Colworth Railway Station

Outline Business Case

On behalf of **Wrenbridge**

WRENBRIDGE

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1	26/03/2018	Additional demand modelling and executive summary	PG	RWP	RWP
2	21/06/2018	Revisions following comments from Bedford Borough Council	PG/AM	RWP	RWP
3	12/10/2018	Revisions following engagement with rail industry and additional timetable reviews	AM	RWP	RWP
4	29/01/2021	Update of business case assessment to reflect latest development proposals	DB	PG	GC

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Executive Summary

This Outline Business Case has been developed for a new railway station near Sharnbrook on the Midland Main Line. The report has been commissioned by Wrenbridge Land Limited (Wrenbridge) who are developing proposals for a new community, Colworth Garden Village, on land to the north-west of Sharnbrook. Several transport proposals are being considered to support this development and, in addition to highways, cycling and local bus services, the opportunity to provide a new rail station has been identified. The contents and results provided in this report have been discussed with Bedford Borough Council during the assessment process.

The approach adopted for the development of the Outline Business Case is consistent with the Network Rail GRIP (Governance for Railway Investment Projects) process. It covers, at a high level, demand, revenue, capital and revenue costings and economic appraisal, to meet GRIP 1 (Output Definition) and GRIP 2 (Feasibility) stages.

This initial assessment suggests that a station could be provided at Colworth with two platforms, pedestrian footbridge, passenger waiting facilities, bus interchange facilities and parking for cars and cycles. The station would be located on the “Slow Lines” of the Midland Main Line, which are currently being electrified as part of Network Rail’s Bedford to Corby/Kettering improvement scheme. The station could be served by stopping East Midlands Trains services – or potentially an extension of half-hourly Thameslink services north of Bedford.

The Outline Business Case has considered:

- Strategic Case – there is national and local policy support for a station at Colworth, as well as strategic railway and wider transportation benefits. A station could in principle be located between Forty Foot Bridge and Back Lane Bridge, subject to more detailed engineering and topographical assessment. The station would help enable the delivery of 4,500 homes at Colworth Garden Village and improve access to jobs at Colworth Science Park.

- Economic Case – there is rail passenger demand for both local and London trips, from both the development and local communities, including a significant intercept from the A6. The economic benefits of the scheme are larger than the costs of the scheme. The economic analysis of the scheme will be further refined using results obtained from Bedford Borough Council’s multi-modal transport once it becomes available.

- Financial Case – capital funding is available from the developer, for the station construction and the scheme can achieve viability in the mid-term, subject to discussions and agreements with the Train Operating Company which would serve the station (e.g. East Midlands Trains)

- Commercial and Management Cases – this review has identified several feasible options for the future procurement and delivery of the station and associated train services, and these will be further developed in GRIP Stage 3 and Stage 4.

In addition, there has been extensive stakeholder engagement with Network Rail, Department for Transport and Bedford Borough Council. The proposals have also been subject to a series of independent reviews.

In summary, a new station meets the objectives of three key parties:

- The residents of Colworth Garden Village and existing employees at the Colworth Science Park would have good rail access, meeting the Borough’s and developer’s aspirations for sustainable travel choices.

- The residents of surrounding villages and towns to the north of Bedford would have greater access to rail services, taking pressure off the A6 corridor and meeting the Borough Council’s aspirations for increased sustainable travel options.

- Rail passengers would have a choice of stations and greater service capacity with the delivery of a new station at Colworth, as well as providing operational, revenue and capital funding benefits for both Network Rail and the train operating companies.

1 Introduction

1.1 Background

1.1.1 This report presents an updated Outline Business Case for a new railway station near Sharnbrook on the Midland Main Line. The report has been commissioned by Wrenbridge, in conjunction with key stakeholders, who are developing proposals for a new community, Colworth Garden Village, on land to the north-west of Sharnbrook and adjacent to Colworth Science Park, an internationally renowned Unilever research facility.

1.1.2 A range of transport proposals is being considered to support this development and, in addition to highways, cycling and local bus services, the opportunity to provide a new rail station has been identified as one option to be examined in more detail. Other modes will be considered for their role in meeting future travel demand, individually and collectively, as part of the full Transport Assessment for the development.

1.1.3 The approach adopted for the development of the Outline Business Case is consistent with the Network Rail GRIP (Governance for Railway Investment Projects) process and it reflects the Department for Transport's (DfT) Transport Appraisal Guidance. As described on the following page, it covers demand, revenue, capital and revenue costings and economic appraisal.

1.1.4 The decision to prepare an Outline Business Case followed previous meetings and communications between Network Rail (NR), Peter Brett Associates LLP (PBA) (now called Stantec) and Wrenbridge in autumn 2017. This updated Outline Business Case has been prepared in 2021 to reflect changes in the development proposals and local policy aspirations and to capture the results of recent discussions with NR, DfT, rail operators and Bedford Borough Council (BBC).

1.2 Context

1.2.1 In January 2018, the BBC published its Regulation 19 consultation Local Plan 2035. This plan included the proposed allocation of Colworth for a 4,500 dwelling mixed-use garden village under policy 27. The allocation encompassed land at the adjacent Santa Pod Raceway (SPR), principally to assist in the provision of off-site mitigation measures that were considered to be a necessary part of the development of the garden village. However, unfortunately, agreement between the site promoters and the owners of SPR in respect of the mitigation could not be realised. In addition, the Council considered that there were still too many uncertainties around the delivery of the proposed railway station. In May 2018, the Council confirmed that it would not proceed with the submission to the Secretary of State of the January Regulation 19 plan, proposing instead to consider revising the development strategy and undertake a second Regulation 19 consultation.

1.2.2 The second Regulation 19 consultation closed on 30 October 2018. The Plan period was reduced to 2030 and the Colworth Garden Village allocation under policy 27 was deleted. The consultant team advising Wrenbridge then prepared representations to the consultation objecting to the deletion of the Colworth allocation. An Outline Business Case (OBC) for the new Colworth railway station was issued in October 2018 and it was prepared to support those representations and demonstrate that Colworth Garden Village could successfully deliver viable sustainable transport options and that it should be re-instated as an allocation in the Local Plan.

The October 2018 OBC was written to reflect the policy requirements and principles of the policy 27 allocation as set out in the January 2018 Regulation 19 version of the local plan.

1.2.3 This revised OBC updates all the previous analysis to reflect current development proposals, updates to capital and operating costs and updates to passenger demand forecasts. These current proposals promote the development of 4,500 dwellings, 7.25 ha employment land and further expansion within the existing Colworth Science Park, four primary schools, one secondary school, other community facilities and green infrastructure, a railway station and other associated

infrastructure, on land controlled for the most part, by Wrenbridge and Unilever. The location and extent of the site is shown in the plan in Appendix A.

1.2.4 This revised OBC is to be submitted to BBC as part of the consultation process for the review of the Bedford Local Plan 2040.

1.3 Approach

1.3.1 The approach to developing the Outline Business Case is designed to be fully compliant with the GRIP process and to give confidence to key stakeholders on the deliverability and viability of a new railway station.

1.3.2 This Outline Business Case will provide most of the key elements required for the Network Rail GRIP stages 1-2 appraisal. The GRIP stages developed by Network Rail are:

1. **Output Definition** – Establishes the scope of investment and potentially asset renewal.
2. **Feasibility** – Defines the investment goals and identifies constraints to ensure that they can be achieved both economically and strategically.
3. **Option Selection** – Assesses potential options and selects the most appropriate one to deliver stakeholders' requirements.
4. **Single Option Development** – The implementation of the option selected during the third stage.
5. **Detailed Design** – The creation of a detailed engineering plan that provides definitive costs, times, resources and risk assessments.
6. **Construction Test & Commission** – The project will be completed to the agreed specifications and testing will commence in order to confirm that everything is operating within the design brief.
7. **Scheme Handback** – The transfer of asset responsibility from the contractor to the operators.
8. **Project Closeout** – Contracts are settled while contingencies and warranties are put into place before an assessment of the benefits is finally carried out.

1.3.3 The purpose of this Outline Business Case, in line with GRIP Stage 1 Stage 2 (Output Definition and Feasibility), is to assess the feasibility of delivering the station at a strategic level, before the detailed design of a preferred single option is undertaken. The following key questions need to be answered at this stage of the process, for both the developer and the rail industry:

- Can it be built?
- What will it cost?
- Can this cost be justified, in terms of passenger demand and user benefits, enabling development and meeting stakeholder objectives?

1.3.4 In developing this OBC through to GRIP 2 (and therefore before advancing to the GRIP 3 option selection stage) we recognise that considerable additional work will be required to finalise the full business case, funding and delivery of the station. Depending on the technical case and delivery requirements from GRIP stage 4 onwards, the scheme may need to be developed primarily with and by Network Rail. The Promoter's role in infrastructure delivery is considered in Network Rail's Stakeholder Relations Code of Practice "Investing in the Network" and we recognise the importance of ongoing engagement with Network Rail, particularly when the Promoter is a private sector funder.

1.3.5 We have sought to ensure that the work undertaken is consistent with DfT, Network Rail and Treasury business case requirements, primarily as set out in the Department for Transport's guidance, 'The Transport Business Case', January 2013 and the comments provided in "The Green Book Review: Findings and Response" issued by the Government in November 2020. This latest review recommends that additional focus in placed on the strategic case for transport interventions – and there is reduced emphasis on the use of benefit cost ratios in decision making.

1.3.6 This revised OBC reflects the Treasury's "five cases" approach to all major project appraisal, namely assessing the Strategic, Economic, Financial, Commercial and Management cases. This revised OBC also includes an assessment of the Land Value Uplift associated with the homes enabled by the new station.

1.3.7 Network Rail is also proactive in providing infrastructure investment guidance through its publication of "Investment in Stations - A guide for promoters and developers" published in June 2017. The guidance in this document has fully informed the approach adopted for this Outline Business Case.

1.3.8 We have also utilised the New Station Fund 2 (NSF2) application form to identify the key elements and to act as a checklist for this report. It covers all the assessment and analysis required at GRIP stages 1-2.

1.3.9 Following this Introduction, this revised OBC therefore includes the following chapters:

- Chapter 2 - Project Overview
- Chapter 3 - Strategic Case
- Chapter 4 - Economic and Financial Cases
- Chapter 5 - Commercial Case
- Chapter 6 - Management Case
- Chapter 7 - Stakeholders and Engagement
- Chapter 8 - Independent Validation
- Chapter 9 - Conclusions

2 Project Overview

2.1 Introduction

2.1.1 This Chapter provides a summary of the existing rail infrastructure services in and around the location of the proposed station at Colworth. Detail of the proposed station in terms of infrastructure and services are also provided.

2.2 Station Facility Overview

2.2.1 The proposed station will have one, two or four platforms (dependent on stopping services), a pedestrian footbridge, passenger waiting facilities, bus interchange facilities and parking for cars and cycles.

2.3 Proposed Station Name and Location Coordinates

2.3.1 The facility will be referred to as Colworth Station and will be located north of Sharnbrook village, Bedfordshire adjacent to either the Back Lane Bridge, at 58 miles, 2 furlongs (52°14'28.1"N 0°33'49.0"W) or the Forty Foot Lane Bridge at 58 miles, 6 furlongs (52°14'57.8"N 0°34'46.9"W).

2.3.2 A plan of the two options for the location of the new station site options is shown in Appendix A.

2.3.3 Both station location options include access to the A6 using an enhanced highway network. The current phasing proposals for Colworth Garden Village assume that the station will have a link to the A6 via Forty Foot Lane. This access is considered to be more straightforward to deliver than an access via Back Lane Bridge/ Sharnbrook Road. An access via Forty Foot Lane would also have a lower traffic impact on Souldrop Village. This means that the access via Forty Foot Lane is currently considered to be the preferred location for the station. This will be confirmed in the next stages of the assessment.

2.4 Existing Rail Infrastructure

Midland Main Line

2.4.1 The proposed Colworth Station would be located on the Midland Main Line (MML). MML is one of Network Rail's principal trunk routes, connecting London (St Pancras International) via Bedford with the East Midlands, including stations in Leicester, Nottingham, Derby and Sheffield. The route is also used between Bedford and London by Thameslink services, which run across London via Blackfriars to stations in Kent, Sussex and Surrey, including Gatwick Airport and Brighton. London Northwestern also runs a service between Bletchley and Bedford, which terminates in a bay platform independent of the MML operations.

2.4.2 The MML also carries considerable freight traffic, including aggregates from the Leicestershire quarries and hydrocarbon products from Humberside.

2.4.3 The MML forms much of the north-eastern boundary of the Colworth Garden Village development site.

2.4.4 The MML between London and Bedford comprises four tracks. The western pair of up and down tracks are the Fast Lines, used by all **East Midlands Trains** (EMT) services between London and the East Midlands and fast **Thameslink** services as far as Bedford. These trains travel at speeds of up to 125 mph. The eastern pair of tracks is designated the Slow Lines, and carry the stopping Thameslink services between London, Luton and Bedford, and all freight trains.

2.4.5 At Bedford station all Thameslink services terminate, using three platforms fed from the Slow Lines. From Bedford station to Sharnbrook the four tracks continue. North of Bedford the Slow Lines are normally used only by freight trains.

2.4.6 The original double line between Bedford and Wellingborough and onwards to Leicester via Kettering was opened in the 1850s. Civil engineering costs were minimised wherever possible, resulting in a steep climb at 1 in 120 in both directions to a summit point just north of Souldrop. By the 1880s this was becoming a major obstacle for freight trains and the route was quadrupled all the way from Bedford to Kettering. At Sharnbrook the Fast and Slow Lines diverge, and the Slow Lines follow a flatter course through the 1.7km Sharnbrook tunnel. This line has a ruling gradient of 1 in 200 and follows a very different alignment between Sharnbrook and Irchester.

2.4.7 This is important, as it explains why the two sets of lines (Fast Lines and Slow Lines) have completely separate characteristics, and therefore differ in terms of their suitability for the siting of a new station.

2.4.8 Figure 2-1 provides a photo which shows the Slow Lines (on the left) before infrastructure works were completed and the Fast Lines on the right.

Figure 2-1 View of Slow Lines and Fast Lines

2.4.9 A station was provided at Sharnbrook until it was removed in 1960. The re-instatement of a station at or near Sharnbrook therefore matches current Government aspirations to reopen old stations as part of the “Restoring Your Railways” programme.

Upgrades to the Midland Main Line

2.4.10 In recent decades the MML has been subject to a series of upgrades.

2.4.11 In 1980, the Midland Main Line was re-signalled and converted to colour light operation, controlled from West Hampstead.

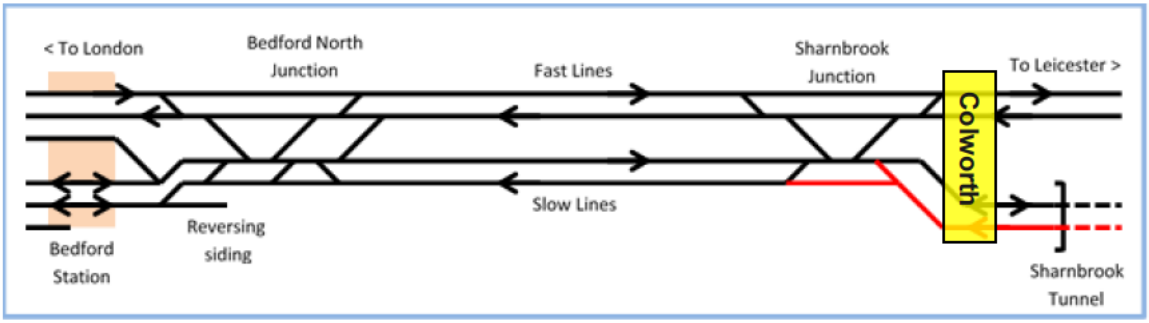
2.4.12 In 1987, the route was reduced to two tracks north of Wellingborough, and between Wellingborough and Sharnbrook a third single bi-directional line was retained primarily for freight trains. South of Sharnbrook Junction the former four-track layout was maintained.

2.4.13 Since 2018, Network Rail has installed electrification equipment to part of the MML. Previously, DfT and Network Rail intended to electrify the entire route to Nottingham and Sheffield. This project was 'paused' by the Secretary of State in 2015 in the face of rising costs.

2.4.14 The electrification project was intended to reinstate the fourth Slow Line track between Sharnbrook Junction and Wellingborough and the Slow Lines between Wellingborough and Kettering to provide additional freight and passenger capacity and to improve the resilience of the rail network.

2.4.15 Electrification of the section between Bedford, Kettering and Corby was subsequently reinstated and infrastructure work has now been completed. The new track layout is as shown in Figure 2-2 and the new sections of track are shown in red. The approximate location of Colworth Station is also shown.

Figure 2-2 Schematic Diagram of Track Layout



2.4.16 The new Up Slow line will operate in a single (southbound) direction, while the previous single line (now the Down Slow Line) will be able to carry trains running in either direction. Both Fast Lines and Slow Lines have been electrified.

2.4.17 The maximum permissible speed on the Fast Lines north of Bedford is 125 mph on the Fast Lines.

2.4.18 Speeds on the Slow Lines will be as follows:

Bedford station to Sharnbrook Junction:
- 75 mph Down Slow (50 mph for freight trains)
- 50 mph Up Slow
- Crossovers at Bedford North Junction 40 mph in all directions

Sharnbrook Junction – Wellingborough:
- Down Slow 50 mph (applies also to trains in the up direction)
- 75 mph Up Slow
- Crossovers at Sharnbrook Junction 20 mph in all directions

2.4.19 Following completion of the infrastructure works, electrified services are expected to commence in May 2021 between London and Corby. These services will operate on the Fast Lines. The target journey time for these services is 1 hour 10 minutes.

2.4.20 It is important to note that despite the construction of new sections of track for the Slow Lines and electrification of the Slow Lines between Bedford and Wellingborough, passenger rail services are not due to use the Slow Lines. Network Rail advise that this is because the remaining speed restrictions on the Slow Lines mean that journey times would be too long if passenger services transferred from operating on the Fast Lines to operating on the Slow Lines. The Slow Lines are therefore available for use by freight services and to provide increased network resilience in case of problems with the Fast Lines.

Use of the Midland Main Line

2.4.21 The MML is open and used by trains 24 hours a day, only closing completely for engineering work between Saturday night and Sunday morning (in common with most of the national rail network). The Network Rail Engineering Access Statement sets out the requirements for track possessions and subject to more detailed review in later stages of the station development, the delivery of the station should not require Schedule 4 compensation payments to the Train Operating Companies or Freight Operating Companies.

Colworth Station

2.4.22 The Colworth Garden Village development site is very well located to incorporate a new rail station. The MML follows a continuous straight alignment at grade from the Back Lane overbridge at Souldrop to the north-easternmost point of the Colworth Garden Village site. Any location in this section where the railway forms the boundary of the site would be potentially suitable for a station.

2.4.23 The location of any new station needs to take into account the following factors:

- Track geometry (horizontal and vertical curves)
- Fit with existing and proposed signalling arrangements
- The lines to serve (Fast Lines, Slow Lines or both)
- The number of platforms to be created (1, 2 or 4)
- Road access to the site and available space for car parking and station facilities

2.4.24 We have considered each of these in turn below.

Track geometry

2.4.25 Any platforms must be long enough to accommodate the longest train which could use the station, plus allowances for stopping variation. The longest train that could use Colworth station would be a 12 car Thameslink Class 700 train, which measures 243 metres. To this must be added tolerance for stopping variation and standback from the platform edge. We would suggest a tolerance of 5m at each end, making a minimum total platform length of 253 metres. If EMT services use Colworth Station they are likely to be much shorter due to a likely shorter train formation.

2.4.26 The requirements for new station platforms are set out in Railway Group Standards. GI/RT7016 (Issue 5) 'Interface between Station Platforms, Track and Trains' specifies the requirements for horizontal alignment:

2.1.1 Station platforms shall be located on straight track unless the particular geographical characteristics of the potential sites and the characteristics of the railway infrastructure at the proposed location of the platform do not provide a reasonable opportunity for achieving this.

2.1.2 Station platforms shall not be located on horizontal curves with radii less than 1000 m.

2.4.27 This is important, as the visibility of the length of the train to ensure that passengers are not trapped by closure of the doors has been the cause of a number of recent accidents. Stepping distances between platform and train are also increased on curved platforms.

2.4.28 Though the tracks in the Sharnbrook area are not straight they are only gently curved, and it appears that the running line curve radii are greater than 1,000m for both Fast and Slow Lines. This needs to be verified against Network Rail's 5-mile diagrams and the asset database as part of the development of GRIP 3 stage and beyond.

2.4.29 The requirement for the vertical alignment is set out in GI/GN7616 (Issue 2) 'Guidance on Interface between Station Platforms, Track and Trains'. This explains that the previous maximum permitted gradients (1 in 260, later reduced to 1 in 500) have now been replaced by a requirement for the designer to carry out a risk assessment for any platform on a section of track steeper than 1 in 500, to include the following factors:

- Actual gradients and length of gradients
- Position of the train relative to the gradient
- Whether trains terminate, reverse or stand for an extended period at the platform
- Operation of trains in platform, for example being coupled / uncoupled, driver changing ends
- Braking capability of trains using the platform
- Engine noise from trains when pulling away from the platform
- Power limitations of trains when pulling away from the platform
- Mitigating circumstances in the event of a runaway (for example catch points, Train Protection and Warning System fitment and adjacent geography and gradients)

2.4.30 The principal risks that need to be addressed are the possibility of wheeled equipment (e.g. pushchairs, wheelchairs and wheeled luggage) running away along the platform and onto the track, and trains moving along the platform without traction power being applied.

2.4.31 This latter issue arises principally at platforms where trains terminate, as the driver will leave the cab to walk to the other end of the train, which may be unattended while this takes place. If the train brake is not applied there is a possibility the gradient will allow the train to roll away. This risk increases with the gradient, but is certainly an issue at gradients of more than 1 in 300.

2.4.32 The Fast Lines north of Sharnbrook rise at a gradient of 1 in 119. For a new station it would be difficult to produce an acceptable risk assessment for turning trains back on this gradient, and also probably for through uni-directional platforms, bearing in mind the roll away risk for wheeled equipment on the platform. We consider that it is unrealistic to propose a new station on the Fast Lines with this gradient.

2.4.33 The Slow Lines north of Sharnbrook rise towards the north at a gradient of 1 in 200. This is steeper than would normally be permissible, and there will need to be a strong set of mitigations in place to counter the risk for services that turn back at a platform at this gradient. Ideally the track alignment would be changed to introduce a shallower gradient through the station site, but this is probably unrealistic. An alternative would be to construct a turnback track or independent platform located to the side of the Slow Lines at a shallower gradient of between 1 in 500 and level, independent of the Slow Lines.

2.4.34 For the rest of this section, we have assumed that suitable mitigations can be devised to construct platforms capable of turnbacks at the existing gradient. For turnback services this may need mitigations such as a new driver entering the rear cab of the train before the arriving driver leaves the front cab. In practice, using through services would be more straightforward.

2.4.35 We have been advised of several potential hazards on the section of route selected for a possible station location, including buried services such as cables and watermains, as well as some restricted clearance. At the next stage of scheme development, the Network Rail Hazard Directory will be reviewed for site issues and their mitigation.

Lines Served by New Station

2.4.36 Our analysis above concludes that the most feasible option is to construct platforms alongside the Slow Lines. This means that a four-platform station which serves the Fast Lines and Slow Lines is not considered suitable.

2.4.37 There are three options for the provision of platforms on the Slow Lines:

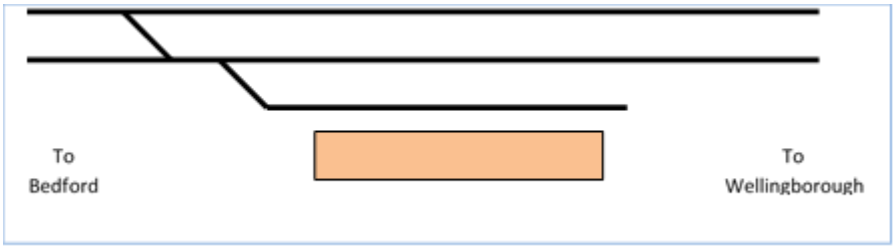
i. Turnback siding
ii. Provision of a single platform on the Slow Lines
iii. Double track station

2.4.38 These are considered in turn below.

Turnback Siding on Slow Lines

2.4.39 A turnback platform could be created on an independent track, which could hold trains independent of the Slow Lines while they wait for their next service, as illustrated in Figure 2.3.

Figure 2-3 Schematic Diagram of Turnback Siding Option



2.4.40 This would be better placed alongside the Up Slow line, to provide level access from the station entrance and car park without needing lifts or ramps. This has the advantages that the new platform could be level, removing risks of trains running away. It also means that passenger trains would be clear of the running lines while waiting at the platform, providing more route capacity for through trains, particularly freight trains.

2.4.41 The disadvantage is that it is not possible to run a service from the new platform through to Wellingborough and stations to the north (i.e. an option which extends Thameslink trains north of Bedford).

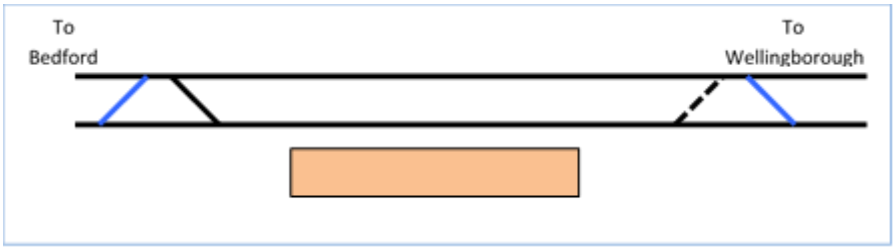
Single Platform on Slow Lines

2.4.42 A potential London – Colworth service would only need one platform for train reversal. This would be better placed alongside the Up Slow line (eastern-most line), to provide level access from the station entrance and car park without needing lifts or ramps, if located on the eastern side of the MML.

2.4.43 Trains standing at this platform for upwards of 10 minutes would provide an obstacle for freight trains, and additional crossovers would be needed to allow through trains, particularly freight trains, to bypass them via the Reversible Down Slow Line.

2.4.44 A sample Slow Line station layout is shown in Figure 2.4.

Figure 2-4 Schematic Diagram of Single Slow Line Platform Option



2.4.45 The connections in blue would be required to allow an up freight train running towards London to pass a passenger train standing at the platform. If this facility is not available freight trains would form a queue behind the passenger train. The dotted connection would only be required if there was a desire to run passenger services north from Colworth towards Wellingborough and Corby.

2.4.46 If Colworth station is located relatively close to Sharnbrook Junction, the junction crossovers will already provide the connections shown on the left of the diagram.

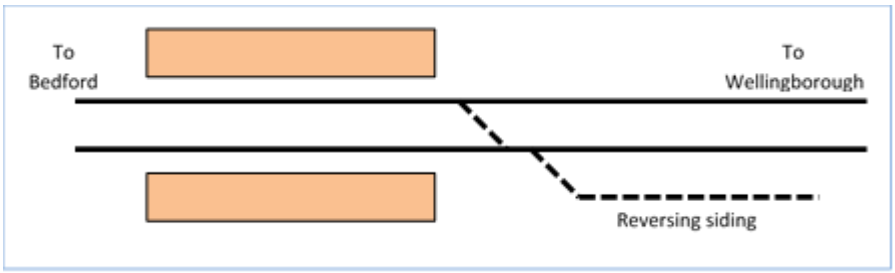
2.4.47 This option has the advantage that it could be expanded relatively simply to become a through station by the addition of a second platform. The disadvantages are the number of new connections required (together with relatively complex reversible signalled connections), while the resulting layout still has constraints for train running (for example when a northbound and southbound freight train need to pass though the station at the same time).

Double Track Station on Slow Lines

2.4.48 If trains were to call at a new Colworth Station and do not need to reverse (i.e. they would run on to another station where they would reverse), then a pair of platforms on the Slow Lines would be required.

2.4.49 If trains were also required to terminate at the station, a separate reversing siding would be required, into which the arriving train could run before returning to the other platform to depart towards London. These connections are shown as dotted lines in Figure 2.5.

Figure 2-5 Schematic Diagram of Double Track Station Option



2.4.50 The reversing siding could have a level gradient, removing concerns about gradient impacts on train reversal. The disadvantage is that extra time would be required for the train to run into the siding, reverse, and return to the station. This could add too much time into the timetable for the train to pick up its next path south of Bedford.

2.4.51 The final issue to be considered is where the station could be located. We have already dealt with the question of gradient – the gradient of the Slow Lines is a constant 1 in 200 between Sharnbrook Junction and Sharnbrook tunnel, meaning that there is no specific location that would be preferred over another on this route section.

2.4.52 The remaining factors are road access and signalling layout.

2.4.53 Network Rail's signalling is designed to standard principles, based on braking distance and overrun protection at junctions. Changes to these basic principles would be extremely expensive and complex. Ideally a new station platform would be located so that a train starting from the platform was in sight of the next stop signal.

2.4.54 Any platform needs to be at least 253 metres long. There should be a gap ('standback') of at least around 25 metres between the platform end and the controlling signal, to ensure the driver has good visibility.

2.4.55 The station could not be located south of the junction signals protecting Sharnbrook Junction. These signals are approximately 80 metres south of the Park Lane underbridge, and therefore the furthest south a new station could be located is around the Park Lane underbridge.

2.4.56 At the northern end, the protecting signals before Sharnbrook tunnel are 300 metres to the south of the tunnel. Any connections for a new station would have to be to the south of this location. This would ideally place a station location somewhere between the Forty Foot Lane and Sharnbrook Road overbridges, where there is sufficient room for the platforms and the connections to turnbacks that might be required (see Appendix A for a plan of the area).

2.4.57 In terms of width, any platform must be of sufficient width to handle the expected passenger footfall, and at an absolute minimum must be 2.5m wide (5.5m wide for any island platform between the Slow and Fast Lines). Analysis demonstrates that there is insufficient width for a platform (including crucially room to build it without disrupting operations on the Fast Lines) south of a point about 750m on the Wellingborough side of the Park Lane underbridge. By this point the track levels are starting to diverge considerably.

2.4.58 The conclusion is therefore that a single platform station, located to the east of the running lines alongside the Up Slow Line could be located between the Forty Foot Lane and Park Lane bridges. A double platform station could potentially be sited between the Back Lane and Sharnbrook Road bridges (see Appendix A for a plan for the area).

2.4.59 Further work is required to validate these assumptions against topography, access and proposed signalling arrangements.

2.5 Proposed Station Facility Owner (SFO)

2.5.1 It is anticipated that either East Midlands Trains (EMT) or Govia Thameslink Railway (GTR) could operate the station.

2.6 Timetable and Stopping Patterns

Current Timetables

East Midlands Trains

2.6.1 EMT runs long distance services between London and the East Midlands. The basic off-peak service comprises five trains per hour, one of which runs to Corby, and two each to Sheffield via Derby and Nottingham. Only two of these services call at Bedford, the others passing non-stop. At peak hours one additional service per hour runs, in the peak direction only. EMT services run on the Fast Lines, between Bedford and Wellingborough. High-speed diesel units, operating at speeds of up to 125 mph, form all EMT services.

Thameslink

2.6.2 GTR runs Thameslink services from Bedford via London Blackfriars to destinations south of the Thames. Thameslink services do not run north of Bedford. Off peak there are four trains per hour from Bedford to Three Bridges and Brighton in Sussex, running initially via the Slow Lines. At peak hours up to eight services per hour operate, with two of these running via the Fast Lines from Bedford.

