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Uckfield Town Council

Lewes – Uckfield Railway

Review of Network Rail Re-instatement Study 2008

Final draft Report

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1 INTRODUCTION

1.1 Jacobs Consultancy Remit

Network Rail (NR) was commissioned in 2008 by the Central Rail Corridor Board, whose members comprise local MPs and representatives from regional, county and district levels, to undertake a study to investigate the technical feasibility, costs and benefits of re-instating the Lewes to Uckfield railway line, and to identify whether or not there is a business case for the proposal. Their study report (July 2008) developed a technical solution but concluded that there was a relatively weak business case for the proposal, both from a financial and transport economic cost benefit perspective. The remit for this study was restricted to considering extension of the diesel railway with no line speed improvements or electrification to be assumed for the Uckfield line.

Jacobs Consultancy has been engaged by Uckfield Town Council to review that report in terms of the robustness of the business case work prepared for the scheme and the appropriateness of the scheme specification. We have also briefly considered options outside the NR study remit, including an electrified re-instatement were the existing Uckfield branch to be electrified as proposed in the Network Rail Electrification RUS (draft 2009). We are grateful to Network Rail and their sub-consultants, Mott MacDonald, for meeting with us to discuss the project and for their assistance in responding to our enquiries to enable a satisfactory review to be conducted.

We note that it is recognised in local and regional policy that more and better rail links are important in the support of economic development in the South East. The NR Study was not remitted to explore the degree to which the scheme could contribute as part of a wider policy driven development of the area to drive economic development.

1.2 Summary of the Network Rail Base Option

The NR “Base Option” consists of a newly built single track railway between Uckfield and Lewes with passing loops provided at Uckfield and also the junction with the Cooksbridge line near Lewes. Network Rail has estimated that the total capital cost for this option would be £141 million, including a 30% contingency allowance. The net benefits from the re-opening are stated to be relatively low with a Benefit to Cost Ratio (DfT definition) ranging between 0.64 and 0.79 dependent on the actual service option modelled.

Three rail service options were appraised, comprising the extension of existing services from Uckfield to Lewes, or beyond to Newhaven or Eastbourne. The best BCR was obtained from the Lewes option and we have therefore undertaken our investigations using that option as our base. Network Rail also considered options for the construction of intermediate stations at Isfield and Barcombe Mills. These were found not to enhance the overall business case.

1.3 Funding

The issue of how the significant outlay required to build the railway could be funded was not within the scope of the NR report. The business case as presented in the NR report suggests that the incremental revenue may more than cover the ongoing train operating costs, but would not provide a commercial return to pay back on the initial capital outlay. We are aware of some interest from a property developer who had apparently identified scope to contribute towards funding through a levy on house building they proposed for the area served by the railway route.

2 REVIEW OF NETWORK RAIL SCHEME PHYSICAL ASPECTS AND COSTS

2.1 Physical specification

2.1.1 Infrastructure definition

The report outlines the options for re-instatement of the route. Originally (in 1858) the line was built such that it joined the Keymer Junction to Lewes route to the west of Lewes. Subsequently in 1869 a new connection was constructed that allowed trains to join the main line to the east of Lewes, thereby permitting through trains to run to and from Brighton. The latter then became the main route and the 1858 route via Hamsey was subsequently closed. The 1869 route from Uckfield to Lewes was closed in 1969 and that route is no longer a feasible option into Lewes owing to the construction of public highway and other significant buildings on the former trackbed. The NR report concludes that the only feasible route for re-opening, therefore, is the eastern approach to Lewes via Hamsey. Whilst that route from Uckfield to Lewes is said to have been protected from development since the 1970s, significant encroachment has taken place, principally the Uckfield road bypass that crosses the rail route at grade and housing developments in the Hamsey area. The latter is of sufficient scale that the NR preferred route option (1A) is to construct a completely new 1.5km alignment to bypass that encroachment.

Option 1A provides for a single line between Uckfield and Lewes via Hamsey with two passing loops. The first would be in the form of a ¾ mile extension of the double junction with the Keymer Jn line and the second a loop at Uckfield station. The double junction would allow for a northbound train to clear the main line while waiting for a late running southbound train to clear the single line from Uckfield and is therefore not strictly required for a half-hourly timetable. The Uckfield loop was required in order to path up to a half-hourly service based on extension of existing London Bridge to Uckfield services, assuming existing timetable north of Uckfield.

The route has been designed to accommodate trains of 240m in length (12 * 20m vehicles). It is highly unlikely that trains of more than 2 cars would be required south of Uckfield in terms of passenger loads to be accommodated, although with through services operating between Lewes and London then existing train lengths of up to a maximum of 8 cars would need to be accommodated.

(a) Line Speed

The ruling line speed has been assumed to be 90mph, giving an anticipated journey time of 10 minutes between Lewes and Uckfield non-stop. The route north of Uckfield has a ruling line speed of 70mph, however, and whilst this could potentially be improved (and the class 171 trains are technically capable of 100mph), the combination of gradients and station spacing means that any line speed improvements would not deliver any tangible journey time reductions given current station calling patterns. NR have stated that construction costs would be similar for a specification of 70 or 90mph and that maintenance costs are also likely to be quite similar. The difference in journey time between Uckfield and Lewes, a distance of some 6 miles, with a 70mph and 90mph line speed would be negligible, even for a non-stop train. If

one or more intermediate stations were to be reopened then there would likely to be no material difference in timings.

(b) Land Take

Whilst planned for single track, land acquisition is envisaged that would allow for double track to be installed at a later stage. For example, bridge abutments would be constructed to double track standards with the actual bridge span being for a single track. A single track would allow for up to a half-hourly service to operate between Lewes and Uckfield and the existing single line sections north of Uckfield would effectively limit overall route capacity to a 30 minute interval as operates today in the Peak periods. As there is unlikely to be a market need for a more frequent service at the southern end of the line only, double tracking would therefore only be of potential value if the existing route north of Uckfield were similarly upgraded. In our discussions with NR, they advised that the marginal cost saving from single track land acquisition compared with a double track formation would not be significant and the legal, Transport & Works Act and compensation costs would likely be significant and at a similar level for both single or double track formations. A case for the Lewes to Uckfield section being double track throughout would be unlikely and the single line sections north of Uckfield would probably then also need to be doubled to realise the full potential in terms of line capacity enhancement. NR does not have any plans for re-doubling in the foreseeable future.

(c) Level Crossings and Bridges

The former Lewes to Uckfield route contained a number of level crossings. Most were over minor roads but the crossing in the centre of Uckfield was a particular problem and was finally closed in the 1990s when the station was re-located to a new site to the north, leaving the former station site abandoned and available for development.

The study assumes that the former Uckfield High Street level crossing would not be re-opened and that a new road bridge would likely to be provided as part of local authority plans for the re-development of the town centre. NR has made allowance for a pedestrian footbridge.

There are five other former level crossings at Isfield, Anchor Lane, Barcombe Mills and Hamsey (two), all of which involve crossing relatively minor lanes. NR envisages providing bridges as the standard industry policy is now to avoid any new level crossings on the grounds of safety and performance. Taking a long term view of costs, whilst the initial outlays required for a bridge solution is higher than for a level crossing, the ongoing annual operating and maintenance costs of the latter tend to be much higher. NR has identified the potential requirement for additional signal box staffing in order to supervise the crossings by CCTV. Furthermore the bridge solution would potentially provide passenger, pedestrian, and road vehicle accident and time savings compared with a level crossing solution.

NR has identified six further public rights of way in the form of footpath crossings across the former alignment and standard policy is to provide bridges for each of these. The NR report identifies potential for three of the rights of way to be closed or diverted thereby reducing the number of bridges to three.

Subsequent to closure of the line in 1969, the Uckfield bypass was constructed across the line at grade, crossing the former rail alignment approximately 1 mile to the south of the town. Given the trunk status of the road and its high traffic density, NR considers

that bridging will be the only feasible solution available, with the bypass raised to cross the re-instated railway.

