Cambridge Waste Water Treatment Plant Relocation Project
Anglian Water Services Limited

Environmental Statement Chapter 6: Agricultural Land and Soils

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Contents

Tables

Summary

This chapter of the Environmental Statement (ES) reports on the likely impact of the Proposed Development on agricultural land, soil resources and farm businesses operating within the Proposed Development. Based on the sensitivity of these receptors and the magnitude of the impact, the significance of the effect of construction was determined.

The types of impact considered in this chapter include:

- temporary and permanent acquisition of land required from farm holdings;
- permanent loss of agricultural land;
- temporary and permanent acquisition of land on soil resources;
- temporary and permanent severance of farm holdings;
- permanent loss of farm infrastructure; and
- disruption to the normal operation of farm businesses.

Most of the impacts occur during the construction phase of the Proposed Development.

The assessments make use of publicly available information in relation to agricultural land and soil resources, survey results from soil surveys completed in relation to the Proposed Development and survey results from an agricultural impact assessment informed by farm interviews with landowners, tenants and /or their land agents.

The majority of the land permanently required for the construction of the proposed Waste Water Treatment Plant (WWTP) and landscape masterplan (within the Landscape Ecology and Recreation Management Plan, (Appendix 8.14, Application Document Reference 5.4.8.14) is grade 2 and grade 3a agricultural land, deemed best and most versatile (BMV). The effect of the permanent loss of BMV land is moderate adverse and is significant.

The temporary acquisition of land required for the construction of the waste water transfer tunnel, treated effluent pipeline, and the outfall would have a temporary minor adverse effect on agricultural land which is not significant. The acquisition of land required for the construction of the Waterbeach pipeline was found to have a temporary moderate effect on agricultural land which is significant.

The large prevalence of BMV land within a 2km radius of the selected development location means that there is no alternative to the use of BMV land for the Proposed Development within this location.

The effect of permanent and temporary land acquisition on soil resources was found to be not significant due to reuse and reinstatement as well as to adherence to the Code of Construction (CoCP) (Appendix 2.1, App Doc Ref 5.4.2.1) and measures within the outline Soil Management Plan (SMP) (provided as an Appendix 6.3) (App Doc Ref 5.4.6.3)).

The effect of permanent and temporary acquisition of land for the proposed WWTP was found to have a moderately significant effect on 11 farm businesses, a major/moderate significant effect on 1 farm business and minor or negligible non-significant effect on 10 farm businesses.

1 Introduction

1.1 Purpose of this chapter

1.1.1 This chapter of the Environmental Statement (ES) presents the findings of Environmental Impact Assessment (EIA) completed in relation to the potential impacts of the Proposed Development on agriculture and soils.

1.1.2 The assessment accounts for impacts of the Proposed Development during its construction (including commissioning), operation and maintenance, and decommissioning phases.

1.1.3 The receptors assessed for agriculture and soils comprise:

- agricultural land – the prevalence of 'best and most versatile' (BMV) land, determined via desktop data and an Agricultural Land Classification (ALC) survey;
- soil resources – the sensitivity of soils to handling determined via desktop data and an ALC survey; and
- farm business – impact on farm businesses of land loss, land severance, infrastructure damage and disruption to activities, determined via an Agricultural Impact Assessment (AIA) (provided as Appendix 6.2, App Doc Ref 5.4.6.2).

1.1.4 This chapter summarises information from supporting studies, technical reports and publicly available data which are included within the Agricultural Land Classification (ALC) (Appendix 6.1, App Doc Ref 5.4.6.1), the Outline Soil Management Plan (SMP) Appendix 6.3 (App Doc Ref 5.4.6.3), AIA (Appendix 6.2, App Doc Ref 5.4.6.2) and the Landscape, Ecology and Recreation Management Plan (LERMP) which contains the landscape masterplan (Application Document Reference 5.4.8.14)

1.1.5 Potential effects of the Proposed Development on soil dust and contamination are assessed in Chapter 7: Air Quality (App Doc Ref 5.2.7) and Chapter 14: Land Quality (App Doc Ref 5.2.14). Potential odour effects of the Proposed Development are assessed in Chapter 18: Odour (App Doc Ref 5.2.18).

1.2 Competency statement

1.2.1 Summaries of the qualifications and experience of the chapter authors are set out in Table 1-1.

Table 1-1: Competent experts

Author	Qualification / professional membership	Years of experience	Project experience summary
[redacted]	Member of British Society of Soil Science	1	Desk studies for various projects relating to ALC grade and soil classification; ALC and soil resource surveys; consultancy for sewage sludge application on agricultural land; soil nutrient analysis for landscaping purposes.
[redacted]	Chartered Scientist of Science Council; Full Member of British Society of Soil Science; FACTS qualified advisor (Fertiliser Advisers Certification and Training Scheme)	32	Agricultural land classification assessment and soil survey; soil management planning; soil nutrient advice; agriculture and soils discipline lead of nationally significant infrastructure projects and other projects.

1.3 Planning policy context

National policy statement requirements

1.3.1 Planning policy on waste water Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to Agricultural Land and Soil Resources, is contained in the National Policy Statement (NPS) for Waste Water (Department of Environment, Food and Rural Affairs 2012).

1.3.2 Table 1-2 sets out how the scope proposed in this chapter complies with the NPS for Waste Water.

Table 1-2: Scope and NPS compliance

NPS requirement	Compliance of ES scope with NPS requirements
Paragraph 4.8.8: Retention of the best and most versatile land within the agricultural industry. Proposed developments should seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification), and preferably use land in areas of poorer quality (grades 3b, 4 and 5) except where this would be inconsistent with other sustainability considerations.	To determine the extent of best and most versatile land, a site survey was undertaken in the area of permanent land acquisition and desktop data were studied over a 2km radius around the site of the Proposed Development. The ES determines that the prevalence of best and most versatile in the area means there is no alternative location for the proposed WWTP. The magnitude of impact and sensitivity of agricultural land is also reported in an AIA (Appendix 6.2, App Doc Ref 5.4.6.2). Land temporarily required will be managed through a SMP an outline is provided in (Appendix 6.3 App Doc Ref 5.4.6.3). This will govern the reinstatement of land, including agricultural land, to its previous use. For areas of land permanently required the extent required has been minimised.

NPS requirement	Compliance of ES scope with NPS requirements
Paragraph 4.8.16: The decision maker should ensure that justification is provided where applicants site their scheme on the best and most versatile agricultural land.	Distribution of BMV land is assessed in an ALC survey (Appendix 6.1, App Doc Ref 5.4.6.1). Where BMV land is present on the site of the Proposed Development, the prevalence of BMV land is assessed in the surrounding area. Mitigation actions are proposed for the management of soil resources.
Paragraph 4.12.7: The impact of dust generation should be kept to a minimum during construction activities.	This ES chapter refers to the ALC (Appendix 6.1 App Doc Ref 5.4.6.1) and outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3), which provide guidance on appropriate soil handling. Chapter 7: Air Quality includes a dust risk assessment which takes into account the measures within Section 7.8 of the CoCP Part A (Air Quality) (Appendix 2.1, App Doc Ref 5.4.2.1)
Paragraph 4.14.3: Disposal of waste should only be considered where other waste management options are not available, or where it is the best overall environmental outcome.	This ES chapter considers the re-use of soils within the Proposed Development, namely for landscaping.
Paragraph 4.15.12: Projects should assess any potential socio-economic changes in respect of any potential new issues compared to the existing baseline.	The AIA (Appendix 6.3, App Doc Ref 5.4.6.2) considers the impact on agricultural businesses.

National planning policy

1.3.3 As outlined in Table 1-2, the national planning policy of relevance to Agricultural Land and Soil Resources, and pertinent to the Proposed Development, includes:

1.3.4 NPS for Waste Water (Department of Environment, Food and Rural Affairs 2012) with particular reference to:

- Section 4.8 (best and most versatile land);
- Section 4.12 (construction activities);
- Section 4.14 (waste disposal); and
- Section 4.15 (socioeconomics).

1.3.5 National Planning Policy Framework (NPPF) (Ministry of Housing 2021) with particular reference to:

- Paragraph 174
  - Protecting and enhancing valued landscapes (covered in Chapter 14: Land Quality), sites of biodiversity (covered in Chapter 8: Biodiversity) or geological value (covered in Chapter 20: Water Resources) and soils (in a manner commensurate with their statutory status or identified quality in the development plan); and

  - Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the BMV agricultural land, and of trees and woodland.

- Paragraph 210
  - Providing for restoration and aftercare at the earliest opportunity, to be carried out to high environmental standards, through the application of appropriate conditions, whereby characterising and protecting the soil resource is a key part of carrying out developments and restorations to high environmental standards.

Local planning policy

1.3.6 Local planning policy of relevance to the Proposed Development includes:

1.3.7 The South Cambridgeshire Local Plan (Council, South Cambridgeshire District 2018) with particular reference to:

- Policy NH/3 (p114) protecting agricultural land, which states that planning permission will not be granted for development which would lead to the irreversible loss of Grades 1, 2 or 3a agricultural land unless:
  - land is allocated for development in the Local Plan; and
  - sustainability considerations and the need for the development are sufficient to override the need to protect the agricultural value of the land.
- Policy CC/6 (p94) which states that soils must be carefully managed on construction sites so as to minimise the amount generated as waste. In addition, any re-use of construction spoil within the development site should take account of the landscape character and avoid the creation of features alien to the topography.

1.3.8 Cambridge City Council Local Plan (Cambridge City Council 2018) with particular reference to:

- Policy 8 (p37) which highlights the importance of the retention of best and most versatile land within the agricultural industry.

1.3.9 Cambridgeshire and Peterborough Minerals and Waste Local Plan 2036 (Cambridgeshire County Council 2021) with particular reference to:

- Policy 24 (p62) entitled ‘Sustainable use of soils’ – mineral and waste development identifies where mineral and waste development will be permitted, specifically in the context of best and most versatile land and peat.

1.4 Legislation

1.4.1 There is no applicable legislation specific to the assessment of effects on agricultural land and soil resources. Planning policy relating to agricultural land and pertinent to the Proposed Development is outlined in Section 1.3, while Section 2.1 sets out the guidance used in the production of this ES chapter.

1.5 Consultation

Scoping

1.5.1 Table 1-3 provides a summary of key points raised during scoping.

Table 1-3: Key points raised during scoping

ID	Consultee	Points raised	Response
3.1.1	PINS	The Applicant states that suitable soil handling measures will be implemented through the Soil Management Plan (SMP) as part of the Construction Environmental Management Plan (CEMP) to ensure that there are no significant effects relating to soil structure and quality. Section 2.16 of the Scoping Report sets out the high-level framework and content for these documents. As there is a reliance on mitigation measures to avoid significant effects, and which are yet to be sufficiently detailed, the Inspectorate is of the opinion that this matter cannot be scoped out at this stage. The Environmental Statement should include an assessment of the potential significant effects, the proposed mitigation measures and any significant residual effects following mitigation.	The AIA (Appendix 6.2, App Doc Ref 5.4.6.2) provides an assessment of the potential significant effects on farm businesses, agricultural land and soil resources based on survey information and desktop studies. This is reflected in this ES chapter. The assessment of significance has been conducted prior to the consideration of mitigation measures. Residual effects have been subsequently determined for the significance of effects after the implementation of mitigation measures. The ALC (Appendix 6.1,App Doc Ref 5.4.6.1) and outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) have been produced and tailored to the soils of within land required for the proposed WWTP and landscape masterplan and include soil handling measures to ensure that overall quality does not unduly deteriorate during construction.
3.1.2	PINS	The Applicant states that there are no agricultural receptors considered likely to be sensitive to odour. However, the Scoping Report states that 'the absence of sensitive agricultural receptors will be confirmed by the Agricultural Impact Assessment, which will evaluate the type, scale and proximity of agricultural businesses within the EIA Scoping boundary'. The Inspectorate is of the opinion that until the AIA has established the presence or absence and extent of receptors, this matter cannot be scoped out.	The AIA (Appendix 6.2, App Doc Ref 5.4.6.2) identifies the type of farm businesses within the Scheme Order Limits. In particular, it was determined that the type of farm businesses located within odour contours of more than 1.5 Odour Units of predicted ground level odour concentrations (as identified by Figure 18.1, Odour Contour Book of Figures – Odour App Doc Ref 5.3.18) are arable and therefore not sensitive to odour. One potentially sensitive farm business has been identified. This is a campsite which is over 2km outside odour contours of more than 1.5 OU. Therefore, odour impacts were not included in the assessment within this chapter as there is no impact pathway.

Technical Working Groups

1.5.2 The Technical Working Group for Biodiversity, which included representatives from Natural England, the Environment Agency, Greater Cambridge Shared Planning, Wildlife Trust and National Trust, did not raise points relating to soils or farm holdings.

Statutory s42 consultation

1.5.3 Table 1-4 provides a summary of key points raised during statutory s42 consultation.

Table 1-4: Key points raised during statutory consultation

Date	Consultee	Points raised	How and where addressed
27/04/2021	Cambridgeshire County Council	To include the pipeline routes where topsoil stripping will take place as part of the soil surveys.	The survey has been completed in line with the Scoping Opinion. The ALC (Appendix 6.1, App Doc Ref 5.4.6.1) and outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) includes measures to be implemented during construction in relation to the cataloguing of soil types. Where soil is to be stripped for temporary stockpiling adjacent to the pipeline route for less than 12 months, a soil survey was not deemed necessary provided a soil specialist is present on-site to monitor key soil management stages, or that a soil specialist has delivered appropriate training to the Contractor prior to the commencement of works.
27/04/2021	Cambridgeshire County Council	To consider the impact of soil compaction by construction traffic near to existing trees and hedgerows. Including what measures should be taken to prevent damage to the roots.	Guidance is provided in the ALC (Appendix 6.1, App Doc Ref 5.4.6.1) and outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3). For example, stockpile construction should occur away from tree roots and crowns. It is recommended that tracked/low ground pressure vehicles are used throughout stripping and haulage to limit soil compression and damage to roots.
27/04/2021	Natural England	Natural England advised that a simple area breakdown for each of the individual soil components should be provided in the ES. Including details of the total agricultural area impacted temporarily and permanently (split by scheme component and by ALC grade), and total BMV agricultural area permanently and temporarily required for the development.	A breakdown has been completed for the area of permanent land acquisition comprising the proposed WWTP using survey data and is included in Section 3.1 of this ES chapter (current baseline). Temporary land acquisition has been recorded in the AIA (Appendix 6.2, App Doc Ref 5.4.6.2) using desktop ALC information in areas where a primary survey was not scoped in. The proportion of each ALC grade and soil type has been calculated for each component of the Proposed Development and included in Section 3.1 of this ES chapter (current baseline) and the ALC (Appendix 6.1, App Doc Ref 5.4.6.1) and outline SMP (Appendix 6.3,App Doc Ref 5.4.6.3).

Date	Consultee	Points raised	How and where addressed
27/04/2021	Natural England	Natural England noted that a detailed SMP and appropriate SMP implementation is essential.	The ALC (Appendix 6.1 App. Doc Ref. 5.4.6.1) and outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) is provided in the application. A draft was included with the Preliminary Environmental Information at Phase Three Consultation. The outline SMP is based on Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites and on the Institute of Quarrying Guide to handling soils; and tailored to the Proposed Development. For extended guidance, refer to Section 7.4 of the CoCP (Appendix 2.1, App Doc Ref 5.4.2.1).

