

13 MATERIAL ASSETS

Material Assets as defined in the ‘Advice Guidelines on the Information to be contained in Environmental Impact Assessment Reports DRAFT’ (EPA, 2017) as ‘built services and infrastructure’. This includes roads and traffic, electricity, telecommunications, water supply infrastructure, waste management and aviation.

This chapter of the EIA addresses the likely significant effects of the Proposed Project on transportation infrastructure (Section 13.1 Traffic and Transport) and on Aviation (Section 13.2), which are economic assets of human origin.

13.1 Roads, Traffic and Transport

13.1.1 Introduction

13.1.1.1 Purpose of Section

The purpose of this section is to assess the traffic impact of the additional traffic movements that will be generated during the construction, operational and decommissioning phases of a Solar Farm and Substation and Grid Connection project, proposed in the townland of Timahoe, located approximately 7kms directly south of Johnstown, County Kildare.

For the purposes of this Chapter, the entire Proposed Project i.e. the Solar Farm as well as the Grid Connection works and Substation are described and assessed together as both will be constructed together should the Proposed Project gain consent and proceed.

The magnitude of the increase in traffic volumes experienced on the surrounding network is identified during the construction, operational and decommissioning stages of the development.

13.1.1.2 Statement of Authority

This section of the EIA has been prepared by Alan Lipscombe of Alan Lipscombe Traffic and Transport Consultants Ltd. Alan is a competent expert in traffic and transport assessments. In 2007 Alan set up a traffic and transportation consultancy providing advice for a range of clients in the private and public sectors. Prior to this Alan was a founding member of Colin Buchanan’s Galway office having moved there as the senior transportation engineer for the Galway Land Use and Transportation Study. Since the completion of that study in 1999, Alan has worked throughout the West of Ireland on a range of projects including: major development schemes, the Galway City Outer Bypass, Limerick Planning Land-Use and Transportation Study, Limerick Southern Ring Road Phase II, cost benefit analyses (COBA) and various studies for the NUI Galway. Before moving to Galway in 1997, Alan was involved in a wide variety of traffic and transport studies for CBP throughout the UK, Malta and Indonesia. He has particular expertise in the assessment of development related traffic and transport modelling, including over 20 wind farm developments, and is an accomplished analyst who has experience of a wide variety of modelling packages and methods.

13.1.1.3 Guidance and Legislation

This section of the EIA has been completed in accordance with the guidance set out in Chapter 1. The assessment uses standard terminology to describe the likely

significant effects associated with the Proposed Project. Further information on the classification of effects used in this assessment is presented in Section 1.6.2 of this EIA.

13.1.1.4 Scoping & Consultation

The scope of this section of the EIA has been informed through the scoping and consultation of Transport Infrastructure Ireland (TII). The key scoping response points received from the TII is summarised in Table 2.4 in the Chapter 2 of this EIA.

The key response points from both Transport Infrastructure Ireland are dealt with in this section of the EIA.

13.1.1.5 Method and Section Structure

The report adopts the guidance for such assessments set out by Transport Infrastructure Ireland (TII), in the document PE-PDV=02045-01 '*Traffic and Transport Assessment Guidelines, May 2014*'. The geometric requirements of the delivery vehicles were assessed using Autocad and Autotrack.

The Traffic and Transport Section of this report is set out as follows:

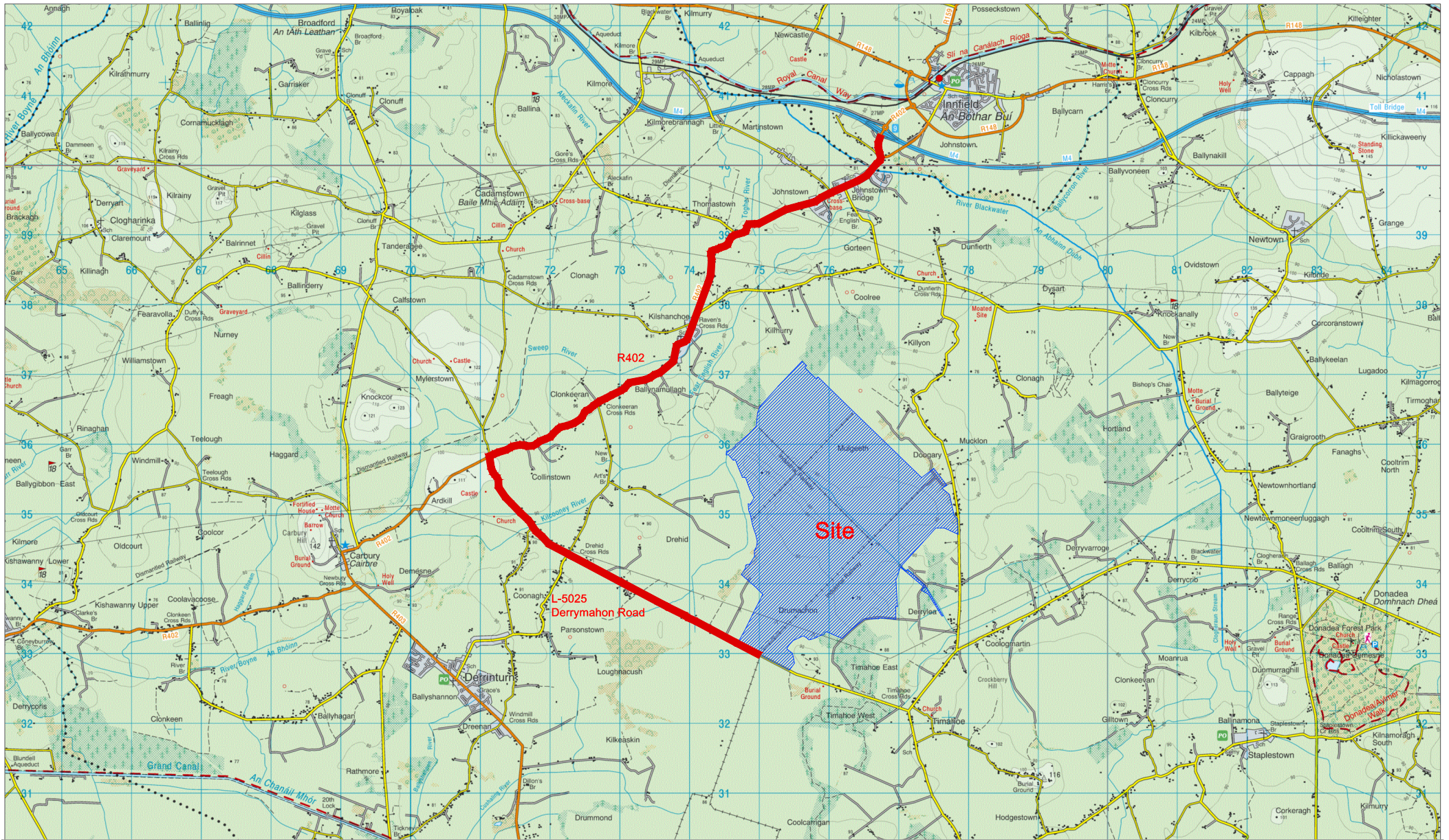
- A review of the existing transport infrastructure in the vicinity of the development, (*Section 13.1.2 - Receiving Environment*),
- An assessment of 2018 traffic flows and traffic forecasts for an assumed construction year of 2021 (*Section 13.1.3 – Existing 2018 and Construction Year 2021 Traffic Volumes*),
- A description of the nature of the Proposed Project and the traffic volumes that will be generated during the construction stage and when it is operational (*Section 13.1.4 – Proposed Project and Traffic Generation*),
- A description of the vehicle types that will require access to the Proposed Project site (*Section 13.1.5 – Construction Traffic Design Vehicles*),
- A review of the impact of development generated traffic on the local network during construction and when the facility is operational (*Section 13.1.6 – Traffic impact during construction and during operation*),
- A geometric assessment of the route and its capacity to accommodate the loads associated with the development (*Section 13.1.7 – Route Assessment*),
- An assessment of the provision for sustainable modes of travel (in this case primarily with respect to the transport of construction staff) (*Section 13.1.8 – Provision for Sustainable Modes of Travel*),
- An assessment of the likely impacts of the Proposed Development (*Section 13.1.9 – Likely and Significant Impacts and Associated Mitigation Measures*).

13.1.2 Receiving Environment

13.1.2.1 Site Location and Network Summary

The location of the Proposed Project in Timahoe, County Kildare, is shown in the context of the national and local highway networks in Figure 13.1.1. The site is accessed from the R402 followed by the local highway network, including the L-5025 Derrymahon Road, which is considered in more detail in Section 13.1.6. The existing road network is shown in Plates 13.1.1 to 13.1.5.

The most likely route for deliveries to the Proposed Project site is from Junction 9 on the M4 in Enfield, before travelling southwest on the R402 for approximately 7 kms passing through the village of Johnstown Bridge.



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Figure 13.1.1 Site location and delivery route

PROJECT: Timahoe North Project EIAR

CLIENT: Bord na Mona

SCALE: NTS

PROJECT NO: 5290

DATE: 15.08.18

DRAWN BY: AL

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Plate 13.1.1 – Location 1 – R402 / L-5025 Derrymahon Junction, looking north east along R402



Plate 13.1.2 – Location 1 – R402 / L-5025 Derrymahon Junction, looking south west along R402



Plate 13.1.3 – Location 3 – Location of proposed access junction on L-5025 Derrymahon Junction, looking west along L-5025 Derrymahon Road



Plate 13.1.4 – Location 3 – Location of proposed access junction on L-5025 Derrymahon Junction, looking east along L-5025 Derrymahon Road

