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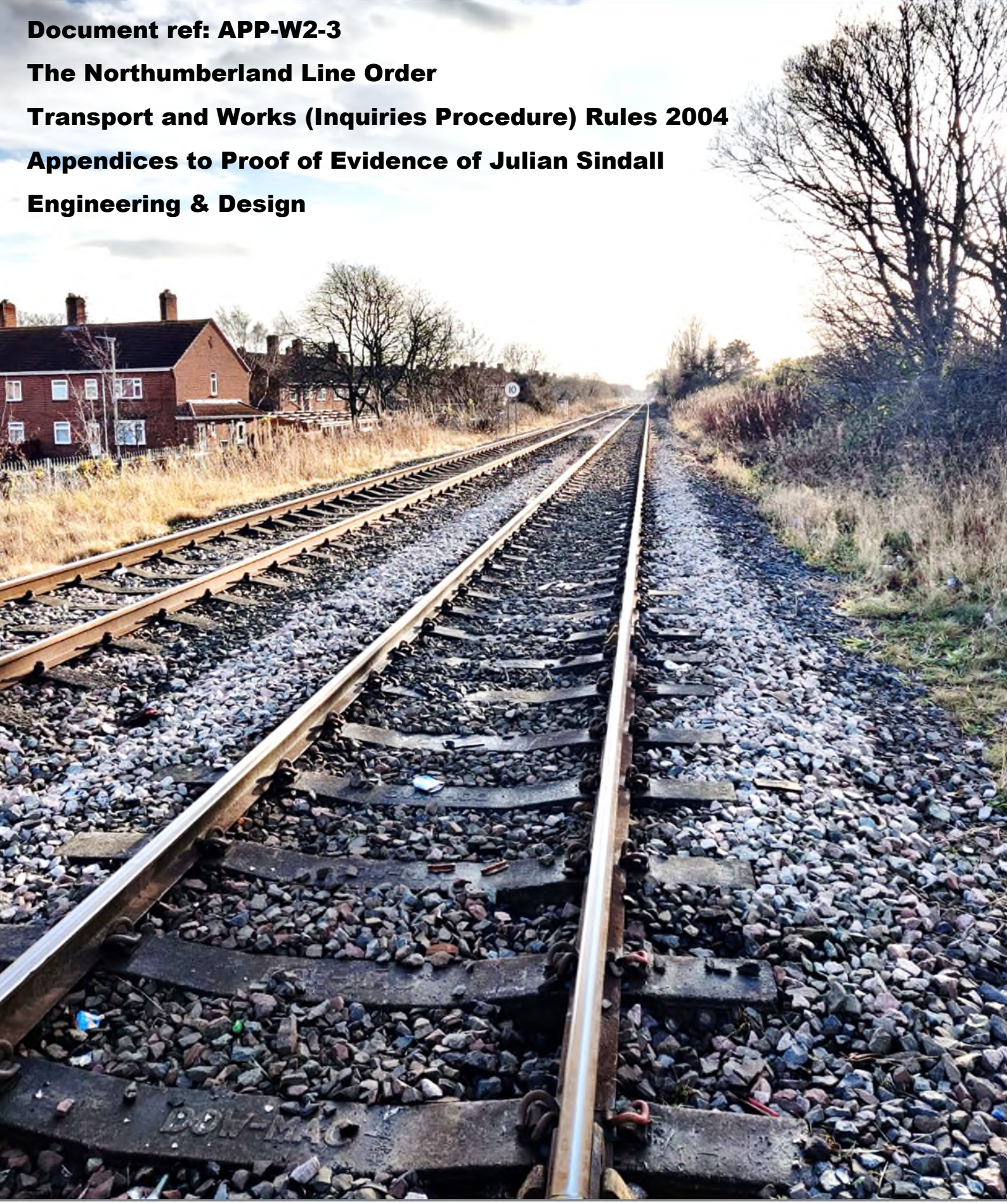
The Northumberland Line Order

Transport and Works (Inquiries Procedure) Rules 2004

Appendices to Proof of Evidence of Julian Sindall

Engineering & Design



Northumberland
County Council

NORTHUMBERLAND COUNTY COUNCIL

NORTHUMBERLAND LINE

ENGINEERING AND DESIGN

APPENDICES TO JULIAN SINDALL'S PROOF OF EVIDENCE

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APPENDIX A ASHINGTON STATION CAR PARK OPTIONS REVIEW

1. When assessing the likely demand for spaces as a result of the Northumberland Line, the project team has determined that the highest demand case is for 186 spaces in 2039, fifteen years from the proposed opening date. The basis for this was the rail demand forecasts that informed the Outline Business Case (OBC) [APP-40], determined using a multi-modal choice model developed in line with standard DfT Transport Appraisal Guidance (TAG), and then the application of appropriate factors to translate this into a demand for car parking spaces. This process is described further in the statement of Mr Coates contained in Appendix B.
2. Information from the OBC was utilised in developing the Ashington station car park layout. Since the OBC was submitted, the Scheme design has progressed alongside the development of a Full Business Case (FBC) and the demand for car park spaces has been reduced in the interim to 99 spaces in 2028 in accordance with DfT guidance for impacts from the Covid pandemic on rail demand.
3. There are 113 car parking spaces within the existing Station Yard South car park, which occupies the land used by the proposed Ashington station car park. The most recent pre pandemic Ashington parking study, commissioned by NCC in 2016, showed that maximum occupancy reached 100%.
4. If a hypothetical and extremely pessimistic case is taken that 50% of these spaces are no longer used due to Covid impact, that would mean only 57 of the existing spaces were needed for town centre use in the long term.
5. If the project were constrained to only using the available at grade land at Ashington identified in the Order documents, but without the Malhotra land, the design team has provided a preliminary optimistic assessment that circa 150 spaces would be available within the remaining site area (though a more realistic assessment is closer to 125 spaces).
6. This assessment of spaces is based on a station car park design that would meet robust Network Rail standards and guidance for accessibility; and provide wider facilities associated with a rail station car park such as provision for cycling, accessible storage to be designed in accordance with parking and cycle standards, public and taxi drop off areas, and Network Rail maintenance access facilities. Extracts of relevant standards follow:
    a. Appendix D: Parking Standards for the Northumberland Local Plan[1]
        i. Parking design (D.3-D.5)
        ii. Parking space minimum dimensions (D.6)
    b. Network Rail standard NR/L3/CIV/160 Issue 1 published 6th June 2009
        i. Section 3, bullet 4: The car park shall be integrated with all other travel modes that use the station, for example public transport, walking and cycling.
        ii. Section 3, bullet 5: The car park shall provide appropriate access for all potential users such as the emergency services, maintenance teams from Network Rail, the Station Facility Owner (SFO) and the Train Operating Company (TOC), and other train operating staff.
        iii. Section 3, bullet 7: The car park shall comply with the requirements of the Disability Discrimination Act, the Accessible Train and Station Design for Disabled People: A Code of Practice, and BS 8300: Design of buildings and their approaches to meet the needs of disabled people.
        iv. Section 12.1.1: Station access to provide for taxi set-down and pick-up; public kiss-and-ride; rail replacement buses; general bus services; emergency vehicles.

