

ENVIRONMENTAL STATEMENT (VOLUME II)

Chapter 16 Population and Human Health (Clean)

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 –
Regulations 5(2)(a)

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16. POPULATION AND HUMAN HEALTH

16.1. INTRODUCTION

- 16.1.1. This Chapter reports the assessment of the likely significant effects of the Development Consent Order (DCO) Proposed Development on Population and Human Health and describes:
- Relevant, legislation, policy and guidance;
 - Consultation undertaken;
 - Scope of the assessment;
 - Assessment methodology;
 - Baseline conditions;
 - Sensitive receptors;
 - Design development and embedded mitigation;
 - Assessment of likely impacts and effects;
 - Mitigation and enhancement measures;
 - Residual effects;
 - Monitoring; and
 - Next steps.
- 16.1.2. This Chapter (and its associated figures and appendices) is intended to be read as part of the wider Environmental Statement (ES), with particular reference to **Chapter 6 - Air Quality, Chapter 11 - Land and Soils, Chapter 12 - Landscape and Visual, Chapter 15 - Noise and Vibration, and Chapter 17 - Traffic and Transport (Volume II)**. The Human Health elements of the assessment draw upon the findings of the Air Quality, Landscape and Visual, and Noise and Vibration assessments.
- 16.1.3. This Chapter has been prepared by competent experts with relevant and appropriate experience, as outlined in **Appendix 5.1 – Relevant Expertise and Competency (Volume III)**.

16.2. LEGISLATIVE AND POLICY FRAMEWORK

- 16.2.1. A summary of the national, and local legislation, planning policy and guidance relevant to the Population and Human Health assessment for the DCO Proposed Development is set out below.

LEGISLATIVE FRAMEWORK

National

Countryside and Rights of Way Act 2000 (Ref. 16.2)

- 16.2.2. This Act makes provision for and aims to protect public access to the countryside. The Act extends the right of public access to the countryside, including to woodlands, the Green Belt, waters and grasslands; and for connected purposes.

Equality Act 2010 (Ref. 16.3)

- 16.2.3. The Act legally protects people from discrimination in the workplace and in wider society. It aims to protect the following characteristics from discrimination:
- age;
 - disability;
 - gender reassignment;
 - marriage and civil partnership;
 - pregnancy and maternity;
 - race;
 - religion or belief;
 - sex; and
 - sexual orientation.

Wellbeing of Future Generations Act 2015 (Wales) (Ref. 16.4)

- 16.2.4. Introduction in 2015, the Wellbeing of Future Generations Act requires public bodies to consider the long-term impacts of their decisions and act to support and promote the improvement of social, economic, environmental and cultural wellbeing of Wales.

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the DCO EIA Regulations) (Ref. 16.1)

- 16.2.5. The DCO EIA Regulations set out the requirements for EIA for nationally significant infrastructure projects. This states that the EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on population and human health.

POLICY

National

Wellbeing of Future Generations Act 2015 (Wales) (Ref. 16.4)

- 16.2.6. The National Policy Statement (NPS) sets out national policy for the energy infrastructure. It has effect for the decisions by the Secretary of State on applications for energy developments that are nationally significant.
- 16.2.7. The NPS states that *“where the proposed project has an effect on human beings, the ES should assess these effects for each element of the project, identifying any adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts”*.
- 16.2.8. It also states that *“where the project is likely to have socio-economic impacts at local or regional levels, the applicant should undertake and include in their application an assessment of these impacts as part of the ES”*. This will, where appropriate, consider the following:
- The creation of jobs and training opportunities;
 - The provision of additional local services and improvements to local infrastructure, including the provision of educational and visitor facilities;
 - Effects on tourism; and
 - The impact of a changing influx of workers during the different Construction, Operation and Decommissioning Stages of the energy infrastructure.

NPS for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Ref.16.6)

- 16.2.9. This NPS, taken together with the ‘Overarching National Policy Statement for Energy’ (EN-1), provides the primary basis for decisions by the Secretary of State on applications it receives for gas supply infrastructure and gas and oil pipelines.

National Planning Policy Framework (Ref. 16.7)

- 16.2.10. The National Planning Policy Framework (NPPF) sets out the Government’s planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced. It states that *“Planning policies and decisions should aim to achieve healthy, inclusive and safe places”*.

National Planning Practice Guidance, Environmental Impact Assessment (Ref. 16.8)

- 16.2.11. This sets out guidance and requirements of the EIA process.

National Planning Practice Guidance, Open space, sports and recreation facilities, public rights of way and local green space (Ref. 16.9):

- 16.2.12. This sets out guidance on how new planning proposals should consider potential impacts on open space, sports and recreation facilities and public rights of way.

National Planning Practice Guidance, Healthy and Safe Communities (Ref. 16.10)

- 16.2.13. This sets out guidance on how new planning proposals should promote health, wellbeing and safety.

Planning Policy Wales: Edition 11 (Ref. 16.11)

- 16.2.14. Planning Policy Wales (PPW, Edition 11) sets the overarching planning policies for Wales. It states that the local community are involved in the development of proposals. The needs, aspirations, health and wellbeing of all people need to be considered at the outset, and proposals should be shaped to help to meet these needs as well as create, integrate, protect and/or enhance a sense of community and promote equality.

Future Wales: The National Plan (Ref. 16.12)

- 16.2.15. This is the national development framework, setting the direction for development in Wales to 2040. It is a development plan with a strategy for addressing key national priorities through the planning system, which includes improving the health and well-being of communities.

Planning Policy Wales, Technical Advice Note 16: Sport Recreation and Open Space (Ref. 16.13)

- 16.2.16. This advice note advises on the role of the planning system in making provision for sport and recreational facilities and informal open spaces, as well as protecting existing facilities and open spaces in urban and rural areas in Wales.

Local

Cheshire West and Chester Local Plan (Ref. 16.14)

- 16.2.17. The Local Plan is divided into two sections: The Local Plan (Part One) which was adopted in 2015 and the Local Plan (Part Two) which was adopted in 2019. The purpose of this Plan is to provide the overall vision, strategic objectives, spatial strategy and strategic planning policies for the borough to 2030. Policy SO8 aims to “Create stronger, safer and healthier communities by enabling access to leisure, recreational and community facilities and promoting walking and cycling”.

Flintshire Local Development Plan

- 16.2.18. The purpose of this Plan is to provide the overall vision, strategic objectives, spatial strategy and strategic planning policies for the borough to 2030.

Objective 7 of the Plan requires development to ‘create places that are safe, accessible and encourage and support good health, well-being and equality.

Cheshire West and Chester Joint Strategic Needs Assessment (Ref. 16.16)

- 16.2.19. The Joint Strategic Needs Assessment (JSNA) brings together data and intelligence that provides greater understanding of the needs of the Cheshire West and Chester local population.

A Well-being Plan for Flintshire, 2017-2023 (Ref. 16.17)

- 16.2.20. To meet the requirements of the Wellbeing of Future Generations (Wales) Act 2015, the Flintshire Public Services Board has prepared an Assessment of Local Well-being. This assesses of the state of economic, social, environmental and cultural well-being in Flintshire.

GUIDANCE

National

Design Manual for Roads and Bridges (DMRB), Sustainability and Environment Appraisal, LA 112 Population and Human Health (Ref. 16.18)

- 16.2.21. This document provides a framework for assessing, mitigating and reporting the effects of road projects on population and health. It introduces significance criteria that aid consistent and proportionate assessment to support the reporting of significant effects of population and human health.

Institute of Environmental Management and Assessment (IEMA), “Health in Environmental Impact Assessment: A primer for a proportionate approach” (Ref. 16.19)

- 16.2.22. This provides guidance and recommendations for public health teams, EIA practitioners, planning officers, consultees, consenting authorities and others concerned with population and human health.

European Public Health Association; Human Health: Ensuring a high level of protection (Ref. 16.20)

- 16.2.23. This paper provides principles and good practice for proportionately addressing health in EIA It contributes towards a consistent coverage of human health within an EIA.

16.3. SCOPING OPINION AND CONSULTATION

RESPONSE TO THE SCOPING OPINION

- 16.3.1. An EIA Scoping Opinion (**Appendix 1.2 – EIA Scoping Opinion (Volume III)**) was received by the Applicant from The Inspectorate on 14 July 2021, including formal responses from Statutory Consultees. A full list of the responses from The Inspectorate and how these requirements have been addressed by the

Applicant are set out in **Appendix 1.3 – Scoping Opinion Responses (Volume III)**.

CONSULTATION UNDERTAKEN TO DATE

- 16.3.2. The following consultation has been undertaken with Flintshire County Council on 28th June 2022 to inform the Population and Human Health assessment: Proposed PRoW diversions and the approach to temporary management at each location were discussed, confirming that all diversions would be temporary. FCC confirmed that they were broadly happy with the proposed approach but temporary closures may be appropriate in some locations.

16.4. SCOPE OF THE ASSESSMENT

- 16.4.1. The scope of this assessment has been established through an ongoing scoping process. Further information can be found in **Chapter 5 - EIA Methodology (Volume II)** of this ES.
- 16.4.2. This section provides an update to the scope of the assessment and re-iterates the evidence base for scoping out elements following further iterative assessment.

ELEMENTS SCOPED OUT OF THE ASSESSMENT

- 16.4.3. The elements shown in **Table 16.1** are not considered to give rise to likely significant effects as a result of the DCO Proposed Development and have therefore not been considered within this assessment. The existing pipeline (Flint Connection to PoA Terminal) is scoped out of the assessment, with only the Newbuild Carbon Dioxide Pipeline and above ground infrastructure being assessed.

Table 16.1– Elements Scoped Out of the Assessment

Element Scoped Out	Justification
Operational and decommissioning effects on private property and housing	Access to private property and housing within the Study Area will be maintained, the ground will be reinstated, and no significant effects have been identified. There are likely to be some temporary disruptions (predominantly from decommissioning traffic) during decommissioning, however, these are unlikely to give rise to any significant effects. Operational and decommissioning effects on private property and housing from landscape and visual, air quality and noise, have also been assessed within Chapter 6 - Air Quality (Volume II) Chapter 12 – Landscape and Visual , Chapter 15 - Noise and Vibration (Volume II) and Chapter 17 – Traffic and Transport assessments, within the ES.

Element Scoped Out	Justification
Operational and decommissioning effects on community land and assets	Access to community land and assets within the Study Area will be maintained, the ground will be reinstated, and no significant effects have been identified. There are likely to be some temporary disruptions (predominantly from decommissioning traffic) during decommissioning, however, these are unlikely to give rise to any significant effects. Operational and decommissioning effects on community land and assets from landscape and visual, air quality and noise, have also been assessed within Chapter 6 - Air Quality, Chapter 12 – Landscape and Visual, Chapter 15 - Noise and Vibration and Chapter 17 – Traffic and Transport (Volume II) assessments, within the ES.
Operational and decommissioning effects on Development Land and Businesses	Access to development land and businesses within the Study Area will be maintained, the ground will be reinstated, and no significant effects have been identified. There are likely to be some temporary disruptions (predominantly from decommissioning traffic) during decommissioning, however, these are unlikely to give rise to any significant effects.
Construction and Decommissioning effects on agricultural land holdings	Whilst there is potential for adverse effects on agricultural land during Construction and Decommissioning these are likely to be very minimal. Surveys undertaken as part of the Land and Soils assessment (Chapter 11 – Land and Soils, Volume II) have identified the amount of land temporarily lost as a result of DCO Proposed Development. In total, 474,992m ² will be temporarily lost during construction. The majority of this land will be used for construction compounds and the land will be reinstated following construction. In total, 4% of the land surveyed will be temporarily lost, and given this low percentage it is not anticipated that loss of agricultural land during construction will significantly affect the operational viability of the agricultural businesses.

Element Scoped Out	Justification
Operational and decommissioning effects on access for walkers, cyclists, and horse riders (WCHs)	There are not anticipated to be significant effects on Public Rights of Way (PRoW), as they will be returned to use, or in the case of Altami Brook, permanently diverted. Any effects are likely to be negligible or minimal and have therefore been scoped out of further assessment. There are likely to be some temporary disruptions during decommissioning, however, there are not anticipated to be any PRoW closures associated with decommissioning. Any potential visual effects have been identified within Chapter 12 – Landscape and Visual (Volume II) .
Operational and decommissioning effects on human health	Once operational the excavation works for the pipeline route will be reinstated, and therefore the baseline environment is not anticipated to change materially. There are likely to be some visual effects from the presence of new Block Valve Stations (BVSs) and Above Ground Installations (AGIs), however, the effects are likely to reduce over time as landscaping and planting establishes. There are likely to be some temporary disruptions (predominantly from decommissioning traffic) during decommissioning, however, these are unlikely to give rise to any significant effects. Operational and decommissioning effects on human health from landscape and visual, air quality and noise, have been assessed within Chapter 12 – Landscape and Visual, Chapter 15 - Noise and Vibration (Volume II) and Chapter 6 - Air Quality (Volume II) assessments, within the ES.

ELEMENTS SCOPED INTO THE ASSESSMENT

Construction Stage

16.4.4.

The construction of the DCO Proposed Development is likely to cause potential disruption to access and negative effects associated with construction noise and dust and potential loss of visual amenity. Therefore, the following elements have been scoped into the assessment:

- Land use and Accessibility
- Disruption to private property and housing;

- Disruption to community land and assets;
- Disruption to local businesses;
- Disruption to access for Walkers, Cyclists, and Horse Riders (WCHs); and
- Potential effects on human health.

Operation Stage

- 16.4.5. The operation of the DCO Proposed Development is likely to cause potential negative effects associated with the permanent loss of agricultural land for landscaping and revegetation mitigation purposes as well as land loss for above ground infrastructure (AGIs and BVSs).

Decommissioning Stage

- 16.4.6. No significant decommissioning effects are anticipated.

16.5. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

STUDY AREA

- 16.5.1. The Study Area for Population and Human Health is detailed below for each element of the assessment. This has been defined using Design Manual for Roads and Bridges (DMRB) guidance LA112 Population and Human Health (herein referred to as DMRB LA112) (**Ref. 16.18**).
- 16.5.2. Despite the DMRB being the standard for assessment of road schemes, this guidance provides the best methodology for assessing Population and Human Health in the context of the DCO Proposed Development.
- 16.5.3. The Study Area for each of the elements of the assessment has been defined below.

Land Use and Accessibility

- 16.5.4. The Study Area for the land use related assessments will include the area within the Newbuild Infrastructure Boundary, and:
- Private property and housing: Land parcels of properties and land owned by private landowners that lie within 500m of the Newbuild Infrastructure Boundary, or those which have a direct means of access within the Newbuild Infrastructure Boundary.
 - Community land and assets: Community land, community and recreational facilities located within 500m of the Newbuild Infrastructure Boundary, or those which have a direct means of access within the Newbuild Infrastructure Boundary.
 - Development land and businesses: Land parcels and businesses located within 500m of the Newbuild Infrastructure Boundary, or those which have a direct means of access within the Newbuild Infrastructure Boundary.

- **Agricultural Land Holdings:** Agricultural land and farm businesses located within 500m of the Newbuild Infrastructure Boundary, or those which have a direct means of access within the Newbuild Infrastructure Boundary.
- **Public Access for WCHs:** A 500m Study Area around the Newbuild Infrastructure Boundary will be used for the assessment of change in accessibility and amenity value of routes used by WCHs and PRoWs. Based on professional judgement, it is considered that this a suitable area within which there is a likelihood of receptors to be affected by the DCO Proposed Development

Human Health

- 16.5.5. For the human health assessment, the Study Area has been determined by the extent and characteristics of the DCO Proposed Development, and the communities directly and indirectly affected by the DCO Proposed Development. The smallest jurisdiction boundaries for the DCO Proposed Development are Lower Super Output Areas (LSOA) which lie within or adjacent to the Newbuild Infrastructure Boundary.
- 16.5.6. Where possible, LSOAs have formed the basis of the Study Area for health because they are the communities that are most likely to experience direct and/or greater impacts.
- 16.5.7. The various area profiles are as follows:
- **National:** England, Wales
 - **Regional:** West Midlands, North Wales
 - **Local Authority:** Cheshire West and Chester (England) and Flintshire (Wales)
 - **Wards:** Gowry, Sandstone, Helsby, Saughall and Mollinton, (Cheshire West and Chester); and Sealand, Shotton Higher, Queensferry, Broughton North East, Aston, Ewloe, Northrop Hall, Northrop, Okenholt, Mancot, Halkyn, Brynford, Flint Trelawny, Caerwys (Flintshire)
 - **LSOAs:**
 - **Section 1:** Cheshire West and Chester 011D, Cheshire West and Chester 022D, and Cheshire West and Chester 022C;
 - **Section 2:** Cheshire West and Chester 022C, and Cheshire West and Chester 022F;
 - **Section 3:** Cheshire West and Chester 025A, Cheshire West and Chester 025C, Cheshire West and Chester 025B, and Sealand 1;
 - **Section 4:** Sealand 1, Queensferry, Mancot 1, and Mancot 2;
 - **Section 5:** Hawarden, Ashton 1, Ashton 2, Ewloe 2, Ewloe 3, Buckley Mountain 2, Northop Hall, and Northop 1;
 - **Section 6:** Northop 1, Flint Trelawny 1; and
 - **Section 7:** Flint Coleshill 1, Brynford, and Caerwys 1.

16.5.8. The human health assessment will focus on the following vulnerable groups who are most likely to experience health impacts, due to the nature of the development:

- Older people;
- People with existing health conditions;
- Unemployed and low-income groups; and
- Socially excluded or isolated groups.

METHOD OF BASELINE DATA COLLATION

Desk Study

16.5.9. The assessment of Population and Human Health is qualitative and has been informed by desk-based study and consultation with relevant authorities and stakeholders.

16.5.10. The following data sources have been used for the collection of baseline information:

- Lle Geo-Portal (**Ref. 16.21**);
- Public Health England Profiles (**Ref. 16.22**);
- Public Health Wales Observatory (**Ref. 16.23**);
- Welsh Index of Multiple Deprivation (WIMD) (**Ref.16.24**);
- English indices of deprivation (IMD) (**Ref. 16.25**);
- NOMIS Labour Market Profiles (**Ref.16.26**); and
- Public Health Wales Local Authority Health Outcomes Profiles (**Ref.16.27**).

