

3 SITE SELECTION AND REASONABLE ALTERNATIVES

3.1 Introduction

This Chapter of the EIA provides a description of the reasonable alternatives in terms of Proposed Project design, technology, location, size and scale studied by the project team which are relevant to the Proposed Project and its specific characteristics. This Chapter indicates the main reasons for selecting the option chosen based on a comparison of the various potential environmental effects. Accordingly, this Chapter sets out the reasoning and justification for:

- The location of the Proposed Project in Timahoe North, Co Kildare;
- The proposed design being the most appropriate for this particular site.

As set out in the ‘*Draft Guidelines on The Information to be Contained in Environmental Impact Assessment Reports*’ (EPA, 2017), the presentation and consideration of reasonable alternatives investigated is an important part of the overall EIA process. It is recognised that some of the alternatives described in the guidance may not be relevant to all sites. Those that are relevant have been included below within Section 3.2.

3.2 Principles of Solar Development Site Selection

The process of identifying a suitable solar energy development site is influenced by a number of factors. While the area of suitable or available land, and planning policy are very important, the grid connection, or the method by which a proposed solar farm is connected to the national grid to export electricity from the site is also of crucial importance. A solar energy project must be commercially viable, to ensure it will attract the necessary project finance required to progress to construction. The distance of any potential solar project to the likely grid connection point, the extent and cost of grid upgrades required to facilitate the connection, the delay in having those reinforcement works undertaken and also the process of securing a grid connection offer to allow a solar project to connect to the grid, are all critical factors rendering a project commercially viable or unviable. With a viable grid connection potentially available in a reasonable timeframe, other site selection considerations can then be considered further.

3.2.1 Grid Connection Process

In order to connect to the national electricity grid that is operated by EirGrid and ESB Networks, electricity generators require a grid connection offer. The grid connection process, including allocation of offers, is the statutory responsibility of the Commission for Regulation of Utilities (CRU) (formerly the Commission of for Energy Regulation).

A grid connection agreement with EirGrid for the Proposed Project site has been secured. That agreement is specific to this site and connecting into the Derryiron-Maynooth 110 kV overhead line which traverses the southern section of the Timahoe North site.

3.3 Site Selection Process

3.3.1 Future Use of Peatlands

Bord na Móna has a vast land bank, comprising active peat extraction, previously active peat extraction and cutaway peatlands and some other lands, totalling approximately 80,000 hectares, or 7% of the peatlands of Ireland. These lands, located mainly in the Midlands, represent one of the company's principal potential assets but are also important resources for the nation as a whole.

A significant number of the Bord na Móna bogs are currently in use, directly or indirectly, for peat production. Cutover bogs are those from which the upper layers of natural vegetation have been removed to facilitate peat harvesting and include bogs currently in production. Cutaway bogs are areas where peat harvesting has been discontinued, usually because it is no longer economically viable to remove any remaining peat.

Bord na Móna's '*Strategic Framework for the Future Use of Peatlands*' was published in 2011 and set out a strategic framework for the consideration of future potential uses of cutaway peatlands. Existing areas of cutaway are used for forestry, biodiversity, amenity, wind energy, waste management, aggregate extraction or a combination of two or more of these uses. Over the coming decades, increasingly greater areas of the Bord na Móna land bank will come out of peat production and be available for alternative land uses, which are being explored on an ongoing basis including solar energy development.

3.3.2 Sustainability Statement 2030

Bord na Móna published its '*Sustainability Statement 2030*' in early 2016. By 2030 Bord na Móna will cease to harvest energy peat but will continue to produce energy through other land-uses including biomass, solar, landfill gas, wind and waste to energy.

Solar energy is a potential use of national significance that is well-suited to areas of cutaway, with their large land parcels, open topography, relative remoteness from major residential areas and, in many cases, relatively good access to the electricity grid. The large scale and generally flat and low-lying nature of many peatlands allows them to visually absorb solar farms without a major impact on the receiving landscape.

Cutaway peatlands that are in close proximity to the electricity grid, such as the Timahoe North site, are prime candidates for solar farm development. In addition to solar farms it is also possible, depending on site-specific issues, to accommodate complementary uses such as wetlands to support biodiversity and/or tourism/amenity uses.

3.4 Optimal Site Selection

From an early stage in the design process, it was considered optimal to seek a site capable of accommodating a large solar array that would be commercially viable as a solar resource. In order to produce renewable energy at the most cost effective rate to the end consumer, projects of larger scale are more appropriate.

