macroworks

LANDSCAPE & VISUAL IMPACT ASSESSMENT

Proposed 110kV Substation and Grid Connection.

Knockraha, Co. Cork.

LVIA I TVIA I Landscape Design I Visibility Analysis I Glint and Glare I Verified Photomontages I CGI I Shadow Flicker Analysis

1 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

1.1 INTRODUCTION

This Landscape and Visual Assessment (LVIA) has been prepared for a planning application for the proposed 110 kilovolt (kV) substation in the townlands of Knockraha East, Ballynanelagh and Killeena in County Cork (the Proposed Development). The LVIA report describes the landscape context of the Proposed Development and assesses the likely landscape and visual impacts of the scheme on the receiving environment.

Landscape Impact Assessment (LIA) relates to assessing effects of a development on the landscape as a resource in its own right and is concerned with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character.

Visual Impact Assessment (VIA) relates to assessing effects of a development on specific views and on the general visual amenity experienced by people. This deals with how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements. Visual impacts may occur from; visual obstruction (blocking of a view, be it full, partial or intermittent) or visual intrusion (interruption of a view without blocking).

Cumulative landscape and visual impact assessment is concerned with additional changes to the landscape or visual amenity caused by a proposed development in conjunction with other developments (associated or separate to it), or actions that occurred in the past, present or are likely to occur in the foreseeable future.

This assessment was guided by:

- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Landscape Institute and the Institute of Environmental Management and Assessment (eds.) (2013) Guidelines for Landscape and Visual Impact Assessment. Routledge, Oxon; and
- Landscape Institute and the Institute of Environmental Management and Assessment (2019) Landscape Institute Technical Guidance Note TGN 02/19 Residential Visual Amenity Assessment.

The capturing of the photography and the preparation of the photomontages was undertaken in accordance with:

- Landscape Institute and the Institute of Environmental Management and Assessment (2019) Landscape Institute Technical Guidance Note TGN 06/19 Visual Representation of development proposals.

1.1.1 Statement of Authority

This LVIA report was prepared by Macro Works Ltd (part of the APEM Group); a landscape consultancy firm specialising in LVIA along with associated visibility mapping and photomontage graphics. Relevant experience includes landscape and visual assessments for a range of industrial, commercial and infrastructural developments. Experience extends to the assessment of over 150 wind energy developments, 120 solar energy developments and includes numerous Strategic Infrastructure Development (SID) projects.

1.1.2 Description of the Proposed Development

The Proposed Development will consist of a 10 year permission for a 110kV electrical substation and associated 110kV infrastructure required to connect a solar farm (permitted under Cork County Council Reg. Ref: 23/4564; which amended previous permission Reg. Ref: 17/5370 and ABP-300434-17) to the existing Knockraha 220kV substation.

The substation compound will include 2 No. single storey control buildings:

- An EirGrid control building (comprising relay room, battery room, workshop/store, mess room and W.C, and generator room); and
- An Independent Power Producer control building (comprising control room, switchgear room, office, store and W.C).

The Proposed Development also includes:

- 110kV grid transformer and two-house transformers within bunded enclosures (height approximately 6m) and associated infrastructure;
- MV switchgear containers;
- Lightning protection masts;
- Perimeter security fencing and entrance gates;
- Security lighting;
- Telecommunication dishes;
- Underground cabling;
- Site drainage infrastructure;
- Proposed access from the L6989 to the south;
- Temporary construction compound; and
- All associated development works above and below ground including landscaping.

A Natura Impact Statement (NIS) is submitted with this planning application.

1.1.3 Assessment Methodology

Production of this LVIA involved:

- A desktop study to establish an appropriate study area, relevant landscape and visual designations in the Cork County Development Plan 2022-2028 (which includes the Cork County Draft Landscape Strategy [2007]) as well as other sensitive visual receptors. This stage culminates in the selection of a set of potential viewpoints from which to study the effects of the proposal;
- Fieldwork to establish the landscape character of the receiving environment and to confirm and refine the set of viewpoints to be used for the visual assessment stage;
- Assessment of the significance of the landscape impact of the development as a function of landscape sensitivity weighed against the magnitude of the landscape impact;
- Assessment of the significance of the visual impact of the development as a function of visual receptor sensitivity weighed against the magnitude of the visual impact. This aspect of the assessment is supported by photomontages prepared in respect of the selected viewpoints; and
- Incorporation of mitigation measures to reduce potential impacts and estimation of residual impacts once mitigation has become established.

1.1.3.1 Landscape Impact Assessment Criteria

When assessing the potential impacts on the landscape resulting from a proposed development, the following criteria are considered:

- Landscape character, value and sensitivity;
- Magnitude of likely impacts; and

- Significance of landscape effects

The sensitivity of the landscape to change is the degree to which a particular landscape receptor (Landscape Character Area (LCA) or feature) can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics. Landscape Value and Sensitivity is classified using the following criteria set out in **Table 1.1.**

Table 1.1 Landscape Value and Sensitivity

Sensitivity	Description
Very High	Areas where the landscape character exhibits a very low capacity for change in the form of development. Examples of which are high value landscapes, protected at an international or national level (World Heritage Site/National Park), where the principal management objectives are likely to be protection of the existing character.
High	Areas where the landscape character exhibits a low capacity for change in the form of development. Examples of which are high value landscapes, protected at a national or regional level (Area of Outstanding Natural Beauty), where the principal management objectives are likely to be considered conservation of the existing character.
Medium	Areas where the landscape character exhibits some capacity and scope for development. Examples of which are landscapes, which have a designation of protection at a county level or at non-designated local level where there is evidence of local value and use.
Low	Areas where the landscape character exhibits a higher capacity for change from development. Typically, this would include lower value, non-designated landscapes that may also have some elements or features of recognisable quality, where landscape management objectives include, enhancement, repair and restoration.
Negligible	Areas of landscape character that include derelict, mining, industrial land or are part of the urban fringe where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and/or restoration to realise a higher landscape value.

The magnitude of a predicted landscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed development. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the Site boundary that may have an effect on the landscape character of the area. **Table 1.2** refers.

Table 1.2 Magnitude of Landscape Impacts

Magnitude of Impact	Description
Very High	Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an extensive change of the landscape in terms of character, value and quality.
High	Change that would be more limited in extent and scale with the loss of important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to a considerable change of the landscape in terms of character, value and quality.

Magnitude of Impact	Description
Medium	Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to noticeable changes in landscape character, and quality.
Low	Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements that would lead to discernible changes in landscape character, and quality.
Negligible	Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable leading to no material change to landscape character, and quality.

The significance of a landscape impact is based on a balance between the sensitivity of the landscape receptor and the magnitude of the impact. The significance of landscape impacts is arrived at using the following matrix set out in **Table 1.3**.

Table 1.3 Significance of Effect Matrix

	Sensitivity of Receptor				
Scale/Magnitude	*Very High*	*High*	*Medium*	*Low*	*Negligible*
Very High	Profound	Profound-substantial	Substantial	Moderate	Slight
High	Profound-substantial	Substantial	Substantial-moderate	Moderate-slight	Slight-imperceptible
Medium	Substantial	Substantial-moderate	Moderate	Slight	Imperceptible
Low	Moderate	Moderate-slight	Slight	Slight-imperceptible	Imperceptible
Negligible	Slight	Slight-imperceptible	Imperceptible	Imperceptible	Imperceptible

Note: The significance matrix provides an indicative framework from which the significance of impact is derived. The significance judgement is ultimately determined by the assessor using professional judgement. Due to nuances within the constituent sensitivity and magnitude judgements, this may be up to one category higher or lower than indicated by the matrix. Judgements indicated in orange are considered to be 'significant effects'.

1.1.3.2 Visual Impact Assessment Criteria

As with the landscape impact, the visual impact of the proposed development will be assessed as a function of sensitivity versus magnitude. In this instance, the sensitivity of the visual receptor, weighed against the magnitude of the visual effect.

1.1.3.3 Sensitivity of Visual Receptors

Unlike landscape sensitivity, the sensitivity of visual receptors has an anthropocentric basis. It considers factors such as the perceived quality and values associated with the view, the landscape context of the viewer, the likely activity they are engaged in and whether this heightens their awareness of the

surrounding landscape. A list of the factors considered by the assessor in estimating the level of sensitivity for a particular visual receptor is outlined in the subsequent sections and used in **Table 1.6** below to establish visual receptor sensitivity at each viewshed reference points (VRP).

1.1.3.3.1 Susceptibility of Receptors

In accordance with the Institute of Environmental Management and Assessment ("IEMA") Guidelines for Landscape and Visual Assessment (3rd edition 2013) visual receptors most susceptible to changes in views and visual amenity are:

- *"Residents at home;*
- *People, whether residents or visitors, who are engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focussed on the landscape and on particular views;*
- *Visitors to heritage assets, or to 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 in the area; and*
- *Travellers on road, rail or other transport routes where such travel involves recognised scenic routes and awareness of views is likely to be heightened".*

Visual receptors that are less susceptible to changes in views and visual amenity include;

- *"People engaged in outdoor sport or recreation, which does not involve or depend upon appreciation of views of the landscape; and*
- *People at their place of work whose attention may be focussed on their work or activity, not their surroundings and where the setting is not important to the quality of working life".*

1.1.3.3.2 Values Associated with the View

1. **Recognised scenic value of the view** (County Development Plan designations, guidebooks, touring maps, postcards etc). These represent a consensus in terms of which scenic views and routes within an area are strongly valued by the population because in the case of County Developments Plans, for example, a public consultation process is required;
2. **Views from within highly sensitive landscape areas**. Again, highly sensitive landscape designations are usually part of a county's Landscape Character Assessment, which is then incorporated within the County Development Plan and is therefore subject to the public consultation process. Viewers within such areas are likely to be highly attuned to the landscape around them;
3. **Primary views from dwellings**. A proposed development might be seen from anywhere within a particular residential property with varying degrees of sensitivity. Therefore, this category is reserved for those instances in which the design of dwellings or housing estates, has been

influenced by the desire to take in a particular view. This might involve the use of a slope or the specific orientation of a house and/or its internal social rooms and exterior spaces;

4. **Intensity of use, popularity**. This relates to the number of viewers likely to experience a view on a regular basis and whether this is significant at county or regional scale;
5. **Connection with the landscape**. This considers whether or not receptors are likely to be highly attuned to views of the landscape i.e., commuters hurriedly driving on busy national route versus hill walkers directly engaged with the landscape enjoying changing sequential views over it;
6. **Provision of elevated panoramic views**. This relates to the extent of the view on offer and the tendency for receptors to become more attuned to the surrounding landscape at locations that afford broad vistas;
7. **Sense of remoteness and/or tranquillity.** Receptors taking in a remote and tranquil scene, which is likely to be fairly static, are likely to be more receptive to changes in the view than those taking in the view of a busy street scene, for example;
8. **Degree of perceived naturalness**. Where a view is valued for the sense of naturalness of the surrounding landscape it is likely to be highly sensitive to visual intrusion by distinctly manmade features;
9. **Presence of striking or noteworthy features.** A view might be strongly valued because it contains a distinctive and memorable landscape feature such as a promontory headland, lough or castle;
10. **Historical, cultural and/or spiritual significance.** Such attributes may be evident or sensed by receptors at certain viewing locations, which may attract visitors for the purposes of contemplation or reflection heightening the sense of their surroundings;
11. **Rarity or uniqueness of the view**. This might include the noteworthy representativeness of a certain landscape type and considers whether the receptor could take in similar views anywhere in the broader region or the country;
12. **Integrity of the landscape character**. This looks at the condition and intactness of the landscape in view and whether the landscape pattern is a regular one of few strongly related components or an irregular one containing a variety of disparate components;
13. **Sense of place**. This considers whether there is special sense of wholeness and harmony at the viewing location; and
14. **Sense of awe**. This considers whether the view inspires an overwhelming sense of scale or the power of nature.

