

## Annex 2

### NPIF – M5 Walking and Cycling – Economic Appraisal

#### General

This technical annex provides a summary of the work undertaken to support the economic case for this project. The M5 Walking and Cycling Improvement comprises of:

- A landmark structure across the M5 motorway, south of Junction 25, providing a high quality (car free) sustainable route connecting the Strategic Employment Site (Nexus25) with Blackbrook Business Park and the existing walk/cycle network in Taunton.

This project is an integral part of supporting economic growth, delivering a sustainable Nexus25 development, and increased commuting by walk and cycle modes across the town.

The economic appraisal is derived from first principle approach, using the following guidance from WebTAG:

- Marginal External Costs (TAG Unit A5-4: Marginal External Costs, December 2015) (Decongestion, infrastructure, accidents, noise, greenhouse gases and indirect taxation);
- Active Modes (TAG Unit A5-1: Active Mode Appraisal, January 2014) (Physical Activity, Absenteeism and Journey Quality); and
- Travel time savings (TAG Unit A1-3: User and Provider Impacts, TAG Databook March 2017 Release v1.7, Table A.1.3.1)

The costs of the project have been derived from:

- Construction costs;
- Allowances for materials, design and supervision, and long term maintenance of the structure; and
- Quantified Risk Assessment

It has been assumed that construction will start in 2018 and the project will be open in 2020, in time for the first occupation of Nexus25. All costs and benefits have been discounted to 2010 and are reported to a 2010 price base. A 30 year (2020 – 2049) and 60 year (2020 – 2079) evaluation period has been considered for the economic case. Each assumes Nexus25 is fully completed (and occupied) by 2029 (10 years after first occupation).

#### Calculation of the Benefits of the project

The calculation of the benefits is based on employees working at Nexus25 being able to achieve a higher mode share in walking and cycling; increasing from the observed level at Blackbrook Business Park, bypassing the Census 2011 level, to the Government’s Cycling Delivery Plan (2014) target. This target is realised as a result of the provision of a high quality (car free) sustainable link directly into Nexus25. The changes in cycle share are outlined below. Details of this shift in mode share can be found in the Propensity to Cycle Tool<sup>1</sup>.

Cycle Mode Share Percentage	Existing Blackbrook Business Park	Census 2011	Government Target
Commuters within catchment area	3.1%	8.2%	11.9%

Nexus25, once fully implemented, will have some 3,000 employees. It is estimated that almost 83% of the workers are living within Taunton Deane<sup>2</sup>. The appraisal considers a realistic cycling catchment area of around 8km (5 miles) from Nexus25, equivalent to 30 minutes cycle time and a slightly smaller catchment are for

<sup>1</sup> <http://pct.bike/>

<sup>2</sup> PBA report “Economic Benefits of a Second Strategic Employment Site” , 2014

walking trips, again equivalent to a 30 minute walk time. Employees living within this commuting distance could switch mode, using this sustainable link to access Nexus25.

The catchment area covers most of the built up area of Taunton, the urban extensions at Monkton Heathfield, Norton Fitzwarren and Staplegrove. Although rural villages such as Corfe, Hatch Beauchamp and Knapp are within the catchment area; it is considered that they are too remote to attract any cycle trips. A smaller walking catchment (Blackbrook, Holway and Lambrook areas) for Nexus25 is considered. Without the project, it is estimated a fully implemented Nexus25 will only attract 57 employees to cycle within the catchment area. The project could potentially attract 218 employees cycling to Nexus25.

The travel time and distance from various Taunton areas to Nexus25 are determined from Google Maps “Get Directions” for driving, cycling and walking. On average, driving routes are generally further than cycling by 1.5km, using the A358 Toneway and through M5 Junction 25; whereas the cycle and walk routes utilise the more direct corridor through the Blackbrook estate. This means cycling is often quicker than driving, averaging just over 4 minutes, and this reflects the congested nature in Taunton during the peak period.

As a result of switching mode, the saving in driving time and commuting distance within the catchment area determined. It is estimated the saving per working day is on the order of 3 hours and 53km in 2020, when only 10% of Nexus25 is completed in its opening year. This saving increases linearly to 33 hours and 528km in 2029, when Nexus25 is fully implemented. This saving is then expanded to annually, assuming typically 220 working days per annum, to calculate the saving in Value of Time in Commuting.

Marginal External Costs is used to capture the decongestion benefits in the absence of a multi-modal model. Active Model Appraisal is used to assess the impact associated with increase in activity. Benefits from each element of the Marginal External Cost and Active Mode Appraisal are calculated. In addition, the saving in commuting time is calculated. They are summarised below.