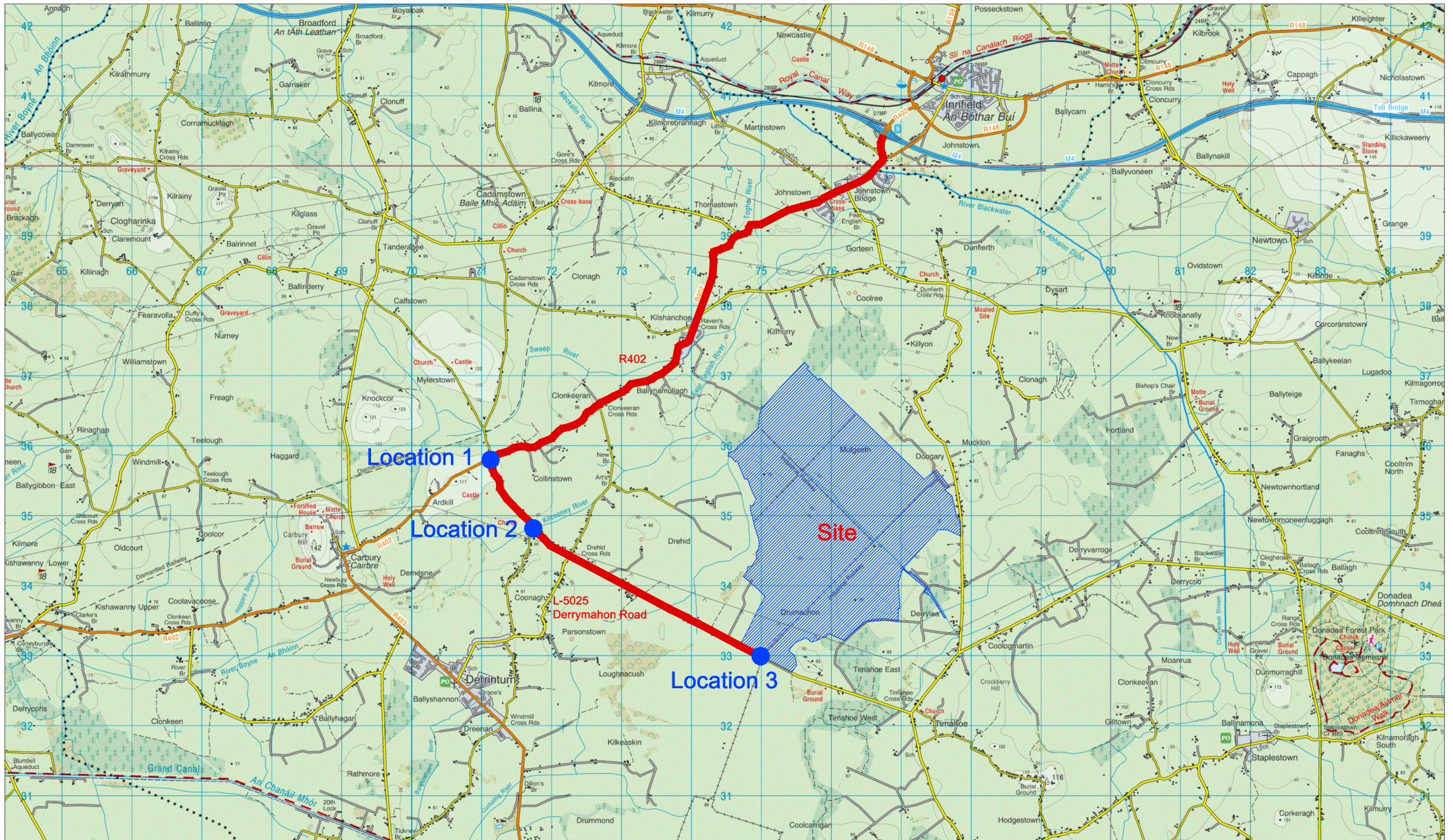


The route then turns left off the R402 onto the L-5025 Derrymahon Road at an existing priority junction, with the latter forming the minor arm at the junction. The geometry at this junction is adequate to provide for large delivery vehicles and visibility splays are clear, as shown in Plates 13.1.1 and 13.1.2.

Observations were made on the local highway network during a site visit undertaken on Wednesday 22nd February 2018. During the PM peak hours of 16:00 to 18:00 the local road network from the R402 onto the L-5025, including the priority junction connecting the 2 roads, was observed to operate within capacity without any significant queues or delays.

13.1.2.2 Proposed Delivery Routes

While the providers for the various materials and component parts required for the construction of the Proposed Project have yet to be decided, deliveries and construction staff will access the site via the route described in Section 13.1.7. and shown in Figures 13.1.1 and 13.1.2. A geometric assessment of the locations indicated



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Figure 13.1.2 Delivery route and autotrack assessment locations

PROJECT: Timahoe North Project EIAR	
CLIENT: Bord na Mona	SCALE: NTS
PROJECT NO: 5290	DATE: 15.08.18
	DRAWN BY: AL

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in Figure 13.1.2 along the transport route is included in Section 13.1.7 based on the largest vehicles that will require access to the Proposed Project site.

13.1.3 Existing 2018 and Construction Year 2021 Traffic Volumes

An EIA was prepared for the Proposed Derrhid Waste Management Facility on behalf of Bord na Mona, by Tobins Consulting Engineers in 2017. An automatic traffic count was undertaken as part of the assessment on the R402, which is also common to the delivery route for the subject development. The ATC data for the R402, and the subsequent forecast for 2019 presented in Derrhid Waste Management EIA was therefore adopted for the Proposed Project traffic assessment. Based on this, it was estimated that the daily traffic flow on the R402 would be 6,022 vehicles by the year 2019.

A sample short term turning count was undertaken at the junction between the R402 and the L-5025 Derrymahon Road (Location 1) between the hours of 17:00 and 18:00 on Wednesday 22nd February 2018, with observed 2-way link flow set out in Table 13.1.1.

Data from a continuous Automatic Traffic Counter (ATC) maintained by Transport Infrastructure Ireland (TII) on the M4 close to Junction 9 in Enfield was used to provide a daily flow profile to apply to the short period traffic count. Data from the ATC site, which is included as Appendix 13-1-1, suggests that the average daily traffic flow is 12.54 times the flow observed during the hour of 17:00 – 18:00. Based on this profile, it is estimated that in February 2018 the L-5025 Derrymahon Road providing for 1,229 vehicle movements at the western end close to the R402.

In order to take account of seasonal variations in traffic levels, the M4 TII data was also used to determine variations in flows by month. It was established that traffic volumes in the busiest month of August were recorded to be 22.5% higher than those observed in the month of February. Year 2018 February flows were therefore seasonally adjusted by +22.5%, as set out in Table 13.1.2.

With an assumed construction year of 2021 background traffic flows for the opening year are also set out in Table 13.1.2. Year 2021 traffic flows were determined from 2018 and 2019 flows described above by applying annual growth factors established from TII's Project Appraisal Guidelines for National Roads Unit 5.3, Table 5.3.2. The following growth factors were therefore applied to the 2018 and 2019 traffic volumes in order to determine the background traffic volumes for the proposed construction year of 2021;

- 2018 to 2021 = 1.043
- 2019 to 2021 = 1.028

All-day traffic flows are broken down by vehicle type and also factored to passenger equivalent car units (pcus) in Table 13.1.3. The % of HGV's from the M4 ATC data is 9.4%. During a typical day it was assumed that the route leading to the Proposed Project site will provide for a similar percentage of HGVs. HGV's were factored by 2.4 in order to convert the flow to pcus. Based on this assessment it is estimated that in the proposed opening year of 2021 the R402 will provide for 7,007 pcus and the L-5025 Derrymahon Road 1,627 pcus.

Table 13.1.1 Observed weekday PM hour link flows, all day factors, all day flows, February 2018 (vehicles)

Link	Year 2018		
	17:00 to 18:00	All day factor	24 hour
L-5025 (west)	98	12.54	1,229

Table 13.1.2 All day flows, 2018 February and seasonally adjusted 2018 and 2021 (vehicles)

Link	Year 2018 February	Seasonally adjusted	
		2018	2021
L-5025	1,229	1,379	1,438

Table 13.1.3 Traffic volumes on study network by vehicle type, 2021

Link	24 hour vehicles	obs % HGV	HGVs	Cars LGVs	PCUs
R402	6,192	9.4%	582	5,610	7,007
L-5025	1,438	9.4%	135	1,302	1,627

13.1.3.1 Road safety of existing network

It is noted from the collision database maintained by the Road Safety Authority, included as Appendix 13-1-2, that there was one collision (with a severity of serious) on the L-5025 Derrymahon Road, just to the west of the proposed access. While the specific cause of the collision, which involved a car on a Saturday evening in 2013, is not available, it was the only incident recorded on the section of the L-5025 on the delivery route in the 10 year period between 2005 and 2014 inclusive. This would indicate that the local road network has operated relatively safely during this period.

13.1.4 Proposed Project and Traffic Generation

13.1.4.1 Development Content

The Proposed Project comprises of a Solar Farm with an export capacity of 70 MW, a 110 kV Substation and Grid Connection as described in Chapter 4.

13.1.4.1.1 Development Trip Generation – During Construction

Details of the traffic volumes that are forecast to be generated during the construction period of the Proposed Project is set out in Table 9 of the Construction Methodology report prepared by ESBI, with the table included as Appendix 13-1-3.

In summary, it is forecast that the construction of the Proposed Project will be undertaken on 400 working days over a period of 20 months, with a total of 14,100 deliveries made to the Proposed Project site by vehicles the size of a standard HGV or similar. During the 20 month period the number of HGV deliveries made to the Proposed Project site will range from 2 deliveries to 64 deliveries per day, with an average over the 20 month period of 35 deliveries per day. Similarly, the number of staff on site will vary according to the task being undertaken on site, from a minimum of 30 staff members during the initial site preparation stage, to a maximum of 213 staff members during the main construction stage.

In order to assess the traffic effects of the Proposed Project generated traffic on the surrounding road network it is convenient to split the construction period into 4 phases,

as set out below, and summarised in terms of daily trips and traffic movements in Tables 13.1.4 and 13.1.5 respectively.

Phase 1 – Advance work & site preparation

- Phase 1 will last 110 working days or 5.5 months,
- During this period there will be 1,360 deliveries made to the Proposed Project site, averaging at 12 per day.
- There will be an average of 27 staff members on site per day.

Phase 2 – Site clearance & civils

- Phase 2 will last 100 working days or 5 months,
- This is the busiest period with respect to deliveries with 8,180 deliveries by HGV made to the Proposed Project site, with an average of 82 per day.
- An average of 58 staff will be on site per day.

Phase 3 – Main construction phase

- This phase will last 110 working days or 5.5 months,
- A total of 4,070 deliveries by HGV will be made to the Proposed Project site, with an average of 37 per day.
- This is the most intense phase for staff, with an average 191 on site per day.

Phase 4 – Substation installation and commissioning

- Phase 4 will last 80 working days or 4 months,
- Just 490 deliveries by HGV will be made to the Proposed Project site, with an average of 6 per day.
- An average of 47 construction staff will be on site per day.

The impact of construction traffic was tested for a typical day for all 4 phases, summarised in Table 13.1.4.

Each HGV movement was factored by 2, as each movement will be 2-way, and weighted by 2.4 to convert to passenger car equivalent units (pcus), as shown in Table 13.1.5. Similarly, all staff trips were factored by 2 to represent 2-way trips but then divided by 3 based on an assumption that there will be an average occupancy of 3 staff per car. The total additional daily traffic generation on the surrounding road network on each of these days is shown in Table 13.1.5, with the total number of additional pcus travelling on the local network ranging from a minimum of +61 pcus during the 80 days of Phase 4 (Substation installation and commissioning) to +431 pcus during the 100 days of Phase 2 (Site clearance and civils).