Those locations which are deemed to satisfy many of the above criteria are likely to be of higher sensitivity. No relative importance is inferred by the order of listing in the **Table 1.5**. Overall sensitivity may be a result of a number of these factors or, alternatively, a strong association with one or two in particular.

1.1.3.4 Visual Impact Magnitude

The magnitude of visual effects is determined on the basis of two factors; the visual presence (relative visual dominance) of the proposal and its effect on visual amenity.

Visual presence is a somewhat quantitative measure relating to how noticeable or visually dominant the proposal is within a particular view. This is based on a number of aspects, aside from scale in relation to distance. Some of these aspects include the extent and complexity of the view, as well as the degree of existing contextual movement experienced. The backdrop against which the development is presented and its relationship with other focal points or prominent features within the view is also considered. Visual presence is essentially a measure of the relative visual dominance of the proposal within the available vista and is often, though not always, expressed as one of the following terms:

- Minimal;
- Sub-dominant;
- Co-dominant;
- Dominant;
- Highly dominant.

The magnitude of visual impacts is classified in **Table 1.4**.

Table 1.4 Magnitude of Visual Impact

Criteria	Description
Very High	The proposal obstructs or intrudes into a large proportion or critical part of the available vista and is without question the most noticeable element. An extensive degree of visual change will occur within the scene completely altering its character, composition and associated visual amenity.
High	The proposal obstructs or intrudes into a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual change will occur within the scene substantially altering its character, composition and associated visual amenity.
Medium	The proposal represents a moderate intrusion into the available vista and is a readily noticeable element. A noticeable degree of visual change will occur within the scene perceptibly altering its character, composition and associated visual amenity.
Low	The proposal intrudes to a minor extent into the available vista and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene.
Negligible	The proposal would be barely discernible within the available vista and/or it would not influence the visual amenity of the scene.

1.1.3.5 Visual Impact Significance

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix and applies the same EPA definitions of significance as used earlier in respect of landscape impacts (**Table 1.3** refers).

1.1.3.6 Quality and Timescale of Effects

In addition to assessing the significance of landscape effects and visual effects, EPA Guidance for Environmental Impact Assessment Reports (2022) requires that the quality of the effects is also determined. This could be negative/adverse, neutral, or positive/beneficial. In the case of new energy/infrastructure developments within rural and semi-rural settings, the landscape and visual change brought about by an increased scale and intensity of built form is seldom considered to be positive/beneficial.

Landscape and Visual effects are also categorised according to their duration:

- Temporary – Lasting for one year or less;
- Short Term – Lasting one to seven years;
- Medium Term – Lasting seven to fifteen years;
- Long Term – Lasting fifteen years to sixty years; and
- Permanent – Lasting over sixty years.

1.1.3.7 Cumulative Impact Assessment Criteria

Cumulative impacts will be assessed at each of the viewpoints where cumulative visibility occurs. Cumulative impacts will be assessed in accordance with the visual impact magnitude criteria contained in **Table 1.4** to determine whether the in-combination effects are greater than for the proposed development in its own right and the overall contribution of the development to any increased cumulative effect.

1.1.4 Extent of Study Area

It is anticipated that the Proposed Development will be difficult to discern and not likely to give rise to significant landscape/townscape or visual impacts beyond 2km. As a result, a 2km study area is to be used in this instance with a focus on those receptors within 1km of the site.

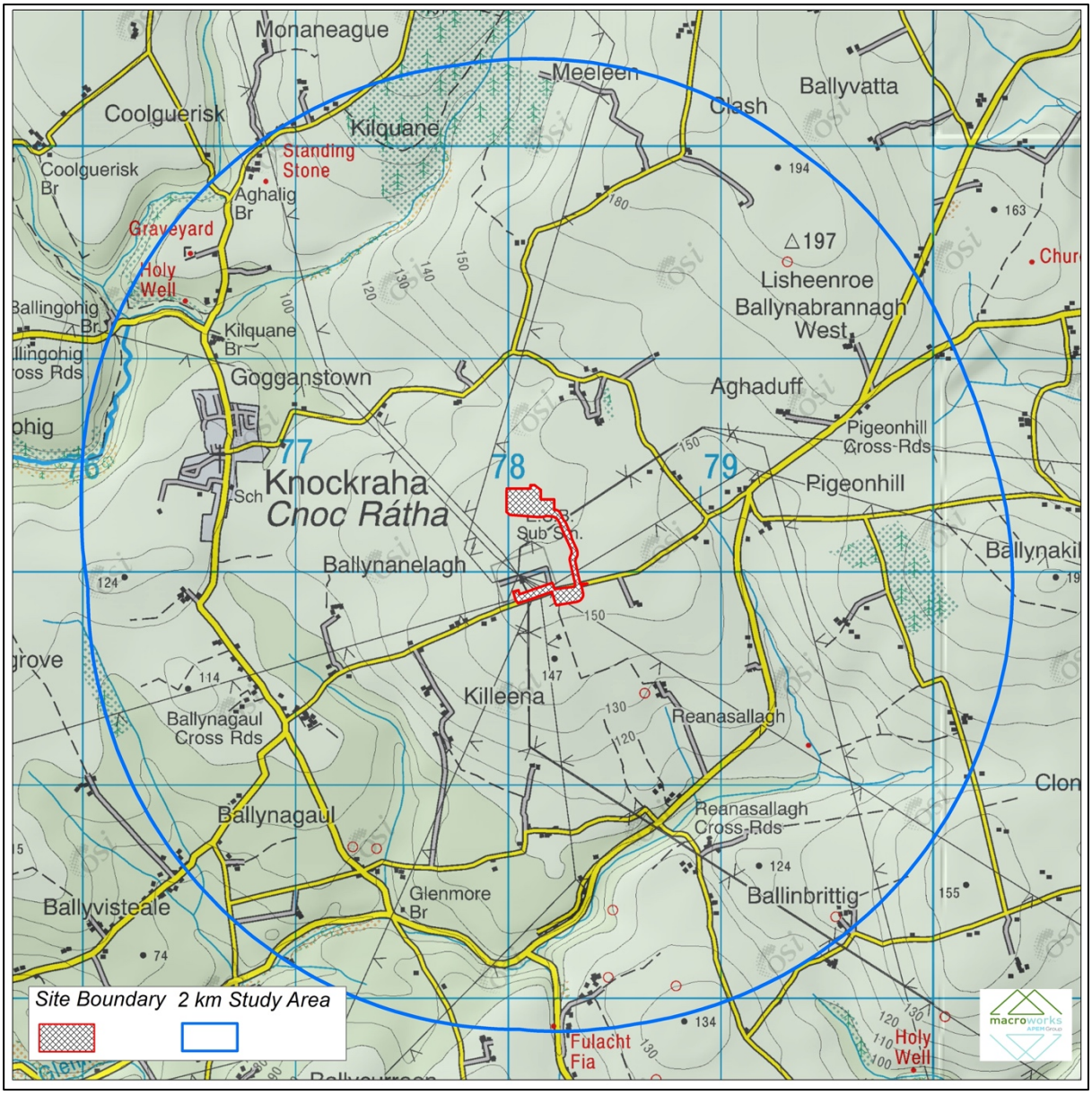

Figure 1.1 Extent of the study area.

1.1.5 Landscape and Visual Policy Context and Designations

1.1.5.1 Cork County Development Plan 2022-2028

The Cork County Development Plan 2022-2028 includes Chapter 14 'Green Infrastructure and Recreation', within which sub-section 14.7 relates to landscape. A number of general objectives relating to landscape are noted within this chapter and are included below:

GI 14-9: Landscape

a) *"Protect the visual and scenic amenities of County Cork's built and natural environment.*

b) *Landscape issues will be an important factor in all land-use proposals, ensuring that a pro-active view of development is undertaken while maintaining respect for the environment and heritage generally in line with the principle of sustainability.*

c) *Ensure that new developments meets high standards of siting and design.*

d) *Protect skylines and ridgelines from development.*

e) *Discourage proposals necessitating the removal of extensive amounts of trees, hedgerows and historic walls or other distinctive boundary treatments."*

GI 14-10: Draft Landscape Strategy

"Ensure that the management of development throughout the County will have regard for the value of the landscape, its character, distinctiveness and sensitivity as recognised in the Cork County Draft Landscape Strategy and its recommendations, in order to minimize the visual and environmental impact of development, particularly in areas designated as High Value Landscapes where higher development standards (layout, design, landscaping, materials used) will be required."

A Landscape Character Assessment was undertaken as part of the Draft Cork Landscape Strategy (2007). This has been incorporated within the Cork County Development Plan (2022-2028) and divides the county into 16 No. Landscape Character Types (LCTs). The proposed development is located within LCT10b - Fissured Fertile Middleground (**Figure 1.3** refers), which is classified with a 'Medium' landscape value, 'High' landscape sensitivity and a 'County' landscape importance.

LCT10b – Fissured Fertile Middleground *"runs broadly between Macroom to the west and the county boundary to the east. This landscape type, as a middleground, has characteristics of both the flatter fertile farmland type (Fertile Plain with Moorland Ridge) and the higher marginal hilly or rugged type (Rolling Marginal and Forested Middleground). It comprises an area rising above adjacent plains with moderate to low relief of elongated interlocking hills forming sinuous rivers. It is an elevated landscape, which is sequentially fissured by these rivers and their valleys. Many of the rivers in the western parts extend beyond this landscape type and feed into the River Lee and Bandon River while those to the east head southwards to the sea."*

Other landscape character types within the study area include 'LCT1 – City Harbour and Estuary', which borders LCT10b some c.1.3km southwest of the site.

