

1 EARL ENVIRONMENTAL IMPACTS ON KIRKLISTON COMMUNITY COUNCIL AREA

1.1 INTRODUCTION

This report provides a summary of the environmental impacts of EARL, as reported in the EARL Environmental Statement (ES) Final v2 (September 2005), on the area covered by the community council of Kirkliston. It should be noted that the ES is currently being revised further and will be available in local libraries, planning departments and on the Scottish Parliament website early next year.

This report isolates specific impacts and mitigation measures identified in the ES relevant to this area. For a full account of generic impacts etc reference should be made to the full ES.

The following environmental topic areas are covered in this summary paper. Also referenced below is the relevant chapter of the Final ES which should be referred to for the complete assessment, including detailed methodology, baseline, impact assessment, mitigation measures and residual impacts.

- Land Use (*Chapter 5*).
- Traffic and Transport (*Chapter 6*).
- Noise and Vibration (*Chapter 7*).
- Air Quality (*Chapter 8*).
- Ground Quality, Contamination and Waste (*Chapter 9*).
- The Water Environment (*Chapter 10*).
- Ecology and Nature Conservation (*Chapter 11*).
- Archaeology and Cultural Heritage (*Chapter 12*).
- Landscape and Visual Impacts (*Chapter 13*).

1.2 SCHEME DESCRIPTION

The parts of the scheme which directly affect the area of Kirkliston Community Council are the northern section of the Central Chord, the North West Chord, North East Chord, and Dalmeny Chord (representing an upgrade of the existing chord).

The north section of the Central Chord begins where the North West and North East Chords merge, north of the airport. It consists mainly of the tunnelled section of the route, passing under the River Almond and Airport. The alignment of this part of the scheme largely passes through agricultural land with arable farmland and wooded and vegetation outcrops along the River Almond in particular.

The North West Chord runs from the Dalmeny Chord to the proposed Central Chord passing through land dominated by arable fields and improved grassland land. The route crosses the B800 and road linking Kirkliston and Carlowrie. No properties lie in the direct vicinity of EARL although the village of Kirkliston does lie immediately south of the proposed alignment. Two areas of land in Kirkliston have been allocated in the finalised Rural West Edinburgh Local Plan (RWELP) for residential development, however, these sites remain un-adopted. A high pressure gas pipeline, adjacent to one of the proposed housing sites, will have to be diverted as it runs within close proximity to the proposed EARL alignment.

The North East Chord runs from its junction with the existing Edinburgh to Fife Railway Line (Dalmeny Junction), passing to the west of BP Dalmeny Oil Depot, to the south of a residential property and to the east of CAP set-aside agricultural land. After bridging over the Dolphinton Burn the route passes along the existing Newbridge to South Queensferry Cycleway, under a new bridge, to be constructed to replace the Standingstone Bridge, and through Pepper Wood Site of Importance to Nature Conservation (SINC), before entering the tunnel portal, to the west of residential properties at Wheatlands, and joining with the Central Chord.

The Dalmeny Chord will be upgraded in terms of track alignment and possible embankment remedial works. The upgrade of this chord will only require a narrow strip of land on both sides (approximately 5 m wide). This land will be predominantly agricultural.

The proposed scheme alignment is illustrated on the attached diagram.

1.3 *CONSULTATION*

1.3.1 *Introduction*

The consultation process adopted for EARL was designed to gather a wide opinion on the EARL scheme. It adopted a two tier approach, consulting at both national and local levels. The logic on the local consultation was to deal directly with individuals and businesses affected. Further to the Public Exhibition in December 2004 more focussed consultation has been undertaken on both an individual and group basis. These meetings have been of both a proactive and reactive nature and have primarily focussed on the following geographical areas within Kirkliston Community Council area:

- Humbie
- Carlowrie
- Wheatlands
- Almondhill

Our decision to publish the EARL Draft Bill & accompanying documents during July and August was another attempt to engage the wider community in advance of formal Bill introduction. 33 core stakeholders included public bodies, statutory bodies, utilities, designated libraries and emergency services and a further 422 parties including landowners, residents, businesses and community councils were notified that the EARL Draft Bill had been published. The documents were also placed in electronic format on the project website www.earlproject.com and hard copy format in local libraries and planning departments.

Details of Consultation

tie is confident that all properties within the Kirkliston Community Council area considered to be directly affected by the proposals have been identified and that residents of such have been invited to consult and meet with the project team.

Names of the specific properties we have consulted with are contained within this document. For Data Protection reasons the details of specific consultations cannot be disclosed within this document. However, as a direct result of ongoing consultations and in response to comments received on the Draft Bill we have made some changes to the Draft Bill documents. These include the following within the Kirkliston area:

- Access track altered to avoid Pepper Wood.
- Burnshot Road - Bill amended to reflect agreement on 50mph speed restriction (see below).
- Change to drainage proposals for one landowner.
- Bill and plans changed to reflect full excavation of Cat Stane site.

Political Consultation

tie Ltd have now met with most Local Councillors including Councillor John Longstaff (Kirkliston & Ratho).

Margaret Smith MSP has been consulted on the proposals and in the Kirkliston Community Council area has attended one of the group meetings arranged between **tie** and the residents of the Carlowrie area as well as the Public Meeting held in December 2004 during the Public Consultation.

1.3.2 *Community Liaison Group (CLG)*

We will continue to seek the views of Local Councillors and Community Councils on whether they feel CLG meetings would be worthwhile, and, if so we will look to the communities to tell us how many they wish to be held, the content of the meetings, and details such as meeting location.

1.4 LAND USE

1.4.1 Overall Approach

In relation to land use, impacts arising to the following topics have been considered:

- existing land use;
- severance;
- sensitive receptors;
- agricultural land;
- Green Belt; and
- development proposals.

1.4.2 Construction Impacts

EARL will take around 3 years to construct (between 2007 and 2011), and temporary land use impacts in relation to EARL are most likely to arise from the location of construction compounds and construction and layout areas (for structures to be assembled prior to installation) along the route.

As a result of construction activities, areas of land at Burnshot Road (2.1ha) and Wheatlands (35ha) will be used to locate site compounds for the works. Other temporary land take will result from requirements for access roads and equipment and material laydown areas such those between Winchburgh Junction and Kirkliston, land for the diversion of the Transco gas main between Winchburgh Junction and north of Kirkliston, land for the temporary diversion of the River Almond the immediate north of the airport, and land for the temporary diversion of traffic from Standingstane Road.

1.4.3 Permanent Impacts

Land Take

The majority of the permanent land use impacts of EARL arise due to the required change in land use for the actual route and accommodation works. Accommodation works include roads and cycleways, bridges and access tracks that re-provide for the loss or severance of existing features and also provide access to the new railway for maintenance purposes. Some other areas of permanent land use change will occur where environmental mitigation is proposed, eg landscaping, planting, floodplain creation; these areas are all included in either the Limits of Deviation (LOD) or the Limits of Land to be Acquired or Used (LLAU).

Land take figures by current land use for the overall scheme are presented in *Chapter 5* of the ES. For the Kirkliston Community Council area, permanent land take will include the loss of part of Pepper Wood SINC and the demolition of Standingstane Bridge.

Land Severance

In addition to land take, several parcels of land, mainly agricultural, will experience severance as the proposed route cuts through the land. This will leave behind smaller pockets of land on either side of the rail and road alignments. Access arrangements will be provided to all areas of severed land, although the farming and management of such land may be less efficient. The areas of land severance related to the North East and North West Chords are detailed in *Table 1* below.

Table 1 *Summary of Land Severance*

<p><i>Landowner and notes</i></p> <p><i>Carlowrie Farm - at North East Chord tunnel portal</i></p> <p>Major severance of land parcel with the railway and road proposals and heavy disruption during construction but proportion of EARL in tunnel once operational. Ventilation tower and required maintenance access will be provided within field near to River Almond. Burn diversion from northside of route alongside Wheatlands Road to River Almond. New field access to northside of Carlowrie Farm, next to Pepperwood Cottage. Land partly lost to compensate for loss of wooded area and railway, new access to be provided. Severed field between the cycletrack and Burnshot Road to be provided with new access on south side. All areas of land will be provided with access.</p> <p><i>Dalmeny Estates - along North East Chord</i></p> <p>Loss of land to cycletrack and railway track access to junction (railway at bottom of embankment). Bridge/culvert over Dolphington Burn will be extended. Access to be provided into field alongside Dolphington Burn.</p> <p><i>DTZ (Royal Elizabeth Yard) - along North East Chord</i></p> <p>Construction disruption and small loss of land to realign cycletrack.</p> <p><i>City of Edinburgh Council (Cycletrack) - Along North East Chord</i></p> <p>Disused solum lost to rail alignment. New cycletrack provided mainly to western side.</p> <p><i>Dundas Estates (Almondhill Farm) - south of the North West Chord north east of Kirkliston</i></p> <p>Loss of land from railway and proposed roads. Small amounts of redundant land taken. Access is maintained through cattle creep. High Pressure Gas mains diverted southwards to avoid crossing road and railway.</p> <p><i>Hopetoun Estates (New Mains Farm) - south of the North West Chord north east of Kirkliston</i></p> <p>Loss of land from railway. Access is maintained. High Pressure Gas mains diverted southwards to avoid crossing road and railway.</p>
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1.4.4 *Mitigation Measures*

While the actual loss of land and impacts resulting from land use severance cannot be avoided or completely mitigated, a number of measures will be undertaken during the detailed design process in order to reduce and minimise both the temporary and permanent impacts on land use. These include:

- a full programme of agricultural reinstatement will be designed to ensure the maximum area of agricultural land is reinstated to productive use, soil profiles will be stored and reused where possible;
- access to all areas of agricultural land will be maintained or re-provided to ensure continued use;
- where proposed, land will be returned to its original use at the earliest opportunity in order to minimise impacts;
- woodland removal will be minimised where possible and replacement planting will be provided (particularly for Pepper Wood);
- road diversions will be in place before roads are closed to minimise severance impacts;
- all Rights of Way, cycleways and footpaths will be diverted and / or re-provided wherever possible rather than stopped up and every effort will be made to maintain the quality of the footpath / cycle way, within the engineering constraints where reasonably practicable – further consultation with local authorities and interested parties will be undertaken and comments will be taken on board;
- landlocked parcels of land will be incorporated into the detailed design of EARL;
- temporary closures of Rights of Way, footpaths and cycleways will be minimised;
- the development of a Code of Construction Practice (a draft of which is set out in *Annex L* of the ES and is published on the EARL website) will ensure that the land use impacts during construction are minimised and environmental mitigation is complied with.

