Infrastructure Projects

Northern Programmes

Network Rail (Huddersfield to Westtown (Dewsbury) Improvements) Order

Environmental Statement

Volume 1: Non-Technical Summary

Network Rail

March 2021

Contents

1. INTRODUCTION

Background

1.1.1 This Non-Technical Summary (NTS) provides an overview of the main findings of the Environmental Statement (ES), which has been prepared on behalf of Network Rail Infrastructure Limited (Network Rail) to support a planning application under the Transport and Works Act 1992.

1.1.2 The application is being made to authorise works to a section of the existing Transpennine Route railway between Huddersfield and Westtown (Dewsbury), known as the Network Rail (Huddersfield to Westtown (Dewsbury) Improvements) Order (the Order), and referred to in this document as 'the Scheme'.

1.1.3 An Environmental Impact Assessment (EIA) has been carried out to understand the potential effects that the Scheme could have on the environment as a result of the construction, operation and maintenance of the Scheme. The results of the EIA process undertaken for the works contained within the Order are reported in the Environmental Statement (ES) and are summarised in this Non-Technical Summary (NTS).

Scheme overview

1.1.4 The Scheme is located within the administrative bounds of Kirklees Council and extends for a distance of 14 kilometres (km).

1.1.5 The proposed works for the Scheme include:

- Four tracking and upgrading of the existing railway line including track realignment (currently the majority of the railway in the Scheme area has two tracks);
- Electrification of the line;
- Increase in line speeds;
- Provision of sections of new railway;
- Provision of new flyover within the Ravensthorpe area;
- Remodelling of stations including platform extension works at Deighton, Mirfield and Huddersfield; and
- Provision of replacement station at Ravensthorpe.

1.1.6 As well as the works identified above, various other engineering works are necessary including strengthening and replacement of bridges (rail and road); electrification of the railway line will require a number of bridges to be raised or demolished and rebuilt due to the height of the overhead equipment needed to power the trains.

1.1.7 There is a need to build a number of electricity sub-stations and other similar equipment along the Scheme to power the railway (electrification, signalling, lighting, stations).

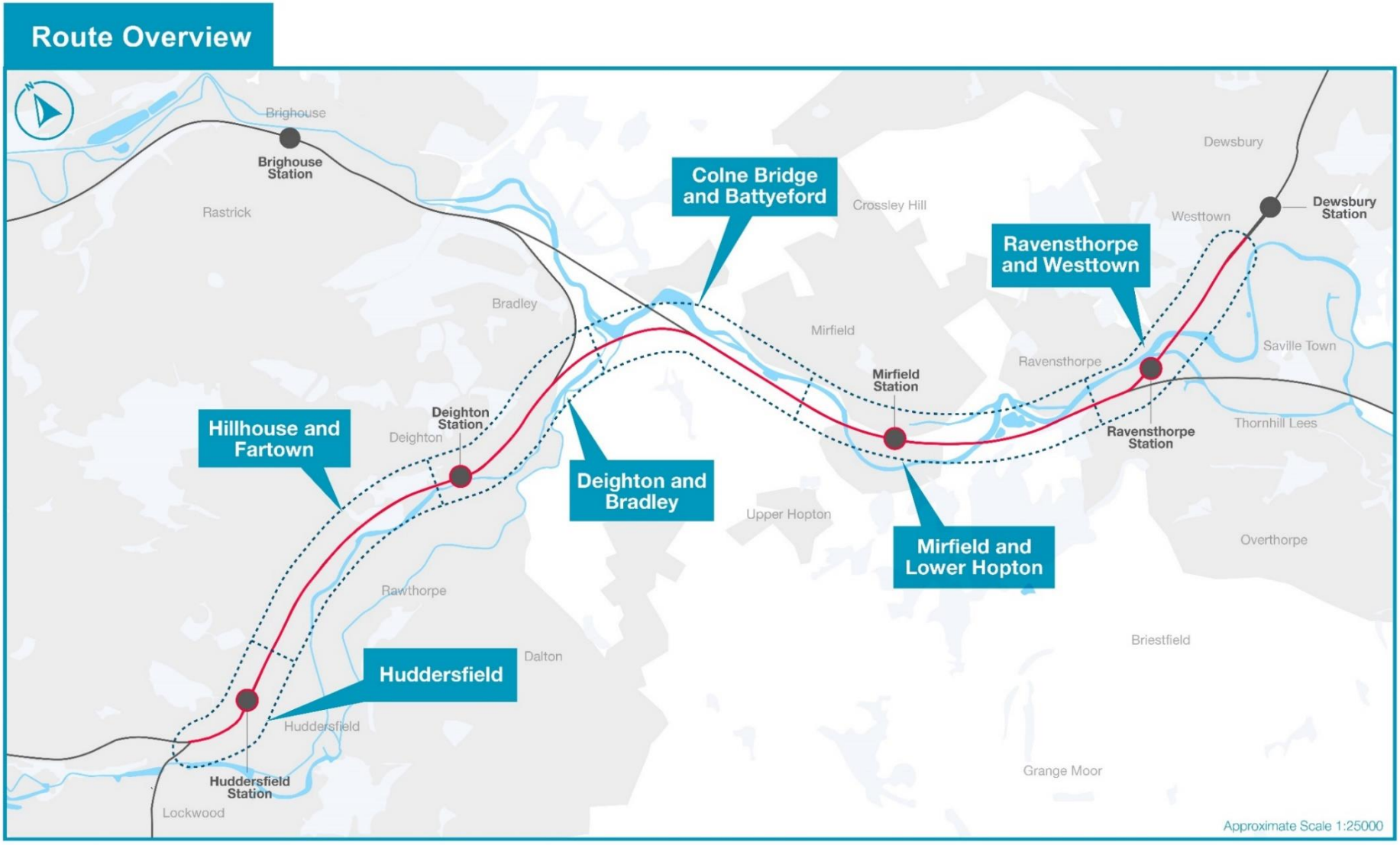
1.1.8 The footprint of the Scheme includes the physical extent of the permanent works including maintenance rights, together with land required temporarily to construct the works. This area is referred to as the "Scheme area" and is delineated by the planning application boundary, which is referred to as "the Scheme boundary".

1.1.9 For the purposes of engineering and construction, the Scheme has been split into six Route Sections as set out below and presented indicatively on Insert 1-1.

- Route Section 1 – Huddersfield;
- Route Section 2 – Hillhouse and Fartown;
- Route Section 3 – Deighton and Bradley;
- Route Section 4 – Colne Bridge and Battyeford;
- Route Section 5 – Mirfield and Lower Hopton; and
- Route Section 6 – Ravensthorpe and Westtown.

1.1.10 This sectional split is carried through to the reporting in the ES. However, for a number of environmental topics, the assessments have only been undertaken at a Scheme-wide level and reported in Volume 2i of the ES. These include:

- Waste and material;
- Traffic and transport;
- Climate vulnerability;
- Effects on climate;
- Electromagnetic interference;
- Agriculture;
- Public open space; and
- Socio-economics.



Insert 1-1 Scheme Overview

2. NEED FOR THE SCHEME

Existing operational railway

2.1.1 The Transpennine Route operates over 122km and is the main rail artery across the North of England linking York with Manchester, via Huddersfield and Leeds. As well as linking city centres, the route also joins these centres to actual and potential commuting areas and key sites, such as Manchester Airport and university and research centres (York, Huddersfield). The route also serves a vital economic function as a freight corridor across the North.

2.1.2 The route has not seen significant infrastructure investment for many years, and key sections had capacity reduced from four tracks to two tracks between the 1960s and 1980s, in response to falling demand. In the last 25 years, demand trends have reversed which has seen passenger journeys doubling to 50 million per annum. Train services have increased in response, but the line is at capacity, with journeys unreliable, crowded and slow.

2.1.3 Reliability and punctuality of passenger trains along the route is very poor. This is primarily due to the constrained TRU infrastructure not currently allowing for fast trains to pass slower ones to make up time, meaning delays can be exacerbated, or at best, not improved.

2.1.4 Peak crowding on the Transpennine Route has been excessive and is exacerbated by the reliability problem. For example, late or cancelled trains lead to more passengers transferring to other services, making overcrowding worse. Although new, longer trains are helping to reduce peak-time overcrowding on the trains that run now, there is no room for additional passenger or freight services to serve a growing economy, and journeys are relatively slow for the distances involved (less than 60 miles per hour (mph) on average for the fastest trains).

Scheme benefits

2.1.5 The Scheme is part of a wider programme of works known as the Transpennine Route Upgrade (TRU) Programme which aims to create a more reliable railway between Manchester, Huddersfield, Leeds and York which provides greater benefits for passengers.

2.1.6 The Scheme is identified as being critical to addressing the constraints in capacity, reliability, and journey times for this section of the TRU Programme. The Scheme is also recognised in providing critical support for the wider TRU Programme to address these constraints and improving connectivity through the region.

2.1.7 Improvements to the railway stations and railway infrastructure, in conjunction with the wider TRU Programme, would improve the passenger experience, reduce journey times and the platform extensions would have the potential to allow a greater number and longer trains that could tackle overcrowding issues.

2.1.8 The TRU programme aims to deliver a target journey time for Leeds to Manchester Victoria of 43 to 44 minutes and a target journey time for York to Manchester Victoria of 67 to 69 minutes.

2.1.9 The Scheme will provide four fully accessible stations (Huddersfield, Deighton, Mirfield and Ravensthorpe), with improved accessibility, including step-free access, drop-off arrangements, and blue badge parking available.

2.1.10 The Scheme will also provide sustainability benefits because this section of the railway will be electrified. The electrification of the route between Huddersfield and Westtown (Dewsbury) and the use of electric trains over diesel trains, would result in less emissions and a beneficial impact on local air quality.

Alternatives

2.1.11 An important part of the EIA process is to consider the 'alternatives' to the Scheme.

2.1.12 Significant work has been undertaken to date relating to consideration of a wide range of options in order to determine the most appropriate to fulfil the purpose of the Scheme.

2.1.13 The approach below sets out the process that has been followed to identify alternatives to the Scheme:

- Do nothing – a consideration of the effects if the environmental baseline would remain unchanged and the Scheme is not delivered;
- High level strategic alternatives to the Scheme – a consideration of the non-rail options to the transport improvements in the region; and
- Local design alternatives – a consideration of the options for detailed aspects of Scheme.

The 'do nothing' alternative

2.1.14 The EIA process requires the consideration of the 'do nothing' scenario, i.e. what would occur if the Scheme did not go ahead. Under the 'do nothing' scenario there would be no

physical changes to the environment, whether positive or negative.

2.1.15 Given the government-wide target to achieve net-zero carbon emissions by 2050 and the priority of decarbonising transport to improve air quality, health and take urgent action on climate change, the TRU Programme is seen as a key opportunity to decarbonise the Manchester-York route. All rail travel is responsible for only 0.6% of total UK emissions, however electrification is identified as one of the primary ways in which the rail industry can contribute to the 2050 net-zero carbon emissions target, by removing diesel-only passenger trains on strategic main routes. The Scheme will be undertaken in accordance with Network Rail's strategy for reduced net-zero carbon emissions which supports the government-wide target.

