

A1 in Northumberland: Morpeth to Ellingham

Scheme Number: TR010059

TT.2 Updated Appendix C of Case for the Scheme WQ TT.1.17

AFPP Regulation Rule 8(1)(b)

Planning Act 2008

Infrastructure Planning (Prescribed Forms and Procedure)
Regulations 2009

Infrastructure Planning

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**The Infrastructure Planning
(Applications: Prescribed Forms
and Procedure) Regulations 2009**

**The A1 in Northumberland: Morpeth to
Ellingham**

Development Consent Order 20[xx]

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HE551459-WSP-GEN-M2F-TN-TP-0050– STAGE 3 WITA BENEFITS

Project:	A1 'Morpeth to Felton' and 'Alnwick to Ellingham' Dualling	Date:	23 rd July 2018
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Subject:	Stage 3 WITA Benefits		
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1 INTRODUCTION

WSP has been appointed by Highways England to update the existing A1 in Northumberland model to provide current and robust forecasts for the proposed A1 Morpeth to Felton and Alnwick to Ellingham dualling schemes. As part of the economic assessment of the schemes, an analysis of the wider economic impacts benefits has been undertaken. The analysis has been undertaken using WSP's Wider Impacts in Transport Appraisal (WITA) tool. This technical note provides an overview of the Stage 3 WITA assessment for the scheme.

2 WIDER IMPACTS IN TRANSPORT APPRAISAL

The Department for Transport (DfT) defines "wider impacts" as the economic impacts of transport schemes that are additional to the transport user benefits. Transport schemes are likely to have impacts in markets other than transport (such as the labour market, product market and land market). These impacts can be large and form an important element of the overall appraisal of a transport scheme. The types of Wider Impacts DfT includes in transport appraisals are:

- **W11 – Agglomeration**

"Agglomeration" refers to the concentration of economic activity over an area. Transport can alter the accessibility of firms in an area to other firms and works, thereby affecting the level of agglomeration. Businesses derive benefits from being located close to one another and being located in large labour markets. Transport investment can bring firms closer together and to their labour markets, thereby generating an increase in labour productivity beyond that would be expected from the direct user benefits alone.

- **W12 – Output change in imperfectly competitive markets**

A reduction in transport costs (to business and/or freight) allows firms to profitably increase output of the goods or services that require use of transport in their production. A transport intervention that leads to increased output of goods and services will deliver a welfare gain as consumers' willingness to pay for the increased output will exceed the cost of producing it.

- **W13 – Tax revenues arising from labour market impacts (from labour supply impacts and moves to more or less productive jobs)**

Changes in transport provision and costs can affect labour market decisions. Two main types of labour market impacts have been identified. These are referred to as "labour supply" impacts, and "moves to more or less productive jobs" impacts.

Transport costs are likely to affect the overall costs and benefits to an individual from working. In deciding whether or not to work, an individual will weigh the costs associated with work, including travel costs, against the wage rate of the job travelled to. A change in transport costs alters the net financial return to individuals from employment. This is likely to affect the incentives of individuals to work, and therefore the numbers choosing to work and the overall amount of labour supplied in the economy.

Transport can also affect the decisions made by firms and workers about where to locate and work. Employment growth or decline in different areas is likely to have implications for productivity, as workers are often more or less productive in different locations.

Some of the economic effects of these impacts are captured in commuter user benefits. However, commuter user benefits do not include the change in tax revenues received by the government. Changes in tax revenues are excluded from commuter user benefits because commuters value benefits in terms of post-tax incomes.

3 METHODOLOGY

The Wider Impacts for the scheme have been calculated using WSP's Wider Impacts in Transport Appraisal (WITA) tool. The spreadsheet tool emulates the methodology set out in WebTAG A2.1 and has previously been accepted for use by Highways England, Transport for the North and the DfT for assessment of wider impact benefits for the Trans-Pennine Tunnel and the M60 North West Quadrant. The WITA tool assesses all three types of Wider Impacts discussed above.

Data Requirements

The data required for Wider Impacts analysis falls into two categories:

- **Economic data:** this includes productivity of labour, employment numbers in an area, agglomeration elasticities representing productivity impacts from changes in level of effective density
- **Transport model data:** this includes generalised cost and travel demand information for different users with and without the scheme being appraised

The inputs required for each component of the Wider Impacts analysis are:

WI1 – Agglomeration

- Average daily generalised cost of business journeys and commuting journeys for each origin/destination journey pair, with and without scheme for each modelled year by Local Authority District (LAD)
- GDP per worker by LAD
- Employment level forecasts broken down by construction, consumer services, manufacturing, producer services and others by LAD

WI2 – Output change in imperfectly competitive markets

- Total user benefits for business journeys. This is estimated to be 10% of business user benefits calculated using Transport User Benefits Appraisal (TUBA)