(d) Stations

NR envisages moving Uckfield station back to its original site to the south of the High Street. This is considered to be the preferred option as there is space for the construction of a passing loop and second platform together with station buildings and a car park. We consider whether this is the best location for a passing loop in Section 2.5 of this review. A lack of car parking is a particular constraint associated with the current site. Also construction could take place largely without affecting current operations to the north of the High Street.

(e) Signalling

Track Circuit Block signalling with train detection by axle counters is envisaged. This would be controlled through modifications to the existing signal boxes at Oxted and Lewes. The level of signalling provided will be dependent on the track layout selected and the method of signalling proposed for the preferred option appears to be appropriate. Allowance is made for provision of a signalling and telecommunications cable route along the new railway, this would be required to control the intermediate pointwork and signalling equipment that NR have included in their specification for the new route section.

(f) Freight

NR has designed the formation to accommodate freight trains of the maximum network permissible axle weight which they consider the norm for all new routes. The route northwards from Uckfield has an existing weight restriction that precludes all but the lightest of freight traffic and we understand that there are no plans for its upgrade.

(g) Electrification

The NR Base Option does not include electrification of the route. Passive provision is proposed for third rail electrification. This is a prudent feature that does not add significant cost. Electrification of the new route would only be worthwhile if the Uckfield to Hurst Green route were electrified too. The latter does feature as having some NR priority featuring in their RUS / electrification strategy, although where it ranks as a priority for investment funding and when it can be progressed is not clearly stated.

2.2 Capital Outlays

Capital costs have been estimated by Network Rail for the base infrastructure option (excluding stations) at £141m. The estimates are based on a specification for the route which allows for future traffic requirements beyond that immediately in prospect, e.g. load and line speed capability. Although the service proposed could operate on a lower specification railway (and the line north of Uckfield itself imposes weight and speed restrictions) we are advised by Network Rail that this would not conform to current standards for new routes, and that any cost savings would not be significant in relation to the overall cost of the scheme.

There may be scope to reduce the scale of track and signalling specification to reduce costs although this may have implications for line capacity, timetable flexibility and performance. We have discussed possible adjustments to infrastructure specification

and resultant saving in capital outlay with NR and this is set out in Section 4 of this review report when we consider our indicative variant options.

Capital cost estimates may appear higher per km than some privately funded and constructed reinstatement schemes, however much of this difference results from the requirement for new structures and earthworks, in particular to bridge the former level crossings, the section of totally new route alignment and the junction required at the south end of the route. The capital construction costs per route km are similar to those of recent schemes undertaken by Network Rail, such as the Airdrie - Bathgate route reopening scheme.

The appraisal excludes in the central case the optimism bias uplift which Treasury Guidance requires to be added to publicly funded capital schemes, and presents this level of optimism bias as a sensitivity test. Network Rail's GRIP framework suggests that 60% be applied at this stage. While we acknowledge that NR's recent unit costings have been more realistic than some in earlier years, our advice is that DfT would require this uplift to be applied to enable a consistent comparison with other scheme submissions to DfT.

2.3 TWA and Planning Requirements

The Network Rail report acknowledges the implementation of a TWA and associated transport case. The costs of this process are included in Network Rail's estimates.

There are clearly adverse impacts on a number of residential areas adjacent to the route. These include noise and vibration of construction and operation, as well road re-routing and severance caused by solutions to bridge former level crossings. We understand that there may be local opposition from some residents of the villages on the route.

2.4 Operating and maintenance costs

We have discussed the ongoing operating and maintenance costs with NR and Mott MacDonald. We understand that the train operating company costs have been estimated from the resources and activities assumed using unit costs provided by the incumbent TOC and from published regulated charges.

We have benchmarked each of the cost categories included within the NR report against similar studies and conclude that those costs appear reasonable for the assumed specifications and outputs.

No allowance is made for reliability and punctuality impacts through operating a longer route with the potential for knock-on delays due to interaction with the existing line around Lewes. Accurate estimation of the likely performance impact requires detailed simulation modelling, which has not been undertaken. Typical capacity charge calculations (which have been calibrated on existing routes to reflect performance impacts) suggest that financial impacts of around £0.1m pa net cost should be allowed for in the business case appraisal. This charge is a proxy for lost revenue due to delays to existing railway passengers.

No allowance is made in the NR report for the incremental costs of retailing tickets, marketing, and central industry charges. We have applied a cost allowance for this equating to 9% of incremental revenue in presenting our view of costs. This 9% cost attribution of ticket retail costs does not just comprise commission payments but includes all incremental costs of retailing such as staffing of ticket offices, banking

charges and commissions, and a share of TOC HQ commercial costs, including a share of rail industry charges which are linked to patronage (e.g. policing and rail telephone enquiries).

The NR report implicitly assumes that the scheme will not bring forward a need for additional peak train lengthening on the route as a whole. We consider that this represents a potential key risk area, in terms of possible overcrowding and operating cost implications. This will depend on the scale of diversion of existing peak passengers, which we believe will largely depend on the future fares strategy on the Uckfield line. If the current fare levels are retained, with the significant differential between stations on the Uckfield route and stations at a similar distance from London on the Brighton Main Line preserved, then travelling from Lewes to London via Uckfield would provide a significant fares saving for passengers, available by purchasing separate tickets for the legs of the journey south and north of Uckfield. We consider this to be a likely scenario given the extent to which the existing Uckfield line fares are regulated. An additional number of London - bound passengers will travel via Uckfield and potentially bring forward the need to strengthen services where possible, albeit with the benefit of providing some crowding relief on other services. With that scenario the assumption in the NR report may be optimistic given that some peak arrivals at London are already close to capacity.

The NR report assumes there is no fares advantage in travelling via Uckfield. This would imply significant fares increases on regulated fares applying to flows north of Uckfield. Under this scenario we concur that there would be very few passengers from Lewes (or south of Lewes) who would choose to travel to London or East Croydon via Uckfield, due to the significantly longer journey times. In this case little additional crowding will occur due to the scheme, and there would be no requirement for train strengthening. The revenue and benefit impacts of fares levels are discussed in section 3.2.

Overall we consider that operating costs have been understated in the NR report and we provide our view of Network Rail's option 4a below (assuming no route fare differential impacts).

Ongoing annual operating and maintenance costs 2008 values & prices (£m)	Network Rail Option 4a	JC View Option 4a
Capital Lease Charge	£ 0.38	£ 0.38
Non-Capital Lease Charge	£ 0.24	£ 0.24
Total Rolling Stock Lease Charge	£ 0.62	£ 0.62
Rolling Stock Maintenance Costs	£ 0.23	£ 0.23
Rolling Stock Maintenance Staff Costs	£ 0.04	£ 0.04
Total Maintenance Cost	£ 0.26	£ 0.26
Fuel Costs	£ 0.36	£ 0.36
Traincrew Cost	£ 0.16	£ 0.16
Variable Track Access Cost	£ 0.13	£ 0.13
Fixed Track Access Charge	£ 0.72	£ 0.72
Performance impact	£ -	£ 0.13
Retailing Cost	£ -	£ 0.14
Additional Long term charge for Uckfield station upgrade	£ 0.03	£ 0.03
Total ongoing annual cost	£ 2.28	£ 2.54

2.4.1 Diesel and Electric Rolling Stock choices

The Network Rail Electrification RUS (draft 2009) proposes DC electrification of the Hurst Green to Uckfield route to allow conversion of the London to Uckfield service to electric traction.

There are significant benefits claimed for electric compared to diesel traction, including lower maintenance costs, superior acceleration enabling a reduction in journey times and better availability and reliability. Electrification can also play a role in reducing carbon emissions as well as improving air quality and reducing noise, particularly in the vicinity of the railway. Electric vehicles, on average, emit 20% to 30% fewer CO2 emissions than diesel.