[1] Northumberland Local Plan Appendix D may be found at https://northumberland-consult.objective.co.uk/portal/planning/localplan/reg19?pointId=s15409149085671#section-s15409149085671 (sourced 04 Oct 2021)

v. Section 12.1.2: Parking to include short and long stay, mobility impaired parking; motorcycle and cycle parking; station maintenance / management /contractor parking; lineside maintenance vehicles
vi. Section 14: Access and parking provision for disabled people

c. Further specifications agreed with Northumberland County Council officers
i. Disabled spaces to be 6% of the total
ii. Min 3m width parking bays for Electric Vehicle charging vehicles
iii. 5m carriageway widths between two kerbs
iv. 6.4m-7.3m width for two-way links and accesses
v. Bus stops to be provided within reasonable walking distance of station platforms circa 400m, relocating bus stops where appropriate

7. If 57 of these 150 spaces are retained for town centre use, that leaves 93 spaces remaining for Northumberland Line use. Since the Covid-adjusted interim demand for the Northumberland Line is forecast to be 99 spaces in 2028, this indicates that the demand would exceed capacity by six spaces only four years after operations begin.
8. It would be unacceptable for Northumberland County Council to invest in a public scheme intended to boost the local economy, only to find that demand exceeded capacity within four years, even when taking an extremely pessimistic view of the effects of Covid, and an optimistic view of the number of spaces deliverable within the land space. A more realistic view would simply mean demand exceeded capacity even earlier.
9. It is necessary, therefore, to provide for the additional spaces expected, either by building up in the same space on the existing land, or by building out sideways onto the Malhotra land.
10. The option of building up has been assessed by developing a preliminary station car park design including a decked structure of 80m x 32m surface area plus surface level parking for disabled spaces, circulation and drop-off etc.. This would provide approximately 246 spaces and would be sufficient for the 2039 Northumberland Line high forecast demand, provided town centre parking were still constrained to no more than 53% of pre-covid levels eighteen years from now. The total car park scheme cost is estimated to cost approximately £5.4m, based on cost rates using the latest industry standard SPONS data.
11. A fully at grade car park extending onto the Malhotra land could provide approximately 270 spaces, providing for either 100% of 2039 highest Northumberland Line demand and 75% of pre-Covid high street demand, or 100% of pre-Covid high street demand and 84% of the 2039 highest Northumberland Line demand. The cost of building sideways out onto the Malhotra land is estimated using the same SPONS source data and comes to £1.6m plus the cost of the Malhotra land. The Malhotra land, has been estimated to be between £300k and £450k for use as a nursing home by a specialist professional surveyor. At the upper end of this estimate, the total cost of building sideways out onto the Malhotra land becomes £2.1m.
12. The cost differential to avoid using the Malhotra land is significant at more than £3m. The cost would be higher if it became necessary to retrofit a second deck to a popular car park no more than four years after the Northumberland Line is operational, because the additional logistics involved would make the installation even more expensive.
13. Although it would be theoretically possible to only use part of the Malhotra land, there would come a tipping point where the remaining space were uneconomical for the proposed nursing home. We cannot assess what this tipping point would be for the Malhotra group.
14. However, the Northumberland Line project would not wish to be unduly constrained by a partial land take and retain the risk of still having to provide a raised deck level earlier than otherwise necessary. Neither would it wish to accept suppressed demand if the scheme proves as popular as anticipated, or the Covid impact long term were less than anticipated.
15. In summary, the need for the Malhotra land derives from the fact that, even when taking an extremely pessimistic view of the Covid impact, demand will outstrip capacity within four years of the Northumberland Line being operational.

16. The most cost-effective use of tax-payer's money to provide the additional capacity is to use the Malhotra land, which would be expected to provide suitable capacity for at least the first fifteen years of operations.

APPENDIX B STATEMENT OF ANDY COATES – DEMAND FORECASTS

Northumberland Line TWAO Inquiry

Proof of Evidence of Andy Coates

October 2021

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
AC	JR		

Revision History

Revision	Revision date	Details	Authorized	Name	Position
1.1	22/09/2021	Original	27/09/2021	AC	Regional Director
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1.3	08/10/2021	Following review by wider team	08/10/2021	AC	Regional Director

Distribution List

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No table of figures entries found.

Tables

1. Introduction

Qualifications and Experience

1.1 My name is Andy Coates. I hold a Bachelor of Science degree in Transport Management from Aston University. I am a Chartered Member of the Institute of Logistics and Transport (CMILT) and a Member of the Transport Planning Society (MTPS).

1.2 I have 32 years' experience in the field of transport planning, with a particular focus on rail planning.

1.3 I am a Regional Director at AECOM Ltd – a global multi-disciplinary engineering and services consultancy that advises public and private sector clients across various markets including transportation, water, environment, power, industrial, construction, governments and urban planning. I am based in AECOM's Manchester office and work within the Transport Planning team in AECOM's Transportation sector.

1.4 I have worked across a variety of rail planning projects, mostly in the field of demand forecasting, economic appraisal, and the development of rail scheme business cases. I also advise clients, mostly across the public sector, on rail matters pertaining to their geography and/or particular rail schemes that they are seeking to promote and develop. These include developing the business cases for schemes such as:

- Burnley-Manchester rail service (client: Lancashire County Council): A new rail service introduced in 2015, which utilises a new curve at Todmorden to facilitate a new direct rail service linking Burnley with Manchester;
- Halton Curve (client: Merseytravel and Cheshire West & Chester Council): Investment in upgrading a dormant curve to allow a new service to be introduced between Liverpool and Chester/North Wales. Service was introduced in 2019;
- Warrington West station (client: Warrington Borough Council): New station in Warrington, which opened in 2019 on the CLC line between Liverpool and Manchester via Warrington Central.

1.5 I also represent a number of Local Authorities across North West England with respect to the development of Northern Powerhouse Rail (NPR), working alongside the various rail industry stakeholders involved in that scheme.

1.6 One of my key roles at AECOM is to be the Project Lead for rail demand forecasting, economic appraisal studies and/or business case work that we are involved in. Alternatively, my role would be as a Lead Verifier within a project team undertaking a rail planning study, ensuring that AECOM's quality procedures are maintained and that client deliverables are met.

1.7 I have been working on the Northumberland Line scheme since AECOM was first commissioned by Northumberland County Council in 2011 to develop the demand forecasting tool that now informs the Scheme's business case. I am therefore familiar with the Scheme and how it has developed and progressed since 2011. In particular, my role within the team focusses on developing the demand forecasting estimates that inform the business case for the Scheme, as well as co-ordinating and producing the Scheme's business case. This has included the following business case submissions to Government (Department of Transport (DfT)):

- Strategic Outline Business Case (SOBC): submitted May 2019;
- Outline Business Case (OBC) [**APP-40**]: submitted March 2020.

1.8 In each case, the demand forecasting model was updated and refreshed in line with the latest Government guidance (Transport Appraisal Guidance - TAG[1]) available at the date, the most up-to-date model input data (e.g. time and cost data), and it represented the most up-to-date Scheme specification.

1.9 At the time of preparing this Proof of Evidence the Scheme's Full Business Case (FBC) is being prepared for submission to Government later in 2021.

1.10 In preparing the demand analysis that informs the Scheme's business case I have been assisted by specialist technical individuals within the transport planning team in AECOM under my supervision.

Scope of Evidence

1.11 This Proof of Evidence has been prepared to set out how the rail passenger demand forecasting for the Northumberland Line rail Scheme has informed the estimation of station car park sizing for design purposes. It does not cover the design of the car park (including how the demand forecasts have been interpreted by those designing the car parks).

1.12 The evidence in this Proof of Evidence explores the matters raised by Malhotra Commercial Properties Limited ("Malhotra") in their Statement of Case pertaining to the plans for a car park at the proposed Ashington station. Specifically, this Proof of Evidence will provide responses to those elements of Malhotra's Statement of Case that relate to the demand forecasting that has informed the car park design.

