TRANSPORT AND WORKS ACT 1992

Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006

THE NETWORK RAIL (HUDDERSFIELD TO WESTTOWN (DEWSBURY) IMPROVEMENTS) ORDER

DOCUMENT NR15: DESIGN AND ACCESS STATEMENT

Rule 10(3)(a)

Document Reference	151667-TSA-W3-MVL3-CNT-W-LP-000017
Author	Network Rail
Date	March 2021
Revision Number	Rev. 1

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1. INTRODUCTION

1.1 Project Overview

1.1.1 The Scheme, the subject of the TWAO, comprises an upgrade of the Trans-Pennine route between Huddersfield and Westtown, a suburb of Dewsbury. The upgrade includes four-tracking and upgrading of the existing railway line; the electrification of the route; provisions of sections of new railway; re-located station at Ravensthorpe; and platform extensions/re-modelling of existing stations at Huddersfield, Deighton and Mirfield. Of the two lengths of new railway one is a curve at Heaton Lodge of approximately 0.8 miles (1 km) in length of which 0.8 km is outwith NR ownership and the other a new grade separated junction including a viaduct approximately 0.9 miles in length.

1.1.2 The Scheme forms part of a wider upgrade to the whole of the Trans-Pennine Route (TRU), which comprises a series of projects between Manchester, Huddersfield, Leeds and York with the objective being to improve journey times and capacity between key destinations on the line, improve overall reliability and resilience, and provide environmental benefits from modal shift to rail and part electrification. TRU is being designed as a phased programme of interventions with those interventions being delivered as separate projects, alongside each other.

1.1.3 The aim of the project is to increase capacity and improve journey times on the Trans-Pennine route. This is achieved by four tracking along the route from Huddersfield to Westtown and removing the conflicts that arise with trains heading to/from the L&Y route crossing the Manchester-Leeds line between Heaton Lodge Junction and Thornhill LNW junction, through the provision of a new grade-separated junction. Furthermore, the new section of railway at Heaton Lodge will smooth out the curve of the line and permit faster line speeds in this section. By removing the conflict, increasing linespeeds and providing four tracking enough capacity is released to enable upto 8 paths per hour to be available on the fast lines for the 2027 timetable. In addition, the Trans-Pennine and L&Y routes will have reduced delays in times of perturbation. The benefits include a more robust timetable operation with reduced delays in clearing the main line, allowing for better pathing of trains, increased capacity and better recovery from delays. This in turn leads to a more efficient and effective service, in turn increasing the attractiveness of the service for the economic benefit of the wider rail network on the Trans-Pennine Route and the UK economy.

1.1.4 This Statement forms part of, and should be read alongside, the suite of application documents submitted by Network Rail in support of its application for the Huddersfield to Westtown TWAO.

1.2 Purpose of the Design and Access Statement

1.2.1 The purpose of this document is to describe the design rationale of the proposed interventions within the Scheme. The main focus of this document is placed on the elements of the Scheme which will be accessed by the public, namely overbridges, underbridges and station interventions.

1.2.2 In addition to this document for a fuller understanding of the design at Huddersfield Station see the Huddersfield Station Design and Access Statement, document W3 TWAO - NR15A. Therefore, the works proposed at Huddersfield Station are explored at a high level in this document.

2. DEVELOPMENT CONTEXT

2.1 Policy Context

2.1.1 The Planning Statement that accompanies the TWAO application provides details of the relevant planning policy context for the Scheme. Appendix 3 of the Planning Statement lists the specific policies relevant to the application, amongst which are pertinent policies relevant to design and access matters. The Scheme has therefore been assessed against relevant national and local planning policy which includes the following:

- National Planning Policy
- Kirklees Local Plan

2.1.2 This statement makes reference to and emphasises those policies relevant to the specific design and access aspects of the Scheme. However, the full texts of the relevant policies are to be found in Appendix 3 of the Planning Statement.

2.2 National Policy

2.2.1 The National Planning Policy Framework (NPPF) provides the planning policy context for this planning request. The NPPF sets out the Government's planning policies for England and how these are expected to be applied. It recognises that the planning system is plan led and that Local Plans must aim to meet the objective of sustainable development. Paragraph 11 of the NPPF states that, at the heart of the Framework, is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking. For decision-taking this means:

- Approving development proposals that accord with the development plan without delay; and
- Where there are no development plan policies, or relevant polices are out of date, granting permission unless:
    - The application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or
    - any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the polices in the NPPF taken as a whole.

2.2.2 NPPF Chapter 12 (achieving well designed spaces) states that the Government attaches great importance to the design of the built environment. Good design is a key aspect of sustainable development, is indivisible from good planning, and should contribute positively to making places better for people. It further lists a series of bullet points requiring that new development should meet certain criteria, including the need to ensure

that developments are safe and accessible and are visually attractive through quality architecture and appropriate landscaping.

2.2.3 Paragraph 130 of the NPPF further states that permission should be refused for development of poor design. Conversely, where design fulfils clear expectations in plan policies it should not be used as a reason to refuse applications. Policies should also encourage innovation, originality or initiative and not through unsubstantiated requirements to conform to certain development forms or styles. It is, however, proper to seek to promote or reinforce local distinctiveness.

2.2.4 Further guidance on design is given in National Planning Practice Guidance (NPPG), the web-based resource. This Guidance makes specific reference to good design and the need to ensure that well-designed places are functional, support mixed uses and tenures, include successful public spaces, be adaptable and resilient, have distinct character, be attractive and encourage ease of movement.

2.3 Local Policy

2.3.1 At the local level development is governed by the local planning authority (KC) and the Local Plan (2012) is the development plan document which sets out the policies and proposals of the Authority in shaping the future management of the area.

2.3.2 In terms of the Local Plan there is a specific chapter on design, and Policy LC24 sets the expected level of design quality and philosophy which should accompany each application for planning permission. These are as follows;

- *Design: Good design should be at the core of all proposals in the district and should be considered at the outset of the development process, ensuring that design forms part of pre-application consultation of a proposal. Development briefs, design codes and masterplans should be used to secure high quality, green, accessible, inclusive and safe design, where applicable. Where appropriate and in agreement with the developer schemes will be submitted for design review. In developing designs for the various elements of the Improvements we are conscious of the heritage aspects of the existing listed structures (particularly Huddersfield station) as well as the general overall philosophy of standard railway design of new structures such as footbridges, re-constructed road bridges and lift installations; these have shaped the eventual design solutions brought forward for both listed and non-listed structures bearing in mind the overall principles espoused in Policy 24.*

Proposals should promote good design by ensuring:

- *the form, scale, layout and details of all development respects and enhances the character of the townscape, heritage assets and landscape;*
- *they provide a high standard of amenity for future and neighbouring occupiers; including maintaining appropriate distances between buildings and the creation of*

development-free buffer zones between housing and employment uses incorporating means of screening where necessary;

- *extensions are subservient to the original building, are in keeping with the existing buildings in terms of scale, materials and details and minimise impact on residential amenity of future and neighbouring occupiers;*
- *high levels of sustainability, to a degree proportionate to the proposal, through:*
  - *The re-use and adaptation of existing buildings, where practicable;*
  - *design that promotes behavioural change, promoting walkable neighbourhoods and making walking and cycling more attractive;*
  - *considering the use of innovative construction materials and techniques, including reclaimed and recycled materials;*
  - *where practicable, minimising resource use in the building by orientating buildings to utilise passive solar design. This includes encouraging the incorporation of vegetation and tree planting to assist heating and cooling and considering the use of renewable energy;*
  - *providing charging points to encourage the use of electric and low emission vehicles; vi. incorporating adequate facilities to allow occupiers to separate and store waste for recycling and recovery that are well designed and visually unobtrusive and allows for the convenient collection of waste;*
  - *designing buildings that are resilient and resistant to flood risk, where such buildings are acceptable in accordance with flood risk policies and through incorporation of multi-functional green infrastructure where appropriate;*
  - *designing places that are adaptable and able to respond to change, with consideration given to accommodating services and infrastructure, access to high quality public transport facilities and offer flexibility to meet changing requirements of the resident / user.*
- *the risk of crime is minimised by enhanced security, and the promotion of well-defined routes, overlooked streets and places, high levels of activity, and well-designed security features;*
- *the needs of a range of different users are met, including disabled people, older people and families with small children to create accessible and inclusive places;*
- *any new open space is accessible, safe, overlooked and strategically located within the site and well-integrated into wider green infrastructure networks;*
- *development contributes towards enhancement of the natural environment, supports biodiversity and connects to and enhances ecological networks and green infrastructure;*
- *the retention of valuable or important trees and where appropriate the planting of new trees and other landscaping to maximise visual amenity and environmental benefits; and*

- *the provision of public art where appropriate.*

Criterion 6 of the policy is particularly important in addressing the accessibility requirements of the proposal.

2.3.3 *Policy LP35 – Historic Environment*

- *Development proposals affecting a designated heritage asset (or an archaeological site of national importance) should preserve or enhance the significance of the asset. In cases likely to result in substantial harm or loss, development will only be permitted where it can be demonstrated that the proposals would bring substantial public benefits that clearly outweigh the harm, or all of the following are met:*
  a) the nature of the heritage asset prevents all reasonable uses of the site;
  b) no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation;
  c) conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible; and
  d) the harm or loss is outweighed by the benefit of bringing the site back into use.
- *Proposals which would remove, harm or undermine the significance of a non-designated heritage asset, or its contribution to the character of a place will be permitted only where benefits of the development outweigh the harm having regard to the scale of the harm and the significance of the heritage asset. In the case of developments affecting archaeological sites of less than national importance where development affecting such sites is acceptable in principle, mitigation of damage will be ensured through preservation of the remains in situ as a preferred solution. When in situ preservation is not justified, the developer will be required to make adequate provision for excavation and recording before or during development.*
- *Proposals should retain those elements of the historic environment which contribute to the distinct identity of the Kirklees area and ensure they are appropriately conserved, to the extent warranted by their significance, also having regard to the wider benefits of development. Consideration should be given to the need to:*
  a) ensure that proposals maintain and reinforce local distinctiveness and conserve the significance of designated and non-designated heritage assets;
  b) ensure that proposals within Conservation Areas conserve those elements which contribute to their significance;
  c) secure a sustainable future for heritage assets at risk and those associated with the local textile industry, historic farm buildings, places of worship and civic and institutional buildings constructed on the back of the wealth created by the textile industry as expressions of local civic pride and identity;
  d) identify opportunities, including use of new technologies, to mitigate, and adapt to, the effects of climate change in ways that do not harm the significance of heritage assets and, where conflict is unavoidable, to balance the public benefit

of climate change mitigation measures with the harm caused to the heritage assets' significance;

e) accommodate innovative design where this does not prejudice the significance of heritage assets; and

f) preserve the setting of Castle Hill where appropriate and proposals which detrimentally impact on the setting of Castle Hill will not be permitted.

2.3.4 In terms of the overall landscape the visual impact of the Scheme has been carefully assessed in the landscape and visual chapter of the Environmental Statement. It concludes that there will be no significant landscape effects both during the construction and operational phase of the development.

2.3.5 In the extensive period of public consultation on the project it is pertinent to observe that no particular comments were expressed on the design of any of the structures.

2.3.6 The design of individual structures is further assessed below. However, as a general principle the tradition of railway engineering would suggest the preferred approach that tends towards robust and plainly expressed surfaces, including powder coated steel, galvanised steel, painted or un- painted (weathering) steel and concrete.

2.4 Equality Act 2010

2.4.1 The Equality Act 2010 provides legal protection from discrimination. As part of its response to the Equality Act 2010, Network Rail published Spaces and Places for Everyone, Inclusive Design Strategy 2015 – 19 which outlines its approach to the delivery of inclusive infrastructure.

2.4.2 The Huddersfield and Westtown (Dewsbury) Scheme requires intervention at Huddersfield, Deighton, Mirfield and Ravensthorpe Stations. The Project Requirements set out the requirement to ensure these stations are accessible to those with reduced mobility. The stations have been designed in accordance with Network Rail's Access for All policy, with step-free platform access.

2.5 Historical Context

2.5.1 The Scheme Route between Huddersfield and Westtown (Dewsbury) was constructed and opened between 1836 and 1849. The route today comprises sections of rail line developed by different railway companies, characteristic of the wider Transpennine Route between York, Leeds and Manchester. The complex chain of companies and projects is a typical product of the "Railway Mania" of the mid-1840s, the height of a period of commercial confidence and expansion in the railways[1].

[1] Alan Baxter Associates, 2019. *TransPennine Route Upgrade Route-wide Statement of Significance*. 14.

2.5.2 Between Huddersfield and Westtown (Dewsbury), the Transpennine Route is made up of sections of:

- The Manchester & Leeds Railway, constructed 1836-39, between Ravensthorpe and Heaton Lodge;
- The Leeds, Dewsbury & Manchester Railway, constructed 1845-47, between Westtown (Dewsbury) and Ravensthorpe; and
- The Manchester & Huddersfield Railway, constructed 1846-49, between Heaton Lodge and Huddersfield.

2.5.3 The line formed a new, more direct route to the West Riding from Manchester, in competition to the earlier Manchester & Leeds Railway which had been constructed through the Calder Valley in the late 1830s. The more direct route was enabled partly through the advances in tunnel construction and large-scale engineering technology, notably realised through the construction of the 3-mile Standedge Tunnel under the Pennine watershed to connect the line between the Upper Thame and Colne Valleys. Between Huddersfield and Westtown (Dewsbury), the line is partly characterised by such examples of large scale and/or pioneering engineering structures, including tunnels, viaducts and both masonry and cast iron bridges.

2.5.4 The development and expansion of the railways and their associated infrastructure during the first half of the 19th century, was characterised by the considerable influence on those towns which experienced the development of this new mode of transport. The railways resulted in place-making and industrial growth, as towns benefited from the connections and influences which they brought with them. This was certainly true of the Transpennine Route between Huddersfield and Westtown (Dewsbury), which formed an additional infrastructure element of the expansion of settlements such as Dewsbury, already underway as a result of the growth of textile, mining and maltings industries. This was particularly the case in Huddersfield, where the Manchester & Huddersfield Railway Company was welcomed with considerable public support, other railway companies having previously bypassed the town. Huddersfield Station, completed in 1850, was itself an exercise in architectural patronage, and as well as being a statement about the monumental arrival of the railway, it was also the catalyst for the wider growth of Huddersfield's town centre. The Station continues today to form a focal point of St George's Square, as an element of considerable civic pride and communal value for Huddersfield and its populace.

2.5.5 The Scheme includes the following Grade I and Grade II listed structures. Where the Scheme involves works which physically impact on these buildings or structures, these are subject to Listed Building Consent (LBC) applications. Further information concerning heritage significance, design response and assessment of impact of the proposals is included in the relevant LBC submission.

Structure	Listing	Application Reference
Huddersfield Station	Grade I	W3 TWAO - NR17- Listed Building Consent Application Form
Huddersfield Viaduct (MVL3/92)	Grade II	W3 TWAO – NR18 - Listed Building Consent Application Form
Colliery Lane (Wheatley's) Overbridge (MVL3/103)	Grade II	W3 TWAO – NR19 - Listed Building Consent Application Form
Colne Bridge Road Overbridge (MVL3/107)	Grade II	W3 TWAO - NR20 - Listed Building Consent Application Form
Mirfield Viaduct (MVN2/192)	Grade II	W3 TWAO - NR21 - Listed Building Consent Application Form
Wheatley's Viaduct (MVN2/196)	Grade II	W3 TWAO - NR22 - Listed Building Consent Application Form
Occupation Underbridge (MDL1/10)	Grade II	W3 TWAO - NR23 - Listed Building Consent Application Form
Toad Holes Underbridge (MDL 1/12)	Grade II	W3 TWAO - NR24 - Listed Building Consent Application Form
Ming Hill Underbridge (MDL 1/14)	Grade II	W3 TWAO - NR25 - Listed Building Consent Application Form

2.5.6 In addition, the new Ravensthorpe Viaduct impacts on the setting of the Grade II MDL 1/6 Calder and Hebble Underbridge and MDL 1/8 River Calder Underbridge . The design principles applied to this structure are explored in section 8.7.12. Though the new viaduct does not involve physical alterations to the structures that necessitate an LBC application, heritage considerations, including assessment of significance and impact of the proposals are included in Chapter 6 (Historic environment) in the Ravensthorpe and Westtown Route Section Assessment in Volume 2ii of the Environmental Statement and Ravensthorpe Viaduct Heritage Assessment.