Rolling stock leasing costs (both capital and non-capital) for diesel trains are much higher than for electric equivalents (typically by £20k per vehicle pa). Light maintenance costs of diesel trains are around 50% higher and fuel costs around double. Electric vehicles, being somewhat lighter in weight, also attract a slightly lower variable track access charge.

2.5 Train Service Proposals

The Base Option has been built on the December 2007 timetable and rolling stock diagrams. It assumes that all existing services are extended from Uckfield to and from Lewes, resulting in an hourly frequency operating all day. This is enhanced to a 30 minute interval in the Monday to Friday peaks. The service specification on this route has changed little since 2007 and a summary of the current (December 2008) Monday to Friday timetable together with the number of vehicles provided on each train is given below:

Cars			4		6	4	4	4	4	4	4	4	4	4	8	2	6	4	6	2	8	4	6	4	4	4
London Bridge					05:55		06:56	08:06	09:09	10:08	11:08	12:08	13:08	14:08	15:08	15:38	16:08	16:38	17:07		18:08		19:08	20:05	21:05	22:05
East Croydon			05:26		06:10		07:10	08:22	09:24	10:23	11:23	12:23	13:23	14:23	15:23	15:53	16:23	16:53	17:23		18:22		19:23	20:20	21:20	22:20
Oxted			05:41		06:30	07:01	07:31	08:37	09:37	10:37	11:37	12:37	13:37	14:37	15:37	16:07	16:37	17:07	17:37	18:07	18:37	19:07	19:37	20:37	21:37	22:37
Uckfield	arr		06:24		07:19	07:49	08:21	09:21	10:21	11:21	12:21	13:21	14:21	15:21	16:21	16:51	17:21	17:51	18:18	18:51	19:17	19:51	20:21	21:21	22:21	23:16

Cars		4	4	8	6	4	4	4	4	4	4	4	4	4	4	8	2	6	4	6	2	8	4	6	4	4
Uckfield	dep	06:00	06:30	06:58	07:30	08:02	08:34	09:34	10:34	11:34	12:34	13:34	14:34	15:34	16:33	17:03	17:32	17:58	18:30	18:57	19:33	20:04	20:34	21:34	22:32
Oxted		06:44	07:13	07:37	08:13	08:45	09:18	10:17	11:17	12:17	13:17	14:17	15:17	16:17	17:17	17:43	18:15	18:43	19:14	19:47	20:17	20:42	21:17	22:17	23:10
East Croydon			07:25	07:53	08:29	08:59	09:32	10:32	11:32	12:32	13:32	14:32	15:32	16:32	17:35		18:38		19:31	20:06	20:31	20:54	21:31	22:31	23:28
London Bridge			07:44	08:11	08:53	09:19	09:51	10:49	11:49	12:49	13:49	14:49	15:49	16:53	17:50		18:54		19:51	20:21	20:49	21:11	21:49	22:49	

Three rail service options were modelled, comprising the extension of existing services from Uckfield to Eastbourne, Newhaven or Lewes. The benefits from the re-opening are stated to be relatively low with a Benefit to Cost Ratio ranging between 0.64 and 0.79 dependent on the actual service option modelled. The best BCR was obtained from the Lewes option and we have therefore undertaken our investigations using that option as the base. Network Rail also considered options for the construction of intermediate stations at Isfield and Barcombe Mills but they do not strengthen the business case, even assuming putative housing developments. These stations have therefore been omitted from our analysis.

The single line sections, the location of proposed passing loops and fit with other services means that stands of 11 or 12 minutes are required at Uckfield in the southbound services.

In our view relocating the proposed new Uckfield passing loop further south in the Barcombe Mills area would be likely to reduce this pathing time and improve overall journey times.

2.6 Rolling Stock Requirements

Given the current relatively short turn round times at Uckfield, then extensions to Lewes would always incur at least one additional class 171 4-car diagram. There would be relatively long layovers at the terminus which would allow for ample time for train reversal via a new turnback siding. In building up the resource requirements, the assumption has been that train formations north of Uckfield will remain at current levels as a minimum. By re-diagramming it is possible to demonstrate that this can be achieved along with all trains being extended to and from Lewes with one additional 4-car diagram. We therefore concur with the report's findings on the level of additional rolling stock requirements.

2.7 Traincrew Requirements

Extension to Lewes will cause an additional rolling stock diagram to be employed throughout the day. This is likely to create the need for additional traincrew at a level of at least two daily driver and conductor diagrams. Typically, this will result in the need to employ double that number of staff to provide cover for rest days, leave, training etc. A full traincrew re-diagramming exercise might reveal potential economies but it would be prudent to assume this level of additional traincrew cost at this stage.

2.8 Scheme Deliverability

We have discussed the scheme and deliverability issues with Network Rail. Based on Network Rail's report and our own analysis of the route and services, although this is not a straightforward re-opening scheme of an intact existing former rail formation, the scheme appears to be capable of being physically delivered.

We are aware of a level of opposition from local residents of villages on the route, potentially on grounds of noise, visual intrusion, and severance, e.g. the impact of proposed bridging solutions for former level crossings. We envisage that significant consultation activity would need to be undertaken by local planning authorities if this scheme were to be progressed further.

3 DEMAND AND BENEFIT ESTIMATES

3.1 Patronage estimation

The NR report segments the addressed market into 3 types of trip, “Diverted”, “New route”, and “New Station” each with a separate demand forecasting model. We have reviewed each model and its input assumptions, as well as running alternative versions to give a Jacobs View:

3.1.1 “Diverted” Trips

These trips comprise those to / from destinations / origins south of Lewes that would have an alternative route to access stations north of East Croydon. The report makes use of the MOIRA model, which estimates changes in demand by flow based on changes in generalised journey times (GJT). We consider this is an appropriate methodology, provided that, as in both our and Mott MacDonald’s work, a fares structure is implemented which avoids significantly cheaper fares being available via Uckfield. Potential fares distortions are discussed in 3.2.

A strength of the MOIRA model is that it calculates GJTs based on detailed consideration of the relative timing of trains, on train journey times and any need for interchange. It is clear that as the options considered do not involve enhanced journey times north of Uckfield, the opportunities to travel via Uckfield are almost all overtaken by the existing route via the Brighton Main Line. We consider that given the longer through journey times via Uckfield compared with via Haywards Heath, there is little potential for long distance trip diversion, and therefore concur with Mott MacDonald’s assessment of modest revenue impacts, assuming no fare distortion inducement for passengers to route their journeys via Uckfield.

3.1.2 “New Route” Trips

We have reviewed the direct demand model which estimates the demand and revenue generated by trips from Wealden stations to Lewes and further south. The Network Rail report gives estimates of between £3.6m and £3.9m (2019) for the options considered. In each case this is over ¾ of the total revenue of the scheme and we feel this correctly reflects this being the major group of flows being provided with significantly better rail services.

The model approach assumes that little abstraction of demand would occur to this route from the Brighton Main Line. While we agree that rail-heading will be far less significant for shorter trips than it is to London, we do consider this to be a source of bias in favour of the scheme and we recommend that a downward estimate be made to allow for railheading in estimating the new trips.

The revenue is estimated by applying a fare per passenger mile yield to the demand estimate. This has been calculated from published single fares. We consider that this should be adjusted lower to reflect discounts (e.g. from Railcards) that dilute the yield achieved below published fares, and have produced our own forecasts based on more realistic typical yields. For option 4a, this would reduce the 2019 revenue from £3.7m to £2.2M.

3.1.3 "New Station" Trips

New stations are modelled for the Network Rail study using a catchment area model. For the options involving new stations, net annual revenue of between £857k and £875k (2019) values is forecast, with daily demand of around 350 passengers of which around 50 are assumed abstracted form existing stations

We have constructed a simple population based trip model calibrated using demand on the existing local stations on routes to the south coast to sense check the Network Rail work. Trip rates on these lines are similar to those suggested in the PDFH for affluent rural areas. Our estimates are shown below:

Table 1 Jacobs new stations Forecasts (2019)

	Station Revenue (£k)	Abstracted Revenue (£k)	Net Daily Patronage
Isfield	791	606	99
Barcombe Mills	710	398	167
TOTAL	1501	1004	266

Our overall estimates are rather lower, due mainly to our higher assessment of abstraction of demand from existing stations. They are however sufficiently close for us to conclude that the NR / Mott MacDonald forecasts are reasonable for their study purpose.