Table 13.1.4 Trips generated by Proposed Project by construction stage, average per day (trips)

Construction stage	Duration (days)	Trips	
		HGVs	Staff
Phase 1 - Advance work, site preparation	110	12	27
Phase 2 - Site clearance & civils	100	82	58

Phase 3 - Main construction stage	110	37	191
Phase 4 - Substation and commissioning	80	6	47

Table 13.1.5 Traffic generated by Proposed Project by construction stage, average per day (2-way vehicle movements)

Construction stage	Duration (days)	Trips		
		HGVs	Staff	pcus
Stage 1 - Advance work, site preparation	110	25	18	77
Stage 2 - Site clearance & civils	100	164	39	431
Stage 3 - Main construction stage	110	74	127	305
Stage 4 - Substation and commissioning	80	12	31	61

Furthermore, traffic generated during the construction of the Proposed Project can contribute to greenhouse gas emissions during the construction period. These have been assessed in Chapter 9 -Air Quality and Climate.

13.1.4.1.2 Development Trip Generation – During Operation

During the operational stage of the development trips to/from the Proposed Project site will be limited to visits by maintenance staff accessing the Proposed Project site by car or light goods van as well as users of the proposed recreational and amenity trails. These visits will be limited to 1 or 2 per week for the Proposed Project maintenance staff and 6 per day for the recreational users, with the maximum 2-way daily trip generation during this period established to be just 16 pcus, as shown in Table 13.1.6.

Table 13.1.6 Traffic generated by Proposed Project during operation stage

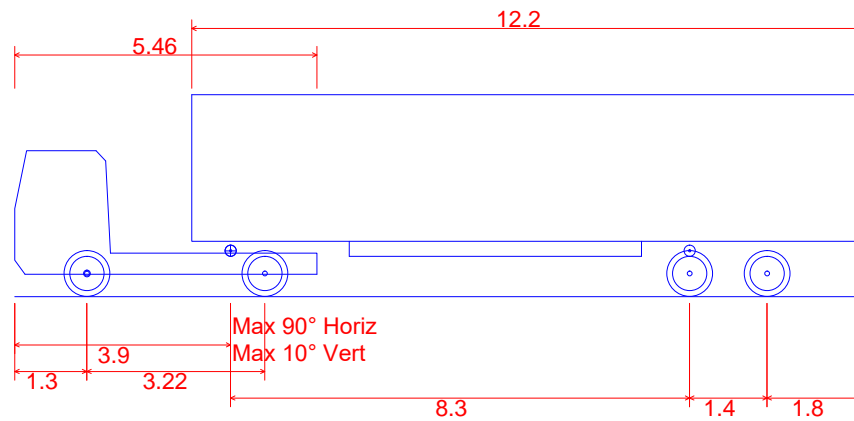
Link	Development traffic - all day		
	HGVs	cars/LGVs	pcus
R402	0	16	16
L-5025	0	16	16

Furthermore, traffic generated during the lifetime of the Proposed Project can contribute to greenhouse gas emissions during the operational period. These have been assessed in Chapter 9 -Air Quality and Climate.

13.1.5 Construction Traffic Vehicles

13.1.5.1 Construction Traffic Vehicle Types

The largest vehicle that will be permitted to access the Proposed Project site is a large articulated HGV, 15.4 metres long and 2.5 metres wide. The profile of such a vehicle is provided in Figure 13.1.3.



Large Articulated Vehicle
Overall Length 15.400m
Overall Width 2.500m
Overall Body Height 3.652m
Min Body Ground Clearance 0.406m
Track Width 2.376m
Lock to Lock Time 6.00s
Kerb to Kerb Turning Radius 6.610m

NOTES:

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Figure 13.1.3 Large articulated HGV profile (15.4m long by 2.50m wide)

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CLIENT: Bord na Mona

PROJECT NO: 5290

DATE: 30.07.18

SCALE: NTS

DRAWN BY: AL

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13.1.6 Traffic Impact During Construction and During Operation

All potential traffic impacts identified during the construction and operation periods relate to both elements of the Proposed Project; that of the Solar Farm, Substation and Grid Connection.

13.1.6.1 Traffic Impact During Construction

During the construction period, all traffic travelling to and from the site is for the development of both the Solar Farm and Substation and Grid Connection.

Year 2021 background traffic levels on the study network, together with additional traffic generated during construction phases 1 to 4, are shown in Tables 13.1.7 to 13.1.10. The figures show the following,

- During Phase 1 (110 days) the additional 77 pcus that will be generated on the transport route will result in a +4.3% increase in HGV movements on the R402 between Johnstown Bridge and the Proposed Project site, and a +1.1% increase in terms of all pcus. On the L-5025 Derrymahon Road approaching the Proposed Project site, corresponding increases are forecast to be +18.5% in terms of HGV's and +4.7% in terms of all pcus. As for all phases, the more significant percentage increases apply to the L-5025 Derrymahon Road leading to the Proposed Project site due to existing flows being light.
- During Phase 2 (100 days), when traffic levels generated by the Proposed Project, and in particular HGVs, increase, the additional 431 pcus generated will result in a +28.2% increase in HGV movements on the R402, and a 6.2% increase in terms of all pcus. On the L-5025 Derrymahon Road approaching the Proposed Project site corresponding increases are forecast to be over +121.4% in terms of HGV's, and +26.5% in terms of pcus.
- During the main construction work Phase 3 (110 days) the additional 305 pcus generated, a high proportion of which are due to construction workers, will result in a +12.7% increase in HGV movements on the R402, and a +4.4% increase in terms of all pcus. On the L-5025 Derrymahon Road approaching the Proposed Project site corresponding increases are forecast to be +54.8% in terms of HGV's, and +18.7% in terms of pcus.
- By Phase 4 (80 days), during which the substation is constructed and the Solar Farm is commissioned, additional development generated traffic flows will reduce to 61 pcus per day. This will result in a +2.1% increase in HGV movements on the R402, and a +0.9% increase in terms of all pcus. On the L-5025 Derrymahon Road approaching the Proposed Project site corresponding increases are forecast to be +8.9% in terms of HGV's, and +3.7% in terms of pcus.

Table 13.1.7 Traffic generated by Proposed Project, background traffic, % increase - Phase 1 construction stage, year 2021

Link	Background traffic			Development traffic			With development traffic			% increase		
	HGVs	cars/ LGVs	pcus	HGVs	cars/ LGVs	pcus	HGVs	cars/ LGVs	pcus	HGVs	cars/ LGVs	pcus
R402	582	5,610	7,007	25	18	77	607	5,628	7,084	4.3%	0.3%	1.1%

L-5025	135	1,302	1,627	25	18	77	160	1,320	1,704	18.5%	1.4%	4.7%
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Table 13.1.8 Traffic generated by Proposed Project, background traffic, % increase - Phase 2 construction stage, year 2021

Link	Background traffic			Development traffic			With development traffic			% increase		
	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	Pcus
R402	582	5,610	7,007	164	39	431	746	5,649	7,438	28.2%	0.7%	6.2%
L-5025	135	1,302	1,627	164	39	431	299	1,341	2,058	121.4%	3.0%	26.5%

Table 13.1.9 Traffic generated by Proposed Project, background traffic, % increase - Phase 3 construction stage, year 2021

Link	Background traffic			Development traffic			With development traffic			% increase		
	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	pcus
R402	582	5,610	7,007	74	127	305	656	5,737	7,312	12.7%	2.3%	4.4%
L-5025	135	1,302	1,627	74	127	305	209	1,429	1,932	54.8%	9.8%	18.7%

Table 13.1.10 Traffic generated by Proposed Project, background traffic, % increase - Phase 4 construction stage, year 2021

Link	Background traffic			Development traffic			With development traffic			% increase		
	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	Pcus
R402	582	5,610	7,007	12	31	61	594	5,641	7,068	2.1%	0.6%	0.9%
L-5025	135	1,302	1,627	12	31	61	147	1,333	1,688	8.9%	2.4%	3.7%

An assessment of the impact on link capacities on the delivery route undertaken for the various construction stages is set out in Tables 13.1.11 to 13.1.13. The capacity for each link in the study area is shown in Table 13.1.11.

The capacities range from a daily flow of 11,600 vehicles on the R402 to 5,000 vehicles on the L-5025 Derrymahon Road approaching the Proposed Project site, and are based on road widths and capacities set out in the Transport Infrastructure Ireland Standards document DN-GEO-03031 Road Link Design, Table 6/1. Background, or do-nothing traffic flows, are compared to flows forecast for the various construction phases in Table 13.1.12, with the percentage capacity reached for each link and phase shown in Table 13.1.13. Based on this assessment it is forecast that both links will operate well within link capacity for all construction phases, with the R402 reaching a maximum of 64% of its capacity, and the L-5025 Derrymahon Road 41% capacity.

Table 13.1.11 Carriageway width, link type and link capacity

Link	Width (m)	Link type	Link capacity
R402	7.3	Type 1 single	11,600
L-5025	6.0	Type 2 single	5,000

Table 13.1.12 Link capacity and link flows by construction phase

Link	Link capacity	Construction phase				
		Background	Phase 1	Phase 2	Phase 3	Phase 4
R402	11,600	7,007	7,084	7,438	7,312	7,068
L-5025	5,000	1,627	1,704	2,058	1,932	1,688

Table 13.1.13 Link capacity and % of link capacity by construction phase

Link	Link capacity	Construction phase				
		Background	Phase 1	Phase 2	Phase 3	Phase 4
R402	11,600	60%	61%	64%	63%	61%
L-5025	5,000	33%	34%	41%	39%	34%

13.1.6.1.1 Effect on Junctions – During Construction

The capacity of the junction most affected (the existing R402 / L-5025 Derrymahon Road junction) was assessed using the industry standard junction simulation software PICADY, which permits the capacity of any junction to be assessed with respect to existing or forecast traffic movements and volumes for a given time period. The capacity for each movement possible at the junction being assessed is determined from geometric data input into the program with the output used in the assessment as follows:

Queue – This is the average queue forecast for each movement and is useful to ensure that queues will not interfere with adjacent junctions.

Degree of Saturation or Ratio of Flow to Capacity (% Sat or RFC) – As suggested, this offers a measure of the amount of available capacity being utilised for each movement. Ideally each movement should operate at a level of no greater than 85% of capacity.

Delay – Output in minutes, this gives an indication of the forecast average delay during the time period modelled for each movement.