3.4.1 Site Selection Criteria

Given the significant capital investment required, it is critical for the applicants and their project team to ensure that the most suitable site for development of a proposed solar project is identified and progressed through planning. The site selection process

for the current proposal has been fully informed by regional and local policy constraints at a macro level as well as site specific constraints that influence the solar layout on site at a micro level. The main policy, planning and environmental considerations for the selection of a potential solar farm site include:

- County Development Plans and Zoning
- Grid Access/Capacity
- Proximity to Houses
- Environmental Sensitivity & Designations
- Flood Plain Analysis
- Supporting Infrastructure.
- Visual Amenity

The criteria above will be explained further below in so far as they influenced the site selection exercise undertaken.

3.4.1.1 Bord na Móna Land Holdings

Bord na Móna's landbank extends to approximately 80,000 hectares in total and is located mainly in the Irish midlands (including the counties of Offaly, Kildare Laois, Westmeath, Roscommon, Longford and Meath). When trying to identify an area for the Proposed Project, policy supportive of solar energy development and access to the national electricity grid proved the most important initial criteria to identify Co. Kildare as the most optimal at this time. In regard to location, the Kildare County Development Plan 2017 – 2023 is clearly supportive in respect to solar development within the county, as well as logistically, where supporting infrastructure within the county, namely the road network, is sufficient for providing for a development of this scale. There are elements of the national grid, i.e. 110 kV lines present and sufficient capacity available on the grid within this wider area.

3.4.1.2 Kildare County Development Plan (CDP) 2017-2023

Chapter 8 of the Plan on Energy and Communications within Kildare CDP states that it is the aim of the Council *“to encourage and support energy and communications efficiency and to achieve a reasonable balance between responding to EU and National Policies on climate change, renewable energy and communications and enabling resources to be harnessed in a manner consistent with the proper planning and sustainable development of the county”*.

In the case of solar energy, the Plan states that *“solar generated energy is increasingly contributing to a reduction in energy demand and energy costs for a range of commercial, industrial and residential properties”*

The Council is supportive of solar energy projects in principle and notes that,

“Site selection is vital for potential solar farms as solar resource, topography and proximity to the grid must be considered.”

The key relevant policies with regard to solar energy development can be found in Chapter 2, Section 2.2.5.2.

The global weighted average levelised cost of electricity (LCOE) of utility-scale solar PV has fallen 73% between 2010 and 2017 (2018 International Renewable Energy Agency) and this along with technological advancements is beginning to make Solar PV developments a viable, realistic and sustainable renewable energy source suitable to the Irish climate. The primary technological advancement relates to the overall

increased efficiency rates for Solar PV panels. Solar PV developments previously tended to be situated in sunnier climates with favourable all year-round exposure to sunlight. However, given the increased efficiency of the latest generation of solar panels Ireland is gradually becoming more commercially viable in the context of the development of larger scale Solar PV farms.

The number and scale of Solar PV developments in the UK in recent years is a clear indicator of both technological advancements and the popularity of Solar PV as a viable alternative to fossil fuel energy production and other forms of renewables and that the resource is available.

In terms of topography, the Proposed Project site is flat and essentially screened from all visual receptors. Separately, there is a grid connection option available on the site itself with minimal works required to avail of that connection.

The general solar policy within the county plan is therefore considered to be supportive of a project of scale at this location, and the suitability of the site is further enhanced due to its site-specific characteristics i.e. well screened and with ease of access to the national grid.

3.4.1.3 Access to Electricity Grid Infrastructure

A key driver in identifying a suitable location for any renewable energy development is grid capacity. A short grid connection to existing infrastructure using either an underground or over ground connection reduces the potential environmental effect by reducing the number of polesets/angle masts and therefore use of materials such as steel and concrete and reduces the disturbance of soil and sediment run-off. A grid connection assessment of the area has been undertaken to inform a potential grid connection for the proposed development which consisted of a review of the local network, capacity at local substations and potential connection methods. A grid connection agreement for the Proposed Project site has been secured.

The Derryiron-Maynooth 110 kV overhead line traverses the southern section of the Timahoe North site. It is therefore proposed to connect the Proposed Project to this line, via two short (less than 1 km) sections of overhead line within the site.