2.1.16 The rail industry has been responding to current problems referred to above through a range of initiatives, especially to reduce crowding and improve passenger experience, and investing in new bi-modal trains, which are able to use the electrified lines.

2.1.17 The key benefit of this investment is a significant increase in seating capacity, with the typical train lengthened from 3 to 5 cars, and those cars having a higher seating density.

2.1.18 The 'do nothing' alternative does not enable the Scheme to deliver on the required capacity or journey time improvement.

Local design alternatives

2.1.19 The Scheme has considered a number of engineering alternatives.

2.1.20 The main options considered include:

- Design of Huddersfield Station – modification of the platform arrangement at Huddersfield Station is required to increase from three to four through platforms to accommodate the Scheme. Three principal options were explored to achieve this platform arrangement, with each having different implications for the structures within the Station. The preferred solution included the retention of the tea rooms (albeit with a slight relocation), relocation of the existing stair and lift, modification of the existing train shed, removing two roof bays from the Manchester end of the platform and the smaller train shed, and new coverage (canopies/roof structure) will be required to some of the extended platform areas;
- Secondary means of access to Huddersfield Station – two options were considered for a second means of access to the proposed island platforms, a subway or a footbridge. A new footbridge was deemed to be the preferred option. The design of the footbridge has been developed to respond to the significance and setting of the Grade I listed station;

- Grade separated junction – Two options were considered for the location of a grade separated junction, either at Heaton Lodge or Ravensthorpe. The preferred solution is to implement a grade separated junction at Ravensthorpe which offered the opportunity to use a brown field site, gain wider railway operational benefits and had a lesser environmental impact;
- A62 Leeds Road Overbridge – early in the design, options were considered which would avoid reconstruction of the bridge. These options were discounted due to engineering complexity and impact to third party landowners. Therefore, reconstruction of the bridge focused on three options; rebuild online, rebuild offline and re-build half-offline. The preferred solution was to rebuild half-offline to minimise disruption to the highway network as far as possible;
- Deighton Station – two location options were considered for Deighton Station; one was to relocate to the west further along Birkby Bradley Greenway, and the second option was to retain in its existing location with platforms shifted to the west. The preferred solution was to retain the existing location of the station, as it has less impact on the open space land surrounding the greenway including the vegetation in this area. The alternative site would result in a station in a more remote location which would likely make it less attractive to passengers (particularly lone passengers) and therefore the preferred option avoids this;
- Ravensthorpe Junction – Two forms of grade separated junction were considered at this location, a flyover solution (the railway over the Wakefield Line) or a dive-under solution (the railway under the Wakefield Line). The preferred solution was for a flyover, as this option reduces impact on landowners and businesses and substantially less concrete would be required when compared to the dive-under option;
- Ravensthorpe Station – Construction of the grade-separated junction at Ravensthorpe resulted in a need to relocate the Ravensthorpe Station to the west of Calder Road. Consideration was given to station facilities and whether these should be located to the north or south of track. The preferred option is to locate the drop-off and station access to the south of the track as this will have less impact on the businesses surrounding the station site;
- Baker Viaduct Underbridge (RBA/2) – design options were considered for a new viaduct at Ravensthorpe. The preferred option considered minimising the impact on the River Calder and comprised a 55 metre (m) span viaduct, which meant that piers were not required to be located within the river channel. The preferred solution would reduce the impacts on the Grade II listed River Calder Underbridge (MDL1/8) and would be less visually intrusive.

- Overhead line equipment placement – design of overhead line equipment has been influenced by its proximity to heritage assets. Bespoke overhead line equipment options were selected for various Grade II listed structures along the Scheme, including Huddersfield Viaduct (MVL3/92) and Mirfield Viaduct Underbridge (MVN2/192).

2.1.21 Environmental factors were considered along with a range of other issues, such as safety, cost and feedback from consultation, in developing and weighing up these options.

2.1.22 The design has been refined to avoid or reduce the environmental and social impact of the Scheme. Examples include, but are not limited:

- Removing the proposed piers in the river at Baker Viaduct Underbridge (RBA/2), and largely on piers across the floodplain;
- Minimising works located in the floodplain, where possible;
- Retaining Deighton Station in its existing location to serve the current community and increase customer safety;
- Amendments to earthworks in the Deighton area to minimise visual impact to local residents and users of the canal;
- Developing design solutions that are sympathetic to the listed status of buildings/structures along the Scheme, including careful choice of materials and finishes;
- Moving temporary construction compounds to avoid sensitive ecological receptors; and
- Amending the works to overhead power lines to avoid an area of known contamination near Mirfield.

2.1.23 Chapter 3 (Consideration of alternatives) in Volume 2i of the ES discusses the key alternatives in more detail.

Summary

2.1.24 The preferred option for the Scheme has been taken forward to single option development stage – the concept design stage.

2.1.25 The preferred option enables sufficient detail on the design, construction, operation and land requirements to assess the environmental impacts of the Scheme, which are reported in this ES.

2.1.26 The design will continue to be refined in the time up to construction, however this will be within the parameters of the Scheme assessed by the EIA and reported in the ES.

3. SCHEME DESCRIPTION

Scheme location

3.1.1 The railway is at an elevation of approximately 110m Above Ordnance Datum (AOD) at its south-western extent, decreasing to around 45m in the north-east. The area to the west of the Scheme boundary slopes downwards from north-west to south-east, while to the east land is generally flatter within the valley of the River Calder.

3.1.2 The land along the route of the Scheme is mainly urban and is defined by its two urban centres of Huddersfield and Dewsbury. Industrial land uses are generally found within the areas surrounding these. Within the northern extent of the Scheme is a substantial area of good agricultural land. Leisure facilities are located within the Scheme boundary, including several sports complexes and areas of open space.

3.1.3 Several watercourses run parallel to and/or cross the railway, at various locations along the Scheme.

3.1.4 At present, the Transpennine route serves a mix of fast express services, local stopping services and freight trains.

Proposed works

3.1.5 In the main, the works are aimed at delivering a four-track railway as well as realignment of tracks and associated works. Most of the new track works can be incorporated within the existing rail corridor (Network Rail operational railway land). Two areas of new track are proposed; these are located in the Heaton Lodge area in the centre of the Scheme, and Ravensthorpe area, to the East of the Scheme.

3.1.6 The entire Scheme will be subject to electrification, which starts to the West of Huddersfield Station at Branch Street. An example of the overhead line equipment to be installed is shown in Insert 3-1.

Insert 3-1 Example of Overhead Line Equipment to be installed

3.1.7 At Huddersfield Station, the railway is remodelled to support an electrified four-track railway with works planned within the station itself to support such remodelling works including alterations to platforms and roof structure. A visualisation illustrating Huddersfield Station following construction of the Scheme is provided in Insert 3-2.

Insert 3-2 Visualisation of Huddersfield Station following construction of the Scheme

3.1.8 To the east of Huddersfield Station, a four-track railway is reinstated from the Huddersfield Viaduct across the Scheme area to the west of Westtown (Dewsbury). This will allow for the segregation of fast and slow trains.

3.1.9 At Heaton Lodge, in the centre of the Scheme, the fast lines are separated from the slow lines in a new cutting which will facilitate line speed increases.

3.1.10 There are works planned to reconstruct Deighton and Mirfield Stations including the relocation of platforms.

3.1.11 A new station will be built at Ravensthorpe to the west of the site of the existing station. The existing Ravensthorpe Station will be demolished. The railway grade separation (flyover) at Ravensthorpe will enable the fast and slow trains to pass over the existing Wakefield lines and then cross the River Calder and Hebble and Calder Navigation Canal on a new viaduct structure in this area.

3.1.12 Works are also required to 34 structures within the Scheme area, including existing tunnels, viaducts, bridges (road and rail) and drainage culverts. Seven structures along the route will need to be demolished and rebuilt. Four new footbridges will also be constructed.

3.1.13 Finally, there are various new permanent access points to the railway along the route as well as utilities diversions and provision of ancillary railway equipment to support the safe operation of the railway.

Construction phase

3.1.14 In order to construct the Scheme, 22 construction compounds will be required at various locations along the Scheme. All construction compounds will be temporary and will be removed as part of the last phase of works on the construction site, and the land will then be returned/reinstated to its previous use.

3.1.15 Construction activities will be managed in accordance with a Code of Construction Practice (CoCP).

3.1.16 Temporary closures of public rights of way will also be required during the construction works. There will be permanent diversions of five public rights of way (footpaths, cycleways and bridleway) to accommodate the Scheme.

3.1.17 Clearance of vegetation will be needed to construct the Scheme; however, this has been kept to a minimum. Replanting will take place once the works have been completed.

Working hours

3.1.18 Construction works will generally take place during day time hours; however, where works are required on the railway, these will be undertaken under possession (i.e. when trains are stopped from running); these periods could be overnight or over a long weekend which can include Bank Holidays. For more significant works, blockades will be required (long term shut down of the railway between two particular points). During these times rail replacement bus services will be provided to ensure that passengers are still able to travel.

3.1.19 Working hours will differ depending upon the nature of the activity and location. However, in general working hours will be as follows:

- 08:00 to 18:00 Monday to Friday, with 30 minutes for setting up and 30 minutes for closing down and organising/cleaning the site;
- 08:00 – 13:00 Saturday, if required, with 30 minutes for setting up and 30 minutes for closing down and organising/cleaning the site;
- No working on Sundays.

3.1.20 Standard working hours refer to all activities where construction does not interfere with or require a closure of the operating railway. In general, this can be taken to define the majority of the works in constructing the Scheme.

Timescales

3.1.21 Construction of the Scheme will occur over a four-year period which is anticipated to commence in late 2022. The Scheme is anticipated to be operational by summer 2026.

3.1.22 Key construction activities will include works to railway, including track replacement, track realignment, installation of line side equipment such as signalling, installation of track side drainage and temporary sidings; station refurbishment; bridge works including demolition and construction; site clearance; earthworks; works to highway; landscape and ecological works, including landscape works e.g. tree planting.

