Appendix C

Midlands Rail Hub – Long Eaton Low

Level Line Study

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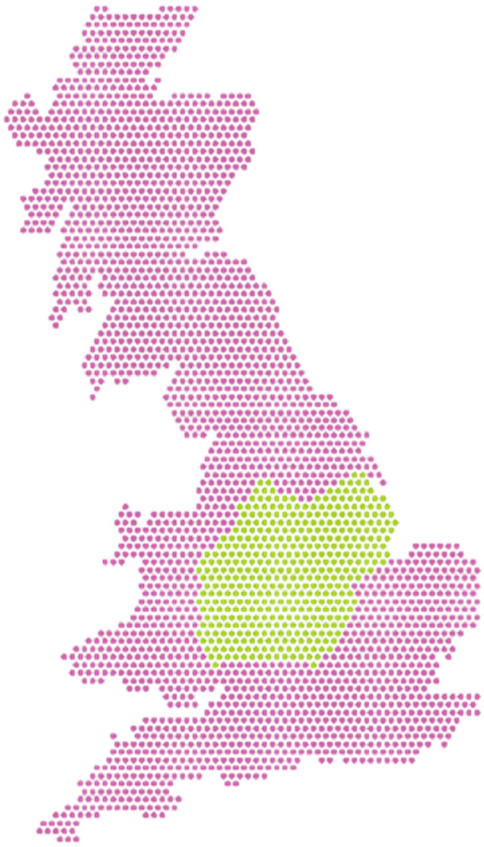
Midlands Connect

Midlands Rail Hub – Long Eaton Low Level Line Study

Initial Draft

Jacobs

10/26/2018



Midlands Rail Hub – Long Eaton Low Level Line Study

Initial Draft

Jacobs

10/26/2018

Midlands Connect

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Issue and Revisions Record

Revision	Date	Originator	Checker	Approver
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Draft Report V2	26/10/2018	EM/CT	GS	ML

Contents

Executive Summary

As part of HS2's Growth Strategy there is a Local Connectivity Package of transport schemes to integrate the new HS2 stations with local transport networks. HS2's Connectivity Programme exemplifies this through four key strands:

- **Connectivity to HS2 Stations:** Providing local and sub-regional connectivity from across the Midlands to HS2 stations in the area thus improving access to businesses and job opportunities;
- **An Integrated HS2:** Ensuring the delivery of a fully integrated network between HS2 and the local and national transport networks to ensure that businesses in the wider area have excellent access to the HS2 network;
- **Midlands Connect:** Maximising the capacity released by HS2 on the conventional rail network (including improving links to Birmingham Airport and HS2 Hubs) and optimising the Midlands' local rail and road networks in preparation for, and post, HS2; and
- **International Connectivity:** Providing direct international services from the Midlands to Paris, Brussels and beyond via a direct rail link between HS2 and the existing HS1 line to the Channel Tunnel and wider European High-Speed Rail Network.

This study focuses on the East Midlands Hub which is proposed to be located between the Low-Level and the High-Level Lines at Toton and includes platforms for classic service connections.

Problem

To ensure connectivity there are plans to divert local services to serve the East Midlands Hub station and new shuttle services to the main cities (Nottingham, Derby and Leicester).

However, the rail network (as currently planned) does not currently provide for a connection between the lines to Derby and the high-level line – the services would therefore have to connect on the low-level lines and are unable to reverse back to access Nottingham / Leicester without additional connections being provided. In fact, the proposed diversion of the Matlock – Nottingham and Liverpool – Norwich services via East Midlands Hub cannot be delivered.

The Low-Level Line currently has level crossings at Main Street and Station Street in Long Eaton, thus operation of new local passenger services on this line to connect with HS2 will have a detrimental impact on traffic and accessibility in the town.

Increased passenger services post HS2 will lead to greater delays at the current level crossings. Measures to raise the road over the existing low-level line have previously been considered prior to this study in an attempt to resolve this issue. However, it was concluded that, in the space between highway junctions either side, it would require a bridge with non-compliant vertical alignments to clear the railway completely. A need therefore exists to examine potential solutions, to determine the most feasible approach.

Solution

This study considers seven options to improve connectivity throughout Long Eaton. These options have been devised to reduce delays on the road network, provide the necessary infrastructure to accommodate HS2 and minimise community disruption across the local area. This study therefore identifies a preferred option through testing seven options for feasibility, deliverability and benefits/dis-benefits that can be provided.

Each option is tested by undergoing a multi-criteria analysis (utilising a DfT type approach with seven-point scale assessment), quantification of benefits through high level economic assessment, investigation of the

wider economic impacts that could arise with each alternative and an evaluation of engineering feasibility/deliverability.

Following Multi-Criteria Analysis and an evaluation of engineering feasibility a preferred solution to connectivity issues for road and rail in Long Eaton is the provision of a new chord line between the low and high-level lines south of Toton. This option enables local connecting services to/from Derby to the high-level platforms at the Hub station and reversal to operate to Nottingham / Leicester. It also frees up local traffic, buses, cyclists and pedestrians from level crossing delays, enables closure of the low-level line and land sales and redevelopment generating local jobs and it removes a key constraint to HS2 enabling reduction in construction costs.

Recommendation

'Option 7' (a Chord from Low-to-High-Level-Line) is therefore recommended to be taken forward through NR GRIP stages of development and delivery as it is found to provide a deliverable solution with positive Benefit Cost Ratio. This option is also found to provide considerable economic benefits for the town while other options would - in most criteria - impact on safety, traffic operations and the Town's economic viability. The Chord would need to be planned taking account of the existing land-uses and the proposed HS2 Viaduct which is planned to cross over the lines south of Long Eaton.

Chapter 1: Introduction

1.1 Project description

This study was undertaken for Midlands Connect in collaboration with Erewash Borough Council and aims to:

- Examine the impacts of the service pattern changes emerging from the creation of the East Midlands Hub station;
- Examine the impacts of closing of the low-level line; and,
- Develop options to resolve the identified issues.

The proposed location of the East Midlands Hub station is between the Low Level and the High-Level Lines at Toton where platforms for classic service connections will be provided.

The local services are planned to be diverted to serve the East Midlands Hub station and new shuttle services provided to the main cities (Nottingham, Derby and Leicester), however, the rail network does not currently provide for a connection between the lines to Derby onto the high level line – so the services would have to connect on the low level lines and could not reverse back to access Nottingham / Leicester without additional connections being provided.[1]

The Low-Level Line has level crossings at Main Street and Station Street in Long Eaton, thus operation of local passenger services to connect with HS2 will have a detrimental impact on traffic and accessibility in the town.

Increased passenger services post HS2 will lead to greater delays at the current level crossings. Measures to raise the road over the existing low-level line have previously been considered prior to this study in an attempt to resolve this issue. However, it was concluded that, in the space between highway junctions either side, it would require a bridge with non-compliant vertical alignments to clear the railway. -. A need therefore exists to examine potential solutions for this scheme, to determine the most feasible approach.

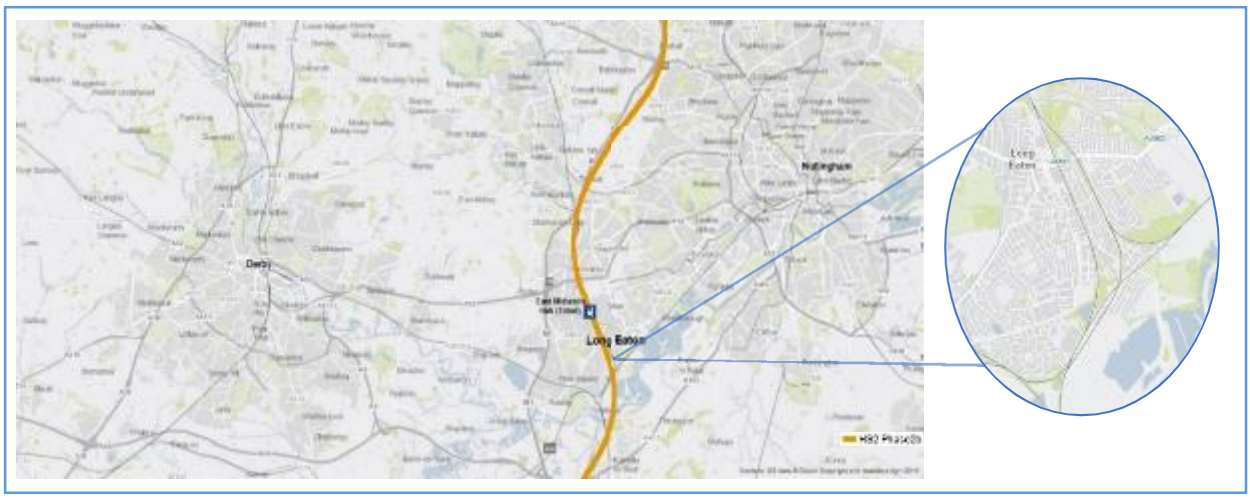

FIGURE 1: LONG EATON LOCATION

[1] In fact, in this scenario the assumed diversion of existing services (eg: Matlock – Nottingham and Norwich – Liverpool) could not be provided either.

The All Level Crossing Risk Model (ALCRM) is used to rank all Network Rail level crossings in terms of risk and has been derived from the "Long Eaton Town and North Erewash Level Crossing Summary of usage". This scoring signifies the individual (to the crossing user) and collective risk (to the crossing user, train staff and train passengers, and individuals near to the railway boundary on both rail approaches) at each crossing with an alphabetic and numerical scoring system as shown below. (Long Eaton = Station Street and North Erewash = Main Street) For this scoring system A1 would represent the highest risk crossing and M13 the lowest. It is important to note that the Collective Risk is of greater importance than Individual Risk in determining which sites are considered for implementation of risk-mitigation measures. The ALCRM scores for the base scenario, HS2 reference case and Midlands Connect aspirations are detailed in Table 1 below. Increased rail frequency leads to a raised risk status at the level crossings with detrimental effects to public safety.

Scenario	Crossing Name	ALCRM Score
Base Scenario	Long Eaton	I5
	North Erewash	J5
HS2 Reference Case	Long Eaton	G3
	North Erewash	H5
Midlands Connect Aspiration	Long Eaton	F2
	North Erewash	G4

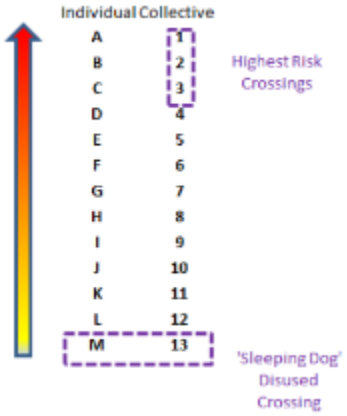

TABLE 1: ALCRM RISK AT LEVEL CROSSINGS

Network rail has identified the crossings at Long Eaton as high risk. It was concluded that, in addition to existing operations, the Midlands Connect programme introduces additional services to be incorporated. These services are anticipated to produce further safety risks. The traffic congestion associated with the crossings would impact on travel and the Town's economy. Further, level crossing closures would potentially risk economic viability and jobs in the Town Centre.

The document is structured as follows:

- Chapter 2 outlines the options and the analysis of the project;
- Chapter 3 explains the preferred option, describes the GRIP stages; and
- Chapter 4 discusses recommendations.

Chapter 2: Options and Analysis

2.1 Introduction

This chapter sets out the seven different options that were taken into consideration. These options include the following:

- Option 1: HS2 Reference Case
- Option 2: Midlands Connect Aspirations
- Option 3: Close level crossings
- Option 4: Close level crossings and provide new road bridge
- Option 5: Close low-level line and redevelop released land
- Option 6: Close low-level line and replace with viaduct
- Option 7: Close low-level line and replace with new chord onto high level line and redevelop released land

Each of these are described and illustrated in the subsequent sections.

2.2 Options

Base

Currently, there is one freight service an hour that uses the low-level line in both directions resulting in around 6 minutes per hour when the local roads are closed to traffic.

Option 1

Option 1 is the HS2 reference case and includes the introduction of two passenger services per hour in each direction using the low-level line alongside the pre-existing freight service. This option is anticipated post HS2 Phase 2b, and therefore will be implemented from 2033 onwards. The estimated crossing closed time is 16 minutes – assuming that the crossing is closed for each train individually, which will depend on the detailed timetable.

Option 2

Option 2 is the Midlands Connect Aspiration and includes the introduction of four passenger services per hour in each direction using the low-level line alongside the pre-existing freight service. Like the HS2 Reference Case (option 1), option 2 is anticipated post HS2 Phase 2b; and is a scenario that would be applied from 2033 onwards. The estimated crossing closed time is 26 minutes – which is the worst case with the crossing closing for each train individually.

Option 3

Option 3 involves closing the level crossings at Main Street and Station Street. The operation of the low-level rail line will continue without changes. This is shown in Figure 2.1 below.

FIGURE 2.1: CLOSE LEVEL CROSSINGS AT STATION STREET & MAIN STREET

Option 4

Option 4 includes the closure of the level crossings on Main Street and Station Street and providing a new road and bridge as demonstrated in Figure 2.2. This road will connect Meadow Lane to Fields Farm Road, will be roughly 650m in length and is predicted to have a speed limit of 30mph to align with current conditions in the local area. The road bridge would cross the existing low-level line.

FIGURE 2.2: CLOSE LEVEL CROSSINGS AND PROVIDE NEW ROAD BRIDGE

Option 5

Option 5 proposes closing the low-level line (see Figure 2.3), thus terminating the rail services that use this line for both passengers and freight. The released land is proposed to be redeveloped.