2.6.3 More Thameslink services start at Luton and St Albans, and all the Bedford services switch to the Fast Lines at some point towards London. This means that towards London, the combination of EMT and Thameslink service patterns mean that the Fast Lines operate at full capacity.

2.6.4 All Thameslink services are formed from 8 or 12 car Electric Multiple Units (EMUs) operating at speeds of up to 100 mph. GTR has a major servicing depot at Bedford, and therefore Bedford station is extremely busy during the day with trains running from the depot to start service or back to the depot to leave service.

2.6.5 Given that Thameslink trains run via an extremely constrained central London section between St Pancras and Blackfriars, punctual running is important. For that reason, Network Rail's Timetable Planning Rules (TPRs) require that there is a minimum 10-minute turnaround gap for any train arriving at Bedford from the south, before it departs on a return journey.

2.6.6 Bedford station capacity is extremely limited, with only three platforms and a reversing siding only long enough for an eight-coach train. In addition, all up EMT services that call at Bedford and freight trains use the same platforms. This acts as a significant constraint on train planning.

London Northwestern Railway

2.6.7 London Northwestern Railway (LNR) runs an hourly service from Bletchley to Bedford calling at all stations on the Marston Vale Line. The service is formed with Diesel Multiple Units (DMUs). These services run via a different route to Bedford and terminate in a bay platform at Bedford independent of the MML services.

Freight

2.6.8 All of the main Freight Operating Companies (FOCs) operate freight trains via Bedford, carrying a variety of commodities including aggregates, cement and hydrocarbons. Freight trains operate 24 hours per day, and capacity is generally freely available overnight. During the day, there are two paths per hour for freight trains between Bedford and London. North of Bedford freight trains generally use the Slow Lines from Sharnbrook to Wellingborough, and may have additional time inserted into their path on this section so they can wait to pick up a path further on in the journey.

Operational Issues

2.6.9 It should be noted that the Thameslink 700 series trainsets have dual electric operation (third rail and overhead), whereas East Midland Trains operating north of Bedford are currently diesel express trains and Marston Vale line services are operated with diesel multiple units (DMUs). As described previously, the Midland Main Line has been electrified from Bedford to Kettering with new services (using electric powered rolling stock) due to begin in May 2021. Extended Thameslink services could potentially use this new infrastructure.

2.6.10 A key operational issue at present is platform capacity at Bedford station. There are currently five platforms, with four full length platforms with through running and one short bay platform, used by the Marston Vale Line services. This situation could be exacerbated by additional East West Rail services (see following section) and Network Rail have indicated in discussions that they would welcome proposals to relocate terminating trains from Bedford station to release capacity, and that a terminus at Colworth could be suitable.

Potential Future Timetables

2.6.11 The COVID-19 pandemic means that timetable arrangements across the rail network are subject to ongoing changes. The comments below reflect proposed arrangements in the absence of the changes due to the pandemic and hence these arrangements need to be kept under review.

East Midlands Trains

2.6.12 Completion of the capacity enhancements north of Bedford is intended to allow EMT to run six trains an hour to provide extra capacity on services to and from the East Midlands. The intention is that the service frequency to Wellingborough, Kettering and Corby will increase to half hourly from May 2021. It is expected that all these services will use the Fast Lines north of Bedford.

Thameslink

2.6.13 The Thameslink route has undergone a major upgrade since 2018, particularly on the section through Central London, where capacity has been enhanced and services from the East Coast Main Line commenced operations from May 2018. There was a further increase of services in December 2019, with 24 trains an hour running through the central core, using automatic train operation. This requires very high levels of punctuality and reliability on the services running towards London.

2.6.14 DfT has provided GTR with 115 new 8 and 12-car trains (Class 700) for the new Thameslink service. There has been considerable difficulty in creating a timetable that reflects the constraints imposed by the Thameslink central core but also allows EMT services to run as near to their current timetable as possible.

2.6.15 In December 2017, EMT announced that because of the Thameslink service changes and lack of capacity between London and Bedford, from the May 2018 timetable their services would no longer call at Bedford or Luton during peak periods, to accommodate the seven Thameslink services per hour running from Bedford. From December 2019 the timetable provided eight Thameslink services per hour running to and from Bedford in the peak.

2.6.16 It is clear that this will impose very significant impacts on operations at Bedford station, where platform availability is not planned to increase. The long-term Thameslink service plan is as follows:

Off peak
- 2 trains per hour Bedford – Brighton
- 2 trains per hour Bedford – Three Bridges

Peak – in addition to the above off peak service
- 2 trains per hour Bedford – Littlehampton
- 2 trains per hour Bedford – East Grinstead

2.6.17 All the above services are expected to run on a ‘clock-face’ basis – that is they will run at the same times past each hour on a repeating basis.

East West Rail

2.6.18 The East West Rail project is now independent of Network Rail, and it aims to reopen the line between Oxford and Bletchley, and upgrade the route onwards to Bedford (and at a later date to Cambridge). This will augment the current all stations Bletchley – Bedford service operated by London Northwestern. More detailed information about the proposals for EWR in and around Bedford are expected to be published in 2021. We understand that the proposals could require significant changes to Bedford station including the provision of new platforms to support the implementation of new services.

2.6.19 We do not currently expect that the proposals for EWR passenger services will have any significant impact on the proposed new station at Colworth and this will be kept under review as the development of the Colworth Station project progresses.

Freight

2.6.20 Analysis of current freight paths on a typical day (11 January 2018) identified that 21 down freight train paths and 26 up freight paths were present in the Working Timetable. It is very typical for there to be more paths in the timetable than actually run, mainly because FOCs respond directly to customer demands and therefore need flexibility in their train plans. In the day analysed no more than two freight trains operated in either direction in any daytime (06.00 – 22.00) hour. Many of these paths involve freight trains standing on the two-track section between Sharnbrook Junction and Bedford, using the tracks here as loops to wait for paths either north or south on more constrained route sections.

2.6.21 FOCs do not plan into the long term in the same way as passenger operators, as their business is geared to responding at short notice to customer requirements. However, both DfT and Network Rail have forecast significant growth in aggregates (for which the MML is a key corridor) and intermodal traffic over the next few years, and it is reasonable to assume that this will result in pressure to run additional paths for freight trains.

2.6.22 The Network Rail East Midlands Route Study, published in March 2016, indicates that there would be capacity for six freight trains per hour in 2043 north of Bedford, though accepts that south of Bedford the current daytime limit of two paths per hour will continue to apply. It is planned that East West Rail would handle freight traffic destined for the East Midlands and running from London or Southampton. Recent indications from East West Rail suggest that EWR freight capacity will be limited.

2.6.23 We have therefore assumed that north of Bedford between two and six freight paths per hour will operate in daytime periods, with a likely maximum of four per hour.

HS2

2.6.24 HS2 Phase 1 of has been granted Royal Assent and construction works have started, with a planned opening date of between 2029 and 2033. Phase 1 would not have a significant effect on the MML. Phase 2b, extending the high-speed line to Leeds would have a significant impact, with Network Rail forecasting that long distance MML passengers will decline by around 50%. However, the delivery of Phase 2b is subject to further review and it is not expected to open until 2040 or later, and has yet to proceed to Hybrid Bill stage. We have therefore discounted HS2 from this stage of the development of the proposals at Colworth Station.

Wixams Station Proposal

2.6.25 A new station is proposed to serve the Wixams residential development south of Bedford. This delivery of this station has a long history and BBC's website provides the following update:

"The original plan for the Wixams development included the provision of a railway station. Following considerable delays and an absence of any progress on building a station through the planning process, we [BBC] are proposing to step in and commit £14 million of capital funds to fill the funding gap and deliver the station. These funds would be recouped from a share of the fares through an agreement with the rail industry."

Source: https://www.bedford.gov.uk/parking-roads-and-travel/strategies-and-projects/

2.6.26 Although the plans for the station are still being developed it is understood the station is being developed so that it can be served by Thameslink services which operate on the Slow Lines south of Bedford. In practice, a four-platform station may be required to provide operational flexibility and resilience.

Timetables for serving Colworth Station

2.6.27 The core remit is for a new Colworth station to provide as a minimum two services an hour towards Bedford and preferably London.

2.6.28 Initially, high-level assessments of potential timetables were developed, as set out in this section, and then subsequently detailed timetable option testing was undertaken, as summarised at the end of this section and with a report included in Appendix B.

Run times between Bedford and Colworth

2.6.29 We do not have running times for a passenger train running the seven miles between the two stations, as only freight trains and the occasional MML trains are planned to run on the Slow Lines between Bedford and Sharnbrook Junction in the current Working Timetable. Freight trains have much slower acceleration than passenger trains, but examination of trains that run past both points without stopping indicates that the fastest freight trains traverse this section in nine minutes. With an allowance for faster acceleration and braking, but running to a new station location north of the Junction, we feel it is prudent to assume a cautious run time of 10 to 11 minutes start to stop between Bedford station and a new Colworth Station.

2.6.30 The new Slow Lines track layout will limit trains to a maximum speed of between 50 and 75 mph.

2.6.31 We do not believe there will be a great variation of running times between electric or diesel trains.

2.6.32 There appear to be three possible options to fulfil the development's service requirement, each of which is considered in turn below.

i. Independent shuttle service between Colworth and Bedford
ii. Stopping Corby services at a new Colworth station
iii. Extending Thameslink services north of Bedford to Colworth

Independent Shuttle Service

2.6.33 A shuttle service operating between Colworth and Bedford would provide a simple rail service which does not require integration with existing EMT or Thameslink services. New platform facilities would though be required at Bedford to accommodate the turnaround of the shuttle service.

2.6.34 The track layout at Bedford station is not currently designed to handle trains terminating from the north. New platform/turnback facilities could potentially be provided on the north-eastern side of the station and this would likely require some land take from the adjacent station car park. Given the aspirations to remodel Bedford as part of the East West Rail scheme it is not considered plausible to progress this option until further details of the EWR proposals are made publicly available.

Stopping Midland Main Line Corby Services

2.6.35 Following the completion of the MML electrification it is proposed to run two services per hour to Corby, calling at all stations. Calling these services at a new Colworth Station would have the advantage of utilising an existing service, and would provide half hourly services towards Kettering as well as to London.

2.6.36 We understand from discussions with EMT that these trains are planned to run on the Fast Lines. We do not yet know what the Working Timetable will look like post electrification, but based on discussions with EMT, and our own review of train operations, we consider that it is unlikely that there will be track capacity for the additional time (estimated at 5-6 minutes) needed to stop services at Colworth on the Fast Lines.

2.6.37 An alternative would be to divert Corby trains from the Fast Line to run via the Slow Lines between Bedford and Wellingborough. These diverted services would have time to call at a new Colworth Station without affecting high speed MML services which would remain on the Fast Lines.

2.6.38 This arrangement would require the trains to and from Corby to operate at slower speeds between Bedford and Wellingborough, which would extend journey times and potentially increase operating costs. Trains would also need to cross over from the Fast Line to the Slow Line at Bedford South Junction and Wellingborough, and this may have impacts on the paths of other services. There would also be a potential impact on the operation of the freight services which use the Slow Line.

Extending Thameslink Services

2.6.39 Thameslink services currently all cross onto the Slow Lines at Bedford South Junction and run into Platforms 1 to 3 to reverse. There is already considerable pressure on platforms at Bedford. If one service every half hour were to be extended to Colworth some of this pressure would be relieved by reducing the station dwell time to one minute in each direction rather than ten minutes. This would be particularly valuable in peak periods.

2.6.40 Thameslink units run in two different variants; 8 car and 12 car trains. Currently at Bedford an incoming Brighton service forms a departing Three Bridges service (and vice versa). We have assumed that this would continue in the future and that these services are all formed with the same length of train. The spacing of Thameslink departures is approximately 15-minute intervals to provide a clockface departure pattern to London. Therefore, we assume at the moment that any Thameslink train arriving can be used for the next available path south.

2.6.41 Analysis of the current Working Timetable shows that the core Thameslink services stand in Bedford station for around 20 minutes before departing south again. This delivers important performance benefits by eliminating the knock-on effect of a late arriving service, which it would be unlikely that GTR would be willing to give up. Some peak services return after ten minutes (the minimum allowed).

2.6.42 If a Thameslink service were extended north to Colworth it would need a minimum of 30 minutes (10 minutes' run time, 10 minutes' dwell and 10 minutes' return run time) to return to Bedford. It would then have missed its current return path and would need to pick up the next clockface path, 15 minutes later. This implies that the dwell time at Colworth would have to be reduced to between 12 and 14 minutes from the current 20 minutes at Bedford, as shown in Figure 2.6.

Figure 2-6 Train Turnaround Times at Terminus

Current		Proposed	
Arr. Bedford	xx.05	Arr. Bedford	xx.05
Dep. Bedford	xx.25	Arr. Colworth	xx.16
Next departure	xx.40	Dep. Colworth	xx.29
		Dep. Bedford	xx.40

2.6.43 This therefore assumes that the Thameslink services that are extended to Colworth drop back a train in the service pattern. Put another way, this means that half an additional rolling stock set (along with driver) is required to resource the service, or one full set if no other operating changes are made.

2.6.44 Delivery of the Class 700 fleet which operates the Thameslink service has now been completed, which means that the requirement for an additional rolling stock set would have to be supplied from the current fleet or a new rolling stock set would need to be used.

Independent Timetable Review

2.6.45 We sought more detailed timetabling inputs in summer 2018 by commissioning independent timetable consultants, Ed Jeffery Ltd, to undertake a timetabling exercise for both options – the GTR service extension and EMT stopping Corby services. This analysis provides useful background to the development of the station and their report is attached in Appendix B.

2.6.46 In summary the study findings were as follows:

> *"Extending GTR services from Bedford to Colworth can be achieved without significant issue and could potentially provide a performance improvement through simplifying platform working and reducing platform occupation at Bedford (especially in the peak hours). Changes to the assumed running times and the May 2018 timetable mean that an additional rolling stock unit and driver is required compared to previous analysis.*
>
> *To support the extension of GTR services, a 2-platform station and turnback siding is recommended at Colworth. The turnback siding is necessary due to the longer turnrounds at the station (to avoid blocking through lines) and would also future-proof the station against subsequent timetable changes. Either of the two proposed station locations is feasible with minimal impact on the timetable.*
>
> *Calling the EMT services is feasible, but results in extended journey times to Corby as the trains must operate on the Slow Lines from Bedford North or Sharnbrook Junctions to serve the new Colworth station. This is also likely to impact rolling stock efficiency and turnrounds at Corby in the future. However, this option should be re-evaluated once the plans for the new East Midlands franchisee are understood."*

2.6.47 The detailed timetable review, which assessed the options within the constraints of the Working Timetable (and was undertaken to Network Rail standards, utilising the latest version of Train Planning Rules 2019), was broadly in line with our initial high-level assessment.

2.6.48 The key difference is that the review identified the need to assume a longer round-trip journey time from Bedford to Colworth and back. This would be expected to lead to the need for a further rolling stock set to be obtained i.e. a total of two rolling stock sets would be required for the delivery of an option which extended Thameslink services north of Bedford.

2.6.49 Since the production of the timetable review in 2018, the East Midlands franchise has been let to EMT and they have provided comments to support the development of the proposed station and operational arrangements. The timetable review has therefore helped inform the development of the scheme to date a further review will be required during further development of the station proposals.

2.7 Passenger Capacity

2.7.1 The anticipated passenger demand is set out in the economic case in Chapter 4 and we consider that both EMT and Thameslink services have sufficient capacity to accommodate the additional trips generated. A further review of capacity, including 'passengers in excess of capacity' (PIXC) levels, will be required in later GRIP stages.

2.8 Service Subsidy

2.8.1 It is estimated that a service operating subsidy may be required in the initial years of operation, potentially payable by the developer. A number of variables will influence the level of subsidy, including start date and buildout rate for new homes, agreed operating costs, revenues estimates and third-party factors. Further analysis of these issues is presented in Chapter 4 and Appendix C.

2.9 Rolling Stock Requirements

2.9.1 If Thameslink services were to be extended to Colworth we consider that one or two additional Class 700 train sets would be required.

2.9.2 Given the current operational arrangements for Thameslink, we assume that these train sets would be in addition to the existing fleet and that they would need to be purchased or leased. However, as the Class 700 trains were designed specifically for the Thameslink service there are not understood to be other Class 700 train sets which could be transferred to the service. This means that new train sets would need to be manufactured – but as the manufacture of the train sets has finished new trains would need to be ordered and manufactured. The costs of this are likely to be prohibitive as there would be no economies of scale associated with the manufacture of a large fleet of trains. This is to be further reviewed in the next stage of this project.

2.9.3 If East Midlands Trains services were to call at Colworth station it is unlikely that additional rolling stock would be required. This is to be reviewed in the next stage of the project.

2.10 Impact on Other Passenger and Freight Services

2.10.1 If the service to Colworth is operated on the Slow Lines, the impact of Colworth station on other passenger and freight rail services would be limited. This is because passenger services do not currently operate on the Slow Lines and freight services are infrequent which means with the limited frequency of the proposed new service (two services per hour per direction) there are expected to be sufficient paths to operate the required services on the Slow Lines.

2.11 GRIP Stages and working with Network Rail

2.11.1 We have agreed with Network Rail and Bedford Borough Council to prepare this Outline Business Case to GRIP Stage 1 (Output Definition) and 2 (Feasibility) levels. Early in the station development process we engaged with Network Rail and identified a number of mutual benefits in working together to achieve a shared objective. Following initial meetings in autumn of 2017 a Memorandum of Understanding was developed with Network Rail and a copy of the agreement is in Appendix D. This agreement has been updated to reflect the potential need to remove existing speed restrictions on the Slow Lines between Bedford and Wellingborough.

2.11.2 In Chapter 6 we provide evidence of our approach to take the project through further GRIP stages to project delivery and handover.

2.12 Summary of Operational Arrangements

2.12.1 The analysis presented in this Chapter shows that extending Thameslink services north of Bedford to Colworth is unlikely to be financially viable due to the requirement to manufacture and purchase (or lease) two new train-sets to enable the service to be delivered. This could cost over £20m.

2.12.2 The analysis also shows that a shuttle service is not currently feasible to develop due to the uncertainties associated with the delivery of the East West Rail project and potential associated changes to Bedford Station.

2.12.3 Stopping EMT services which use the Fast Lines at Colworth Station is not considered feasible due to the negative impact on other long-distance EMT services – and the gradient of the Fast Lines at the proposed location of Colworth Station means that providing platforms is problematic.

2.12.4 This means that diverting EMT services to/from Corby from the Fast Lines to the Slow Lines is considered the most feasible way of providing rail services to a new station at Colworth. It is noted that as part of this scheme, measures are likely to be required to remove or reduce existing speed restrictions along the Slow Lines to reduce the impact of this change on journey times between Bedford and Wellingborough. Discussions on the scope of these measures are ongoing with NR and DfT.

2.12.5 A summary of these options is presented in Table 2-7.

Figure 2-7 Summary of Station Options

Option	Use of Fast or Slow Lines	Comment
Extend Thameslink services north of Bedford	Slow Lines	Currently considered to be financially difficult due to requirement to purchase or lease one or two new sets of rolling stock
Shuttle service between Bedford and Colworth	Slow Lines	Currently not feasible to progress due to uncertainties caused by East West Rail project
Stop EMT trains	Fast Lines	Not considered feasibly due to impacts on long-distance EMT services and gradient of track which makes providing platforms problematic
Stop EMT trains	Slow Lines	Considered feasible in engineering terms – disbenefits of stopping services on existing passengers consider as part of analysis

2.12.6 The costs and benefits of delivering the option which stops EMT trains on the Slow Lines are consider in the rest of this OBC.

3 Strategic Case

3.1 Introduction

3.1.1 This Strategic Case presents a clear rationale for the scheme, supporting the need for the investment. The objectives of the new station are presented together with why this station is considered the best way of meeting local and national transport policies, how the scheme addresses the identified transport issues in the area, and how the scheme helps deliver new sustainable housing growth.

3.2 Current Transport Issues and Challenges

3.2.1 The transport issues and challenges faced in the area are identified in the Bedford Borough Local Transport Plan and submission draft Bedford Borough Local Plan 2030, as well as in the work being undertaken by the Stantec transport team to develop the Transport Assessment (TA) for Colworth Garden Village. In general terms the concerns identified by the local communities, business and the council include:

- Peak hour congestion on routes into Bedford
- Limited bus services, in terms of frequencies, reliability and choice of destinations
- Poor walking and cycling routes connecting villages and main towns
- Costs of public transport alternatives

3.2.2 Each of these issues will be considered in more detail in the TA, where the level of difficulty in developing transport measures to meet the needs of the new settlement (perceived and real) will be taken into account.

3.3 Target Population

3.3.1 The target market for the station consists of four distinct groups:

- The future population associated with the development of at least 4,500 dwellings and employment land at Colworth Garden Village
- The existing population of Sharnbrook, Souldrop and surrounding villages
- The existing and new employees at the Colworth Science Park
- Rail passengers intercepted from the A6 corridor i.e. rail passengers who currently drive from the north into Bedford to catch a train but in the future would park at Colworth to catch a rail service.

3.3.2 In the Passenger Demand Modelling note in Appendix C there is a high-level assessment of the estimated future demand to use the station based on an analysis of modes shares of likely trip patterns.

3.4 Strategic and Operational Benefits

3.4.1 The high-level strategic and operational benefits of providing a new station have been identified in Chapter 2, where the opportunity to extend Thameslink services and/or stop services to Corby to help support the delivery of Colworth Garden Village were considered. The benefits to the operation of Bedford station in terms of providing additional capacity and more flexible operation are also recognised.

3.5 Economic Growth

3.5.1 The new station would support the economic growth aspirations of both the Colworth Garden Village (residential and employment land) and the Colworth Science Park. Further assessment of the level of the economic benefits (including land value uplift) are provided in Chapter 4.

3.6 Compatibility with Route Strategy

3.6.1 The East Midlands Route Study (2016) is the main Network Rail long-term planning policy document to be considered in the delivery of Colworth station.

3.6.2 The key project in the EMRS is the completion of the electrification of the Midland Main Line (MML) from Bedford to Kettering and Corby and Nottingham and Sheffield via Derby. It suggested that:

> *"By the end of 2019 the MML will be electrified from London to Kettering and Corby. Electrification to Nottingham and Sheffield via Derby is due for completion by the end of 2023."*

3.6.3 As described previously the electrification works to Kettering and Corby have been completed and new services are due to begin operating in May 2021.

3.6.4 These changes are particularly relevant to the aspirations for a new station on the Midland Main Line at Colworth. Although a new station is not identified (as the option had not been discussed with Network Rail at the time of publication in 2016) there is a precedent as the Study notes:

> "*With third party support, a new station is being built in CP5 between Nottingham and Chesterfield at Ilkeston. Development of potential new stations is ongoing with local funders at other locations."*

3.6.5 Conditional Outputs are the rail industry's long-term aspirations for the levels of service to be provided on each route. The key Conditional Outputs identified for the East Midlands route (and coordinated to reflect South East demands) are shown below:

Figure 3-1 Conditional Outputs

Reference Key Market	Journey time	Peak Frequency (trains per hour)
CO56 Suburban journeys from stations as far as Bedford to London St Pancras International, and London Blackfriars, Farringdon, City Thameslink	To provide incremental improvements in journey time	minimum 3 – 4
CO57 Market Harborough, Kettering and Wellingborough to London	Good outer suburban speed (at least semi-fast)	4
CO58 Corby to London	Good outer suburban speed (at least semi-fast)	2
CO59 Luton/Bedford and Leicester and the north of the Midland Main Line		2

3.6.6 These Conditional Outputs have been considered when assessing timetable options and route characteristics at a new station at Colworth.

3.6.7 In the section on 'Cross-boundary services in 2043' it is noted that the 'Indicative Train Service Specification' (ITSS) includes:

> *"inner and outer suburban services operating at the southern end of the Midland Main Line from stations in Kent, Surrey and Sussex,* ***some of which are extended through to serve locations in the north Northamptonshire commuter belt.****"* [our emphasis]

3.6.8 As noted previously, Bedford station is a significant constraint on rail operations and the EMRS identifies an option to enhance operations at Bedford station. The provision of a new platform on the west side of Bedford station, for the use of long distance high speed services calling at Bedford was identified for consideration for funding in CP6 (although subsequently deferred), plus capacity work south of Bedford. Again, as there had been no discussions in 2016 with Network Rail, the option of a turnback facility north of Bedford (e.g. at Colworth) is not identified.

3.6.9 There is not a separate Thameslink Route Study covering Bedford to London (these services are included in the EMRS) but Thameslink services south of St Pancras were considered in the South East Route (Sussex Area Route Study) (2015).

3.6.10 The Network Rail Route Specifications: London North Eastern and East Midlands (April 2018) describes the route, assesses the line 'capability' and the passenger and freight operating patterns for 2018, 2019 and the aspiration for 2043. It also highlights once again the capacity constraints at Bedford Station.

3.7 Compatibility with Network Rail Business Plan

3.7.1 The London North Eastern and East Midlands Route Strategic Plan (January 2018) is the prime medium-term business planning tool used by Network Rail to set out its objectives and vision, plans and programmes for Control Period 6 (CP6) – from 1 April 2019 to 31 March 2024.

3.7.2 It sets out the progress on key outputs on the Midland Main Line Improvement Programme, referencing the improvements at Sharnbrook:

> *"London to Corby Electrification and Capacity Upgrade (L2C) - Provision on an additional 4th line between Sharnbrook and Kettering, Installation of 25Kv Overhead Line between Bedford, Kettering and Corby, provision of an electric stabling facility at Kettering and provision of W6A to W12 gauge clearance between Bedford, Kettering and Corby"*

3.7.3 The proposals for a new station at Colworth are therefore compatible with Network Rail's business plan.

3.8 National Planning Policy

3.8.1 In February 2019, the Ministry of Housing, Communities & Local Government published a revised National Planning Policy Framework (NPPF). This framework sets out the Government's planning policies for England and how these are expected to be applied. Key points which relate to Colworth are provided below.

Chapter 9 – 'Promoting Sustainable Transport' of the NPPF outlines the following policies:

- Paragraph 102: "Transport issues should be considered from the earliest stages of plan making and development proposals, so that: the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains."

- Paragraph 103: “The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.”

- Paragraph 108: “In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:

  a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;

  b) safe and suitable access to the site can be achieved for all users; and

  c) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.”

- Paragraph 109: “Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.”

- Paragraph 110: “Within this context, applications for development should:

  iv. give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;

  v. address the needs of people with disabilities and reduced mobility in relation to all modes of transport;

  vi. create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;

  vii. allow for the efficient delivery of goods, and access by service and emergency vehicles; and

  viii. be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.”

3.8.2 These policies show in principle support for the delivery of a new rail station at Colworth to support the implementation of Colworth Garden Village.

3.9 Local and Regional Objectives

Bedford Borough Local Plan

3.9.1 The Bedford Borough Local Plan 2030 was adopted in January 2020, with the intention of guiding development in the borough through to 2030.

3.9.2 The Bedford Borough Local Plan 2030 was prepared and examined against the 2012 edition of the National Planning Policy Framework (NPPF) and as such does not accord with the updated housing calculation methodology included as part of the 2019 update.

3.9.3 This lack of consistency with the NPPF means that the Borough is therefore obliged to review the Local Plan and submit an updated or replacement Plan for examination within three years of the Plan's adoption (Policy 1). As stated in the 2030 Local Plan, the review 'may also provide the opportunity for the Council to make site allocations in the rural part of the borough if neighbourhood plans have failed to deliver them in the timescale anticipated' (Para 1.10).

3.9.4 As stated in the Chief Officer for Planning and Infrastructure Development's report to the Mayor dated April 2020, the revised NPPF policy means that the Borough is anticipating a required allocation increase from '970 dwellings to 1,305 dwellings per year based on current national data-sets'.1 This number of 1,305 dwellings is confirmed in the Standard Methodology published by the Government in December 2020.

3.9.5 The April 2020 LDS includes a timetable for the review of the Local Plan, although it is understood that this is in the process of been revised. Notwithstanding this, a Call for Sites exercise alongside an Issues and Options consultation was held between July and September 2020. A Regulation18 plan consultation is anticipated during the summer of 2021 in order that the Council maintains its review timetable in accordance with Policy 1 of the 2030 Local Plan.

3.9.6 The previous evolution of the Local Plan included the draft Bedford Borough Local Plan 2035 which was published for consultation in January 2018 and provided the initial policy framework for the development of Colworth Garden Village. The Plan supported a station at Colworth, following a consideration of four potential sites for a new settlement. Colworth Garden Village was identified as a preferred location and a new station was significant in the choice:

> *"…the added opportunity to deliver a new Parkway station serving the development. The provision of a Parkway station in close proximity to the Garden Village presents a genuine and timely opportunity for a sustainable housing and transport hub with connections into Bedford, local and regional destinations including London. The Parkway station will also have the added benefit of easing capacity on the A6 by displacing car based journeys which otherwise would have travelled into Bedford to connect with the rail network. In taking full advantage of this important transport link, connectivity by public transport, walking and cycling will be a key theme in the development of the Garden Village in line with garden city principles." Bedford Local Plan 2035*

3.9.7 In May 2018 the Council agreed not to proceed with the previous draft Local Plan and to consult on a revised Local Plan. The new Local Plan period has been reduced to 2030 and the Colworth Garden Village allocation under Policy 27 has been deleted.

3.9.8 Notwithstanding the specific removal of the Colworth Garden Village site, there is considerable policy alignment with a development focussed on the provision of a new railway station as part of its overall sustainable transport package.

3.9.9 The Objectives for the Bedford Borough Local Plan 2030 also note the importance of improving transport:

> *"4.7. Improve the borough's transport infrastructure in order to support growth in the local economy and to make the borough more attractive as a place to live and do business. Reduce congestion in the borough, particularly into and around the town centre and by making journeys by public transport, walking and cycling more attractive to encourage an increase in more sustainable and healthy modes of transport."*

3.9.10 In the Plan Implementation and Infrastructure Delivery section (12) there is a clear focus on the role of significant transport investment in the overall spatial strategy:

> *"12.17 Transport and accessibility are fundamental to the delivery of the local plan's spatial strategy. It is important that new development is located in the most sustainable locations*

[1] http://apps.bedford.gov.uk/ExecDecisions/Files/D439446080563542.pdf

and accessible by a choice of travel modes, including walking, cycling and public transport. This will help to reduce the need for people to travel by car, minimise congestion, improve road safety and meet climate change reduction targets. This also links with the need to improve people's health by creating more opportunities for people to walk or cycle rather than using a car."

3.9.11 The provision of both bus and rail infrastructure and services at Colworth Garden Village would be in line with the Council's Policy 87:

"Policy 87 - Public transport - The Council will require that new developments provide the following:

(i) Where appropriate, for new developments which are not currently connected to the public transport network, highway and public transport infrastructure suitable for including dedicated facilities will be provided from an early stage of occupation of the development, and

(ii) iWhere there is an existing bus service with hourly or more frequent service levels, or there is potential to improve current services to such levels, then every dwelling and work place should usually be within 400 metres walking distance of a bus stop, and

(iii) Deliver facilities which are capable of reflecting technological requirements (such as real time information or a similar future technology) in conjunction with the public transport and infrastructure, and iv. Contribute to the development of off-site interchange facilities directly related to the proposed development.