Statutory s47 local community consultation

1.5.4 The Consultation Report (App Doc Ref 6.1) details the responses to all comments made during the public consultation. Matters raised in relevance to agricultural land and soil resources include:

- Concerns raised by Save Honey Hill about the permanent loss of agricultural land.
- Landowner raised concern regarding the need for use of the expanse of (agricultural) land for mitigation.
- Landowner raised issue of providing access at all times for farm machinery to allow tenants to continue farming activities.
- Landowner requested confirmation of access routes to parcels of land required for the construction of the treated effluent pipeline and outfall land that details were also provided on measures to mitigate damage to ground conditions by machinery.
- Landowner requested details on how topsoil would be separated and treated in construction and assurance that land used in construction would be able to be restored to farm land.
- Landowner requested assurance that access to the land required for the construction of the transfer tunnel would not use existing farm accesses off the B1047 Horningsea Road.
- Landowner requested detail regarding pipe depths such that arable farming could continue in operation.
- Landowner requires details of any surface level equipment and chambers in relation to understanding impedance to farming

2 Assessment Approach

2.1 Guidance

2.1.1 The following list sets out the guidance associated with Agricultural Land and Soil Resources:

- A New Perspective on Land and Soil in Environmental Impact Assessment (IEMA 2022) pursues a wider approach to assessing the soil functions, ecosystem services and natural capital provided by land and soils as part of EIA;
- The 25 Year Environment Plan (Defra 2018) sets out government action to aid the natural world in regaining good health. The plan acts as a policy driver, calling for a more sustainable approach to aspects such as agriculture and land use. Key aims include improving soil health and restoring and protecting peatlands in the context of widespread soil degradation;
- Safeguarding our Soils: A Strategy for England (Defra 2019) emphasises the sustainable use of soil as a non-renewable natural resource that provides ecosystem services and is threatened by intensive agriculture, pollution and urban development;
- The National Planning Practice Guidance (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government 2019) includes a dedicated section on natural environment, which sets out the information local planning authorities may require in order to take account of the quality of agricultural land when making planning decisions;
- Agricultural Land Classification guidelines (Ministry of Agriculture, Fisheries and Food 1988) set out categories for land in England and Wales, based on physical or chemical properties that impose long-term limitations on agricultural use. This provides the industry standard framework for classifying land with respect to developments impacting agricultural land; and
- The British Standards Specification for Topsoil (The British Standards Institution 2015), Specification for Subsoil (The British Standards Institution 2013) and the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (CoCP) (Defra 2018)) describe practical measures for stripping, stockpiling and reinstating soil. The latter also highlights the importance of utilising soil surveys – namely ALC surveys – to best characterise and mitigate impacts to soil quality.
- London-West Midlands Environmental Statement, Volume 5, Technical Appendices, Scope and Methodology Report Addendum (HS2, 2013). The document outlines methodology for assessing the environmental impact on agriculture and soils.

2.1.2 ALC guidelines (Ministry of Agriculture, Fisheries and Food 1988) set out categories for land in England and Wales, based on physical or chemical properties that impose

long-term limitations on agricultural use. This provides the industry standard framework for classifying land with respect to developments impacting agricultural land. The framework uses the following grade definitions:

- Grade 1 (excellent quality agricultural land): 'Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality';
- Grade 2 (very good quality agricultural land): 'Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1';
- Grade 3 (good to moderate quality agricultural land): 'Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown, yields are generally lower or more variable than on land in Grades 1 and 2';
- Subgrade 3a (good quality agricultural land): 'Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops';
- Subgrade 3b (moderate quality agricultural land): 'Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year';
- Grade 4 (poor quality agricultural land): 'Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g., cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land'; and
- Grade 5 (very poor-quality agricultural land): 'Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops'.

2.1.3 Grades 1, 2 and 3a are classified as BMV land, denoting land which is 'most flexible, productive and efficient in response to inputs and which can best deliver future crops for food and non-food uses' (Natural England 2021).

2.2 Assessment methodology

2.2.1 The general approach to assessment is described in Chapter 5: Assessment Methodology.

2.2.2 Following the preliminary assessment of the likely significant effects of the Proposed Development, any further mitigation measures (secondary mitigation) are identified and described. These mitigation measures would further reduce an adverse effect or enhance a beneficial one. The assessment of likely significant effects is then carried out taking into account the identified secondary mitigation measures to identify the 'residual' environmental effects.

2.2.3 This section provides specific details of the Agriculture and Soils methodology applied to the assessment of the Proposed Development.

2.2.4 The assessments of the ES are based upon a baseline study, intrusive soils surveys (ALC survey and soil nutrient sampling), and an AIA survey. The methodology of each is outlined below.

2.2.5 The significance of an effect is determined based on the magnitude of an impact and the sensitivity of the receptor affected by the impact of that magnitude. This section describes the criteria applied in this chapter to characterise the magnitude of potential impacts and sensitivity of receptors.

Impact assessment criteria - soil resources

2.2.6 The terms used to define magnitude and sensitivity in relation to soil resources stem from guidance published by IEMA (IEMA 2022).

Magnitude of impact – soil resources

2.2.7 The criteria for defining magnitude for the assessment of impacts to soil resources are defined within Table 2-1.

Table 2-1: Impact magnitude for soil resources

Magnitude	Criteria
High	Permanent, irreversible loss of one or more soil functions or soil volumes (including land quality downgrading), over an area of more than 20ha, including effects from temporary developments.
Medium	Permanent, irreversible loss of one or more soil functions or soil volumes (including land quality downgrading), over an area of 5ha - 20ha, including effects from temporary developments.
Low	Permanent, irreversible loss of one or more soil functions or soil volumes (including land quality downgrading), over an area of less than 5ha, including effects from temporary developments.
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use.

Source: Table adapted from (IEMA 2022)

Sensitivity of receptor – soil resources

2.2.8 The criteria for defining receptor sensitivity for the assessment of impacts to soil resources are defined in Table 2-2.

Table 2-2: Receptor sensitivity for soil resources

Magnitude	Criteria
High	• Soils with high clay and silt fractions and organo-mineral and peaty soils where the Field Capacity Days[1] (FCD) are 150 or greater; or • Medium-textured soils where the FCDs are 225 or greater.
Medium	• Clays, silty clays, sandy clays, heavy silty clay loams, heavy clay loams, silty loams and organo-mineral and peaty soils where the FCDs are fewer than 150; or • Medium-textured soils where FCDs are fewer than 225; or • Sands, loamy sands, sandy loams and sandy silt loams where the FCDs are 225 or greater or are in wetness classes WCIII and WCIV.
Low	• Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams) where the FCDs are fewer than 225.

Source: Table adapted from (IEMA 2022)

Significance of effects – soil resources

2.2.9 The overall significance of the development for soil resources was determined as a function of impact magnitude and receptor sensitivity. A significance rating was calculated as shown in Table 2-3.

Table 2-3: Signifiance matrix – soil ressources

Sensitivity of receptor	Magnitude of Impact: High	Medium	Low	Negligible
High	Major: significant	Major/moderate: significant	Moderate: significant	Minor: not significant
Medium	Major/moderate: significant	Moderate: significant	Minor: not significant	Negligible: not significant
Low	Moderate: significant	Minor: not significant	Negligible: not significant	Negligible: not significant

Residual effect – soil resources

2.2.10 The assessment of effects on soil resources follows the approach set out within Chapter 5: Assessment Methodology. Effects have been assessed to take into account for both embedded (primary) mitigation and legal requirements (tertiary mitigation), and after the application of further mitigation measures (secondary mitigation). Effects after mitigation are referred to as 'residual effects'.

[1] Field capacity is the amount of soil moisture or water content within the soil after excess water has drained away and the rate of downward movement has decreased. This usually takes place two to three days after rain or irrigation in pervious soils of uniform structure and texture.

Impact assessment criteria – farm businesses

2.2.11 The definitions of magnitude and sensitivity in relation to farm businesses are based on those published by HS2 (HS2 2013). These are the most comprehensive methods available and deemed best practice.

2.2.12 Throughout this document, a 'farm holding' is defined as 'an area of land that consists of one or more land parcels or group of fields that are managed by a named person or named business entity as an owner, tenant or in any other commercial agricultural capacity, for the production of food, forage or fibre'.

2.2.13 Farm holdings are considered to comprise (i) a farm business and (ii) agricultural land.

2.2.14 The farm business is the activity within the farm holding that generates income. The agricultural land refers to the area of land used for agricultural production.

Magnitude of impact – farm businesses

2.2.15 For Table 2-4, the overall impact magnitude for a farm holding is assigned as the highest magnitude identified among the four criteria (land required, severance, infrastructure, disruptive effects). For example, a farm holding experiencing a high impact from land severance but medium impact for other criteria would experience an overall high impact magnitude. The impact magnitude was then used in the quantification of significance (Table 2-6).

2.2.16 A distinction was made between land required permanently by the development and land required temporarily and returned to agriculture, with a lower scale of impact assigned for temporary impacts than for permanent impacts.

2.2.17 Where the farm holding forms part of a larger business (that extends beyond the extent of the Scheme Order Limits of the Proposed Development), the percentage of land acquired from that farm business was calculated according to the area of the larger business.

Table 2-4: Impact magnitude criteria for farm businesses

Impact magnitude	Land required (permanently)	Land required (temporarily)	Severance	Infrastructure	Disruptive effects
High	Removal or loss of soil function of >20% of all land farmed	Removal or loss of soil function of >50% of all land farmed	No access available to severed land	Direct loss of farm dwelling, building or structure	Disruption discontinues land use or enterprise
Medium	Removal or loss of soil function of 10% - 20% of all land farmed	Removal or loss of soil function of 26% - 50% of all land farmed	Access available to severed land via the public highway	Loss of or damage to infrastructure affecting land use	Disruption necessitates change to scale or nature of land use or enterprise

Impact magnitude	Land required (permanently)	Land required (temporarily)	Severance	Infrastructure	Disruptive effects
Low	Removal or loss of soil function of 5% - 10% of all land farmed	Removal or loss of soil function of 10% - 25% of all land farmed	Access available to severed land via private way	Infrastructure loss/damage does not affect land use	Disruption does not affect land use or enterprise
Negligible	Loss of soil function of <5% of all land farmed	Loss of soil function of <10% of all land farmed	No new severance	No impact on farm infrastructure	No disruption on land use or enterprise

Source: Table adapted from (HS2 2013) and (Highways England 2018).

Sensitivity of receptor – farm businesses

2.2.18 The sensitivity of a farm business refers to the relationship between land and key infrastructure, flexibility in the normal course of operations, and the degree of commercialisation.

2.2.19 The sensitivity was determined according to the criteria within Table 2-5.

Table 2-5: Receptor sensitivity criteria – farm businesses

Sensitivity	Criteria
High	Farm types in which the operation of the enterprise is dependent on the spatial relationship of land to key infrastructure, and where there is a requirement for frequent and regular access between the two, or dependent on the existence of the infrastructure itself, e.g.: • Dairying, in which milking cows must travel between fields and the parlour at least twice a day; • Irrigated arable cropping and field-scale horticulture, which are dependent on irrigation water supplies; and • Intensive livestock or horticultural production that is undertaken primarily within buildings, often in controlled environments.
Medium	Farm types in which there is a degree of flexibility in the normal course of operations, e.g.: • Combinable arable farms; and • Grazing livestock (other than dairying).
Low	Farm types and land uses undertaken on a non-commercial basis. For example, smallholdings where the main source of income is not derived from the agricultural business.

Source: Table adapted from (HS2 2013) and (Highways England 2018).

Significance of effects – farm businesses

2.2.20 The overall significance of the development for individual farm businesses was determined as a function of impact magnitude and receptor sensitivity. A significance rating was calculated for the farm businesses using Table 2-6.

Table 2-6: Significance matrix – farm businesses

Sensitivity of receptor	Magnitude of Impact: High	Medium	Low	Negligible
High	Major: significant	Major/moderate: significant	Moderate: significant	Minor: not significant
Medium	Major/moderate: significant	Moderate: significant	Minor: not significant	Negligible: not significant
Low	Moderate: significant	Minor: not significant	Negligible: not significant	Negligible: not significant

Residual effect – farm businesses

2.2.21 The assessment of effects on farm businesses follows the approach set out within Chapter 5: Assessment Methodology. Effects have been assessed to take into account for both embedded (primary) mitigation and legal requirements (tertiary mitigation), and after the application of further mitigation measures (secondary mitigation). Effects after mitigation are referred to as 'residual effects'.

Impact assessment criteria – agricultural land

2.2.22 The definitions of magnitude and sensitivity in relation to farm businesses are based on those published by HS2 (HS2 2013). These are the most comprehensive methods available and deemed best practice.

Magnitude of impact – agricultural land

2.2.23 The magnitude of impact on agricultural land was determined according to the criteria in Table 2-7.

2.2.24 The percentage of BMV land was calculated based on the results of the ALC survey reported in the ALC (Appendix 6.1, App Doc Ref 5.4.6.1) and desktop predicted ALC grades (Natural England 2020).

2.2.25 The ranking of impact is independent of the requirement to consult Natural England where development would involve loss of 20ha or more of BMV land.

Table 2-7: Impact magnitude for agricultural land.

Impact magnitude	The percentage of agricultural BMV land required for the development
High	> 60%
Medium	20% - 60%
Low	< 20% or < 10ha, whichever is higher.
Negligible	< 2%

Source: Table adapted from (HS2 2013) and (Highways England 2018).

Sensitivity of receptor – agricultural land

2.2.26 Agricultural land sensitivity was determined according to the criteria in Table 2-8 using the rationale that the resource with the highest sensitivity corresponds to areas of agricultural land where BMV land is scarce and therefore most sensitive.

2.2.27 The likelihood of BMV land occurring was identified using Natural England's Strategic Scale Maps (Defra 2001) which provide a prediction of the occurrence of BMV land.

Table 2-8: Receptor sensitivity criteria – agricultural land

Sensitivity	Criteria
High	Best and most versatile land where 'low likelihood of best and most versatile land' is the most extensive category in a 2km radius according to the Defra Likelihood maps.
Medium	Best and most versatile land where 'moderate likelihood of best and most versatile land' is the most extensive category in a 2km radius according to the Defra Likelihood maps.
Low	Best and most versatile land where 'high likelihood of best and most versatile land' is the most extensive category in a 2km radius according to the Defra Likelihood maps.

Source: Table adapted from (HS2 2013) and (Highways England 2018).

Significance of effects – agricultural land

2.2.28 The overall significance of the development for agricultural land was determined as a function of impact magnitude and receptor sensitivity. A significance rating was calculated for the impact on agricultural land using Table 2-9.

Table 2-9: Significance matrix - agricultural land

		Magnitude of Impact			
		High	**Medium**	**Low**	**Negligible**
Sensitivity of receptor	**High**	Major: significant	Major/moderate: significant	Moderate: significant	Minor: not significant
	Medium	Major/moderate: significant	Moderate: significant	Minor: not significant	Negligible: not significant
	Low	Moderate: significant	Minor: not significant	Negligible: not significant	Negligible: not significant

Residual effect – agricultural land

2.2.29 The assessment of effects on agricultural land follows the approach set out within Chapter 5: Assessment Methodology. Effects have been assessed to take into account for both embedded (primary) mitigation and legal requirements (tertiary mitigation), and after the application of further mitigation measures (secondary mitigation). Effects after mitigation are referred to as 'residual effects'.

2.3 Study area

Agricultural Land Classification and soil resources

2.3.1 The study area for the ALC survey and soils comprised the maximum area of land permanently required for the construction, operation and maintenance of the proposed WWTP and landscape masterplan. Provisional ALC information and soil

association mapping were consulted for the Waterbeach pipeline and final effluent pipeline, the outfall, waste water transfer tunnel and new access connecting with Horningsea Road. These sources of information were deemed suitable for areas with no permanent change to land use and for soils stockpiled in close proximity for less than 12 months on the understanding that a soil specialist is present on-site to monitor key soil management stages, or that a soil specialist has delivered appropriate training to the Contractor prior to the commencement of works.

Farm holdings

2.3.2 All farm holdings wholly or partially within the Scheme Order Limits have been considered within this assessment.

2.3.3 The farm holdings assessed were categorised by location as follows:

- holdings for which the largest impact was from the proposed WWTP and landscape masterplan – permanent acquisition of land;
- holdings for which the largest impact was from temporary land-take for the construction of the waste water transfer tunnel, shafts, final effluent pipeline and the outfall - temporary acquisition of land; and
- holdings for which the largest impact was from temporary land-take for the construction of the Waterbeach pipeline - temporary acquisition of land.

