CAPITA

South East Blackburn Growth Corridor

Traffic Forecasting and Economics Report
November 2019

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Contents

Tables

Appendices

1. Introduction

1.1 Report Context

Capita Property and Infrastructure Ltd has been commissioned by Blackburn with Darwen Borough Council (BwDBC) to undertake a value for money (VfM) appraisal to support a business case for the South East Blackburn Growth Corridor Scheme. This comprises of a number of highway interventions across south east Blackburn to address congestion issues across the corridor and provide additional capacity for future growth. Specific intervention locations are summarised as follows:

- Widening of the A6077 Haslingden Road between its junctions with Lions Drive and Shadsworth Road to provide S4 carriageway with two lanes in each direction, as well as associated junction improvements;
- A new roundabout junction providing enhanced access to the Royal Blackburn Hospital (RBH) site near to the A6077 Haslingden Road/ Old Bank Lane junction; and
- Provision of a new link road directly connecting Roman Road and the B6231 Blackamoor Road, as well as changes to the existing Roman Road/ Blackamoor Road junction.

As part of business case development and appraisal of the scheme, forecasting of future traffic demand within the study area has been undertaken to assess the relative performance of the proposed intervention under future traffic flow conditions.

This report provides details of the methodology and results of future year traffic forecasting and modelling, and assesses the relative performance of the highway network across south east Blackburn with and without the proposed scheme. The report also details the economic appraisal process undertaken to assess each of the proposed highway interventions forming part of the South East Blackburn Growth Corridor Scheme under various future forecast scenarios. This determines whether the scheme delivers the necessary benefits to justify the proposed interventions.

Both forecasting and appraisal have been undertaken in line with best practice guidelines provided in WebTAG documentation in relation to modelling, forecasting and economic appraisal.

1.2 Highway Network Context

1.2.1 The A6077 Haslingden Road

The A6077 Haslingden Road forms a main arterial route across south east Blackburn connecting the town centre to the M65 motorway. Its route takes it south east away from the town centre providing access to RBH and a number of industrial estates before terminating at the M65 Junction 5. Traffic flows along the route have steadily increased since the M65 opened in 1997. The A6077 Haslingden Road and junctions approaching the M65 Junction 5 have been intermittently upgraded and improved over the years as traffic flows have increased.

A clear tidal flow movement along the A6077 Haslingden Road across AM and PM peak travel periods can be identified, with the dominant traffic movement towards Blackburn town centre, RBH and Shadsworth Business Park during the AM peak. The tidal flow reverses during the PM peak period, with the dominant flow outbound from these locations towards guide junction and the M65 Junction 5.

The A6077 Haslingden Road route suffers from congestion and link capacity issues during both AM and PM travel periods in the direction of tidal flow. During the AM peak, traffic is constrained where the route merges from two lanes to a single lane on the north westbound exit from its junction with Lions Drive, as well as at other junctions along the route at Shadsworth Road and the Royal Blackburn Hospital (RBH). During the PM peak, congestions and blocking back occurs along the entire length of Haslingden Road between the M65 Junction 5 and its junction with Old Bank Lane, suggesting link and junction capacity issues along the route.

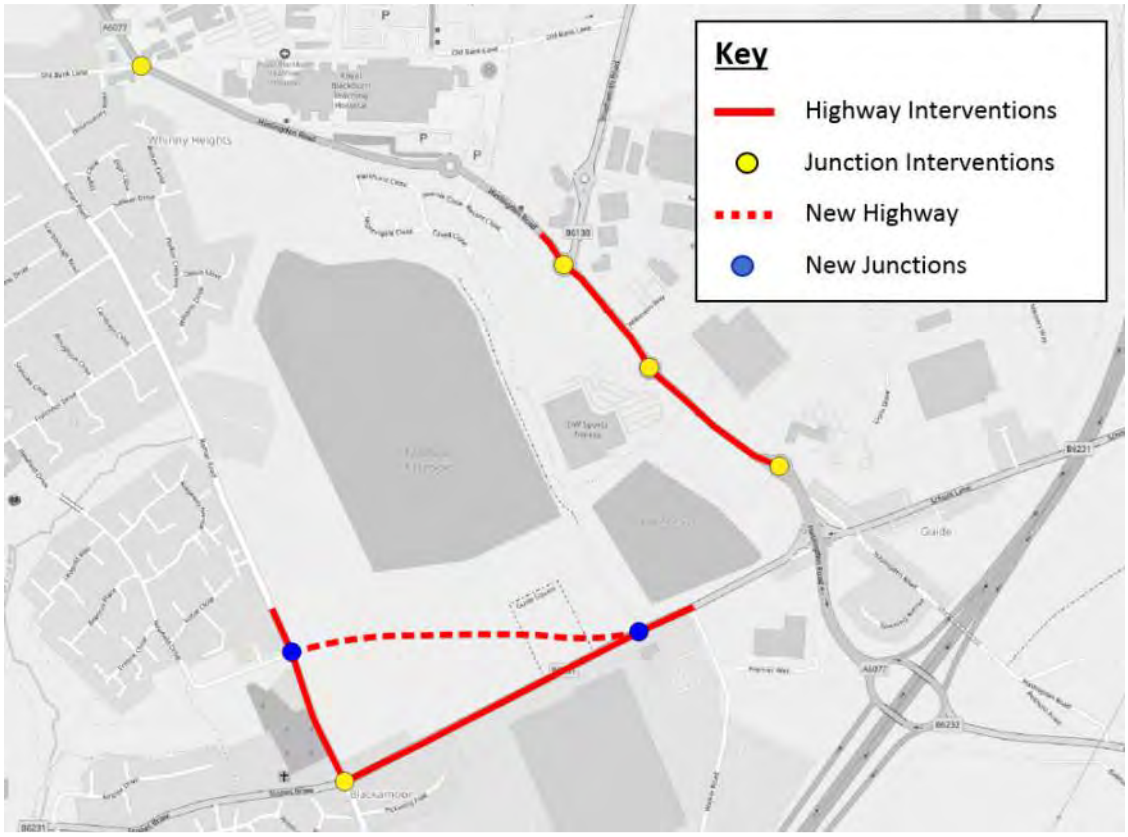
1.2.2 The B6231 Blackamoor Road and Roman Road

