ASSESSMENT OF CUMULATIVE EFFECTS

2.1 Cumulative Landscape Effects

2.1.1 Cumulative landscape effects are likely to include effects:

- on the fabric of the landscape as a result of removal of changes in individual elements or features of the landscape and/or the introduction of new elements or features;
- on the aesthetic aspects of the landscape – for example its scale, sense of enclosure, diversity, pattern and colour, and/or on its perceptual or experiential attributes, such as a sense of naturalness, remoteness or tranquillity;
- on the overall character of the landscape as a result of changes in the landscape fabric and/or in aesthetic or perceptual aspects, leading to the modification of key characteristics and possible creation of new landscape character if the changes are substantial enough.

2.1.2 Any cumulative landscape effects would be likely to be greatest in areas that are of greater susceptibility to change and of higher value, all other factors being equal. Other factors that would determine the level of cumulative effects include the size or scale of the cumulative effects, the extent of the geographical area influenced by the cumulative effects, and the duration of the cumulative effects. Areas where there are concentrations of people and where the landscape character is an accepted backdrop to settlements could also be particularly sensitive to cumulative landscape effects.

2.1.3 High levels of adverse cumulative landscape impacts are more likely to occur where similar development schemes would be close to the proposed development and the ZTVs overlap, resulting in energy developments becoming a greater characteristic of the landscape, changing the landscape character.

2.2 Cumulative Visual Effects

2.2.1 The study of cumulative visual effects concerns the effects on views and visual amenity enjoyed by people, which may result either from adding the effects of the development to other developments, or their combined effect. This assessment is in accordance with Assessing the cumulative landscape and visual impact of onshore wind energy developments and has considered the potential for the effects given in Table 7.2.12 (taken from GLVIA 3, Table 7.2.12):

Table 7.2.12: Types of Cumulative Visual Effects		
Generic	Specific	Characteristics
Combined		
Occurs where the observer is able to see two or more developments from one viewpoint	In combination	Where two or more developments are or would be within the observer's arc of vision at the same time without moving her/his head
	In succession	Where the observer has to turn her/his head to see the various developments – actual and visualised
Sequential		
Occurs when the observer has to move to another viewpoint to see the same or different developments. Sequential effects may be assessed for travel along regularly used routes such as major roads or popular paths	Frequently sequential	Where the features appear regularly and with short time lapses between instances depending on speed of travel and distance between the viewpoints
	Occasionally sequential	Where longer time lapses between appearances would occur because the observer is moving very slowly and/or there are larger distances between the viewpoints

2.2.2 Cumulative visual effects are considered in terms of:

- the susceptibility of the visual receptors that have been assessed, to changes in views and visual amenity;
- the value attached to the views they experience;
- the size or scale of the cumulative visual effects identified;
- the geographical extent of the cumulative visual effects identified;

- the duration of the cumulative visual effects, including the timescales relating to both the project being assessed and the other projects being considered, and the extent to which the cumulative effects may be considered reversible.

2.2.3 In addition to above, for sequential visibility, potential cumulative visual effects are considered in terms of:

- the frequency and duration of the sequential effects (frequent or occasional, glimpsed or prolonged);
- the scale and nature of the views (near or distant views, oblique or direct views, filtered or open views);
- the speed of travel and distance and time between views; and
- the contexts of the sequential views.

2.2.4 An effect may exist but may not be important. Highly adverse cumulative visual effects are anticipated to be more likely in areas where more than one energy development is visible at the same time and in the same field of view as the proposed development, and/or particularly where the development(s) are within close distance to the viewer and there are open views.

3 VISUAL REPRESENTATIONS

3.1.1 The methodology for undertaking ZTVs and preparing visual representations is in accordance with the below guidance:

- ‘Visual representation of Wind Farms’, Version 2.2, Scottish Natural Heritage, 2017.
- ‘Visual Representation of Development Proposals, Technical Guidance Note 06/19’, Landscape Institute (LI), 2019.
- ‘Guidelines for Landscape and Visual Impact Assessment’ Third Edition, Landscape Institute and the Institute of Environmental Assessment, 2013 (GLVIA3).

3.1.2 The LI Visualisation guidance is not windfarm specific but is broadly consistent with the SNH 2017 guidance. The LI guidance provides more detail on maintaining a proportionate approach to visualisations and providing advice on selecting visualisation types. The LI guidance is also useful to consider for aspects of the windfarm application that may not be directly covered by the SNH 2017 guidance such as substations, infrastructure and co-located technologies.