3.9.12 The Council specifically refers to new development as making a potential contribution to the delivery of larger transport infrastructure:

'12.22 .. The provision of public transport interchange facilities is addressed in Policy 87 (Public Transport). The potential for small public transport interchanges with associated infrastructure, including new rail stations to link with public transport routes and facilities shall be addressed in development proposals. New and existing public transport facilities will need to reflect future technological developments particularly in relation to the provision of information. Where appropriate, new developments shall provide new public transport routes and infrastructure, or support to existing services so that people can make informed travel choices.'

And

12.28 .. New development provides the opportunity to deliver sustainable transport opportunities. The development of sustainable measures is not always sufficient to mitigate the impact of large scale development, and new infrastructure has a role to play in increasing access to economic activity. New infrastructure does not necessarily have to be located adjacent to an area of development and to deliver the measures required, the Council has an approved Community Infrastructure Levy Regulation 123 List to help fund future infrastructure projects.

3.9.13 The Bedford Borough Local Plan 2030 therefore contains effective policy support for the type of major transport investment proposed for Colworth Garden Village.

Bedford Borough Transport Plans

3.9.14 The Bedford Local Transport Plan (LTP 3) 2011- 2021 generally supports the improvement of rail services, capacity and access. It does not include any references to a new station north of Bedford, but policy PT14 seeks to "Engage with the rail industry to support improvements to line speeds and capacity on the Midland Main Line".

3.9.15 LTP3 also includes a policy (p10) to "provide, subject to affordability, a second Park & Ride facility to the north of the town". This is cited in the LTP3 implementation plan for delivery prior to March 2015 but there appears to have been no progress in planning or design, nor implementation to date. Provision of a station at Colworth could, therefore, assist in the delivery of this specific Council policy, providing an alternative to a bus-based park and ride.

Local Enterprise Partnership

3.9.16 The South East Midlands Local Enterprise Partnership takes a wider regional view of the strategic economic objectives for the region, with its policies and programmes identified in the 2017 Strategic Economic Plan. In the section on Local Transport Infrastructure it notes the role of transport improvements in enabling economic growth and development and how SEMLEP can assist:

> *"Working with Highways England, Network Rail and other partners to consider local infrastructure planning in the round, including rail franchises, and to identify – and seek funding for – future priority projects."*

Development of Garden Villages

3.9.17 The housing development at Colworth is proposed to be a Garden Community and the Ministry of Housing, Communities & Local Government (MHCLG) defines Garden Communities as having the following characteristics:

- "a purpose built new settlement, or large extension to an existing town
- a community with a clear identity and attractive environment
- it provides a mix of homes, including affordable and self-build
- planned by local authorities or private sector in consultation with the local community"

https://www.gov.uk/government/publications/garden-communities

3.9.18 The Ministry also notes that Garden Communities should provide :

- "job opportunities
- attractive green space and public realm areas
- transport infrastructure, including roads, buses and cycle routes
- community infrastructure, schools, community and health centres
- a plan for long-term stewardship of community assets"

https://www.gov.uk/government/publications/garden-communities

3.9.19 Transport infrastructure is therefore considered to be an integral part of a successful Garden Community.

3.10 Other Stakeholders

3.10.1 By encouraging travel by rail and supporting more sustainable housing development, the new station scheme contributes to the objectives of several stakeholders, including Network Rail, Train Operating Companies and Bedford Borough Council as well as third-parties, such as communities and local businesses on the A6 corridor between Bedford and Wellingborough.

3.10.2 As the project is developed, further engagement with the public, business and other stakeholders will help identify opportunities to meet their specific needs and objectives. This could be in terms of enhanced access to employment (eg at Colworth Science Park), education and healthcare services or through economic growth, achieved through improved access to a larger local and sub-regional workforce.

3.11 Measuring Success

3.11.1 The success of the new Colworth Station project will be through a significant generation of new trips for rail travel and the interception of current car borne trips travelling to access rail services at Bedford rail station. The Transport Assessment for Colworth Garden Village will identity the levels of trips arising from the development and how the mode share targets agreed with the local planning and highways authorities will be achieved and monitored.

3.11.2 Colworth Station will support the delivery of up to 4,500 homes helping local, regional and national policies for providing housing which is supported by public transport services. Colworth Station will also provide an alternative non-car-based mode of travel for employees travelling to and from Colworth Science Park.

3.12 Constraints and Dependencies

3.12.1 The project is at a relatively early stage of development and therefore the key constraints to date have been securing timely commitments, information and support from the rail industry.

3.12.2 Network Rail and the Train Operating Companies need to understand the opportunities provided by Colworth Station in terms of future demand, income and funding of capital and operating costs, before committing resources to project development. As such the demand modelling and initial assessment of build costs provided in this OBC allows stakeholders to understand the key issues affecting delivery of Colworth Station.

3.12.3 As the development of the project continues, key constraints and dependencies may include:

- Franchise renewals
- Engineering constraints at proposed location of new station
- Bedford Station capacity schemes (e.g. new platforms) and interaction with proposals for East-West Rail
- Rail industry engineering capacity, specifically for signals work
- Post Carillion collapse contractor issues
- Wider economic influences, post Brexit and impacts of COVID-19
- Political changes

3.12.4 All of these constraints that may hinder the development, delivery and ongoing operation of the project will be set out in the early risk assessment provided as part of the next stage of the development of the project and they will be discussed fully with all stakeholders.

3.13 Other Potential Transport Solutions

3.13.1 The other potential transport solutions which have been considered as part of the development of the proposals are set out in full in Transport Assessment. In summary, they are primarily a mix of higher frequency local bus services, investment in walking and cycling, appropriate levels of highway improvements and both residential and employment travel planning.

3.13.2 The initial travel options sifting process resulted in the construction of the new station being assessed as the optimal solution, in terms of supporting a more sustainable housing development, meeting the travel demand generated by the development, meeting the travel needs of the local area and offering an opportunity to intercept trips that would otherwise travel into Bedford (especially on the A6).

3.14 'Do-Nothing' Scenario

3.14.1 It is expected that a viable business case could not be made for a railway station at Colworth to meet the travel needs of Sharnbrook and Souldrop villages without the Garden Village development. This is because of the capital costs required to deliver the scheme and the expect low passenger demand in the absence of the 4,500 homes enabled by the station.

3.14.2 The 'Do-Nothing' scenario therefore assumes no changes to the surrounding transport networks.

3.14.3 The Neighbourhood Plan proposes a 500-dwelling allocation at Mill Lane to the east of Sharnbrook which is expected to be delivered with or without a station at Colworth. The residents from these homes would generate additional travel demands on the local public transport and highway networks.

3.15 Previous Funding Attempts

3.15.1 There have not been any previous public sector bids to secure funding for a new rail station at Colworth.

3.16 Sustainable Transport

3.16.1 As part of the wider development plan for Colworth Garden Village, the station will be at the heart of a sustainable transport network and infrastructure, which promotes the use of all modes, including walking, cycling, local buses and electric vehicles.

3.16.2 An important objective is to encourage rail passengers to access the station using sustainable modes (e.g. walking, cycling, public transport or future mobility transport modes such as e-bikes or autonomous vehicles). It is also recognised that some rail passengers will travel by car to access the station from the wider local area and some car parking facilities are proposed. However, it would be noted that station is not being developed as a "Parkway" station i.e. a station which aims to be used by residents from a wider area e.g. passengers who currently drive to Bedford to use a rail service. Whilst this would likely provide benefits to Bedford town centre (due to the reduction in car trips to the station) there would be an increase in car trips on the routes to Colworth station.

3.16.3 These issues are covered in more detail in the Transport Assessment.

3.17 Passenger Disruption

3.17.1 It is too early in the design process to give certainty over the potential construction impacts, and so we will in due course need to assess how disruption to existing services on the Midland Main Line will be minimised. If the station is to be located on the 'Slow Lines', any disruption would be primarily to freight traffic, rather than to through services operated by East Midlands Trains. The exception to this would be the provision of a footbridge across all four lines to connect with the station and car park on the Colworth Garden Village development, which is to the south west of the station.

3.17.2 As part of the preparation of the construction arrangements, we would therefore need to develop agreements with Network Rail on how they would reduce track possession time, recognising the potential impacts on costs, time and resources. We have reviewed the Network Rail Engineering Access Statement and would assess all potential impacts on existing passengers during construction and the necessary possessions as part of the further development of the scheme. We would expect to enter into a Basic Asset Protection Agreement with Network Rail to deliver the works.

4 Economic and Financial Cases

4.1 Introduction

4.1.1 This Chapter presents the Economic Case for Colworth Station and it identifies the key economic impacts of the scheme, and its overall value for money. This includes consideration of the passenger demand forecasts and the assumptions made in the modelling.

4.1.2 The Financial Case is then used to present evidence of the scheme's affordability including revenue impacts, outturn costs and maintenance costs.

4.2 Capital Cost

4.2.1 The developer will meet all capital costs associated with the delivery of the new station. An allowance has also been made for the capital costs associated with the removal of some of the speed restrictions located on the Slow Lines. The sources of funding for these measures is to be considered during the further development of the scheme as removal of the speed restrictions would provide benefits to other users of the railway as well as users of Colworth Station.

4.2.2 Since the production of the previous Outline Business Case in 2018, the estimated capital cost of the scheme has been reviewed by Bedford Borough Council and their consultants. Based on this review and a further consideration of the scheme proposal the revised capital cost (2020 prices) is:

- Capital cost of station £21.1m (with a risk and contingency factor of 30%)

4.2.3 These costs have been benchmarked against the recent costs of providing similar new stations and full details of this analysis are provided in Appendix E.

4.2.4 As part of the economic appraisal, it has been assumed that the station would take approximately two years to build, with 20% of the station being completed in 2025 and the remaining 80% in the opening year of 2026. Construction cost inflation has therefore been applied together with Optimism Bias (64%) and discounting to a cost year of 2010 (the standard DfT assessment year).

4.2.5 The resulting capital cost of the station is **£21.1m** (PV, 2010 prices).

4.2.6 The allowance for capital costs to remove speed restrictions is **£3.0m** (PV, 2010 prices).

4.3 Total Funds to be Provided through Identified Third Party Sources

4.3.1 The purpose of this OBC is to assess the options for the provision of a station at Colworth fully funded by associated housing and commercial development.

4.3.2 At this stage of scheme development, the need for other funding sources has not been consider as the proposed station is expected to be funded by the developer of Colworth Garden Village. As option development proceeds as part of GRIP 3, and further testing of benefits is undertaken, the source of potential additional funds could be explored if required by Network Rail, Bedford Borough Council and others.

4.4 Annual Station Operation, Maintenance and Repair Costs

4.4.1 The total operational costs for the station are set out below in Table 4-1. For this OBC assessment, the 2020 costs have had optimism bias of 1.6% per annum and cost inflation applied to reflect the forecast years of construction and opening of the station. The resulting costs have then been discounted to 2010 values. It should be noted that the station is assumed to be unmanned and hence there are no staffing costs. In addition, only limited retail facilities are assumed.

Figure 4-1 Operational Costs

Item	2020 Cost p.a.
Utilities	£5,000
Retail Systems	£5,000
Station Equipment	£10,000
Station Maintenance	£20,000
Car Park Operation, Maintenance and Enforcement	£30,000
Network Rail Long-term Charge	£100,000
TOTAL	**£170,000**

Note: assumed station is unmanned

4.4.2 The estimate of the Network Rail Long-term charge is based on the CP6 Franchised Station Long-term Charge price list. The annual value for Wellingborough is £136,000 and Flitwick is £142,000. A value of £100,000 reflects the expected lower passenger demand at Colworth.

4.4.3 The total annual operating cost of the station is compared to the total revenue from rail fares and car parking in a following section.

4.5 Annual Operational Costs for Train Services

4.5.1 Transferring EMT services from the Fast Lines to the Slow Lines and calling services at Colworth Station is expected to add up to approximately eight minutes to the journey time between Bedford and Wellingborough.

4.5.2 The Steer Davies Gleave report 'Understanding the Rolling Stock Costs of TOCs in the UK' enables the operating cost of this additional journey time to be estimated as follows:

- Estimated operating cost of a train £750 per hour
- Extra time due to Colworth Station 8 minutes
- Extra operating cost per train stopping at Colworth station £100
- Trains per day (2 per hour, 12 hours per day, 2 directions) 48
- Cost per day £48,000
- Annualisation factor (equivalent days per year) 300
- Overall cost per year £1.44m

4.5.3 The total additional operating costs to run a new service are therefore £1.44m p.a. Optimism Bias of 1.6% p.a. and inflation has been applied to these operating costs which have also been discounted to 2010 values. The potential need for a subsidy to support this increase in operating costs is considered in a following section.

4.5.4 This operating cost estimate will be reviewed as part of the preparation of the next stages of the GRIP process. This will include confirming the impact of the service changes on rolling stock requirements.

4.6 Assumptions

Economic Appraisal

4.6.1 The economic appraisal utilises a range of variables to calculate the cost and benefits of the scheme. Table 4-2 summarises the key variables used in the assessment.

Figure 4-2 Key Variables

Item	Variable
Construction period	2025-2026 (20% in 2025 / 80% in 2026)
Opening year	2027
Homes delivered per year	200
Full build out	2046-2050
Number of appraisal years - economic	60
Number of appraisal years- financial	20
Base year for passenger demand forecasts	2027
Discount rate - first 30 years	3.5%
Discount rate - 31 to 75 years	3.0%
Inflation	2.0%
Weekday Annualisation Factor	175
Weekend Annualisation Factor	109
Capital Cost Optimism Bias – GRIP Stage 1	64%
Operational Cost Optimism Bias – GRIP Stage 1	1.6% pa
Year assumed for all prices	2010
Minimum size of car park (spaces) – with scope for expansion	250

Rail Fares

4.6.2 Rail fares for trips from Colworth station were derived by utilising the fares for trips between Flitwick, Bedford (local trips) and London. Fares data were extracted from the National Rail Enquiries website for full, reduced (rail cards) and season tickets (six months). These were applied to the ORR Station Data entries and exits per ticket type for Flitwick (which acts as a comparator station) between 2016 and 2017 to form a weighted average for London-bound and local-bound fares. An additional amount has been added to the fare to reflect the additional costs associated for trips going to and from Colworth.

4.6.3 The fares used within the assessment are summarised within Table 4-3 below.

Figure 4-3 Average Ticket Costs

Fare from Colworth	Ticket Type	Cost
To London	Day Return	£24.22
	Peak	£20.10
To Local	Day Return	£7.10
	Peak	£5.73

4.6.4 As part of the assessment of fare revenue, rail fares have been increased by 1% above RPI over 20-year period as specified in DfT guidance.

Car Park Charges

4.6.5 Car parking charges at the new Colworth station are assumed to be similar to Flitwick and they were taken from the National Rail website charges for both daily and weekend so they could be included as part of the assessment.

4.6.6 Table 4-4 presents the parking charges proposed at Colworth.

Figure 4-4 Car Parking Charges – Colworth (2020 prices)

Type	Charge
Weekday Daily Peak	£6.30
Weekdays after 10:00	£3.60

4.6.7 For comparison car park charges at Bedford Station are presented in Table 4-5. The setting of car park charges at Colworth Station will need to ensure that it remains cheaper to park at Colworth and catch a train rather than drive to Bedford and catch a train there. This will help deliver the aim of reducing car trips into Bedford via the A6.

Figure 4-5 Car Parking Charges – Bedford (2020 prices)

Day and time	Charge
Weekday Daily Peak	£9.20
Weekdays after 10:00	£3.70

4.6.8 RPI Annual Growth values per year were applied to the car parking charges to include inflation over the assessment period and values were then deflated to 2010 prices. The RPI and deflation values applied were taken from WebTAG Table A5.3.1 December 2017 release v1.9.1.

4.6.9 The operational costs of the car park (e.g. maintenance and enforcement) are set out above in sections 4.4.

4.7 Contingency Funding

4.7.1 As this is a GRIP Level 1-2 outline business case, a 64% optimism bias has been applied to the station capital costs. Additionally, a 1.6% per annum optimism bias has been applied to the operational costs used within the economic assessment. As stated previously the proposed new station is to be funded by the developer of Colworth Garden Village.

4.8 Other Key Dependencies

4.8.1 At this early stage of project development, other dependencies which could impact on the assessment of costs have not been identified, other than the strategic factors identified in section 3.12 above.

Passenger Demand Forecasts

4.9 Data Sources and Assumptions

4.9.1 Transport modelling has been undertaken to estimate the number of trips to and from Colworth Garden Village and the surrounding area. The surrounding area trips provide an estimate of the those who would use rail (with or without the station) and of these rail trips, those that would transfer from car.

4.9.2 The 2011 census Travel to Work (TTW) data has formed the basis of this demand modelling which provides information on commuting trips. The derivation of other trips is detailed later in this section. The daily transport demand from the Colworth development has been calculated for the full development of 4,500 dwellings.

4.9.3 The census TTW data was interrogated to understand the current rail trip making patterns for commuters, as well as to derive those that could potentially transfer from car to rail. As part of this, two zone systems were developed and these are shown in Figure 4-1 in Appendix C, which shows the likely catchment area for rail commuters. Figure 4-2 in Appendix C shows the catchment area for trips that could potentially transfer from car to use Colworth station.

4.9.4 Population data for each of the zones has been extracted from the 2011 census. The opening year of the station is assumed to be 2027 for the purposes of the appraisal and therefore population growth to 2027 has been applied for the surrounding area zones. The growth factor applied to the

population in the zones has been taken from the National Trip End Model (NTEM) dataset 7.2, using the DfT TEMPro software.

4.9.5 Further information on this process can be found within the technical note provided in Appendix C - TN001 – Colworth Railway Station – Passenger Demand Modelling.

4.10 Annual Demand for New Station

4.10.1 The forecast rail demand for Colworth station for the five years after opening (2032) and following the full build out of the scheme (2046) are shown in Table 4-6 and Table 4-7.

4.10.2 The COVID-19 pandemic has had a fundamental impact on rail travel since March 2020. At present, the long-term impacts of the pandemic on rail travel and wider travel patterns is unclear. The DfT has issued a series of notes on how to capture these effects in the preparation of business cases and to respond to this issue we have provided a sensitivity test which reduces expected rail demand by 20%. This issue will be further considered as part of the work to complete the next GRIP stages.

4.10.3 The passenger numbers also include an annual passenger growth figure of 2% per annum for the first 20-years. The annual weekday demand is based on an annualisation factor of 175 working weekdays per year - this assumes that not every commuter will use the station every day of the week. A weekend annualisation factor of 109 is also included.

4.10.4 Results are presented for the option with Colworth Station served by EMT trains operating on the Slow Lines.

Figure 4-6 Colworth Station Passenger Demand - 2032

	Peak (Before 0930)	Off-Peak (After 0930)	Weekday 24-Hour Total	Weekend	Annual Two-Way Demand
To London – Abstracted	239	51	289	72	117,000
To London – Newly Generated	68	27	96	0	33,400
Local – Abstracted	38	118	156	0	54,700
Local – Newly Generated	163	84	247	0	86,500
Total Trips	508	280	788	72	291,600

Figure 4-7 Colworth Station Passenger Demand - 2046

	Peak (Before 0930)	Off-Peak (After 0930)	Weekday 24-Hour Total	Weekend	Annual Two-Way Demand
To London – Abstracted	578	123	702	93	265,700
To London – Newly Generated	200	80	280	71	113,400
Local – Abstracted	93	288	380	216	180,200
Local – Newly Generated	333	211	544	165	226,400
Total Trips	1,204	702	1,906	545	785,800

4.11 These results show that the two-way forecast annual station demand at Colworth is expected to be 0.3m passengers per annum five years after opening, rising to 0.8m passengers per annum 20 years after opening.

4.12 For reference, equivalent values for the nearby stations for 2018/2019, show annual total entries and exists as follows:

- Flitwick 1.6m passengers p.a.
- Bedford 4.0m passengers p.a.
- Wellingborough 1.0m passengers p.a.

4.13 This shows that the estimated demand at Colworth is broadly similar to demand at other similar stations.

4.14 Annual Demand - 'New to Rail'

4.14.1 The forecast of passengers using the new rail station includes some passengers who would previously have used rail services i.e. they would have driven to Bedford to use rail services. Analysis of census data provides details of the number of people who would travel to work using rail without Colworth station. This analysis shows that 40% of annual passenger demand for Colworth rail station is forecast to be 'New to Rail'.

4.15 Annual Demand - 'Abstracted from Other Services'

4.15.1 Based on the analysis above, 60% of annual passenger demand to use Colworth rail station is forecast to be 'Abstracted from Other Services' i.e. these passengers would use rail services in the absence of Colworth station but transfer to using Colworth rail station as it is more convenient.

4.16 Peak Demand Forecast

4.16.1 Passenger demand forecasts have allowed for an increase as a result of the development of Colworth, to include 4% of the predicted population of Colworth in 2027, to 100% of the predicted population in 2050 based on 200 units being built per year until the full build-out in 2050. An additional 2% passenger increase over 20 years has also been applied within the calculations to reflect an expected wider increase in rail travel over the same period.

Revenue Forecasts

4.17 Annual Passenger Revenue for New Station

4.17.1 The estimated passenger demand forecasts and fares have been used to estimate the annual revenue generated by the new station. At this early stage it is not possible to establish whether peak commuters, for example will purchase season tickets, or turn up and go (as has been assumed for our assessment) Further revenue assessments will be developed for discussion with the train operating companies during the next stages of the development of the scheme.

4.17.2 The results of the revenue analysis are shown in in Table 4-8 for the opening year and then at five-year intervals until the full build-out of Colworth Garden Village in 2046. This revenue is for newly generated trips only i.e. it excludes abstracted trips.

Figure 4-8 Annual Passenger Revenue

Forecast Year	2027	2032	2037	2046
Value (£'000s)	372	761	1,252	1,677

4.17.3 The revenue analysis shows that the opening of Colworth Station in 2027 would result in an estimated annual passenger revenue of £0.4m rising to £1.7m p.a. after 20 years.

4.18 Annual Passenger Revenue - 'New to Rail'

4.18.1 Over the 20-year financial appraisal period the average percentage of annual passenger revenue that is 'New to Rail' is 40%. Further information on this assessment can be found within TN001 – Colworth Railway Station – Passenger Demand Modelling within Appendix C.

4.19 Annual Passenger Revenue - 'Abstracted from Other Services'

4.19.1 The annual passenger revenue that is 'Abstracted from Other Services over the 20-year financial appraisal period is 60%. Further information on this process can be found within TN001 – Colworth Railway Station – Passenger Demand Modelling within Appendix C.

4.20 Car Parking Revenue

4.20.1 The car park revenue for the opening year and five-year intervals until 2046 are shown in Table 4-9.

Figure 4-9 Park and Rail Revenue

Forecast Year	2027	2032	2037	2046
Value (£'000s)	£6	£12	£18	£22

4.20.2 The analysis demonstrates that in the opening year of the station the car park will generate £6,000, whilst by 2046 (and the full buildout of Colworth Garden Village) it will generate £22,000 per annum.

4.21 Other Revenue Sources

4.21.1 It is expected that a coffee shop and / or other facilities will be provided at the station and that these could generate a net income of approximately £10,000 per year (2020 prices). The inclusion of these revenues would further reduce the revenue shortfall identified below.

4.22 Summary of Financial Assessment

4.22.1 The financial assessments shows that operating costs of the new station and rail service are estimated at c£1.2m per annum (2010 prices). These costs are off-set by the revenue generated by new passengers using the rail service and car park as shown in Table 4-10. Revenues are presented for new passengers only i.e. revenues which are abstracted from other services are not included.

Figure 4-10 Summary of Costs and Revenues for new passengers

Parameter	2027	2032	2037	2046
Operating costs (rail service + station) (£m PV)	1.2	1.2	1.2	1.2
Revenue (fares + car parking fees + retail) (£m PV)	0.4	0.8	1.3	1.7

4.22.2 This analysis shows that revenues cover operating costs approximately half-way through the full build-out of Colworth Garden Village.

4.23 Other Economic Impacts and Wider Benefits

4.23.1 Other impacts such as Noise, Local Air Quality, Greenhouse Gases, Journey Quality and Accident benefits have been included specifically in the Economic Efficiency of the Transport System (TEE), Public Accounts (PA) table and the Analysis of Monetised Costs and Benefits (ANMCB) tables. The resultant Prevent Value of these benefits is £23.0m (2010 prices).

4.23.2 The delivery of Colworth Station can also be expected to lead to a range of wider benefits including:

- improved access to public transport by existing residents of the area around Colworth which helps increase social value in the area;
- long-term potential to provide further residential developments due to new rail station; and
- more efficient use of existing infrastructure through use of Slow Lines;

4.24 Land Value Uplift

4.24.1 The delivery of Colworth Station would support the implementation of Colworth Garden Village. This would mean that the land values of the proposed development site would increase due to the conversion of the land from broadly agricultural use to housing. This provides an economic benefit which should be included as part of the assessment of the proposed rail station.

4.24.2 This Land Value Uplift has been assessed in the Financial Viability Assessment for the development and the results has been summarised in Table 4-11.

Figure 4-11 Summary of Land Value Uplift Analysis

Parameter	Value
Size of Development	4,500 homes
Residual Land Value assuming 30% affordable housing	£53.1m
Residual Land Value excluding allowance for affordable housing	£76.9m
Allowance for S106/CIL	£47.5m
Residual Lane Value excluding Allowance for S106/CIL	£123.5m
Deadweight (%)	11%
Displacement (i.e. homes which would be delivered elsewhere if the scheme does not go ahead)	20%
Additionality (%) (= (1-* deadweight) x (1- * displacement)	71%
Additionality (homes)	3,200
Total LVU for development (2020 prices)	£87.9m
Total LVU for development (2010 prices)	£73.6m
LVU per additional home (2020 prices)	£27k

4.24.3 This analysis shows that the delivery of the station helps enable the delivery of Colworth Garden Village and provides substantial economic benefits.

4.25 Transport Impacts

4.25.1 Bedford Borough Council is developing a multi-modal transport model of Bedford and the surrounding area. When this model has been successfully calibrated and validated it has been agreed with BBC that it can be used to assess the transport impact of Colworth Garden Village on the operation of nearby transport networks. This will include an assessment of the impact of Colworth Garden Village on the A6 north of Bedford.

4.25.2 As the model is not currently available, the level of transport benefits and disbenefits has not been assessed in detail. This information will therefore be included as part of the next stages of the development of Colworth Station or as a further update to this OBC.

4.25.3 To provide some insight into the effects of including transport impact in the economic case for the station, a Present Value allowance of £10m (2010 prices) of transport disbenefits has been included as part of the assessment. This reflects transport disbenefits observed at other new stations which support housing developments. A sensitivity test is also provided using a Present Value of £20m (2010 prices) for transport disbenefits to show the impact of transport disbenefits on the wider BCR.

4.25.4 The introduction of an extra stop at Colworth will lead to increased journey times for passengers travelling between Wellingborough, Kettering and Corby, and Bedford. A high-level estimate of the economic disbenefit of this increased journey time has been calculated as follows:

- Extra journey time — 8 minutes
- Average value of time for rail passenger — £9.95 per hour (Source: WebTAG)
- Value of extra journey time — £1.33
- No. of passengers affected — 1.8m p.a.
- Annual cost of extra delay — £2.4m p.a.

4.25.5 This additional journey time disbenefit equates to a Present Value of £42m (2010 prices) over the appraisal period. This value has been included as part in the economic appraisal of the scheme. This analysis will be enhanced during the next stages of development of the scheme and the potential associated drop in revenue will be calculated due to some passengers deciding not to travel by train from Wellingborough towards Bedford because of the increased journey times.

4.26 Summary of Costs and Benefits

4.26.1 A summary of the costs and benefits of providing the new rail station at Colworth is presented in Table 4.12. A Benefit Cost Ratio is provided for all components of the scheme's capital and operational costs and benefits. (Note: in the table costs and disbenefits are negative and incomes and benefits are positive).

Figure 4-12 Summary of Costs and Benefits (Present Values – 2010 prices)

Ref.	Parameter	Proposed Scheme- Stop EMT services on Slow Lines
A	Capital Costs	-£24.2m
B	Operating Costs	-£70.7m
C	Revenues	+£68.4m
D	Economic Benefits (Air quality etc)	+£23.0m
E	Land Value Uplift	+£73.6m
F	Transport External Costs and Transport User Benefits	-£51.8m
G=(C+D+E+F)	Present Value of Benefits	+£113.2m
H=(A+B)	Present Value of Costs	-£94.9m
I=(G+H)	Net Present Value of Benefits and Costs	£18.4m
J=/HI	**BCR: Present Value of Benefits / Present Value of Costs**	**1.2**

4.26.2 This analysis shows the BCR for all benefits and all costs is 1.2 and in terms of DfT's WebTAG guidance this means that the Colworth Station scheme provides a Low value for money.

4.26.3 Table 4.13 presents sensitivity tests for this analysis.

Figure 4-13 Summary of Costs and Benefits (Present Values – 2010 prices)

Test	Scenario	Benefit Cost Ratio
1	Central Case	1.2
2	Increase Transport External Costs and Transport User Benefits from -£10m to -£20m	1.0
3	Reduce passenger revenues by 20% (proxy for impact of COVID-19)	1.1
4	Increase estimate of Land Value Uplift by 25%	1.4
5	Reduce estimate of Land Value Uplift by 25%	1.0

4.26.4 This analysis shows that Colworth Station provides more benefits than costs under several scenarios. This shows that the delivery and funding of the station by Wrenbridge provides a wide range of economic benefits.

4.27 Next Steps for the Economic and Financial Cases

4.27.1 The key next steps for the development of the economic and financial case will include:

- Further refinement of the assessment of operating costs
- Further refinement of the assessment of capital costs
- Inclusion of transport benefits calculated by BBC's multi-modal transport model.

4.27.2 Further work on understanding the operating costs of stopping or extending services is therefore a critical step in the further development of options in the GRIP 3 stage.

4.27.3 In addition, further work on risk will need to be undertaken to establish key risks and their mitigation.

5 Commercial Case

5.1 Introduction

5.1.1 In this Outline Business Case, the Commercial Case refers to the procurement strategy and risk management for the project. Network Rail typically expect this to be fully aligned with their GRIP process.

5.2 Procurement Strategy

5.2.1 In Stage 3 in the GRIP process we will seek to agree a robust contracting and procurement strategy with Network Rail for the delivery of the station. We will work with Network Rail to understand how the contract specification for the construction works will be developed, the appropriate contract form and the optimal method of securing a construction partner.

5.3 Delivery Contract

5.3.1 At this stage, it is too early to commit to a specific type of construction contractor and delivery contract but in due course this will be agreed with Network Rail.

5.4 Project Risks

5.4.1 Further work will be undertaken in GRIP Stage 3 to assess the development, construction and operational risks associated with delivering this project.

5.4.2 Working with Network Rail we would seek to agree a risk register, which should be in place by the end of GRIP 3 with all the key risks quantified. An initial view of risks is presented in Table 5.1.

Figure 5-1 Initial Risk Register

Ref.	Risk	Owner	Potential Mitigation
1	Impacts of diverting rail services from Fast Lines to Slow Lines not considered acceptable by Network Rail and / or EMT	Stantec	Increased level of infrastructure to increase speeds on Slow Lines
2	Impacts of increased journey times between Bedford and Wellingborough not considered acceptable to residents and stakeholders based in Wellinborough and Corby	Stantec	Increased level of infrastructure to increase speeds on Slow Lines
3	East West Rail proposals mean developed of rail schemes in and around Bedford is more complex requiring additional time and money	Stantec	Liaise with Bedford Borough Council and EWR Consortium to understand and if possible shape proposals so that Colworth station scheme is complementary to EWR proposals.

