

23

Agronomy

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List of Abbreviations

Acronym	Meaning
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
CEMP	Construction Environmental Management Plan
CSO	Central Statistics Office
DA	Dublin Airport
DAA	Dublin Airport Authority
DANP	Dublin Airport North Portal
DASP	Dublin Airport South Portal
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
ESBN	Electricity Supply Board Networks
GB	Green Belt
GE	General Employment
HA	Hectares
HA	High Amenity
HGV	Heavy Goods Vehicles
HT	High Technology
HV	High Voltage
KM	Kilometres
KV	Kilovolt
LO	Land Owner
LOD	Limits of Deviation
ME	Metro Economic Corridor
OCC	Operations Control Centre
OS	Open Space
OSI	Ordnance Survey of Ireland
PR	Plot Reference
PRAI	Property Registration Authority Information
RO	Railway Order
STMP	Scheme Traffic Management Plan
TB	Bovine Tuberculosis
TBM	Tunnel-boring Machine
TII	Transport Infrastructure Ireland

23. Agronomy

23.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) assesses the impact of the MetroLink Project (hereafter referred to as the proposed Project) on agronomy during the Construction Phase and Operational Phase. Agronomy is the science associated with the interaction between the cultivation of land, soil management, animal and crop production for food production and other human benefits. This Chapter describes and assesses the likely direct and indirect significant impacts of the proposed Project on agronomy in accordance with the requirements of Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (i.e., the EIA Directive) (European Union, 2014a).

This Chapter provides a characterisation of the receiving environment within the proposed Project and into a broader study area in the vicinity of the proposed Project.

This Chapter should be read in conjunction with the following chapters, and their appendices, which describe the proposed Project, and present related impacts arising from the proposed Project and proposed mitigation measures to ameliorate the predicted impacts:

- Chapter 9 (Traffic & Transport);
- Chapter 11 (Population & Land Use);
- Chapter 13 (Airborne Noise & Vibration);
- Chapter 14 (Groundborne Noise & Vibration);
- Chapter 15 (Biodiversity);
- Chapter 16 (Air Quality);
- Chapter 20 (Soils & Geology);
- Chapter 21 (Land Take);
- Chapter 22 (Infrastructure & Utilities); and
- Chapter 27 (Landscape & Visual).

The assessment is based on identifying and describing the likely significant effects arising from the proposed Project as described in Chapters 4 to 6 of this EIAR. The proposed Project description is based on the design prepared to inform the planning stage of the project and to allow for a robust assessment as part of the Environmental Impact Assessment (EIA) Process.

Where it is required to make assumptions as to the basis of the assessment presented here, these assumptions are based on advice from competent project designers and are clearly outlined within the Chapter.

23.1.1 Outline Project Description

A full description of the proposed Project is provided in the following chapters of this EIAR:

- Chapter 4 (Description of the MetroLink Project);
- Chapter 5 (MetroLink Construction Phase); and
- Chapter 6 (MetroLink Operations & Maintenance).

The following Table 23.1, Diagram 23.1, and Diagram 23.2 were derived from Chapter 1 (Introduction). Table 23.1 presents an outline description of the key proposed Project elements that are appraised in this chapter. Diagram 23.1 presents an outline of the main elements of the proposed Construction Phase that are appraised in this Chapter, and Diagram 23.2 presents an outline of the main elements of the Operational Phase of the proposed Project that are appraised in this Chapter.

Limits of deviation have been set for the proposed Project and this is addressed in the Wider Effects Report annexed at Appendix A5.19.

Table 23.1: Outline Description of the Principal Project Elements Along the Alignment

Project Elements	Outline Description
Permanent Project Elements	
Tunnels	<p>It is proposed to construct two geographically separate, single-bore tunnels, using a Tunnel Boring Machine (TBM). Each section of tunnel will have a 8.5m inside diameter and will contain both northbound and southbound rail lines within the same tunnel. These tunnels will be located as follows:</p> <ul style="list-style-type: none"> ▪ The Airport Tunnel: running south from Dublin Airport North Portal (DANP) under Dublin Airport and surfacing south of the airport at Dublin Airport South Portal (DASP) and will be approximately 2.3km in length; and ▪ The City Tunnel: running for 9.4 km from Northwood Portal and terminating underground south of Charlemont Station.
Cut Sections	<p>The northern section of the alignment is characterised by a shallow excavated alignment whereby the alignment runs below the existing ground level. Part of the cut sections are open at the top, with fences along the alignment for safety and security. While other sections are "cut and cover", whereby the alignment is covered.</p>
Tunnel Portals	<p>The openings at the end of the tunnel are referred to as portals. They are concrete and steel structures designed to provide the commencement or termination of a tunnelled section of route and provide a transition to adjacent lengths of the route which may be in retained structures or at the surface.</p> <p>There are three proposed portals, which are:</p> <ul style="list-style-type: none"> ▪ DANP; ▪ DASP; and ▪ Northwood Portal. <p>There will be no portal at the southern end of the proposed Project, as the southern termination and turnback would be underground.</p>
Stations	<p>There are three types of stations: surface stations, retained cut stations and underground stations:</p> <ul style="list-style-type: none"> ▪ Estuary Station will be built at surface level, known as a 'surface station'; ▪ Seatown, Swords Central, Fosterstown Stations and the proposed Dardistown Station will be in retained cutting, known as 'retained cut stations'; and ▪ Dublin Airport Station and all 10 stations along the City Tunnel will be 'underground stations'.
Intervention Shaft	<p>An intervention shaft will be required at Albert College Park to provide adequate emergency egress from the City Tunnel and to support tunnel ventilation. Following the European Standard for safety in railway tunnels TSI 1303/2014: Technical Specification for Interoperability relating to 'safety in railway tunnels' of the rail system of the European Union, it has been recommended that the maximum spacing between emergency exits is 1,000m.</p> <p>As the distance between Collins Avenue and Griffith Park is 1,494m, this intervention shaft is proposed to safely support evacuation/emergency service access in the event of an incident. This shaft will also function to provide ventilation to the tunnel. The shaft will require two 23m long connection tunnels extending from the shaft, connecting to the main tunnel.</p> <p>At other locations, emergency access will be incorporated into the stations and portals or intervention tunnels will be utilised at locations where there is no available space for a shaft to be constructed and located where required (see below).</p>
Intervention Tunnel	<p>In addition to the two main 'running' tunnels, there are three shorter, smaller diameter tunnels. These are the evacuation and ventilation tunnels (known as Intervention Tunnels):</p> <ul style="list-style-type: none"> ▪ Airport Intervention Tunnels: parallel to the Airport Tunnel, there will also be two smaller diameter tunnels; on the west side, an evacuation tunnel running northwards from DASP for about 315m, and on the east side, a ventilation tunnel connected to the main tunnel and extending about 600m from DASP underneath Dublin Airport Lands. In the event of an

Project Elements	Outline Description
	<p>incident in the main tunnel, the evacuation tunnel will enable passengers to walk out to a safe location outside the Dublin Airport Lands.</p> <ul style="list-style-type: none"> ▪ Charlemont Intervention Tunnel: The City Tunnel will extend 360m south of Charlemont Station. A parallel evacuation and ventilation tunnel is required from the end of the City Tunnel back to Charlemont Station to support emergency evacuation of maintenance staff and ventilation for this section of tunnel.
Park and Ride Facility	The proposed Park and Ride Facility next to Estuary Station will include provision for up to 3,000 parking spaces.
Broadmeadow and Ward River Viaduct	A 260m long viaduct is proposed between Estuary and Seatown Stations to cross the Broadmeadow and Ward Rivers and their floodplains.
Proposed Grid Connections	Grid connections will be provided via cable routes with the addition of new 110kV substations at DANP and Dardistown. (Approval for the proposed grid connections to be applied for separately, but are assessed in the EIAR).
Dardistown Depot	<p>A maintenance depot will be located at Dardistown. It will include:</p> <ul style="list-style-type: none"> ▪ Vehicle stabling; ▪ Maintenance workshops and pits; ▪ Automatic vehicle wash facilities; ▪ A test track; ▪ Sanding system for rolling stock; ▪ The Operations Control Centre for the proposed Project; ▪ A substation; ▪ A mast; and ▪ Other staff facilities and a carpark
Operations Control Centre	The main Operations Control Centre (OCC) will be located at Dardistown Depot and a back-up OCC will be provided at Estuary.
M50 Viaduct	A 100m long rail bridge is proposed to carry the proposed Project across the M50 between the Dardistown Depot and Northwood Station.
Temporary Project Elements	
Construction Compounds	<p>There will be 34 Construction Compounds including 20 main Construction Compounds, 14 Satellite Construction Compounds required during the Construction Phase of the proposed Project. The main Construction Compounds will be located at each of the proposed station locations, the portal locations and the Dardistown Depot Location (also covering the Dardistown Station) with satellite compounds located at other locations along the alignment.</p> <p>Outside of the Construction Compounds there will be works areas and sites associated with the construction of all elements of the proposed Project, including an easement strip along the surface sections.</p>
Logistics Sites	The main logistics sites will be located at Estuary, near Pinnock Hill east of the R132 Swords Bypass and north of Saint Margaret's Road at the Northwood Compound. (These areas are included within the 14 Satellite Construction Compounds).
Tunnel Boring Machine Launch Site	There will be two main tunnel boring machine (TBM) launch sites. One will be located at DASP which will serve the TBM boring the Airport Tunnel and the second will be located at the Northwood Construction Compound which will serve the TBM boring the City Tunnel.

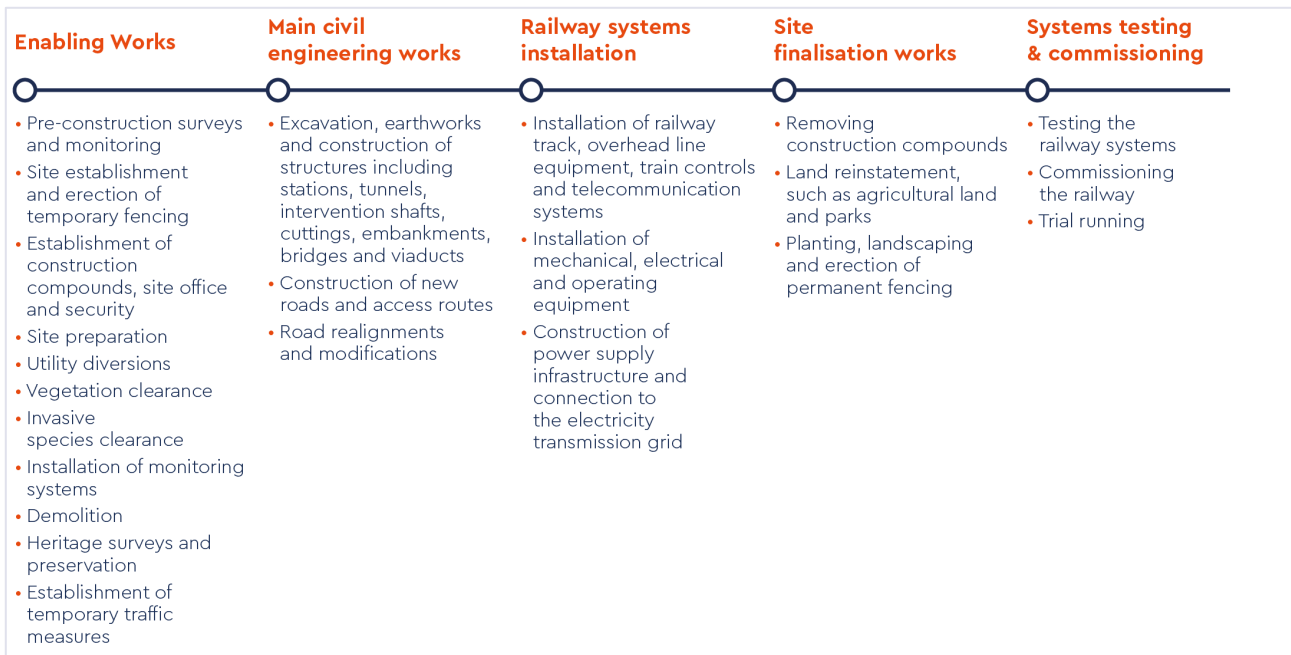


Diagram 23.1: Summary of Key Activities during the Construction Phase of the Proposed Project



Diagram 23.2: Summary of Key Activities during the Operational Phase of the Proposed Project

23.2 Methodology

In order to assess the potential impact of the proposed Project on each agricultural land holding along the alignment, the following methodology was adopted:

- The study area was defined;
- A review of all relevant Guidelines, Policy, and Legislation was undertaken;
- Data was collected and collated;
- Consultation was undertaken;
- The Baseline Environment was described;
- Farm visits were undertaken;
- Assessment of Impacts was undertaken; and
- Mitigation and monitoring measures were determined, and the residual impacts were defined.

23.2.1 Study Area

The study area for the agronomy assessment is defined by a 250m wide corridor; 125m on either side of the centreline of the proposed alignment or the planned infrastructure. This area has been selected as it comprises the outer limit area of agricultural land, which is predicted to experience direct and indirect effects of construction and operation of the proposed Project or changes that are predicted to result from the proposed Project. Where the Depot, stations, Park and Ride Facility, access roads and other elements of the proposed Project occur, consideration is given to the sensitivity level associated with the adjoining agricultural land use.

Further to this corridor, the study area for the agronomy assessment captures all land described as agricultural that is within the Project Boundary. Lands directly impacted by the Construction Phase included land where land take and or changes to access arrangements are to occur. Additional agricultural lands considered for potential indirect impacts consisted of a review for highly sensitive enterprises within 300m, neighbouring or directly adjacent to construction sites. It is acknowledged that indirect impacts such as noise and dust are likely outcomes for all neighbouring agriculture land parcels. However, mitigation measures identified from other assessments (i.e., Chapter 13: Airborne Noise & Vibration, Chapter 14: Groundborne Noise & Vibration and Chapter 16: Air Quality) will be employed during the Construction Phase and will minimise impacts on adjacent farms. Given the location of the relevant agricultural land along busy roads, motorways and close to the airport, noise and dust are already present.

The study area affects land owned by eleven landowners with 14 land parcels which were classified as agricultural at the time of assessment. The main agricultural land use is tillage and grassland. Grassland is described as 'Grassland' or 'Grassland - Managed extensively'. Where a land holding is described as Grassland, the area is farmed and kept in good agricultural environmental condition, where a land holding is described as 'Grassland - Managed extensively' it is either extensively farmed or not farmed at all. Refer to Table 23.8 for land parcel use and Figure 23.1 for an illustration of the agronomy study area.

The study area encompasses agricultural land from Estuary to Dardistown located in AZ1 Northern Section, AZ2 Airport Section and AZ3 Dardistown to Northwood. No agricultural land is located in AZ4 Northwood to Charlemont (refer to Figure 23.1). The agronomy study area includes the affected land parcels which are directly impacted and other sensitive agricultural land parcels which may be indirectly impacted within 300m either side of the construction area. The assessment for each land parcel has taken into account the entire land holding belonging to each landowner at different locations along the proposed Project.

23.2.2 Relevant Guidelines, Policy and Legislation

The methodology used to assess the impacts associated with agronomy is consistent with, and cognisant of, relevant guidance and legislation.

There are no statutory standards in Ireland relating to Agronomy for construction works or for Agronomy relating to the Operational Phase. In the absence of specific statutory Irish guidelines, the assessment

has made reference to non-statutory national guidelines, where available, in addition to international standards and guidelines relating environmental sources. These are summarised below:

- Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report (European Union (EU) 2017);
- Environmental Impact Assessment of Projects, Guidance on Scoping (EU 2017);
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (Environmental Protection Agency (EPA) 2017);
- Advice notes for Preparing Environmental Impact Statements (EP 2015);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA 2003);
- Environmental Impact Assessment of National Road Schemes – A Practical Guide (National Roads Authority 2008); and
- Section 39 (2)(b) of the Transport (Railway Infrastructure) Act, 2001.