2.6 Local Context

2.6.1 The railway plays an important part in the social, economic and environmental fabric of this part of West Yorkshire. It is an all-important artery of communication between Lancashire and Yorkshire and the wider North; the railway has become familiar to

millions because of the way it is seen and used; together with the M62, it now forms the backbone of the North. Intended originally to be mainly a freight route it has become a major passenger line for long-distance and commuter passengers. Some are regular travellers and commuters but for others since the opening of the route a journey has been the prelude to a holiday trip by the sea or as part of a journey to more exotic destinations.

2.6.2 Through Kirklees District, the Scheme serves the towns of Huddersfield, Dewsbury and Mirfield. Huddersfield is the largest town in Kirklees with a population of approximately 141,600. Dewsbury is the principal town centre in the north of the district and serves a population of approximately 61,500. Mirfield has a population of around 20,000. By 2027, the population of Kirklees is expected to grow by over 4% to 455,300 (based on ONS population projections from 2018).

2.6.3 Millions of families, workers, students, and holidaymakers use the railway. The local station, whether it be the magnificence of Huddersfield or the simplicity of Deighton, is a focal point and important not only as a means of communication but in giving an area a sense of identity.

2.6.4 Baseline analysis (undertaken to inform the socio-economic chapter of the Environmental Statement) identifies more than two thirds of workers across Kirklees as a whole, live and work in Kirklees. Approximately 60,000 Kirklees residents work outside Kirklees and approximately 34,500 people work in Kirklees but live elsewhere. Out commuting allows Kirklees residents access to higher paid jobs, particularly in Leeds. This general pattern is likely to also apply to people working and living in the area surrounding the Scheme.

2.6.5 In the Council's vision for the future through the Local Plan, Policy LP2 mentions "place shaping", saying that "All development proposals should seek to build on the strengths, opportunities and help address challenges identified in the Local Plan, in order to protect and enhance the qualities which contribute to the character of these places..." and it is significant to note that the existence of the railway and the fast and frequent services it provides are seen as one of the characteristic strengths of each area identified. The stations at Huddersfield, Deighton, Mirfield and Ravensthorpe will all be improved in some form thereby perpetuating the important role they have to play in fostering the environmental, social and economic well-being of the area.

2.7 Overview of Design Requirements

2.7.1 The Scheme involves upgrading a working railway and thus must comply with the rigorous standards that apply to railway developments in terms of operation and safety. The approach taken to the to design of the Scheme balances the necessary technical

and current design and safety standards adopted by Network Rail with other design considerations. Among the factors to be taken into account are:

- Operational and functional requirements of the railway
- Environmental effects including construction effects
- Aesthetics and quality of design
- Views and feedback from stakeholders and consultees
- Sustainability and climate change adaption
- Access for maintenance and inspection
- Materials durability, lifespan and appearance
- Health & Safety
- Buildability
- The local context and site constraints

2.7.2 These manifest themselves in terms of the best engineering fit for the efficient and effective operation of the railway (e.g. in terms of ruling gradients, track cant and bridge clearances) and the necessary safety requirements separating a live railway from the general public, particularly in the interface between the railway boundary and where it abuts public highway. More detail in relation to how these design requirements have influenced the Scheme design is included in the following sections.

2.7.3 Network Rail's Environmental and Social Minimum Requirements for Projects – Design and Construction (NR/L2/ENV/015) standards that have been considered in design of the Scheme, along with the relevant guidance, including:

- NR Guidance note NR/GN/ESD26 – Minimising impact of artificial lighting on people and wildlife February 2020[1]
- NR Guidance note NR/GN/ESD29 – Breeding Bird & Nest Check Form, March 2020[2]
- NR/GN/ESD02 – Waste: Route Services Supply Chain Operations, February 2018[3]
- NR/GN/ESD04 – Pollution prevention (land and water), February 2018[4]

[1] Available online: https://safety.networkrail.co.uk/wp-content/uploads/2020/02/NR_GN_ESD26-Minimising-impact-of-artificial-light-on-people-and-wildlife-v1-Feb-2020.pdf

[2] Available online: https://safety.networkrail.co.uk/wp-content/uploads/2019/02/ESD29-Breeding-Bird-and-Nest-Check-form.pdf

[3] Available online: https://safety.networkrail.co.uk/wp-content/uploads/2018/03/Route-Services-SCO-ESD02-V.2.pdf

[4] Available online: https://safety.networkrail.co.uk/wp-content/uploads/2018/06/Pollution-prevention-land-and-water-Guidance-Note.pdf

- NR/GN/ESD01 – Waste management, February 2018[5]
- Network Rail Japanese Knotweed Environmental Management Guidance, Spring 2018[6]
- NR/GN/ESD10 - Noise, nuisance and disturbance, April 2018[7]

[5] Available online: https://safety.networkrail.co.uk/wp-content/uploads/2018/03/Waste-management-ESD01-V.13.pdf

[6] Available online: https://safety.networkrail.co.uk/wp-content/uploads/2018/06/Japanese-knotweed-Guidance-2018-v1.pdf

[7] Available online: https://safety.networkrail.co.uk/wp-content/uploads/2018/06/Noise-nuisance-and-disturbance-Guidance-Note.pdf

3. CONSULTATION

3.1 Overview

3.1.1 The NPFF recognises the importance of early engagement with stakeholders and local communities in the preparation of development proposals, including design. NPPF paragraph 188 highlights the advantages of pre-application engagement and front loading. It states that 'Good quality pre-application discussion enables better coordination between public and private resources and improved outcomes for the community'.

3.1.2 The NPFF recognises the importance of early engagement with stakeholders and local communities in the preparation of development proposals, including design. NPPF paragraph 188 highlights the advantages of pre-application engagement and front loading. It states that 'Good quality pre-application discussion enables better coordination between public and private resources and improved outcomes for the community'.

3.1.3 Network Rail is committed to robust consultation with all stakeholders and recognises that consultation is important in helping identify potential issues at an early stage of the Scheme's development. The phases of consultation carried out by Network Rail for the Scheme have provided an opportunity to share the emerging plans with stakeholders and provide opportunities for feedback whilst the proposals were evolving.

3.1.4 A summary of the consultation process undertaken during the two phases of consultation is provided in this section, with examples of how this has informed the design process.

3.1.5 For more detailed information about the consultation process, a consultation report (NR07) which supports the Order application summarises the consultation undertaken by Network Rail and explains who was consulted, on what issues, during each phase of consultation.

3.2 Statutory Consultees, Non-Statutory Consultees and Landowners

3.2.1 Stakeholder consultation includes engagement with those organisations listed within Schedule 5 and 6 of the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 ("the Application Rules"), the relevant local authority (Kirklees Council) and any owner, lessee, tenant or occupier of land potentially impacted by the Scheme (listed in the Book of Reference which supports the Order application).

<u>Phase 1A: August 2019</u>

3.2.2 Meetings with landowners were defined as Phase 1A consultation and was undertaken prior to community consultation (September 2019).

3.2.3 A review of landowners and property owners was undertaken which categorised land as red, amber and green (RAG).

3.2.4 The purpose of the engagement with landowners was to explain the potential impacts that the Scheme may have on their land and in some cases, understand the operation of businesses so that these discussions could be taken into consideration when developing the design.

3.2.5 Landowners categorised as red were written to, offering a one to one meeting before the community consultation began. Those identified as amber were by letter offered one to one meetings at the community consultation events and those identified as green were invited to attend the community events.

Phase 1B: September 2019

3.2.6 Those organisations listed under Schedule 5 and 6 of the Transport and Works (Applications and Objections Procedure) (England and Wales) Rules 2006 ("the Application Rules") were sent a technical consultation pack in September 2019, requesting them to provide feedback within a six-week period, this was defined as Phase 1B consultation.

3.2.7 Once phase 1 consultation was underway, it was iterative. Network Rail's intention was to work with all parties during the development of the Order application and to reach agreement, where possible, on any issues prior to submitting the Order application.

Phase 2: March 2020

3.2.8 Meetings with landowners continued and further letters were sent out to landowners requesting meetings.

3.2.9 Those organisations listed under Schedule 5 and 6 were contacted and directed to the Network Rail website and requested to provide feedback on the Scheme proposals.

3.2.10 As part of phase 1 and 2 consultation , feedback was considered, and where relevant, influenced the developing design of the Scheme.

3.3 Community Consultation

Phase 1: 9 September to 21 September 2019

3.3.1 In order to present the Scheme proposals to as wide an audience as possible, a thorough programme of publicity was undertaken. This included; the distribution of leaflets by Royal Mail to households and businesses along the rail corridor, posters at local railway stations, and press and radio advertisements. Members of the public were encouraged

to provide written feedback to Network Rail by 25 October 2019. Members of the public were also directed to the Network Rail website to view and comment on the proposals.

3.3.2 During phase 1 of the community consultation, nine events were held over a two-week period. Over 500 people attended the events and a total of 230 responses were received either through the post, online or by email correspondence.

3.3.3 The project team reviewed all consultation feedback at each phase of consultation and where appropriate, it informed the design and construction methodology of the Scheme.

Phase 2: 16 March to 28 March 2020

3.3.4 Phase 2 consultation events were advertised as they were for phase 1 – see point 3.3.1 above.

3.3.5 For phase 2, nine events were scheduled to be held over a two week period. However, on the morning of the first event, 16 March 2020, employees at Network Rail and its Alliance partners were instructed to work from home and not to travel to work. A decision was therefore made not to carry out the community consultation events in the venues booked along the route but to proceed with the consultation online and by telephone.

3.3.6 The following mitigation measures were put in place on the morning of 16 March 2020 so that the public could still view and comment on the Scheme proposals:

- Posters were put up at all local venues that were scheduled to hold the community consultation events and railway stations, giving the Network Rail website address so that scheme proposals could be viewed online. The Network Rail helpline number was also given so that the public could call the helpline, who in turn would forward the call to a member of the project team to speak to the caller.
- The Network Rail website was updated, advising that the venues would not be open and directing viewers to the consultation material online and the Network Rail helpline and advising of ways to provide feedback.
- A press release and advertisement were placed in the local newspapers, advising of the above mitigation measures.

3.3.7 The deadline for feedback to the phase consultation was extended from 10 April to 30 April 2020. 44 online responses were received, and 16 by email.

3.3.8 The project team reviewed all consultation feedback at each phase of consultation and where appropriate, it informed the design and construction methodology of the Scheme as illustrated by the following examples:

- John William St bridge (Span 1 of Huddersfield Viaduct).

  - Following consultation which indicated a preference for a single span bridge over John William St to reduce the impact to the highway, the Scheme has developed this intervention.

- Location and impact of Deighton Station.
  - Following consultation feedback the new station infrastructure has been designed within the area of the existing station to serve the current community and increase customer safety. This has included the use of soil nails enable the retention of residential properties in the area.
- Deighton corridor earthworks.
  - Following consultation, the earthworks in the Deighton corridor have been further developed to remove the requirement for large retaining walls to the south of the corridor, thus minimising so far as reasonably practicable the visual impact to local residents and canal users.

3.3.9 For more information on the consultation see document W3 TWAO - NR07 the Report Summarising Consultation Undertaken.

4. SUSTAINABILITY

4.1.1 The sustainability performance of the Scheme has been an active consideration in the design development of each intervention. From a holistic viewpoint, the Scheme champions the improvement of existing infrastructure to meet the needs of the operational railway today. This includes the delivery of a four-track railway in an existing corridor which historically had been constructed to facilitate four tracks, thus reducing the quantum of works in comparison to a new route.

4.1.2 For more information see the Climate Change chapter of the Environmental Statement, which presents the climate vulnerability effects associated with the construction and operation of the Scheme. This has shown that climate projections covering the study 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 are significant as embedded mitigation sufficiently adapts the design and operational processes to remove and reduce to acceptable levels all otherwise significant climate vulnerability impacts.

4.2 Flood Risk

4.2.1 A Level 3 Flood Risk Assessment (detailed study) has been undertaken which provides detail on flood risk prevalence to and from the Scheme. The FRA has been prepared in accordance with the National Planning Policy Framework (NPPF) and Local Policy and also takes account of the required climate change allowance to be applied according to the development type and Flood Zone. Across the Scheme area an allowance of 50% has been made. The Flood Risk Assessment will be submitted to support the Order. In terms of the works, the FRA acknowledges that Mirfield Station falls within the maximum flood extent and whilst the track alignment and station are elevated at this location, access and egress to the station is restricted during times of flood. Section 7.5.7 explains how the design has sought to respond to this.

4.3 Carbon Reduction

4.3.1 The government has set a target to reduce carbon emission by 80% by 2050, compared to 1990 levels. Network Rail is committed to reducing energy consumption and carbon emissions across the rail network, as outlined in the Network Rail Energy and Carbon Policy. In order to achieve these objectives, the carbon reduction hierarchy (Build Nothing, Build, Less, Build Clever, Build Efficiently) outlined in the Publicly Available Specification PAS 2080:2016 has been applied at key decision points throughout the option selection and development process.

4.3.2 Examples of the use of the carbon reduction hierarchy to guide sustainable design include:

- Build nothing: MVL3/105 was due to be demolished and reconstructed as part of the proposed works. Through an exercise to rationalise clearances for OLE across the route it was agreed that reduced clearances could be utilised and that the bridge would not require reconstruction.
- Build less: at the following structures a replacement deck is to be installed on the existing abutments which are to be retained, this has been achieved through considered multidisciplinary design including track geometry considerations, OLE clearance requirements and structural approach:
  - MVL3/92 (1) Huddersfield Viaduct Span 1
  - MVL3/96 Red Doles Road
  - MVL3/98 Fieldhouse
  - MVL3/101 Whiteacre St (one abutment only retained)
  - MVL3/102 A62 Leeds Rd (one abutment only retained)
  - MVL3/108S Huddersfield Broad Canal
  - MVL4/2 Coopers Intersection Structure

4.4 Whole Life Benefits

4.4.1 The design process has considered options for providing long-term benefit over the lifetime of the infrastructure. One aspect of this is reducing future maintenance requirements where possible. Examples of where the design has considered future maintenance requirements include the following:

- Considered use of materials including weathering steel and GRP to reduce the number of maintenance interventions;
- In order to reduce maintenance requirements, new bridge structures such as MVL3/107 Colne Bridge Road will not incorporate the use of bearings, which would require regular inspection and maintenance; and
- The infilling of redundant underbridge structures such as MVN2/204 Lees Hall Farm Bridge removes the need for any future maintenance of these structures.

4.5 Future Needs

4.5.1 The design has considered both the possible future needs of the railway network, and the likely future needs of the surrounding local areas. For example, passive provision for longer platforms has been provided at all stations, to allow for longer trains to use the stations in the future.

4.5.2 The Scheme aims to provide better punctuality (resilience), more capacity and faster journeys. The TRU Programme would improve the passenger experience and reduce journey times. Other benefits of the Scheme could include reduction in crowding, improved quality of journeys.

4.5.3 Throughout the design process the impact of climate change on the proposals have been considered, in particular with regard to changing weather patterns and future weather resilience. For example, assessing the location and access to electrical transmission site to deliver resilience against flooding.

5. DESIGN DESCRIPTION AND APPRAISAL OVERVIEW

5.1.1 This section provides a summary of the proposed development works concerned with the circa 14km length of railway works between Huddersfield, and Westtown, Dewsbury.

5.1.2 The Scheme comprises the upgrade of the existing two track railway to four track electrified railway, improvements to Huddersfield Station, delivery of sidings at Hillhouse and the provision of a grade separated junction at Ravensthorpe. Associated works to railway infrastructure is required to facilitate these interventions, including works to highways and local stations, namely Deighton, Mirfield and Ravensthorpe.

5.1.3 Throughout the development of the Scheme, consideration has been given to delivering the required outcomes in a sustainable manner which prioritises good quality design. This approach is rooted in the planning context of the existing railway, appreciation of setting and the natural landscape. It has also considered the long-term sustainability of railway operations, including safe access, whole life cost and reduced maintenance liability.

5.1.4 A number of assets which form part of the Scheme are Grade I and Grade II listed, while the Scheme also passes through a Conservation Area. In addition to the considerations above, the design of the Scheme in relation to these designated heritage assets structures has been guided by an understanding of the heritage significance of the historic buildings and structures in question, as well as that of the wider Transpennine Route as a whole. The design of the Scheme has drawn on baseline heritage studies and has also been developed alongside engagement with statutory historic environment stakeholders.

5.1.5 Where physical alterations are required to Grade I or Grade II listed buildings and structures as part of the Scheme, Listed Building Consent is required. The accompanying Heritage Assessments for each of these structures support the applications for Listed Building Consent. These Assessments provide further information on design development and consultation with Historic England and Kirklees Council.