3.4.1.4 Proximity to Houses

The Timahoe North site measures approximately 807 hectares and is of sufficient size to accommodate a large-scale solar energy development, while maintaining a large set-back distance from houses in the surrounding area. There are no specified minimum set-back distances required between solar panels and dwelling houses (with solar panels frequently being provided on or in the immediate curtilage of dwellings).

Although no specified minimum set-back distance is required, the location and layout of the Proposed Project allows for no solar panels to be located within 500 metres of the nearest occupied house. Additionally, the Proposed Project is heavily screened from any local properties. This reduces the potential for visual effects associated with the Proposed Project.

3.4.1.5 Environmental Sensitivity Designations

Environmental sensitivity is a key factor in identifying suitable sites for development. The assessment of environmental sensitivity among the candidate sites included a review of proximity to Natura 2000 sites, biodiversity of the lands within the sites themselves, and acknowledgement of any other site-specific ecological data that has

already been captured, for example, previously determined important populations of winter birds, bats or mammals.

No part of the proposed development site is located within an area designated for ecological protection. The nearest Natura 2000 site, i.e. Special Protection Area (SPA) or Special Area of Conservation (SAC), is Ballynafagh Lake SAC, located approximately 5.8 kilometres southeast of the Proposed Project. The nearest nationally designated site, i.e. Natural Heritage Area (NHA) or proposed Natural Heritage Area (pNHA), is Hodgestown Bog NHA, located approximately 3.9 kilometres southeast of the site at its nearest point.

Timahoe North is a previously commercially harvested bog and has a lower ecological sensitivity than generally undisturbed intact peatlands. The site is sufficiently large that any potentially sensitive areas have been constrained out for development purposes.

3.4.1.6 Flood Plain Analysis

Flood Plain Analysis assesses the Proposed Projects location in terms of historical flooding data. The site is a former bog and is therefore naturally wet due to localised topography. The wetter lower lying areas of the site are not being used for development, only the higher, drier areas. The site comprises one catchment of c. 800 Ha with an historical man-made drainage system, employed during peat extraction. The site therefore lends itself to the upgrade of this system which will allow for the control of water flows within and from the site and minimise any potential flooding within the footprint of the development and downstream of the development.

3.4.1.7 Supporting Infrastructure.

The proximity of the existing road and electricity transmission network to the Timahoe North site were considered in terms of ease of delivery of the Proposed Project components and relative cost of potential grid connection. A well developed, maintained and strong road infrastructure in the local area reduces the requirement for significant road upgrade works and therefore minimises the environmental effect of the Proposed Project.

3.4.1.8 Visual Amenity

The location of the Proposed Project is dominated by large coniferous forests which border the site. Apart from the coniferous forests on the sites periphery, mature hedgerows, naturally regenerating woodlands, bog habitats and tree lines form field boundaries beyond the site boundary. The area to be felled is located within a central area of the site and will be screened by existing and proposed vegetation and nearby forestry and will allow for no visual impact on surrounding receptors.

3.5 Consideration of Alternatives

3.5.1 Alternative Locations

Selection of the Proposed Project site at Timahoe North was decided through a site assessment process as described in Section 3.3 above. Bord na Móna conducted a site selection process to identify the optimum site to accommodate a large-scale solar project, which was determined as being in County Kildare. In determining this, the proximity to the grid connection point, the size of the scheme and the nature of the site were essential factors. The main process used to inform the final site selection and design was constraints led. As noted above and detailed below, environmental, ecological, and landscape sensitivities and designations were assessed and mapped to help determine the most environmentally robust Proposed Project site.

The proposed site offers scale with minimal grid connection works in an isolated unobtrusive location and with the potential to generate recreational and amenity facilities for those living locally. The alternative is to not use this site however this is not considered preferable given the site's conformity with the various site selection criteria.

3.5.2 Alternative Layout– Solar Farm

The Co. Kildare site which is the preferred option comprises approximately 807 hectares of land, outlined in green in Figure 4.1. The first step in the Proposed Project evolution was to assess the sensitivity of the site in terms of ecological receptors and habitats. Based on a review of the site's habitats and hydrological regime a restricted area, shown by the area enclosed by the black line in Figure 4.1 was identified as potentially developable. Detailed site assessments were then progressed to determine the suitability of that land for the Proposed Project including additional ecological surveys, drainage mapping and assessment of the existing drainage regime and flood risk identification.

An initial layout for the various Proposed Project components was developed and since then there has been a selection of changes in regard to location and extent of infrastructure on site. The entire process to determine the final site design and layout has been a constraints led process.