These forecasts allow for housing growth in the district but not assumed concentrated around the new station catchments specifically.

We have undertaken further analysis assuming 8000 new homes are created within 800m of new stations on the route. Over the 60 year appraisal period this would improve the BCR of the Option 4A business case from 0.33 to 0.88 – still short of a strong economic case.

We have further undertaken appraisal to estimate the new demand and benefits which would be required for a worthwhile economic case, using favourable assumptions to the scheme – namely that no additional operating costs are required nor that any rail use would be generated by the new housing in the absence of the new stations. We estimated that in order for a BCR of 1.5 to be achieved through demand and benefits associated with new development, a settlement of over 14,000 new homes would need to be constructed near to new stations on the extended route (with optimistic trip rates now observed at Lewes) or over 50,000 new homes with the more realistic trip rate observed at Polegate.

3.1.4 Patronage build up

The following build up profile as a percentage of full fruition demand has been assumed in Network Rail's appraisal. We consider this realistic and have adopted it in our analysis.

- 60% in 2017 (assumed opening year)
- 90% in 2018
- 100% in 2019 and thereafter

3.1.5 Forecast growth rates

Network Rail's growth assumptions are set out in 3.4.17 of their report and appear to be an accurate implementation of the method prescribed in PDFH v4.1. In Network Rail's appraisal demand grows at a declining rate (1.6% to 1.1%) between 2017 and 2031. We consider this rate of growth to be an appropriately prudent assumption. In order to conform to WebTAG guidance we cap demand in 2026 in presenting our view.

Fares are assumed to grow at RPI +1% in line with DfT policy of recent years. We consider this an appropriate assumption.

3.2 Fares

We have examined the spreadsheets used for the Study report and confirm that (although not explicitly described in that report) fares increases are not assumed to apply to flows on the existing Uckfield line and that the higher rates per mile are assumed to apply only to newly created direct flows, or extensions of flows. This approach therefore did not burden the scheme with an adverse passenger reaction. In fact the Study may have been generous to the scheme by ignoring the revenue abstraction risk that would occur if passengers were able to obtain cheaper fares from Lewes (and stations to the south of Lewes) via the extended Uckfield line by buying multiple tickets.

Uckfield line fares are much lower than for stations at similar distances on the Brighton Main Line and we show below how passengers from Lewes (and south of Lewes) would be able to trade the longer journey time for a much lower fare by buying two seasons tickets. A similar discrepancy also holds for day and period peak and off-peak fares. This fares anomaly, if allowed to stand, would introduce significant risk of substantial revenue loss to the train operator. Overcrowding on peak trains could occur and train strengthening would be constrained by the existing 8 car platform lengths on the Uckfield line.

Flow	Weekly Season	Monthly Season	Annual Season
Uckfield – London	£57	£219	£2,280
Lewes – London	£82	£315	£3,280
Lewes - Uckfield (assumed fare by analogy with Uckfield - Crowborough)	£13	£ 52	£ 536
Lewes – Vic via Uckfield	£70	£270	£2,816
Saving via Uckfield	£12	£ 45	£ 464

There would thus be pressure for Uckfield fares to be increased relative to others in the region by the operator of the South Central TOC, to avoid resultant revenue abstraction. Such fare increases would not be permitted for regulated fares, without DfT sanction. The scale of real fare increases required to remove the anomaly would be very unpopular, even if phased in over a number of years, and likely to be strongly resisted by existing Uckfield line railway passengers.

3.3 Freight

Current DfT railfreight forecasts indicate limited demand for freight traffic on routes in this area. The potential sources of freight actually on the route (e.g. recycling at Isfield) are of too small a scale for rail to be a viable option.

Further, the route does not appear attractive for through freight trains due to weight and gauge restrictions north of Uckfield. Network Rail have indicated to us that there are sufficient paths to route any emerging freight traffics (e.g. from Newhaven Port or incinerator) via Haywards Heath where the axle limit would permit such trains and where capacity exists during the off-peak hours.

3.4 Unpriced benefits

We consider that journey time and non-user benefits have been correctly estimated for the demand calculated.

Crowding and performance impacts were not assessed in Network Rail's study. While we agree that these are likely to be second order impacts, we have included a financial impact for performance worsenment as a cost.

Crowding impacts of the scheme are unlikely to be material on the assumption made that Uckfield route fares are priced to avoid creating an artificially lower cost route. We do not consider there is a rational basis for creating a fares structure which would promote the Wealden Line as a lower cost parallel route to the BML. The effect on Southern TOC of lower fares on this route would be to increase subsidy requirement overall, as elasticities to fares changes are less than 1 for this type of rail market. The wider case for using the Uckfield route to relieve crowding on the BML would also be flawed if additional diesel rolling stock is required for peak Uckfield services (given that diesel rolling stock has higher capital and operating costs than equivalent electric trains). A transfer of traffic to the Uckfield route would result in a need for platform lengthening north of Uckfield. Furthermore, the Thameslink programme will, from 2015, increase peak capacity capability on services to London Bridge.

4 ALTERNATIVE OPTIONS

4.1 Overview

In view of the poor BCRs that have emerged from the NR report, we have considered some alternative options that might improve this situation. These are:

1. Diesel train service similar in quantum to the NR report (Option 4a) but retimed. The provision of a basic single line infrastructure only with no passing loops at Uckfield, nor at the junction with the Haywards Heath line. Reversible signalling would be required at Lewes so as to allow trains to reverse in platform 1;
2. This option illustrates the train service that could be resourced within the existing Uckfield line diesel rolling stock fleet i.e. in marginal time. Infrastructure as Option 1; and
3. An electric railway, as an extension to an electrified Uckfield line. The train service similar in quantum to the NR report (Option 4a) but retimed. The route to be used as a diversionary route as appropriate.

4.2 Option 1 - Simplified Infrastructure

4.2.1 Timetable Assumption

Extension of the hourly existing London Bridge to Uckfield services to Lewes is assumed with the current additional peak services between Uckfield and London Bridge continuing to start and terminate at Uckfield. Compared with Network Rail's option 4a this minimises additional rolling stock requirements and avoids unnecessary vehicle miles operating between Lewes and Uckfield. A timing allowance is assumed for attachments and detachments at Uckfield.

The following timetable illustrates a possible solution with 12 minute turnrounds available at Lewes. The times shown in red reflect existing paths that have been moved by 30 minutes in order to optimise the utilisation of platform 1 at Lewes and avoid conflicts with existing services in that area. These alternative paths are not currently utilised as other services operate on a 30 minute repeating cycle:

Cars			4		10	2	8	4	4	4	4	4	4	4	4	2	6	4	6	2	8	2	4	4	4	4
London Bridge					05:55		06:56	08:06	09:09	10:08	11:08	12:08	13:08	14:08	15:08	15:38	16:08	16:38	17:07		18:08		19:08	20:05	21:05	22:05
East Croydon			05:10		06:10		07:10	08:22	09:24	10:23	11:23	12:23	13:23	14:23	15:23	15:53	16:23	16:53	17:23		18:22		19:23	20:20	21:20	22:20
Oxted			05:30		06:30	07:01	07:31	08:37	09:37	10:37	11:37	12:37	13:37	14:37	15:37	16:07	16:37	17:07	17:37	18:07	18:37	19:07	19:37	20:37	21:37	22:37
Uckfield	arr		06:19		07:19	07:49	08:21	09:21	10:21	11:21	12:21	13:21	14:21	15:21	16:21	16:51	17:21	17:51	18:18	18:51	19:17	19:51	20:21	21:21	22:21	23:16
Cars					2		4	4	4	4	4	4	4	4	4		2		2		4		4	4	4	
Uckfield	dep				07:22		08:24	09:21	10:21	11:21	12:21	13:21	14:21	15:21	16:21		17:24		18:21		19:20		20:21	21:21	22:21	
Lewes					07:33		08:35	09:32	10:32	11:32	12:32	13:32	14:32	15:32	16:32		17:35		18:32		19:31		20:32	21:32	22:32	

