
Chapter 16
Material Assets:
Agricultural Properties

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16. MATERIAL ASSETS: AGRICULTURAL PROPERTIES

16.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes and presents an assessment of the likely significant effects of the DART+ Coastal North Project (“the Proposed Development”) on the topic of Material Assets: Agricultural Property during the Construction and Operational Phase of the Proposed Development. The chapter has assessed the potential effects on Material Assets: Agricultural Property arising from the Proposed Development during the Construction and Operational Phases based on the draft Railway Order as well as Chapter 4 (Description of Proposed Development) and Chapter 5 (Construction Strategy) of this EIAR.

Other impacts on Material Assets are also addressed throughout the EIAR in the following chapters:

- Chapter 7 (Population)
- Chapter 10 (Water)
- Chapter 11 (Hydrogeology)
- Chapter 12 (Air Quality)
- Chapter 14 (Noise and Vibration)
- Chapter 15 (Landscape and Visual)
- Chapter 17 (Material Assets: Non-agricultural land)
- Chapter 18 (Material Assets: Utilities)
- Chapter 19 (Material Assets: Waste and Resources)
- Chapter 20 (Archaeology and Cultural Heritage)
- Chapter 21 (Architectural Heritage); and
- Chapter 23 (Human Health)

16.2 Legislation, Policy and Guidance

16.2.1 Legislation

The key legislation and guidance for the preparation of this EIAR is presented in Chapter 1 (Introduction). This assessment complies with the Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU (“the EIA Directive”), the Transport (Railway Infrastructure) Act 2001 (as amended and substituted) (“the 2001 Act”) and the European Union (Railway Orders) (Environmental Impact Assessment) (Amendment) Regulations 2021 (S.I. No. 743/2021) which give further effect to transposition of the EIA Directive by amending the 2001 Act.

16.2.2 Policy and Guidance

There are no specific policies or guidelines for the assessment of Material Assets: Agriculture. In carrying out the assessment the author follows general guidance set out in the Environmental Protection Agency Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (EPA 2022). These guidelines are adapted for this assessment as shown in Table 16-3 and Sections 16.3.1, 16.3.2, and 16.3.3.

16.3 Methodology

This chapter is prepared having regard to the standard guidelines for environmental assessment published by the EPA in May 2022. The assessment of agricultural impacts involves:

- Evaluation of the baseline environment, the types of farm enterprises and the sensitivity of agricultural land parcels along the Proposed Development
- Evaluation of the nature and magnitude of the impacts on agricultural land parcels along the Proposed Development and the effects on agriculture within Counties Dublin, Meath and Louth (i.e. regional effects); and
- Having considered the sensitivity of the baseline agricultural environment and the magnitude of effects, the significance of effect is predicted for
 - a. Each affected agricultural land parcel along the Proposed Development (see Appendix A16.1 in Volume 4 of this EIAR)
 - b. Agriculture along the Proposed Development (i.e. locally); and
 - c. Agriculture within Counties Dublin, Meath and Louth (i.e. regionally).

The three elements of the methodology are described in Sections 16.3.1, 16.3.2 and 16.3.3. The agricultural assessment predicts changes to the existing agricultural environment and expresses these changes using the EPA terminology set out in Table 16-3. The study area has been divided into 5 zones (A, B, C, D & E) as described in Chapter 4 (Description of the Proposed Development) and the results of the assessment are presented for each zone.

16.3.1 Evaluation of the Baseline Sensitivity

Each affected agricultural land parcel along the Proposed Development is categorised according to its sensitivity. The criteria for the evaluation of land parcel sensitivity in Table 16-1 are based on guidelines contained in Section 3.6 of the Guidelines on the information to be contained in Environmental Impact Assessment Reports, EPA, May 2022, and on the author's experience and professional judgement. The main criterion which determines the sensitivity is the farm enterprise. For example, equine farms are generally high or very high sensitivity because horses are sensitive to disturbance (e.g. construction noise). Dairy farms are high sensitivity because it is critical that the movement of cows between the grazing plots and the milking parlour is not interrupted (this could be caused where there is severance of access). Table 16-1 shows the sensitivity of agricultural enterprises along the Proposed Development.

Table 16-1 Farm enterprise type and corresponding sensitivity

Farm Enterprise	Sensitivity
Stud farm, Equestrian centre, Horticulture (e.g. glass houses), intensive agriculture sites (pigs and poultry)	High – Very High
Dairy enterprise, Intensive equine enterprise	High (medium where enterprise is small scale)
Non-dairy grazing livestock enterprises (including beef, sheep and non-intensive equine) and grass cropping enterprise	Medium
Tillage	Medium
Small non-dairy grazing livestock enterprises, rough Grazing, Bog, Forestry, Woodland (where poor land quality restricts farming practices)	Low – Very Low

Each appraisal of sensitivity was subject to professional judgement and evaluation of other site-specific factors such as the land quality and importance of the enterprise. The size and viability of the agricultural land parcel was also considered when assigning sensitivity. For example, small land parcels are generally low sensitivity unless there is an intensive agriculture enterprise (e.g. pig or poultry houses).