Site Visit and Surveys

16.5.11. No site visits or surveys have been undertaken for the purposes of the Population and Human Health assessment. The Population and Human Health assessment has however been reliant upon site visits and surveys undertaken for other chapters. These include:

- Field surveys and site visits to collect viewpoints for the Landscape and Visual Amenity Assessment (**Chapter 12 - Landscape and Visual (Volume II)**)
- Baseline noise surveys undertaken for the Noise and Vibration assessment (**Chapter 15 – Noise and Vibration (Volume II)**)
- Site visits and Automatic Traffic Count (ATC) surveys undertaken for the Traffic and Transport assessment (**Chapter 17 – Traffic and Transport (Volume II)**)

IMPACT ASSESSMENT METHODOLOGY

16.5.12. The methodology for land use related assessments has been defined using DMRB LA112 (**Ref. 16.18**). Despite the DMRB being the standard for

assessment of road schemes, this guidance provides the best methodology for assessing Population and Human Health (in particular for assessing the impacts on land use and accessibility) in the context of the DCO Proposed Development, due to the linear nature of the route.

16.5.13. This approach reflects past professional experience of similar schemes and is deemed to be an appropriate methodology and approach for the DCO Application.

16.5.14. A worst-case scenario has been applied to the assessment, where a 500m Study Area has been applied around the Newbuild Infrastructure Boundary which includes the Permanent Acquisition of Subsurface Area (the corridor within the Newbuild Infrastructure Boundary where the final alignment of the Newbuild Carbon Dioxide Pipeline will be located). This has ensured that all potential receptors have been considered within the assessment.

16.5.15. Further details on the methodologies of each aspect of the Population and Human Health assessment have been detailed below.

Land Use and Accessibility

Private Property and Housing

16.5.16. The assessment has identified accessibility restrictions / severance and changes to amenity as a result of the DCO Proposed Development. The location and likely effects on future residential development land identified in site allocations documentation has also been assessed.

Community Land and Assets

16.5.17. The assessment has identified the location and typical level of use of community land and assets. The impact on the public is set out in terms of accessibility restrictions / severance and changes to amenity.

Development Land and Businesses

16.5.18. The assessment has identified the location and typical level of use of development land and businesses. The impacts on the public have been set out in terms of accessibility restrictions / severance and changes to amenity.

Agricultural Land Holdings

16.5.19. The assessment has identified the location, agricultural use, and frequency of access of agricultural land. The impacts on the viability of agricultural businesses have been set out in terms of accessibility restrictions / severance and permanent loss of land.

Walkers, Cyclists and Horse-riders (WCH)

16.5.20. The assessment has identified likely routes taken by WCHs. The frequency of use for these routes has been determined in consultation with Flintshire County Council (FCC) and Cheshire West and Chester Council (CWCC). The

assessment has set out the impact on WCH receptors according accessibility restrictions / severance resulting in changes to journey length, and changes to amenity.

Human Health

- 16.5.21. A qualitative assessment has been undertaken to determine effects of the DCO Proposed Development on human health. Changes to health determinants as a result of the DCO Proposed Development have been identified using appropriate information from other environmental topics included in the EIA (including Air Quality, Noise, and Landscape and Visual) and any other available information regarding health. Where other relevant environmental topics identify significant residual effects, these are considered likely to give rise to significant effects on human health and are considered as part of this assessment.
- 16.5.22. Health determinants likely to be affected by the DCO Proposed Development, and therefore included in the assessment of human health are:
- Air quality (construction): Emissions are likely to be generated by the release of dust and particulate matter (PM) during the site preparation and construction stage; changes in local pollutant concentrations (Nitrus Oxide [NO²] and PM) due to exhaust emissions from construction vehicles and plant; and changes in local pollutant concentrations due to exhaust emissions from road vehicles delayed due to construction works and road closures. Exposure to air pollutants has been linked to health risks including respiratory conditions.
 - Noise (construction): Noise can give rise to sleep disturbance, annoyance, and effects on mental health, such as anxiety, for nearby residents. Construction work during the night is likely to result in sleep disturbance for all residents, whereby construction work in the day is likely to impact shift workers that have different work patterns which may require them to sleep throughout the day, as well as children, young people, and older people.
 - Visual amenity (construction): Pedestrians, cyclists, and users of the local road network may experience amenity impacts caused by construction traffic resulting in nuisance and disruption; fear and intimidation; increased traffic delay; severance; and road safety impacts as a result of construction traffic (consisting of Heavy Good Vehicles [HGVs], cars and Light Goods Vehicles [LGV]) travelling to and from construction location and equipment storage and Construction Compounds and due to road closures and diversions.
 - Opportunities for physical activity (construction); and
 - Employment opportunities (construction): There is the potential for beneficial impacts on the local economy during construction as expenditure within the local supply chain is likely to increase during the construction works. During construction the average workforce associated with the pipeline installation work is anticipated to be approximately 230 full time equivalent (FTE)

employees, with a peak workforce of approximately 630 FTE employees. The Construction Contractor will be committed to promoting the use of local workforce and suppliers, wherever practicable. Construction employment represents a positive economic effect, with the Construction Stage resulting in job creation and increased local expenditure. Such employment gains will have the potential to result in beneficial health outcomes such as improved mental and physical health and provided opportunities for social contact and inclusion.

SIGNIFICANCE CRITERIA

Land Use and Accessibility

- 16.5.23. The assessment of likely significant effects as a result of the DCO Proposed Development has considered the construction stage. The significance level attributed to each effect has been assessed based on the magnitude of change due to the DCO Proposed Development and the sensitivity of the affected receptor.
- 16.5.24. For Population and Human Health, there is no accepted definition of what constitutes a significant, or not significant, effect. As such, effects have been assessed on the basis of:
- **Consideration of sensitivity of receptors:** Specific values in terms of sensitivity are not attributed to socio-economic resources/receptors due to their diversity in nature and scale, however the assessment instead takes account of the qualitative (rather than quantitative) 'sensitivity' of each receptor and, in particular, on their ability to respond to change.
 - **Magnitude of impact:** This entails consideration of the size of the impact on people or businesses in the context of the area in which the effects will be experienced.
 - **Scope for adjustment or mitigation:** This assessment is concerned in part with economies which adjust themselves continually to changes in supply and demand. The scope for the changes brought about by the DCO Proposed Development to be accommodated by market adjustment will therefore be a criterion in assessing effect significance.
- 16.5.25. Effects are defined as follows:
- **Beneficial:** Classifications of significance indicate an advantageous or beneficial impact on an area, which may be minor, moderate, or major.
 - **Negligible:** Classifications of significance indicate imperceptible impacts on an area.
 - **Adverse:** Classifications of significance indicate a disadvantageous or adverse impact on an area, which may be minor, moderate, or major.
- 16.5.26. For land use and accessibility, sensitivity criteria and magnitude of impact has been assigned according to Table 3.11 and Table 3.12 in the DMRB LA112

(**Ref. 16.18**). This categorises a receptors' sensitivity as: very high; high; medium; low; or negligible. This has been outlined in **Table 16.2** below.

Table 16.2 – Land Use and Accessibility Significance Criteria

Sensitivity	Receptor
Very High	<p>Private Property and Housing:</p> <ul style="list-style-type: none"> Existing housing and land allocated for housing covering >5ha/>150 houses. <p>Community Land and Assets:</p> <ul style="list-style-type: none"> Community land and assets where there is a combination of the following: <ul style="list-style-type: none"> 1) complete severance between communities and their land/assets, with little/no accessibility provision; 2) alternatives are only available outside the local planning authority area; 3) the level of use is very frequent (daily); and 4) the land and assets are used by the majority (>=50%) of the community <p>Development Land and Businesses:</p> <ul style="list-style-type: none"> Existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering >5ha <p>Agricultural Land Holdings:</p> <ul style="list-style-type: none"> Areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure; and Access between land and key agricultural infrastructure is required on a frequent basis (daily). <p>WCH:</p> <ul style="list-style-type: none"> National trails and routes likely to be used for both commuting and recreation that record frequent (daily) use. Such routes connect communities with employment land uses and other services with a direct and convenient WCH route. Little/no potential for substitution. Routes regularly used by vulnerable travellers such as the elderly, school children and people with disabilities, who will be disproportionately affected by small changes in the baseline due to potentially different needs.

Sensitivity	Receptor
	<ul style="list-style-type: none"> • Rights of way for WCH crossing roads at grade with >16,000 vehicles per day.
High	<p>Private Property and Housing:</p> <ul style="list-style-type: none"> • Existing housing and land allocated for housing covering >1-5ha/>30 -150 houses <p>Community Land and Assets:</p> <ul style="list-style-type: none"> • Community land and assets where there is a combination of the following: <ul style="list-style-type: none"> - 1) there is substantial severance between community and assets, with limited accessibility provision; - 2) alternatives are only available in the wider local planning authority area; - 3) the level of use is very frequent (weekly); and - 4) the land and assets are used by the majority (>=50%) of the community <p>Development Land and Businesses:</p> <ul style="list-style-type: none"> • Existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering >1 - 5ha <p>Agricultural Land Holdings:</p> <ul style="list-style-type: none"> • Areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure; and • Access between land and key agricultural infrastructure is required on a frequent basis (weekly). <p>WCH:</p> <ul style="list-style-type: none"> • Regional trails and routes (e.g. promoted circular walks) likely to be used for recreation and to a lesser extent commuting, that record frequent (daily) use. Limited potential for substitution; and/or • Rights of way for WCH crossing roads at grade with >8,000 - 16,000 vehicles per day.

Sensitivity	Receptor
Medium	<p>Private Property and Housing:</p> <ul style="list-style-type: none"> Existing housing and land allocated for housing covering <1ha/<30 houses <p>Community Land and Assets:</p> <ul style="list-style-type: none"> Community land and assets where there is a combination of the following: <ul style="list-style-type: none"> - 1) there is severance between community and assets but with existing accessibility provision; - 2) Limited alternative facilities are available at a local level within adjacent communities; - 3) the level of use is reasonably frequent (monthly); and - 4) the land and assets are used by the majority (>=50%) of the community <p>Development Land and Businesses:</p> <ul style="list-style-type: none"> Existing employment sites (excluding agriculture) and land allocated for employment (e.g. strategic employment sites) covering <1ha <p>Agricultural Land Holdings:</p> <ul style="list-style-type: none"> Areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure; and Access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly). <p>WCH:</p> <ul style="list-style-type: none"> Public rights of way and other routes close to communities which are used for recreational purposes (e.g. dog walking), but for which alternative routes can be taken. These routes are likely to link to a wider network of routes to provide options for longer, recreational journeys, and / or Rights of way for WCH crossing roads at grade with >4000 – 8000 vehicles per day.

Sensitivity	Receptor
Low	<p>Private Property and Housing:</p> <ul style="list-style-type: none"> Proposed development on unallocated sites providing housing with planning permission/in the planning process. <p>Community Land and Assets:</p> <ul style="list-style-type: none"> Community land and assets where there is a combination of the following: <ul style="list-style-type: none"> - 1) limited existing severance between community and assets, with existing full Disability Discrimination Act (DDA)1995 (Ref. 16.30 compliant accessibility provision; - 2) alternative facilities are available at a local level within the wider community; - 3) the level of use is infrequent (monthly or less frequent); and - 4) the land and assets are used by the minority ($\geq 50\%$) of the community. <p>Development Land and Businesses:</p> <ul style="list-style-type: none"> Proposed development on unallocated sites providing employment with planning permission/in the planning process. <p>Agricultural Land Holdings:</p> <ul style="list-style-type: none"> Areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure; and Access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent). <p>WCH:</p> <ul style="list-style-type: none"> Routes which have fallen into disuse through past severance or which are scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes, and/or; Rights of way for WCH crossing roads at grade with $< 4,000$ vehicles per day.

Sensitivity	Receptor
Negligible	<p>Private property and housing: N/A.</p> <p>Community Land and Assets:</p> <ul style="list-style-type: none"> Community land and assets where there is a combination of the following: <ul style="list-style-type: none"> - 1) no or limited severance or accessibility issues; - 2) alternative facilities are available within the same community; - 3) the level of use is very infrequent (a few occasions yearly); and - 4) the land and assets are used by the minority ($\geq 50\%$) of the community. <p>Development land and businesses: N/A.</p> <p>Agricultural Land Holdings:</p> <ul style="list-style-type: none"> Areas of land which are infrequently used on a non-commercial basis. <p>WCH: N/A.</p>

16.5.27. DMRB LA112 (**Ref.16.18**) categorises magnitude as follows:

- **Major effect:** where the DCO Proposed Development could be expected to have a considerable effect (either beneficial or adverse) on receptors.
- **Moderate effect:** where the DCO Proposed Development could be expected to have a perceptible effect (either beneficial or adverse) on receptors.
- **Minor effect:** where the DCO Proposed Development could be expected to result in a small, barely perceptible effect (either beneficial or adverse) on receptors.
- **Negligible:** Where no discernible effect is expected as a result of the DCO Proposed Development on receptors.

16.5.28. DMRB LA112 (**Ref.16.18**) refers to DMRB LA104 Table 3.8.1. (**Ref. 16.28**) for determining significance of effect. This categorises significance as the following:

- **Very Large:** Effects at this level are material in the decision-making process.
- **Large:** Effects at this level are likely to be material in the decision-making process.
- **Moderate:** Effects at this level can be considered to be material decision-making factors.
- **Slight:** Effects at this level are not material in the decision-making process.
- **Neutral:** No effects or those that are beneath levels of perception, within normal bounds of variation.

16.5.29. The significance of effect has been determined using **Table 16.3** below.

Table 16.3 – Land Use and Accessibility Magnitude Criteria

	Magnitude of Impact	No Change	Negligible	Minor	Moderate	Major
Sensitivity	Very High	Neutral	Slight	Moderate or large	Large or very large	Very Large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral or Slight	Neutral or Slight	Neutral or Slight	Slight

Human Health

- 16.5.30. The sensitivity of the population has been determined using professional judgement applied to the health profile presented in the baseline, and reported as low, medium, or high.
- 16.5.31. Community / population sensitivity and changes to health determinants likely to occur as a result of a development have been established, the likely health outcome(s) were identified in line with the following categories:
- **Positive:** A beneficial health impact is identified.
 - **Neutral:** No discernible health impact is identified.
 - **Negative:** An adverse health impact is identified.
 - **Uncertain:** Where uncertainty exists as to the overall health impact.
- 16.5.32. Although the assessment of human health effects describes the likely qualitative health outcomes, it is not possible to quantify the severity or extent of the effects which give rise to these outcomes. For this reason, the magnitude of impact or significance is not applied for human health effects.

ASSUMPTIONS AND LIMITATIONS

- 16.5.33. This Chapter of the ES provides assessment findings as it relates to the DCO Proposed Development as described in **Chapter 3 – Description of the DCO Proposed Development (Volume II)** of the ES and draws upon published data available at this point in the assessment process. The assessment has been carried out against a benchmark of the current baseline conditions prevailing within and around the Newbuild Infrastructure Boundary.
- 16.5.34. As with any dataset, these may be subject to change over time, which may influence the findings of the assessment. As such, there may be a statistical time lag associated with the assessment. However, the approach set out in this ES is accepted best practice.
- 16.5.35. With regards to impacts reported on agricultural land holdings the assessment is based on our current understanding of the agricultural land holdings intersected by the DCO Proposed Development. Compensation as a form of mitigation will be paid on the basis of the true impacts of the DCO Proposed Development on the land holding. These measures would primarily be in the form of financial compensation, for example to allow animal feed to be bought in where loss of land makes that necessary.

16.6. BASELINE CONDITIONS

EXISTING BASELINE

Population

- 16.6.1. The DCO Proposed Development is located across two regions, CWCC in England, and FCC in Wales. Cheshire West and Chester has a total population of 357,200 and Flintshire has a total population of 155,000 (**Ref. 16.29**).
- 16.6.2. The percentages of population per age group for CWCC, FCC, the North West England, Wales, and England are outlined in **Table 16.4**.

Table 16.4– Population by age group (%) (Ref. 16.29).

Age Group	CWCC	FCC	North West England	Wales	England
Under 14	16.2	16.5	17.6	16.5	17.4
15-24	10.8	10	11.9	11.7	11.7
25-64	51.9	51.9	51.8	50.5	52.4
65-84	18.5	19	16.4	18.6	16
85 and over	2.7	2.5	2.3	2.7	2.4

- 16.6.3. Flintshire has the highest population density in North Wales at 352 people per square kilometre (**Ref. 16.29**).
- 16.6.4. Cheshire West and Chester has a population density of 388 people per square kilometre and is one of the least densely populated local authorities within North West England (**Ref. 16.29**).

Human Health

- 16.6.5. According to the World Health Organization (WHO), health is described as “*a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity*” (**Ref. 16.30**).
- 16.6.6. According to the WHO, “*good mental health is when you can: cope with the normal stresses of life; work productively; realise your potential and contribute to the community*” (**Ref. 16.30**).

Public Health Profile

- 16.6.7. The local authority health profile for CWCC states that the health of residents is generally similar to the North West England and England averages.
- 16.6.8. Of the key indicators used by the Office for Health Improvements and Disparities (OHID) (formally Public Health England) Local Authority Profiles (**Ref. 16.22**) only estimated dementia diagnosis rate (aged 65 and over) is significantly worse than the national average.
- 16.6.9. The following indicators perform significantly better than the national average:
- Hip fractures in people aged 65 and over.
 - Percentage of physically active adults.
 - Children in low income families (under 16).
 - Average Attainment 8 score¹.
 - New Sexually Transmitted Infections diagnosis.
 - Tuberculosis incidence (three year average).
- 16.6.10. **Table 16.5** shows that the number of adults (16+) that describe their health as good or very good is highest in the ward of Gowy Rural (which is located within Section 1 and 2 of the DCO Proposed Development) at 84.7%, which is higher than both regional and national averages. Gowy Rural also had the lowest percentage of adults that describe their health as bad or very bad at 3.5%. The neighbouring ward of Upton also has a slightly higher proportion of adults in Good or Very Good health (83.5%) compared with Saughall and Mollington (Section 2 and 3) and the regional and national averages.
- 16.6.11. The ward of Saughall and Mollington has the largest percentage of adults who are 'limited' and 'limited a lot' by a longstanding illness compared to the other wards, as well as both regional and national averages.

¹ The data measures the results of pupils at state-funded mainstream schools in England in 8 GCSE-level qualifications, known as 'Attainment 8'. Each pupil's Attainment 8 score is calculated by adding up the points for their 8 subjects, with English and maths counted twice.