23.2.3 Data Collection and Collation

The baseline data collection and collation involved a desktop study of currently available mapping to identify agricultural land parcels along the alignment that will be directly and potentially indirectly impacted by the proposed Project. Reference Design Drawings and Railway Order (RO) plans and schedules were consulted to determine the design of the proposed Project.

Available mapping included Ordnance Survey of Ireland (OSI) maps on which the proposed Project alignment was delineated, orthophotographic mapping and project specific data held on a project specific ArcGIS webGIS service which was last accessed in February 2022.

Land boundary information was assessed throughout each revision of works to identify individual land holdings, using the Land Direct website, 2020 Property Registration Authority, accessed November 2020.

Irish Soil Information System digital data were gathered from the Irish Soil Information website, updated dataset August 2018, accessed December 2020¹.

The data contained on the proposed Project specific ArcGIS webGIS service was assessed to identify the potential impacts of the proposed Project to individual land holdings.

The following sources were also consulted to obtain information on the nature of farming at the National, County and Farm Level:

- Central Statistics Office (CSO) Census of Agriculture 2020, Preliminary Results (CSO 2020);
- Census of Agriculture 2010 (CSO 2010);
- Farm Structure Survey 2016 (CSO 2016);
- Fingal Development Plan 2017-2023 (Fingal County Council 2017);
- National Farm Survey (Teagasc 2019);
- Teagasc National Farm Survey 2020 Sustainability Report (Teagasc 2021); and
- Irish National Soils Map, 1:250,000k, V1(2014). Teagasc, Cranfield University. Jointly funded by the EPA STRIVE Research Programme 2007-2013 and Teagasc (Teagasc 2014).

23.2.4 Analysis Methods

The characterisation of the baseline environment was based on all available mapping of the proposed Project and agricultural and soil maps as described in Section 23.2.3, the review of other data including soil associations, and the results of farm walkovers and questionnaires.

¹ Soils and Subsoils digital data from Environmental Protection Agency and Teagasc <http://gis.teagasc.ie/soils/>

Soil association is not a soil classification category but is a cartographic (or mapping) unit. It consists of two or more soils, usually from the same parent material, which are associated with the landscape in a particular pattern. The Irish National Soils Map provides the soil association associated with any area and gives a listing of the soil types associated with that association.

23.2.5 Consultation

It is best practice to consult with relevant local subject experts and the agricultural landowner / occupiers that are potentially impacted by a project. Consultation provides a more focused consideration of significant impacts, provides early understanding of the potential concerns of the consultees, and allows for the identification of appropriate mitigation measures to minimise potential impacts.

Consultation and roadside inspections were undertaken with landowner / occupiers in December 2018 and throughout 2019 by Senior Agronomists from Philip Farrelly & Company. Consultations identified that the majority of agricultural land within the proposed Project is leased. Further windshield surveys of the alignment and remote communications with landowners were undertaken in early 2021 (due to COVID-19 restrictions) and 2022 in order to update the findings of the earlier surveys and identify any changes in land use.

A summary of the principal concerns arising from the landowner consultations are listed below:

- Access to the holdings throughout construction;
- Degree of land take to the holding;
- Degree of severance to the holding; and
- Timeline for the proposed Project.

Consultation with particular relevance to the agricultural environment included the following:

- Individual landowners and occupiers;
- Irish Farmers Association;
- Teagasc; and
- Agricultural Consultants Association.

The consultation process is discussed further in Chapter 8 (Consultation) of the EIAR.

23.2.6 Farm Visits

Farm visits were carried out to establish the specific baseline conditions of individual land parcels and to record other relevant details on all agricultural lands in agricultural use at the time of the study. The farm visits and landowner/occupier face to face interviews were carried out in December 2018 and throughout 2019. Additional consultations which varied from face-to-face meetings, remote communications and windshield inspections, were undertaken in early 2021 and 2022 to re-confirm land use information from earlier consultations. Farm visits consisted of a physical walkover of the relevant lands together with an interview with the owner/occupier and the completion of a targeted questionnaire to act as an aid memoir (Appendix A23.1 Agronomy Landowner Questionnaire). Some landowner/occupier interviews were completed face to face and others were completed remotely followed by unassisted walkovers with permission from landowner/ occupiers, alternatively a roadside inspection was completed by the Senior Agronomist.

Farm visits were carried out by an experienced agricultural consultant from Philip Farrelly and Co. The farm walkovers enabled data to be collected in relation to the farm size, internal and external boundaries, enterprise type, farming intensity, farm facilities, drainage and other relevant matters. The interview allowed the landowner/occupier to detail the farming enterprise from the landowner's/occupier's perspective and to capture any comments they wished to be noted. The questionnaire acted as an aid memoir and allowed details to be recorded which assisted in the later assessment of the impact of the proposed Project on that farm.

Between 2018 and 2022, consultations made up of farm walkovers, face to face meetings, remote consultations and walkover surveys were completed for the following land parcel references: LO1 PR1, LO2 PR1, LO2 PR2, LO3 PR1, LO4 PR1, LO4 PR2, LO5, PR1, LO6 PR1, LO7 PR1, LO8 PR1, LO9 PR1, LO 10 PR 1, LO 10 PR 2 and LO 11 PR 1.

Farm walkovers were completed from November 2018 to April 2019 across the following land parcels: LO3 PR1, LO4 PR1, LO5 PR1, LO8 PR1, LO10 PR1 and LO10 PR1. In January 2021, a farm walk over was undertaken at land parcels LO6 PR1, LO10 PR1 and LO10 PR1. A roadside inspection was completed for remaining land parcels.

A review of the information collected in 2018/2019 was undertaken 2021 and 2022, to reconfirm landownership and land use. Verbal communication was received from the landowner/occupier of LO2 PR1 and LO2 PR2 to complete an unassisted walkover should the access points to the fields be unlocked. On the date of inspection (1 March 2021) both land access points were locked, and the Senior Agronomist completed a roadside inspection to confirm the land use information.

For safety reasons, a roadside inspection took place for land parcel LO9 PR1, (Grassland – Managed extensively) owned by Dublin Airport Authority (DAA). A telephone interview was held with DAA (18 February 2021) in respect of their affected land holding. The affected area was visually assessed from the Naul Road to confirm the land use detail provided from the DAA in 2021 and 2022.

All other reviews were completed by remote communications with the landowner/occupier or landowner/occupier agent and followed up with a roadside inspection on all the lands to reconfirm land details on 1 March 2021 and 9 May 2022 (Figure 23.1).

23.2.7 Appraisal Method for the Assessment of Impacts

Assessment of the potential impacts on agronomy has been undertaken in line with the Guidelines on the Information to be Contained in Environmental Impact Statements (EPA 2002) and Revised and Draft Guidelines (EPA 2015b; EPA 2017).

The agricultural impact assessment was undertaken following consultations, farm visits, a review of the detailed questionnaire from the farm visit and notes, and a detailed review of the mapping for the proposed Project onto agricultural land. The completion of the questionnaire and walkover study allowed a professional judgement to be reached in relation to the sensitivity of the receptor, the magnitude and duration of the impacts and using this information to assign a significance level to the impacts.

The assessment of impacts process involved:

- Evaluation of the baseline environment, evaluating farm types and predicted impacts along the proposed Project;
- Assigning sensitivity: The sensitivity of the receiving environment (farm) is principally influenced by the type and size of the farm holding together with the intensity of the farming operation;
- Identifying and categorising the magnitude and duration of the impacts: While the duration of each impact has a predicted life span, the magnitude of each impact will vary from farm to farm depending on factors such as size, cropping, enterprise mix and land take; and
- Identifying and assigning the significance of impacts.

This assessment considered the overall impact of the proposed Project at the National, County and Individual Farm Level.

23.2.7.1 Assigning the Significance of Impacts to Each Farm Holding

Applying professional judgement, the EPA Guidelines is used determine the significance of the impact on the receptor. There are no specific guidelines associated to agronomy, however an experienced agronomist has the ability to identify how infrastructural projects will impact on agricultural practices based on its character, magnitude, duration probability, consequence and the sensitivity of the affected

farms. The EPA Guidelines refer to prescribed environmental factors which must be addressed within EIARs. Agronomy which addresses agricultural lands affected by infrastructural projects is a key environmental factor.

Diagram 23.3 below shows how comparison of the character of the predicted impact to the sensitivity of the receiving environment can determine the significance of the impact.

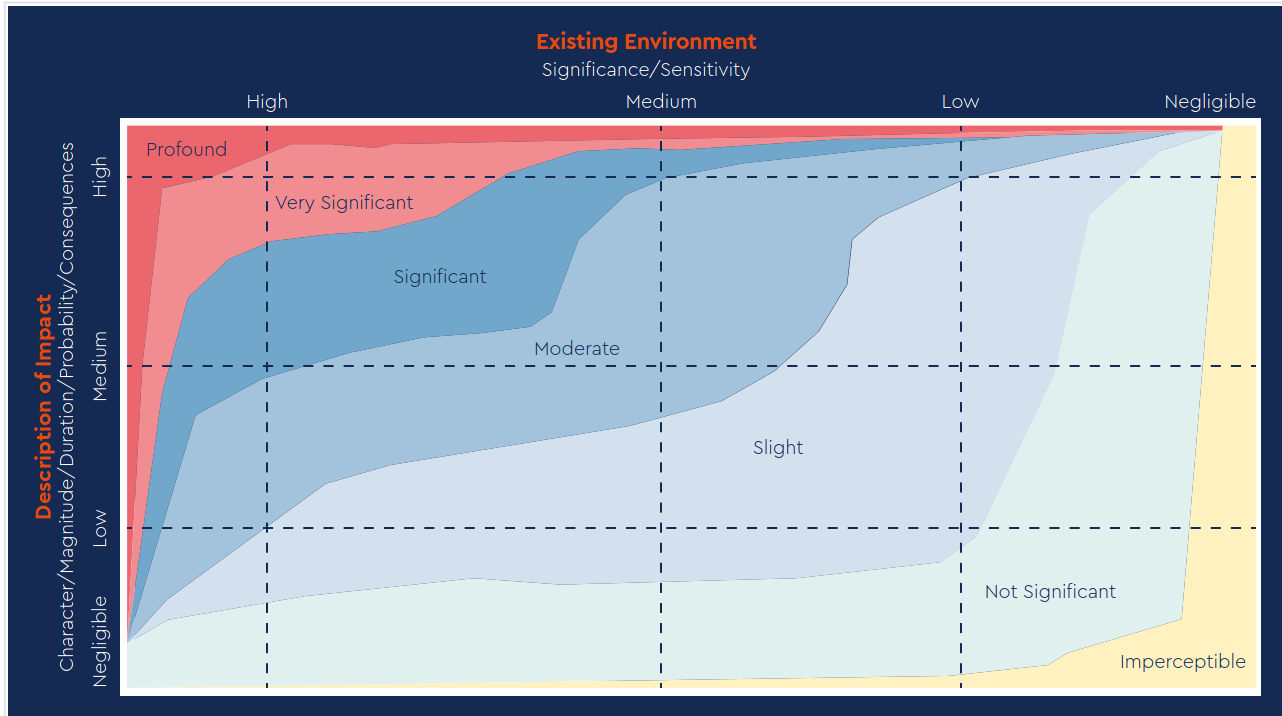


Diagram 23.3: Chart Showing Typical Classifications of the Significance of Impacts (EPA 2022)

23.2.7.2 Magnitude of Impact

A detailed review of the farm visit notes, questionnaire, and available mapping, in conjunction with the proposed Project design were all considered by the Senior Agronomist to identify the impact magnitude. Key considerations by the Senior Agronomist are enterprise type, how current farm management practices will be affected, the location of the proposed Project on the holding and the proportion of land take. The indicative criteria used to decide the magnitude of predicted impacts are outlined in Table 23.2.

Table 23.2: Indicative Criteria for the Assessment of Impact Magnitude

Indicative Criteria	Impact Magnitude
<ul style="list-style-type: none"> A substantial and serious reduction in available land e.g., Land take >15% of the farm). A material proportion of the affected farm separated by the proposed Project (e.g., >25% of the farm). Permanent loss of farm buildings or water sources. Impact will cause a change in farming enterprise or dramatic reduction. 	High
<ul style="list-style-type: none"> A serious reduction in available land (e.g., 10% to 15% of the farm). A high proportion of land separated (e.g., 15% to 25% of the farm). Farm buildings or water sources may be affected but can be replaced. Impact will not cause a change in farming enterprise but will require a high degree of operational changes. 	Medium - High
<ul style="list-style-type: none"> A medium proportion of the land lost (e.g., 5% to 10% of the farm). A medium proportion of land separated (e.g., 7% to 15% of the farm). Farm buildings or water sources may be affected but can be replaced. 	Low - Medium

Indicative Criteria	Impact Magnitude
<ul style="list-style-type: none"> Impact will not cause a change in farming enterprise but will require operational changes. 	
<ul style="list-style-type: none"> A small proportion of the land (e.g., 2.5% to 5% of the farm). A small proportion of land separated or no separation (e.g., 3% to 7% of the farm). Farm buildings or water sources generally not affected but if affected can be replaced. Impact will cause a minor change in the day-to-day operation of the farm. 	Negligible to Low
<ul style="list-style-type: none"> A very small proportion of the land lost (e.g., <2.5% of the farm). A very small proportion of land separated or no separation (e.g., <3% of the farm). No significant impact on operation of the farm. 	Negligible

23.2.7.3 Duration of Impact

The duration, reversibility and frequency of impacts, defined in Table 23.3, are key elements to determining significance of the impact.

Table 23.3: Indicative Criteria for the Assessment of Duration of Impacts

Description	Duration
Momentary	Effects lasting seconds to minutes
Brief	< 1 day
Temporary	< 1 year
Short-term	1 to 7 years
Medium-term	7 to 15 years
Long-term	15 to 60 years
Permanent	> 60 years
Reversible	Effects that can be undone, for example through remediation or restoration
Frequency of Effects	Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)

23.2.7.4 Sensitivity of the Receptor

Table 23.4 is used to identify the sensitivity of the farm enterprise (receptor) depending on the farm's intensity and other factors, for example, a stud farm or dairy farm at high intensity might be rated very high for sensitivity. Intensity of a farm holding is concluded following the farm visit, interview and walk over to determine among other things, land quality, farm management practice, assessment of farm facilities and the professional opinion of the Agronomist. Generally, intensive farms will be found on good quality productive agricultural land and have the benefit of the highest management skills.

Table 23.4: Categorisation of Sensitivity based on Farm Enterprise Type and Intensity of Production

Farm Enterprise Type	Intensity*	Sensitivity
Stud farm	High	Very high
	Medium	High
	Low	Medium
Dairy farm, intensive equine enterprise	High	High
	Medium	High
	Low	Medium
Non-dairy grazing livestock enterprises (includes beef, sheep and non-intensive equine) and grass cropping enterprise	High	Medium
	Medium	Low
	Low	Very low
Tillage	High	Medium
	Medium	Low
	Low	Very low
Rough grazing, bog, forestry, woodland	Low	Very low

*Note: The intensity of the farm enterprise is assessed by site evaluation and details provided at the time of the farm survey

The sensitivity ratings for farms are defined in Table 23.5.

Table 23.5: Baseline Environment Sensitivity Rating for Farms

Sensitivity	Criteria
Very High to High	Intensively managed farms on good quality lands. Typical farms in this category include specialist dairy, stud farms or equine farms.
Medium	Grassland used for livestock or tillage enterprises on good quality land. Agricultural lands of good quality zoned for non-agricultural purposes.
Low	Extensively managed farm enterprises on medium quality lands. Agricultural lands of medium quality zoned for non-agricultural purposes.
Very Low	Extensively managed farm enterprises on poor quality lands. Rough grazing, Bog, or Forestry. Agricultural lands of poor quality zoned for non-agricultural purposes.