16.3.2 Evaluation of the Magnitude of Impact

The magnitude of the potential effect was assessed by predicting the change on the affected land parcel or on agriculture along the route of the Proposed Development. For example, if the Proposed Development takes 10% of an affected grass land parcel, and provided the farm enterprise can continue, it can be predicted that the yield of grass from the land parcel will be affected by approximately 10%. In order to quantify the magnitude of the effect, typical baseline trends¹ in the agricultural environment were examined and interpreted. Effects which result in a 2.5% to 5% variation in yield are considered to create a low magnitude effect on the farm and are similar to natural baseline trends in yield. Between 5% and 10%, the magnitude of yield loss is starting to exceed the natural baseline trends and is considered of medium magnitude. Yield effects which exceed 10% are considered to be high magnitude. Other factors affect the magnitude of effects such as, severance or separation of land, the duration of effect, the quality of land affected and impact on farmyards and other farm facilities. Table 16-2 shows the criteria which are used to indicate the magnitude of effect – these criteria are based on analysis of baseline trends in crop yields and the author’s professional judgment.

Table 16-2 Criteria for the Assessment of Magnitude of Effects

Indicative Criteria	Magnitude of Effects
A high proportion of the land permanently taken (e.g. >10%) A high proportion of farm permanently separated (e.g. > 15 %) Farm buildings or water sources may be affected permanently	High – Very High
A medium proportion of the farm permanently taken (e.g. 5% -10%) A medium proportion of farm permanently separated (e.g. 7 % -15%) Farm buildings or water sources may be affected but can be replaced Temporary (construction) impacts which have long term effects	Medium
A small proportion of the farm permanently taken (e.g. 2.5% - 5%) A small proportion of farm separated or no separation (e.g. 2.5% - 7%) Farm buildings or water sources generally not affected but if affected can be replaced Temporary (construction) impacts which have short – medium term effects	Low
A very small proportion of the farm taken (e.g. <2.5%). A very small proportion of farm separated or no separation (e.g. <2.5% of the farm) Temporary (construction) impacts which do not have residual effects	Negligible – Very Low

¹ According to CSO data (2008 – 2022) the yield of spring barley and winter wheat has varied by approximately 7.9% and 9% respectively from the average mean yield. Teagasc data for grass production at Ballyhaise Agricultural College (2008 – 2021) shows the natural trend is for grass production to vary on average by 6.5% from year to year. UCD data for grass production at Lyons Estate (2016 – 2022) shows the natural trend is for grass production to vary on average by 6.2% from year to year.

Impacts that occur during the Construction Phase would generally result in low or very low magnitude because of the short duration (e.g. construction noise and vibration). Medium magnitude effects may arise during construction where for example there is a long-term effect on land drainage or quality as a result of the construction activity; however, generally the effect magnitude is low after mitigation.

16.3.3 Evaluation of the Significance of Impact

Once the description of the effect, including magnitude, character, duration etc. has been determined, this can be cross-referenced with the sensitivity of the affected agricultural land parcel to derive the overall significance of effect as per Section 3.7.3 of the EPA guidelines (EPA 2022). An effect which affects an agricultural land parcel with a low sensitivity will not be as significant as a similar magnitude of effect which affects an agricultural land parcel with a high sensitivity. Table 16-3 presents how the EPA guidelines for assessing significance have been adopted for this assessment with minor adjustments that are appropriate for agricultural impact assessment. In general, the effects from the Proposed Development on agriculture are adverse in nature.

Table 16-3 Comparison of Significance of Effect Criteria Used in this Assessment with the EPA 2022 Guidance

Significance of Effects as per EPA 2022 Guidance	Significance of Effect Used in this Assessment
<p>Imperceptible An effect capable of measurement but without significant consequences</p>	Not Significant
<p>Not Significant An effect which causes noticeable changes in the character of the environment without significant consequences</p>	An impact which may result in measurable effects and / or noticeable changes but the consequences are not significant.
<p>Slight An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.</p>	<p>Slight Adverse Effect An effect which causes noticeable changes in the character and management of a farm in a minor way. The farm enterprise experiences inconvenience as a result of the Proposed Development.</p>
<p>Moderate An effect that alters the character of the environment in a manner that is consistent with existing emerging trends.</p>	<p>Moderate Adverse Effect An effect which alters the character of a farm in a manner that requires moderate changes in the management and operation of the farm. The farm enterprise can be continued as before but with increased management or operational difficulties.</p>
<p>Significant An effect which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.</p>	<p>Significant and Very Significant Adverse Effect An effect which by its character, magnitude, duration or intensity alters a sensitive aspect of the farm. The farm enterprise can be continued but will require major changes in management and operation of the farm.</p>
<p>Very Significant An effect which by its character, magnitude, duration or intensity alters most of a sensitive aspect of the environment.</p>	<p>This would typically occur where the farm was split in two due to separation but where access between the separated portions and the farm buildings could still be achieved effectively.</p>