1.5 *TRAFFIC AND TRANSPORT*

1.5.1 *General Approach*

Construction traffic and the operation of EARL may lead to traffic and transport impacts in terms of:

- changes in traffic conditions (in particular, where temporary or permanent road/lane closures are required);
- changes in traffic-related noise levels and air quality;
- access to properties; and

- changes in conditions for pedestrians and cyclists.

The overall objective of this assessment is to estimate the impact of changes in traffic resulting from the construction and operation of EARL. This assessment is based upon the details of EARL as presented in *Chapter 2* of the ES, but also the Construction Methodology report ⁽¹⁾ and traffic modelling data ⁽²⁾. Where information has not been made available assumptions have been made, these are clearly stated.

For a full account of the detailed methodology and significance criteria used in this assessment, please refer to *Chapter 6* of the ES.

1.5.2 *Construction Impacts*

In relation to the removal of spoil from site, it is proposed that 59,150 HGV movements will take place over the 3 year construction period. Vehicles will travel along the North West Chord via a new junction onto Queensferry Road (A8000), and then to either the M9, M8, or M90 via Forth Road Bridge. The assessment of construction generated traffic has shown that the majority of increases are substantially less than 10%. However, there are four locations which may potentially, as a worst case, experience increases in excess of 10%. Three of these locations are along the B9080, the other is on New Liston Road leading north towards Kirkliston. The application of all 32 HGV movements to each road is an over estimate and is a scenario which is highly unlikely to occur. These roads have very low traffic flows and so an additional 32 HGV movements an hour are unlikely to cause capacity impacts.

Temporary closures of roads and Public Rights of Way will be required during construction. In each case where a road or other Public Right of Way is temporarily closed an alternative route will be provided. These closures and diversions would affect, in particular, journey times for pedestrians, cyclists, horse-riders and other road users. The duration of these closures and the length of the diversion routes vary but all result in the potential for impacts. In particular, users of the access track between Queensferry Road and Almondhill (public road) and footpath over Boathouse Bridge will experience significantly longer journey times, albeit for a limited period only.

Private and business accesses will be maintained through construction with the exception of the access to and from Standingstone Cottage. Alternative access will be provided during construction and the existing access reopened on completion of the scheme.

1.5.3 *Permanent Impacts*

The assessment of traffic flow indicates that very few roads are expected to receive an increase in traffic flow in excess of 10% as a result of EARL. In fact

(1) Scott Wilson (2005) EARL Construction Methodology Report, May 2005.

(2) Scott Wilson Traffic Modelling, May 2005.

the vast majority of roads will undergo a negligible change in traffic flow. As an exception, Burnshot Road is predicted to have significant decreases in traffic flows by 2011, as will the A8000 by 2026. However, overall, no impacts to road users from changes in traffic flow are envisaged.

A number of roads and Public Rights of Way will be permanently stopped up as a result of the scheme. Within the Kirkliston Community, six roads or rights of way will be stopped up, namely:

- Queensferry Road between Kirkliston and the north side of the roundabout;
- a private access road from Queensferry Road to Gas Mains;
- a private track between Almondhill Steading and Almondhill Farm;
- Burnshot Road (in four locations);
- The Newbridge to South Queensferry Cycleway; and
- Wheatlands Road (in two locations).

All public roads, Rights of Way and access points that will be severed will be re-provided. Taking account of this, only one stopping up along Burnshot Road is anticipated to result in significant longer journey times.

1.5.4 *Mitigation Measures*

While certain traffic impacts cannot be avoided or completely mitigated a number of measures have already been incorporated during the design process in order to reduce and minimise both the temporary and permanent traffic impacts. These include the following.

- As the construction strategy proposes to utilise haul roads within the site as far as possible, it minimises the potential impacts by removing the need for vehicles to use local roads (other than in exceptional circumstances).
- The construction strategy sets out that HGV movements will be restricted to off-peak traffic times to prevent exacerbation of peak traffic levels by the movement of materials for the scheme.
- The construction strategy enables waste to exit the site onto trunk roads in the most efficient manner.
- As shown on the plans, where existing accesses would have been affected, revised access arrangements have been designed in consultation with affected parties; this includes public roads and private access routes.

- **tie** ltd have committed to producing a Code of Construction Practice (CoCP) which will be agreed to by the local authorities. This will form part of the construction contracts and will ensure that construction traffic and road management requirements are dealt with appropriately.

1.5.5 *Residual Impacts*

A temporary significant impact will occur to users of some public Rights of Way during temporary periods of closure, specifically, journey times will be increased significantly for pedestrians and traffic wanting to use the footpath over Boathouse Bridge and adjacent to south Bank of River Almond, and the access track between Queensferry Road and Almondhill (public road) respectively. The permanent realignment of Burnshot Road will create a significant impact that cannot be mitigated. The new alignment is much longer than the original and so travelling times would be notably lengthened by the new route for all modes. A slight negative impact is also expected to occur from the inconvenience to users resulting from the realignment of the Newbridge to South Queensferry Cycleway.

In terms of changes in traffic flows arising from EARL, 4 locations are predicted to experience increases in excess of 10% resulting from construction activities. However, these roads have very low traffic flows and so the additional movements are unlikely to cause capacity impacts. Following completion of the scheme, two roads are predicted to undergo a significant reduction in flow, namely, Burnshot Road and the A8000. No significant adverse residual impacts to road users from changes in traffic flow will occur as a result of the operation of EARL.

1.6 *NOISE AND VIBRATION*

1.6.1 *General Approach*

Construction Noise

Advice and guidelines to local planning authorities and developers on construction noise in the UK can be found in British Standard BS 5228 ⁽¹⁾ and Department of the Environment (DoE) Advisory Leaflet (AL) 72 ⁽²⁾. AL 72 is out of print, but remains as a paper giving guidance on acceptable levels of noise that have been widely used to assess noise from construction works (primarily relating to plant).

Operational Noise

Noise from new developments is assessed in two ways:

(1) British Standard BS 5228 **Noise control on construction and open sites**, BSI 1997.

(2) Advisory Leaflet 72 (1976) **Noise control on building sites**, DoE.

- by comparing the levels of noise that are expected to be generated against absolute noise standards, such as those that indicate likely annoyance or disturbance with everyday activities; and/or
- by considering the change in ambient noise that will occur with the development in operation.

For a full account of the detailed methodology and significance criteria used in this assessment, please refer to *Chapter 7* of the ES.

1.6.2 *Predicted Construction Noise*

The construction work compounds will have varying noise emissions, but all properties within 115 m of the main route, work compounds, or where structures and bridges are to be constructed may potentially be impacted by construction noise. For completeness, all properties within 200 m of LLAU boundaries and those where structures and bridgeworks will take place, have been considered. Seven such properties were identified within the Kirkliston Community area of which six were predicted as potentially requiring mitigation (see *Table 2* below).

Table 2 *Receptors where Mitigation from Construction Noise May be required*

Ref.	Receptor name and location	Distance to worksite (m)	Description of worksite / activity
R38	Wheatlands (North East Chord)	45	Route construction and LLAU at property boundary. Main site compound, tunnelling works
R39	Easter Carlowrie (North East Chord)	100	Route construction LLAU, structures & bridgework
R41	Carlowrie Cottages (North East Chord)	95	Route construction LLAU, structures & bridgework
R42	Standingstone Cottage (North East Chord)	45	Route construction LLAU at property boundary
R44	Whitelees (North East Chord)	45	Route construction and LLAU
R45	Almondhill Steading (North West Chord)	80	LLAU to access track

It is predicted that, following the implementation of appropriate mitigation measures embodied within the Code of Construction Practice (CoCP), receptors R39, R41 and R45 will not experience significant noise impacts from construction.

No significant noise impacts are predicted as the result of construction traffic flows on the local and wider road network.

1.6.3

Predicted Operational Noise

Railway operational noise has been calculated based on the prediction method in Calculation of Railway Noise (CRN) ⁽¹⁾ on the basis of measured data from Class 170 trains as described in *Annex D* and the ES. The noise levels have been calculated based on adjusting measured levels to account for distance from the source, speed, length of the train, and corrections for air absorption and angle of view. Acoustic screening from cuttings has been taken into account. Predicted impacts upon receptors in the Kirkliston Community area, from operational noise, are presented in *Table 3* below.

Table 3

Summary of Operational Impacts (no Mitigation)

Ref	Receptor	Distance to nearest track (m)	L _{Aeq,0700} (dB)	L _{Amax} (dB)	L _{Aeq,2300} (dB)	Exceedence (dB)	Significance of Impact (exceedence of baseline or absolute criterion) ⁽¹⁾
R38	Wheatlands (North East Chord)	45	55	75	52	7 dB above night-time L _{Aeq} criterion	<i>Substantial</i> impact of (exceedence of criteria) ⁽²⁾
R50	Kirklands Park Grove (North West Chord)	220	51	70	48	3 dB above night-time L _{Aeq} criterion	<i>Moderate</i> impact of (exceedence of baseline)

(1) All impact predictions are based on worst case assumptions, and may prove to be less significant

(2) The 82 dB L_{Amax} criterion at Wheatlands may be exceeded due to train horn noise depending on the actual mitigation offered by the cutting where EARL will pass Wheatlands

It should be noted that properties at Wheatlands are also predicted to experience occasional horn noise from the trains due to proximity to the tunnel portal.