23.2.7.5 Significance of Impact

The significance criteria illustrated in Diagram 23.3 are defined in Table 23.6. The third column interprets the significance of the impacts using examples relevant to agronomy.

Table 23.6: Significance Criteria for Overall Impact on Farm Holdings

EPA Glossary of Impacts	Significance of Impact as per EPA Guidelines (EPA 2022)	Level of Impact for Agronomy
Imperceptible	An effect capable of measurement but without significant consequences.	An impact so small it is imperceptible or is capable of measurement but without noticeable consequences on the integrity of the farm holding.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.	An impact is not significant where the farm enterprise suffers a slight inconvenience such as relocation of access or loss of shelter.

EPA Glossary of Impacts	Significance of Impact as per EPA Guidelines (EPA 2022)	Level of Impact for Agronomy
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.	An impact which causes noticeable changes in the character and management of the farm. The farm enterprise experiences inconvenience as a result of the proposed Project.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.	A moderate impact occurs where the farm enterprise can be continued as before but with increased management or operational difficulties. While portions of the land might be sub-divided, the enterprise mix will be such that the farming system could continue, perhaps with reduced stock numbers or additional labour, contractor or other charges.
Significant Effects	An effect which by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.	Significant impact occurs where the farm enterprise suffers serious inconvenience as a result of the proposed Project. Sub-division will occur, but access could be achieved.
Very Significant	An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.	A very significant impact occurs where the farm enterprise cannot be continued without considerable management or operational changes. There will be significant sub-division on the affected parcel(s). The proposed Project may affect farm buildings and or/facilities. Access to the sub-divided land can only be achieved through the use of non-farm roads to access sub-divided land. Where the impact is very significant, an enterprise change may be necessitated, e.g., from dairy to dry stock.
Profound Effects	An effect which obliterates sensitive characteristics.	A profound impact occurs where the farm enterprise cannot be continued as a result of the proposed Project. This will occur where the land-take was of such a nature to make the holding unworkable and/or where important farm buildings and facilities were removed. An impact of this degree will be rare and will most likely occur on a dairy/horticultural or stud farm.

23.3 Baseline Environment

23.3.1 Baseline Environment: County Context

The Census of Agriculture collects information on the structural characteristics of agricultural holdings such as land use, farm size, and enterprise type every 10 years. Data from the Census of Agriculture 2020, Preliminary Results (CSO 2020) became available in December 2021 and has been updated within the baseline environment.

23.3.1.1 Land Use and Quality in the County Context

According to the Census of Agriculture 2020, Preliminary Results (CSO 2020) County Dublin has a total Utilisable Agricultural Area, excluding commonage, of 37,963ha (hectares). This represents approximately 0.80% of the national agriculture land area. The census further states that there are 699 farms in County Dublin with an average farm size of 47.57ha, of which 25.3% is 'specialist tillage', 3.6% is 'specialist dairy', 28.5% is 'specialist beef production', 16.5% is 'specialist sheep', 5.3% is 'mixed grazing livestock', 2.0% is 'mixed crops and livestock', 15.3% is 'mixed field crops', and 3.6% is 'other'.

Within the Census of Agriculture 2020, Preliminary Results, there is no breakdown of 'specialist equine' farms which would include farms with solely equine interests. The classification provided within the census for Equine is 'horses as grazing stock'. However, the horses included would not necessarily be the only grazing stock on any particular farm but may include specialist equine only holdings. It is important to note within this Chapter we make reference to 'specialist equine' where horses and ponies are the predominant enterprise or livestock on the holding.

While there is no universally accepted definition of land quality, nonetheless, it is common to describe lands along a range of good, average and poor. While many factors contribute to the productive capacity of agricultural soils including parent geology, topography and drainage characteristics we have listed below the criteria used for this study (refer to Table 23.7).

Table 23.7: Description of Land Quality

Land Quality Status	Comment
Good Quality Land	High agricultural value and potential. Accessibility is good and the maintenance level is very high. The drainage is very good or the soil is free draining. It is suitable for a wide range of arable and livestock enterprises at an intensive level.
Average Quality Land	Average agricultural value with a high agricultural potential. There may be drainage problems in these areas. These areas may require maintenance work to increase productivity. It is suitable for a wide range of arable and livestock enterprises.
Poor Quality Land	Low agricultural value and potential. These areas are unsuitable for intensive grazing by livestock enterprises. They are suitable for extensive stocking, rough grazing, forestry or peat production.

23.3.1.2 Soil Type

The predominant soil type found in the land parcels along the proposed alignment is classified as soil association Elton. This soil type is derived from a fine loamy drift with limestone. The soil is associated with flat and gently rolling topography. It is a moderately well drained soil of clay loam texture. This soil association has a moderately wide use range. It is suitable for grassland, tillage and intensive vegetable production. There is a tradition of tillage farming throughout the study area. Refer to Chapter 20 (Soils & Geology) for further information on the soils along the proposed Project.

23.3.2 Baseline Environment: Study Area

23.3.2.1 Land Use and Quality in the Study Area

The study area contains 11 individual landowner / occupiers with a total of 14 land parcels. Each individual land parcel was identified using Property Registration Authority Information (PRAI) information. The main agricultural land use is tillage, grassland and grassland – managed extensively. Grassland - managed extensively are areas that were found to not be intensively managed or grazed or found to not be farmed at the time of assessment.

During the walkover assessment in 2018/2019, LO4 PR1 was described as tillage. During the 2021 review the area was described as Grassland, managed extensively, while during the 2022 review the area was described as tillage. The land use changing annually is due to the crop regime in-situ. In 2021, the Grassland , managed extensively, was used as a cover crop. Cover crops occur in a tillage system after an intensive cropping regime. Cover crops offer soil, crop and environmental benefits. Cover crops are sown between two main tillage crops, usually autumn/winter and used to maintain a green cover on the land to take up nutrients left over from the previous cropping season.

A veterinary practice was also identified within the study area at LO7 PR1. The veterinary practice is located just off Pinnock Hill Roundabout, Swords. The practice consists of two animal treatment buildings, a car park, horse stables, an animal handling area and a recovery paddock which is described as Grassland. The practice treats both small and large animals at its facility. Large animals consist mainly of horses and sick calves.

Refer to Figure 23.1 for an illustration of the agronomy study area. Table 23.8 details in summary, the land parcel use and land quality of the study area.

Table 23.8: Baseline Land Parcel Use and Land Quality Status along the Proposed Project

Geographic Section	Parcel Location	Land Owner (LO) Ref	Parcel Ref (PR)	Jacobs MetroLink EIA mapper Chainage	Land Parcel Use	Land Quality Status	
AZ1 Northern Section	Lissenhall Little, Swords	1	1	Ch 1120 – 1320	Farmyard and Grassland (Leased)	Good	
		2	1	Ch 1000 – 1100	Tillage (Leased)		
		3	1	Ch 1360 – 1500	Tillage (Leased)		
	Balheary Demesne, Swords	2	2	Ch 3620 – 3960	Grassland - Managed extensively	Medium	
	Pinnock Hill, Swords	Pinnock Hill, Swords	4	1	Ch 4160 – 4360	Tillage (Leased)	Good
			4	2	Ch 4720 – 4820	Grassland Manged extensively	Good
			5	1	Ch 4560 – 4700	Grassland	Good
			7	1	Ch 4500 – 4520	Grassland	Good
	Fosterstown North, Swords	6	1	320 meters east of Ch 5580	Grassland - Specialist Equine	Good	

Geographic Section	Parcel Location	Land Owner (LO) Ref	Parcel Ref (PR)	Jacobs MetroLink EIA mapper Chainage	Land Parcel Use	Land Quality Status
	Fosterstown North, Swords	8	1	Ch 5280 – 5960	Tillage (Leased)	Good
AZ2 Airport Section	Cloghran, Swords	9	1	Ch 5980 – 6100	Grassland - Managed extensively	Good
AZ3 Dardistown to Northwood	Ballystruan, Swords	10	1	Ch 8348 – 8650	Tillage (Leased)	Good
		10	2	Ch 8910 – 9300 Ch 9360 – 9640		
		11	1	Ch 9310 – 9350	Grassland	Good

Six landowner / occupiers have leased seven land parcels to other local farmers, LO1 PR1, LO2 PR1, LO3 PR 1, LO4 PR1, LO8 PR1, LO10 PR 1 & LO10 PR2 consisting of six tillage parcels and one grassland parcel.

23.3.3 Land Zoning and Future Baseline

The Fingal Development Plan 2017-2023 (FCC 2017) identifies zoned lands contained within the study area. There are 14 agricultural land parcels discussed within this chapter, of which, 13 land parcels are directly impacted and one land parcel may be indirectly impacted by the proposed Project. The agricultural lands impacted by the proposed Project are zoned for one of the following:

- 'Metro Economic Corridor', to facilitate opportunities for high-density mixed-use employment generating activity and commercial development and support the provision of an appropriate quantum of residential development within the Metro Economic Corridor;
- 'Open Space', to preserve and provide for open space and recreational amenities;
- 'High Amenity' to protect and enhance high amenity areas;
- 'General Employment' to provide opportunities for general enterprise and employment;
- 'High Technology' to provide for office, research and development and high technology manufacturing type employment in a high quality built and landscaped environment;
- 'Green Belt' to protect and provide for Green belt;
- 'Dublin Airport' to ensure the efficient and effective operation and development of the airport in accordance with approved Local Area Plan; and
- 'General Employment' to provide opportunities for general enterprise and employment.

Table 23.9: Zoning Objectives of Agricultural Lands within the Study Area Directly Affected by the Proposed Project

Parcel Location	Land Owner Ref	Land Parcel Ref	Jacobs MetroLink EIA Mapper Chainage	Impacted by proposed Project	Zoning Objective Type
AZ1 Northern Section	1	1	Ch 1120 - 1320	Directly	ME – Metro Economic Corridor
	2	1	Ch 1000-1100	Directly	ME – Metro Economic Corridor
	3	1	Ch 1360 - 1500	Directly	OS – Open Space HA – High Amenity
	2	2	Ch 3620 - 3960	Directly	ME – Metro Economic Corridor / HT – High Technology
	4	1	Ch 4160 - 4360	Directly	HT – High Technology
	4	2	Ch 4720 - 4820	Directly	HT – High Technology
	5	1	Ch 4560 - 4700	Directly	HT – High Technology
	7	1	Ch 4500 - 4520	Directly	HT – High Technology

Parcel Location	Land Owner Ref	Land Parcel Ref	Jacobs MetroLink EIA Mapper Chainage	Impacted by proposed Project	Zoning Objective Type
	6	1	320 meters east of Ch 5580	Potentially indirectly	GB – Green Belt
	8	1	Ch 5280 – 5960	Directly	GB – Green Belt
AZ2 Airport Section	9	1	Ch 5980 - 6100	Directly	DA – Dublin Airport
AZ3 Dardistown to Northwood	10	1	Ch 8340 - 8650	Directly	GE- General Employment
	10	2	Ch 8910 - 9300	Directly	HT – High Technology / GE- General Employment
	11	1	Ch 9310 - 9350	Directly	HT – High Technology

As illustrated in Table 23.9, the majority of the agricultural land within the study area is zoned for non-agricultural development. Given the urban location and limited supply of land within the study area, the land is high value and farming this high value land does not provide optimal economic return. The predominant land use within the study area is tillage production.

According to the Teagasc National Farm Survey 2020 Sustainability Report (Teagasc 2021) the average gross margin per hectare for tillage farms was €756. The average family farm income per hectare on tillage farms was €558 in 2020. Median income ranged from €866 from the top performing cohort to €225 for the bottom performers economically. Therefore, the majority of the land in the study area is likely to be developed in the future and unlikely to remain in agricultural use in the long-term without the proposed Project.

23.3.3.1 Sensitivity Rating

Having completed the data review, desktop study and farm visits, including the completion of questionnaire a sensitivity rating was assigned to each farm holding, which is presented in Table 23.10. All the land holdings directly affected by the proposed Project are low or medium sensitivity, while the specialist equine facility belonging to landowner / occupier LO6 PR1 is assigned a Very High Sensitivity.

Refer to Table 23.5 for baseline environment for sensitivity ratings for farms.

Table 23.10: Farm Classified by Farm Type and Sensitivity Rating

Parcel location	Land Owner Ref	Land Parcel Ref	Description	Sensitivity Rating
AZ1 Northern Section	1	1	Total agricultural land area 10.62ha. The land is currently in grassland and is leased out to a local farmer who uses the land for grazing livestock. Farm buildings are present on the holding. Livestock are housed in the farm buildings during the winter period. Access to the holding is from the R132.	Medium
	2	1	Total agricultural land area 34.04ha. The land is currently leased out and used for tillage production. Access to the holding is from Ennis Lane.	Medium
	3	1	Total agricultural land area 28.99ha. The land is currently leased out and used for tillage production. Access to the holding is from Ennis Lane.	Medium

Parcel location	Land Owner Ref	Land Parcel Ref	Description	Sensitivity Rating
	2	2	Total agricultural land area 18.09ha. The land is described as grassland - managed extensively and supports grazing horses. Access to the holding is from Drynam Road.	Low
	4	1	Total agricultural land area 3.26ha. The land is described as tillage. Access to the holding is from the R132.	Medium
	4	2	Total agricultural land area 0.44ha. The land is described as grassland - managed extensively. Access to the holding is from the R132 through the carpark of Airside Shopping Centre to the rear of Smyths Toy store.	Low
	5	1	Total agricultural land area 1.86ha. The land is in grassland, it is maintained in good agricultural and environmental condition. Access to the holding is located at Pinnock hill roundabout on the R132.	Low
	7	1	Total agricultural land area 0.99ha. The land is in grassland. Access to the holding is located off Pinnock hill roundabout on the R132 O'Scanaill Veterinary Hospital.	Very High
	6	1	Total agricultural land area 14.57ha. The land is grassland for specialist equine. Access to the holding is from Kettles Lane.	Very High
	8	1	Total agricultural land area 44.16ha. The land is leased out and is used for tillage production. Access to the holding is from the R132.	Medium
AZ2 Airport Section	9	1	Total agricultural land area 11.76ha. The land is described as grassland – managed extensively and is not currently farmed. Owned by DAA. Access to the holding is from the Naul Road.	Low
AZ3 Dardistown to Northwood	10	1	Total agricultural land area 15.89ha. The land is leased out and used for tillage production. Access to the land holding is from the R108.	Medium
	10	2	Total agricultural land area 45.17ha. The land is leased out and used for tillage production. Access to the land holding is from the R108 opposite Silloge Park, Public Golf Course.	Medium
	11	1	Total agricultural land area 2.98ha. The land is in grassland. Access to the land holding is from the R108 opposite Silloge Park, Public Golf Course.	Low

23.4 Predicted Impacts

In order to assess the impacts, it is necessary to be aware of and familiar with the range of possible impacts. From experience of similar large infrastructural projects, the following list of potential impacts has been created. For the assessment, the potential impacts on each land parcel along the alignment of the proposed Project are evaluated.

Some impacts will be of a temporary nature, some impacts can be eliminated by mitigation measures and some impacts will have a residual impact.

It is estimated that the Construction Phase will be short-term to medium-term and will last up to nine years. None of the impacted farms will experience all of the potential impacts identified but some impacts will be identified on all farms.

23.4.1 Do Nothing

In the case of the 'Do Nothing Scenario' there would be no impacts on the environment and no change in land use. However, given the urban location of the proposed Project and the zoning in place on agricultural lands it is expected that even in the absence of the proposed Project, the current agricultural land use will change in line with zoning objectives of the Fingal Development Plan 2017-2023 (FCC 2017).