Significance of Effects as per EPA 2022 Guidance	Significance of Effect Used in this Assessment
	Assuming the enterprise can continue the degree of change in the management and operation of the farm will determine whether the effect is Significant or Very Significant.
<p>Profound</p> <p>An effect which obliterates sensitive characteristics.</p>	<p>Profound Adverse</p> <p>An effect which obliterates sensitive characteristics of the farm. The farm enterprise cannot be continued as a result of the Proposed Development. This would occur where land-take was of such a scale that the remaining land would not form a viable unit or where separation was of such a nature to make the holding unworkable or where important farm buildings and facilities were removed and could not be replaced. In some situations the farm enterprise may continue but will require dramatic changes in the future management and operation of the farm, such that the scale and operation of the enterprise is changed dramatically.</p>
<p>Source: Based on Table 3.4. EPA's 'Guidelines on the information to be contained in environmental impact assessment reports' (EPA, May 2022)</p>	

When assessing significance of effects, the basic principle which applies is that as sensitivity increases so also does the significance of effect, at any one level of magnitude. This assessment is subject to variation due to professional judgement on a case-by-case basis.

16.3.4 Study Area

The agricultural study area in this assessment is defined as the combined area of agricultural land parcels where there are direct land take and land separation effects from the Proposed Development as set out in Figure 16.1 in Volume 3A of this EIAR. In addition, the study area has been divided into five distinct zones, as described in Chapter 4 (Description of the Proposed Development).

- Zone A – North of Connolly Station to Howth Junction & Donaghmede Station
- Zone B – Howth Junction & Donaghmede Station to Malahide Viaduct
- Zone C – Malahide Viaduct to south of Gormanston Station (Fingal County Council administrative boundary)
- Zone D – South of Gormanston Station (Fingal border) to Louth/Meath border; and
- Zone E – Drogheda MacBride Station and surrounds

16.3.5 Data Sources used and Survey Methodology

The following data sources were referred to;

- Census of Agriculture 2020, (CSO.ie). The average size and type of farms in Counties Dublin, Meath and Louth was determined from the 2020 Census of Agriculture
- Land Registry mapping available on prai.ie was used to determine land ownership boundaries of agricultural land parcels along the Proposed Development
- Baseline information on the agricultural environment was gathered from consultations with the land liaison officer for the project, stakeholder engagement manager and design team

- Orthophotography was used as an aid in examining agricultural land parcel layout and land quality; and
- Baseline crops and grass yield data was used to determine baseline trends as outlined in Section 16.3.2 when assessing magnitude of impact. Average crop yields 2008 – 2022 is available from the CSO, Crops and Livestock, June, Final Results. Baseline grass yields and trends were derived from available information from Teagasc at Ballyhaise Agricultural College 2008 – 2021 and UCD farm at Lyons Estate, Co Kildare from 2016 – 2022

A drive-by survey was conducted in June 2024. These observations were used to supplement data obtained from aerial photography (Google Earth accessed April – June 2023) and Property Registration Authority of Ireland (PRAI) data.

16.3.6 Consultation

Stakeholder engagement for the overall project was undertaken through public consultation as set out in Chapter 3 (Alternatives). Additional information on the findings of the public consultations is included in Appendix A3.1 (Public Consultation No.1 Consultation Findings Report) and A3.2 (Public Consultation No. 2 Consultation Findings Report) within Volume 4 of this EIAR. All feedback was collated and any feedback relevant to this chapter was considered.

Landowner liaison officers from the project team engaged with landowners along the Proposed Development throughout the design development. The author of this chapter examined the meeting notes of affected landowners and discussed agricultural issues with the landowner liaison officers.

Any other information of relevance to this chapter, from meetings with key stakeholders, including An Bord Pleanála, local authorities and other statutory bodies, was also considered.

16.3.7 Difficulties Encountered / Limitations

There are no specific agricultural impact assessment guidelines for assessing impacts of railway projects on farms. However, the EPA guidelines provide adequate guidance on the assessment of significance of effects which can be adapted for agricultural impact assessment.

There were no difficulties encountered in the gathering of baseline data which would significantly affect the assessment.

16.4 Receiving Environment

16.4.1 Agricultural Land

The area of agricultural land within Counties Dublin, Meath and Louth is approximately 259,000 ha² which is approximately 6% of the national total. The study area is comprised of 58 affected agricultural land parcels with an area of approximately 997 hectares.