5.5 Risk Management and Reporting

5.5.1 In the development of GRIP Stage 3, the plan for the management and reporting of risk, including how the financial risks will be managed throughout the delivery phase, will be agreed.

5.6 Risk Transfer

5.6.1 The significant involvement of the developer (Wrenbridge Land Ltd) means that there will be a higher level of risk transfer and offsetting to the private sector than in projects delivered wholly by the public sector.

5.6.2 However, further work will be required to consider the risk transfer processes which will be put in place and we recognise that where necessary these processes may have to be supported by incentives (positive or negative, across all stakeholders) to achieve the successful delivery and operation of the station. This will include considering risks associated with the balance of revenues and increased operating costs associated with the delivery of the new station.

5.7 Marginal Risk

5.7.1 Similarly, on the apportioning of any marginal risk, including on planning consent, demand, revenue availability and integration risk, we will work with Network Rail, the Department for Transport, the Train Operating Company and Bedford Borough Council to identify and resolve such risks.

5.8 Station Facility Owner (SFO)

5.8.1 As Colworth Station is expected to be served by East Midlands Trains, East Midlands Trains is expected to be the Station Facility Owner.

5.9 Asset Transfer Date

5.9.1 The timeline for planning, construction and delivery is identified in Chapter 4 and with a proposed opening date of 2027 and the asset transfer is anticipated for late 2027 (i.e. completion of the station and its handover to EMT to begin operations).

6 Management Case

6.1 Introduction

6.1.1 In the Management Case, we consider the processes and resources required to deliver the project, with an explanation of the engineering, operational and planning matters to be resolved. It is in the Management Case that we review the involvement of Network Rail and other key stakeholder in the project to date and going forward.

6.2 Land Requirements

6.2.1 The land and access rights required to complete the project are made available through the land assembly process undertaken by Wrenbridge. In discussions with Network Rail and Bedford Borough Council we have identified the current land agreements to be utilised in delivering the station site and road access.

6.3 Planning Status

6.3.1 As noted above in Chapter 3, Wrenbridge continues to promote Colworth Garden Village through the current review of the Local Plan to 2040. Assuming a successful allocation in the 2040 Plan, it is anticipated that Wrenbridge would submit a planning application for the Colworth Garden Village, including the railway station.

6.4 Project Management Plan

6.4.1 A detailed project management plan for the project, including key milestones and deliverables, will be agreed with Network Rail. An outline plan is shown below relating to all the GRIP Stages.

Figure 6-1 Outline Project Management Plan

GRIP Stage	Activities	Lead	Support	Month
1	Output Definition – Establishes the scope of investment and potentially asset renewal.	Stantec	Ed Jeffery Ltd Railfreight Consulting Ltd; Rapleys Network Rail	Complete
2	Feasibility – Defines the investment goals and identifies constraints to ensure that they can be achieved both economically and strategically.	Stantec	Ed Jeffery Ltd Railfreight Consulting Ltd; Rapleys Network Rail	Complete
3	Option Selection – Assesses potential options and selects the most appropriate one to deliver stakeholders' requirements.	Stantec	Ed Jeffery Ltd Railfreight Consulting Ltd; Rapleys Network Rail, BBC	1-6
4	Single Option Development – The implementation of the option selected during the third step.	Stantec/NR	Ed Jeffery Ltd Railfreight Consulting Ltd; Rapleys Network Rail, BBC	6-12
5	Detailed Design – The creation of a detailed engineering plan that provides definitive costs, times, resources and risk assessments.	NR	[NR consultants] [NR contractor]	12-18
6	Construction, Test & Commission – The project will be completed to the agreed specifications and testing will commence in order to confirm that everything is operating within the design brief.	NR	[NR contractor]	18-42
7	Scheme Handback – The transfer of asset responsibility from the contractor to the operators.	NR	[NR contractor]	42
8	Project Closeout – Contracts are settled while contingencies and warranties are put into place before an assessment of the benefits is finally carried out.	NR	[NR contractor]	42-54

6.5 Date for Site Works Commencement

6.5.1 To be agreed but anticipated to be in 2025.

6.6 Date for Substantial Completion of Site Works

6.6.1 To be agreed but anticipated to be in 2027.

6.7 Date for the Start of Services Calling at the Station

6.7.1 To be agreed but anticipated to be in 2027.

6.7.2 The Planning Authority's transport consultants have previously questioned the likelihood of the timeline identified above being achieved. We recognise that because of potential delays in securing Local Plan support, submitting a planning application and getting project signoff from Network Rail and others that station opening may be delayed. We do though currently consider that a five-six year delivery programme is realistic (bearing in mind the Local Plan must be submitted to the Secretary of State for Examination by January 2023) and hence we have modelled passenger demand on a 2027 station opening.

6.7.3 It should be noted that the fundamentals of the business case would not be affected by a delay in the opening of the station and there may be revenue, costs and viability benefits. We will determine these in the next iteration of the business case, as a number of variables and key milestones are confirmed.

6.8 Project Delivery Programme – Constraints and Dependencies

6.8.1 As noted in Chapter 2 there are several factors affecting the delivery of Colworth Station:

- The Colworth Garden Village development
- The Midland Main Line upgrade and electrification
- Potential works on the Slow Lines to reduce or remove existing speed restrictions
- Changes to EMT timetable

6.8.2 In the table below we set out a summary of the key constraints and dependencies that may affect the Delivery Programme:

Figure 6-2 Delivery Plan Constraints and Dependencies

Key Factors	Constraints	Dependencies
The Colworth Garden Village development	Local plan process Planning application Land availability	Bedford Borough Council Landowners
The Midland Main Line upgrade and electrification	Contractor change Funding Technical issues	Network Rail Department for Transport East Midland Trains
Changes to Slow Lines to reduce or remove speed restrictions	Technical issues (e.g. design work) Funding	Network Rail Department for Transport Funders (including landowners and public sector organisations)
Changes to EMT timetable	Technical work Implementation arrangements Funding/subsidy arrangements (if required)	East Midlands Trains Department for Transport Network Rail Funders (including landowners and public sector organisations)

6.8.3 Further detailed assessment of the risks (and their mitigation) to the delivery will be undertaken as part of the GRIP 3 and 4 stages.

6.8.4 Resource Plan

6.8.5 For GRIP Stage 1 and Stage 2, the main resources used to date have been transport consultancy support (Stantec) and town planning advice from Rapleys, on behalf of Wrenbridge. Ed Jeffery Ltd and Railfreight Consulting Ltd have provided specialist rail support to the project team. We are also working with BBC to use their multi-modal transport model to assess the transport impact of Colworth Garden Village with and without the proposed rail station.

6.8.6 Network Rail and DfT have provided comments on the proposals and Systra, on behalf of Bedford Borough Council, has reviewed the proposals as part of the Council's Local Plan evidence review.

6.8.7 As part of the GRIP Stage 3 and Stage 4, a detailed resource plan with appropriate roles will be identified for the detailed design and delivery stages of the project.

7 Stakeholders and Engagement

7.1 Stakeholder Engagement to date

7.1.1 The plans for the station have been developed in consultation with officers from Network Rail, DfT and Bedford Borough Council.

7.1.2 Meetings have also been held with East Midlands Trains who operate trains north of Bedford on the Midland Main Line.

7.1.3 Discussions with communities and the general public will come later as options are further developed and as part of both the GRIP Stage 3 and Stage 4, and the Local Plan consultation and its Examination in Public.

7.2 Future Stakeholder Engagement

7.2.1 In due course we will develop a Stakeholder Management Plan, which confirm all of the key stakeholders involved in developing and delivering the project. In the Stakeholder Engagement Plan we will provide evidence of engagement undertaken with the stakeholders and their support for the project.

7.2.2 Network Rail and DfT have been asked to review this Outline Business Case and their response will be utilised in the development of the next stage of the Colworth Station business case and GRIP Stage 3.

7.2.3 Further meetings are also expected with East Midlands Trains and any other train operating company affected by the proposals to provide Colworth Station.

7.2.4 There has been considerable involvement by BBC in the emerging plans for the Colworth Garden Village on a wide range of topics, including planning, transport and environmental matters. This has been managed through regular meetings, briefings, progress notes and emails.

7.3 Future Community Engagement

7.3.1 At this stage of project development, public engagement will be achieved primarily through the Local Plan consultation and the discussion with communities and individuals following the initial site development consultation. It is anticipated that as part of the promotion of the Colworth Garden Village site, materials and websites will be provided to inform the public on the proposal, including the station.

8 Independent Validation

8.1 Introduction

8.1.1 Systra were previously appointed by Bedford Borough Council to review the evidence provided by developers to support delivery of the Local Plan. Systra were tasked with providing the Council with an overview of the viability and deliverability of the Colworth Station scheme, specifically:

- Station capital and operational costs
- Service planning and timetables
- Passenger demand and revenue forecasts

8.1.2 Their comments on earlier drafts of this Outline Business Case have assisted the project team in developing these proposals.

9 Conclusions

9.1 Summary

9.1.1 This Outline Business Case has been prepared for the delivery of a new rail station at Colworth. This rail station would support the sustainable development of Colworth Garden Village promoted by Wrenbridge .

9.1.2 The Outline Business Case has been prepared to provide stakeholders with details of the proposals in accordance with Network Rail's GRIP Stage 1 and Stage 2. A summary of the station project is provided which sets out the key components of infrastructure and services required to deliver the scheme, including timetables and other operational matters.

9.1.3 The Strategic Case for the scheme demonstrates that the delivery of the station would help enable the sustainable delivery of 4,500 homes on an adjacent development site and also reduce the need for rail passengers to drive into Bedford to catch rail services.

9.1.4 An assessment of the Economic Case and Financial Case is provided, using local information and industry standard demand modelling to understand the potential passenger trips to and from the new station, from the first day of operation to full build out. This is complemented by a review of construction and operating costs, with expected levels of potential ticket and parking income also identified.

9.1.5 An initial assessment of procurement and construction issues is considered in the Commercial Case and Management Case together with a timescale for achieving the opening of the station in line with the delivery of new homes.

9.1.6 Details of stakeholder engagement are provided and the need for wider public engagement in due course is noted.

9.1.7 The Outline Business Case identifies:

- There is national and local policy support for a new station to be provided which enables sustainable housing development at Colworth Garden Village
- Initial assessments suggest that it is feasible in engineering terms to provide a new station between Forty Foot Bridge and Back Lane Bridge (this is subject to more detailed engineering and topographical assessments)
- A car park with a minimum of 250 spaces (and scope for expansion) would be provided to serve the station
- EMT services could call at the new station if they transfer from the Fast Lines to the Slow Lines – this would increase journey times for these services and lead to additional operating costs and journey time disbenefits to passengers travelling between Wellingborough and Bedford
- The station would provide a wide range of economic benefits including Land Value Uplift
- Capital funding is to be provided by the developer for construction of the station and the scheme can achieve viability in the mid-term, subject to EMT operating requirements
- The delivery of the station is expected to provide more economic benefits than costs under a range of scenarios

- Several commercial procurement and construction options are available, as well as several future management and operational arrangements e.g. as part of the Midland Main Line franchising and infrastructure regime

9.1.8 Network Rail, in discussions with our project team and in their original formal submission to the Local Plan 2035 consultation, has supported the principle of a station at this location:

> "*Network Rail supports in principle the construction of a new Parkway station at this location however the implementation of a new station will be dependent upon the completion of the electrification of the Midland Main Line and subject to agreement about the level of funding required by the developer to bring the new railway station forward.*"

9.1.9 In summary, the delivery of Colworth Station would help meet the objectives of three key groups:

- the residents of Colworth Garden Village and employees at the Colworth Science Park who would have good rail access, meeting the Borough's and developer's aspirations;
- the residents of surrounding villages and towns to the north of Bedford who would have greater access to rail services, taking pressure off the A6 corridor and meeting Bedford Borough Council's aspirations; and
- rail passengers will have a greater choice of stations and there would be operational, revenue and capital funding benefits for both Network Rail and EMT.

9.2 Next Steps

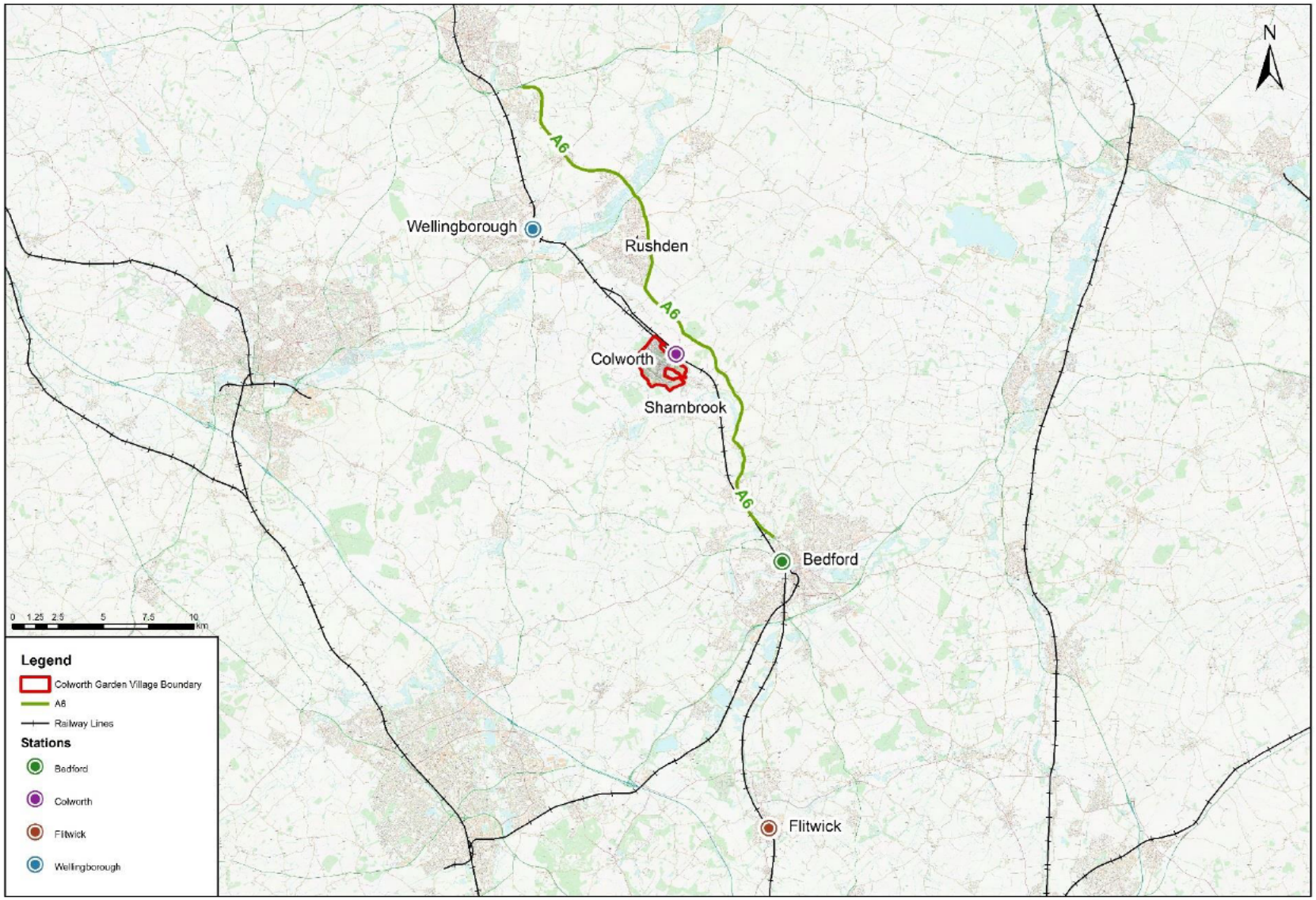
9.2.1 This Outline Business Case demonstrates the case for delivering Colworth Station. Further work is required including:

- Updates to the OBC to reflect the progress of the review of the Bedford Borough Local Plan 2030.
- Discussions with Network Rail and EMT to further develop station and operational proposals.
- Further work to refine the assessment of passenger demand, revenues and costs etc.
- Development of multi-modal transport model to assess potential impact of Colworth Garden Village with and without the delivery of Colworth Station.
- Further work to develop GRIP Stage 3 and subsequently GRIP Stage 4.

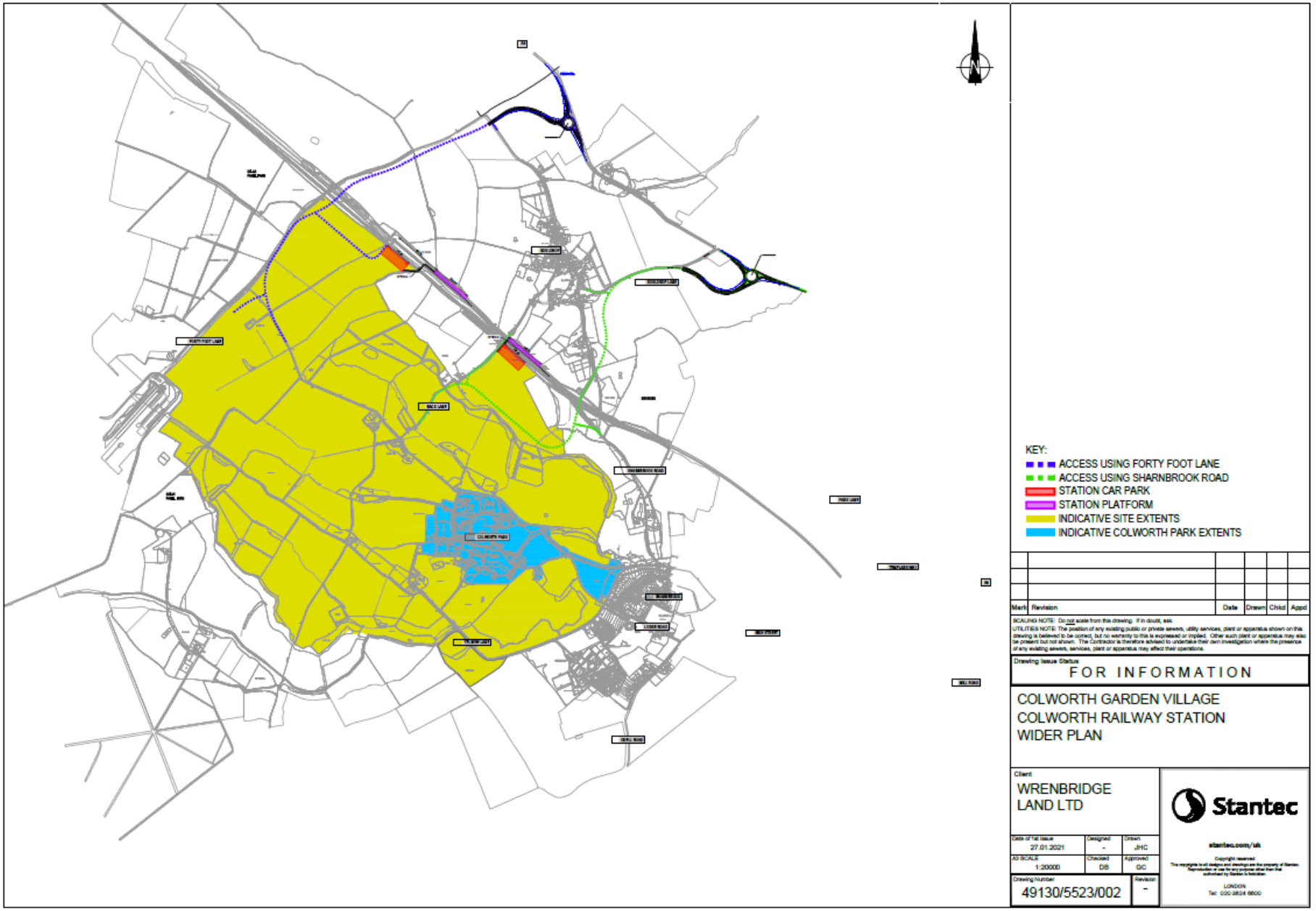
9.2.2 The aim would be to achieve project signoff of GRIP Stage 4 by early 2022.

Appendix A Site Plans

Stantec



Service Layer Credits: Contains Ordnance Survey data (c) Crown copyright and database right 2018.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ACCESS USING SHARNBROOK ROAD
STATION CAR PARK
STATION PLATFORM
INDICATIVE SITE EXTENTS
INDICATIVE COLWORTH PARK EXTENTS
Mark Revision Date Drawn Chkd Appd
SCALING NOTE: Do not scale from this drawing. If in doubt, ask.
UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.
Drawing Issue Status
FOR INFORMATION
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COLWORTH RAILWAY STATION
WIDER PLAN
Client
WRENBRIDGE LAND LTD
Stantec
stantec.com/uk
Date of 1st Issue 27.01.2021
Designed -
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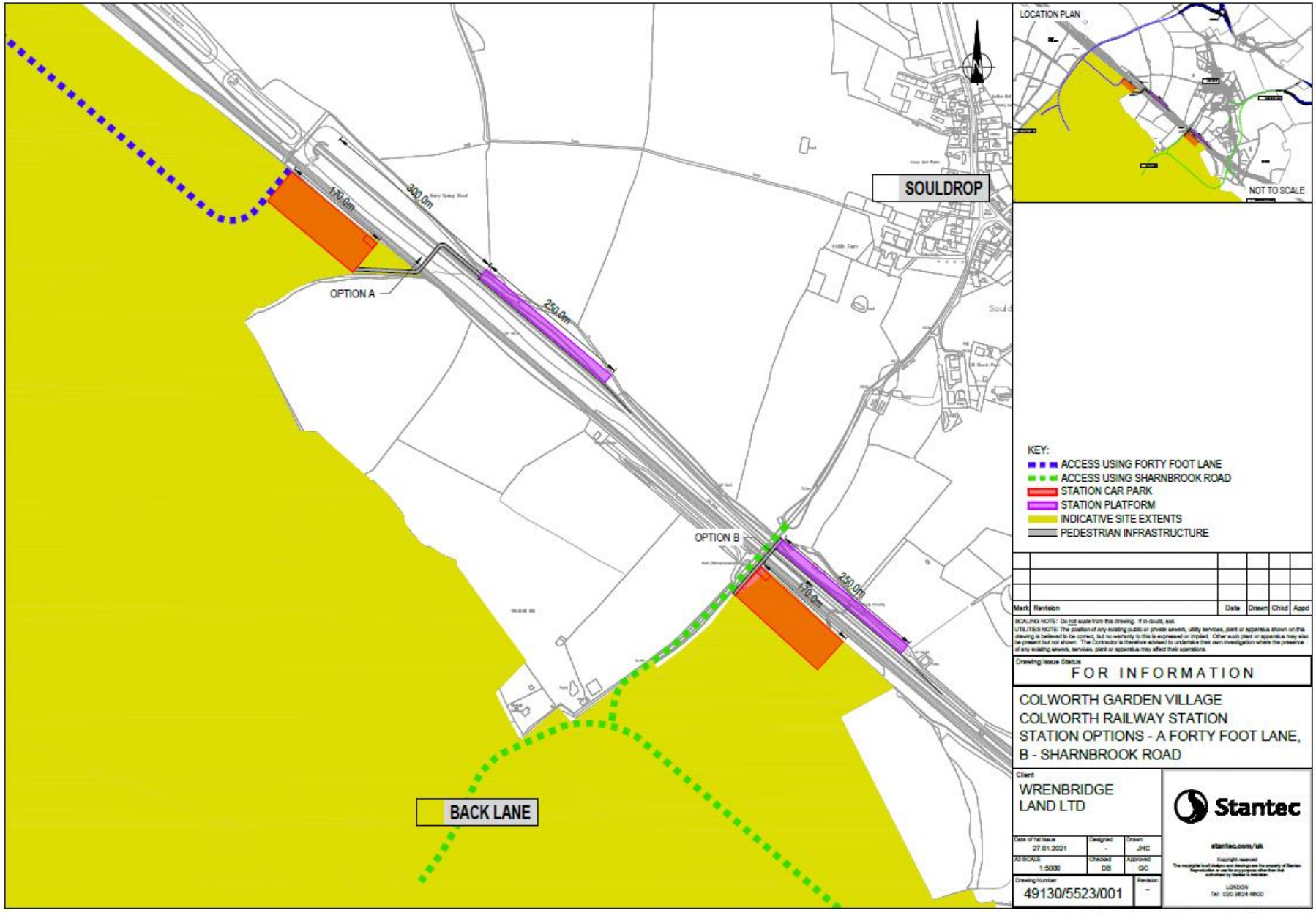
At SCALE 1:20000
Checked DB
Approved GC
Drawing Number 49130/5523/002
Revision -
LONDON
Tel: 020 3824 6600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ACCESS USING SHARNBROOK ROAD
STATION CAR PARK
STATION PLATFORM
INDICATIVE SITE EXTENTS
PEDESTRIAN INFRASTRUCTURE
Mark
Revision
Date
Drawn
Chkd
Appd
Drawing Issue Status
FOR INFORMATION
COLWORTH GARDEN VILLAGE
COLWORTH RAILWAY STATION
STATION OPTIONS - A FORTY FOOT LANE, B - SHARNBROOK ROAD
Client
WRENBRIDGE LAND LTD
Stantec
stantec.com/uk
Date of 1st Issue
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Drawn
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AO SCALE
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Checked
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Approved
GC
Drawing Number
49130/5523/001
Revision
-
LONDON

Appendix B Timetable Review

ED JEFFERY LTD
Rail Network Capacity Consultancy

Colworth Station

High Level Timetable Study

DOCUMENT CONTROL	
Project Title	Colworth Station
Author(s)	Ed Jeffery
Version Number	1.0
Status	FINAL
Date	27/09/2018
Client	Peter Brett

Version Number	Date	Issued By	Reason
0.1	20/09/2018	Ed Jeffery	First draft
1.0	27/09/2018	Ed Jeffery	Final

Registered in England No. 09638982

ED JEFFERY LTD
Rail Network Capacity Consultancy

Contents

1 Executive Summary

Colworth station is a proposed new station north of Sharnbrook Junction on the Slow Lines of the Midland Main Line (MML), serving a nearby residential and employment development. The purpose of this analysis is to investigate the feasibility and impact of serving the station by extending Govia Thameslink Railway (GTR) services from Bedford or calling East Midlands Trains (EMT) Corby services.

Extending GTR services from Bedford to Colworth can be achieved without significant issue and could potentially provide a performance improvement through simplifying platform working and reducing platform occupation at Bedford (especially in the peak hours). Changes to the assumed running times and the May 2018 timetable mean that an additional rolling stock unit and driver is required compared to previous analysis.

To support the extension of GTR services, a 2-platform station and turnback siding is recommended at Colworth. The turnback siding is necessary due to the longer turnrounds at the station (to avoid blocking through lines) and would also future-proof the station against subsequent timetable changes. Either of the two proposed station locations is feasible with minimal impact on the timetable.

Calling the EMT services is feasible, but results in extended journey times to Corby as the trains must operate on the Slow Lines from Bedford North or Sharnbrook Junctions to serve the new Colworth station. This is also likely to impact rolling stock efficiency and turnrounds at Corby in the future. However, this option should be re-evaluated once the plans for the new East Midlands franchisee are understood.

Based on current information, the option to extend GTR services is likely to be preferred. This option is also the least likely to be impacted by future timetable changes, as a 4 trains per hour Thameslink service to Bedford is expected to be operated for the foreseeable future. The turnback siding at Colworth would provide the flexibility to accommodate changes to timings of these trains.

It is also recommended that this analysis is updated when the issues with the May 2018 Thameslink timetable are resolved, and when the future franchisee's plans are understood. Performance modelling may also be required in the future to quantify the performance benefit of extending GTR services suggested in this analysis.

2 Introduction

2.1 Background

Colworth is a proposed new station on the Midland Main Line north of Sharnbrook Junction (between Bedford and Wellingborough), serving a new residential and employment development. The scheme has currently been developed to Outline Business Case (OBC) level. Options exist for a one- or two-platform station on the Slow Lines with and without a reversing siding north of the station location.

Figure 1: Location of Colworth station (highlighted)

Some timetable feasibility work has already been undertaken, but more analysis is required to inform the current development stage. The issues surrounding the May 2018 timetable on the Midland Main Line have also added uncertainty which requires further study.

2.2 Aim of the analysis

The output of this work is a high-level timetable feasibility study to determine what the impact to the existing timetable of the new station would be. Two potential service options exist:

- Extend Govia Thameslink Railway (GTR) services which currently terminate at Bedford to Colworth
- Stop East Midlands Trains (EMT) or successor franchise services (to/from Corby) at Colworth

The feasibility of these options will then drive which station option is preferred operationally.

2.3 Key Assumptions

2.3.1 Colworth Station

The station site is either located at 58 miles 440 yards or 58 miles 1320 yards on the Slow Lines. This is approximately 9 miles north of Bedford. For the purposes of this work, the northern location is assumed (as this is the worst-case scenario for the extension of the GTR services as it will have the longest running time; the difference will be minimal for calling EMT). Should the location have a fundamental impact on outputs, this will be discussed later in this report.

Either a one or two-platform station is assumed. If a side-turnback is provided, it is assumed it will be placed on the up side close to the station location.

The scheme to fully four-track between Bedford and Kettering has been assumed to be completed before the station opens. Dependencies (for the Corby service option) on Kettering – Corby doubling will be discussed in the relevant section.

2.3.2 Source Timetable

The source timetable used for this study is the May 2018 timetable. This represents the best-known current position.

For GTR, the May 2018 timetable does not represent the final position in terms of services due to the well-publicised issues implementing the enhanced timetable. However, the off-peak service quantum of 4 trains per hour (tph) almost evenly spaced matches the final output. Therefore, the specific timings may change but the overall findings from this report are still likely to apply.

For EMT, the picture is less clear due to the ongoing franchise competition. It is likely that the winning franchisee will increase the long-distance high speed (LDHS) service to at least 6 tph. This is likely to be by providing a second service every hour to Corby. The exact timetable cannot be known, however the approach in this work is to assume that this service operates 30 minutes apart from the current service to Corby. Therefore, the exact timings may change but as the most likely output is a half-hourly service, the findings of this analysis will still apply.

A three-hour off-peak period has been analysed in this work. The impact on peak services has not been analysed in detail, but the findings for the off-peak will be extrapolated to comment on the likely impact at a high level.

2.3.3 Timetable assumptions

This analysis assumes the latest version (4.0) of the 2019 Train Planning Rules (TPR). Timetable analysis has been undertaken in ATTUne, which undertakes a level of automatic compliance checking against the TPR.

A RailSys model has been used at a high-level to estimate the time penalty for calling at Colworth station. RailSys is an industry-standard signal-berth level simulation tool. Indicative Running Times (IRTs) have been calculated for both stopping pattern options.