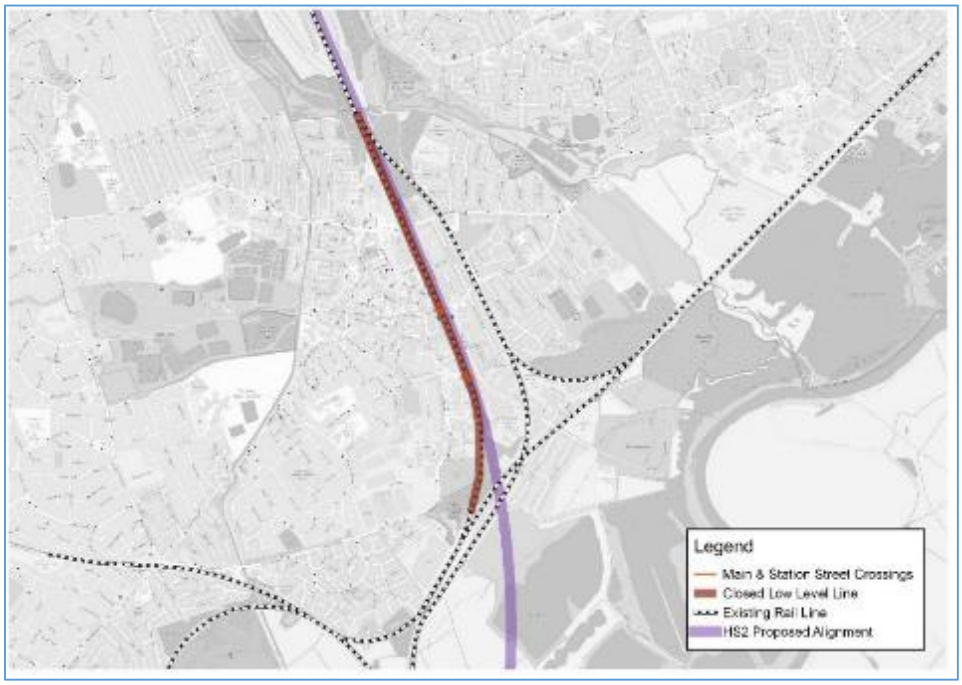

FIGURE 2.3: CLOSE LOW LEVEL LINE

Option 6

Option 6 Includes the closure of the low-level line and its replacement with a viaduct as shown in Figure 2.4. The existing rail services will continue to operate, and Main Street and Station Street level crossings will no longer be required (allowing free flow on these roads).

To increase the level of the track by 7m from the existing level crossing level, the track will need to gradually increase on an embankment, viaduct, etc. for some considerable distance in advance of the level crossing and then again on the far side to drop beneath the A6005 Derby Road bridge. The track would be renewed along this entire section. The distance from existing track level, up and over the two existing level crossings, then back down to existing track level is approximately 1,700m; two tracks will be required therefore 3,400m. This could be complete viaduct or could be a mixture of earthworks / viaduct / bridges. An engineered assessment of this option with details of the viaducts potential extent is included below.

- The alignment can rise after Trent East Junction to clear Main Street and Station Street using normal design values for gradient and vertical radii.
- 7m has been allowed from top of road to running edge (top of rail), considering a height of 5 metres from road level, 1 metre for piles and track and then 1 metre for the viaduct itself.
- The alignment then utilises exceptional design values for gradient (1 in 63.6) and maximum design values for vertical curves from Station Street onwards to tie into the existing alignment before Derby Road overbridge. These design values will require approval through Network Rail's national non-compliance process which brings risk of the design not being approved.
- The existing connections to the Down Goods and Up Goods in this location will need to be relocated north of Derby Road due to this proposed vertical geometry. This will significantly reduce the length of the Down Goods and Up Goods. The impact of this will need to be assessed should this option be progressed further.

- Requirements for cost estimation – 3,400m of new track, 2 bridges (or one long viaduct) and 2 DV15 switches.

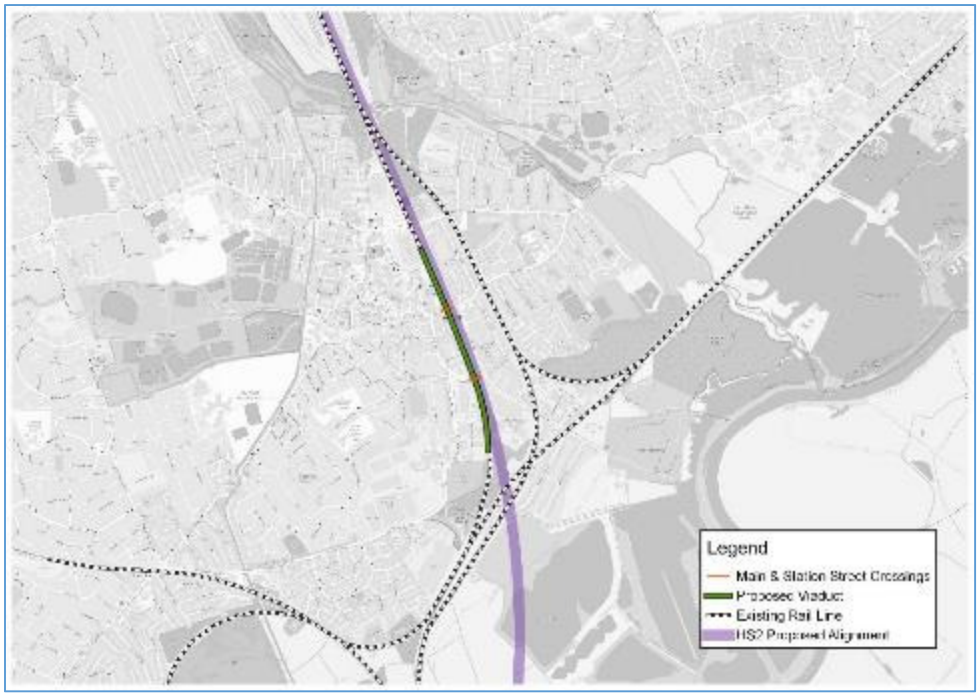

FIGURE 2.4: CLOSE LOW LEVEL LINE AND REPLACE WITH VIADUCT

OPTION 7A

Option 7A supports closing the low-level line by transferring services onto the existing high-level line via a new chord across the main line between Leicester and Nottingham (see Figures 2.5 and 2.6). The released land is proposed to be redeveloped bringing further environmental and regeneration benefits. This chord will need to be sufficiently engineered to safely cope with the change in gradient from the low to high level line and not disrupt any existing tracks.

The existing crossovers at this location would all need to be removed and plain lined. New switches and crossings will be introduced that tie in with the existing lines. This is taking place over multiple lines, therefore the total amount of new track required would be approximately 3,600m. An engineered assessment is summarised below.

- Access from the Down East Curve and Up East Curve to the Down High-Level Goods Line and Up High-Level Goods Line is achieved by an 30mph S&C ladder arrangement to cross the Down Main and Up Main.
- S&C would also be installed to allow the same vehicle movements between the Up Main, Down Main and Down Goods Line as existing.
- Up Erewash and Down Erewash lines would be closed.
- The connections between the Up Main and Down High-Level Goods Line would utilise exceptional design values for gradient (1 in 77). These design values would require approval through Network Rail's national non-compliance process which brings risk of the design not being approved.
- This option would necessitate the purchase and demolition of several buildings between the Up Main and Down High-Level Goods lines.
- Costs include 3,600m of new track including 13 DV15 switches plus property purchase.

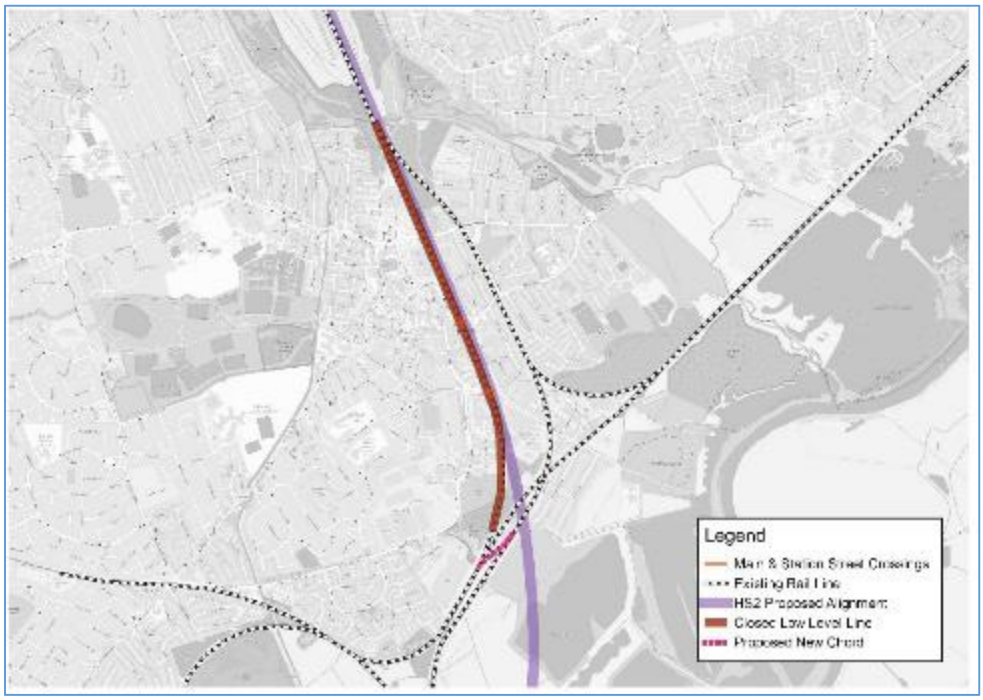

FIGURE 2.5: CLOSE LOW LEVEL LINE AND REPLACE WITH NEW CHORD

FIGURE 2.6: PROPOSED NEW CHORD ALIGNMENT

OPTION 7B

Option 7B includes a chord to transfer services from the low to high level line keeping the infrastructure to the north of the other rail lines. This option also has the potential for redevelopment in Long Eaton upon the land released with closure of the low-level line.

This alternative to Option 7A addresses concerns regarding the change in gradient between the Up Main and Down High-Level Goods Line that would utilise exceptional design values for gradient (1 in 77). Option 7B provides a longer section of track and therefore allows a more gradual climb from the low to high level line (see Figures 2.7 and 2.8). The design values associated with this option are therefore more likely to be approved through Network Rail's national non-compliance process. The total amount of new track required would be approximately 1,600m. An engineering assessment is summarised below.

- Down Erewash and Up Erewash will be redirected to connect with Down High-Level Goods Line south of UB6 Meadow Lane with a crossover north of UB6. This is accomplished with normal design values for horizontal and vertical geometry.

- Tight radii are used off the back of the connection to Down High-Level Goods Line which will need to be considered at future stages.
- At the location of the proposed HS2 line, this proposed alignment is approximately 1m higher than the existing ground level with little or no opportunity for this to be lowered. Therefore, the HS2 alignment designers will need to confirm that adequate clearance is achievable above these proposed lines. This may need the HS2 alignment to be lifted.
- New alignments cut off access road to sidings and existing signalling infrastructure. New access will be required, likely from the future HS2 depot with a new structure under the proposed tracks. This will need to be considered at future stages.
- Costs include 1,600m of new track and 4 DV15 switches.

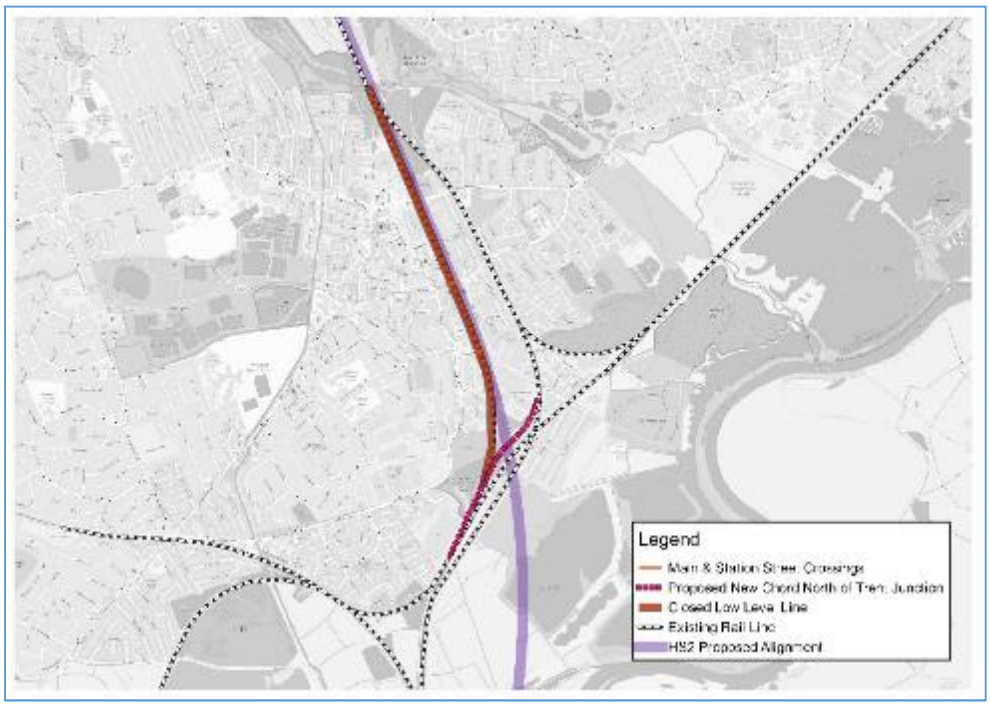

FIGURE 2.7: CLOSE LOW LEVEL LINE AND REPLACE WITH NEW CHORD

FIGURE 2.8: PROPOSED NEW CHORD ALIGNMENT

Alternative locations were considered regarding the position of the chord, but were not carried forward for the following reasons (and shown in Figure 2.9):

A: If the chord was located west of the proposed location it would require a diamond junction as both lines would have to cross the existing high-level line and other Nottingham lines. Diamond junctions create huge operational, timetabling and maintenance issues. This may be unfavourable to Network Rail due to the associated additional work required.

B: Another option was to locate the chord south west diverging south inside the triangle and flying over the Leicester to Nottingham line to connect the high-level line north of Trent Lane. This would require non-compliant vertical alignment to rise fast enough to cross the existing lines. There is also a pond in the middle of the triangle making this option more difficult to be achieved.