² Table 2.2 of the 2020 Census of Agriculture Preliminary results, Dublin = 33,063ha, Meath = 194,450 ha, Louth = 61,413 ha.

The area of agricultural land required for the Proposed Development is approximately 26ha and within this area approximately 9ha will be permanently acquired.

The remaining 17ha will be returned to landowners following construction. The land quality along the Proposed Development is generally good. There will be easements over land (approximately 5ha of permanent easements and 5ha of temporary easements) in order to provide access for maintenance purposes. Rights-of-way will be extinguished or altered in sixteen land parcels. The easements and alteration of rights-of-way is expected to cause a permanent disturbance effect on affected land parcels.

16.4.2 Soils

Based on the Teagasc soils classification (<http://gis.teagasc/soils/> - Teagasc 2021), the dominant soil type along the Proposed Development is a Luvisol soil type which is a fertile, deep and mainly well drained soil. The second soil type is a fertile and well drained Brown Earth. Both soil types are suitable for tillage and the land quality is mainly good. The third soil type in terms of prevalence is a surface water gley which tends to be moderately drained and suited mostly for grassland. The fourth soil type in terms of prevalence is an alluvial soil type found along river valleys and streams. Where adequate drainage has been achieved these soils may be tilled but are mainly suited for grassland due to restricted drainage.

16.4.3 Agriculture in the Study Area

The 2020 Census of Agriculture shows that the average size of farms in Counties Dublin, Meath and Louth is 47.3, 43.8 and 37.8 hectares respectively. This compares to a national average size of 33.4ha. Therefore, farms encountered along the Proposed Development will be larger than the national average. The average size of directly affected land parcels is approximately 17 hectares but the average size of these farms can be assumed to be similar to the County averages because within the affected farms there are land parcels too remote from the Proposed Development to be included in this assessment.

Table 16-4 presents a comparison of land use along the route of the Proposed Development to the statistics for Counties Dublin, Meath and Louth. The Census of Agricultural (2020) Statistics categorises land use into eight agricultural groups: specialist tillage, specialist dairy, specialist beef, specialist sheep, mixed grazing livestock, mixed crops and livestock, mixed field crops (mainly hay & silage) and other. For this assessment, the number of groups is reduced to five for comparison purposes, by grouping similarly sensitive enterprises together, as follows:

1. Group 1 - Mainly Dairy - entirely a dairy farm or the dairy enterprise is the most significant target of the impact). Generally high sensitivity;
2. Group 2 - Beef and/or sheep i.e. non-dairy grazing livestock and mixed field crops – includes specialist beef cattle, specialist sheep, and mixed farms with cattle, sheep and horses. Generally medium sensitivity;
3. Group 3 - Mainly tillage - tillage cropping. Generally medium sensitivity;
4. Group 4 - Mixed crops and livestock - various crops and livestock. Medium sensitivity; and
Group 5 - Other (e.g. pigs, poultry, horticultural cropping and equine as the main enterprises). Medium – very high sensitivity.

Table 16-4 Land Use Statistics along the Proposed Development compared to National and Regional Statistics

Farm enterprise type	Total numbers affected by Proposed Development	Sensitivity	% of farms/land parcels within each group ³				
			Proposed Development	Co Dublin	Co Meath	Co Louth	Within the State
Group 1 - Dairy	0	High (0)	0	4	11	21	11
Group 2 – Beef/sheep/grass cropping	Total - 14 Zone B - 1 Zone C - 9 Zone D - 6	Low (7) Medium (9)	25	66	77	10	83
Group 3 - Tillage	Total - 30 Zone C - 25 Zone D - 5	Low (2) Medium (28)	53	25	9	40	3
Group 4 – Mixed crops and livestock	Total - 6 Zone C - 2 Zone D 3 Zone E - 1	Low (2) Medium (4)	11	2	2	25	1.5
Group 5 - Other	Total 6 (4 equine, 2 horticulture) Zone C - 4 Zone D - 2	Medium (1) High (4) Very High (1)	11	4	2	4	1.5
Totals	58	-	100	100	100	100	100

There are eleven low sensitivity land parcels, forty-two medium sensitivity land parcels, four high sensitivity land parcels and one very high sensitivity land parcel.