2.3.4 For holdings affected by more than one aspect of the Proposed Development (e.g., holdings that are affected by both the Waterbeach pipeline and the waste water transfer tunnel), the assessment has addressed all impacts. The holding was categorised under the subheading of the project component that affected the largest area.

2.3.5 To retain farm anonymity, farm holdings were assigned an alphanumeric code (e.g., Y039).

2.4 Temporal Scope of Assessment

Construction

2.4.1 For the assessment, these effects will be taken to be those for which the source begins and ends during the construction and commissioning stages prior to the proposed WWTP becoming fully operational as set out in Chapter 2 Project Description.

2.4.2 The assumed assessment years for construction are from 2024 until 2028.

Operation and maintenance

2.4.3 For the assessment, these are the effects that, start once the proposed WWTP is commissioned and fully operational and includes the effects of the physical presence of the infrastructure, its operation, use and maintenance, including the permanent change in land use.

2.4.4 The assessment of operational effects will be the first full 12 months of operation (excluding any commissioning period for the proposed WWTP as this is part of the Construction Phase). The proposed WWTP proposes to become fully operational in 2028, therefore the assessment year for the Operational Phase is 2028.

Duration of effects

2.4.5 Timescales associated with these effects, regardless of phase are as follows:

- Short- term – endures for up to 12 months after construction or decommissioning;
- Medium-term – endures for 1-5 years;
- Long-term – endures for 5-15 years; and
- Permanent effects – endures for more than 15 years and / or effects which cannot be reversed (e.g., where buried archaeology is permanently removed during construction).

2.5 Baseline study

Desktop data

2.5.1 Baseline information was collected through a detailed desktop review of existing studies and datasets. The information used and source are summarised in Table 2-10.

2.5.2 In particular, the ALC system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use.

2.5.3 The principal physical factors influencing agricultural production are climate, site and soil. These factors together with interactions between them form the basis for classifying land into one of five grades, described in paragraph 2.1.2.

2.5.4 Preliminary ALC information was used to conduct the AIA on the Waterbeach pipeline (temporary land acquisition).

Table 2-10: Desktop information sources

Baseline data	Data sets reviewed	Year	Data owner
Provisional ALC grades	Magic Map Application	2021	Defra
Likelihood of BMV land strategic scale maps	Natural England's Strategic Scale Maps (Defra 2001)	2001	Natural England
Soil types	The Soils Guide, LandIS	2021	Cranfield University
Geology: bedrock and superficial deposits	Geology of Britain viewer	2021	British Geological Survey
Climate data	UK climate averages	2021	Met Office
Flooding data	Flood map for planning.	2021	Environment Agency

Surveys

2.5.5 In addition to existing information, non-intrusive and intrusive surveys were completed within the area of land required for the Proposed Development. The ALC (Appendix 6.1, App Doc Ref. 5.4.6.1), outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3 and Figure 6.3 (App Doc Ref 5.3.6)) detail the intrusive surveys for agricultural land and soil resources completed in relation to the Proposed Development.

2.5.6 The ALC survey was undertaken in accordance with ALC guidelines (Ministry of Agriculture, Fisheries and Food 1988) and Soil Survey Handbook (Hodgson 1997). Soil nutrient sampling was conducted in accordance with the guidelines outlined in Natural England Technical Information Note TIN035 (Natural England 2008).

2.5.7 The information obtained from intrusive soil surveys was used to conduct the AIA in relation to permanent land acquisition in the area of land required for the proposed WWTP and landscape masterplan.

2.5.8 Farm surveys were completed through consultation with landowners and tenants for farm holdings within the Scheme Order Limits. The AIA (Application Document Reference 5.4.6.2) includes the approach to consultation and the questionnaire adopted to understand the use of each farm holding.

Table 2-11: Summary of surveys for agriculture and soil resources

Survey	Coverage	Completed by	Date	Location
ALC survey	The survey involved taking soil cores every 100m to a depth of 120cm or to bedrock, whichever was shallower, using a hand auger. Two soil pits were also included to further examine the soil profile and structure. The ALC survey comprised an assessment for soil horizon depth, texture, mottling, stoniness, structure, ped strength, carbonate content, slope and presence of roots. These criteria were used with climate data to assign an ALC grade to each borehole.	A chartered soil scientist with British Society of Soi Science (BSSS) membership and two soil scientists with BSSS membership.	22/11/2021 to 26/11/2021	Appendix 6.1, App Doc Ref 5.4.6.1
Soil nutrient sampling	Soil samples were taken from each field and comprised 25 cores bulked together to give a single sample of topsoil (to a depth of ~25cm) and subsoil (to a depth of ~25cm – 50cm). The soil samples were tested by NRM Laboratories (UK) for pH, available phosphorus (P), potassium (K) and magnesium (Mg), and organic matter. The results were interpreted as per Natural England TIN036 (Natural England 2008) and British Standard guidance (The British Standards Institution 2013), (The British Standards Institution 2015).	A graduate soil scientist under the supervision of a chartered soil scientist.	22/11/2021 to 26/11/2021	Appendix 6.1, App Doc Ref 5.4.6.1

Survey	Coverage	Completed by	Date	Location
AIA survey	Data on farm operations, holding size, land use, land accessibility and potential effects on buildings were collected by Savills Consultants via a questionnaire and interviews with landowners, tenants, and managers. These were interpreted to rate the significance of impact on the farm holdings.	A graduate soil scientist under the supervision of a chartered soil scientist and a surveyor with membership of the Royal Institution of Chartered Surveyors	20/05/2022	App Doc Ref 5.4.6.2

2.6 Maximum design envelope parameters for assessment

2.6.1 The design parameters and assumptions presented are in line with the 'maximum design envelope' approach (base scheme design). For each element of this chapter the maximum design envelope parameters detailed within Table 2-12 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group.

2.6.2 The assessment parameters are based on the design of the proposed WWTP and access, waste water transfer tunnel route and the outfall location, Waterbeach pipeline route and connections within the existing Cambridge WWTP. The assessment considers a realistic maximum design envelope based on the maximum scale of the elements and as a result, no effects with a greater significance than those assessed are likely.

Table 2-12: Maximum design envelope for agricultural land and soils

Potential impact	Maximum design scenario	Justification
Agricultural land and soils		
Permanent disruption to field drainage within the land required for the construction of the proposed WWTP and landscape masterplan.	All land areas within the Scheme Order Limits that require ground break, earthworks and permanent infrastructure construction which would result in disturbance to land drainage structures.	Represents the area affected by land acquired temporarily and permanently. This may result in a loss of, or modification to, the drainage network which would lead to the backing up of field drainage channels and surface water systems leading to potential surcharging and flood risk.
Temporary changes to drainage due to construction of the Waterbeach pipeline and final effluent pipeline.	All land areas within the Scheme Order Limits that require ground break and earthworks which would result in temporary disturbance to land drainage structures. Worst case for Waterbeach assumes all open cut with the exception of river, rail and road crossings. The average depth of the Waterbeach pipeline would be 2-5m with deeper sections of up to 20m below finished ground level (bfgl) for crossings by trenchless construction techniques, such as to cross the River Cam, railway, A14 and Horningsea Road. Long sections are referred to in App Doc Ref 4.14. Worst case for the final effluent pipeline installation is that it would all be by open cut methods. Worst case for final effluent pipeline is a maximum depth of trench 5m bfgl. Shaft 4 will be reinstated (backfilled) and the surface reinstated for agricultural use. Backfilling and reinstatement will take up to 1 month(s).	
Loss of/deterioration of soil resources associated with the area of land required for the proposed WWTP and the landscape masterplan.	Extent of land required for the landscape masterplan and proposed WWTP (including access road).	Represents the extent of soils to be reused within the landscape masterplan. Represents the extent of soils to be stockpiled temporarily that may result in a deterioration of soil structure and quality before re-use.

Potential impact	Maximum design scenario	Justification
	The estimate of soil material from within the land required for the proposed WWTP and landscape masterplan is estimated to be up to 167, 000m^3	Represents the maximum amount of site won material (soils) from this area for re-use within the Proposed Development
Permanent loss of/agricultural land land required for the proposed WWTP, landscape masterplan and ditch creation	Up to 80ha (30ha Grade 2 and 50ha Grade 3a) of BMV land permanently required within land required for the proposed WWTP (including access road and landscaping proposals) and the ditch creation	Represents maximum extent of BMV land permanently required Final extent depends on final design of ditches so assumption is entirety of area for habitat creation is required
Temporary requirement of agricultural land results in effect on soil resources due to soil compaction, poor soil storage, run-off, water logging and contamination from leaks and spills to temporary change to use of soils during construction of the waste water transfer tunnel including shafts 4 and 5.	Extent of land required for the construction of waste water transfer tunnel and Shafts 4 and 5. Land temporarily required for up to 24 months. Shaft 4 will be reinstated (backfilled) and the surface reinstated for agricultural use. Backfilling and reinstatement will take up to 1 month(s).	Represents the duration and extent of soils to be stockpiled temporarily that may result in a deterioration of soil structure and quality before reinstatement.
Temporary requirement of agricultural land results in effect on soil resources due to soil compaction, poor soil storage, run-off, water logging and contamination from leaks and spills to temporary change to use of soils during construction of the Waterbeach pipeline and final effluent pipeline.	Extent of land required for the Waterbeach pipeline and final effluent pipeline. Land temporarily required for 12 months.	Represents the duration and extent of soils to be stockpiled temporarily that may result in a deterioration of soil structure and quality before reinstatement.
	Up to 50 ha of agricultural land (42ha predicted to be Grades 1 and 2, deemed BMV land, with 8ha of Grade 3 land which may be BMV land depending on sub-grade) during construction of the Waterbeach pipeline	Represents maximum extent of BMV land temporarily required during construction of the Waterbeach pipeline
	Up to 18ha of BMV agricultural land (predicted to be grade 2) and 8.7ha grade 4 land.	Represents maximum extent of BMV land temporarily required during construction of the waste water transfer tunnel and treated effluent pipelines and the outfall

Potential impact	Maximum design scenario	Justification
Loss of soil resources from the area temporarily required for the Proposed Development excluding land required for the proposed WWTP and the landscape masterplan.	Excavation to 1.2m is considered soil anything deeper is a material. On this basis there will not be excess 'soil' generated (other than approximately 20cm of lower subsoil in any areas where the top of the pipe is set at just 1m below ground level. This would be negligible due to losses during excavating and moving soil around during construction. Furthermore a "crown" ore excess is often left over the pipeline following reinstatement to account for settlement and slumping of repeated wetting and drying cycles. Therefore it is expected that an excess of material will be available for reuse but soil resource will be replaced during reinstatement and land returned to former use.	Represents further source of material to be reused within the landscape masterplan.
Farm businesses		
Land management practices are permanently altered due to change in access to land.	All land within the Scheme Order Limits required for the landscape masterplan and proposed WWTP and which may cause land severance and removal of access to fields. Location of any new (temporary) access points installed. All land areas within the Scheme Order Limits that require ground break and earthworks as this would result in disturbance to land drainage structures and therefore impacts on the way the land is used.	Represents the area affected by land acquired permanently. This may result in very small parcels or parcels with an awkward shape that may change cropping or crop husbandry.
Land management practices are temporarily altered due to change in access to land.	All land within the Scheme Order Limits required temporarily and which may cause land severance and removal of access to fields. Location of any new (temporary) access points installed. All land areas within the Scheme Order Limits that require ground break and earthworks which cause disturbance to land drainage structures and therefore impacts on the way the land is used.	Represents the area affected by land acquired temporarily and permanently and which may cause temporary changes to cropping or crop husbandry.

Potential impact	Maximum design scenario	Justification
Permanent land acquisition from farm businesses resulting in reduced income due to impacts on access to land.	The maximum area of permanent agricultural land lost. Assessment of severed land parcels that are uneconomical to farm. Location of any new access points installed.	Represents the total area affected by land permanently acquired. Represents land lost as a result of severance. Represents land affected by new access.
Temporary land acquisition from farm businesses resulting in reduced income due to change in access to land.	The maximum area of agricultural land temporarily required for construction. Assessment of any land areas temporarily severed and unavailable for production. Land required for the construction of the Waterbeach pipeline and compound will be required for up to 12 months. Land required for the construction of the final effluent pipeline and compound will be required for up to 12 months. Land required for the construction of the waste water transfer tunnel including Shaft 4 and Shaft 5 will be required for up to 24 months.	Represents the area affected by land acquired temporarily as this may result in disturbance to farm businesses. Represents the duration of the temporary acquisition.
Operational access to buried infrastructure disrupts farm business.	Visits would be extremely infrequent. Inspections would be limited to two to three persons in an LDV accessing small sections of pipe routes.	Represents operational activity requiring short term temporary access to farm holding.
Restriction to farm business as a result of operational land rights (easement).	Permanent land rights will be maintained 15m either side of the centreline of the Waterbeach pipeline. Permanent land rights will be maintained 15m either side of the centreline of the waste water transfer tunnel. The easement will not limit the use of land within the easement for existing farming practices.	Represents the area of land affected by operational easement.

2.7 Impacts scoped out of the assessment

2.7.1 The impacts presented in Table 2-13 have been scoped out of the assessment. The justification is provided in the table and expanded upon in the subsequent paragraphs.

Table 2-13: Impacts scoped out of the agricultural land and soil resources assessment

Potential impact	Justification
Adverse effects on crops or livestock arising from construction	No significant effects are identified with respect to air quality, noise or light disturbance and land drainage, and taking into account mitigation measures within the CoCP (Appendix 2.1, App Doc Ref 5.4.2.1) and Drainage Strategy (Appendix 20.12, App Doc Ref 5.4.20.12). These effects are addressed in the relevant technical assessments and are not repeated here.
Potential odour impacts to agricultural business receptors	Chapter 18: Odour has assessed sensitive receptors and found no significant effects. The AIA survey has confirmed that there are no sensitive agricultural receptors within the area of land predicted to be affected by odour levels of more than 1.5 Odour Units.
ALC survey on the Waterbeach pipeline	The construction on the Waterbeach pipeline will lead to temporary, not permanent, effects on the agricultural land and therefore an ALC survey has been scoped out.
Permanent change in land rights	The easement will not limit the use of land within the easement for existing farming practices but would require the landowner to consult the Applicant on future development proposals within to ensure no risk to the tunnel. As there are no changes to the way land is presently used the introduction of easements is not assessed further.

2.7.2 Chapter 7: Air Quality includes an assessment of dust risk and takes into account the incorporation of general dust control measures included in Section 7.8 , Air Quality, of the CoCP Part A. Section 7.8 of the CoCP Part A also requires the preparation of an Air Quality Management Plan (AQMP) where the dust emission magnitudes would be reduced by at least one level (e.g. Large to Medium) below the uncontrolled magnitude. The best-practice dust and pollution mitigation measures within the CoCP will reduce the impact of any related events to a level at which significant effects would not occur.

2.7.3 Noise and light may indirectly disturb livestock. The CoCP Part A Section 7.7 (Noise and vibration) includes measures to control noise, and Section 5.9 (Site Lighting) includes measures in relation to minimising light nuisance. Chapter: 15 Landscape and visual amenity details measures applied in construction to minimise light. Chapter 17: Noise and vibration details measures applied in construction to minimise noise impacts.

2.7.4 Temporary changes to land drainage and run-off from areas of construction may affect crops and livestock. The CoCP (Water Resources and Flood Risk) requires that land drains are avoided. In the event that drains cannot be avoided there is a requirement that these are reinstated. In any instances where extensive damage occurs, it may become necessary to install a pre- and post-works land drainage system. A Drainage Strategy (Appendix 20.12, App Doc Ref 5.4.20.12) is provided

with the application which sets out how the drainage relating to the area of land required for the proposed WWTP and landscape masterplan would be managed. Chapter 19: Water Resources details measures applied in construction to avoid and minimise run-off and impacts to land drainage.