Initially, the site was designed with a larger potential solar array, with panels extending further northwest towards the landowner boundary. Additionally, the development of the proposed solar arrays was linked and crossed an old railway line that runs in a northwest – southeast direction in the centre of the site as shown in Figure 3.1.

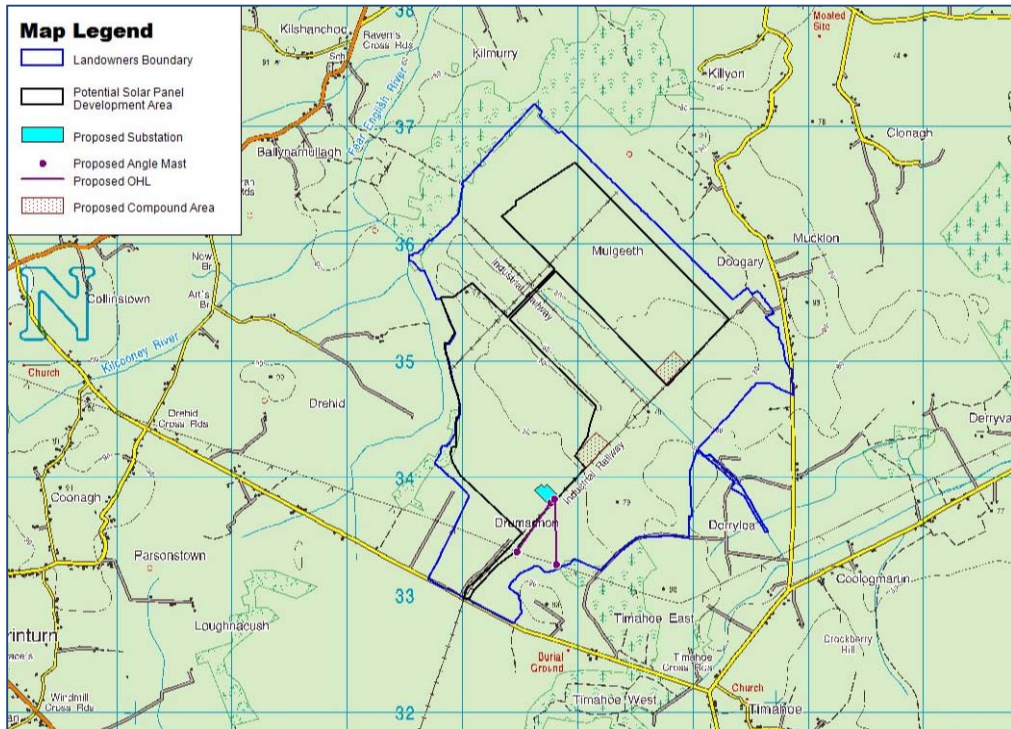


Figure 3.1 – Initial design for the Proposed Project site.

The design shown in Figure 3.1, highlighted potential hydrological and archaeological issues with a portion of the site located in an area with potential elevated risk of flooding. In updating the site design, the wetter areas of the site were then avoided, with higher, drier areas only being focused on to site elements of the proposed development. The existing drainage system is proposed for upgrade to control water flow within and from the site. In avoiding the old railway line, the development boundary was changed and the link in the development boundary was removed. These alterations can be seen in Figure 3.2 below.