- In Zone A there are no agricultural land parcels
- In Zone B there is one low sensitivity agricultural land parcel (Group 2)
- In Zone C there are forty agricultural land parcels
 - Two low sensitivity grass land parcels (Group 2), one low sensitivity tillage parcel (small) (Group 3) and one low sensitivity mixed crops and livestock (Group 4)
 - Seven medium sensitivity beef and grassland / meadow land parcels (Group 2), twenty-four medium sensitivity tillage land parcels (Group 3) and one medium sensitivity mixed crops and livestock (Group 4)
 - Three high sensitivity equine land parcels and one high sensitivity horticultural enterprise (Group 5); and
 - One very high sensitivity horticultural enterprise (glasshouses) (Group 5)
- In Zone D there are fourteen agricultural land parcels
 - Four low sensitivity beef/grassland land parcels (Group 2) and one low sensitivity tillage land parcel (Group 3)

³ CSO Table 2.3 at <https://www.cso.ie/en/releasesandpublications/ep/p-coa/censusofagriculture2020-preliminaryresults/farmstructure/>

- Ten medium sensitivity enterprises (two beef - Group 2; four tillage – Group 3; one equine – Group 5; three mixed livestock & crops – Group 4); and
- One high sensitivity enterprise (one equine – Group 5 and one Equine and tillage – Group 4)
- In Zone E there are one low sensitivity grassland and tillage plot. It is low sensitivity because it is zoned for housing development and will be built on in the short to medium term

16.4.4 Baseline Rating

Overall, the study area baseline sensitivity is medium - high because the majority of farming enterprises are from medium sensitivity Groups 2 and 3 i.e. a mixture of beef, sheep, forage (hay/silage) and tillage enterprises. There are no dairy farms but the number of high sensitivity enterprises (equine and horticulture) is higher than the County averages and the land quality is good.

16.5 Description of Potential Impacts

The Proposed Development is described in Chapter 4 (Description of the Proposed Development) and the construction programme is described in Chapter 5 (Construction Strategy) in Volume 2 of this EIAR. There are multiple potential effects which will arise from fencing off the acquired land, construction activity, construction traffic and operation of the completed Proposed Development. Collectively these effects are addressed under the headings:

- Land take
- Land separation/severance
- Disturbance (construction and permanent); and
- Injurious affection (to the retained holding)

16.5.1 Potential Construction Impacts

The construction programme will last approximately 36 months. The construction programme will be phased and this means that a single land parcel may only be affected for a period of 1 – 3 months. Where there is a Construction Compound located on the land parcel the construction activity could last the entire 36 month period. To be consistent this assessment assumes that the worst case scenario applies to each affected land parcel i.e. that the construction disturbance will occur over the full 36 month construction period. At the beginning of the Construction Phase the approximately 26 ha of land required for the Proposed Development will be fenced off and access across it will be restricted. Water and power supplies may be disrupted potentially requiring alternative sources. Land drainage could be disrupted during construction excavations requiring the construction of culverts and maintenance of the land drainage along the edge of the Proposed Development. Landtake will be required during the Construction Phase for construction of rail infrastructure, to facilitate access of construction machinery and materials to the sites of construction and to facilitate utilities diversions. The general construction works will generate noise, dust and movement of machinery which would potentially impact on adjoining lands. The duration of these works would vary.

16.5.1.1 Land take

Where works are confined within the existing railway boundary fence there are no land take effects on adjoining agricultural land parcels. Landtake within non-agricultural land is not assessed in this chapter.

At the commencement of the Construction Phase there will be approximately 26ha of landtake from 58 agricultural land parcels. Following the construction of permanent infrastructure 9ha of this land will be permanently acquired and 17ha will be returned to landowners. Therefore, there is 9ha of permanent landtake and 17ha of temporary landtake. There will be a permanent easement of approximately 5ha in 36 land parcels and temporary easement of approximately 5ha in 33 land parcels.

The permanent reduction in land area will result in permanent pre mitigation effects which range from not significant to moderate adverse. It is assumed (in the reasonable worst-case scenario) that lands temporarily required for Construction Compounds will experience damage to soil structure and drainage due to compaction. Temporary landtake required for utilities diversions will result in medium term⁴ damage to soil structure and Construction Compounds will result in long term damage to soil structure. The temporary land take will result in permanent effects which range from not significant to moderate adverse.

16.5.1.2 Land Separation/Severance

The Proposed Development will sever access in one low sensitivity agricultural land parcel Ref No 1 (Figure 16.1 in Volume 3A of this EIAR) where an agricultural level crossing is closed. Without mitigation such as an underpass or accommodation roads the effect will be moderate adverse. There will be temporary severance during the Construction Phase on twenty eight land parcels (see Appendix A16.1 in Volume 4 of this EIAR). Without mitigation the effects range from not significant to slight adverse in these twenty eight land parcels.