13.1.6.1.2 Scenarios Modelled

While other junctions and links on the network will experience an increase in traffic volumes passing through them, as discussed previously and as set out in Tables 13.1.7 to 13.1.10 above, the worst-case effect will be experienced during peak hours, when, during the peak construction period (Phase 3), approximately 64 cars generated by construction workers will leave the Proposed Project site.

R402 / L-5025 Derrymahon Road junction Capacity Test Results

The PM peak hour traffic flows for the year 2021 without and with construction traffic are shown in Figures 13.1.4 and 13.1.5, with the capacity results shown in Table 13.1.11. The results show that additional traffic passing through the junction will have the effect of increasing the maximum ratio of flow to capacity (RFC) at the junction from 19.3% to 38.3% for traffic turning out of the L-5025 onto the R402, which is well within the acceptable limit of 85% (see Table 13.1.14).

Table 13.1.14 Junction capacity test results - R402 / L-5025 junction, without and with construction traffic, PM peak hour, year 2021

Year	Arm	Weekday PM peak hour					
		No development			With construction traffic		
		RFC	Q	Delay	RFC	Q	Delay
2021	From L-5025 Derrymahon Road	19.3	0.24	0.19	38.3	0.61	0.25
	Right into L-5025 Derrymahon Road	5.5	0.06	0.13	5.5	0.06	0.13

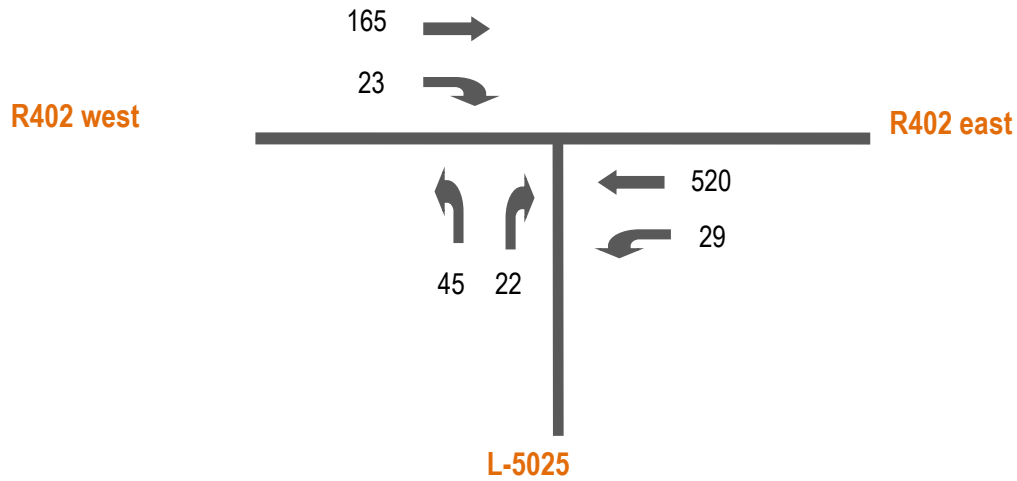
13.1.6.2 Traffic Impact During Operation

During the operation period, all traffic travelling to and from the Proposed Project site will cater for both the Solar Farm and Substation and Grid Connection.

Similarly, year 2021 background traffic levels on the study network, together with additional traffic generated by the Proposed Project during the operational stage is shown in Table 13.1.15. As would be expected, the occasional visit by maintenance staff and members of the public to the Proposed Project site will have negligible impact on the surrounding highway network, increasing traffic volumes on the transport route by a maximum of 1.0%.

The addition of the proposed amenity trail, including formal parking provision for approximately 20 cars, will likely cater for locals in the community as well as for tourists to the area. The additional amenity traffic volumes that will be generated on the local road network will likely be minimal compared to those already visiting the area and already recorded in background traffic levels.

PM Peak hour
2018 background
traffic flows



PM Peak hour
2021 background
traffic flows

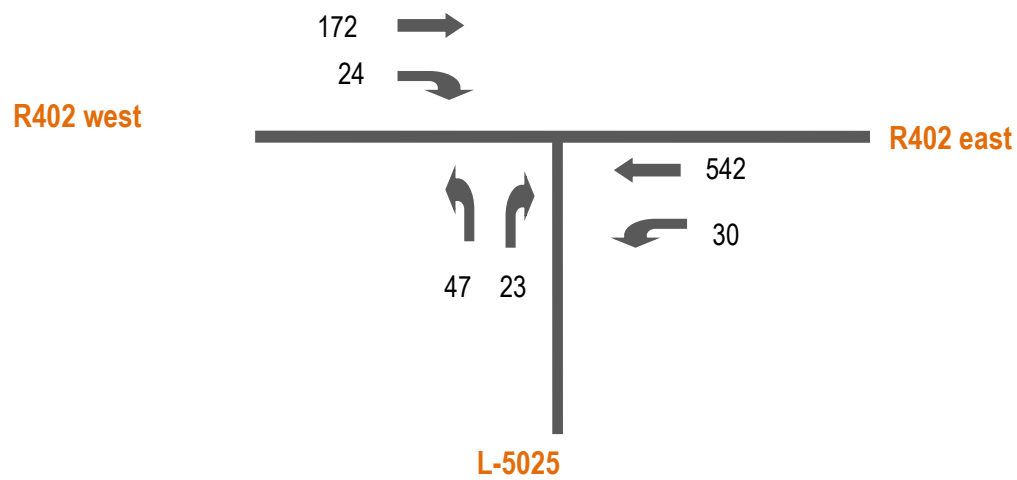


FIGURE 13.1.4 PM peak hour traffic flows, R402 / L-5025 junction, background traffic flows 2018 and 2021 (pcus)

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Project No.: 5290

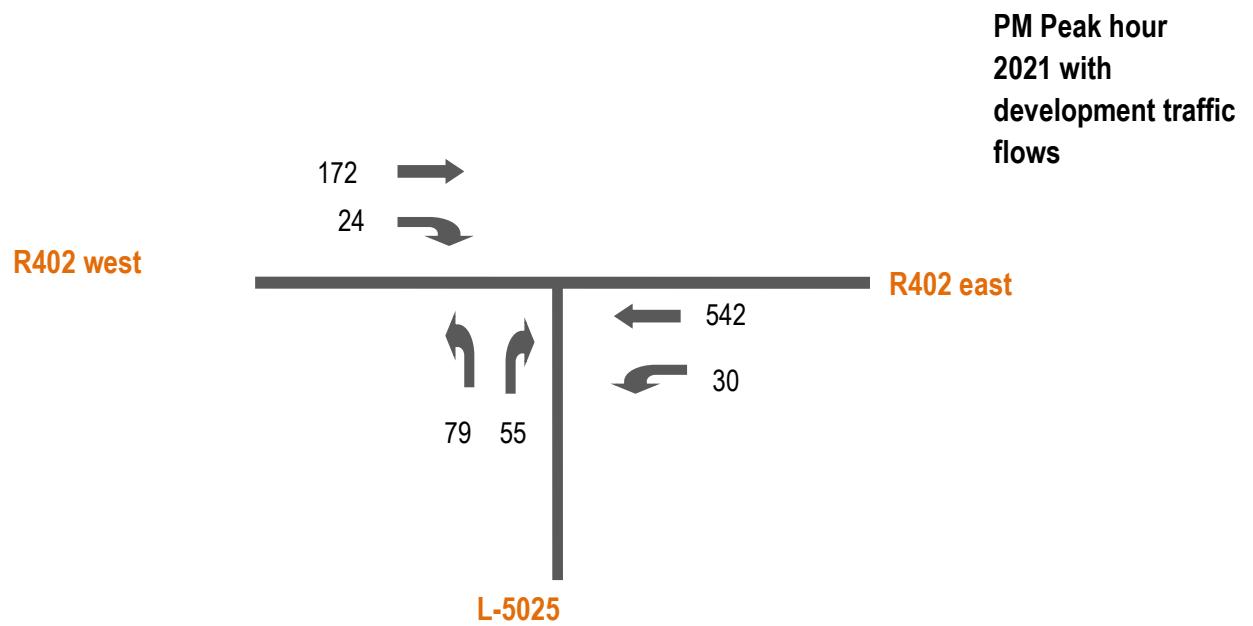
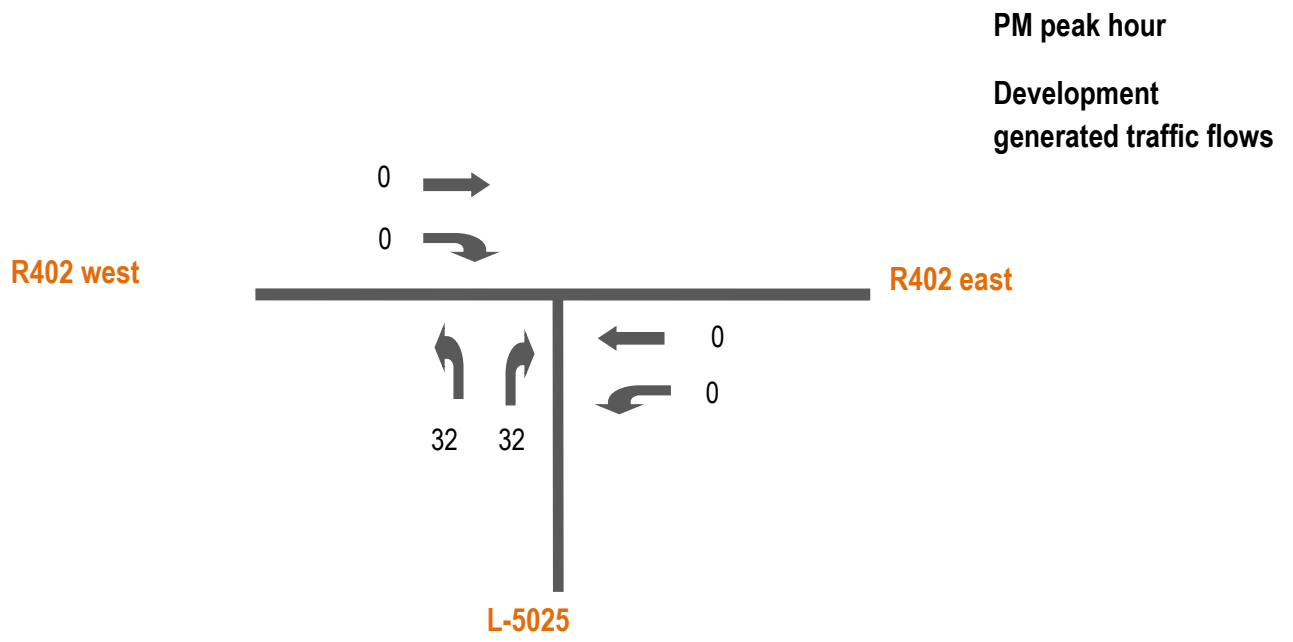


FIGURE 13.1.5 PM peak hour traffic flows, R402 / L-5025 junction, development generated traffic and with development traffic flows, year 2021 (pcus)

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Project:	Timahoe North Project EIAR	Date:	10.12.18
		Drawn by:	AL
Client:	Bord na Mona	Project No.:	5290

Table 13.1.15 Traffic generated by Proposed Project, background traffic, % increase - during operation stage, year 2021

Link	Background traffic			Development traffic			With development traffic			% increase		
	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	pcus	HGVs	cars/LGVs	pcus
R402	582	5,610	7,007	0	16	16	582	5,626	7,023	0.0%	0.3%	0.2%
L-5025	135	1,302	1,627	0	16	16	135	1,318	1,643	0.0%	1.2%	1.0%

13.1.7 Route Assessment

Location 1 – Left turn from R402 onto L-5025 Derrymahon Road

Deliveries travelling along the R402 will be required to turn left onto the L-5025 Derrymahon road at the existing priority junction. An autotrack assessment based on OS mapping and the large articulated HGV profile discussed in Section 13.1.4, included as Figure 13.1.6, shows that the largest delivery vehicles that will require access to the Proposed Project site will be accommodated at this location.