Location	Route	Type	Class 700 IRT (s)	Suggested Rounded Value (mins)
Bedford – Bedford North Junction	Slow Line	Start-pass	50	1.0
Bedford North Junction – Sharnbrook Jn	Slow Line	Pass-pass	455	7.5
Sharnbrook Junction - Colworth	Slow Line	Pass-stop	172	3.0
Colworth – Sharnbrook Junction	Slow Line	Start-pass	145	2.5
Sharnbrook Jn – Bedford North Junction	Slow Line	Pass-pass	457	7.5
Bedford North Junction - Bedford	Slow Line	Pass-stop	69	1.5

Table 1: Estimated time penalty for stopping at Colworth station for GTR services

Location	Route	Type	Class 700 IRT (s)	Suggested Rounded Value (mins)
Bedford – Bedford North Junction	Fast Line	Start-pass	55	1.0
Bedford North Junction – Sharnbrook Jn	Slow Line	Pass-pass	459	7.5
Sharnbrook Junction - Colworth	Slow Line	Pass-stop	167	3.0
Colworth - Wellingborough	Slow Line	Start-stop	450	7.5
Wellingborough - Colworth	Slow Line	Start-stop	446	7.5
Colworth – Sharnbrook Junction	Slow Line	Start-pass	140	2.5
Sharnbrook Jn – Bedford North Junction	Slow Line	Pass-pass	490	8.0
Bedford North Junction - Bedford	Down Slow	Pass-stop	78	1.5

Table 2: Estimated time penalty for stopping at Colworth station for EMT services

Where required, these values include signalling approach control allowances (e.g. approaching Bedford North Junction for EMT services, as these are assumed to pick up their current path using Platform 3 at Bedford).

These values will need to be refined at later GRIP stages but provides a realistic assumption for this work.

3 Findings

3.1 GTR services

In the May 2018 timetable, in the off-peak four trains per hour terminate at Bedford, arriving and departing at 14/16-minute intervals (i.e. an approximately even 15-minute service interval). Each train has a 14-minute turnround at Bedford (the time between the first train arriving and the same rolling stock unit departing on its next service).

The critical time is how long it takes the train to run from Bedford to Colworth, turnround and return to Bedford to form the next southbound departure. This will be one of the following scenarios:

- 14 minutes or less: no change, forms same service
- 15 – 29 minutes: forms southbound departure 15 minutes later, requires 1 extra rolling stock unit and driver
- 30 – 44 minutes: forms southbound departure 30 minutes later, requires 2 extra rolling stock units and drivers
- 45 – 59 minutes: forms southbound departure 45 minutes later, requires 3 extra rolling stock units and drivers

This time will be formed of the individual factors shown in Table 3.

Factor	Value	Comment
Dwell time at Bedford northbound	1 min	From TPR; included as dwell time is required at Bedford
Run time Bedford - Colworth	11.5 mins	As shown in Table 1
Minimum turnround time	10 mins	From TPR
Run time Colworth - Bedford	11.5 mins	As shown in Table 1
Dwell time at Bedford southbound	1 min	From TPR; included as dwell time is required at Bedford
TOTAL	35 mins	

Table 3: Factors making up additional running time Bedford - Colworth

Therefore, this means that the third scenario described above applies; the train forms the next southbound departure 30 minutes later than in the May 2018 timetable.

As the time taken to run to Colworth and return is 35 minutes and the maximum time allowable to meet the correct departure from Bedford is 44 minutes, this means there is 9 minutes 'spare' time which needs to be accounted for. This time could either be allocated at Bedford or Colworth through extending the dwell or turnround time respectively.

Extending the time at Bedford in one or both directions is unlikely to be preferred as it would:

- Remove some of the performance benefit from reduction platform use at Bedford (section 3.4)
- Extend journey times between Colworth and places south of Bedford

Therefore, extending the turnround at Colworth (to 19 minutes) is likely to be the better option. However, this will mean that the platform line at Colworth is blocked for approximately 38 minutes per hour (around two-thirds of the total time) throughout the day. The main impact of this will be for freight trains. As a minimum, crossovers would need to be provided to route freight trains around the passenger train standing in the platform.

This is likely to be feasible in the short-term (when typically only one or two freight paths operate in each direction per hour) but would not be sustainable in the longer term if the anticipated freight growth materialises (particularly after the opening of East West Rail). Considering the current project to increase from three tracks to four tracks in the area, there is likely to be a requirement to avoid blocking the running line for a significant period of time. This would drive the provision of a turnback siding at Colworth.

It assumed that to use the turnback siding, the following time needs to be assumed:

- 1 minute dwell time at Colworth for terminating train
- 2 minutes run time Colworth – Siding
- Turnround time already accounted for in calculation in Table 3
- 1 minute dwell time at Colworth for outbound train

This would reduce the turnround in the siding to 15 minutes, which is more than the minimum required and would address any concerns about freight capacity. Although a centre turnback facility will always provide a bigger performance benefit, the level of traffic (even including freight growth) is such that a side turnback facility is likely to be feasible at Colworth.

In terms of the station position, moving the station to the location closest to Bedford would not reduce the running time by the 6 minutes (3 minutes in each direction) that would be required to meet an earlier departure time from Bedford. Therefore, station location does not have any impact on these findings.

3.1.1 Comparison to previous analysis

The results describe in section 3.1 differ slightly from the previous analysis. This is due to two factors:

- The previous analysis assumed a running time Bedford – Colworth of 10 minutes each way
- The turnround times at Bedford have generally been reduced in May 2018 compared to previous timetables

The latest designs for the Bedford – Kettering four-tracking scheme have a linespeed of 50mph in both directions between Bedford and Sharnbrook Junction, 50mph from Sharnbrook Jn to just before the station location (Down direction) and 75mph from Colworth to Sharnbrook Jn in the Up direction (which is not fully utilised due to acceleration from the station stop).

As the distance from Bedford to Colworth is approximately 9 miles at a 50mph linespeed, a high-level speed/distance/time calculation shows the running time should be around 11 minutes. When acceleration and braking is factored in, the 11.5 minutes time calculated using RailSys is as expected.

The turnround times at Bedford are a sensitivity that would influence the infrastructure requirements rather than overall feasibility (as a 4 tph even-spaced timetable is likely to still be operating). An increase in turnround time from 14 to 18 minutes at Bedford would allow a train to connect with the preceding service (and would require 1 fewer rolling stock unit and train crew) as well as being unlikely to require the turnback siding. However, providing the turnback siding would ensure that all possible changes to turnround time at Bedford can be accommodated, and these changes would only impact on the resource requirements rather than the overall feasibility of extending trains to Colworth.

3.2 EMT services

As described in section 2.3, a second Corby train per hour is assumed to operate (departing St. Pancras at xx.17 and arriving xx.20. The path of both the existing train and the new train is assumed to be unchanged between St. Pancras and Bedford.

Considering the Down trains, they will need to cross to the Slow Lines at either Bedford North Junction or Sharnbrook Junction to call at Colworth. Based on the current timetable, this would need to take place at Bedford North Junction for the xx.47 from St. Pancras (otherwise it would clash with a Sheffield – London train at Sharnbrook Junction) and at Sharnbrook Junction for the new xx.17 (to avoid clashing with the other Sheffield London train at Bedford North Junction). Although these conflicts are likely to change with a future Midland Main Line timetable, it demonstrates the pathing difficulty that is likely to be encountered on these services.

Once the train has called at Colworth, it would logically be required to stay on the Slow Lines. Otherwise, it would need to cross back to the Fast Lines at Harrowden Junction (north of

Wellingborough) and back again at Kettering South Junction. This train would then conflict with Up Fast traffic three times, which is unlikely to be feasible in a future timetable and would be unacceptable due to the potential performance impact.

The Up trains have fewer conflicts but would also be unlikely to cross at Kettering South Junction, Harrowden Junction and Bedford South/Sharnbrook Junctions. Due to the journey time extension of calling at Colworth and extended Slow Line running, the current Fast Line paths in the Kettering around would not be viable. In practice, this means that the likely option is for the Up trains to also run on the Slow Lines.

Both Up and Down paths can operate with the current level of freight service (assuming the paths change after four-tracking to eliminate the need to wait at the ends of the three-track sections) but may begin to interact more significantly when freight services once service levels increase. This is especially true north of Wellingborough, where the linespeed increases to 90mph in sections, which is beyond the capability of freight trains. In the worst case, this would result in a further journey time extension.

The main drawback to running on the Slow Lines is the extended journey time passenger trains would incur. The linespeeds are predominantly 50 or 75mph, with sections of 90mph near Kettering, compared to up to 125mph on the Fast Lines. Calculations using RailSys on the post-four-track infrastructure suggest a running time 8 minutes slower than today's train in the Down direction (including the impact of calling at Colworth and running on the Slow Line) and 7 minutes slower in the Up direction.

Table 4 shows the impact of this journey time on the arrival and departure times at Corby, keeping times fixed at Bedford.

Service	Existing (doubled to 2tph) arrival or departure time at Corby	New arrival or departure time at Corby with Colworth call
xx.47 St. Pancras - Corby	xx.54	xx.02
xx.17 St. Pancras - Corby	xx.24	xx.32
xx.41 Corby – St. Pancras	xx.41	xx.34
xx.11 Corby – St. Pancras	xx.11	xx.04

Table 4: Times for existing/doubled Corby services and for services calling at Colworth and running on the Slow Lines. Times assumed fixed south of Bedford

Without a Colworth call and running on the Fast Lines as today, a 2 tph service would work well at Corby with a 17-minute turnround. Adding the penalty for Colworth and Slow Line running, this reduces to 2 minutes. This is not feasible, and a longer, less efficient, turnround time would be

required. Additionally, journey times would need to be extended further as Corby station will only have a single platform face, even after the Kettering – Corby doubling scheme. Kettering – Corby doubling will also therefore definitely be required.

These timings may change in a future Midland Main Line timetable, but it does demonstrate that a significant change to today's timetable would be required to enable services calling at Colworth to call and operate efficiently (with optimal turnround times). Even if this were to be achievable, the journey time penalty for passengers to Corby would need to be assessed.

3.3 Peak Hours

This analysis has not specifically considered the peak timetable, but a high-level assessment of these findings on the peak trains has been undertaken.

For EMT, the findings are unlikely to change from the off-peak. The timings at Corby are reasonably consistent throughout the day, although non-standard timings for other passenger trains are likely to mean additional time penalties to achieve the correct slots from crossing to and from the Slow Lines.

For GTR, the number of services increases significantly in the peak, although the May 2018 timetable is not fully representative of the increased service levels delivered in the final Thameslink timetable. This will provide more flexibility in which trains to extend to Colworth and will mean that the running times can be more closely matched to the available turnround times. This means that it may be possible to avoid the use of the turnback siding and increase efficiency in the number of units and drivers required. Additionally, there is likely to be an opportunity the number of services extended to Colworth if required.

3.4 Performance Impact

The performance impact of extending the EMT services is likely to be minimal if they operate on the Slow Lines from Bedford North or Sharnbrook Junctions. There may actually be a small benefit from not making Wellingborough calls on the Fast Lines.

For GTR services, provision of a turnback siding at Colworth is likely to be required based on the May 2018 timetable. However, the net performance impact is likely to be positive. This is due to the impact on platforming at Bedford. May 2018 arrival and departure times for Thameslink at Bedford are shown in Table 5.

Note	Arrives	Departs	Note
xx.05 extend Colworth	xx.05	xx.19	xx.19 extend Colworth
	xx.21	xx.35	
xx.35 extend Colworth	xx.35	xx.49	xx.49 extend Colworth
	xx.51	xx.05	

Table 5: May 2018 arrival/departure times at Bedford, showing which trains extend to Colworth

Performance at Bedford is likely to improve due to the fact that platforming can be greatly simplified:

- Fewer services turnround at Bedford off-peak, freeing up capacity for freight trains passing through the station and for Up EMT trains which need to use Platform 3 if they call at station
- Platforming is severely constrained in the peaks, which is likely to be partially mitigated by extending some trains to Colworth
- In May 2018, the timings of trains means that there are a number of minimum margin moves and parallel arrivals/departures at Bedford and Bedford South Junction. The extension of trains to Colworth will reduce this (e.g. the remaining pairs of trains can turnround in Platform 2 and leave Platforms 1 and 3 free for through services)

The fact that the changes in the May 2018 timetable requires an arrival to connect to the departure 30 rather than 15 minutes later simplifies platforming. For example, Table 5 shows that the existing xx.21 arrival can form the existing xx.35 departure. In the previous Colworth analysis, the xx.35 departure would come from Colworth, meaning the xx.21 arrival would form the xx.49 departure. This means the platform would be blocked for nearly half an hour, and the xx.49 departure and xx.51 arrival would need careful platforming to avoid conflicts (as today).

4 Conclusions

The impact of stopping either East Midlands Trains or Govia Thameslink Railway services at the proposed Colworth station (north of Sharnbrook Junction on the Midland Main Line) has been analysed.

This analysis is based on May 2018 as it represents the 'best known' timetable position, acknowledging that change is likely once the Thameslink timetable issues are resolved and the future East Midlands franchisee's plans are understood. However, the assumptions in this work have been selected to allow the impact of these changes on the findings are minimal.

GTR Services

It is possible to extend GTR services to Colworth. Changes to the assumed running time between Bedford and Colworth and to the May 2018 timetable compared to the previous analysis means that each arrival must form the train approximately 45 minutes later (rather than 30 minutes previously assumed). However, this simplifies the platform working at Bedford and means that extension to Colworth is likely to provide a performance benefit due to simplifying the station operation.

Although peak services have not been analysed in detail, there is no identified issue in extending services in the peak as well, and this is likely to have additional benefits in freeing-up platform capacity at Bedford which is already constrained in the peaks.

Extending these services would require a two-platform station at Colworth with a turnback siding. The turnback siding is required to reduce the occupancy of the through lines due to longer than minimum turnround times. This is dependent on the timetable but providing the siding would provide flexibility to operate the service irrespective of future timetable changes. Either proposed station location would also be feasible.

EMT Services

It is feasible to call EMT services (which would require a 2-platform station), however these trains would need to operate on the Slow Lines between Bedford North/Sharnbrook Junction and Kettering. This is to minimise the number of conflicting moves (particularly with trains running on the Up Fast line) which are unlikely to be feasible in a future Midland Main Line timetable and would likely pose an unacceptable performance risk. This results in a journey time extension to Corby of 8 minutes (Down direction) and 7 minutes (Up direction).

Furthermore, if the future timetable is similar to today's timetable (but with a second Corby path included), this journey time extension will make the platform working at Corby inefficient and require

further journey time extension (pathing time) due to the single platform at Corby. This also requires Kettering – Corby doubling to be completed.

4.1 Recommendations and next steps

It is recommended that:

- Extension of GTR services is the preferred option due to the positive performance impact and the journey time extension and operational issues if the Corby services call
- The station design to support this is a 2-platform station with turnback siding. This will also provide the maximum 'future-proofing' against timetable change
- Either station location is developed, as there is minimal impact based on the timetable findings

The recommended next steps are:

- More detailed timetabling work at a later stage, once more is known about the future Thameslink timetable and the issue associated with May 2018 have been resolved
- Performance modelling is recommended at a later stage to confirm and quantify any performance benefits suggested here through more optimal platform working at Bedford

5 Appendix A: Working Timetables

Sample three-hour working timetables (WTT) are provided for:

- Base (May 2018)
- Colworth served by GTR
- Colworth served by EMT

Down Direction May 2018 Base Timetable

Train ID		9R18	1F23	1D22	9T14	1M26	9R20	1F25	1D29	9T16	9R22	1F28	1D27	9T18	1M31	9R24	1F30	1D34	9T20	9R26	1F33	1D32	9T22	1M36	9R28	1F35	1D39	9T24
Dep		08:34	10:31	10:34	09:02	10:47	09:33	11:02	11:05	09:25	10:03	11:31	11:34	09:58	11:47	10:33	12:02	12:05	10:26	11:03	12:31	12:34	10:58	12:47	11:33	13:02	13:05	11:26
From		Horsham	STPX	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton	Gatwick	STPX	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton	Gatwick	STPX	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton
To		Bedford	Sheffield	Nottm	Bedford	Corby	Bedford	Sheffield	Nottm	Bedford	Bedford	Sheffield	Nottm	Bedford	Corby	Bedford	Sheffield	Nottm	Bedford	Bedford	Sheffield	Nottm	Bedford	Corby	Bedford	Sheffield	Nottm	Bedford
T/L		700	222	HST	700	222	700	222	222	700	700	222	HST	700	222	700	222	HST	700	700	700	HST	700	222	700	222	222	700
Luton	a	10:40			10:56	11:08 H	11:10 H			11:26	11:39 H			11:56	12:08 H	12:09 H			12:26	12:39 H			12:56	13:08 H	13:09 H			13:26
	pl	3	5	5	3	5	3	5	5	3	3	5	5	3	5	3	5	5	3	3	5	5	3	5	3	5	5	3
	d	10:41 H	*10/52 H*	*10/55 H*	10:57 H	11:10	11:12	*11/22 H*	*11/28 H*	11:27 H	11:41	*11/52 H*	*11/55 H*	11:57 H	12:10	12:11	*12/22 H*	*12/28 H*	12:27 H	12:41	*12/52 H*	*12/55 H*	12:57 H	13:10	13:11	*13/22 H*	*13/28 H*	13:27 H
	line	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	SL
Leagrave	d	10:45			11:01		11a16			11:31	11a45			12:01		12a15			12:31	12a45			13:01		13a15			13:31
Leagrave Jn	p	*10/45 H*	*10/54*	*10/57*	*11/01 H*	*11/12 H*	*11/16 H*	*11/24*	*11/30*	*11/31 H*	*11/45 H*	*11/54*	*11/57*	*12/01 H*	*12/12 H*	*12/15 H*	*12/24*	*12/30*	*12/31 H*	*12/45 H*	*12/54*	*12/57*	*13/01 H*	*13/12 H*	*13/15 H*	*13/24*	*13/30*	*13/31 H*
	line	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	FL
Harlington	d	10:49 H			11:05 H		11:20 H			11:35 H	11:49 H			12:05 H		12:19 H			12:35 H	12:49 H			13:05 H		13:19 H			13:35 H
Flitwick	d	10:53 H	*10/57 H*	*11/00 H*	11:09 H	*11/16*	11:24 H	*11/27 H*	*11/33 H*	11:39 H	11:53 H	*11/57 H*	*12/00 H*	12:09 H	*12/16*	12:23 H	*12/27 H*	*12/33 H*	12:39 H	12:53 H	*12/57 H*	*13/00 H*	13:09 H	*13/16*	13:23 H	*13/27 H*	*13/33 H*	13:39 H
	line	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	SL
	allow.		[1]	[1]		[1]		[1]	[1]			[1]	[1]		[1]		[1]	[1]			[1]	[1]		[1]		[1]	[1]	<H>
Bedford South	p	*11/01 H*	*11/02 H*	*11/05 H*	*11/17*	*11/21*	*11/32*	*11/32 H*	*11/38 H*	*11/47*	*12/01 H*	*12/02 H*	*12/05 H*	*12/17*	*12/21*	*12/31 H*	*12/32 H*	*12/38 H*	*12/47*	*13/01 H*	*13/02 H*	*13/05 H*	*13/17*	*13/21*	*13/31 H*	*13/32 H*	*13/38 H*	*13/47 H*
	line	USL	FL	FL	DSL	FL	USL	FL	FL	DSL	USL	FL	FL	SL	FL	USL	FL	FL	DSL	USL	FL	FL	DSL	FL	USL	FL	FL	DSL
	allow.	[1]		(H)	[1]<H>		[1]<H>			[1]<H>	[1]			[1]<H>		[1]			[1]<H>	[1]			[1]<H>		[1]			[1]
Bedford	a	11:05			11:21	11:22 H	11:36		11:40	11:51	12:05			12:21	12:22 H	12:35		12:40	12:51	13:05			13:21	13:22 H	13:35		13:40	13:51
	pl	2	4	4	3	4	1	4	4	3	1	4	4	3	4		4	4	3	1	4	4	3	4	1	4	4	3
	d		*11/03 H*	*11/07*		11:24		*11/33 H*	11:41 H			*12/03 H*	*12/06 H*		12:24		*12/33 H*	12:41 H			*13/03 H*	*13/06 H*		13:24		*13/33 H*	13:41 H	
Bedford North Jn	p		*11/04*	*11/08*		*11/26*		*11/34*	*11/43 H*			*12/04*	*12/07 H*		*12/26*		*12/34*	*12/43 H*			*13/04*	*13/07 H*		*13/26*		*13/34*	*13/43 H*	
	line		FL	FL		FL		FL	FL			FL	FL		FL		FL	FL			FL	FL		FL		FL	FL	
Sharnbrook Jn	p		*11/07 H*	*11/11*		*11/29 H*		*11/37 H*	*11/47*			*12/07 H*	*12/10 H*		*12/29 H*		*12/37 H*	*12/47*			*13/07 H*	*13/10 H*		*13/29 H*		*13/37 H*	*13/47*	
	line		FL	FL		FL		FL	FL			FL	FL		FL		FL	FL			FL	FL		FL		FL	FL	
Wellingborough	a					11:34 H			11:52						12:34 H			12:52						13:34 H			13:52	
	d		*11/12*	*11/16*		11:36		*11/42*	11:53 H			*12/12*	*12/15 H*		12:36		*12/42*	12:53 H			*13/12*	*13/15 H*		13:36		*13/42*	13:53 H	
	line		FL	FL		FL		FL	FL			FL	FL		FL		FL	FL			FL	FL		FL		FL	FL	
	allow.					(H)																						
Kettering Sth Jn	d					*11/41 H*									*12/41*									*13/41*				
	line					SL									SL									SL				
Kettering	a					11:44			11:59 H						12:43 H			12:59 H						13:43 H			13:59 H	
	d		*11/16*	*11/20*		11:45 H		*11/46*	12:01			*12/16*	*12/19 H*		12:45		*12/46*	13:01			*13/16*	*13/19 H*		13:45		*13/46*	14:01	

Up Direction May 2018 Base Timetable

Train ID		9R21	1P30	5Y19	1B31	1C32	9R23	1B33	9T31	1C34	9R25	1P35	9T33	1B36	9T33	1C37	9R27	1B38	9T35	1C39	9R29	1P40	9T37	1B41	9T37	1C42	9R31	1B43	9T39	1C44
Dep		11:05	10:41	11:16	10:12	10:00	11:35	10:45	11:49	10:29	12:05	11:41	12:19	11:12	12:19	11:00	12:35	11:45	12:49	11:29	13:05	12:41	13:19	12:12	13:19	12:00	13:35	12:45	13:49	12:29
From		Bedford	Corby	Bedford	Nottm	Sheffield	Bedford	Nottm	Bedford	Sheffield	Bedford	Corby	Bedford	Nottm	Bedford	Sheffield	Bedford	Nottm	Bedford	Sheffield	Bedford	Corby	Bedford	Nottm	Bedford	Sheffield	Bedford	Nottm	Bedford	Sheffield
To		Gatwick	STPX	Jowett	STPX	STPX	Gatwick	STPX	Brighton	STPX	Gatwick	STPX	Brighton	STPX	Brighton	STPX	Gatwick	STPX	Brighton	STPX	Gatwick	STPX	Brighton	STPX	Brighton	STPX	Gatwick	STPX	Brighton	STPX
T/L		700	222	700	222	222	700	HST	700	222	700	222	700	222	700	222	700	HST	700	222	700	222	700	222	700	222	700	HST	700	222
Kettering	a		**10:49 H**		**11:00 H**							**11:49 H**		**12:00 H**								**12:49 H**		**13:00 H**						
	d		**10:51**		**11:02**	*11/21 H*		*11/36 H*		*11/43 H*		**11:51 H**		**12:02**		*12/21*		*12/36 H*		*12/44*		**12:51 H**		**13:02**		*13/22 H*		*13/36 H*		*13/44 H*
	line		SL		FL	FL		FL		FL		SL		FL		FL		FL		FL		SL		FL		FL		FL		FL
Kettering Sth Jn	p		*10/53 H*									*11/54*										*12/54*								
	line		FL									FL										FL								
Wellingborough	a		**10:58**		**11:08**							**11:58 H**		**12:08**								**12:58 H**		**13:08**						
	d		**10:59 H**		**11:09 H**	*11/25 H*		*11/40 H*		*11/47 H*		**12:00**		**12:09 H**		*12/25*		*12/40 H*		*12/48*		**13:00**		**13:09 H**		*13/26 H*		*13/40 H*		*13/48 H*
	line		FL		FL	FL		FL		FL		FL		FL		FL		FL		FL		FL		FL		FL		FL		FL
	allow		[H]							(H)																				
Sharnbrook Jn	p		*11/06*		*11/15 H*	*11/31*		*11/46*		*11/53 H*		*12/06*		*12/16*		*12/30 H*		*12/46*		*12/53 H*		*13/06*		*13/15 H*		*13/32*		*13/46*		*13/54*
	line		FL		FL	FL		FL		FL		FL		FL		FL		FL		FL		FL		FL		FL		FL		FL
	allow		[H]		[1]	[1]		[1]		[1]		[1]		[1]		[1]		[1]		[1]		[1]		[1](H)		[1]		[1]		[1]
Bedford North Jn	p		*11/10*		*11/20*	*11/35*		*11/50*		*11/57 H*		*12/10 H*		*12/20*		*12/34 H*		*12/50*		*12/57 H*		*13/10 H*		*13/20*		*13/36*		*13/50*		*13/58*
	line		DSL		DSL	FL		FL		FL		DSL		DSL		FL		FL		FL		DSL		DSL		FL		FL		FL
Bedford	a		**11:11 H**		**11:21 H**							**12:12**		**12:21 H**								**13:12**		**13:21 H**						
	pl	3	3	2	3	FL	3	FL	1	FL	3	3	1	3		FL	3	FL	1	FL	3	3	1	2		FL	3	FL	1	FL
	d	**11:05**	**11:13**	**11:16**	**11:23**	*11/35 H*	**11:35**	*11/50 H*	**11:49**	*11/58*	**12:05**	**12:13 H**	**12:19**	**12:23**		*12/35*	**12:35**	*12/50 H*	**12:49**	*12/58*	**13:05**	**13:13 H**	**13:19**	**13:23**		*13/36 H*	**13:35**	*13/50 H*	**13:49**	*13/58 H*
	line	DSL	DSL		DSL	FL	DSL	FL	USL	FL	DSL	FL	USL	FL		FL	DSL	FL	USL	FL	DSL	DSL	USL	DSL		FL	DSL	FL	USL	FL
St Johns GL	a			**11:19**																										
Bedford South	p	*11/07 H*	*11/15*		*11/25*	*11/36*	*11/37 H*	*11/51*	*11/51 H*	*11/58 H*	*12/07 H*	*12/15 H*	*12/21 H*	*12/25*		*12/35 H*	*12/37 H*	*12/51*	*12/51 H*	*12/58 H*	*13/07 H*	*13/15 H*	*13/21 H*	*13/25*		*13/37*	*13/37 H*	*13/51*	*13/51 H*	*13/59*
	line	SL	FL		FL	FL	SL	FL	SL	FL	SL	FL	SL	FL		FL	SL	FL	SL	FL	SL	FL	SL	FL		FL	SL	FL	SL	FL
Flitwick	d	**11:16**	*11/20 H*		*11/30 H*	*11/41*	**11:46**	*11/56*	**12:00**	*12/03 H*	**12:16**	*12/21*	**12:30**	*12/30 H*		*12/40 H*	**12:46**	*12/56*	**13:00**	*13/03 H*	**13:16**	*13/21*	**13:29**	*13/30 H*		*13/42*	**13:46**	*13/56*	**14:00**	*14/04*
	line	SL	FL		FL	FL	SL	FL	SL	FL	SL	FL	SL	FL		FL	SL	FL	SL	FL	SL	FL	SL	FL			SL		SL	
Harlington	d	**11:20**					**11:50**		**12:04**		**12:20**		**12:34**				**12:50**		**13:04**		**13:20**		**13:33**				**13:50**		**14:04**	
Sundon South Jn	p	*11/21 H*					*11/51 H*		*12/05 H*		*12/21 H*		*12/35 H*		<----		*12/51 H*		*13/05 H*		*13/21H*		*13/34 H*		<----		*13/51 H*		*14/05 H*	
Leagrave Jn	p	*11/23 H*	*11/24*		*11/34*	*11/44 H*	*11/53 H*	*12/00*	*12/07 H*	*12/07*	*12/23 H*	*12/24 H*	*12/37 H*	*12/34*	*12/37 H*	*12/44*	*12/53 H*	*13/00*	*13/07 H*	*13/07*	*13/23 H*	*13/24 H*	*13/36 H*	*13/34*	*13/36 H*	*13/45 H*	*13/53 H*	*14/00*	*14/07 H*	*14/07 H*
	line	SL	FL		FL	FL	SL	FL	SL	FL	SL	FL	--->	FL	SL	FL	SL	FL	SL	FL	SL		---->	FL	SL	FL	SL	FL	SL	FL
Leagrave	d	**11:25**					**11:55**		**12:09**		**12:25**				**12:39**		**12:55**		**13:09**		**13:25**				**13:38**		**13:55**		**14:09**	
Luton	a	**11:28**	**11:26 H**				**11:58**		**12:12**		**12:28**	**12:27**			**12:42**		**12:58**		**13:12**		**13:28**	**13:27**			**13:41**		**13:58**		**14:12**	
	pl	1	4		4	4	1	4	1	4	1	4		4	1	4	1		1		1	4			1		1		1	
	d	**11:29 H**	**11:28**		*11/36*	*11/46 H*	**11:59 H**	*12/02*	**12:13 H**	*12/09*	**12:29 H**	**12:28 H**		*12/36*	**12:43 H**	*12/46*	**12:59 H**	*13/02*	**13:13 H**	*13/09*	**13:29 H**	**13:28 H**		*13/36*	**13:42**	*13/47 H*	**13:59 H**	*14/02*	**14:13 H**	*14/09 H*