No significant noise impacts are predicted as the result of construction traffic flows on the local and wider road network.

1.6.4

Mitigation Measures

With respect to construction, since the detailed programming and selection of plant will be carried out by the contractor, specific mitigation can not be developed for the scheme at this stage. However, in order to reduce noise emissions during the construction phase a CoCP, incorporating noise and vibration control measures agreed with the Local Authorities, will be adopted for the development of the scheme. A number of generic mitigation measures will be adopted within the CoCP, and these are identified in *Section 7.7.1* of the ES.

With respect to the operation of EARL, the precise details of mitigation required will be determined at the final design stage of the scheme when

(1) Department of Transport (1995), *Calculation of Rail Noise*.

further noise assessments will also be undertaken. Consideration will, however, focus the installation of trackside barriers with full account given to track safety, driver line of sight requirements, visual impact and the potential creation of crime havens issues.

1.6.5 *Residual Impacts*

With the application of mitigation through a CoCP, properties beyond approximately 40 m from work sites will remain below the construction noise level assessment criterion. Three properties out of those listed in *Table 2*, Wheatlands (R38), Standingstone Cottage (R42) and Whitelees (R44), may therefore experience residual impacts during construction.

Potential significant impacts are predicted for two properties within the Kirkliston Community area once EARL is operational, namely, Wheatlands (R38) and Kirklands Park Grove (R50). However, noise barriers and bunds will be incorporated in to the scheme where necessary and practicable and it is envisaged that significant train noise impacts can be avoided. The sounding of the horn could be obtrusive at Wheatlands. Similarly train vibration may be perceptible in some areas, but it is envisaged that significant impacts can be mitigated.

1.7 *AIR QUALITY*

1.7.1 *General Approach*

Impacts from construction dust are limited to a distance of 150 m from the construction sites for the scheme. Dust is not, therefore, predicted to have an impact on properties at a distance greater than 150 m from the site boundary.

Emissions from changes in traffic due to construction and operational traffic are confined to the local road network and the properties within 200 m of these roads. Traffic related pollutant concentrations decrease with distance from the roadside and air quality at properties at distances greater than 200 m from the roadside are not, therefore, expected to be influenced by changes in traffic.

Direct pollutant emissions from the trains are limited to the route of the train, and the stations and junctions where the trains may idle whilst stationary. There will be no additional services and therefore a quantification of emissions to air for the purposes of a regional impact assessment is judged not to be required. Vent shafts positioned along the sections of the route that lie within tunnels will be localised point sources for the diesel engine emissions.

Three ventilation shafts are proposed: at the station, south of the River Almond and north of the River Almond. The ventilation shaft at the station extends 13 m above ground level (3 m above the proposed concourse building) and each of the ventilation shafts adjacent to the river measure 5 to

8 m above ground level. Emissions from these vents have been quantitatively assessed.

1.7.2 Construction Impacts

Construction Dust

The potential for dust to be emitted during construction is strongly dependent on the type of activities taking place, on wind speed and on whether winds carry emitted particles towards sensitive receptors, such as hospitals, schools and residential property. It is considered that the scheme is highly unlikely to cause a dust nuisance at a distance greater than 150 m from the construction site boundary. Properties within Kirkliston Community area which lie within this distance from EARL include Wheatlands, Carlowrie Cottages, Easter Carlowrie, Carlowrie Farm Cottages, Standingstone Cottage, properties east of Standingstone Road, a retail property to west of Standingstone Road, the northern part of Kirkliston, a property to southern end of Dalmeny and Almondhill Steading.

Construction Traffic

The ES predicts that the roadside concentrations of PM₁₀ and NO₂ increase slightly as a result of construction traffic. These increases will occur at the roadside of B9080 and New Liston Road but despite these increases in traffic, the pollutant concentrations remain within the air quality objectives and will occur for a limited duration.

1.7.3 Permanent Impacts

There are no predicted permanent impacts as a result of direct train emissions as there will be no additional services, therefore, this is unlikely to impact significantly on ambient air quality. Furthermore, the quantity and significance of emissions of pollutants from the tunnel portals is expected to be limited and emissions from the vents positioned along the EARL route and the station are not likely to have an impact on air quality.

In terms of changes in road traffic, whilst localised degradation in air quality may occur in certain areas, a slight improvement in air quality across the study area is predicted as a result of EARL. The majority of households in the study area are predicted to experience insignificant changes in air quality as a result of EARL.

1.7.4 Mitigation Measures

No mitigation is required with respect to traffic and train emissions to air. However, the construction process can incorporate certain measures that will assist in minimising particle emissions, and reducing the significance of the potential impacts resulting from dust.

There are a number of good site practices that will be employed to reduce the risk of dust effects arising during construction. The following measures have been incorporated into the draft Code of Construction Practice (CoCP) and will be required to be adopted by the contractor:

- wheel washing of vehicles leaving the construction site to minimise the re-suspension of dust due to construction traffic;
- water suppression or dust extraction technology fitted to drilling and grinding equipment;
- drilling and excavation surfaces to be wetted, where appropriate;
- surfaces damped down prior to clearing;
- debris piles to be kept watered or sheeted as necessary so that no dust nuisance may be caused to receptors;
- containers to be totally enclosed or covered by tarpaulins or nets to prevent escape of dust or waste materials during loading and transfer from site; and
- lorries to be sheeted during transportation of construction materials and spoil export.

Tarmac laying and the associated use of hot bitumen can generate significant amounts of black smoke particles. This can be minimised by the application of the following measures suggested by the Building Research Establishment (BRE) ⁽¹⁾:

- bitumen will not be overheated;
- pots and tanks containing hot bitumen will be covered to minimise fume production;
- spillages will be minimised; and
- where possible, bitumen will not be heated with open flame burners.

Any properties significantly affected by construction dust will be offered a dust cleansing service once construction has ceased.

1.7.5

Residual Impacts

The impacts from construction dust have the potential to be significant, but assuming mitigation outlined within this chapter is applied, minor impacts

(1) Buildings Research Establishment (BRE), 2003. **Control of dust from construction and demolition activities**. Kukadia, V., Upton, S. and Hall, D. BRE Bookshop, London. February 2003.

are predicted to result. Construction traffic will be of a limited duration, and is not predicted to significantly impact upon air quality.

1.8 *GROUND QUALITY, CONTAMINATION AND WASTE*

1.8.1 *General Approach*

There are very limited number of area-specific impacts predicted or mitigation measures proposed in the ES with respect to ground quality, contamination and waste. With respect to Kirkliston Community area, specific impacts relate to operational ground quality. These impacts and mitigation specific to Kirkliston are detailed below. Scheme wide impacts and mitigation can be referred to in Chapter 9 of the ES.

1.8.2 *Operational Impacts*

Groundwater will potentially be impacted through the operational dewatering near Wheatlands. This will lower the groundwater level in this area but is not expected to impact the base flow to the River Almond if the abstracted water is discharged into the river. This dewatering could, however, cause soil settlement at Wheatlands so engineering mitigation will be required to prevent this.

1.8.3 *Mitigation Measures*

Mitigation measures will be taken to limit potential impacts to ground quality. These will include soil nailing, underpinning and good topsoil handling.

- Engineered mitigation will be undertaken under the buildings within the zone of influence of dewatering around the Wheatlands area. As the permanent dewatering in this area may lead to some soil settlement by lowering the groundwater table, the measures would aim to prevent any resultant soil settlement causing any structural damage to the properties involved. The most likely engineering solution would be underpinning of the effected buildings with steel rods and concrete. Installation of a pile curtain between the buildings and the dewatering pump and undertaking controlled settlement are also potential mitigation measures. The type of engineering mitigation adopted will be finalised after further ground investigation is undertaken.
- Soil nailing will also be undertaken along the North East Chord where potential soil instability has been identified. The construction methodologies adopted throughout EARL will be designed to limit soil instability.

1.8.4 *Residual Impacts*

There will be localised impacts on shallow groundwater flow and a lowering of the natural groundwater level at Wheatlands. However, it is considered that the overall water balance of the site will remain static as all drainage discharges to the River Almond.

1.9 *THE WATER ENVIRONMENT*

1.9.1 *Overall Approach*

With particular regard to the water environment, the assessment process has taken into account the following factors.

- The magnitude of an effect, as determined by its intensity and by its extent in space and time.
- The sensitivity of the surface and groundwater bodies in the vicinity of the scheme, taking into account water quality and resilience and considering pathways through which secondary impacts may result (eg within water body catchment areas, groundwater recharge zones and throughout the length of watercourses).
- The sensitivity and effects upon surrounding and dependent environments, including the effects upon flood plains and related developments and environments, initiatives (eg existing initiatives to improve water quality), and users of the water environment (eg abstractors and recreational users).

The assessment took account of existing and potential uses, users and receptors within the water environment.

1.9.2 *Construction Impacts*

River Almond Temporary Diversion

The geology of the area is predominantly boulder clays to the south, changing to alluvial deposits to the north. The boundary between these deposits lies beneath the river itself. Due to the difference in the characteristics of these deposits, it is significantly more complex to bore the tunnel beneath the river, attracting a number of major risks. Construction will therefore need to utilise cut and cover methods from the airport boundary northwards; a boring method will be required to tunnel under the airport from the airport boundary southwards. This requires a temporary diversion of the River Almond. It is thought that the river will need to be diverted for a period of between 12 and 18 months. The river would be diverted by approximately 50 m to the north over a stretch of around 50 m to 100 m.