The Roman Road/ B6231 Blackamoor Road junction forms a four-arm signalised junction to the south west of Haslingden Road. Each approach arm has a single lane, except for the Roman Road approach from the south, which has two lanes. The junction is constrained by the proximity of nearby properties, creating tight vehicle turning radii through the junction and limiting potential options for widening approach arms to increase junction capacity. Extensive queuing and delay frequently occurs during both AM and PM peak travel periods along all approach arms to the junction, notably along the Stopes Brow and Roman Road (southbound) approaches during the AM period, and the Blackamoor Road and Roman Road (southbound) approaches during the PM period.

1.3 Proposed Scheme Aims and Objectives

The location of the South East Blackburn Growth Corridor Scheme is shown in Figure 1.1 below.

Figure 1.1 - Scheme Location



The proposed scheme aims to alleviate and reduce existing congestion and capacity issues along the A6077 Haslingden Road during peak travel periods, as well as improve traffic flow conditions along Blackamoor Road and at the Roman Road/ Blackamoor Road intersection. It is also expected that the proposed scheme will support housing and employment growth, both locally along the Haslingden Road corridor and more widely across the borough. Specifically, the scheme consists of the following highway interventions across south east Blackburn:

- Widen Haslingden Road between its junctions with Lions Drive and Shadsworth Road, upgrading the existing highway from S2 to S4 carriageway, providing two lanes in each direction;

- Upgrade Roundabouts at major access points along Haslingden Road including Shadsworth Road and the Soccerdome roundabout; and
- Deliver the Blackamoor Link Road: including two new junctions at Roman Road and Blackamoor Road plus a stretch of new Highway.

Works are proposed to start in early 2020 and be complete by March 2021. The project will:

- Improve congestion on the Haslingden Road corridor to / from Royal Blackburn Hospital and M65 Junction 5;
- Improve air quality at Blackamoor Junction (which is a designated Air Quality Management Area);
- Enable further development of employment opportunities; and
- Support future housing growth in the Borough.

Major transport improvements will act as the catalyst for new housing and commercial development, contributing to the delivery of the Council's adopted Local Plan targets for new housing, businesses and jobs.

In order to meet these aims and help to address the identified issues on the local highway network, the following objectives have been derived:

- Enable Blackburn with Darwen Borough Councils growth ambitions to be realised without adversely impacting on the current level of service (congestion) provided by the Haslingden Road corridor and adjoining local highway network;
- Improve air quality at the Blackamoor Road / Roman Road junction to bring nitrogen dioxide levels within the (annual mean) objective as specified in the Air Quality (England) Regulations 2000 (as amended) to enable the revocation of the Blackamoor AQMA;
- Enable further development of employment opportunities by facilitating the delivery of over 47,894sqm of new commercial floorspace creating over 3,862 jobs; and
- Support future housing growth by enabling the delivery of over 643 additional houses within the borough.

Further details of specific scheme objectives can be found in the main business case document.

1.4 Report Structure

The remainder of this report will take the following structure:

Chapter 2: Traffic Forecasting Methodology

Chapter 3: Traffic Forecasting Results

Chapter 4: Scheme Economic Appraisal

Chapter 5: Summary and Conclusions

2. Traffic Modelling and Forecasting Methodology

2.1 Introduction

This chapter defines the traffic forecasting and modelling methodology used to undertake evaluation of scheme performance and scheme benefits.