Table 16.5– General Health and Illness (%) (Ref. 16-22)

Description of Health	Gowy Rural (Section 1 and 2)	Upton (Section 2)	Saughall and Mollington (Section 2 and 3)	Cheshire West and Chester	England
Good or Very Good	84.7	83.5	81.5	81.6	81.2
Fair	11.9	11.9	13.2	12.9	13.2
Bad or Very Bad	3.5	4.7	5.1	5.5	5.6
Limited by Longstanding Illness	9.7	9.6	10.9	9.7	9.4
Limited a lot by Longstanding Illness	6.4	7.9	7.9	8.8	8.5

16.6.12. Public Health Wales does not release health profiles in the same way as the Office for Health Improvement and Disparities; however, the North Wales Population Needs Assessment (**Ref. 16.27**) stated that the main conditions affecting the population of North Wales are hypertension (high blood pressure), diabetes, asthma, coronary heart disease and cancer.

16.6.13. **Table 16.6** shows that the number of adults (16+) who describe their health as ‘good or very good’ is higher in Flintshire (which is located entirely within Sections 3 to 7) than both the Betsi Cadwaladr Health Board (the health board for North Wales) and the national average. The number who are ‘limited’ and ‘limited a lot’ by a longstanding illness is also lower than both the Betsi Cadwaladr Health Board and the national average.

Table 16.6– General Health and Illness (%) (Ref. 16.27)

Description of Health	Flintshire (Section 3 to 7)	Betsi Cadwaladr Health Board	Wales
Good or Very Good	76	75	72
Fair	17	18	20
Bad or Very Bad	7	8	9
Limited by Longstanding Illness	30	31	34

Description of Health	Flintshire (Section 3 to 7)	Betsi Cadwaladr Health Board	Wales
Limited a lot by Longstanding Illness	14	15	18

Life Expectancy and Mortality

- 16.6.14. Life expectancy for males and females is shown in **Table 16.7**. Overall male and female life expectancy in Cheshire West and Chester, and Flintshire is broadly in line with the England and Wales averages, with the exception of the North West England region which is slightly lower than national averages.

Table 16.7- Life Expectancy (Ref. 16.22 (England data) and Ref. 16.27 (Wales data))

	Male Life Expectancy (years)	Female Life Expectancy (years)
Cheshire West and Chester	79.9	83.1
Flintshire	79.5	82.7
North West England	77.9	81.7
England	79.7	83.2
Wales	78.5	82.3

Index of Multiple Deprivation

- 16.6.15. The Indices of Deprivation 2019 (**Ref. 16.25**) provide a set of relative measures of deprivation for small geographical areas (Lower-layer Super Output Areas) across England and Wales. The overall Index of Multiple Deprivation 2019 combines together indicators under seven different domains of deprivation, detailed below:
- **Income Deprivation** - the proportion of the population in an area experiencing deprivation relating to low income;
 - **Employment Deprivation** - the proportion of the working-age population in an area involuntarily excluded from the labour market;
 - **Education, Skills and Training Deprivation** - the lack of attainment and skills in the local population relating to both children and young people, and adults;

- **Health Deprivation and Disability** - the risk of premature death and the impairment of quality of life through poor physical or mental health;
- **Crime** - the risk of personal and material victimisation at local level;
- **Barriers to Housing and Services** - the physical and financial accessibility of housing and local services; and
- **Living Environment Deprivation** - the quality of the local environment, relating to the quality of both the 'indoor' and 'outdoor' environments.

- 16.6.16. CWCC has a rank of 183rd out of 317 local authorities in England for overall deprivation (where 1 is the most deprived and 317 the least deprived) (**Ref. 16.25**).
- 16.6.17. Although CWCC has a less deprived population profile compared to England, there are some areas of the local authority experiencing relatively high deprivation. There are 16 LSOAs ranked in the top 10% most deprived neighbourhoods nationally two of which are amongst the top 2% of most deprived areas nationally (**Ref. 16.25**)
- 16.6.18. FCC is the fifth least deprived local authority in Wales (of 22 local authorities). Similarly, to Cheshire West and Chester, there are some pockets of deprivation, with three LSOAs ranked among the top 10% most deprived neighbourhoods in Wales (**Ref. 16.24**)
- 16.6.19. **Table 16.8** shows the rank of deprivation within the LSOAs that fall within the Study Area of the DCO Proposed Development. Sections 1 to 3 of the DCO Proposed Development intersects LSOAs of varying overall deprivation, including an LSOA within the top 10% least deprived in England (Cheshire West and Chester 025B) and an LSOA within the top 50% most deprived in England (Cheshire West and Chester 025C).
- 16.6.20. This is also a similar picture for health deprivation within the same area, with half of the LSOAs that the DCO Proposed Development intersects being within the top 50% most deprived in England and the other half being within the top 50% least deprived in England.
- 16.6.21. From Sections 4 to 7 the levels of overall deprivation are mostly similar, with the majority of LSOAs that the DCO Proposed Development intersects being within the top 50% least deprived in Wales. However, Sealand 1 and Queensferry LSOAs are within the top 30% most deprived in Wales. These LSOAs alongside Macot 2 are also within the top 40% most deprived in terms of health in Wales.

Table 16.8 – Deprivation across LSOAs (Sections 1 – 7)² (Ref. 16.25 - England) (Ref. 16.24 - Wales)

Section	LSOA	Overall Deprivation	Health Deprivation
Section 1	Cheshire West and Chester 022B	50% Least deprived	40% Most deprived
Section 1	Cheshire West and Chester 011D	30% Most deprived	20% Most deprived
Section 1	Cheshire West and Chester 022D	40% Least deprived	50% Most deprived
Section 1/2	Cheshire West and Chester 022C	30% Most deprived	30% Most deprived
Section 2	Cheshire West and Chester 022F	30% Least deprived	40% Least deprived
Section 3	Cheshire West and Chester 025A	40% Least deprived	50% Least deprived
Section 3	Cheshire West and Chester 025C	50% Most deprived	50% Least deprived
Section 3	Cheshire West and Chester 025B	10% Least deprived	40% Least deprived
Section 3/4	Sealand 1	30% Most deprived	30% Most deprived
Section 4	Queensferry	20% Most deprived	20% Most deprived
Section 4	Mancot 1	50% Least deprived	50% Least deprived
Section 4	Mancot 2	50% Least deprived	40% Most deprived
Section 5	Hawarden	10% Least deprived	20% Least deprived
Section 5	Ashton 1	50% Least deprived	50% Least deprived
Section 5	Ashton 2	30% Least deprived	40% Least deprived
Section 5	Ewloe 2	10% Least deprived	10% Least deprived
Section 5	Ewloe 3	10% Least deprived	10% Least deprived
Section 5	Buckley Mountain 2	40% Least deprived	40% Least deprived
Section 5	Northop Hall	20% Least deprived	30% Least deprived

² This table contains national deprivation data from both the English Indices of Deprivation and the Welsh Indices of Deprivation, which are scored slightly differently. Sealand1 (Section 3) is the first LSOA in Wales.

Section	LSOA	Overall Deprivation	Health Deprivation
Section 5/6	Northop 1	20% Least deprived	20% Least deprived
Section 6	Flint Trelawny 1	20% Least deprived	30% Least deprived
Section 7	Flint Coleshill 1	40% Least deprived	50% Least deprived
Section 7	Brynford	40% Least deprived	40% Least deprived
Section 7	Caerwys 1	20% Least deprived	10% Least deprived

Qualifications and Economic Activity

- 16.6.22. The population of Flintshire that are economically active is 79.6% which is slightly higher than the Wales average of 76.4% (**Ref. 16.31**). The population that are unemployed in Flintshire is 3.3% which is slightly lower than the Wales average of 4.2% (**Ref. 16.31**).
- 16.6.23. **Table 16.9** shows that in CWCC, 78.7% of the population (aged between 16 – 64) are economically active which is slightly higher than the North West England average of 76.5% and broadly in line with the Great Britain average (78.4%) (**Ref. 16.32**). Levels of unemployment are somewhat lower in Cheshire West and Chester at 3.6% compared to both regional and national averages (4.6% and 4.4% respectively) (**Ref. 16.32**).
- 16.6.24. CWCC has the highest percentage of skilled workers and lowest unskilled population compared with regional, national and Flintshire averages, with 43.6% of the population attaining level 4 qualifications and above (degree level) and 6.1% of the population with no qualifications (**Ref. 16.32**).
- 16.6.25. By contrast, FCC has a slightly lower proportion of skilled workers compared to the Wales average (38.7%) at 36.7%. Similarly, the proportion of the population with no qualifications is lower than the Wales average (8.2%) at 6.8% (**Ref. 16.32**).

Table 16.9 – Working Age (16-64) Qualification Attainment (%) (Ref. 16.31 and Ref. 16.32.)

	CWCC	FCC	North West England	Wales	Great Britain
NVQ4 and above	43.6	36.7	38.5	38.7	43.5
NVQ3 and above	60.8	55.7	58.1	58.2	61.5

NVQ2 and above	81.8	74.3	77.3	75.4	78.2
NVQ1 and above	89.1	86.6	87.3	85.8	87.6
No qualifications	6.1	6.8	7.5	8.2	6.6

16.6.26. **Table 16.10** outlines employee jobs by industry in CWCC and FCC (**Ref. 16.31** and **Ref. 16.32**). It shows that Flintshire has over three times the number of employees working in manufacturing (28.2%) than Cheshire West and Chester (8.0%) and North West England (9.7%).

16.6.27. The industry with the highest number of employees in CWCC is the Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles at 19%, which is moderately higher than the regional and national averages (**Ref. 16.32**).

Table 16.10 – Employee Jobs by Industry (%) (Ref. 16.31 and Ref. 16.32)

Employee Job by Industry	CWCC	FCC	North West England	Wales	Great Britain
B: Mining and Quarrying	0.1	0.4	0.1	0.2	0.2
C: Manufacturing	8.0	28.2	9.7	11.2	7.9
D: Electricity, Gas, Steam and Air Conditioning Supply	0.3	0.4	0.6	0.6	0.5
E: Water Supply; Sewerage, Waste Management and Remediation Activities	0.8	0.7	0.7	1.0	0.7
F: Construction	3.7	6.3	4.2	5.5	4.8
G: Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	19.0	12.7	16.7	13.4	14.9
H: Transportation and Storage	4.3	4.2	5.0	3.7	5.1
I: Accommodation and Food Service Activities	8.0	6.3	6.8	8.5	7.2
J: Information and Communication	2.8	1.8	3.1	2.2	4.5
K: Financial and Insurance Activities	6.7	0.8	2.6	2.3	3.5

Employee Job by Industry	CWCC	FCC	North West England	Wales	Great Britain
L: Real Estate Activities	1.5	0.7	1.6	1.5	1.8
M: Professional, Scientific and Technical Activities	9.8	7.0	8.9	5.5	8.7
N: Administrative and Support Service Activities	8.0	8.5	8.4	7.3	8.8
O: Public Administration and Defence; Compulsory Social Security	3.7	4.9	4.6	8.1	4.6
P: Education	8.6	6.3	8.5	9.2	9.0
Q: Human Health and Social Work Activities	11.0	7.0	14.4	15.9	13.6
R: Arts, Entertainment and Recreation	3.1	1.8	2.2	2.3	2.2
S: Other Service Activities	1.8	1.0	1.8	1.6	1.9

Air Quality

- 16.6.28. Poor air quality is a significant public health issue and there is clear evidence that particulate matter (PM) has a significant contributory role in mortality rates, and in particular in cardiopulmonary mortality. Sufferers of chronic respiratory diseases such as chronic obstructive pulmonary disease (COPD) and asthma are especially vulnerable to the effects of air pollutants.
- 16.6.29. The prevalence of COPD in CWCC is slightly lower than the national average, with 49.5 people per 100,000 compared to the national average of 50.4 per 100,000 people (**Ref. 16.34**). Conversely, the prevalence of those with asthma is slightly higher at 7.0% of the population compared the national average of 6.5% (**Ref. 16.34**).
- 16.6.30. In Flintshire, the prevalence of COPD is slightly higher than the Welsh average (2% compared to 1.4% nationally) and the prevalence of asthma is somewhat lower than the national average (7% compared to 10% nationally) (**Ref. 16.33**).
- 16.6.31. No current Air Quality Management Areas (AQMAs) are located within Flintshire; however, there are two AQMAs established by CWCC for controlling Nitrogen Dioxide (NO₂), that fall within the Study Area. Both of these AQMAs are located around Elton - one of the AQMAs falls within Section 1, whilst the other straddles the boundary between Section 1 and Section 2.

- 16.6.32. A full review of baseline conditions for air quality receptors is outlined in **Chapter 6 – Air Quality (Volume II)** of this ES.
- Noise and Vibration
- 16.6.33. Excessive noise can harm human health and interferes with people's daily activities. It can disturb sleep, cause cardiovascular and psychophysiological effects, and provoke annoyance responses and changes in social behaviour (**Ref. 16.35**).
- 16.6.34. There are 12 Noise Important Areas (NIAs) and Noise Action Plan Priority Areas (NAPPAs) located across the Study Area. These are associated with the A540 and A41 in Cheshire West and Chester, and the A55 and A494 in Wales (**Ref. 16.21** and **Ref. 16.36**).
- 16.6.35. A full review of baseline conditions for noise sensitive receptors are outlined in **Chapter 15 – Noise and Vibration (Volume II)** of this ES.
- Landscape and Visual Amenity
- 16.6.36. Large areas of Section 1 of the Newbuild Infrastructure Boundary are predominantly urban, with the village of Elton, industrial manufacturers and the Stanlow Manufacturing Complex to the north and northwest. The east, south and southeast is largely rural, however, the M56 runs northeast to southwest of the Newbuild Infrastructure Boundary.
- 16.6.37. Section 2 is predominantly rural with more built-up areas containing residential and commercial dwellings in Thornton Le Moors, Picton, Wervin, and Backford. Chester Zoo is also located to the south of the Newbuild Infrastructure Boundary.
- 16.6.38. Section 3 is predominantly rural. More built-up areas are located to the east and northwest of the Newbuild Infrastructure Boundary within the villages of Saughall and Mollington.
- 16.6.39. Large areas of landscape within Section 4 are built up. Residential dwellings are primarily located towards the northeast, west and northwest of the Newbuild Infrastructure Boundary within the villages of Sandycroft, Mancot and Pentre. A large number of commercial dwellings are located towards the northeast of the Newbuild Infrastructure Boundary within the Queensferry and the Pentre Industrial estates. The Greenacres Animal Park and the Willow Holiday Park are also located adjacent to the Newbuild Infrastructure Boundary to the south and north respectively.
- 16.6.40. Section 5 is predominately urban to the north and south of the Newbuild Infrastructure Boundary, with residential and commercial dwellings concentrated within the outskirts of Shotton and Mancot, Ewloe, and Northop Hall. A quarry landfill is located to the south of the Newbuild Infrastructure Boundary, with the Northop Country Park Golf Club and the Ewloe Castle located to the east and north respectively.

- 16.6.41. Section 6 is predominantly rural with very few residential and commercial properties located throughout. Leadbrook Wood runs east of the Newbuild Infrastructure Boundary.
- 16.6.42. The landscape surrounding Cornist Lane, Pentre Halkyn and Babell Block Valve Stations (Section 7) is predominantly rural with a few residential dwellings.

Land Use and Accessibility

Private Property and Housing

- 16.6.43. Private property is residential land that does not accommodate public space or any other community facility or asset or land allocated within planning policy for residential development. Commercial property is considered under the 'Development Land and Businesses' section below.
- 16.6.44. There are numerous residential properties located within the Study Area, which have the potential to be adversely affected by the DCO Proposed Development. Similarly, there are access roads and entrance ways to a number of private properties within the Newbuild Infrastructure Boundary which have the potential to be adversely affected.
- 16.6.45. An overview of private property and housing for each section of the DCO Proposed Development is provided below; however, full details of residential properties can be found in **Appendix 16.1 –Land Use and Assets (Volume III)**.

Section 1

- 16.6.46. The majority of the private property and housing in Section 1 is located within the village of Elton which is adjacent to the Newbuild Infrastructure Boundary to the northeast, in particular properties along Parkland Drive, and Holm Drive.

Section 2

- 16.6.47. Private property and housing are located predominantly within the villages of Thornton le Moors, Picton, Backford and Wervin. Access to some of these dwellings lies within the Newbuild Infrastructure Boundary, especially Thornton Green Lane, Picton Lane, Wervin Road and Cryers Lane.

Section 3

- 16.6.48. The majority of the private property and housing in Section 3 is located within the villages of Mollington and Saughall. Access to some of these dwellings lies within the Newbuild Infrastructure Boundary, in particular Station Road, Gove Road, and Hermitage Road.

Section 4

- 16.6.49. Private property and housing are located predominantly within the villages of Mancot, Sandy Croft, and Pentre. The Newbuild Infrastructure Boundary

intersects the access roads and entrances to some of these dwellings, in particular Sealand Road, Deeside Lane, Moor Lane and Chester Road East.

Section 5

- 16.6.50. Private property and housing are located predominantly within the villages of Ewloe Green, Aston, and Northop Hall. The Newbuild Infrastructure Boundary crosses the access to some of these dwellings, in particular, Lower Aston Hall Lane, Church Lane, Brookside, and Pinfold Lane.

Section 6

- 16.6.51. There are numerous private properties and housing within Section 6. These are located primarily along Starkey Lane, and Allt-Goch Lane which the Newbuild Infrastructure Boundary intersects.

Section 7

- 16.6.52. There are a number of private properties located within the Study Area of the BVSS - Cornist Lane, Pentre Halkyn and Babell. These are mainly along Cornist Lane, Ffordd Babell, Allt Y Chwiler, and Racecourse Lane.

Development Land and Businesses

- 16.6.53. Businesses are classed as land and buildings operating as commercial or industrial enterprises. A high number of businesses have been identified within the Study Area of the DCO Proposed Development, which have the potential to be adversely affected during the construction stage. Similarly, there are road crossings which provide direct access to a number of businesses within the Newbuild Infrastructure Boundary which have the potential to be adversely affected.
- 16.6.54. An overview of development land and businesses for each section of the DCO Proposed Development is provided below; however, full details of development land and businesses can be found in **Appendix 16.1 – Land Use and Assets (Volume III)**.