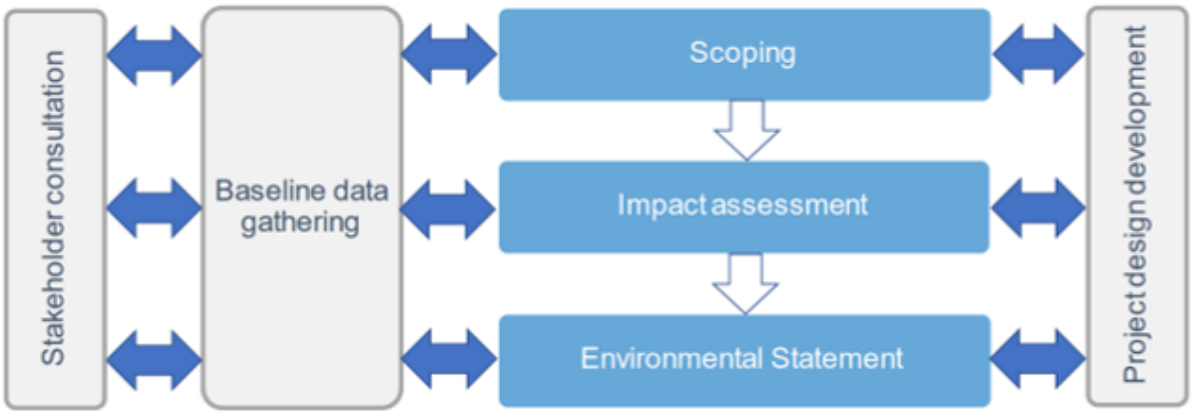
4. ENVIRONMENTAL IMPACT ASSESSMENT

EIA process

4.1.1 EIA is a process undertaken by competent experts to assess the likely significant environmental effects arising from a proposed development. The outcome of this process is the production of an ES.

4.1.2 The EIA for this Scheme has been an iterative process utilising the information gathered to inform the design where appropriate, as illustrated in Insert 4-1.

4.1.3



Insert 4-1 Environmental Impact Assessment Process

Consultation

Scoping

4.1.4 An Environmental Scoping Report was submitted to the Secretary of State in June 2019 to outline the issues to be addressed in the EIA and request a Scoping Opinion to ensure that the assessment of environmental effects is proportionate and focuses on the key issues. The Scoping Opinion was received on the 31 July 2019, and identified that the following EIA topics should be assessed and reported in the ES:

- Historic environment;
- Air quality;
- Noise and vibration;
- Biodiversity;
- Landscape, townscape and visual;
- Water environment (including flood risk);

- Geology, soils and land contamination;
- Waste and materials;
- Traffic and transport;
- Population and human health;
- Climate (effects and vulnerability);
- Electromagnetic interference;
- Agriculture;
- Public open space; and
- Socio-economic.

4.1.5 Ongoing engagement with environmental, planning and community stakeholders has taken place throughout the engineering design and assessment process.

4.1.6 The ES takes account of the responses received, and the views expressed have been considered throughout the EIA process.

Stakeholder consultation

4.1.7 Formal and informal consultation was undertaken with both statutory, such as the Environment Agency and non-statutory bodies, such as the Railway Heritage Trust, throughout the EIA process.

4.1.8 Consultees included (but were not limited to) Historic England, Kirklees Council (various departments), Natural England, Sustrans, Environment Agency, Highways England, Canal & River Trust and the Ramblers Association.

4.1.9 Consultation has been used to agree appropriate assessment methodologies, obtain environmental data; and allow consultees an opportunity to comment on and influence the Scheme design and mitigation measures (where appropriate).

Public consultation

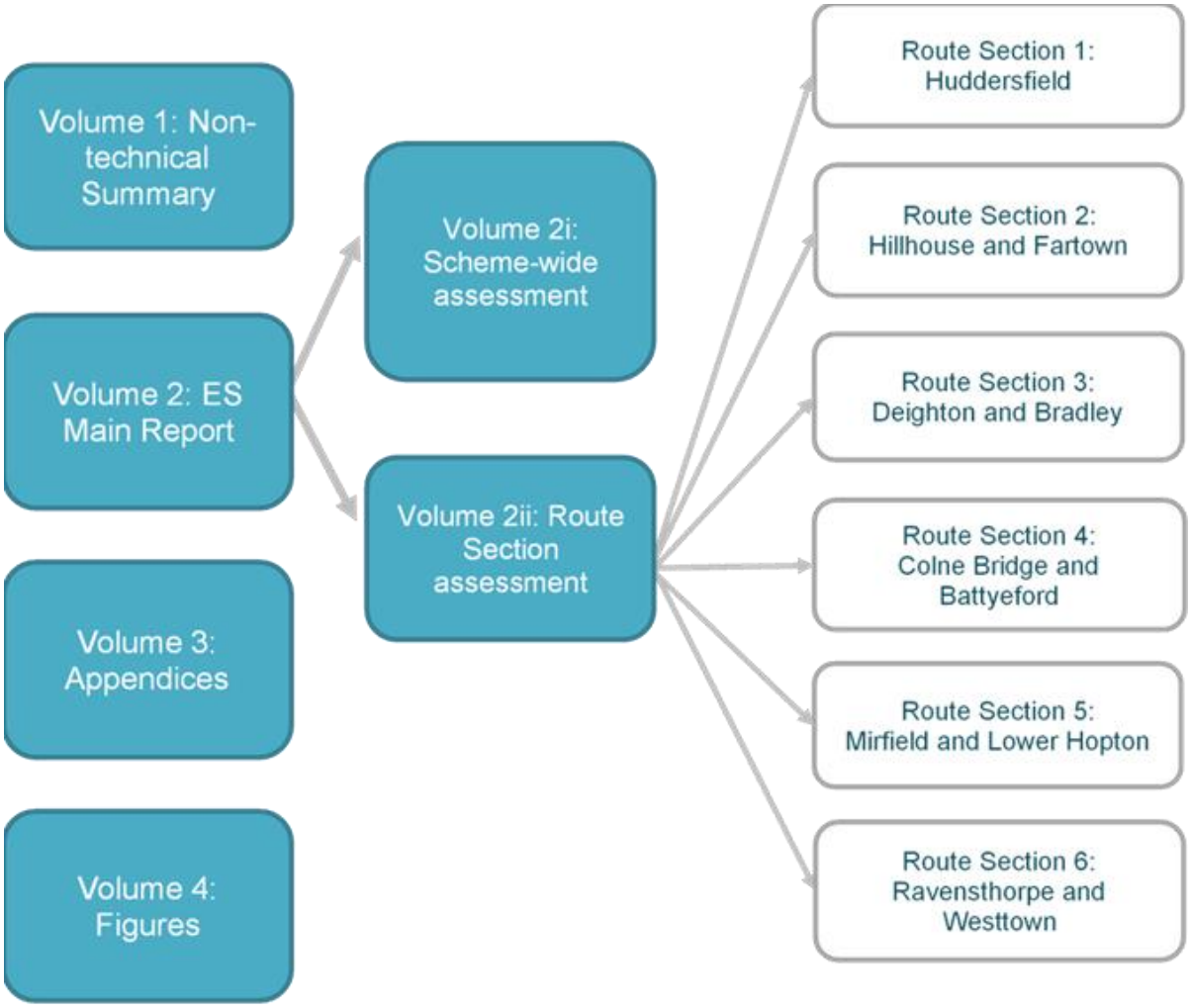
4.1.10 Two phases of public consultation have been undertaken and, where appropriate, the outcomes have been used to identify key issues, influence the design and construction proposals as well as inform the EIA process.

4.1.11 Full details of the consultation process, issues raised and how the Scheme has responded can be found in the Report Summarising Consultation Undertaken (NR07) which has been produced to accompany the TWAO application.

Reporting

4.1.12 An EIA has been undertaken to assess the potential environmental impacts arising from the development of the Scheme. The predicted significant environmental effects are reported in the ES.

4.1.13 The ES comprises four volumes, as shown in Insert 4-2.



Insert 4-2 Environmental Statement Structure

5. POTENTIAL ENVIRONMENTAL EFFECTS

Introduction

5.1.1 An assessment has been carried out to determine the likely significant effects on the environment of the construction and operation of the Scheme (i.e. those effects that should be taken into account in the decision-making process).

5.1.2 The design of the Scheme has sought to avoid environmental impacts where possible through the design of the Scheme. This is termed embedded mitigation and is assumed to be in place when the assessment of potential effects is carried out.

5.1.3 Where significant effects are unable to be avoided, additional mitigation measures are proposed to minimise any significant effects identified for each environmental topic in the ES. Any significant effects remaining following mitigation being implemented are termed 'residual effects'.

5.1.4 The following section summarises the findings of the environmental assessments for each environmental topic undertaken for the Scheme. As this is a summary, the impacts are not described in detail and not every location is specified. Further details are included in the Scheme-wide Assessment in Volume 2i and the Route Section Assessments in Volume 2ii of the ES.

Historic environment

Introduction

5.1.5 A number of heritage features are located along the Scheme, which include designated and non-designated assets.

5.1.6 Designated heritage assets include World Heritage Sites, Listed Buildings, Scheduled Monuments, Registered Parks and Gardens and Conservation Areas. Non-designated heritage assets are those not afforded statutory protection, but which are recorded on the West Yorkshire Historic Environment Record (HER), or which have been identified during the baseline assessment (e.g. historic maps).

5.1.7 The assessment has included heritage assets within and outside the Scheme boundary. Key heritage assets within the Scheme boundary include the Grade I Listed Huddersfield Station and 19 Grade II listed bridges.

5.1.8 In addition, the potential for buried archaeological remains has been considered. Potential for buried archaeological remains are limited throughout the majority of the Scheme due to previous considerable ground disturbance associated with development, however potential exists around the Heaton Lodge area where ground disturbance has been limited and at Ravensthorpe where there is earlier evidence of activity and listed buildings associated with an area of medieval settlement.

Construction effects

5.1.9 During construction of the Scheme there will be significant adverse effects on Huddersfield Station, a Grade I Listed building, due to physical changes to the historic fabric of the station. Significant effects are also anticipated at the station in relation to construction activity affecting its setting.

5.1.10 The whole length of Huddersfield Viaduct is Grade II Listed. Significant adverse effects are anticipated for Huddersfield Viaduct (Spans 1, 4 and 29).

5.1.11 The Empire Cinema, and Sportsman and the Marhaba Takeaway, which are both Grade II listed will experience temporary significant adverse effects during construction.

5.1.12 During construction a permanent significant adverse effect will occur on Wheatley's Overbridge (MVL3/103), which is Grade II listed. Further significant adverse effects have been identified for B6118 Bridge Road Overbridge (MVL3/107) (Grade II Listed) and.

5.1.13 Significant adverse effects of a temporary nature are expected to occur on Mirfield Viaduct Underbridge (MVN2/192), Wheatley's Underbridge (MVN2/196) and Ledgard Bridge (Over River Calder), all Grade II listed, due to the changes required to these structures to accommodate the Scheme.

5.1.14 During construction, presence of a construction compound at Ravensthorpe would result in temporary significant adverse effects, on Calder & Hebble Canal Underbridge (MDL1/6) and River Calder Underbridge (MDL1/8), both of which are Grade II listed.

Operational effects

5.1.15 Huddersfield Station will experience significant adverse effects due to the permanent notable change to its setting, relating to the infiltration of new elements, such as overhead line equipment and a new footbridge, into the setting of the station.

5.1.16 Huddersfield Viaduct will experience significant adverse effects due to the change in its setting from the presence of overhead line equipment and the signal gantry.

5.1.17 During operation, there would be a significant adverse effect on Calder & Hebble Navigation Number 2 Lock/Sir John Ramsden's Canal Number 2 Lock, due to the increased presence of the railway in the views from the lock, the installation of elements of the Scheme and the removal of vegetation which will alter the character of the area and affect the setting of this heritage asset.