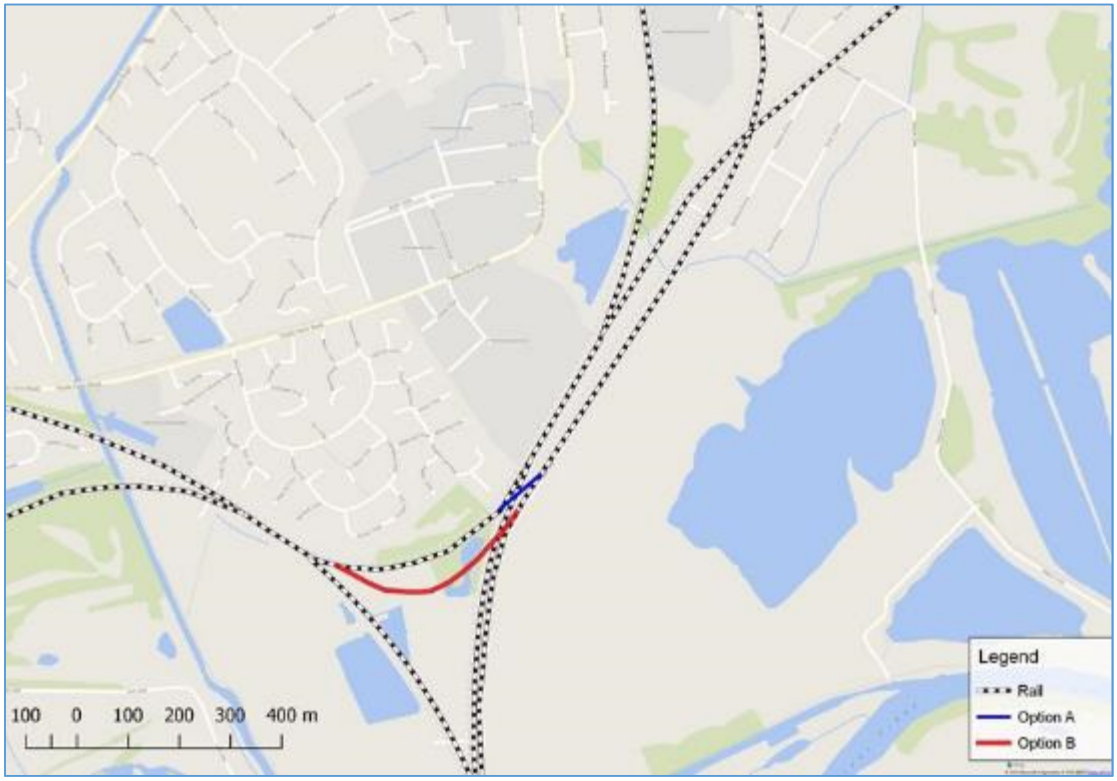

FIGURE 2.9: OTHER OPTIONS DISCOUNTED

2.3 Multi-criteria analysis of options

A multi-criteria analysis (MCA) has been carried out to assess the impact of the options against a wide set of criteria encompassing DfT objectives and local issues and objectives. MCA evaluates the alternatives from different perspectives and by analysing their robustness with respect to uncertainty. A multicriteria approaches often evaluates based on a number of explicitly formulated criteria that provide indications of the performance of the different alternatives. Such criteria are scored by appropriate units of measurement. For this study each option has been scored against a set of 18 criteria.

These criteria are described below:

- **Rail Freight:** The effect of the different alternatives on rail freight services (e.g. change of route, delay).
- **Rail Passengers:** The impact of each different option on rail passenger services.
- **Traffic:** The impact of each option on the traffic patterns of the area (e.g. change of route, delay).
- **Buses:** The impact of each alternative on the bus services (e.g. change of route, delay).
- **Pedestrians/cyclists:** How the movement of pedestrians and cyclists is affected by the implementation of each option.
- **Safety:** The effects of each option on safety, both in the vicinity of the level crossings and further away where traffic would be diverted.
- **Town Centre Economy:** The impact of each option on the town centre economy – mainly assessed by the access to the town centre.
- **Air Quality:** How the implementation of the option affects the air quality of the local area, principally through traffic emissions.
- **Townscape- Biodiversity:** The impact of each alternative on the townscape environment and the local biodiversity (e.g. movement of fauna).
- **Noise:** How the implementation of the option affects the noise levels of the local area.
- **HS2:** The expected impact of each alternative on the HS2 constructability.
- **Cost:** The estimated cost of each option.
- **Construction Impact:** The expected cost of each option due to the construction of the project.
- **Regeneration:** The effect of each option on the town's regeneration and redevelopment, principally job growth.
- **Social and Distributional Impacts (SDIs):** The eight SDIs that are considered in appraisal are Noise, Air Quality, Severance, Accessibility, Personal Affordability, Accidents, Security and User Benefits and the distribution of impacts on particular user groups.
- **Access to Services:** The impact of each option on people accessing the town centre and employment to the east and south east of the town centre.
- **Severance:** The effects of severance to the local area emerging from each alternative option.
- **Land/ Planning Requirements:** The land-use consequences of each intervention.

As demonstrated in the Figure below, each criterion has received a score from +3 to -3; this scoring represents:

3	Large beneficial
2	Moderate beneficial
1	Slight Beneficial
0	Neutral effect
-1	Slight adverse
-2	Moderate adverse
-3	Large / V.Large adverse

Option Number	Option Description	Rail Freight	Rail Passengers	Traffic	Buses	Peds/ Cyclists	Safety	Town Centre Economy	AQ	Townscape Biodeversity	Noise	HS2	Cost	Construction Impact	Regen	SDI	Access to services	Severence	Land/ Planning requirement
1	Do nothing HS2 Ref Case	0	0	-1	-1	-1	-2	-1	-1	0	-1	0	0	0	0	-1	-1	0	0
2	Do nothing Midlands Connect Aspiration	0	0	-2	-1	-1	-3	-1	-2	0	-2	0	0	0	0	-1	-1	0	0
3	Close Level Crossing	0	0	-3	-2	-2	2	-3	-3	0	-2	1	0	0	0	-2	-2	-3	0
4	Close Level Crossing and provide new Road Bridge	0	0	-2	-2	-2	2	-2	-2	-2	-2	-1	-1	-2	0	-1	-1	0	-3
5	Close low level line (And redevelop land)	-3	-3	3	3	3	3	3	3	2	2	3	0	0	3	2	2	0	0
6	Close low level line and replace with viaduct	0	0	3	3	3	3	3	3	0	0	1	-3	-2	0	2	2	0	-2
7	Close low level line and replace with new chord onto high level line	0	1	3	3	3	3	3	3	-1	1	3	-2	-1	3	2	2	0	-1

TABLE 2.1: MULTI-CRITERIA ANALYSIS MATRIX

2.3.1 Option 1: Do Nothing HS2 Reference Case

Rail

This option includes the introduction of two passenger services on the low-level line. These new passenger services and the existing freight service will operate without disruption. Although, with the services using the low-level line they will not be able to run direct from Derby to Nottingham / Leicester via Toton, an additional interchange at Toton would be required.

Traffic

This option will see an increase in the number of trains utilising the low-level line. With increased train services, traffic flow will be delayed as the level crossings on Main Street and Station Street are forced to operate more frequently. The level crossings will be in operation six times an hour to accommodate the movement of one freight and two passenger services in each direction. Consequently, during this option the barriers will be down for approximately 16 minutes every hour.

Buses

Similarly, this option will impact the efficient movement of bus services that pass over the level crossings. This option will impact the 460 bus service that currently uses the Main Street level crossing. The 460 bus operates once a day during weekdays and starts its journey at 14:55 departing from Wilsthorpe School, Long Eaton and ending in Victoria Avenue, Borrowash.

Pedestrians/Cyclists

At Station Street the existing raised pedestrian bridge will remain that currently allows the safe movement of pedestrians over the tracks. The pedestrian access at Main Street level crossing will be disrupted by an increased service pattern. However, a raised pedestrian crossing is located within close proximity - accessible via New Tythe Street. Ultimately this option will therefore not significantly hinder pedestrian movement.

Safety

With this option both level crossings are expected to have an increased All Level Crossing Risk Model (ALCRM) score. At Station Street the score is expected to worsen from I5 to G3 suggesting that individual and collective risk will deteriorate. At Main Street, while the collective risk is expected to remain the same; individual risk will worsen. It is important to note that the collective risk is of greater importance than individual risk according to the ALCRM model.

- Station Street (Long Eaton Town) I5 – G3
- Main Street (North Erewash) J5 – H5

Town centre economy

16.6% of the population of Long Eaton is located in the Nottingham Road ward (east of the low level line) and will have reduced access to Long Eaton Town Centre with the increased time that the level crossings are closed. The new services will result in additional delay for the residents of the east area and increased congestion on the alternative routes. This fact will pose a risk to the selection of Long Eaton for business and shopping and could result in potential significant loss of trade.

Environment

While this option is not expected to impact on the townscape or biodiversity it is predicted that increased train services will negatively impact Air Quality and Noise pollution. With more train services passing through the level crossings each day, cars using Main Street and Station Street will encounter delays that lead to queues of stationary vehicles with engines running. Engine idling increases the amount of exhaust fumes in the air producing up to twice as many exhaust emissions as an engine in motion.

Cost

There is no additional cost, construction impact or land/planning requirements associated with this option.

Regeneration

There is no regeneration associated with this option.

Accessibility

The increased likelihood of cars being held up by level crossings at each location hinders access to services. The current arrangement with both level crossings in place may be the most efficient route to access local amenities and employment for certain communities. The introduction of more train services would disrupt this movement. This option could therefore be considered to also have a negative influence on Social and Distributional Impacts (SDIs) due to the impact on people accessing the town centre and the impact on people accessing employment to the east and south east of the town centre.

Do-nothing option is considered but the impact of congestion is found to increase. The implications of this option on safety will be detrimental. Therefore, do-nothing is not considered a viable option.

2.3.2 Option 2: Do Nothing Midlands Connect Aspiration

Rail

Other than providing more services for the travelling public this option will have no significant impact upon rail passengers or freight movement. Although, with the services using the low-level line they will not be able to run direct from Derby to Nottingham / Leicester via Toton, an additional interchange at Toton would be required.

Traffic

This option will see a significant increase in the number of trains utilising the low-level line. With increased train services, traffic flow will be reduced as the level crossings on Main Street and Station Street are forced to operate more frequently. The level crossings will be in operation ten times an hour to accommodate the movement of one freight and four passenger services in each direction. Consequently, for this option, the barriers will be down for approximately 26 minutes every hour, in the worst case.

Buses

Currently the 460 bus is the only service that uses the level crossings (at Main Street). The 460 bus operates once a day during weekdays and starts its journey at 14:55 departing from Wilsthorpe School, Long Eaton and ending in Victoria Avenue, Borrowash. With increased train frequency this bus service is much more likely to be significantly delayed.

Pedestrians/Cyclists

With this option in place, cyclists at both crossings will be hindered by the increase in train services; causing delay or the need to reroute to avoid the level crossings. Pedestrians will not be hindered by the proposed service changes at the Main Station level crossing (due to the footbridge), but those who use the Main Street level crossing may have to alter their route; possibly by means of the closely situated raised bridge.

Safety

Due to the nature of this option both level crossings are expected to have an increased ALCRM score. At the Station Street level crossing the ALCRM score is predicted to worsen significantly for both individual and collective user risk. A score of F2 identifies this crossing as a “High Risk Crossing” for collective users. For Main Street, the ALCRM score is also expected to worsen for individual and collective users from J5 to G4.

- Station Street (Long Eaton Town) I5 – F2
- Main Street (North Erewash) J5 – G4

Town centre economy

16.6% of the Long Eaton population is located in the Nottingham Road ward (east of the low level line) and will have reduced access to Long Eaton Town Centre with the increased incidence of the level crossings operations. This will bring additional delay for the residents of the east area and increased congestion on the alternative routes. This fact will pose a risk to the selection of Long Eaton for business and shopping and could result to potential significant loss of trade.

Environment

The increased occurrence of level crossing operation with a more frequent train service, will have a negative environmental impact relative to air quality and noise. Air quality will be hindered most, as throughout the day vehicles will be stationary with their engine running for roughly 26 minutes every hour; and inevitably a more frequently used rail line will generate noise itself at both locations. Engine idling for this period of time will lead to increased exhaust fumes in the air including carbon dioxide, nitrogen dioxide, carbon monoxide and hydrocarbons which are linked to asthma and other lung diseases.

Cost

This option is to simply increase the utilisation of the low-level line. As such, there are no associated costs relative to construction or land/planning requirements.

Regeneration

There is no regeneration associated with this option.

Accessibility

The increased likelihood of cars being held up by level crossings (at each location) disrupts access to local amenities and employment for certain communities. This option therefore has a negative influence on Social and Distributional Impacts (SDIs) including accessibility; and could be perceived as severing the existing community.

In this Do-nothing scenario the impact of congestion is found to increase. Traffic, safety and air quality implications will be detrimental. Therefore, do-nothing is not considered a viable option.

2.3.3 Option 3: Close Level Crossings

Rail

This option includes the complete closure of the two level crossings so will have no significant impact on the current rail service. Although, with the services using the low-level line they will not be able to run direct from Derby to Nottingham / Leicester via Toton, an additional interchange at Toton would be required.

Traffic

This option will impact traffic significantly; by closing the crossings vehicles will be forced to reroute. For example, communities that are located east of the rail lines that previously used the level crossings will be forced to travel north and divert via the A6005 to access Long Eaton. A significant amount of traffic will be forced to use this connection to Long Eaton and could lead to increased traffic congestion during the peak periods.

Buses

Currently the 460 bus is the only service that uses the level crossings (Main Street). The 460 bus operates once a day during weekdays and starts its journey at 14:55 departing from Wilsthorpe School, Long Eaton and ending in Victoria Avenue, Borrowash. By closing Main Street level crossing this service would have to reroute incurring additional journey time. Alteration of this service would negatively impact some communities that rely on this mode of transport.

Pedestrians/Cyclists

With this option in place, cyclists who utilise both crossings will be hindered by closing the level crossings and must reroute. From Main St to / from the Town Centre would involve an extra 0.3 miles and 2 minutes.

Providing the existing pedestrian bridge remains at Station Street, pedestrians will not need to make this diversion. However, at Main Street pedestrians using the level crossing will have to alter their route to use the pre-existing bridge on New Tythe Street.

This option would have a particularly negative impact for people with reduced mobility such as wheelchairs and pushchairs.

Safety

This option is anticipated to generally improve safety locally due to the removal of the level crossings and all associated individual and collective risk. With this option any risks relative to the crossing user, train staff and train passengers, and individuals near to the railway boundary on both rail approaches will be eliminated.

On the other hand, increased traffic volumes on A6005,which would be used as an alternative route for residents located east of the rail lines, could result in raising the accident risk for road users, pedestrians and cyclists. Full analysis of incidents at the A6005 are detailed in section 2.7.

Town Centre Economy

16.6% of the Long Eaton population is located in the Nottingham Road ward (east of the low level line) and will have reduced access to Long Eaton Central with the level crossings closure. Closing the level crossings will also bring additional delay for the residents of the eastern area and increased congestion on the alternative routes. This fact will pose a risk to the selection of Long Eaton for business and shopping and is likely to result in potential significant loss of trade.

Environment

Travel patterns will be forced to change because of this option. Diversions due to the closure of the level crossings will place a strain on existing roads. Rerouting traffic would improve air quality in the vicinity of

the railway but would increase emissions on the A6005. This option would generate noise pollution over a wider area rather than just near the level crossing.

Cost

This option is to simply close the level crossings that pass over the low-level line. As such, there are minimal associated costs relative to construction or land/planning requirements.

Regeneration

There is no regeneration associated with this option. Reduced accessibility could hinder development plans.

Accessibility

This option disrupts access to local amenities and employment for certain communities that are forced to divert and chose an alternative route. It therefore has a negative influence on Social and Distributional Impacts (SDIs) and would sever the existing community. For example, the impact this option has on Cycling, walking and the routing of the 460 bus service may have a significant impact on vulnerable groups such as low income, disabled, children and the elderly who have less access to the private car.