5.1.6 The design development process for listed heritage structures has sought to ensure the Scheme responds to the significance of these structures and the route as a whole. The design approach to such structures has utilised the principals listed below:

5.1.7 Designs should seek to retain, as far as practicable, historic fabric heritage material.

5.1.8 Deliver design solutions which respond to the significance of the structure and minimise harm to that significance, as far as is practicable allow the history and progression of the structure to be understood.

5.1.9 Where larger-scale alterations or wholly new interventions are required, these shall still aim to respond to the significance of the structure, but also be honest with regards to loss of historic fabric and provide be of a modern but sympathetic interpretation of high quality design.

5.1.10 Any area of the Scheme design which proposes the loss of a listed building or structure needs to have been fully optioneered and justified, included embedded design mitigation to realise the above principles.

5.1.11 The Scheme is delivered entirely within the Kirklees Council Local Authority area but also interfaces with the adjacent Calderdale District Council. Within the TWAO submission six geographical areas within the Kirklees district have been used to sub-divide the Scheme, as follows:

- Area 1: Huddersfield
- Area 2: Hillhouse and Fartown
- Area 3: Deighton and Bradley
- Area 4: Colne Bridge and Battyeford
- Area 5: Mirfield and Lower Hopton
- Area 6: Ravensthorpe and Westtown

5.1.12 The following sections set out the permanent works delivered as part of the Scheme. Each section sets out the design drivers which have resulted in provision of the intervention, followed by an appraisal of the design to be delivered, including form and materiality. Where applicable a diversity impact assessment has been undertaken and is summarised in this document. The design description and appraisal proceeds as follows; section 6 considers the principal scheme interventions concerning permanent way (the tracks, sleepers and ballast that form the railway lines) and overline electrification (OLE). This includes new elements of railway at Heaton Lodge, Ravensthorpe and the Thornhill Lees area. Section 7 considers the new stabling provision at Hillhouse and goes on to set out the interventions at the stations on the route, Huddersfield, Deighton, Mirfield and Ravensthorpe. Section 8 considers the interventions to bridges and highways. This section presents the existing condition and drivers for each intervention. The proposed form, materiality, and accessibility of the structures. Section 9 provides an overview of the proposed maintenance and access interventions to be delivered as part of the Scheme to ensure a safe and resilient railway. The appraisal concludes with consideration of utility works required to deliver the Scheme (section 10).

6. DESIGN DETAIL AND APPRAISAL: PERMANENT WAY AND OVERHEAD LINE ELECTRIFICATION

6.1.1 The Permanent way and OLE describe the railway assets within the Scheme. This includes the track, ballast and sleepers. Railway operational equipment including signalling, and line side assets such as cable routes and equipment housing. The Huddersfield to Westtown (Dewsbury) scheme proposes the delivery of OLE to provide power to trains in the area, formed from supporting structures and overhead wires. The Scheme will achieve significant increases in capacity by the addition of two tracks from Huddersfield Station to Thornhill Lees as well as enabling line speed improvements. The additional tracks will enable direct trains to/from Leeds to bypass existing junctions, thereby reducing service conflicts on this route section, which includes a vertical grade separation at Thornhill Junction Ravensthorpe. Provision of the additional lines will allow direct trains to pass the stopping trains, a constraint which currently leads to delays. This results in up and down slow lines with a maximum line speed of 75mph (as existing) and up and down fast line with maximum speeds of 110mph.

6.1.2 The existing railway corridor between Huddersfield and Ravensthorpe provides the greatest opportunity to implement these improvements on the TRU route. This is due to the corridor having been historically constructed to facilitate four tracks meaning that maximum benefit can be achieved with minimal impact to the environment and railway neighbours. The permeant way design has been developed to fit within the existing corridor as far as possible. However, due to changes in railway standards, increased line speeds and encroachment of third-party developments, this has not always been possible. Details of the 3 major sections of the route where this has not been possible are set out in this section.

6.1.3 Overhead Line Electrification will be implemented throughout the length of the Scheme. Three forms of OLE support will be used; portal structures, twin-track cantilever and single-track cantilevers. Selection and spacing of OLE supports will be undertaken based on both engineering factors and wider environmental considerations including visual impact.

6.2 Heaton Lodge Curve

6.2.1 Currently the railway passes through Heaton Lodge Junction in the Colne Bridge to Battyeford area. The junction is formed from the Manchester to Leeds lines running west to east, with the Calder Valley line from Brighouse joining from the North.

6.2.2 The Scheme will deliver the two new lines to the south of the junction, thus allowing the direct services to by-pass the junction and therefore improve journey time and reliability of the route.

Figure 1: Proposed design at Heaton Lodge curve Visualisation

6.2.3 The principal design driver at the Heaton Lodge curve was the opportunity to increase line speed generally between Huddersfield and Dewsbury through the flattening of the alignment adjacent to the existing 70mph curve, one of the few locations between Leeds and Manchester where this is possible. The resultant alignment has been selected to deliver optimum benefit to the railway whilst minimising as far as possible the impact to railway neighbours. However, selection of this alignment does result in the need to demolish three residential properties in the area.

6.2.4 The proposed alignment sits within a cutting, minimising visual impact. During design development, a grade separated junction was considered in the Heaton Lodge area. This was discounted as locating the grade separation at Ravensthorpe offered the opportunity to use a brown field site, gain wider railway operational benefits and had a lesser environmental impact.

6.2.5 The provision of overline electrification results in works to the existing intersection structure between the Leeds to Manchester line and Calder Valley line. The Scheme proposes to partially demolish the existing arched structure and provide a reduced depth roof. This enables delivery of the OLE whilst minimising impact to the surrounding landscape, which is dominated by the River Calder.

6.2.6 Within the Heaton Lodge curve operational equipment will be upgraded and the existing communication mast modified in its current location.

6.2.7 The implementation of the additional tracks results in modification to Helm Lane footpath, for more information see section 8.5.19.

6.3 Ravensthorpe Grade Separated Junction

6.3.1 The Scheme will implement a grade separated junction at Ravensthorpe, within the Ravensthorpe and Westtown area. The function of the grade separated junction is to allow the fast lines to by-pass Thornhill LNW Junction removing conflict and thus delivering improved journey time and reliability. The grade separated junction also acts as the termination point of the four tracking.

6.3.2 The principal design approach to the grade separated junction was to locate the required structures in an area which is both beneficial to the operation of the railway the impact to railway neighbours as far as reasonably practicable. As such the grade separated junction has been located on a brown field site within the triangle of land bounded by the existing operational railways (subsequently referred to as the Ravensthorpe Railway Triangle).

6.3.3 Two forms of grade separated junction were considered; fly-over and dive under. The two options describe the position of the new fast lines relative to the existing junction of the railway where the Leeds and Wakefield lines meet. In the fly-over option, the new fast lines are carried over the junction on a new bridge structure and the junction placed underneath. In the dive-under option the new fast lines pass under the new bridge structure, with the Leeds and Wakefield lines being carried on top. In plan the new structure is constructed offline from the existing railway. This is to minimise disruption to the railway during construction.

6.3.4 The Scheme will deliver a fly-over grade separated solution. The optioneering undertaken considered railway operations, environmental impact, construction considerations and impact to third parties. Driving considerations which led to the preference for the fly-over included; the risk associated in excavating in a brown field site, reduced programme duration and reduced cost. These considerations were scrutinised against environmental impact and impact to third parties.

6.3.5 The grade separated junction is formed from a concrete intersection structure and earthwork embankments which carry the railway alignment onto the new Ravensthorpe Viaduct, see section 8.7.12. To minimise disruption, construction of the grade separated junction is, as far as practicable, constructed offline from the existing railway alignments. This results in the realignment of the Wakefield lines to the north and the infilling of MVN2/204 Lees Hall Farm Underbridge, (section 8.7.25). The grade separated junction also necessities the re-location of Ravensthorpe Station, (section 7.6), and re-alignment of Calder Road (section 8.7.1).

6.3.6 To the east of the River Calder the railway reverts to two tracks at Ravensthorpe East Junction, a new junction formed where slow lines diverge either side of the fast lines.

6.3.7 Within the Ravensthorpe Railway Triangle, the Scheme will also install an electrical transmission site (Ravensthorpe Static Frequency Converter site) to provide traction power to the railway Overhead Line Equipment. In a similar way to the grade separation, the location of this site has been chosen to minimise impact to railway neighbours, whilst also benefitting from easy connection to existing high voltage power supplies traversing this area. Access to the site is via the disused Ravensthorpe Station access road via a new junction with Calder Road and under the new Ravensthorpe Viaduct via a back span to the west of the Calder and Hebble Navigation.

6.3.8 Other operational infrastructure including railway access points and drainage assets will also be located within the Ravensthorpe Railway Triangle site. The site will be fenced to ensure safe and secure operation.

6.3.9 As discussed in section 2.1 the visual impact of the proposed grade separated junction and the electrical equipment site has been carefully assessed and mitigation proposed. For more information see the landscape and visual chapter of the Environmental Statement.

Figure 2: Proposed Grade Separated Junction at Ravensthorpe Visualisation

6.4 Thornhill Lees Re-alignment

6.4.1 To the east of Thornhill LNW Junction there is an existing horizontal reverse curve in the alignment where the railway passes over Thornhill Road on the approach into Dewsbury station. This reverse curve impedes delivery of the line speed improvements required by the Scheme and also restricts the horizontal rail geometry required to develop the grade separation within the brownfield land afforded by the Ravensthorpe Railway Triangle.

6.4.2 The Scheme considered a range of options for re-aligning the railway in the Thornhill Lees area to achieve the desired line speed of 100mph. This included railway geometry, construction considerations and impact to third party land.

6.4.3 The Scheme will remove the reverse curve through construction of a new alignment to the north. In addition to the new earthworks, this necessitates the rebuilding of Thornhill Road Bridge, MDL1/9, with associated highway works (section 8.7.27) and works to Occupation Underbridge, MDL1/10, (section 8.7.38).

Figure 3: Proposed re-alignment at Thornhill Lees Visualisation

7. DESIGN DESCRIPTION AND APPRAISAL: STATIONS AND STABLING FACILITIES

7.1.1 As part of the Scheme significant works are required to the stations at Huddersfield, Deighton, Mirfield and Ravensthorpe. Details of the works to be carried out at each of the stations are laid out below.

7.2 Huddersfield Station

7.2.1 Huddersfield Station is discussed in full detail in the separate Huddersfield Station Design and Access Statement.

7.2.2 Huddersfield Station is a Grade I listed station located within the Huddersfield Town Centre conservation area. The original station was constructed in 1850 and modified in 1885 when a section of the roof collapsed. More recently, in 2010 and 2011 the station received development works on the pedestrian access to the subway and platforms with the installation of two new lifts and new staircase to platform 1, as well as improvement works to the concourse and waiting area. The existing Roof A structure is known to have been strengthened on at least two occasions during its lifetime. In the 1980s the horizontal section of the top chord of each truss was strengthened by fixing additional box sections to each side. In c.2013, further sections of the top chord were strengthened by bolting steel plates to the web as well as reinstating plan bracing for stability amongst other works. The station is accessed via the Principal Building from St Georges Square.

7.2.3 The current station arrangement is as follows:

- Platform 1 – Through platform servicing express routes to Manchester Piccadilly, Manchester Airport and Liverpool (via Manchester Victoria);
- Platform 2 – Turn back platform servicing the Penistone Line to/from Sheffield via Barnsley;
- Platform 4 – Through platform servicing the stopping services to Leeds and Manchester Piccadilly;
- Platforms 5 and 6 – Turn back platforms for local services to/from Leeds (via Brighouse, Halifax and Bradford) and Wakefield Kirkgate; and
- Platform 8 – Through platform servicing Leeds, Hull, York, Scarborough, Middlesbrough and Newcastle.

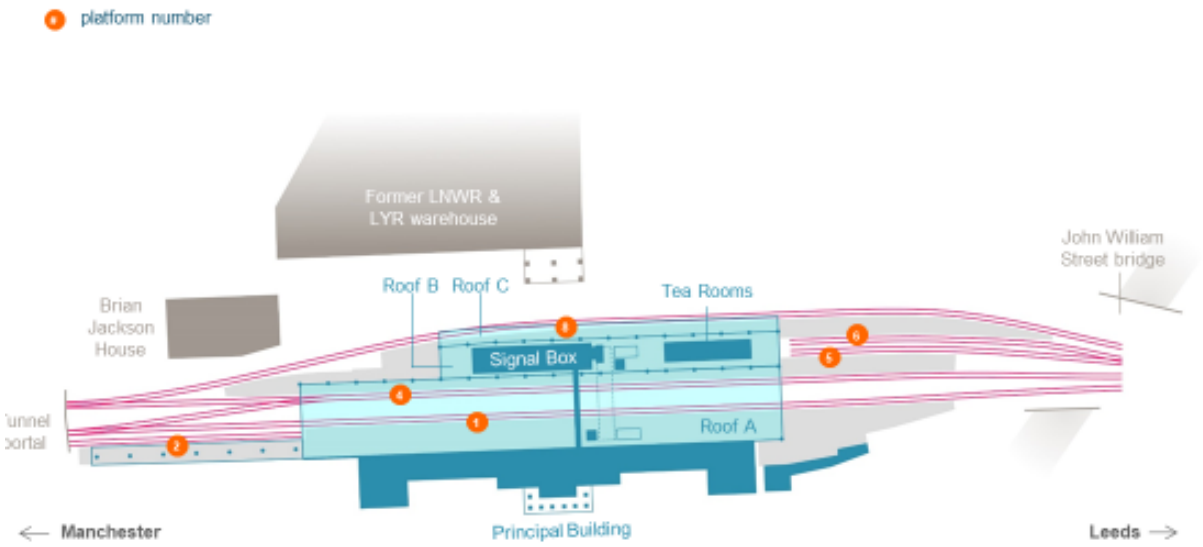

Figure 4: Existing Huddersfield Station Layout

7.2.4 The design approach to works at the station have been driven by the duel requirements of responding to the heritage fabric of the listed structure whilst also providing a station functional for the needs for a modern railway and required performance of the upgraded Manchester to Leeds route.

7.2.5 The heritage approach has been guided by the principles listed below. For more information see the Huddersfield Station Listed Building Consent Application.

- Retain as far as practicable heritage material;
- Implement a hierarchy approach ensuring new interventions are subservient to structures of heritage significance;
- Where new interventions are required these shall be of a modern interpretation; and
- Build a relationship with the wider heritage setting of Huddersfield including the surrounding conservation area, Grade II listed Warehouse Building and the Grade II listed Huddersfield Viaduct.

7.2.6 The operational approach has been guided by the following principles;

- Delivery to railway standards and the Technical Specifications for Interoperability;
- Delivery to Transpennine Rail Upgrade operational and infrastructure requirements;
- Provision of operational flexibility in times of perturbed service; and
- Provide step-free access to all platforms and dedicated blue badge parking for persons with reduced mobility.

7.2.7 The Scheme proposes to remodel the station from three through platforms at present to four through platforms (renumbered platforms 2 to 5, with a usable platform length of

200m. One east facing bay platform 6 is provided to the north. The existing west facing bay platform 1 for the Penistone line is extended.

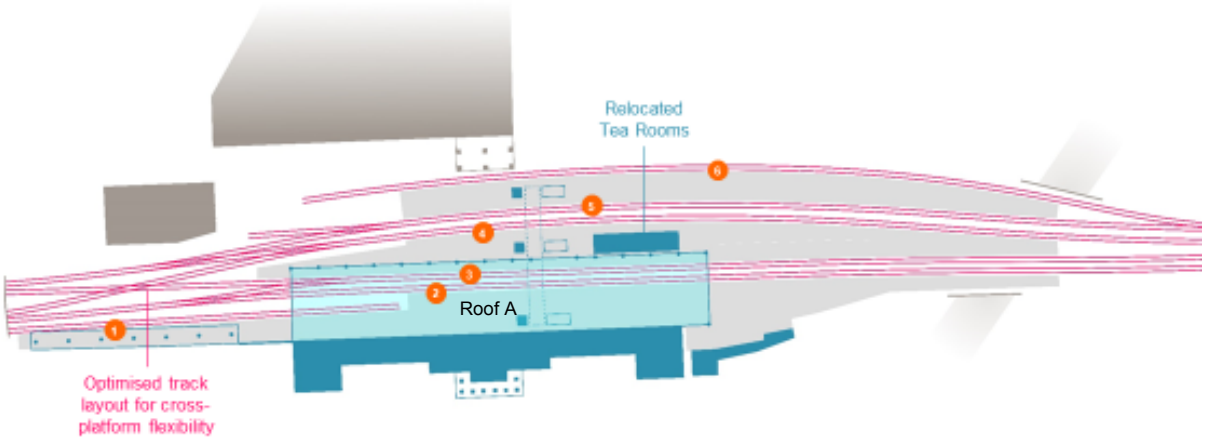

Figure 5: Proposed Huddersfield Station Layout

7.2.8 The reconfiguration of the track and platforms necessitates changes to the heritage fabric of the station identified within the Statement of Significance, namely extension and repair of roof A, demolition of roof B and C and relocation of the tea rooms.