4 ZONES OF THEORETICAL VISIBILITY

- 4.1.1 ZTVs are produced using Geographic information System (GIS) software (ESRI ArcGIS). Turbine coordinates of the proposed windfarm (and also other windfarm sites for cumulative ZTVs) are input into GIS. Observer height is set to 2m above ground level and the Earth's curvature and atmospheric refraction are taken into account.
- 4.1.2 The resulting ZTVs are set up in the GIS figure template associated with the project. Paired ZTVs for blade-tip/hub height or cumulative assessment are generated by adding them together in ArcGIS.
- 4.1.3 The ZTV illustrates the 'bare ground' situation, and does not take into account the screening effects of vegetation, buildings or other surface features.
- 4.1.4 The ZTVs are based on theoretically visibility from 2m above ground level.
- 4.1.5 The blade tip ZTV does not indicate the decrease in visibility that occurs with increased distance from the proposed development. The nature of what is visible from 3 km away would be markedly different from what is visible from 10 km away.
- 4.1.6 There is a wide range of variation within the visibility shown on the ZTV, for example an area shown on the blade tip ZTV as having visibility of large numbers of turbines may gain views of the smallest extremity of blade tips, or of many full turbines. This can make a considerable difference in the effects of the proposed development on that area.

5 VIEWPOINT PHOTOGRAPHY

- 5.1.1 Photography for all the assessment viewpoints has been undertaken fully in accordance with the SNH 2017 visualisation guidance. The key aspects of the methodology include:

- a 50mm fixed lens on a SLR camera with a full frame sensor;
- tripod with a panoramic head;
- 50% overlap on panoramic photographs to minimise distortion when stitching the photographs;
- portrait orientation photographs taken for viewpoints;
- 360-degree panorama taken (where the viewpoint allows); and
- grid reference recorded at each viewpoint location using handheld GPS.

6 VISUALISATIONS

6.1.1 The viewpoint assessment is illustrated by photographs, wirelines and photomontages informed by a 3D model. Visualisations of windfarms have a number of limitations when informing a judgement on a wind farm proposal, as set out in SNH (2017), page 24:

- *“Visualisations provide a tool for assessment that can be compared with an actual view in the field; they should never be considered as a substitute to visiting a viewpoint in the field*
- *Neither photographs nor visualisations can replicate a view as seen in reality by the human eye.*
- *Visualisations are only as accurate as the data used to construct them*
- *Visualisations can only represent the view from a single location at a particular time and in particular weather conditions*
- *Static visualisations cannot convey the effect of turbine blade movement”*

6.2 Photographic Panoramas

6.2.1 Photographs are stitched together using PTGui software which provides an accurate planar or projection panorama as required. The resulting panorama is cropped to the required horizontal field of view and image size as required by SNH guidance.

6.3 3D Model

6.3.1 A 3D Model is created in ReSoft WindFarm software, the positions of the turbines at their designated co-ordinates, viewpoint locations at their GPS co-ordinates and any points that have been surveyed to assist with the accurate positioning of the turbines within the photomontage. The turbines modelled are based upon the dimensions and model required by the client.

6.4 Wirelines

- 6.4.1 Using the 3D model in ReSoft WindFarm, the wirelines are generated using the GPS coordinates for the viewpoints. Appropriate colours and identification markers are created, identifying the proposed development and cumulative developments. The wirelines are set to the relevant horizontal field of view and exported for insertion into figure templates set up to the correct image size as required by SNH guidance.

6.5 Photomontages

- 6.5.1 Following production of the wirelines using ReSoft Windfarm software, the photograph panoramas are imported into the Photomontage module of the software and aligned with the wireline using the associated viewpoint coordinates, view direction and pitch angle. Once the photograph is aligned with the wireline, the turbines are lit according to the weather conditions and the time of day/year, rendered to the image and exported.
- 6.5.2 The draft photomontage is then finalised using GIMP where ground cover/forestry is edited as necessary to ensure the turbines appear as realistic as possible.
- 6.5.3 To photomontage the solar elements a 3D model of the development was created and modelled in and rendered accordingly. Raster outputs are then generated from each of the viewpoints where there is potential visibility of the solar panels to be aligned and rendered into the panorama using GIMP.

7 RESIDENTIAL VISUAL AMENITY ASSESSMENT (RVAA) METHDOLOGY

- 7.1.1 A separate Residential Visual Amenity Assessment (RVAA) covering properties within 2km from the outermost turbines of the proposed development has been produced and can be found in Appendix 7.9.
- 7.1.2 The RVAA focus on private views and private visual amenity from residential properties.
- 7.1.3 This methodology for the RVAA has been produced in accordance with the Landscape Institutes Technical Guidance Note 2/19 RVAA. It should be noted that the guidance is not prescriptive, and it recognises that every project will require its own set of criteria and thresholds, tailored to suit local conditions, circumstances and the potential scale of impacts. This methodology has been adapted to reflect the extent and number of potential residential receptors within the immediate context of the study area.