The option of closing the level crossings has been considered, but the impacts on traffic, town centre economy, air quality and severance are significantly negative. The impacts on the bus services, pedestrians and cyclists' movement, noise levels, SDIs and access to services are also adverse. Although the closure of the level crossings benefits safety in general, this option is not considered to be viable.

2.3.4 Option 4: Close Level Crossings and provide new Road Bridge

Rail

The option of closing the level crossings and providing a new Road Bridge will not bring any changes in the rail services for both passengers and freight. Although, with the services using the low-level line they will not be able to run direct from Derby to Nottingham / Leicester via Toton, an additional interchange at Toton would be required.

The new road would also run through a proposed HS2 construction compound on Meadow Lane, this option therefore conflicts with these plans. Detail of the proposed construction compound are included in section 2.8.

Traffic

The traffic is expected to be disrupted as the level crossings on Main Street and Station Street will close. The new crossing/ road over rail bridge is likely to be used by the current user of Main Street and would be a longer route for some of the traffic. Traffic using Station Street will be likely to use A46005 after this intervention adding to traffic congestion on that route.

Buses

This option will also affect the effective function of the bus service. The 460 service uses the Main Street level crossing. The 460 bus operates once a day during weekdays and starts its journey at 14:55 departing from Wilsthorpe School, Long Eaton and ending in Victoria Avenue, Borrowash. It is anticipated that this bus would divert to use the new bridge, but this would result in an increase in journey time.

Pedestrians/Cyclists

The accessibility for cyclists is expected to worsen due to the closing of the two level crossings. They would need to travel significantly further via the A6005 or the new bridge.

The existing pedestrian bridge at Station could remain. The access at Main Street level crossing will be interrupted, although pedestrians will still be able to use the pedestrian footbridge on New Tythe Street.

This option would have a particularly negative impact for people with reduced mobility such as wheelchairs and pushchairs. The new crossing will provide users another option for crossing the rail line but will be a diversion, away from the main areas of activity.

Safety

The removal of the level crossings will overall benefit safety as it will eliminate the risk of being involved in a collision at these points for both crossing and railway users. Level crossings are widely recognised as safety risks on the transport networks and the maximum possible reduction in risk of accidents at level crossings can be achieved through their closing.

However, two new junctions would be created on the highway network potentially increasing the potential for traffic accidents. Also, there would still be an increase in traffic volume on A6005, which would be used as an alternative route for some residents located east of the rail lines, and could result in raising the accident risk for road users, pedestrians and cyclists.

Town Centre Economy

16.6% of the Long Eaton population is located in the Nottingham Road ward (east of the low level line) and will have reduced access to Long Eaton Town Centre with the level crossings closure. Closing the level crossings will also bring additional delay for the residents of the east area and increased congestion in the alternative routes. This fact will pose a risk to the selection of Long Eaton for business and shopping and could result in potential significant loss of trade. The new road bridge would improve access to the area to the south east of Long Eaton that would otherwise have to reroute via the A6005 – a significant distance / time.

Environment

The impacts of this option to the environment are forecast to deteriorate compared to the existing situation. The new Road Bridge will force traffic to follow a broader route and, as such, more area will experience higher noise levels (noise will travel further) and poorer air quality. The effects of the new Road Bridge construction will also be detrimental to the townscape and local biodiversity.

Cost

Although the closing of the level crossings can be achieved without cost, the construction of the new Road Bridge will have a cost associated with it. This is estimated to be £4 million. There will also be an impact during the construction of the new road bridge, using lorries needed to access the site and new junctions needed on the existing roads either end. A need for suitable land for the new Road Bridge construction will also be needed, along with relevant planning requirements.

Regeneration

A detrimental impact on the town centre economy is expected due to longer routes to access from the east for the estimated 12% of population affected. In addition, the new road will utilise land that could be developed off Field Farm Road.

Accessibility

The overall social and distributional impacts (SDIs) of this intervention are expected to be negative. This emerges from a series of adverse consequences in the environmental condition, economic growth and accessibility, which will be negatively affected by the closing of the level crossings at Main Street and Station Street.

The option of closing the level crossings and providing a new road bridge is considered, but the impacts on traffic and land requirement are significantly negative. The impacts on the town centre economy, bus services, pedestrians and cyclists' movement, environment, as well as the construction impact is also detrimental. Although the closure of the level crossings benefits safety in general, this option does not fully mitigate the impacts on traffic, cyclists and pedestrians and is not preferred.

2.3.5 Option 5: Close Low-Level Line and redevelop land

Rail

The closing of the Low-Level Line will result in the termination of the rail services for both passengers and significant diversion (via the high level line) for freight. Local passenger services will be unable to connect with HS2 having detrimental impacts on expected traffic and economic growth. This would impose a burden in the movement of rail users as well as of freight distribution. Rail freight traffic will be diverted via the high-level line and a reversal into the Toton yards. This will add time and costs to the freight operations.

However, the closure of the low-level line would free up land to access the proposed HS2 works site. Consequently, this would enable the acquisition of a cheaper site (Fields Farm Road) for the main construction compound, therefore providing a potential saving for HS2. Detail of the proposed construction compound are included in section 2.8.

Traffic

In the local area, traffic will benefit from the closing of the Low-Level Line as it would no longer be interrupted by gates. This will improve the traffic flow as well as shorten the travel time of some road users.

However, more strategically, lack of rail access between Derby and East Midlands Hub would lead to larger numbers driving to the new hub station which will impact on the strategic road network (A52).

Buses

Bus services will operate more effectively as they will not be potentially disturbed by the closed barriers for the rail operations.

There may be more demand for bus service to access the HS2 Hub station.

Pedestrians/Cyclists

Removal of the closed barriers and the level crossings will result in shorter on average journey times for pedestrians and cyclists.

Safety

The closing of the rail line will eliminate the level crossings and the related risks of being involved in an accident at these points for both crossing and railway users. Thus, safety is expected to be highly enhanced considering that hazardous situations associated with the rail network can be avoided.

Town centre economy

There will be limited impact on the town centre economy.

Environment

Locally air quality is anticipated to be improved since the congested and stop-and-go situations emerging from the closed barriers will be eliminated. Free flowing traffic is recognised to produce significantly less emissions than occasions where the traffic is help up. Moreover, the noise levels will be reduced since trains will no longer be required to sound their horns and the level crossings on Main and Station Street will

be removed removing the sound and flashing lights of the existing warning system. The redevelopment of the land will benefit the townscape biodiversity due to the removal of the rail tracks and the new buildings will be more sustainable and friendlier to the environment.

Additional traffic accessing HS2 station from the West may produce worse noise and air quality on the A52 and other roads to the north.

Cost

Shutting down the Low-Level Line can be accomplished with minimal cost; however, the redevelopment of the land is accompanied by costs for demolitions as well as for new and extended units and roads that would be potentially required for the re-development of the land. There will also be an impact during the redevelopment of the area, using lorries needed to access the site and noise from the construction.

This option is likely to involve removal of the pedestrian footbridges at Station Street and New Tythe Street and reduction of infrastructure maintenance costs.

Regeneration

The land redevelopment will bring significant urban renewal and regeneration opportunities in Long Eaton. Further details can be found in Section 2.6.

Accessibility

Locally, the social and distributional impacts (SDIs) of this intervention will be relatively positive considering that the air quality, noise levels, safety and accessibility will be positively affected by the closing of the Low Line Level and removal of the level crossings.

Strategically, the option removes the ability to travel by train to East Midlands Hub leaving people without access to a car reliant on bus connections.

The option of closing the level crossings and redeveloping the land is considered, but the impacts on the rails services for freight and passengers are significantly negative. Although this option will benefit regeneration, safety, traffic, town centre economy and air quality it is not considered as viable due to the negative impacts on rail passenger and freight traffic.

2.3.6 Option 6: Close Low-Level Line and replace with viaduct

Rail

A viaduct would allow the rail services to function without impacting on road traffic. Although, with the services using the low-level line they will not be able to run direct from Derby to Nottingham / Leicester via Toton, an additional interchange at Toton would be required.

This option would also generate additional construction work, directly alongside that already planned for HS2.

Traffic

Traffic will benefit from the removal of the level crossings and resultant reduction of delays to traffic.

Buses

In a similar way, the bus services will operate more effectively as they will not be potentially disturbed by the barriers closing for the rail operation.

Pedestrians/Cyclists

Likewise, removal of the closed barriers at the level crossings will result in shorter journey times on average and safer movement for both pedestrians and cyclists.

Safety

The safety will be highly benefited by this intervention. The viaduct will carry railway tracks above the general level of the ground, so the level crossings will be removed ensuring safer journeys for rail as well as road users.

Town Centre Economy

There will be no significant impact over existing situation, however significant positive impacts are expected over the scenarios with higher passenger train flows.

Environment

Removing the level crossings will bring an environmental benefit, as greenhouse gas emissions may be reduced when vehicles spend less time idling while waiting at the crossings. The traffic noise levels will remain relatively the same.

There could be increased noise from the trains operating over the viaduct – dependent on the design. There would be air quality and noise impacts during construction

There could be negative impacts on townscape as a result of the viaduct. It would be alongside the proposed HS2 viaduct but at a lower level. It may therefore add to the reduction of east – west views across the area and the level of shadow created by the structures on neighbouring properties. The cumulative impact would be significantly worse.

There could be a negative impact on biodiversity from the construction of structures in the rail corridor. There would be impacts during and after construction with the new structure potentially acting as a barrier to movement of fauna.

Cost

The cost of this option is anticipated to be high. The cost of the viaduct is estimated around £50 million. This option is likely to involve removal of the pedestrian footbridges at Station Street and New Tythe Street and reduction of infrastructure maintenance costs associated with those facilities and the level crossing equipment.

Regeneration

No regeneration is associated with this option.

Accessibility

The social and distributional impacts (SDIs) of this intervention will be relatively positive taking into account the environmental, safety and accessibility benefits that will emerge from the closing of the Low Line Level and the level crossings. The severance is not anticipated to witness any significant changes.

The option of closing the level crossings and replacing with a viaduct is considered, but the cost impacts are detrimental. The construction impact as well as the land requirement is also considerably negative. Although this option will benefit safety, traffic, town centre economy and air quality it is not preferred.

2.3.7 Option 7: Close Low-Level Line and replace with new chord onto High-Level Line

Rail

All services will be transferred onto the existing high-level line to access East Midlands Hub Station. Passenger services would be able to run from Derby to Nottingham / Leicester via Toton as the trains would be able to turn back on the same line. Train services between Matlock and Notttingham and between Liverpool and Norwich would also be able to be diverted to call at East Midlands Hub. There could be more efficient use of rolling stock and increase local connectivity in the East Midlands.

In addition, the closure of the low-level line would free up land to access the proposed HS2 works site. Consequently, this would enable the acquisition of a cheaper site (Fields Farm Road) for the main construction compound, therefore providing a potential saving for HS2. Detail of the proposed construction compound are included in section 2.8.

Traffic

Removal of the level crossings will benefit traffic on Station Street and Main Street.

Buses

In a similar way, the bus services will operate more effectively as they will not be disturbed by the closed barriers for the rail operation.

Pedestrians/Cyclists

Likewise, removal of the level crossings will result in shorter journey times on average and safer movement for both pedestrians and cyclists.

Safety

Elimination of the level crossings will remove the accident risks between road and rail.

Town Centre Economy

There will be no significant impact over existing situation, however significant positive impacts are expected over the scenarios with higher passenger train flows.

Environment

Removal of the level crossing will result in a reduction of greenhouse gas emissions and improvement in air quality as vehicles will not spend time idling while waiting at level crossings.

Locally there will be a slight improvement of noise due to removal of the crossings and idling traffic and accelerating traffic.

There is potential to improve the townscape and local biodiversity on Station Street and Main Street, because the released land that will result from the closure of the Low-Level Line will be redeveloped.

At the location of the new Chord there will be construction impacts on air quality, noise and biodiversity as the works will affect the railway embankments. However, dependent on the location there may be an impact on property or could be relatively remote.

The new chord will result in new rail embankment / facilities above existing ground level which may affect landscape / townscape but is likely to be within the location of similar facilities and at similar levels.

Cost

Two options have been developed. The cost of Option 7A includes the cost of the construction of the new chord, which is estimated around £22.5 million, excluding property and land costs.

The cost of Option 7B includes the construction of the new chord, which is anticipated to be much lower, at around £8.5 million.

There will also be a cost for land redevelopment along the low level line which is accompanied by planning requirements for both alternatives.

This option is likely to involve removal of the pedestrian footbridges at Station Street and New Tythe Street and reduction of infrastructure maintenance costs.

There are potential cost savings for HS2.

Regeneration

The closing of the Low-Level Line will release land which can be a prospect for redevelopment and regeneration opportunities in Long Eaton. This redevelopment will have positive benefits for the local community and wider area.

Accessibility

The social and distributional impacts (SDIs) of this intervention will be positive considering the environmental, safety and regeneration benefits that will emerge from the closing of the Low Line Level and the level crossings.

The option of closing the level crossing and replacing with a new chord is considered the preferred option. The social, economic and environmental viability of this option and the fact that it is not associated with any significant negative impacts suggest that Option 7 should be taken forward.

2.4 Quantification of Traffic Impacts

For this study the benefits/dis-benefits of each of the proposed options were calculated. These were calculated by assessing the vehicle delay caused at the level crossing or by a diversion for each of the options and quantifying this delay based on time of day, mode of travel and values of time detailed in the current WebTAG appraisal guidance.

Table 2.2 identifies the annual benefits associated with each of the proposed options. The benefits of each option have been compared against the existing/do nothing scenario. Options 1, 2, 3 and 4 will generate dis-benefits when compared to the existing scenario due to the increase in trains per hour for Options 1 and 2 and the diversions needed in Options 3 and 4. Options 5, 6 and 7 will have a positive impact, generated by removing all existing delay and enabling the free flow of traffic.

Option		Congestion Impact	Comparison with Existing
0	Existing	-£92k	**£0**
1	Do Nothing HS2 Reference Case	-£245k	**-£153k**
2	Do Nothing Midlands Connect Aspiration	-£398k	**-£306k**
3	Close Level Crossing	-£918k	**-£826k**
4	Close Level Crossing and provide new Road Bridge	-£764k	**-£672k**
5	Close low-level line (And redevelop land)	£0	**£92k**
6	Close low-level line and replace with viaduct	£0	**£92k**
7a & 7b	Close low-level line and replace with new chord onto high level line	£0	**£92k**

TABLE 2.2: BENEFITS/DIS-BENEFITS OF OPTIONS

2.5 Wider Economic Impacts (WEI)

Local economy

This section presents the local economy of Long Eaton. In 2006 the turnover of Long Eaton Town Centre was £170 million per annum. Considering the Bank of England rate of inflation is 2.9% per year since 2006, this suggests a turnover of £242 million in 2018.