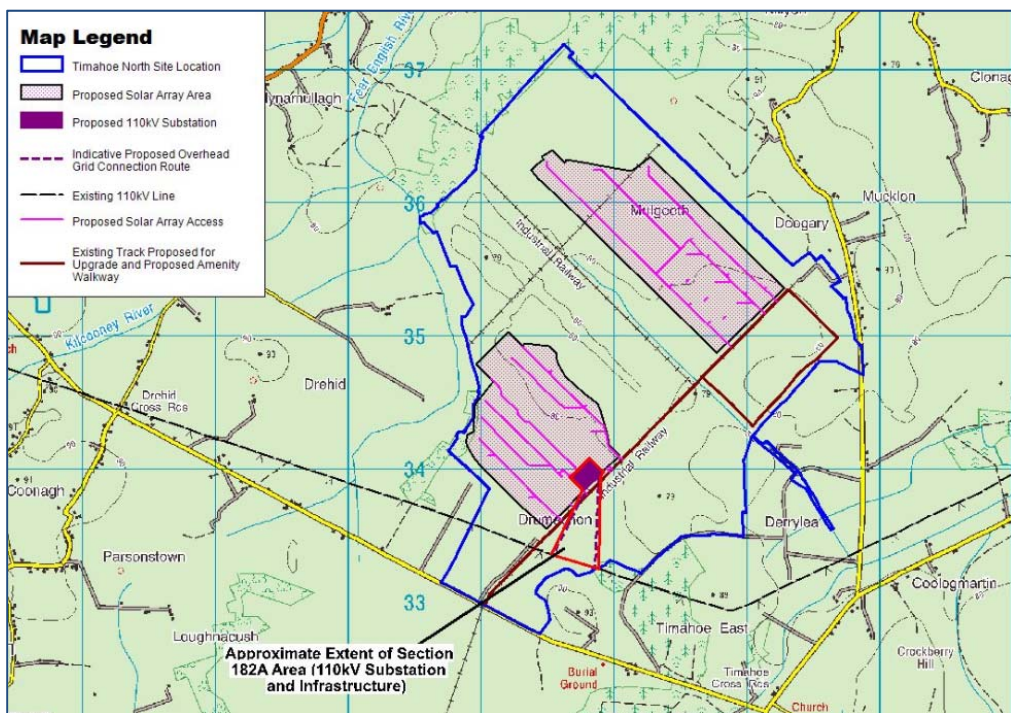


Figure 3.2 – Alternative final design for the Proposed Project site.

The design shown in Figure 3.2, encompasses all the updates mentioned in the previous section. Upon finalisation of this design, further amendments were made to the most southern panels. On feedback from the project archaeologist, a recorded monument (KD008-025) located on the south west of the proposed solar array area, was afforded a larger buffer than initially used (3.5m). The recorded monument was marked, and a 15-metre buffer was subsequently applied. This meant that some of the panelling on the south western side were removed and a fence line altered to accommodate this buffer. The buffer is represented within the red circle as shown on Figure 3.3 below.

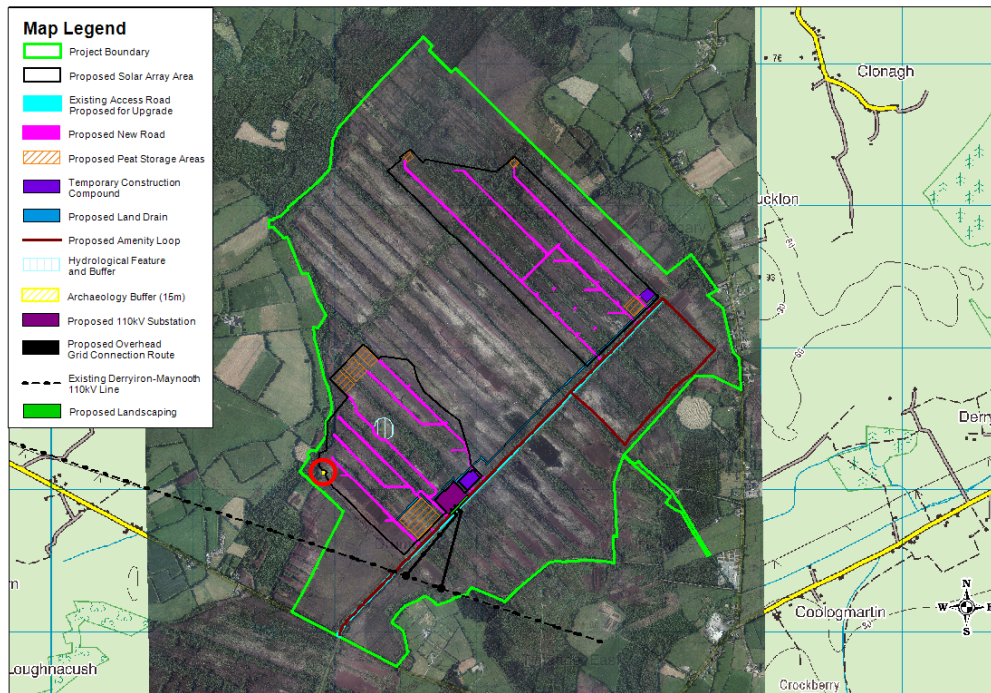


Figure 3.3 – Final design for the Proposed Project site

3.5.3 Alternative Design – Solar Farm

3.5.3.1 Solar Array

A PV System Design report is included in Appendix 3-1. The report describes the design rationale and discusses the various technology alternatives considered in terms of the solar array. Due to the nature of the technological advances in the sector, flexibility in terms of the array configurations and technologies is required to facilitate the most efficient Proposed Project prior to commencement. The planning application, EIAR and NIS presents and assesses the densest configuration of panels and the most expansive in terms of footprint and height. The Solar Farm, if permitted, will be constructed within proposed size envelopes as noted in Appendix 3-1.