Location 2 – Bend on L-5025 Derrymahon Road

Observations on the ground together with the autotrack assessments shown in Figure 13.1.7 indicate that the HGV's visiting the Proposed Project site will be accommodated at this location.

Location 3– Access junction on the L-5025 Derrymahon Road

Details for the proposed access junction off the L-5025 Derrymahon are shown in Figures 13.1.8 to 13.1.10.

The proposed access junction takes the form of a simple priority junction with the development access forming the minor arm of the junction. It is proposed to provide formal STOP markings and signage at the junction, in accordance with Figure 7.35 of the Traffic Signs Manual, as shown in Figure 13.1.8.

All hedges/fencing and other existing obstructions that may exist will be cleared to provide the visibility splays shown in Figure 13.1.9. Taken from a point 3.0m metres setback from the carriageway edge, visibility splays 160m to the nearside carriageway will be provided in accordance with sight stopping distances for an 80 km/h design speed set out in DN-GEO-03060 Geometric Design of Junctions, Transport Infrastructure Ireland (TII), April 2017.

An autotrack assessment showing that the junction will accommodate the design articulated HGVs is shown in Figure 13.1.10.

13.1.8 Provision for Sustainable Modes of Travel

13.1.8.1 Walking and Cycling

The provision for these modes is not relevant during the construction stage of the development and travel distances will likely exclude any permanent employees walking or cycling to work.

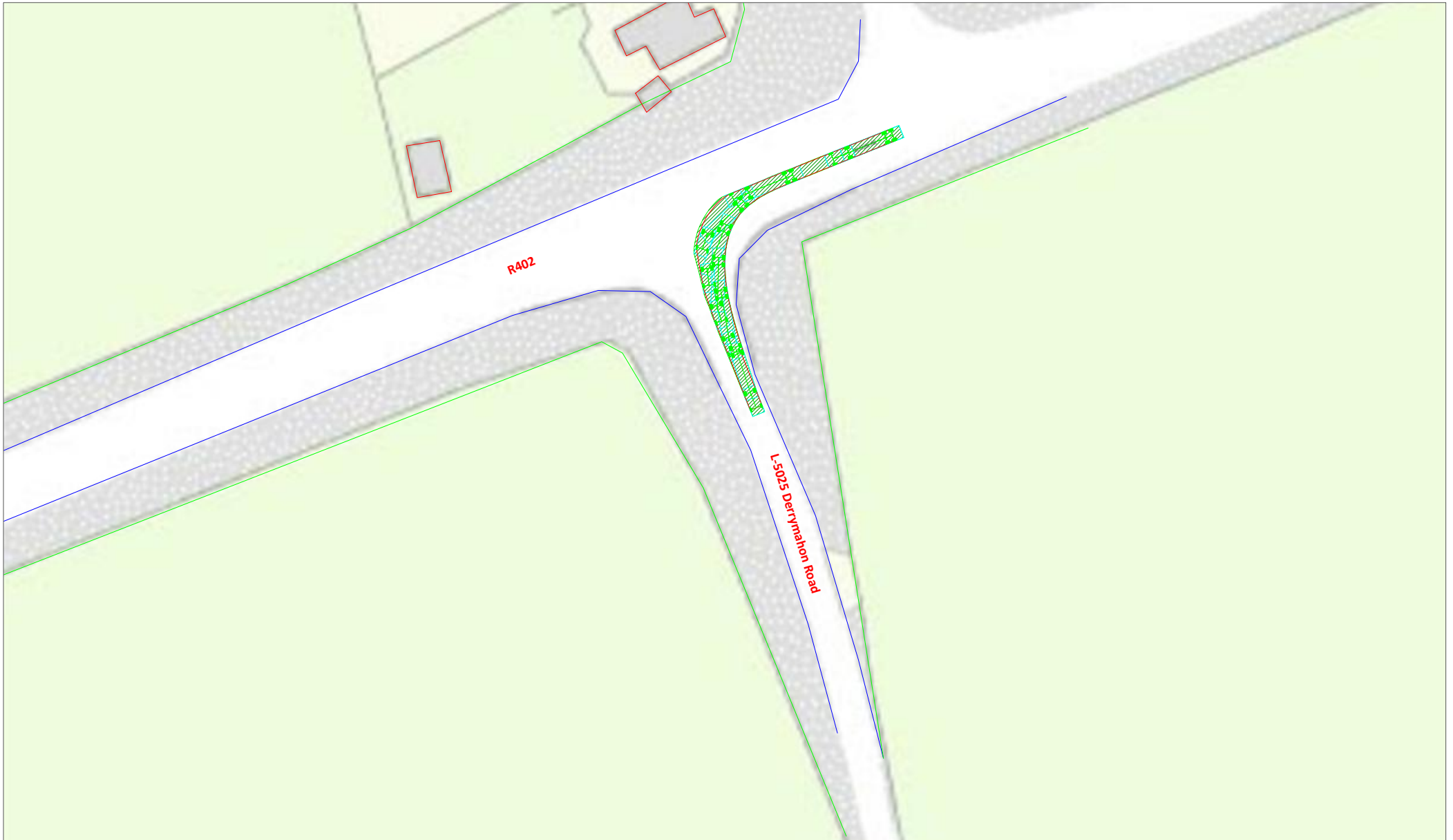


Figure 13.1.6 Location 1 - autotrack assessment - left turn from R402 onto L-5025 Derrymahon Road

NOTES:
 PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

PROJECT: Timahoe North Project EIAR		
CLIENT: Bord na Mona	SCALE: 1:1000	
PROJECT NO: 5290	DATE: 30.07.18	DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

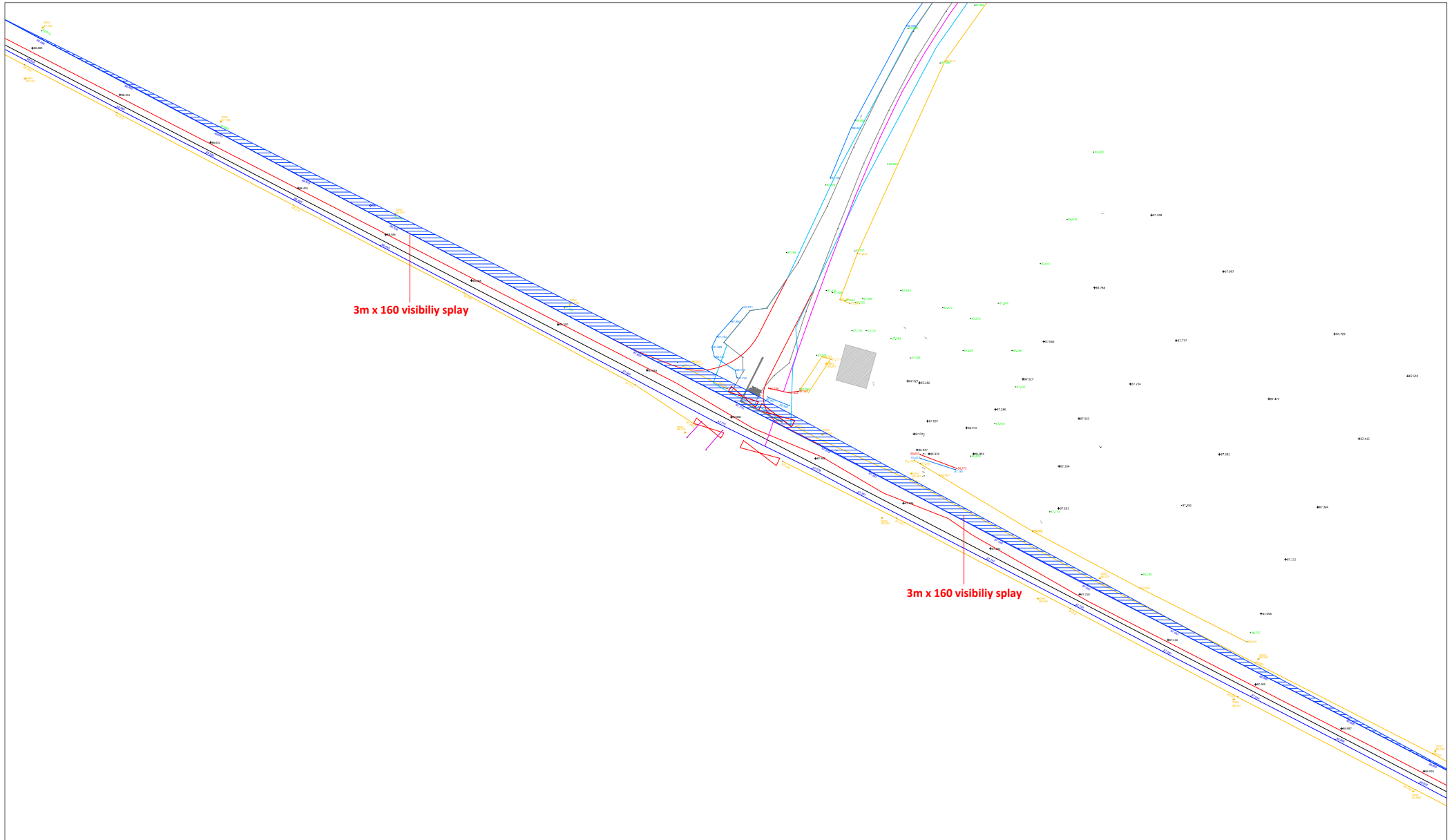


NOTES:
 PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 13.1.7 Location 2 - autotrack assessment - location on L-5025 Derrymahon Road

PROJECT: Timahoe North Project EIAR		
CLIENT: Bord na Mona	SCALE: 1:1000	
PROJECT NO: 5290	DATE: 30.07.18	DRAWN BY: AL

ALAN LIPSCOMBE
 TRAFFIC & TRANSPORT CONSULTANTS



NOTES:

PLANNING DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Figure 13.1.9 Location 3 - proposed access junction and visibility splays

PROJECT: Timahoe North Project EIAR

CLIENT: Bord na Mona

PROJECT NO: 5290

DATE: 02.08.18

SCALE: 1:1000

DRAWN BY: AL

ALAN LIPSCOMBE
TRAFFIC & TRANSPORT CONSULTANTS

13.1.8.2 Public Transport

There are no public transport services that currently pass the Proposed Project site although car sharing and mini buses will be considered for transporting staff to and from the Proposed Project site in order to minimise traffic generation and parking demand on site.