23.4.2 Construction Phase Impacts

23.4.2.1 Construction Phase Activities

It is estimated that the Construction Phase will last for approximately nine years (Refer to Appendix A5.2 Construction Programme) . At the beginning of the Construction Phase the land required for the proposed Project will be fenced off. Temporary access and crossing points for livestock and agricultural machinery will be provided. Within the proposed works sites, where necessary, topsoil will be removed and placed into stockpiles (in accordance with approved protocols) and temporary and permanent drainage will be installed before the main works commence.

The Construction Phase activities of the proposed Project that occur on or close to existing agricultural land are listed in Table 23.11.

The veterinary hospital located just off Pinnock Hill Roundabout in Swords will be directly impacted during the Construction Phase. Direct impacts include disruption to access, noise, vibrations, dust. There is 0.99ha of grassland associated to the veterinary hospital, used as a recovery paddock for large animals. Disruption to access and land-take will affect the recovery paddock, during the Construction Phase it may not be possible to utilise the recovery facilities due to sporadic noise from construction which may cause stress or fright to the animal. The veterinary practice and its handling facilities for large animals are located <50m from the centre of the alignment of the proposed Project. Handling facilities for large animals are located outside. Large animals which use the recovery paddock consist of horses and young cattle. Stables are also present on-site and are available to horses in recovery. Animals may use the recovery paddock and or stables for only a few hours, or up to a few days. Animals treated by the veterinary hospital are visiting and may be affected by construction noise which may cause them fright. In some cases, there may be a potential impact from dust nuisance e.g., where animals are confined to stables during recovery. Generally, animals in recovery, depending on the severity of the procedure, would be housed on-site for a short period (i.e., up to 24 hours or longer perhaps up to one week). A separate detailed assessment has been undertaken to assess the impacts the proposed Project will have on the veterinary hospital and associated grounds.

23.4.2.2 ESNB within Agricultural lands

The power supply for the proposed Project will be brought forward for planning approval under a separate consent application but has been assessed in this EIAR on the basis of the best and most up-to-date information available. As currently proposed, MetroLink will include two High Voltage (HV) 110 Kilovolt (kV) substations, one named Forest Little Station located at DANP in Cloghran and Ballystruan 110kV Station located at Dardistown Depot in Ballystruan. The HV cables will be installed along a mixture of public road and private land. The proposed extension of 110kV underground cables to facilitate the proposed Project will not impact on agricultural lands.

An assessment of ESNB cable routes was undertaken initially in 2019 and again as part of a full review of this chapter (April 2022). A desktop review of mapping and a windshield of the locations was

undertaken as part of this review. The proposed cable lines will follow existing roads and will not encroach on agricultural lands. The construction activities that may produce potential agronomy impacts consist of enabling works and main infrastructure works. Enabling works will consist of utility works, boundary treatments and demolition.

Further information on the construction of the proposed Project is provided in Chapter 5 (MetroLink Construction Phase) and details of the alignments of these cable routes can be reviewed in Chapter 4 (MetroLink Project Description).

Table 23.11: Construction Phase Activities

Parcel location	Land Owner Ref	Land Parcel Ref	Description
AZ1 Northern Section	1	1	Construction of surface track, Estuary Station, Park and Ride Facility – including construction site establishment, fencing, topsoil removal, earthworks, enabling works, utility works, vegetation clearance, demolition, construction of access roads, main civil works.
	2	1	Construction of surface track – including site establishment, fencing, topsoil removal, earthworks, utility works, construction of access roads, main civil works.
	3	1	Construction of surface track – including site establishment, fencing, topsoil removal, earthworks, utility works, construction of access roads, main civil works. Construction of Broadmeadow and Ward Rivers Viaduct to the south of the parcel.
	2	2	Construction of retained cut sections, cut and cover sections, Swords Central Station – including site establishment, fencing, topsoil removal, utility works, construction of access roads, earthworks, excavation, traffic works, piling and main civil works.
	4	1	Construction of retained cut track, cut and cover track - including site establishment, fencing, top soil removal, utility works, earthworks, excavation, traffic works, piling and main civil works.
	4	2	Construction of retained cut track, cut and cover track, Fosterstown Station - including site establishment, fencing, topsoil removal, demolition, utility works, earthworks, excavation, traffic works, piling and main civil works.
	5	1	Construction of retained cut track, cut and cover track, Fosterstown Station - including site establishment, fencing, topsoil removal, demolition, utility works, earthworks, excavation, traffic works, piling and main civil works.
	7	1	Construction of cut and cover track – including site establishment, fencing, topsoil removal, earthworks, utility works, construction of access roads, main civil works.
	6	1	N/A.
	8	1	Construction of retained cut track and surface track - including site establishment, fencing, topsoil removal, demolition, utility works, earthworks, excavation, traffic works, piling and main civil works.
AZ2 Airport Section	9	1	Construction of surface track, retained cut track, cut and cover track, tunnel - including site establishment, fencing, top soil removal, demolition, utility works, earthworks, excavation, construction of access roads, tunnelling works, traffic works, diaphragm walling and main civil works.
AZ3 Dardistown to Northwood	10	1	Tunnel, surface track, cut and cover track, retained cut track, and South Portal - including site establishment, fencing, top soil removal, demolition, utility works, earthworks, excavation, construction of access roads, tunnelling works, traffic works, piling and main civil works.
	10	2	Tunnel, surface track, cut and cover track, retained cut track, incline track, M50 Viaduct - including site establishment, fencing, top soil removal, demolition, utility works, earthworks, excavation, construction of access roads, tunnelling works, traffic works, piling and main civil works.
	11	1	Construction of retained cut track - including site establishment, fencing, topsoil removal, demolition, utility works, earthworks, excavation, traffic works, piling and main civil works.

Table 23.12 lists the potential impacts identified during farm visits and consultations which may affect land holdings during the Construction Phase of the proposed Project, as they affect individual land holdings.

Table 23.12: Construction Phase Impacts on Individual Land Holdings

Parcel location	Land Owner Ref	Land Parcel Ref	Construction Phase Impacts
AZ1 Northern Section	1	1	<ul style="list-style-type: none"> ▪ Land take; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Potential impact to water supply land parcels; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; ▪ Disruption to existing farm roadway; and ▪ Potential excess noise and dust above existing levels.
	2	1	<ul style="list-style-type: none"> ▪ Land take; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; ▪ Disruption to existing farm roadway; and ▪ Potential excess noise and dust above existing levels.
	3	1	<ul style="list-style-type: none"> ▪ Land take; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels.
	2	2	<ul style="list-style-type: none"> ▪ Land take; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Potential for loss of utilities such as water supply during Construction Phase; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels.
	4	1	<ul style="list-style-type: none"> ▪ Land take; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels.
	4	2	<ul style="list-style-type: none"> ▪ Land take; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels.
	5	1	<ul style="list-style-type: none"> ▪ Land take; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels.

Parcel location	Land Owner Ref	Land Parcel Ref	Construction Phase Impacts
	7	1	<ul style="list-style-type: none"> ▪ Land take; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels.
	6	1	<ul style="list-style-type: none"> ▪ No direct impact; ▪ Potential for indirect impact as a result of excess noise and dust; and ▪ Potential for loss of utilities such as water supply during Construction Phase.
	8	1	<ul style="list-style-type: none"> ▪ Land take; ▪ Severance; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels.
AZ2 Airport Section	9	1	<ul style="list-style-type: none"> ▪ Land take; ▪ Severance; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels.
AZ3 Dardistown to Northwood	10	1	<ul style="list-style-type: none"> ▪ Land take; ▪ Severance; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels.
	10	2	<ul style="list-style-type: none"> ▪ Land take; ▪ Severance; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels.
	11	1	<ul style="list-style-type: none"> ▪ Land take; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as trees and hedgerows; ▪ Removal of existing field boundaries; ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels.

An evaluation of the Construction Phase impacts, as described in the Chapter 5 (MetroLink Construction Phase) and from experience of similar projects, the following potential impacts are predicted by the Agronomist.

23.4.2.2.1 *Permanent Land Loss*

There will be a permanent removal of lands from agricultural use along the alignment of the proposed Project where permanent features of the proposed Project will be built. The predicted amount of permanent land loss is summarised in Table 23.13.

Of the 14 'agricultural' land parcels, 13 are directly affected by land take (refer to Figure 23.2 Agricultural Land Take), while one agricultural holding belonging to landowner / occupier LO6 PR1 is identified as a 'Very Sensitive' enterprise which may experience indirect impacts such as sporadic noise, causing stress or fright to grazing horses. LO6 PR1 will not experience any land take as a result of the proposed Project. Agricultural holdings directly impacted by land take are discussed in Table 23.13. Table 23.13 describes the permanent and temporary land acquisition required to accommodate the construction of the alignment, Estuary Station, Swords Central Station and the Park and Ride Facility, Fosterstown Station and Dardistown (future) Station and Depot.

23.4.2.2.2 *Short-Term Loss of Land during Construction*

Land will be required temporarily during the Construction Phase for the following activities.

- Construction compounds with sufficient area available for activities including:
 - The location of (concrete) batching plants;
 - Storage of temporary material stockpiles;
 - Safe access and egress arrangements for construction plant and equipment;
 - Office and welfare facilities;
 - Site parking;
 - Unloading and holding areas;
 - Security;
 - Wheel washing facilities; and
 - Waste management.
- The diversion, realignment and widening of roads and junctions, and/or the provision of temporary alternative routes;
- The diversion and realignment of public rights of way and private accesses, and/or the provision of temporary alternatives routes;
- The diversion and realignment of sections of existing railways, watercourses and utilities;
- Groundwater control and grouting activities; and
- Transfer nodes (known as haul routes) for the movement of excavated material and delivery of construction materials and plant.

Land used only for construction purposes will be reinstated as agreed with the owner of the land and the relevant planning authority once the construction works in that area are complete.

Of the 14 'agricultural' land parcels, 13 are directly affected by land take, of which nine will experience some temporary land take (Chapter 5 MetroLink Construction Phase).

Table 23.13: Land Take on Individual Land Holdings

Parcel location	Land Owner Ref	Land Parcel Ref	Zoning Objective Type	Total Land Parcel Area	Permanent Land Take	% Permanent Land Take of Total Area	Temporary Land Take	% Temporary Land Take of Total Area	Total Land Take	% Land Take of Total Area (Construction Phase)	Potential disturbance/ demolition of farmyard structures
				m ² / ha	m ²	%	m ²	%	m ² / ha	%	
AZ1 Northern Section	1	1	ME	106,200m ² 10.62ha	53176.2417	50.1	1144.0715	1.1	54320.3132m ² 5.432ha	51.1	✓
	2	1	ME	340,400m ² 34.04ha	42547.2604	12.5	48741.9723	14.3	91289.2327m ² 9.128ha	26.8	×
	3	1	OS / HA	289,900m ² 28.99ha	21772.8578	7.5	N/A	N/A	21772.8578m ² 2.177ha	7.5	×
	2	2	ME / HT	180,900m ² 18.09ha	10262.6996	5.7	11462.2644	6.3	21724.964m ² 2.172ha	12.0	×
	4	1	HT	32,600m ² 3.26ha	5782.5439	17.7	24801.3074	76.1	30583.8513m ² 3.058ha	93.8	×
	4	2	HT	4400m ² 0.44ha	4356.8371	99.1	N/A	N/A	4356.8371m ² 0.435ha	99.0	×
	5	1	HT	18,581m ² 1.86ha	11162	60.1	N/A	N/A	11162m ² 1.1162ha	60.1	×
	7	1	HT	9900m ² 0.99ha	473	4.8	N/A	N/A	473m ² 0.0473ha	4.8	×
	6	1	GB	145,700m ² 14.57ha	N/A	N/A	N/A	N/A	N/A	N/A	×
AZ2 Airport Section	8	1	GB	441,600m ² 44.16ha	38268.7095	8.7	26081.9679	5.9	64350.6774m ² 6.435ha	14.6	×
	9	1	DA	117,600m ² 11.76ha	38506.2753	32.7	6890.7864	5.9	45397.0616m ² 4.539ha	38.6	×
AZ3 Dardistown to Northwood	10	1	GE	158,900m ² 15.89ha	18698.7474	11.8	71571.1623	45.0	90269.9097m ² 9.026ha	56.82	×
	10	2	HT / GE	451,700m ² 45.17ha	206906.715	45.8	122301.998	27.1	329208.712m ² 32.921ha	72.9	×
	11	1	HT	29,800m ² 2.98ha	1496.1320	5.0	6742.3171	22.6	8238.4491m ² 0.823ha	27.7	×

23.4.2.2.3 Temporary Loss of Services (Water and Electricity)

The presence of construction activity through the 14 affected land parcels is predicted to interrupt temporarily utilities such as water and electricity supplies to agricultural land (Chapter 22 Infrastructure & Utilities, Section 22.4 Baseline Environment). Construction works required to divert utilities have been detailed in Chapter 5 (MetroLink Construction Phase). The potential magnitude of any impact to water supply will be greatest on holdings supporting livestock-based enterprises. The impact on water supply is predicted to be temporary and occasional during construction. Alternative supplies will be provided by the appointed contractor(s) and normal supplies will be restored as part of the completed works.

The land holdings identified that may be potentially affected by loss of utilities are LO1 PR1, LO2 PR2 and LO6 PR1. These are the only land holdings identified to be supporting livestock at the time of assessment.

23.4.2.2.4 Nuisance Caused by Increased Traffic Volume due to Construction Traffic

Increased traffic volumes associated with the Construction Phase of the proposed Project is predicted to cause nuisance to farming operations. There will be indirect impacts on farmers who use the local road network to access land parcels within the study area but these impacts are not predicted to be significant. These indirect impacts will occur as a result of changes to the local road network and increased traffic volumes. Please see Chapter 9 (Traffic & Transport) for further details.

Access arrangements during the Construction Phase will potentially cause nuisance to all farming operations due to increased traffic volumes.

23.4.2.2.5 Nuisance Caused by Noise Emanating from the Construction

Construction activities such as earth-moving machinery, movement of Heavy Goods Vehicles (HGVs) and other ancillary vehicles will generate noise emissions in the immediate vicinity of where construction will occur for the proposed Project (refer to Chapter 13 Airborne Noise & Vibration for further detail).

Noise may cause distress to farm animals if it becomes excessively loud. Although in general, animals become accustomed to regular noise and sounds. This is evident by the nationwide grazing of livestock in close proximity to motorways. Intermittent noise may cause fright and distress to animals. Tonal and impulsive noise activity can be of particular concern to sensitive livestock such as horses. Horses are of a more nervous disposition than other stock types and are more sensitive to unfamiliar, sporadic and excessively loud noise. Rock breaking activity can be of particular concern to the breeding and training of horses. Therefore, noise can cause nuisance to farm operators.

The land holdings that have the potential to be affected by noise emanating from the construction are LO1 PR1 and LO2 PR2 and LO6 PR1. Livestock are kept on these holdings.

Grazing cattle are kept on LO1 PR1 and horses are grazing on LO2 PR2. A specialist equine enterprise is permanently located on LO6 PR1. It is not anticipated that excessively loud noise will occur within the agronomy study area. However, new noises arising from construction and or operational activities, that have not yet been experienced by the livestock may initially cause fright until they become habituated to the new noises (refer to Chapter 13: Airborne Noise & Vibration).

It is unlikely that rock breaking activity will occur in sufficiently close proximity to the agronomy study area. Bulk excavation of rock is likely to require drilling and blasting. Typically, blasting will be carried out at agreed set times each day, with nearby residents, landowner, and occupiers notified and informed of the schedule. Blasting is anticipated to be required at AZ3 Northwood Station and Portal and at locations in AZ4, but there are no agricultural activities in this area. Tillage activities are located at Dardistown within AZ3, tillage is not affected by noise levels.