7.2.9 Roof B and C are replaced with a new roof covering forming an extension to the repaired roof A and finger canopies are provided on the Leeds end of all platforms. OLE is provided throughout.

7.2.10 A new structure is provided for platforms 5 and 6. To access these platforms the existing subway is extended with lift and stair access provided. A new footbridge with lift and stair access to all platforms is provided for additional capacity and compliance with fire and escape requirements. Platform 2 is extended over John William St Bridge with a fire escape provided to the station car park.

7.2.11 In normal operating conditions, train sorting is to the east of the station using switches and crossings installed on MVL3/92 Huddersfield Viaduct. The western throat is substantially remodelled, including switches and crossings to allow for perturbed working conditions. Services to Manchester will normally use the two southern through platforms 2 and 3, the northern through platforms 4 and 5 for Leeds services. However, all through platforms are designed to allow bi-directional working to give maximum flexibility under perturbed working conditions.

Figure 6: Proposed Huddersfield Station Visualisation

7.3 Local Stations

7.3.1 The local stations on the Scheme, Deighton, Mirfield and Ravensthorpe are each impacted by works to the railway alignment. The Scheme proposes to replicate existing facilities on a like for like basis and provide improvements to accessibility in line with the requirements of the Equality Act.

The local stations have been designed using the following key principles:

- Delivery to Transpennine Rail Upgrade operational and infrastructure requirements;
- Meet the requirements of the preferred permanent way intervention;
- Provide step-free access to all platforms and dedicated blue badge parking for persons with reduced mobility;
- Delivery of a cohesive scheme in which each of the local stations share an identity though the use of a consistent material pallet and asset forms; and
- At each station delivery of a master planning approach to design, so to allow, where practicable, to not unduly prohibit future changes in operation or passenger facilities.

7.3.2 To ensure compliance with the Project Requirements and wider obligations under the Equality Act, Diversity Impact Assessments have been completed to inform the interventions at stations and where the Scheme impacts footways. Practically this

involves the delivery of lifts to platforms where there is a level difference of two metres, and the provision of at least three blue badge bays.

7.4 Deighton Station

7.4.1 Deighton Station is located adjacent to Whitacre Street, north west of the A62. Currently there are two approximately 90m long platforms with ramped access provided to each platform directly from Whitacre Street. There is no formal drop off point for the station. There are a small number of residential properties located to the North and South of the station and its respective accesses. There is no access provided between the platforms.

Figure 7: Photo of the existing Deighton Station

7.4.2 Deighton Station was built in the 1980s as a simple timber framed construction with platforms located on the historic disused track bed. The Scheme proposes to re-provide the four-track railway in the corridor, displacing the existing platforms and ramped entrances.

7.4.3 At Deighton Station two platforms will be provided to serve the stopping services on the slow lines. The fast lines will not be platformed. The platforms will provide a 150m of usable platform length with future passive provision to increase this to 200m.

7.4.4 The platforms will be provided with two waiting shelters seating areas at 50m intervals per platform. Visual and audio announcements will be provided on platforms. CCTV and lighting will be provided on both platforms, forecourt and station entrance.

7.4.5 Self-evacuation emergency egress will be provided from both platforms. From platform one (northern platform) the emergency egress will be provided by a back of platform escape route to the station footbridge. A PRM refuge will be provided to eastern end of the platform. The emergency egress from the eastern end of platform two (southern platform) will be provided via the station footbridge, with a PRM refuge adjacent to the lift entry. Self-evacuation from the western end of the platform is not feasible due to the proximity to the proposed fast lines. A refuge for all passengers is provided within the operational platform extents, including a dedicated PRM refuge area, at the western end of platform two.

7.4.6 Both platforms will be accessed via a footbridge with stairs and 16 person, turn back lifts. The footbridge will be level with the forecourt.

7.4.7 The station will be accessed from the south east via a new forecourt from Whitacre Street consisting of three number blue badge accessible parking spaces, a maintenance parking bay and a turning head.

7.4.8 To accommodate the additional tracks and new slow platforms, retaining structures are required to the north of the station. The retaining structures in and around Deighton Station will be of a concrete form guided by the construction method implemented. To deliver the forecourt to the south the existing ground level will be raised to Whitacre Street level and the existing brick arch infilled.

7.4.9 The railway corridor is widened to the north to accommodate the additional tracks and new slow line platforms. This necessitates the reconstruction of the Whitacre Street bridge, with a new northern abutment approximately 10m behind the existing abutment. This will align with two new soil nailed walls to either side of the bridge, allowing the retention of the neighbouring residential properties due to the reduced construction working room when compared to a piled retaining wall option. The existing southern abutment will be retained to avoid additional impact on the existing arch span adjacent. It is proposed that the bridge is a steel-concrete composite deck structure with concrete parapets. The retaining structures in and around Deighton Station will be of a concrete or reinforced earth form guided by the construction method implemented.

7.4.10 To deliver the forecourt, a faced reinforced earth wall is proposed along the up fast line to allow levels to be raised to Whitacre Street level. The existing brick arch span will be infilled. A new access will be formed from Whitacre Street to the station forecourt and delivered as part of the highway and bridge works.

7.4.11 There is an existing Yorkshire Water combined sewer that is indicated to run from a chamber on the north side of the Whitacre Street bridge along the boundary with 13 Whitacre Street, before crossing the railway in a UTX beneath the existing platform access points (at the bottom of the ramps). It is proposed to divert this around the proposed lift shaft on platform one and provide a new UTX to the west of the existing crossing. The sewer will tie in to the existing alignment to the south of platform two. Existing utilities within the Whitacre Street bridge will be retained in the proposed structure.

Figure 8: Proposed Deighton Station Visualisation

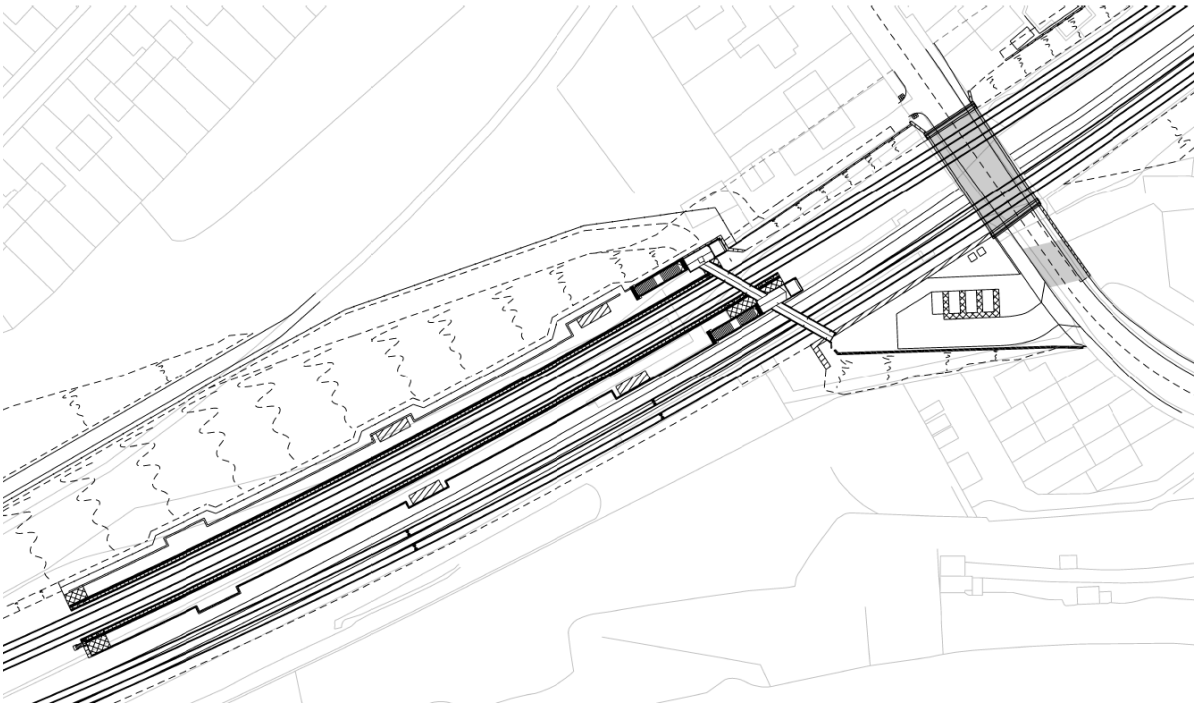

Figure 9: Proposed Deighton Station Layout

7.5 Mirfield Station

7.5.1 Mirfield station is located a short distance south of Mirfield town centre and the A644, between the River Calder and the Calder and Hebble Navigation. There are residential and commercial properties located to the north and south of the site.

7.5.2 The station is currently formed from an island platform (the original station with platforms of solid infill with brick riser walls) and side platform (Platform 3, of timber frame construction) adjacent to the car park. Step free access is available from the car park to platform 3. No step free access is provided to the island platform.

Figure 10: Photo of the existing Mirfield Station

7.5.3 The reconfigured station will service both slow lines via an island platform. Reconstruction of the island platform will extend the existing platform to 150m with future passive provision to further extend this to 200m. The current platform three will be removed to make way for the fast lines. The island platform will be provided with two waiting shelter seating areas at 50m intervals. Visual and audio announcements will be provided on platforms. CCTV and lighting will be provided on the platform, in the station entrance and car park.

7.5.4 Accessibility of the station will be improved by providing step free access to the new platform. The station entrance will be moved to the eastern side of Station Road with steps and a 16 person three stopping lift providing access to the platform and footbridge. The existing car park will be reconfigured to provide a drop off area, in addition to the existing three blue badge parking bays and 56 standard parking bays. A footbridge will be provided from the drop off area and car park to the platform accessed via steps and a 16 person through lift. Step-free movements between Station Road and the platform level will be via a through lift route. Step-free movements between the platform and footbridge necessitates a turn-back action within the lift.

7.5.5 Relocation of the entrance on Station Road necessitates works to Station Road bridge. This includes breaking through the eastern abutment and removal and reconstruction of

part of the existing bridge deck. The existing spans that carry the existing rails will be retained and strengthened locally if necessary. The existing redundant deck at the south of the railway corridor will be retained as additional bridge strike protection, required due to the low headroom provided by the existing railway bridge over Station Road.

Figure 11: Proposed Mirfield Station Visualisation

7.5.6 Construction of a new eastern entrance requires modification to Station Road. The western kerb will be retained with the half-width bay removed, and the lane widths narrowed under the bridge to reduce speeds and provide more space directly outside the station entrance. The kerb in front of the proposed eastern entrance will be raised by a high containment kerb, which may require some local utility diversions within the vicinity of the footway.

7.5.7 The floor levels of new lift infrastructure throughout the station have been designed to raise the lift thresholds out of flood levels where possible. In a 1 in 25 year storm event or worse, it will not be possible to access Mirfield Station via the entrance on Station Road due to flooding. A high containment kerb is proposed along the eastern footway on Station Road, along with a 1 in 50m (2%) gradient within the station entrance area to raise the threshold level of the lift shaft above the 1 in 25 year flood level.

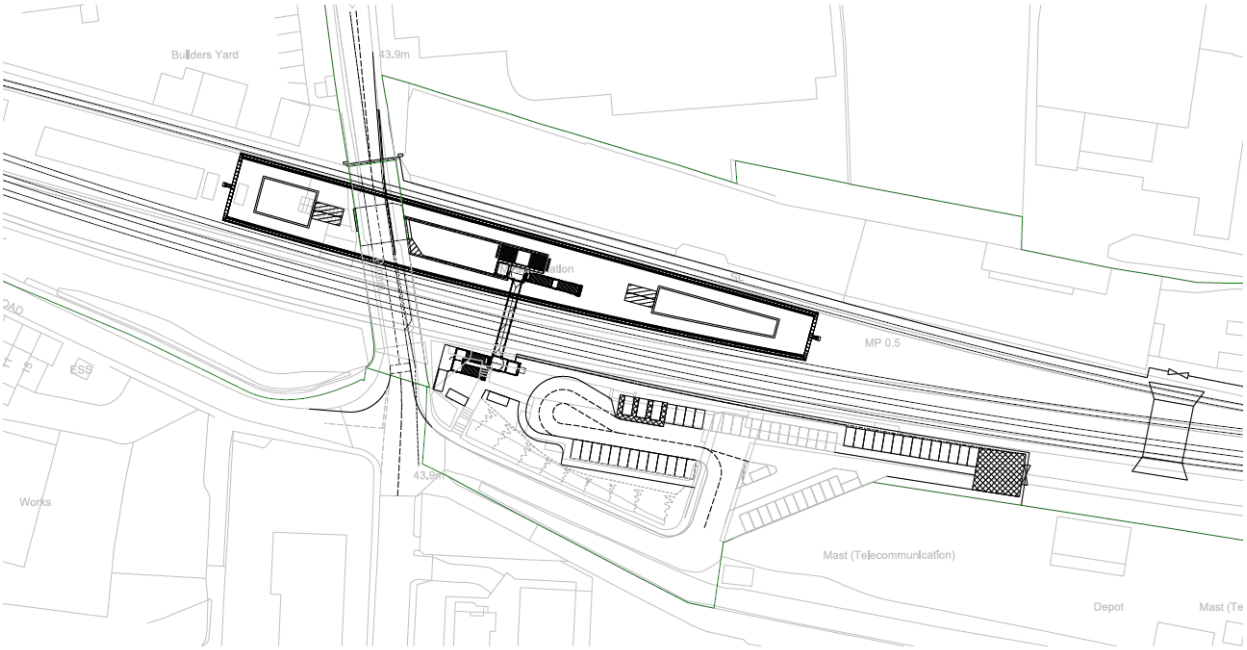

Figure 12: Proposed Mirfield Station Layout

7.6 Ravensthorpe Station

7.6.1 Ravensthorpe Station is currently located to the south of Ravensthorpe to the east of Calder Road. The station is accessed from Calder Road via an informal road with no drop off area or turning head.

7.6.2 The station is served by two platforms. A non-compliant ramped access from the informal road serves the station. Platform 1 is accessed from this road. Access to platform 2 is via a stepped footbridge.

Figure 13: Photo of the existing Ravensthorpe Station

7.6.3 In order to provide the required capacity and journey time improvements required by the Scheme, a grade separated junction is proposed in the Ravensthorpe area, for more information see section 6.3. The grade separated junction necessitates the demolition and relocation of the existing station and Calder Road bridge. The station is to be relocated approximately 200m to the west of the existing Station to the south of the railway.

7.6.4 The Scheme proposes to provide one island platform to serve the stopping services on the slow lines. The fast lines will not be platformed. This approach unites the current disparate platforms providing a more intuitive station environment. The new island platform will be 150m long with future passive provision to extend this to 200m.

7.6.5 The platform will be provided with two waiting shelters seating areas at 50m intervals per platform. Visual and audio announcements will be provided on platforms. CCTV and lighting will be provided on both platform, forecourt and station entrance.

7.6.6 The platform will be accessed via a footbridge with stairs and 16 person, through lifts. The footbridge will be level with the forecourt.

7.6.7 The station will be accessed from the south via a new forecourt from a roundabout on the realigned Calder Road consisting of three number blue badge accessible parking spaces, a maintenance parking bay and a turning head.

7.6.8 The bridleway to the southwest of Calder Road overbridge is a public right of way connecting Calder Road/Ravensthorpe Road to Lady Wood and Sands Lane. It is a rough track of mixed surfacing with a steep slope (approximately 8%) rising up from where it meets Calder Road. A steeper section (approximately 9.5%) descends to meet Hunger Hill overbridge (MVN2/201) at the west end of the Ravensthorpe Cutting.

7.6.9 The new station necessitates the permanent diversion of this bridleway. The diversion will be provided at the top of the new cutting with access to Ravensthorpe Road adjacent to the existing residential properties.