<b>Benefits</b>	<b>30 Years Period</b>	<b>60 Years Period</b>	
Decongestion	194,564	310,415	(£ in 2010 value 2010 price base)
Infrastructure	2,330	3,769	(£ in 2010 value 2010 price base)
Accidents	56,178	89,279	(£ in 2010 value 2010 price base)
Local Air Quality	0	0	(£ in 2010 value 2010 price base)
Noise	3,828	5,987	(£ in 2010 value 2010 price base)
Greenhouse Gas	10,570	17,046	(£ in 2010 value 2010 price base)
Indirect Taxation	-36,962	-57,110	(£ in 2010 value 2010 price base)
<b>Marginal External Cost</b>	<b>230,508</b>	<b>369,386</b>	<b>(£ in 2010 value 2010 price base)</b>
<b>Value of Time in Commuting</b>			
	<b>799,726</b>	<b>1,244,458</b>	<b>(£ in 2010 value 2010 price base)</b>
<b>Active Mode Appraisal</b>			
Physical Activity	35,435,676	117,424,466	(£ in real value 2010 price base)
Absenteeism	213,721	708,216	(£ in real value 2010 price base)
Journey Quality	19,729,523	66,182,404	(£ in real value 2010 price base)
<b>Active Mode Appraisal</b>	<b>22,869,268</b>	<b>48,169,802</b>	<b>(£ in 2010 value 2010 price base)</b>

### Calculation of the Costs of the project

The preliminary report produced by PBA<sup>3</sup> considers 3 bridge options to connect Nexus25 with Blackbrook Business Park. Option 2 – Tied Arch with Spine Bean Ramps is preferred and the report indicates that the construction cost is between £6m-8m. From the perspective of calculating PVC, a construction cost of £7m has

<sup>3</sup> Taunton Strategic Employment Site – Foot/Cycle Link Bridge over the M5 (38488/1501/REP-001 | Rev: P01)  
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been assumed. In addition, it has been assumed that further costs: 25% for materials and 20% for design and supervision will be incurred. A QRA has been estimated at £604,800 (in 2016 prices) and a 66% optimism bias has been added to reflect the early stage of this project. In terms of maintenance, a sum of £10,000 per annum (in 2016 prices) is assumed from 2021 onwards. Costs of the project is summarised below.

<b>Contribution</b>		
Department for Transport	4.813	£m, 2016 prices, 2016 price base, factor prices
Local authority	0.741	£m, 2016 prices, 2016 price base, factor prices
Third party	1.851	£m, 2016 prices, 2016 price base, factor prices
<b>Total project cost</b>	<b>7.405</b>	<b>£m, 2016 prices, 2016 price base, factor prices</b>
Total Maintenance Cost	0.180 (30 years) 0.590 (60 years)	£m, 2016 prices, 2016 price base, factor prices
Optimism bias (66%)	5.717 (30 years) 6.449 (60 years)	£m, real prices, 2016 price base, factor prices
Conversion factor to market prices	1.190	
Total project cost (including Optimism bias)	12.492 (30 years) 13.117 (60 years)	£m, real prices, 2010 price base, factor prices
<b>Present Value of Costs (PVC)</b>	<b>11.053 (30 years)</b> <b>11.171 (60 years)</b>	<b>£m, 2010 value, 2010 price base, market prices</b>

### Cost-Benefit Analysis Summary

The following table summarises the cost-benefit analysis.

<b>Present Value Benefits (£m 2010 prices)</b>	30 year period	60 year period
Marginal External Costs	0.231	0.369
Value of Time in Commuting	0.800	1.244
Active Mode	22.869	48.170
<b>Total Present Value Benefits</b>	<b>23.900</b>	<b>49.784</b>
<b>Present Value Costs (£m 2010 prices)</b>	<b>11.053</b>	<b>11.171</b>
<b>Net Present Value (£m 2010 prices)</b>	<b>12.846</b>	<b>38.612</b>
<b>BCR</b>	<b>2.16</b>	<b>4.46</b>

### Conclusion from Economic Appraisal

The economic appraisal has been undertaken for the project to deliver a sustainable link connecting the proposed Strategic Employment Site (Nexus25) with Blackbrook Business Park and the existing foot/cycle network in Taunton. The link will improve viability of walking and cycling to Nexus25, enabling the development to achieve the Government's targets. The benefits accrue from increasing the mode share of walking and cycling commuting trips in terms of quicker travel times, healthier individuals, less absenteeism, less congestion and safer roads. Thereby increasing the productivity of the Strategic Employment Site.

The value of these benefits have been calculated and offset against the costs associated with the delivery of the project. Depending on the length of the appraisal period the project, the benefits are between £23.9m and £49.8m against of cost of £11.05m or £11.17m. This provides a range estimate for the BCR of this project as between 2.16 and 4.46.