Down Direction Timetable with Colworth served by GTR

Train ID		9R18	1F23	1D22	9T14	1M26	9R20	1F25	1D29	9T16	9R22	1F28	1D27	9T18	1M31	9R24	1F30	1D34	9T20	9R26	1F33	1D32	9T22	1M36	9R28	1F35	1D39	9T24
Dep		08:34	10:31	10:34	09:02	10:47	09:33	11:02	11:05	09:25	10:03	11:31	11:34	09:58	11:47	10:33	12:02	12:05	10:26	11:03	12:31	12:34	10:58	12:47	11:33	13:02	13:05	11:26
From		Horsham	STPX	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton	Gatwick	STPX	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton	Gatwick	STPX	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton
To		Bedford	Sheffield	Nottm	Colworth	Corby	Bedford	Sheffield	Nottm	Colworth	Bedford	Sheffield	Nottm	Colworth	Corby	Bedford	Sheffield	Nottm	Colworth	Bedford	Sheffield	Nottm	Colworth	Corby	Bedford	Sheffield	Nottm	Colworth
T/L		700	222	HST	700	222	700	222	222	700	700	222	HST	700	222	700	222	HST	700	700	700	HST	700	222	700	222	222	700
Luton	a	**10:40**			**10:56**	**11:08 H**	**11:10 H**			**11:26**	**11:39 H**			**11:56**	**12:08 H**	**12:09 H**			**12:26**	**12:39 H**			**12:56**	**13:08 H**	**13:09 H**			**13:26**
	pl	3	5	5	3	5	3	5	5	3	3	5	5	3	5	3	5	5	3	3	5	5	3	5	3	5	5	3
	d	**10:41 H**	*10/52 H*	*10/55 H*	**10:57 H**	**11:10**	**11:12**	*11/22 H*	*11/28 H*	**11:27 H**	**11:41**	*11/52 H*	*11/55 H*	**11:57 H**	**12:10**	**12:11**	*12/22 H*	*12/28 H*	**12:27 H**	**12:41**	*12/52 H*	*12/55 H*	**12:57 H**	**13:10**	**13:11**	*13/22 H*	*13/28 H*	**13:27 H**
	line	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	SL
Leagrave	d	**10:45**			**11:01**		**11a16**			**11:31**	**11a45**			**12:01**		**12a15**			**12:31**	**12a45**			**13:01**		**13a15**			**13:31**
Leagrave Jn	p	*10/45 H*	*10/54*	*10/57*	*11/01 H*	*11/12 H*	*11/16 H*	*11/24*	*11/30*	*11/31 H*	*11/45 H*	*11/54*	*11/57*	*12/01 H*	*12/12 H*	*12/15 H*	*12/24*	*12/30*	*12/31 H*	*12/45 H*	*12/54*	*12/57*	*13/01 H*	*13/12 H*	*13/15 H*	*13/24*	*13/30*	*13/31 H*
	line	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	FL
Harlington	d	**10:49 H**			**11:05 H**		**11:20 H**			**11:35 H**	**11:49 H**			**12:05 H**		**12:19 H**			**12:35 H**	**12:49 H**			**13:05 H**		**13:19 H**			**13:35 H**
Flitwick	d	**10:53 H**	*10/57 H*	*11/00 H*	**11:09 H**	*11/16*	**11:24 H**	*11/27 H*	*11/33 H*	**11:39 H**	**11:53 H**	*11/57 H*	*12/00 H*	**12:09 H**	*12/16*	**12:23 H**	*12/27 H*	*12/33 H*	**12:39 H**	**12:53 H**	*12/57 H*	*13/00 H*	**13:09 H**	*13/16*	**13:23 H**	*13/27 H*	*13/33 H*	**13:39 H**
	line	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	SL	SL	FL	FL	SL	FL	SL	FL	FL	SL
	allow.		[1]	[1]		[1]		[1]	[1]			[1]	[1]		[1]		[1]	[1]			[1]	[1]		[1]		[1]	[1]	<H>
Bedford South	p	*11/01 H*	*11/02 H*	*11/05 H*	*11/17*	*11/21*	*11/32*	*11/32 H*	*11/38 H*	*11/47*	*12/01 H*	*12/02 H*	*12/05 H*	*12/17*	*12/21*	*12/31 H*	*12/32 H*	*12/38 H*	*12/47*	*13/01 H*	*13/02 H*	*13/05 H*	*13/17*	*13/21*	*13/31 H*	*13/32 H*	*13/38 H*	*13/47 H*
	line	USL	FL	FL	DSL	FL	USL	FL	FL	DSL	USL	FL	FL	SL	FL	USL	FL	FL	DSL	USL	FL	FL	DSL	FL	USL	FL	FL	DSL
	allow.	[1]		(H)	[1]<H>		[1]<H>			[1]<H>	[1]			[1]<H>		[1]			[1]<H>	[1]			[1]<H>		[1]			[1]
Bedford	a	**11:05**			**11:21**	**11:22 H**	**11:36**		**11:40**	**11:51**	**12:05**			**12:21**	**12:22 H**	**12:35**		**12:40**	**12:51**	**13:05**			**13:21**	**13:22 H**	**13:35**		**13:40**	**13:51**
	pl	2	4	4	3	4	2	4	4	3	2	4	4	3	4		4	4	3	2	4	4	3	4	2	4	4	3
	d		*11/03 H*	*11/07*	**11:22**	**11:24**		*11/33 H*	**11:41 H**	**11:52**		*12/03 H*	*12/06 H*	**12:22**	**12:24**		*12/33 H*	**12:41 H**	**12:52**		*13/03 H*	*13/06 H*	**13:22**	**13:24**		*13/33 H*	**13:41 H**	**13:52**
Bedford North Jn	p		*11/04*	*11/08*	*11/23*	*11/26*		*11/34*	*11/43 H*	*11/53*		*12/04*	*12/07 H*	*12/23*	*12/26*		*12/34*	*12/43 H*	*12/53*		*13/04*	*13/07 H*	*13/23*	*13/26*		*13/34*	*13/43 H*	*13/53*
	line		FL	FL	SL	FL		FL	FL	SL		FL	FL	SL	FL		FL	FL	SL		FL	FL	SL	FL		FL	FL	SL
Sharnbrook Jn	p		*11/07 H*	*11/11*	*11/30 H*	*11/29 H*		*11/37 H*	*11/47*	*12/00 H*		*12/07 H*	*12/10 H*	*12/30 H*	*12/29 H*		*12/37 H*	*12/47*	*13/00 H*		*13/07 H*	*13/10 H*	*13/30 H*	*13/29 H*		*13/37 H*	*13/47*	*14/00 H*
	line		FL	FL	SL	FL		FL	FL	FL		FL	FL	SL	FL		FL	FL	SL		FL	FL	SL	FL		FL	FL	SL
Colworth					**11:34**					**12:04**				**12:34**					**13:04**				**13:34**					**14:04**
Wellingborough	a					**11:34 H**			**11:52**						**12:34 H**			**12:52**						**13:34 H**			**13:52**	
	d		*11/12*	*11/16*		**11:36**		*11/42*	**11:53 H**			*12/12*	*12/15 H*		**12:36**		*12/42*	**12:53 H**			*13/12*	*13/15 H*		**13:36**		*13/42*	**13:53 H**	
	line		FL	FL		FL		FL	FL			FL	FL		FL		FL	FL			FL	FL		FL		FL	FL	
	allow.					(H)																						
Kettering Sth Jn	d					*11/41 H*									*12/41*									*13/41*				
	line					SL									SL									SL				
Kettering	a					**11:44**			**11:59 H**						**12:43 H**			**12:59 H**						**13:43 H**			**13:59 H**	
	d		*11/16*	*11/20*		**11:45 H**		*11/46*	**12:01**			*12/16*	*12/19 H*		**12:45**		*12/46*	**13:01**			*13/16*	*13/19 H*		**13:45**		*13/46*	**14:01**	

Up Direction Timetable with Colworth served by GTR

Train ID		9R21	1P30	5Y19	1B31	1C32	9R23	1B33	9T31	1C34	9R25	1P35	9T33	1B36	9T33	1C37	9R27	1B38	9T35	1C39	9R29	1P40	9T37	1B41	9T37	1C42	9R31	1B43	9T39	1C44
Dep		10:52	10:41	11:16	10:12	10:00	11:22	10:45	11:49	10:29	11:52	11:41	12:19	11:12	12:19	11:00	12:22	11:45	12:49	11:29	12:52	12:41	13:19	12:12	13:19	12:00	13:22	12:45	13:49	12:29
From		Colworth	Corby	Bedford	Nottm	Sheffield	Colworth	Nottm	Bedford	Sheffield	Colworth	Corby	Bedford	Nottm	Bedford	Sheffield	Colworth	Nottm	Bedford	Sheffield	Colworth	Corby	Bedford	Nottm	Bedford	Sheffield	Colworth	Nottm	Bedford	Sheffield
To		Gatwick	STPX	Jowett	STPX	STPX	Gatwick	STPX	Brighton	STPX	Gatwick	STPX	Brighton	STPX	Brighton	STPX	Gatwick	STPX	Brighton	STPX	Gatwick	STPX	Brighton	STPX	Brighton	STPX	Gatwick	STPX	Brighton	STPX
T/L		700	222	700	222	222	700	HST	700	222	700	222	700	222	700	222	700	HST	700	222	700	222	700	222	700	222	700	HST	700	222
Kettering	a		**10:49 H**		**11:00 H**							**11:49 H**		**12:00 H**								**12:49 H**		**13:00 H**						
	d		**10:51**		**11:02**	*11/21 H*		*11/36 H*		*11/43 H*		**11:51 H**		**12:02**		*12/21*		*12/36 H*		*12/44*		**12:51 H**		**13:02**		*13/22 H*		*13/36 H*		*13/44 H*
	line		SL		FL	FL		FL		FL		SL		FL		FL		FL		FL		SL		FL		FL		FL		FL
Kettering Sth Jn	p		*10/53 H*									*11/54*										*12/54*								
	line		FL									FL										FL								
Wellingborough	a		**10:58**		**11:08**							**11:58 H**		**12:08**								**12:58 H**		**13:08**						
	d		**10:59 H**		**11:09 H**	*11/25 H*		*11/40 H*		*11/47 H*		**12:00**		**12:09 H**		*12/25*		*12/40 H*		*12/48*		**13:00**		**13:09 H**		*13/26 H*		*13/40 H*		*13/48 H*
	line		FL		FL	FL		FL		FL		FL		FL		FL		FL		FL		FL		FL		FL		FL		FL
	allow		[H]							(H)																				
Colworth		**10:52**					**11:22**				**11:52**						**12:22**				**12:52**						**13:22**			
Sharnbrook Jn	p	*10/54 H*	*11/06*		*11/15 H*	*11/31*	*11/24 H*	*11/46*		*11/53 H*	*11/54 H*	*12/06*		*12/16*		*12/30 H*	*12/24 H*	*12/46*		*12/53 H*	*12/54 H*	*13/06*		*13/15 H*		*13/32*	*13/24 H*	*13/46*		*13/54*
	line	SL	FL		FL	FL	SL	FL		FL	SL	FL		FL		FL	SL	FL		FL	SL	FL		FL		FL	SL	FL		FL
	allow		[H]		[1]	[1]		[1]		[1]		[1]		[1]		[1]		[1]		[1]		[1]		[1](H)		[1]		[1]		[1]
Bedford North Jn	p	*11/02*	*11/10*		*11/20*	*11/35*	*11/32*	*11/50*		*11/57 H*	*12/02*	*12/10 H*		*12/20*		*12/34 H*	*12/32*	*12/50*		*12/57 H*	*13/02*	*13/10 H*		*13/20*		*13/36*	*13/32*	*13/50*		*13/58*
	line	SL	DSL		DSL	FL	SL	FL		FL	SL	DSL		DSL		FL	SL	FL		FL	SL	DSL		DSL		FL	SL	FL		FL
Bedford	a	**11:03 H**	**11:11 H**		**11:21 H**		**11:33 H**				**12:03 H**	**12:12**		**12:21 H**			**12:33 H**					**13:03 H**	**13:12**		**13:21 H**			**13:33 H**			
	pl	1	3	2	3	FL	1	FL	2	FL	3	3	2	3		FL	3	FL	2	FL	3	3	2	3		FL	3	FL	2	FL
	d	**11:05**	**11:13**	**11:16**	**11:23**	*11/35 H*	**11:35**	*11/50 H*	**11:49**	*11/58*	**12:05**	**12:13 H**	**12:19**	**12:23**		*12/35*	**12:35**	*12/50 H*	**12:49**	*12/58*	**13:05**	**13:13 H**	**13:19**	**13:23**		*13/36 H*	**13:35**	*13/50 H*	**13:49**	*13/58 H*
	line	DSL	DSL		DSL	FL	DSL	FL	USL	FL	DSL	FL	USL	FL		FL	DSL	FL	USL	FL	DSL	DSL	USL	DSL		FL	DSL	FL	USL	FL
St Johns GL	a			**11:19**																										
Bedford South	p	*11/07 H*	*11/15*		*11/25*	*11/36*	*11/37 H*	*11/51*	*11/51 H*	*11/58 H*	*12/07 H*	*12/15 H*	*12/21 H*	*12/25*		*12/35 H*	*12/37 H*	*12/51*	*12/51 H*	*12/58 H*	*13/07 H*	*13/15 H*	*13/21 H*	*13/25*		*13/37*	*13/37 H*	*13/51*	*13/51 H*	*13/59*
	line	SL	FL		FL	FL	SL	FL	SL	FL	SL	FL	SL	FL		FL	SL	FL	SL	FL	SL	FL	SL	FL		FL	SL	FL	SL	FL
Flitwick	d	**11:16**	*11/20 H*		*11/30 H*	*11/41*	**11:46**	*11/56*	**12:00**	*12/03 H*	**12:16**	*12/21*	**12:30**	*12/30 H*		*12/40 H*	**12:46**	*12/56*	**13:00**	*13/03 H*	**13:16**	*13/21*	**13:29**	*13/30 H*		*13/42*	**13:46**	*13/56*	**14:00**	*14/04*
	line	SL	FL		FL	FL	SL	FL	SL	FL	SL	FL	SL	FL		FL	SL	FL	SL	FL	SL	FL	SL	FL			SL		SL	
Harlington	d	**11:20**					**11:50**		**12:04**		**12:20**		**12:34**				**12:50**		**13:04**		**13:20**		**13:33**				**13:50**		**14:04**	
Sundon South Jn	p	*11/21 H*					*11/51 H*		*12/05 H*		*12/21 H*		*12/35 H*		<----		*12/51 H*		*13/05 H*		*13/21H*		*13/34 H*		<----		*13/51 H*		*14/05 H*	
Leagrave Jn	p	*11/23 H*	*11/24*		*11/34*	*11/44 H*	*11/53 H*	*12/00*	*12/07 H*	*12/07*	*12/23 H*	*12/24 H*	*12/37 H*	*12/34*	*12/37 H*	*12/44*	*12/53 H*	*13/00*	*13/07 H*	*13/07*	*13/23 H*	*13/24 H*	*13/36 H*	*13/34*	*13/36 H*	*13/45 H*	*13/53 H*	*14/00*	*14/07 H*	*14/07 H*
	line	SL	FL		FL	FL	SL	FL	SL	FL	SL	FL	--->	FL	SL	FL	SL	FL	SL	FL	SL		---->	FL	SL	FL	SL	FL	SL	FL
Leagrave	d	**11:25**					**11:55**		**12:09**		**12:25**				**12:39**		**12:55**		**13:09**		**13:25**				**13:38**		**13:55**		**14:09**	
Luton	a	**11:28**	**11:26 H**				**11:58**		**12:12**		**12:28**	**12:27**			**12:42**		**12:58**		**13:12**		**13:28**	**13:27**			**13:41**		**13:58**		**14:12**	
	pl	1	4		4	4	1	4	1	4	1	4		4	1	4	1		1		1	4			1		1		1	
	d	**11:29 H**	**11:28**		*11/36*	*11/46 H*	**11:59 H**	*12/02*	**12:13 H**	*12/09*	**12:29 H**	**12:28 H**		*12/36*	**12:43 H**	*12/46*	**12:59 H**	*13/02*	**13:13 H**	*13/09*	**13:29 H**	**13:28 H**		*13/36*	**13:42**	*13/47 H*	**13:59 H**	*14/02*	**14:13 H**	*14/09 H*

Down Direction Timetable with enhanced EMT timetable and Colworth served by EMT

Train ID		9R18	1F23	1D22	9T14	1M26	9R20	1F25	1D29	9T16	1M90	9R22	1F28	1D27	9T18	1M31	9R24	1F30	1D34	9T20	1M91	9R26	1F33	1D32	9T22	1M36	9R28	1F35	1D39	9T24	1M92
Dep		**08:34**	**10:31**	**10:34**	**09:02**	**10:47**	**09:33**	**11:02**	**11:05**	**09:25**	**11:17**	**10:03**	**11:31**	**11:34**	**09:58**	**11:47**	**10:33**	**12:02**	**12:05**	**10:26**	**12:17**	**11:03**	**12:31**	**12:34**	**10:58**	**12:47**	**11:33**	**13:02**	**13:05**	**11:26**	**13:17**
From		Horsham	STPX	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton	STPX
To		Bedford	Sheffield	Nottm	Bedford	Corby	Bedford	Sheffield	Nottm	Bedford	Corby	Bedford	Sheffield	Nottm	Bedford	Corby	Bedford	Sheffield	Nottm	Bedford	Corby	Bedford	Sheffield	Nottm	Bedford	Corby	Bedford	Sheffield	Nottm	Bedford	Corby
T/L		700	222	HST	700	222	700	222	222	700	222	700	222	HST	700	222	700	222	HST	700	222	700	700	HST	700	222	700	222	222	700	222
Luton	a	**10:40**			**10:56**	**11:08 H**	**11:10 H**			**11:26**	**11:38 H**	**11:39 H**			**11:56**	**12:08 H**	**12:09 H**			**12:26**	**12:38 H**	**12:39 H**			**12:56**	**13:08 H**	**13:09 H**			**13:26**	**13:38 H**
	pl	3	5	5	3	5	3	5	5	3	5	3	5	5	3	5	3	5	5	3	5	3	5	5	3	5	3	5	5	3	5
	d	**10:41 H**	*10/52 H*	*10/55 H*	**10:57 H**	**11:10**	**11:12**	*11/22 H*	*11/28 H*	**11:27 H**	**11:40**	**11:41**	*11/52 H*	*11/55 H*	**11:57 H**	**12:10**	**12:11**	*12/22 H*	*12/28 H*	**12:27 H**	**12:40**	**12:41**	*12/52 H*	*12/55 H*	**12:57 H**	**13:10**	**13:11**	*13/22 H*	*13/28 H*	**13:27 H**	**13:40**
	line	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL
Leagrave	d	**10:45**			**11:01**		**11a16**			**11:31**		**11a45**			**12:01**		**12a15**			**12:31**		**12a45**			**13:01**		**13a15**			**13:31**	
Leagrave Jn	p	*10/45 H*	*10/54*	*10/57*	*11/01 H*	*11/12 H*	*11/16 H*	*11/24*	*11/30*	*11/31 H*	*11/42 H*	*11/45 H*	*11/54*	*11/57*	*12/01 H*	*12/12 H*	*12/15 H*	*12/24*	*12/30*	*12/31 H*	*12/42 H*	*12/45 H*	*12/54*	*12/57*	*13/01 H*	*13/12 H*	*13/15 H*	*13/24*	*13/30*	*13/31 H*	*13/42 H*
	line	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	FL	FL
Harlington	d	**10:49 H**			**11:05 H**		**11:20 H**			**11:35 H**		**11:49 H**			**12:05 H**		**12:19 H**			**12:35 H**		**12:49 H**			**13:05 H**		**13:19 H**			**13:35 H**	
Flitwick	d	**10:53 H**	*10/57 H*	*11/00 H*	**11:09 H**	*11/16*	**11:24 H**	*11/27 H*	*11/33 H*	**11:39 H**	*11/46*	**11:53 H**	*11/57 H*	*12/00 H*	**12:09 H**	*12/16*	**12:23 H**	*12/27 H*	*12/33 H*	**12:39 H**	*12/46*	**12:53 H**	*12/57 H*	*13/00 H*	**13:09 H**	*13/16*	**13:23 H**	*13/27 H*	*13/33 H*	**13:39 H**	*13/46*
	line	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL	SL	FL	FL	SL	FL
	allow.		[1]	[1]		[1]		[1]	[1]		[1]		[1]	[1]		[1]		[1]	[1]		[1]		[1]	[1]		[1]		[1]	[1]	<H>	[1]
Bedford South	p	*11/01 H*	*11/02 H*	*11/05 H*	*11/17*	*11/21*	*11/32*	*11/32 H*	*11/38 H*	*11/47*	*11/51*	*12/01 H*	*12/02 H*	*12/05 H*	*12/17*	*12/21*	*12/31 H*	*12/32 H*	*12/38 H*	*12/47*	*12/51*	*13/01 H*	*13/02 H*	*13/05 H*	*13/17*	*13/21*	*13/31 H*	*13/32 H*	*13/38 H*	*13/47 H*	*13/51*
	line	USL	FL	FL	DSL	FL	USL	FL	FL	DSL	FL	USL	FL	FL	SL	FL	USL	FL	FL	DSL	FL	USL	FL	FL	DSL	FL	USL	FL	FL	DSL	
	allow.	[1]		(H)	[1]<H>		[1]<H>			[1]<H>		[1]			[1]<H>		[1]			[1]<H>		[1]			[1]<H>		[1]			[1]	
Bedford	a	**11:05**			**11:21**	**11:22 H**	**11:36**			**11:51**	**11:52 H**	**12:05**			**12:21**	**12:22 H**	**12:35**			**12:51**	**12:52 H**	**13:05**			**13:21**	**13:22 H**	**13:35**			**13:51**	**13:52 H**
	pl	2	4	4	3	4	1	4	4	3	4	1	4	4	3	4		4	4	3	4	1	4	4	3	4	1	4	4	3	4
	d		*11/03 H*	*11/07*		**11:24**		*11/33 H*	**11:41 H**		**11:54**		*12/03 H*	*12/06 H*		**12:24**		*12/33 H*	**12:41 H**		**12:54**		*13/03 H*	*13/06 H*		**13:24**		*13/33 H*	**13:41 H**		**13:54**
Bedford North Jn	p		*11/04*	*11/08*		*11/26*		*11/34*	*11/43 H*		*11/56*		*12/04*	*12/07 H*		*12/26*		*12/34*	*12/43 H*		*12/56*		*13/04*	*13/07 H*		*13/26*		*13/34*	*13/43 H*		*13/56*
	line		FL	FL		SL		FL	FL		FL		FL	FL		SL		FL	FL		FL		FL	FL		SL		FL	FL		FL
Sharnbrook Jn	p		*11/07 H*	*11/11*		*11/33 H*		*11/37 H*	*11/47*		*12/01*		*12/07 H*	*12/10 H*		*12/33 H*		*12/37 H*	*12/47*		*13/01*		*13/07 H*	*13/10 H*		*13/33 H*		*13/37 H*	*13/47*		*14/01*
	line		FL	FL		SL		FL	FL		SL		FL	FL		SL		FL	FL		SL		FL	FL		SL		FL	FL		SL
Colworth						**11b38**					**12b06**					**12b38**					**13b06**					**13b38**					**14b06**
Wellingborough	a					**11:45 H**			**11:52**		**12:13 H**					**12:45 H**			**12:52**		**13:13 H**					**13:45 H**			**13:52**		**14:13 H**
	d		*11/12*	*11/16*		**11:47**		*11/42*	**11:53 H**		**12:15**		*12/12*	*12/15 H*		**12:47**		*12/42*	**12:53 H**		**13:15**		*13/12*	*13/15 H*		**13:47**		*13/42*	**13:53 H**		**14:15**
	line		FL	FL		SL		FL	FL		SL		FL	FL		SL		FL	FL		SL		FL	FL		SL		FL	FL		SL
	allow.																														
Kettering	a					**11:54**			**11:59 H**		**12:22**					**12:54**			**12:59 H**		**13:22**					**13:54**			**13:59 H**		**14:22**
	d		*11/16*	*11/20*		**11:55 H**		*11/46*	**12:01**		**12:23 H**		*12/16*	*12/19 H*		**12:55 H**		*12/46*	**13:01**		**13:23 H**		*13/16*	*13/19 H*		**13:55 H**		*13/46*	**14:01**		**14:23 H**

Down Direction Timetable with enhanced EMT timetable and Colworth served by EMT

Train ID		9R21	1P30	5Y19	1B31	1C32	9R23	1P90	1B33	9T31	1C34	9R25	1P35	9T33	1B36	9T33	1C37	9R27	1P91	1B38	9T35	1C39	9R29	1P40	9T37	1B41	9T37	1C42	9R31	1P92	1B43	9T39	1C44
Dep		11:05	10:34	11:16	10:12	10:00	11:35	11:04	10:45	11:49	10:29	12:05	11:34	12:19	11:12	12:19	11:00	12:35	12:04	11:45	12:49	11:29	13:05	12:34	13:19	12:12	13:19	12:00	13:35	13:04	12:45	13:49	12:29
From		Bedford	Corby	Bedford	Nottm	Sheffield	Bedford	Corby	Nottm	Bedford	Sheffield	Bedford	Corby	Bedford	Nottm	Bedford	Sheffield	Bedford	Corby	Nottm	Bedford	Sheffield	Bedford	Corby	Bedford	Nottm	Bedford	Sheffield	Bedford	Corby	Nottm	Bedford	Sheffield
To		Gatwick	STPX	Jowett	STPX	STPX	Gatwick	STPX	STPX	Brighton	STPX	Gatwick	STPX	Brighton	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton	STPX	Gatwick	STPX	Brighton	STPX	Brighton	STPX	Gatwick	STPX	STPX	Brighton	STPX
T/L		700	222	700	222	222	700	222	HST	700	222	700	222	700	222	700	222	700	222	HST	700	222	700	222	700	222	700	222	700	222	HST	700	222
Kettering	a		10:40 H		11:00 H			11:10 H					11:40 H		12:00 H				12:10 H					12:40 H		13:00 H				13:10 H			
	d		10:42		11:02	*11/21 H*		11:12	*11/36 H*		*11/43 H*		11:42 H		12:02		*12/21*		12:12	*12/36 H*		*12/44*		12:42 H		13:02		*13/22 H*		13:12	*13/36 H*		*13/44 H*
	line		SL		FL	FL		SL	FL		FL		SL		FL		FL		SL	FL		FL		SL		FL		FL		SL	FL		FL
Wellingborough	a		10:48		11:08			11:18					10:48 H		12:08				12:18					12:48 H		13:08				13:18			
	d		10:49 H		11:09 H	*11/25 H*		11:19 H	*11/40 H*		*11/47 H*		10:50		12:09 H		*12/25*		12:19 H	*12/40 H*		*12/48*		12 50		13:09 H		*13/26 H*		13:19 H	*13/40 H*		*13/48 H*
	line		SL		FL	FL		SL	FL		FL		SL		FL		FL		SL	FL		FL		SL		FL		FL		SL	FL		FL
	allow										(H)																						
Colworth	d		10b58 H					11b28 H					10b59						12b28 H					12b59						13b28 H			
Sharnbrook Jn	p		*11/01*		*11/15 H*	*11/31*		*11/31*	*11/46*		*11/53 H*		*12/01 H*		*12/16*		*12/30 H*		*12/31*	*12/46*		*12/53 H*		*13/01 H*		*13/15 H*		*13/32*		*13/31*	*13/46*		*13/54*
	line		SL		FL	FL		SL	FL		FL		SL		FL		FL		SL	FL		FL		SL		FL		FL		SL	FL		FL
	allow		[1]		[1]	[1]		[1]	[1]		[1]		[1]		[1]		[1]		[1]	[1]		[1]		[1]		[1](H)		[1]		[1]	[1]		[1]
Bedford North Jn	p		*11/10*		*11/20*	*11/35*		*11/40*	*11/50*		*11/57 H*		*12/10 H*		*12/20*		*12/34 H*		*12/40*	*12/50*		*12/57 H*		*13/10 H*		*13/20*		*13/36*		*13/40*	*13/50*		*13/58*
	line		DSL		DSL	FL		DSL	FL		FL		DSL		DSL		FL		DSL	FL		FL		DSL		DSL		FL		DSL	FL		FL
Bedford	a		11:11 H		11:21 H			11:41 H					12:12		12:21 H				12:41 H					13:12		13:21 H				13:41 H			
	pl	3	3	2	3	FL	3	3	FL	1	FL	3	3	1	3		FL	3	3	FL	1	FL	3	3	1	2		FL	3	3	FL	1	FL
	d	11:05	11:13	11:16	11:23	*11/35 H*	11:35	11:43	*11/50 H*	11:49	*11/58*	12:05	12:13 H	12:19	12:23		*12/35*	12:35	12:43	*12/50 H*	12:49	*12/58*	13:05	13:13 H	13:19	13:23		*13/36 H*	13:35	13:43	*13/50 H*	13:49	*13/58 H*
	line	DSL	DSL		DSL	FL	DSL	DSL	FL	USL	FL	DSL	FL	USL	FL		FL	DSL	DSL	FL	USL	FL	DSL	DSL	USL	DSL		FL	DSL	DSL	FL	USL	FL
St Johns GL	a			11:19																													
Bedford South	p	*11/07 H*	*11/15*		*11/25*	*11/36*	*11/37 H*	*11/45*	*11/51*	*11/51 H*	*11/58 H*	*12/07 H*	*12/15 H*	*12/21 H*	*12/25*		*12/35 H*	*12/37 H*	*12/45*	*12/51*	*12/51 H*	*12/58 H*	*13/07 H*	*13/15 H*	*13/21 H*	*13/25*		*13/37*	*13/37 H*	*13/45*	*13/51*	*13/51 H*	*13/59*
	line	SL	FL		FL	FL	SL	FL	FL	SL	FL	SL	FL	SL	FL		FL	SL	FL	FL	SL	FL	SL	FL	SL	FL		FL	SL	FL	FL	SL	FL
Flitwick	d	11:16	*11/20 H*		*11/30 H*	*11/41*	11:46	*11/50 H*	*11/56*	12:00	*12/03 H*	12:16	*12/21*	12:30	*12/30 H*		*12/40 H*	12:46	*12/50 H*	*12/56*	13:00	*13/03 H*	13:16	*13/21*	13:29	*13/30 H*		*13/42*	13:46	*13/50 H*	*13/56*	14:00	*14/04*
	line	SL	FL		FL	FL	SL	FL	FL	SL	FL	SL	FL	SL	FL		FL	SL	FL	FL	SL	FL	SL	FL	SL	FL			SL	FL	FL	SL	FL
Harlington	d	11:20					11:50			12:04		12:20		12:34				12:50			13:04		13:20		13:33				13:50			14:04	
Sundon South Jn	p	*11/21 H*					*11/51 H*			*12/05 H*		*12/21 H*		*12/35 H*		<----		*12/51 H*			*13/05 H*		*13/21H*		*13/34 H*		<----		*13/51 H*			*14/05 H*	
Leagrave Jn	p	*11/23 H*	*11/24*		*11/34*	*11/44 H*	*11/53 H*	*11/54*	*12/00*	*12/07 H*	*12/07*	*12/23 H*	*12/24 H*	*12/37 H*	*12/34*	*12/37 H*	*12/44*	*12/53 H*	*12/54*	*13/00*	*13/07 H*	*13/07*	*13/23 H*	*13/24 H*	*13/36 H*	*13/34*	*13/36 H*	*13/45 H*	*13/53 H*	*13/54*	*14/00*	*14/07 H*	*14/07 H*
	line	SL	FL		FL	FL	SL	FL	FL	SL	FL	SL	FL	--->	FL	SL	FL	SL	FL	FL	SL	FL	SL		---->	FL	SL	FL	SL	FL	FL	SL	FL
Leagrave	d	11:25					11:55			12:09		12:25				12:39		12:55			13:09		13:25				13:38		13:55			14:09	
Luton	a	11:28	11:26 H				11:58	11:56 H		12:12		12:28	12:27			12:42		12:58	12:56 H		13:12		13:28	13:27			13:41		13:58	13 56 H		14:12	
	pl	1	4		4	4	1	4	4	1	4	1	4		4	1	4	1	4		1		1	4			1		1	4		1	
	d	11:29 H	11:28		*11/36*	*11/46 H*	11:59 H	11:58	*12/02*	12:13 H	*12/09*	12:29 H	12:28 H		*12/36*	12:43 H	*12/46*	12:59 H	12:58	*13/02*	13:13 H	*13/09*	13:29 H	13:28 H		*13/36*	13:42	*13/47 H*	13 59 H	13:58	*14/02*	14:13 H	*14/09 H*

Appendix C Economic and Financial Case – Passenger Demand

Colworth Railway Station

Passenger Demand Modelling Report

On behalf of **Wrenbridge**

WRENBRIDGE

Project Ref: 34172-5523 | Rev: 01 | Date: January 2021

Office Address: Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN
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Document Control Sheet

Project Name: **Colworth Railway Station**
Project Ref: **34172-5523**
Report Title: **Passenger Demand Modelling**
Doc Ref: **TN001**
Date: **27/01/2021**

	Name	Position	Signature	Date
Prepared by:	Kim Bell	Transport Planner		27/01/21
Reviewed by:	David Bowers	Senior Associate		27/01/21
Approved by:	Greg Callaghan	Director		27/01/21
For and on behalf of Stantec Ltd				

Revision	Date	Description	Prepared	Reviewed	Approved
B	29/01/2018	Addition of Flitwick Census Rail Mode Share	DC	BP	BP
C	27/01/2021	Full update to reflect revised OBC	KB	DB	GC

Contents

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1 Introduction

1.1 Overview

1.1.1 This report summarises the passenger demand modelling process that has been used to provide the outputs necessary to inform the Economic and Financial Case sections of the Outline Business Case for the proposed rail station at Colworth.