5.1.18 The operation of the Scheme would result in a significant adverse effect on Calder & Hebble Canal Underbridge (MDL1/6) and River Calder Underbridge (MDL1/8) as a result of the visual impact on their setting. The new viaduct at Ravensthorpe will be a dominant feature in views towards these bridges from the south-east.

5.1.19 Significant adverse effects are anticipated on Occupation Underbridge (MDL1/10) (Grade II Listed), as works to the bridge will end the asset's historic function as an accommodation bridge and alter the way in which the bridge is experienced.

5.1.20 Significant adverse effects are anticipated in relation to Ravensthorpe Station Footbridge (MDL1/4), due to the removal of the footbridge.

Measures to minimise effects

5.1.21 The following mitigation measures are proposed to minimise temporary and permanent significant adverse effects on listed buildings and structures during construction and operation of the Scheme:

- Planting of vegetation to shield the Scheme from view;
- Fencing to protect heritage assets during construction work e.g. from dust;
- Sensitive traffic routing; and
- Short presentations (known as Toolbox talks) to construction staff to explain the risks to heritage assets.

5.1.22 Where mitigation measures do not diminish the effects on affected heritage assets, additional compensation measures are proposed. Compensation measures acknowledge permanent change to, or loss of these heritage assets, and include:

- Historic building recording;
- Archaeological investigation and recording; and
- Re-use of historic fabric in the reconstruction or replacement of a heritage asset to retain some of the historic character of the lost heritage asset.

5.1.23 Due to the direct works proposed to a number of designated assets, Listed Building Consent

applications will be needed for the following structures. These will be submitted in parallel to the TWAO:

- Huddersfield Station;
- Huddersfield Viaduct (MVL3/92);
- Wheatley's Overbridge (MVL3/103);
- B6118 Colne Bridge Road Overbridge (MVL3/107);
- Mirfield Viaduct (MVN2/192);
- Wheatley's Underbridge (MVN2/196);
- Occupation Underbridge (MDL1/10);
- Toad Holes Underbridge (MDL1/12); and
- Ming Hill Underbridge (MDL1/14).

Residual effects

5.1.24 The following residual effects on heritage assets are predicted (those effects remaining, as a result of the Scheme, after mitigation measures have been taken into account):

Construction

5.1.25 The following residual significant adverse effects remain for the following listed structures during the construction phase:

- Huddersfield Station – permanent loss of historic fabric and alteration of elements of the station which contribute to its overall significance will result in significant adverse effects. The construction works within and around the station will temporarily form a prominent element of the setting of the station and will temporarily alter the experience of the station with potential infiltration from noise, dust and vibration, resulting in a temporary significant adverse effect.
- Huddersfield Viaduct – the permanent physical alterations to the viaduct will result in loss of historic fabric along its entire length for construction of overhead line equipment and a signal gantry, resulting in permanent significant adverse effects;
- The Empire Cinema and The Sportsman and the Marhaba Takeaway – construction activity will infiltrate on their setting as both buildings are located with views towards or from them which contain Huddersfield Viaduct. The presence of construction compounds and works around Huddersfield Viaduct will be visible in these views and degrade this aspect of the assets' settings, resulting in temporary significant adverse effects;

- Wheatley's Overbridge (MVL3/103) – The construction of the Scheme will result in the majority loss of the Grade II Listed bridge due to its removal and replacement, resulting in permanent significant adverse effects;
- B6118 Bridge Road Overbridge (MVL3/107) – partial demolition and rebuild of this Grade II listed bridge will be required to accommodate the Scheme, resulting in a permanent significant adverse effect;
- Heaton Lodge Footbridge ((MVL4/4) – the removal and replacement of the structure will result in permanent significant adverse effects;
- Calder & Hebble Navigation Number 2 Lock/Sir John Ramsden's Canal Number 2 Lock - increased noise levels in the setting of the lock from the presence of a construction compound, as well as works to B6118 Bridge Road Overbridge (MVL3/107) in proximity to the lock, will result in temporary significant adverse effect;
- Mirfield Viaduct Underbridge (MVN2/192) – Construction works, including scaffolding, hoardings and construction plant, will temporarily alter the appearance of the viaduct, resulting in temporary significant adverse effects;
- Wheatley's Underbridge (MVN2/196) – Construction works, including scaffolding, hoardings and construction plant, will temporarily alter the appearance of the viaduct, resulting in temporary significant adverse effects;
- Ledgard Bridge (Over River Calder) – Construction work associated with Mirfield Viaduct Underbridge (MVN2/192) will be present within the immediate vicinity of this listed bridge; hoardings and plant will be visible in views to, from and across Ledgard Bridge, while noise and dust will also be present within its setting, resulting in temporary significant adverse effects;
- Calder & Hebble Canal Underbridge (MDL1/6) Underbridge and River Calder Underbridge (MDL1/8) – Construction works in this area would result in noticeable noise and visual intrusion on the setting of these bridges during the construction phase, intruding on views to and from the bridges on their southern side, and intruding on appreciation of their architectural form and value, resulting in temporary significant adverse effects;
- Occupation Underbridge (MDL1/10) – the bridge arch will be infilled preventing movement under the bridge and a new embankment will be constructed, obscuring the view of the bridge from the north. These changes will cease the asset's historic function as an accommodation bridge and alter the way in which the bridge is experienced, resulting in permanent significant adverse effects;

- Ravensthorpe Station Footbridge (MDL1/4) – the removal of the footbridge at the existing Ravensthorpe Station will result in permanent significant adverse effects.

Operation

5.1.26 Permanent residual significant adverse effects for the following listed structures:

- Huddersfield Station – permanent changes will result in notable alterations to the station's setting, resulting in a permanent significant adverse effect;
- Huddersfield Viaduct (Spans 1 – 4 and Span 29); - permanent alterations to the setting of each asset from the presence of overhead line equipment and the signal gantry will result in a notable alteration to the assets' setting and therefore a permanent significant adverse effect;
- Calder & Hebble Navigation Number 2 Lock / Sir John Ramsden's Canal Number 2 Lock – the increased presence of the railway, due to the installation of elements of the Scheme and the removal of vegetation will alter the character of the area and dominate the setting of this heritage asset, resulting in permanent significant adverse effects; and
- Calder & Hebble Canal Underbridge (MDL1/6) Underbridge and River Calder Underbridge (MDL1/8) – the proposed viaduct at Ravensthorpe will form a major new element in the setting of these bridges, resulting in a permanent significant adverse effect.

Air quality

Introduction

5.1.27 The air quality assessment considers the effects of:

- Dust emissions during construction and operation;
- Road traffic emissions during construction; and
- Emissions from trains once the Scheme is operational, along with the road traffic making journeys to and from the railway stations.

5.1.28 The assessment of effects on air quality has considered residential properties near the railway and on public highways that will be used by construction vehicles.

5.1.29 Kirklees Council currently has 10 Air Quality Management Areas (AQMA) declared within its borough and currently undertakes air quality monitoring of nitrogen dioxide (NO_2) and Particulate Matter. Overall, the results of the monitoring undertaken by Kirklees Council show that there has been a reduction in measured Nitrogen Oxide concentrations between

2016 and 2019. Concentrations in some areas of the Scheme still exceed the annual mean Nitrogen Oxide objective particularly within the AQMA.

Construction effects

5.1.30 Effects of construction dust were assessed, and it was found that risk from dust generated during construction of the Scheme could result in significant short-term and long-term impacts at residential and non-residential receptors without the implementation of best practice methods.

Operational effects

5.1.31 During operation, no significant adverse effects are anticipated as a result of the Scheme.

Measures to minimise effects

5.1.32 Best practice measures to prevent nuisance dust effects from construction works, will be implemented during construction through a Nuisance Management Plan which forms part of the CoCP. Such measures include ensuring all vehicles carrying loose or potentially dusty material to or from the site are fully sheeted, storing materials with the potential to produce dust away from site boundaries, ensuring water suppression is used during demolition work where appropriate, and providing and ensuring the use of wheel cleaning facilities near the site exits wherever there is a potential for carrying dust or mud off the site.

Residual effects

5.1.33 With the implementation of the dust mitigation measures, effective site management and measures within the CoCP, no significant effects will remain during construction.

5.1.34 During operation, no significant adverse effects on local air quality are anticipated as a result of the Scheme, as the Scheme will electrify the railway and introduce bi-modal trains, removing older diesel-only trains and thereby improving local air quality.

Noise and vibration

Introduction

5.1.35 Noise and vibration may arise during construction from on-site construction activities and from construction traffic on haul routes (access points to compounds) and public highways. During operation, noise and vibration may arise from fast train movements, lineside equipment, redistribution of road traffic as a result of road alteration and use of public

announcement and voice alarm systems at railway stations.

5.1.36 These aspects have been considered in the noise and vibration assessment, which looks at the impacts on noise sensitive 'receptors' in the vicinity of the Scheme, such as residential properties, schools and educational facilities, hospitals, community facilities and places of worship.

Construction effects

5.1.37 The assessment has identified potential significant adverse effects from noise associated with construction activities (during daytime hours) at 46 noise sensitive receptors along the Scheme.

5.1.38 Night-time construction activities at the Hillhouse Compound have the potential to cause significant adverse effects at nearby noise sensitive receptors owing to the level of noise and the duration of works. Additional night-time working at other locations along the Scheme are not typically of a sufficient duration to lead to significant adverse effects.

5.1.39 Construction traffic on 19 roads is likely to result in temporary significant adverse effects affecting approximately 1,250 noise sensitive receptors.

Operational effects

5.1.40 There are potential significant effects on the operation of Dr Reddy's Laboratories, in terms of the use of precision equipment during vibratory construction works (such as compaction and piling).

5.1.41 There is potential for cosmetic damage to 27 buildings located close to potential sources of construction vibration.

5.1.42 Assessment of operational noise has been undertaken in respect of 5,165 noise sensitive receptors. In total, 70 individual noise sensitive receptors are affected by the Scheme. Potential significant adverse effects have been identified at 65 of these during the day, and 34 at night. Effects relate to the operation of the sidings at Hillhouse compound, the operation of the railway and impacts from the realignment of roads.

Measures to minimise effects

5.1.43 Mitigation measures set out in the CoCP and Noise and Vibration Management Plan will be implemented to minimise noise and vibration impacts during construction at noise sensitive receptors, including residential properties. All mitigation measures will be agreed with

Kirklees Council as the Local Authority, prior to construction commencing.

5.1.44 To minimise noise resulting from construction traffic, temporary traffic diversions and traffic routes will be managed by a CTMP. A roads and motorways will be used where possible, minimising the use of local roads. The Scheme's reuse and recycle policy reduces the amount of material that needs to be removed, which in turn minimises vehicle movements on the local road network, and therefore also reduces noise associated with construction traffic.

5.1.45 To minimise impacts from the operation of the Scheme, line-side noise attenuation measures, in the form of noise barriers, will be implemented at eight locations along the Scheme, as they have the potential to benefit both the internal (inside the residential receptor) and external amenity space (such as gardens and patios) as well as the wider area during both daytime and night-time.