To appraise the local economic activity profile, a study at ward level was conducted. The wards demonstrated in Figure 2.10 were examined.

FIGURE 2.10: LONG EATON AREA

The population of each ward has been investigated as shown in Table 2.3 and shows that 16.6% of the Long Eaton population is located in Nottingham Road ward will have reduced access to Long Eaton Central with the level crossings closure.

	Population 2011	%
Long Eaton Central	6,053	16.0%
Nottingham Road	6,277	16.6 %
Sawley	6,629	17.6%
Wilsthorpe	7,399	19.6%
Derby Road East	5,204	13.8%
Derby Road West	6,198	16.4%
Total	37,760	

TABLE 2.3: POPULATION OF WARDS

Figure 2.11 shows the employment rates by industry sector as a percentage of the working population of the areas illustrated above which equals to 19,035 people. The breakdown of employment reveals that the

highest proportion of employees are involved in business services (27.7%) followed by public services (24.6%) and wholesale and retail (19.2%).

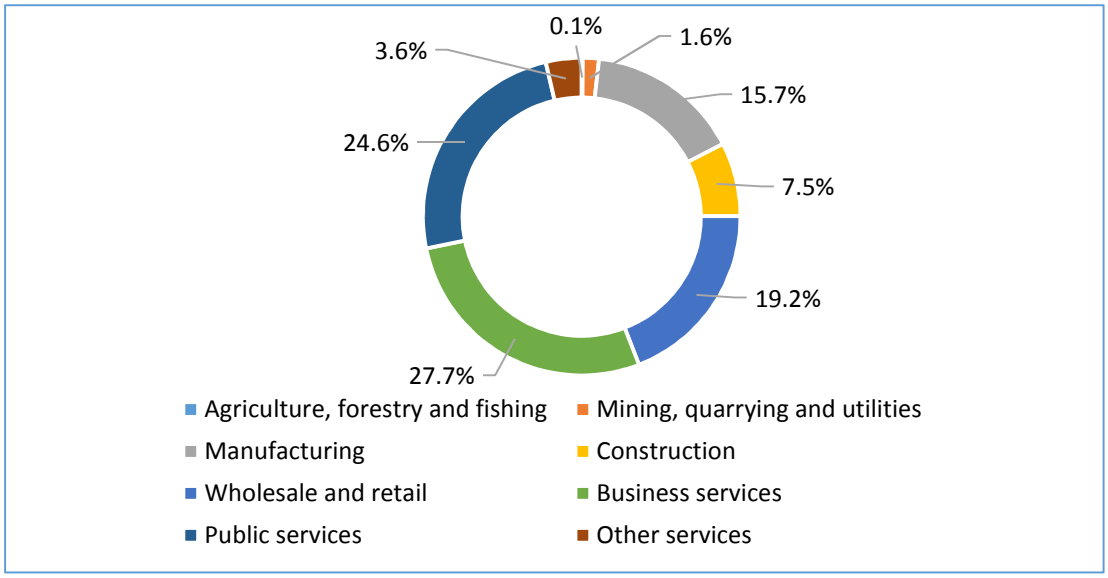

FIGURE 2.11: EMPLOYMENT BREAKDOWN BY INDUSTRY SECTOR

Figure 2.12 demonstrates the level of qualifications as a percentage of the population aged 16+ in the six wards showed in Figure 2.10. Interestingly, a quarter of people do not hold any formal qualifications- slightly higher than the England average rate (22.5%). One fifth of the population (20.8%) have Level 4 or 5 qualifications- significantly lower than the England average rate (27%). Taking a closer look in the difference of the levels of education between Long Eaton Central (west of the low-level line) and Nottingham Road (east of the low-level line), the figures were found to be almost identical.

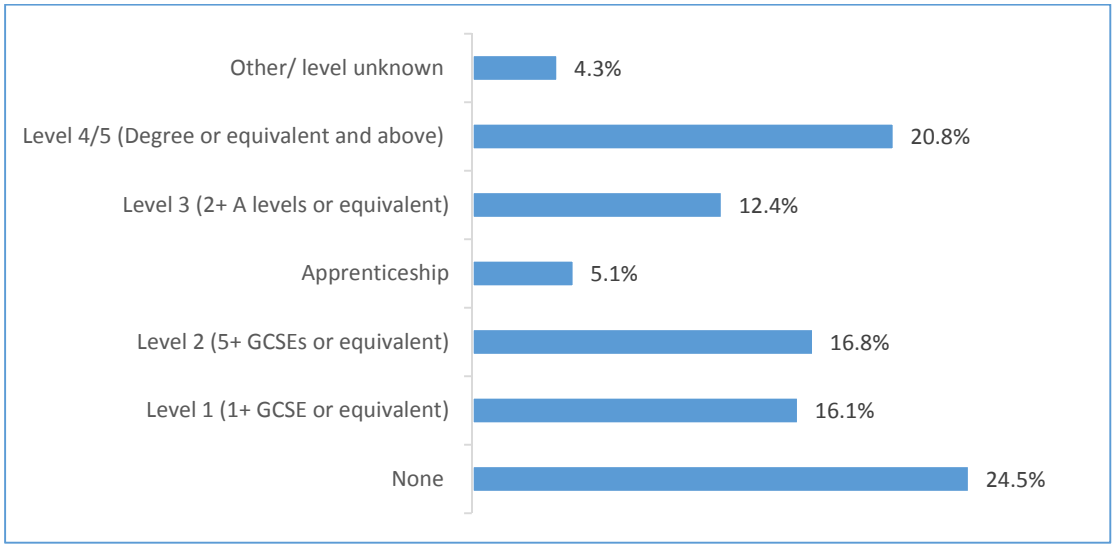

FIGURE 2.12: QUALIFICATIONS LEVEL

Figure 2.13 shows the mode split for travelling to work as a percentage of commuters. The figure reveals that over two thirds of the commuters choose to travel by car, with over 90% of them being car drivers. A percentage of 7% choose to travel by bus, whereas a proportion of 10% prefer walking to their work destination. Cycling to work is the fourth most popular choice at 5.6%.

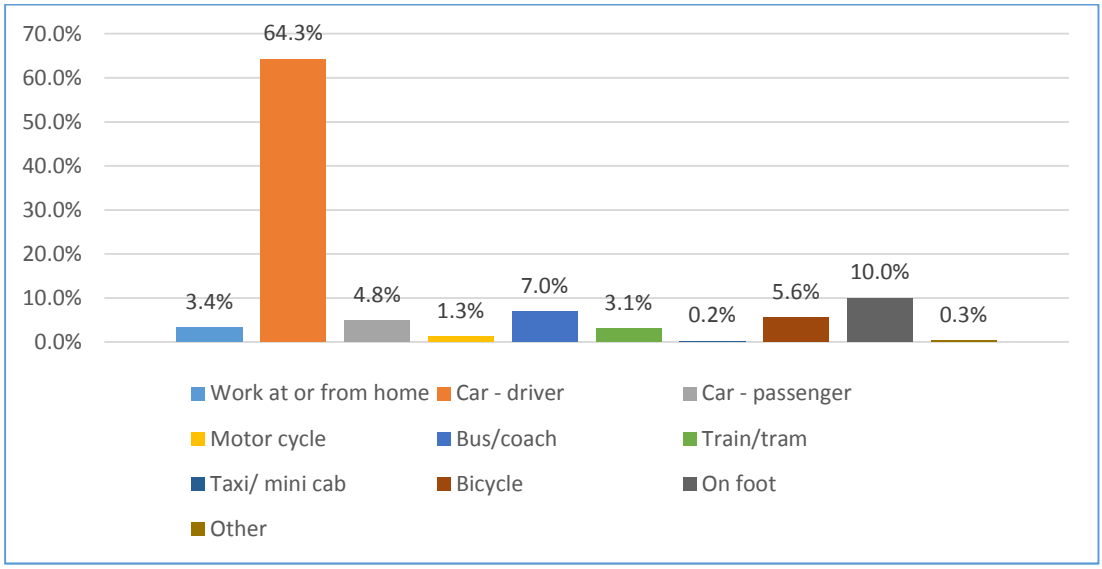

FIGURE 2.13: METHOD OF TRAVELING TO WORK

The gross weekly income for all full-time workers (male and female) in Erewash is shown in Table 2.4. The weekly pay in the area has risen by 9.2% from 2011 to 2017, however it remains 4% lower than the Great Britain average at £552.7.

Gross Weekly Pay (£)			
Date	Erewash	East Midlands	Great Britain
2011	£485.9	£468.2	£500.2
2017	£530.5	£515.5	£552.7

TABLE 2.4: GROSS WEEKLY PAY IN EREWASH

Retail

Long Eaton serves an important role in meeting the convenience goods shopping needs of the local population. Although the main food shopping catchment of Long Eaton is the largest in the Borough, the Erewash Borough Retail Study (2010) states that the vast majority (75%) of main food shopping trips are directed to either the Asda or Tesco Extra large-format superstores at the edge-of Long Eaton Town Centre (Long Eaton Central). Collectively, these two stores attract 91% of the total expenditure attracted to facilities in Long Eaton.

Store	Gross Floorspace – sq m	Net Floorspace – sq m	Net Convenience – sq m	Turnover per sq m - £	Benchmark Turnover - £m	Survey Estimate - £m
Aldi, Cross Street	1,190	833	608	3,987	2.42	1.79
Asda, Midland Street	9,082	4,723	2,739	14,741	40.38	49.80
Tesco Extra, Waverley Street	8,960	5,967	3,938	12,069	47.53	24.91
Iceland, Tamworth Road	510	357	332	5,545	1.84	0.78
Local Shops	1,448	1,014	963	3,250	3.13	4.27
TOTAL	**21,998**	**12,572**	**8,281**	**-**	**95.30**	**81.54**

Notes: Gross Floorspace Derived from Experian Goad (2006) or Erewash Borough Council
Gross to net split for existing foodstores / local shops based on 70%/30% with the exception of the larger stores (Tesco and Asda) which is based on a gross / net split of 55%
Net Convenience floorspace based on information provided by Verdict (2009) for Tesco, Iceland and Asda and WYG judgement for Aldi and local shops
Sales density derived from Verdict (2009) and Mintel Retail Rankings for national multiples and WYG assessment for local shops
Survey estimate derived from Household Survey with trade directed to Co-op on High Street being redistributed *pro rata* to other stores
At 2007 Prices

The findings of the Household Survey conducted by Erewash Borough Council indicated that all facilities in Long Eaton Town Centre (including the edge-of-centre stores) draw from a wide area with an identified main food shopping catchment population of approximately 52,000 people in 2009 (which is the largest of the four main centres in Erewash). Between 2009 and present-day Erewash has witnessed population growth in line with that of the nation; in 2015 projections indicated that the population in Erewash had grown from 112,081 (at the 2011 Census) to 114,500 in June 2015. Local people have a dependence on Long Eaton to cater for their daily needs; whether this is for work, retail or leisure.

The area of Long Eaton is made up of 6 wards as shown in Figure 2.9. The population of the Nottingham Road ward east of Long Eaton Central represents 16.6% of the area's total population. With retailing focused primarily on High Street and Market Place, residents of Nottingham Road use the Main Street and Station Street level crossings to access the convenience goods stores located in Long Eaton Central. The removal of the level crossings (as proposed within one of the outlined options of this study) would deter these residents and could cut trade to the town centre, to the detriment of local businesses.

If the 16.6% of the population stopped using the Town Centre as a result of severance from the centre the cost of the town's economy would be approximately £40 million/annum. This is considered the maximum potential impact which would be unlikely to result from 1 minute to 2-minute increases in journey time.

Expenditure per person	2006	2018	% Expenditure Long Eaton	Expenditure
Comparison	£1,597	£2,267	80%	£11,384k
Convenience	£3,046	£4,325	50%	£13,574k
Total				£24,958k

TABLE 2.5: COMPARISON AND CONVENIENCE EXPENDITURE IN LONG EATON

Table 2.5 estimates the Comparison and Convenience shopping expenditure in Long Eaton based on Expenditure per person in 2006 uplifted by inflation to 2018 and proportion of spending in each category that occurs in Long Eaton. If the low-level line crossings were closed for 50% of the time this could reduce use and expenditure in the town centre. For example, if the expenditure was reduced by a third, the reduction is £8.23 million per annum which is equivalent to 3.4% of town turnover. Alternatively, if the crossings were closed permanently this could significantly reduce use and expenditure of the town centre. For example, if the expenditure was to reduce by two thirds the reduction is £16.45 million per annum which is equal to 6.8% of town turnover.

Housing values

Property prices in Erewash are fairly moderate, with an average house price of £166,232 for all property types (detached/semi-detached/terraced/flats and maisonettes) (Land Registry UK House Price Index - July 2018). Housing affordability is a significant issue within the Borough, with average house prices around seven times higher than average incomes. Thus, a high demand exists for affordable family housing across the Borough.

Land use and location theory suggests that accessibility is an important determinant of residential land values, and of changes in those values. If access to the centre of Long Eaton becomes more difficult this might be reflected in property valuation.

Land Redevelopment

The removal of level crossings will enable the re-development of land and bring associated employment opportunities. Further insight to the re-development of the Low-Level Line was has been explored to identify the land sections and relevant urban renewal opportunities. A re-development plan was developed assuming a 16m wide rail corridor footprint. Table 2.6 demonstrates the land released for development. The assumptions of the plan are:

- Commercial land value £1.1 million / Ha, Industrial land value £0.6 million / Ha.
- Commercial employment density = 1/20sqm, Industrial employment density = 1/40sqm.

Section	Land	Type	Value	Nett Buildings	Employment
North of Nottingham Rd	7,300sqm	Commercial	£0.8 million	2,000sqm	100
Nottingham Rd to Peel St	3,000sqm	Commercial	£0.3 million	-	-
Peel St to Station St	2,800sqm	Commercial	£0.3 million	1,200sqm	60
Station St to Main St	4,300sqm	Industrial	£0.25 million	3,200sqm	80
Main St to Forbes Hole LNR	7,600sqm	Industrial	£0.45 million	3,600sqm	90
Total	**2.5 ha**	**Mixed**	**£1.8 million**	**10,000sqm**	**330**

TABLE 2.6: RE-DEVELOPMENT PLAN OF THE LOW-LEVEL LINE

The following development proposals from south to north of the low-level line are detailed below. In addition, Figure 2.14 demonstrates proposed demolitions, the possible released land and the new and extended units and roads that would be potentially required for the re-development of the Low-Level Line.