16.5.1.3 Construction Disturbance

Construction disturbance will occur during the 36 month construction period. Potential construction disturbance is a combination of:

- Where there is temporary or permanent land take there will be interrupted access to retained lands. This will result in pre mitigation effects which are not significant or slight adverse due to the relatively short period of construction
- Noise and vibration disturbance may result in a flight response in livestock but rarely causes a significant pre mitigation effect. Noise and vibration will generally result in pre mitigation effects which are not significant reflecting the ability of livestock to quickly adapt to changes in the ambient noise environment
- Dust and air emissions during construction will generally result in pre mitigation effects which are not significant because livestock are not sensitive to the dust and air emissions typical of a road or rail construction project

⁴ Medium term = 7 – 15 years; Long term = 15 - 60 years; Table 3.4 of Guidelines on the information to be contained in Environmental Impact Assessment Reports, EPA, May 2022

- Increased level of soil/dirt on road pavement and/or land adjoining the works may cause inconvenience to farmers using these roads. There may also be temporary effects on surface water quality. These pre mitigation effects are not significant
- Interruption to services such as water and power causing inconvenience and disturbance would be not significant or slight adverse, without mitigation, during the construction period
- Damage to soil structure will occur at the Construction Compounds. Without mitigation the effects may be medium term or permanent and the effects range from not significant to moderate adverse
- Potential pre mitigation effects on land drainage arising from construction works would be not significant to slight adverse; and
- Increased risks/reduced safety of farming the retained lands will result in pre mitigation effects which are not significant

In relation to construction effects two scenarios are assessed in this report;

1. Land parcels adjoining the Proposed Development which do not experience temporary land take, permanent land take, severance of access to land, easements or alteration to rights-of-way are screened out of the assessment because there will be no impacts on these land parcels.
2. Where there is temporary land take, permanent land take, severance of access to land, easements or altered rights-of-way, there are potential effects which range from not significant to moderate adverse – see Table 16-5. These land parcels are assessed for potential construction effects and included in the study area as shown in Figure 16.1 in Volume 3A of this EIAR

Table 16-5 presents a summary of Construction Phase effects on affected land parcels.

Table 16-5 Summary of Predicted Construction Phase Impacts (pre mitigation)

Significance of Effect	Land parcel Ref Nos (Refer to Figure 16.1)	Number (%)
Not significant	Zone C – Ref No - 4, 5, 8, 9, 10, 11, 16, 17, 19, 22, 32, 34, 35, 36, 37, 39, 40, 41, 42, 44, 65, 66, 67 Zone D – Ref No - 46, 47, 48, 53, 54, 55, 56, 57, 58, 59, 61, 68, 69 Zone E – Ref No – 62	Zone C – 23 Zone D – 13 Zone E – 1 Total = 37 (64%)
Slight adverse	Zone B – Ref No 1 Zone C – Ref No – 12, 13, 14, 15, 20, 23, 24, 26, 28, 29, 31 Zone D – Ref No – 45, 50, 60	Zone B - 1 Zone C – 11 Zone D – 3 Total = 15 (26%)
Moderate Adverse	Zone C – Ref No 3, 18, 21, 27, 33, 38	Zone C – 6 Total = 6 (10%)
Significant adverse	None	-
Very significant adverse	None	-
Profound adverse	None	-

When the entire study area is assessed the overall potential pre mitigation construction effect is not significant.

16.5.2 Potential Operational Impacts

The operation of the Proposed Development is assumed to be on a time scale exceeding 60 years and therefore, according to the EPA Guidelines, these operational effects will be permanent.

16.5.2.1 Land- take

During the Operational Phase, it is generally not possible to replace the acquired land with replacement land that adjoins the retained land parcel. Therefore, the land take usually results in a permanent reduction in the size of agricultural land parcels directly affected by the Proposed Development. This effect results in pre mitigation effects ranging from not significant to moderate adverse during the Operational Phase.

16.5.2.2 Land Separation/Severance

Where the Proposed Development would sever the access to one low sensitivity land parcel (Ref No 1) causing the separation without access to that land parcel, there is a new permanent severance/separation impact. The pre mitigation effect is slight adverse during the Operational Phase.

16.5.2.3 Permanent Disturbance

Permanent disturbance may occur during the Operational Phase and can potentially be a combination of:

- Maintenance works carried out on the Proposed Development can be a source of permanent disturbance. This will result in pre mitigation effects which are not significant
- Changed access to retained separated lands requiring additional journey times, increased distances for livestock movements, increased handling of livestock to ensure safe passage to severed lands, opening/closing of gates and additional time and labour required. For the Proposed Development this will result in pre mitigation effects which are not significant
- Noise disturbance from train traffic will result in pre mitigation effects which are not significant
- Potential air emissions during the Operational Phase will result in pre mitigation effects which are not significant
- Potential impacts on water and power services will result in pre mitigation effects which are not significant
- Medium to long term damage to soil structure at the temporary Construction Compounds will result in effects which range from not significant to moderate adverse
- Potential impact on land drainage will result in pre mitigation effects which range from not significant to slight adverse; and
- Loss of shelter will result in pre mitigation effects which are not significant

16.5.2.4 “Injurious Affection”

“Injurious Affection” is a term often used to describe the overall adverse effect on the retained land parcel due to the presence of the Proposed Development.