Cars				8		2		4	4	4	4	4	4	4	4	4		2		2		4	4	4	4
Lewes				06:37		07:44		08:44	09:44	10:44	11:44	12:44	13:44	14:44	15:44	16:44		17:44		18:43		19:47	20:47	21:47	22:47
Uckfield	arr			06:58		07:55		08:55	09:55	10:55	11:55	12:55	13:55	14:55	15:55	16:55		17:55		18:54		19:58	20:58	21:58	22:58
Cars		2	4	8	6	4	4	4	4	4	4	4	4	4	4	6	4	6	6	4	4	6	4	4	4
Uckfield	dep	06:00	06:30	06:58	07:30	08:02	08:34	09:02	10:02	11:02	12:02	13:02	14:02	15:02	16:02	17:03	17:32	17:58	18:30	18:57	19:33	20:04	21:04	22:04	23:04
Oxted		06:44	07:13	07:37	08:13	08:45	09:18	09:45	10:45	11:45	12:45	13:45	14:45	15:45	16:45	17:43	18:15	18:43	19:14	19:47	20:17	20:42	21:42	22:42	23:42
East Croydon			07:25	07:53	08:29	08:59	09:32	09:59	10:59	11:59	12:59	13:59	14:59	15:59	16:59		18:38		19:31	20:06	20:31	20:54	21:54	22:54	23:54	
London Bridge			07:44	08:11	08:53	09:19	09:51	10:19	11:19	12:19	13:19	14:19	15:19	16:19	17:19		18:54		19:51	20:21	20:49	21:11	22:11	23:11		

The main passenger disbenefit compared with Option 4a is the thinning of the peak service south of Uckfield from half hourly to hourly. PDFH recommends that this is regarded as a similar penalty as 6 minutes journey time for reduced ticket passengers and 13 minutes for full price and seasons tickets. The generalised journey time in the demand model has been adjusted correspondingly to provide revised demand and revenue forecasts.

4.2.2 Infrastructure Assumed

The infrastructure solution selected by NR consists of a new single line between Uckfield and Lewes with 90mph line speed. A passing loop would be provided at Uckfield and a double junction with the main line to the east of Lewes. A double line section to the north of the main line connection enables a train to stand clear of the main line waiting for a southbound train to clear the single line.

This infrastructure solution allows for a half-hourly service to operate south of Uckfield. Extension of an hourly London Bridge to Uckfield service would, however, be possible with a basic single line between Uckfield and Lewes and with no passing loop required at Uckfield. A signalling solution would need to be developed that would allow peak rolling stock attachments and detachments at Uckfield.

Reducing costs further, the junction with the main line can be simplified to comprise merely a trailing connection into the Down Lewes line with reversible signalling provided between the Uckfield line junction and platform 1 at Lewes. Trains from Uckfield would therefore operate over the Down Lewes line in both directions between these points meaning that a main line crossover at the junction is no longer required. The maximum frequency of existing services over this section of line is half hourly and therefore the Uckfield line trains need to be timetabled to occupy it between one pair of trains in each hour.

Certain peak services need to attach / detach units at Uckfield and this is shown in the timetable where the number of cars differs on either side of Uckfield. Overall, one additional 4-car class 171 diagram is required and existing train formations north of Uckfield have been maintained.

Our discussion with NR indicated that capital cost savings of around £20m might be achieved with simplification of infrastructure in this way.

4.3 Option 2 – Simplified Infrastructure, no rolling stock requirement

4.3.1 Timetable Assumption

Option 2 is a derivative of option 1 that explores the level of service that could be provided between Uckfield and Lewes with the existing southern diesel fleet in marginal time, i.e. without incurring any additional rolling stock, and whilst maintaining existing train formations north of Uckfield.

Cars			4		8	2	4	4	8	4	4	4	4	4	4	2	6	4	6	2	8	2	4	4	4	4
London Bridge					05:55		06:56	08:06	09:09	10:08	11:08	12:08	13:08	14:08	15:08	15:38	16:08	16:38	17:07		18:08		19:08	20:05	21:05	22:05
East Croydon			05:10		06:10		07:10	08:22	09:24	10:23	11:23	12:23	13:23	14:23	15:23	15:53	16:23	16:53	17:23		18:22		19:23	20:20	21:20	22:20
Oxted			05:30		06:30	07:01	07:31	08:37	09:37	10:37	11:37	12:37	13:37	14:37	15:37	16:07	16:37	17:07	17:37	18:07	18:37	19:07	19:37	20:37	21:37	22:37
Uckfield	arr		06:19		07:19	07:49	08:21	09:21	10:21	11:21	12:21	13:21	14:21	15:21	16:21	16:51	17:21	17:51	18:18	18:51	19:17	19:51	20:21	21:21	22:21	23:16
Cars					2				4	4	4	4	4	4			2		2		4		4	4	4	
Uckfield	dep				07:22				10:24	11:21	12:21	13:21	14:21	15:21			17:24		18:21		19:20		20:21	21:21	22:21	
Lewes					07:33				10:35	11:32	12:32	13:32	14:32	15:32			17:35		18:32		19:31		20:32	21:32	22:32	

Cars				8		2				4	4	4	4	4	4			2		2		4	4	4	4
Lewes				06:37		07:44				10:44	11:44	12:44	13:44	14:44	15:44			17:44		18:43		19:47	20:47	21:47	22:47
Uckfield	arr			06:58		07:55				10:55	11:55	12:55	13:55	14:55	15:55			17:55		18:54		19:58	20:58	21:58	22:58
Cars		2	4	8	6	4	4	4	4	4	4	4	4	4	4	2	4	6	4	4	4	6	4	4	4
Uckfield	dep	06:00	06:30	06:58	07:30	08:02	08:34	09:34	10:34	11:02	12:02	13:02	14:02	15:02	16:02	17:03	17:32	17:58	18:30	18:57	19:33	20:04	21:04	22:04	23:04
Oxted		06:44	07:13	07:37	08:13	08:45	09:18	10:18	11:18	11:45	12:45	13:45	14:45	15:45	16:45	17:43	18:15	18:43	19:14	19:47	20:17	20:42	21:42	22:42	23:42
East Croydon			07:25	07:53	08:29	08:59	09:32	10:32	11:32	11:59	12:59	13:59	14:59	15:59	16:59		18:38		19:31	20:06	20:31	20:54	21:54	22:54	23:54	
London Bridge			07:44	08:11	08:53	09:19	09:51	10:51	11:51	12:19	13:19	14:19	15:19	16:19	17:19		18:54		19:51	20:21	20:49	21:11	22:11	23:11		

The resultant train service is far from suitable for the principal local market i.e. the Uckfield - Lewes flow. The option would result in a long 3 hour gap between services in both directions in the morning and a 2 hour gap in the late afternoon. In our view the lack of a service southbound in the morning peak into Lewes renders this option

inappropriate. We include it in this review report purely to show what would be potentially possible with the existing rolling stock deployed on the Uckfield line.

4.3.2 Infrastructure Assumed

Infrastructure is assumed as for Option 1

4.4 Option 3 – Route electrification

4.4.1 Timetable Assumption

This option assumes that Uckfield to Hurst Green is electrified in a revised base case. The following sample timetable includes an assumed journey time benefit of electric trains being able to reduce journey times between Uckfield and London Bridge by 2 minutes. This enables further optimisation of the infrastructure with the passing loop at Uckfield no longer being required.