7.1.4 The RVAA comprises of four Steps, which are set out below:

Step 1: Define study area and Identify properties to be assessed.

7.1.5 Stage 1 involves the following key tasks:

- Undertake a desk-based study to locate, name and map all residential properties that fall within 2km of the proposed turbines. Where possible, commercial and other non-residential properties will be identified and excluded from the RVAA.
- Undertake a desk -based appraisal/analysis and scoping exercise to identify broad groupings of properties likely to share common baseline visual characteristics. This will be informed by:
 - A Site/field study;
 - ZTV's, mapping and aerial photos;
 - Potential for screening from topography/landform;
 - Potential for enclosure/screening from vegetation;
 - Settlement pattern/form.
- Undertake a further desk-based/field-based 'scoping' exercise from publicly accessible locations to identify and exclude properties/property groups unlikely to experience significant visibility of the proposed development;
- Prepare a property location plan showing the location of each properties/property groupings to be included/excluded in the RVAA.

Step 2: Evaluation of Baseline Visual Amenity

7.1.6 Stage 2 involves describing and evaluating the existing visual baseline conditions of properties/property groups within the 2km study area via desk-based/field surveys.

7.1.7 When describing the existing visual baseline, the type, nature, extent, and quality of available views 'in the round' from the property itself and its 'domestic curtilage' (domestic gardens and access drives) will be considered.

7.1.8 When evaluating the visual baseline, the following aspects will be considered:

- *“the nature and extent of all potentially available existing views from the property and its garden / domestic curtilage, including the proximity and relationship of the property to surrounding landform, landcover and visual foci. This may include*

primary / main views from the property or domestic curtilage, as well as secondary / peripheral views; and

- *views as experienced when arriving at or leaving the property, for example from private driveways / access tracks.”*

Step 3: Assessment of likely change to visual amenity of properties

7.1.9 Assess the magnitude and significance of likely visual effect at properties/property groups identified in Stage 2. The assessment will be carried out from the nearest publicly accessible location, representing the worse-case scenario where possible.

7.1.10 Visual effects will be assessed in accordance with GLVIA3, considering the ‘nature of the receptor’ (‘sensitivity’ comprising ‘value’ and ‘susceptibility’) with the ‘nature of effect’. Each properties/property group will be supplemented with a 90° wireline from the nearest publicly accessible location.

7.1.11 The Assessment will consider aspects such as:

- The distance from the proposed development having regard to its size / scale and location relative to the property (e.g. on higher or lower ground);
- The type and nature of available views (e.g. panoramic, open, framed, enclosed) and seasonal variations;
- The direction of view / aspect of property affected, having regard to both the main / primary and peripheral / secondary views;
- The extent to which the development would be visible from the property, having regard to views from principal rooms, the domestic curtilage (i.e. garden);
- The scale of change in views having regard to the loss or addition of features and the proportion of the view occupied by the development,
- The scale and character of the landscape in which the wind farm will be viewed;
- Duration and nature of the changes, whether temporary or permanent, intermittent or continuous, reversible or irreversible etc;
- The presence of other existing and consented wind farms and built structures within the view; and
- Identify individual properties/property groups where significant effects warrant further detailed assessment.

Step 4: Detailed Assessment

7.1.12 Properties/property groups identified in Stage 3 as having the greatest magnitude of change, will be identified and assessed in further detail, through a desk-based assessment and site visit to the nearest publicly accessible location.

A judgement will then be made as to whether predicted effects are likely to reach or exceed the RVA threshold.

Assessment of Effects

7.1.13 A precautionary approach has been taken; therefore, it is assumed that the sensitivity of visual receptors within residential properties will be high.

Magnitude of Impacts

Table 4.2.13: Criteria for the Assessment of Magnitude	
Level	Typical criteria (not all of which need be applicable)
High	<ul style="list-style-type: none"> • Total loss of or major alteration to views and/or the addition of new features that would be very prominent, and/or would greatly contrast with the existing view • Full, open views • The views would be close, direct and/or totally occupied by the proposed development • The impacts would be long term (e.g. over 10 years) and/or irreversible
Medium	<ul style="list-style-type: none"> • Partial loss of or alteration to views and/or the addition of new features that would be prominent, and/or would contrast with the existing view • Partial views • The views would be middle distance, partially oblique and/or partially occupied by the proposed development • The impacts would be medium term (e.g. 5 to 10 years) and/or partially reversible
Low	<ul style="list-style-type: none"> • Minor loss of or alteration to views and/or the addition of new features that would not be prominent, and/or would not contrast with the existing view • Glimpsed views, • The views would be distant, oblique and/or only a small part of the view would be occupied by the proposed development • The impacts would be short term (e.g. 0 to 5 years) and/or reversible
Negligible	<ul style="list-style-type: none"> • Very minor loss of or alteration to views and/or the addition of new features that would be almost imperceptible - approximating the 'no change' situation • Very brief glimpsed views • The views would be very distant, very oblique and/or only a tiny part of the view would be occupied by the proposed development • The impacts would be very short term (e.g. less than 1 year) and/or reversible