Section 1

- 16.6.55. Numerous businesses within the Section 1 Study Area of the DCO Proposed Development were identified, with the majority of the smaller businesses located in the village of Elton. Larger national and international businesses within the Study Area include:
- Encirc Glass - located adjacent to the Newbuild Infrastructure Boundary to the west from Station Road;
 - Ince Bio Power – located on Protos, Marsh Lane approximately 320m north of the Newbuild Infrastructure Boundary;

- The former CF Fertilisers UK Ltd manufacturing complex³ – located off of Marsh Lane adjacent to the Newbuild Infrastructure Boundary to the northeast;
- Roadchef Chester Motorway Services – located on Hill View Way within the Newbuild Infrastructure Boundary;
- Stanlow Manufacturing Complex – located off Poole Lane, within the Newbuild Infrastructure Boundary.

Section 2

- 16.6.56. There are fewer businesses within the Section 2 Study Area of the DCO Proposed Development which are located mainly in the villages of Thornton Le Moors or Picton. Exolum, an international logistics company, is located 90m north of the Newbuild Infrastructure Boundary on Croughton Cottage Lane.

Section 3

- 16.6.57. The majority of businesses within the Study Area of Section 3 of the DCO Proposed Development are located within the villages of Mollington and Saughall. Businesses within the industrial estate on Liverpool Road are adjacent to the Newbuild Infrastructure Boundary to the north. These include Mollington Farm Shop, The Chester Shelf Company, and Aggregate Industries Concrete.

Section 4

- 16.6.58. There are a high number of businesses within the Section 4 Study Area of the DCO Proposed Development which are located primarily in Mancot, Sandycroft, and the Queensferry and Pentre Industrial Estates.
- 16.6.59. Businesses within the Queensferry and Pentre Industrial Estates are adjacent to the Newbuild Infrastructure Boundary including Chester Composites and Intertek. The Greenacres Animal Park is also adjacent to the Newbuild Infrastructure Boundary to the south. The 2 Sisters Poultry is located in the Glendale Business Park, within the Newbuild Infrastructure Boundary.

Section 5

- 16.6.60. There are a high number of businesses identified within the Section 5 Study Area of the DCO Proposed Development. These are mainly located in the outskirts of Shotton and Mancot, and within Ewloe Green and Northop Hall.
- 16.6.61. Chester West Services including Travelodge, Shell, Starbucks and Greggs are located adjacent to the Newbuild Infrastructure Boundary along the A55 North Wales Express Way, with access to these services within the Newbuild Infrastructure Boundary.

³ CF Fertilisers has been confirmed for closure, and this is not anticipated to impact the function or operation of the DCO Proposed Development.

Section 6

- 16.6.62. As Section 6 of the DCO Proposed Development Study Area is not densely populated, only a few businesses were identified. These are located along Connah's Quay Road, Starky Lane and Allt-Goch Lane, and none are adjacent or within the Newbuild Infrastructure Boundary.

Section 7

- 16.6.63. There were no businesses identified within the Study Area of Section 7 of the DCO Proposed Development.

Community Land and Assets

- 16.6.64. In total 76 community receptors have been identified within the Study Area of Sections 1 to 5. There were no community land and asset receptors identified within the Study Area of Sections 6 and 7.
- 16.6.65. **Table 16.11** shows key community land and assets within each section of the DCO Proposed Development. The full list of community land and asset receptors are detailed in **Appendix 16.1 – Land Use and Assets (Volume III)**.

Table 16.11 – Community Land and Assets

Section	Community Land and Assets
Section 1	<ul style="list-style-type: none">• Five play parks• Elton Allotments• Elton Church Hall• Elton pharmacy• University of Chester, Thornton Science Park• St James the Great• Ince Village Hall
Section 2	<ul style="list-style-type: none">• Three churches• Thornton Manor Care Home• Gowy Meadows Nature Reserve• Greater Grace School of Christian Education• Chester Zoo
Section 3	<ul style="list-style-type: none">• The Five Villages Hall• St Oswald Primary School• Crabwall Hall Care Home• St Bartholomew's Church
Section 4	<ul style="list-style-type: none">• Fore Golf Course• Harwarden Airport• Tornado Heritage Centre• Three places of worship• Sandycroft Community Centre• Two care homes• Two doctors' surgeries• Mancot Library

Section	Community Land and Assets
	<ul style="list-style-type: none"> • Mancot Village Hall • Sandycroft County Primary School • Library • Four Play parks/ playing fields
Section 5	<ul style="list-style-type: none"> • Allotments • Hawarden and Ewloe Community Woodland • Three primary schools • The Highway Day Nursery • Hawarden High School • Post Office • Nature Reserve • Two care homes • Four churches • Flintshire County Council Offices • Hawarden Scout Club • Skatepark • Five sports clubs
Section 6	No community facilities were identified.
Section 7 (BVS)	No community facilities were identified.

Agricultural Land Holdings

- 16.6.66. There are a considerable number of agricultural land holdings and land used for farming purposes within the Study Area of the Proposed Development, which have been identified using arial mapping and the Agricultural Land Classification (ALC) Survey undertaken, as outlined in Appendix 11.4 – Agricultural Land Classification and Soil Resources. Only a limited number of these landholdings have the potential to be adversely affected during the operational stage (due to the operational phase land take being required for essential mitigation for significant effects and the citing of AGIs and BVSs), and these are identified in the below tables.

Section 1

Table 16.12 – Agricultural Land Holdings located within the Study Area – Section 1

Plot Number	Agricultural Use	Frequency of Access Required
Plot 1-07 (Work No. 1)	Arable	Monthly
Plot 1-09 (Work No. 1 and Work No. 2)	Arable	Monthly

Plot Number	Agricultural Use	Frequency of Access Required
Plot 1-10 (Work No. 4)	Arable	Monthly
Plot 1-14 (Work No. 2 and Work No. 3)	Arable	Monthly
Plot 3-03 (Work No. 57A)	Dairy and mixed arable	Daily
Plot 3-18a (Work No. 57B)	Mixed livestock	Daily

Section 2

Table 16.13 – Agricultural Land Holdings located within the Study Area – Section 2

Plot Number	Agricultural Use	Frequency of Access Required
Plot 5-01 (Work No. 57C) Plot 5-07 (Work No. 57D)	Horses	Daily
Plot 3-18a (Work No. 57B)	Mixed livestock	Daily
Plot 5-18 (Work No. 57E)	Arable	Monthly
Plot 6-01 (Work No. 57F)	Arable	Monthly
Plot 6-03 (Work No. 57F)	Pasture	Infrequent
Plot 6-06 (Work No. 57F)	Arable	Monthly
Plot 8-12 (Work No. 20)	Arable	Monthly
Plot 8-13 (Work No. 20)	Pasture	Infrequent

Section 3

Table 16.14 – Agricultural Land Holdings located within the Study Area – Section 3

Plot Number	Agricultural Use	Frequency of Access Required
Plot 9-15 (Work No. 57G)	Dairy and pasture	Daily
Plot 11-03 (Work No. 26 and 27)	Arable	Monthly

Section 5

Table 16.15 – Agricultural Land Holdings located within the Study Area – Section 5

Plot Number	Agricultural Use	Frequency of Access Required
Plot 17-03 (Work No. 36 and 37)	Pasture	Infrequent
Plot 17-04 (Work No. 37)	Pasture	Infrequent
Plot 17-21 (Work No. 57H)	Pasture	Infrequent
Plot 17-43 (Work No. 57I)	Livestock	Daily
Plot 17-44 (Work No. 57I) Plot 19-01 (Work No. 57J)	Arable	Monthly
Plot 19-04a (Work No. 57K) Plot 19-04b (Work No. 57K)	Dairy	Daily
Plot 19-13 (Work No. 57L)	Pasture	Infrequent
Plot 20-11 (Work No. 57M)	Pasture	Infrequent
Plot 20-13a (Work No. 57M)	Pasture	Infrequent
Plot 20-19a (Work No. 45)	Pasture	Infrequent

Section 6

Table 16.16 – Agricultural Land Holdings located within the Study Area – Section 6

Plot Number	Agricultural Use	Frequency of Access Required
Plot 22-03 (Work No. 48)	Arable	Monthly
Plot 22-06 (Work No. 48)	Arable	Monthly
Plot 22-10 (Work No. 50)	Arable	Monthly

Section 7

Table 16.17 – Agricultural Land Holdings located within the Study Area – Section 7

Plot Number	Agricultural Use	Frequency of Access Required
Plot 25-05 (Work No. 51)	Arable	Monthly
Plot 25-10 (Work No. 51 and 52)	Arable	Monthly
Plot 27-03 (Work No. 53 and Work No. 54)	Pasture	Infrequent
Plot 29-05 (Work No. 55 and Work No. 56)	Pasture	Infrequent

Walkers Cyclist and Horse Riders

- 16.6.67. The PRoWs have been identified using the Flintshire County Council PRoWs map (**Ref. 16.37**) and Cheshire West and Chester Council PRoWs map (**Ref. 16.38**).
- 16.6.68. In total across the Study Area of the DCO Proposed Development, 184 PRoWs were identified. Further details have been provided in **Appendix 16.2 (Revision B)**.
- 16.6.69. In addition, there are three National Cycle Routes within the Study Area; Route 5 (runs within Section 1 and 3), Route 56 (Section 3) and Route 70 (Section 3) (**Ref. 16.39**).

Table 16.18 – PRowS located within the Study Area

Section	PRow
Section 1	10 Footpaths NCN Route 5
Section 2	20 Footpaths 4 Bridleways NCN Route 70
Section 3	19 Footpaths 1 Byway NCN Routes 5, 56 and 70 Traffic Free Chester Chester Millennium Greenway
Section 4	22 footpaths Wales Coast Path
Section 5	54 footpaths
Section 6	11 footpaths
Section 7	44 footpaths

FUTURE BASELINE

- 16.6.70. The population in Flintshire is set to increase by 3% over the next 20 years whilst the population in Cheshire West and Chester is anticipated to increase by 10.8% (**Ref.16.40**). Changes to the distribution and structure of the population will impact on the labour market, the housing market and demand for services and facilities.
- 16.6.71. The population isn't just growing it is also ageing, with the over 65s anticipated to grow by 25.6% in Flintshire and 39.6% in Cheshire West and Chester over the next 20 years (**Ref.16.40**). An increasing older population is likely to result in greater pressure on community facilities, particularly those related to elderly care services such as medical services and care homes.

16.7. SENSITIVE RECEPTORS

- 16.7.1. The sensitivity of receptors has been outlined in **Appendix 16.1 – Land Use and Assets** and **Appendix 16.2 - PRowS (Volume III)**.
- 16.7.2. The sensitivity of the population is reported as either low, medium or high. The sensitivity of health receptors is reported differently to land use and accessibility. As outlined in DMRB LA 112 (**Ref. 16.18**), there is a need to identify the health profile of affected communities, identifying vulnerable groups / communities. The sensitivity of population encompasses their ability to withstand exposures and the range of associated impacts or effects, and the physiological and socio-economic factors that increase their susceptibility to the exposure.

16.7.3. Using the baseline information set out in **Section 16.6**, the sensitivity of the population residing in the LSOAs within the Study Areas for each of the proposed sections is detailed below:

- Section 1 – Medium
- Section 2 – Medium
- Section 3 – Low
- Section 4 – Medium
- Section 5 – Low
- Section 6 – Low
- Section 7 – Low

16.8. DESIGN DEVELOPMENT, IMPACT AVOIDANCE, AND EMBEDDED MITIGATION

16.8.1. Embedded mitigation includes those measures that have already been incorporated into the Preliminary Design of the DCO Proposed Development to avoid or reduce any likely significant effects (these measures have been included in the assessment in **Section 16.9** below).

16.8.2. The Population and Human Health assessment has included the following embedded mitigation measures:

- A standard working-day of ten hours per day and five days per week is being proposed by the Applicant for the construction of the DCO Proposed Development. However, certain activities will require continual 24 hour working, for example, the drilling phase for trenchless installation techniques. As described in **Chapter 3 – Description of the DCO Proposed Development (Volume II)** these activities are not anticipated to exceed a period of days, though the longer crossings in difficult ground conditions are expected to last up to four weeks.
- All designated PRowS have been identified (See **Appendix 16.2 - PRowS (Volume III)**), and any potential temporary closures and diversions applied for/detailed in the DCO Application. All designated PRowS crossing the working areas will be managed, with access only closed for short periods while construction activities occur.
- An Outline Construction Traffic Management Plan (OCTMP) has been prepared in support of this ES (**OCTMP Document reference: D.6.5.3**). This provides details of procedures for construction related traffic.
- An Interim Workers Travel Plan is presented in **Appendix 17-14 (Volume III)**. This focuses on reducing the traffic impacts associated with construction workers travelling to and from the site.
- Construction works will generally be contained within a fenced working area.

- The Carbon Dioxide Pipeline will be buried underground for its entire length, except for short sections of pipeline within the AGIs, and above-ground valve stems within the BVSs.
- Temporary Construction Compounds will be established before commencement of the main construction works. The fenced compounds will be accessed from the existing road network.
- Lighting at construction compounds will be of the lowest luminosity necessary for safe delivery of each task. It will be designed, positioned, and directed to reduce the intrusion into adjacent properties and habitats.
- Construction works for open cut trenching will generally be contained within a fenced construction corridor, termed the Working Width. This will be kept as narrow as practicable but will be a typical up to maximum width of 32m.
- Where hedgerow removal is required to facilitate construction, it has been assumed this will be kept to a maximum width of 15 m (this includes both hedgerows and the trees that sit within hedgerows). The Construction Contractor will be committed to promoting the use of local workforce and suppliers, wherever practicable.
- Routine operations at the AGIs and BVSs are not anticipated to produce notable noise emissions and there will be no on-site power generating equipment.
- Once the DCO Proposed Development is operational, it will not require permanent staffing or personnel presence.

16.9. ASSESSMENT OF LIKELY IMPACTS AND EFFECTS

16.9.1. This section details the assessment of predicted impacts and effects for the DCO Proposed Development during the construction and operational stages.

SIGNIFICANT EFFECTS

16.9.2. The likely significant effects for Population and Human Health associated with the construction and operational stages are set out below. These have been split out into the seven sections of the DCO Proposed Development and further broken down by topic.

Construction Stage – Section 1

Private Property and Housing

16.9.3. No significant effects on private property and housing in Section 1 have been identified. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details.

Community Land and Assets

16.9.4. No significant effects on community land and assets in Section 1 have been identified. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details.

Development Land and Businesses

- 16.9.5. The Ince Resource Recovery Park (Protos) is a safeguarded development site (yet to be fully developed) under the Cheshire West and Chester Local Plan (**Ref. 16.14**). Located within the Study Area boundary, the site is 104 hectares, with 50 hectares of developable land. Due to its size, and potential employment opportunities, the site is deemed to be of very high sensitivity.
- There are nine businesses located within the Study Area, the majority of which are small local businesses that serve the Elton community, however, there are some larger firms located towards the north of the village. Due to the size of Encirc Glass (Ash Road) this has been deemed to be of a high sensitivity.
- 16.9.6. There is the potential for temporary disruption to all businesses within the Study Areas and their employees as a result of potential minor access restrictions to roads whilst construction is undertaken. Associated construction traffic could also give rise to amenity effects for employees and customers.
- 16.9.7. As such, there is the potential for businesses, employees and customers to experience adverse impacts associated with disruption in access. The magnitude of these effects is, however, likely to be minor. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details on these businesses and the anticipated effects.
- 16.9.8. Given the very high sensitivity of the Protos development site, and high sensitivity of Encirc Glass, ***moderate adverse (significant)***, temporary, short-term effects have been identified.

WCH

- 16.9.9. There are 11 PRoWs located within the Study Area for Section 1. In addition, National Cycle Network (NCN) Route 5 is also located within the Study Area. All PRoWs are deemed to be of a medium sensitivity, whilst the national significance of NCN Route 5, has resulted in a finding of very high sensitivity.
- 16.9.10. There is one planned diversion to PRoW 123/FP3/1 (south of Elton) within the Study Area, however, as the cumulative increase in journey length is 160m, effects are anticipated to minor and *not significant*. All other PRoWs in the Study Area are likely to remain unaffected by the DCO Proposed Development. Refer to **Appendix 16.2 - PRoWs (Volume III)** for further details.
- 16.9.11. NCN Route 5 is predominantly located on the local roads around Elton, including those adjacent to the Newbuild Infrastructure Boundary. Users therefore have potential to feel intimidated by construction traffic and could face temporary delays to their journeys, due to a potential increase in the volume of construction traffic. There may also be a temporary loss in amenity value from construction work. The magnitude of effect is deemed to be minor. Therefore, ***moderate adverse (significant)***, temporary, short-term effects have been identified on WCHs using this route.

Human Health

- 16.9.12. The overall sensitivity of the population in Section 1 is deemed to be Medium, see **Section 16.7** for more details.
- 16.9.13. It should be noted that following the DMRB methodology, significance and magnitude of impact is not recorded for human health impacts. Refer to **Section 16.5** above for further details.
- 16.9.14. Details on each of the key determinants of health within the assessment of human health impacts have been described below.

Air pollution

- 16.9.15. **Chapter 6 - Air Quality (Volume II)** identifies the village of Elton to be a sensitive human receptor location due to the close proximity of residential dwellings. However, air quality risks to human health were deemed low to negligible during construction of the DCO Proposed Development pre-mitigation, including pipeline trench digging and Stanlow AGI construction.
- 16.9.16. Therefore, air quality effects on human health during construction are likely to result in a neutral effect.

Noise and Vibration

- 16.9.17. Construction activities are likely to result in some noise impacts from construction plant and construction vehicles accessing and servicing the DCO Proposed Development.
- 16.9.18. Due to the proximity of the residential dwellings in Elton to the proposed construction works, noise during construction may result in a negative effect on human health.
- 16.9.19. **Chapter 15 - Noise and Vibration (Volume II)** of this ES – states that pre-mitigation, 13 sensitive receptors (which includes dwellings and community facilities) will experience medium to high adverse daytime noise impacts during the Construction Stage, 83 sensitive receptors are likely to experience medium to high adverse evening noise impacts and 144 sensitive receptors are likely to experience medium to high adverse night time noise impacts.
- 16.9.20. Day time noise is likely to be associated with vibratory piling, ground compaction and in some areas, construction traffic, whilst evening and night time noise is anticipated to be as a result of construction activities associated with the trenchless installation techniques.
- 16.9.21. However, it is acknowledged that, at the majority of trenchless crossings, this activity will occur occasionally and for a short period of time. As described in **Chapter 3 – Description of the DCO Proposed Development (Volume II)**, at some locations with difficult ground conditions, the duration of the evening and night-time working is expected to last up to four weeks.