1.13 The evidence contained in this Proof of Evidence is structured as follows:

- Section 2: Description of the demand forecasting work that has been undertaken to inform the car park design;
- Section 3: Considers the Malhotra Statement of Case with respect to those elements that relate to the demand forecasting that has informed the car park design;
- Appendices:
  - Appendix A: Extracts from the PDFH re demand modelling.
  - Appendix B: Extracts from car park design guidance by the IHT.
  - Appendix C: List of North East stations used to determine car park use factor.

[1] Transport analysis guidance - GOV.UK (www.gov.uk)

2. Determining the Demand for Car Park Spaces

Overview

2.1 In order to determine the demand for car park spaces, two processes are required:

- The development of rail passenger demand forecasts; and
- The conversion of the rail passenger demand into the demand for car park spaces at a given station.

Rail Passenger Demand Forecasts

2.2 The rail passenger demand generated by the Northumberland Line Scheme has been forecast using a spreadsheet-based mode-choice model. This form of model was necessary due to the fact that no multi-modal modelling tool existed for this study area and other rail industry modelling tools were unsuitable for this study given it is a new passenger service running over an existing freight-only route.

2.3 The modelling structure needed to be flexible and sufficiently disaggregated to be able to distinguish between various options that might be developed (i.e. options could be specified in terms of differing journey times, different stations, different service patterns, stopping patterns, etc.). This in turn required the development of an appropriate zoning system and that the journeys by all available modes were assessed, so that modal transfer could be determined.

2.4 Given the nature of the rail network in the study area, there is limited scope for multi-routing and therefore the need for a network assignment-based approach was deemed to be unnecessary. It was therefore considered that the most appropriate approach was to build a bespoke spreadsheet-based mode-choice model, with appropriate imported 'off-the-shelf' parameters, calibrated to ensure a suitable level of validation to the study area (aligned with TAG guidance validation criteria). This approach is recommended in the Passenger Demand Forecasting Handbook (PDFH)[2] (relevant extracts in Appendix A) and ensures good practice is adopted, in that the forecasts are generated 'bottom-up' with built-in sense checks and more formal validation processes at key stages/building blocks. Using a spreadsheet-based platform also ensures model transparency.

2.5 The demand forecasting model represents a defined study area – in this case the South East Northumberland corridor and Tyne & Wear – which is represented by a series of zones which have been determined to consider the respective station catchments along the corridor. These zones are based on aggregations of Census Lower Super Output Areas (LSOA). The base demand for travel across all modes of transport is then established across the study area on a zone-to-zone basis and the mode-choice model then allocates that demand for travel to each mode of transport represented in the model. The modes of transport represented are:

- Car;
- Bus;
- Rail (existing – via Morpeth or Cramlington);
- Rail (proposed scheme – Northumberland Line); and
- Tyne & Wear Metro (park-and-ride (P&R)).

[2] The PDF Handbook is maintained by the Rail Delivery Group on behalf of the rail industry and summarises over twenty years of research on rail demand forecasting, providing guidance on aspects such as the effects of service quality, fares and external factors on rail demand. It is recognised within the industry as the key source of evidence in this area, which is reflected by the board membership of the scheme. About the Passenger Demand Forecasting Handbook | Rail Delivery Group

2.6 The basic model form is a hierarchical logit model with coefficients representing costs (e.g. fares, fuel costs, parking charges, etc.), in-vehicle time and out-of-vehicle time (e.g. walk time, wait time, etc.). There are also mode constants for the public transport and P&R modes (i.e. a weighting to represent traveller's preference for one mode compared to another, once time and cost impacts have been removed). The model works by calculating the disutility to travel by each mode for each valid movement in the model. Disutility is another name for generalised cost and is made up of the costs of travel, the in-vehicle times and the out-of-vehicle times. A logit formula is then applied using these disutilities in order to determine mode shares by movement.

2.7 In addition, the model structure is split into four segments that represent different decision-making across the time of the day that you travel and also whether you have a car available for your journey or not:

- Peak period, car available;
- Peak period, non-car available;
- Inter-peak period, car available; and
- Inter-peak period, non-car available.

2.8 The base year for the model is 2018, whilst future year models were developed for 2023 and 2039. 2039 was selected as the final forecast year as this is 20 years after the scheme appraisal year of 2019 (at the OBC stage when the demand forecasting model was substantially updated). In line with TAG guidance for rail schemes, year 20 is the demand-cap year when demand growth is assumed to flatten out (apart from an allowance for population growth). Trip growth by zone, mode and time period was sourced from TEMPro (version 7.2)[3] to generate future year trip matrices. In addition, TEMPro data was used to move some trips from the no-car available matrices to the car available matrices in line with changes in the forecasted number of car-owning households. Finally, the mode-choice model was used to determine the impacts in the future of relative changes in travel times and costs across the modes. Changes in travel times and costs by mode into the future were sourced from a mix of TAG guidance and relevant evidence.

2.9 The demand forecasting model has been calibrated and validated in line with TAG. In summary, the validation consists of:

- Calibrating the model parameters to ensure they represented the correct values of time as per TAG guidance[4] and that certain parameters were within expected ranges as defined by TAG Unit M2.1[5];
- Ensuring that the mode shares produced by the demand model for the base year replicate the observed mode shares in the base trips. This was undertaken at both the aggregate level (i.e. across all movements) and also at the disaggregate level on a zone-to-zone basis. The analysis demonstrated a satisfactory validation in all cases; and
- A check of implied elasticities as defined by the DfT in TAG Unit M2.1. These are 'realism tests' imposed by the DfT that ensure that any model produces demand impacts to changes to costs or times that are within acceptable boundaries (based on observed data). It should be noted that these realism tests have been defined by the DfT principally to test the performance of full transport models incorporating all four stages of the modelling process (generation, distribution, mode-choice, assignment). However, the principles of these tests provide a robust mechanism for testing the performance of this model with regard to public transport enhancements and therefore we undertook the 'change in public transport fares' realism test. The elasticity values produced by this analysis were within the expected range as defined by TAG.

[3] TEMPro is the DfT's database of trip end forecasts, including the planning data that drives the trip end forecasts. Trip End Model Presentation Program (TEMPro) download - GOV.UK (www.gov.uk)
[4] TAG data book - GOV.UK (www.gov.uk)
[5] TAG unit M2-1 variable demand modelling - GOV.UK (www.gov.uk)

2.10 The mode-choice model estimates the demand for the new rail passenger service for journeys in the study area (e.g. Ashington to Newcastle, Blyth to South Shields) that have transferred from other modes. In addition, uplift factors are used to determine further potential sources of rail demand in relation to induced travel (totally new journeys) and longer distance travel (e.g. Ashington to London). Uplift factors have been determined based on the best available evidence in both cases. The induced demand uplift factor has been sourced from evidence from a number of post-implementation studies of new rail services, including the Borders Rail Line in Scotland which opened in 2015. The long-distance travel uplift factor was developed from observed rail demand patterns on the Tyne Valley line into Newcastle.

2.11 The demand forecasts produced by the demand forecasting model have been benchmarked against the Tyne Valley corridor by comparing trips rates at stations on both corridors. This exercise provides a useful indication of how the mode choice model outputs (including induced demand and long-distance trips) compares to another corridor with regular rail services into Newcastle. The outcome of this exercise demonstrated that the implied trip rates being generated by the model benchmarked well against those observed on the Tyne Valley line.

2.12 The demand forecasting model was originally developed in 2012, with updates in 2014, 2016, 2018, 2019, 2020, and now 2021, in line with key development stages of the Scheme as a whole. In order to support the Scheme's business case, and in particular the economic appraisal of the Scheme, the demand forecasting model has to demonstrate that it is fit for purpose, reflects the latest Scheme service specifications, uses the latest Government TAG guidance and the most up-to-date and appropriate input data. The model has been re-calibrated and re-validated for each stage of the business case. It is also subject to review by the DfT as part of the business case approvals process. This has included the following business case submissions:

- Strategic Outline Business Case (SOBC): submitted May 2019;
- Outline Business Case (OBC): submitted March 2020.