7.6.10 The proposed gradients have been designed to reflect the existing and minimise and steepening of gradients where possible. The existing gradients range from 0.6% to 9.5% along the route and the proposed from 0.8% to 10%.

Figure 14: Proposed Ravensthorpe Station Visualisation

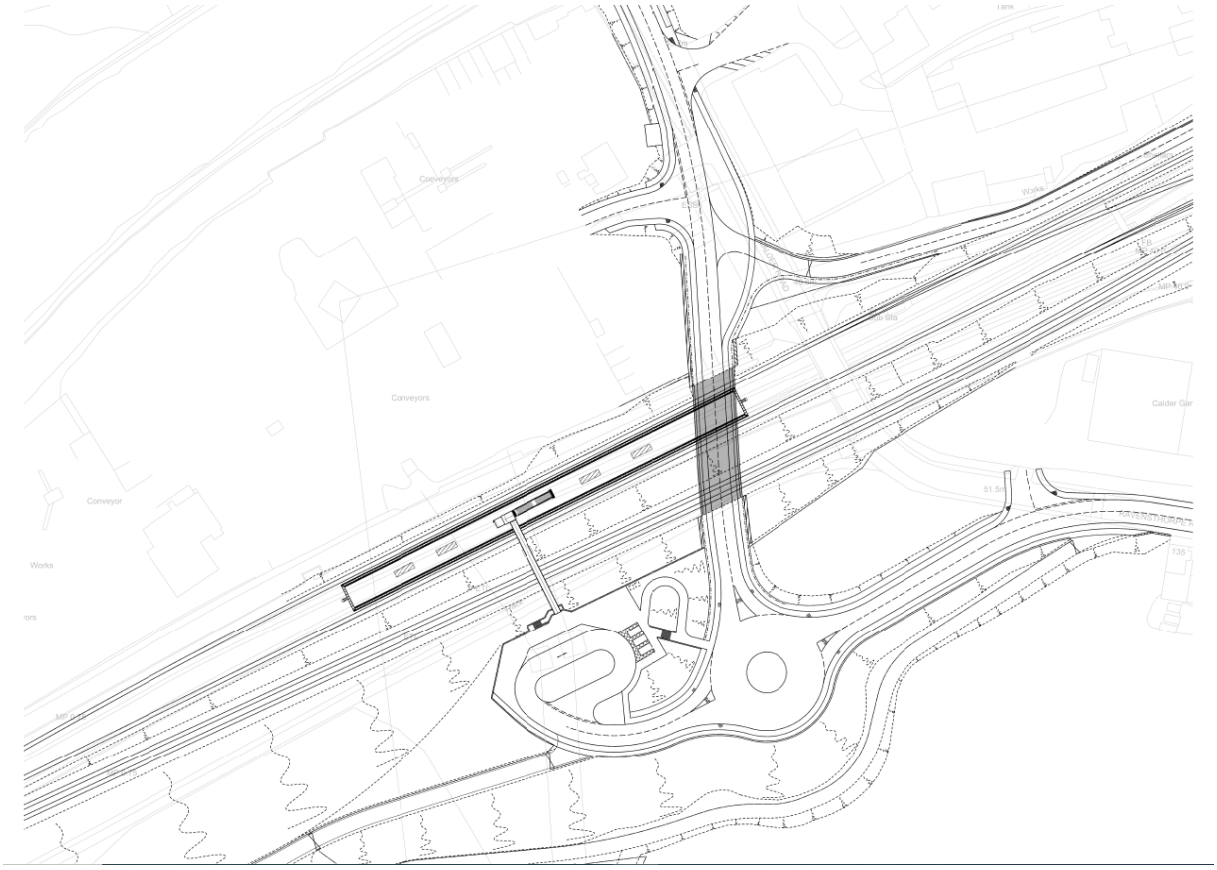

Figure 15: Proposed Ravensthorpe Station Layout

7.7 Stabling – Hillhouse Sidings

7.7.1 The Hillhouse site is a former rail sidings and coal drops, owned by Network Rail. At present the site is used by various commercial properties. A Road Rail Access Point is located to the western end of the site, towards Huddersfield. There are also residential properties located north of the site and commercial properties to the west along Alder street.

7.7.2 The site will be used as a construction hub. This will include storage and laydown facilities for construction of the Scheme. A temporary platform will be constructed on the site to facilitate train services during periods of the construction at Huddersfield Station when the platforms are closed. In the permanent case sidings will be provided on the site to replace the current sidings lost at Huddersfield Station as a result of the works.

8. DESIGN DESCRIPTION AND APPRAISAL: BRIDGES AND HIGHWAYS

8.1.1 The Scheme will have an impact on a wide range of bridge structures along the route from Huddersfield to Westtown (Dewsbury). The design response to each of these structures is rooted in its context considering relevant planning policy, its functionality and the landscape in which it sits. The historical context of this route is particularly significant and through engagement with the local authority and Historic England design solutions have been developed to respond to the heritage of the structure whilst ensuring its contribution to the modern railway. The design of heritage interventions has followed the hierarchy set out in section 2.4.

8.1.2 In addition to the stations within the Scheme, each of the bridges form a point of interface between the public and the railway. The design of new interventions has considered the impact to the public using a Diversity Impact Assessment (DIA) approach. The inclusion of design elements driven from the DIA is explored further in the subsequent paragraphs.

Underbridges

8.1.3 An underbridge is defined as a structure which carries the railway over a highway, footpath or other amenity. The Scheme requires interventions to 15 underbridges as a result of changes to track geometry, line speed and installation of overhead electrification equipment. In addition, three new underbridges will be delivered in response to the new alignment.

8.1.4 The design approach to underbridges has been led by the functional requirements of the railway, whilst where possible, maintaining the existing headroom and width of the structure.

Overbridges

8.1.5 An overbridge is defined as a structure which carries a highway, footpath or other amenity over the railway. The Scheme requires intervention to 13 overbridges as a result of changes to track geometry and clearances for overhead electrification equipment. In addition four new overbridges will be delivered at stations in the Scheme, see section 7.

8.1.6 The design approach to overbridges has been led by the functional requirements of the railway and in response to the requirements of the amenity provided by the structure. This includes highway geometry, footpath provision and wider design considerations such as Heritage Listing.

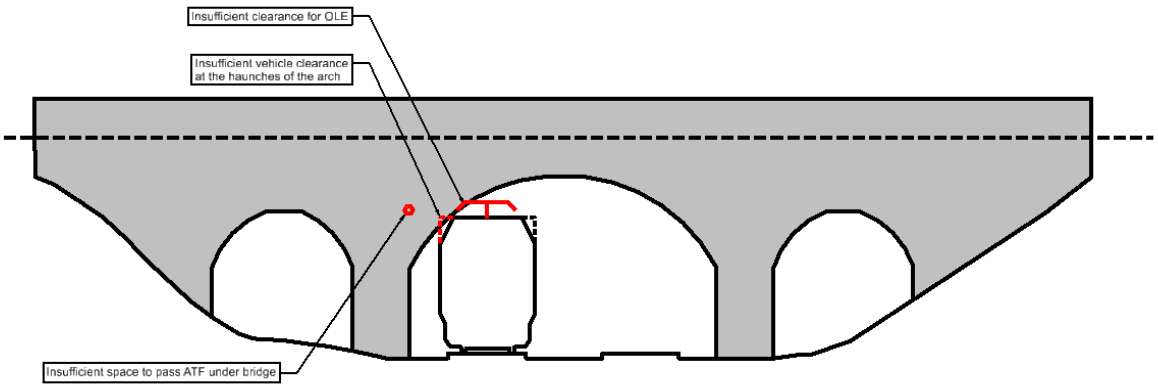

Figure 16: Constraints for the installation OLE under an existing overbridge

Permanent Works

8.1.7 The following paragraphs consider the design and access considerations made when specifying the intervention at each of the bridges in the Huddersfield to Westtown (Dewsbury) Scheme, highlighting the design approach, resultant provision and materials to be used. This assessment is undertaken by area, commencing at area 1, Huddersfield.

Construction Impacts

8.1.8 The works to replace and modify the bridges across the Huddersfield to Westtown (Dewsbury) Scheme will result in temporary construction impacts. This includes the provision of diversion routes for both vehicles and pedestrians. For more information on the proposed diversion routes see the Traffic Assessment contained within the EIA.

8.2 Area 1: Huddersfield

Westgate Overbridge (MVL3/90)

8.2.1 Westgate (MVL3/90) is a two-span concrete beam overbridge with engineering brick abutments which forms the eastern portal to the Huddersfield Tunnels. The structure supports the carriageway of Westgate and a footway over the railway to the west side of Huddersfield Station.

8.2.2 It is necessary to extend and raise the existing masonry parapet, which acts as the boundary wall to the railway, in order to provide public protection to overhead electrification equipment. The parapet will be raised to minimum height of 1.85m over the railway and 1.55m on the approaches. The parapet will be raised using concrete copers and anti-climb measures will be installed on relevant street furniture. The increase in the height of the parapets over the railway will result in the view of the station

being obstructed, however it will remain possible to view the station from the approaches where the height of the parapets is lower. The invention proposed at Westgate is limited in extent and will not detract from the overall appearance of the conservation area. There will be no change to the operation of the footway or highway following the works.

Huddersfield Viaduct (MVL3/92)

8.2.3 Huddersfield Viaduct is a Grade II listed 47-span masonry and metallic viaduct located in the east of Huddersfield town centre. The viaduct currently carries two lines at the Leeds end and three at the station end (plus some additional sidings), all without overhead electrification.

8.2.4 The viaduct was constructed in two phases. The original 1840s construction comprises ashlar sandstone masonry arch barrels with ashlar stone masonry voussoirs, spandrel walls and parapets. The viaduct was widened in the 1880s with blue brick arch barrels and ashlar stone masonry voussoirs, spandrel walls and parapets. At the station (South) end this widening occurred only to the West side, while from Northgate/Bradford Rd at Span 29 the widening occurred to both sides (due to the shape of the 1840s viaduct).

8.2.5 The Scheme will install additional tracks, switches and crossings, over line electrification and signalling equipment on the viaduct.

8.2.6 Two spans; span 1, John William St and span 29, Bradford Road require major interventions to facilitate the proposed track layout. See sections 8.2.14 and 8.2.19 respectively.

8.2.7 The design approach to the installation of electrification on the viaduct has been driven by the requirements of the operational railway, and the requirement to minimise as far as possible the impact to the Grade II listed structure. From the station to around span 33, the OLE supports will be fixed to the outside of the structure, at piers, on both elevations of the viaduct. This is required at the station end of the viaduct due to insufficient width to attach the OLE within the footprint of the viaduct. It becomes possible to accommodate OLE within the width of the viaduct on the West elevation from around span 17, but for visual consistency it is proposed to continue to support the OLE on the exterior of the viaduct until around span 33.

8.2.8 The OLE supports need to be fixed to the outside of the structure on the east elevation throughout its length. From spans 33 to 47 the west elevation is not visible from public highways and, as it backs onto private gardens, it is proposed to minimise disruption by locating the structures within the viaduct footprint.

8.2.9 Some of the OLE structures attached to the viaduct are ‘anchor portals’ and will require tie wires to adjacent piers, which appear as a diagonal wire when viewed on elevation.

8.2.10 A signal gantry will be placed at the station end of the viaduct to facilitate train movements in and out of the station.

8.2.11 Strengthening and repairs will be undertaken throughout the structure. This may include the introduction of tie bars and pattress plates and the installation of a reinforced concrete strengthening detail behind the spandrel walls and parapet at track level.

8.2.12 For further information refer to the Huddersfield Viaduct Listed Building Consent Application.

8.2.13 With the exception of span 1, John William St and span 29, Bradford Road. There will be no change to the operation of the footways or highways following the works.

Huddersfield Viaduct Span 1, John William Street (MVL3/92(1))

8.2.14 The existing single-span rail bridge was built in 1845 and extensive modifications were undertaken in 1881. The current arrangement comprises a wrought iron superstructure tapered in plan and skew. The superstructure has five half-through girders (not in parallel), with cross girders carrying multiple tracks, over John William Street and into Huddersfield Station. Decorative cast iron parapet screens are fixed to the outer edge girders. The bridge is supported off sandstone abutments.

8.2.15 To achieve the performance requirements of the Scheme, a number of the Huddersfield Station platforms are extended over John William Street Bridge to accommodate longer trains. The current girder arrangement of the bridge clashes with the proposed track alignment and platform extensions, therefore an intervention is necessary in order to accommodate the proposed rail infrastructure.

8.2.16 The new metallic half-through girders bridge will accommodate the proposed track alignment and platform arrangements, resulting in a type of structure similar to the existing. The required interventions will be of a modern interpretation but in keeping with the surrounding heritage assets. The edge girders will be reconfigured and architectural details will be developed to maintain as far as possible the existing visual appearance.

8.2.17 A fire escape with a fire refuge will also be provided for the new platform 2 extension over John William Street Bridge and incorporated into the eastern edge girder design.

8.2.18 The extension of the bridge to this eastern face requires some modification to the highway and footpath on Viaduct Street. Existing footway width and pedestrian crossing infrastructure will be re-provided. Bollards will also be provided on the corner of John William St and Viaduct Street to protect a cantilevered cill beam which supports the new platform above. This will be achieved through a reduction in the length of the existing parking bay. The soffit height and minimum vehicle clearance of the existing bridge is maintained under the new structure.

Figure 17: Proposed Span 1 Visualisation

Huddersfield Viaduct Span 29, Bradford Road (MVL3/92(29))

8.2.19 Bradford Road, span 29, is formed from the central 1840s masonry arch and two wrought iron bridge decks added either side during the 1880's widening.

8.2.20 The metallic parts of Span 29 has been out of use for several decades and the wrought iron members have deteriorated beyond repair. Additionally, the original Span 29 deck did not carry high speed ballasted track but instead used longitudinal timbers. This form of construction is unsuitable for the proposed track alignment and speeds.

8.2.21 A range of structural forms were considered and assessed against the dual requirements of suitability for the proposed railway and respecting the heritage structure. For more information see the Huddersfield Viaduct Heritage Assessment.

8.2.22 A prestressed concrete beam solution is proposed to replace the wrought iron spans. This involves new abutments built in front of the existing sandstone abutments at both ends and on both elevations. The masonry arch in the centre of span 29 will remain in-situ. The concrete deck option removes girders from track level and gives sufficient clearances to allow switch and crossing unit (points) to be placed over span 29, bringing several sets of points on the viaduct closer to the station. This reduces platform reoccupation time and therefore has an operational benefit for passengers. The concrete form also provides the best long-term value by eliminating the steel/masonry interface at which the previous deck has corroded, and which is challenging to inspect or paint.

8.2.23 A concrete parapet is proposed to both elevations which will be joined to the concrete beam deck. The parapet will be of similar depth to the existing wrought iron box girder and parapet and will feature vertical strips to reference the web cover plates of the box girder which is being replaced. Additional masonry pilasters/buttresses will be formed at the corners of the new abutments into which the concrete parapet will join, referencing the existing detail between the wrought iron box girder and the existing masonry pilasters.

8.2.24 These modifications will impact at street level reducing the width of the widest sections of the footways. Following the works both footway widths through span 29 are 1.8m or greater, which is sufficient for two wheelchair users to pass. The overall effect of the works to Span 29 on the townscape is negligible.

Figure 18: Proposed Span 29 Visualisation

8.3 Area 2: Hillhouse and Fartown

Red Doles Road (MVL3/96)

8.3.1 The original bridge over Red Doles Road was constructed circa 1840 and widened in the 1880's. The abutments and bridge decks were re-constructed in the 1990's and comprised of two single span steel structures carrying four tracks. Two of these tracks were subsequently removed leaving the south span redundant. The bridge deck on the north side of the railway corridor was recently replaced. The redundant bridge to the south was removed, but its abutments and foundations were retained.

8.3.2 It is necessary to provide two new tracks at this location in addition to the existing two-tracks. It is proposed to provide these to the south of the existing tracks within the existing railway corridor. A new structure is hence required to span Red Doles Road which will make use of the disused historic abutments.

8.3.3 The proposed structure is of steel construction (Network Rail Standard Design Detail U-type) and will be painted Holly Green to match the existing bridge. The new structure will include a walkway and handrail on the southern extents to facilitate Network Rail maintenance access.

8.3.4 Red Doles Road provides vehicular and pedestrian access beneath the railway. The footway on the north east side of Red Doles Road ends at the junction for Aquamarine Drive. One footway passes under the existing structure positioned on the south west side of the highway. The footpath is elevated with a metal railing adjacent to the road. This provision will be retained. The overall visual effect on the surrounding area is negligible given the Scheme is merely restoring a bridge which was previously in existence.