13.1.9 Likely and Significant Impacts and Associated Mitigation Measures

13.1.9.1 “Do Nothing” Scenario

If the Proposed Project does not proceed there would be no impact in terms of changes in traffic levels on the surrounding road network. The Proposed Project site would continue to be accessed by the public as an unofficial walking route, and by those who use the Proposed Project site for turf cutting on the spread.

13.1.9.2 Construction Phase – Proposed Project

All potential traffic impacts identified during the construction period relates to both elements of the Proposed Project; that of the Solar Farm and Substation and Grid Connection.

Construction Phase 1 – Advance work & site preparation

During the 110 days (5.5 months) of construction phase 1, the impact of the development generated traffic will be slight and temporary on the R402, increasing traffic flows by a maximum of 1.1% in total and by 4.3% in terms of HGV's.

On the L-5025 leading to the Proposed Project site access, existing traffic volumes are relatively low, and the impact of the additional traffic generated by the Proposed Project will be more noticeable. During construction phase 1 it is forecast that impact will be slight and temporary, with traffic flows increasing by a maximum of +4.7% in total and by +18.5% in terms of HGV's.

Construction Phase 2- Site clearance and civils

During construction phase 2, which will last 100 days (5 months), the impact of the development generated traffic will be the greatest. It is forecast that during this phase traffic impacts will be slight to moderate and temporary on the R402, increasing traffic flows by a maximum of +6.2% in total and by +28.2% in terms of HGV's.

On the L-5025 the impact of the additional traffic generated by the Proposed Project during the construction phase 2 will be moderate and temporary, increasing traffic flows by a maximum of +26.5% in total and by 121.4% in terms of HGV's.

Construction Phase 3 – Main construction phase

During construction phase 3, which will last 110 days (5.5 months), the impact of the development generated traffic will be less than during phase 2. It is forecast that during this phase traffic impacts will be slight and temporary on the R402, increasing traffic flows by a maximum of +4.4% in total and by +12.7% in terms of HGV's.

On the L-5025 the impact of the additional traffic generated by the Proposed Project during the construction phase 3 will be moderate and temporary, increasing traffic flows by a maximum of +18.7% in total, and by +54.8% in terms of HGV's.

Construction Phase 4 – Substation and commissioning

During the 80 days (4 months) of the final construction phase, the impact of the development generated traffic will reduce to being imperceptible to slight, and temporary on the R402, increasing traffic flows by a maximum of 0.9% in total and by 2.1% in terms of HGV's.

On the L-5025 approaching the Proposed Project site access, during construction phase 4 it is forecast that impact will be slight and temporary, with traffic flows increasing by a maximum of +3.7% in total and by +8.9% in terms of HGV's.

13.1.9.3 Operational Phase

13.1.9.3.1 Recreation & Amenity

The addition of the recreational amenity trail to the Proposed Project site will allow for a slight increase in volumes of amenity traffic generated by the site. While the effects will be long-term they will be imperceptible.

13.1.9.3.2 Project

During the operation phase the impact on the surrounding local highway network will be negligible.

13.1.9.4 Decommissioning Phase

The Substation and Grid Connection will form a permanent part of the national transmission system and will not be decommissioned. The design life of the Solar Farm is 35 years; after which time a decision will be made to determine whether or not the solar panels will be replaced or if decommissioning will occur.

All infrastructure including solar units will be separated and removed off-site for re-use, recycling and waste disposal. It is proposed that foundations will be left in place and covered with soil/topsoil. It is proposed to leave the access roads in situ at the decommissioning stage. It is considered that leaving the foundations and access tracks in situ will cause less environmental damage than removing and recycling them. However, if removal is deemed to be required, all infrastructure will be removed with mitigation measures similar to those during construction being employed. While the actual number of loads that will require to be removed from the site in the event that the Proposed Project is decommissioned has not been determined at this stage, the impact in terms of traffic volumes will be significantly less than during the construction stage.

13.1.9.5 Mitigation Measures

This section summarises the mitigation measures to minimise the effects of the proposed Timahoe North project during both the construction and operational stages.

Mitigation by Design

Mitigation by design measures include the following;

- Selection of the most appropriate delivery route to transport all materials to the Proposed Project site and,
- Avoidance of unsuitable local roads and alternative routes to the Proposed Project site

Mitigation Measures During the Construction Stage

The successful completion of this project will require significant coordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction stage of the project in order to minimise the effects of the additional traffic generated by the Proposed Project. The range of measures will include the following which are also set out in Appendix 4-5 Construction Environmental Management Plan:

A detailed **Traffic Management Plan (TMP)**, incorporating all the mitigation measures set out in the Outline TMP submitted as part of the CEMP, included in Appendix 4-6 of this EIA, will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the roads authority prior to construction works commencing on site. The detailed TMP will include the following:

Traffic Management Coordinator – a competent Traffic Management Co-ordinator will be appointed for the duration of the project and this person will be the main point of contact for all matters relating to traffic management.

Delivery Programme – a programme of deliveries will be submitted to Kildare County Council in advance of deliveries to site.

Information to locals – Locals in the area will be informed of any upcoming traffic related matters via letter drops and posters in public places. Information will include the contact details of the Contract Project Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number will also be provided.

A Pre and Post Construction Condition Survey – A pre-condition survey of roads associated with the Proposed Project will be carried out prior to construction commencement to record the condition of the road. A post construction survey will be carried out after works are completed. Where required the timing of these surveys will be agreed with the local authority.

Liaison with the relevant local authority - Liaison with the relevant local authority including the roads sections of local authorities that the delivery routes traverse.

Identification of delivery routes – These routes will be agreed and adhered to by all contractors.

Travel plan for construction workers – While the assessment above has assumed the worst case that construction workers will drive to the Proposed Project site (3 per car), the construction company will be required to provide a travel plan for construction staff, which will include the identification of a routes to / from the site and identification of an area for parking.

Temporary traffic signs – As part of the traffic management measures temporary traffic signs will be put in place at the access junction on the L-5025 Derrymahon Road. All measures will be in accordance with the *"Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works"* (DoT now DoTT&S) and *"Guidance for the Control and Management of Traffic at Roadworks"* (DoTT&S). A member of construction staff (flagman) will be present at the access junction during peak delivery times.

Additional measures - Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including wheel washing facilities on site and sweeping / cleaning of local roads as required.

Re-instatement works - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.

Mitigation Measures During Operational Stage

Due to the very low volumes of traffic forecast to be generated during this stage no mitigation measures are required.

Mitigation Measures During Decommissioning Stage

In the event that the Solar Farm is decommissioned after the 35 years of operation, a decommissioning plan, including material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning of the Solar Farm. The Substation and Grid Connection will form a permanent part of the national transmission system and will not be decommissioned.

13.1.9.6 Residual Impacts

Construction Stage

During the 20 month construction stage of the Proposed Project, it is forecast that the additional traffic that will appear on the delivery route indicated in Figure 13.1.1 will have a slight (short term) moderate (temporary) impact on existing road users, which will be minimised with the implementation of the mitigation measures included in the proposed traffic management plan.

Operational Stage

As the traffic impact of the Proposed Project will be imperceptible during the operational stage, there will be no residual impacts during this stage.

Decommissioning Stage

As stated above, in the event that the Solar Farm is decommissioned a decommissioning plan will be prepared and implemented in order to minimise the residual impacts during this stage.

13.1.10 Cumulative Effects – Proposed Project

A detailed assessment of all developments at varying stages in the planning process (from pre-planning to operational), is set out in Section 2.6 of this EIAR, with an assessment of the potential cumulative traffic effects with the Proposed Project assessed on the following criteria;

- Project status (proposed to operational)
- Traffic volumes (low to high)

In this regard in order to assess overall cumulative effects on traffic and transport, the construction, operation and decommissioning of the Proposed Project (i.e. Solar Farm and Substation and Grid Connection) is considered in the context of other developments namely;

- Turf cutting within the Project site
- Proposed and permitted nearby solar projects
 - Ovidstown Solar Farm (PL. Ref. 1894)

- Hortland Solar Farm (Pl. Ref. 171494)
- Power Capital Renewable Energy Limited Solar Farm (Pl. Ref. 161265)
- Drehid Waste Management Facility (DWMF)

For the 3 proposed or permitted Solar Farms listed above, while all delivery routes will be via the M6 and junction 9 at Johnstown Bridge, all sites are located just to the south of the M6. The delivery routes for these developments will therefore have little overlap with the R402 and L-5025 Derrymahon Road proposed for the Proposed Project. For this reason it is concluded that the cumulative impacts for all will be imperceptible.

The proposed expansion of the DWMF was also considered in the cumulative assessment. If the facility is consented, various trip distribution assumptions were made for the facility, with the daily trips forecast for the common section of the R402 extracted from Tables 10-12 to 10-16 of the DWMF EIAR, and summarised in Table 13.1.16. The figures show that in the proposed construction year for the Timahoe Solar Farm, traffic forecasts for the DWMF range from a minimum of zero pcus, to a maximum of 1,391 pcus. While there will therefore potentially be a degree of cumulative impact, it is noted that the worst case for both developments would be the following;

- 7,438 pcus for background + maximum delivery day for the Timahoe Solar Farm,
- plus 1,391 for the worst case for the DWMF,
- totalling 8,829 pcus.

The maximum cumulative total of 8,829 pcus forecast for the R402 would still utilise just 76% of the available capacity of the R402. It is noted that the maximum delivery day for the Proposed Project will occur for a short period of time only, and therefore the cumulative impact will be short term in nature.

The development or activities that were considered to have potential cumulative impacts with the Proposed Project in terms of traffic impacts are summarised in Table 13.1.17.