2.13 At the time of preparing this Proof of Evidence the scheme's Full Business Case (FBC) is being prepared for submission to Government later in 2021.

2.14 The demand forecasts at OBC and at FBC stage for the new stations on the Northumberland Line are presented in Table 1. These are presented for the service specification that is intended to commence operation, namely:

- A service frequency of 2 trains per hour to Newcastle;
- Train service operated by Northern Trains;
- Fares set as an extension of the Tyne & Wear Metro fare zones.

2.15 The FBC model outputs incorporate the estimated post-pandemic impacts of the COVID-19 pandemic to varying degrees, based on the latest DfT guidance[6].

Table 1: Demand Forecasts at Northumberland Line Stations

Number of Originating Passengers per Weekday, 2039	OBC Model	FBC Model	FBC Model (COVID Sensitivity)
Ashington	844	853	700
Bedlington	596	613	503
Blyth Bebside	591	623	511
Newsham	961	953	782
Seaton Delaval	1,170	1,179	968

[originating passengers defined as those rail passengers who start their outbound journey at that station]

[6] The DfT has maintained a COVID Forecasting Tool in order to translate the latest research and evidence on possible post-pandemic impacts on rail demand into rail scheme appraisal guidance. At the time of writing this is at version 16 (June 2021). The guidance requests that a 'Central Case' is developed for economic appraisal purposes which takes into account the Office for Budget Responsibilities' forecasts for GDP and employment post-pandemic. A further scenario is developed as a sensitivity test that also includes a potential behavioural impact (i.e. a longer term impact of increased working from home, plus changes in attitudes towards certain leisure activities).

Translation of Rail Passenger Demand into a Demand for Car Park Spaces

2.16 In order to inform the Scheme design, and in relation to station car park design specifically, it was necessary to translate the rail passenger demand forecasts into a demand for car park spaces. There is no specific guidance to undertake this task and therefore a methodology was devised to undertake this translation. This methodology was reliant on the best available data and had to take into account the following:

- The proportion of rail passenger demand at each station that would use a car to access that station;
- The proportion of car access users who would choose to use that station's car park;
- Average car occupancy rates;
- Car park space re-occupancy rates; and
- A target occupancy rate at each station car park.

Each of the above factors are discussed in turn below.

2.17 The rail passenger demand forecasting model is able to distinguish between passengers that have a car available for their journey and those that do not. The station catchment zones are identified as being those that are within a 'walk-in' catchment of the station (typically up to 1km to 2km from the station – depending on the actual boundaries as defined by the Census LSOA upon which they are based) or those that are located further away. The planning assumption made was that rail passengers that originated from catchment zones that were not walk-in zones and had a car available would use a car to access the station. This ensured that the calculation would be based on forecast demand and take into account local geography and levels of car availability. However, it is important to note a number of inherent assumptions associated with adopting this planning assumption:

- It is assumed that all demand from within the walk-in catchment zone around each station will walk to the station. In practice, some of this demand could use other modes, including car;
- The assumption has been made that all 'car available' demand that originates beyond the walk-in catchment zone will use car to access a station. In practice, some of this demand could use other modes to access the station (e.g. bus, walk, cycle, taxi);
- Zones are allocated to specific stations in the demand model, based on a consideration of what the station catchment for that station might be. In practice, some users of the rail service may consider joining the train at a different station to that allocated in the model.

2.18 It is important to note that these present both potential upside and potential downside impacts on the estimates for car park spaces.

2.19 Table 2 presents the proportions of those who are assumed to use car to access the stations.

Table 2: Proportion of Rail Passengers Assumed to Use Car to Access the Stations

% Rail Passengers Accessing by Car	OBC Model	FBC Model	FBC Model (COVID Sensitivity)
Ashington	46%	46%	46%
Bedlington	25%	25%	25%
Blyth Bebside	72%	59%	59%
Newsham	50%	50%	50%
Seaton Delaval	64%	64%	64%

2.20 These values vary by station due to variations in zone boundary sizes, differing levels of car available demand across each zone and the actual levels of demand being forecast at each station.

2.21 It is acknowledged that not everyone who accesses the station by car will want to park at the station. A significant proportion of them will be people who have been given a lift to the station (known as 'kiss and ride'). In the absence of any local data from surveys, NRPS[7] data over the period 2010 to 2017 was used to determine indicative factors to represent the proportion of rail users that use a car to access the station and that use the station car park. Two factors were identified:

- 64% of rail demand that uses a car to access the station uses the station's car park, based on Morpeth station data. Morpeth was selected on the basis of being the closest station to, and sharing some characteristics with, the Northumberland Line (shared catchment, similar rail journey times into Newcastle). It is acknowledged that there are aspects of Morpeth station that are different to those on the Northumberland Line, hence the use of a different factor outlined below based on the average across North East stations.
- 42% of rail demand that uses a car to access the station uses the station's car park, based on the average across all stations in North East England. Appendix A lists out all the stations in the North East that this average value is based on. This average value therefore represents the cross-section of station demand characteristics across the North East.

2.22 Average car occupancy rates have been used to convert the demand from 'people' into 'cars'. In the absence, to our knowledge, of any appropriate local data on average car occupancy rates, TAG guidance has been used to determine these factors. Two factors have been used, both sourced from the TAG Databook (Table A1.3.3)[8] on the basis that this produces a more representative range of forecasts to consider:

- 1.49 people per car (average weekday car occupancy);
- 1.43 people per car (average 7am to 10am weekday car occupancy).

2.23 There is very little data available on the rates of station car park space usage per day. This is the number of times each station car park space might typically be expected to be used by a car each day on average. Some regional station car park usage rates were sourced from our own consultant's database, which indicated a range of between 1.07 and 1.26 times a day. For the purposes of this analysis this was rounded to provide an indicative range of between 1.10 to 1.25 times a day.

2.24 The number of car parking spaces required at each station have been estimated based on a target occupancy rate of 85%, in line with the guidance contained in the 'Parking Strategies & Management' published by the Institution of Highways and Transportation[9] (relevant extracts in Appendix B). This is an application of guidance that adds further car parking spaces as an allowance for being able to find a space.

2.25 The car park demand conversion factors discussed above were combined to determine a range for the potential car park size that might be desirable at each station. Table 3 summarises this specification:

Table 3: Demand Conversion Factors

Assumption/Factor	**Top End of Range**	**Bottom End of Range**
% of people who use a car to access station that park at the station car park	64%	42%
Average car occupancy rate	1.43	1.49
Car park space re-occupancy rate	1.10	1.25

[7] National Rail Passenger Survey National Rail Passenger Survey - Transport Focus
[8] TAG data book - GOV.UK (www.gov.uk)
[9] Parking Management and Strategies - IHT

2.26 The estimated car park sizes are set out in Table 4 for the level of service specification that is intended to commence operation, namely:

- A service frequency of 2 trains per hour to Newcastle;
- Train service operated by Northern Trains;
- Fares set as an extension of the Tyne & Wear Metro fare zones.