8.3.5 The soffit height and minimum clearance of the existing bridge is maintained on the new structure.

Field House (MVL3/98)

8.3.6 Field House overbridge is a wrought iron bridge originally constructed in circa 1850. It carries public right of way HUD/42/10 over the railway. Either side of the footbridge, the footpath is formed from lose material on a steep slope. The southern approach to the bridge is formed from a steep concrete ramp with a gradient of approximately 1 in 4. Although the structure is 12.8m wide (originally carrying a highway), the footpath is constrained within a 3m corridor enclosed with a palisade cage. This is to prevent pedestrians accessing unsafe areas of the structure and to reduce incidences of trespass.

8.3.7 The bridge is in extremely poor condition and is insufficiently high to allow over line electrification to pass underneath. For this reason, replacement of the wrought iron deck is proposed with a new footbridge supported on the existing abutments.

8.3.8 The new structure will have clear width of 3m to match the existing provision. It will be formed from weathering steel with a galvanised steel canopy. The canopy has been specified to replicate the existing security arrangement on the footbridge. Chevaux de frise will be placed at either end of the canopy to deter climbing. Palisade fencing up to a height of 3m will be installed for safety and security. The new structure will considerably improve the visual appearance of the bridge.

8.3.9 To provide sufficient vertical clearance for the electrification below the structure, the new footbridge deck level needs to be higher thereby affecting the tie-ins into the approach paths. On the northern approach the new footbridge ties into the existing footpath within the bridge span. On the southern approach 10 steps and a ramp are proposed.

8.3.10 The approach structure at Fieldhouse includes a series of landings and steps on the existing footpath alignment to achieve the level different. A dog-leg ramp will tie into the stair landings and a gradient no steeper than the existing approach ramp. The ramp will be of steel construction. This will considerably improve accessibility over the structure for mobility impaired people.

Figure 19: Proposed Fieldhouse Overbridge Visualisation

Ridings (MVL3/99)

8.3.11 Ridings underbridge carries the railway over a public right of way footpath connecting the end of Peace Pit Lane with the Birkby-Bradley Greenway. The underbridge comprises two adjoining structures: a metallic span to the north side and a stone arch to the south side. The metallic span is presumed to have been constructed as part of the 1880's widening of the railway corridor

8.3.12 The metallic bridge deck on the north side of the existing railway is not wide enough to carry the additional tracks required by the Scheme. This is because the footprint of the new tracks begins to widen on the approach to the platforms at the reconstructed Deighton Station, for further information see section 7.4. Therefore, the metallic bridge deck requires replacement with a wider structure.

8.3.13 When specifying the new structure, design considerations included; the sensitive interface with the arch structure to the south, removal of hiding places within the structure and retention of the current public right of way alignment.

8.3.14 The new structure is formed from a concrete portal. Adjacent to the new portal the track will be supported on a concrete infill clad with masonry.

8.3.15 There will be no change to the operation of the Public Right of Way following the works. Currently the area is unlit and this condition is retained.

8.4 Area 3: Deighton and Bradley

Whitacre Street Bridge (MVL3/101)

8.4.1 The railway passes under Whitacre Street adjacent to Deighton Station. Works to Deighton Station requires invention to the bridge and highway, for more information on the works in this location see section 7.4.

A62 Leeds Road (MVL3/102)

8.4.2 The existing A62 Leeds Road overbridge is a 22m long skew span bridge over the railway. It is a concrete beam bridge with brick abutments. It carries the carriageway, associated footway, cycleway and multiple services. The A62 is a critical and heavily trafficked highway route in the Huddersfield area.

8.4.3 The current structure is too low to allow over line electrification to pass beneath. The addition of two tracks and changes in railway geometry to facilitate line speed increases within the corridor footprint, means that the distance between the abutments is also insufficient to facilitate the proposed track alignment.

8.4.4 The design approach has been to minimise disruption to the highway network as far as possible. 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, the Scheme proposes to reconstruct the bridge.

8.4.5 The proposed track layout was developed to retain the existing north abutment. This approach enabled a staging strategy which minimised highway disruption and simplified construction phasing.

8.4.6 To minimise disruption to the A62 during the construction phase, it is proposed to reconstruct the new bridge to one side, partially overlapping the existing bridge (i.e. half offline). This enables a temporary road alignment to be provided during the demolition of the existing bridge and construction of the new bridge. The existing bridge can therefore be retained in use until the temporary alignment is ready, avoiding lengthy road

closures or traffic diversions. This also enables a pedestrian and cycle route to be retained throughout the works in the vicinity of the existing bridge. Some closures of short durations will be required, see the Chapter 14 (Traffic and Transport) in the Scheme-wide Assessment in Volume 2i of the Environmental Statement.

8.4.7 The permanent Scheme comprises of an 8m carriageway width, two 2m cycle lanes and two 2m footpaths. Vehicle restraint barriers and 1.8m high parapets (minimum) will be provided to highway and railway standards.

8.4.8 To provide space for the electrification and to tie into both highway approaches, the maximum highway gradient is increased to 5.75%. The tie-in on the southern approach is the driving factor for the maximum gradient of 5.75% and is a consequence of tying into the existing highway layout and levels prior to the existing A62 / Neptune Way signalised junction.

8.4.9 The provision of a maximum gradient of 5.75% is above the desirable maximum gradient of 5% (1 in 20). The maximum gradient is applied over a relatively short distance of 15m with vertical curves provided either side. The impact of providing a maximum gradient of 5% would result in the tie-in point to the existing highway being approximately 18m further to the south of the current proposed location. This would require the whole of the signalised junction to be reconstructed. Consequently, achieving a 5% gradient on the southern approach is not considered a reasonable adjustment.

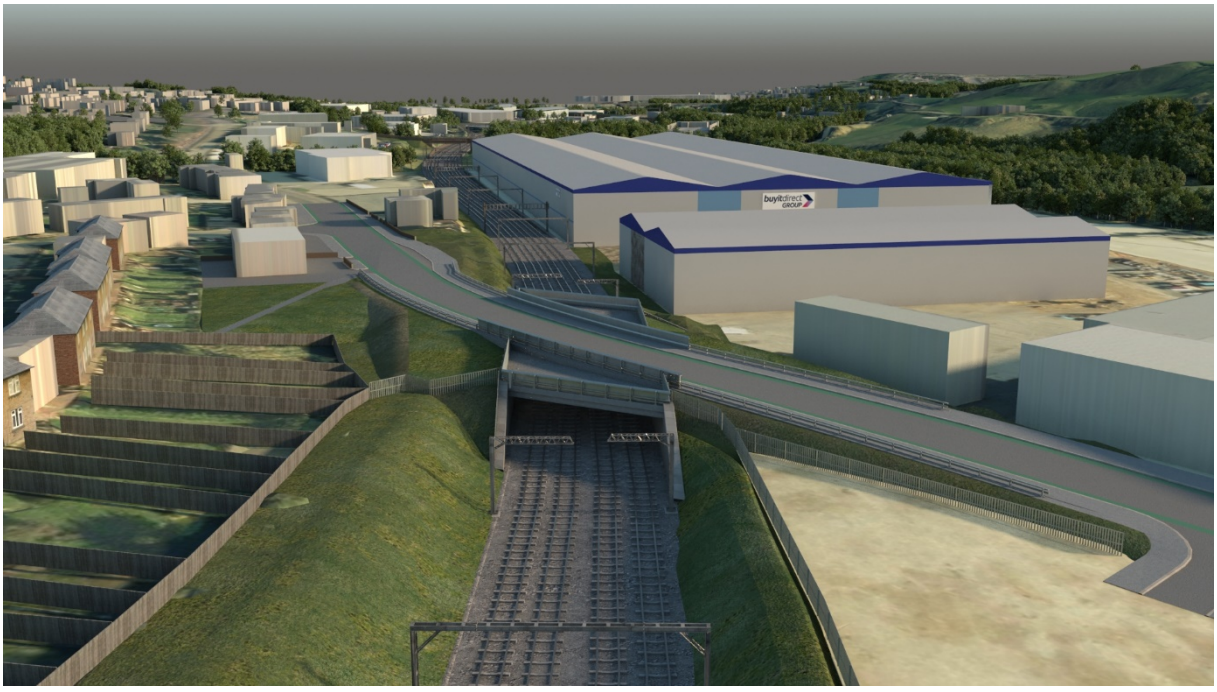

Figure 20: Proposed A62 Leeds Road Visualisation

8.4.10 The new structure will consist of reinforced concrete abutment walls and a deck formed from either steel or prestressed concrete beams with a concrete deck slab. New high containment steel parapets (1.8m) will be provided along the carriageway with painted infill panels. The redundant areas of the deck at each end will also be protected with steel infilled parapets with a similar finish.

8.4.11 The new bridge will be constructed with a double-skew arrangement, both to the railway (30°) and to the highway (18°). This approach has been chosen to minimise construction depth and therefore vertical realignment of the highway, to facilitate the temporary alignment and to facilitate the utilities which pass over the structure. This arrangement results in triangular redundant deck areas to either side of the highway. Access will be restricted to these areas to ensure safety and security.

8.4.12 Existing bus stops and crossing points will be reinstated following construction.

8.4.13 Public Right of Way HUD/51/10 connects to the highway at the northwest corner of the bridge. This route will be impacted by the works. The Scheme proposed to re-provide the route via an existing footpath to the east.

Wheatley's Overbridge (MVL3/103)

8.4.14 Wheatley's Overbridge is a two span, gritstone arch, pedestrian and cycle bridge. The bridge currently carries the National Cycle Route 66 over the railway. It was originally built in the 1850's and it was Grade II listed in 2018.

8.4.15 The new alignment of the railway lines clash with the supports of the existing structure. Additionally, the existing arches have inadequate clearance for the proposed OLE. It is proposed that the existing bridge is to be demolished and replaced with a new structure providing adequate horizontal and vertical clearance.

8.4.16 The design of the replacement structure has been influenced by retaining functionality of the cycleway and responding positively to the loss of a listed structure in the delivery of a high-quality modern design. Minimising disruption to the cycleway and utilities in the temporary case has also influenced the design.

8.4.17 The new overbridge will be a single span, approximately 23m in length. The main girders will be weathering steel beams, which also form the 1.8m high parapets. The approach walls and the abutments will be masonry clad to match existing. The existing utilities will be diverted and supported below the new deck.

8.4.18 The existing 3.5m width of the cycleway is maintained and the vertical alignment improved. The proposed horizontal alignment has been adjusted to ensure good visibility across the structure to reduce the likelihood of collisions between pedestrians and cyclists. In the existing arrangement, a bench is provided in the centre of the bridge as

a method of covering a utilities access hatch. A new bench will be provided to the south of the structure outside the line of the cycle path. Currently the area is unlit and this condition is retained.

8.4.19 As compensation for the loss of MVL 3/103 Wheatley's Overbridge, it will be a requirement to incorporate heritage interpretation in the design of the new replacement bridge. There will be further engagement with stakeholders with respect to the final design and interpretive elements to be incorporated; this will be secured as a condition of the TWAO. Such measures would provide opportunity for the retention of understanding and legibility of the history of the Grade II Listed bridge, including its use and historical associations, after the structure is lost. Further information on this can be found in the MVL 3/103 Wheatley's Overbridge Heritage Assessment and the Environmental Statement (Chapter 6 (Historic environment) in the Deighton and Bradley Route Section Assessment in Volume 2ii).

Bradley's No. 2 (MVL3/105)

8.4.20 Bradley's No.2 (MVL3/105) is a two-span overbridge of steel beam and gritstone construction which carries a private highway to an industrial estate to the south of the railway corridor.

8.4.21 The addition of OLE to the railway corridor results in the need to raise parapets. The parapet will be raised to minimum height of 1.85m over the railway and 1.55m on the approaches. The parapet over the railway will be raised using galvanised perforated steel angle. Concrete steeple copers will replace the existing copers on the approaches. Chevaux de frise, fences and vehicle restraint barrier will be provided for safety and security. There will be no change to the operation of the footway or highway following the works.

8.5 Area 4: Colne Bridge and Battyeford

Colne Bridge Road (MVL3/107)

8.5.1 Colne Bridge Road is a Grade II listed 4-span gritstone arch bridge carrying B1168 Bridge Road across the railway. The highway carried by the bridge forms part of a critical route within the Local Highway Authority network. The three arch spans to the north comprise stone arch barrels. The fourth, smaller, arch to the south comprises a brick-faced arch barrel. The spandrel and parapet walls are of stone masonry construction.

8.5.2 There is insufficient clearance for the overhead line equipment (OLE) under the arch spans of the bridge. Additionally, the new fast lines clash horizontally with the pier between spans 2 and 3.

8.5.3 A number of options were considered with the aim of retaining the heritage fabric of the bridge whilst delivery the operational benefits required for the Scheme. Briefly, these included track lowering and jacking of the bridge. Upon evaluation neither option was deemed feasible. For more information see B6118 Colne Bridge Road Heritage Assessment.

8.5.4 A new bridge will be constructed to the east adjacent to the existing structure in order to minimise disruption to traffic and pedestrians during construction. The width of the crossing will be increased to 7.3m in line with modern standards. One 2.0m footway will be provided to tie into the existing provision.

8.5.5 The new structure will comprise reinforced concrete abutment walls and a deck formed from steel beams and a concrete slab. The new parapets will be steel and will be infilled across the structure in order to protect the public from the OLE below the bridge.

8.5.6 The two remaining arches will be infilled. The eastern face of both arches will be buried below the new highway alignment. The western face of both of the arches will have a masonry façade. The material for the façade is to be agreed. Walls will be constructed on the retained piers adjacent to the tracks. These will be of a sufficient height to protect members of the public and maintenance workers from electrocution from the OLE equipment, in line with Network Rail requirements

8.5.7 The existing carriageway vertical alignment is substandard with a tight crest curve over the bridge, which limits the forward visibility for car and pedestrian users. The existing maximum approach gradient to the bridge is approximately 6.5%. It is necessary to increase the level of the highway where it crosses the railway in order to provide sufficient clearance below the bridge to accommodate the OLE. This level increase has been minimised by reducing electrification clearances, lowering track levels and minimising bridge construction thicknesses and tolerances. Notwithstanding these efforts, the preferred option retains the maximum highway vertical gradient of 6.5%. It has not been possible to reduce this; however, the design ensures that the existing maximum gradient is not increased.

Figure 21: Proposed Colne Bridge Road Visualisation

Huddersfield Broad Canal (MVL3/108S)

8.5.8 The existing railway passes over the Huddersfield Broad Canal and its towpath on structure MVL108 a wrought iron girder span structure. No works are proposed to this structure.

8.5.9 The new fast lines will be constructed to the south side of the existing railway corridor and use the redundant MVL3/108S span to cross the canal. The existing bridge has a metallic superstructure that was built around 1880 when the railway was widened. This metal superstructure is of limited heritage value, comprising a later alteration to the bridge which is of unexceptional design, and which reduces understanding of the bridge's original engineering and construction. Since removal of the railway from this structure, it has suffered extensive corrosion and its poor condition means that is not able to carry the proposed fast lines. Therefore, the deck will be replaced on the existing abutments.

8.5.10 Design considerations included retention of the existing headroom to the canal and towpath, provision of a safe maintainer route and interface with a Yorkshire Water pipe asset currently occupying the redundant track bed and located over the structure.

8.5.11 The existing MVL3/108S overbridge will be replaced with a new steel deck. A separate pipe crossing will be provided to carry the Yorkshire Water pipe and to provide a safe walking route for railway maintenance personnel. The pipe crossing will be located a

close as practicable to the new railway bridge. The existing 17.75m clear span and headroom to the canal will be retained. There is no impact to the operation of the canal or towpath in the permanent case. Overall there is no significant change to the visual appearance of the bridge in the context of its surroundings.

Colne Viaduct (MVL3/109)

8.5.12 The structure carries the existing railway lines over the River Colne. It is a three span segmental gritstone structure with one span having been replaced in steel. There is no public access to land either side of the river in this location. Similar to adjacent bridge MVL3/108 the new fast lines will be constructed to the south side of the existing railway corridor and use the existing redundant spans to cross the river. The existing southerly river span (steel), in its current condition is not suitable to carry railway traffic. In order to support the two new fast lines, the metallic deck needs to be modified. No intervention is planned to the northern masonry span.

8.5.13 Design considerations included; clearance to the River Colne, provision of a safe maintainer route and interface with a Yorkshire Water pipe asset currently located on the structure.