It describes both how the combination of the above listed adverse effects impact the on-going operation of the agricultural land parcel and how the agricultural potential of the land parcel may be restricted due to the presence of the Proposed Development. It includes potential adverse effects already mentioned and other potential effects such as loss of privacy, reduced security, visual impact and change of setting associated with farming adjoining the Proposed Development. In relation to injurious affection there is no significant effect arising from the existing railway development and this will not change for the Proposed Development. The potential pre mitigation injurious affection effects are not significant.

Table 16-6 presents a summary of Operational Phase effects on affected land parcels.

Table 16-6 Summary of Predicted Operational Phase Impacts (pre mitigation)

Significance of Effect	Land parcel Ref Nos (Refer to Figure 16.1)	Number (%)
Not significant	Zone C – Ref No 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 28, 29, 31, 32, 34, 35, 36, 37, 38, 39, 40, 41, 42, 44, 65, 66, 67 Zone D – Ref No 45, 46, 47, 48, 53, 54, 55, 56, 57, 58, 59, 60, 61, 68, 69 Zone E – Ref No 62	Zone C – 37 Zone D – 15 Zone E – 1 Total = 53 (91%)
Slight adverse	Zone B – Ref No 1 Zone C – Ref No 27 Zone D – Ref No 50	Zone B – 1 Zone C - 1 Zone D – 1 Total = 3 (5%)
Moderate Adverse	Zone B – None Zone C – Ref No 3, 33	Zone C - 2 Total = 2 (4%)
Significant adverse	None	-
Very significant adverse	None	-
Profound adverse	None	-

There are two pre mitigation moderate adverse effects on land parcels Ref No 3 and Ref No 33 in Zone C. These effects arise where a large proportion of these land parcels is subject to permanent and temporary land take. When the entire study area is assessed the potential pre mitigation Operational Phase effect on the study area will be not significant due to approximately 17 ha of agricultural land which is acquired from 17 land parcels.

16.6 Mitigation Measures

16.6.1 Construction Phase

- Temporary Land take
 - A landowner liaison officer (LLO) will be identified by the contractor during the Construction Phase to facilitate communications between affected landowners and to facilitate the management of farm enterprises with landowners during critical times
 - Prior to works commencing each affected landowner will be met by a member of the project team to inform them of the expected start date on their lands, duration of works and to agree on specific issues in relation to access, presence of livestock, etc. which pertain to the Proposed Development
 - Following completion of relevant construction work, lands temporarily acquired will be reinstated to the existing agricultural condition. All materials and waste will be removed and disposed of appropriately
- The landowner will be provided with access to all separated land parcels during the Construction Phase of the Proposed Development where reasonably practicable. Where temporary disruptions to this access occur landowners will be notified in advance, and access will be restored as soon as possible. Temporary or replacement access will be provided at a suitable location, and where possible, in agreement with the landowner
- Where existing water and electricity supplies are disrupted during the Construction Phase an alternative water source or electricity supply will be made available. If access to surface drinking water sources are permanently restricted alternative groundwater supplies will be provided (or compensation provided to enable landowner to drill his or her own well)
- Suitable boundary fencing will be erected to delineate the line of the Proposed Development boundary and prevent straying livestock
- Landowners with lands adjoining sites where either rock breaking, piling takes place will be notified in advance of these activities
- If the Proposed Development boundary interferes with access to agricultural land the contractor will facilitate the movement of livestock and agricultural machinery to minimise disturbance
- A re-instatement programme for the Construction Compounds will be agreed with each landowner. This programme will apply best practice to the storage of top soil, maintenance of land drainage and re instatement of land
- The impacts on water quality will be minimised by way of a programme of mitigation measures for surface and ground water sources as described in Chapter 10 (Water)
- The spread of dust onto adjoining lands would be minimised by way of mitigation measures set out in Chapter 12 (Air Quality) and Appendix A5.1 (Construction Environmental Management Plan). Typically, the effect of dust on agricultural grazing livestock is not significant; and
- Where drainage outfalls are temporarily altered or land drains blocked or damaged an adequate drainage outfall will be maintained and land drains will be repaired

16.6.2 Operational Phase

- The loss of agricultural land due to the construction of the Proposed Development will be a permanent loss which cannot be mitigated except through compensation

- Where existing water and electricity supplies to fields or farmyards are severed, the supply would be reinstated by provision of ducting where possible. Alternatively, where ducting is not feasible a permanent alternative water source or electricity supply would be made available. Compensation payments would enable farmers to replace power and water supplies
- The drainage design of the Proposed Development will connect with existing field drainage systems and carry the drainage water to suitable outfalls
- The loss of shelter would be addressed by the proposed landscaping plan (see Chapter 15 (Landscape and Visual Amenity). Landscaping along the Proposed Development will minimise the visual impact on farms, and
- The Proposed Development boundary will prevent trespass of livestock onto the adjoining railway development

16.7 Monitoring

Monitoring measures are not required.