2.7.5 Section 2.6 of Chapter 18: Odour sets out the measures included for the control of odour. These measures include design (embedded features) as well and regulatory measures (permits). Furthermore, the CoCP section on Air Quality includes commitments for the control of activities in construction that may result in short-term odour emissions. Part B of the CoCP sets out how potential odour impacts arising from activities associated with connecting into and diverting existing sewers will be managed. A Preliminary Odour Management Plan (OMP) (Appendix 18.4 App Doc Ref 5.4.18.4) sets out operational odour control measures.

2.7.6 Taking account of the above requirements, adverse effects on crops or livestock arising during construction such as from dust are scoped out of the assessment as these will be controlled through the application of the CoCP and preparation of a CEMP.

2.8 Mitigation measures adopted as part of the Proposed Development

2.8.1 This section refers to the mitigation types, as defined in Chapter 5: Assessment Methodology, and how they apply to the assessment of Agriculture and Soils.

2.8.2 In developing the Proposed Development through an iterative process including consultation and engagement with consultees, and through the Environmental Impact Assessment (EIA), the Applicant has sought to identify and incorporate suitable measures and mitigation for potentially significant adverse effects, as well as maximising beneficial effects where possible.

2.8.3 Some measures are 'embedded' in the design of the Proposed Development for which consent is sought by virtue of the scope of the authorised development as set out in Schedule 1 to the DCO and the accompanying Works Plans. For example, adjustment of Order Limits to avoid sensitive features, amending the sizing and location of temporary access routes and compounds.

2.8.4 Chapter 5: Assessment Methodology sets out required permits and consents related to the Proposed Development.

2.8.5 Other measures are either secondary, such as control plans, or measures integrated into legal requirements through environmental permits and consents (termed tertiary).

2.8.6 The following sets out the embedded measures (primary), legal requirements (tertiary) and additional measures (secondary) relevant to the assessment of Agriculture and Soils.

Embedded (primary and tertiary measures)

2.8.7 Table 2-14 sets out the embedded mitigation measures that will be adopted during the construction, operation, maintenance and decommissioning of the Proposed Development.

Table 2-14: Primary and tertiary mitigation measures relating to agricultural land, soil resources and farm businesses adopted as part of the Proposed Development

Mitigation measures	Type	Applied to	Justification
Construction			
Agricultural land			
Minimising land required	Primary	Overall Scheme Order Limits extent	In line with the NPS for Waste Water, the Proposed Development has sought to reduce the extent of disturbance to agricultural land and the wider environment.
Minimising construction widths of the Waterbeach pipeline corridor.	Primary	Waterbeach pipeline corridor	In line with the NPS for Waste Water, the Proposed Development has sought to reduce the extent of disturbance to agricultural land and the wider environment.
Selection of trenchless techniques for sections of the Waterbeach pipeline and the waste water transfer tunnel and tunnel corridor.	Primary	Crossings of the River Cam, A14 and railway on the Waterbeach pipeline, and land affected by the waste water transfer tunnel.	To minimise adverse impact on agricultural soil quality.
Farm businesses			
Minimisation of land required and orientation of Scheme Order Limits to avoid severance and creation of land slivers.	Primary	Overall Scheme Order Limits extent	The size and shape of land that can be farmed is dependent on the size of farm machinery. Farm businesses may be reliant on the spatial relation between fields and infrastructure.
Creation of temporary haul route section parallel to Hatridges' Lane to allow farming activities to continue.	Primary	G108, P106, GO37, R106, R107, and R040;	Requirement to agree temporary access through coordination with landowners, tenants and/or land agents via implementation of Section 7.6 of the CoCP Part A (Traffic and Transport. Farmers need access to their fields in order to carry out their operations.

Mitigation measures	Type	Applied to	Justification
Coordination with the landowner for the final position of air valves within the Waterbeach pipelines.	Primary	G037	To minimise adverse impact on agricultural activities.
Soil resources			
Minimising land required	Primary	Overall Scheme Order Limits extent	In line with the NPS for Waste Water, the Proposed Development has sought to reduce the extent of disturbance to agricultural land and the wider environment.
Minimising construction widths of the Waterbeach pipeline corridor.	Primary	Waterbeach pipeline corridor	In line with the NPS for Waste Water, the Proposed Development has sought to reduce the extent of disturbance to agricultural land and the wider environment.
Selection of trenchless techniques for sections of the Waterbeach pipeline and the waste water transfer tunnel and tunnel corridor.	Primary	Crossings of the River Cam, A14 and railway on the Waterbeach pipeline, and land affected by the waste water transfer tunnel.	To minimise adverse impact on soil resources.
Operation			
Farm businesses			
Orienting the area of the proposed WWTP and landscape masterplan to avoid severing land and making it unavailable for agriculture.	Primary	Land required for the construction of the proposed WWTP and landscape masterplan.	In line with the NPS for Waste Water, the Proposed Development has sought to reduce the extent of disturbance to agricultural land and the wider environment.

Additional measures (secondary mitigation)

Construction

2.8.8 During the construction phase, the CoCP and associated management plans specify the range of measures to avoid and minimise impacts that may occur in construction (CoCP Part A (Appendix 2.1 App Doc Ref 5.4.2.1)). Post grant of the DCO and prior to commencement of construction of specific construction activities the contractor will prepare the CEMP and associated sub-plans as specified in the COCP Part A. These detailed plans will be approved by the Employer. The CEMP and associated management plans will remain 'live' documents and periodically modified throughout the duration of construction.

2.8.9 An outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) has been prepared in a manner specific to the site in accordance with the guidance in the Construction Code of Practice (CCoP) (Defra 2018). The CcoP (Defra 2018) provides general measures that are required to be in place to ensure that soil is appropriately managed during construction and suitable for its final use.

2.8.10 The outline SMP will provide the basis for detailed SMP which will be prepared by the Principal Contractor prior to construction. A detailed SMP will include the measures as applicable to the particular soil types of the particular area/construction activity that should be adhered to during and after the Construction Phase. The detailed SMP will be approved by the Employer prior to the start of the works.

2.8.11 Specific measures in the CoCP and LERMP relevant to Agriculture and Soils are described below.

COCP

2.8.12 Section 7.4 of the CoCP Part A (Construction Environment Management Plan (CEMP)): application of appropriate soil handling practices through implementation of the outline SMP to prevent degradation of soil resources.

2.8.13 Section 7.4 of the CoCP Part A: return land that is temporarily required during construction to its previous use via the application of a SMP based on the outline SMP. This is to prevent degradation of soil resources.

2.8.14 Section 5.14 of the CoCP Part A (Other watercourses/drainage channels/Land drains): provision/reinstatement of land drainage.

2.8.15 Section 7.6 of the CoCP Part A (Traffic and Transport): siting work areas and accesses to avoid severance of farm holdings as much as possible and the provision of farm and field accesses to enable agricultural operations to continue during construction and operation. Temporary access will be agreed through coordination with landowners, tenants and/or land agents.

2.8.16 Section 7.6 of the CoCP Part A (Traffic and Transport): creation of a temporary access from the B1047 Horningsea Road to land required for the construction of the

transfer tunnel and avoidance of existing farm access to Poplar Hall. Affected farms are R037 and Y039.

2.8.17 Section 5.3 of the CoCP Part A (Appendix 2.1 App Doc Ref 5.4.2.1): The use of fencing in locations where construction might result in disturbance to crops, livestock or horses. The working area will be delineated by post and rope fence except in fields where livestock is present, in which case livestock or horse fencing will be used.

LERMP

2.8.18 Reuse soils for planting and landscaping as indicated within the LERMP. The management of soil resources in relation to the LERMP is critical to appropriately manage newly created habitats for soil health.

Operation

2.8.19 The LERMP is included within the Application (Appendix 8.14 App Doc Ref. 5.4.8.14). The purpose of the LERMP is to set out how landscape, recreational features and ecological habitat and enhancements (vegetation and habitats) would be protected and managed following construction for a period of 30 years. Post grant of the DCO and prior to commencement of landscaping works an updated plan will be prepared and agreed with the local authority.

2.8.20 The implementation of the Drainage Strategy (Appendix 20.12 App Doc Ref 5.4.20.12) will provide green field run off from the area of land required for the proposed WWTP and landscape masterplan.

2.8.21 Operation and maintenance activities would be subject to operational management plans and procedures. The management plans and procedures will sit within the EMS required under the environmental permitting regime. These would be 'live' documents that identify the environmental risks and legal obligations associated with the operations of the Proposed Development once construction has been completed. These specify the management measures the operator will implement in order to prevent or minimise the environmental effects associated with the Proposed Development.

Decommissioning

2.8.22 Decommissioning of the existing Cambridge WWTP would be subject to a Decommissioning Management Plan which is to be agreed with the Environment Agency. An outline Decommissioning Management Plan (Appendix 2.3 App Doc Ref. 5.4.2.3) describes measure applied to this activity. Post grant of the DCO and prior to commencement of decommissioning a detailed plan will be prepared and agreed with the Environment Agency.

2.9 Assumptions and limitations

Data limitations and assumptions

2.9.1 Soil volume estimates have been calculated from averaged point data (auger bores), on a field by field basis at a density of one auger bore per hectare. Final Volumes of topsoil available for reuse within the landscape masterplan are likely to differ due to more local spatial variations in topsoil thickness visible at the time of stripping and the accuracy of the stripping operation.

2.9.2 Engagement with landowners, their agents and tenants has established the size (ha) of the plots directly affected by the Proposed Development. Information on farm holdings was collected by the Applicant's Land Team and it is assumed to be suitable for the purpose of assessment.

Assessment limitations and assumptions

2.9.3 It is assumed that the loss of agricultural land quality and land from the farm holding would remain as assessed during the construction phase of the Proposed Development. Changes to the extent of land required, either temporarily or permanently may trigger the need for re-assessment and identification of further mitigation.

2.9.4 It is assumed that all soils within the land required for the construction of the proposed WWTP and the landscape masterplan as set out within the LERMP (Appendix 8.14, App Doc Ref 5.4.8.14) can be reused within the landscaping proposals.

2.9.5 The assessment of residual effects is based on the assumption that a detailed SMP based on the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) will be duly implemented to maintain high-quality soil handling practices.

2.9.6 In operation, there will be residual easements in relation to sub-surface structures. These easements are designed to avoid disruption to buried assets and to afford permissions for future access (such as for inspections and maintenance or infrequent emergency situations). These easements will not prevent the ongoing agricultural use of the land in holdings affected by easements.

2.9.7 Financial compensation would be available under existing statutory arrangements to offset these impacts. However, it is not a consideration in the assessment of effects on farm holdings.

2.9.8 Where land acquisition may affect viability of a farm holding as identified through discussions between the landowner, their agents, tenants and the Applicant, the Applicant will seek to establish appropriate mitigation and/or compensation. Any necessary land negotiations and acquisition(s) will be considered by the application in accordance with the government's compulsory purchase and compensation: guide 3 (Department for Levelling Up, Housing and Communities 2021).

3 Baseline Environment

3.1 Current baseline

Agricultural land

Proposed WWTP and area of land required for the landscape masterplan

3.1.1 The desk-top review provisionally identified ALC Grade 2 (Very Good) agricultural land throughout the area required for the proposed WWTP and landscape masterplan. The subsequent ALC survey identified 30ha of Grade 2, 50ha of Grade 3a (Good), and 20ha of Grade 3b (Moderate) land. Accordingly, while the provisional baseline indicated that the whole of the area required for the proposed WWTP and landscape masterplan consisted of BMV land (Grades 1 to 3a), the ALC survey determined that BMV land constituted 80% of the area.

Area of land required for the waste water transfer tunnel, shafts and treated effluent/ storm pipeline

3.1.2 Provisional ALC mapping indicated that non-agricultural land is found to the west of the Proposed Development (a section south of the A14 which connects to the area of land in the vicinity of the existing Cambridge WWTP). The area in the vicinity of the River Cam comprises predicted Grade 4 and Grade 2 land.

Area of land required for the Waterbeach pipeline

3.1.3 Provisional ALC mapping showed the land to predominantly consist of Grades 2 and 3 land. At least 42ha of land are predicted to be grades 1 and 2, deemed BMV land, whilst 8ha are predicted to be Grade 3 land which may be BMV depending on sub-grade. 10ha are predicted to be Grade 4 land.

Soil resources

3.1.4 National soil association mapping (Cranfield University 2021) suggests that the soils in the proposed WWTP comprise the two soil associations, Wantage 2 (north-western area) and Swaffham Prior (central and eastern areas), see Figure 3.1 Soil Associations (App Doc Ref 5.3.6). They are described as follows:

- Wantage 2: Shallow well-drained calcareous silty soils over argillaceous chalk. Sometimes affected by groundwater. Deeper well-drained coarse loamy soils in places. Complex soil patterns locally; and
- Swaffham Prior: Well-drained calcareous coarse and fine loamy soils over chalk drift or rubble. Some similar shallow soils. Deep non-calcareous loamy soils in places. Striped and polygonal soil patterns locally.

3.1.5 Soil associations within the area of land required for the Waterbeach pipeline and the area of land between the existing Cambridge WWTP and proposed WWTP mainly include the following:

- Milton: Deep permeable calcareous fine loamy soils variably affected by groundwater. Some similar shallower well drained soils over gravel in places. Complex soil patterns locally;
- Midelney: Stoneless clayey soils mostly overlying peat. Soils variably affected by groundwater which is, in places, controlled by ditches and pumps. Flat land. Risk of flooding locally; and
- Adventurers 1: Deep peat soils. Flat land. Groundwater levels often controlled by ditches and pumps, some undrained areas. Risk of wind erosion.

3.1.6 The topsoil thickness within the land required for the proposed WWTP ranged from 0.23m to a maximum depth of 0.34m, see Figure 6.4 Soil type (App Doc Ref 5.3.6).

3.1.7 Soil Associations figure shown in the ALC report (Appendix 6.1 App Doc Ref 5.4.6.1) and Figure 6.1 (App Doc Ref 5.3.6) shows the soil resource types within the Scheme Order Limits.

Farm businesses

3.1.8 Farm holdings within the Scheme Order Limits are indicated in the within the AIA (Appendix 6.2 App Doc Ref 5.4.6.2). To retain farm anonymity, farm holdings have been assigned an alphanumeric code (e.g., Y039).

3.1.9 Details on each farm holding have been acquired through contact with the land owners and occupiers by the Applicant's Land Team by use of a questionnaire to standardise the understanding of each entity. A copy of the questionnaire is included within the AIA (Appendix 6.2 App Doc Ref 5.4.6.2).

3.1.10 There are 23 individual farm holdings identified within the study area, one of which was not included in the assessment due to access issues and the lack of farming activity on the land. The dominant activity is arable farming.

Watercourses, groundwater and flood risk

3.1.11 Chapter 20: Water resources includes a baseline for watercourses, groundwater and flood risk.

3.2 Future baseline

3.2.1 In the absence of the Proposed Development, it is likely that the land will continue to be used for agricultural purposes. There may be potential changes in the nature of the cropping, particularly with the evolution of government grants for farmers where greater emphasis is placed on farming for nature.

3.2.2 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2024 – construction commencement.

3.2.3 No committed developments have been identified in this study area that will materially alter the baseline conditions in 2028 – year 1 of operation.

Impacts of climate change on future baseline

3.2.4 Soil guidance for construction focuses on direct, shorter-term impacts.

3.2.5 In relation to areas permanently required, once BMV land and soil are removed, they are no longer suitable for agriculture and the future baseline is irrelevant.

3.2.6 Climate change impacts on agriculture and soils are considered in Section 4.4 of Chapter 9: Climate Resilience (Inter-related effects) (App Doc Ref 5.2.9).

4 Assessment of Effects

4.1.1 The assessment of effects takes into account primary and tertiary mitigation in determining effects and then considers secondary mitigation and the assessment of residual effects.

4.2 Construction phase

Proposed WWTP

4.2.1 This section sets out the assessment of effects in relation to the construction of the proposed WWTP including the landscaping proposals, final effluent pipeline, the outfall, waste water transfer tunnel and new access connecting with Horningsea Road.