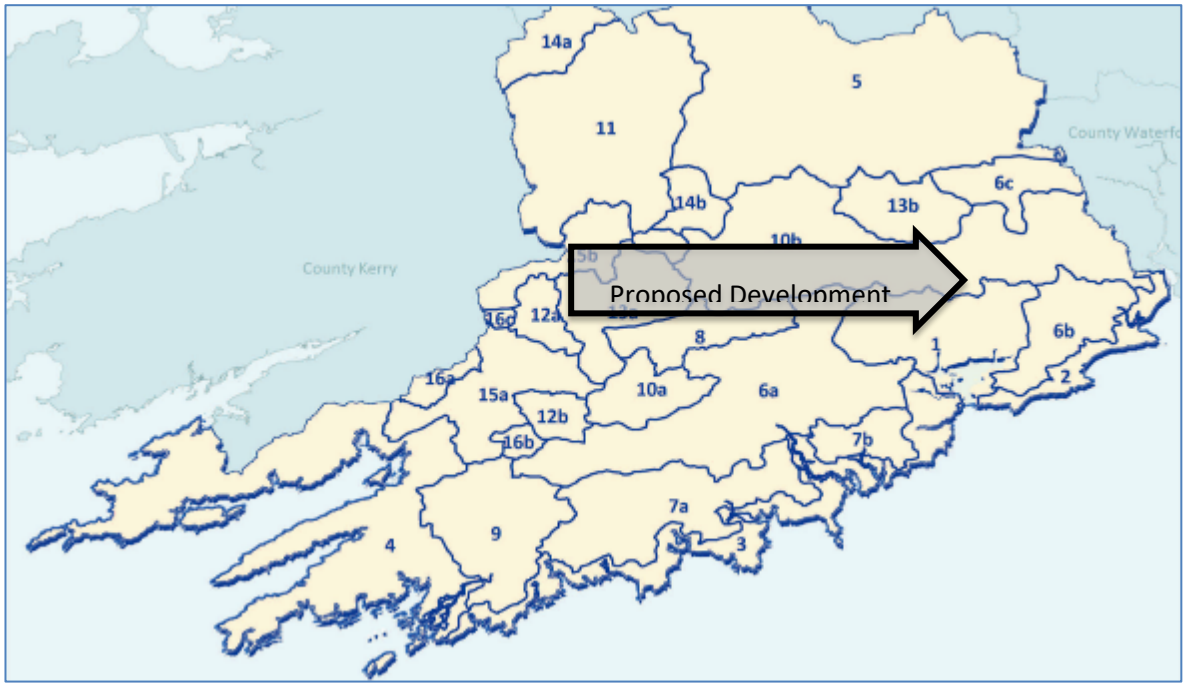

Figure 1.2 Excerpt from Cork County Development Plan (2022-2028). Appendix F, Map 2 showing approximate location of the proposed development in relation to Landscape Character Types.

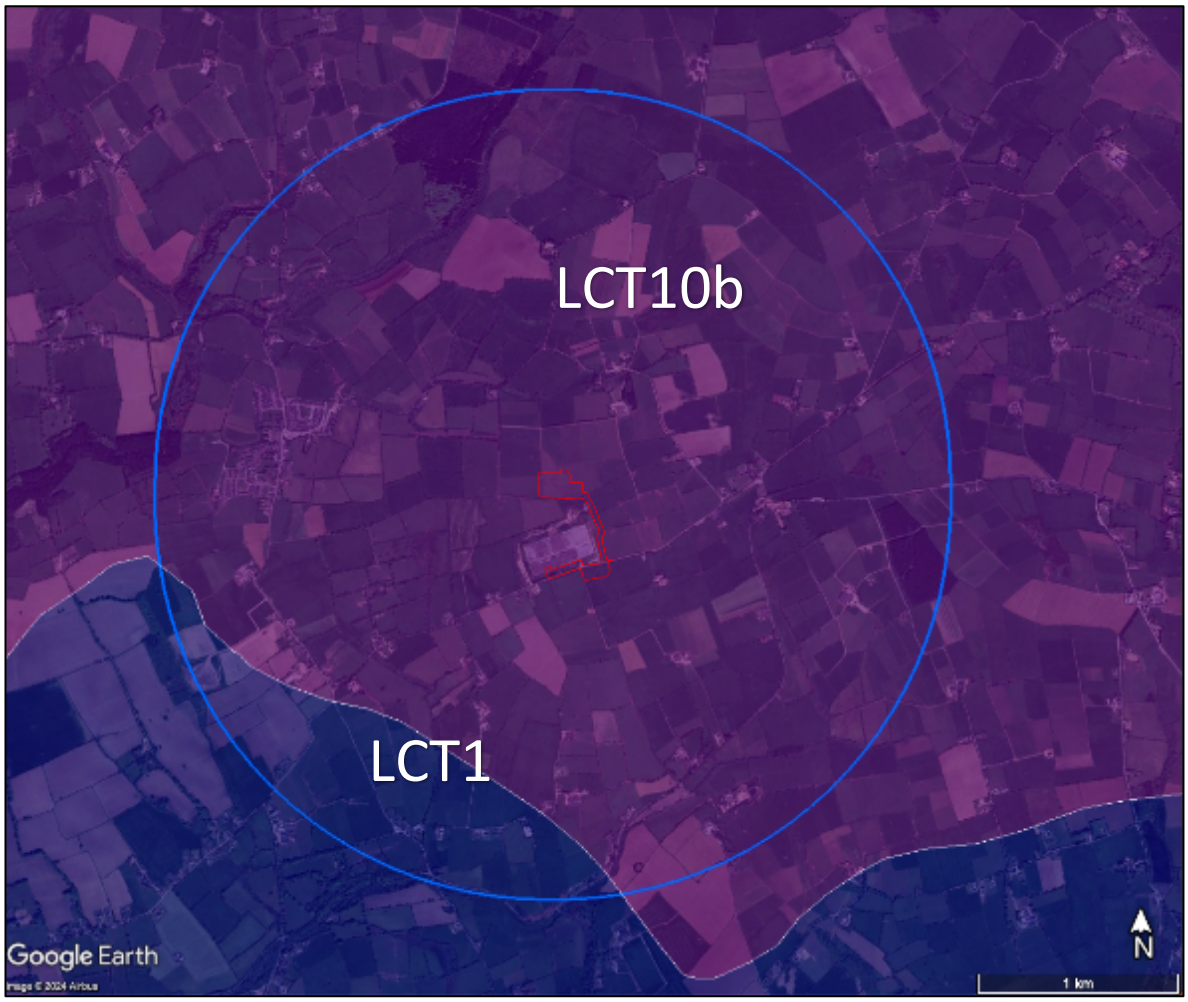

Figure 1.3 Excerpt from Cork County Development Plan (2022-2028) map browser, showing landscape character types in relation to the proposed development (pink colour – LCT10b, blue colour – LCT1).

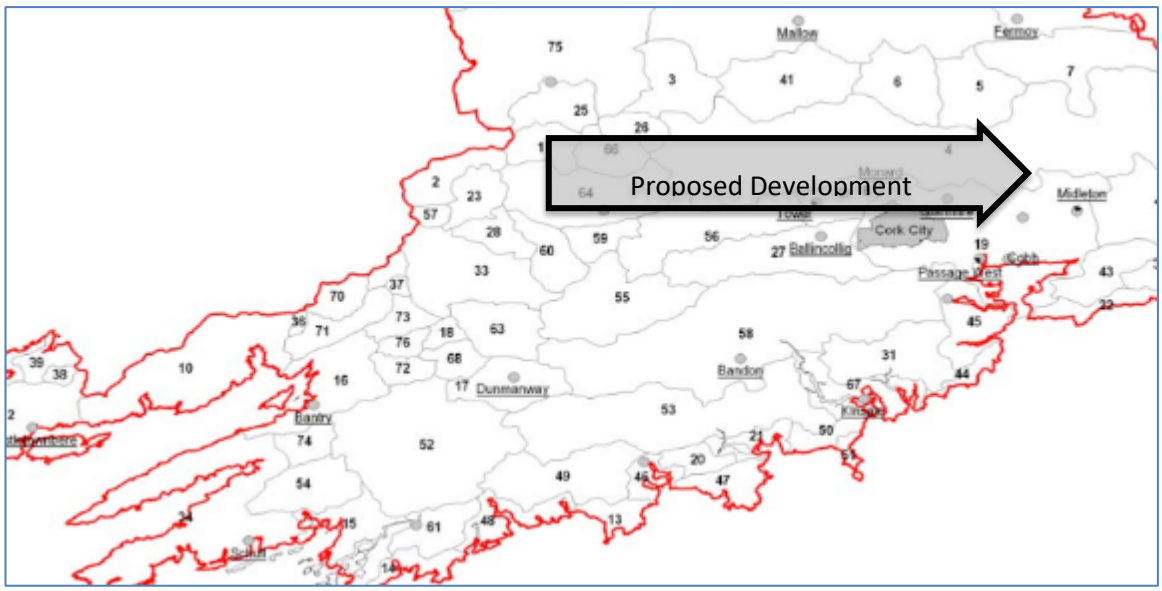

Figure 1.4 Excerpt from County Cork Draft Landscape Strategy 2007. Map 1 showing approximate location of proposed development in relation to Landscape Character Areas

The value of the landscape in county Cork "*is defined as the environmental or cultural benefits, including services and functions, which are derived from various landscape attributes. Value is evaluated using criteria ranging from Very High to Low*". Whilst the proposed development is located outside of the High Value Landscape (HVL) designation, a broad HVL designation occurs less than 1km southwest of the site and is associated with the landscape character type 'LCT1 – City Harbour and Estuary' (refer to

Figure 1.5 below).