There are three retained cut stations located within the agronomy study area: Swords Central, Fosterstown and Dardistown Future Station. Piling along with excavations works are anticipated at these locations.

Estuary Station located within the study area will be built at ground surface level. Piling works for the station are anticipated. However, no major excavation works or retaining structures will be necessary for the construction of Estuary Station.

Effects arising from construction noise are likely to be temporary and habituation will occur reasonably quickly. Land holdings likely to be affected during the Construction Phase are those with livestock present.

23.4.2.2.6 Nuisance Caused by Dust

Dust generated by construction machinery and exposure of soil to the atmosphere during construction may have a nuisance impact for a landowner/occupier and farm animals. The proliferation of dust during construction has a nuisance effect if it is produced in high volumes. Dust may accumulate on crops growing adjacent to the construction works, restricting the ability of crops to photosynthesise. However, it is predicted that construction dust from the proposed Project will not cause significant issues given the level of rain fall in Ireland and the mitigation measures that will be employed to limited dust arising from construction.

Grazing stock are not generally sensitive to dust, and livestock grazing adjacent to the construction site are not predicted to be susceptible to eye irritations as they are in an open area, and any dust arising from construction will disperse.

Livestock confined to a shed, perhaps over the winter period, and located within 150m to 300m of a construction site have the potential to be impacted by plumes of dust during the Construction Phase. Winter housing for grazing stock is present on land holding LO1 PR1 - Grassland and is located over 200m away from the centre of the alignment of the proposed Project.

During this assessment, it was found that livestock are present either adjacent to or close to proposed works sites associated with Estuary Station, Swords Central Station and Fosterstown Station. Piling along with excavation works are anticipated at these locations. Due to the construction methodology of piling, it is anticipated that any impact from dust outside 150m will be imperceptible. Further information on the air quality assessment is provided in Chapter 16 (Air Quality).

LO7 PR1 is a veterinary Hospital, the facilities are close the proposed project and animals hosted here are recovering from illness or surgery, they may be impacted by dust arising from construction.

23.4.2.2.7 Impact on Shelter

Enabling works carried out prior to the main infrastructure works will involve boundary treatments that will result in the removal of mature trees and hedgerows, considered as local biodiversity areas. The impact of loss of shelter on farms will be greatest on livestock-based farm enterprises. The removal of mature trees and hedgerows, which provide shelter to livestock, especially younger stock, may potentially impact farm holdings. It is anticipated that a combination of hedgerow and treelines will be impacted by the proposed Project, of the length of hedgerow impacted, it is predicted that the following landowner / occupiers will experience some removal of hedgerow during the Construction Phase:

- LO1 PR1: Potentially up to c. 900m of mature hedgerow (assuming 50m works area) will be removed during the Construction Phase at two locations within the grassland parcel south-west of the farmyard which borders Ennis Lane. Part of a shared hedgerow will be potentially removed from the north of the Grassland parcel which borders LO2 PR1, tillage, and part of hedgerow to the south-west of the field which borders Ennis Lane;

- LO3 PR1: Potentially up to c. 300m of mature hedgerow/stone wall structures (assuming 50m working corridor) will be removed during the Construction Phase at two locations, along the boundary at Ennis Lane and along the southern boundary of the parcel;
- LO2 PR2: Potentially up to c. 480m of mature hedgerow/trees (assuming 50m working corridor) will be removed during the Construction Phase located to the east of the parcel, just off Malahide Road Roundabout and located the location of Swords Central Station, the northern end of the parcel bordering the R132 Swords Bypass;
- LO4 PR1: Potentially up to c. 250m of mature hedgerow/trees (assuming 50m working corridor) will be removed during the Construction Phase located to the north of the parcel, bordering the R132 Swords Bypass;
- LO5 PR1: Potentially up to c. 215m of mature hedgerow/trees (assuming 50m working corridor) will be removed during the Construction Phase at two locations, the north corner of the field which is a shared boundary with LO7 PR1, veterinary hospital, located just off Pinnock Hill Roundabout and the south-eastern hedgerow/tree which is a shared hedgerow with LO4 PR2, to facilitate the location of Fosterstown Station;
- LO4 PR2: Shared boundary is detailed in LO5 PR1 above, in addition potentially up to c. 70m of mature hedgerow/trees (assuming 50m working corridor) will be removed during the Construction Phase to the south of the parcel bordering Airside Retail Park, to facilitate the location of Fosterstown Station;
- LO8 PR1: Potential removal of up to c. 100m of tree line located along the access road within the parcel. Potential removal of up to c. 160m of shared boundary hedgerow to the south of the parcel with LO9 PR1; and potential removal of up to c. 150m of boundary to the north east of the parcel;
- LO10 PR1: Potential removal of up to c. 300m of hedgerow/tree line located at the north right corner, and LO10 PR2: Potential removal of up to c. 2100m of hedgerow/tree line throughout the land parcel; and
- LO11 PR1: Potential removal of up to c. 200m of field boundary, hedgerow/tree line located to north east of the land parcel.

The level of impact will depend on the extent of the shelter removed and the type of enterprise affected (refer to Chapter 15 Biodiversity and Chapter 27 Landscape & Visual for further details on trees and hedgerows to be removed during the Construction Phase).

23.4.2.2.8 Disturbance to Farm Operations

In general, changes to the layout of farm infrastructure such as paddocking systems can impact operations. Irregular land parcel shapes may require double passes of machinery, and interruption to existing layouts can potentially require a reorganisation of fencing systems. Interruption to farming activities such as the interruptions to free-flowing movement of livestock may occur due to temporary access arrangements and access to sub-divided lands.

Within the agronomy study area, the main disturbances identified to farm operations was a removal of land from 'agriculture' through either permanent or temporary land take. A potential change in access to lands were identified for LO1 PR1, LO2 PR1, LO2 PR2, LO3 PR1, LO2 PR2, LO4 PR1, LO5 PR1, LO4 PR2, LO7 PR1, LO8 PR1, LO9 PR1, LO10 PR1, LO10 PR2 and LO11 PR1.

A reduction in the area available outside the Project Boundary was identified for LO1 PR1, LO2 PR1, LO3 PR1 LO2 PR2, LO7 PR1, LO5 PR1, LO8 PR1, LO9 PR1, LO10 PR1, LO10 PR2 and LO11 PR1.

Land severance was identified on four land holdings, LO8 PR1, LO9 PR1, LO10 PR1 and LO10 PR2 and access will need to be accommodated to the severed lands.

23.4.2.2.9 Interruption to Field Drainage Systems

Field drainage systems within the proposed alignment have the potential to be impacted by the construction of the proposed Project. If land drains are intercepted during the Construction Phase, these will be modified to permit construction of the proposed Project. Sustainable drainage methods will be used where reasonable, to improve the quality. Where sections of track and other construction features

such as the Park and Ride Facility and Dardistown Depot are present at the surface (primarily AZ1 and AZ3 respectively), the potential for surface water runoff to cause erosion of soil will be reduced by the installation of trackside and surface water drainage systems. With the use of drainage systems, the magnitude of impact on soils is considered to be negligible, resulting in an imperceptible significance of impact across the proposed Project.

It is not known if any major land drains are located within land parcels impacted by the proposed Project, as they are located beneath the topsoil. Impacts on drainage are expected to only last for the duration of the Construction Phase. Impacts to field drainage may occur on agricultural lands, and these will only be discovered at the site clearance stage during the enabling works. The soil type within the study area is described as a free draining soil (refer to Chapter 20 Soils & Geology).

23.4.2.2.10 Spread of Noxious Weeds and Invasive Species when Soil is Exposed

Noxious weeds can potentially spread rapidly through exposed soil because of their prolific seed production. Seeds can be carried by the wind or on machinery used for the construction of the proposed Project. The spread of invasive species can be facilitated in the same way. Invasive species have the potential to be introduced and dispersed along the alignment of the proposed Project.

Giant hogweed, *Heracleum mantegazzianum*, was identified as scattered throughout the proposed Project. Japanese knotweed, *Fallopia japonica*, was identified throughout the proposed Project at specific locations (Refer to Chapter 15 Biodiversity).

23.4.2.2.11 Spread of Animal Diseases and Soilborne Diseases

There is an increased risk of spreading animal diseases such as Bovine Tuberculosis (TB). This can be due to cattle straying or causing stress to the environment where certain wildlife inhabits such as badger sets within hedgerows. TB is an infectious disease of cattle. It is caused by the bacterium *M. bovis* (*Mycobacterium bovis*). Bovine TB is transmitted between cattle, between badgers and between the two species. Cattle grazing area where infected badgers have been present are exposed to risk of infection.

Potato eelworm is a microscopic soil borne worm that destroys the root of a potato plant. Once the pest becomes established in lands, it can take up to twenty years or more for it to become undetectable in the soil. The pest can be spread from field to field by direct movement of soil or by soil attached to equipment such as harvesters. Some of the landholdings which are directly impacted, are tillage enterprises and potatoes may be used in the crop rotation.

Spread of animal diseases contributes to determining the sensitivity of the receptor.

23.4.2.3 Results of Assessment of the Construction Phase Impacts

The results of the assessment of the predicted impacts at Construction Phase before mitigation measures are employed are presented at individual farm level.

During the Construction Phase, none of the affected farms will experience all of the potential impacts identified, but some impacts will be identified on all farms. The magnitude of these impacts will be influenced by the particular farm enterprise type. Where possible, mitigation will reduce or eliminate these impacts. The Construction Phase impacts will vary from farm to farm depending on the factors outlined above. A general example, the impact on a dairy farm where land is sub-divided and where access is required across the construction site twice daily, will be more significant than that of a tillage farm, where the land is sub-divided but daily access across the construction site is not required. Tillage is the predominant farm enterprise of the agronomy areas.

23.4.2.4 Magnitude

The magnitude of the impact is described in Table 23.14. Taking into consideration all relevant factors, such as land use, enterprise and farming intensity and maximum weighting being given to the scale of

land take and the degree of severance on each individual land holding a magnitude level ranging from High to Negligible was assigned.

Table 23.14: Farm Classified by Farm Type and Magnitude Rating

Parcel location	Land Owner Ref	Land Parcel Ref	Description of Magnitude	Magnitude Rating
AZ1 Northern Section	1	1	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Grassland – 10.62ha.</p> <p>Total agricultural land area post proposed Project – 5.30ha (-5.32ha)</p> <p>Severance: No</p> <p>Land use: Farmyard structures are present, Grassland, used for grazing beef cattle.</p> <p>Land use intensity: High</p> <p>Land take: Permanent Grassland approx. ha, c. 50.1%</p> <p>Land take: Temporary Grassland approx. ha, c. 1.1%</p> <p>Farm structures present: Yes</p> <p>Potential disturbance / demolition to Farmyard structures: Yes</p> <p>The Magnitude is deemed to be High based on professional opinion.</p>	High
	2	1	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Tillage – 34.04ha.</p> <p>Total agricultural land area post proposed Project – 29.79ha (-4.25ha)</p> <p>Severance: No</p> <p>Land use: Tillage, annual cropping regime in practice.</p> <p>Land use intensity: High</p> <p>Land take: Permanent Tillage approx. ha, c. 12.5%</p> <p>Land take: Temporary Tillage approx. ha, c. 14.3%</p> <p>Farm structures present: No</p> <p>Potential disturbance / demolition to Farmyard structures: N/A</p> <p>The Magnitude is deemed to be Medium - High based on professional opinion.</p>	Medium - High
	3	1	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Tillage – 28.99ha.</p> <p>Total agricultural land area post proposed Project – 26.81ha (-2.81ha)</p> <p>Severance: No</p> <p>Land use: Tillage, annual cropping regime in practice.</p> <p>Land use intensity: High</p> <p>Land take: Permanent Tillage approx. ha, c. 7.5%</p> <p>Land take: Temporary Tillage approx. ha, c. 0%</p> <p>Farm structures present: No</p> <p>Potential disturbance / demolition to Farmyard structures: N/A</p> <p>The Magnitude is deemed to be Low - Medium based on professional opinion.</p>	Low - Medium

Parcel location	Land Owner Ref	Land Parcel Ref	Description of Magnitude	Magnitude Rating
	2	2	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Grassland - Managed extensively - 18.09ha Total agricultural land area post proposed Project - 17.06ha (-1.03ha) Severance: No Land use: Grassland - Managed extensively, grazing horses. Land use intensity: Low Land take: Permanent Grassland - Managed extensively approx. ha, c. 5.7% Land take: Temporary Grassland - Managed extensively approx. ha, c. 6.3% Farm structures present: No Potential disturbance / demolition to Farmyard structures: N/A The Magnitude is deemed to be Negligible - Low based on professional opinion.</p>	Negligible - Low
	4	1	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Tillage - 3.26ha. Total agricultural land area post proposed Project - 2.68ha (-0.58ha) Severance: No Land use: Tillage, annual cropping regime in practice. Land use intensity: High Land take: Permanent Tillage approx. ha, c. 17.7% Land take: Temporary Tillage approx. ha, c. 76.1% Farm structures present: No Potential disturbance/ demolition to Farmyard structures: N/A The Magnitude is deemed to be Medium - High based on professional opinion.</p>	Very High
	4	2	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Grassland - Managed extensively - 0.44ha Total agricultural land area post proposed Project - 0.004ha (-0.436ha) Severance: No Land use: Grassland -Managed extensively, Land use intensity: Negligible Land take: Permanent Grassland - Managed extensively approx. ha, c. 99%. Land take: Temporary Grassland - Managed extensively approx. ha, c. 0%. Farm structures present: No Potential disturbance / demolition to Farmyard structures: N/A The Magnitude is deemed to be High based on professional opinion.</p>	High

Parcel location	Land Owner Ref	Land Parcel Ref	Description of Magnitude	Magnitude Rating
	5	1	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Grassland – 1.86 ha.</p> <p>Total agricultural land area post proposed Project – 0.74ha (-1.12ha)</p> <p>Severance: No</p> <p>Land use: Grassland</p> <p>Land use intensity: Low</p> <p>Land take: approx. ha, c. 60.1% of the Grassland area</p> <p>Farm structures present: No</p> <p>Potential disturbance / demolition to Farmyard structures: N/A</p> <p>The Magnitude is deemed to be High based on professional opinion.</p>	High
	7	1	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Grassland – 0.99ha.</p> <p>Total agricultural land area post proposed Project – 0.943ha (-0.047ha)</p> <p>Severance: No</p> <p>Land use: Grassland</p> <p>Land use intensity: Low</p> <p>Land use sensitivity to proposed Project: High</p> <p>Land take: Land take, approx. ha, c. 4.8% of the Grassland area</p> <p>Farm structures present: No</p> <p>Potential disturbance / demolition to Farmyard structures: N/A</p> <p>The Magnitude is deemed to be High based on professional opinion.</p>	High
	6	1	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Grassland – 14.57ha.</p> <p>Total agricultural land area post proposed Project – 14.57ha</p> <p>Severance: No</p> <p>Land use: Grass</p> <p>Land use intensity: High</p> <p>Land use sensitivity to proposed Project: High</p> <p>Land take: N/A</p> <p>Farm structures present: Yes</p> <p>Potential disturbance/ demolition to Farmyard structures: N/A</p> <p>The Magnitude is deemed to Negligible on professional opinion.</p>	Negligible