Permanent loss of BMV land due to land required for the proposed WWTP, access road and landscaping proposals

Magnitude of impact

4.2.2 Permanent loss of up to 80ha (30ha Grade 2 and 50ha Grade 3a) of BMV agricultural land will occur on four farm holdings due to the construction of the proposed WWTP (R037 and Y039), landscaping proposals (G036, R037 and Y039) and the creation of a new ditch habitat (G040).

4.2.3 Efforts have been made from an early stage of the design to minimise the area of permanent loss of BMV land and proposed WWTP, landscaping and access road to avoid severing pockets of land, making them unavailable for agriculture.

4.2.4 The impact magnitude is, however, high because 80% of the land constitutes BMV land and comprises 30ha Grade 2 (very good quality agricultural land) and 50ha Grade 3a (good quality agricultural land) land.

Sensitivity of receptor

4.2.5 The sensitivity of BMV land is low due to a high prevalence of BMV land within a 2km radius of the site.

Significance of effect

4.2.6 There will be a moderate significant effect on BMV land due to permanent acquisition of land required. This is due to a high impact on BMV land and low sensitivity of the receptor.

Further mitigation or enhancement

4.2.7 No further mitigation is possible.

Residual effect

4.2.8 The residual effect will remain moderate and is **significant**.

Permanent acquisition of land from farm businesses

Magnitude of impact

4.2.9 The construction of the proposed WWTP and the landscaping proposals results in permanent land acquisition from four farm businesses (G036, G040, R037 and Y039). Negligible (less than 0.1ha of land) permanent land acquisition affects P119 and Y844.

4.2.10 Financial compensation would be available under existing statutory arrangements to offset these impacts. However, it is not a consideration in the assessment of effects on farm holdings.

4.2.11 The creation of the new ditch habitat within Work No 29 will require the permanent acquisition of up to 31.5ha land from two farm businesses (G040 and R037).

4.2.12 The permanent acquisition of land from G040 would have a low impact, at 3.8% of the overall farmed area and this farm holding is assessed in Section 4.2.49 due to the higher impact of temporary land acquisition.

4.2.13 The permanent acquisition of land from G036, R037 and Y039 would be negligible at less than 3% due to the large size of the overall farmed area of these farm holdings.

4.2.14 However, disruption to farm activities and severance would have a moderate impact magnitude on G036 and R037, leading to an overall moderate impact magnitude on these farm holdings.

4.2.15 Severance is considered low for Y039, leading to an overall low impact magnitude for this farm holding.

4.2.16 In summary, the overall impact magnitude would be medium for G036 and R037 and low for Y039.

Sensitivity of receptor

4.2.17 The sensitivity of farm businesses G036, R037 and Y039 is medium as they are in arable rotation with a degree of flexibility in the course of operations.

Significance of effect

4.2.18 The effect on two farm businesses (RO37 and GO36) is moderate and is **significant.**

4.2.19 The effect on one farm business (Y039) is minor and is **not significant.**

Further mitigation or enhancement

4.2.20 During the construction phase there is a requirement for the provision of a crossing location at Low Fen Drove Way for R037 and Y039, both of which are accessed via this track.

4.2.21 Access will be severed by the proposed planting as part of the landscaping along Low Fen Drove Way. Therefore, access through the line of proposed planting is required.

4.2.22 Through application of Section 7.6 of the CoCP Part A (Traffic and Transport) access will be provided through discussion with the landowner, their tenants and or land agents.

Residual effect

4.2.23 Following implementation of the further mitigation measures described above, the severance of R037 and Y039 will be reduced to negligible.

4.2.24 However, the overall residual effect will remain moderate, which is significant, for R037 and minor for Y039, which is not significant. This is due to the disruption to the business staying the same as a change of scale to the farm business is imposed.

Impact to quality of soil resources due to permanent change to land use

Magnitude of impact

4.2.25 The main functions provided by soils, other than for food and biomass production, include flood water attenuation, carbon storage and/or supporting habitats of biodiversity value. Chapter 10: Carbon (App Doc Ref 5.2.10) includes a consideration of the land type, arable land and land use change as defined in the LERMP (Appendix 8.14, App Doc Ref 5.4.8.14) in terms of carbon sequestration.

4.2.26 The magnitude of the impact of a change to the use of soils is high because over 20ha of soils will be affected by the construction of the proposed WWTP.

4.2.27 It is estimated that there will be up to 167, 000m^3 of site-won soil material excavated from within the land required for the proposed WWTP and landscape masterplan.

Sensitivity of receptor

4.2.28 The sensitivity of soils is medium as they comprise medium and heavy clay loams (based on the ALC survey, Appendix 6.1, App Doc Ref 5.4.6.1) with field capacity days that are lower than 150.

Significance of effect

4.2.29 The significance of effects is major/moderate and is **significant.**

Further mitigation or enhancement

4.2.30 The soils within the area of land required for the construction of the proposed WWTP and landscape masterplan would be re-used within the landscape masterplan as indicated within the LERMP (Appendix 8.14, App Doc Ref 5.4.8.14).

4.2.31 The handling of soils following guidance in the outline SMP (App Doc Ref 5.4.6.3) is crucial to retain soil health. The measures include:

- handling of site soils should always be conducted in accordance with the Construction Code of Practice for Sustainable Use of Soils on Construction Sites (Defra 2018).
- limited activities during wet periods where soils are susceptible to structural damage when handled at high moisture content or when plastic;

- use of tracked/low ground pressure vehicles throughout stripping and haulage to reduce structural damage through compaction;
- completion of soil stripping areas subject to earthworks with separate n storage and handling as per their type; and
- stockpiling of stripped soils, where possible, on dry, flat ground avoiding hollows.

4.2.32 A detailed Soil Management Plan (SMP) aligned with the outline SMP (App Doc Ref 5.4.6.3) will be submitted to and approved by the LPA and will form part of a Construction Environmental Management Plan (CEMP).

4.2.33 There may be other smaller quantities of surplus soil from other elements of the Proposed Development; these would also be re-used to deliver the landscape masterplan.

Residual effect

4.2.34 Following implementation of the further mitigation measures described above, the residual effect will be negligible and **not significant**.

Temporary loss of agricultural land from waste water transfer tunnel, treated effluent pipelines and the outfall

Magnitude of impact

4.2.35 During the construction phase there will be a requirement to acquire land for the construction of the final effluent pipeline for up to 12 months, and for up to 24 months for the construction of the waste water transfer tunnel owing to construction and reinstatement. This will mean the temporary loss of up to 18ha of BMV agricultural land (predicted to be grade 2) and 8.7ha grade 4 land.

4.2.36 Where possible, the working widths required for trenching and temporary accesses will be minimized as part of the embedded mitigation.

4.2.37 The magnitude of the impact on agricultural land is medium as 57% of land is Grade 2 (18ha) and, considered BMV land. The remaining land is Grade 4 (8.7ha) or non-agricultural (7ha).

Sensitivity of receptor

4.2.38 The sensitivity of agricultural land is low due to a high prevalence of BMV land within a 2km radius of the Proposed Development.

Significance of effect

4.2.39 There will be a permanent minor effect, which is **not significant.**

Further mitigation or enhancement

4.2.40 Mitigation includes measures for the protection and handling of soils within the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) in order to preserve the quality of the soil and the grade of the agricultural land.

4.2.41 The land will be returned to its original use.

Residual effect

4.2.42 Following implementation of the further mitigation measures described above, the residual effect will remain reversible, temporary, minor and **not significant.**

4.2.43 The construction phase of the Proposed Development would not lead to any long-term impacts to agricultural land.

Temporary requirement of land from farm businesses for waste water transfer tunnel and treated effluent transfer pipelines

Magnitude of impact

4.2.44 During the construction phase there will be a requirement to acquire land for the construction of the final effluent pipeline for up to 12 months, and for up to 24 months for the construction of the waste water transfer tunnel owing to construction and reinstatement.

4.2.45 The construction of the waste water transfer tunnel including Shafts 4 and 5 and the southern section of the Waterbeach pipeline will require the temporary acquisition of land from two farm businesses (G040, P119). The construction of the final effluent pipeline and the outfall will require the temporary acquisition of land from two farm businesses (Y844, RO37). Overall, four farm businesses would be affected.

4.2.46 The temporary use of the land would result in short-term impacts on the agricultural businesses due to a reduction in land available for production.

4.2.47 The construction of the pipelines may also result in the creation of a physical barrier between different parts of a farm holding resulting in severance. During pipeline construction land may be temporarily severed.

4.2.48 R037 is assessed and covered in paragraphs 4.2.9 to 4.2.23 due to impacts from permanent land acquisition.

4.2.49 The temporary acquisition of land from G040 would have a low impact, at 17% of the overall farmed area, but the disruption to agriculture during construction leads to an overall medium impact magnitude on G040.

4.2.50 Impacts to Y844 are avoided through the use of trenchless technology for installation of the Waterbeach pipeline section in this location (as indicated within Design Plans – Waterbeach pipeline long sections (App Doc Ref 4.14)) as part of embedded mitigation. Impact magnitude is therefore considered negligible.

4.2.51 The magnitude of impact on P119 is high due to a high percentage of land temporarily required in construction (68% of the farm holding) and leading to temporary loss of income as specified in the AIA (Appendix 6.2, Application Document Reference 5.4.6.2).

4.2.52 Other criteria contributing to the impact include severance, disruption to farm activities and infrastructure loss with magnitudes ranging from negligible to high.

Sensitivity of receptor

4.2.53 R037 is assessed and covered in paragraphs 4.2.9 to 4.2.23 due to impacts from permanent land acquisition that are greater than the impacts of temporary land acquisition.

4.2.54 The sensitivity of farm business G040 is medium as it comprises mixed arable, permanent pasture and conservation areas.

4.2.55 The overall sensitivity of the farm businesses is low for P119 and Y844 both comprising equine holdings. More detail is included in the AIA (Appendix 6.2, App Doc Ref 5.4.6.2).

Significance of effect

4.2.56 The effect on two farm businesses (G040 and P119) is moderate and is **significant.**

4.2.57 The effect on one farm business (Y844) is negligible and **not significant.**

4.2.58 The effect on one farm business (R037) is covered in paragraphs 4.2.18 to 4.2.19.

Further mitigation or enhancement

4.2.59 Mitigation measures address severance through careful planning of construction activities in consultation with the landowners:

- maintaining farm access where possible and reinstating as soon as possible through minimising access disruption and disturbance through implementation of Section 7.6 (Traffic management measures) of the CoCP Part A (Traffic and Transport) and section 6.9 of the CTMP (App Doc Ref 5.4.19.7) requirement to agree temporary access through coordination with landowners (or tenants and/or land agents);
- instatement of temporary access, where existing access cannot be maintained, and the severed area of land is still of a size that is viable for agricultural production; and
- careful siting of construction compounds and lay down areas.

Residual effect

4.2.60 Following implementation of the further mitigation measures described above, the residual effect on P119 will remain temporary, reversible, moderate and significant due to the large area relative to the farm holding which is temporarily required.

4.2.61 The residual effect on one farm business (Y844) remains negligible and **not significant.**

4.2.62 On the basis of disruption, the residual effect on G040 remains moderate and is significant, and the effect on G036 remains moderate and is **significant.**

Effect on quality of soil resources due to temporary requirement of land for waste water transfer tunnel and treated effluent transfer pipelines

Magnitude of impact

4.2.63 During the construction phase there will be requirement to acquire land for the construction of the final effluent pipeline for up to 12 months, and for up to 24 months for the construction of the waste water transfer tunnel owing to construction and reinstatement.

4.2.64 The temporary use of this land would include excavation for the installation of sub-surface structures. This would also include the movement of vehicles and equipment along the length of the trench.

4.2.65 Construction can affect the quality of soil through soil compaction, poor soil storage, water logging, and contamination from leaks and spills.

4.2.66 Approximately 9ha of soil resources may be affected.

4.2.67 The magnitude of the impact on the 9ha of soil resources is medium in the absence of mitigation due to the risk of permanent, irreversible loss of one or more soil functions.

Sensitivity of receptor

4.2.68 The soil resources are judged to have medium sensitivity as they have field capacity days that are lower than 150 and are anticipated to have high clay fractions or be peaty as per National soil association mapping (Section 3.1.5).

Significance of effect

4.2.69 The effect is moderate and **significant.**

Further mitigation or enhancement

4.2.70 Mitigation to preserve soil quality and function will be through the measures for the protection and handling of soils within the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) in order to preserve the quality of the soil and the grade of the agricultural land. These measures are set out in paragraph 4.2.3 .

Residual effect

4.2.71 Following implementation of the further mitigation measures described above, the residual effect will be minor and **not significant**. This is because there should be no permanent loss of soil quality or function with the implementation of the measures required within Section 7.4 of the CoCP Part A and implementation of the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) to preserve the resource.

Waterbeach pipeline

4.2.72 This section sets out the assessment of effects in relation to the construction of the Waterbeach pipeline which consists of a transfer section running from the north near Waterbeach to Low Fen Drove Way, a section crossing the area of land required

for the construction of the proposed WWTP and a section south of the A14 which connects to the area of land where the existing Cambridge WWTP is located.

Temporary loss of agricultural land

Magnitude of impact

4.2.73 Some areas of land required for the Waterbeach pipeline would be constructed through trenchless techniques. In these locations, surface sections would be unaffected. For the remaining areas, where possible, the working widths required for trenching and temporary access will be minimised.

4.2.74 The land temporarily required will be restored to agriculture after construction.

4.2.75 At least 42ha of land are predicted to be Grades 1 and 2, deemed BMV land, with 8ha of Grade 3 land which may be BMV land depending on sub-grade. There are 10ha predicted to be Grade 4 land.

4.2.76 The magnitude of the impact on agricultural land is high as more than 60% of land required for the construction of the Waterbeach pipeline is BMV land.

Sensitivity of receptor

4.2.77 The sensitivity of the agricultural land is low due to the high prevalence of BMV land within a 2km radius.

Significance of effect

4.2.78 The effect of construction of the Waterbeach pipeline is likely to be moderate and temporary, which is **significant.**

Further mitigation or enhancement

4.2.79 Mitigation includes measures for the protection and handling of soils within the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) in order to preserve the quality of the soil and the grade of the agricultural land. These measures are set out in paragraph 4.2.3.

Residual effect

4.2.80 Following implementation of the further mitigation measures described above, the residual effect will remain moderate reversible and temporary, which is **significant.**

Temporary requirement of land from farm businesses

Magnitude of impact

4.2.81 During the construction phase land will need to be acquired for the construction of the Waterbeach pipeline for up to 12 months owing to construction and reinstatement.

4.2.82 The sixteen farm holdings assessed as being affected by this work include B107, G037, G041, G108, G109, G110, O025, O108, O842, P025, P106, P881, R040, R106, R107 and Y041.

4.2.83 Although G040, R037 and Y039 are affected by this work, they are assessed in paragraphs 4.2.9 to 4.2.23 and paragraphs 4.2.46 to 4.2.62 due to the permanent and temporary acquisition of land for the proposed WWTP and the waste water transfer tunnel.

4.2.84 The temporary use of this land would result in short-term impacts on the agricultural businesses due to a reduction in land available for production.

4.2.85 The construction of pipelines may also result in the creation of a physical barrier between different parts of a farm holding resulting in severance. During pipeline construction land may be temporarily severed.

4.2.86 Where feasible working widths for the pipeline construction will be reduced.

4.2.87 Construction activity may also disrupt access including the temporary loss of existing accesses.

4.2.88 Potential disturbance to land drainage during construction may occur.

4.2.89 Measures in relation to disturbance to land drainage include:

- avoidance of assets through identification and discussions with landowners, their tenants and agents; and
- provision of temporary arrangements if needed during construction and subsequent reinstatement of drainage.

4.2.90 The impact magnitude of temporary land requirement from farm holdings and of severance ranges from negligible to high. Further detail on individual farm holdings is provided in the AIA (Appendix 6.2, Application Document Reference 5.4.6.2).