16.8 Residual Effects

Residual effects are those effects that remain following the implementation of mitigation measures proposed in Section 16.6. In this assessment the effects on agriculture along the route of the Proposed Development (i.e. within the study area) and within Counties Dublin, Meath and Louth is evaluated and cumulative impacts are assessed.

16.8.1 Residual Effects arising due to the Construction Phase after mitigation is implemented

While landowners will experience temporary disturbance during construction, the effects resulting from the generation of noise, dust and construction traffic are temporary in nature and will generally not result in significant long term or residual effects. Prior to the provision of access gates land could be separated by the Proposed Development. In such situations points of temporary access will be provided to landowners to allow them to access their separated land parcels during the Construction Phase. Disturbance due to construction activity will be temporary and the effect is predicted to be not significant. Land drainage effects that are mitigated during the Construction Phase are not significant. Any significant effects will arise mainly from temporary damage to soil structure which is generally a medium term effect (7-15 years) or in the case of Construction Compounds the effects may last longer than this.

Table 16-7 Summary of Predicted Construction Phase Residual Impacts following the implementation of Mitigation

Significance of Effect	Land parcel Ref Nos (Refer to Figure 16.1)	Number (%)
Not significant	Zone C – Ref No 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 28, 29, 31, 32, 34, 35, 36, 37, 38, 39, 40, 41, 42, 44, 65, 66, 67 Zone D – Ref No 45, 46, 47, 48, 53, 54, 55, 56, 57, 58, 59, 60, 61, 68, 69 Zone E – Ref No62	Zone C – 37 Zone D – 15 Zone E – 1 Total = 53 (91%)
Slight adverse	Zone B – Ref No 1 Zone C – Ref No - 27, 33 Zone D – Ref No 50	Zone B – 1 Zone C - 2 Zone D – 1 Total = 4 (7%)
Moderate Adverse	Zone C – Ref No 3	Zone C – 1 Total = 1 (2%)
Significant adverse	None	-
Very significant adverse	None	-
Profound adverse	None	-

A moderate adverse effect arises on land parcel No 3 in Zone C where 26% of the land parcel is subject to damage to soil and 18% of the land is acquired. The permanent acquisition of Ref No 1 in Zone B (owned by Fingal County Council) gives rise to a slight adverse effect on this plot because it has not been used for agricultural purposes for a few years.

16.8.2 Operational Phase

The Operational Phase is considered to be in excess of 60 years and residual effects that occur for this duration are permanent and therefore more significant than the temporary effects that occur during the 36 month Construction Phase. There is only one land parcel which is permanently separated / severed as a result of the Proposed Development. Compaction on relatively small areas could give rise to drainage issues and reduce productivity. The design of the Proposed Development will ensure that the land drainage of affected agricultural land parcels is not significantly affected. The residual effects on land parcels are summarised in Table 16.8 and in Appendix A16.1.

Table 16-8 Summary of Predicted Operational Phase Residual Impacts following the implementation of Mitigation

Significance of Effect	Land parcel Ref Nos (Refer to Figure 16.1)	Number (%)
Not significant	Zone C – Ref No - 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 28, 29, 31, 32, 34, 35, 36, 37, 38, 39, 40, 41, 42, 44, 65, 66, 67 Zone D – Ref No 45, 46, 47, 48, 53, 54, 55, 56, 57, 58, 59, 60, 61, 68, 69 Zone E – Ref No62	Zone C – 37 Zone D – 15 Zone E – 2 Total = 53 (91%)
Slight adverse	Zone B – Ref No 1 Zone C – Ref No 27 Zone D – Ref No - 50	Zone B - 1 Zone C - 1 Zone D – 1 Total = 3 (5%)
Moderate Adverse	Zone C – Ref No 3, 33	Zone C - 2 Total = 2 (4%)
Significant adverse	None	-
Very significant adverse	None	-
Profound adverse	None	-

The implementation of mitigation measures does not result in a reduction in the significance of effects. This is because where slight adverse, moderate adverse and significant adverse effects arise, it is due to the loss of land which cannot be mitigated and a precautionary worst case scenario is assumed for damage to land.

There are two moderate residual effects in Zone C. The area of plot Ref No 3, which is low sensitivity, is permanently reduced by 18% and a further 8% of the land parcel is subject to medium – long term damage to soil due to compaction. The area of plot Ref No 33, which is medium sensitivity, is permanently reduced by 10% and a further 12% of the land parcel is subject to medium – long term damage to soil due to compaction. There are no significant, very significant or profound adverse effects arising from the Proposed Development.

16.8.3 Cumulative Effects

The cumulative assessment of relevant plans and projects is undertaken separately in Chapter 26 (Cumulative Effects) in Volume 2 of this EIAR.

16.9 References

CSO. (2020). Census of Agriculture 2020 from the Central Statistics Office.

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Teagasc. (2021) Data and Downloads [online] Available at: <http://gis.teagasc.ie/soils/>

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