5.1.46 If appropriate, statutory noise insulation (required under legislation if specific noise thresholds are exceeded) is also proposed at 10 noise sensitive receptors, this will be subject to further assessment. Non-statutory noise insulation (not required under legislation but required where significant adverse residual effects remain) may also be offered at 12 other noise sensitive receptors on a case-by-case basis if reasonable acoustic conditions are not achievable with the existing glazing and ventilation provision, again subject to further assessment.

Residual effects

5.1.47 With the application of these measures, there are no predicted significant residual adverse noise and vibration effects from construction activities within the Scheme. There are, however, temporary and short-term significant adverse effects in the wider study area due to construction traffic and temporary road diversions.

5.1.48 During the operation of the Scheme, with mitigation measures in place, significant adverse residual effects will be avoided at noise sensitive receptors in terms of internal amenity (i.e. inside residential properties). External amenity will also be maintained where noise barriers are introduced. Where barriers are not feasible, there will be residual significant effects in external amenity areas, such as gardens and patio space, at 14 noise sensitive receptors.

Biodiversity

Introduction

5.1.49 An Ecological Impact Assessment (EcIA) has been undertaken for the Scheme which has identified effects of the Scheme on designated sites, habitats and protected species (such as badgers and bats). The assessment has been informed by desk studies, field surveys, and stakeholder consultation.

5.1.50 The following Important Ecological Features were identified relevant to the Scheme:

- Five Local Nature Reserves;
- 18 Local Wildlife Sites, two of which are located within the Scheme boundary (Gledholt Woods and Sir John Ramsden Canal);
- Terrestrial habitats (for example, woodland, ancient woodland, traditional orchards, hedgerows, scattered trees, scrub and semi-improved neutral grassland);
- Aquatic habitats (for example, rivers, canals, becks, dikes and ponds); and
- Protected and priority flora and fauna (floating water-plantain, great crested newt, bats, badger, barn owl, little-ringed plover, breeding birds, reptiles, otter and water vole).

Construction effects

Terrestrial habitats

5.1.51 Construction works will result in a temporary significant adverse effect on Geldholt Woods Local Nature Reserve/Local Wildlife Site (LWS), a statutory designated site.

5.1.52 The construction phase is assessed to have a temporary significant adverse effect on non-statutory sites, specifically Whitley Wood LWS and Sir John Ramsden Canal LWS (and any floating water-plantain present)).

5.1.53 A temporary significant adverse effect is anticipated due to the loss of semi-natural broad-leaved woodland, semi-natural mixed woodland, plantation broad-leaved woodland, scrub, semi-improved grassland, to accommodate the works.

Aquatic habitats

5.1.54 Both, temporary (due to pollution and disturbance) and permanent (due to habitat loss) significant adverse effects are anticipated on the Unnamed Watercourse at Bradley Culvert, Blackhouse Dike and the River Calder.

5.1.55 The construction phase is assessed to have a temporary significant adverse effect on the River Colne and Calder and Hebble Navigation Canal (and any floating water-plantain

present).

5.1.56 A temporary significant adverse effect is anticipated on Gledholt Beck, as the proximity of the construction works provides a potential pathway for pollution and sedimentation of the watercourse, which could adversely affect aquatic habitats and species.

5.1.57 An uncontrolled pollution event has the potential to result in the deterioration of pond habitats and/or direct loss of resident species of nature conservation interest at Ladywood Lakes. This would result in a temporary significant adverse effect.

5.1.58 One of the lakes at Ladywood Lakes includes the presence the presence of a Regionally Notable and Nationally Scarce freshwater snail which could conceivably be lost from the pond in the event of an uncontrolled pollution event and may not re-establish. This would result in a permanent significant adverse effect.

5.1.59 Permanent significant adverse effects have also been identified in association with the complete loss of two (recently created) ponds within the restored area of Thornhill Quarry. A temporary adverse effect is also anticipated on the ponds/lakes within Forge Lane Quarry.

Protected and priority flora and fauna

5.1.60 Loss of terrestrial habitat (scrub) to the north of the railway line, to accommodate the Scheme, would lead to a reduction in the availability of habitat used by Great Crested Newts for foraging, commuting and shelter. Prior to the implementation of mitigation, this would result in a permanent and temporary significant adverse effect on Great Crested Newts.

5.1.61 The Scheme could result in the killing and injury of roosting bats, as well as the loss and/or abandonment of several roost sites, resulting in a permanent significant adverse effect.

5.1.62 Vegetation clearance along the railway corridor is likely to result in the destruction and/or disturbance of badger setts, including one active main sett, seven partially used non-main setts and 19 disused non-main setts. The destruction of setts will result in a reduction in the availability of suitable places for badger to shelter/take refuge and could also potentially cause harm to individual badgers using setts that have been identified as active. Badgers could come to harm in construction sites, for example by becoming trapped in open excavations. Overall, this would result in both a permanent and temporary significant adverse effect on badger as a result of the Scheme, prior to the implementation of mitigation measures, including the creation of a replacement artificial sett within the Scheme boundary.

5.1.63 Loss of suitable breeding habitat has potential to result in the destruction of active nests and injury/killing of birds. The destruction of active nests will result in a permanent adverse effect on breeding birds.

5.1.64 Vegetation clearance along the railway corridor has potential to kill/injure any individuals which may be present. Vegetation clearance will also result in the localised loss of habitat suitable for reptiles, such as mosaics of grassland, scrub and scattered trees. The construction phase is assessed to have a permanent significant adverse effect.

5.1.65 Construction of the Scheme will require the localised loss of riparian habitat along watercourse and terrestrial habitats (dense scrub and woodland), of potential value to otter. This will result in a reduction in the availability of habitat that may be used by otter and could also potentially lead to the loss of unidentified otter resting sites. There is a small possibility that otter could come to harm in construction sites, for example by becoming trapped in open excavations. A temporary significant adverse effect is therefore anticipated during construction.

Operational effects

5.1.66 The new section of railway at Heaton Lodge will present an additional potential collision hazard to foraging and commuting barn owls during operation, resulting in a permanent significant adverse effect on barn owl.

5.1.67 Changes to water quality, resulting in changes from culvert discharge volumes, are expected during operation of the Scheme (which could reduce the abundance of fish and other aquatic prey in watercourses) and therefore have potential to impact otter.

Measures to minimise effects

5.1.68 Part A of the CoCP sets out the general principles, relevant measures and standards and environmental management requirements to be followed throughout the construction period that avoid or minimise impacts upon biodiversity, such as the sensitive removal of existing ponds; ensuring all vegetation clearance or other work activities that might potentially impact on nesting birds will be conducted outside the established nesting season, generally considered to be between March and August inclusive, to reduce the risk of disturbing nesting birds; sensitive clearance of vegetation, fingertip searches of vegetation for great crested newts; and ecological watching briefs.

5.1.69 Part B of the CoCP is a series of environmental delivery plans including a Noise and Vibration Management Plan (NVMP), Pollution Prevention and Incident Control Plan

(PPICP), Nuisance Management Plan (NMP) and Environmental Design Plan (EDP) (Land Contamination and Hydrogeology) which will further detail measures to minimise impacts.

5.1.70 A Landscape and Ecological Management Plan (LEMP) will be prepared which will reflect the survey results and ecological measures set out in the ES, including a plan of areas of new planting and details of any new habitats created. Details of all conditions of protected species licensing agreed with Natural England will also be included in relation to bats (including location of reinstated bat boxes, new bat boxes and protected foraging and commuting corridors); floating water plantain; badgers; great crested newt, reptiles, otter and water vole, where appropriate.

5.1.71 Approximately 90m of riparian planting will be undertaken to compensate for loss of riparian/terrestrial habits along the River Calder in relation to the construction of the new viaduct at Ravensthorpe.

5.1.72 New ponds will be created to fully compensate for the loss of two ecologically important ponds at the Thornhill Quarry site.

Residual effects

5.1.73 With the implementation of the measures outlined, the following significant residual effects are anticipated during construction or operation of the Scheme:

- Temporary adverse effect on the River Calder at Ravensthorpe, where the proposed viaduct crosses the River Calder due toa permanent alteration of adjacent riparian/terrestrial habitat within the footprint of the viaduct on each bank. The new structure will also result in the loss of scattered trees adjacent to the River Calder and loss of aquatic plants to the footprint at the point of construction. The effects of the compensatory riparian planting will be short term (2-5 years) until planting is established. After this point, no significant residual effects on rivers are predicted;
- Two ecologically important ponds will be lost during construction at the Thornhill Quarry site. There will be a temporary residual adverse effect on ponds in the short term (3-5 years), until the replacement pond habitats are established to comparable condition. No permanent residual effects on ponds are anticipated;
- Temporary significant adverse residual effects to semi-natural broad-leaved woodland are assessed in the medium to long term (30-100 years) until replacement planting is established. After this point, no significant residual effects are predicted;
- Residual effects to semi-natural mixed woodland, plantation broad-leaved woodland and plantation mixed woodland are assessed to be temporary, adverse and significant in the

medium term (less than 30 years) until replacement planting is established. After this point, no significant residual effects are predicted;

- Temporary significant adverse residual effects to scrub are assessed in the short term (5-10 years) until replacement planting or natural regeneration becomes established. After this point, no significant residual effects are predicted; and
- Residual effects to semi-improved neutral grassland are assessed to be temporary, adverse and significant in the short term (less than 5 years) until replacement planting or natural regeneration becomes established. After this point, no significant residual effects are predicted.

5.1.74 No significant effects on any other Important Ecological Features are predicted.

Landscape, townscape and visual

Introduction

5.1.75 The effect of the Scheme on the landscape character, townscape and visual amenity has been assessed.

5.1.76 Landscape character is the distinct and recognisable pattern of elements that occurs consistently in a landscape and how this is perceived by people. It reflects combinations of landform, soils, vegetation, land use and settlement and creates the sense of place. Examples of landscape types include Upland Pastures, Wooded Rural Valleys, Industrial Lowland Valleys and Rolling Wooded Farmland.

5.1.77 Visual receptors are single or groups of elements whose visual enjoyment would be affected by a proposal. The nature of visual receptors varies according to their location, type, activity of view and the importance of the view. Visual receptors include occupiers of residential properties, views from people using amenity landscapes, and the sensitivity of views.

5.1.78 For this assessment, adverse effects are considered to be changes that are detrimental in terms of reducing the quality of the landscape/townscape resource or a receptor's views. Beneficial effects are changes that enhance the quality of the landscape/townscape resource or a receptor's views.

Construction effects

5.1.79 During the construction phase, the local landscape and townscape character would experience adverse effects as a result of the Scheme, which are considered significant for

this assessment. This is due to the construction work taking place on and near the railway line and includes the provision of compounds to facilitate the work. Vegetation clearance along the railway and moving plant and machinery would introduce features into these character areas. However, these elements would be temporary and would not have detrimental effect on the overall permanent character of the local landscape and townscape.