4.2.91 Overall, the magnitude of the impact on the farm businesses is high (0842), medium (G108, G109, G110, G041, O025, P025, P106, P881 and Y041), low (G037, O108, R040, R106 and R107) and negligible (B107). This is primarily due to temporary disruption to farm activities. Damage to infrastructure is assessed as being negligible as there will be no loss of buildings.

Sensitivity of receptor

4.2.92 Four farm businesses (G108, O108, O842 and P106) have a low sensitivity. Further detail on individual farm holdings is provided in the AIA (Appendix 6.2, Application Document Reference 5.4.6.2).

4.2.93 Eleven farm businesses (B107, G037, G109, G041, G110, O025, P025, R106, R107, R040 and P881) have medium sensitivity.

4.2.94 One farm business (Y041) has high sensitivity.

4.2.95 Further detail on these farm holdings is provided in the AIA (App Doc Ref 5.4.6.2).

Significance of effect

4.2.96 Overall, there will be a:

- temporary adverse major/moderate effect on one farm business (Y041);
- temporary adverse moderate effect on seven farm businesses (O842, G109, G041, G110, O025, P025 and P881) which is **significant**;
- temporary minor effect on six businesses (G108, P106, GO37, R106, R107, and R040) which is **not significant**; and
- temporary negligible effect on two businesses (B107 and O108) which is **not significant.**

Further mitigation or enhancement

4.2.97 Measures in relation to disturbance to land drainage include:

- avoidance of assets through identification and discussions with landowners, their tenants and agents; and
- provision of temporary arrangements if needed during construction and subsequent reinstatement of drainage.

4.2.98 Provision / reinstatement of land drainage would be through implementation of Section 5.14 of the CoCP Part (App Doc Ref 5.4.2.1) (Other watercourses/drainage channels/Land drains).

4.2.99 Measures in relation to severance will be applied through Section 7.6 of the CoCP Part A (Traffic and Transport) for R106, Y041, R040, P881 and Y039. These will be coordinated through discussions with the landowners, their tenants and/or their agents and the appointed contractor in order to organise mutually agreeable temporary access. Measures could include:

- maintaining farm accesses where possible and reinstating these as soon as possible;
- instating new temporary and permanent accesses, where existing access cannot be maintained, and the severed area of land is still of a size that is viable for agricultural production; and
- careful siting of construction compounds and lay down areas.

4.2.100 The CoCP Part B section 3.4 specifies that the final access arrangements for the following farm holdings will be agreed with the landowner as per the Land Plans (App Doc Ref 4.4), parcel numbers: 012a-012m, 021a-021o, 036a-036d, 037a-037c, 039a-039c, 042a-042f, 044a-044d, 046a-046d and 055a.

Residual effect

4.2.101 Following implementation of the further mitigation measures described above, the residual effects will remain the same for 15 out of 16 farm businesses identified in paragraph 4.2.96, due to temporary disruption to farm activities.

4.2.102 The impact magnitude would be reduced from medium to low for Y041, thereby reducing the significance from major/moderate to moderate. This remains a **significant** effect.

4.2.103 Overall, the residual effect remains significant for eight farm businesses and **not significant** for eight farm businesses.

Temporary impact on quality of soil resources due to construction of the Waterbeach pipeline

Magnitude of impact

4.2.104 Construction can affect the soil quality in a number of ways such as soil compaction from the use of heavy equipment and vehicle movements, poor soil storage, run-off and water logging, and contamination from leaks and spills.

4.2.105 Approximately 70ha of soil resources will be affected by temporary land acquisition on the Waterbeach Pipeline.

4.2.106 The magnitude of the impact on the soil resources is high in the absence of mitigation due to the risk of permanent, irreversible loss of one or more soil functions.

Sensitivity of receptor

4.2.107 The soil resources are judged to have medium sensitivity as they have field capacity days that are lower than 150 and are anticipated to have high clay fractions or be peaty as per National Soil Association mapping (Section 3.1.5).

Significance of effect

4.2.108 The effect would be temporary, major/moderate and **significant**.

Further mitigation or enhancement

4.2.109 Mitigation includes measures for the protection and handling of soils within the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) in order to preserve the quality of the soil and the grade of the agricultural land. These measures are set out in paragraph 4.2.3.

Residual effect

4.2.110 Following implementation of the further mitigation measures described above, the residual effects will be minor, which is **not significant**.

Monitoring

4.2.111 During the construction phase, monitoring will be in accordance with section 7.4 of the CoCP. This requires the implementation of an outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3). Section 5.7 specifies monitoring and includes durations of one to five years and, therefore, monitoring may extend into the operational period.

4.2.112 Although well-executed soil management will minimise damage to soil resources, it is crucial to adhere to a period of aftercare and soil monitoring to ensure that reinstated soils are functional to the required level. For this reason, the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) advises that reinstated soils are subject to a period of aftercare, as per Defra (Defra 2018) guidance. During this period, the Principal Contractor is required to closely monitor both soil and plant health to swiftly identify and rectify deficiencies.

4.2.113 During the construction and operational phases, the Principal Contractor will ensure monitoring in accordance with section 7.4 of the CoCP Part A (App Doc Ref 5.4.4.1) and section 5.5 (Aftercare) of the outline SMP (App Doc Ref 5.4.6.3) for a duration of up to five years. A minimum of one report will be prepared as the proposed minimum aftercare period is one year.

4.3 Operational phase

Proposed WWTP

4.3.1 This section sets out the assessment of effects in relation to the operation and maintenance of the Proposed Development including the WWTP, landscaping proposals, final effluent pipeline, the outfall, waste water transfer tunnel and new access connecting with B1047 Horningsea Road.

Permanent loss of BMV land due to the proposed WWTP

4.3.2 There will be no effects on agriculture and soils during the operational phase as the land will already be removed from agricultural use.

Effect on quality of soil resources due to the proposed WWTP

Magnitude of impact

4.3.3 During operation, changes in drainage patterns on the land required for the landscape masterplan could affect the soil quality in adjacent land holdings through changes to run-off, water logging or reduction in soil moisture.

4.3.4 The impact magnitude is high because over 20ha of soils may be affected.

Sensitivity of receptor

4.3.5 The soil resources across the three farm holdings (G036, Y039 and R037) bordering the landscape masterplan are assessed as is medium sensitivity as they comprise medium and heavy clay loams (based on the ALC survey, App Doc Ref 5.4.6.1) with field capacity days that are lower than 150.

Significance of effect

4.3.6 The effect would be major/moderate and **significant.**

Further mitigation or enhancement

4.3.7 The following mitigation measures would mitigate the impact to soil resources. These are set out in the following:

- LERMP (Appendix 8.14, App Doc Ref 5.4.8.14) where the measures of particular relevance to soils are the reuse of soils for planting and landscaping;
- the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) where the measures of particular relevance to soils are appropriate handling of soils based on soil type identified in soil surveys and monitoring of soils for a period of up to 5 years following construction in order to identify any potential needs for remediation as uided by the SMP; and
- Drainage Strategy (Appendix 20.12, App Doc Ref 5.4.20.12) where the measures of particular relevance to soils arerequiring that the drainage from the proposed WWTP and landscape masterplan will adopt green field run off rates.

Residual effect

4.3.8 The residual effect is negligible and is **not significant.**

Waterbeach pipeline

4.3.9 This section sets out the assessment of effects in relation to the operation and maintenance of the Waterbeach pipeline which consists of a transfer section running from the north near Waterbeach to Low Fen Drove Way, a section crossing the area of land required for the construction of the proposed WWTP and a section south of the A14 which connects to the area of land where the existing Cambridge WWTP is located.

Permanent acquisition of land

Magnitude of impact

4.3.10 There will be up to 16 above ground air valve structures at the surface along the Waterbeach pipeline each with a footprint of up to 600mm x 900mm clear opening (which equates to 0.54m^2). The air valves will also be located below ground with an accessible manhole cover at ground level and be used during construction and occasionally during operation. . Impacts to one farm business (G037) have been identified in relation to the presence of valves which create small areas of permanent severance. The magnitude of impact is low.

Sensitivity of receptor

4.3.11 The farm holding has medium sensitivity.

Significance of effect

4.3.12 The effect would be minor and **not significant.**

Further mitigation or enhancement

4.3.13 In consultation with the landowner, the positions of air valves are to be adjusted as much as possible to minimise disruption from severance. This requirement is included within Section 3.4 of the CoCP Part B (App Doc Ref 5.4.4.2).

Residual effect

4.3.14 Following implementation of the further mitigation measures, the residual effect remains minor, and **not significant.**

Monitoring

4.3.15 During the operational phase, monitoring will be in accordance with the approved CEMP and SMP which would align with section 7.4 of the CoCP Part A (App Doc Ref 5.4.4.1) and Section 5.5. of the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3). Section 5.5 specifies monitoring and includes durations of one to five years and therefore monitoring may extend into the operational period.

4.3.16 Although well-executed soil management will minimise damage to soil resources, it is crucial to adhere to a period of aftercare and soil monitoring to ensure that reinstated soils are functional to the required level. For this reason, the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) advises that reinstated soils are subject to a period of aftercare, as per Defra (Defra 2018) guidance. During this period, the Principal Contractor is required to closely monitor both soil and plant health to swiftly identify and rectify deficiencies.

4.3.17 During the construction and operational phases, the Principal Contractor will ensure monitoring in accordance with the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) which specifies that the minimum aftercare period is one year.

4.4 Cumulative effects

4.4.1 Cumulative effects are those arising from impacts of the Proposed Development in combination with impacts of other proposed or consented development projects that are not yet built or operational. An assessment of cumulative effects for Agricultural Land and Soil Resources has been completed and is reported in Chapter 21: Cumulative Effects Assessment.

4.4.2 For agriculture and soil resources there are no residual cumulative effects. The assessment does not consider activities relating to decommissioning of the existing Cambridge WWTP as these activities do not interact with any agricultural land receptors.

4.5 Inter-related effects

4.5.1 Inter-relationships are the impacts and associated effects of different aspects of the construction and operation of the Proposed Development and the decommissioning of the existing Cambridge WWTP on the same receptor. The assessment of inter-

related effects has been completed and is reported in Chapter 22: Cumulative Effects Assessment.

4.5.2 For agriculture and soil resources there are no inter-related effects.

5 Conclusion and Summary

5.1 Assessment summary

5.1.1 This assessment of the effects, and their significance, of the Proposed Development as it applies to agricultural land and soils has been carried out thoroughly, based on the information currently available.

5.1.2 The approach to assessment has included reference to publicly available information in relation to ALC, results of an ALC survey completed on the land required for the proposed WWTP and landscape masterplan, and results of an AIA.

Construction

Agricultural land

5.1.3 The effects of the Proposed Development on agricultural land during construction would vary from minor to moderate adverse prior to mitigation, which would be significant in the case of moderate adverse effects.

5.1.4 During construction there will be a requirement for mitigation measures to be implemented through the application of management plans as specified by the CoCP Part A and B. In addition to the requirements of the CoCP there will also be a requirement to implement an SMP (Appendix 6.3, App Doc Ref 5.4.6.3) for the appropriate handling of soils.

5.1.5 In construction there will be controls on vehicle movements so that no construction traffic will be permitted to travel through Horningsea or Fen Ditton.

5.1.6 Use of trenchless techniques for the construction of the Waterbeach pipeline will be used to avoid a land parcel between the River Cam and Fen Road in the southern extent of the Scheme Order Limits.

5.1.7 With the implementation of mitigation measures the construction effects would be **minor adverse (not significant)** in areas of temporary land acquisition and **moderate adverse effect (significant)** where there is permanent land acquisition for the proposed WWTP.

Soil resources

5.1.8 The effects of the Proposed Development on soil resources during construction would be major/moderate adverse prior to mitigation, which would be significant.

5.1.9 During construction there will be a requirement for mitigation measures to be implemented through the application of management plans as specified by the CoCP Part A and B. In addition to the requirements of the CoCP there will also be a

requirement to implement an SMP prepared to accord with the requirements of the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) for the appropriate handling of soils.

5.1.10 In construction there will be controls on vehicle movements so that no construction traffic will be permitted to travel through Horningsea or Fen Ditton.

5.1.11 With the implementation of mitigation measures the construction effects to soil resources would be negligible – minor adverse (not significant) in areas of temporary land acquisition and negligible – minor adverse (not significant) where there is permanent land acquisition.

5.1.12 Taking into account the application of mitigation measures the likely significance of effects would be **negligible to minor adverse** during the construction phase.

Farm businesses

5.1.13 The effects of the Proposed Development on farm businesses during construction would vary from negligible (not significant) to major/moderate adverse prior to mitigation, which would be **significant**.

5.1.14 During construction there will be a requirement for mitigation measures to be implemented through the application of management plans as specified by the CoCP Part A and B. In addition to the requirements of the CoCP there will also be a requirement to implement an SMP prepared to accord with the requirements of the outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) for the appropriate handling of soils.

5.1.15 In construction there will be controls on vehicle movements so that no construction traffic will be permitted to travel through Horningsea or Fen Ditton.

5.1.16 With the implementation of mitigation measures the construction effects would be negligible – minor adverse (not significant) for 10 farm holdings and moderate to major adverse (significant) for 12 farm holdings.

5.1.17 Taking into account the application of mitigation measures the likely significance of effects would be **negligible to major/moderate adverse** during the construction phase.

Operation

Agricultural land

5.1.18 The effects of the Proposed Development on agricultural land only apply to the construction phase.

Soil resources

5.1.19 The effects of the Proposed Development on soil resources during operation would be moderate/major adverse prior to mitigation, which would be significant.

5.1.20 The potential impacts in operation are changes in drainage patterns on the land required for the landscape masterplan that could affect the soil quality in adjacent land holdings through changes to run-off, water logging or reduction in soil moisture.

5.1.21 With the implementation of mitigation such as appropriate soil handing, which maintains pre-development soil structure, the significance of effects would be negligible for the operational phase, and not significant.

5.1.22 Overall, the significance of effects would be **negligible** for the operation of the Proposed Development and are **not significant**.

Farm businesses

5.1.23 The effects of the Proposed Development on soil resources during operation would minor adverse prior to mitigation, which would be **not significant**.

5.1.24 The potential impacts in operation are air valve structures at the surface along the Waterbeach pipeline. Impacts to one farm business (G037) have been identified in relation to the presence of valves which create small areas of permanent severance.

5.1.25 With the implementation of mitigation, the significance of effects would remain minor for the operational phase, and are **not significant.**

5.2 Mitigation summary

5.2.1 A summary of potential environmental effects, mitigation and monitoring is provided in Table 5.1.

5.2.2 The delivery of mitigation will be controlled through the 'Development Consent Order (DCO), which:

- identifies parameters within which certain works activities will be located and constructed (e.g. maximum and minimum building dimensions (including below ground), or locational zones);
- sets requirements for construction, operation and maintenance of the Proposed Development to be undertaken in accordance with 'control plans / documents' (including those that are related to compliance with environmental permits); and
- sets requirements for the control of specific issues or works (e.g. time limits around the completion of the outfall construction)

5.2.3 Table 5-2 summarises all mitigation in relation to agricultural land and soil, how these measures are secured, the party responsible for the implementation of the measure, when the measure would be delivered and any mechanisms to deliver the measure.