London Bridge					05:55		06:56	08:06	09:09	10:08	11:08	12:08	13:08	14:08	15:08	15:38	16:08	16:38	17:07		18:08		19:08	20:05	21:05	22:05
East Croydon			05:21		06:10		07:10	08:22	09:24	10:23	11:23	12:23	13:23	14:23	15:23	15:53	16:23	16:53	17:23		18:22		19:23	20:20	21:20	22:20
Oxted			05:34		06:29	07:00	07:30	08:36	09:36	10:36	11:36	12:36	13:36	14:36	15:36	16:06	16:36	17:06	17:36	18:06	18:36	19:06	19:36	20:36	21:36	22:36
Uckfield	arr		06:17		07:17	07:47	08:19	09:19	10:19	11:19	12:19	13:19	14:19	15:19	16:19	16:49	17:19	17:49	18:16	18:49	19:15	19:49	20:19	21:19	22:19	23:14
Uckfield	dep	05:47	06:17	06:45	07:17	07:49	08:20	09:20	10:20	11:20	12:20	13:20	14:20	15:20	16:20	16:50	17:19	17:49	18:16	18:49	19:16	19:49	20:19	21:19	22:19	23:15
Hamsey Jn	arr																									
Hamsey Jn	dep	*05:54*	*06:24*	*06:52*	*07:24*	*07:56*	*08:27*	*09:27*	*10:27*	*11:27*	*12:27*	*13:27*	*14:27*	*15:27*	*16:27*	*16:57*	*17:26*	*17:56*	*18:23*	*18:56*	*19:25*	*19:56*	*20:26*	*21:26*	*22:26*	*23:21*
Lewes		05:58	06:28	06:56	07:28	08:00	08:30	09:30	10:30	11:30	12:30	13:30	14:30	15:30	16:30	17:00	17:30	18:00	18:27	19:00	19:30	20:00	20:30	21:30	22:30	23:25

Lewes		05:48	06:18	06:46	07:18	07:50	08:21	09:21	10:21	11:21	12:21	13:21	14:21	15:21	16:21	16:51	17:20	17:48	18:15	18:48	19:18	19:48	20:18	21:18	22:18
Hamsey Jn	arr	05:52	06:22	06:50	07:22	07:54	08:25	09:25	10:25	11:25	12:25	13:25	14:25	15:25	16:25	16:55	17:24	17:54	18:21	18:54	19:24	19:54	20:24	21:24	22:24
Hamsey Jn	dep	05:55	06:25	06:53	07:25	07:57	08:28	09:28	10:28	11:28	12:28	13:28	14:28	15:28	16:28	16:58	17:27	17:57	18:24	18:57	19:27	19:57	20:27	21:27	22:27
Uckfield	arr	06:02	06:32	07:00	07:32	08:04	08:35	09:35	10:35	11:35	12:35	13:35	14:35	15:35	16:35	17:05	17:34	18:04	18:31	19:04	19:34	20:04	20:34	21:34	22:34
Uckfield	dep	06:02	06:32	07:00	07:32	08:04	08:36	09:36	10:36	11:36	12:36	13:36	14:36	15:36	16:35	17:05	17:34	18:04	18:32	19:04	19:35	20:06	20:36	21:36	22:34
Oxted		06:45	07:14	07:38	08:14	08:46	09:19	10:18	11:18	12:18	13:18	14:18	15:18	16:18	17:18	17:44	18:16	18:46	19:15	19:48	20:18	20:43	21:18	22:18	23:11
East Croydon			07:25	07:53	08:29	08:59	09:32	10:32	11:32	12:32	13:32	14:32	15:32	16:32	17:35		18:38		19:31	20:06	20:31	20:54	21:31	22:31	23:28
London Bridge			07:44	08:11	08:53	09:19	09:51	10:49	11:49	12:49	13:49	14:49	15:49	16:53	17:50		18:54		19:51	20:21	20:49	21:11	21:49	22:49	

The main passenger benefit arises through the potential to divert electric services (principally Eastbourne – London trains) via Uckfield in the event of both planned and unplanned disruption to their existing route. We have been advised by Network Rail that on average they would expect annually two unplanned route closures of 90 minutes and four planned weekends of disrupted services. The number of diversions would be constrained by the half hourly capacity of the reinstated route.

For unplanned disruption we assume that in each incident 6 x 8-car trains are diverted with 50 passengers per vehicle. We assume that passengers would otherwise be delayed by the full 90 minutes and that their disbenefit is at an average value of £30 per hour (£10 normal value of time weighted by 3 for disruption).

For planned weekend disruption we assume that on each occasion 20 x 8-car trains would be diverted and carrying 50 passengers per vehicle. We assume that passengers would otherwise have journeys lengthened by the equivalent of 60 minutes penalty and that their disbenefit is at an average value of £10 per hour.

4.4.2 Infrastructure Assumed

We have assumed that the infrastructure provided is a derivative of the NR Base Case, where the intermediate passing loop is provided in a more optimal location, avoiding the need for trains to stand for 10 minutes or more, while waiting to pass. Operating costs can be reduced owing to the inherent lower costs of operating electric trains and their superior availability. NR has advised indicative costs at £500k per track km for electrification. On this basis we assume electrification of Lewes – Uckfield would cost around £6m capital outlay.

NR has provided an indicative estimate for electrification of the existing Uckfield line only of around £30m. Our initial outline appraisal confirms that electrification of the existing line may have potential to deliver a sound commercial return on investment.

5 FINANCIAL AND ECONOMIC APPRAISAL

5.1 Revenue

We show below Jacobs revenue forecasts for option 4a, as specified in the Network Rail study and the variant options we describe in section 4. Revenue changes are estimated through changes in generalised journey time, with different options differing mainly in terms of frequency and the need to interchange.

Annual Demand & Revenue (million journeys / £m)	Network Rail Option 4a	JC View Option 4a	Jacobs Option 1	Jacobs Option 2	Jacobs Option 3
2007 Total Demand	0.37	0.37	0.32	0.30	0.35
2019 Total Demand	0.49	0.49	0.42	0.39	0.45
2007 Total Revenue £k	£ 2.56	£ 1.55	£ 1.36	£ 1.31	£ 2.08
2019 Total Revenue £k	£ 3.72	£ 2.25	£ 1.98	£ 1.90	£ 3.02

5.2 Operating and Maintenance Costs

We show below Jacobs cost estimates for option 4a, as specified in the Network Rail study, and the variant options we describe in section 4. Both ours and NR's appraisals assume that operating costs remain constant in real terms, but include an 'optimism bias' uplift on operating costs at DfT's recommended 15% rate. This uplift is justified to cover the risk of cost escalation and its impact in PV terms is equivalent to an annual real cost increase of 0.65% per annum. We consider this reasonable to cover real wage cost escalation and the inevitable uncertainty over future fuel prices.

Annual Opex 2008 values & prices (£m)	Network Rail Option 4a	JC View Option	Jacobs Option 1	Jacobs Option 2	Jacobs Option 3
Capital Lease Charge	£ 0.38	£ 0.38	£ 0.38	£ -	£ 0.31
Non-Capital Lease Charge	£ 0.24	£ 0.24	£ 0.17	£ 0.15	£ 0.20
Total Rolling Stock Lease Charge	£ 0.62	£ 0.62	£ 0.62	£ 0.15	£ 0.51
Rolling Stock Maintenance Costs	£ 0.23	£ 0.23	£ 0.14	£ 0.11	£ 0.15
Rolling Stock Maintenance Staff Costs	£ 0.04	£ 0.04	£ 0.02	£ 0.02	£ 0.02
Total Maintenance Cost	£ 0.26	£ 0.26	£ 0.16	£ 0.13	£ 0.17
Fuel Costs	£ 0.36	£ 0.36	£ 0.22	£ 0.18	£ 0.20
Traincrew Cost	£ 0.16	£ 0.16	£ 0.16	£ 0.13	£ 0.16
Variable Track Access Cost	£ 0.13	£ 0.13	£ 0.08	£ 0.07	£ 0.12
Fixed Track Access Charge Adjustment	£ 0.72	£ 0.72	£ 0.72	£ 0.72	£ 0.79
Performance impact	£ -	£ 0.13	£ 0.08	£ 0.06	£ 0.13
Retailing Cost	£ -	£ 0.14	£ 0.12	£ 0.12	£ 0.19
Additional Long term charge for Uckfield station upgrade	£ 0.03	£ 0.03	£ 0.03	£ 0.03	£ 0.03
Total Operational Cost	£ 2.28	£ 2.54	£ 2.19	£ 1.59	£ 2.28

In line with Network Rail's assumed phasing, capital outlays are incurred equally in 2015 and 2016. We show their value in PV terms below, both with and without the 60% optimism bias required by DfT appraisal.