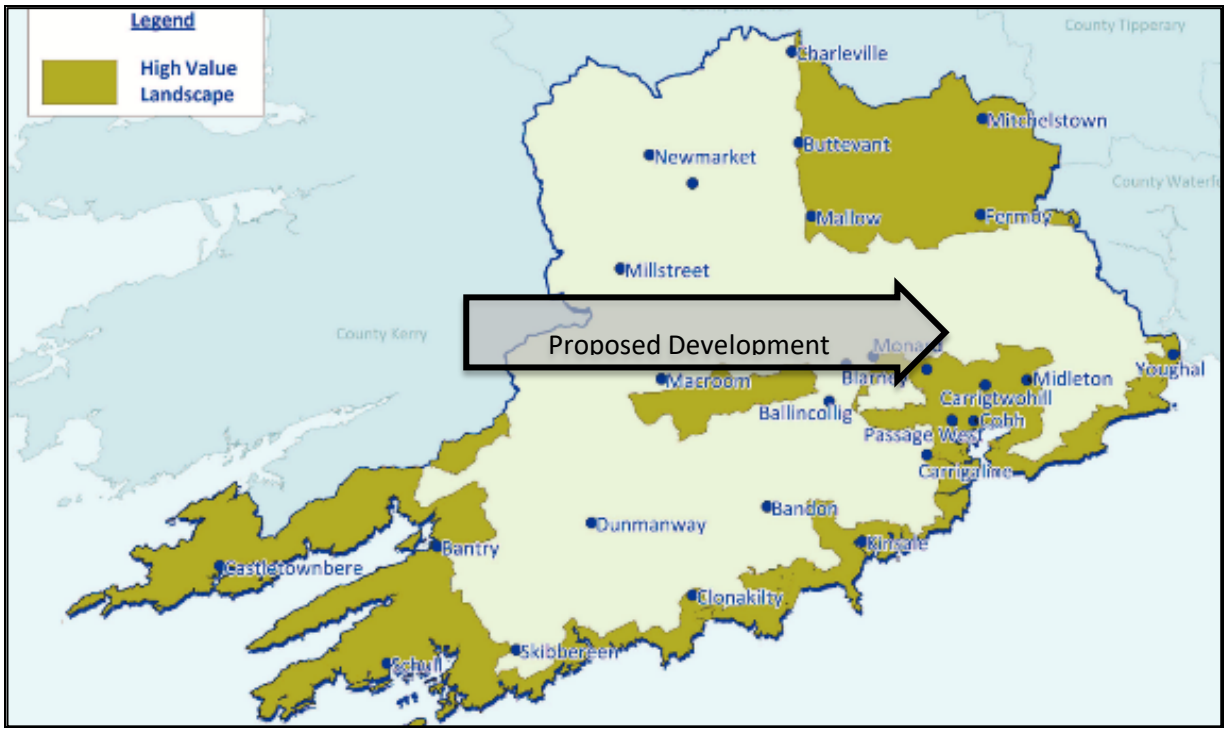

Figure 1.5 Excerpt from CCDP (2022-2028). Chapter 14, Figure 14.2 showing approximate location of proposed development in relation to high value landscapes.

A number of general recommendations are outlined in the Draft Cork County Landscape Strategy regarding 'LCT10b – Fissured Fertile Middleground', some of which relate to the development in question and are outlined below:

- *"New farm buildings must be designed to integrate with the landscape considering factors such as size, materials and colouring.*
- *Maintain and enhance views to and from areas of visual value including extensive uninterrupted views across open countryside.*
- *Maintain the visual integrity of the area which has retained a dominantly undisturbed upland character."*

1.1.5.2 Views of Recognised Scenic Value

Views of recognised scenic value are primarily indicated within Development Plans in the context of scenic views/routes designations, but they might also be indicated on touring maps, guidebooks, websites, road side rest stops or on post cards that represent the area.

Cork County Development Plan 2022-2028

Whilst a considerable number of designated scenic routes are located throughout county Cork, none of these occur within the 2km study area.

1.2 EXISTING ENVIRONMENT

1.2.1 Landscape Baseline

The landscape baseline represents the existing landscape context and is the scenario against which any changes to the landscape brought about by the proposed development will be assessed. A description of the landscape context of the proposed application site and wider study area is provided below under the headings of landform and drainage, vegetation and land use, centres of population and houses, transport routes and public amenities and facilities. Although this description forms part of the landscape baseline, many of the landscape elements identified also relate to visual receptors i.e., places and transport routes from which viewers can potentially see the proposed development.

1.2.1.1 Landscape Context

The Proposed Development is located along a locally elevated plateau with an overall elevation of c. 154m above ordnance datum (AOD) with the proposed development site ranging between c. 141m and 132m. The surrounding local landscape comprises low rolling terrain intersected by small winding river valleys. The nearest watercourse is the Gogganstown stream located c. 500m southwest. The nearest river is the Glenmore River, situated some c. 1.7km southeast of the site and meanders through the valley in the southern extent of the study area. The Butlerstown River passes just west of the settlement of Knockraha in the northwestern portion of the study area. Regarding land use, the principal form of land cover in the study area and wider landscape is pastoral farmland bound by mixed mature hedgerow vegetation. Small blocks of conifer forest are also located throughout the study area, whilst linear swathes of riparian woodland often cloak the sloping valley-side terrain of the rivers and streams that traverse the study area. The existing Knockraha 220kV substation is one of the more notable single land uses within the study area and is located on top of the same low rolling plateaux that contain the application site.

The small village settlement of Knockraha is the most notable population centre in relation to the proposed development. It is located c. 1.4km northwest of the site at its nearest point. Aside from the village of Knockraha, the study area comprises a modest rural population principally consisting of small linear clusters of residential dwellings and isolated farmsteads. There are no major routes within the study area, although the M8 motorway is situated some 4.4km northwest of the site at its nearest point. The most notable local routes in the study area include the L2964, which passes through the settlement of Knockraha in the western extents of the study area, and the L3604 local road in the eastern and southern half of the study area. The nearest local road to the proposed development is the L6989 local road, which passes within the site boundary. It is not considered that the study area is synonymous with any notable sense of heritage or recreation.

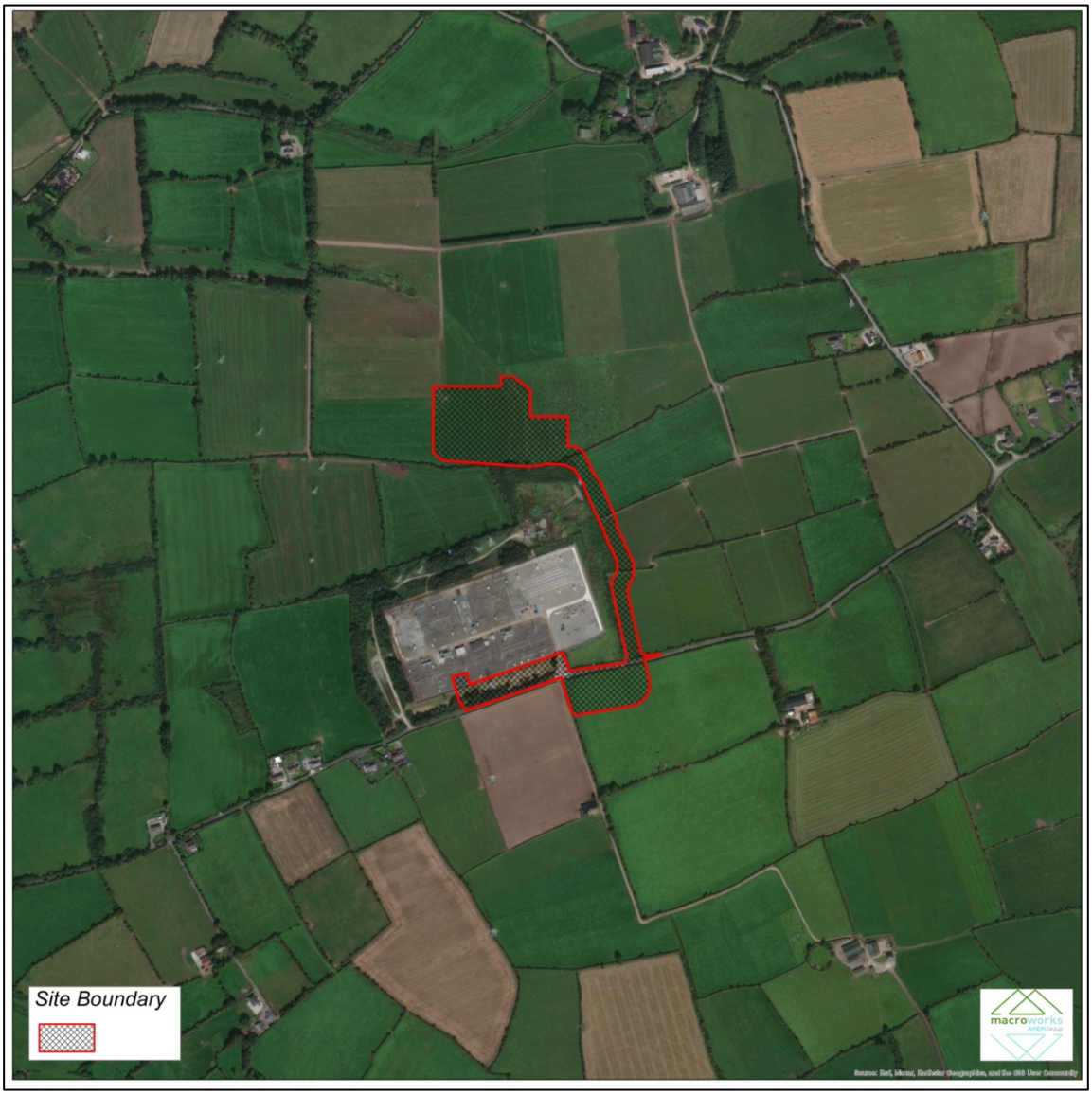

Figure 1.6 Landscape context of the site.

1.2.2 Visual Baseline

Only those parts of the receiving environment that potentially afford views of the proposed development are of concern to this section of the assessment. A computer-generated Zone of Theoretical Visibility (ZTV) map has been prepared to illustrate where the proposed development is potentially visible from. The ZTV map is based solely on terrain data (bare ground visibility), and ignores features such as trees, hedges or buildings, which may screen views. Given the complex vegetation patterns within this landscape, the main value of this form of ZTV mapping is to determine those parts of the landscape from which the proposed development will definitely not be visible, due to terrain screening within the study area.