Table 5-1: Summary of effects to agricultural land, soil resources and farm business

Description of effect	Primary and tertiary measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Initial classification of effect	Additional mitigation	Residual effect significance	Proposed monitoring
Construction – proposed WWTP							
Permanent loss of up to 80ha (30ha Grade 2 and 50ha Grade 3a) of BMV land due to proposed WWTP (including access road and landscaping proposals).	Impact reduced through minimisation of land required.	High	Low	Moderate (significant)	Provision / reinstatement of land drainage through implementation of Section 5.14 of the CoCP Part (App Doc Ref 5.4.2.1) (Other watercourses/drainage channels/Land drains).	Moderate (significant)	N/A
Permanent acquisition of land from farm businesses due to proposed WWTP impacts access to adjoining agricultural land parcels.	Impact minimised through the minimisation of land required and orientation of Scheme Order Limits to avoid severance and creation of land slivers. Provision of land access to avoid severed land.	Low – high	Medium	Moderate (significant) for G040; Moderate (significant) on RO37 and GO36; Minor (not significant) on Y039.	To reduce impacts to farm businesses the Construction Traffic Management Plan includes the details of traffic management measures such as reduced speeds, signage and haul route and access points. Minimising access disruption and disturbance through implementation of Section 7.6 of the CoCP Part A (Traffic and Transport) and the CTMP requirement to agree temporary access through coordination with landowners, tenants and/or land agents. Requirement within section 3 (Community & Stakeholder Engagement) of the CoCP Part A (App Doc Ref: 5.4.2.1) to appoint a Community Liaison Officer responsible for ensuring that relationships and lines of communication are maintained throughout the construction period including communication of temporary changes to access. During the construction phase there is a requirement for the provision of a crossing location at Low Fen Drove Way for R037 and Y039, both of which are accessed via this track	Moderate (significant) for G040; Moderate (significant) on RO37 and GO36; Minor (not significant) on Y039.	N/A
Reduction in the quality of soil resources within the land required for the proposed WWTP due to soil compaction, run-off, water logging and contamination from leaks and spills.	Minimisation of land required.	High	Medium	Major/moderate (significant)	Manged through soil quality and management mitigation measures within the CoCP Part A Section 7.4, Land quality (Soil management) (App Doc Ref 5.4.4.1) during construction including, but not limited to: • Handling of site soils should always be conducted in accordance with the Construction Code of Practice for Sustainable Use of Soils on Construction Sites; • Soil handling will be limited during wet periods where soils are susceptible to structural damage when handled at high moisture content or when plastic; • Tracked/low ground pressure vehicles are used throughout stripping and haulage to reduce structural damage through compaction; • Soil stripping will be carried out in all areas subject to earthworks and will be stored and handled separately as per their type; and • Stripped soils will be stockpiled, where possible, on dry, flat ground avoiding hollows. • A detailed Soil Management Plan building on the outline SMP will be submitted to and approved by the LPA and will form part of a Construction Environmental Management Plan Management of excavation impact on drainage and groundwater through the requirement within the CoCP Part A, section 5.14 (Watercourses/drainage channels) which requires the identification of land drains potentially affected by construction works and the reinstatement of a post works drainage system to the satisfaction of the land owner.	Negligible (not significant)	N/A

Description of effect	Primary and tertiary measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Initial classification of effect	Additional mitigation	Residual effect significance	Proposed monitoring
					Reuse soils for planting and landscaping within the land required for the landscape masterplan, and management of these soils as part of the LERMP (App Doc Ref 5.4.8.14). Measures delivered during operation will be implemented through the long term application of the LERMP (App Doc Ref 5.4.8.14) which requires that the operator to prepare a detailed management and maintenance plan (secured through requirements in the DCO), based on the LERMP which will be agreed with key stakeholders.		
Construction – waste water transfer tunnel and treated effluent pipelines and the outfall.							
Temporary loss of up to 18ha of agricultural land (predicted to be grade 2) and 8.7ha grade 4 land from waste water transfer tunnel and treated effluent pipelines and the outfall.	Minimisation of land required and orientation of Scheme Order Limits to avoid severance and creation of land slivers.	Medium	Low	Minor (not significant)	Return land temporarily required during construction to previous use through reinstatement and implementation of section 7.4, Land quality (Soil management), of the CoCP Part A (App Doc Ref 5.4.4.1) and application of measures within an approved SMP based on the outline SMP (App Doc Ref 5.4.6.3).	Minor (not significant)	N/A
Temporary requirement of land from farm businesses for construction of the waste water transfer tunnel and treated effluent transfer pipelines results in temporary disturbance from construction traffic and short-term land severance.	Creation of a temporary access from the B1047 Horningsea Road to land required for the construction of the transfer tunnel and avoidance of existing farm access to Poplar Hall. Impacts to farm holding Y844 are avoided through the use of trenchless technology for installation of the Waterbeach pipeline.	Negligible - high	Low - medium	Moderate (significant) on P119; Negligible (not significant) on Y844.	Minimising temporary short-term impacts to farm businesses through application of the measures required by the CTMP (App Doc Ref 5.4.19.7) in particular: Minimising access disruption and disturbance through implementation of Section 7.6 of the CoCP Part A (Traffic and Transport) and section 6.9 of the CTMP (App Doc Ref 5.4.19.7) requirement to agree temporary access through coordination with landowners, tenants and/or land agents. Requirement within section 3 (Community & Stakeholder Engagement)of the CoCP Part A (App Doc Ref: 5.4.2.1) to appoint a Community Liaison Officer responsible for ensuring that relationships and lines of communication are maintained throughout the construction period including communication of temporary changes to access.	Moderate (significant) on P119; Negligible (not significant) on Y844.	N/A
Temporary requirement of up to 18ha of BMV agricultural land (predicted to be grade 2) and 8.7ha grade 4 land results in effect on soil resources due to soil compaction, poor soil storage, run-off, water logging and contamination from leaks and spill during construction of the final effluent pipeline and the waste water transfer tunnel.	Through the minimisation of land required.	Medium	Medium	Moderate (significant)	Soil quality and management mitigation measures include, but are not limited to the following: • handling of site soils should always be conducted in accordance with the Construction Code of Practice for Sustainable Use of Soils on Construction Sites; • soil handling will be limited during wet periods where soils are susceptible to structural damage when handled at high moisture content or when plastic; • tracked/low ground pressure vehicles are used throughout stripping and haulage to reduce structural damage through compaction; • soil stripping will be carried out in all areas subject to earthworks and will be stored and handled separately as per their type; and • stripped soils will be stockpiled, where possible, on dry, flat ground avoiding hollows. • where possible land drains will be avoided (Section 5.14 of CoCP Part A). a detailed Soil Management Plan building on the outline SMP will be submitted to and approved by the LPA and will form part of a Construction Environmental Management Plan. Minimising access disruption and disturbance through implementation of Section 7.6 of the CoCP Part A	Minor (not significant)	N/A

Description of effect	Primary and tertiary measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Initial classification of effect	Additional mitigation	Residual effect significance	Proposed monitoring
					(Traffic and Transport) and the CTMP requirement to agree temporary access through coordination with landowners, tenants and/or land agents Requirement within section 3 of the CoCP Part A and B (App Doc Ref: 5.4.2.1) Part A (Community & Stakeholder Engagement) to appoint a Community Liaison Officer responsible for ensuring that relationships and lines of communication are maintained throughout the construction period including communication of temporary changes to access Provision / reinstatement of land drainage through implementation of Section 5.14 of the CoCP Part A (Other watercourses/drainage Channels/Land Drains).		
Construction Waterbeach pipeline							
Temporary loss of up to 50 ha of agricultural land (42ha predicted to be Grades 1 and 2, deemed BMV land, with 8ha of Grade 3 land which may be BMV land depending on sub-grade) during construction of the Waterbeach pipeline.	Minimising construction widths of the Waterbeach pipeline corridor.	High	Low	Moderate (significant)	Minimising access disruption and disturbance through implementation of Section 7.6 of the CoCP Part A (Traffic and Transport) and requirement to agree temporary access through coordination with landowners, tenants and/or land agents. Advance communication with landowners and businesses in relation to traffic and transport and access matters through implementation of a Community Liaison Plan. Return land temporarily required during construction to previous use through reinstatement and implementation of section 7.5 of the CoCP Part A and application of a SMP based on the outline SMP (App Doc Ref 5.4.6.3).	Moderate (significant)	N/A
Temporary requirement of land from farm businesses for construction of the Waterbeach pipeline.	Creation of temporary haul route section parallel to Hatridges' Lane. Use of trenchless techniques for the construction of the Waterbeach pipeline to avoid a land parcel between the River Cam and Fen Road in the southern extent of the Scheme Order Limits.	Low – high	Low - medium	Major/moderate (significant) on Y041; Moderate (significant) on O842, G109, G041, G110, O025, P025 and P881; Minor (not significant) on G108, P106, GO37, R106, R107, and R040; Negligible (not significant) on O108, B107.	Minimising temporary short-term impacts to farm businesses through application of the measures required by the CTMP in particular: • Section 6.3 Adherence to Designated Routes • Section 5.2 (Temporary access points and construction road signage) which requires the use of temporary signage along all proposed construction haul roads. As a minimum this will include internal haul road speed limits, warning (hazard signs), potential vehicle or pedestrian. Minimising access disruption and disturbance through implementation of Section 7.6 of the CoCP Part A (Traffic and Transport) and CTMP including the requirement to agree temporary access through coordination with landowners, tenants and/or land agents. Requirement within section 3(Community & Stakeholder Engagement) of the CoCP Part A (App Doc Ref: 5.4.2.1) to appoint a Community Liaison Officer responsible for ensuring that relationships and lines of communication are maintained throughout the construction period including communication of temporary changes to access CoCP Part B section 3.4 - Final access arrangements for the following farm holdings will be agreed with the landowner as per the Land Plans (App Doc Ref 4.4), parcel numbers: 012a-012m, 021a-021o, 036a-036d, 037a-037c, 039a-039c, 042a-042f, 044a-044d, 046a-046d and 055a.	Moderate (significant) on O842, G109, G041, G110, O025, P025, P881 and Y041; Minor (not significant) on G108, P106, GO37, R106, R107, and R040; Negligible (not significant) on O108, B107.	N/A
Temporary reduction in the quality of soil resources during the construction of the Waterbeach pipeline due to soil compaction, poor	Use of trenchless techniques for the construction of the Waterbeach pipeline to avoid a land parcel between the River Cam and Fen Road in the southern extent of the Scheme Order Limits.	High	Medium	Major/moderate (significant)	Soil quality and management mitigation measures include, but are not limited to the following:	Negligible – minor (not significant)	As defined in outline SMP

Description of effect	Primary and tertiary measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Initial classification of effect	Additional mitigation	Residual effect significance	Proposed monitoring
soil storage, run-off, water logging and contamination from leaks and spills.					• handling of site soils should always be conducted in accordance with the Construction Code of Practice for Sustainable Use of Soils on Construction Sites (Defra 2018); • soil handling will be limited during wet periods where soils are susceptible to structural damage when handled at high moisture content or when plastic; • tracked/low ground pressure vehicles are used throughout stripping and haulage to reduce structural damage through compaction; • -soil stripping will be carried out in all areas subject to earthworks and will be stored and handled separately as per their type; and • stripped soils will be stockpiled, where possible, on dry, flat ground avoiding hollows. • where possible land drains will be avoided (Section 5.14 of CoCP Part A). • a detailed Soil Management Plan building on the outline SMP will be submitted to and approved by the LPA and will form part of a Construction Environmental Management Plan Management of excavation impact on drainage and groundwater through the requirement within the CoCP Part A, section 5.14 (Watercourses/drainage channels) which requires the identification of land drains potentially affected by construction works and the reinstatement of a post works drainage system to the satisfaction of the land owner.		
Operation phase – Proposed WWTP							
Permanent loss of up to 80ha (30ha Grade 2 and 50ha Grade 3a) of BMV land due to proposed WWTP (including access road and landscaping proposals).	None (as BMV land will already be removed from agriculture use during Construction Phase)	N/A	N/A	N/A	None	N/A	N/A
Effect on soil resources reused within landscape masterplan	Minimisation of land required.	High	Medium	Major/moderate (significant)	Management of excavation impact on drainage and groundwater through the requirement within the CoCP Part A, section 5.14 (Watercourses/drainage channels) which requires the identification of land drains potentially affected by construction works and the reinstatement of a post works drainage system to the satisfaction of the land owner Implementation of the Drainage Strategy (Application Document Reference 5.4.20.12) to provide green field run off from the area of land required for the proposed WWTP and landscape masterplan. Reuse soils for planting and landscaping as indicated within the LERMP (App Doc Ref 5.4.8.14). Measures delivered during operation will be implemented through the long term application of the LERMP (App Doc Ref 5.4.8.14) which requires that the operator to prepare a detailed management and maintenance plan (secured through requirements in the DCO), based on the LERMP to include soil management.	Negligible (not significant)	in line with LERMP
Operation phase – Waterbeach Pipeline							

Description of effect	Primary and tertiary measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Initial classification of effect	Additional mitigation	Residual effect significance	Proposed monitoring
Permanent acquisition of land from farm businesses resulting in small areas of severance.	None	Low	Medium	Minor (not significant)	Management of potential impact from the location of permanent valves as set out within the CoCP Part B, Section 4.4 which requires the coordination with the land owners for the final position of air valves.	Minor (not significant)	N/A

Table 5-2: Agricultural land and soil resources mitigation summary

Description of impact	Residual effect	Mitigation measure	Mitigation Type	Secured by	Responsible party	Timing on the provision of the measure	Trigger for the discharge of any related requirement
Construction Phase – proposed WWTP							
Permanent loss of up to 80ha (30ha Grade 2 and 50ha Grade 3a) BMV land due to land required for the proposed WWTP, access road and landscaping proposals.	Moderate (significant)	Impact reduced through the minimisation of land required.	Primary	DCO Schedule 2 Requirement 7 (Detailed Design) (App Doc Ref 2.1)	Appointed Contractor(s)	Pre-construction	Approved design and work plan
Permanent acquisition of land from farm businesses due to proposed WWTP impacts access to adjoining agricultural land parcels	Moderate (significant) for G040; Moderate (significant) on RO37 and GO36; Minor (not significant) on Y039.	Impact minimised through the minimisation of land required and orientation of Scheme Order Limits to avoid severance and creation of land slivers.	Primary	DCO Schedule 2 Requirement 7 (Detailed Design) (App Doc Ref 2.1)	The Applicant	Pre-construction	Approved design and work plan
		To reduce impacts to farm businesses the Construction Traffic Management Plan includes the details of traffic management measures such as reduced speeds, signage and haul route and access points. Minimising access disruption and disturbance through implementation of Section 7.6 of the CoCP Part A (Traffic and Transport) and the CTMP requirement to agree temporary access through coordination with landowners, tenants and/or land agents. Requirement within section 3 of the CoCP Part A and B (Application Document Reference: 5.4.2.1) Part A (Community & Stakeholder Engagement) to appoint a Community Liaison Officer responsible for ensuring that relationships and lines of communication are maintained throughout the construction period including communication of temporary changes to access.	Secondary	Section 4.4 (CEMP) and 5.14 (Watercourses/drainage channels), Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1). Construction Traffic Management Plan (App Doc Ref 5.4.19.7), secured through a requirement of the draft DCO (App Doc Ref 2.1)	Appointed Contractor(s)	Prior to construction	Approved design and work plan and agreement with landowner Approved CEMP Approved CTMP