Parcel location	Land Owner Ref	Land Parcel Ref	Description of Magnitude	Magnitude Rating
	8	1	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Tillage Approx. 44.16ha</p> <p>Total agricultural land area post proposed Project – 40.33ha (-3.83ha)</p> <p>Severance: Yes</p> <p>Land use: Tillage</p> <p>Land use intensity: High</p> <p>Land use sensitivity to proposed Project: Medium</p> <p>Land take: Permanent Tillage approx. ha, c. 8.7%</p> <p>Land take: Temporary Tillage approx. ha, c. 5.9%</p> <p>Farm structures present: No</p> <p>Potential disturbance/ demolition to Farmyard structures: N/A</p> <p>The Magnitude is deemed to be Low - Medium based on professional opinion.</p>	Low - Medium
AZ2 Airport Section	9	1	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Grassland - Managed extensively Approx. 11.76ha</p> <p>Total agricultural land area post proposed Project – 7.91ha (-3.85ha)</p> <p>Severance: Yes</p> <p>Land use: Grassland -Managed extensively.</p> <p>Land use intensity: Negligible</p> <p>Land take: Permanent Grassland – Managed extensively approx. ha, c. 32.7%</p> <p>Land take: Temporary Grassland – Managed extensively approx. ha, c. 5.9%</p> <p>Farm structures present: No</p> <p>Potential disturbance/ demolition to Farmyard structures: N/A</p> <p>The Magnitude is deemed to be High based on professional opinion.</p>	High
AZ3 Dardistown to Northwood	10	1	<p>Considering land use, farming intensity and the total land take of the holding at this location.</p> <p>Total agricultural land area Tillage – 15.89ha.</p> <p>Total agricultural land area post proposed Project – 14.02ha (-1.87ha)</p> <p>Severance: Yes</p> <p>Land use: Tillage, annual cropping regime in practice.</p> <p>Land use intensity: High</p> <p>Land take: Permanent Tillage approx. ha, c. 11.8%</p> <p>Land take: Temporary Tillage approx. ha, c. 45%</p> <p>Farm structures present: No</p> <p>Potential disturbance / demolition to Farmyard structures: N/A</p> <p>The Magnitude is deemed to be Medium - High based on professional opinion.</p>	Medium - High

Parcel location	Land Owner Ref	Land Parcel Ref	Description of Magnitude	Magnitude Rating
	10	2	Considering land use, farming intensity and the total land take of the holding at this location. Total agricultural land area Tillage – 45.17ha. Total agricultural land area post proposed Project – 24.48ha (-20.69ha) Severance: Yes Land use: Tillage, annual cropping regime in practice. Land use intensity: High Land take: Permanent Tillage approx. ha, c. 45.8% Land take: Temporary Tillage approx. ha, c. 27.1% Farm structures present: No Potential disturbance / demolition to Farmyard structures: N/A The Magnitude is deemed to be High based on professional opinion.	High
	11	1	Considering land use, farming intensity and the total land take of the holding at this location. Total agricultural land area Grassland – 2.98ha. Total agricultural land area post proposed Project – 2.83ha (-0.15ha) Severance: No Land use: Grassland Land use intensity: Negligible Land take: Permanent Grassland – Managed extensively approx. ha, c. 5% Land take: Temporary Grassland – Managed extensively approx. ha, c. 22.6% Farm structures present: No Potential disturbance / demolition to Farmyard structures: N/A The Magnitude is deemed to be Low - Medium based on professional opinion.	Low - Medium

23.4.2.5 Duration

The duration for which an impact is felt will influence the significance. Table 23.3 defines the various categories of duration deemed relevant to the study ranging from momentary to permanent. Each land holding was assessed to establish both the duration of the impact and the source.

Table 23.15 lists the results of the assessments on an individual land holding basis.

Table 23.15: Farm Classified by Duration of Impact

Parcel location	Land Owner Ref	Land Parcel Ref	Duration of Impacts on the Proposed Project			
			Construction Phase		Operational Phase	
			Duration	Impacts	Duration	Impacts
AZ1 Northern Section	1	1	Short Term	✓ Direct Construction Impacts will be experienced by 13	Permanent	✓ Operational Impacts will be experienced by 13 of the 14 land parcels.
	2	1				
	3	1				
	2	2				
	4	1				

Parcel location	Land Owner Ref	Land Parcel Ref	Duration of Impacts on the Proposed Project			
			Construction Phase		Operational Phase	
			Duration	Impacts	Duration	Impacts
	4	2		of the 14 land parcels. One land parcel (LO6 PR1) may experience indirect impacts although the impacts of these are predicted to be Negligible. Construction works associated with each land parcel are listed in Table 23.11		One land parcel (LO6 PR1) may experience indirect impacts although the impacts of these are predicted to be Negligible.
	5	1				
	7	1				
	6	1				
	8	1				
AZ2 Airport Section	9	1				
AZ3 Dardistown Section	10	1				
	10	2				
	11	1				

23.4.3 Significance

During the assessment, the predicted impacts on each land holding were reviewed. All of the impacts will be temporary or permanent in nature. However, without mitigation measures the significance of impacts during the Construction Phase increases, with the implementation of mitigation measures during the Construction Phase the significance of impacts decreases. The combination and significance of impacts pre-mitigation is shown in Table 23.16. The combination and significance of impacts post-mitigation is shown in Table 23.17.

Table 23.16: Summary of Predicted Construction Phase Impacts Pre-Mitigation

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (March 2022)	Land Area (m ² / ha)	Total Land Take Construction Phase (ha)	Nature of Impact on Individual Parcels	Construction Phase			
						Impact Magnitude Pre-Mitigation	Sensitivity	Duration	Significance of Impact Pre-Mitigation
AZ1 Northern Section	LO1 PR1	Leased - Grassland	106,200m ² 10.62ha	5.43	<ul style="list-style-type: none"> The land consists of a grassland parcel used to gaze livestock. Farmyard structures are located on the holding. Disruption to farm roadway. Reduction in area due to permanent (5.31ha) and temporary (0.12ha) land take. There may be some disturbance/ demolition required of farmyard structures (See Section 23.4.2.2.3 Potential disturbance to farmyard structures) Impact to existing access point to land. Construction of the alignment, Estuary Station and Estuary Park and Ride Facility. Potential interruption to utilities such as water and electricity. Potential for sporadic noises associated to construction works to cause distress to livestock. Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Removal of hedgerows and impact on existing field boundaries and farm roadway Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 	High	Medium	Short-Term	Very Significant
	LO2 PR1	Leased-Tillage	340,400m ² 34.04ha	9.13	<ul style="list-style-type: none"> The land consists of tillage production. No farm buildings are located on the holding. Disruption to farm roadway. Reduction in area due to permanent (4.25ha) and temporary (4.87ha) land take. Impact to existing access point to land. Construction of the alignment, and Estuary Station & Estuary Park and Ride Facility. Potential interruption to utilities such as water. Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Removal of hedgerows and impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 	Medium - High	Medium	Short-Term	Very Significant
	LO3 PR1	Leased-Tillage	289,900m ² 28.99ha	2.2	<ul style="list-style-type: none"> The land consists of tillage production. No farm buildings are located on the holding. Reduction in area due to permanent (2.18ha). There is no temporary land take. Impact to existing access point to land. Construction of the alignment, and Estuary Station & Estuary Park and Ride Facility. Potential interruption to utilities such as water. Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Removal of hedgerows and impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 	Low - Medium	Medium	Short-Term	Very Significant

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (March 2022)	Land Area (m ² / ha)	Total Land Take Construction Phase (ha)	Nature of Impact on Individual Parcels	Construction Phase			
						Impact Magnitude Pre-Mitigation	Sensitivity	Duration	Significance of Impact Pre-Mitigation
	LO2 PR2	Grassland - Managed extensively	180,900m ² 18.09ha	2.17	<ul style="list-style-type: none"> The land is in grassland – managed extensively and is grazed by horses. Reduction in area due to permanent (1.03ha) and temporary (1.15ha) land take. Construction of the alignment and for the construction of Swords Central Station. Impact on existing access point to land. Potential for sporadic noises associated to construction works to cause distress to livestock. Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Removal of hedgerows and impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 	Negligible – Low	Low	Short-Term	Moderate
	LO4 PR1	Leased-Tillage	32,600m ² 3.26ha	3.06	<ul style="list-style-type: none"> The land consists of tillage production. No farm buildings are located on the holding. Reduction in area due to permanent (0.58ha) and temporary (2.48ha) land take. Impact to existing access point to land. Construction of the alignment. Impact on existing access point to land. Potential interruption to utilities such as water. Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Removal of hedgerows and impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 	Very High	Medium	Short-Term	Significant
	LO4 PR2	Grassland - Managed extensively	4400m ² 0.44ha	0.44	<ul style="list-style-type: none"> The land is in grassland as is managed extensively. No farm buildings are located on the holding. 100% Reduction in area due to permanent land take (0.44ha). There is no temporary land take. Construction of the alignment and Fosterstown Station. Impact on existing access point to land. Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Removal of hedgerows and impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 	High	Low	Short-Term	Profound
	LO5 PR1	Grassland	18,581m ² 1.86ha	1.12	<ul style="list-style-type: none"> The land is in Grassland. Impact on existing access point to land. Construction of the alignment. Reduction in area due to permanent (1.12ha) ha and no temporary land take. Impact on existing access point to land. Potential interruption to utilities such as water supply. 	High	Medium	Short-Term	Moderate

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (March 2022)	Land Area (m ² / ha)	Total Land Take Construction Phase (ha)	Nature of Impact on Individual Parcels	Construction Phase			
						Impact Magnitude Pre-Mitigation	Sensitivity	Duration	Significance of Impact Pre-Mitigation
					<ul style="list-style-type: none"> Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Removal of hedgerows and impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 				
	LO6 PR 1	Grassland - Specialist Equine	145,700m ² 14.57ha	N/A	<ul style="list-style-type: none"> The land is in grassland which supports a specialist equine facility. Potential for sporadic noises associated to construction works to cause distress to livestock. 	Negligible	Very High	Short-Term	Slight Effects
	LO7 PR1	Grassland	9900m ² 0.99ha	0.047	<ul style="list-style-type: none"> The land is in grassland which supports a veterinary hospital, the plot is used as a recovery paddock for treated animals such as horses, young calves etc. Construction for the alignment. Reduction in area due to permanent (0.047ha) and no temporary land take. Impact on existing access point to land. Potential interruption to utilities such as water supply. Potential for sporadic noises associated to construction works to cause distress to livestock. Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Removal of hedgerows and impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 	High	Very High	Short-Term	Significant
	LO8 PR1	Leased-Tillage	441,600m ² 44.16ha	6.44	<ul style="list-style-type: none"> The land is leased out and used for tillage production. Impact on existing access point to land. Construction of the alignment. Reduction in Agronomy area due to permanent (3.83ha) and temporary (2.6ha) land take. Sub-division of main land holding. Potential interruption to utilities such as water supply Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Removal of hedgerows and impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 	High	Medium	Short-Term	Significant
AZ2 Airport Section	LO9 PR1	Grassland - Managed extensively	117,600m ² 11.76ha	4.54	<ul style="list-style-type: none"> The land is in grassland as is managed extensively. No farm buildings are located on the holding. Reduction in Agronomy area due to permanent (3.85ha) and temporary (0.69ha) land take. Construction of the alignment and Fosterstown Station. Impact on existing access point to land. Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Sub-division of main land holding 	High	Low	Short-Term	Moderate

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (March 2022)	Land Area (m ² / ha)	Total Land Take Construction Phase (ha)	Nature of Impact on Individual Parcels	Construction Phase			
						Impact Magnitude Pre-Mitigation	Sensitivity	Duration	Significance of Impact Pre-Mitigation
					<ul style="list-style-type: none"> Removal of hedgerows and impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 				
AZ3 Dardistown to Northwood	LO10 PR1	Leased-Tillage Production	158,900m ² / 15.89ha	9.03	<ul style="list-style-type: none"> The land is leased out and used for tillage production. Impact on existing access point to land. Construction for the alignment and for Dardistown (future) Depot. Sub-division of main land holding. Reduction in Agronomy area due to permanent (1.87ha) and temporary (7.16ha) land take. Sub-division of main land holding. Potential interruption to utilities such as water supply Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Removal of hedgerows and impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 	Medium - High	Medium	Short-Term	Significant
	LO10 PR2	Leased-Tillage Production	451,700m ² / 45.17ha	32.91	<ul style="list-style-type: none"> The land is leased out and used for tillage production. Impact on existing access point to land. Construction for the alignment and for Dardistown (future) Depot. Sub-division of main land holding. Reduction in Agronomy area due to permanent (20.69ha) and temporary (12.23ha) land take. Sub-division of main land holding. Potential interruption to utilities such as water supply Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Removal of hedgerows and impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds 	High	Medium	Short-Term	Significant
	LO11 PR1	Grassland	29,800m ² / 2.98ha	0.82	<ul style="list-style-type: none"> The land is in grassland. Construction for the alignment. Reduction in area due to permanent (0.15ha) and temporary (0.67ha) land take. Impact on existing access point to land. Potential interruption to utilities such as water supply. Potential for nuisance dust emanating from construction. Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material. Impact on existing field boundaries. Disturbance to soil profile during the construction of the proposed Project. Potential disturbance to existing drainage systems during the construction period. Potential to spread non-native or noxious weeds. 	Low - Medium	Low	Short-Term	Moderate

23.4.4 Operational Phase Impacts

23.4.4.1 Assessment of Operational Phase Impacts

The principal agronomic impacts during the Operational Phase pre-mitigation of the proposed Project are summarised below.

23.4.4.1.1 Permanent Land Take

The level to which the loss of land affects the viability of an individual farm is not solely dependent on the amount of land take or land removed but is also dependant on other factors such as the quality of the land, the total size of the effected holding, enterprise type, if any severance of land occurs, permanent reduction and damage to land access, farm structures or utility supplies as a result of the proposed project.

Agricultural land take will be required for the construction of the proposed Project alignment, stations, park and ride locations, footpaths, cycle lanes, access roads, landscaped areas, earthworks and all other necessary project components. The proposed Project will necessitate the removal of approximately 76.146ha during construction with approx. 26.716ha permanently removed from 'agricultural' use during the operation phase.

Ten of the landowner/occupiers will incur permanent land take, LO1, LO2, LO3, LO4, LO5, LO7, LO8, LO9, LO10 and LO11. Refer to Table 23.13 Land take on individual holdings and Figure 23.2 Agricultural Land Take. Under the statutory compensation process, landowner/occupier will be compensated for permanent land loss which will enable them to purchase alternative replacement lands, albeit at a different location.

23.4.4.1.2 Permanent Severance of Land Parcels

Of the 14 land parcels owned by 11 landowners/occupiers, four land parcels will incur severance, located at LO8 PR1, LO9 PR1, LO10 PR1 and LO10 PR2, in all cases alternative access to the severed land will be provided. Under the statutory compensation process, compensation will be paid to cover additional predicted disturbance caused by severance.

23.4.4.1.3 Operational Noise

All of the landowner/occupiers assessed will be subject to potential additional noise during the Operational Phase. Given the general location, all of the land parcels are already exposed to noise from nearby sources such as roads and Dublin Airport, so the additional noise is not predicted to have any significant impact on landowner / occupier or their land holdings, refer to Chapter 13 (Airborne Noise & Vibration) and Chapter 14 (Groundborne Noise & Vibration).

23.4.4.2 Results of Assessment of the Operational Phase Impacts

The results of the assessment for the proposed Project during the Operational Phase at the individual farm level are summarised in Table 23.17.

The proposed Project is anticipated to result in expanded economic activity in a range of industries at certain areas near the alignment where the land is zoned for uses other than agriculture. This may accelerate the change in land use from agricultural use to other uses such as Metro Economic Corridor, Open Space, High Amenity, High Technology, Green Belt, Dublin Airport, and General Employment consistent with the zoning objectives of the land (refer to Chapter 11 Population & Land Use and the Planning Report).

23.5 Mitigation Measures

Mitigation, according to the EPA Guidelines (2022) is described as a description of measure(s) envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment.