1.2 Report Structure

1.2.1 Following this introduction, the report is set out as follows:

- Section 2 provides a brief description of the scheme;
- Section 3 provides an overview of the passenger demand modelling approach
- Section 4 details the passenger demand modelling; and
- Section 5 provides details of the passenger demand forecasts.

2 Scheme Description

2.1 Overview

2.1.1 The development of 4,500 dwellings at Colworth will result in an increase in demand to access strategic centres near the development, including London and Bedford. Currently access from Sharnbrook and Souldrop to London by rail is poor, with Bedford being the closest station. Additional demand on the local highway network will potentially increase congestion, specifically on the northern approaches into Bedford along the A6 from the north, which are widely perceived to suffer from peak congestion.

2.1.2 A new railway station at Colworth will provide access to Bedford, London and other destinations (see Figure 2-1). This station would benefit not only the proposed development itself, but also the existing villages of Sharnbrook and Souldrop, as well as the Colworth Science Park.

2.1.3 The station will also provide an opportunity to attract trips on to the rail network at Colworth from passengers who would otherwise drive to Bedford. This could assist in providing some congestion relief on the A6.

2.2 Access to employment

2.2.1 The proposal for 7.25 ha of additional employment land and the expansion at Colworth Science Park will add an additional 820 jobs, which would increase the attractiveness of a new rail link between Colworth, Bedford and London for increased inward investment, because of the easy access to London. Furthermore, the potential introduction of the new East West rail link between Oxford and Cambridge via Bedford may provide additional incentives to locate additional employment and housing in the vicinity in the future.

2.3 Other developments

2.3.1 The development of the Bedford Borough Local Plan has highlighted areas close to Colworth which are under consideration for new settlements, such as Twinwoods south east of Sharnbrook and the old airfield at Thurleigh to the east of Sharnbrook. Any potential demand from smaller scale developments on these sites has not been included within this assessment.

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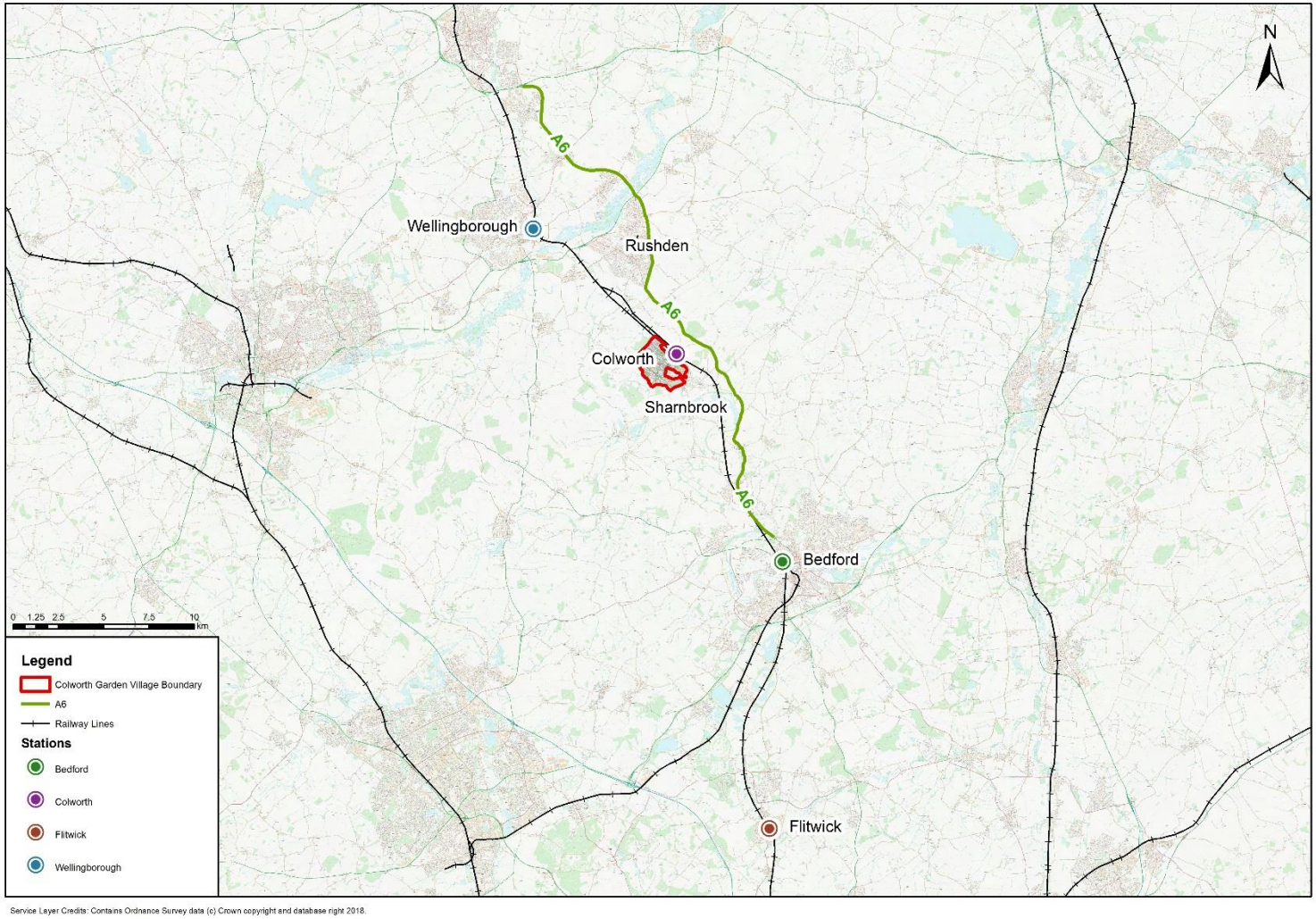
Figure 2-1: Proposed Station Location



3 Overview of Modelling Approach

3.1 Introduction

3.1.1 To prepare the economic case for the OBC, a calculation of potential passenger demand for the station was required. The following section explains the methodology and data used to assist in these calculations. The outputs from the demand model have been included within the Colworth Railway Station Outline Business Case.

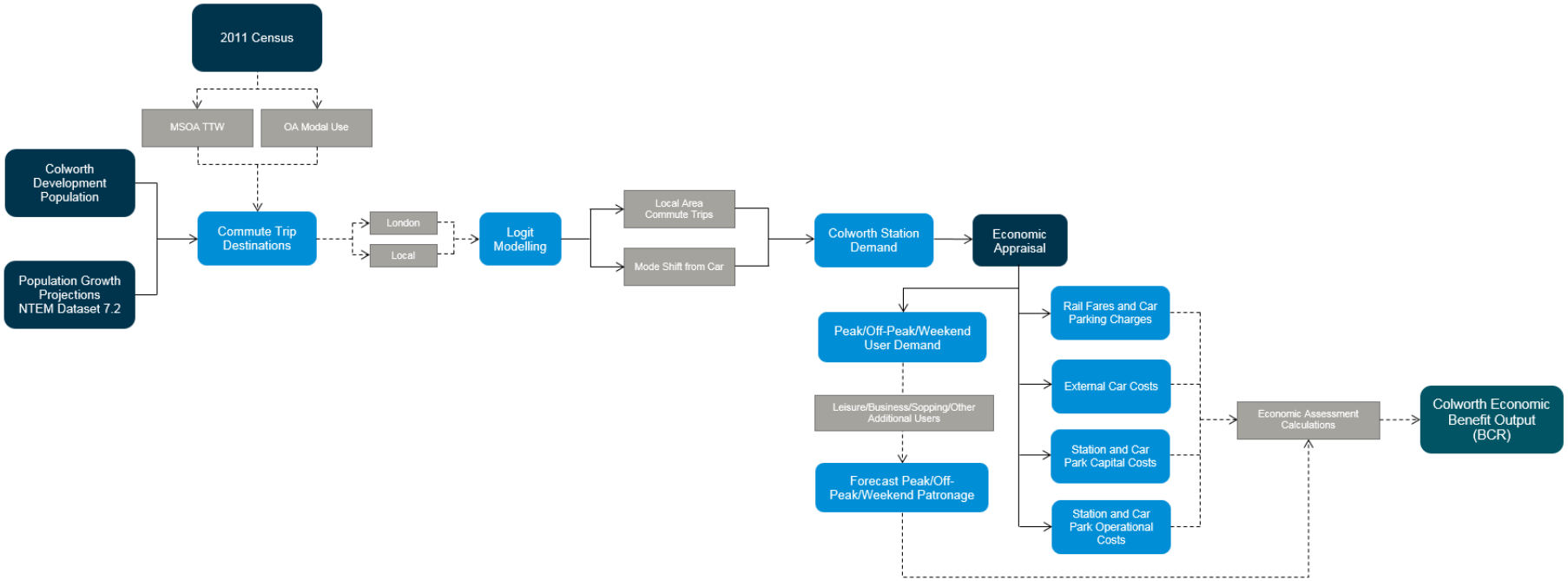
3.1.2 An overview of the modelling approach, showing the process and key inputs and outputs is shown in Figure 3-1.

3.2 Data Sources

3.2.1 The economic modelling has utilised the following data sources to calculate forecast passenger demand.

- ONS 2011 Census Data – Travel to Work (TTW) and Population statistics - to assist in the calculation of a demand and origin trip rate;
- ORR – Estimates of Station Usage (2018/19) - to provide typical ticketing data including Reduced, Full and Season proportions;
- Ticket costs and service frequencies from Flitwick and Bedford - to assist in the calculation to obtain predicted ticket revenue, taken from National Rail Enquiries website;
- Travel time and link distances from GIS mapping and Google maps;
- Population data derived for the Colworth Garden Village;
- Car parking charges at Flitwick and Bedford stations taken from National Rail Enquiries Website;
- DfT statistics from the National Travel Survey providing trip purpose information for rail, and;
- July 2020 release v1.13.1 WebTAG Databook

Figure 3-1: Colworth Assessment Process



3.3 Modelling Approach - Overview

3.3.1 The modelling approach used is proportionate and pragmatic given the stage of scheme development and the requirement to provide outputs to inform initial feasibility studies for the station. Available data sources have been used to inform the assessment. Further detail on the approach and assumptions used are provided in the following sections.

3.3.2 A series of steps has been undertaken to derive daily passenger numbers for Colworth station, along with potential car trips which could be removed from the A6 towards Bedford if the station was developed. This data has then been used to inform the economic and financial appraisals to feed into the business cases for the full OBC.

Donor Station

3.3.3 Flitwick Railway Station has been designated as the 'donor' station, as this station will contribute variables which can be used as suitable equivalent values for Colworth. Flitwick is both a similar distance from Bedford as the proposed Colworth station would be and it also has a similar trip distribution to that of the Sharnbrook Output Areas.

Derivation of Passenger Demand

3.3.4 The assessment work has been undertaken within a number of spreadsheets, which are all interlinked.

3.3.5 The modelling process has been split into a number of areas to inform the overall development of demand for the station and to derive the number of newly generated and abstracted trips, which will be used to inform revenue generation. The trips can be broken down as follows:

- Home-based trips derived from the new development;
- Home-based trips derived from the surrounding area that were already utilising the rail network;
- Home-based trips from surrounding areas that could potentially change mode from car to rail; and
- Trips attracted to the Colworth Science Park.

3.3.6 The core basis of the assessment is the Census Travel to Work (TTW) data from the 2011 census, The TTW data has been used to derive trip rates for rail-based commute trips that have been used in the assessment.

3.3.7 To inform this process TTW data for Census Middle Super Output Areas (MSOA) was abstracted for locations close to the proposed station and in the area around Flitwick Station. The purpose of this was to show the typical rail mode shares for commute trips for the local area, with no station in place and for a similar location i.e. Flitwick, which does have access to a local station.

3.3.8 This data was used to produce trip rates for rail trips.

3.3.9 The Census TTW data was also used to derive the main destination for trips for both the local area and for Flitwick. This data shows that London is by far the main destination for rail-based commute trips.

3.3.10 The derivation of home-based trips to London from the new development and the surrounding area were both derived from a logit model approach. The development and surrounding area were split into a number of zones and a generalised cost derived for five potential choices for each zone as follows:

- Walk to station and then direct train to London;
- Walk to station, train to Bedford and then change to fast train to London;
- Drive to station and then direct train to London;
- Drive to station, train to Bedford and then change to fast train to London;
- Drive to Bedford and then fast train to London.

3.3.11 The derivation of local trips utilised the existing London - local splits derived from the Census TTW data. This data showed that for the existing rail-based trips from the local area, 87% had a destination of London and 13% other, for Flitwick the number was 70% London, 30% other.

3.3.12 In the case with no station in place, the local area split has been used to produce rail-based trips for the development. With the Colworth station in place, the Flitwick split has been used. Therefore, to derive local-based commute trips from the development, it is assumed that 70% of the trips would be to London and 30% local. The London based trips are derived from the logit model, which would then equate to 70% of total demand from Colworth.

3.3.13 For the purposes of this appraisal, all other trips have been assumed to be to Bedford. This means that the estimate of generated fares for other trips is a conservative estimate, as fares for Bedford are applied.

3.3.14 To derive potential mode shift from car to rail, a separate logit model has been developed. In this instance, this has only considered commute car trips to Bedford from geographical locations that could potentially utilise Colworth station to park and ride. Census TTW data was again used to derive those zones which were deemed to be ‘geographically in-scope’. This only took trips which were deemed likely to use the A6 from the north into Bedford, and had a work destination close to the station.

3.3.15 It is recognised that there are likely to be a proportion of these trips who would have a free parking space at their workplace, therefore these were omitted and the resultant trip numbers deemed to be ‘economically’ in-scope.

3.3.16 Generalised costs were produced for trips by car and by rail and used within the logit model to derive the potential trips that may transfer from car to rail.

3.3.17 The above processes outline the derivation of commute trips from home. To derive trips by other purposes National Travel Statistics rail data has been utilised. This data is produced by DfT.

3.3.18 The data includes the proportion of trips by trip purpose for all rail trips and this data has been used to derive the number of trips for the other uses for Colworth.

3.3.19 The assessment has been broken down in to trips that are made before 09:30 and those after. This is to reflect the difference in peak and off-peak fares when deriving fare revenue. For the purposes of the assessment, it has been assumed that all commute and business trips are made at peak times, whilst all other trips are made off-peak.

3.3.20 To derive the trips for the Colworth Science Park, TRICS data has been interrogated and a trip rate has been derived for rail trips. This has been applied to both the existing development and the proposals for further employment development as part of the Colworth development proposals. The existing Science Park has around 750 employees and a floor area of 32,000m^2, based on information taken from a Travel Plan for the site. This equates to one employee for each 42.67m^2. It is proposed that a further 35,000m^2 is developed, which will provide an additional 820 employees. A trip rate of 0.018 trips per employee in peak and 0.01 trips per employee in off-peak have been used to derive trip numbers.

4 Daily Passenger Demand Modelling

4.1 Overview

4.1.1 This section sets out the detailed modelling undertaken to determine the daily passenger demand for the proposed Colworth Station. This daily demand is used within the economic appraisal. The assessment is based on several assumptions which are set out within the section where relevant.

4.1.2 Separate modelling has been undertaken to derive trips from the Colworth development and from the surrounding area. The surrounding area trips have then been split into those who would use rail with or without the station and those that would transfer from car. For both sets of data the 2011 census TTW data has formed the basis of the demand modelling. This data only provides trip numbers for commute trips and the derivation of other trips is detailed later in this section. The daily demand from the Colworth development has been calculated for the full development of 4,500 dwellings.

4.1.3 The census TTW data was interrogated to understand the current rail trip patterns for commuters, as well as to derive those that could potentially transfer from car to rail. To this end two zone systems have been developed and these ae shown in Figure 4-1 which shows the likely catchment area for rail commute trips and Figure 4-2 shows the catchment area for trips that could potentially transfer from car to use Colworth station.

4.1.4 Population data for each of the zones has been extracted from the 2011 census. The opening year of the station is assumed to be 2027 for the purposes of the appraisal and therefore population growth to 2027 has been applied for the surrounding area zones. The growth factor applied to the population in the zones has been taken from the National Trip End Model (NTEM) dataset 7.2, using the DfT TEMPro software.

Figure 4-1: New and Existing Rail User Demand Zones

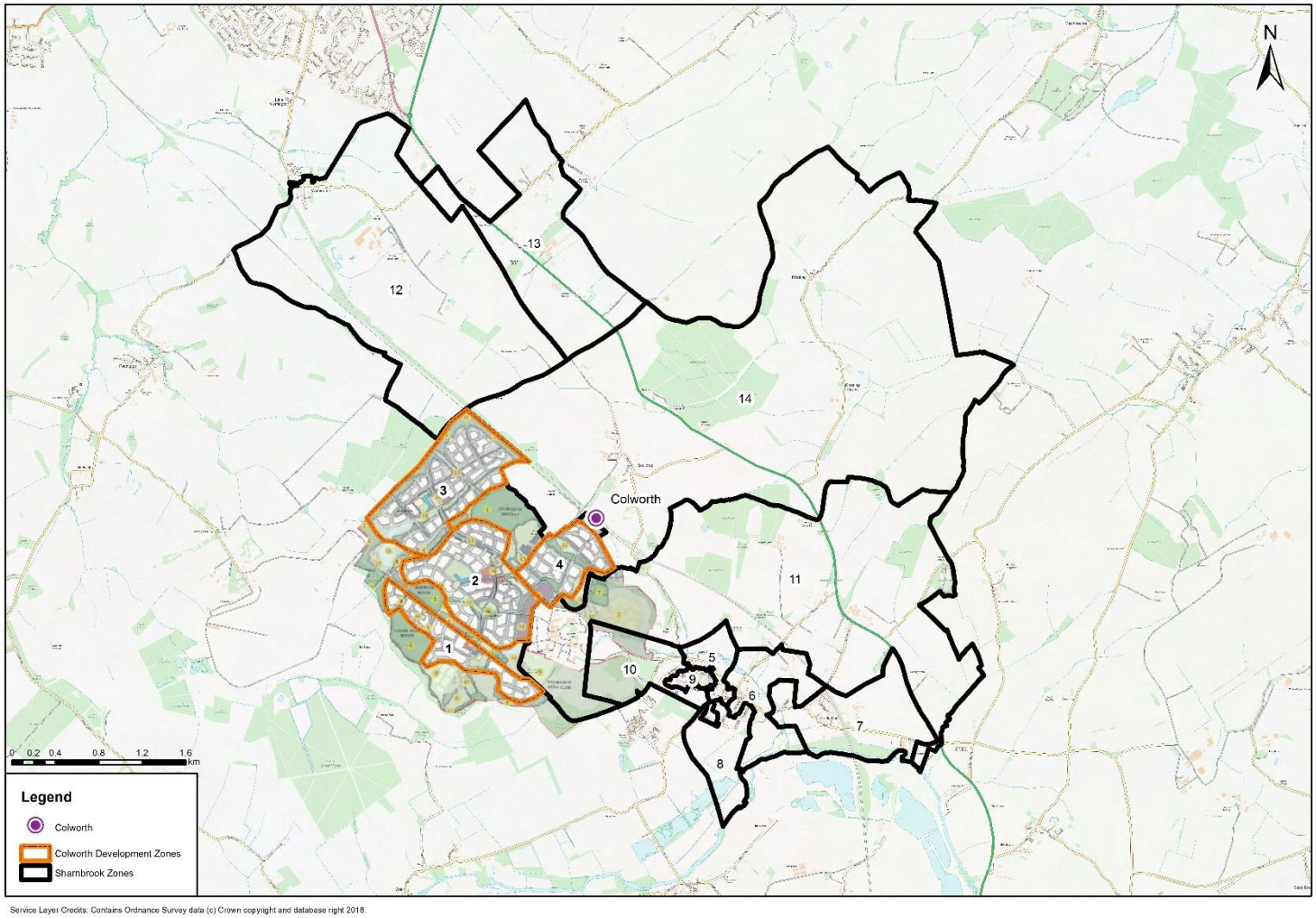
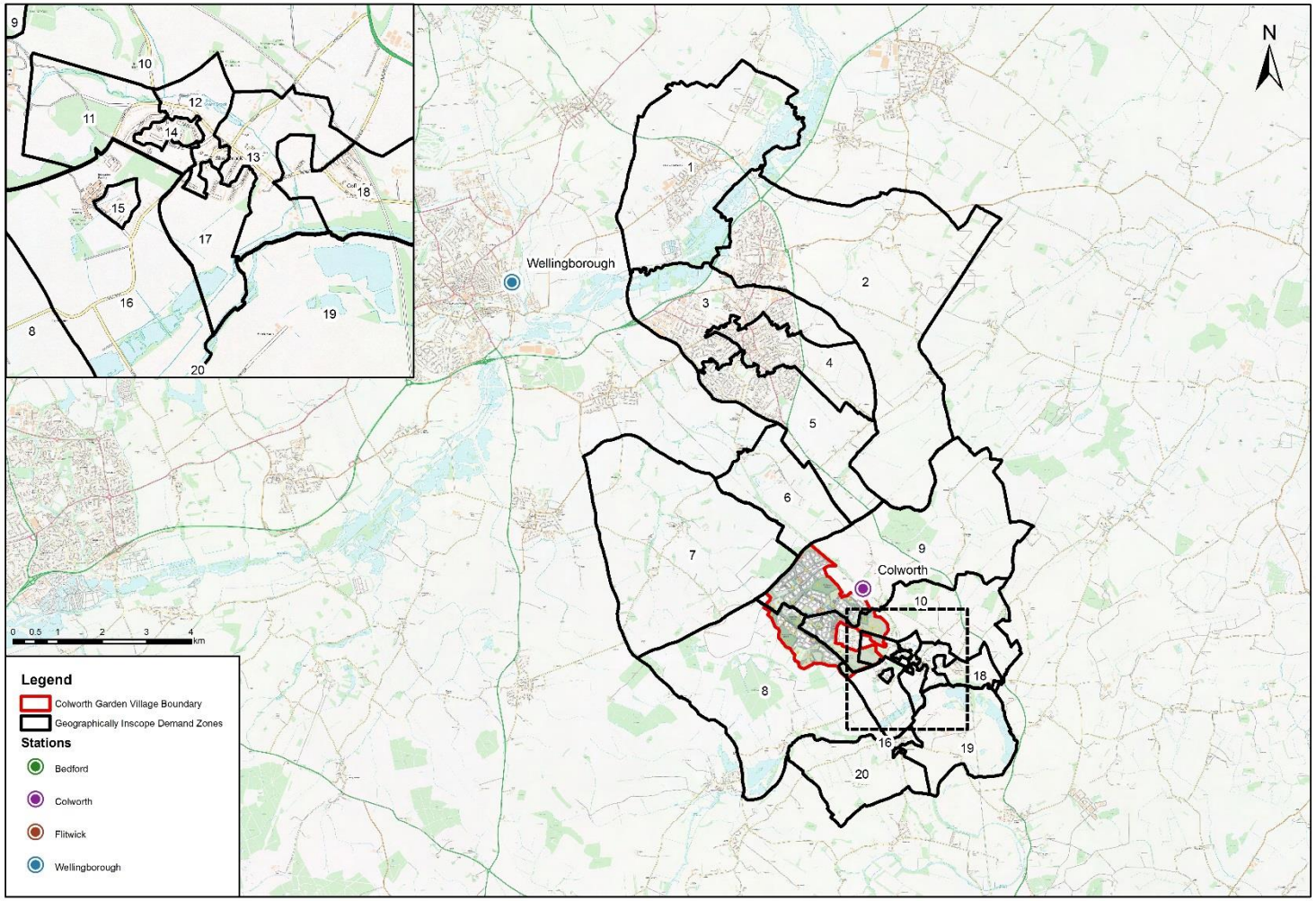


Figure 4-3: Catchment area for Potential Mode Transfer from Car



4.2 Forecast Passenger Demand – Colworth Development Commute Trips

Commute Trip Numbers

4.2.1 The first step in the modelling process has been to derive demand from the Colworth development for commute trips. Outputs for two scenarios have been derived i.e. 'Without' Colworth Station and 'With' Colworth Station.

4.2.2 Forecast rail demand for commute trips from the Colworth development with and without a rail station in place, has been derived using a trip-rate approach.

4.2.3 Without the station, the trip rate for rail trips is assumed to be the same as per the existing trip making patterns taken from the MSOA that includes Sharnbrook village. This shows that there are 35 trips per 1000 of the population who commute by rail.

4.2.4 To derive a trip rate for the 'with' station scenario, the trip rates have been derived by using the 2011 Census data for the area around Flitwick station, as the donor station. According to the 2011 Census the percentage of working population who travel to work by train is 11.1%. With Flitwick being identified as a major commuter station, this value was deemed appropriate for use as a proxy of the expected working population of Colworth using the proposed station.

4.2.5 Trip rates have been produced, with trips per 1000 of the population calculated based on distance to Flitwick station from nearby census output areas. Table 4-1 summarises the rail trips per 1000 by distance from Flitwick station.

Table 4-1: Flitwick total trips per 1000 of the population.

Bands	Distances	Trips per 1000
1	0 to 0.5	78
2	0.5 to 1	57
3	1 to 1.5	76
4	1.5 to 2	59
5	2 to 2.5	59
6	>2.5	68

4.2.6 The total households assumed for the Colworth development is 4,500 dwellings. The total population has been calculated by applying a 2011 Census average household size of 2.3 to obtain the total population.

4.2.7 To obtain the commute passenger trips generated from the Colworth development, the proportions per band were applied to the zonal population within Colworth. Four zones were generated with dwelling density identified for each. The four Colworth zones are shown in Figure 4-1 in brown.

4.2.8 Applying the proportions for Flitwick, based on the zone centroid distances to the proposed station, identified that a total of 622 people from Colworth are forecast to use rail for commuting with the new station in place.

4.2.9 Using the trip rate of 35 trips per 1000 of the population. The resulting commuter rail trips from the development (population c10,350) without the station would be 367.

Commute Trip Destinations

4.2.10 The destination of the commuter rail trips with or without the rail station have been derived from the census TTW data for Sharnbrook for the 'without station' scenario and for Flitwick in the 'with station' scenario. Table 4-2 shows the proportion of trips for London and local destinations for Sharnbrook and Flitwick.

Table 4-2: Trip Proportions London and Local

Area	London	Local
Sharnbrook	0.87	0.13
Flitwick	0.70	0.30

4.2.11 The Colworth commute trips have been split using these proportions and the assumed Colworth development rail users 'with' and 'without' the station has been calculated. Table 4-3 summarises these totals.

Table 4-3: Assumed Colworth Development Rail Users

	London	Local	Total
Without Colworth Station	319	47	367
With Colworth Station	436	186	622

London Trips

4.2.12 The local trips shown in Table 4-3, for the 'With' Colworth station scenario, are all assumed to travel from Colworth. However, for London trips there would be a split between those that use Colworth and those that would use Bedford, even with Colworth Station.

4.2.13 The trains that would run direct from Colworth to London are assumed to be 'slow' trains to London, whilst it is recognised that with 'fast' trains to London, calling at Bedford, but not Colworth, that some rail-based London commute trips would potentially drive to Bedford, rather than board at Colworth.

4.2.14 To forecast expected patronage at Colworth station, for London based trips from the Colworth, a logit model has been produced. This takes the generalised cost for potential choices for travel to London by rail. Five alternative options have been identified:

- Option 1 - Walk to station and then direct train to London;
- Option 2 - Walk to station, train to Bedford and then change to fast train to London;
- Option 3 - Drive to station and then direct train to London;
- Option 4 - Drive to station, train to Bedford and then change to fast train to London;
- Option 5 - Drive to Bedford and then fast train to London.

4.2.15 The model has been applied on a zonal basis for London commute trips only and for each option a generalised cost has been produced.

4.2.16 The generalised cost includes the following:

- Access time for walk to Colworth station (options 1 and 2)
- Access time for drive to Colworth station (options 3 and 4)
- Access time to drive to Bedford station (option 5)
- Travel time by rail to London (All options)
- Walk time from car park to station at Colworth (options 3 and 4)
- Walk time from car park to station at Bedford (option 5)
- Wait time for trains derived from the Passenger Demand Forecasting Handbook (PDFH) based on service headways (All options)
- Interchange time between services (for change at Bedford for options 2 and 4)
- Rail Fares (all options)
- Vehicle operating costs (options 3, 4 and 5)
- Car Park Charges (options 3, 4 and 5)

Access Time and Distance to Stations

4.2.1 The distances between the centroids for each of the Colworth zones and the proposed station location, were calculated in GIS using the Meridian Road network and the Network Analysis tool; this calculates the shortest route between the Origin and Destination point.

4.2.2 For the driving to Colworth station element an average speed of 32kph was used, for walking any trips for distances under 3km were identified to be suitable distances to travel to Colworth.

4.2.3 Google Maps was used to identify the access times and distances by car from the four Colworth zones to Colworth station and to Bedford station. AM peak journey times were extracted. Google maps gives a range of journey times for the peak period, and it was decided to reflect the likely worsening of traffic conditions in the future, that the top of the range value would be used.

4.2.4 The access times and distances for the car elements of the trips, were also used to derive the Vehicle Operating Costs, using values taken from WebTAG Databook.

Rail Journey Times

4.2.5 Current rail timetables were used to calculate the rail journey times to London for the existing scenario, without Colworth. The services that are assumed to be using Colworth in the future currently terminate at Bedford. The additional journey time for the Bedford to Colworth element, was derived from looking at the journey time from Flitwick to Bedford. The distance from Flitwick to Bedford is similar to that from Bedford to the proposed Colworth station. Therefore, the journey time has been assumed to be 10 minutes to Bedford and 1 hour 17 minutes to London.

4.2.6 Two additional scenarios have included the journey time for fast trains stopping at Colworth from Corby. To consider an additional two fast trains per hour a journey time of 1:01 minutes between Colworth and London (option 2), whilst for option 3, two fast trains per hour, results in a journey time of approximately 51 minutes.

4.2.7 The Generalised Cost (GC) calculations also include the service interval and transit time between Flitwick to London, Flitwick to Bedford and Bedford to London.

4.2.8 The cost of travel was also applied depending on the service assessed for each subsequent scenario. This included ticket costs between Bedford and London, Flitwick to London and to Bedford. For the generalised journey time calculations this was converted into time using the Value of Time (VOT) of 9.95 £/hr (TAG Unit 3.5.6).

Rail Fares

4.2.9 Rail fares have been derived from National Rail Enquiries (NRES) website and are input into the generalised cost model as full off-peak single fares. For Colworth, an additional fare of £2.50 has been applied, on top of the current Bedford fare to London.

4.2.10 It is possible that through negotiation with the train operating company a lower fare or the same fare as Bedford could be offered, increasing the attractiveness of the service.

Car Park Charges

4.2.11 Car parking charges have been taken from the National Rail Enquiries website for Bedford and Flitwick stations. The Flitwick car parking fee was taken as a proxy for the new Colworth Station car park.