- 16.9.22. Therefore, noise impacts on human health during construction are likely to result in a **negative** effect.

Visual Amenity and Physical Activity

- 16.9.23. There are no proposed closures of PRow however, PRow 123/FP3/1 is temporary diverted. **Chapter 12 – Landscape and Visual (Volume II)** concludes that the construction of the DCO Proposed Development will be clearly visible from a number of PRows. However, as the area is already influenced by the surrounding industrial landscape, nearby effects are likely to be low pre-mitigation.

- 16.9.24. Therefore, visual amenity and physical activity effects on human health during construction is likely to result in a neutral effect.

Employment

- 16.9.25. Health outcomes as a result of increased employment opportunities and income levels during construction are anticipated to have a **positive** effect, particularly for unemployed and low-income groups who are able to access employment as a result of the DCO Proposed Development.

Construction Stage – Section 2

Private Property and Housing

- 16.9.26. There are 157 private properties located in the 500m Study Area for Section 2. The majority of these properties will remain unaffected by the construction of the DCO Proposed Development.
- 16.9.27. As part of the DCO Proposed Development there is a planned open cut trench that crosses Cryers Lane, which will temporarily block northern access to Elton. Although this crossing is located in Section 1, it only affects properties located within Section 2.
- 16.9.28. There is a planned diversion, which will divert cars south, joining Ince Lane and Warrington Road. This will add an approximate 10km diversion. There are five properties that are likely to be affected by the planned diversion, for which residents will need to temporarily take this diversion in order to access their properties. These properties are deemed to be of a medium sensitivity. See **Table 16.19** below.
- 16.9.29. The magnitude of impact is deemed to be moderate, resulting in **moderate adverse (significant)** temporary, short term effects on properties on Cryers Lane.

Table 16.19– Affected Private Property and Housing in Section 2

Road Name, Location	Diversion/Effect Details	Number of Properties Affected (Sensitivity)	Magnitude of Impact
Cryers Lane (north of M56)	Planned Open cut trench across Cryers Lane (B5132). Diversion via Thornton Green Lane	2 (Moderate)	Medium
Cryers Lane (south of M56)	Construction of Rock Bank BVS is anticipated to last 4 months. Approximate Length: 10km Diversion Duration: 2-4 weeks	3 (Moderate)	Medium

Community Land and Assets

- 16.9.30. There are seven community facilities located within 500m Study Area for Section 2, most of which will remain unaffected by the construction of the DCO Proposed Development.
- 16.9.31. Thornton Manor Care Centre and Nursing Home is located off of Thornton Green Lane, approximately 250m north west of the proposed open cut trench across Thornton Green Lane, within the Study Area.
- 16.9.32. Access will be maintained throughout the construction period; however, there is potential for disturbance from noise and vibration, construction traffic and potential traffic delays due to the proposed diversion.
- 16.9.33. The nursing home provides 24 hour care to residents, some of which are highly vulnerable. The sensitivity of Thornton Manor Nursing Home is therefore deemed to be very high. The magnitude of effect is anticipated to be moderate, resulting in **large adverse (significant)**, temporary, short term effects, on Thornton Manor Care Centre Nursing Home.

Development Land and Businesses

- 16.9.34. No significant effects on development land and businesses in Section 2 have been identified. **Appendix 16.1 – Land Use and Assets (Volume III)** for further details.

WCH

- 16.9.35. There are 20 PRowS located within 500m Study Area for Section 2, of which six are located within the Newbuild Infrastructure Boundary and eight which run

adjacent to the Newbuild Infrastructure Boundary. All routes are of a medium sensitivity.

- 16.9.36. **Table 16.20** below shows those PRowWs intersected by the Newbuild Infrastructure Boundary, which have the potential to be negatively affected by the DCO Proposed Development.

Table 16.20 – Affected PRowWs in Section 2

PRow Name	Indicative Diversion/Effect Details	Sensitivity of PRow	Magnitude of Impact
309/FP1/2	Proposed to divert along the southern Newbuild Infrastructure Boundary to join up with Picton Lane. Diversion Length: 265m Journey Decrease: 385m Diversion Duration: 2-4 weeks	Medium	Moderate
309/FP3/1	Proposed to divert along the southern Newbuild Infrastructure Boundary to join up with Picton Lane. Diversion Length: 205m Journey Decrease: 675m Diversion Duration: 2-4 weeks	Medium	Major
294/FP2/1	Proposed to diverted south, through the trenchless crossing and back north to re-join the existing route. Diversion Length: 430m Journey Increase: 334m Diversion Duration: 2-4 weeks	Medium	Moderate
309/BR4/1	No planned diversion Route likely to be sequenced and fully reinstated once Construction Stage completed	Medium	Major

- 16.9.37. The magnitude of impact for PRow routes 309/FP1/2 and 294/FP2/1 is moderate, resulting in ***moderate adverse (significant)*** temporary, short-term effects on WCHs using these routes.
- 16.9.38. The magnitude of impact for PRow routes 309/FP3/1 and 309/BR4/1 is major due to their diversion lengths either exceeding 500m or there being no possible diversion route. This has resulted in ***large adverse (significant)*** temporary, short-term effects on WCHs using these routes.

Human Health

- 16.9.39. The overall sensitivity of the population in Section 2 is deemed to be Medium, see **Section 16.7** for more details. Details on each of the key determinants of health within the assessment of human health impacts have been described below.

Air pollution

- 16.9.40. Due to the close proximity of the residential dwellings in Thornton-Le-Moors and the Thornton Manor Care Centre and Nursing Home to the proposed construction works, changes in air quality may result in negative effects on human health, especially for vulnerable people such as those with respiratory conditions and the elderly.
- 16.9.41. The air quality findings (outlined in **Chapter 6 - Air Quality (Volume II)**) state that effects to human health are deemed to be negligible for dust and low risk for earthworks, trackout and construction plant emissions pre-mitigation. Although, Thornton Manor Care Centre and Nursing Home has vulnerable populations, this risk to health is still likely to be low.
- 16.9.42. Therefore, air quality effects on human health during construction is likely to result in a *neutral* effect.

Noise and Vibration

- 16.9.43. Construction activities are likely to result in some noise impacts from construction plant and construction vehicles accessing and servicing.
- 16.9.44. Due to the proximity of the residential dwellings in Thornton-Le-Moors, (including the Thornton Manor Care Centre) to the proposed construction works noise during construction may result in a negative effect on human health.
- 16.9.45. **Chapter 15 - Noise and Vibration (Volume II)** of this ES – states that pre-mitigation, 40 sensitive receptors (which includes dwellings and community facilities) will experience medium to high adverse daytime noise impacts during the Construction Stage, 45 sensitive receptors are likely to experience medium to high adverse evening noise impacts and 59 sensitive receptors are likely to experience medium to high adverse night time noise impacts.
- 16.9.46. Day time noise is likely to be associated with vibratory piling, ground compaction and in some areas, construction traffic, whilst evening and night time noise is anticipated to be as a result of construction activities associated with the trenchless installation techniques.
- 16.9.47. However, it is acknowledged that, at the majority of trenchless crossings, this activity will occur occasionally and for a short period of time. As described in **Chapter 3 – Description of the DCO Proposed Development (Volume II)**, at some locations with difficult ground conditions, the duration of the evening and night-time working is expected to last up to four weeks.

- 16.9.48. Therefore, noise impacts on human health during construction are likely to result in a **negative** effect.

Visual Amenity and Physical Activity

- 16.9.49. Indirect effects associated with disruption or reduced connectivity during construction to recreational and open space areas, such as the Gowry Meadows Nature Reserve, and PRoWs may occur temporarily due to construction traffic and possible road diversion and closures. There are two proposed diversions of PRoWs (See **Table 16.20** above) associated with Section 2 of the DCO Proposed Development. These are 309/FP1/2 and 309/FP3/1). There are also two PRoW closures within Section 2; 294/FP2/1 along Yew Tree Close, and 309/BR4/1 along Ashwood Lane adjacent to the M53.

- 16.9.50. The DCO Proposed Development intersects the Shropshire Union Canal at Caughall Road over Pretty Bridge, which is a popular site used for recreation, both on the Canal Path and the canal itself. This is likely to cause temporary minor disruption and reduced connectivity of the canal pre-mitigation, however, access will be maintained throughout.

- 16.9.51. **Chapter 12 - Landscape and Visual (Volume II)** concludes that the construction of the DCO Proposed Development will be clearly visible from a number of PRoWs. At Pretty Bridge, construction activity associated with the DCO Proposed Development will also be visible. In addition, construction envelopes associated with the trenchless crossing under the canal are also likely to be visible through gaps in the existing vegetation structure along the canal.

- 16.9.52. Due to the temporary severance of access to two PRoWs, temporary diversions of over 500m, and disruption to views the visual amenity and physical activity impacts on human health during construction is likely to result in **negative** effects prior to mitigation.

Employment

- 16.9.53. Health outcomes as a result of increased employment opportunities and income levels during construction are anticipated to have a **positive** effect, particularly for unemployed and low-income groups who are able to access employment as a result of the DCO Proposed Development.

Construction Stage – Section 3

Private Property and Housing

- 16.9.54. There are approximately 546 properties located in the 500m Study Area for Section 3. With the exception of Grove Road, all properties will remain largely unaffected by the construction of the DCO Proposed Development.

- 16.9.55. As part of construction, an open cut trench is planned across Grove Road, north of St Oswald's Primary School. There is a planned temporary diversion (for 2-4 weeks) via Coalpit Lane, Overwood Lane, and Damage Lane; adding an

additional 2.5km in journey length. There are approximately 30 properties along this road which may be adversely affected by construction due to loss of access, amenity effects, and the proposed diversion.

- 16.9.56. Properties along Grove Road are deemed to be of medium sensitivity and the magnitude of impact is considered to be moderate. This has therefore, resulted in ***moderate adverse (significant)*** effects on residents of properties on Grove Road.

Community Land and Assets

- 16.9.57. There are six community land assets located within the 500m Study Area of Section 3, which include: The Five Villages Hall; St Oswald's Primary School; St Oswald's Church; Greater Grace Evangelical Church; Crabwall Hall Residential Home; and St Bartholomew's Church.
- 16.9.58. The proposed trenchless crossing across Liverpool Road (A41), the associated construction areas and the construction access point on Station Road, have the potential to adversely affect those accessing the Five Villages Hall. Construction activities may also negatively affect the amenity of the Village Hall which is used daily for a variety of different community activities and events. The construction works here are anticipated to last for up to 5 months.
- 16.9.59. Due to the daily usage, the sensitivity of the community centre is deemed to be very high. The magnitude of effect is deemed to be minor. Therefore, ***moderate adverse (significant)***, temporary, short-term effects have been identified for the Five Villages Hall.
- 16.9.60. St Oswald's Primary School is located within the 500m Study Area, adjacent to the Newbuild Infrastructure Boundary, off Grove Road in Mollington. It is located 100m south of construction access point and 150m south of an open trench road crossing. Pupils and staff at the school are likely to experience high levels of disturbance (from noise, vibration and dust) during construction without mitigation. Access to the school during peak drop off and pick up times could be adversely affected by construction traffic and those accessing the school north of the open trench crossing will need to follow diversion via Coalpit Lane and Townfield Lane.
- 16.9.61. Given that the school is used daily during term times and is used by a more vulnerable group (young people), the sensitivity is deemed to be very high. The magnitude of effect is deemed to be moderate. Therefore, ***large adverse (significant)***, temporary, short-term effects have been identified for St Oswald's School.

Development Land and Businesses

- 16.9.62. There are 21 businesses located within the 500m Study Area for Section 3, the majority of which are located within a small industrial estate located on the northbound side of Liverpool Road (A41). There is the potential for temporary disruption to these businesses and their employees due to additional volumes

of construction traffic, required for the trenchless crossing across Liverpool Road (A41). However, disruption is anticipated to be minor and therefore, no significant effects on development land and businesses within the 500m Study Area for Section 3 have been identified. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details.

WCH

- 16.9.63. There are 19 PRoWs located within the 500m Study Area in Section 3, of which two PRoWs are of local significance – Traffic Free Chester and Chester Millennium Greenway and three are of a national significance – NCN Routes 70, 56 and 5.
- 16.9.64. As a result of construction activities, there is the potential for walkers, cyclists, and horse riders to experience adverse impacts associated with disturbance from construction, loss in amenity and potential disruption from construction traffic which could limit and disrupt access to PRoWs as well as NCN Routes.
- 16.9.65. **Table 16.21** below outlines the PRoW routes significantly affected by the DCO Proposed Development.

Table 16.21– Affected PRoWs in Section 3

PRoW Name	Indicative Diversion/Effect Details	Sensitivity of PRoW	Magnitude of Impact
211/FP4/1	PRoW is intersected by pipeline route, located in field west of Gypsy Lane. Planned sequenced diversion. Diversion Length: 375m Journey Increase: 325m Diversion Duration: 2-4 weeks	Medium	Moderate
263/BY11/1	The route runs along Kingswood Lane, is intersected by an open trench crossing. No diversion possible route will be temporarily closed.	Low	Major
Chester Millennium Greenway	No diversion required – trenchless crossing. Potential loss in amenity. Work on trenchless installation techniques anticipated to last up to 3 months.	High	Minor
NCN Route 5	No diversion required – trenchless crossing. Potential loss in amenity. Work on trenchless installation techniques to last up to 3 months.	Very High	Minor

- 16.9.66. The construction of the DCO Proposed Development is likely to adversely affect those PRowWs listed in **Table 16.21** above, through diversions, temporary closures and loss in amenity. These effects are anticipated to result in a ***moderate adverse (significant)*** temporary, short term effects on WCHs using these routes.

Human Health

- 16.9.67. The overall sensitivity of the population in Section 3 is deemed to be Low, see **Section 16.7** for more details. Details on each of the key determinants of health within the assessment of human health impacts have been described below.

Air Pollution

- 16.9.68. St Oswalds Primary School is adjacent to the Newbuild Infrastructure Boundary on Grove Road. Due to the close proximity, the school may experience ***negative*** effects on human health pre-mitigation due to potential changes in air quality during construction of the DCO Proposed Development, especially since the majority of users of the school will be children who are deemed more vulnerable to changes in air quality.

- 16.9.69. **Chapter 6 - Air Quality (Volume II)** identified the village of Mollington as a sensitive human receptor due to the close proximity of residential dwellings. However, following the Construction Dust Assessment, air quality risks to human health are deemed to be low to negligible pre-mitigation during construction of the DCO Proposed Development, including pipeline trench digging and the construction of Mollington AGI. Therefore, air quality effects on human health during construction is likely to result in a ***neutral*** effect.

Noise and Vibration

- 16.9.70. Noise impacts are likely to arise from construction activities, including construction plant and vehicles accessing and servicing. The use of Construction Compounds and envelopes near Mollington, and the south and southwest of Saughall have the potential to cause an increase in noise pollution within these areas.
- 16.9.71. Due to the proximity of residential receptors to the proposed construction works in Mollington and Saughall, as well as St Oswalds Primary School, noise during construction may result in a ***negative*** effect on human health.
- 16.9.72. **Chapter 15 - Noise and Vibration (Volume II)** of this ES – states that pre-mitigation 131 sensitive receptors (which includes dwellings and community facilities) will experience medium to high adverse daytime noise impacts during the Construction Stage, 148 sensitive receptors are likely to experience medium to high adverse evening noise impacts and 244 sensitive receptors are likely to experience medium to high adverse night time noise impacts.

- 16.9.73. Day time noise is likely to be associated with vibratory piling, ground compaction and in some areas, construction traffic, whilst evening and night time noise is anticipated to be as a result of construction activities associated with the trenchless installation techniques.
- 16.9.74. However, it is acknowledged that, at the majority of trenchless crossings, this activity will occur occasionally and for a short period of time. As described in **Chapter 3 – Description of the DCO Proposed Development (Volume II)**, at some locations with difficult ground conditions, the duration of the evening and night-time working is expected to last up to four weeks.
- 16.9.75. Therefore, noise impacts on human health during construction are likely to result in a **negative** effect.

Visual Amenity and Physical Activity

- 16.9.76. There are multiple recreational and open spaces within the Study Area of Section 3 including the Five Villages Hall located within close proximity to the DCO Proposed Development on Station Road, which is used daily for multiple recreational and socialising activities by all ages. The Five Villages Hall is likely to be negatively affected during construction of the DCO Proposed Development due to disturbance and reduced access.
- 16.9.77. The Newbuild Infrastructure Boundary of the DCO Proposed Development runs adjacent to the Shropshire Union Canal near Liverpool Road. This is likely to cause disruption for the users of the Canal and potentially reduce connectivity to the Canal temporally pre-mitigation.
- 16.9.78. There is one planned PRoW diversion associated with the construction of the DCO Proposed Development; 211/FP4/1 along Gypsy Lane (see **Table 16.21** above). There is also one temporary closure; 263/BY11/1 which runs along Kingswood Lane. **Chapter 12 - Landscape and Visual (Volume II)** concludes that construction activity associated with the DCO Proposed Development will be clearly visible within the view for a number of PRoWs. Visibility of construction activity from the Shropshire Union Canal is mixed.
- 16.9.79. Construction activity including Trenchless Crossing Compounds associated with the trenchless tunnelling under Liverpool Road will be visible from Liverpool Road, whereas in Wervin the construction activity will be obscured by intervening vegetation and topography in some areas along the Shropshire Union Canal.
- 16.9.80. Due to the temporary severance of access and temporary diversions of PRoWs as well as the disruption to views; visual amenity and physical activity effects on human health during construction is likely to result in **negative** effects.

Employment

- 16.9.81. Health outcomes as a result of increased employment opportunities and income levels during construction are anticipated to have a **positive** effect for

unemployed and low-income groups, who have the potential to access construction employment jobs.