Under the statutory compensation process, compensation will be paid to landowner/occupiers directly impacted by the proposed Project for land take, severance, injurious affection and disturbance to their farming operation, where appropriate.

23.5.1 Construction Phase Mitigation

Construction works will be undertaken following the Indicative Construction Programme outlined in Appendix A5.2 of this EIAR which is designed to minimise disturbance to each individual landowner / occupier. Boundary fencing will be erected to prevent disruption to any adjacent land.

All requisite measures will be employed to minimise the impacts on farms and allow the continuous operation of all affected holdings during the Construction Phase. Crossing points will be agreed and suitable access arrangements will be provided which will accommodate the landowner / occupier while at the same time facilitating the construction of the proposed Project. Access to LO1 PR1, LO2, PR1, LO2 PR2, LO7 PR1, LO8 PR1, LO10 PR, LO10 PR2 and LO11 PR1 land will be required during the Construction Phase. Access to LO6 PR1 is not affected during the Construction Phase. The remaining land parcels LO3 PR1, LO4 PR1, LO4 PR2, LO5 PR1 and LO9 PR1 will be used for the Construction Phase with only some of the land returned post construction. The areas not taken up by construction are likely to be too small to continue farming during the construction period. Existing services (i.e., water and power supplies) will be maintained during the Construction Phase. LO1 PR1, LO2 PR2 and LO6 PR1 will require (if interrupted) the provision of water and power services which, where possible, will be maintained during the Construction Phase.

All reinstatement work will be undertaken in accordance with the requirements outlined in the outline CEMP in Appendix A5.1 and the Landscape Plans devised for the proposed Project (refer to Chapter 27 Landscape & Visual).

Individual landowner/occupiers shall be given notice in advance of construction works so they can arrange their farming activities on lands held adjacent to the proposed Project construction sites to reduce any potential impacts to their overall farming operations. This is particularly important for LO1 PR1, LO2 PR2, LO7, PR1 and LO6 PR1 where livestock are present.

A key liaison person will be appointed during the Construction Phase and will liaise with landowner / occupiers throughout the construction, reinstatement and handover phases to address any queries that landowner / occupiers and stakeholders may have throughout the proposed Project, as outlined in the outline CEMP in Appendix A5.1. They will facilitate communications between affected landowner / occupiers to facilitate the reorganisation of farm enterprises during critical times during the Construction Phase. They will also consult with landowner/occupiers to identify any special management requirements such as specific on farm biosecurity measures and or disease status of farms affected.

23.5.1.1 Land Take (Permanent and Short-Term)

Temporary land occupation and permanent land take will be required for the proposed Project. Land acquired on a temporary basis during the Construction Phase will be reinstated by agreement and returned to the landowner / occupier and compensation will be payable under the Statutory Process. The permanent loss of agricultural land as a result of the construction of the proposed Project will be mitigated through the statutory compensation process.

23.5.1.2 Temporary Loss of Services (Water and Electricity)

Where existing water and power supplies are disrupted during the Construction Phase, an alternative water source and electricity supply will be made available such as a water tanker or electric cable

ducting. If permanent access to surface water sources is disrupted, alternative water supplies will be provided (or compensation will be provided to allow the landowner/occupier to drill their own well).

23.5.1.3 Nuisance Caused by Increased Traffic Volume due to Construction Traffic:

A Scheme Traffic Management Plan (STMP) will be put in place for the Construction Phase to reduce nuisance to landowner / occupiers and other road users (refer to Appendix A9.5). The STMP sets out management and mitigation measures to minimise the transport impact during the Construction Phase of the proposed Project.

23.5.1.4 Nuisance Caused by Noise Emanating from the Construction Phase Works

Mitigation measures will be designed to address specific issues raised by landowner / occupiers. In recognition of the need to work with landowner / occupiers, specific mitigation measures most suitable to individual farm situations will be developed. This will involve continued dialogue with landowner / occupiers to determine the most appropriate mitigation measures for each agricultural holding.

Mitigation measures to limit noise and vibration levels are detailed in the outline CEMP in Appendix A5.1 and further mitigation and monitoring requirements are detailed in Chapter 14 (Groundborne Noise & Vibration).

23.5.1.5 Nuisance Caused by Dust Emanating from Construction Phase Works

A stockpile and materials movement management plan as part of the CEMP has been formulated to ensure measures including but not limited to construction of stockpiles bunds and covers to reduce potentially contaminated run-off and generation of leachate, damping down to prevent wind-blown dust and monitoring of stockpile emissions. Appropriate mitigation measures will be taken to reduce levels of dust generation, including wheel washing and road sweeping. These measures are described in the outline CEMP in Appendix A5.1 and further mitigation and monitoring requirements are detailed in Chapter 16 (Air Quality).

23.5.1.6 Impact on Shelter

Any shelter removed will be reinstated. Re-planting of hedgerows will reflect the original species mix. Refer to Chapter 27 (Landscape & Visual) for further details. Where loss of shelter causes disturbance during the regrowth period, compensation may be payable under the Statutory Process.

Temporary loss of shelter may reduce the protection of livestock from hot and sunny and/or cold and windy weather. Only a small proportion of shelter available to livestock will be impacted in the short-term. The impact to livestock along the proposed Project is minor.

23.5.1.7 Disturbance to Farm Operations

Consultation and liaison between the landowner / occupiers and the appointed contractor(s) during the Construction Phase shall ensure that appropriate measures are taken to minimise disruption and to enable proposed Project activities to occur, in as far as practicable, in conjunction with farming operations.

Appropriate measures include notification of works and commencement of specific works, access arrangements and access to severed lands.

23.5.1.8 Interruption to Drainage Systems

Consultations between project team and the landowner / occupiers will be held to agree the extent of existing land drainage systems that will be impacted by the Construction Phase and to agree the nature and extent of replacement drains required. A detailed record of the locations of land drains intercepted during the Construction Phase will be kept. Drainage systems impacted by the proposed Project will be reinstated. These measures are described in the outline CEMP in Appendix A5.1.

23.5.1.9 Spread of Noxious Weeds and Invasive Species when Soil is Exposed

All plant and equipment used during the Construction Phase will be thoroughly cleaned down using a power washer unit prior to arrival on-site, and prior to leaving site, to prevent the spread of invasive species. A sign-off sheet will be maintained to confirm cleaning. Staff involved in the works will be informed of the specific locations of any invasive species in the area.

The mitigation strategy in relation to non-native invasive plant species is based on the Guidelines on the Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (National Roads Authority, 2010) and The Management of Invasive Alien Plant Species on National Roads (TII, December 2020). A Non-Native Invasive Species Management Plan has been prepared and included in the outline CEMP in Appendix A5.1. This will be implemented in advance of the proposed construction works. This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and preventing the spread of any established population present within the boundary of the proposed Project (refer to Chapter 15 Biodiversity for further information).

23.5.1.10 Spread of Animal Diseases

Disease protocols and farm biosecurity measures will be employed to protect and prevent the spread of pests and diseases. The appointed contractor(s) will comply with the Department of Agriculture Food and the Marine (DAFM) regulations in relation to crops and livestock diseases. During the detailed design phase, fencing requirements will be discussed with landowner / occupiers to ensure that boundaries remain stockproof to prevent the mixing of livestock. Livestock are present for LO1 PR1, LO2 PR2, LO7, PR1 all of which are directly impacted by the proposed Project. LO6 PR1 is a grassland and specialist equine farm, and maybe indirectly impacted by the proposed Project.

Disease protocols and farm biosecurity measures include appropriate fencing off of the proposed Project working area to prevent livestock breaking out. Appropriate fencing off and spraying water for dust from the proposed Project working area will take place within a tillage area to prevent accidental mixing of soils or other materials arising from the Construction Phase.

Procedures during the Construction Phase, as detailed in the outline CEMP in Appendix A5.1, will be undertaken to limit the spread of any disease such as the use of appropriate fencing to prevent livestock from straying, and isolating and separately storing the topsoil and subsoil layers, reinstating all drains and ensuring that there is no cross contamination between different land holdings. This risk will be reduced significantly by ensuring that soil is always stockpiled close to origin and on the same land holding.

23.5.1.11 Spread of Soil-Borne Diseases

All construction equipment will arrive on site clean and free of weeds, soil and debris. Wash-down facilities will be developed to ensure a full clean down of all appointed contractor(s) equipment, machinery, vehicles and footwear before entering farm premises. Biosecurity measures will be implemented to minimise the spread of soil-borne diseases and weeds during the Construction Phase of the proposed Project. These measures are described in the outline CEMP in Appendix A5.1.

23.5.2 Operational Phase Mitigation

Measures to address the Operational Phase impacts of the proposed Project will be implemented as part of the Construction Phase (refer to Chapter 27: The Landscape). For example, where noise is predicted as an impact, noise barriers will be erected, and where hedgerows are removed or land is permanently acquired, compensation to replant hedgerows or purchase alternative land will be available under statutory compensation.

The mitigation measures during the Operational Phase will be the on-going maintenance and upkeep of the boundary fences for the proposed Project.

Table 23.17: Summary of Predicted Construction Phase Impacts Post Mitigation

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
AZ1 Northern Section	LO1 PR 1	Leased – Grassland and Farmyard	<p>Construction Activities within this holding:</p> <p>Construction of surface track, Estuary Station, Park and Ride Facility – including construction site establishment, fencing, topsoil removal, earthworks, enabling works, utility works, vegetation clearance, demolition, construction of access roads, main civil works.</p>	Very Significant	<p><u>Loss of land:</u></p> <p>Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Utilities:</u></p> <p>Alternative utility supplies (Water) will be provided by contractor and normal supplies will be restored as part of completed works.</p> <p><u>Noise:</u></p> <p>Clear communication to the landowner / occupier in advance in relation to any excess noise as a result of noise e.g., Sporadic noises which may arise from blasting, landowner / occupier will need to be aware of this to relocate stock to alternative pastures to avoid stress to livestock during the relevant periods.</p> <p><u>Dust:</u></p> <p>Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p><u>Landscape:</u></p> <p>Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted.</p> <p>All soil will be stocked piles close to origin and within the same land holding.</p> <p>If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated</p> <p>A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.</p>	Moderate

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> Land take (Permanent 5.31ha Temporary 0.144ha / 51% of parcel); Disruption to existing land access; Removal of green infrastructure such as boundaries, trees and hedgerows (Potentially up to c. 900m); Potential impact to water supply land parcels; Disturbance to soil profile; Potential disruption to field drainage systems; Disruption to existing farm roadway; Potential for nuisance dust emanating from construction; Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material; and Potential to spread non-native or noxious weeds if they are existing within the holding. <p>Magnitude Rating pre-mitigation: High Duration: Short Term Sensitivity: Medium</p>			
	LO2 PR1	Leased – Tillage	<p>Construction Activities within this holding:</p> <p>Construction of surface track – including site establishment, fencing, topsoil removal, earthworks, utility works, construction of access roads, main civil works.</p>	Very Significant	<p><u>Loss of land:</u></p> <p>Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Dust:</u></p> <p>Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p><u>Landscape:</u></p> <p>Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted.</p> <p>All soil will be stocked piles close to origin and within the same land holding.</p> <p>If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated</p> <p>A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.</p>	Moderate

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> Land take (Permanent 4.25ha Temporary 4.87ha / 26% of parcel); Disruption to existing land access; Removal of green infrastructure such as boundaries, trees and hedgerows (Boundary shared with LO1 PR1) Disturbance to soil profile; Potential disruption to field drainage systems; Disruption to existing farm roadway; and Potential excess noise and dust above existing levels. <p>Magnitude Rating pre-mitigation: Medium – High Duration: Short Term Sensitivity: Medium</p>			
	LO3 PR1	Leased – Tillage	<p>Construction Activities within this holding:</p> <p>Construction of surface track – including site establishment, fencing, topsoil removal, earthworks, utility works, construction of access roads, main civil works.</p> <p>Construction of Viaduct Broad Meadow Ward River to the south of the parcel.</p>	Very Significant	<p><u>Loss of land:</u> Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Dust:</u> Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p><u>Landscape:</u> Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted. All soil will be stocked piles close to origin and within the same land holding. If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.</p>	Moderate

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> Land take (Permanent 2.18ha Temporary 0ha / 7.5% of parcel); Disruption to existing land access; Removal of green infrastructure such as boundaries, trees and hedgerows (Potentially up to c. 300m); Disturbance to soil profile; Potential disruption to field drainage systems; Potential for nuisance dust emanating from construction; Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material; and Potential to spread non-native or noxious weeds if they are existing within the holding. <p>Magnitude Rating pre-mitigation: Low – Medium Duration: Short Term Sensitivity: Medium</p>			
	LO2 PR2	Grassland - Managed extensively	<p>Construction Activities within this holding:</p> <p>Construction of retained cut sections, cut and cover sections, Swords Central Station – including site establishment, fencing, topsoil removal, utility works, construction of access roads, earthworks, excavation, traffic works, piling and main civil works.</p>	Moderate	<p><u>Loss of land:</u> Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Utilities:</u> Alternative utility supplies (Water) will be provided by contractor and normal supplies will be restored as part of completed works.</p> <p><u>Noise:</u> Clear communication to the landowner / occupier in advance in relation to any excess noise as a result of noise e.g., Sporadic noises which may arise from blasting, landowner / occupier will need to be aware of this to relocate stock to alternative pastures to avoid stress to livestock during the relevant periods.</p> <p><u>Dust:</u> Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p><u>Landscape:</u> Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted. All soil will be stocked piles close to origin and within the same land holding. If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of</p>	Moderate

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
					managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.	
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> Land take (Permanent 1.03ha Temporary 1.15ha / 12% of parcel); Disruption to existing land access; Removal of green infrastructure such as boundaries, trees and hedgerows (Potentially up to c. 480m); Potential for loss of utilities such as water supply during Construction Phase; Disturbance to soil profile; Potential disruption to field drainage systems; Potential sporadic noise associated to construction works may cause distress to livestock; Potential for nuisance dust emanating from construction; Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material; and Potential to spread non-native or noxious weeds if they are existing within the holding. <p>Magnitude Rating pre-mitigation: Negligible – Low Duration: Short Term Sensitivity: Low</p>			
	LO4 PR1	Leased – Tillage	<p>Construction Activities within this holding:</p> <p>Construction of retained cut track, cut and cover track - including site establishment, fencing, top soil removal, utility works, earthworks, excavation, traffic works, piling and main civil works.</p>	Significant	<p><u>Loss of land:</u></p> <p>Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Dust:</u></p> <p>Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p><u>Landscape:</u></p> <p>Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted.</p> <p>All soil will be stocked piles close to origin and within the same land holding.</p> <p>If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated</p> <p>A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.</p>	Moderate
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> Land take (Permanent 0.57ha Temporary 02.48ha / 93.8% of parcel); Disruption to existing land access; Removal of green infrastructure such as boundaries, trees and hedgerows (Potentially up to c. 250m); Disturbance to soil profile; Potential disruption to field drainage systems; and Potential excess noise and dust above existing levels. <p>Magnitude Rating pre-mitigation: Very High Duration: Short Term Sensitivity: Medium</p>			

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
	LO4 PR2	Grassland - Managed extensively	<p>Construction Activities within this holding:</p> <p>Construction of retained cut track, cut and cover track, Fosterstown Station - including site establishment, fencing, topsoil removal, demolition, utility works, earthworks, excavation, traffic works, piling and main civil works.</p>	Profound	<p><u>Loss of land:</u></p> <p>Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Landscape:</u></p> <p>Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted.</p> <p>All soil will be stocked piles close to origin and within the same land holding.</p> <p>If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated</p> <p>A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.</p>	Profound
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> ▪ Land take (Permanent 0.43ha Temporary 0ha / 99% of parcel); ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as boundaries, trees and hedgerows (Potentially up to c. 70m); ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels. <p>Magnitude Rating pre-mitigation: High Duration: Short Term Sensitivity: Low</p>			
	LO5 PR1	Grassland	<p>Construction Activities within this holding:</p> <p>Construction of retained cut track, cut and cover track, Fosterstown Station - including site establishment, fencing, topsoil removal, demolition, utility works, earthworks, excavation, traffic works, piling and main civil works.</p>	Significant	<p><u>Loss of land:</u></p> <p>Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Dust:</u></p> <p>Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p>	Moderate