Rail User Weightings and Penalties

4.2.12 Assumptions on weightings and penalties used with the calculation of the generalised cost are shown in Table 4-4.

Table 4-4: Rail User Weightings and Penalties

Item	Penalty Time	Scenario Applied
Walk time Weighting	2	All Scenarios
Wait time Weighting	2	All Scenarios
Interchange Penalty	10	Scenario 2 Drive and Walk

Mode Constant

4.2.13 To reflect the relative attractiveness of the different rail services available from Bedford and Colworth, i.e. the perceived value of the 'fast' trains over the 'slow' trains, will not just reflect the journey time, a different mode constant has been applied to the generalised cost. This will reflect the fact that the 'slow' trains will be more 'stop-start' due to the number of station stops. The 'fast' train has a mode constant of 5 minutes, whilst the slow train has 15 minutes.

Value of Time

4.2.14 All generalised cost parameters that have been derived in monetary values i.e. fares, car park charges and vehicle operating costs have been converted into generalised minutes, using a Value of Time (VOT) of 9.95 £/hr for commute trips. This is taken from WebTAG Databook Table 3.5.6.

Logit Model

4.2.15 The form of logit model used is

$P_n = Exp(^{-lamda \times GC_1}) / Sum(Exp(^{-lamda \times GC_1}), Exp(^{-lamda \times GC_1}), Exp(^{-lamda \times GC_1}) Exp(^{-lamda \times GC_1}) Exp(^{-lamda \times GC_1})$

Where:

P_n = Probability of selecting Option n

GC_n = Generalised cost for option n

4.2.16 A Lambda value of 0.04 has been used within the logit model.

4.2.17 The logit model output probability is applied to the London based rail trips only from the Colworth development.

4.3 Forecast Passenger Demand – Local Area Commute Trips

4.3.1 A very similar approach to deriving rail trips from the surrounding area has also been undertaken. The approach again derives a generalised cost for the potential options of travel for trips to London, based on a zonal system. The zones included are shown in black on Figure 4-1. The same logit model is then applied to these trips.

4.3.2 The assumption is, that given the distance of these zones from the station, that only drive options are available, either to Colworth or Bedford.

4.3.3 The trip rate used is assumed to be the same for the 'without' and 'with station' scenarios for these areas and the 35 trips per thousand of the population has been maintained for both. The split of London and local commute trips for the local study area is maintained for this population i.e. the proportion of London trips stays at 87%.

4.3.4 This results in the outputs from this element reflecting a direct choice between Colworth and Bedford for the same numbers in each scenario.

4.3.5 This approach may be a conservative estimate for the local area as no uplift in London commute trips from this area is applied. It should be noted that for trips to local stations, these are again assumed to all use Colworth, and there will be some uplift in rail use from this area, through mode transfer from car. This element is detailed below.

4.4 Forecast Passenger Demand – Mode Shift from Car

4.4.1 There is potential for Colworth station to be used as a park and ride location for some trips.

4.4.2 To derive any potential mode shift from car to rail the Census TTW data has again been interrogated. The first step was to identify any trips that could potentially transfer from car to rail. This would provide trips which were deemed to be 'geographically' in-scope. This would provide numbers of trips which currently commute by car from destinations north of Colworth, to destinations south served by rail.

4.4.3 The data indicated that only trips to locations relatively close to Bedford station from further north would be deemed to be in-scope.

4.4.4 In additional it is likely that a proportion of these trips which would have free car parking at their destination and these have been omitted from the potential demand, as they are deemed

to not be 'economically' in-scope. Recent work undertaken within Reading indicated that around 35% of people driving to work in the town, had access to a free parking space. This figure has been used here, although further work will be undertaken to assess the level of employee parking available in Bedford and other local employment centres.

4.4.5 The approach to determine the level of model shift has used a logit model. In this instance, just two options have been included within the logit model, which are:

- Drive to Bedford
- Drive to Colworth Station and drive to Bedford

4.4.6 The generalised cost has been calculated on a zonal basis and includes the zones shown in Figure 4-2. For each of the option the generalised cost calculation includes:

Drive to Bedford

- In Vehicle Time – derived from Google maps
- Walk time at destination
- Vehicle operating cost
- Car park charge in Bedford

Rail Park and Ride

- Car in-vehicle time to Colworth Station
- Walk time form station car park to station
- Wait time for train
- In-vehicle time for train element
- Walk time at destination
- Car park charge at Colworth

4.4.7 All generalised cost parameters that have been derived in monetary values i.e. fares, car park charges and vehicle operating costs have again been converted into generalised minutes, using a Value of Time (VOT) of 9.95 £/hr for commute trips. This is taken from WebTAG Databook Table 3.5.6.

4.4.8 The logit model has then been used to determine the proportion of trips by each option. A lambda value of 0.04 has been used within the logit model.

4.4.9 The resultant probabilities were applied to the total population of commute-drive trips that were deemed to be both 'geographically' and 'economically' in-scope.

4.5 Journey Purpose Splits

4.5.1 The methods detailed so far in this section show the derivation of commuting trips that could potentially use Colworth station. In addition to the commuting trips there will be trips made for other trip purposes. Through the National Travel Survey, the Department for Transport provide a Rail Factsheet, which sets out the split of rail trips by journey purpose. The available data from December 2019, is shown in Table 4-5.

Table 4-5: DfT Rail Factsheet England Journey Purpose

Journey Purpose	Proportion of rail journeys in England	Period Used
Commuting	54%	-
Business	8%	Peak
Leisure	26%	Off-peak
Shopping	5%	Off-peak
Other	7%	Off-peak

4.5.2 This data has been used to derive trips by other purposes to provide total daily trips from Colworth Station.

Time-Period Assumptions

4.5.3 The predicted passenger numbers for Colworth have been split into trips that would travel before 09:30 and those after 09:30. The assumption is that all commute and business trips are made before 09:30 and all other trips will be made after 09:30.

Calculation of Abstracted and Newly Generated Trips

4.5.4 Not all trips derived through the modelling would be newly generated and for the purposes of the economic appraisal it is important to split out the trips between newly generated and abstracted trips. The abstracted trips are those that would use the rail system, even without Colworth station. In this case this would be trips that would transfer from using Bedford to using Colworth, if the station is developed.

4.5.5 Passenger boarding numbers have been derived with and without the station in place, with outputs for peak and off-peak periods only. Results were presented for travel to London and local destinations separately for the following:

- Abstracted trips generated from the Colworth development;
- Abstracted trips taken from those that currently drive to Bedford to use rail, and;
- Intercepted trips, those taken off the A6 which are forecast to use the P&R site.

4.5.6 In terms of the breakdown of abstracted and newly generated trips, these have been calculated for each of the sets of outputs separately.

4.5.7 Trips that are shown to change mode from car to rail park and ride are deemed to all be newly generated.

4.5.8 Local trips from the surrounding area, as well as from the Colworth development who would use Colworth station are also deemed to be newly generated trips.

4.5.9 London trips from the surrounding area, are all assumed to be abstracted trips as they are assumed to use Bedford in the 'without' Colworth scenario. As stated previously, no uplift has been applied to these trips between the two scenarios i.e. the trip rate for commuter rail trips would be the same in both scenarios.

4.5.10 The calculation of the abstracted and newly generated trips for the Colworth development is derived from the uplift in passenger numbers, due to the increased trip rate with the station in place. The abstracted trips would equal the number of trips derived from the lower trip rate, minus those trips that would still drive to Bedford, even with a Colworth station in place. The remaining passengers are deemed to be newly generated.

5 Passenger Demand Forecasts

5.1 Demand Outputs

5.1.1 Passenger demand outputs have been produced below for the opening year and for five year periods thereafter. The passenger numbers will take account of the phased build out of the Colworth development. For the purposes of the assessment, it has been assumed that the build rate will be 200 dwellings per annum, recognising that the annual build rate will vary. The passenger numbers are daily passenger numbers boarding at Colworth before 09:30 and after 09:30 and have been split by London and local trips and newly generated and abstracted.

5.2 Results Summary

Passenger Demand – Colworth Railway Station

5.2.1 The forecast patronage demand for Colworth for the year of opening, and for five year periods thereafter are shown in Tables 5-1 to 5-5. Full build out is assumed to be 2038, based on the 250 units p.a. build out rate. The passenger numbers also include an annual passenger growth figure of 2% per annum for the first 20-years. The annual weekday demand is based on an annualisation factor of 175 working weekdays per year, this assumes that not every commuter will use the station every day of the week. It includes a weekend annualisation factor of 109.

5.2.2 Results are provided for an option which has Colworth Station provided on the "Slow Lines" and served by East Midlands Trains travelling to and from Corby.

Table 5-1: Colworth Station Passenger Demand – 2027

	Peak (Before 0930)	Off-Peak (After 0930)	Weekday 24-Hour Total	Weekend	Annual Two-Way Demand
To London – Abstracted	130	28	158	0	55,400
To London – Newly Generated	27	11	38	0	13,500
Local – Abstracted	20	65	85	0	29,700
Local – Newly Generated	107	44	151	0	52,900
Total Trips	285	147	433	0	151,400

Table 5-2: Colworth Station Passenger Demand – 2032

	Peak (Before 0930)	Off-Peak (After 0930)	Weekday 24-Hour Total	Weekend	Annual Two-Way Demand
To London – Abstracted	239	51	289	72	117,000
To London – Newly Generated	68	27	96	0	33,400
Local – Abstracted	38	118	156	0	54,700
Local – Newly Generated	163	84	247	0	86,500
Total Trips	508	280	788	72	291,600

Table 5-3: Colworth Station Passenger Demand – 2037

	Peak (Before 0930)	Off-Peak (After 0930)	Weekday 24-Hour Total	Weekend	Annual Two-Way Demand
To London – Abstracted	368	78	446	50	167,000
To London – Newly Generated	117	47	164	39	65,900
Local – Abstracted	58	183	241	117	110,000
Local – Newly Generated	230	132	362	90	146,300
Total Trips	773	440	1,213	297	489,200

Table 5-4: Colworth Station Passenger Demand – 2042

	Peak (Before 0930)	Off-Peak (After 0930)	Weekday 24-Hour Total	Weekend	Annual Two-Way Demand
To London – Abstracted	501	107	608	79	230,000
To London – Newly Generated	169	68	236	61	96,000
Local – Abstracted	80	249	329	185	155,600
Local – Newly Generated	297	181	478	142	198,200
Total Trips	1,046	605	1,651	468	679,800

Table 5-5: Colworth Station Passenger Demand – 2046

	Peak (Before 0930)	Off-Peak (After 0930)	Weekday 24-Hour Total	Weekend	Annual Two-Way Demand
To London – Abstracted	578	123	702	93	265,700
To London – Newly Generated	200	80	280	71	113,400
Local – Abstracted	93	288	380	216	180,200
Local – Newly Generated	333	211	544	165	226,400
Total Trips	1,204	702	1,906	545	,785,800

5.2.3 The analysis shows that by the time of the full build out of Colworth Garden Village the station would be used by approximately 0.8m passengers per year.

Passengers diverting from Bedford - Demand

5.2.4 A further segment of demand for Colworth has been determined by taking the proportion of people estimated to drive to the station which already drive to Bedford to catch a train and those that have been intercepted from the A6. The demand for the peak and off-peak periods are shown in five year intervals including the completed development year in Table 5-6 below.

Table 5-6: Additional Demand – Passengers diverted from Bedford

Period	2027	2032	2037	2042	2046
Peak Demand	40	91	142	192	228
Off-Peak Demand	8	18	28	38	46

5.2.5 The analysis indicates that the total number of parking spaces required at Colworth during peak times would range from 40 in 2027 to 228 in 2046, the off-peak demand is significantly lower.

Appendix D Memorandum of Understanding

Memorandum of Understanding for The Development of a New Sharnbrook Station

This Memorandum made on this [DATE] by and between **Wrenbridge Land Ltd** whose registered office is at Mill House Mill Court, Station Road, Great Shelford, Cambridge, CB22 5LD ("Wrenbridge") and **Network Rail Ltd** whose registered office is at 1 Eversholt Street London, NW1 2DN ("Network Rail") (collectively the "**Parties**" and singularly a "**Party**").

References to any party include its successors and assigns; including for Wrenbridge, **Stantec Ltd** whose registered office is at Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN, acting as transport consultants and **Rapleys LLP** whose registered office is Falcon Road, Hinchingbrooke Business Park, Huntingdon PE29 6FG acting as development managers.

WHEREAS

A. The **Parties** have agreed their intention to jointly develop proposals for:

   1. A land developer's voluntary agreement to jointly develop plans to build a new rail station at Sharnbrook, Bedfordshire and to provide funding through developer's contributions to be paid direct to Network Rail, East Midlands Trains ("EMT"), and/or the local transport and planning authority (Bedford Borough Council), following a successful planning application for residential development in Sharnbrook
   2. An infrastructure provider's voluntary agreement to jointly develop plans to build a railway station at Sharnbrook, Bedfordshire
   3. A train operator's voluntary agreement to develop operational plans to deliver additional service capacity and efficiencies, in return for directed private sector investment

B. Collectively these proposals ("**the Project**") are to be developed over the Project development period, which will be for [xxx] months commencing on [date], or other date agreed between the Parties.

C. Network Rail are the owners, operators and deve
D. lopers of Britain's railway system and are responsible for the railway infrastructure including tracks, signals and stations.

E. East Midlands Trains are the train operator providing rail services under the East Midlands rail franchise.

F. Wrenbridge seeks to secure and promote land asset opportunities with the aim of maximising land values, through the development of residential, employment and retail sites.

G. Wrenbridge intends to make a submission to the local planning authority and if successful enter into a contract with Network Rail to provide infrastructure and EMT to provide services for the Project.

H. As stated in F above, if successful the Parties wish to co-operate to combine and exploit their complementary skills in the provision of services for the Project.

I. The services to be delivered by the Parties are as described in the specification in Appendix 1.

NOW THEREFORE IT IS AGREED AS FOLLOWS:

1. Purpose and Relationships of the Parties

1.1. The purpose of the Memorandum is to establish the principles governing the relationships of the Parties with each other and third parties in relation to the development of the Project.

1.2. The Parties shall co-operate fully and exclusively with each other in accordance with the provisions of this Memorandum to develop the Project. The Parties shall refrain from any action or conduct which may work contrary to this objective.

1.3. Nothing contained in this Memorandum shall create or be construed as creating any partnership, agency, employment or fiduciary relationship between the Parties. No Party shall be authorised to incur any obligation on behalf of the other Parties without obtaining the prior written consent of such Parties.

1.4. None of the Parties shall participate in any other development of the Project either directly or through any subsidiary or other associated company without the prior written consent of the other Parties.

2. Project Development

2.1 The Parties will meet and consider in detail how they will collaborate to develop the Project.

2.2 The proposals in the Project shall be in such form and shall contain such terms and conditions, rates and prices as Network Rail and Wrenbridge shall agree following discussion on commercial issues amongst the Parties.

2.3 Network Rail and Wrenbridge shall determine the price and consider any request for additional funding from the third parties such as EMT or the Transport Authorities for the Project.

2.4 The Parties shall agree the prices and terms and conditions of the contract under which Network Rail shall provide services for the Project to Wrenbridge.

2.5 The Parties agree that they shall be separately and solely liable for all costs, charges and expenses they may have incurred in connection with the preparation and submission of the bid for the Project except as otherwise agreed.

3. **Project Organisation**

3.1 The Parties shall establish a team (the "**Project Development Team**") which shall have the following purposes:

(i) to identify the best approach to developing a new station scheme as part of a planning application that will lead to the award of planning approval and enable the Project,

(ii) to agree upon the proposed management structure for the Project;

(iii) to determine in more detail the roles and responsibilities of the Parties in the Project;

(iv) to identify any other suitable third parties who shall be invited to participate with the Parties in the development of the Project to the extent that no Party has the necessary resource or expertise.

4. Information

4.1 The Parties shall co-operate and provide each other promptly with all information (within any Party's control) and assistance as may reasonably be required for the purposes of the preparation of any bid, and pursuit of the Project.

4.2 If any Party finds that the information so provided under Clause 4.1 above is inaccurate or incorrect, such Party shall notify the other Parties without delay and the Party providing such information shall correct such inaccuracy or mistake, subject to such information being capable of correction.

4.3 All documents and other information obtained by the Parties from each other in collaborating pursuant to this Memorandum shall be treated as strictly confidential and shall be used solely for the purpose for which they are disclosed. Third parties shall only be given access to such documents or information with the consent of the disclosing Party and then only to the extent necessary for purposes for which such disclosure is made and subject to the third party concerned undertaking to keep the information confidential. This shall not apply to documents or information which are in the public domain (other than by reason of a breach hereof) or are already in the possession of the Party concerned at the time of communication or after communication which are obtained in good faith from a third party entitled to disclose it.

4.4 No Party shall make any public announcement concerning the Project without the prior approval of the other Parties. All public announcements, unless otherwise agreed, or communication with third parties concerning the Project shall be done in the name of Wrenbridge.

5.0 Memorandum Duration

This Memorandum shall terminate upon the first to occur of the following:

(a) upon the written confirmation of Network Rail to Wrenbridge that the Project is not viable and will not be progressed, or vice versa;

(b) the date upon which Network Rail enters into a contract for the Project services with Wrenbridge;

(c) failure to agree terms and conditions of the bid;

(d) the Project development period end date of [date].

6.0 EXCLUSION OF THIRD PARTY RIGHTS

No provision of this Memorandum is intended to nor does it confer upon any third party any benefit or right enforceable at the option of that third party or any liability whatsoever on any third party.

7.0 LAW

7.1 This Memorandum shall in all respects be governed by and interpreted in accordance with the laws of England and Wales.

Signed by _____

duly authorised for and on behalf of **Network Rail Ltd.**

Signed by _____

duly authorised for and on behalf of **Wrenbridge Land Ltd.**

Appendix 1

Project Specification

1. Scope
    1.1 To jointly develop proposals for the delivery of a new railway station at Sharnbrook, Bedfordshire and for areas adjacent to the station, as part of one or more planning applications for residential development.
2. Joint Activities
    2.1 Develop and agree options for the construction of the following:
        - Station buildings
        - Station facilities, including platform, lift and footbridge
        - Car parking
        - Other operational and commercial facilities as required
    2.2 Develop and agree options for access by all transport modes
    2.3 Develop and agree a costs model
    2.4 Develop and agree a funding model
    2.5 To engage with EMT to consider train operations options and preferred approach
    2.6 To engage with local planning and transport authorities to seek approval for options and preferred approach
    2.7 To develop and agree a package of measures to enable the station construction
3. Project Timescale
    3.1 The project will be complete when an agreed development proposal has been developed and submitted as part of one or more planning applications.
    3.2 Any work beyond the submission of planning applications will be undertaken by the parties as required and outside the scope of this project specification.

Appendix E Capital Cost Estimate

Stantec

Memo

To:	Project File	From:	David Bowers London
File:	Colworth Station Costs v1 1	Date:	January 27, 2021

Reference: Colworth Garden Village – Costs for Rail Station

INTRODUCTION

This memo provides a summary of the potential capital costs for a new rail station to support the proposed development of Colworth Garden Village. Two potential station options are considered possible: a single platform arrangement provided adjacent to the "slow" lines; a double platform arrangement for the "fast" lines. In preparing capital cost estimates the addition of various allowances for design, project management and risk have a substantial impact on the final estimate and the use of different allowances by different estimators means that a direct comparison of final costs is not always straightforward.

It should be noted that the capital costs of the station are expected to be met by the developer of the proposed Colworth Garden Village and hence they (and not the public sector) have the risk that the delivery costs are higher than the estimated costs.

Previous estimates of the station cost have been developed as follows.

STANTEC – OUTLINE BUSINESS CASE – 2018

A high-level capital cost estimate for the station was developed to support the preparation of the Outline Business Case for the station. This cost was prepared for a single platform option and associated signal and track work and the cost was estimated at £10.35m (2018 prices and including a risk allowance of 15%). A breakdown of this cost is provided in Annex A. It was assumed that the cost for a double platform option would be similar to a single platform option because the costs of an additional platform would be offset by the reduced need for signal and track works. This is considered appropriate given the limited amount of design work that has been undertaken to date.

WSP – VIABILITY AND DELIVERY CONSIDERATIONS – 2018

As part of work to support the Twinwoods development, WSP prepared a critique of the analysis supporting Colworth Garden Village (*Viability and Delivery Considerations – Colworth Garden Village, 2018*). This report included a review of the capital cost of providing a station and they provided their own estimate of the cost of providing a two platform station of £31.1m (2018 prices). This included an allowance for preliminary costs of 45%, project management, design and interruption costs of 45% and a risk allowance of 30%. Overall, these additional allowances increase the base infrastructure cost by 120%. A breakdown of the cost is provided in Annex B.

SYSTRA – COST ESTIMATE – 2017

As part of a previous review of the Colworth rail station proposals, Systra reviewed the cost estimate prepared by Stantec *(SYSTRA Comments on PBA Colworth Garden Village: Sharnbrook Railway Station Initial Transport Feasibility)*. As part of this review Systra estimated that the cost of the station would be £13.2m and £18.4m.

Reference: **Colworth Garden Village – Costs for Rail Station**

OTHER RAIL STATIONS

Two other relatively similar stations provide comparators for potential station costs:

- Thanet Parkway £19.99m (incl 11% contingency)
- Reading Green Park £14.75m

These stations are in the final stations of the design process and further details are provided in Annex C.

COST COMPARISON

The capital costs described above have each been prepared on a slightly different basis. The difference between the Stantec 2018 estimate (£10.4m) and the WSP estimate (£31.1m) can be accounted for as follows:

- WSP assumed 35% for preliminaries and overheads compared to 0% for Stantec
- WSP assumed 45% for design, project management and interruptions to rail services compared to 4% for Stantec
- WSP assumed 30% for risk compared to 15% for Stantec

A more detailed comparison of the two cost estimates is provided in Annex D together with a revised cost estimate based on the information provided by the different analyses.

CONCLUSION AND REVISED ESTIMATE

Based on this review of the capital costs, we have revised our high-level outline estimate of the Colworth Station cost as follows:

- Cost estimate – 15% risk allowance £18.6m
- Cost estimate – 30% risk allowance £21.1m

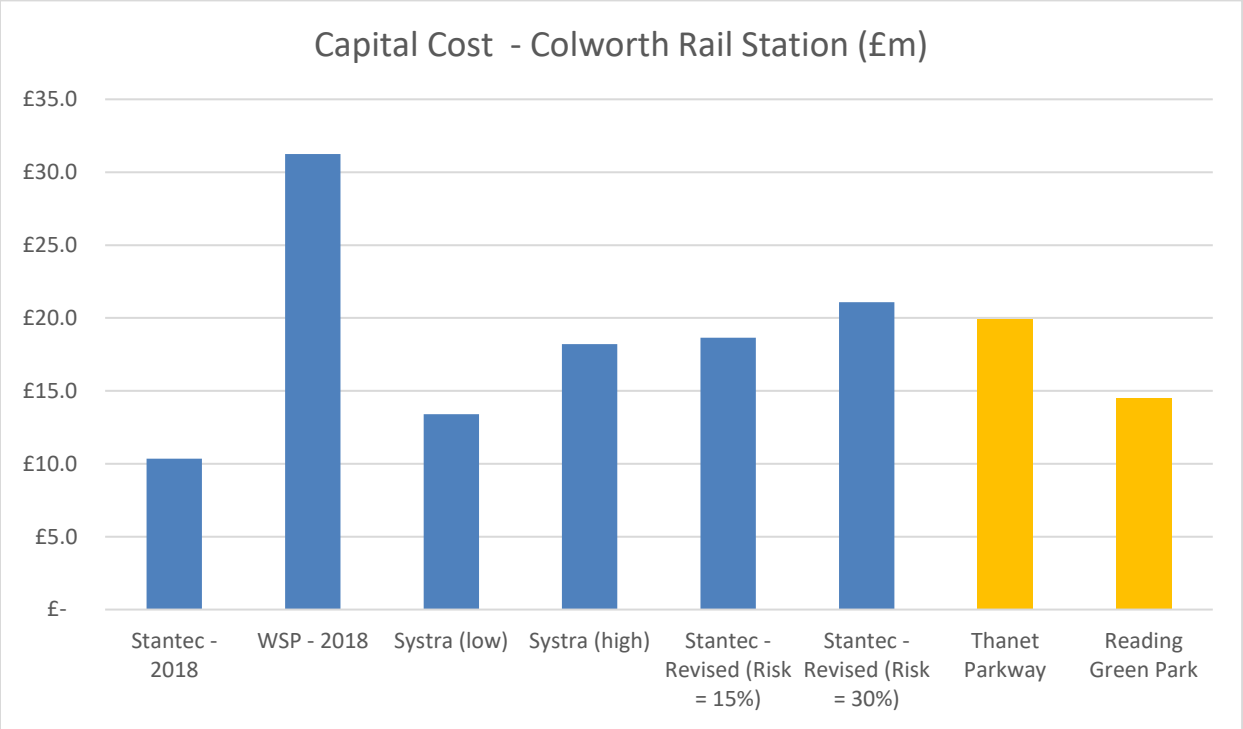
Based on this analysis, we consider that a capital cost estimate of c£18m-£21m (2018 prices) provides a suitable input to the Outline Business Case and other associated viability studies.

Figure 1 compares the different capital cost estimates for the proposed station together with details of the two “benchmark” stations and the revised cost estimates.

Further work to refine the cost estimate will be undertaken during the next stages of the development of the project.

Reference: **Colworth Garden Village – Costs for Rail Station**

Figure 1 – Cost Comparison



Reference: **Colworth Garden Village – Costs for Rail Station**

ANNEX A CAPITAL COST ESTIMATE – STANTEC – 2018

Cost Estimate Summary Report					
Project Title	Sharnbrook Station Assessment				
Estimate Date	**01/02/2018**				
Version	**1**				
Price 'Base Date'	**2018**				
Estimated Stage	**GRIP1**				
ITEM	**QUANTITY/SCALE**	**RATE**	**UNIT**	**COST**	
Platform*	415	£1,000	m2	£415,000	
Footbridge	1	£2,000,000		£2,000,000	
Lift				£0	
Shelter	2	£25,000		£50,000	
Ticket Vending Machines	4	£23,000		£92,000	
Security fencing	230	£100	m2	£23,000	
Lighting	120	£1,000		£120,000	
CCTV	500	£1,000		£500,000	
Signals	2	£1,500,000		£3,000,000	
Crossover	2	£750,000		£1,500,000	
Fees	20%	-		£300,000	
Car Park	500	£2,000		£1,000,000	
			Total	**£9,000,000**	
Uplift for Risk and Contingency		**15%**		**£1,350,000**	
Optimism Bias+		**64%**			
			Total Inc. Risk and Contingency	**£10,350,000**	
*Costs based on a single platform of 166m length to accommodate 162m 8 car class 700 Thameslink trains.				DfT Price Base Year	2010
+ Optimism Bias obtained from WebTAG Unit A5.3 Dec 2017				Cost Base	2018 Q2

Reference: **Colworth Garden Village – Costs for Rail Station**

ANNEX 2 - WSP COST ESTIMATE - 2018

Cost Breakdown		£,000	
		2 platforms	4 platforms
Direct Costs			
Platforms		4250	8500
Platform Furniture / Facilities		365	700
Lighting		90	180
Canopies		875	1750
Lifts and Escalators		625	1250
Footbridges		2000	2200
Station Equipment		745	1400
Station Systems		500	1000
Buildings & Shelters		150	150
Track Mods		60	100
Signalling		400	600
Traction		500	1000
Car Parking and Access		2500	3500
Earthworks		40	100
Highways and Bridges		250	250
Demolition Works		0	0
Sub Total		*13350*	*22680*
Indirect Costs			
Preliminaries		20%	20%
Overheads		15%	15%
Sub Total		*4673*	*7938*
Construction Cost (excl Risk)		18023	30618
Employers Indirect Costs			
Design		16%	16%
PM		14%	14%
Interuption of Use		15%	15%
Sub Total		*5941*	*10093*
Risk			
Risk		30%	30%
		7189	12213
Overall Project Cost		**31152**	**52924**

Reference: **Colworth Garden Village – Costs for Rail Station**

ANNEX C – OTHER STATION COSTS

THANET PARKWAY

The proposed Thanet Parkway railway station

The costs comprise of:

£19.99m for the station and car park (at 80% probability and inclusive of 11% contingency);

£10.20m for the level crossing upgrades (at 10% probability and inclusive of 57% contingency – this level of contingency is standard industry practice with work at GRIP1 stage);

£4.14m for other costs including the highway junction works, archaeological mitigation works, land purchase, planning costs, legal costs and fees.

Source: https://theisleofthanetnews.com/2020/01/27/kent-county-council-cabinet-approves-17-8million-thanet-parkway-station-spend/

READING GREEN PARK

- **Reading Green Park** - sponsored by Reading Borough Council, plans submitted in March 2014 and funding approved in November 2014 with construction planned to start in October 2016 but delayed to winter 2017 by GW electrification slippage. Funding has been increased to £14.75m, partly by the second round of the New Stations Fund, to support higher expected passenger numbers. Opening was planned for May 2019; it has since been confirmed as December 2020 when Reading Borough Council approved revised plans on 12 September 2019. Construction progress pictured in mid-May 2020.

Source: https://www.railfuture.org.uk/New+stations

Reference: **Colworth Garden Village – Costs for Rail Station**

ANNEX D – FURTHER COST ANALYSIS

	Stantec (2018)	Stantec - Adjusted (2020)	WSP (2018)	Stantec - Blended - Low (2020)	Stantec - Blended - High (2020)
Infrastructure (excluding car park)	£7,700,000	£7,700,000	£10,850,000	£10,180,000	£10,180,000
Preliminaries and Overheads (%)	0%	0%	35%	15%	15%
Preliminaries and Overheads	£0	£0	£3,797,500	£1,527,000	£1,527,000
Total (Infrastructure + Fees)	£7,700,000	£7,700,000	£14,647,500	£11,707,000	£11,707,000
Car Park	£1,000,000	£1,000,000	£2,500,000	£1,000,000	£1,000,000
Car Park (allowance for design/PM etc)	£0	£0	£875,000	£150,000	£150,000
Total (Infrastructure + Fees + Car Park)	£8,700,000	£8,700,000	£18,022,500	£12,857,000	£12,857,000
Fees (Design / PM / Interruption (%))	3.4%	20%	45%	30%	30%
Fees (Design / PM / Interruption)	£300,000	£1,740,000	£6,007,500	£3,354,000	£3,354,000
Risk (%)	15%	15%	30%	15%	30%
Risk	£1,350,000	£1,305,000	£7,209,000	£2,431,650	£4,863,300
Total (Infrastructure + Fees + Risk)	**£10,350,000**	**£11,745,000**	**£31,239,000**	**£18,642,650**	**£21,074,300**

Reference: **Colworth Garden Village – Costs for Rail Station**

Stantec – Blended Cost Estimate – 2020 (excludes allowances for design etc)

Infrastructure Costs (£)	WSP	Stantec	Stantec - Blended
Platforms	4250	415	415
Platform Furniture / Facilities	365	23	365
Lighting	90	120	90
Canopies	875	0	0
Lifts and Escalators	625	0	625
Footbridges	2000	2000	2000
Station Equipment	745	92	745
Station Systems	500	500	500
Buildings and Shelters	150	50	150
Tracks Mods	60	1500	1500
Signalling	400	3000	3000
Traction	500	0	500
Car Parking and Access	2500	1000	1000
Earthworks	40	0	40
Highways and Bridges	250	0	250
Demolition Works	0	0	0
Sub total	**13350**	**8700**	**11180**