5.1.80 Due to the introduction of partially constructed infrastructure as a result of the works, several viewpoints would be adversely affected by the Scheme during the construction phase. While close range views would experience the most noticeable and severe effects, mid-range and long-distance views would also be affected. Construction activity taking place on the railway or increased traffic to the Scheme would be noticeable from these locations. However, these effects would be localised and temporary and would not affect the overall visual amenity of the Scheme.

Operational effects

5.1.81 During the operational phase, there would be limited effect on the local landscape and townscape character. This is due to the proposed infrastructure being in keeping with the existing built form and infrastructure, which ensures that the integrity of the existing character remains intact. The majority of the landscape and townscape character areas are considered to remain as existing. This is because the railway is an existing feature.

Measures to minimise effects

5.1.82 Mitigation measures in the form of replacement planting are proposed. Replacement planting proposals are outlined in an outline environmental management plan included in the ES, the detail of which will be agreed with Kirklees Council. During the operational phase at Year 1, the replacement planting would be noticeable, however, the mitigating effects would be limited since the vegetation would not be fully developed and matured at this stage. Close and mid-range views would experience adverse effects as a result of the Scheme. However, effects would be localised and would not impact the overall visual amenity of the Scheme. During the operational phase at Year 15, any mitigation planting would be mature and would provide screening effects to soften the effects on certain areas of the Scheme. Close-range views would experience the most considerable effects at this stage. The visual effects would remain localised and would have a limited effect on the visual amenity of the Scheme.

5.1.83 The detailed design process will seek to ensure that the visual impacts are minimised, through consideration of the design of gantries and overhead wire connectors and

minimising the size and scale of equipment where possible. A refined design will also mean that fewer portals (to hold the overhead wires) will need to be installed with a wider spacing between portals likely to be achieved. The detailed design will also consider sensitive receptors including residents and where practicably possible the gantries will be located on property boundaries rather than directly opposite gardens or windows.

Residual effects

5.1.84 Overall, the Scheme would introduce new railway infrastructure e.g. overhead line equipment and signalling, as well as new and replacement structures along the existing railway line. Long distance and mid-range views would experience limited effects as a result of the Scheme. Close-range views are assessed as experiencing the most noticeable and significant effects, due to the introduction of railway infrastructure including overhead line equipment. Since the Scheme is in keeping with the existing railway infrastructure and context, it is considered to have limited residual adverse effects on the surrounding landscape character and visual amenity.

Water environment

Introduction

5.1.85 Construction and operation of the Scheme has the potential to affect water quality and water resources, surface water flow and flood risk.

5.1.86 A water environment assessment has been undertaken for the Scheme and has considered impacts to surface water quality, hydromorphology (which considers the physical character and water content of water bodies), flood risk and groundwater quantity and flow associated with the Scheme.

5.1.87 The Scheme crosses or runs close to several rivers, lakes, ponds and canals. In total, 32 receptors have been identified comprising two surface water features; one groundwater body; 12 culverts; and 17 surface watercourses.

5.1.88 A Flood Risk Assessment and Water Framework Directive Compliance Assessment have also been prepared for the Scheme.

5.1.89 The Environment Agency's flood maps show that the Scheme crosses both Flood Zones 2 and 3 in certain defined locations associated with several waterbodies. In addition to the designation of flood zones along the Scheme, other critical flood management infrastructure is present within 1km of the Scheme boundary.

Construction effects

5.1.90 Potential significant adverse effects identified during construction include risk of contamination, increase in flood risk, increase in surface water runoff, the inclusion of works in the channel of the River Calder (associated with the new viaduct at Ravensthorpe) and changes in the functionality and capacity of a floodplain.

Operational effects

5.1.91 During operation, a significant adverse effect has been identified due to the presence of the new viaduct across the River Calder at Ravensthorpe. The effects result from the engineering structures that are required to be built at the edge of the River (river training walls). The construction of an embankment in this area will also change the functionality and capacity of the floodplain.

Measures to minimise effects

5.1.92 The following measures are proposed to reduce and, wherever possible, avoid significant adverse effects identified for the water environment:

- All construction activities including construction compounds and in-channel works, will be carried out in accordance with best practice guidelines, such as the Environment Agency's Pollution Prevention Guidelines, which will be detailed in a Pollution Prevention and Incident Control Plan (PPICP) under Part B of the CoCP. The Pollution Prevention Guidelines contain a mix of regulatory requirements and good practice advice;
- Measures included in Part A of the CoCP include procedures being put in place to dealt with accidental leakages or spillages of oils, or accidental release of hazardous substances; and using appropriate dust suppression/extraction to ensure minimal contamination to watercourse;
- A PPICP will ensure contamination of watercourses is prevented;
- All works be undertaken in accordance with the Scheme-wide drainage strategy which provides detailed information on drainage across the Scheme for drainage outfalls, storm water strategy and foul water strategy. The strategy aims to maintain the existing hydrological behaviour as far is reasonably possible, and mitigate any potential water quality impacts to receiving watercourses;
- Water quality monitoring will also be used where high risks from in-channel works are expected; and

- A flood storage area will be provided to compensate for the area of floodplain lost as a result of the Scheme.

Residual effects

5.1.93 With the adoption of such measures, there will be no significant residual effects on the water environment during either construction or operation of the Scheme.

Geology, soils and land contamination

Introduction

5.1.94 The effects of the Scheme on geology and mineral resources and effects associated with the re-use of soils and generation of waste soils has been assessed.

5.1.95 The Scheme passes through urban and rural areas, with the potential for a wide range of potential contamination sources, including past and present industrial activities, landfill sites, chemical works etc. Potential geohazards associated with existing ground conditions and historical mining activities have also been identified.

Construction effects

5.1.96 Construction activities can create new pathways for contaminants such as within surface water run-off, groundwater and gas migration. Works during construction can also lead to impacts associated with ground stability, erosion and mineral resources. Adverse effects identified during construction are typically assessed as not significant.

5.1.97 A limited number of potentially significant adverse effects are identified in relation to localised areas of the Scheme where geohazards (such as landslides, compressible ground and running sands) could be caused or worsened (e.g. coal mine entries/shallow workings at Hillhouse Sidings), or where ground contamination/gas might pose an unacceptable risk (e.g. new foundations/ excavations mobilising contamination from landfill waste into a below aquifer at the new Ravensthorpe Station forecourt area).

Operational effects

5.1.98 Potential impacts during operation relate to possible spills/leaks of chemicals, fuels etc. that may be used (for instance during maintenance activities).

5.1.99 Adverse effects identified during operation are typically assessed as not significant.

Measures to minimise effects

5.1.100 To mitigate the effects associated with ground contamination and contamination exposure to humans, all site activities will be carried out in accordance with Part A of the CoCP during construction of the Scheme. Measures include preparation/utilisation of health and safety risk assessments, method statements and appropriate Personal Protective Equipment (PPE) for the protection of construction workers, implementing appropriate fuel storage (i.e. allocated re-fuelling area) and pollution control measures (i.e. drip trays and spill kits); and use of hardstanding or compacted aggregate where practicable to minimise infiltration and the generation of dust that might contain contaminants.

5.1.101 Best practice measures will be implemented to avoid accidental spillages of polluting substances and to ensure that management of any excavated contaminated material will not pose significant risk to receptors. The measures will be detailed within the PPICP under Part B of the CoCP.

5.1.102 Public access to the parts of the Scheme area where exposure to potential ground contamination will be restricted and areas fenced off.

5.1.103 Prior to construction, where land is required for temporary access or use as a construction compound, a walkover survey will be undertaken by a land contamination consultant prior to the Scheme Contractor taking possession of the land to confirm baseline conditions.

5.1.104 Following completion of the ground investigation and risk assessment across the Scheme, if contamination/gas are considered to pose an unacceptable risk, remediation of soil/groundwater contamination will be undertaken. A remediation options appraisal/strategy will be prepared. Following completion of the remediation activities, a verification report will also be prepared. Potential unidentified impacts could be mitigated through readily available industry standard techniques that are frequently and successfully applied to a wide range of construction schemes.

Residual effects

5.1.105 Following the application of the measures outlined, no residual significant adverse effects are anticipated during construction or operation.

5.1.106 Remediation and ground improvement works would be undertaken for areas within the Scheme where more severe geohazard and coal/mining-related risks have been identified. This would result in a potential significant beneficial effect.

Waste and materials

Introduction

5.1.107 An assessment has been made of the waste and materials effects associated with the construction and operation of the Scheme.

5.1.108 The study area for this assessment covers the Yorkshire and The Humber region for waste and Yorkshire and The Humber region and nationally (UK) for materials.

Construction effects

5.1.109 Effects associated with the construction of the Scheme include the high volume, short-term, permanent use of landfill void capacity and materials, and the permanent sterilisation of Mineral Safeguarding Areas (an area designated to protect essential mineral infrastructure and resources).

5.1.110 There are various waste streams which will be generated as a result of the Scheme. Waste will be generated from bridge demolitions and from the clearance of areas to construct compounds, haul roads and access structure and the railway along the Scheme. General waste will be generated by the workforce from food packaging and office type waste. Excessive waste generation and material use has been considered during the design of the Scheme, to ensure materials used are reused (from excavation and/or demolition); and/or recycled or reclaimed, where practicable. The waste generated is not anticipated to result in significant adverse effects.

Operational effects

5.1.111 No significant effects on waste and materials have been identified during operation.

Measures to minimise effects

5.1.112 To mitigate these effects, the Scheme has been designed to reuse excavated material instead of bringing in virgin fill material to reduce the need for imported material and waste disposal. A Materials Management Plan (MMP) incorporating a Soils Mitigation Plan, and a Waste Management Plan (WMP) will also be implemented during construction under Part B of the CoCP. Measures to be incorporated into the MMP will include details of the Scheme requirement to implement a material tracking system to identify, track, monitor and report on material use. The tracking system will, for example, ensure that materials and waste are segregated, stored in appropriate stockpiles and the correct quantity of material is stored

and used etc.

5.1.113 On-site mitigation will also include best practice such as providing separate containers for waste to achieve high recycling rates and training staff to minimise waste generation.

5.1.114 To ensure the permanent sterilisation of Mineral Safeguarding Areas, wastage of materials will be minimised, with efforts made to maximise on-site reuse, off-site recycling and/or recovery of the waste generated.

5.1.115 Good practice measures will also be implemented during operation. Measures include:

- Any materials required for planned/unplanned maintenance will be managed in accordance with the good practice procedures;
- Recyclable waste will be source segregated using clearly marked and/or colour-coded containers to enable easy identification of where waste should be placed during planned/unplanned maintenance;
- Hazardous waste will be source segregated. An area will be set aside, at maintenance depots, for hazardous waste storage which will include appropriate containers; and
- Regular training will be provided for staff and/or sub-contractors. The training will focus on the practices necessary to minimise waste and to facilitate good practice whilst undertaking litter picking and planned/unplanned maintenance.