Table 13.1.16 Forecast flows on the R402 generated by the DWMF, by distribution assumption and year

Link	Year 2019			Year 2024		
	LGV	HGV	pcus	LGV	HGV	pcus
Distribution 1	736	273	1,391	242	89	456
Distribution 2	493	183	932	162	60	306
Distribution 3	368	136	694	121	44	227
Distribution 4	243	90	459	80	29	150
Distribution 5	0	0	0	0	0	0

Table 13.1.17 Summary of projects considered in cumulative assessment and potential for cumulative traffic effects with proposed Timahoe Solar Farm

Project	Status	Degree of overlap of highway network (low / medium / high)	Traffic volumes (low / medium / high)	Potential cumulative traffic effects
Turf cutting within site	On-going	Not applicable	Not applicable	Already included in background traffic levels
Ovidstown Solar Farm	In planning	Low	Low	Imperceptible
Hortland Solar Farm	In planning	Low	Low	Imperceptible
Power Capital Renewable Energy	Extension granted	Low	Low	Imperceptible
Drehid Waste Management Facility	Granted	High	High	Moderate

Cognisance has also been had of a potential wind farm development, Drehid Wind Farm, which at the time of preparation of this EIA has undergone a public consultation process and is proposed to the west of the Proposed Project site. It is possible that the wind farm project will also use the R402 and the L-5025 if consented. In the unlikely event that both projects are constructed at the same time, coordination will be required and implemented between the projects and with agreement of Kildare County Council to ensure the network operates within capacity.

For the Drehid Wind Farm, it would be expected that the delivery of abnormal loads will be controlled by a Traffic Management Plan overseen by the Garda Traffic Corps and so the potential for cumulative impacts does not arise in this instance.

13.2 Aviation

13.2.1 Introduction

This section of the EIA addresses the potential impact of the Proposed Project with regards to aviation. Section 13.2.2 below provides details regarding the way in which solar arrays can potentially interfere with aviation processes. Section 13.2.4 and 13.2.5 presents details regarding the assessment carried out on site and potential effects on aviation respectively.

13.2.1.1 Methodology and Guidance

This section of the EIA has been prepared in line with the guidance set out in Chapter 1, Section 1.1.4.

This section of the assessment focuses particularly on the scoping and consultation exercise conducted with aviation authorities. A full description of the scoping and consultation exercise is provided in Section 2.5 of this EIA.

The assessment of likely significant effects on material assets uses the standard methodology and classification of effects as presented in Chapter 1, Section 1.6.2 of this EIA. The full Proposed Project description, including proposed solar array size, location and elevations, are provided in Chapter 4.

13.2.1.2 Statement of Authority

This section of the EIA has been prepared by Órla Murphy (B.Sc. M.Sc.), an Environmental Scientist with McCarthy Keville O’Sullivan Ltd. Órla has over 2 years’ experience in the preparation of EIAs, including the assessment of likely significant effects on material assets. She has coordinated the scoping and consultation exercise with telecommunications operators and aviation authorities for numerous renewable energy developments and prepared the relevant sections of the EIAs. Further information on her competencies can be found in Chapter 1 and in Appendix 1-1. The Glint & Glare assessment, upon which the effects on aviation is determined was completed by Macro Works Ltd. Their competency is described in Chapter 5.

13.2.2 Background and Existing Environment

13.2.2.1 Aviation

Solar Farm developments have the potential to impact aviation in regard to interference with communications navigational and surveillance equipment and infringement of obstacle limitation surfaces in aircraft flightpaths and most notably by causing Glint and glare effects.

Glint and glare is an impact that is described as the reflection of sunlight from reflective surfaces, in this case the solar array. As noted in the Solar Trade Association (STA) report¹; aviation concerns have been raised relating to the potential Glint and glare impacts from solar panels as causing distraction both to pilots and air traffic controllers.

In contrast, the STA report acknowledged where it had contacted several experts in Glint and glare analysis for solar around airports, concluding that there are *hundreds, perhaps thousands of examples worldwide of solar PV installations operational on or around aerodromes*. Within Ireland, there is evidence of large scale solar panels adjacent to airports; most notably Crookedstown Solar Farm, which is located in County Antrim and is situated 600m from Belfast International Airport’s primary runway.

13.2.3 Scoping and Consultation

As part of the scoping and consultation exercise, MKO contacted the relevant aviation authorities and other relevant parties. The aviation consultees are presented below in Table 13.2.1.

Table 13.2.1 Aviation Scoping Responses

Consultee	Response	Potential Impact Flagged?
Department of Defence	Email response received 2 nd July 2018	Aviation and Glint and glare issues
Irish Aviation Authority	Response received 14 th May 2018	Aviation and Glint and glare issues

¹ Solar Trade Association (2016) Impact of solar PV on aviation and airports. www.solar-trade.org.uk
<http://www.solar-trade.org.uk/wp-content/uploads/2016/04/STA-glint-and-glare-briefing-April-2016-v3.pdf>

The scoping responses from the aviation consultees are summarised below. Copies of scoping responses are provided in Appendix 2-1.

13.2.3.1 Aviation

13.2.3.1.1 Department of Defence

The Department of Defence scoping response stated that having consulted with the Irish Air Corps, they would request that:

Due to Aviation activity in the area outlined, An Aviation Impact assessment for the development should be completed to include Glint and glare observation.

13.2.3.1.2 Irish Aviation Authority

The Irish Aviation Authority scoping response stated that the Proposed Project should be assessed for any potential Glint and glare issues in relation to aviation. In particular, it noted the close proximity to Casement Weston, Clonbullogue and Moyglare aerodromes; all of which should be included within an aviation assessment.

They provided details on the USA Federal Aviation Administration (FAA) guidance and Solar Glare Hazard Analysis Tool (SGHAT) to be used to evaluate the potential effect of solar systems on aviation. They noted the need for a specialised consultant to carry out any detailed analysis.

13.2.4 Aviation Impact and Glint and glare Assessment

13.2.4.1 Background

As the Proposed Project involves the installation of large-scale solar array, a Glint and glare assessment was carried out to identify any potential impacts on surrounding receptors. The effect of Glint and glare can occur on many different receptors in both rural and urban areas, in this instance, the potential impact on aviation has been assessed.

In regard to impacts on aviation, a full aviation assessment was completed using SGHAT analysis (see Appendix 5.3). In response to a scoping request by the Irish Aviation Authority (IAA), the proposed Solar Farm was assessed for potential Glint and glare issues at the aerodromes listed in Section 13.2.2.1.

The frequency of occurrence and the strength of any potential Glint and glare impact depends on several factors as identified in Section 5.5.2.

13.2.4.2 Guidance

Guidance has been prepared by the Federal Aviation Authority² to address the potential hazards that solar developments may pose to aviation activities, and this has been adopted for use by the IAA. This guidance, concerned with hazard assessment, has relevance to the other receptor types mentioned, and coupled with numerous assessments already carried out across the UK, combine to establish a suitable best practice.

² Harris, Miller, Miller & Hanson Inc.. (November 2010). Technical Guidance for Evaluating Selected Solar Technologies on Airports; 3.1.2 Reflectivity. Technical Guidance for Evaluating Selected Solar Technologies on Airports. Available at: https://www.faa.gov/airports/environmental/policy_guidance/media/airport-solar-guide.pdf

13.2.4.3 Glint and glare Prediction Methodology

The IAA have requested to be consulted on all applications for PV solar arrays within 10km of an airport or an aerodrome, for this reason a 10km aviation study area has been adopted as standard. The Dublin Airport Authority (DAA) separately requested that all projects falling within 15km of either of the main Dublin or Cork Airports also be assessed. Additionally, if there is a military aerodrome within the 10km aviation study area or within 15km of Dublin or Cork airport; then the locations of aviation receptors such as runway approaches and air traffic control towers will be identified.

The Federal Aviation Authority (FAA) approved SGHAT will be used to determine if any of these aviation receptors has the potential to theoretically experience glint or glare. This tool also calculates the intensity of such reflectance and whether it is acceptable by FAA standards.

As a note, SGHAT does not account for terrain screening or screening provided by surface elements such as existing vegetation or buildings, therefore the results of the SGHAT will be considered, in conjunction with an assessment of existing intervening screening that may be present, to establish if reflectance can actually be experienced by the receptors.

As noted within Appendix 5-3, if necessary, additional assessment will be undertaken using Macro Works Ltd. proprietary model which takes into account any screening provided by any proposed mitigation measures.

Further details regarding methodology requirements and limitations are noted in Appendix 5.3, Section 1.1.5.

13.2.4.4 Glint and glare Assessment Results

As detailed in Appendix 5.3, results of the SGHAT show that there will be no impact at either Clonbullogue or Moyglare aerodromes.

Runways

SGHAT results also show that there is the potential for glare to occur along the approaches to Runway 29 at Casement Aerodrome and Weston Runway 25. Additionally, SGHAT results indicate theoretical potential for glare to occur at the Air Traffic Control Towers (ATCT) at both Casement and Weston.

In relation to runway approaches at Casement Aerodrome, the SGHAT results show that there was 'No Glare Found' along the approaches to Runways 05, 11 or 23, although they do indicate the potential for "Green Glare" – glare with a 'low potential for temporary after image,' along the approach to Runway 29.

In relation to Runway Approaches at Weston Aerodrome, the SGHAT results show that there was 'No Glare Found' along the approach to Runway 07, although they do indicate the potential for "Green Glare" – glare with a 'low potential for temporary after image,' along the approach to Runway 25.

'Low potential for temporary after image' is considered by the FAA to be an acceptable level of reflectance effect for Runway Approaches.

Air Traffic Control Towers

SGHAT results show that at the Air Traffic Control Tower (ATCT) at Weston Aerodrome has the potential for up to 58 minutes of glare per annum and that the intensity of this glare is "Green Glare" i.e. it has a "low potential for temporary after image'.

SGHAT results show that at the ATCT at Casement Aerodrome, there is the potential for up to 32 minutes of glare per annum and that the intensity of this glare is “Green Glare” i.e. it has a “low potential for temporary after image”.

Whilst the FAA consider glare with a low potential for after image to be an acceptable level of reflectance effect along runway approaches, it is not acceptable at an ATCT.

Viewshed analysis was undertaken using a DTM (Digital Terrain Model) from the ATCTs at both Casement and Weston, where as a result of terrain screening, there is no possibility for visibility of the proposed solar array from either of the Air Traffic Control Towers, therefore, is not possible for reflectance to occur at the Air Traffic Control Towers at Casement or Weston.

Further information relating to aviation and Glint and glare results are noted within Appendix 5-3

13.2.5 Potential Aviation Impacts and Associated Mitigation Measures

13.2.5.1 ‘Do-Nothing’ Scenario

If the Proposed Project were not to proceed, there would be no change to existing aviation operations in the area.