WI3 – Tax revenues arising from labour market impacts (Labour Market)

- Change in average generalised cost for workers commuting from each origin (home) zone to each destination (employment) zone by LAD
- Average workplace earnings by LAD
- Average National GDP per worker by forecast year
- Index of Productivity per worker by LAD

WI4 – Tax revenues arising from labour market impacts (Move to More or Less Productive Jobs)

- Not assessed. WebTAG A2.1 advises that the impact on location on employment should be calculated only when a Land Use Transport Interaction (LUTI) model is used to forecast employment and residential location consequences of the scheme

Definition of Assessment Area

The WITA study area includes all zones in the following Local Area Districts (LADs):

- Northumberland
- North Tyneside
- Newcastle

The above study area is considered appropriate as it captures the main Travel to Work destinations of the resident population of Northumberland. WebTAG Unit A2.1 (para 6.1.5) warns against considering too small an area as it is likely to exaggerate the impact of the scheme appraised. The study area is consistent with that used at Stage 2.

Economic Data

The economic and employment data were obtained from the latest WebTAG Wider Impacts dataset v2.5, released in July 2013. These data are available by Local Authority Districts (LAD) from 2016 to 2061 in five years intervals. The values for the relevant LADs are presented in Appendix A.

The assessment also requires the following information from the WebTAG data book:

- Value of Time (VoT) for business users
- Forecast growth in VoT
- Discount rates
- Reliability parameters
- Generalised cost parameters
- Vehicle occupancies
- Proportion of travel in work and non-work time
- Fuel Costs and VAT rates
- Vehicle operating cost parameters

Values from the above were obtained from the latest WebTAG data book (v1.10.1 released in May 2018).

Scheme Data

Scheme data is required in a similar format to the TUBA input file. To be consistent with the TUBA benefits, calculations of Wider Impact benefits adopts the same parameters as below:

- Opening Year: 2023
- Modelled Years: 2023, 2038 and 2051
- Horizon Year: 2082 (60 years from the Opening year)

The modelled time periods are the same as used in the TUBA as summarised below:

- 08:00-09:00 (AM peak)
- 10:00-16:00 (Inter peak)
- 16:00-17:00 (PM peak)



The above time periods were expanded to represent a full weekday using the same annualisation factors used in the TUBA. These factors are detailed in TN-48 ‘TUBA Benefits’.

The Wider Impacts assessment only applies to car commuting and business trips. Freight has not been included as it is not well known how changes in generalised costs for freight affect changes in destination choice, time of day or mode (WebTAG A2.1, Dec 2014, para 4.1.4). The modes used in the WITA calculations are summarised in Table 1.

Table 1 WITA User Classes

Model User Class	TUBA User Class	Veh / submode	Purpose
1	2	Car	Commuting
2	1	Car	Business

The assessment also requires a 24-hour commute Production-Attraction (PA) matrix indicating level of trips between households and employment for each assessment year in the Do-Something scenario. This was derived from the car-commute Origin-Destination (OD) matrices and the average proportion of trips ending and originating from households obtained from the National Travel Survey data (2010 – 2014) for the Northeast (see Table 2). The process involves:

- Applying the proportions in Table 2 to the OD matrices to obtain “From Home” and “To Home” matrices
- Transposing the “To Home” matrices and adding them to the “From Home” matrices to produce PA matrices for the modelled time periods
- Applying relevant hour to time period expansion factors to the PA matrices for each time period
- Sum the PA matrices across all time periods to produce a 24-hour PA matrix and then divide by two to remove double counting of home-employment and employment-home trips

Table 2 North East Proportion of Commute Trips Originating and Ending at Home

Time Period	From Home	To Home
AM	0.86	0.14
IP	0.46	0.54
PM	0.32	0.68

Source: National Travel Survey (2010 - 2014)

Agglomeration Adjustments

The WSP WITA Tool is designed to take account of public transport and walking trips in the calculation of agglomeration benefits even in the event of a unimodal analysis (car) being conducted. In this instance changes in public transport and walking trips have not been modelled thus the tool is likely to overestimate the agglomeration benefits. In order to adjust the agglomeration benefits so that dampening effect of a full multimodal analysis are considered the results have been factored using the proportion of business and commute trips undertaken by car to limit impacts. Car trips proportions have been derived from TEMPRO 7.2 for each LAD included in the assessment. The resulting proportions have been applied to the calculated agglomeration benefits for the relevant LAD. The car trip proportions used are summarised in Table 3. In this way the Northumberland benefits have been reduced to only



79.5% of computed values to account for multimodal effects. This represents a conservative but defensible assumption.