Residual effects

5.1.116 Having implemented the mitigation measures no significant effects are anticipated.

Traffic and transport

Introduction

5.1.117 An assessment has been undertaken to assess traffic and transport related impacts and consequential effects of the Scheme during construction and operation. The assessment has been informed by the results of a separate Transport Assessment, which was undertaken to quantify the potential impacts of the Scheme on all modes of transport during construction and operation.

5.1.118 A comprehensive review of all the potential transport impacts of the Scheme has been undertaken with measures to mitigate any adverse consequences identified.

Construction effects

5.1.119 The assessment considers traffic volumes, delays, demand and capacity of the road network and road safety within the Scheme and surrounding transport routes. It assesses the potential effect of changes to traffic volumes and traffic composition during construction and operation on a number of assessment areas including driver delay, pedestrian and cyclist delay/amenity, fear and intimidation, accident and safety, and severance.

5.1.120 Forecasted traffic growth, traffic associated with planned developments (Committed developments agreed with Kirklees Council), which include projects under construction, permitted and submitted planning applications; and projects identified in the relevant Development Plan, and trip estimates for the Scheme have been added to the Kirklees Traffic Model (provided by Kirklees Council) in order to provide a conservative (worst-case scenario) assessment.

5.1.121 The assessment identified a total of 107 links on 68 roads that could be impacted by the Scheme during the construction phase. Links represent sections of road that have the same properties (speed, capacity etc.). A road may be represented by one or many links, depending on whether the properties of the road change for example, a change in speed limit.

5.1.122 Temporary significant adverse effects are predicted for the following during the construction stage:

- Driver delay, pedestrian and cyclist delay, and accidents and safety – 48 links (37 roads);
- Pedestrian and cyclist amenity – 28 links (27 roads);
- Fear and intimidation – 47 links (37 roads); and
- Severance – 67 links (42 roads).

Operational effects

5.1.123 The operation of the Scheme will not result in significant changes to traffic flows and will in most cases have a beneficial effect on non-motorised users in and around the stations. It is therefore considered that the operation of the Scheme will have a beneficial effect on road users and on rail travel. During operation, the Scheme is considered to have a permanent beneficial effect, which is not considered to be significant.

Measures to minimise effects

5.1.124 In order to minimise the construction effects, a CTMP will be produced to help manage traffic

throughout the construction phase and limit the impact on the highway network and receptors. Measures will include diversion routes for the road network during temporary road closures, planning works in phases, and maintaining access to properties and businesses, as far as reasonably practicable during construction. These measures will be agreed with Kirklees Council prior to works commencing. As no significant effects have been identified during the operational phase, no measures are proposed.

Residual effects

5.1.125 Due to the requirement for temporary road closures, it is expected that significant adverse residual effects during construction will remain.

5.1.126 No significant residual effects were identified during operation.

Population and human health

Introduction

5.1.127 An assessment has been undertaken to identify population and human health effects associated with the construction and operation of the Scheme. The assessment covers the following wider determinants of health:

- Air pollution;
- Soil and water pollution;
- Risk of injuries and death;
- Housing;
- Education, healthcare services and community facilities;
- Transport options;
- Active travel;
- Work and training;
- Social cohesion and lifetime neighbourhoods; and
- Noise pollution and vibration.

5.1.128 The assessment considers the potential effects of the Scheme on two types of population. The first is the general or wider population (e.g. residents, passengers, workers, owners, operators and users of community and amenity facilities, visitors to and users of open spaces, recreation routes and sports facilities, and road users) and the second is vulnerable groups present within the general population.

Construction effects

5.1.129 During construction, the assessment found that significant effects are predicted for the following wider determinants of health.

Housing

5.1.130 Temporary land take and/or disruption effects would be experienced during construction at a number of residential properties along the Scheme resulting in temporary significant adverse effects on the physical receptors (houses) and human receptors (owners/occupants). The significant adverse effects have only been identified for the owner/occupants of the properties.

Education, healthcare services and other social infrastructure

5.1.131 Temporary disruptions to access and severance effects at a children's nursery on Thornhill Road, Dewsbury would result in significant temporary effects for workers, parents and children that attend the nursery. There would be no significant adverse effects for people not working at or using the nursery.

Transport options

5.1.132 The temporary closure of the railway and stations would result in significant disruption effects, changes to travel patterns, longer journey distances and times, changes in journey quality and reliability, inconvenience and increased costs. These effects would be temporary, direct, short-term and reversible. The effects would be the same for all population groups, including the wider group and any vulnerable groups. Following completion of the works, there would be no permanent significant adverse effects for the physical or human receptors.

5.1.133 The temporary closure of a number of local roads in the Scheme area would result in disruptions, re-routing of vehicles, changes to travel patterns, longer journey distances and times, changes in journey quality and reliability, inconvenience and increased costs. The effect would be significant and temporary for the physical and human receptors.

5.1.134 For active travel (making journeys by physically active means, like walking or cycling), significant disruption effects, increases in journey distance and times and severance are predicted for pedestrians and other users from the permanent diversion/realignment of four Public Rights of Way (PRoW).

5.1.135 Temporary closure, disruption effects, and in some cases diversions, are also proposed during construction at a number of PRoW, footpaths, canal towpaths and greenways. Most

of the effects would be short-term.

Work and training

5.1.136 Temporary significant adverse disruption effects would be experienced for local businesses to accommodate works at Huddersfield Station, Longroyd Lane, Red Doles Road and the A62 Leeds Road.

5.1.137 Local businesses off the A62 Leeds Road and off Colne Bridge Road would be impacted by works in the surrounding area during the temporary closure of these roads and a range of local businesses near the proposed works at Calder Road and Thornhill Road would also be impacted. These effects would be temporary for the physical and human receptors (owners/employees). No significant adverse effects are predicted for customers or people that use these local businesses.

Operational effects

Housing

5.1.138 The permanent loss of three residential properties and permanent loss of garden space at five residential properties would result in permanent significant adverse effects on the physical receptor (houses) and human receptors (owners/occupants).

Work and training

5.1.139 Permanent significant adverse effects from the demolition of a commercial property on Thornhill Road would be experienced by the owners of the property.

Measures to minimise effects

5.1.140 Best practice environmental management measures will be implemented on site through application of Part A of the CoCP to minimise disruption and amenity effects.

5.1.141 Part B of the CoCP will incorporate a series of environmental delivery plans, including a Nuisance Management Plan (NMP), a Pollution Prevention and Incident Control Plan (PPICP), a Noise and Vibration Management Plan (NVMP), a Materials Management Plan (MMP) and a Waste Management Plan (WMP), all of which include measures to minimise effects on the population in the area surrounding the Scheme.

5.1.142 Measures included in an External Communications Programme under Part B of the CoCP will minimise effects on community land and facilities and include engaging in meaningful discussions with local businesses and ensure continued engagement with Kirklees Council

and local communities.

5.1.143 A Construction Traffic Management Plan will include measures to reduce impacts of temporary traffic management arrangements.

Residual effects

Construction

5.1.144 During construction, permanent significant adverse residual effects are still predicted from the loss of three residential properties and permanent land take at five other residential properties. Significant temporary residual effects are still predicted from temporary land take and disruption effects at a number of residential properties.

5.1.145 Temporary significant adverse residual effects are still predicted for one education facility, Childs Play Day Care Nursery, on Thornhill Road.

5.1.146 Temporary significant adverse residual effects are still predicted following the temporary closure of the railway and railway stations, and the temporary closure of several local roads which cross or are located near to the railway line and construction impact on the highway network and receptors.

5.1.147 Temporary significant adverse residual effects are still predicted for a number of PRoW, footpaths/cycle provision and the Birkby Bradley Greenway and Calder Valley Greenway from temporary closures, diversions and/or disruption effects.

5.1.148 Permanent and temporary significant adverse residual effects are still predicted from the loss of a small number of local businesses, land take and disruption effects.

5.1.149 Temporary significant adverse residual effects are still predicted from road traffic noise at due to temporary diversions and construction traffic along affected routes.

Operation

5.1.150 Significant adverse residual effects in relation to noise and vibration are still predicted for the external amenity areas, such as gardens and patio areas, during daytime periods at 14 noise sensitive receptors.

Climate vulnerability

Introduction

5.1.151 An assessment of the climate vulnerability effects associated with the construction and operation of the Scheme has been carried out and the impact of future climatic conditions on the Scheme have been considered.

Construction effects

5.1.152 The assessment of the vulnerability of the Scheme to climate change has shown that climate projections covering the Scheme area show that it is likely climate will change in the future and that the Scheme will be vulnerable to the consequences of this change during its operation. However, the detailed assessment has found that none of these vulnerabilities (such as exposure to hotter and drier summers, heavier rainfall and extreme weather) are significant, as the Scheme has been designed to sufficiently adapt to such effects.

Operational effects

5.1.153 Operational processes have been considered in the design of the Scheme and will be implemented during operation, to remove and reduce any significant climate vulnerability impacts. No significant effects have been identified during operation.

Measures to minimise the effects

5.1.154 No specific measures are required, as no significant effects have been identified during construction or operation of the Scheme. However, the detailed design of the Scheme will be undertaken in accordance with Network Rail's engineering standards, which address weather resilience.

Residual effects

5.1.155 No significant residual effects remain in relation to climate vulnerability during construction or operation of the Scheme.

Effects on climate

Introduction

5.1.156 An assessment has been made on the effects on climate resulting from construction and operation of the Scheme.

Construction effects

5.1.157 Greenhouse gas (GHG) emissions for the construction of the Scheme have been calculated, based on available design information, and have been considered in the context of the UK's national carbon budgets and overall Net Zero Carbon ambition.

5.1.158 The construction of the Scheme, plus operation of the Scheme in the first year, will contribute approximately 265,000 tonnes of carbon dioxide equivalents to the UK's carbon budget (2023-2027) which is less than 1%.

5.1.159 Due to the small scale of emissions and emissions reductions (all rail travel is responsible for only 0.6% of total UK emissions), the Scheme is deemed to be unlikely to cause significant effects on climate during construction.

Operational effects

5.1.160 In operation, there will be a reduction in annual emissions of approximately 1,500 tonnes of carbon dioxide equivalents due to electrification of the line and a shift to bi-modal trains, which are able to use the electrified lines.

5.1.161 The Scheme supports UK Government policy to encourage electrification of railways as a means of reducing carbon emissions. Whilst it is not possible to quantify the future beneficial effects of this element of the Scheme, it is considered likely that the Scheme will provide an overall beneficial effect during its lifetime.

5.1.162 However, due to the small scale of emissions and emissions reductions (all rail travel is responsible for only 0.6% of total UK emissions), the Scheme is deemed to be unlikely to significantly affect the UK's ability to meet its emissions reduction targets.

Measures to minimise effects

5.1.163 As the detailed design develops, more focus will be given to building clever.

5.1.164 Measures are proposed in Part A of the CoCP to minimise effects during construction. These aim to 'build efficiently' and examples include: fixed site plant and temporary offices will be powered by mains electrical sources wherever possible; reliance on diesel and associated emissions will be reduced; machinery and vehicles which are not in use will be shut down rather than being allowed to idle; and, energy efficiency of vehicles will be maximised, by full loading and efficient routing.