Description of impact	Residual effect	Mitigation measure	Mitigation Type	Secured by	Responsible party	Timing on the provision of the measure	Trigger for the discharge of any related requirement
Reduction in the quality of soil resources within the land required for the proposed WWTP due to soil compaction, run-off, water logging and contamination from leaks and spills.	Negligible (not significant)	Minimisation of land required.	Primary	DCO Schedule 2 Requirement 7 (Detailed Design) (App Doc Ref 2.1)	The Applicant	Pre-construction	Approved design and work plan
		Manged through soil quality and management mitigation measures within the CoCP Part A Section 7.4, Land quality (Soil management) (App Doc Ref 5.4.4.1) during construction including, but not limited to: - Handling of site soils should always be conducted in accordance with the Construction Code of Practice for Sustainable Use of Soils on Construction Sites; - Soil handling will be limited during wet periods where soils are susceptible to structural damage when handled at high moisture content or when plastic; - Tracked/low ground pressure vehicles are used throughout stripping and haulage to reduce structural damage through compaction; - Soil stripping will be carried out in all areas subject to earthworks and will be stored and handled separately as per their type; and - Stripped soils will be stockpiled, where possible, on dry, flat ground avoiding hollows. - A detailed Soil Management Plan building on the outline SMP will be submitted to and approved by the LPA and will form part of a Construction Environmental Management Plan. The detailed SMP will include provision for management and monitoring for a period of at least 5 years following construction for areas not covered by the LERMP.	Secondary	Section 4.4 (CEMP) and 5.14 (Watercourses/drainage channels), Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1). Outline SMP (App Doc Ref 5.4.6.3) which are secured through the requirements of the draft DCO (App Doc Ref 2.1))	Appointed Contractor(s)	Prior to construction	Approved CEMP Approved SMP required prior to the commencement of soil excavation
		Management of excavation impact on drainage and groundwater through the requirement within the CoCP Part A, section 5.14 (Watercourses/drainage channels) which requires the identification of land drains potentially affected by construction works and the reinstatement of a post works drainage system to the satisfaction of the land owner.	Secondary	Section 4.4 (CEMP) and 5.14 (Watercourses/drainage channels), Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1).	Appointed Contractor(s)	Prior to construction	Approved design and work plan and agreement with landowner Approved CEMP
		Reuse soils for planting and landscaping within the land required for the landscape masterplan, and management of these soils as part of the LERMP (Application Document Reference 5.4.8.14). Measures delivered during operation will be implemented through the long term application of the LERMP (Application Document Reference	Secondary	DCO Schedule 2 Requirement 11 (LERMP) (App Doc Ref 2.1) which requires the approval and implementation of a detailed management and monitoring plan secured to comply with LERMP (Application Document Reference 5.4.8.14)Approval and implementation of detailed management and monitoring plan as	Appointed Contractor(s)	Prior to construction	Approved LERMP

Description of impact	Residual effect	Mitigation measure	Mitigation Type	Secured by	Responsible party	Timing on the provision of the measure	Trigger for the discharge of any related requirement
		5.4.8.14) which requires that the operator to prepare a detailed management and maintenance plan (secured through requirements in the DCO), based on the LERMP which will be agreed with key stakeholders.		required by the LERMP secured through a requirement of the draft DCO (App Doc Ref 2.1).			
		Implementation of management and monitoring plan as a requirement of the LERMP which will include soil management.	Secondary	DCO Schedule 2 Requirement 11 (LERMP) (App Doc Ref 2.1) which requires the approval and implementation of a detailed management and monitoring plan secured to comply with LERMP (Application Document Reference 5.4.8.14)Approval and implementation of detailed management and monitoring plan as required by the LERMP secured through a requirement of the draft DCO (App Doc Ref 2.1).	Appointed Contractor(s)	Prior to start of operation	Approved LERMP
Construction phase – waste water transfer tunnel and treated effluent pipelines and the outfall.							
Temporary loss of up to 18ha of BMV agricultural land (predicted to be grade 2) and 8.7ha of grade 4 agricultural land from the land required for the waste water transfer tunnel and treated effluent pipelines and the outfall.	Minor (not significant)	Minimisation of land required and orientation of Scheme Order Limits to avoid severance and creation of land slivers.	Primary	DCO Schedule 2 Requirement 7 (Detailed Design) (App Doc Ref 2.1)	The Applicant	Pre-construction	Approved design and work plan
		Return land temporarily required during construction to previous use through reinstatement and implementation of section 7.5 4, Land quality (Soil management), of the CoCP Part A (App Doc Ref 5.4.4.1) and application of measures within an approved a SMP based on the outline SMP (App Doc Ref 5.4.6.3).	Secondary	Section 4.4 (CEMP) and 5.14 (Watercourses/drainage channels), Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1). Outline SMP (App Doc Ref 5.4.6.3) which are secured through the requirements of the draft DCO (App Doc Ref 2.1))	Appointed Contractor(s)	Prior to construction	Approved CEMP Approved SMP required prior to the commencement of soil excavation
Temporary requirement of land from farm businesses for construction of the waste water transfer tunnel and treated effluent transfer pipelines results in	Moderate (significant) on P119; Negligible (not significant) on Y844.	Creation of a temporary access from the B1047 Horningsea Road to land required for the construction of the transfer tunnel and avoidance of existing farm access to Poplar Hall. Impacts to farm holding Y844 are avoided through the use of trenchless technology for installation of the Waterbeach pipeline.	Primary	DCO Schedule 2 Requirement 7 (Detailed Design) (App Doc Ref 2.1)	Appointed Contractor(s)	Prior to construction	Approved design and work plan and agreement with landowner
		Minimising temporary short-term impacts to farm businesses through application of the measures required by the CTMP in particular: • Section 6.3 Adherence to Designated Routes	Secondary	Section 4.4 (CEMP) and 5.14 (Watercourses/drainage channels), Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management	Appointed Contractor(s)	Prior to construction	Approved design and work plan Approved CEMP Approved CTMP

Description of impact	Residual effect	Mitigation measure	Mitigation Type	Secured by	Responsible party	Timing on the provision of the measure	Trigger for the discharge of any related requirement
temporary disturbance from construction traffic and short-term land severance.		• Section 5.2 (Temporary access points and construction road signage) which requires the use of temporary signage along all proposed construction haul roads. As a minimum this will include internal haul road speed limits, warning (hazard signs), potential vehicle or pedestrian. Minimising access disruption and disturbance through implementation of Section 7.6 of the CoCP Part A (Traffic and Transport) and the CTMP requirement to agree temporary access through coordination with landowners, tenants and/or land agents. Requirement within section 3 of the CoCP Part A and B (Application Doc Ref: 5.4.2.1) Part A (Community & Stakeholder Engagement) to appoint a Community Liaison Officer responsible for ensuring that relationships and lines of communication are maintained throughout the construction period including communication of temporary changes to access		Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1). Construction Traffic Management Plan (App Doc Ref 5.4.19.7), secured through a requirement of the draft DCO (App Doc Ref 2.1)			
Temporary requirement of agricultural land results in effect on soil resources due to soil compaction, poor soil storage, run-off, water logging and contamination from leaks and spills during construction of the final effluent pipeline and the waste water transfer tunnel	Minor (not significant)	Minimisation of land required.	Primary	DCO Schedule 2 Requirement 7 (Detailed Design) (App Doc Ref 2.1)	The Applicant	Pre-construction	Approved design and work plan
		Soil quality and management mitigation measures include, but are not limited to the following: • handling of site soils should always be conducted in accordance with the Construction Code of Practice for Sustainable Use of Soils on Construction Sites; • soil handling will be limited during wet periods where soils are susceptible to structural damage when handled at high moisture content or when plastic; • tracked/low ground pressure vehicles are used throughout stripping and haulage to reduce structural damage through compaction; • soil stripping will be carried out in all areas subject to earthworks and will be stored and handled separately as per their type; and • stripped soils will be stockpiled, where possible, on dry, flat ground avoiding hollows. • where possible land drains will be avoided (Section 5.14 of CoCP Part A).	Secondary	Section 4.4 (CEMP) and 5.14 (Watercourses/drainage channels), Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1). Outline SMP (App Doc Ref 5.4.6.3) which are secured through the requirements of the draft DCO (App Doc Ref 2.1))	Appointed Contractor(s)	Prior to construction	Approved CEMP Approved SMP required prior to the commencement of soil excavation

Description of impact	Residual effect	Mitigation measure	Mitigation Type	Secured by	Responsible party	Timing on the provision of the measure	Trigger for the discharge of any related requirement
		• a detailed Soil Management Plan building on the outline SMP will be submitted to and approved by the LPA and will form part of a Construction Environmental Management Plan.					
		Management of excavation impact on drainage and groundwater through the requirement within the CoCP Part A, section 5.14 (Watercourses/drainage channels) which requires the identification of land drains potentially affected by construction works and the reinstatement of a post works drainage system to the satisfaction of the land owner	Secondary	Section 4.4 (CEMP) and 5.14 (Watercourses/drainage channels), Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1).	Appointed Contractor(s)	Prior to construction	Approved CEMP Approved design and work plan and agreement with landowner
Effect on quality of soil resources due to temporary requirement of land for waste water transfer tunnel and treated effluent transfer pipelines	Moderate (significant)	Manged through soil quality and management mitigation measures within the CoCP Part A Section 7.4, Land quality (Soil management) (App Doc Ref 5.4.4.1) during construction including, a detailed Soil Management Plan building on the outline SMP will be submitted to and approved by the LPA and will form part of a Construction Environmental Management Plan.		Section 4.4 (CEMP) and 5.14 (Watercourses/drainage channels), Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1). Outline SMP (App Doc Ref 5.4.6.3) which are secured through the requirements of the draft DCO (App Doc Ref 2.1))	Appointed Contractor(s)	Prior to construction	Approved CEMP Approved SMP required prior to the commencement of soil excavation
Construction Waterbeach pipeline							
Temporary loss of up to	Moderate (significant)	Minimising construction widths of the Waterbeach pipeline corridor.	Primary	DCO Schedule 2 Requirement 7 (Detailed Design) (App Doc Ref 2.1)		Pre-construction	Approved design and work plan

Description of impact	Residual effect	Mitigation measure	Mitigation Type	Secured by	Responsible party	Timing on the provision of the measure	Trigger for the discharge of any related requirement
50 ha of agricultural land (42ha predicted to be Grades 1 and 2, deemed BMV land, with 8ha of Grade 3 land which may be BMV land depending on sub-grade) during construction of the Waterbeach pipeline..		Return land temporarily required during construction to previous use through reinstatement and implementation of section 7.4.30 of the CoCP Part A and application of a SMP based on the outline SMP (Application Document Reference 5.4.6.3).	Secondary	Section 4.4 and 5.14, Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1). Outline SMP (App Doc Ref 5.4.6.3) which are secured through the requirements of the draft DCO (App Doc Ref 2.1))	Appointed Contractor(s)	Prior to construction	Approved CEMP Approved SMP required prior to the commencement of soil excavation
Temporary requirement of land from farm businesses for construction of the Waterbeach pipeline.	Moderate (significant) on O842, G109, G041, G110, O025, P025, P881 and Y041; Minor (not significant) on G108, P106, GO37, R106, R107, and R040; Negligible (not significant) on O108, B107.	Manged through a design measure which creates a temporary haul route section parallel to Hatridges' Lane	Primary	DCO Schedule 2 Requirement 7 (Detailed Design) (App Doc Ref 2.1)	Appointed Contractor(s)	Prior to construction	Approved design and work plan
		Use of trenchless techniques for the construction of the Waterbeach pipeline to avoid a land parcel between the River Cam and Fen Road in the southern extent of the Scheme Order Limits.	Primary	DCO Schedule 2 Requirement 7 (Detailed Design) (App Doc Ref 2.1)	The Applicant	Prior to construction	Approved design and work plan
		Minimising temporary short-term impacts to farm businesses through application of the measures required by the CTMP in particular: • Section 6.3 Adherence to Designated Routes • Section 5.2 (Temporary access points and construction road signage) which requires the use of temporary signage along all proposed construction haul roads. As a minimum this will include internal haul road speed limits, warning (hazard signs), potential vehicle or pedestrian. Minimising access disruption and disturbance through implementation of Section 7.6 of the CoCP Part A (Traffic and Transport) and CTMP including the requirement to agree temporary access through coordination with landowners, tenants and/or land agents. Requirement within section 3 of the CoCP Part A and B (App Doc Ref: 5.4.2.1) Part A (Community & Stakeholder Engagement) to appoint a Community Liaison Officer responsible for ensuring that relationships and lines of	Secondary	Section 4.4 (CEMP) and 5.14 (Watercourses/drainage channels), Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1).	Appointed Contractor(s)	Prior to construction	Approved CEMP Approved design and work plan and agreement with landowner

Description of impact	Residual effect	Mitigation measure	Mitigation Type	Secured by	Responsible party	Timing on the provision of the measure	Trigger for the discharge of any related requirement
		communication are maintained throughout the construction period including communication of temporary changes to access CoCP Part B section 3.4 (Waterbeach pipeline) - Final access arrangements for the following Farm farm holdings will be agreed with the landowner as per the Land Plans (App Doc Ref 4.4), parcel numbers: 012a-012m, 021a-021o, 036a-036d, 037a-037c, 039a-039c, 042a-042f, 044a-044d, 046a-046d and 055a.					
Temporary reduction in the quality of soil resources during the construction of the Waterbeach pipeline due to soil compaction, poor soil storage, run-off, water logging and contamination from leaks and spills.	Negligible – minor (not significant)	Use of trenchless techniques for the construction of the Waterbeach pipeline to avoid a land parcel between the River Cam and Fen Road in the southern extent of the Scheme Order Limits.	Primary	DCO Schedule 2 Requirement 7 (Detailed Design) (App Doc Ref 2.1)	Appointed Contractor(s)	Prior to construction	Approved design and work plan
		Soil quality and management mitigation measures include, but are not limited to the following: • handling of site soils should always be conducted in accordance with the Construction Code of Practice for Sustainable Use of Soils on Construction Sites (Defra 2018); • soil handling will be limited during wet periods where soils are susceptible to structural damage when handled at high moisture content or when plastic; • tracked/low ground pressure vehicles are used throughout stripping and haulage to reduce structural damage through compaction; • -soil stripping will be carried out in all areas subject to earthworks and will be stored and handled separately as per their type; and • stripped soils will be stockpiled, where possible, on dry, flat ground avoiding hollows. • where possible land drains will be avoided (Section 5.14 of CoCP Part A). • a detailed Soil Management Plan building on the outline SMP will be submitted to and approved by the LPA and will form part of a Construction Environmental Management Plan..	Secondary	Section 4.4 (CEMP) and 5.14 (Watercourses/drainage channels), Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1). Outline SMP (App Doc Ref 5.4.6.3) which are secured through the requirements of the draft DCO (App Doc Ref 2.1))	Appointed Contractor(s)	Prior to construction	Approved CEMP Approved SMP required prior to the commencement of soil excavation
		Management of excavation impact on drainage and groundwater through the requirement within the CoCP Part A, section 5.14 (Watercourses/drainage channels) which	Secondary	Section 4.4 (CEMP) and 5.14 (Watercourses/drainage channels), Code of	Appointed Contractor(s)	Prior to construction	Approved CEMP Approved design and work plan and agreement with landowner

Description of impact	Residual effect	Mitigation measure	Mitigation Type	Secured by	Responsible party	Timing on the provision of the measure	Trigger for the discharge of any related requirement
		requires the identification of land drains potentially affected by construction works and the reinstatement of a post works drainage system to the satisfaction of the land owner		Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) Approval and implementation of a Construction Environmental Management Plan (CEMP) secured through a requirement of the draft DCO (App Doc Ref 2.1).			
Operation – proposed WWTP							
Effect on soil resources reused within the landscape masterplan	Negligible (not significant)	Measures delivered during operation will be implemented through the long term application of the LERMP (App Doc Ref 5.4.8.14) which requires that the operator to prepare a detailed management and maintenance plan (secured through requirements in the DCO), based on the LERMP	Secondary	DCO Schedule 2 Requirement 11 (LERMP) (App Doc Ref 2.1) which requires the approval and implementation of a detailed management and monitoring plan secured to comply with LERMP (Application Document Reference 5.4.8.14)	Appointed Contractor(s)	Prior to construction	Detailed management and monitoring plan prepared prior to year 1 of operation
Operation -Waterbeach pipeline							
Permanent acquisition of land from farm businesses resulting in small areas of severance.	Minor (not significant)	Management of potential impact from the location of permanent valves as set out within the CoCP Part B, Section 4.4 which requires the coordination with landowners for the final position of air valves.	Secondary	Section 3 (Site specific measures),, CoCP Part B (App Doc Ref 5.4.2.1)	Appointed Contractor(s)	Prior to final design of Waterbeach pipeline	Approved CEMP
Permanent acquisition of land from farm businesses due to proposed WWTP impacts access to adjoining agricultural land parcelsS	Minor (not significant)	Management of potential impact from the location of permanent valves as set out within the CoCP Part B, Section 4.4 which requires the coordination with the land owners for the final position of air valves.	Secondary	Section 4.4 (CEMP), CoCP Part B (App Doc Ref 5.4.2.1)	Appointed Contractor(s)	Prior to final design of Waterbeach pipeline	Approved CEMP

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