The following impacts relating to the River Almond diversion have been identified as having the potential to effect:

- flooding;
- watercourse flow dynamics;
- aquatic and bank side flora and fauna; and
- noise.

Impacts in relation to flooding and watercourse flow dynamics will be mitigated through the appropriate design of the diversion and so no significant impacts are anticipated (see mitigation below).

Impacts associated with the diversion will result from the disruption to the aquatic and bank side flora and fauna. The main impacts are expected to result from the act of diverting the river, mainly due to the loss of flora and fauna on the bank sides, within the river itself, and river bed around the diverted section, and the temporary changes in flow and suspension of sediments at the time of diversion. Impacts are likely to be greatest, therefore, at the point and time of diversion for construction, and re-diversion on completion of construction.

The activity of sheet piling can introduce high levels of noise and vibration to the environment, especially when percussive, or driven, piles are used. For EARL, contiguous piling methods are favoured. The installation of contiguous piles produces a much lower level of noise and vibration, as the piles are screwed or bored into the ground. The disturbance effects due to noise and vibration will therefore not be as high. There may, however, be areas where the ground conditions or the nature of works (ie deep, narrow excavation) do not allow contiguous piling. In this instance, short term impacts would be expected to result, having a disturbance effect upon ecology and a potential impact upon noise receptors in the vicinity of the River Almond.

Pollution, sediment and dust entry into the River Almond

Impacts may also result from the entry of pollutants, sediments and dust into the River Almond. Sediment discharges will affect water quality and may lead to changes in the hydraulic capacity of drainage channels. High sediment concentrations and siltation in watercourses would also be detrimental to fish, either directly by causing gill abrasion or smothering, or indirectly by reducing dissolved oxygen levels or destroying plant and invertebrate food sources. This can have significant impacts, especially where migratory and spawning fish (eg salmonids) are observed. As salmon and trout are thought to be present within the River Almond, extreme care will need to be taken to minimise the mobilisation of sediments and prevent the accidental release of polluting substances. SuDS will be employed to address this issue and are described in outline below (*Section 1.9.4*).

Temporary River Almond crossings

Temporary bridges over the existing and diverted course of the River Almond are required to enable the transport of construction materials and equipment. There are two main potential impacts associated with the crossings:

- the potential for the construction of the crossings themselves and the materials to be transported via the crossings on completion to pollute the River Almond; and
- the potential for the crossing to reduce the hydraulic capacity of the river channel at the crossing point, leading to an increase in water levels upstream and a short term increase in erosion downstream.

1.9.3 *Permanent Impacts*

No significant permanent impacts in relation to the Kirkliston Community area are predicted.

1.9.4 *Mitigation Measures*

River Almond Diversion

Specific mitigation for the temporary diversion of the River Almond has been developed as follows.

- Water quality data will be gathered to provide an indication of the baseline conditions before works commence.
- Berms will be installed next to the sheet pile wall to soften the feature and provide a temporary 'bank' on the south side of the diversion.
- On the northern side, natural materials such as rocks or natural matting will be used for revetment wherever feasible. It should be noted, however, that this feasibility will be dependant on the flows and subsequent erosion of the banks sides over the diverted section. This will be determined during the detailed design phase, and must be led by the engineering case in order to preserve bank stability.
- Existing bed material will be removed and reinstated after the construction of the tunnel is complete.
- Due to the potential to affect migratory fish species (such as salmon and trout) all in-stream works, including the act of diverting and redirecting the river, will be subject to the following conditions:
 - works will be conducted outwith upstream and downstream fish migration, spawning, incubation and hatching periods (effectively reducing the period of works to between June and August inclusive); and

- existing fish stocks in the vicinity of the diversion will be removed to a temporary location to be agreed with the Forth District Salmon Fishery Board (FDSFB) prior to diversion and the redirection of the river.
- A specific restoration plan will be developed and the River Restoration Centre will be involved with the detailed planning of the realignment of the river and the methodologies by which water will be redirected along the river's natural course.
- All in river works will be conducted in accordance with PPG5: Works In, Near or Liable to Affect Watercourses.

On completion, EARL is predicted to have minimal effects upon the River Almond due to the restoration of the river bed and bank sides and the sub surface positioning of the tunnel. Terrestrial and aquatic habitats affected will, however, take a variable, but in some cases, long period of time before they may be considered to be fully restored.

Pollution, sediment and dust entry into the River Almond

Impacts resulting from small increases in sediment loading are likely to be local and temporary; however, given the scale of the proposed works, the potential exists for large volumes of sediment to enter local watercourses. All attempts will be made to minimise the entry of sediments and other pollutants to watercourses, and the following mitigation and SUDs measures will be adopted.

- No direct discharge to watercourses will be made.
- Filter drains, silt traps, silt screens, settlement ponds, retention ponds or sediment mats will be installed to serve critical construction areas. These may be in the form of natural hollows. The potential of birdstrike risks to the airport will be considered both in the positioning and design of ponds. Measures to deter birds, such as klaxons warnings will be considered.

Pumped discharges will be passed through silt traps, screens, discharged to settlement or retention ponds, or passed over land ⁽¹⁾ to capture sediments before release into receiving waters.

Temporary River crossing

Where materials and equipment are to be transported over watercourses, consideration will first be given to alternative routes to avoid crossing the watercourse. If there is no alternative, the following measures will be applied.

- Loose materials will be covered so as to prevent spills and leakage.

(1) This is a suitable method for low drainage volumes only.

- Equipment and chemicals will be checked for leaks and safely and securely fastened to a designated transportation vehicle before crossing the watercourse.

Details of the crossings will be finalised during the detailed design phase. The resulting designs will take account of flood flow levels together with relevant PPGs and other relevant guidance.

General

In addition to the measures outlined above, a number of generic mitigation measures are proposed for protection of the water environment and are presented in *Chapter 10* of the ES.

1.9.5 *Residual Impacts*

Following the implementation of the mitigation, the main residual impacts to the water environment can be considered to be as follows.

- Impacts upon flooding due to:
 - the temporary diversion of the River Almond.
- Permanent changes to the natural drainage of the area.
- Changes to aquatic and bankside flora and fauna, as habitats and species may take some time to be fully restored.
- Temporary and permanent risks of pollution, particularly during construction.

1.10 *ECOLOGY AND NATURE CONSERVATION*

1.10.1 *General Approach*

The EARL proposals were examined in the context of the findings of a number of ecological surveys to predict the impacts that may result from the scheme. This included nature conservation resources potentially directly affected, and those which may be indirectly affected.

The potential for ecological and nature conservation impacts has been assessed in the light of habitats and the species that will be affected by the proposals in line with the Guidelines for Ecological Evaluation and Impact Assessment published by the Institute of Ecology and Environmental Management (IEEM) ⁽¹⁾.

1.10.2 *Construction Impacts*

The River Almond

The River Almond is a non-statutory Site of Importance for Nature Conservation. In order to develop EARL the temporary diversion of 50 to 100 m of the River Almond is required. In addition a temporary bridge over the river is required to allow construction traffic to cross. This will result in the loss of the following habitat types:

- river corridor;
- poor semi-improved grassland;
- scattered mature trees and scrub;
- tall ruderal vegetation; and
- arable farmland.

The river diversion and temporary bridge are both expected to be in place for 12 to 18 months to allow the construction of the tunnel led section of EARL. The actual diversion will take place over a period of a month before and after the construction works. The length of watercourse to be temporarily diverted is relatively short and the river bed itself will be protected throughout the period of diversion. A limited area of habitat will be lost which supports a range of plant species which are common in the area and of only local nature conservation value.

Some parts of the river bank over the area of the proposed diversion have been colonised by invasive alien species such as Himalayan balsam and Japanese knotweed. These species and the associated soil will be required to be removed to a licensed site to avoid assisting their spread. In areas unaffected by these invasive species, topsoil and subsoil will be stripped and stored separately, and then used in restoration with the soils being replaced as close as possible to the locations from which they were taken. The removal of invasive species and the restoration with native species typical of the area will allow longer term improvements to the habitat of the affected areas.

The River Almond supports sea trout, and may support salmon. There is the potential for disturbance to these species during the two month-long periods of diversion. Otters are also present on the River Almond, and two holts were recorded during the surveys. These holts are sufficiently distant from the proposed works, and will not be affected by the proposals. It is likely, however, that some disturbance to the passage of otters along the river will

(1) IEEM (2002) *Guidelines for Ecological Impact Assessment* <http://www.ieem.org.uk/Projects.htm>

occur during construction, and appropriate licences will be obtained from the Scottish Executive in advance of works commencing. Surveys along the River Almond corridor have also recorded a range of predominantly common waterbirds and passerines, but no species of note have been recorded nesting in the areas to be directly affected.

The development of EARL is likely to result in some localised and short-term impacts to the wildlife corridor along the River Almond, as the movement of some fauna species across the working area may be temporarily restricted. However, in the longer term the wildlife corridor will be maintained as the diversion will be removed and the affected areas of the river restored. Restoration will take a variable length of time, with some species recolonising the affected areas quickly. However, due to the loss of mature trees and the time taken for the terrestrial and aquatic habitats to be completely restored, a negative minor residual long term impact has been applied ⁽¹⁾. Minor positive long term impacts would also be expected, due to the removal of alien species from the site.

Birds

Linnet, tree sparrow, skylark (all red list species) and stock dove are known to overwinter in the arable fields to the north of the River Almond. These fields are to be used as construction compounds for the duration of the construction period (3 years). There is a risk of localised disturbance to these species for the duration of the works. Given the large area of arable fields in the vicinity of the airport, and the coverage of much of the immediate surrounds by the airport's Bird Hazard Management Plan (which enables the airport to manage birds present) this disturbance and temporary loss of habitat is not expected to be significant for these bird species.