Capital Outlays (£m PV)	Network Rail Option 4a	JC View Option 4a	Jacobs Option 1	Jacobs Option 2	Jacobs Option 3
Including Optimism bias	154	154	132	132	160
Excluding Optimism bias	96	96	82	82	100

5.3 JC View of Economic Case for NR Option 4a

Our view is that NR Option 4a performs less well in terms of economic appraisal than shown in the NR report. (A BCR of 0.33 rather than 0.78). Details are given in Appendix A.

The principal reasons why the case appears worse in our review than that presented in the NR report are:

- We consider that a number of train operating cost items have been understated, performance impacts and retailing and marketing costs. Adjusting only for these reduces the BCR from 0.78 to 0.75, although revenue would continue to exceed ongoing operating cost;
- Although demand levels have been estimated robustly, we consider that the yield per passenger mile and hence revenue should be lower. Adjusting additionally for this reduces the BCR to 0.46. We assess that ongoing operating costs would exceed revenue by £9m PV; and
- We consider that conventional application of DfT's appraisal guidance requires optimism bias at 60% to be applied to capital costs. This would further reduce the BCR to 0.33.

5.4 Business Case & Subsidy

Only slightly better BCR's are attained for each of the options we have examined. Options 1 and 2 offers infrastructure and operating cost savings, while Option 3 achieves lower unit operating cost savings at the expense of higher outlays.

When capital costs are included in the appraisal, each option has a poor BCR in the range 0.32 to 0.41. If capital costs are regarded as sunk then rather better BCRs are obtained for operation in the full fruition year (2019) although these are still below DfT's benchmark value of 2 for a strongly worthwhile scheme.

	JC View Option 4a	Jacobs Option 1	Jacobs Option 2	Jacobs Option 3
BCR - 60 year DfT appraisal	0.33	0.34	0.34	0.43
BCR - single year 2019 excluding capital costs	1.16	1.18	1.52	1.68
Ongoing operating subsidy - 60 year PV (£m)	-£3.3m	-£3.4m	-£12.3m	-£24m
Ongoing operating subsidy - 2019 (£m)	£0.3m	£0.2m	£0.0m	-£0.8m
Economic NPV (60 years) (£m)	-£135m	-£115m	-£107m	-£116m

None of the options delivers a net positive economic PV over the appraisal term. Removal of the 60% optimism bias on capex (as assumed in the Network Rail work) improves the economic case for both the scheme and options, but insufficiently to provide a positive transport economic case.

We assess that the proposal as specified in the NR requires ongoing farebox subsidy for many years. This is significant e.g. £0.3m in 2019. Only the electrification option (Option 3) would produce an annual operating surplus in that year, and this also performs better than the diesel options in terms of DfT's measure of BCR.

6 CONCLUSIONS

We have reviewed the Lewes - Uckfield Railway Line Reinstatement Study Final Report produced by Network Rail in 2008 and the underlying demand and appraisal spreadsheet models. We have also met with both Network Rail and their demand modellers Mott MacDonald for clarification of their analysis.

Overall we consider that a sound methodology has been applied. There are a number of areas where we feel that different detailed assumptions and appraisal conventions could have been applied and we provide a Jacobs View in this report of the option which delivered the best BCR in Network Rail's work (4a). In summary:

- We consider that a number of train operating cost items have been understated including performance impacts and retailing and marketing costs;
- Although demand levels have been estimated robustly, we consider that the yield per passenger mile and hence revenue should be lower; and
- We consider that conventional application of DfT's appraisal guidance requires optimism bias at 60% to be applied to capital costs in the presented appraisal central case.

With our revised figures a worse BCR is calculated for option 4a - 0.33 compared with 0.78. We have developed a number of options which slightly improve the economic case. None of these, however, delivers a good BCR, although the electric railway appears to perform better than the other options including potential as a diversionary route.

A number of significant risks are identified for the scheme. These include:

- The risk of the existing lower fares structure on the Uckfield - London route resulting in a cheaper (albeit slower) route becoming available via Uckfield. A proportion of passengers from Lewes could be expected to transfer to the new route resulting in a loss of revenue to the TOC and additional costs of strengthening Uckfield diesel services to avoid severe overcrowding south of East Croydon. Current fares regulation would prohibit large increases on current Uckfield fares – nor would this be acceptable to current rail passengers at Uckfield;
- We have been made aware of strong objection from some residents of villages adjacent to the former route. Given that they would clearly suffer disbenefit in terms of noise/ vibration, possible road severance and new railway structures close to residential areas, there is some risk of a lengthy planning process including public inquiry; and
- Costings have been undertaken to GRIP level 2. This includes significant uncertainty which the optimism bias is intended to cover. Nevertheless schemes of this sort are often prone to capital cost escalation.

In our view, the electrification of the existing railway north of Uckfield, as prioritised by Network rail in the Electrification RUS, is likely to be a logical step before any route reinstatement south of Uckfield is considered further. With the prospect of electrification north of Uckfield, we consider it would be worthwhile exploring the reinstatement of the route at the time when some growth in underlying demand levels has been realised. Our option 3 shows how a stronger economic case can be obtained with the lower costs of electric rolling stock and the benefits of providing a diversionary route for electric trains.

We conclude that:

- The initial capital construction costs required to recreate the railway would be too large in relation to the passenger demand (and freight) potential for a good value for money case to be made in terms of financial or transport economic appraisal. The size of the capital outlays reflects the significant requirement for new structures and earthworks, in particular to bridge the former level crossings, the section of totally new route alignment and the junction required at the south end of the route. The outlays are similar per route km to those of recent schemes undertaken by Network Rail and, following discussion with Network Rail, we see limited potential for any scaling back of outlays to significantly improve the appraisal results.

- A substantial change in land use on the route would be required to create sufficient new market demand to provide the need for this proposed rail re-opening. Our sensitivity testing suggests that for the scheme to deliver a good value transport economic case, a substantial quantity of new dwellings would be required, the equivalent of a new town in scale, to be located near to a new station site on the route.

APPENDIX A - TRANSPORT ECONONIC ASSESSMENT

60 year standard DfT appraisal

JC View of Network Rail Option 4a	Present value £m
Public sector capital cost	(154.3)
Indirect taxation	(3.1)
TOC cost	(45.1)
Revenue (Direct Demand)	48.4
User time savings	13.2
Congestion	4.1
Infrastructure	0.1
Accident	0.7
Local Air Quality	0.2
Noise	0.1
Greenhouse Gases	0.3
Operating subsidy	(3.3)
Cost to public accounts	£157
Transport providers including TOC	£45
Benefits to Users	£13
Benefits to Non Users and Society	£54
Economic NPV	-£135
BCR	0.33

Option 1	Present value £m
Public sector capital cost	(132.2)
Indirect taxation	(2.7)
TOC cost	(38.7)
Revenue (Direct Demand)	42.0
User time savings	11.5
Congestion	3.6
Infrastructure	0.1
Accident	0.6
Local Air Quality	0.1
Noise	0.1
Greenhouse Gases	0.3
Operating subsidy	(3.4)
Cost to public accounts	£135
Transport providers including TOC	£39
Benefits to Users	£12
Benefits to Non Users and Society	£47
Economic NPV	-£115
BCR	0.34