Construction Stage – Section 4

Private Property and Housing

- 16.9.82. There are approximately 1,845 private properties located within the 500m Study Area for Section 4. The majority of these properties are likely to remain unaffected by the construction of the DCO Proposed Development, however, 236 properties have the potential to be adversely affected by construction traffic, carriageway diversions, traffic controls, as well as amenity effects from increased noise and vibration.
- 16.9.83. The DCO Proposed Development includes an open cut trench across Moor Lane (Sandycroft) and Deeside Lane (Sealand). Works will be sequenced, and access will be maintained throughout construction, for properties located on Deeside Lane, whilst there is a planned diversion for Moor Lane, which may also affect properties located at Rosalyn Close. Residents accessing these properties may experience minor delays and potential loss in amenity as a result of construction activities.
- 16.9.84. **Table 16.22** below outlines those roads affected by construction of the DCO Proposed Development, as well as the number of properties affected, and outline planned diversion routes (where applicable.)
- 16.9.85. The magnitude of effect for all properties whose access roads are affected by the construction of the DCO Proposed Development, are anticipated to be moderate, resulting in ***moderate adverse (significant)***, temporary, short-term effects, on those properties listed in **Table 16.22**.
- 16.9.86. See **Chapter 17 – Traffic and Transport (Volume II)** and **Appendix 17.5 PRow by Section (Volume III)** for further details on diversions.

Table 16.22– Affected Private Property and Housing in Section 4

Road Name, Location	Diversion/Effect Details	Number of Home Affected (Sensitivity)	Magnitude of Impact
Deeside Lane	No planned diversion. Planned open cut trench across Deeside Road. Access maintained throughout, but there is potential for a loss in amenity value. Duration of works: 2 – 4 weeks	22 (medium)	Moderate
Rosslyn Close	Planned open cut trench across Moor Lane. Proposed diversion via Duckers Lane, Leachers Lane and Chester Road. Potential for a loss in amenity value.	6 (medium)	Moderate
Moor Lane	Approximate Length: 2.9km Duration of works: 2 – 4 weeks	4 (medium)	Moderate

Community Land and Assets

- 16.9.87. There are 23 community facilities located within Section 4. The majority of these assets will remain largely unaffected by the DCO Proposed Development, however, given the sensitivity of Saint Francis Anglican Church (high) and Sandycroft County Primary School (very high) and their proximity to the Newbuild Infrastructure Boundary, there is potential for both assets to be adversely affected.
- 16.9.88. It is anticipated that there may be temporary restrictions along the B5129 (Chester Road) which may require traffic management to be in place for approximately eight weeks. Sandycroft County Primary School is located on the B5129 (Chester Road) and is adjacent to a construction access point and a construction envelope.
- 16.9.89. Pupils and staff at the school are likely to experience high levels of disturbance (from noise, vibration and dust) during construction. Access to the school during peak drop off and pick up times will be adversely affected by construction traffic and those accessing the school.

- 16.9.90. The magnitude of effect is anticipated to be moderate, resulting in **large adverse (significant)**, temporary, short-term effects, on Sandycroft County Primary School.
- 16.9.91. Saint Francis Anglican Church is located on Moor Lane, which as part of the DCO Proposed Development includes an open cut trench (Sandycroft), south of the Church. The proposed diversion (see **Table 16-22** above) across Moor Lane may restrict access to the church and users may experience delays. There is also potential for construction works to negatively affect the tranquillity and setting of the church, which may affect the church's users.
- 16.9.92. The magnitude of effect is anticipated to be minor, resulting in **moderate adverse (significant)** temporary, short term effects, on Saint Francis Anglican Church.
- Development Land and Businesses
- 16.9.93. There are 125 businesses located within the 500m Study Area for Section 4, the majority of which will remain largely unaffected by the DCO Proposed Development. See **Appendix 16.1 – Land Use and Assets (Volume III)** for further detail on the affected businesses.
- 16.9.94. There are however, seven businesses that have potential to be adversely affected by the DCO Proposed Development. These have been outlined in **Table 16.23** below.

Table 16.23– Affected Businesses in Section 4

Business Name/ Location	Effect Details	Sensitivity	Magnitude of Impact
Psyche Studios, Deeside Lane	Planned open cut trench proposed across Deeside Lane. Businesses will remain open throughout construction, however, there is likely to be disruption to employees and users.	Medium	Moderate
Intertek, Deeside Lane		Medium	Moderate
Recycling Solutions, Deeside Lane		Medium	Moderate
Chester Composites, Deeside Lane		Medium	Moderate
Gorilla Access Services Ltd, Deeside Lane		Medium	Moderate
2 Sisters Food Group, Glendale Business Park, Chester Road	Part of the car park will be temporarily required for construction of the DCO Proposed Development.	High	Moderate
Greenacres Animal Park, Brekendale Road	Land will be temporarily lost to open cut trenches and construction area	Very High	Major

- 16.9.95. The open cut trench proposed across Deeside Lane, is likely to adversely affect those businesses that are dependent upon Deeside Lane for access. Access to

these businesses will be maintained throughout construction, however, it is likely that employees and customers will temporarily face potential disruption and delays to access.

- 16.9.96. These businesses are of a medium sensitivity. The magnitude of effect is anticipated to be medium, resulting in a ***moderate adverse (significant)*** temporary, short term effect on those businesses located on Deeside Lane.
- 16.9.97. 2 Sisters Food Group has a large site located at the Glendale Business Park, of which the car park may experience some through-construction traffic in order to access the construction compound. Although the majority car park will remain in operation throughout construction, there is potential it could result in some disruption and temporarily restrict access to the site for employees and customers. Due to the size of the site, it is of a high sensitivity.
- 16.9.98. The magnitude of effect is anticipated to be moderate, resulting in a ***moderate adverse (significant)*** temporary, short-term effect on 2 Sisters Food Group .
- 16.9.99. Greenacres Animal Park is intersected by the DCO Proposed Development, with some areas of land being temporarily lost to open cut trenches and construction areas. There is potential for construction works to result in significant disruption to the business and this may result in partial closure of some areas of the park. Due to the open cut trench along Colliery Lane, which serves as the main access to the Animal Park, there is a planned diversion route, which may also cause additional disruption for those accessing the park.
- 16.9.100. Due to the size of the park, it is deemed to be of a high sensitivity and the magnitude of impact is anticipated to be major. This has resulted in a ***very large adverse (significant)*** temporary, short term effect.

WCH

- 16.9.101. There are 21 PRoWs located within the 500m Study Area for Section 4. The majority of these routes will remain unaffected by the construction of the DCO Proposed Development; however, four PRoWs have proposed diversions.
- 16.9.102. PRoWs 303/54/10, 307/3/10 and 308/1/20 are located between Moor Lane and Rake Lane and provide a connection to Chester Road. The Newbuild Infrastructure Boundary intersects these PRoWs, with a number of proposed open cut trenches. PRoW route 303/32/10 is located in Willows Park and is intersected by the Newbuild Infrastructure Boundary.
- 16.9.103. **Table 16.24** below outlines the proposed diversions for each of the PRoW routes, as well as their sensitivity and magnitude of impact.
- 16.9.104. This PRoW is of a medium sensitivity, therefore resulting in ***moderate adverse (significant)*** temporary, short term effects on WCHs using this route.

Table 16.24– Affected PRow in Section 4

PRow Name	Indicative Diversion/Effect Details	Sensitivity of PRow	Magnitude of Impact
303/54/10	Proposed PRow diversion diverts north along the Newbuild Infrastructure Boundary towards the east, crossing through Chester Road (east) trenchless crossing and diverting back west towards existing routes. Diversion Length: 750m Journey Increase: 700m Diversion Duration: 2-4 weeks	Medium	Major
307/3/10		Medium	Major
308/1/20		Medium	Major
303/32/10	A diversion is proposed on a north east alignment to cross the pipeline above the proposed trenchless crossing, beyond the construction envelope. Diversion Length: 675m Journey Increase: 615m Diversion Duration: 3-5 months	Medium	Major
308/4/10	Proposed PRow diversion due to an open cut trench. The route diverts northeast 175m before diverting north 55m and then south 170m towards St Francis Church. Diversion length: 400m Journey Increase 270m	Medium	Moderate

- 16.9.105. The construction of the DCO Proposed Development is likely to adversely affect those PRowS listed in **Table 16.24** above, through diversions and loss in amenity. These effects are anticipated to result in a ***moderate adverse (significant)*** temporary, short term effects on WCHs using these routes.

Human Health

- 16.9.106. The overall sensitivity of the population in Section 4 is deemed to be Medium, see **Section 16.7** for more details. Details on each of the key determinants of health within the assessment of human health impacts have been described below.

Air Pollution

- 16.9.107. It is anticipated that there may be temporary restrictions along B5129 Chester Road which may require traffic management to be in place for approximately eight weeks. This is likely to cause a change in air quality pre-mitigation due to traffic idling and congestion. Sandycroft County Primary School and the Saint Francis Anglican Church are located adjacent to the Newbuild Infrastructure Boundary along Chester Road. Therefore, negative effects on human health may be experienced during construction of the DCO Proposed Development, especially since the majority of users of the school will be children, who are deemed more vulnerable to respiratory conditions.
- 16.9.108. Other sensitive receptors within the Study Area of Section 4 include the Wyldecrest Willow Park and the Greenacres Animal Park on Colliery Lane, of which the Newbuild Infrastructure Boundary intersects. These facilities are used daily for recreational use and tourism. Therefore, there is potential for temporary adverse effects on health during construction of the DCO Proposed Development through changes in air quality, particularly for vulnerable groups.
- 16.9.109. **Chapter 6 - Air Quality (Volume II)** identified the village of Mancot and Chester Road as sensitive receptor due to the close proximity of residential dwellings to the Newbuild Infrastructure Boundary. However, air quality risks to human health were deemed as low to negligible pre-mitigation during construction of the DCO Proposed Development, including pipeline trench digging and preparation of Construction Compounds construction.
- 16.9.110. Therefore, air quality effects on human health during construction are likely to result in *neutral* impacts.

Noise and Vibration

- 16.9.111. Construction activities are likely to give rise to noise impacts from construction plant and construction vehicles access and servicing. The use of construction envelopes near Mancot and Sandycroft, including the Pentre and Queensferry Industrial Estates, the Greenacres Animal Park, and the Sandycroft County Primary School have potential to cause an increase in noise pollution.
- 16.9.112. **Chapter 15 - Noise and Vibration (Volume II)** of this ES – states that pre-mitigation, 337 sensitive receptors (which includes dwellings and community facilities) will experience medium to high adverse daytime noise impacts during the Construction Stage, 444 sensitive receptors are likely to experience medium to high adverse evening noise impacts and 642 sensitive receptors are likely to experience medium to high adverse evening noise impacts.
- 16.9.113. Day time noise is likely to be associated with vibratory piling, ground compaction and in some areas, construction traffic, whilst evening and night time noise is anticipated to be as a result of construction activities associated with the trenchless installation techniques.

16.9.114. However, it is acknowledged that, at the majority of trenchless crossings, this activity will occur occasionally and for a short period of time. As described in **Chapter 3 – Description of the DCO Proposed Development (Volume II)**, at some locations with difficult ground conditions, the duration of the evening and night-time working is expected to last up to four weeks.

16.9.115. Therefore, noise impacts on human health during construction are likely to result in a **negative** effect.

Visual Amenity and Physical Activity

16.9.116. Fore Golf Course is located adjacent to the Newbuild Infrastructure Boundary on Deeside Lane. Therefore, users are likely to experience temporary negative effects due to disturbance and potential reduced access.

16.9.117. The Wales Coast Path, a well-known long distance recreational route intersects the Study Area of Section 4 alongside the River Dee. There is the potential for users of the Wales Coast Path to be negatively affected pre-mitigation as a result of visual disturbance.

16.9.118. There are four proposed PRow diversions associated with the construction of the DCO Proposed Development in Section 4. These are 303/54/10, 307/3/10, 308/1/20, and 303/32/10 (See **Table 16.24** above).

16.9.119. **Chapter 12 - Landscape and Visual (Volume II)** concludes that construction activity associated with the DCO Proposed Development in Section 4 will be visible from multiple PRows. Construction activity will also be clearly visible within the view from the Wales Coast Path due to limited vegetation cover and large extent of arable fields.

16.9.120. Therefore, visual and physical activity effects on human health during construction is likely to result in **negative** impacts.

Employment

16.9.121. Health outcomes as a result of increased employment opportunities and income levels during construction are anticipated to have a **positive** effect, particularly for unemployed and low-income groups who are able to access employment as a result of the DCO Proposed Development.

Construction Stage – Section 5

Private Property and Housing

16.9.122. There are approximately 2,692 residential properties located within the 500m Study Area for Section 5. The majority of these properties are likely to remain unaffected by the construction of the DCO Proposed Development, however, 250 properties have the potential to be significantly adversely affected by construction traffic, diversions, potential traffic controls as well as disturbance from noise and vibration.

- 16.9.123. There are planned open cut trenches across Lower Aston Hall Lane, Green Lane, Pinfold Lane and Brookside, which (with the exception of Green Lane) have planned diversions, which will increase journey length. There is the potential that disturbance from construction activities at Aston Hill BVS (estimated to last up to 4 months) as well as drilling associated with trenched and trenchless crossing, will negatively affect those properties located along Lower Aston Hall Lane, Green Lane, Pinfold Lane, and Brookside.
- 16.9.124. **Table 16.25** outlines those roads affected by construction of the DCO Proposed Development, the number of properties affected, and planned diversion routes (where applicable.)
- 16.9.125. The magnitude of effect for all properties is anticipated to be moderate, resulting in ***moderate adverse (significant)***, temporary, short term effects, on those properties listed in **Table 16.25**.
- 16.9.126. See **Chapter 17 – Traffic and Transport (Volume II)** and **Appendix 17.5 PRoW by Section (Volume III)** for further details on diversions.

Table 16.25– Affected Private Property and Housing in Section 5

Road Name, Location	Diversion/Effect Details	Number of Home Affected (Sensitivity)	Magnitude of Impact
Lower Aston Hall Lane, Deeside (west of Aston Hill BVS)	Planned Open cut trench across Lower Aston Hall Lane.	59 (High)	Moderate
Llys Gary Speed, Deeside (west of Aston Hill BVS)	Diversion via A550 / B5125 / Old Aston Hill/A494	21 (Medium)	Moderate
Moorfield Court Deeside (west of Aston Hill BVS)	Construction of Aston Hill BVS is anticipated to last 4 months. Approximate Length: 4km Diversion Duration: 2-4 weeks	11 (Medium)	Moderate
Moorfield Road Deeside (west of Aston Hill BVS)		4 (Medium)	Moderate
Mountfield Road Deeside (west of Aston Hill BVS)		16 (Medium)	Moderate
Hillfield Road Deeside (west of Aston Hill BVS)		2 (Medium)	Moderate
The Barnyard Deeside (west of Aston Hill BVS)		7 (Medium)	Moderate
Church Lane, Ewloe Green	No diversion required– Construction access	9 (Medium)	Moderate

Road Name, Location	Diversion/Effect Details	Number of Home Affected (Sensitivity)	Magnitude of Impact
	point and construction area located adjacent to Church Lane. Potential for loss in amenity value. Duration of works: 3-5 months		
Brookside, Northop Hall	Diversion via Chester Road/ Brookside/ B5125	10 (Medium)	Moderate
Brookside Crescent, Northop Hall	Approximate Length: 2.8km Diversion Duration: 2-4 weeks	19 (Medium)	Moderate
Pinfold Lane, Northop Hall	Diversion via A494/ B5125/ A55/ Old Mold Road Approximate Length: 3.8km Diversion Duration: 2-4 weeks	3 (Medium)	Moderate

Community Land and Assets

- 16.9.127. Aston Hall Care Home is located on Lower Aston Hall Road. Land south of Lower Aston Hall Lane is proposed to be used for the construction of the DCO Proposed Development and includes three construction access points. An open cut trench is also proposed across Lower Aston Hall Lane. There is a proposed 4km diversion, which will ensure that access to the care home will be maintained throughout the construction period, however, there is potential for amenity effects from noise and vibration, construction traffic and potential traffic delays.
- 16.9.128. The care home provides 24 hour care to residents, some of which are highly vulnerable. The sensitivity of Aston Hall Care Home is therefore deemed to be very high. The magnitude of effect is anticipated to be minor, resulting in ***moderate adverse (significant)***, temporary, short term effects on those properties listed above.

Development Land and Businesses

- 16.9.129. There are 47 businesses located within the 500m Study Area for Section 5. The majority of these business will remain unaffected by the construction of the DCO Proposed Development. The exception to this is Highfield Hall.
- 16.9.130. Highfield Hall is a wedding venue located on Village Road, west of Northop Hall. There is planned open cut trench on Village Road, west of Highfield Hall and the entrance for the Construction Compound for Northop Hall AGI, is located 180m south east. There is a planned diversion which will add approximately an additional 14km to the journey length, via the via B5125, A494, B5129, B5126, A55 and A5119.
- 16.9.131. Village Road is anticipated to be closed and temporarily diverted (14km) for 2 weeks, whilst the Construction Compound and the works at Northop Hall AGI are likely to last 15 months. Construction is likely to increase volumes of construction traffic, as well as potential noise and vibration, which will increase disturbance and adversely affect the setting of Highfield Hall.
- 16.9.132. The sensitivity of Highfield Hall is deemed to be medium, and the magnitude of impact is considered to be moderate. This has therefore resulted in a ***moderate adverse (significant)*** temporary, short term effect on guests and employees at Highfield Hall.

WCH

- 16.9.133. There are 52 PRoW routes located within the 500m Study Area Section 5, the majority of which will remain unaffected by the DCO Proposed Development. There are five proposed diversions and one permanent shortening of a disused PRoW (414/37/10). Refer to **Appendix 16.2 - PRoWs (Volume III)** for further details on these indicative diversions.
- 16.9.134. PRoW routes 414/39/10 and 414/39A/10 provide a circular walk around Northop Hall Country House Hotel and is used by both the public and hotel residents. Construction of the DCO Proposed Development requires an open cut trench, which crosses 414/39A/10, temporarily severing the route. Works here are anticipated to last between 2-4 weeks. Therefore, a shortening of the loop is proposed, resulting in a total temporary reduction of approximately 360m, representing a moderate magnitude of impact.
- 16.9.135. PRoWs 414/39/10 and 414/39A/10 are of a medium sensitivity; therefore, the proposed diversion of this route will result in a ***moderate adverse (significant)***, temporary, short-term effects on WCHs using this route.
- 16.9.136. PRoW (303/25/10) is adjacent to the Newbuild Infrastructure Boundary and links 3030/31/10 to the A494 and would be adversely affected during the construction phase of the DCO Proposed Development. PRoW (303/25/10) is of medium sensitivity and the works would have a moderate magnitude of impact resulting in a ***moderate adverse (significant)***, temporary, short-term effect.