Bats

Bats are known to forage in the general area, with records established for the River Almond. Daytime surveys to date indicate that there is potential for bat roosts in the areas to be affected by EARL. As bats are mobile species due regard will be required in respect to checking all properties, bridges and other built structures and mature trees for their use by bats prior to demolition, felling or construction works ⁽²⁾, in particular, with respect to Boathouse Bridge.

Measures to mitigate any demolitions or felling will be agreed in detail with SNH and implemented prior to construction. If necessary, application for appropriate licences will be made to the Scottish Executive.

Amphibians

(1) This is because the impact is predicted to persist for the 'foreseeable future' as defined within *Chapter 3*.

(2) Due to the likely construction start date of 2007 and the fact that bat roost locations may change, these surveys will be carried out closer to construction to ensure that all necessary mitigation is implemented.

The Dalmeny Railway Ponds SINC, immediately adjacent and west of the northern end of the North East Chord, is known to contain amphibian populations in particular great crested newts (*Triturus cristatus*). The potential presence of this species at this location will be confirmed by surveys undertaken prior to construction. Should they be found to be present suitable mitigation measures will be required in order to minimise impacts upon this species and its habitat.

1.10.3 *Permanent Impacts*

Habitats

Adjacent to Dalmeny Railway Ponds is an area (6.6 ha) of semi neutral grassland. 0.3ha of this grassland will be lost for the construction of an access track for railway maintenance. This grassland is of local nature conservation importance and provides foraging habitat for badgers and birds. Given the small land take for the track, the impacts are not expected to be significant.

There is also a housing development proposed north of Kirkliston, situated approximately 50 m south of the railway. In conjunction with EARL, the two projects would lead to an increased loss of arable land which would impact the fauna that forage on this habitat (eg badgers and wintering wildfowl). However, this is not expected to be significant as arable land provides only limited foraging habitat for badgers.

Newbridge to South Queensferry Cycleway

The North East Chord will run along a 1 km section of the cycleway between NT 143756 and NT 144764. As a wildlife corridor, this area is listed as a priority habitat in the LBAP. The works will result in the direct loss of the following habitat types:

- plantation broadleaved and mixed woodland and scrub;
- tall ruderal vegetation; and
- neutral grassland.

These habitats are of moderate to high local nature conservation value as they act as a wildlife corridor and provide foraging habitats for bats and breeding birds.

The loss of these habitats may lead to a reduction in nesting/roosting and foraging habitats for birds and bats. A new cycleway will be created to run parallel to the railway. Replacement woodland, using native species typical of the area, will be planted on either side of the cycleway and the railway between Burnshot Road and Standingstone Road, which will part mitigate the loss of habitat.

In the short term, the impacts are predicted to be significant to foraging fauna species. Over time, the planting in the surrounding area and along the new cycleway will provide replacement habitat for these species.

Pepper Wood

The North East Chord will pass directly through Pepper Wood SINC and SWT Listed Wildlife Site. The wood comprises a mix of typical native woodland flora, naturalised plants and some planted species, which although rare in Britain are non-native to the local area including the May lily (*Maianthemum bifolium*), a Red Data Book species. Almost all the flora of interest in the wood is concentrated in the central section, which will be lost to the scheme.

The proposals will result in the loss of 0.8ha of woodland (ie 70% of its total area), and hence will have a significant impact on the wood, which is of high local nature conservation value.

It is proposed, however, to off set these permanent impacts but planting 1ha of native broadleaved woodland in a field adjacent to the existing Pepper Wood, which is currently set-aside arable land, to part mitigate the loss of woodland (landscape mitigation planting is shown on *Figures 13.6a to j*). Soil containing the seedbank from the existing woodland will be stored separately and reused in the creation of the new area of woodland. The details of the final proposals in this area will be discussed and agreed with SWT.

Birds

Many of the fields around the route are used by bird species outwith the breeding season, especially greylag geese and wintering / passage waders. The alignment of the route will sever arable fields along Burnshot Road which are currently used by large numbers of wintering geese and waders. Geese prefer to feed in open areas and the fragmentation of fields may displace some of the geese from parts of the fields closer to the railway, or from the fields entirely. Given the amount of arable land in the wider area, and the size of some of the fields affected, these impacts are not considered to be significant.

Otters

Surveys have recorded signs of otters on both the Dolphington Burn. The works to the Dolphington Burn involve the extension of an existing bridge, the habitats along the burn will not be affected and no permanent impacts to otters are predicted. As the works involve changes to an existing structure it will not be possible to incorporate an otter ledge into the bridge.

1.10.4 Mitigation Measures

The findings of the baseline survey were used in an iterative way to help identify likely impacts of EARL on ecological resources. Based on the

findings, mitigation measures were developed to help avoid or reduce these impacts. Those specifically required to address impacts on the natural heritage resource within Kirkliston Community area are described below

- Habitat loss will be limited to the minimum needed for safe implementation of the works, and where work is occurring in sensitive habitats adjacent habitats will be taped off. This includes Pepper Wood, the River Almond, the Gogar Burn and the Newbridge to South Queensferry Cycleway.
- 0.8 ha of Pepper Wood SINC and SWT reserve will be lost to EARL. 1 ha of land has been identified to plant a 1 ha area of woodland to part mitigate for the loss of Pepper Wood. This will be undertaken following consultation with SWT, SNH and the Scottish Executive.
- The River Almond will be diverted for a period of 12 to 18 months. On completion of construction of the tunnel, the watercourse will be returned to its original course and new riparian habitat created along the banks.
- Specific diversion and restoration plans will be developed for the River Almond and Gogar Burn.
- Invasive alien species listed on Schedule 9, Part II of the Wildlife and Countryside Act 1981 and amendments will be removed from site and disposed of at a licensed site at the start of works following best practice guidance to ensure that they are not spread inadvertently along the route.
- Best site management practices during construction will be adopted to minimise the risk of secondary impacts to adjacent habitat (for example, incursions into adjacent habitat, pollution, draining of adjacent wet habitats). SUDS measures will be put into place where possible.
- Impacts on adjacent wetland habitats and watercourses will be avoided by appropriate design of site drainage. SUDS measures comprising a combination of filter drains, silt traps, silt screens, sediment mats and possibly settlement and retention ponds (depending on consultation with BAA, location and risk of increasing birdstrike) will be provided along the route.
- Check surveys for protected species will be undertaken along the route prior to work commencing. Any necessary mitigation measures that are required will be agreed with Scottish Executive Environment Group, Wildlife and Habitats Division (SEEGWHD - formally CANHU) and SNH. In addition, the works will comply with the requirements of relevant legislation.
- Wherever possible, habitat removal (particularly woodland and other trees) will take place outside the breeding bird season (approximately mid March to the end of July, although this can extend beyond July for some

species) to avoid effects on nesting birds. Where this is not possible, all habitats will be checked for nesting birds before removal. If any are identified, appropriate mitigation measures will be agreed with SNH and implemented.

- River crossings will be treated with care so that the river corridor is not compromised. Bridges will be designed to have sufficiently wide enough spans to allow animals' dry passage underneath.
- In-stream diversion works to the River Almond and Gogar Burn will be restricted to the period June to August inclusive to protect salmon migration, spawning, incubation and hatching periods. Where in-stream work is carried out, existing fish stocks will be protected by removing them to a place of safety, in agreement with the FSDFB, for the duration of the works.

In addition to the measures outlined above, a number of generic mitigation measures are proposed for protection of the natural heritage and are presented in *Chapter 11* of the ES.

1.10.5 Residual Impacts

In the short term, residual impacts to the River Almond are predicted to be moderate negative. However, in the longer term, given the time taken for watercourse restoration enhancement, constraints along some sections of the burn, and benefits provided by the restoration and removal of alien invasive species, impacts will be minor negative and positive, respectively.

With respect to Pepper Wood and the Newbridge to South Queensferry Cycleway, a moderate negative and minor negative impact will result, respectively, with the permanent loss of habitat from each off set by replacement planting.

With the exception of otters, all species of note affected by the scheme will experience no greater than minor negative impacts with otters experiencing negligible impacts over the longer term (from moderate over the shorter term), as restored habitats mature.

1.11 ARCHAEOLOGY AND CULTURAL HERITAGE

1.11.1 General Approach

The assessment of significance of impacts has taken into account the importance of the receptor and the magnitude of impact. The importance of archaeological and heritage resources has been assessed principally according to the criteria published in NPPG 5 and NPPG 18. The main thresholds of archaeological importance defined in NPPG 5 are National Importance, Regional and Local Importance, and Lesser Importance. The Memorandum

states that Category A Listed Buildings are of national or international importance, Category B buildings are of regional or more than local importance, and Category C(s) structures are of local importance. Historic Gardens and Designed Landscapes are considered to be nationally important.

1.11.2 *Temporary Construction Impacts*

Certain construction impacts may be temporary in nature and affect the settings of cultural heritage receptors. These direct impacts relate, for example, to visual intrusion (eg through the presence of construction works or the erection of temporary structures), dust, noise and vibration upon receptors in the immediate vicinity of the development works. The presence of construction compounds may also have temporary impacts upon the settings of local cultural heritage receptors.

The following receptors are most likely to experience such temporary construction impacts:

- Almondhill Steading (L9); and
- Carlowrie House (L33).

1.11.3 *Permanent Construction Impacts*

Dalmeny Chord

The remains of a concrete railway building recorded in 1993 as demolished (A36) will be removed during trackside works associated with the proposed alterations to the existing Dalmeny Chord. However, as this feature is of Lesser Importance, the high magnitude impact will lead to a minor and non-significant impact.

Area north of the Airport (including North West and North East Chords)

Ten undesignated sites will experience physical impacts as a result of the construction of EARL, of which four lie along the North West Chord, five along the North East Chord and one along the Central Chord. Only those which will experience significant impacts are detailed below.