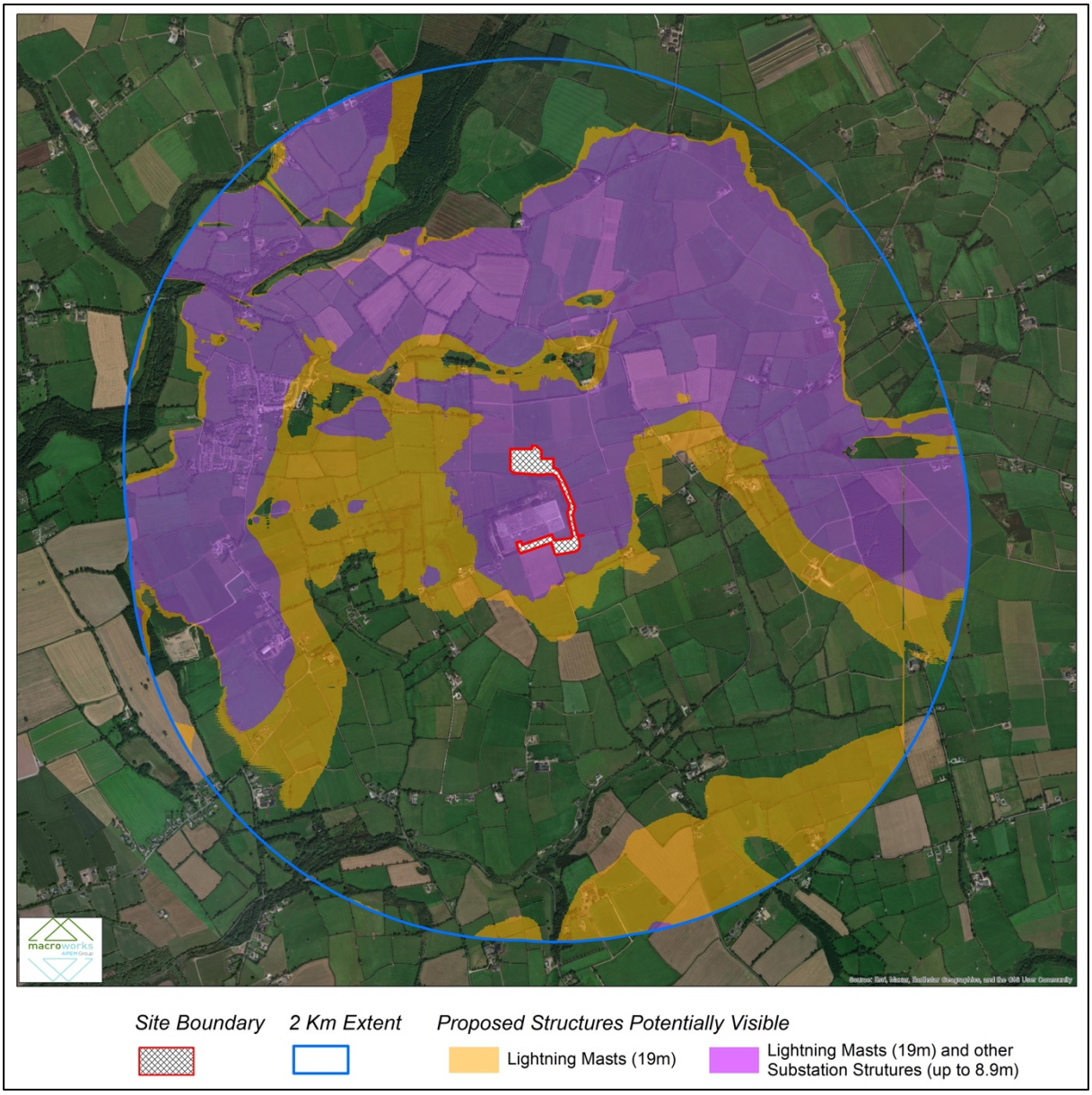

Figure 1.7 Standard (bare-ground) ZTV map

The following key points are illustrated by the 'bare-ground' ZTV map (see **Figure 1.7**):

- Despite the site's locally elevated location, approximately half of the study area will have no view of the Proposed Development due to the rolling nature of the surrounding landscape context.
- Areas without visibility of the Proposed Development (no colour pattern) are principally contained in the valleys in the study areas' southern portion and the northernmost extent.
- The settlement of Knockraha has the potential to afford views of the Proposed Development due to its location along east-facing rolling terrain.

The most important point to make in respect of this 'bare-ground' ZTV map is that it is theoretical. The proposed lightning mast c. 19m in height above the finished compound level (FCL) of 147.3m and have the potential to be somewhat visually exposed in the surrounding landscape, however, these structures are likely be difficult to discern from further than c. 2km. The proposed EirGrid Control Building will have a larger mass than the lightning masts and will be up to 8.9m high.

The second form of ZTV mapping relies on a Digital Surface Model ("DSM"), which also accounts for terrestrial land cover elements, such as hedgerows and buildings. This is of far more value in determining the likely visibility of the proposed development. For this finer grain of visibility analysis, a more consolidated area incorporating the surrounding network of roads and dwellings within approximately 1km of the application site boundary is used (see **Figure 1.9** below). A 1 km version of the DTM ZVT is provided below for direct comparison with the DSM ZTV (**Figure 1.8**).

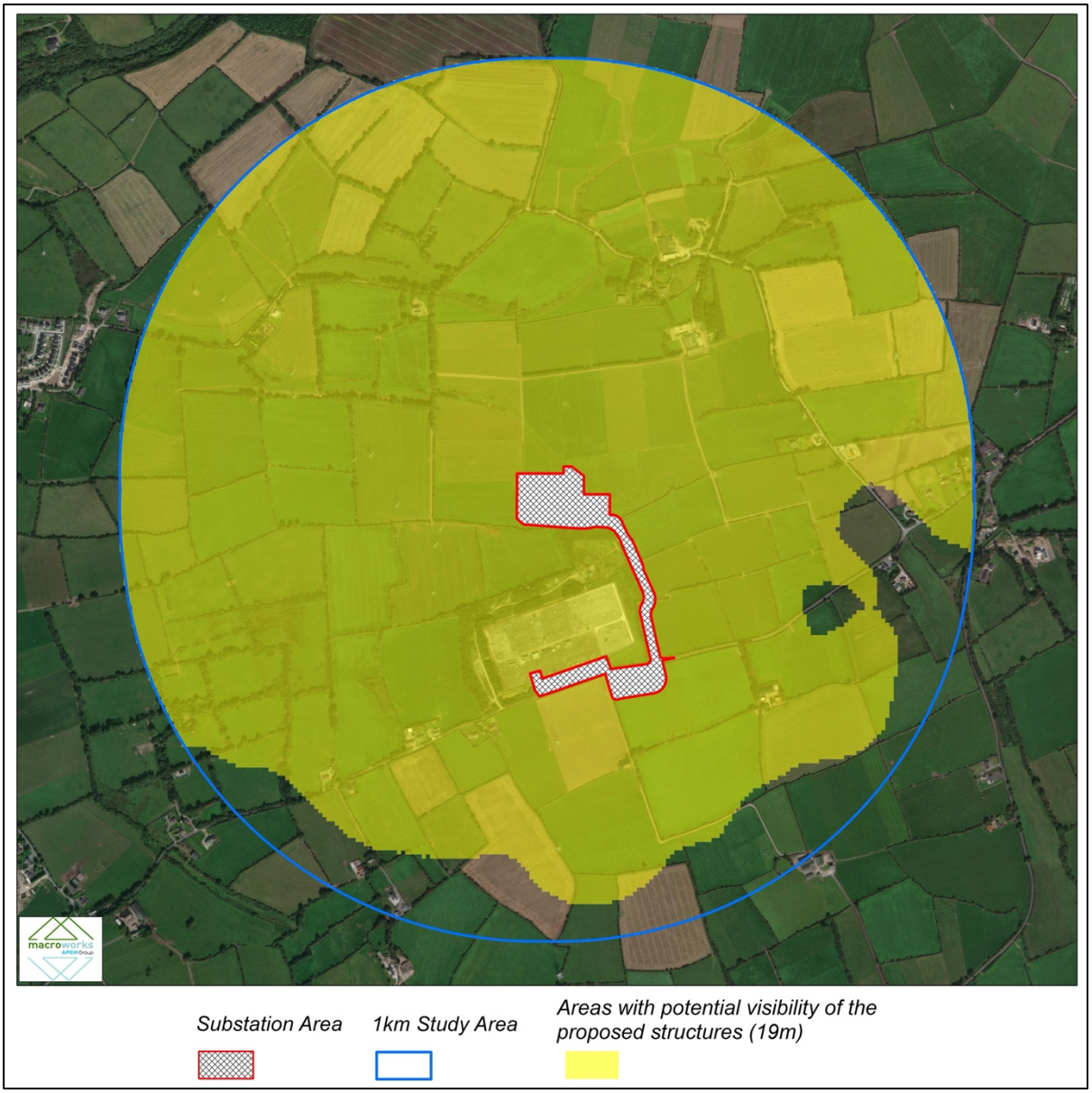

Figure 1.8 Digital Terrain Model (DTM) based ZTV map- Standard (bare-ground)

Figure 1.9 Digital Surface Model (DSM) based ZTV map accounting for screening by surface elements such as hedgerows, trees lines

As can be seen from the comparison of the 1 km 'bare-ground' ZTV map (see **Figure 1.8**) and the 1 km Digital Surface Model-based ZTV map (see **Figure 1.9** above):

- The Proposed Development's likely visibility from many parts of the area surrounding the application site boundary is considerably reduced as the existing hedgerow network notably limits the potential for views of the Proposed Development.
- The Proposed Development's visibility will primarily be in the form of partial glimpses (i.e., a sporadic yellow pattern). There will actually be many places within this yellow area where the visibility of the proposed development will be entirely screened where the yellow pattern is a result of the registration of treetops and hedgerows.
- A pocket of the yellow pattern occurs immediately adjoining the application site, indicating the proposed development may be visible. However, these areas appear predominantly composed of agricultural fields, and the enclosing hedgerows serve to screen the landscape beyond, particularly to the south, southeast, southwest, and northwest.

1.2.2.1 Identification of Viewshed Reference Points as a Basis for Assessment

VRPs are the locations used to study the visual impacts of a proposal in detail. It is not warranted to include each and every location that provides a view of a Proposed Development, as this would result in an unwieldy report and make it extremely difficult to draw out the key impacts arising from the Proposed Development. Instead, the selected viewpoints are intended to reflect various receptor types, distances and angles. The visual impact of a Proposed Development is assessed by Macro Works using up to 6 no. categories of receptor type as listed below:

- Key views (from features of national or international importance);
- Designated scenic routes and views;
- Local community views;
- Centres of population;
- Major routes;
- Amenity and heritage features.

VRPs might be relevant to more than one category, making them even more valid for inclusion in the assessment. The receptors that are intended to be represented by a particular VRP are listed at the beginning of each viewpoint appraisal. The VPRs selected in this instance are set out in the **Table 1.5** and **Figure 1.10** below.