3.5.3.2 Peat repositories

Within particular areas of the Proposed Project site, where small volumes of material are being excavated, such as from the inverter bases; this may be side casted and profiled locally where feasible. Where there are larger excavations, such as within the substation area, materials that are surplus to backfill requirements and are deemed unsuitable for use in construction will be brought to the repository areas and placed at heights of no more the 1 metre at designated locations. The alternative is to transport the material offsite which is an unnecessary and unsustainable use of resources.

3.5.3.3 Battery Storage

The battery storage element of the Proposed Project is intended to be used to provide cost effective services to EirGrid, such as adding electricity to, or removing electricity from the system, when this is useful to the operation of the system, thus optimising the integration of renewable energy sources. EirGrid procures such services from grid connected energy systems and the flexibility they provide is critical to achieving national decarbonisation targets and a stable supply of electricity at least cost to consumers. The alternative is to not provide this service to the grid operator which is not in the spirit of the DS3 Programme described in Chapter 2.

3.5.4 Alternative Layout & Design – Substation & Grid Connection

The selection of the location for the substation has had regard to the constraints of the site. Ease of access and specific EirGrid/ ESB Networks design requirements also informed the substation site selection process. The design of the substation is as required by EirGrid/ESB Networks which sets a prescriptive design requirement and therefore the alternatives to the design are limited.

A short (less than 1km) over ground 110 kV connection between the onsite substation and the existing 110kV line that traverses the site will be required. This will require 4 No. angle masts which will be connected by two overhead lines supported by standard wooden polesets. The poles will measure approximately 18m in height and be spaced approximately every 200 metres. The main alternative would be to lay the grid connection line underground between the substation and the existing line. This would require a trench to be constructed from the substation to two new angle masts at the existing line. In this instance, the provision of an overhead line is considered the most preferred as the main concern related to overhead lines i.e. the potential landscape and visual effects are mitigated by the enclosed and screened nature of the site. In the absence of significant landscape or visual effects, the potential environmental effects of installing an underground line is not considered optimal.

3.5.5 Amenity Proposals

The amenity proposals to facilitate access to and use of the site by the public, include a loop walk, repurposing of the construction access track, which will continue to be used for operations and maintenance and use of an old peat extraction related machine pass to lay the walking track on. An alternative is to locate the amenity track on other less disturbed lands or not have a 'loop' element to the walkway. The baseline scenario without implementation of the Proposed Project would be not to provide these which would fail to maximise the use of the site and would be contrary to the local communities wishes.

The amenity proposals are an integral part of the Proposed Project. The Timahoe North site is a suitable area for walkers and those with an interest in Irish ecology. The Proposed Project will facilitate the development of the amenity proposals with the intention of attracting members of the public to come and view the site in a safe manner. The site and surrounding area has significant potential as a recreational and amenity resource. The proposed recreation and amenity proposals outlined above may be developed further, subject to planning permission throughout the life of the Proposed Project.

3.5.6 Transport Route & Site Access

The proposed development site will be accessed from the south, via the existing site entrance from the Derrymahon-Drehid L5025 local road. Vehicles will turn onto the L-5025 from the R402 Regional Road located to the west of the site. It is proposed to

upgrade this entrance as part of the proposal. The upgrade will facilitate access during the construction stage and operational stage and will also facilitate the use of the site for amenity purposes with a new car park proposed close to the entrance location.

The volume of traffic generated during the operational phase will be minimal including occasional maintenance vehicles and members of public accessing the public amenity. It is likely that the majority of traffic during this phase will access from the R402 to the west however any alternate route to the site will be viable. During the construction phase, traffic will access the site only from the R402 – L-5025. The alternative to this route for traffic is to allow vehicles access the site from other local roads to the north south and east. To avoid any potential cumulative effects on the local road network in general and in particular with the existing and proposed Drehid landfill, this alternative was discounted. The R402 and L-5025 are good quality roads allowing for a clearly defined and manageable traffic system to be proposed for the duration of the construction phase.