Overall Level of Effects

Table 7.2.14: Criteria for Determining the Overall Level of effects	
Level	Typical criteria
Severe	The proposals would dominate views and would be wholly out of character with the existing situation. Other existing features will become subordinate.
Substantial	The proposals would be prominent and contrasting with the existing views, which may lead to the loss of some essential landscape features which contribute to the visual character or quality of the view.
Moderate	The proposals would be noticeable in views but not dominating. The proposed development is potentially unavoidable, although the overall quality of the view may remain intact.

Table 7.2.14: Criteria for Determining the Overall Level of effects	
Level	Typical criteria
Slight	The proposals would result in small changes to the views. Awareness of the development will not have a marked effect on the overall quality of the view.
Imperceptible	The proposals would be barely perceptible/imperceptible in views and will have no marked effect on the overall quality of the view.

7.1.14 Using professional judgement and with reference to the Guidelines for Environmental Impact Assessment (IEMA 2004), the assessments within The RVAA consider effects of moderate and greater level of effect to be significant (blue boxes in Table 7.2.9), while those less than moderate to be non-significant.

7.2 LANDMAP and Landscape Character Areas

7.2.1 LANDMAP is a complete all-Wales geographic information system (GIS) based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set.

7.2.2 LANDMAP offers a mapped, contextual baseline of landscape information about landscape character, qualities and values, in which the greater detail of a LVIA can be set.

7.2.3 LANDMAP comprises five spatially related datasets:

- Geological Landscape;
- Landscape Habitats;
- Visual & Sensory;
- Historic Landscape; and
- Cultural Landscape Services.

7.2.4 Landscape Character Areas (LCA) within the 20km study area with theoretical visibility of the proposed development are determined based on, where available, published landscape character assessments. Where these are not available the LCA's will be determined using boundaries and typologies of the LANDMAP aspect areas, predominantly Visual and Sensory. All character areas are illustrated on drawing 011 to 023 .

7.2.5 LCAs determined by LANDMAP have been created in accordance with NRW Guidance Note 046, 'Using LANDMAP in Landscape and Visual Impact Assessments, (LVIA),' (January 2021)

7.2.6 To ensure the LVIA focusses on potentially sensitive landscape receptors within aspect areas most likely to be affected, a four-step filtering process has been applied to the LANDMAP aspect areas to ascertain those that are required to be assessed within the LVIA.

Geological Landscape, Landscape Habitats and Cultural Landscape Aspect Areas

7.2.7 The initial search area, (Filter 1), includes areas that overlap fully or partially or are immediately adjacent to the development site boundary.

7.2.8 Filters 2, 3 and 4 are then applied applied,

7.2.9 Filter 2 relates to the relationship to other aspect areas and is only applicable to Geological Landscape.

7.2.10 Filter 3 relates to theoretical visibility, Then Filter 4 relates to evaluation scoring and /or specific characteristics, such as rarity/uniqueness for Geological Landscape or connectivity/cohesion for Landscape Habitats.

7.2.11 Aspect areas in which the proposed development is located are retained for assessment within the LVIA irrespective of their evaluation or any special characteristics.

7.2.12 Cultural Landscape Services does not include landscape evaluation information, retain all aspect areas identified from filter 1 or 3.

Visual and Sensory and Historic Landscape Aspect Areas

7.2.13 Filter 1 for Visual and Sensory and Historic Landscape also extends across the 20km study area.

7.2.14 Filters 2, was then applied, relating to theoretical Visibility and Filter 3 relates to overall evaluation scoring for both Visual and Sensory and Historic Landscape and high sensitivity visual receptors.

7.2.15 Consideration of Scenic Value (Q48) and Character (Q48) were also applied to help filter Visual and Sensory aspect areas.

7.2.16 The LANDMAP Aspect Areas identified following the GN46 filtering are illustrated on drawing 011 to 023.

- 7.2.17 Using the filtered LANDMAP aspect areas, suitably scaled character-based reporting units were created where published landscape character assessments are unavailable.
- 7.2.18 LANDMAP visual and sensory aspect areas, were used as a starting point and where these were not entirely suitable, other LANDMAP aspect layers were used to assist with the subdivision or amalgamation of visual and sensory aspect boundaries.
- 7.2.19 The LCAs identified where potential for significant effects may occur and are to be included within the LVIA are illustrated on drawing 039.