Table 1.5 Outline Description of Selected Viewshed Reference Points (VRPs)

VRP No.	*Location*	*Representative of:*	*Direction of view*
VP1	Local road north of site at Knockraha East	Local community views	S
VP2	Local road, Knockraha East	Local community views	S
VP3	L2964 local road at dwelling, Ballynanelagh	Centre of population Local community views	E
VP4	L2964 local road at farm entrance, Ballynanelagh	Local community views	E
VP5	Local road south of site at Ballynanelagh	Local community views	NW

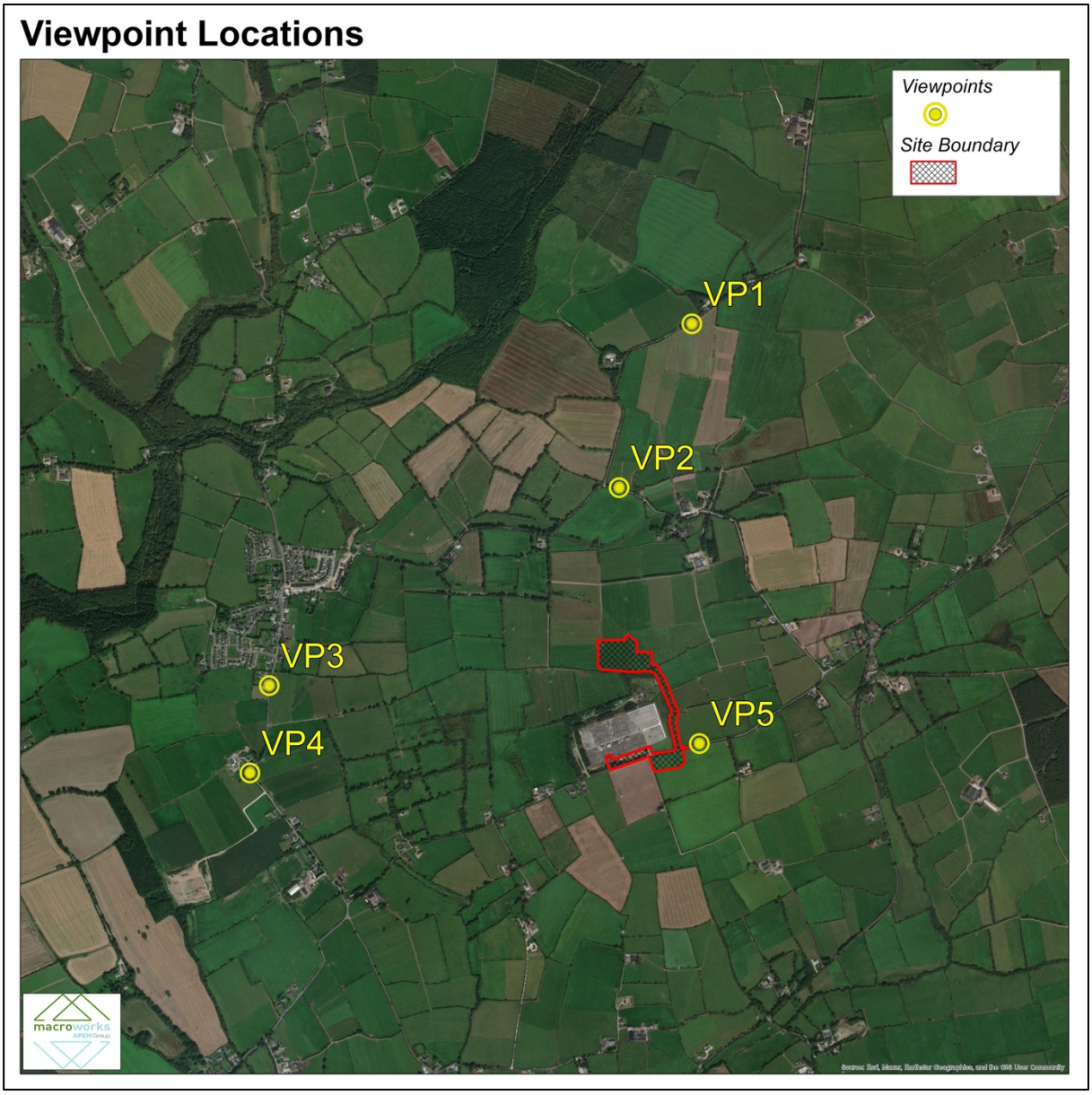

Figure 1.10 Viewpoint location map

1.3 MITIGATION AND RESTORATION MEASURES

The main mitigation by avoidance measure employed in this instance is the siting of the Proposed Development in a robust landscape context that already comprises existing electrical infrastructure so that the proposed development will not appear as an incongruous or inappropriate built feature. The study area also avails of a notable degree of existing vegetative screening, so the Proposed Development will not be a highly prominent feature in the surrounding landscape context.

Retention, in so far as possible, of existing hedgerow boundaries within and around the application site also prevents a sense of disregard, aids visual screening, and maintains the existing field pattern. In this respect, the proposed development is not perceived to impose itself on the existing landscape pattern.

After the landform is reinstated above the underground cable and the site access has been constructed, these areas will be reseeded with an amenity grass mix or form part of the proposed access roads. Additionally, a new hedgerow is proposed along the boundary of the proposed substation compound. Refer to the Landscape Mitigation Plan (drawing reference LD.KNCKRH 1.1) for details.

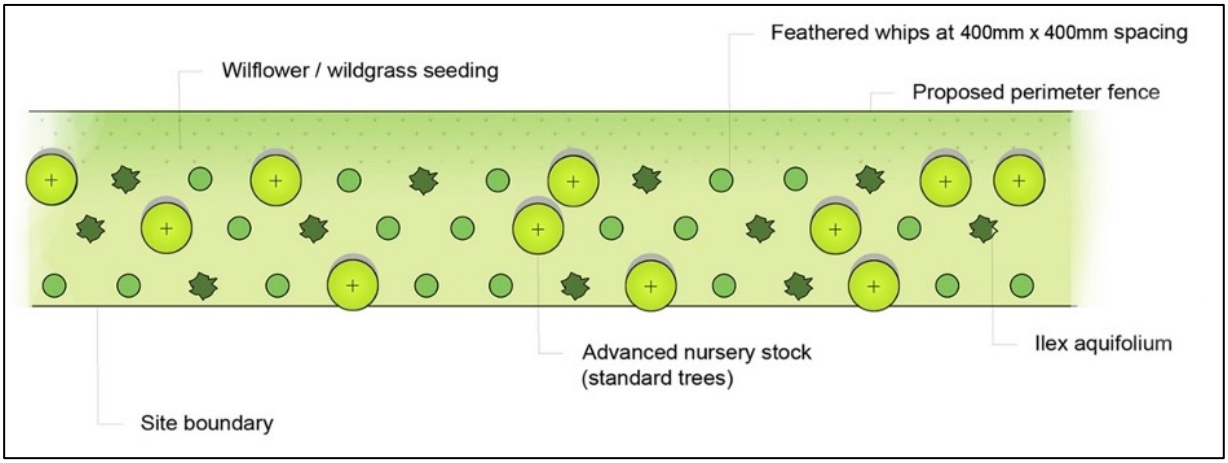

Figure 1.11 Hedgerow Type 2: Indicative Boundary Planting Detail Showing the Introduction of New Hedgerows.

The Landscape Masterplan specifies that the hedgerow planting will be laid out in 'triple staggered rows at a spacing of 600mm'. A table outlining the selected plant species mix and maturity specification at implementation indicates that most of the trees planted in the proposed new hedgerows will be 'whips' with a height of less than 1m.

It is also indicated on the inset diagram 'Hedgerow Type 2' on the Landscape Masterplan that the plant spacing of the new hedgerows will be 600 x 600mm and that it is anticipated that the advanced nursery stock in the proposed new hedgerows will be between 2 to 3m in height at implementation.

1.4 IMPACT ASSESSMENT

1.4.1 LANDSCAPE IMPACT ASSESSMENT

1.4.1.1 Landscape Value and Sensitivity

Landscape value and sensitivity are considered in relation to several factors highlighted in the Guidelines for Landscape and Visual Impact Assessment 2013, which are set out below and discussed relative to the application site and wider study area.

This typical rural landscape is comprised of rolling terrain cloaked in rolling pastoral farmland and networks of mature mixed hedgerow vegetation. This is not considered a highly rare or distinctive landscape in County Cork or the wider island of Ireland. One of the principal features of the local landscape context is the existing 220kV substation. The study area also comprises the small pleasant village of Knockraha, located along east-facing sloping terrain west of the Butlerstown River valley. However, the study area has no strong sense of amenity or recreation. Instead, much of the local landscape values relate to the subsistence of the rural economy as opposed to any highly susceptible naturalistic, scenic or tourism values. This is further reflected in the Cork County Development Plan, where the landscape character type 'LCT 10b – Fissured Fertile Middleground', which contains the site and much of the study area, is classified with a 'Medium' landscape value and 'County' landscape importance. Whilst this landscape type also encompasses a 'High' landscape sensitivity designation, it is not considered that this landscape is highly sensitive or susceptible to change at a local level.

Based on the reasons outlined above, it is considered that the study area encompasses a robust landscape context that is already influenced by existing large-scale electrical infrastructure development. It is not considered that the landscape of the study area is highly rare or distinctive on a local, regional or national level, and therefore, on the balance of these factors and in accordance with the criteria outlined in **Table 1.1**, the landscape sensitivity is deemed to be **Medium-low**.

1.4.1.2 Magnitude of Landscape Effects

1.4.1.2.1 Construction Stage

Substation

During the construction phase, physical landscape impacts will occur at the site of the Proposed Development. These impacts will result from the disturbance of landform and land cover due to the erection of various structures, buildings, and access roads. The construction activities will commence with the installation of temporary site perimeter fencing. Enabling works will include site clearance, topsoil stripping and localised excavations to facilitate the construction of building foundations and structural elements within the proposed substation compound.. Given that this is a gently sloping site, significant modification or redistribution of subsoil material is not anticipated to accommodate access road gradients or building ground levels. The earthworks have been designed to balance excavated materials, optimising the reuse of topsoil and minimising the physical impact.

Access to the site will be via the L6989 local road, requiring the translocation of approximately 50m of perimeter hedgerow on the north side of the road to facilitate the full extent of the proposed site entrance and its associated sightlines. Additionally, along with the site entrance, three additional sections of hedgerow will be removed (approximately 30m in total) sto facilitate access to the proposed substation compound.

In addition to the permanent physical disturbance, there will be temporary effects on the landscape character of the site and its immediate surroundings during construction. This will be due to the intensity of construction activities, including the movement of heavy vehicles. The temporary construction compound will house site welfare facilities, vehicle parking, and storage areas for excavated earth and building materials. Tower cranes and partially completed structures will be more visible than surface-level construction activities and characteristic of this phase. These activities represent a significant increase in baseline activity levels for this rural site.