Table 4: Estimated Car Park Sizes, 2039

Number of Spaces	OBC Model	FBC Model	FBC Model (COVID Sensitivity)
Ashington	103 - 186	104 – 188	86 – 155
Bedlington	39 – 71	40 – 73	33 – 60
Blyth Bebside	112 – 202	98 – 176	80 – 145
Newsham	128 – 232	126 – 228	104 – 187
Seaton Delaval	200 – 361	201 – 363	165 – 298

2.27 A single value was required for each station car park for design purposes. Ultimately, this was a decision for the Design Team to adopt an appropriate value from the range presented above. A number of options present themselves, including:

- Taking either the top or bottom value of the range;
- Taking a value that is based on the mid-point (or average) of the factors presented in Table 3; or
- Taking a value that is based on a considered evaluation of the factors presented in Table 3, plus the average values. Known as the ‘selected value’.

2.28 The selected value was based on the following considerations:

- In terms of the percentage of people who use car to access the station and that park at the station car park, the lower value of 42% is based on data from a number of stations across the North East, whereas the higher value comes from data at Morpeth station specifically. There is a case for using either of these values; a sample across stations in the North East might be considered more appropriate, but what happens at Morpeth station could be considered more representative of what might occur on the Northumberland Line. Therefore, the average value of 53% was considered to contribute to the ‘selected’ option.
- In terms of average car occupancy rates, these values have been sourced from TAG guidance and not local data. In the absence of local data, the use of TAG guidance remains the most suitable source. The higher value of 1.43 is based on the morning peak period and, given that car parks tend to fill up during the morning peak, this value was considered for the ‘selected’ option.
- The rate of use of a car park space is a function of whether a station is predominantly used by commuters or not. A lower turnover rate (e.g. 1.10) means that a car park space is only really used by a commuter parked there all day. The demand profile on the Northumberland Line suggests a more balanced demand over the whole day and therefore, if choosing a single value, the value of 1.25 was considered for the ‘selected’ option.

2.29 On the basis of the above, Table 3 could be expanded to demonstrate how a number of different single values could be adopted by the Design Team.

2.30 Table 5 summarises how each of these single values has been determined:

Table 5: Demand Conversion Factors – Single Values

Assumption/Factor	Top End of Range	Average Values	Selected Values	Bottom End of Range
% of people who use a car to access station that park at the station car park	64%	53%	53%	42%
Average car occupancy rate	1.43	1.46	1.43	1.49
Car park space re-occupancy rate	1.10	1.175	1.25	1.25

2.31 The estimated car park sizes – based on single values - are set out in Table 6 for each station:

Table 6: Estimated Car Park Sizes, 2039

Number of Spaces		QBC Model	FBC Model	FBC Model (COVID Sensitivity)
Ashington	Range	103 - 186	104 – 188	86 – 155
	Based on Average	142	143	117
	Based on 'Selected'	136	137	113
Bedlington	Range	39 – 71	40 – 73	33 – 60
	Based on Average	54	55	45
	Based on 'Selected'	52	53	44
Blyth Bebside	Range	112 – 202	98 – 176	80 – 145
	Based on Average	154	134	110
	Based on 'Selected'	147	128	105
Newsham	Range	128 – 232	126 – 228	104 – 187
	Based on Average	176	173	142
	Based on 'Selected'	169	166	136
Seaton Delaval	Range	200 – 361	201 – 363	165 – 298
	Based on Average	274	276	226
	Based on 'Selected'	263	264	217

2.32 There is very little difference between the car park sizes identified via the average set of values and those identified via the 'selected' set of values.

3. Responses to Malhotra Statement of Case

Overview

3.1 This chapter sets out responses to objections raised by Malhotra Commercial Properties Ltd in their Statement of Case as Objector (OBJ-22) to the Application.

3.2 The responses below have been determined in response to the matters raised by Malhotra in their Statement of Case pertaining to the plans for a car park at the proposed Ashington station, specifically providing responses to those elements of Malhotra's Statement of Case that relate to the demand forecasting that has informed the car park design.

Responses to Matters Raised on Demand Forecasting

Malhotra Statement of Case – paragraph 3.1.1

"AECOM has undertaken demand and revenue forecasting to inform the reopening of the railway line to passenger services. A key element of this work is forecasting the passengers that will use each station and how these passengers will access the station. This work therefore gives a good indication as to the level of car parking provision that is needed at each station."

There is no detailed explanation illustrating the manner in which the demand and revenue forecasting has been undertaking. Based upon a review of the Transport Assessment, prepared by Aecom to accompany the planning application for the station, 275 car parking spaces are to be provided. The Assessment advises at page 24 that Aecom has undertaken a demand and revenue forecasts to determine the level of car parking provision required at the station. This exercise confirmed that just 186 spaces are required for the station itself, whilst 113 spaces are currently available on part of the application site, functioning as a town centre car park. The capacity for linked or shared trips between the town centre car park and the railway station does not appear to have been explored and, to this end, there is a possibility that provision has effectively been double counted. In addition, no clarity is provided on the pricing strategy for the new/existing car parking. Notwithstanding this, the data relied upon to undertake the demand and revenue forecast also predates the Covid 19 pandemic therefore is unreliable and does not reflect the actual use of the amenity. Further evidence is therefore required justifying the need for the proposed levels of car parking.

Response

3.3 The calculation of the demand for car park spaces is based on the application of a number of factors that convert the rail passenger demand into the estimated number of car park spaces required. One of the factors used is the proportion of rail users that use a car to access the station and use the station car park. As outlined in the previous section (paragraph 2.21), if that factor is 42%, then it follows that 58% of rail users that use a car to access the station are not parking their car at the station car park. This proportion of people will, by definition, include those that have obtained a lift to the station. Therefore the calculation of car park spaces required has removed those rail users that are getting a lift to the station (where these might include people who have obtained a lift from those that are driving to Ashington town centre and happening to park their car at the existing car park).

3.4 The calculation of rail passenger demand, and the number of car park spaces required to accommodate rail users, assumes that there is no charge to park a car at the car park.

3.5 The original forecast that informed the assessment in the station planning application was based on the Outline Business Case (OBC) [APP-40], which was submitted to the Department of Transport (DfT) in March 2020. This was pre-COVID pandemic. The latest set of forecasts that have informed the preparation of the Full Business Case (FBC), as outlined in the previous chapter (paragraph 2.13), now take account of the DfT's latest guidance with regard to how post-pandemic impacts on rail demand might materialise. The maximum demand in the FBC model is 188 spaces, and in the FBC (Covid sensitivity) model is 155. The "selected" or "average" figures (as described above) range between 113 and 143 spaces.

Malhotra Statement of Case – paragraph 3.2.2

The National Planning Policy framework "the NPPF states that 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 mode. Recognition is given to the role this can play in reducing congestion and emissions and improving air quality and public health. In the case of the Northumberland Line, providing carparks at each station means that for many people, new railway to access their place of work or leisure, becomes a real alternative to a car."

This is a generic statement; what demand studies have been undertaken in a post Covid world to confirm that there is an inherent demand from car users to use the station for either travel to work or leisure? Without a clear understanding of this demand it is not possible to predict the car parking needs.

Response

3.6 The latest set of forecasts that have informed the Full Business Case (FBC), as outlined in the previous section (paragraph **2.14**), now take account of the DfT's latest guidance with regard to how post-pandemic impacts on rail demand might materialise.

Malhotra Statement of Case – paragraph 3.3.1

"The rail demand generated by the Northumberland Line has been forecast using a spreadsheet-based mode choice model". "The estimation of car parking size at each station depends directly on outputs from this model."

The modelling is highly sensitive to assumptions and variation of input and has been undertaken using pre Covid 19 data.

The carpark estimation modelling described at page 95 and the assumptions adopted are incorrect. In particular, the use of data drawn from existing stations is flawed as it fails to have regard to the characteristics and use of the proposed stations and the fact that Ashington is a terminus station.