8.5.14 The Scheme will modify the existing metallic ladder deck structure by the addition of a new reinforced concrete deck, retaining the existing girders. The new structure will extend approximately 1.2m further south than currently to facilitate the fast track alignment, Yorkshire Water asset and maintenance walkway. A new galvanised steel handrail will be installed. Overall there will be no significant change to the visual appearance of the bridge.

8.5.15 To the west of the main span the approaches are formed of multiple masonry arch structures which provide flood relief to the river channel. These structures need to be widened to the south side like the main span. This is achieved using new concrete cantilever elements, which also support the diverted Yorkshire Water pipe and maintenance walkway.

Parks Overbridge (MVL3/110 and MVL4/1)

8.5.16 Structures MVL3/110 and MVl4/1 are wrought iron girder bridges with brick abutments and form a private access to a Yorkshire Water treatment site. There is no public access to the site. The proposed track alignment clashes with the existing bridge supports and has insufficient clearance to allow OLE to pass beneath.

8.5.17 Design considerations were led by a Yorkshire Water requirement to provide uninterrupted access to the site during construction works, and consideration of the multiple utilities carried by the structure. A new steel beam and concrete structure to the

east of the existing is proposed, with appropriate parapet provision to highway and railway standards.

8.5.18 The access road will be realigned within the Yorkshire Water site to the north and the single lane approach from the south.

Heaton Lodge Footbridge (MVL4/4) and Helm Lane (MVN2/188)

8.5.19 An existing public right of way KIR/240/10 crosses the railway to the west of Battyeford, connecting the tow path of the Calder and Hebble Navigation Battye Cut to Helm Lane. This path crosses over the Down Main line via a wrought iron lattice girder footbridge (Heaton Lodge Footbridge, MVL4/4) and under the Up Main and Calder Valley lines via a subway (Helm Lane Underpass,MVN2/188).

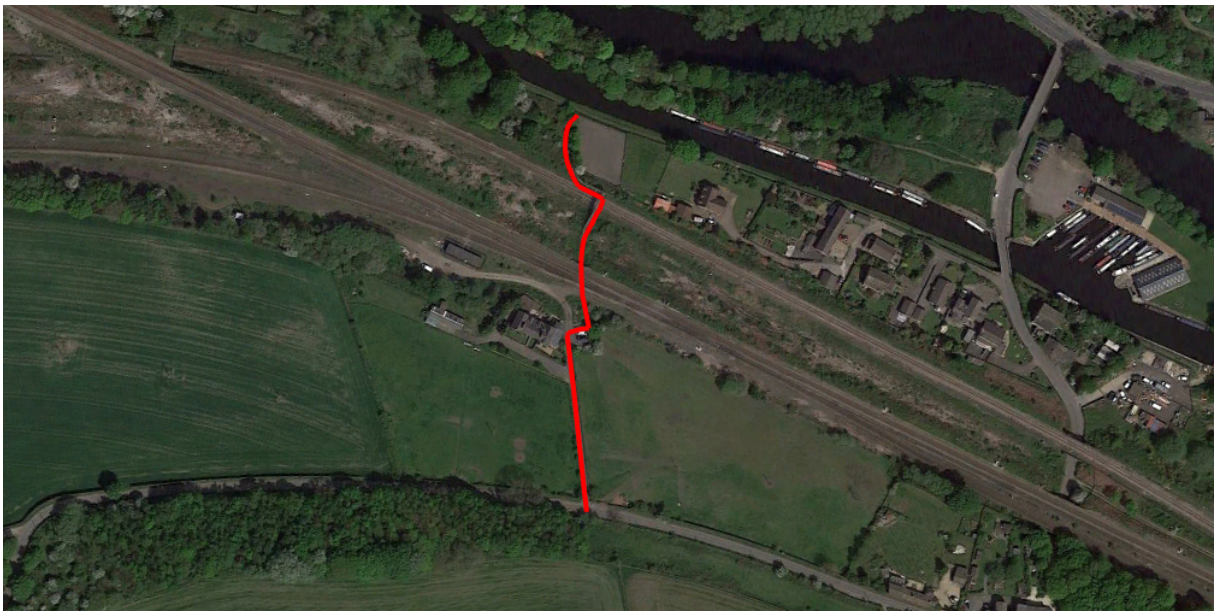

Figure 22: Existing public right of way

8.5.20 The existing footbridge does not provide adequate vertical or horizontal clearance to safely accommodate electrification of the existing line. Therefore, the footbridge needs to be replaced with a structure that provides clearances and adequately protect the public.

8.5.21 The Scheme will replace the current stepped footbridge with a new stepped footbridge to modern railway standards. This includes a 2m clear width walkway and a solid parapet 1.8m in height. The bridge including the parapet will be formed from weathering steel. The inside face of the parapet will be painted Holly Green.

8.5.22 Owing to the limited space within the Network Rail land boundary to the north and the footpath not being fully accessible elsewhere along its route, providing step-free access

over the footbridge is not considered a reasonable adjustment at this time. The structure is currently unlit and uncovered and this condition will remain.

Figure 23: Proposed Footbridge Visualisation

8.5.23 The new fast lines will intersect the footpath to the south of the existing subway. A new structure is required to allow the public to safely cross these new lines.

8.5.24 To achieve this, Helm Lane Underpass (MVN2/188) will be relocated and extended. The relocation is driven by engineering and operational constraints. This also presents an opportunity to improve passage through the subway.

8.5.25 It is proposed to construct the new underpass approximately 90m to the east of the existing structure to avoid the existing switches and crossings in the area. Whilst constructing the new underpass in this location increases the length of the footpath, it allows for offline construction and reduces the gradient of the footpath between the footbridge and the underpass.

8.5.26 The new lines create an isolated parcel of land between the fast lines and the up main line. Network Rail require vehicular access to this land for maintenance purposes. A new maintenance access point is proposed at Wood Lane along with provision for vehicles to pass through the new Helm Lane Underpass to access this area. Therefore this creates a shared route for pedestrians and maintenance vehicles over a short distance.

8.5.27 The underpass will be formed from two short concrete portal structures each about 10m in length. The northerly structure combines pedestrian and maintenance vehicle access

and has a clear height of 3.25m. The southerly structure is for pedestrian use only and has a clear height of 2.60m. Both of these clearances provide significant benefit over the existing structure which at its shallowest provides less than 1.70m of vertical clearance for users.

8.5.28 The existing underpass structure is currently unlit and this condition remains

8.5.29 The proposed works will impact users of the public right of way. The level of the footbridge and underpass will change as a result of achieving the vertical clearances required by modern standards.

8.5.30 Within the Network Rail corridor, the Public Right of Way will be fenced to ensure safety and security of both the user and the railway.

8.6 Area 5: Mirfield and Lower Hopton

Mirfield Viaduct (MVN2/192 and MVN/192a)

8.6.1 MVN2/192 Mirfield Viaduct spans the River Calder approximately 300m to the west of Mirfield station. The viaduct was originally built in the 1840s as a rock faced gritstone four arch structure and was widened to the south with the addition of an adjacent metal viaduct MVN2-192a. The original structure (MVN2/192) was Grade II listed in March 2018. The newer metal structure (MVN2/192a) is not listed.

8.6.2 The original masonry arch structure comprises eleven arches in total of which the eastern six arches span the channel. The newer viaduct to the south consists of a steel deck spanning between two brick river piers and brick abutments. The piers of the two structures do not align with one another. The viaduct currently carries three lines without overhead electrification.

8.6.3 An additional track will be added to the southerly structure MVN/192a to complete the proposed 4 track railway. In order to provide overhead electrification portal structures are also required on the viaduct and will impact both structures.

8.6.4 The spacing of the portals over the viaduct has been maximised to reduce the number of portals required on the viaduct to three. These will span perpendicular to the tracks to minimise the size of foundations. The portal foundations will be located to align with the centrelines of the masonry piers on the listed structure MVN2/192.

8.6.5 On the listed masonry side of the viaduct (MVN2-192) the OLE portal foundations will be located within the footprint of the structure, in-board of the masonry parapets. This option is proposed as it requires only minor modifications to be made to the bridge deck and parapet structure and therefore limits harm to listed features of the bridge .

8.6.6 On the metallic structure (MVN/192a) the OLE portals will be fixed to the exterior of the metal bridge structure

8.6.7 For more information refer to the Mirfield Viaduct Heritage Assessment

8.6.8 In the permanent case there will be no change to the operation of the highway infrastructure which passes under the viaduct.

Figure 24: Proposed Mirfield Viaduct Visualisation

Mirfield Station Road (MVN2/193)

8.6.9 The railway passes over Station Road in the location of Mirfield Station. Works to Mirfield Station requires invention to the bridge and highway below, for more information see section 7.5.

Wheatley's Viaduct (MVN2/196)

8.6.10 MVN2/196 Wheatley's is a 5-span skew arch structure carrying the railway across the River Calder. It was Grade II listed in March 2018. The viaduct currently carries three lines without overhead electrification. The northern half of the structure comprises ashlar sandstone masonry arch barrels with irregular shaped ashlar stone masonry voussoirs, spandrel walls and parapets. The southern half is formed from brickwork masonry arch barrels with ashlar stone spandrel walls and parapets. The southern parapet is topped with a steel post and handrail.

8.6.11 The east abutment of Wheatley's Viaduct is shared with the adjacent MVN2/197 Steanard Lane Bridge, a single-span metal bridge carrying the railway over Steanard Lane.

8.6.12 An additional track and two OLE portal structures will be added to the viaduct. The number of portals required to be located on the structure has been minimised through maximising the spacing between adjacent portals.

8.6.13 On Wheatley's Viaduct there is insufficient width for the portals and their foundations to be located within the footprint of the existing viaduct. Therefore, at portal locations the parapet will be locally removed during construction. Once the OLE portal foundations are installed, the parapet will be reinstated with a reduced thickness around the foundation. This will ensure that the masonry aesthetic will continue in front of the portal structures.

8.6.14 Whilst it would be visually preferable to locate the portal foundations at pier centre lines, constructability considerations have discounted this option. The portals will be aligned perpendicular to the north parapet walls supported on the spandrel wall.

8.6.15 For more information refer to the Wheatley's Viaduct LBC heritage statement.

8.6.16 In the permeant case there will be no change to the operation of the Steanard Lane and no works are required to the Steanard Lane bridge itself.

Figure 25: Proposed Wheatley's Viaduct Visualisation

8.7 Area 6: Ravensthorpe and Westtown

Calder Road (MNV2/202) and Calder Road River Bridge (MDL1/3)

8.7.1 Calder Road crosses the River Calder and the railway in the Ravensthorpe area to the west of Ravensthorpe Station on two structures, Calder Road MVN2/202 and Calder Road River Bridge MDL1/3. The two bridges provide a well-used vehicular and pedestrian route between Ravensthorpe to the north and Thornhill to the southeast.

8.7.2 Calder Road bridge is a concrete beam structure with brick parapets, it carries a two-lane carriageway and one 1.4m footway, located in the eastern side. There is currently no footway provision on the west side. The longitudinal gradient of the highway and footway to the north of Calder Road overbridge is approximately 5.3%. This is greater than Local Highway Authority guidance which proposes a maximum longitudinal gradient of 5.0% (1:20).

8.7.3 The Scheme will increase the number of tracks passing through the Calder Road overbridge (MVN2/202) from three to four. All four lines will be electrified. The four lines comprise: two slow lines and two fast lines. The slow lines will split to the east of Calder Road at a reconfigured Thornhill LNW Junction providing separate routes to Leeds and Wakefield. The fast lines provide an uninterrupted route between Dewsbury and Huddersfield.

8.7.4 To achieve this layout, the fast lines need to cross over the slow lines towards Wakefield and are therefore on a rising gradient at the location of the existing Calder Road bridge. For more information see section 6.3, grade separated junction. As a result, these elevated lines clash with the existing bridge deck and its southern abutment. Therefore, reconstruction of the bridge is necessary. To provide sufficient vertical clearance to the fast lines for trains and the OLE, the new bridge will have to be constructed at a higher level with the highway either side modified to suit. It is not possible to reconstruct Calder Road overbridge on the current highway alignment. It would need to be constructed significantly higher than the current bridge resulting in non-compliant highway gradients to either side.

8.7.5 It is proposed to construct the new bridge to the west of the existing bridge because the level of the fast lines gradually falls in this direction, reducing the level at which the replacement bridge needs to be constructed. The greater the offset between the new and existing bridge (horizontal realignment), the more the new highway alignment can climb to pass over the railway. The more height that the highway can gain, the less horizontal realignment is required to pass over the railway. Minimising the amount of horizontal realignment is desirable as it minimises the increase in length of journeys between Thornhill and Ravensthorpe. It also minimises use of third-party land.

8.7.6 Highway alignment options with gradients of 5.0% and 5.5% have been considered in the design. The 5.0% alignment would increase the length of the new highway by approximately 35m and increase third-party land requirements by approximately 60%. Consequently, it is proposed to adopt the 5.5% gradient. This is slightly steeper than the existing highway and footway gradient of 5.3% and steeper than the preferred maximum longitudinal gradient of 5.0%. To address this, the Scheme proposes to provide an offset footway to the east with a maximum gradient of 5.0%.

8.7.7 The proposed highway realignment includes a roundabout to the south of the railway. This is included to minimise third-party land use as far as reasonably practicable and avoid the need for tight bends where it ties back into Ravensthorpe Road. The new station is accessed via the roundabout.

8.7.8 The current station footbridge is approximately 115 m from the junction leading onto Calder Road. The new footbridge is approximately 55m from the nearest access to the proposed Calder Road alignment and less than 15m from the drop off bays.

8.7.9 To the north, the new road ties back into Calder Road on Calder River Bridge. The tie in has been located on the river bridge to enable the Scheme to deliver the proposed 5.5% gradient. This is achieved by increasing the level of the road surface on the bridge by approximately 0.5m maximum at its southerly abutment.

8.7.10 Four junctions are altered as part of the Calder Road works. Entrances to commercial properties to the north and south of the railway are reconfigured to provide access. The existing access road to Ravensthorpe Station will be modified to tie into the new Calder Road alignment and becomes a maintenance access road for railway staff.

8.7.11 The new overbridge is formed of two spans. A short span over the fast lines will be of concrete slab construction, and a longer span over the slow lines and station platform will be formed of weathering steel beams with a concrete deck slab. The parapets will be formed of steel high containment barriers with painted steel infill panels. The colour of the parapet infill panels is to be agreed. Overall there will be no significant harmful visual alteration to the townscape through the new structure given the existing general industrial nature of the area and that there is to be substantial residential development of the open fields to the south

<u>Ravensthorpe Viaduct</u>

8.7.12 MDL1/6 Calder and Hebble Underbridge and MDL1/8 River Calder Underbridge are two Grade II listed underbridges spanning the Calder & Hebble Navigation and River Calder respectively between Ravensthorpe and Dewsbury. They carry two tracks without overhead electrification. The bridges are of similar construction and were built in in 1847. MDL1/6 comprises of a single 101 foot span; MDL1/8 comprises of two 101 foot spans.

Each span has six longitudinal cast iron arch ribs transversely braced by cast iron elements and tie bars. The substructures of both bridges are constructed from sandstone blockwork.

8.7.13 The bridges are located c.1.5km west of Dewsbury town centre, and their setting is formed primarily by their location spanning the Calder and Hebble Navigation and River Calder respectively. Views towards the historic structures are largely limited to the river and canal corridors, due to the presence of mature vegetation and industrial development along their banks. Despite this, the bridges are notable features in the local landscape, forming prominent features in views along the river and canal, from where their decorative gothic design can be appreciated, silhouetted against the sky.

8.7.14 As discussed in section 6.4 the fast lines will be grade separated at Thornhill LNE Junction to avoid conflict with the lines towards Wakefield. Owing to the condition of the two bridges and the geometric constraints that they impose on the railway corridor, it is necessary to construct a new viaduct over the Calder floodplain to carry the four new lines.

8.7.15 Options to reuse the existing alignment over MDL1/6 and MDL1/8 to carry two of the four proposed tracks have been considered. A new viaduct would still be required to carry the other two lines. Owing to the current condition of the bridges, they would need to be significantly reconstructed to provide enough structural capacity and design life to meet the requirements of TRU. This would be extremely difficult and costly to implement should the heritage features of these structures be preserved. These options were discounted on this basis in preference for a new four-track viaduct to the south of the existing alignment.