Residual effects

5.1.165 No significant residual effects remain with regard to effects on climate during construction or operation of the Scheme.

Electromagnetic interference

Introduction

5.1.166 An assessment of electromagnetic interference and electromagnetic field exposure effects associated with the construction and operation of the Scheme has been carried out. Potential effects have been identified using a risk-based approach and recorded in a Risk Assessment, which has been prepared in accordance with electromagnetic interference and electromagnetic field exposure legislation, standards and guidelines. The Scheme will also be implemented in accordance with Network Rail's engineering standards.

5.1.167 Each potential hazard is categorised into electromagnetic zones (a bounded area in which specific levels of electromagnetic energy are deemed to exist). In the railway environment, the zone containing most energy exists on the trackside of the railway and close to power distribution equipment. The zones applied are used to determine the required electromagnetic compatibility immunity levels, electromagnetic field exposure limits and control methods to be applied to equipment operating in this area.

Construction effects

5.1.168 There are no anticipated electromagnetic interference or electromagnetic field exposure effects during the construction of the Scheme.

Operational effects

5.1.169 In total eight receptors were identified along the Scheme which have initially been classified as significant with regards to electromagnetic interference during operation.

5.1.170 Two sites were identified to not be significant following assessment and six sites will require further assessment during detailed design to determine any required mitigation measures with regards to electromagnetic interference in conjunction with the site owners. One of these sites will also require further assessment with regards to electromagnetic field exposure once the design matures.

Measures to minimise effects

5.1.171 Prior to detailed design, consultation with the site owner shall be undertaken to determine the presence of any highly sensitive equipment and its location within the site. An External Communications Programme will be produced under Part B of the Code of Construction Practice (CoCP) which will set out the procedure for engagement.

5.1.172 A risk assessment will be undertaken during detailed design to determine any additional mitigation measures required. Potential measures have been identified for these sites which include, but are not limited to:

- Relocation of susceptible equipment within the premises;
- Change of use in the rooms located nearest to the railway; and,
- Insulation or gapping and bonding of metallic utilities and buried services.

Residual effects

5.1.173 The assessment has determined that the implementation of mitigation measures would be sufficient to ensure no significant residual effects remain, regardless of the outcomes of any further assessments undertaken.

Agriculture

Introduction

5.1.174 An assessment has been made of agricultural soils and the viability of affected agricultural holdings associated with the construction and operation of the Scheme. The assessment considers the temporary and permanent agricultural land take required to construct and operate the Scheme.

Construction effects

5.1.175 Temporary construction effects will occur on agricultural land required to construct the Scheme and will include any temporary severance of land during the construction period and the effects of disruption, primarily from construction noise and dust, on land uses. In most cases, the temporary and permanent land acquisition will occur simultaneously at the start of the construction period and it is the combined effect of both that will have an impact on the holdings and associated agricultural soils.

5.1.176 Agricultural land acquired in the construction phase will total 21.77 hectares (ha) of which 5.17ha is classed as best and most versatile (BMV) quality in Agricultural Land Classification

(ALC) Grades 2 and 3a.

5.1.177 Three agricultural holdings will be affected during the construction phase.

Operational effects

5.1.178 Where land is required permanently, permanent land take will total 10.21ha, of which 1.56ha is of BMV quality, and this is a significant adverse effect. The effect would begin during the construction period and remain following the construction period into operation of the Scheme.

Measures to minimise effects

5.1.179 Measures to minimise construction effects on agricultural holdings include prevention of disturbance to adjacent land, suppression of dust and reduction of noise in the vicinity of livestock, and provision of temporary access to land which is severed by construction works, if required. These measures would be detailed in the Nuisance Management Plan under Part B of the CoCP.

5.1.180 Following completion of construction, temporarily acquired land, totalling 11.56ha will be restored to a condition equivalent to its original, unless the landowner and Network Rail agree an alternative position. To minimise effects on agricultural soils, A Soil Mitigation Plan will include a pre-disturbance record of the 11.56 ha of soil's physical characteristics and ALC grade of the land. The quality and quantity of soil on-site will be maintained by implementing appropriate techniques for stripping, stockpiling and reinstatement of topsoil and sub-soil.

5.1.181 There is no environmental mitigation for temporary loss of use of agricultural land. Acquisition by negotiation is the preferred option, however if necessary, land will be compulsorily purchased through the TWAO. Discussions are already ongoing between the landowners and tenants and Network Rail's land and property team.

5.1.182 Impacts of construction on the affected agricultural holdings will be minimised through liaison between the contractor and landowner and tenant, as set out in the External Communications Plan under Part B of the CoCP.

Residual effects

5.1.183 With appropriate mitigation of impacts during construction, there will be not be a significant effect on the viability of the three agricultural holdings.

5.1.184 All three holdings will permanently lose small amounts of land to the engineering footprint of the Scheme, none of which is will be significant in terms of their future operation.

Public open space

Introduction

5.1.185 An assessment of impacts to public open space associated with the construction and operation of the Scheme has been undertaken.

5.1.186 For the purposes of this assessment public open space is defined as “land laid out as a public garden, or used for the purposes of public recreation, or land which is a disused burial ground”.

5.1.187 In total, 12 areas of public open space were identified within the Scheme boundary that may be impacted by the works (during construction and/or operation).

Construction effects

5.1.188 During construction, temporary significant adverse effects are anticipated on five areas of public open space in relation to recreational and visual amenity.

Operational effects

5.1.189 The Scheme would result in the permanent loss of around 26,261 square metres of public open space.

Measures to minimise effects

5.1.190 The permanent loss of public open space will be fully mitigated through the provision of 26,540 square metres of exchange land.

5.1.191 Network Rail will enter into consultation with Kirklees Council, the Canal & River Trust and the operators of Forge Land Quarry to create a landscape design for the exchange land in this plot, to ensure that the planting schemes to be included within the LEMP provide a wider connectivity benefit between the sites. Such landscaping might include but is not limited to improvement in footpaths, occasional benches, specified planting and information boards explaining the history and importance of the area.

5.1.192 Where vegetation removal is proposed in public open space land, replacement planting or measures to enable regeneration will be undertaken. Further details, including planting plans

will be included in the LEMP.

Residual effects

5.1.193 There will be no significant residual effects on public open space.

Socio-economics

Introduction

5.1.194 A socio-economic assessment has been undertaken to consider impacts to:

- Employment;
- Business activity; and
- Population and community welfare.

Construction effects

5.1.195 No significant adverse effects are anticipated during the construction period.

5.1.196 During construction temporary significant beneficial impacts are predicted for the local economy and local workforce, due to direct and indirect demand for labour.

Operational effects

5.1.197 There would be major operational benefits from the improvement to the railway through the Local Authority area, as the Scheme will facilitate improvements to journey times between Huddersfield and Westtown (Dewsbury). The Scheme provides four-tracking between Huddersfield and Westtown (Dewsbury), which unlocks significant performance benefits, as it reduces conflict and enables fast and semi-fast trains to overtake slower stopping trains, reducing the risk of delay.

5.1.198 These Scheme operational benefits also include remodelling at Huddersfield Station, increasing capacity and improving the passenger experience through improved wayfinding as well as the introduction of a secondary step free access (lifts and footbridge) to the east of the station. Two further stations are upgraded within the Scheme, Deighton and Mirfield, which creates access for all stations.

5.1.199 It has been judged that the Scheme's operation is likely bring significant socio-economic benefits across the Local, Sub-regional and Regional level in terms of business activity and employment.

5.1.200 The improvements will have a beneficial effect overall on access to local businesses in the Scheme area and the local economy in terms of encouraging new development opportunities and jobs that could be generated directly and indirectly by the Scheme. This will be enhanced locally with TRU Programme employment approaches concerning employment targets for the 25 mile and 40 mile radius, apprenticeships, and local procurement opportunities. It is judged that there are likely to be significant cumulative benefits from the Scheme as it enables the benefits of the wider TRU Programme and provides improved reliability, performance, capacity as well as faster journey times between Manchester and Leeds. These benefits will be strengthened with the development of the TRU Programme.

Measures to minimise effects

5.1.201 The socio-economic effects of the Scheme identified during construction are beneficial or not assessed to be significant and therefore no specific mitigation measures are proposed.

5.1.202 However, measures to limit disruption to business activity are detailed in Part A of the CoCP. Further detail of measures to minimise disruption will be included in a CTMP and an External Communications Programme (through the CoCP) which will be implemented. This may include details on diversion routes, signage and support provided for business access (for operations, workers and customers), along with measures to maintain access to local businesses throughout the construction stage.

5.1.203 The socio-economic effects of the Scheme identified during operation are beneficial and therefore no mitigation measures are proposed.

Residual effects

5.1.204 Significant residual effects are anticipated arising from both the construction and operation of the Scheme.

5.1.205 Significant residual effects arising from the construction of the Scheme have been identified as those of employment and expenditure in the Local Authority area through the significant Scheme construction and supply chain activity, with a notable local employment target. Though temporary in nature access to employment and upskilling opportunities, including Scheme approaches to apprenticeships, alongside the induced spending impact from direct employees are judged to have a significant beneficial effect.

5.1.206 Significant residual effects arising from the operation of the Scheme are identified as resulting from the improved journey times, reliability, and capacity at the Local Authority area

and in turn the Sub-regional and Regional level. These improvements are judged to likely bring direct significant benefits to local businesses and the labour market through improved access and in providing opportunities at and around Huddersfield Station through passenger spend and business activity uplifts.

5.1.207 Indirectly, the Scheme will also support wider economic benefits such as productivity and agglomeration in the Sub-regional and Regional levels. strategic The Scheme supports the sub-regional and regional strategic aims from its contribution to the wider TRU Programme and strategic connectivity improvements across West Yorkshire and the North of England. Such effects are considered likely to be significant.

6. CONCLUSION

6.1.1 The Scheme will provide an improved train service between Huddersfield and Westtown (Dewsbury).

6.1.2 Alternatives have been assessed throughout the design process, and this process has identified that the selected preferred option is the most appropriate.

6.1.3 The EIA has identified that, through careful design and implementation of appropriate measures, adverse effects resulting from the Scheme can be largely avoided.

6.1.4 However, whilst a series of appropriate mitigation measures will be implemented to minimise these adverse effects, they cannot entirely prevent effects, given the size and scale of the structures and the nature of the surrounding landscape.

6.1.5 Following the implementation of mitigation measures, significant adverse residual effects are anticipated during construction for the following environmental topics:

- Historic environment;
- Landscape, townscape and visual impact;
- Traffic and transport;
- Population and human health; and
- Public open space.

6.1.6 Following the implementation of mitigation measures, significant adverse residual effects during operation are anticipated for the following environmental topics:

- Historic environment;
- Noise and vibration;
- Landscape, townscape and visual impact; and
- Population and human health.

6.1.7 Significant beneficial residual effects are anticipated during operation, in association with geology, soils and land contamination, and socio-economics.

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