Human Health

- 16.9.137. The overall sensitivity of the population in Section 5 is deemed to be low, see **Section 16.7** for more details. Details on each of the key determinants of health within the assessment of human health impacts have been described below.

Air Pollution

- 16.9.138. Emissions are likely to be generated by the release of dust and PM during the site preparation and construction of Aston Hill BVS, Northop Hall AGI as well as the pipeline route.
- 16.9.139. Aston Hall Care Home is located adjacent to the Newbuild Infrastructure Boundary on Lower Aston Hall Lane. Due to the close proximity to the DCO Proposed Development and that the care home is used by more vulnerable groups (older people), changes to air quality during construction of the DCO Proposed Development may result in negative effects on human health.
- 16.9.140. **Chapter 6 - Air Quality (Volume II)** identified the village of Ewloe and Northop Hall as sensitive receptors due to the close proximity of residential dwellings to the DCO Proposed Development Newbuild Infrastructure Boundary. However, air quality risks to human health are identified as low to negligible pre-mitigation during construction of the DCO Proposed Development, including pipeline trench digging and construction of Aston Hill BVS and Northop Hall AGI .
- 16.9.141. Therefore, air quality effects on human health during construction is likely to result in a *neutral* impact.

Noise and Vibration

- 16.9.142. Construction activities are likely to result in noise impacts from construction plant and construction vehicle access and servicing. The use of Construction Compounds and envelopes near Aston, Ewloe Green, and Northop Hall have potential to cause an increase in noise pollution.
- 16.9.143. Due to the proximity of residential and commercial receptors, including the Aston Hall Care Home to the proposed construction works, noise during construction may result in a negative effect on human health.
- 16.9.144. **Chapter 15 - Noise and Vibration (Volume II)** of this ES – states that pre-mitigation, 288 sensitive receptors (which includes dwellings and community facilities) will experience medium to high adverse daytime noise impacts during the Construction Stage, 364 sensitive receptors are likely to experience medium to high adverse evening noise impacts and 732 sensitive receptors are likely to experience medium to high adverse night time noise impacts.
- 16.9.145. Day time noise is likely to be associated with vibratory piling, ground compaction and in some areas, construction traffic, whilst evening and night time noise is anticipated to be as a result of construction activities associated with the trenchless installation techniques.

16.9.146. However, it is acknowledged that, at the majority of trenchless crossings, this activity will occur occasionally and for a short period of time. As described in **Chapter 3 – Description of the DCO Proposed Development (Volume II)**, at some locations with difficult ground conditions, the duration of the evening and night-time working is expected to last up to four weeks.

16.9.147. Therefore, noise impacts on human health during construction are likely to result in a **negative** effect.

Visual Amenity and Physical Activity

16.9.148. The Hawarden and Ewloe Community Woodland nature reserve and the community allotments on Upper Aston Hall Lane are within close proximity to the Newbuild Infrastructure Boundary of the DCO Proposed Development. Users of these recreational facilities are likely to experience adverse effects through distance and reduced access.

16.9.149. There are five proposed PRow diversions associated with the construction of the DCO Proposed Development in Section 5. These are 303/34/10, 303/25/20, 303/24/10, 303/20/10, and 303/141/10. There is also one permeant shortening of a PRow (414/37/10), however it is understood that this PRow is disused. The construction of the DCO Proposed Development also requires an open cut trench, which crosses a PRow (414/39A/10), temporarily severing the route for an anticipated 2-4 weeks.

16.9.150. **Chapter 12 - Landscape and Visual (Volume II)** concludes that construction activity associated with the DCO Proposed Development in Section 5 will be visible from multiple PRows. From Upper Aston Hall Lane, construction activity will also be clearly visible within the existing grass field, and taller elements of construction activity likely to be visible above the existing field boundary vegetation.

16.9.151. Therefore, visual and physical activity effects on human health during construction is likely to result in a **negative** impact.

Employment

16.9.152. Health outcomes as a result of increased employment opportunities and income levels during construction are anticipated to have a **positive** effect, particularly for unemployed and low-income groups who are able to access employment as a result of the DCO Proposed Development.

Construction Stage – Section 6

Private Property and Housing

16.9.153. No significant effects on private property and housing within the 500m Study Area for Section 6 have been identified. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details.

Community Land and Assets

- 16.9.154. There are no community assets located within the 500m Study Area for Section 6.

Development Land and Businesses

- 16.9.155. No significant effects on development land and businesses within the 500m Study Area for Section 6 have been identified. Refer to **Appendix 16.1 – Lane Use and Assets (Volume IV)** for further details.

WCH

- 16.9.156. There are 11 PRoWs located within the 500m Study Area for Section 6, of which five have proposed indicative diversions during the construction of the DCO Proposed Development. These diversions will not significantly increase the overall journey length therefore no significant effects have been identified for WCH in Section 6.

Human Health

- 16.9.157. The overall sensitivity of the population in Section 6 is deemed to be low, see **Section 16.7** for more details. Details on each of the key determinants of health within the assessment of human health impacts have been described below.

Air Quality

- 16.9.158. Emissions are likely to be generated by the release of dust and PM during the site preparation and construction of Flint AGI and the pipeline.
- 16.9.159. The Study Area within Section 6 of the DCO Proposed Development is not densely populated, however there are multiple residential dwellings on Starkey Lane and Allt-Goch Lane. **Chapter 6 - Air Quality (Volume II)** states that air quality risks to human health are projected to be low to negligible pre-mitigation during construction of the DCO Proposed Development, including pipeline trench digging and construction of Flint AGI.
- 16.9.160. Therefore, air quality effects on human health during construction are likely to result in a *neutral* effect.

Noise and Vibration

- 16.9.161. Construction activities are likely to result in adverse noise impacts from construction plant and construction vehicles accessing the Construction Compound and service area, as well as the disturbance of the ground for pipeline trenching. Construction Compounds near Allt-Goch Lane and Connah's Quay Road have potential to give rise to an increase in noise pollution.
- 16.9.162. **Chapter 15 - Noise and Vibration (Volume II)** of this ES – states that pre-mitigation, 13 sensitive receptors (which includes dwellings and community facilities) will experience medium to high adverse daytime noise impacts during the Construction Stage, 9 sensitive receptors are likely to experience medium to

high adverse evening noise impacts and 13 sensitive receptors are likely to experience medium to high adverse evening noise impacts.

- 16.9.163. Day time noise is likely to be associated with vibratory piling, ground compaction and in some areas, construction traffic, whilst evening and night time noise is anticipated to be as a result of construction activities associated with the trenchless installation techniques.
- 16.9.164. However, it is acknowledged that, at the majority of trenchless crossings, this activity will occur occasionally and for a short period of time. As described in **Chapter 3 – Description of the DCO Proposed Development (Volume II)**, at some locations with difficult ground conditions, the duration of the evening and night-time working is expected to last up to four weeks.
- 16.9.165. Therefore, noise impacts on human health during construction are likely to result in a **negative** effect.

Visual Amenity and Physical Activity

- 16.9.166. No PRoWs are anticipated to be affected by the construction of the DCO Proposed Development in Section 6.
- 16.9.167. **Chapter 12 - Landscape and Visual (Volume II)** concludes that construction activity associated with the DCO Proposed Development will be clearly visible from a number of PRoWs. The construction of the DCO Proposed Development will be visible from Starkey Lane and Allt-Goch Lane, with activity likely occupying the foreground of the view. However, the sloping topography and existing vegetation ensures that these changes are localised.
- 16.9.168. Therefore, visual amenity and physical activity effects on human health during construction is likely to result in a *neutral* impact.

Employment

- 16.9.169. Health outcomes as a result of increased employment opportunities and income levels during construction are anticipated to have a **positive** effect, particularly for unemployed and low-income groups who are able to access employment as a result of the DCO Proposed Development.

Construction Stage – Section 7

Private Property and Housing

- 16.9.170. There are approximately 46 residential properties located within the 500m Study Area for Section 7. The majority of these properties are likely to remain unaffected by the construction of the DCO Proposed Development, however, 20 properties have the potential to be significantly adversely affected. Access to private property will be maintained throughout the construction period, however, the construction works are likely to temporarily disrupt private property access due to increases in construction traffic as well as temporary loss in amenity.

- 16.9.171. The residential properties most likely to be affected in Section 7 are outlined in **Table 16.26** below.

Table 16.26 – Affected Private Property

Road Name	Location/Distance from RLB	Number of properties affected (sensitivity)	Magnitude
Cornist Lane	Adjacent to RLB for Cornist Lane BVS	2 (medium)	Moderate
Nant Road	Adjacent to RLB for Cornist Lane BVS	7 (medium)	Moderate
Lleprog Lane	Adjacent to RLB for Cornist Lane BVS	1 (medium)	Moderate
Allt Y Chwiler	Adjacent to RLB for Pentre Halkyn. Construction access is located on Allt Y Chwiler.	6 (medium)	Moderate

- 16.9.172. The properties likely to be affected are of a medium sensitivity and the magnitude of change has been identified as moderate. Therefore, there is the potential for Construction Stage effects on private property and housing to result in a ***moderate adverse (significant)***, temporary effect during construction.

- 16.9.173. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details.

Community Land and Assets

- 16.9.174. There are no community assets located within the 500m Study Area for Section 7.

Development Land and Businesses

- 16.9.175. No significant effects on development Land and businesses in the 500m Study Area for Section 7 have been identified. Refer to **Appendix 16.1 - Land Use and Assets (Volume III)** for further details.

WCH

- 16.9.176. There are 38 PRowS located within the 500m Study Area in Section 7. None of these routes intersect the Newbuild Infrastructure Boundary or require diversions and are likely to remain unaffected by the DCO Proposed Development. No significant effects on WCH have therefore been identified. Refer to **Appendix 16.2 – ProWs (Volume III)** for further details.

Human Health

- 16.9.177. The overall sensitivity of the population in Section 7 is deemed to be low, see **Section 16.7** for more details. Details on each of the key determinants of health within the assessment of human health impacts have been described below.

Air Pollution

- 16.9.178. Emissions are likely to be generated by the release of dust and PM during the site preparation and the construction of Cornist Lane, Pentre Halkyn and Babell BVSS.
- 16.9.179. **Chapter 6 - Air Quality (Volume II)** states as the construction Study Area is not densely populated in Section 7 and the sensitivity of the area to nuisance dust impacts is low pre-mitigation. The closest receptors to any construction works are those located on Station Road and Talacre Beach Resort. Furthermore, with background PM₁₀ concentrations around 9µg/m³, the sensitivity of the area to health impacts from increased PM concentrations is also low.
- 16.9.180. Therefore, air quality effects on human health during construction are likely to result in a *neutral* effect.

Noise and Vibration

- 16.9.181. Construction activities are likely to result in some noise impacts from construction plant and construction vehicles accessing and servicing. The use of Construction Compounds and equipment yards near Babell, Brynford and areas west of Flint have potential to cause an increase in noise pollution.
- 16.9.182. **Chapter 15 - Noise and Vibration (Volume II)** of this ES – states that pre-mitigation, 9 sensitive receptors will experience medium to high adverse daytime noise impacts during the Construction Stage. Construction of this section is unlikely to generate evening or night time noise. Day time noise is likely to be associated with vibratory piling, ground compaction and in some areas, construction traffic.
- 16.9.183. Therefore, noise impacts on human health during construction are likely to result in a *negative* effect.

Loss of visual amenity and physical activity

- 16.9.184. There are no proposed closures or diversions of PRoW associated with the construction of the BVSS. **Chapter 12 - Landscape and Visual (Volume II)** concludes that construction activity associated with the DCO Proposed Development will be clearly visible from a number of PRoWs. Temporary disturbance and loss of visual amenity of PRoWs for users is therefore likely to result in *negative* effects on human health.

Employment

- 16.9.185. Health outcomes as a result of increased employment opportunities and income levels during construction are anticipated to have a *positive* effect, particularly for unemployed and low-income groups who are able to access employment as a result of the DCO Proposed Development.

Operational Stage – Section 1

Agricultural Land Holdings

16.9.186. There are six agricultural land holdings which have the potential to be adversely affected by the operation of the DCO Proposed Development, as a result of permanent land take for essential mitigation of significant effects. Of these land holdings, two have the potential to be significantly adversely affected by permanent land take which will take the form of:

- Plot 3-03 - Woodland planting to create a shelterbelt and tie into the existing small parcel of woodland; and
- Plot 3-18a - Woodland planting to tie into the existing line of trees.

16.9.187. Refer to **Figure 3-4 - Landscape and Ecological Mitigation Plan (Volume IV)** for further details.

Table 16.27 – Impacts on Agricultural Land Holdings During Operation – Section 1

Plot Number	Impact on Land Holding	Impact on Severance	Impact on Business Viability
Plot 3-03 (Work No. 57A)	Permanent loss of the land within Plot 3-03, however no impact on use of adjacent land for farming activities to continue.	No impact on access to adjacent land.	Business considered likely to remain viable, however some financial loss expected due to loss of land for dairy farming activities which would no longer be able to take place on this plot.
Plot 3-18a (Work No. 57B)	Permanent loss of the land within Plot 3-18a, however no impact on use of adjacent land for farming activities to continue.	No impact on access to adjacent land.	Business considered likely to remain viable, however some financial loss expected due to loss of land for livestock farming activities which would no longer be able to take place on this plot.

16.9.188. The sensitivity of both Plot 3-03 and Plot 3-18a is deemed to be very high and the magnitude of impact is considered to be minor for both plots. This has therefore resulted in a ***moderate adverse (significant)*** permanent, long term effect on the operational viability of both agricultural holdings.

16.9.189. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details on non-significant effects on agricultural land holdings.

Operational Stage – Section 2

Agricultural Land Holdings

16.9.190. There are eight agricultural land holdings which have the potential to be adversely affected by the operation of the DCO Proposed Development, as a result of permanent land take for essential mitigation of significant effects. Of these land holdings, one has the potential to be significantly adversely affected by permanent land take which will take the form of:

- Plots 5-01 and 5-07 - Woodland planting to tie into an existing group of trees.

16.9.191. Refer to **Figure 3-4 - Landscape and Ecological Mitigation Plan (Volume IV)** for further details.

Table 16.28 – Impacts on Agricultural Land Holdings During Operation – Section 2

Plot Number	Impact on Land Holding	Impact on Severance	Impact on Business Viability
Plot 5-01 (Work No. 57C) Plot 5-07 (Work No. 57D)	Permanent loss of the land within Plots 5-01 and 5-07, however no impact on use of adjacent land for farming activities to continue.	No impact on access to adjacent land.	Business considered likely to remain viable, however some financial loss expected due to loss of land for keeping horses which would no longer be able to take place on this plot.

16.9.192. The sensitivity of Plot 5-01 and Plot 5-07 is deemed to be very high and the magnitude of impact is considered to be minor for both plots. This has therefore resulted in a ***moderate adverse (significant)*** permanent, long term effect on the operational viability of these agricultural holdings.

16.9.193. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details on non-significant effects on agricultural land holdings.

Operational Stage – Section 3

Agricultural Land Holdings

16.9.194. There are two agricultural land holdings which have the potential to be adversely affected by the operation of the DCO Proposed Development, as a result of permanent land take for essential mitigation of significant effects. Of

these land holdings, one has the potential to be significantly adversely affected which will take the form of:

- Plot 9-15 - Woodland planting to enhance the canal side and existing small tree group.

16.9.195. Refer to **Figure 3-4 - Landscape and Ecological Mitigation Plan (Volume IV)** for further details.

Table 16.29 – Impacts on Agricultural Land Holdings During Operation – Section 3

Plot Number	Impact on Land Holding	Impact on Severance	Impact on Business Viability
Plot 9-15 (Work No. 57G)	Permanent loss of the land within Plot 9-15, however no impact on use of adjacent land for farming activities to continue.	No impact on access to adjacent land.	Business considered likely to remain viable, however some financial loss expected due to loss of land for dairy farming activities which would no longer be able to take place on this plot, and pasture land.

16.9.196. The sensitivity of Plot 9-15 is deemed to be very high and the magnitude of impact is considered to be minor. This has therefore resulted in a ***moderate adverse (significant)*** permanent, long term effect on the operational viability of this agricultural holding.

16.9.197. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details on non-significant effects on agricultural land holdings.

Operational Stage – Section 4

16.9.198. There are no agricultural land holdings permanently required within Section 4, therefore no significant operational effects have been identified.

Operational Stage – Section 5

Agricultural Land Holdings

16.9.199. There are nine agricultural land holdings which have the potential to be adversely affected by the operation of the DCO Proposed Development, as a result of permanent land take for essential mitigation of significant effects. Of these land holdings, two have the potential to be significantly adversely affected by permanent land take which will take the form of:

- Plots 17-43 - Woodland planting to tie into the existing woodland/scrub.
- Plots 19-04a and 19-04b – planting yet to be determined.

16.9.200. Refer to **Figure 3-4 - Landscape and Ecological Mitigation Plan (Volume IV)** for further details.

Table 16.30 – Impacts on Agricultural Land Holdings During Operation-Section 5

Plot Number	Impact on Land Holding	Impact on Severance	Impact on Business Viability
Plot 17-43 (Work No. 57I)	Permanent loss of the land within Plot 17-43, however no impact on use of adjacent land for farming activities to continue.	No impact on access to adjacent land.	Business considered likely to remain viable, however some financial loss expected due to loss of land for livestock farming activities which would no longer be able to take place on this plot.
Plot 19-04a (Work No. 57K) Plot 19-04b (Work No. 57K)	Permanent loss of the land within Plots 19-04a and 19-04b, with impact on use of adjacent land for farming activities due to restriction of access.	Access to adjacent land will be cut off as a result of permanent loss of land.	In the worst case scenario the business may become unviable, with financial loss expected due to loss of land for dairy farming activities which would no longer be able to take place on this plot and restriction in access to surrounding land preventing farming taking place.

- 16.9.201. The sensitivity of plots 19-04a and 19-04b is deemed to be very high and the magnitude of impact is considered to be major for both plots. This has therefore resulted in a **very large adverse (significant)** permanent, long term effect on the operational viability of these agricultural holdings.
- 16.9.202. The sensitivity of plot 17-43 is deemed to be very high and the magnitude of impact is considered to be minor. This has therefore resulted in a **moderate adverse (significant)** permanent, long term effect on the operational viability of this agricultural holding.
- 16.9.203. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details on non-significant effects on agricultural land holdings.