13.2.5.2 Construction Phase - Solar Farm

The potential for aviation issues from installation of the solar arrays during construction of the Solar Farm will not have any impact on aviation. Any potential impacts will only occur during the operational phase of the development. There are no aviation impacts associated with the construction phase of the Solar Farm and hence no mitigation required.

13.2.5.3 Construction Phase – Substation and Grid Connection

The proposed Substation and Grid Connection will have no impact on aviation during the construction phase.

13.2.5.4 Operational Phase – Solar Farm

13.2.5.4.1 Aviation

Pre-Mitigation Impact

Consultation regarding the potential for aviation issues from the Proposed Project was carried out with the relevant aviation authorities. The existence of potential Glint and glare on identified aviation from solar arrays during operation, was identified by both the Department of Defence and the Irish Aviation Authority in their scoping responses.

Mitigation Measures

In order to inform whether there is a potential impact on all identified receptors, an aviation impact assessment, including Glint and glare analysis was completed.

The results of the Glint and glare analysis determined that there would be no potential impact on aviation as a result of distance, visibility and terrain screening of the proposed Solar Farm and selected aerodromes, as identified in Section 13.2.4 and in attached Appendix 5-3.

Residual Impact

There will be no residual effect on aviation from the proposed Solar Farm development.

Significance of Effects

There will be no significant effect on aviation from the proposed Solar Farm development.

13.2.5.5 Operational Phase – Substation and Grid Connection

The proposed Substation and Grid Connection will have no impact on aviation during the operational phase.

13.2.5.6 Decommissioning Phase

The solar farm infrastructure proposed as part of the Proposed Project are expected to have a lifespan of approximately 35 years. Following the end of their useful life, the solar infrastructure may be replaced, subject to planning permission being obtained, or the Proposed Project may be decommissioned fully. Individual panels may need to be replaced during the lifetime of the Proposed Project and this will occur on an as needed basis. The onsite substation will remain in place as it will be under the ownership of the ESB/EirGrid and part of the national transmission network.

The works required during the decommissioning phase are described in Section 4.11 in Chapter 4 of this EIA. Any impact and consequential effect on that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent.

13.2.6 Cumulative Impact Assessment / In-combination Assessment

Section 2.6 of this EIA describes the methodology used in compiling the list of projects considered in the assessment of cumulative effects, and provides a description of each project, including current status. It is noted that there are several other solar farm applications within 5km from the Proposed Project site. These include current planning applications for Ovidstown Solar Farm and Hortland Solar Farm, as well as planning permission for an extension of the granted Power Capital Renewable Energy solar development at Dysart, north east of the Proposed Project site and the granted Coolcarrigan site located in Timahoe West.

Due to the lack of potential for significant Glint and glare affects for the Proposed Project and the identified screening surrounding the site; there will be no cumulative impact in respect to other solar farms within the area.

During the development of any large project that holds the potential to effect aviation, the Developer is responsible for engaging with all relevant Aviation Authorities to ensure that the proposals will not interfere with aviation activities. In the event of any potential impact, the Developer for each individual project is responsible for ensuring that the necessary mitigatory measures are in place. Therefore, as each project is designed and built to avoid impacts arising, a cumulative impact will not arise.

13.2.7 Conclusion

A comprehensive scoping and consultation exercise was carried out with the main aviation bodies. Both the Department of Defence and The Irish Aviation Authority queried a potential Glint and glare issue on selected aerodromes within the surrounding area. This potential impact was assessed by completion of an Aviation Impact and Glint and glare Assessment, determining any potential impacts to be mitigated by visibility and terrain screening surrounding the Proposed Project, allowing for no significant effects on aviation.

13.3 Electricity, Waste and Other Services

13.3.1 Statement of Authority

This section of the EIAR has been prepared by Órla Murphy and reviewed by Michael Watson, both in MKO. Órla is an Environmental Scientist and has over 2 years' experience in the preparation of EIARs, including the assessment of likely significant effects on material assets. Michael Watson is a Project Director with MKO; with over 17 years of experience in the environmental sector. Their environmental experiences involves report writing of Environmental Reports (ER), Environmental Impact Statements/Environmental Impact Assessment Reports (EIS/EIAR) & Strategic Environmental Assessments (SEA) as well as project management of a variety of small and large scale jobs, including residential and commercial development projects. Further information on competencies can be found in Chapter 1 and in Appendix 1-1.

13.3.2 Consultation

The relevant national and regional authorities and bodies listed in Chapter 2, Section 2.5 were consulted to identify any potential impact on material assets. No response was received from the Commission for Regulation of Utilities or ESB Networks. The scoping responses are discussed in further detail in Section 2.5.2 of this EIAR.

13.3.3 Construction Methodology

The construction methodology detailed in Chapter 4 of this EIAR and included as Appendix 4-3, describes the manner in which the Proposed Project will be constructed, including any excavations and installation of services. Prior to works, the area where excavations are planned will be surveyed and all existing services will be identified. All relevant bodies i.e. ESB, Kildare County Council etc. Irish water will be contacted and all drawings for any all existing services sought.

If relevant, any underground services encountered during the works will be surveyed for level and where possible will be left in place. If there is a requirement to move the service, then the appropriate body (ESB, Gas Networks Ireland, etc.) will be contacted, and the appropriate procedure put in place. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All works will be in compliance with required specifications.

13.3.4 Receiving Environment

As previously noted, the Proposed Project is located on Timahoe North bog which is currently a brownfield site (former commercial scale cutaway peatland) and forms part of the Bord na Móna Allen Bog Group. The Timahoe North Bog site measures approximately 807 hectares and was formerly used for the production of sod peat for power generation and domestic heating purposes. Timahoe North is not currently in commercial use and has been out of large-scale commercial production for over 20 years. With this in mind, the Proposed Project could have the potential to impact the following:

- Electricity Network
- Water Supply Networks
- Land Use
- Waste Management

13.3.4.1 Electricity

As the Proposed Project site is a former commercial scale cutaway peatland, it is known to the Applicant that there are no underground electrical services which could

be encountered during the construction works. The Proposed Project will also include the construction of a 110 kV substation within the site. It is then envisaged to connect from this substation to the Derryiron-Maynooth 110 kV overhead line that traverses the southern section of the Timahoe North site.

13.3.4.2 Water Supply

There are no major water pipelines within or in the vicinity of the Proposed Project site. A potable water supply will be provided by a water tanker or by means of borehole on site. All caution will be taken to ensure that no foul water produced on site will enter local watercourses. Further detail is provided in Appendix 4-5 CEMP.

13.3.4.3 Land Use

Previous land-use onsite includes commercial scale peat extraction, which ceased in the 1990's. Land-use includes regenerating woodland, cutover peatland and as well as some 'turf on the spread' peat extraction activity taking place within the northeast and south-southeast of the Timahoe North site. Only a portion of this area under lease is actively being cut. The Proposed Project site is also used as an informal site for members of the public for walking.

During construction, the public will not have access to the Proposed Project site for safety reasons.

The footprint of the Proposed Project site, including solar arrays and associated infrastructure, Substation and Grid Connection, will occupy only a small percentage of the total Study Area defined for the purposes of this EIAR. The current land-use includes regenerating woodland and cutover peatland, and this will continue to co-exist with the Proposed Project. As part of the Proposed Project, development of amenity facilities, including visitor access, car parking and a looped walk are proposed, allowing the area to still be used by locals. As such, there will no significant impact on land-use.

13.3.4.4 Waste Management

As with any project of this scale, there will be waste generated from site during the construction phase in particular. It is not expected that any waste will be generated during the operational phase of the Proposed Project. All waste will be managed in accordance with applicable legislation and recognised best practice within the construction industry. Burning or burying of waste or packaging materials will not be allowed on site at any time. Further details on waste management on site and the specific measures employed to deal with waste during construction of the Proposed Project are provided in Chapter 4 and Appendices 4-3 and 4-5 of this EIAR.

13.3.5 Likely and Significant Impacts and Associated Mitigation Measures

13.3.5.1 'Do-Nothing' Scenario

If the Proposed Project was not developed, the site will continue to function as it does at present, with no changes made to the current land-use, which includes continued natural development of scrub and woodland areas within the Proposed Project site and turf cutting on the spread. As such, there would be no development of electrical services within the site. The site is also used as an informal site for members of the public for walking.

13.3.5.2 Construction Phase

The construction of the Proposed Project will have no impact on telecommunications networks.

During construction, a potable water supply will be provided by a water tanker or by means of borehole on site. All caution and mitigation as proposed in Appendix 4-5 will be taken to ensure that no foul water produced on site will enter local watercourses.

There are no services existing beneath the Proposed Project. As noted above, the Derryiron-Maynooth 110 kV overhead line that traverses the southern section of the Timahoe North site, will form a connection to the network from the proposed 110 kV substation within the Proposed Project site.

The overall Proposed Project will have a temporary imperceptible negative impact on services.

Mitigation

Specific measures are incorporated into the Construction and Environmental Management Plan, included as Appendix 4-5 of this EIA, to ensure that the construction of the Proposed Project will not have any adverse effect on any service networks in the vicinity.

Residual Impacts

There will be an overall imperceptible impact on electricity, water, land-use and waste networks.

Significance of Effects

Based on the assessment above there will be no significant effects.

13.3.5.3 Operational Phase

There will be no operational phase impacts or associated effects on electricity, water, land-use or waste networks associated with the Proposed Project.

13.3.5.4 Decommissioning Phase

The solar farm infrastructure proposed as part of the Proposed Project are expected to have a lifespan of approximately 35 years. Following the end of their useful life, the solar infrastructure may be replaced, subject to planning permission being obtained, or the Proposed Project may be decommissioned fully. Individual panels may need to be replaced during the lifetime of the Proposed Project and this will occur on an as needed basis. The onsite substation will remain in place as it will be under the ownership of the ESB/EirGrid. As such, there will be no further impacts on services in association with the Proposed Project.

The works required during the decommissioning phase are described in Section 4.11 in Chapter 4 of this EIA. Any impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent.

13.3.5.5 Cumulative Effects

The potential cumulative impacts and associated effects between the Proposed Project and the projects described in Section 2.6 of this EIA, have been considered in terms of telecoms and other services.

The measures outlined above, and in the Construction and Environmental Management Plan (CEMP), included as Appendix 4-5 of this EIA, will eliminate any potential for cumulative effects in relation to electricity, water, and waste networks during the construction, operational and decommissioning phases of the Proposed Project and the other projects.

13.3.6 Summary

A comprehensive scoping and consultation exercise was carried out with the relevant national and regional authorities and bodies. No response was received from the Commission for Regulation of Utilities or ESB Networks. An assessment of the services within and in the vicinity of the Proposed Project site allowed for no significant effects on services.