The proposed relocation of a Transco gas plant will lead to disturbance of the site of a cottage present before the gas plant was erected (A71). However, this site was disturbed, if not destroyed, with the construction of the gas plant. The site of a former cottage and possible fermtoun named Puncheonlaw (A97) will be disturbed by the proposed realignment of Burnshot Road around Carlowrie Cottages. Linear cropmarks of unknown importance (A104) may be partly clipped by the route of the North West Chord, west of Wheatlands. The significance of impact cannot be established in these three cases (A71, A97, A104) due to insufficient baseline information about the condition and/or importance of the sites. Depending upon the nature of any archaeological

remains present at these sites, there is the potential for significant impacts to arise in two cases (A97, A104).

Construction works around Standingstone could disturb buried remains of either the former settlement (A92) or features associated with the cist burial discovered in the 19th century (A93). In neither case is it known if or where any such remains might survive, and thus it is not possible to predict either the magnitude or significance of any impact. Depending upon the nature of any archaeological remains present at these sites, there is the potential for significant impacts to arise.

Along the Central Chord a cut-and-cover tunnel will be constructed across the potential location of a Bronze Age cist cemetery discovered in the 19th century (A109). This site area lies within the proposed main EARL site compound, and also potentially within the area of the proposed temporary diversion route of the River Almond. It is not known if any physical remains of that site survive, or for certain if the previous discoveries were made within the scheme area, and hence the magnitude and significance of any impact cannot be predicted. However, any remains that do survive in the area are likely to be substantially disturbed by the scheme, which will lead to a significant impact occurring.

The construction of this section of EARL will have no significant impacts on the settings of cultural heritage receptors within this part of the baseline study corridor.

The construction of both EARL and housing within the strategic allocation area to the north of Kirkliston will give rise to a cumulative impact on the setting of Almondhill Steading (L9). The presence of additional housing around the steading will substantially close in the Listed Building within a suburban environment, and will be the main contributor to the cumulative impact. Depending upon its height and massing, future housing present between the steading and the North West Chord embankment to the north may reduce the visibility of EARL from the steading. At both locations there is potential for a cumulative loss of archaeological resources that extend into both scheme areas.

1.11.4 *Mitigation Measures*

The preferred mitigation strategy is to preserve *in situ* and in an appropriate setting all cultural heritage resources. Site-specific mitigation measures are defined to avoid, reduce or offset the potential impacts detailed above that could not be designed out.

The following archaeological mitigation measures will be undertaken in advance of the commencement of construction works.

- Photographic and standing building survey recording to RCAHMS, Historic Scotland and IFA standards ⁽¹⁾ will be undertaken of the structures and landscape features proposed for demolition / removal at Myre (B3), Ashley House Lodge (L45) and Castle Gogar designed landscape (D3), as well as the railway bridge at Standingstone (B21) and the pillbox at Edinburgh Airport (A120).
- An appropriate topographic and photographic survey record will be made of the Priestinch tramway (A5) and the quarry, ditches and bank present within woodland near Carlowrie (A100).
- Examination as part of the field evaluation of those parts of the archaeological sites that lie within the LOD and LLAU and that will be disturbed by the construction of EARL. They potentially include Almondhill, field boundary (A72), Dalmeny Rows (A88), Standingstone possible settlement (A92), Standingstone, site of cist (A93), site of Puncheonlaw (A97), Wheatlands, linear cropmarks (A104), Wheatlands, probable site of cist burials (A109), Castle Gogar, hearth (A123), Gogar Stone settlement (A133), Roddinglaw enclosures (A134), East Mains of Ingliston, putative pit alignments (A143), and Castle Gogar designed landscape (D3). The vicinity of Easter Norton standing stone (S6) will also be evaluated, but the archaeological works will be outside the scheduled area of the monument, and thus do not require a statutory consent.

In addition to the measures outlined above, a number of generic mitigation measures are proposed for protection of the natural heritage and are presented in *Chapter 12* of the ES.

1.11.5 *Residual Impacts*

The proposed screen planting along the south side of the North West Chord embankment to the north of Almondhill Steading (L9) will reduce the visual impact of the scheme on the setting of that Listed Building. In the long term, once vegetation has matured, the magnitude of impact may reduce to imperceptible and the significance of impact may decrease to negligible and remain non-significant.

Elsewhere, the undertaking of a comprehensive programme of archaeological mitigation works will provide a full record of all other significant archaeological features present within the scheme areas that cannot be preserved *in situ*. This will partly offset the impact of the scheme upon archaeological resources, and positive impacts may arise through increased knowledge about the past occupation of the Almond Valley. It is not possible to be specific about the significance of residual impact, since baseline conditions do not allow the collective magnitude of physical loss and sensitivity of archaeological features to be predicted. However, it is

(1) Institute of Field Archaeologists (2001) **Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures.**

considered that taking into account mitigation, the cumulative residual impact of the scheme on unscheduled buried archaeology will not be significant.

1.12 *LANDSCAPE AND VISUAL IMPACTS*

1.12.1 *Methodology*

The assessment reported in the EARL ES was prepared and conducted in accordance with good practice, as described in the *Guidelines for Landscape and Visual Impact Assessment* produced jointly by the Landscape Institute and the Institute of Environmental Management and Assessment ⁽¹⁾. This methodology is applicable to the assessment of short-term impacts during the construction of the scheme, and to long-term impacts during its operation.

The key steps in the methodology were as follows:

- to describe the landscape character areas and types present in the area;
- to identify significant landscape features that may be affected by the project;
- to identify key viewpoints and viewers likely to be affected by the project;
- to predict the effect of the project on landscape resources and character and on visual amenity;
- to evaluate the significance of these impacts; and
- to identify measures that will be taken to mitigate significant adverse impacts.

For a full account of the detailed methodology and significance criteria used in this assessment refer to *Chapter 13* of the ES.

1.12.2 *Temporary Impacts*

There are three main landscape character areas within the Kirkliston Community area, namely, Kirkliston Rolling Arable Farmland, Kirkliston Settlement and River Almond and Flat Arable Farmland. Within each of these areas are located a number of potentially sensitive visual receptors.

Construction activities, and the following key landscape and visual impacts will have a temporary negative impact on the landscape in all character areas which will be direct in areas which are physically affected by the works, and indirect in areas which lie outwith, but close to the works corridor:

- removal of vegetation for access, construction and work areas;
- soil stripping and storage;
- installation of contractors' compound(s) and site office(s);
- temporary traffic and pedestrian management arrangements;
- temporary road closures and diversions, including the temporary diversion of the A8, B800 and Standingstone Road;

(1) Countryside Agency and Scottish Natural Heritage (2002) *Landscape Character Assessment: Guidance for England and Scotland*.

- temporary footpath, cycleway and Right of Way closures and diversions;
- temporary diversion of the River Almond;
- installation and movement of construction machinery;
- construction traffic movements into and away from the area;
- construction of a ventilation tower and emergency access points north of River Almond;
- views of site operations and construction plant;
- HGV and special load movement and storage;
- cranes;
- cut and fill construction methods;
- construction lighting; and
- storage of materials and spoil.

In particular, extensive cut and fill operations, the temporary diversion of the B800 and Standingstone Road and tree loss will occur within the Kirkliston Rolling Arable Farmland character area. The temporary diversion of the River Almond, extensive cut operations and construction compound installation will be the most significant temporary impacts within the River Almond and Flat Arable Farmland character area.

Residents, as the most sensitive visual receptors, will experience the most significant impacts: views of construction and vehicle activities, work compounds, night-time and security lighting etc will create a degree of increased disruption to those residents in close proximity to EARL during construction.

Of particular note are the following receptors that will experience moderate to substantial significant negative visual impacts during construction:

- residents at Carlowrie Cottages;
- 1 and 1a Burnshot Road;
- Standingstone Cottage;
- Carlowrie;
- Wheatlands;
- Kirkliston; and
- Almondhill and Almondhill Cottages.

1.12.3

Permanent Impacts

Kirkliston Settlement

No significant impacts are anticipated upon the Kirkliston Settlement character area. The most significant visual impacts in this character area will be upon residential receptors to the north of Kirkliston. Views are currently open northwards toward the existing Dalmeny Chord rail line and embankment. EARL will not substantially alter this view, as new rail infrastructure and embankments will be constructed in front of the existing embankment, however, the rail infrastructure across this area will appear

closer to the viewer and the increased frequency of trains using this line will increase the visual dominance of the Dalmeny Chord to visual receptors along the edge of Kirkliston. Overall the significance of the impact to visual receptors is *moderate negative*.

Kirkliston Rolling Arable Farmland

The proposed scheme includes the construction of new rail infrastructure including cuttings and embankments both east to west and north to south across the character area, resulting in a degree of fragmentation and severance within the landscape. A new bridge will be constructed over the B800 and the carriageway will be lowered in height to achieve the necessary head clearance under this structure. A new field access track eastwards from the B800 will be constructed to the north of EARL as the proposed rail line will sever the original route. An additional track from the B800 will be constructed along the toe of the rail embankment westwards and minor alterations will also be required to the access track eastwards towards Almondhill Steading.

Standingstone Road, Burnshot Road, and Wheatlands Road will be diverted as will the Newbridge to South Queensferry Cycleway, with the loss of mature vegetation along this route and the partial loss of Pepper Wood (SINC). Road diversions will be particularly significant adjacent to the B800 and Standingstone Cottage. A temporary diversion is to be constructed to the west of the B800 (including a temporary bridge under the Dalmeny Chord), whilst the B800 is lowered. A temporary road diversion will also be constructed to the east of Standingstone Cottage whilst construction commences to the west. Following completion of the works, land required for both diversions will be restored to its former use.