Response

3.7 It is acknowledged that the basis of any transport demand forecasting can be sensitive to the assumptions and inputs used. This is acknowledged by the Department of Transport ("Any model is a simplification of reality"[10]). That is why each transport model is subject to rigorous testing and assurance during the model development process, the model's use for its intended purpose and any subsequent updating of the model. The DfT's TAG guidance sets out the expectations with regard to model calibration, validation and sensitivity testing. In section 2 (paragraph 2.9) the validation of the rail demand model is outlined – this demonstrates how the model performs in terms of being able to replicate observed transport movements and decision-making in the study corridor. Paragraph 2.11 in section 2 sets out how the outputs of the modelling process have been benchmarked against observed rail travel demand on a similar rail corridor into Newcastle.

3.8 TAG guidance also recommends that a transport model is tested via a series of sensitivity tests, which involve re-running the model with changes to model inputs and parameters to check whether the model results are robust to changes in those parameters and input assumptions (or to otherwise indicate areas of risk if model assumptions/inputs might change). Sensitivity testing to inform the Northumberland Line scheme's appraisal has been included at every stage of the business case, including variations on demand. In the latest FBC these sensitivity tests have taken account of the DfT's latest guidance with regard to how post-COVID pandemic impacts on rail demand might materialise (as outlined in the previous section (paragraph 2.15)).

3.9 With regard to the use of data drawn from existing stations to inform the translation of rail passenger demand into the demand for car park spaces, it is difficult to see what alternative solutions might be available to inform this process. In the absence of observed data that can reflect the proposed stations, the use and interpretation of observed data at existing stations is necessary in order to inform the process. This information has been sourced from a well-known and respected data source (NRPS – refer to paragraph 2.21 in section 2). In addition, and acknowledging that this can only be representative of the characteristics that might occur across the study corridor stations, we have adopted two interpretations of the data to inform the range of car park sizes: one based on a specific station that is close to the study corridor, and one that takes an average value across a wider selection of existing stations across the North East. The fact that Ashington is a terminus station is reflected in the rail passenger demand forecasting and the station catchment allocated to the station. It is not clear how the fact that Ashington is a terminus station might impact on the factors used to translate the rail passenger demand into the demand for car park spaces. Notwithstanding this, it is worth noting that there are stations in the North East sample that are terminus stations (refer to Appendix A – stations such as Bishop Auckland).

Malhotra Statement of Case – paragraph 3.4.1

"Ashington Station is estimated to require a car park with between 80 and 180 spaces by 2039."

The prediction for demand is 18 years in the future, represents a huge variation (80 to 180 spaces) and is based on modelling using averaging from stations which are not necessarily comparable with Ashington Station. In addition, the 275 spaces provided as part of the planning application seeks to replicate the existing 113 spaces in the current town centre car park, with no apparent evidence regarding the extent to which the spaces must be provided as part of the station development itself. The variation in these assumptions must be explained in order to properly understand whether or not the acquisition of the Objector's site is indeed required.

Section 4. Demand Forecasting of Appendix E 'Northumberland Line Car Parking Requirements' Technical Note of the Transport Assessment uses an average figure for the percentage of people who use a car to access station that park at the station car park. This figure is 53% and is an average

[10] TAG Unit M1.1 – paragraph 4.7.4

value from 'a number of stations across the North East' (42%) and Morpeth station (64%). The authority is asked to:

- Define which stations are included in the North East average.
- Justify why these stations have been selected.
- Justify why Morpeth been selected given that this station is vastly different to that proposed at Ashington, offering routes direct the London King's Cross and Edinburgh Waverley.
- Explain why the North East average figure (42%) was not used?

Response

3.10 The demand ranges from 86 to 188 on the FBC assumptions, including the Covid adjustment. The adoption of a range to define the number of car park spaces required reflected the reliance on a set of factors to convert the rail passenger demand into the demand for car park spaces. These factors, by definition, are sourced from observed data and/or TAG guidance (as set out in section 2, paragraphs 2.21 to 2.24), and it is therefore prudent to demonstrate the likely scale of car park size required acknowledging that these factors are not in themselves specific to the scheme's characteristics.

3.11 With regard to the specific questions posed by Malhotra above, and acknowledging that this can only be representative of the characteristics that might occur across the study corridor stations, we have adopted two interpretations of the data to inform the range of car park sizes: one based on a specific station that is close to the study corridor, and one that takes an average value across a wider selection of existing stations across the North East.

3.12 Appendix C sets out the stations that have been used to define the North East average, as one of the factors used in the process to convert the rail passenger demand forecasts into a demand for car park spaces. These stations were selected to represent a cross-section of stations in the North East of varying characteristics in terms of station catchments and service offer, whilst at the same time sharing the broad travel decision making made by rail users in the North East.

3.13 Morpeth station has been selected to provide an alternative value for the factor in question, on the basis that it is one of the closest existing stations to the study area and therefore has the potential to share a number of the characteristics in rail user decision making that might be experienced at a future Ashington station. It is acknowledged that the service offer at Morpeth will be different to that at Ashington in certain respects, but in essence there is a core two trains per hour between Morpeth and Newcastle, where Newcastle remains the dominant destination for rail journeys that originate at Morpeth.

3.14 The 42% factor (North East average) was used to define the range, with the Morpeth value being used to define the other end of the range. These are both representative factors based on the same source data, where there could be a case for using either of these values; a sample across stations in the North East might be considered more appropriate, but what happens at Morpeth station could be considered more representative of what might occur on the Northumberland Line. For design purposes a single value was required for each station car park. Ultimately this was a decision for the Design Team to adopt an appropriate value from the range presented, and it was deemed pragmatic to select an average of the two values as being representative of the range (this is explained in section 2 – paragraphs 2.27 and 2.28).

Malhotra Statement of Case – paragraph 4.2

The traditional office workplace has changed. This is highlighted in a University of Strathclyde survey which reports that fewer than one in ten office workers wants to return to the office full time when

COVID-19 restrictions are eased. The 'Covid-19 and Working from Home Survey' additionally states that 78% of the 3,000 respondents said they would prefer to work in the office only two days or less (per week). Section 4. Demand Forecasting of Appendix E 'Northumberland Line Car Parking Requirements' Technical Note of the Transport Assessment is based on historic and outdated information and should not be accepted as true forecast. Elsewhere in the region, Network Rail has recently provided a more up-to-date analysis of the post Covid demand for the Newcastle Gateway Project at Central Station in order to inform the viability of (and funding for) that project moving forward.

Response

3.15 The latest set of forecasts that have informed the Full Business Case (FBC), as outlined in the previous section (paragraph 2.15), now take account of the DfT's latest guidance with regard to how post-pandemic impacts on rail demand might materialise.

Malhotra Statement of Case – paragraph 4.3

Section 3.6.2 Sensitivity Tests of The Northumberland Line Strategic Outline Business Case was published in March 2019; this document should be reviewed to reflect the impact of Covid. The acquiring authority should demonstrate that the plans initially put in place are still viable.

Response

3.16 The latest set of forecasts that have informed the Full Business Case (FBC), as outlined in the previous section (paragraph 2.15), now take account of the DfT's latest guidance with regard to how post-pandemic impacts on rail demand might materialise.

4. Conclusions

4.1 The demand for car park spaces at each of the proposed new stations on the Northumberland Line has been determined through the application of factors and assumptions to the rail passenger demand forecasts that have informed the scheme's business case. The rail passenger demand forecasts have been developed in line with best practice and calibrated/validated in accordance with DfT TAG guidance. They have also been benchmarked against observed rail passenger flows on an existing line into Newcastle.