Forbes Hole Nature Reserve to Main Street

- This stretch is 500m long, varying in effective width from 26m to 4m where HS2 would take land.
- This area is roughly 10,000sqm in area
- The land runs round the back of industrial estates and could form extensions to the existing service yards.
- This could enable the existing premises to extend. A conservative estimate of 10% would yield an extra 1,000sqm floorspace.

Main Street to Station Street

- This section abuts the Tappers Harker pub at its southern end, the Huss's Lane industrial estate in its centre, and a dwelling on Station Street.
- It is logical to see how the existing Huss's Lane industrial estate could provide access to new small industrial units along the line, providing a net increase of 2,000sqm units if 250sqm of badly placed units were demolished on 3,000sqm of land.
- The 600sqm plots facing Station Street and Main Street respectively could both support commercial development / parking.

Station Street to Nottingham Road

- This 430m stretch runs behind the car park associated with retail users Long Eaton Court, Armstrongs Mill, Lidl and Tesco.
- Its 7,000sqm is suited to town centre car park expansion, but could host selected commercial development / facilitate retail expansions.

North of Nottingham Road

- A 400m section runs alongside ASDA, offering car parking, service yard and retail expansion over 10,000sqm.

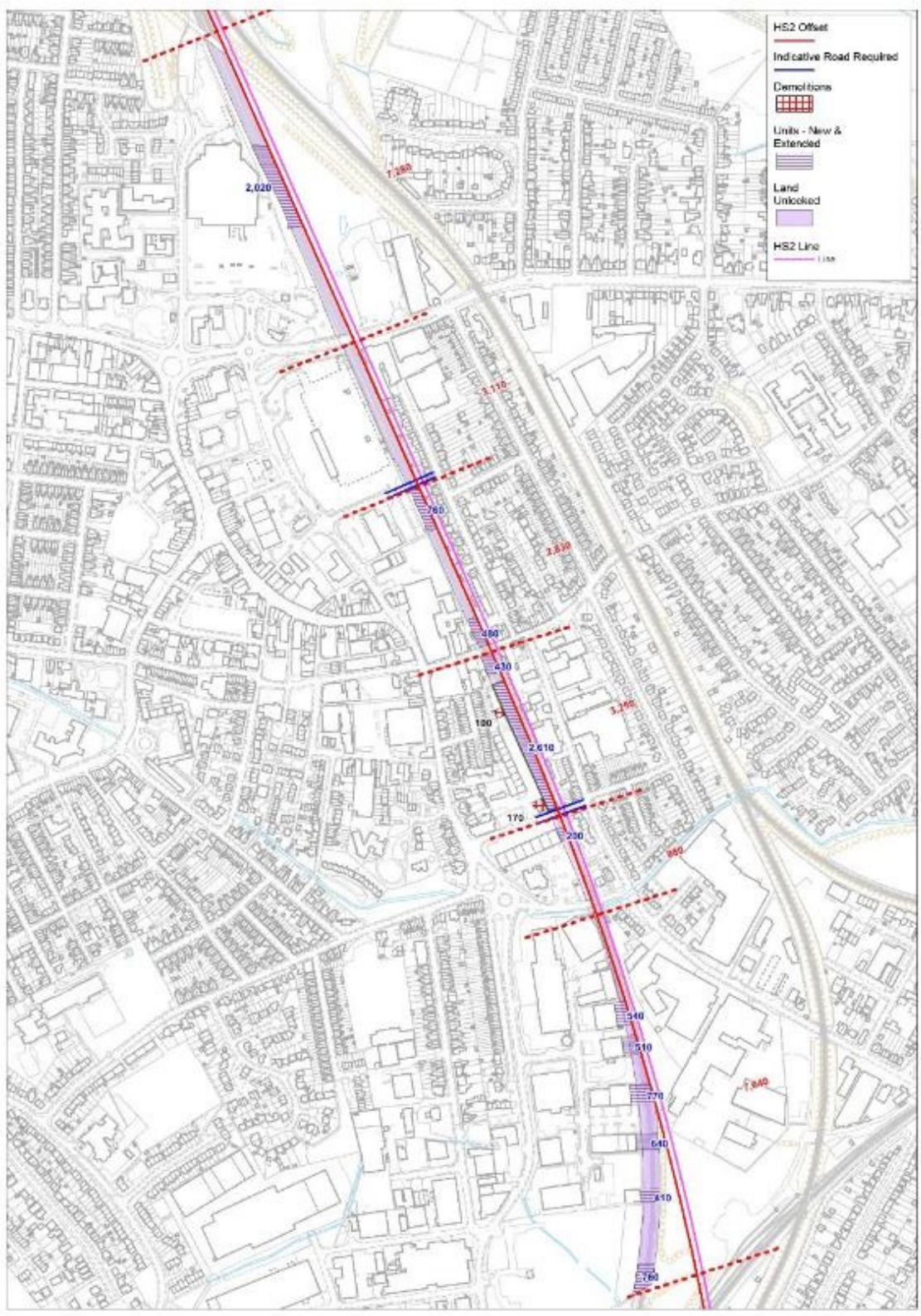

FIGURE 2.14: RE-DEVELOPMENT OF LOW LEVEL LINE

The conclusion is that Option 7 has the potential to provide further developable land c 2.5 ha with land value of c £1.8 million. This is considered significant for the town centre economy.

2.6 Safety

In the past 10 years, 4 incidents were found to have occurred on Station Street and Main Street with a severity ranging from serious to slight. Six cars and five casualties in total were involved in the accidents demonstrated in Figure 2.15. In the serious accident, the level crossing could potentially be the cause of the collision, as the car left the carriageway and collided with a permanent object in close proximity to the barriers. The proposed option involves closing the low-level Line and, as such, mitigate the risk of being involved in an accident that could be associated to the level crossings on Main Street and Station Street. In addition to the increase in train services, the level crossings could impose further safety risks. Removal of the level crossings will produce safety benefits as the individual and collective risks will be eradicated.

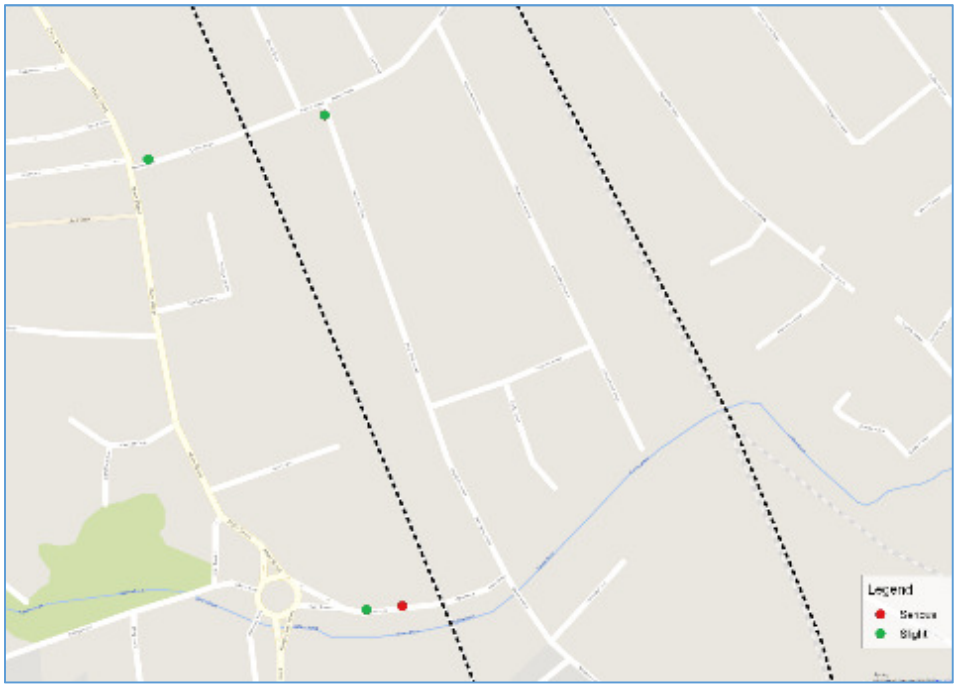

FIGURE 2.15: ACCIDENTS IN THE PAST 5 YEARS

If the level crossings are closed the residents that are located east of the rail lines that previously used the level crossings will be forced to travel north and divert via the already heavily congested A6005 to access Long Eaton centre. The A6005 is one of the main roads between Long Eaton and its surrounding villages to the cities of Derby and Nottingham. Figure 2.16 illustrates the incidents from 2012 to 2017 that took place on the section of A6005. A significant number of incidents occurred at junctions of the A6005 with minor roads. In the six years period, 46 incidents were recorded; among them 8 serious accidents and one fatal. The vehicle involved in the fatal accident was a pedal cycle the casualty was the cyclist.

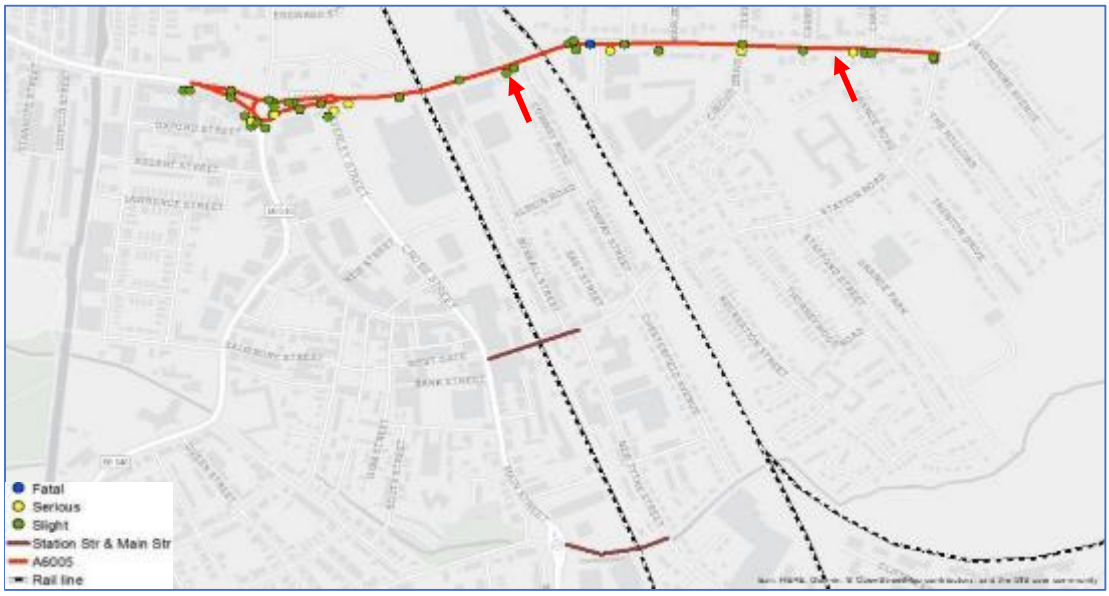

FIGURE 2.16: ACCIDENTS ON A6005

The accident risk rate was calculated using the AADF on the dashed stretch of A6005 demonstrated in the Figure 2.17. The count data were collected manually by trained enumerators from the Department for Transport at the Count Point showed in the figure. The AADF for all vehicles - except pedal cycles - in 2015 (the most recent available count dataset) was measured to be 21,680. Considering that in 2015 six incidents took place on the same road section and a total of 12 vehicles were involved, the accident risk rate is calculated at 0.06%. Increased traffic volume on A6005 would lead to an increased accident risk to road users as well as pedestrians and cyclists. Observations by Network Rail revealed that individual recorded movements over the crossings equate to a total usage of 8600 vehicles when applied to the entire day. Combined with the current flows this gives an AADF of over 30,000 vehicles on the A6005. Considering these numbers, it is predicted that 18 vehicles will be involved in accidents are per annum, This is a significant dis-benefit that must be carefully considered with appropriate network management going forward.

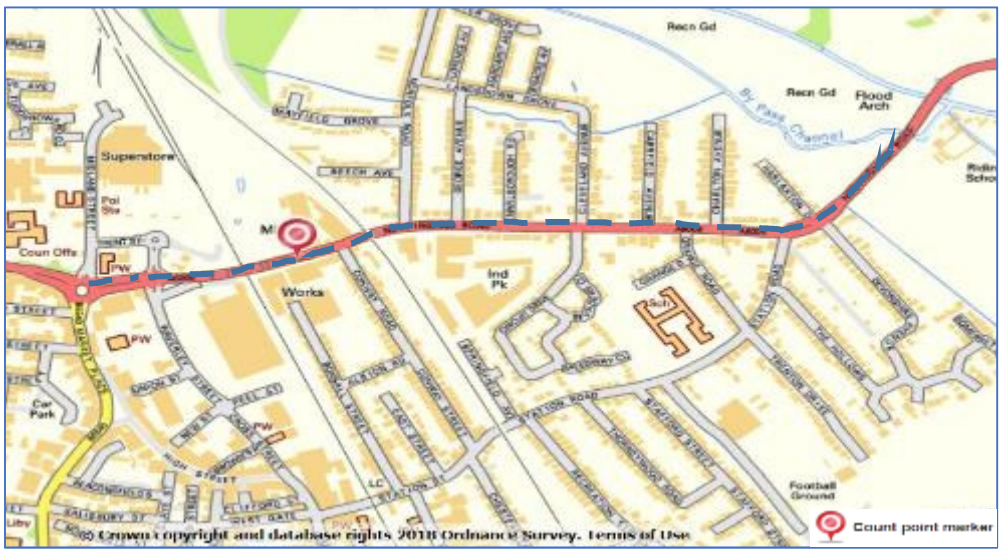

FIGURE 2.17: AADF COUNT LOCATION

2.7 HS2 Constructability

Figure 2.18 shows the proposed HS2 alignment and main construction compound that will be utilised during construction of the HS2 viaduct. To accommodate this compound, some pre-existing structures at Meadowbrook Business Park would need to be demolished and businesses relocated.

The proposed chord that runs parallel with the high-level line dissects the land currently set aside by HS2 for a main construction compound. However, the provision of this chord would free up the land associated with the low-level line, therefore making Forbes Park (accessible via Fields Farm) a possible alternative construction compound with easy access to the HS2 work site. Use of this site would provide access to the HS2 viaduct west of the current low-level line.