The construction activities will be relatively modest in scale and short-term in duration. While there will be a noticeable increase in activity from workers and construction machinery, there are few visual receptors in close proximity to the works. Nevertheless, the construction phase may temporarily impact landscape character due to heavy machinery movement, excavation and stockpiling of soil, and the temporary storage of construction materials.

Underground Cable

Trenches will be excavated to install conductors below ground, with two joint bays included. The physical impact of the trench on the landscape will be modest. Impacts on land cover for the off-road portions of the proposed underground cable will be limited to a narrow swathe where some grassland and hedgerow vegetation must be removed. These impacts will not materially affect the overall landscape fabric or character in the study area. While construction activity may temporarily alter the landscape character locally, these changes will be transitory. Open-cut trenching and joint bay construction will remove localised vegetation, but healthy mature trees will be preserved wherever possible. Some vegetation removal may open up previously screened views. Horizontal Directional Drilling (HDD) will be the technique used to install the cable below the road near the site entrance, which will limit the quantum of vegetation clearance at this location.

Where replanting removed vegetation is impractical, there will be a permanent but localised change. Trenches will be backfilled, topsoiled, and re-vegetated, considering agricultural land use and biodiversity requirements.

Significance of Landscape Effect

On the basis of the reasons outlined above, the magnitude of construction stage landscape effects is deemed to be **Medium-Low** within the immediate surrounds of the site. However, this quickly reduces to Low and Negligible in the study area's wider surroundings where construction activity's visibility is likely to be very limited. Combined with the Medium-low landscape sensitivity designation outlined

above, the significance of construction stage effects is deemed **Moderate-Slight** within the site's immediate surroundings. However, this quickly reduces to Slight and Imperceptible within the wider study area where construction activities will not be discernible. The quality of the construction stage effects will be **Negative**.

1.4.1.2.2 Operational Stage

Substation

There will be permanent physical changes to the land cover within the site, which will not be easily reversible. These changes relate to the excavation required for the foundations of the proposed substation compound. The lightning masts will reach a maximum height of approximately 19m, and the proposed EirGrid Control Building will be up to 8.9m in height. While the development will result in the loss of productive agricultural farmland, this will be replaced by electrical infrastructure, which is consistent with the existing landscape influenced by the Knockraha 220kV substation and its surrounding overhead cable corridors. The new approximately 500m section of internal access road will resemble farm tracks commonly found in this rural area.

The proposed substation compound, due to its relative height and bulk compared to other surface-level features within the site, has the potential to impact the landscape character. The primary effect will be an increased sense of industrialization within the predominantly rural setting, though this is in a context already influenced by existing electrical infrastructure. The Proposed Development involves adding more electrical infrastructure adjacent to the existing Knockraha Substation, thus intensifying an existing land use rather than introducing a new and unfamiliar one. Once fully constructed, the Proposed Development will significantly increase the intensity of electrical infrastructure in the immediate surroundings but will not appear inappropriate or incongruous.

From a landscape character perspective, the proposed substation compound will increase the degree of industrialization within the landscape but only to a limited extent. It will not significantly alter the wider landscape setting, which is already marked by substantial electrical infrastructure.

The perimeter of the proposed substation compound will feature screen planting to help integrate the substation into the landscape and blend with the surrounding vegetation.

Underground Cable

The proposed underground cable will largely occur within the existing road network or adjoin the proposed access road. Because it will not materially rise above the existing terrain, it is deemed not to have the potential to result in any notable adverse impacts on the physical landscape or landscape character within the receiving landscape. Any potentially noticeable permanent changes will be negative but highly localised and generally limited to where it is impossible to reinstate vegetation directly over the cable trench.

Significance of Landscape Effect

Based on the factors discussed above, the operational phase magnitude of landscape impact is considered medium within the immediate vicinity of the site (being those lands contained within approximately 1km). Thereafter, the magnitude of landscape impact is deemed to reduce as it becomes a progressively smaller component of the overall landscape fabric. It is considered that the impact will be **Negative**.

With reference to the significance graph (Table 1.3 refers) above, the Medium-low landscape sensitivity judgement attributed to the study area, coupled with a Medium magnitude of operational stage landscape impact, is considered to result in an overall significance of no greater than **Moderate-slight**.

1.4.2 VISUAL IMPACT ASSESSMENT

1.4.2.1 Sensitivity of Visual Receptors

Table 1.6 Analysis of Visual Receptor Sensitivity at Viewshed Reference Points

Scale of value for each criterion

Strong association	Moderate association	Mild association	Negligible association

Values associated with the view	**VP1**	**VP2**	**VP3**	**VP4**	**VP5**
Susceptibility of viewers to changes in views					
Recognised scenic value of the view					
Views from within highly sensitive landscape areas					
Primary views from residences					
Intensity of use, popularity (number of viewers)					
Viewer connection with the landscape					
Provision of vast, elevated panoramic views					
Sense of remoteness/tranquillity at the viewing location					
Degree of perceived naturalness					
Presence of striking or noteworthy features					
Sense of Historical, cultural and/or spiritual significance					
Rarity or uniqueness of the view					
Integrity of the landscape character within the view					
Sense of place at the viewing location					
Sense of awe					
Overall sensitivity assessment	**ML**	**ML**	**ML**	**ML**	**L**

N = Negligible; **L** = low sensitivity; **ML** = medium-low sensitivity **M** = medium sensitivity; **HM** = High-medium sensitivity; **H** = high sensitivity; **VH** = very high sensitivity

1.4.2.2 Magnitude of Visual Effects

The assessment of visual impacts at each of the selected viewpoints is aided by photomontages of the proposed development. Photomontages are a 'photo-real' depiction of the scheme within the view utilising a rendered three-dimensional model of the development, which has been geo-referenced to allow accurate placement and scale. For each viewpoint, the following images have been produced:

- Existing view;
- Outline view with cumulative (showing the extent of the proposed development overlaid on the same photograph with other relevant cumulative developments);
- Montage view; and
- Montage view with mitigation established.

VP NO.	EXISTING VIEW	VP SENSITIVITY	VISUA IMPACT MAGNITUDE (PRE & POST MITIGATION)	PRE MITIGATION SIGNIFICANCE/QUALITY/DURATION OF IMPACT	POST MITIGATION SIGNIFICANCE/QUALITY/DURATION OF IMPACT
VP1	**Local road north of site at Knockraha East** - This is a brief view afforded through a gap in a dense hedgerow along a local road in the townland of Knockraha East. The brief view extends across a low rolling landscape interspersed with mature, dense vegetation, pastoral fields and residential dwellings. The existing Knockraha 220kV substation and its surrounding overhead cable corridors are visible in the distance, rising above stacked layers of mature vegetation.	**Medium-low**	The proposed development will not be visible from here, and therefore the magnitude of visual impact is **Negligible** by default.	**Imperceptible/Negative/Long Term**	**Imperceptible/Negative/Long Term**
VP2	**Local road, Knockraha East** - This is a channelled view from a gap in an otherwise mature roadside hedgerow. Broad, undulating fields occupy the fore-to-middle ground. A row of evergreen trees line the ridge in the background, from behind which the upper portions of multiple electrical structures within the Knockraha Substation can be seen.	**Medium-low**	Apart from the uppermost portions of the lightning masts, the Proposed Development will be fully screened by the row of evergreen trees in the background of the view. The scale of the visual change will be small and consequently the visual presence will be minimal. These lightning masts will be seen against a backcloth of existing electrical infrastructure associated with the existing Knockraha Substation, thus there will be no material adverse effect on the visual amenity at this viewpoint. The magnitude of impact is **Negligible**. The proposed mitigation planting will not be visible from this location and therefore the post-mitigation magnitude of visual impact remains **Negligible**.	**Imperceptible/Negative/Long Term**	**Imperceptible/Negative/Long Term**

VP NO.	EXISTING VIEW	VP SENSITIVITY	VISUA IMPACT MAGNITUDE (PRE & POST MITIGATION)	PRE MITIGATION SIGNIFICANCE/QUALITY/DURATION OF IMPACT	POST MITIGATION SIGNIFICANCE/QUALITY/DURATION OF IMPACT
VP3	**L2964 local road at dwelling, Ballynanelagh** – This view is representative of the residential dwellings in the settlement of Knockraha, located to the north of this viewpoint. A medium distance view is afforded over a grassy roadside berm along a local road in the townland of Ballynanelagh. The view extends across a rolling landscape interspersed with hedgerows with mature hedgerow trees. Portions of the existing Knockraha 220kV substation and its surrounding overhead cable corridors are visible in the distance, producing a skyline of pylons interspersed with mature hedgerow trees.	**Medium-low**	Apart from the uppermost portions of the lightning masts, the Proposed Development will be fully screened by the intervening hedgerows in the background of the view. The scale of the visual change will be small and consequently the visual presence will be minimal. These lightning masts will be seen rising above the tree canopies. They will be viewed against a backcloth of sky immediately next to existing electrical infrastructure associated with the existing Knockraha Substation, thus there will be no material adverse effect on the visual amenity at this viewpoint. The magnitude of impact is **Negligible**. The proposed mitigation planting will not be visible from this location and therefore the post-mitigation magnitude of visual impact remains **Negligible**.	**Imperceptible/Negative/Long Term**	**Imperceptible/Negative/Long Term**
VP4	**L2964 local road at farm entrance, Ballynanelagh** – This view is representative of the dwellings immediately to the north and road users of the L2964 local road. This is broad and slightly elevated view which affords long distance views. A large undulating field in the foreground falls away from this viewpoint which is separated by a roadside drystone wall and a concrete post and wire fence.	**Medium-low**	Apart from the uppermost portions of the lightning masts, the Proposed Development will be fully screened by the intervening hedgerows in the background of the view. The scale of the visual change will be small and consequently the visual presence minimal. These lightning masts will be seen rising above the tree canopies. They will be viewed against a backcloth of sky amongst existing electrical infrastructure associated with the existing Knockraha Substation,	**Imperceptible/Negative/Long Term**	**Imperceptible/Negative/Long Term**