The amenity proposals also incorporate the provision of an off-road parking area to accommodate walkers. The alternative to this would be to omit the parking area which would result in ad-hoc parking occurring on the roadside which is not considered appropriate and would have the potential to create a traffic hazard on the public road.

3.5.7 Alternative Felling & Replanting Methods & Location

Felling and replanting will be carried out under licence from the Forest Service which will be prescriptive in terms of the guidelines to be applied and so the alternatives are limited. It is likely that various methods of felling and replanting will be used onsite given the various species types, ages, heights and densities of trees across the site. All options and alternatives as described in Chapter 4 for felling methodologies will be available for use onsite and all have been assessed as part of the EIAR.

The alternative to replanting onsite is to replant on another site not physically connected to the Proposed Project. This alternative is viable but on balance is not optimal as the lands proposed for replanting are available and the proximity to the Proposed Project means it can be managed easier throughout the lifetime of the Proposed Project. The proposed replanting area is also contiguous with the remaining woodland onsite which is preferred ecologically. The final replanting area with the Proposed Project site is shown on Figure 4.6 in Chapter 4.

3.5.8 Alternative Processes

The management of processes that affect the volumes and characteristics of emissions, residues, traffic and the use of natural resources has formed part of the alternatives considerations through the Proposed Projects development.

During the operational phase the processes required at the site are relatively benign. There is no manufacturing process *per se* with the potential for the generation of significant emissions to any environmental media, the use of finite natural resources or the generation of wastes or traffic volumes. On this basis, alternative processes designed to reduce emissions and use of resources etc during the operational stage are not required.

The construction of the site will require the use of raw materials in the form of energy to supply plant and machinery, standard building materials including stone, metals, pipework, concrete, electrical, plumbing etc and raw materials are consumed to manufacture the solar array and electrical infrastructure. The use of these resources

will be controlled by the employment of best practice construction techniques including waste management practices.

The purpose of the Proposed Project is to generate electricity from an infinite renewable source which will offset the use of finite fossil fuels which currently dominate the country's energy supply mix. The baseline scenario without implementation of the Proposed Project is to not provide a renewable energy source at this eminently suitable location which will not contribute to climate change objectives, such an approach would neither be optimal nor appropriate.

3.5.9 Alternative Mitigation Measures

Mitigation by avoidance has been a key aspect of the Proposed Project's evolution through the selection and design process. Avoidance of the most ecologically sensitive areas of the site, any areas of the site potentially prone to flooding as well as archaeological monuments limits the potential for environmental effects on these receptors. Mitigation by offsetting has also been employed in that the area of regenerating woodland that will be lost to the footprint of the Proposed Project will be replaced onsite, with no net loss of habitat. An alternative to this approach is to encroach on the environmentally sensitive areas of the site and accept the potential environmental effects and risk associated with this.

Due to the nature of the Proposed Project, the most potential for environmental effects exists during the construction phase rather than the operational phase. During the operational phase there are no significant ongoing emissions to any environmental media and the general environmental risk associated with the type of infrastructure to be constructed is low. Alternative mitigation measures for this phase are therefore not necessary for further consideration

During the construction phase, ground works and the control of water quality will be the key environmental risk to be managed. The mitigation measures mentioned above (avoiding the most sensitive and wettest areas) will contribute to reducing this risk and further mitigation by prevention measures have also been designed into the Proposed Project to break the pathway between the site and the hydrological receptor i.e. the Mulgeeth stream. The proposed measures which are described in Chapter 8 Water, are best practice measures. The alternative is to either not propose these measures or propose measures which are not best practice and neither of these options is sustainable.

3.5.10 "Do Nothing" Alternative – the Baseline

An alternative land-use option to developing the Proposed Project at the proposed development site would be to leave the site as it is, with no changes made to the current land-use including regenerating woodland, cutover peatland and turf cutting on the spread. In doing so, the opportunity to capture a significant part of County Kildare's valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment and investment would also be lost. Should the Proposed Project proceed the existing turf cutting, which is located within the northeast and south-southeast of the Timahoe North site will cease prior to construction.

3.6 Conclusion

The presentation and consideration of the various reasonable alternatives investigated by the Applicant is an important requirement of the EIA process. Upon completion of

the site selection process and consideration of alternatives (including other options that may have been considered i.e. alternative designs and alternative processes); the Applicant has been able to propose the most appropriate design at the Proposed Project site, while considering its effect on the environment.