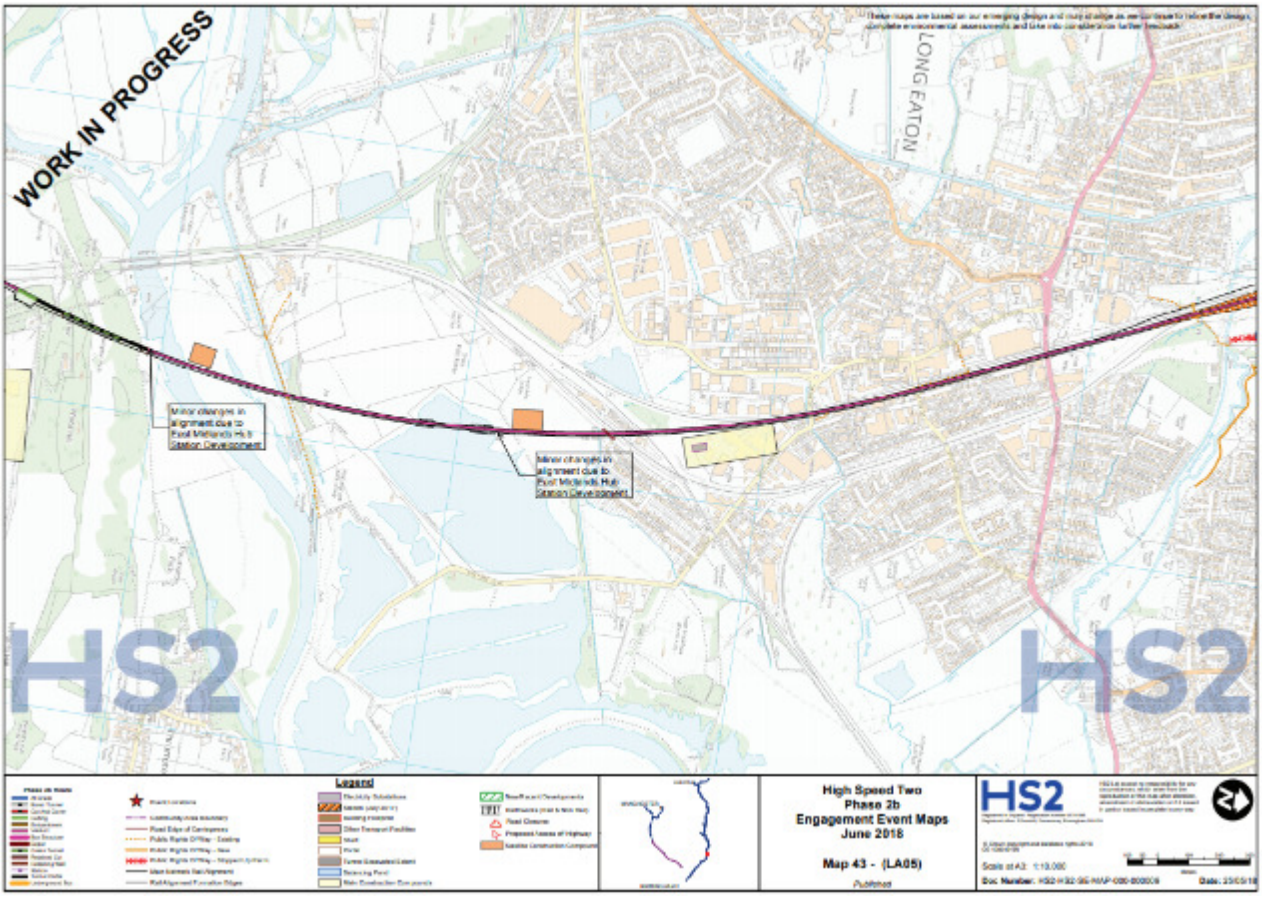

FIGURE 2.18: HS2 ALIGNMENT THROUGH LONG EATON

The current plans for HS2 include a viaduct running through Long Eaton. The tracks on the viaduct are currently planned to be 15 metres above ground level. There will also be two-metre-high sound barriers on either side of the tracks, then the cabling for the trains will add a further five-and-a-half metres above that, taking the total height to 22.5 metres. The height of this design has been developed to accommodate the current road bridge that crosses the low-level line at Nottingham Road (A6005). However, if the low-level line was closed this road bridge would no longer be required and consequently the proposed height of the HS2 viaduct (and East Midlands Hub Station) could be reduced unnecessary. A structure of reduced elevation could provide a further cost saving for HS2.

2.8 Transport Economic Assessment

This section presents the findings from a high-level economics assessment. This high-level assessment has examined two elements, the congestion impact of the scenario and the cost of construction of the road bridge, viaduct and chord. No other benefits or costs have been taken into consideration. The economic appraisal has examined costs and benefits over 60 years with the costs occurred at the time of opening of HS2 (2033) and discounted to a common 2010 base year in accordance with WebTAG. The following tables identify and compare the following:

- Present Value of Benefits (PVB)
- Present Value of Costs (PVC)
- Net Present Value (NPV)
- Benefit Cost Ratio (BCR)

The above criteria have been assessed for options 3, 4, 6 and 7 and compared against three scenarios; the base scenario; the HS2 reference case, and; Midlands Connect Aspirations scenario. The economic appraisal includes the sale of land in options where the low-level line is closed. Option 5 has been discounted because this option would have to quantify dis-benefits to passengers and freight which cannot be done without significantly more modelling.

	Option 3: Closing Level Crossings	Option 4: New Road Bridge	Option 6: Viaduct	Option 7A: Chord	Option 7B: Chord
PVB	-20,044k	-16,310k	2,227k	2,206k	2,206k
PVC	0	3,848k	31,550k	13,062k	4,228k
NPV	-20,044k	-20,158k	-29,323k	-10,856k	-2,022k
BCR	0.0	-4.2	0.1	0.2	0.5

TABLE 2.7: ECONOMIC APPRAISAL COMPARED AGAINST THE BASE

	Option 3: Closing Level Crossings	Option 4: New Road Bridge	Option 6: Viaduct	Option 7A: Chord	Option 7B: Chord
PVB	-16,332k	-12,598k	5,939k	5,933k	5,933k
PVC	0	3,848k	31,550k	13,062k	4,228k
NPV	-16,332k	-16,446k	-25,612k	-7,129k	1,705k
BCR	0.0	-3.3	0.2	0.5	1.4

TABLE 2.8: ECONOMIC APPRAISAL COMPARED AGAINST THE HS2 REFERENCE CASE

	Option 3: Closing Level Crossings	Option 4: New Road Bridge	Option 6: Viaduct	Option 7A: Chord	Option 7B: Chord
PVB	-12,620k	-8,887k	9,651k	9,641k	9,641k
PVC	0	3,848k	31,550k	13,062k	4,228k
NPV	-12,620k	-12,734k	-21,900k	-3,421k	5,413k
BCR	0.0	-2.3	0.3	0.7	2.3

TABLE 2.9: ECONOMIC APPRAISAL COMPARED AGAINST THE MIDLANDS CONNECT ASPIRATION

2.7.1 Application of Cost saving to HS2 from the preferred option

As shown in Options 7A and 7B, the provision of a new rail chord (connecting the high and low-level lines) would release the land currently occupied by the low-level line. The subsequent closure of the low-level line provides opportunity for redevelopment as discussed in section 2.6 but also has potential to provide significant cost savings for HS2.

Current plans for HS2 include a viaduct approximately 22m in height that passes through the centre of Long Eaton and has been designed to cross over the existing A6005 road bridge. The removal of the road bridge could mean the HS2 track can be lowered therefore reducing construction costs and posing less of a blot on the landscape. Removal of the low-level line means that the current A6005 road bridge will no longer be required and theoretically the road level could be lowered.

The removal of the low-level line could also provide an alternative construction compound for HS2 west of the low-level line, that would not lead to business relocation or demolition.

Option 7 is therefore perceived to generate construction cost savings for HS2. Below are the capital cost reductions that would be needed to generate a BCR of 2.0 for this option.

Option	Cost Saving	BCR
Option 7A	15,999k	2.0
Option 7B	1,999k	2.0

TABLE 2.10: HS2 COST SAVING REQUIRED TO PRODUCE BCR 2.0 - HS2 REFERENCE CASE

Option	Cost Saving	BCR
Option 7A	13,061k	2.0
Option 7B	Not Required	2.8

TABLE 2.11: HS2 COST SAVING REQUIRED TO PRODUCE BCR 2.0 – MIDLANDS CONNECT ASPIRATION

In the HS2 Reference Case the cost savings to HS2 to return a Benefit Cost Ratio of 2.0 are just £4m.

2.8.2 Economic Appraisal including Wider Impacts

The proposed regeneration that is associated with closing the low-level line and redeveloping the released land, has been calculated to provide a benefit of almost £30 million to the wider economy over a ten-year appraisal period. These benefits greatly exceed the PVB displayed in the tables above that currently only quantify traffic benefits. Including these regeneration benefits will therefore positively influence the BCRs.

The tables below show PVB, PVC, NPV and BCR values for Option 7 (Chord options A and B). These values consider the land value benefits associated with the released land following low-level line closure. A consideration is also made for the potential wider economic benefits allied with job creation at this newly developed land.

Considering an assumed 330 jobs produced by the proposed development and an average annual salary of £25,000; over a ten-year period, redevelopment of the low-level line has been estimated to generate discounted regeneration benefits of £30m.

Analysis of Monetised Costs and Benefits (AMCB)	Option 7A: Chord	Option 7B: Chord
PVB	31,851k	31,851k
PVC	13,062k	4,228k
NPV	18,789k	27,623k
BCR	2.4	7.5

TABLE 2.12: ECONOMIC APPRAISAL INC WEBS COMPARED AGAINST THE BASE

Analysis of Monetised Costs and Benefits (AMCB)	Option 7A: Chord	Option 7B: Chord
PVB	35,559k	35,559k
PVC	13,062k	4,228k
NPV	22,497k	31,331k
BCR	2.7	8.4

TABLE 2.13: ECONOMIC APPRAISAL INC WEBS COMPARED AGAINST THE HS2 REFERENCE CASE

Analysis of Monetised Costs and Benefits (AMCB)	Option 7A: Chord	Option 7B: Chord
PVB	39,267k	39,267k
PVC	13,062k	4,228k
NPV	26,205k	35,039k
BCR	3.0	9.3

TABLE 2.14: ECONOMIC APPRAISAL INC WEBS COMPARED AGAINST THE MIDLANDS CONNECT ASPIRATION

Chapter 3: Option Feasibility and Preferred Option GRIP0 Stages

3.1 Preferred Option 7B

After conducting analysis of the social, economic and environmental viability of each option; the proposed construction of a chord connecting the existing low and high-level lines appears more advantageous.

This conclusion has been drawn due to a more favourable BCR; outperforming other options in the base scenario, HS2 reference case and Midlands Connect aspirations. The relatively low cost of this option (compared to others) and a significant time saving as a direct consequence of delay reduction means that this option has a positive BCR (that is greater than 1). This option could therefore deliver a positive Net Present Value (NPV) and have an internal rate of return (IRR) above the discount rate used in the discount cash flow (DCF) calculations. This suggests that the NPV of the option's cash flows outweighs the NPV of the costs, and the new chord should be considered.

The multi-criteria analysis conducted during this study revealed that this option could provide the following benefits:

- All road users including cars, buses, pedestrians and cyclists could experience reduced delays with removal of the low-level line and level crossings;
- Any safety issues associated with the level crossings at Main Street and Station Street could be eliminated;
- There will be environmental benefits related to air quality, noise and townscape biodiversity particularly due to the removal of stationary vehicles with idling engines at level crossings;
- The transfer of services to the high-level line will maintain the existing services (that are a prerequisite of HS2) and possibly improve the speed, enable operating efficiencies, connections to regional services and reduce interchange requirements for passengers;
- The removal of the low-level line will open space for new developments and regeneration of Long Eaton Town Centre;
- The removal of the existing level crossings will eliminate the severance that exists through Long Eaton therefore making the town centre more accessible from the East. With enhanced accessibility the area could benefit by an improved town centre economy and positive social distributional impacts.

3.2 Engineering feasibility

Based on engineering feasibility, the chord appears to be the preferred option. Two alternatives have been put forward as part of this study which broadly see the development of a connection between the current low and high-level lines and subsequent closure of the low-level.

Option 7A

Access from the Down East Curve and Up East Curve to the Down High-Level Goods Line and Up High-Level Goods Line is achieved by a 30mph S&C ladder arrangement to cross the Down Main and Up Main.

S&C would also be installed to allow the same vehicle movements between the Up Main, Down Main and Down Goods Line as existing.

Up Erewash and Down Erewash lines would be closed.

The connections between the Up Main and Down High-Level Goods Line would utilise exceptional design values for gradient (1 in 77). These design values will require approval through Network Rail's national non-compliance process which brings risk of the design not being approved.

This option would necessitate the purchase and demolition of several buildings between the Up Main and Down High-Level Goods lines.

The existing crossovers at this location would all need to be removed and plain lined. New switches and crossings will therefore be introduced and tied into the existing lines. As with the above, this is taking place over multiple lines, therefore the total amount of new track very quickly adds up. This option would therefore require 3600m of new track including 13 DV15 switches (plus possible property purchase).

HS2 designs indicate a proposed layout with some land/property acquisition. It is understood from a HS2 Information Event, that buildings on Trent Cottages are planned to be demolished as part of this design. Figure 3.1 below is utilised from HS2's design for Long Eaton. The design introduces a viaduct, running parallel to the low-level line with no interaction with the Town's transport network, thereby minimising safety risk and impact on the Town's economy.

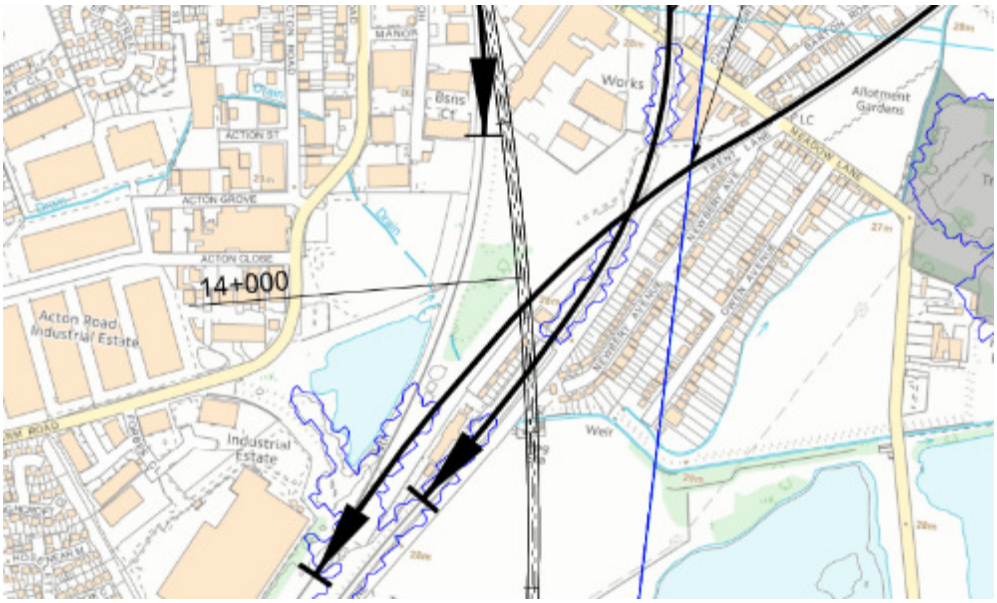

FIGURE 3.1: HS2 RAIL LINE DESIGN

Option 7B

Down Erewash and Up Erewash to be redirected to connect to Down High-Level Goods Line south of UB6 Meadow Lane with a crossover north of UB6. This is accomplished with normal design values for horizontal and vertical geometry.