Overall impacts within the Kirkliston Rolling Arable Farmland character area are considered to be of *moderate to substantial* negative significance.

Within this character area the most significant visual impacts will be on residents of Carlowrie Cottages, Almondhill Steading and Cottages and Standingstone Cottage with the overall the significance of the impact predicted to be *moderate to substantial negative*.

River Almond and Flat Arable Farmland

EARL includes the construction of new rail infrastructure, predominantly in cuttings and tunnels. It also requires the construction of two new tunnel portals and the construction of ventilation shafts and an emergency access tower north of the River Almond, 5-8m in height. Wheatlands Road will also be diverted. The River Almond will be temporarily diverted in order to permit construction of the underground tunnelled section of the scheme. This will be returned to its original alignment following completion of these works.

Overall impacts within the River Almond and Flat Arable Farmland character area assessed as being of *moderate to substantial* negative significance.

The most significant visual impacts in this character area will be upon residential receptors at Wheatlands who currently have unrestricted views east and west across arable farmland, to the north up to Pepper Wood and to the south over the River Almond to the airport. With the exception of Wheatlands which is likely to experience an impact of *substantial negative* significance, the significance of impacts on most receptors in this area will be *slight to moderate*.

1.12.4 *Mitigation Measures*

The following mitigation measures will be adopted throughout the construction phase to minimise landscape and visual disruption and will be included within the CoCP, temporary planting will be agreed and implemented before works commence on site (or at the earliest appropriate opportunity).

- Unnecessary tree and vegetation removal will be avoided, particularly at Pepper Wood, along the Newbridge to South Queensferry Cycleway, Winchburgh and to hedgerow trees between the A8 and Roddinglaw and to the south of Ashley Lodge.
- All existing trees to be retained will be protected prior to the commencement of construction in accordance with the draft CoCP and BS5837: 1991 Guide for Trees in Relation to Construction. In particular tree protection will be required around trees to be retained in Pepper Wood, to the woodland copse to the east of the B800, mature trees to the east of Carlowrie House and to the South of Kellerstain.
- Large compound areas will be enclosed within a seeded topsoil and/or subsoil bund. This will be positioned to the north, east and western boundaries of the proposed compound adjacent to Wheatlands, to the south of Myreside in the proposed Winchburgh compound and to the south west of Castle Gogar in the Gogar Mains compound.
- Lighting of compounds and works sites will be restricted to agreed working hours and those which are necessary for security, specifically in the compounds adjacent to Wheatlands, to the west of Gogar Stone, adjacent to the airport, either side of Roddinglaw Road to the north of Roddinglaw bridge, to the east of Gogar Mains Road, adjacent to Burnshot Road, to the south of Myreside and to the north of Kirkliston Junction, north of Kirkliston.
- All materials and machinery will be stored tidily during the works in order to minimise impacts on views, specifically within the compound sites adjacent to Wheatlands, to the west of Gogar Stone, adjacent to the airport, either side of Roddinglaw Road to the north of Roddinglaw bridge, to the east of Gogar Mains Road, adjacent to Burnshot Road and to the south of Myreside.

All planting proposed as long term mitigation for the scheme will be implemented prior to the commissioning of EARL and will be managed and maintained in accordance with a Landscape Management Plan. Generic landscape mitigation measures are set out in the ES along with a graphical illustration in a series of schematic landscape plans of the area. In particular, this includes:

- To the north of Almondhill Steading in order to screen the new rail embankment, by infilling the triangle of land created between the existing (now redundant) access track and the new diverted access track. Woodland will match the scale and species of the existing woodland copse adjacent the B800 rail bridge.
- A triangular shaped area of land immediately to the north of Pepper Wood will be planted as replacement woodland to mitigate against the partial loss of Pepper Wood. New woodland planting will be tied into the remnants of Pepper Wood and the vegetated slopes of the Newbridge to South Queensferry Cycleway. The woodland structure will be further extended into the triangle of land left over immediately to the east of the listed bridge over Burnshot Road, between the redundant Burnshot Road and the new road diversion to the north.
- New woodland will be planted along the North West Chord to mitigate against the loss of vegetation along the line of the former Newbridge to South Queensferry Cycleway. Woodland planting will be created in between the proposed Newbridge to South Queensferry Cycleway and EARL to the west and between EARL and the diverted Standingstone Road to the east. The rail cuttings along this route will be planted with native shrub species in accordance with guidance on landscape works produced by Network Rail.
- New woodland will be planted in between the former Wheatlands Road alignment (left redundant) and EARL, in particular around the North West Chord portal area. This will screen EARL from Wheatlands and help integrate the scheme into the existing landscape in this area.

In addition, the following locations are to have new hedgerow planting:

- both sides of the North West Chord to reduce the impact of EARL as it crosses fields between Wheatlands and Kirkliston;
- both sides of the diverted Burnshot Road; and
- both sides of the diverted Wheatlands Road, in particular to minimise views east towards the Central Junction Area.

Finally, proposed embankments will be effectively married into the existing landscape using smooth and flowing contours, and gentle concave and convex

slopes to mimic the natural slopes in the area, specifically at the following locations:

- the western side of the Wheatlands Road diversion;
- the northern side of the grade separated junction;
- the western side of the proposed Newbridge to South Queensferry Cycleway realignment; and
- both sides of the proposed Burnshot Road diversion.

In addition to the measures outlined above, a number of generic mitigation measures are proposed for protection of the natural heritage and are presented in *Chapter 13* of the ES.

1.12.5 *Summary of Residual Impacts*

Assuming that the mitigation measures set out in the ES are implemented, resultant residual effects of specific direct impacts to the Landscape Character Areas and visual receptors identified will still remain, in three forms, namely, residual construction impacts, residual operational impacts to landscape character and residual operational impacts of EARL on visual receptors, as follows.

Kirkliston Rolling Arable Farmland

Residual impacts due to construction may arise as a result of the restoration of work sites to the south of Burnshot Road, land to the north of the North West Chord and to the east of the North East Chord. Residual impacts on the landscape character and resources will result from the construction of 5 km of rail line in a cutting across arable farmland and the raising of the North West Chord to meet the existing Dalmeny Chord. New bridges will be built at road crossings and a number of minor roads and the Newbridge to South Queensferry Cycleway will be permanently diverted.

Residual impacts on views include effects on views towards new rail infrastructure. Receptors which will be most affected include those at Almondhill Steading and Cottages, Carlowrie Cottages, 1-1a Burnshot Road and Standingstone Cottage, Carlowrie Farm, Carlowrie Farm Cottages, Kirkliston House, Craigbrae Farm and Cottages. Although views of rail infrastructure will generally be considered negative, the planting of new hedgerows, trees and woodland will make a positive contribution to the character of the area.

Following the mitigation the significance of impacts is considered to be *moderate negative*.

Kirkliston Settlement

There will be no residual impacts resulting from construction or impacts on the landscape within this character area. Residual impacts on views include views to rail infrastructure. Receptors which will be most affected include the many residents to the north of Kirkliston. Following the implementation of the mitigation the significance of impacts is considered to be *slight negative*.

River Almond and Flat Arable Farmland

Residual impacts due to construction may arise due to the restoration of a work site to the south of Wheatlands and land to the east of the existing Wheatlands Road, to the north and south of the temporary River Almond diversion, and to the south of the North West Chord. Residual impacts on the landscape character and resources will result from the construction of rail infrastructure around the Central Airport Junction, including cuttings tunnel entrances, security fencing, ventilation shafts and emergency access points, and from the partial loss of Pepper Wood (SINC). The receptors which will be most affected reside at Wheatlands and Carlowrie. Although views of rail infrastructure will generally be negative, the planting of new hedgerows, trees, riparian planting and woodland will make a positive contribution to the character of the area.

Following the implementation of the mitigation the significance of impacts is considered to be *moderate negative*.

1.13

SUMMARY

Table 4, below, contains a summary of all the significant residual impacts associated with the proposed construction and operation of EARL affecting the area covered by Kirkliston Community Council.

Summary Table: Significant Residual Impacts

Impact	Mitigation	Significant Residual Impacts
LAND USE		
<p><i>Major Negative</i> A number of areas, particularly farmland, will be severed by the proposed route.</p>	<ul style="list-style-type: none"> Access points will be created to all areas of land severed. SASA will be provided with a field access bridge over EARL. Landlocked parcels of land will be incorporated into the detailed design of EARL. 	<p><i>Moderate to Major Negative</i> Although access will be possible the farming of this land is likely to become less efficient.</p>
<p><i>Major Negative</i> A number of public roads will be required to be diverted; some of which will be significantly longer in length.</p>	<ul style="list-style-type: none"> Road diversions will be in place before roads are closed to minimise severance impacts. Temporary road closures and diversions will be minimised, in number and duration, wherever possible. 	<p><i>Moderate Negative</i> Longer journey times. There will, however, be safety improvements to some of the diverted roads.</p>
<p><i>Major Negative</i> A number of public Rights of Way, footpaths/cycleways and private access routes will need to be diverted.</p>	<ul style="list-style-type: none"> All footpaths/cycleways and private access routes that require diverting will be realigned and re-provided. No route will be permanently severed or discontinued. Temporary closures will be minimised. 	<p><i>Moderate Negative</i> For the most part routes will follow a similar alignment as the original however there are a few notable exceptions, namely Roddinglaw Road and the Newbridge to South Queensferry Cycleway which will be longer and steeper respectively than their current alignment.</p>
TRAFFIC & TRANSPORT		
<p>Short term: <i>Significant Negative</i> Journey time increases for pedestrians of access track between B8020 and Union Canal at Myreside and also footpath over Boathouse Bridge and adjacent to south Bank of River Almond.</p>	<ul style="list-style-type: none"> None 	<p>Short term: <i>Significant Negative</i> Journey time increases.</p>
<p>Long term: <i>Significant Positive</i> Permanent benefit to users of Burnshot Road from reduced traffic flow.</p>	<ul style="list-style-type: none"> N/A 	<p>Long term: <i>Significant Positive</i> Reduced traffic flow.</p>
<p>Long term: <i>Significant Positive</i> Permanent benefit to users of A8000 from reduced traffic flow.</p>	<ul style="list-style-type: none"> N/A 	<p>Long term: <i>Significant Positive</i> Reduced traffic flow.</p>

Impact	Mitigation	Significant Residual Impacts
Long term: <i>Significant Negative</i> Lengthened travelling time for all users due to realignment of Burnshot Road.	<ul style="list-style-type: none"> None 	Long term: <i>Significant Negative</i> Lengthened travelling time for all users.
Long term: <i>Significant Positive</i> Improved road traffic safety on all realigned roads.	<ul style="list-style-type: none"> N/A 	Long term: <i>Significant Positive</i> Improved road traffic safety.
Long term: <i>Significant Positive</i> Improved options of public transport to and from the airport.	<ul style="list-style-type: none"> N/A 	Long term: <i>Significant Positive</i> Improved options of public transport to and from the airport.