WCH

- 16.9.204. A section of PRoW 414/39A follows the route of Altami Brook within a valley, forming a circular walk from Northrop Hall aligned east to west on either side of the Brook. During operation, the proposed design of the embedded pipe bridge option will prevent users from following the route of PRoW 414/39A and will therefore require permanent diversion.
- 16.9.205. Assuming a worst-case assessment scenario, a permanent diversion of the PRoW is proposed around the north-west pier of the embedded pipe bridge option, resulting in a small increased journey length with limited change to the route gradient. This would represent an overall minor magnitude of impact. This PRoW is of a medium sensitivity; therefore, the proposed diversion of this route will result in a *minor adverse (not significant)*, permanent, long-term effect on WCHs using this route.

Operational Stage – Section 6

- 16.9.206. The operation of Flint AGI would result in the permanent loss of two land holdings – Plots 22-03 and 22-06. These plots are currently used for pasture and are therefore in infrequent use. Due to the low usage of this land, no significant effects on these agricultural land holdings have been identified. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details on these agricultural land holdings.

Operational Stage – Section 7

- 16.9.207. The operation of Pentre Halkyn, Cornist Lane and Babel BVS would result in the permanent loss of four agricultural land holdings – Plots 25-05, 25-10, 27-03 and 29-05. These plots are currently used for pasture and are therefore in infrequent use. Due to the low usage of this land, no significant effects on these agricultural land holdings have been identified.
- 16.9.208. Refer to **Appendix 16.1 – Land Use and Assets (Volume III)** for further details on these agricultural land holdings.

16.10. MITIGATION AND ENHANCEMENT MEASURES

- 16.10.1. This section sets out the proposed avoidance, mitigation and compensation measures which are likely to be required to address the significant effects as assessed in **Section 16.9**.
- 16.10.2. These are also listed in the **Register of Environmental Actions and Commitments (REAC) (Document Reference: D.6.5.1)**.
- 16.10.3. Mitigation measures for the construction stage include:
- The public will be informed of the nature, timing and duration of particular construction activities and the duration of the construction works by newsletters and liaison with the Applicant (**D-PH-004** of the **REAC**, **Document Reference: D.6.5.1**).

- Construction Compounds will be set out and managed to reduce impacts on access to/from private property and housing and community facilities as far as practicable (**D-PH-005** of the **REAC, Document Reference: D.6.5.1**).
- Clear signage and directions for any alternative routes and appropriate alternative diversions will be provided and diversions clearly publicised to maintain access. Signage to advertise businesses that are open and operating as normal will also be provided where required (**D-PH-006** of the **REAC, Document Reference: D.6.5.1**).
- Community Facilities will be consulted prior to construction where access arrangements will be directly affected. Traffic management systems and diversion routes will be put in place to maintain access to identified community facilities (**D-PH-008** of the **REAC, Document Reference: D.6.5.1**).
- Vehicular access will be maintained at all times to community facilities which perform emergency service activities (**D-PH-009** of the **REAC, Document Reference: D.6.5.1**).
- A Dust Management Plan (DMP), which may include measures to control other emissions, in addition to the dust and PM₁₀ mitigation measures, is included as a Requirement of the **Draft DCO (Document Reference: D.3.1)**.
- A Construction Traffic Management Plan (CTMP) is included as a Requirement of the **Draft DCO (Document Reference: D.3.1)**.
- Construction activities that take place outside of St Oswald's School and Sandycroft County Primary School will be scheduled outside of term time where possible, to avoid potential disturbance and traffic delays (**D-PH-013** of the **REAC, Document Reference: D.6.5.1**).
- Discussions will be undertaken with Greenacres Animal Park to ascertain the off-peak season and/or the most convenient period to undertake construction activities (**D-PH-014** of the **REAC, Document Reference: D.6.5.1**).
- Discussions are being undertaken with 2 Sisters Food Group to mitigate the DCO Proposed Development's impact on their existing car park and will be formalised via a commercial agreement. This should ensure the DCO Proposed Development and the business's operations can co-exist. The Construction Contractor will set out and enact a suitable mitigation plan, to ensure that the impact on the business's operations are minimised as far as practicable. (**D-PH-015** of the **REAC, Document Reference: D.6.5.1**).
- Lighting at compounds will be of the lowest luminosity necessary for the delivery of each task. It will be designed, positioned, and directed to reduce the intrusion into adjacent properties and habitats ((**D-PD-013, D-PD-014** and **D-BD-015** of the **REAC, Document Reference: D.6.5.1**)).

- The Construction Contractor will promote the use of local workforce and suppliers, wherever practicable (**D-PH-002** of the **REAC, Document Reference: D.6.5.1**).

16.10.4. Compensation measures for the operational stage will be implemented for all agricultural land where there is a finding of significance, indicating that the operational viability of agricultural businesses could be adversely affected. These measures would primarily be in the form of financial compensation, for example to allow animal feed to be bought in where loss of land makes that necessary.

16.11. RESIDUAL EFFECTS

16.11.1. Table 16.31 below summarises the residual effects associated with the DCO Proposed Development during construction.

Table 16.31 - Summary of Construction Residual Effects

Description of the effect	Pre-mitigation significance of effects	Mitigation measure	Residual effect
Section 1			
Adverse effects on Ince Resource Recovery Park (Protos), safeguarded development site	Moderate adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users.	<i>Minor adverse (not significant)</i>
Adverse effects on access for employees to Encirc Glass, Elton	Moderate adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users.	<i>Minor adverse (not significant)</i>
Adverse effects to users of NCN Route from construction traffic	Moderate adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users, Sustrans and local authority.	<i>Minor adverse (not significant)</i>
Impacts from the generation of noise emissions resulting in annoyance, anxiety and adverse effects on psychological health and quality of life and wellbeing.	Negative	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Mitigation measures as identified in Chapter 15 Noise.	<i>Neutral</i>
Section 2			
Temporary disruption to users of PRow routes 294/FP2/1 and 309/FP1/2.	Moderate adverse (significant)	Clear signage. Engagement with affected users and local authority.	<i>Minor adverse (not significant)</i>
Temporary disruption to users of PRow routes 309/BR4/1 and 309/FP3/1.	Large adverse (significant)	Clear signage. Engagement with affected users and local authority.	Moderate adverse (significant)
Temporary changes to visual amenity, green space and PRow resulting in adverse mental health impacts from annoyance and nuisance; and reduced perceived amenity value (and associated reduced social contact and physical activity)	Negative	Engagement with affected users and local authority. Application of DMP. Mitigation measures as identified in Chapter 15 Noise.	<i>Neutral</i>

Description of the effect	Pre-mitigation significance of effects	Mitigation measure	Residual effect
Temporary disruption to access to properties located on Cryers Lane	Moderate adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Clear signage of any diversions.	<i>Minor adverse (not significant)</i>
Temporary disruption to access and disturbance to residence at Thornton Manor Care Centre and Nursing Home	Large adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Application of DMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Mitigation measures as identified in Chapter 15 Noise.	Moderate adverse (significant)
Temporary changes to visual amenity, green space and PRoW resulting in adverse mental health impacts from annoyance and nuisance; and reduced perceived amenity value (and associated reduced social contact and physical activity)	<i>Negative</i>	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Application of DMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Mitigation measures as identified in Chapter 15 Noise	<i>Neutral</i>
Impacts from the generation of noise emissions resulting in annoyance, anxiety and adverse effects on psychological health and quality of life and wellbeing.	<i>Negative</i>	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Mitigation measures as identified in Chapter 15 Noise Engagement with affected users.	<i>Neutral</i>
Section 3			
Temporary disruption to access to Five Villages Hall and potential disturbance to users	Moderate adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	<i>Minor adverse (not significant)</i>

Description of the effect	Pre-mitigation significance of effects	Mitigation measure	Residual effect
		Engagement with affected users. Mitigation measures as identified in Chapter 15 Noise Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	
Temporary disruption to access to pupils and staff at St Oswald's School and disturbance to users	Large adverse (significant)	Works carried out outside of term times. Engagement with affected users. Mitigation measures as identified in Chapter 15 Noise Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	Moderate adverse (significant)
Temporary disruption to access to properties on Grove Road	Moderate adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Clear signage of any diversions.	<i>Minor adverse (not significant)</i>
Temporary disruption to users of PRowS 211/FP4/1, NCN Route 5 and Chester Millennium Greenway	Moderate adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users and local authority.	<i>Minor adverse (not significant)</i>
Temporary closure of Public byway 263/BY11/1	Moderate adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users and local authority.	<i>Minor adverse (not significant)</i>
Temporary changes to visual amenity, green space, Shropshire Union Canal and PRow resulting in adverse mental health impacts from annoyance and nuisance; and reduced perceived amenity value (and associated reduced social contact and physical activity)	<i>Negative</i>	Engagement with affected users and local authority. Application of DMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Mitigation measures as identified in Chapter 15 Noise	<i>Neutral</i>
Impacts from the generation of noise emissions resulting in annoyance, anxiety and adverse effects on psychological health and quality of life and wellbeing.	<i>Negative</i>	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Mitigation measures as identified in Chapter 15 Noise	<i>Neutral</i>
Section 4			

Description of the effect	Pre-mitigation significance of effects	Mitigation measure	Residual effect
Temporary disruption to access to properties located along Deeside Road	Moderate adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Clear signage of any proposed diversions or temporary closures. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1)	<i>Minor adverse (not significant)</i>
Temporary disruption to access to properties located along Moor Lane and Rosslyn Close	Moderate adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Clear signage of any proposed diversions.	<i>Minor adverse (not significant)</i>
Temporary disruption to access and disturbance of users of Sandycroft County Primary School.	Large adverse (significant)	Works carried out outside of term times. Engagement with affected users. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	Moderate adverse (significant)
Temporary disruption to access, and disturbance of users of Saint Francis Anglican Church	Moderate adverse (significant)	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	<i>Minor adverse (not significant)</i>
Temporary loss of land and disruption to access to 2 Sister's Food Group	Moderate adverse (Significant)	Engagement with affected users. Development of a mitigation plan with 2 Sister's Food Group.	<i>Minor adverse (not significant)</i>
Temporary disruption to Greenacres Animal Park	Large adverse (significant)	Engagement with affected users. Undertaking works outside of peak season. Development of mitigation plan with Greenacres Animal Park.	Moderate adverse (significant)
Temporary disruption to WCHs using PRoWs 303/54/10, 307/3/10, 308/1/20 and 303/32/10	Moderate adverse (significant)	Engagement with affected users.	<i>Minor adverse (not significant)</i>
Temporary changes to visual amenity, green space and PRoW resulting in adverse mental health impacts from annoyance and nuisance; and reduced perceived amenity value (and associated reduced social contact and physical activity)	<i>Negative</i>	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Application of DMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	<i>Neutral</i>

Description of the effect	Pre-mitigation significance of effects	Mitigation measure	Residual effect
		Mitigation measures as identified in Chapter 15 Noise	
Impacts from the generation of noise emissions resulting in annoyance, anxiety and adverse effects on psychological health and quality of life and wellbeing.	<i>Negative</i>	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Mitigation measures as identified in Chapter 15 Noise	<i>Neutral</i>
Section 5			
Temporary disruption to access to properties associated with the open cut trench on Lower Aston Hall Lane	<i>Moderate adverse (significant)</i>	Engagement with affected users. Clear signage of any diversions. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	<i>Minor adverse (not significant)</i>
Temporary disruption to access to properties located on Church Lane	<i>Moderate adverse (significant)</i>	Engagement with affected users. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	<i>Minor adverse (not significant)</i>
Temporary disruption to access to properties located on Green Lane	<i>Moderate adverse (significant)</i>	Engagement with affected users. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	<i>Minor adverse (not significant)</i>
Temporary disruption to access to properties located on Brookside and Brookside Crescent	<i>Moderate adverse (significant)</i>	Engagement with affected users. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	<i>Minor adverse (not significant)</i>
Temporary disruption to access to properties located on Pinfold Lane	<i>Moderate adverse (significant)</i>	Engagement with affected users. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	<i>Minor adverse (not significant)</i>
Temporary disruption to access and disturbance to residence at Aston Hall Care Home.	<i>Moderate adverse (significant)</i>	Engagement with affected users.	<i>Minor adverse (not significant)</i>

Description of the effect	Pre-mitigation significance of effects	Mitigation measure	Residual effect
		Application of DMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Mitigation measures as identified in Chapter 15 Noise Clear signage of any diversions.	
Temporary disruption to WCHs using PRoWs 414/39/10 and 414/39A/10	Moderate adverse (significant)	Engagement with affected users. Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	<i>Minor adverse (not significant)</i>
Section 6			
Temporary disruption to access and users of Highfield Hall	Moderate adverse (significant)	Engagement with affected users. Application of DMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Mitigation measures as identified in Chapter 15 Noise Clear signage of any diversions.	<i>Minor adverse (not significant)</i>
Impacts from the generation of noise emissions resulting in annoyance, anxiety and adverse effects on psychological health and quality of life and wellbeing.	<i>Negative</i>	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Mitigation measures as identified in Chapter 15 Noise	<i>Neutral</i>
Section 7			
Temporary disruption to access to properties located on Cornist Lane, Nant Road, Lleprog Lane and Allt Y Chwiler	Moderate adverse (significant)	Engagement with affected users. Application of CTMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) .	<i>Minor adverse (not significant)</i>
Temporary changes to visual amenity, green space and PRoW resulting in adverse mental health impacts from annoyance and nuisance; and reduced perceived amenity value (and associated reduced social contact and physical activity).	<i>Negative</i>	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Application of DMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Mitigation measures as identified in Chapter 15 Noise	<i>Neutral</i>
Impacts from the generation of noise emissions resulting in annoyance, anxiety and adverse effects on psychological health and quality of life and wellbeing.	<i>Negative</i>	Application of detailed CEMP as included as a Requirement of the Draft DCO (Document Reference: D.3.1) . Engagement with affected users. Mitigation measures as identified in Chapter 15 Noise	<i>Neutral</i>

16.11.2. **Table 16.32** below summarises the residual effects associated with the DCO Proposed Development during operation.

Table 16.32 - Summary of Operational Residual Effects

Description of the effect	Pre-mitigation significance of effects	Mitigation measure	Residual effect
Section 1			
Permanent loss of agricultural land in Plot 3-03 (Work No. 57A) used for dairy farming, however no impact on the use of adjacent land for farming activities to continue. Whilst some financial loss is expected due to the loss of land for dairy farming activities which would no longer be able to take place on this plot, as only this plot will be lost in the context of the wider agricultural business, this should not prevent the functional operation of the entire business owned and operated by the farmer.	Moderate adverse (significant)	Financial compensation for loss of plot of land.	<i>Neutral</i>
Permanent loss of agricultural land in Plot 3-18a (Work No. 57B) used for livestock farming, however no impact on the use of adjacent land for farming activities to continue. Whilst some financial loss is expected due to the loss of land for dairy farming activities which would no longer be able to take place on this plot, as only this plot will be lost in the context of the wider agricultural business, this should not prevent the functional operation of the entire business owned and operated by the farmer.	Moderate adverse (significant)	Financial compensation for loss of plot of land.	<i>Neutral</i>
Section 2			
Permanent loss of agricultural land in Plot 5-01 (Work No. 57C) used for keeping horses, however no impact on the use of adjacent land for farming activities to continue. Whilst some financial loss is expected due to the loss of land for dairy farming activities which would no longer be able to take place on this plot, as only this plot will be lost in the context of the wider agricultural business, this should not prevent the functional operation of the entire business owned and operated by the farmer.	Moderate adverse (significant)	Financial compensation for loss of plot of land.	<i>Neutral</i>
Permanent loss of agricultural land in Plot 5-07 (Work No. 57D) used for keeping horses, however no impact on the use of adjacent land for farming activities to continue. Whilst some financial loss is expected due to the loss of land for dairy farming activities which would no longer be able to take place on this plot, as only this plot will be lost in the context of the wider agricultural business, this should not prevent the functional operation of the entire business owned and operated by the farmer.	Moderate adverse (significant)	Financial compensation for loss of plot of land.	<i>Neutral</i>
Section 3			
Permanent loss of agricultural land in Plot 9-15 (Work No. 57G) used for dairy farming, however no impact on the use of adjacent land for farming activities to continue. Whilst some financial loss is expected due to the loss of land for dairy farming activities which would no longer be able to take place on this plot, as only this plot will be lost in the context of the	Moderate adverse (significant)	Financial compensation for loss of plot of land.	<i>Neutral</i>

Description of the effect	Pre-mitigation significance of effects	Mitigation measure	Residual effect
wider agricultural business, this should not prevent the functional operation of the entire business owned and operated by the farmer.			
Section 5			
Permanent loss of agricultural land in Plot 17-43 (Work No. 57I) used for livestock farming, however no impact on the use of adjacent land for farming activities to continue. Whilst some financial loss is expected due to the loss of land for livestock farming activities which would no longer be able to take place on this plot, as only this plot will be lost in the context of the wider agricultural business, this should not prevent the functional operation of the entire business owned and operated by the farmer.	Moderate adverse (significant)	Financial compensation for loss of plot of land.	<i>Neutral</i>
In the worst case scenario, the permanent loss of the of agricultural land in Plot 19-04a (Work No. 57K), could result in the business becoming unviable, with financial loss expected due to loss of land for dairy farming activities which would no longer be able to take place on this plot and restriction in access to surrounding land preventing farming taking place.	Very large adverse (significant)	Financial compensation for loss of plot of land and the loss of viability for the business to be able to continue operating.	<i>Minor adverse (not significant)</i>
In the worst case scenario, the permanent loss of the of agricultural land in Plot 19-04a (Work No. 57K), could result in the business becoming unviable, with financial loss expected due to loss of land for dairy farming activities which would no longer be able to take place on this plot and restriction in access to surrounding land preventing farming taking place.	Very large adverse (significant)	Financial compensation for loss of plot of land and the loss of viability for the business to be able to continue operating.	<i>Minor adverse (not significant)</i>

16.12. IN-COMBINATION CLIMATE CHANGE IMPACTS

- 16.12.1. The in-combination climate change impact assessment considers the extent to which climate change may alter the effects which have already been identified within this Chapter.
- 16.12.2. The effects that have been considered within this Chapter have been considered against likely climate hazards, as set out within Chapter 7 - Climate Resilience (Volume II) and the effects identified are not anticipated to change as a result of these hazards.

16.13. MONITORING

- 16.13.1. There are no proposed monitoring arrangements for Population and Human Health.

16.14. REFERENCES

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