4.2 The factors and assumptions used to convert the rail passenger demand forecasts into a demand for car park spaces have been sourced from available data, where in most cases there are more than one possible value that could be adopted. These factors have included the possible proportions of rail passengers who will access the station by car and the proportions of those that will want to park their car at the station, levels of expected car occupancy and the likely car park space turnover rates. A further factor incorporates car park guidance around capacity provision in relation to anticipated demand. However, the inherent limitations around future forecasting and the adoption of factors and assumptions to establish the necessary outputs has been recognised and addressed through the derivation of a range of possible car park sizes across each of the proposed new stations.

4.3 Post submission of the Outline Business Case (OBC) for the scheme in March 2020, the DfT has developed guidelines for rail scheme appraisal in a post Covid pandemic environment based on the best available evidence. This guidance continues to evolve as further evidence emerges. The more recent rail passenger demand forecasting that is informing the Full Business Case (FBC) has adopted this guidance and presents new demand forecasting that takes into account both the estimated socio-economic and behavioural impacts of the post pandemic on rail demand. It remains important, however, to note that the DfT's guidance highlights the uncertainty that surrounds attempts to forecast rail demand post pandemic.

4.4 The latest rail passenger demand analysis in support of the FBC has driven a forecast range of car park spaces for Ashington station of up to 188 spaces by 2039. This demand for car park spaces is a direct function of the demand to use the proposed new rail service on the Northumberland Line. It is, therefore, a new demand for parking which does not exist at present.

Appendix A Relevant Extracts from PDFH re Demand Modelling

B4.4.1 More Complex Applications

For irregular services, the method of combining journey time, frequency and interchange becomes more complicated. The recommended approach is to use the 'rooftop model', described in Chapter D3. For each pair of origin and destination stations, this model must be applied to both the base and new timetables to calculate an average GJT between stations. In practice, it is best to use the MOIRA software. This provides a means of evaluating such changes: automatically calculating GJT values from the timetables and applying the elasticities appropriate to the situation. Individual TOC versions of MOIRA, with specially adapted zone systems, have been set up for each individual subscriber to the PDFC. The versions for TOCs in the South East also contain details of access/egress journey lengths within Central London.

Use of the MOIRA software is recommended for all but the simplest applications. It should be noted that the GJT elasticities in this Handbook should only be applied to changes in the station-to-station GJT; for trips to/from Central London, the GJT elasticities should only be applied to GJT that does not include access (tube/DLR/walk) times to the 'London Terminals' (ex-'London BR') group of stations. Currently, MOIRA includes access times in London within its calculation of GJT, and users of the software should take account of that when modelling the impact of timetable changes. We suggest that future versions of the MOIRA software apply the GJT elasticities to station-to-station GJTs, excluding access/egress times between London Terminals and ultimate origins/destinations.

Where significant competitive effects are likely, and the application is sufficiently important, the construction of a mode-choice model should be considered. This is likely to be expensive, and will require expert advice. Similarly, advice should be sought if there is a large change ('a step change') in GJT. This is discussed further in Sections 4.5.4 to 4.5.6.

B9.3 New Stations and Services

When a station or service is entirely new and the base demand is zero, the standard PDFH approach of calculating a factor to multiply the existing demand will not work. There are a number of possible approaches in this context depending on what data and models are available (or on the resources available to collect data and construct models). We present below three possible approaches, which cover the range of approaches used, noting that it is sometimes possible to combine the approaches:

- using current true origin/destination data[1] by rail (and possibly other modes) to assess the improved end to end journey characteristics if using the new service and hence the demand that is likely to use it;
- trip rate or trip end models; these do not consider current travel patterns from the location concerned, but look at demographic and economic characteristics of the location, and by comparison with similar locations assess the likely demand for travel; such models are also sometimes called gravity models;
- large sophisticated models that either use an existing model or one specifically constructed for the scheme being considered.

The following sections discuss these approaches in more detail.

Appendix B Relevant Extracts from Parking Strategies & Management (IHT)

comparison goods and a high quality environment.

Moreover, the relationships between amenity, activities and accessibility (including roads, parking and other modes) are complex, and the view, widely held, that more parking is necessary for the viability and vitality of town centres is based upon an assumption rather than a fact. Indeed the way in which parking supply is managed is likely to impact on the way the local economy is perceived.

Ideally towns should work together when determining parking supply and price, since providing parking incentives unilaterally may cause unreasonable competition and draw in customers from neighbouring catchments, thus increasing the overall length of shopping journeys by car. Equally, there is no point in deterring car users from using a particular centre if this leads to excessive travel to competing centres. The Regional Transport Strategy should be an important

- To manage parking to encourage short stay visits in the town centre;
- To integrate the charges for parking with objectives for other modes of travel;
- To charge for parking to ensure a reasonable balance between the demand and supply for parking at all times; and
- To ensure that parking revenues cover parking costs.

Again appropriate policies are covered in Chapter 6, but suitable targets might be:

- Peak demand not to exceed 85% of supply at all parking locations;
- A declared level of parking space in the town centre that emphasises short stay parking; and
- X% of on-street car parking space in the town centre (defined) to be converted to alternative uses within a designated period.

Efficiency

The policies adopted should enable the most efficient use to be made of public resources, including the transport infrastructure. The extent and management of parking can influence the extent and quality of access by car as compared to access by other modes. One of the difficulties in achieving an efficient balance is the fact that a

junctions can have a disproportionate impact on capacity.

If capacity is measured in terms of people and goods rather than vehicles, better overall accessibility may be achieved by allocating space and time to non-car modes. In a more holistic approach to traffic management, throughput in some instances is less important than the ability of

Chapter 6
Formulating Parking Interventions

Introduction

This chapter sets out the schemes, policies and protocols (collectively referred to as interventions) that can be brought into play to meet objectives. The various topics are grouped under 4 headings

- 1. The quantity of different types of parking space;
- 2. The quality of parking spaces (location, level of service, design);
- 3. Parking control and pricing – both on and off-street; and
- 4. Management of Parking (Protocols).

The Quantity of Parking Space: How much parking?

One of the important considerations is to determine how well the supply of parking space relates to the level of demand in the area, both at present and in the future, and to decide whether more or less space should be provided. This needs to take account also of the variability of parking demand. Such considerations have to be set within the policy context within a Parking Strategy. To balance supply and demand, the options are to increase supply or to limit demand through price or regulation. Attempts to limit demand by allowing parking

frustration and "searching" traffic, which is inefficient and environmentally damaging. The quantity of parking cannot realistically be decided without also deciding on the conditions and charges for use.