Table 3 Proportion of North East Commute and Business Trips by Car

LAD	From Home
Northumberland	79.5%
Newcastle	65.0%
North Tyneside	73.5%

Source: TEMPRO 7.2

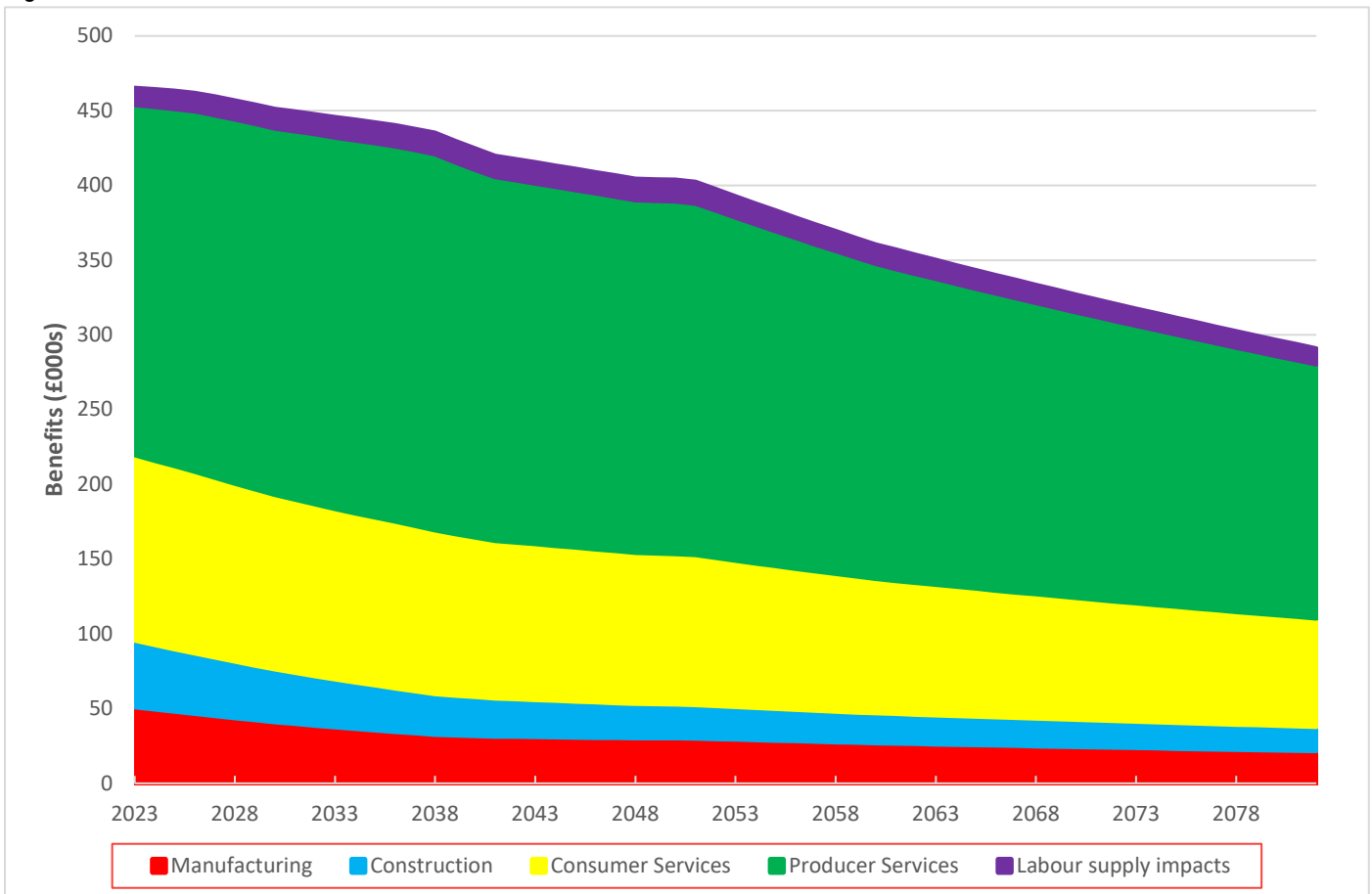
4 CORE RESULTS

The results of the WITA using the Core Scenario models are summarised in Table 4. The profile of benefits is illustrated in Figure 1. The total Wider Impact benefits for the scheme are in the order of £24m.

Table 4 DS4 Core WITA Results Summary

Price Base: 2010, discounted to 2010				
Appraisal Period: 60 years				
Unit: £ (000)				
Wider Impact	2023	2038	2051	Full Appraisal Period
Agglomeration				
• Manufacturing	51	33	30	1,853
• Construction	45	27	22	1,463
• Consumer Services	124	110	100	5,830
• Producer Services	234	252	235	13,184
• Total	454	421	388	22,330
Output in Imperfectly Competitive Markets	-	-	-	1,081
Labour Supply Impact (No resident relocation)	11	14	14	745
Total	465	435	402	24,157

Figure 3 Core WITA Results Profile – DS4



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