8.7.16 The new track alignment is positioned to the south of the existing alignment which facilitates offline construction of the grade separation at Thornhill LNE Junction, minimising impact to the operational railway. To the east of the River Calder, the new alignment allows an existing reverse curve in the alignment to be flattened out enabling linespeed to be increased, see section 6.4.

8.7.17 To minimise the impact of the proposed viaduct on the setting of MDL1/6 and MDL1/8, the viaduct is offset as far to the south as possible. The alignment is constrained by the Weaving Lane Household Waste Recycling Centre (to the east) and tying into the remodelled Thornhill LNE Junction (to the west).

8.7.18 The viaduct has set parameters in terms of approach gradient, curvature and alignment. The design process has recognised these limitations whilst also delivering individuality to respond to local circumstances (as advocated in the NPPG and CS20) in terms of the individual structure and the overall context in the landscape.

8.7.19 The proposed new viaduct will cross public rights of way (Calder Valley Greenway and public footpath along the west bank for the River Calder) and permissive paths (Calder & Hebble Navigation tow path and Spen Valley Greenway). It will also cross the River Calder which is used by people fishing and a navigable section of the Calder & Hebble Navigation.

8.7.20 Proposed pier locations have been developed primarily to respect the watercourses and public footpaths. A single span accommodates the Calder & Hebble Navigation and its towpath. A back-span is provided to the west of the navigation to avoid a heavy abutment immediately adjacent to the waterway that could adversely affect setting. A separate span crosses the Spen Valley Greenway.

8.7.21 It is necessary to position piers in the banks of the River Calder owing to the greater width of the river. This means piers are located between the river and the access track along the west bank, and between the river and the Calder Valley Greenway. It was recognised that this could adversely affect sightlines of people approaching from the south, so options to avoid this by providing a longer span were considered. The longer span leads to either a very deep deck which reduces headroom under the proposed viaduct (again constraining sightlines), or a very large structure from which to suspend the deck, which would be imposing in the landscape. Through consultation it has been agreed that a slimmer deck with piers located in the riverbanks is the preferred option. To minimise the impact of the piers on sightlines, the pier design is being developed in the form of three separate columns which will allow views through the structure.

8.7.22 The width of the deck has been minimised whilst still providing safe walking routes over the viaduct for regular railway inspection and maintenance. Where the alignment widens at the west end of the viaduct, voids through the deck will allow daylight down to the canal and tow path to improve the experience of users. In the permeant case there is no change to the width or gradient of the footpaths which pass under the new structure.

8.7.23 The choice of materials and detailing of the new viaduct have been developed to provide sympathetic contrast to the existing bridges. The deck will be of a composite design comprising a reinforced concrete slab and steel girders. Weathering steel has been selected to provide a low maintenance modern aesthetic in contrast to the wrought iron of the heritage bridges. The soffits of the longer span girders will be curved in response to the curved soffits of the girders of the heritage bridges.

8.7.24 The four new lines will be electrified. It is proposed that this will be supported from portals along the viaduct to minimise the number of vertical elements attached to the deck. The portal locations are coordinated with the pier locations in consideration of the aesthetic quality of the viaduct.

Lees Hall Farm Bridge (MVN2/204)

8.7.25 MVN2/204 is a single-span masonry arch underbridge carrying the Up Lancashire and Yorkshire and Down Lancashire and Yorkshire lines. To facilitate the flyover at the Ravensthorpe junction, these lines will be realigned to the north of their current location, coming back on line past MVN2/204. Therefore, at the location of MVN2/204, the embankment is to be widened to accommodate the new track alignment.

8.7.26 As MNV2/204 is not used as a through-route, the proposal is to infill the structure using the Network Rail standard infill detail, or similar. The southern side of the infill will have a masonry wall façade. On the north side, the widened embankment will be constructed up to the north face of the infilled structure.

Thornhill Road (MDL1/9) and Fall Lane

8.7.27 Thornhill Road underbridge (MDL1/9) carries two tracks over a single two-lane carriageway (B6117 Thornhill Road) and sits adjacent to the highway junction with Fall Lane. The highway also carries a large number of significant utilities. The current structure comprises two steel bridge decks installed in 2014, which sit on earlier abutments.

8.7.28 Currently the width of the footways narrows on the approach and through the underbridge (approximately 1.2m at the minimum). Both Fall Lane and Thornhill Road feature maximum vertical gradients in excess of 10%.

8.7.29 The Scheme proposes to alter the railway alignment by moving it to the north, which facilitates the increased line speed required by the Scheme. For more information, see section 6.4. The new alignment moves the railway from the current structure and therefore a new structure is required.

8.7.30 A range of options were considered for the design of the new bridge which looked to satisfy a compromise between bridge size, impact to the highway in the temporary and permanent case, and impact to utilities.

8.7.31 The resultant solution locates the new bridge over the current junction between Thornhill Road and Fall Lane. This requires modification to the highway to relocate the junction further to the north.

8.7.32 The proposed MDL1/9 underbridge will approximately match the span and skew angle of the existing. The new abutments will be located directly adjacent to the existing. A new single-span metallic underbridge, likely be of similar construction to the existing double track U-deck, will be installed. Cantilever walkways will be attached to both sides of the deck to maintain safe walking routes adjacent to both lines.

8.7.33 The proposed rail alignment is raised approximately 1m above the existing over the length of the structure in order to retain a minimum 5.3m headroom clearance between the finished highway level and the soffit of the new bridge.

8.7.34 The decision to adopt a short span bridge was partly informed by a desire to avoid clashing with existing wingwalls/lineside retaining walls. This would have necessitated complex temporary works near the existing rails to retain the embankment with consequential disruption to the railway including possessions and line speed restrictions. The significant number of utilities in this area, results in a comprehensive programme of utility diversions to deliver the new structure.

8.7.35 The decision to match the existing span and skew angle of the MDL1/9 creates the opportunity of reusing the existing MDL1/9 deck, albeit with modification to the steelwork. This opportunity will be explored in more detail in future design stages.

8.7.36 The modification of the junction and associated realignment of Thornhill Road and Fall Lane necessitate changes to the current gradients. The proposed gradients of both Thornhill Road and Fall Lane do not exceed the current maximum gradients. It is proposed to retain the operational concept of the 3-way signalised junction between Fall Lane and Thornhill Road. This is to ensure sufficient visibility is retained through the existing and proposed abutments.

8.7.37 A retaining wall is proposed between the highway and residential properties on Brookes Yard to minimise third party land impact. The residential properties on Brooks Yard are retained. Brooks Yard is stopped up at the junction with Fall Lane and alternative access is provided from Fearnley Street.

<u>Occupation Underbridge (MDL1/10)</u>

8.7.38 Occupation Underbridge is a Grade II listed masonry arch bridge that was constructed in the mid-1840s. The bridge provides private right of access to a single residential property from Thornhill Road. It is not accessible to the public.

8.7.39 The straightening of the existing reverse curve alignment in the Thornhill Lees area, see section 6.4, results in the re-alignment of the railway tracks to the north of the bridge.

8.7.40 Following a period of optioneering and consultation, the Scheme proposes to infill the structure. For more information see the Occupation Underbridge Listed Building Consent Application.

<u>Toad Holes Underbridge (MDL1/12)</u>

8.7.41 MDL1/12 is a Grade II listed cast iron beam bridge that was constructed in the mid-1840s. The bridge is no longer in use as the north western approach to the bridge was

infilled in around 1970 to facilitate the widening of Watergate Road. It is not accessible to the public.

8.7.42 The Scheme proposes to infill the structure due to its poor condition. For more information see the Toad Holes Underbridge Listed Building Consent Application.

Ming Hill Underbridge (MDL1/14)

8.7.43 MDL1/14 is a Grade II listed cast iron beam bridge that was constructed in the mid-1840s. The bridge is no longer in use as the north western approach to the bridge was infilled in around 1970 to facilitate the widening of Watergate Road. It is not accessible to the public.

8.7.44 The Scheme proposes to infill the structure. This is in response to the future maintenance liability of retaining the structure, which is in relatively poor condition and has been subject to recent strengthening measures to correct defects in the deck span. For more information see the Ming Hill Underbridge Listed Building Consent Application.

9. DESIGN DESCRIPTION AND APPRAISAL: MAINTENANCE AND ACCESS

9.1.1 In consultation with train operating companies and maintenance teams the following works will be delivered ensure suitable and safe access to the railway. The design of maintenance and access points in the Scheme area has considered safety, security, operational suitability and impact to railway neighbours.

9.1.2 Materials employed will follow the preferred approach that tends towards robust and honestly expressed forms. A secure fencing system at a minimum height of 1.8m will be provided.

9.1.3 Impacts from new and altered maintenance and access locations have been considered in the Environmental Impact Assessment, with mitigations made were deemed appropriate.

9.2 Colne Bridge Road power supply point and railway access point

9.2.1 At present there is a power supply point and railway access located to the east of, and accessed from, Colne Bridge Road. This area has been identified by the maintainer as a strategic location which provides the opportunity for significant improvements to the maintenance of the route in this area. In addition, the proposed new fast lines clash with the current power supply point building and the railway access on the site. Therefore, intervention is required.

9.2.2 The power supply point will be reconstructed away from but adjacent to the new proposed rail alignment. The building will be reconstructed in a similar form to the existing with brickwork walls and pitched roof, the dimensions are 8m by 15m. A new railway access point for vehicles and pedestrians will be provided, with appropriate security fencing.

9.2.3 These works, and the works to Colne Bridge Road bridge necessitate a modified junction from Colne Bridge Road, see section 8.5.1. This will lead to a modified access road and a turning area with formalised access to the operational equipment.

9.2.4 The site is adjacent to the Huddersfield Broad Canal, although the tow path is located on the opposite side of the canal. Landscape mitigation (planting) will be provided between the power supply point and the canal.

9.3 Wood Lane access point

9.3.1 Van access is currently provided to the east of Wood Lane, between the two existing railway underbridges. The Scheme will retain this access with additional infrastructure added to increase the safety and security of the site.

9.3.2 Currently to the west there is no access provided. This Scheme will construct a van access to the west to provide access to railway assets. Gates and fencing will be erected to provide security to the railway.

9.4 Sands Lane access point

9.4.1 Access to the north of the railway on Sands Lane is provided via a shared access and turning head located on the Bridleway. The Scheme will retain this provision.

9.5 Ravensthorpe Railway Triangle access point

9.5.1 A railway access point will be provided as part of the operational traction power compound at Ravensthorpe. For more information see section 6.3.

9.6 Fall Lane access point

9.6.1 A new railway access point for vehicles is proposed on Fall Lane. The site has been chosen to provide a safe and secure area to access the railway from the eastern end of the Scheme. The site will comprise of an access road onto Fall Lane and area of elevated hard standing level with the railway. The site will be gated and fenced to provide security.

9.7 Boundary treatment

9.7.1 The railway land boundary has undergone the necessary risk and security assessments to determine if existing arrangement supports the planned infrastructure upgrades and associated additional land requirements. These assessments have concluded that the inclusion of an electrified rail system and changes to the existing boundary position will require alteration to the existing boundary. Broadly speaking, these alterations will generally be the provision of a secure fencing system typically powder coated palisade fencing in Holly Green at a minimum height of 1.8m. Where required, the proposed boundary arrangement will provide maintenance access to the railway via a secure gated arrangement. In locations where there is a potential for interaction between vehicles and the proposed boundary, a suitable Vehicle Restraints System will be provided and installed in agreement with third party landowners.

10. DESIGN DESCRIPTION AND APPRAISAL: UTILITIES DIVERSIONS

10.1.1 The Scheme proposes to undertake a wide range of utility diversions across the route in response to the interventions required by the Scheme

10.1.2 The principal area of work concerns utility diversions within highway structures, notably Whitacre Street, Leeds Road (A62), Colne Bridge Road, Calder Road and Thornhill Road. For further information see the relevant bridges and highways sections of this report.

10.1.3 In addition, a number of utilities carried in the railway corridor require modification. The Scheme has progressed options which look to retain these assets within the corridor with minimal visual impact. One of these assets crosses the Huddersfield Broad Canal on structure MVL3/108s, see section 8.5.8 for further detail.

10.1.4 In the Ravensthorpe area, Northern Powergrid (NPG); Northern Gas Networks (NGN); and Yorkshire Water (YW) assets have been identified as requiring diversion to support the works as shown on the diagram below. .

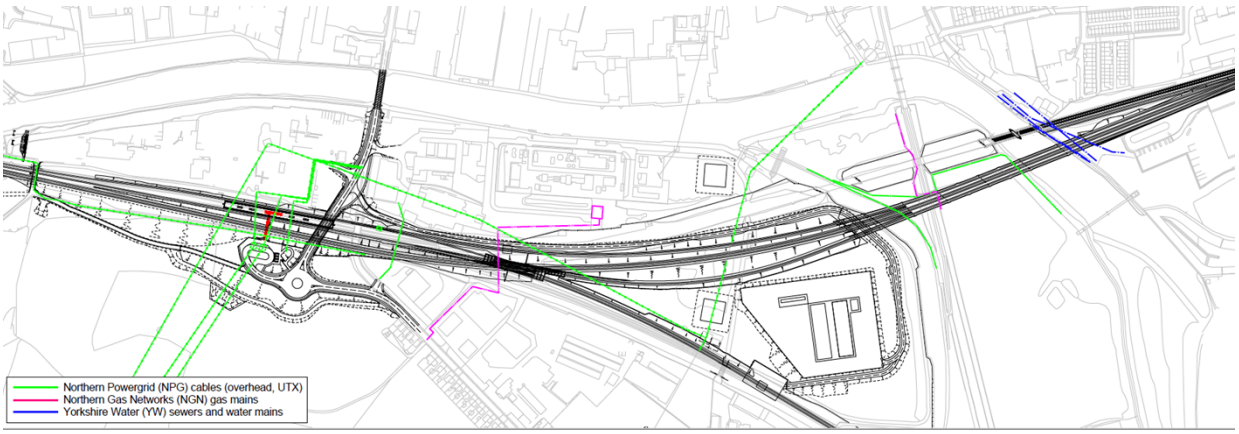

Figure 26: Utilities

10.1.5 There are a number of utility assets which follow approximately the alignment of the existing PROW running parallel to the track alignment to the west of Calder Road. The existing position of these utility assets and the PROW clash with the widened cutting to accommodate the proposed fast line alignment. As a result, the PROW along with utility assets shall be diverted.

10.1.6 An overhead electricity circuit currently crosses the railway to the west of Calder Road running south to north. These circuits are proposed to be diverted south of the Scheme area via Ouzelwell Lane removing current electricity infrastructure in the Ravensthorpe area.

10.1.7 In the vicinity of Calder Road, there are a number of 33kV electrify assets which will require diversion as a result of the proposed works. These circuits are all proposed to be diverted through the new Calder Road Overbridge (MVN2/202). A NGN high pressure gas main under track crossing (UTX) crosses below the railway running north to south below the proposed position of the grade separation structure. This gas main shall be diverted to the west of its existing position with a new UTX outside of the influence of the works for the grade separation structure.

10.1.8 The works proposed in the Ravensthorpe Railway Triangle area include a new embankment to support the new railway lines on the approach to the new Ravensthorpe Viaduct. As a result of this, overhead electricity cables which cross the triangle north to south require diversion underground across the triangle area. The proposed diversion will include a terminal pylon at either end to provide the transition between the overhead lines and an underground section of the route. The north terminal pylon is proposed to be situated to the north of the existing railway, west of the Calder-Hebble Navigation. The southern terminal pylon is proposed to be situated to the south of the Wakefield line on greenspace.

11. CONCLUSION

11.1.1 The Huddersfield to Westtown (Dewsbury) Scheme forms part of the wider Transpennine Route Upgrade which will bring with it economic and social benefit through the delivery of infrastructure to provide faster, more reliable train services on the route with greater capacity, both within the Kirklees Local Authority area and the wider northern region.

11.1.2 The design appraisal has demonstrated that the Scheme presented for Transport and Works Act complies with the relevant National and Local policies.

11.1.3 The broadest design approach in response to this opportunity has been to implement interventions which manifest themselves in terms of the best engineering fit for the efficient and effective operation of the railway, with an holistic approach to engineering requirements and use of modern materials.

11.1.4 The opportunity to deliver these benefits using existing infrastructure is key in its sustainable delivery. A focus has been placed on making the most of the existing rail corridor alongside the addition of OLE, a cleaner way to power the railway.

11.1.5 It has been demonstrated that the Scheme, as proposed, can deliver a development which is of a design, scale, layout and appearance appropriate to its required function and which provides an attractive, safe and easily navigate environment that is accessible to all users within the parameters of its technical and operational requirements.

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