Option 2	Present value £m
Public sector capital cost	(132.2)
Indirect taxation	(2.6)
TOC cost	(28.2)
Revenue (Direct Demand)	40.4
User time savings	11.1
Congestion	3.5
Infrastructure	0.1
Accident	0.6
Local Air Quality	0.1
Noise	0.1
Greenhouse Gases	0.3
Operating subsidy	(12.3)
Cost to public accounts	£135
Transport providers including TOC	£28
Benefits to Users	£11
Benefits to Non Users and Society	£45
Economic NPV	-£107
BCR	0.34

Option 3	Present value £m
Public sector capital cost	(161.1)
Indirect taxation	(4.1)
TOC cost	(40.3)
Revenue (Direct Demand)	64.2
User time savings	17.6
Congestion	5.5
Infrastructure	0.1
Accident	0.9
Local Air Quality	0.2
Noise	0.1
Greenhouse Gases	0.5
Operating subsidy	(24.0)
Cost to public accounts	£165
Transport providers including TOC	£40
Benefits to Users	£18
Benefits to Non Users and Society	£72
Economic NPV	-£116
BCR	0.43

Full fruition year (2019) appraisal

JC View of Option 4a	2019 £k
Public sector capital cost	0.0
Indirect taxation	(162.4)
TOC cost	(2,527.0)
Revenue (Direct Demand)	2,268.1
User time savings	651.7
Congestion	142.1
Infrastructure	3.4
Accident	28.8
Local Air Quality	10.1
Noise	4.2
Greenhouse Gases	16.8
Operating subsidy	258.8
Cost to public accounts	£162
Transport providers including TOC	£2,527
Benefits to Users	£652
Benefits to Non Users and Society	£2,474
Economic NPV	£436
BCR	1.16

Option 1	2019 £k
Public sector capital cost	0.0
Indirect taxation	(141.1)
TOC cost	(2,166.0)
Revenue (Direct Demand)	1,970.7
User time savings	566.2
Congestion	123.5
Infrastructure	3.0
Accident	25.0
Local Air Quality	8.8
Noise	3.6
Greenhouse Gases	14.6
Operating subsidy	195.3
Cost to public accounts	£141
Transport providers including TOC	£2,166
Benefits to Users	£566
Benefits to Non Users and Society	£2,149
Economic NPV	£408
BCR	1.18

Option 2	2019 £k
Public sector capital cost	0.0
Indirect taxation	(135.8)
TOC cost	(1,579.4)
Revenue (Direct Demand)	1,896.3
User time savings	544.8
Congestion	118.8
Infrastructure	2.9
Accident	24.1
Local Air Quality	8.5
Noise	3.5
Greenhouse Gases	14.0
Operating subsidy	(317.0)
Cost to public accounts	£136
Transport providers including TOC	£1,579
Benefits to Users	£545
Benefits to Non Users and Society	£2,068
Economic NPV	£898
BCR	1.52

Option 3	2019 £k
Public sector capital cost	0.0
Indirect taxation	(215.7)
TOC cost	(2,256.2)
Revenue (Direct Demand)	3,011.8
User time savings	865.3
Congestion	188.7
Infrastructure	4.5
Accident	38.2
Local Air Quality	13.4
Noise	5.6
Greenhouse Gases	22.2
Operating subsidy	(755.6)
Cost to public accounts	£216
Transport providers including TOC	£2,256
Benefits to Users	£865
Benefits to Non Users and Society	£3,285
Economic NPV	£1,678
BCR	1.68

APPENDIX B - NEW STATIONS SENSITIVITY

Our trip rate analysis draws on comparison with that achieved by local stations. As shown below, there is a wide range of values, partly due to different services levels at different stations, and partly due to higher service levels encouraging passengers to rail head to the station from outside the natural catchment. In this sensitivity analysis we have been generous to the scheme in assuming a similar trip rate to that from Lewes, although a rate more similar to that from Polegate is probably more realistic.

	Working population within catchment distance					Station Users	Trip rate
	<800m	800m - 2km	2km to 5km	Over 5km	Total	Single jnys (2007/8)	
Lewes	7,551	11,781	2,835	-	22,167	2,714,826	122
Polegate	3,445	3,908	10,364	7,692	25,409	905,954	36
Uckfield	5,672	8,266	2,847	3,289	20,074	310,293	15

In order for an economic BCR of1.5 to be achieved, over 14,000 new houses would need to be created near new stations assuming a Lewes trip rate and over 50,000 new houses assuming the Polegate trip rate.

JC View with 8000 additional homes near stations	**Present value £m**
Public sector capital cost	(154.3)
Indirect taxation	(3.1)
TOC cost	(45.1)
Revenue	128.5
User time savings	35.2
Congestion	11.0
Infrastructure	0.2
Accident	1.8
Local Air Quality	0.4
Noise	0.3
Greenhouse Gases	0.9
Operating subsidy	(83.4)
Cost to public accounts	£157
Transport providers including TOC	£45
Benefits to Users	£35
Benefits to Non Users and Society	£143
Economic NPV	-£24
BCR	0.88

APPENDIX C - ALTERNATIVE FORCASTING METHOD

In order to provide confidence in the applicability of generic PDFH assumptions we have undertaken a 'sense check' using 2001 Census data of the largest flow forecast for the scheme – that between Uckfield and Lewes.

The direct demand model forecasts 69k single trips per annum on this flow, of which 92% travel in the peak. This pattern is typical of local rail travel in this region as a key advantage of rail is the ability to avoid local road congestion. We would thus expect many of these passengers to be commuting to work.

We show below commuting by mode into Lewes from Wealden locations. Car is the dominant mode (88% drive to work) and neither rail nor bus has a high share from most locations. Workers only seem to use rail where a station is very nearby, as would be expected for local commuting. Polegate appears the closest analogy to Uckfield if the scheme were implemented both in terms of its distance from Lewes (slightly greater at ~ 15km) and size of town. 20% of workers from northern Polegate to Lewes travel by rail and 14% from southern Polegate which has more distant access to the railway station. Uckfield might realistically aspire to a similar percentage of rail commuting in the long term – perhaps 15% in the medium term.

In 2001, 601 Uckfield workers worked in Lewes. If 15% of these travelled by rail for 260 days, they would contribute 48k single trips annually. If we were to apply a 50% uplift to account for non-peak work trips and commuting in the reverse direction, then we obtain the 69k annual figure derived in the direct demand model. While this calculation is a crude simplification it does give some confidence that forecast demand levels are plausible.

Originating ward	Worker by originating ward %	Access by Train (%)	Access by Bus (%)
Alfriston	3%	6%	0%
Buxted and Maresfield	4%	2%	7%
Chiddingly and East Hoathly	5%	2%	2%
Cross in Hand/Five Ashes	1%	0%	0%
Crowborough East	3%	3%	6%
Crowborough Jarvis Brook	0%	0%	20%
Crowborough North	1%	0%	0%
Crowborough St. Johns	0%	0%	0%
Crowborough West	1%	0%	0%
Danehill/Fletching/Nutley	4%	0%	0%
East Dean	4%	3%	3%
Forest Row	1%	0%	0%
Framfield	3%	0%	0%
Frant/Withyham	1%	0%	9%
Hailsham Central and North	4%	0%	0%
Hailsham East	2%	0%	4%
Hailsham South and West	7%	0%	0%
Hartfield	1%	0%	0%
Heathfield East	1%	0%	0%
Heathfield North and Central	4%	0%	0%
Hellingly	6%	2%	2%
Herstmonceux	2%	0%	0%
Horam	2%	0%	0%
Mayfield	1%	29%	0%
Ninfield and Hooe with Wartling	1%	0%	0%
Pevensey and Westham	6%	2%	0%
Polegate North	4%	20%	0%
Polegate South	1%	14%	0%
Rotherfield	1%	9%	9%
Uckfield Central	3%	0%	9%
Uckfield New Town	4%	0%	15%
Uckfield North	7%	0%	7%
Uckfield Ridgewood	5%	0%	0%
Wadhurst	0%	0%	0%
Willingdon	5%	2%	0%
Grand Total	100%	2%	3%