Tight radii are used off the back of the connection to Down High-Level Goods which will need to be considered at future stages.

At the location of the proposed HS2 line, this proposed alignment is approximately 1m higher than the existing ground level with little or no opportunity for this to be lowered. Therefore, the HS2 alignment designers will need confirm that adequate clearance is achievable above these proposed lines. This may need the HS2 alignment to be lifted.

New alignments cut off access road to sidings and existing signalling infrastructure. New access will be required, likely from the future HS2 depot with a new structure under the proposed tracks. This will need to be considered at future stages.

This option requires 1600m of new track and 4 DV15 switches.

Chapter 4: Recommendations

This study identified a preferred option through testing seven options for feasibility, deliverability and benefits/dis-benefits it can provide to the town.

Multi-Criteria Analysis, utilising DfT type approach with seven-scale assessment have been utilised to sift long list of options. Engineering feasibility at the initial stage was conducted to identify deliverability.

It is concluded that the “Option 7” The Cord from Low-to-High-Level-Line is found to provide a deliverable solution with positive Benefit Cost Ratio. This option is found to provide considerable economic benefits for the town while other options would, in most criteria impact on safety, traffic operations and Town’s economic viability.

‘Option 7’ is therefore recommended to be taken forward through NR GRIP stages of development and delivery.

Appendix A

A.1 Data sources

For the development of the SOBC reliable and up-to-date data was required. The primary sources of data were:

- Nottingham and Nottinghamshire Model (D2N2)
- WebTAG
- Network Rail

Nottingham and Nottinghamshire (D2N2) – Modelled Traffic Flows

Traffic flows were extracted from the D2N2 model for each of the level crossings at Main Street and Station Street. Flows for 2033 were made available and are shown in the table below. These flows were factored into the benefits calculations for each option.

Station Street / Main Street					
2033	Nodes	Flows (pcus)			AADT (vehicles)
		AM	IP	PM	
Main Street North NB	1101312667	256	266	284	8,228
Main Street North SB	1266711013	448	446	391	
Station Street EB	1266713653	138	125	108	4,863
Station Street WB	1365312667	245	322	293	
Main Street South NB	1267112667	479	508	375	11,151
Main Street South SB	1266712671	392	525	453	

Network Rail - Recorded Flows

Recorded flows from Network Rail's "Long Eaton Town and North Erewash Level Crossing Summary of usage" were used to interpret the current situation at each of the level crossings. The following flows represent a 30-minute interval and AADTs at each crossing.

Long Eaton Town	Count
Cars	111
Vans & Lorries < 7.5tonnes	43
Buses	0
LGV	3
Pedal/Motor Cycles	6
Pedestrians	52
Horse/Riders	0
Animals on the hoof	0
Tractors/Farm Vehicles	0
AADT	4239

North Erewash	Count
Cars	112
Vans & Lorries < 7.5tonnes	35
Buses	0
LGV	3
Pedal/Motor Cycles	6
Pedestrians	9
Horse/Riders	0
Animals on the hoof	0
Tractors/Farm Vehicles	0
AADT	4374

Values of Time

Values of time were calculated using Table "A 1.3.5: Market Price Values of Time per Vehicle based on distance travelled" from the WebTAG Databook (June 2018). These figures represent £ per hour in 2010 prices and are shown below. These values were used to quantify the delay posed by each of the options.

Table A 1.3.5: Market Price Values of Time per Vehicle based on distance travelled

(£ per hour, 2010 prices and 2010 values)

Vehicle Type	Journey Purpose	Weekday					Weekend	All Week
		7am – 10am	10am – 4pm	4pm – 7pm	7pm – 7am	Average		
Car	Work	20.00	20.49	20.29	20.67	20.32	23.23	20.53
	Commuting	11.27	11.45	11.31	11.48	11.35	12.01	11.40
	Other	7.78	8.28	8.14	8.11	8.13	9.63	8.66
	Average Car	11.33	10.67	10.88	11.03	10.95	10.29	10.79
LGV	Work (freight)	14.62	14.62	14.62	14.62	14.62	15.35	14.62
	Commuting & Other	8.92	8.92	8.92	8.92	8.92	12.41	9.72
	Average LGV	13.93	13.93	13.93	13.93	13.93	14.99	14.03
OGV1	Working	14.35	14.35	14.35	14.35	14.35	14.35	14.35
OGV2	Working	14.35	14.35	14.35	14.35	14.35	14.35	14.35
PSV	Work	16.35	16.69	17.46	17.45	16.82	15.32	16.45
(Occupants)	Commuting	22.39	7.85	31.48	43.04	19.43	7.36	16.45
	Other	44.44	50.92	39.78	34.52	45.58	51.76	47.10
	Total	83.18	75.46	88.73	95.00	81.82	74.44	80.00

To best use these values of time the traffic was proportioned based on "Table A1.3.4: Proportion of travel in work and none work time"; these are shown in the table below.

Table A 1.3.4:		Proportion of travel in work and non-work time		
Mode / Vehicle Type & Journey Purpose		Weekday		
		7am – 10am	10am – 4pm	4pm – 7pm
		Percentage of Distance Travelled by Vehicles		
Car	Work	16.5	16.5	11.8
	Commuting	44.1	11.8	41.3
	Other	39.5	71.7	46.9
LGV	Work (freight)	88.0	88.0	88.0
	Non – Work	12.0	12.0	12.0
OGV1	Work	100.0	100.0	100.0
OGV2	Work	100.0	100.0	100.0

Train Frequencies

In each of the scenarios Midlands Connect has made the following assumptions regarding train service frequencies (See Table below).

Scenario	Current	HS2 Base Case (Post-Phase 2b)	Midlands Connect Aspiration (Post-Phase 2b)
Freight	1	1	1
Passenger	0	2	4
Total	1	3	5

In light of these predictions, assuming that the barriers are down for 2.5 minutes for a passenger service and 3 minutes for a freight service the barrier down time for each scenario are as follows.

Scenario	Barrier Down Time
Current	6 Minutes Per Hour
HS2 Base Case	16 Minutes Per Hour
Midlands Connect	26 Minutes Per Hour

Appendix B: TEE, PA & AMBC Tables

B.1 Economic Efficiency of Transport System

Table 1: Economic Efficiency of Transport System (revenues are scored as positives, costs as negatives)					
	All Modes	**Road**	**Bus & Coach**	**Rail Total**	
	Total	**Cars, LGVs and goods vehicles**	**Passengers**	**Passengers**	**Walk and Cycle**
Consumers - Commuting					
User benefits					
- travel time saving	955,176	955,176		-	
- Vehicle opcost	-			-	
- user charges	-			-	
- during construction & maintenance	-			-	
Net Consumer Benefits (1a)	**955,176**	955,176		-	
				-	
Consumers - Other					
User Benefits					
- travel time saving	4,752,150	4,752,150		-	
- Vehicle opcost	-			-	
- user charges	-			-	
- during construction & maintenance	-			-	
Net Consumer Benefits (1b)	**4,752,150**	4,752,150	-	-	
Business					
User benefits					
- Travel time	225,445	225,445		-	
- Vehicle opcost	-			-	
- Reduced absenteeism	-				
- user charges	-			-	
- during construction & maintenance	-			-	
Net Business User Benefits (2)	**225,445**	225,445	-	-	-
Private sector provider impact					
- revenue	-				
- opcost	-				
- investment cost	-			-	
- grant/subsidy	-			-	
- revenue transfer	-			-	
Sub total (3)	**-**	-	-	-	
Other impacts					
- Developer contribution (4)		-	-		
Net business impact (5 = 2+3+4)	**225,445**	225,445	-	-	-
Total, PV of transport econ eff. Benefits (6 = 1a + 1b + 5)	**5,932,772**				
Note that subtotals (1a + 1b) and (5) flow into the AMCB table. Subtotal (6) does not.					

B.2 Public Accounts

Table 2 Public Accounts (costs should be recorded as a positive number, surpluses as a negative one)

	All Modes Total	Road Infrastructure	Bus & Coach	Rail	Walk and Cycle
Local Government funding					
- Direct Revenue	-				
- Operating costs	-				
- Investment costs	-				
- Developer and other contributions	-				
- Grant/Subsidy (k)*	-				
- Revenue transfer	-				
Net (7)	**-**	-	-	-	
Central Government funding: Transport					
- Direct Revenue	-				
- Operating costs	-				
- Investment costs*	5,363,565			5,363,565	
- Developer and other contributions	- 1,135,814			-1,135,814	
- Grant/Subsidy (k)*	-			0	
- Indirect Tax Revenues					
- Revenue transfer	-				
Net (8)	**4,227,751**	-	-	4,227,751	
Central Government Funding: Non-Transport					
Indirect tax Revenues (9)	**-**				
Totals					
Broad Transport Budget (10 = 7 + 8)	**4,227,751**				
Wider Public Finances (11 = 9)	**0**				

*The public sector costs in these boxes should exclude developer contribution e.g. developer contribution is subtracted from these figures to give Net (8)

B.3 Analysis of Monetised Costs and Benefits (AMCB)

Table 3: Analysis of Monetised Costs and Benefits (AMCB)					
	Total	**Road**	**Bus & Coach**	**Rail**	**Walk and Cycle**
Noise	-				
Local air quality	-				
Greenhouse gases	-				
Journey ambience (incl. rolling stock quality, and in vehicle crowding)	-				
Accidents (incl. safety)	-				
Physical Fitness	-				
Economic Efficiency: Consumers Users (Commuting) (1a)	955,176	955,176		0	
Economic Efficiency: Consumers Users (Other) (1b)	4,752,150	4,752,150	0	0	
Economic Efficiency: Business users and providers (5)	225,445	225,445	0	0	
Wider Public Finances (indirect Taxation Revenues (-11)	-				
Reliability (incl. performance & reliability)	-				
Option values	-				
Interchange (station quality and crowding)	-				
Present Value of Benefits (PVB) (sum all benefits - 11)	**5,932,772**				
Broad Transport Budget (10)	4,227,751				
Present Value of Costs (PVC) (10)	**4,227,751**				
Overall Impacts					
Net Present Value (NPV)	**1,705,021**				
Benefit to Cost Ratio (BCR)	**1.40**				

Appendix C : Appraisal Summary Table

C.1 Appraisal Summary Table (AST) for Preferred Option

Appraisal Summary Table			Date produced:	24	10	2018			Contact:	
Name of scheme:		Midlands Rail Hub - Long Eaton Low Level Line Study							Name	Geoff Smith
Description of scheme:		New Chord from existing Low Level Line to High Level Line - alignment north of existing railway. Closure of Low Level Line and level crossings. Sale and Redevelopment of the Low Level Line							Organisation	Jacobs
									Role	PM
Impacts		Summary of key impacts	Assessment							
			Quantitative						Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Rail services transfered to the existing high-level line, allowing passengers to travel from Derby to Nottingham/Leicester via Toton. Increased local connectivity. Potential saving for HS2 with cheaper site as construction compound. Reduced traffic congestion due to no level crossings. New chord promotes free flowing traffic.	Value of journey time changes(£)			9.3k p.a.			large Beneficial	£225k	large Beneficial
			Net journey time changes (£)								
			0 to 2min	2 to 5min		> 5min					
			9.3k p.a.	£ -		£ -					
	Reliability impact on Business users	Will eliminate journey delay from closing barriers.							large Beneficial		
	Regeneration	Released land will be redeveloped.							large Beneficial		
	Wider Impacts	Increases accessibility to town centre, redevelopment of land generates local							Moderate Beneficial		
Environmental	Noise	Construction Minimal, operational benefit reduced traffic congestion and free flowing traffic.							Slight beneficial		Slight beneficial
	Air Quality	Improvements due to eliminated idling at level crossings, free flowing traffic.							Slight beneficial		large Beneficial
	Greenhouse gases	Reduced CO2 emission levels due to eliminated stop-and-go at level crossings, free flowing traffic.	Change in non-traded carbon over 60y (CO2e)						Slight beneficial		
			Change in traded carbon over 60y (CO2e)								
	Landscape	Works contained within rail network boundaries. New grade separated chord slight impact							Slight Adverse		
	Townscape	Improvements due to redevelopment of released land, but slight negative impact of chord construction							neutral		
	Historic Environment	No significant impact							neutral		
	Biodiversity	Improvements due to redevelopment of released land. Negative impact due to the extent							Slight Adverse		
	Water Environment	No significant impact.							neutral		
Social	Commuting and Other users	Rail passengers allowed to travel from Derby to Nottingham/Leicester via Toton. Increased local connectivity and accessibility across Long Eaton especially for the residents of the East side. Shorter and safer journeys for pedestrians and cyclists due to no level crossings.	Value of journey time changes(£)			£235k p.a.			large Beneficial	£5,707k	large Beneficial
			Net journey time changes (£)								
			0 to 2min	2 to 5min		> 5min					
			£235k p.a.	£ -		£ -					
	Reliability impact on Commuting and Other users	Bus 460 will operate without disruption of rail services. Shorter and safer journeys for pedestrians and cyclists due to no level crossings.							Moderate Beneficial		
	Physical activity	No significant impact.							neutral		
	Journey quality	Significant improvement in terms of accident risk removal for car and rail users, pedestrians and cyclists due to no level crossings. Enhanced traffic quality as the new chord promotes free traffic flow.							Moderate Beneficial		
	Accidents	Road accidents risk significantly reduced through removal of level crossings.							Slight beneficial		Slight Beneficial
	Security	No Significant Impact.							neutral		neutral
	Access to services	The new chord and the closing of low-level line enhances access to services in Long Eaton central.							Slight beneficial		Slight Beneficial
	Affordability	No Significant Impact.							neutral		neutral
	Severance	No significant impact.							neutral		neutral
	Option and non-use values	No Significant Impact.							neutral		
Public Accounts	Cost to Broad Transport Budget									£4,228k	
	Indirect Tax Revenues									£0k	