NOISE AND VIBRATION

Short term: <i>Negative</i> 23 receptors overall may experience construction noise impacts. 3 properties within the Kirkliston Community Council area may experience residual impacts.	<ul style="list-style-type: none"> Measures will be developed within the CoCP and the construction method details (good site practices etc). 	Short term: <i>Negative</i> 7 receptors may continue to experience construction noise impacts.
Short term: <i>Negative</i> Construction road traffic noise and vibration. Long term: <i>Negative</i> Operational noise and vibration: Overall, 10 representative receptors potentially affected. 2 properties within the Kirkliston Community Council area may experience residual impacts.	<ul style="list-style-type: none"> Measures will be developed within the CoCP and the construction method details (good site practices etc). Potential operating measures will be developed at the detailed design stage. 	Short term: <i>Negative</i> Up to 3 years next to major site compounds. Long term: <i>Negative</i> Possible horn noise anticipated at R38, Wheatlands.

AIR QUALITY

No Significant (ie *Moderate* or above) *Negative* or *Positive* residual impacts have been identified with regard to Air Quality.

GROUND QUALITY AND WASTE

Impact	Mitigation	Significant Residual Impacts
<p><i>Moderate to Major Negative</i></p> <p>The removal of 1,561,532 m³ of material during the construction phase will impact the site and areas outwith the site in terms of geological setting, drainage, potential for pollution of underlying sediments and groundwaters, noise and traffic movements during construction and in the loss of landfill capacity in the surrounding area.</p> <p>Localised impacts to the Kirkliston Community Council area, but overall water balance of the site predicted to remain static.</p>	<ul style="list-style-type: none"> From a geological perspective, limited mitigation is available. The structural quality of the material to be removed makes the majority unsuitable for reuse in other areas or projects. Material will be reused wherever possible. 	<p><i>Moderate to Major Negative</i></p> <p>The residual impact is significant due to the inability to mitigate the potential impacts because of material quality constraints.</p>

THE WATER ENVIRONMENT

<p><i>Major Negative</i></p> <p>Impacts to aquatic and bank side flora and fauna during construction.</p>	<ul style="list-style-type: none"> Reinstatement of habitats along the route. Specific restoration plans will be developed. Measures to prevent the entry and mobilisation of, and to attenuate pollutants including sediments and dusts. Measures to protect fish and other fauna during the diversion periods. Removal of alien species. Designing the diversions to recreate natural conditions (the River Almond) and to reinstate natural meanders, berms and riffles where appropriate (the Gogar Burn). All works to be conducted in accordance with SEPA guidance, current regulations and local plans. 	<p>Short term: <i>Moderate Negative</i></p> <p>Long term: <i>Minor Positive and Negative</i></p> <p>There is the potential for long term positive and negative impacts to both watercourses. There is the potential, particularly, for long term improvements along the Gogar Burn.</p>
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Impact	Mitigation	Significant Residual Impacts
<i>Major Negative</i> Impacts to watercourse flow.	<ul style="list-style-type: none"> • Diversions will be designed so as to maintain or improve current flows (ie in the case of the Gogar Burn, the new channels will aim to restore natural flows). 	<p>Short term: <i>Moderate to Major Negative</i></p> <p>Short term impacts to the River Almond and Gogar Burn will be moderate to major due to the nature of the works.</p> <p>No long term residual impacts to the River Almond. Potential for positive impacts to the flow of the Gogar Burn.</p>
ECOLOGY		
<i>Major Negative</i> River Almond diversion.	<ul style="list-style-type: none"> • A detailed method statement, diversion, restoration and emergency response plans will be provided for the construction works and diversion. These will minimise potential impacts, inform the Appropriate Assessment and ensure river protection as the river runs into the Firth of Forth SPA. 	<p>Short term: <i>Moderate Negative</i> Long term: <i>Minor Positive</i> and <i>Negative</i></p> <p><i>Minor negative</i> and <i>positive</i> impacts due to the time taken for watercourse restoration along the original alignment and benefits provided by the restoration and removal of alien invasive species.</p>
<i>Major Negative</i> Loss of Pepper Wood, 0.8 ha of the woodland will be permanently lost to accommodate the track	<ul style="list-style-type: none"> • Minimise land take during construction and fence off adjacent habitats to prevent incursion. • Retain soil and seedbank. • 1 ha of replacement woodland planting adjacent to existing woodland. 	<p><i>Moderate Negative</i> A larger area of woodland will be created.</p>
<i>Major Negative</i> Disturbance to otters, including loss of foraging habitat and restricted access along burn corridor during construction.	<ul style="list-style-type: none"> • Mitigation strategy to be developed in consultation with SNH and City of Edinburgh Council Biodiversity Officer. • Removal of restriction on completion of the works. • Restoration of habitat, where possible on completion of the works. 	<p>Short term: <i>Moderate Negative</i> Long Term: <i>Negligible</i></p>
ARCHAEOLOGY		
Probably significant at scheme-wide level (indefinable) Physical disturbance of archaeological sites	<ul style="list-style-type: none"> • Archaeological excavation and recording. 	<p>Likely non-significant and partly compensated by excavation and recording Sites removed in whole or in part</p>

Impact	Mitigation	Significant Residual Impacts
LANDSCAPE AND VISUAL		
<i>Kirkliston Rolling Arable Farmland</i>		
<p><i>Moderate to Substantial Negative</i></p> <p>The overall significance of impacts is due to the following.</p> <ul style="list-style-type: none"> • Construction of new rail infrastructure, cuttings, embankments and bridges. • Diversion of Standingstone Road, Burnshot Road, Wheatlands Road and the Newbridge to South Queensferry Cycleway. • The loss of mature vegetation. • Change in views to receptors at Almondhill Steading and Cottages, Carlowrie Cottages, 1-1a Burnshot Road, Standingstone Cottage Carlowrie Farm, Carlowrie Farm Cottages, Kirkliston House, Craigbrae Farm and Cottages. 	<ul style="list-style-type: none"> • New woodland planting along the former Newbridge to South Queensferry Cycleway, north of Almondhill and Pepper Wood. • Hedgerow planting either side of the alignment and road diversions and localised earthworks to reduce the impact of engineered slope profiles. 	<p><i>Moderate Negative</i></p> <p>Significance on landscape character and resources.</p>
<i>River Almond and Flat Arable Farmland</i>		
<p><i>Moderate to Substantial Negative.</i></p> <p>The overall significance of impacts is due to the following.</p> <ul style="list-style-type: none"> • The construction of new rail infrastructure • Two tunnel portals adjacent to Wheatlands and ventilation shafts • Wheatlands Road diversion • Loss of mature vegetation including a portion of Pepper Wood (SINC) and bank side vegetation along the River Almond • Changes to views from Wheatlands 	<ul style="list-style-type: none"> • New woodland planting, around the portals and to the north of Pepper Wood. • Hedgerow planting either side of the alignment and road diversion and localised earthworks to reduce the impact of engineered slope profiles. 	<p><i>Moderate Negative</i></p> <p>Significance on landscape character and resources.</p>
* <i>Wheatlands Farm and Adjacent Residential Properties (receptors)</i>		
<p><i>Substantial Negative</i></p> <p>The overall significance of impacts is due to the</p>	<ul style="list-style-type: none"> • Consultations with receptors relating to proposed planting. • In respect to Wheatlands House - topsoil bunds along western and 	<p><i>Moderate Negative</i></p> <p>Significance on receptor.</p>

Impact	Mitigation	Significant Residual Impacts
<p>following.</p> <ul style="list-style-type: none"> • Immediate/close views towards the main worksite, compound area and associated works including diversion of the River Almond and tunnelling works to the south. • Views to the west of excavations, construction activities, machinery and HGV movements. • Permanent view to a ventilation tower north of the River Almond. • Loss of planting along the River Almond to the east and a portion of Pepper Wood to the north east. • Tunnel portals and cuttings of the North East and North West Chords visible. • Direct views along cuttings. 	<p>northern boundaries of the construction site to be planted with fast growing native tree and shrub species (10 m gap between bunds and edge of property).</p> <ul style="list-style-type: none"> • New woodland planting and hedge planting to the west to screen views. 	
<p><i>Kirkliston Settlement</i></p> <p><i>Moderate to Substantial Negative</i></p> <p>The overall significance of impacts is due to the following.</p> <ul style="list-style-type: none"> • There will be no long term landscape impacts on this character area • Visual impacts will result from new rail infrastructure, embankments and bridges • Changes to views as experienced by residents along the northern edge of Kirkliston. 	<ul style="list-style-type: none"> • New woodland and hedgerow planting 	<p><i>Slight Negative</i></p> <p>significance on landscape character and resources</p>