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
					<p><u>Landscape:</u> Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted. All soil will be stocked piles close to origin and within the same land holding. If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.</p>	
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> Land take (Permanent 1.12ha Temporary 0ha / 60.1% of parcel); Disruption to existing land access; Removal of green infrastructure such as boundaries, trees and hedgerows (Potentially up to c. 215m); Disturbance to soil profile; Potential disruption to field drainage systems; and Potential excess noise and dust above existing levels. <p>Magnitude Rating pre-mitigation: High Duration: Short Term Sensitivity: Medium</p>			
	LO6 PR1	Grassland – Specialist Equine	<p>Construction Activities within this holding: N/A.</p>	Not Significant	<p><u>Noise:</u> Clear communication to the landowner / occupier in advance in relation to any excess noise as a result of noise e.g., Sporadic noises which may arise from blasting, landowner / occupier will need to be aware of this to relocate stock to alternative pastures to avoid stress to livestock during the relevant periods.</p>	Not Significant
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> No direct impact; Potential for indirect impact as a result of excess noise and dust. Potential sporadic noise associated to construction works may cause distress to livestock. Potential for nuisance dust emanating from construction., dust may be generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material; Potential to spread non-native or noxious weeds if they are existing within the holding; and Potential for loss of utilities such as water supply during Construction Phase. <p>Magnitude Rating pre-mitigation: Negligible Duration: Short Term Sensitivity: Very High</p>			
	LO7 PR1	Grassland	<p>Construction Activities within this holding: Construction of cut and cover track – including site establishment, fencing, topsoil removal, earthworks, utility works, construction of access roads, main civil works.</p>	Significant	<p><u>Loss of land:</u> Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained</p>	Moderate

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
					<p>throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Utilities:</u> Alternative utility supplies (Water) will be provided by contractor and normal supplies will be restored as part of completed works.</p> <p><u>Noise:</u> Clear communication to the landowner / occupier in advance in relation to any excess noise as a result of noise e.g., Sporadic noises which may arise from blasting, landowner / occupier will need to be aware of this to relocate stock to alternative pastures to avoid stress to livestock during the relevant periods.</p> <p><u>Dust:</u> Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p><u>Landscape:</u> Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted. All soil will be stocked piles close to origin and within the same land holding. If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.</p>	
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> ▪ Land take (Permanent 0.047ha Temporary 0ha / 4.78% of parcel) ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as boundaries, trees and hedgerows (Boundary shared with LO5 PR1); ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; ▪ Potential sporadic noise associated to construction works may cause distress to livestock; ▪ Potential for nuisance dust emanating from construction. ▪ Dust generated from the following activities: vegetation clearance, movement of trucks, extraction material, and stockpiling of material; and ▪ Potential to spread non-native or noxious weeds if they are existing within the holding. <p>Magnitude Rating pre-mitigation: High Duration: Short Term Sensitivity: Very High</p>			

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
	LO8 PR1	Leased Tillage	<p>Construction Activities within this holding: Construction of retained cut track and surface track - including site establishment, fencing, topsoil removal, demolition, utility works, earthworks, excavation, traffic works, piling and main civil works.</p>	Significant	<p><u>Loss of land:</u> Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Dust:</u> Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p><u>Landscape:</u> Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted. All soil will be stocked piles close to origin and within the same land holding. If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.</p>	Moderate
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> ▪ Land take (Permanent 3.83ha Temporary 2.61ha / 14.57% of parcel); ▪ Severance; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as boundaries, trees and hedgerows (Potentially up to c. 410m including a shared boundary with LO9 PR1 od approx. 160m); ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels. <p>Magnitude Rating pre-mitigation: High Duration: Short Term Sensitivity: Medium</p>			
AZ2 Airport Section	LO9 PR1	Grassland - Managed extensively	<p>Construction Activities within this holding: Construction of surface track, retained cut track, cut and cover track, tunnel - including site establishment, fencing, top soil removal, demolition, utility works, earthworks, excavation, construction of access roads, tunnelling works, traffic works, diaphragm walling and main civil works.</p>	Moderate	<p><u>Loss of land:</u> Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation</p>	Slight

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> Land take (Permanent 3.85ha Temporary 0.69ha / 38.6% of parcel); Severance; Disruption to existing land access; Removal of green infrastructure such as boundaries, trees and hedgerows (Boundary shared with LO8 PR1); Disturbance to soil profile; Potential disruption to field drainage systems; and Potential excess noise and dust above existing levels. <p>Magnitude Rating pre-mitigation: High Duration: Short Term Sensitivity: Low</p>		<p>process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Dust:</u> Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p><u>Landscape:</u> Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted. All soil will be stocked piles close to origin and within the same land holding. If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.</p>	
AZ3 Dardistown Section	LO10 PR1	Leased-Tillage Production	<p>Construction Activities within this holding: Tunnel, surface track, cut and cover track, retained cut track, incline track, M50 Viaduct - including site establishment, fencing, top soil removal, demolition, utility works, earthworks, excavation, construction of access roads, tunnelling works, traffic works, piling and main civil works.</p> <p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> Land take (Permanent 1.87ha Temporary 7.16ha / 56.8% of parcel); Severance; Disruption to existing land access; Removal of green infrastructure such as boundaries, trees and hedgerows (Potentially up to c. 300m); Disturbance to soil profile; Potential disruption to field drainage systems; and Potential excess noise and dust above existing levels. <p>Magnitude Rating pre-mitigation: Medium – High Duration: Short Term Sensitivity: Medium</p>	Significant	<p><u>Loss of land:</u> Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Dust:</u> Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p><u>Landscape:</u> Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted. All soil will be stocked piles close to origin and within the same land holding. If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are</p>	Moderate

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
					visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.	
	LO10 PR2	Leased-Tillage Production	<p>Construction Activities within this holding:</p> <p>Tunnel, surface track, cut and cover track, retained cut track, incline track, M50 Viaduct - including site establishment, fencing, top soil removal, demolition, utility works, earthworks, excavation, construction of access roads, tunnelling works, traffic works, piling and main civil works.</p>	Significant	<p><u>Loss of land:</u></p> <p>Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Dust:</u></p> <p>Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p><u>Landscape:</u></p> <p>Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted.</p> <p>All soil will be stocked piles close to origin and within the same land holding.</p> <p>If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.</p>	Moderate
			<p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> ▪ Land take (Permanent 2.07ha Temporary 12.23ha / 72% of parcel); ▪ Severance; ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as Boundaries, trees and hedgerows (Potentially up to c. 2100m); ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels. <p>Magnitude Rating pre-mitigation: High Duration: Short Term Sensitivity: Medium</p>			

Parcel Location	Landowner (LO) and Parcel Ref. (PR)	Land Use (Jan 2021)	Nature of Impact on Individual Parcels	Construction Phase		
				Significance of Impact Pre-Mitigation	Mitigation Relating to Disturbance of Farming Activities	Significance of Impact Post Mitigation
	LO11 PR1	Grassland	<p>Construction Activities within this holding: Construction of retained cut track - including site establishment, fencing, topsoil removal, demolition, utility works, earthworks, excavation, traffic works, piling and main civil works.</p> <p>Nature of Impacts to Individual Parcels:</p> <ul style="list-style-type: none"> ▪ Land take (Permanent 0.15ha Temporary 0.67ha / 27% of parcel); ▪ Disruption to existing land access; ▪ Removal of green infrastructure such as boundaries, trees and hedgerows (Potentially up to c. 200m); ▪ Disturbance to soil profile; ▪ Potential disruption to field drainage systems; and ▪ Potential excess noise and dust above existing levels. <p>Magnitude Rating pre-mitigation: Low – Medium Duration: Short Term Sensitivity: Low - Medium</p>	Moderate	<p><u>Loss of land:</u> Short term loss of land to facilitate access, storage or construction compounds, Land will be reinstated as far as is reasonably practicable to previous conditions. Ensure access to retained land is maintained throughout the construction period. Under the statutory compensation process, landowner / occupier will be compensated for Temporary and Permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.</p> <p><u>Dust:</u> Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.</p> <p><u>Landscape:</u> Replace boundary with permanent stockproof boundary. Ensure hedgerows and treelines are replanted. All soil will be stocked piles close to origin and within the same land holding. If land drains are intercepted during construction, these will be modified to permit construction of the proposed project. Where field drains are uncovered during excavation, temporary measures will be put in place e.g., additional drainage stone to divert the field drain. Such interruptions may have an impact on other adjacent lands. For land drains that are visible which may include open drains, generally located on the boundary, these will be protected where reasonable, redirected and or reinstated A Non-native Invasive Species Management Plan has been prepared and included in the CEMP; This plan includes measures with the objective of managing noxious weeds and non-native invasive plant species within the working area and prevent the spread of any established population present within the boundary of the proposed Project.</p>	Moderate

23.6 Residual Impacts

The residual impacts are impacts of the proposed Project that will remain following the implementation of mitigation measures, including:

- Residual impacts of the proposed Project at the National and County level; and
- Residual effects at individual farm level.

23.6.1 Residual Impacts at National and County Level

The Agricultural Area in Ireland is 4,509,256ha, (CSO 2020, Preliminary Results). According to Census of Agriculture 2010, the Utilisable Agricultural Area in County Dublin is 37,963ha (this figure will be amended when CSO 2020, Final is released). The proposed Project will necessitate the removal of approximately 76.146ha during construction with approximately 26.716ha permanently removed from 'agricultural' use during the operation phase. The area is not significant at a National or County level. At County level, the total agricultural land acquired for the proposed Project is 0.002%, and a National level of 0.000016%.

There will be no significant change in land use at either the national or local level due to the proposed Project. Therefore, there will be no impact of National or County significance as a result of the construction of the proposed Project.

23.6.2 Residual Impacts at Individual Farm Level

During the Construction Phase, the residual impacts likely to be felt at the individual farm level consist of a reduction in the area farmed; land loss; an increase in construction traffic along with the proposed Project; some instances of increased noise depending on the type of construction (e.g., blasting and general machinery usages such as large excavators and dumper trucks); and the severance of agricultural lands at locations, LO8 PR1, LO9 PR1, LO10 PR1 and LO10 PR2.

Following the Construction Phase, the Operational Phase will come into effect. The majority of residual impacts felt during the Construction Phase will no longer be experienced during the Operational Phase. As a result of the Operational Phase, residual effects such as a change in land use (i.e., from agriculture to a Metro Corridor) and permanent land severance at locations LO8 PR1, LO9 PR1, LO10 PR1 and LO10 PR2. The land take is felt during the Construction Phase and is not a new impact during the Operational Phase. Under the statutory compensation process, compensation will be paid to cover additional predicted disturbance caused by severance, temporary and permanent land loss which will to cover additional predicted disturbance caused by severance and enable them to purchase alternative replacement lands, all be it at a different location.

The residual impacts predicted to affect land holdings will be the same as the impacts experienced during the Operational Phase. The results are summarised in Table 23.18.

Table 23.18: Operational Phase and Residual Impacts

Landowner (LO) and Parcel Ref. (PR)	Nature of Potential Impacts	Operational Phase	Residual Impacts
LO1 PR1	Permanent land loss Reduction to area available for 'Agriculture' Potential noise	Slight	Not Significant
LO2 PR1	Permanent land loss Reduction to area available for 'Agriculture' Potential noise	Not Significant	Not Significant
LO3 PR1	Permanent land loss	Not Significant	Not Significant

Landowner (LO) and Parcel Ref. (PR)	Nature of Potential Impacts	Operational Phase	Residual Impacts
	Reduction to area available for 'Agriculture'		
LO2 PR2	Permanent land loss Reduction to area available for 'Agriculture' Potential noise	Not Significant	Imperceptible
LO4 PR1	Permanent land loss Reduction to area available for 'Agriculture' Potential noise	Slight	Not Significant
LO4 PR2	Permanent land loss of entire parcel	Imperceptible	Imperceptible
LO5 PR1	Permanent land loss Reduction to area available for 'Agriculture' Potential noise	Slight	Not Significant
LO6 PR1	Potential noise	Not Significant	Imperceptible
LO7 PR1	Permanent land loss Reduction to area available for 'Agriculture' Potential noise	Moderate	Not Significant
LO8 PR1	Permanent land loss Reduction to area available for 'Agriculture' Potential noise Land Severance	Moderate	Not Significant
LO9 PR1	Permanent land loss Reduction to area available for 'Agriculture'	Not Significant	Imperceptible
LO10 PR1	Permanent land loss Reduction to area available for 'Agriculture' Potential noise Land Severance	Moderate	Not Significant
LO10 PR2	Permanent land loss Reduction to area available for 'Agriculture' Potential noise Land Severance	Moderate	Not Significant
LO11 PR1	Permanent land loss Reduction to area available for 'Agriculture' Potential noise	Not Significant	Not Significant

23.7 Difficulties Encountered in Compiling Information

No difficulties were encountered in undertaking the impact assessment on agronomy.

During the COVID-19 pandemic, all consultations were completed within the government guidelines. Where possible, landowner/occupier liaison took place remotely via telephone followed by a roadside survey. Where landowner consultations took place face to face, the agronomist remained outside wearing a face covering and gloves as they exited their vehicles and ensured to maintain the two-metre social distance through the consultation.

23.8 Glossary

Term	Meaning
Alignment	Alignment refers to the three-dimensional (3D) route of the railway, considering both the horizontal and vertical alignment.
Construction compound	An area occupied temporarily for construction-related activities. The main construction compounds will act as strategic hubs for core project management activities (i.e., engineering, planning and construction delivery) and for office-based construction personnel. The main construction compounds will include: offices and welfare facilities, workshops and stores, and storage and laydown areas for materials and equipment (e.g., aggregate, structural steel, and steel reinforcement).
Cultivated land	Arable land that is worked by ploughing, sowing and raising crops
Easement strip	During construction, easement strips will be located along the proposed railway alignment within AZ1 and AZ3 to aid construction of retained cutting, cut and cover, elevated track and surface track sections. The easement strips will range between 10m and 25m wide on either side of the alignment. A portion of these strips will be retained as permanent features for rail maintenance purposes during the Operational Phase.
Enabling works	These are works to prepare a site in advance of the main construction works, for example, demolition, removal of vegetation, land levelling.
Grassland	Area in which the vegetation is dominated by a nearly continuous cover of grasses
Intervention shaft	Required to allow access for the fire and rescue service in the event of an emergency underground; to allow control of smoke in the event of fire in the tunnel; and to maintain the tunnel air quality and temperature within prescribed limits during periods of train service congestion
Intervention tunnel	A tunnel parallel to the railway tunnel to provide emergency access
Invasive species	Any kind of living organism that is not native to an ecosystem and causes harm to the environment, the economy, or even human health. Invasive species can grow and reproduce quickly and spread aggressively.
Park & ride facility	A location usually sited out of the main urban areas comprising a large car park and connected with a mass transit system, in the case of MetroLink an urban metro to attract potential travellers to drive and park at the facility and take the metro into the city centre and avoid driving into the city centre.
Retained cut station	A railway station constructed primarily below ground level with vertical retaining walls either side of the alignment to reinforce the walls and no roof or enclosure overhead.
Surface station	A railway station designed at ground level
Tillage	The agricultural preparation of soil by mechanical agitation of various types, such as digging, stirring, and overturning
Tunnel portals	The openings at the end of the tunnel
Underground stations	A railway station located fully underground with a roof slab over the station to enclose it fully.

23.9 References

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