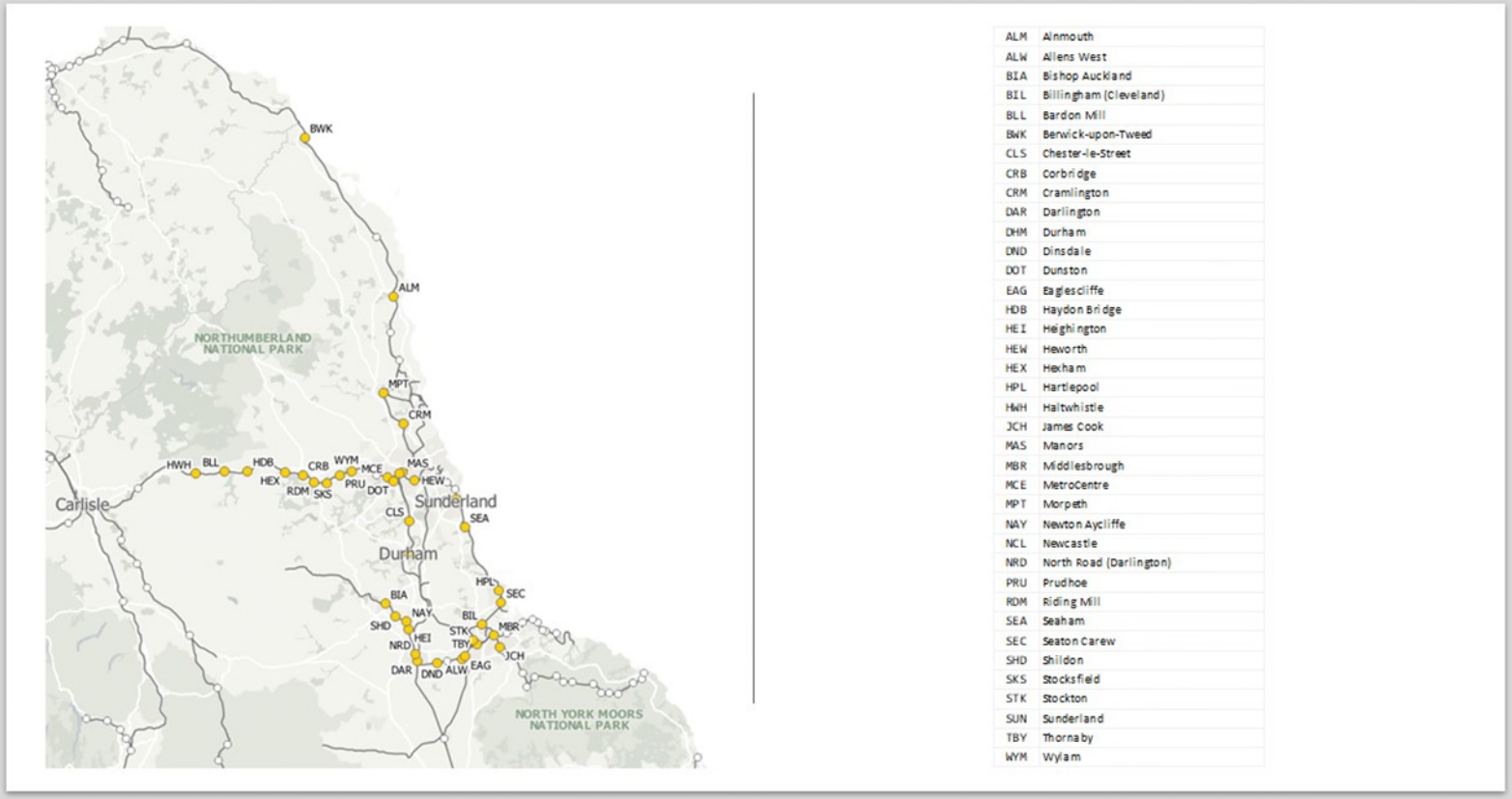
The steps involved are, therefore:

- 1. Decide on the quantity of parking, together with its allocation as between different types of use, its use over time and its consistency with mode split targets and other objectives;
- 2. Take measures to achieve the desired quantities in different categories; and
- 3. Set charges and controls at a level that will keep peak demand at no more than about 85% of capacity.

A number of mechanisms exist by which a local authority can influence the amount of parking space:

- Street design;
- On-street controls;
- Negotiated levels of parking in new development (the lowest that are workable within prescribed maxima);
- Planning permission for the conversion of parking space to other uses;
- Planning permission for new

Appendix C List of North East stations used to determine car park use factor



ALM	Alnmouth
ALW	Allens West
BIA	Bishop Auckland
BIL	Billingham (Cleveland)
BLL	Bardon Mill
BWK	Berwick-upon-Tweed
CLS	Chester-le-Street
CRB	Corbridge
CRM	Cramlington
DAR	Darlington
DHM	Durham
DND	Dinsdale
DOT	Dunston
EAG	Eaglescliffe
HDB	Haydon Bridge
HEI	Heighington
HEW	Heworth
HEX	Hexham
HPL	Hartlepool
HWH	Haltwhistle
JCH	James Cook
MAS	Manors
MBR	Middlesbrough
MCE	MetroCentre
MPT	Morpeth
NAY	Newton Aycliffe
NCL	Newcastle
NRD	North Road (Darlington)
PRU	Prudhoe
RDM	Riding Mill
SEA	Seaham
SEC	Seaton Carew
SHD	Shildon
SKS	Stocksfield
STK	Stockton
SUN	Sunderland
TBY	Thornaby
WYM	Wylam

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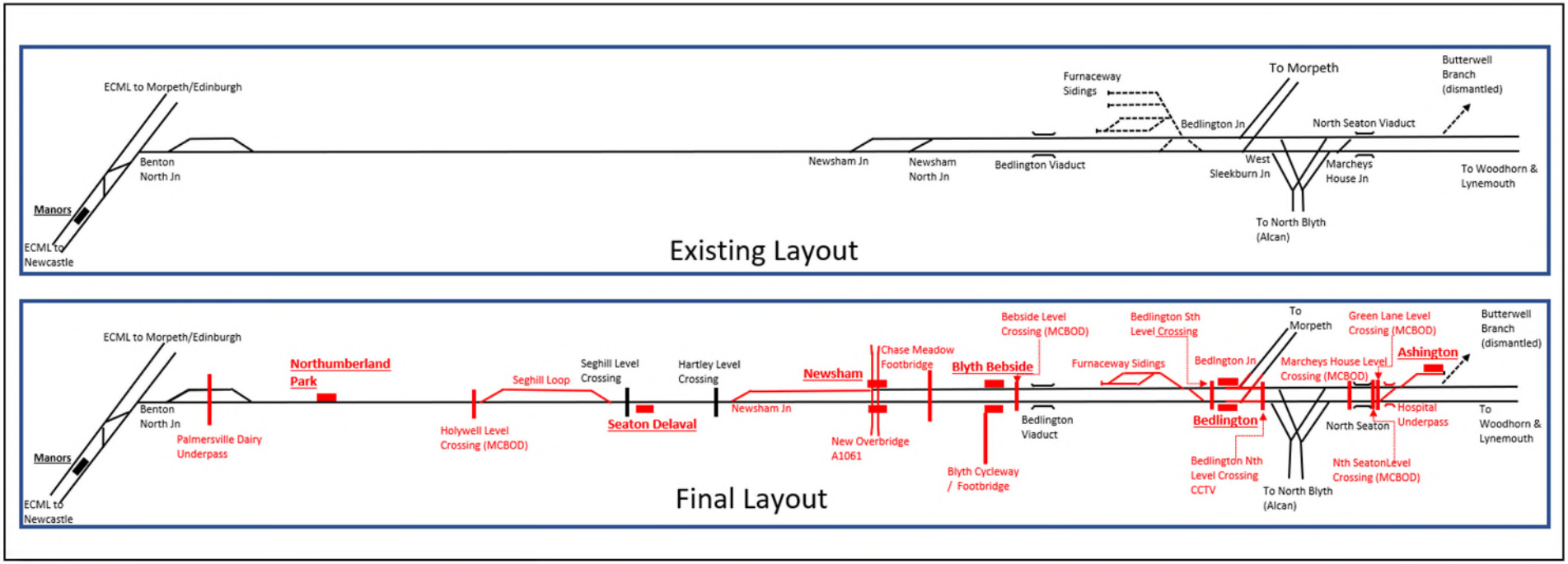
APPENDIX C DIAGRAMS CROSS-REFERENCED IN THE MAIN TEXT

B1 SCHEMATIC INDICATION OF PRIMARY ROUTE INTERVENTIONS (FIGURE 2)



B.2 TRAIN GRAPH DIAGRAM (FIGURE 3)