VP NO.	EXISTING VIEW	VP SENSITIVITY	VISUA IMPACT MAGNITUDE (PRE & POST MITIGATION)	PRE MITIGATION SIGNIFICANCE/QUALITY/DURATION OF IMPACT	POST MITIGATION SIGNIFICANCE/QUALITY/DURATION OF IMPACT
	The view extends across a rolling pastoral landscape in the middle ground. The existing Knockraha 220kV substation and its surrounding overhead cable corridors are visible in the distance, rising above the intervening tree canopies.		thus there will be no material adverse effect on the visual amenity at this viewpoint. The magnitude of impact is **Negligible**. The proposed mitigation planting will not be visible from this location and therefore the post-mitigation magnitude of visual impact remains **Negligible**.		
VP5	**Local road south of site at Ballynanelagh** - This is a channelled view afforded over a field gate situated on an enclosed local road and represents a glimpse view for road users on an otherwise largely enclosed section of road. A flat arable field occupies the foreground. The existing Knockraha 220kV substation and its surrounding overhead cables are visible in the middle ground. A glimpse of distant terrain the background is possible over a hedgerow in the middle ground.	**Low**	Apart from the uppermost portions of the lightning masts and partially screened roof of the EirGrid Control Building, the Proposed Development will be fully screened by the hedgerow in the middle ground. These lightning masts will be seen against a backcloth of the distant terrain in the background of the view and will be positioned in the immediate context of the adjacent existing electrical infrastructure associated with the existing Knockraha Substation. The proposed access road will be visible passing through the arable field in the foreground but it will not cause any visual obstruction and will look broadly similar to a contemporary farm access road. The scale of the visual change will be small and consequently the visual presence will be minimal. Although this the closest viewpoint to the Proposed Development, the existing view is highly visually complex which helps to	**Slight-Imperceptible/Negative/Long Term**	**Imperceptible/Negative/Long Term**

VP NO.	EXISTING VIEW	VP SENSITIVITY	VISUA IMPACT MAGNITUDE (PRE & POST MITIGATION)	PRE MITIGATION SIGNIFICANCE/QUALITY/DURATION OF IMPACT	POST MITIGATION SIGNIFICANCE/QUALITY/DURATION OF IMPACT
			visually absorb the Proposed Development, thus there will be limited adverse effect on the visual amenity at this viewpoint. For these reasons, the magnitude of impact is **Low-Negligible**. The proposed mitigation planting will not be visible from this location and therefore the post-mitigation magnitude of visual impact remains **Negligible**.		

1.5 CUMULATIVE IMPACT

The following were considered in relation to potential cumulative impacts with respect to the proposed development:

- Proposed Knockraha Power Reserve (Neon Renewables Ireland Limited (Planning Reference: Cork County Council 23/5992);
- Proposed Knockraha Synchronous Compensator (Killeena Energy Limited) (Planning Reference: Cork County Council Planning Register Reference 22/4488 and An Bord Pleanála Reference ABP-314972-22); and,
- Proposed Ballyvatta Solar Farm (Ballyvatta Solar Farm Limited) (Planning Reference: Cork County Council Planning Register Reference 23/4564).

The Proposed Development is located approximately 150m north of the existing Knockraha 220kV. The existing Knockraha 220kV substation is included in the baseline for the main LVIA assessment. The proposed Knockraha Synchronous Compensator would be located on the southern side of the L6989 local road to the southeast of the existing Knockraha 220kV Substation. The proposed Knockraha Power Reserve would be located 300m west of the proposed development. The proposed Ballyvatta Solar Farm would be located c. 1.6km northeast of the proposed development. The location of these cumulative developments is indicated in **Figure 1.12**.

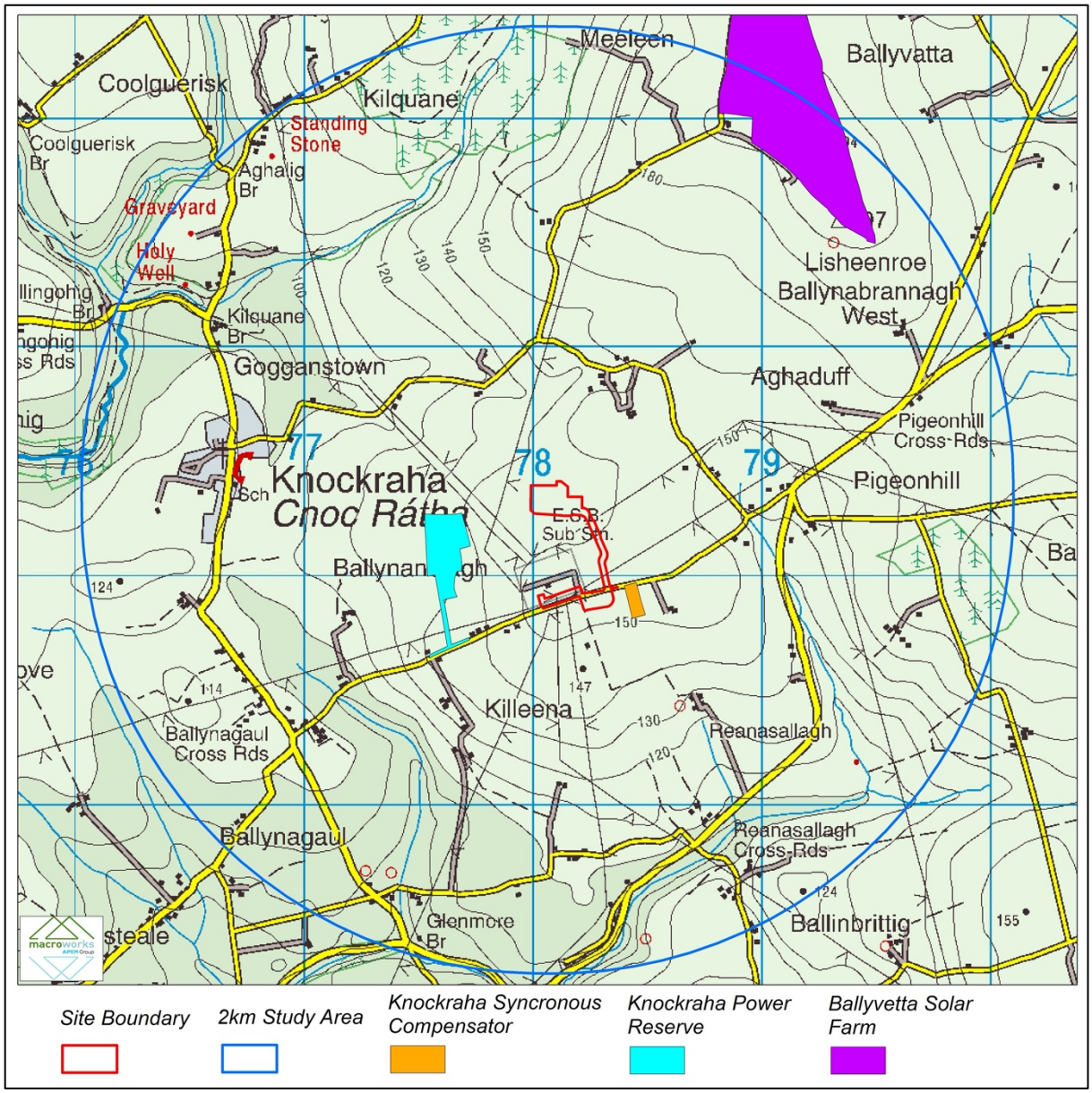

Figure 1.12 Map of cumulative developments.

As described in **Section 1.4.2**, photomontages of the proposed development aid the assessment of visual impacts at each of the selected viewpoints. These photomontages include a 'Cumulative Outline View,' which provides a basis for the cumulative visual impact assessment.

VP	CUMULATIVE VIEW
VP1	**Local road north of site at Knockraha East** - The proposed development will not be visible from VP1, therefore, there is no potential for cumulative visual effects
VP2	**Local road, Knockraha East** - The proposed development will be visible from VP1, but none of the cumulative projects are visible within the same viewshed, so there is no potential for cumulative visual effects.
VP3 & VP4	**L2964 local road at dwelling, Ballynanelagh** and **L2964 local road at farm entrance, Ballynanelagh** – The cumulative view from both of these locations is very similar. From these locations the Proposed Development will be in the background of the view and will be heavily screened by intervening terrain and vegetation. The propose Knockraha Power Reserve will be situated on slightly sloping terrain closer to these viewpoints but will also benefit from existing intervening screening. Both developments would occur below a section of the skyline that contains a cluster of above-ground electrical infrastructure associated with the existing Knockraha 220kV

VP	CUMULATIVE VIEW
	substation. The addition of the Proposed Development into the context of the existing Knockraha 220kV substation and the proposed Knockraha Power Reserve would be barely discernible thus will not contribute any material cumulative visual impact.
VP5	**Local road south of site at Ballynanelagh** – No cumulative developments will be visible while looking at the Proposed Development from VP5, therefore, there is no potential for cumulative visual effects

Overall, the proposed and cumulative developments are unlikely to noticeably alter or detract from the visual amenity afforded by the surrounding areas, which are already characterised by the existing Knockraha 220kV substation and the other existing electrical infrastructure in the area.

Additionally, as a consequence of the proposed mitigation planting associated with the Proposed Development and the proposed planting in relation to the cumulative developments, it is likely that there will be very limited potential for clear views of more than one development at a time following the establishment of this planting. This is also anticipated to be the case even from the nearest sections of the L6989 local road that passes close to many of the above cumulative developments.

For these reasons, cumulative visual effects are deemed to be no greater than Slight-imperceptible/Negative/Long Term. In summary, it is not considered that any significant cumulative impacts will arise from the Proposed Development in conjunction with other existing or cumulative developments.

1.6 CONCLUSION

Regarding landscape impacts, the Proposed Development is considered to have a relatively modest physical impact on the site as the substation is contained within the existing hedgerow network, and the Proposed Development will result in only very minor areas of permanent hedgerow removal to facilitate the site access road and the underground cable. With regard to landscape character, the Proposed Development is thematically linked to the existing Knockraha 220kV Substation and other consented developments within the study area. Therefore, it will not appear incongruous in this landscape context. Indeed, it is likely to be perceived as an evolution of the existing electrical infrastructure development along this low-rolling ridge. This is a productive rural landscape with associated landscape values, and whilst the Proposed Development may alter the 'landscape fabric' of the area, it does not markedly affect the prevailing landscape pattern or predominantly working rural landscape character of the area. This is considered an appropriately sited development in a robust landscape context. Consequently, the impact on landscape character (post-construction) will be of ***Moderate-slight*** significance and a ***Negative*** quality.

Visual impacts were assessed at five viewpoint locations, representing various viewing distances, angles and receptor types. This is a typical productive rural landscape that is not rare or distinctive at a national or regional level. This is further reinforced through the CDP landscape value designation of 'medium' and the visual receptor sensitivity judgements, where all five views are categorised as either Medium-low or Low. The overall significance of visual impacts ranged between 'Slight-imperceptible' (VP5) and 'Imperceptible' (VP1 to VP4). This is principally a consequence of the high degree of existing screening located within the intervening low-rolling landscape, which heavily reduces the visual exposure of the Proposed Development.

Based on the landscape and visual impact judgements provided throughout this LVIA, the Proposed Development is not considered to give rise to any significant landscape and visual effects.