2.2 2019 Baseline Conditions

A calibrated and validated microsimulation model of the local highway network has been produced using VISSIM V11.00-09 for a 2019 baseline. The model was calibrated against Manual Classified Count (MCC) data and validated against TomTom journey time data. Model calibration and validation was informed by guidance and criteria set out in TAG Unit M3-1 Highway Assignment Modelling. Full details of model calibration and validation can be found in the Local Model Development and Validation Report (LMDVR) also submitted in support of the main South East Blackburn Growth Corridor Business Case.

2.3 Model Scope

The extent of the highway network modelled for scheme appraisal covers the extent of highway network defined in Figure 1.1 overleaf. The modelling study area is considered to cover the extent of the direct influence on the highway network expected from each of the proposed interventions, including all approach arms to affected junctions and key highway link sections.

The key routes and junctions forming the local highway network study area across south east Blackburn are detailed as follows:

- The A6077 Haslingden Road – From its junction with Old Bank Lane in the north west to its junction with the M65 Junction 5 in the south east. The following junctions with the A6077 Haslingden road along its route have been modelled directly:
    - Old Bank Lane;
    - The Royal Blackburn Hospital (RBH);
    - Shadsworth Road;
    - The Soccerdome and the Eurogarages Petrol Filling Station (PFS);
    - Lions Drive (Beehive Junction);
    - Blackamoor Road/ School Lane (Guide Junction); and

- The M65 Junction 5, including M65 north east bound and south west bound approach arms.

- The B6231 Blackamoor Road – From its junction with Roman Road to the west and its junction with the A6077 Haslingden Road to the east. The following junctions along its route have been modelled directly:
  - Roman Road, including the Stopes Brow approach arm to the junction; and
  - Walker Road.

The modelled network also includes the Newfield drive junction with Roman Road to the north of the Roman Road/ Blackamoor Road junction.

Figure 2.1 - Modelling Study Area

2.4 Model Forecast Years and Time Periods

Traffic forecasts have been developed from the 2019 baseline for the following future years:

- 2021 (expected scheme opening year); and
- 2026 (future modelled year).

A 2026 future year forecast (five years post opening) scenario has been derived and considered appropriate to appraise the proposed scheme under likely future traffic growth conditions.

In line with baseline modelling defined in the LMDVR, the following time periods and peak hours will be modelled and forecast:

- 07:00 – 09:00 (07:30 – 08:30 assessed peak hour); and
- 16:00 – 18:00 (16:30 – 17:30 assessed peak hour).

2.5 Infrastructure Supply Forecasting - Identified Intervention Option

A summary of the intervention options proposed across south east Blackburn are detailed in Table 2-1. A summary note providing a review of options has been provided with the main business case document summarising the review process for identifying the preferred intervention options. Drawings of the proposed highway arrangement following implementation of the scheme can be found in Appendix A.

Table 2-1 - A6077 Haslingden Road Capacity Assessment Recommendations

Location	Identified Intervention Option
A6077 Haslingden Road	Widening of the A6077 Haslingden Road between its junctions with Lions Drive and Shadsworth Road from S2 carriageway to S4 carriageway to provide two lanes in each direction. This will include associated improvements to roundabout junctions at the Shadsworth Road junction, the Soccerdome junction and the Lions Drive (beehive) junction.
Old Bank Lane/ RBH Access	Enhanced access to the Royal Blackburn Hospital (RBH) site adjacent to the A6077 Haslingden Road junction with Old Bank Lane. The intervention will include: • Provision of a new four-arm roundabout junction; • New single lane access / egress to/from the RBH site; and • Single lane approach arms from both Haslingden Road approaches and Old Bank Lane.
Blackamoor Road Link Road	Construction of the Blackamoor Road link road, providing a new highway connection between the B6231 Blackamoor

	Road and Roman Road, as well as the associated highway and junction improvements. Specifically changes will include: • Provision of a new single carriageway link road directly connecting Roman Road with the B6231 Blackamoor Road; • The new link road will form the major approach arms to a three-arm ghost island priority junction, with the existing Blackamoor Road forming the minor arm; • Provision of a new four-arm roundabout junction located along the new link road giving access to future development sites; • A new four-arm signalised junction where the link road meets roman road adjacent to its existing junction with Newfield Drive; and • Changes to the existing Roman Road/ Stopes Brow junction, including stopping up of the Blackamoor Road approach, and a new signal staging arrangement.

2.6 Infrastructure Supply Forecasting - Scenario Definitions

The transport infrastructure supply scenarios applied to future forecast years are defined as follows:

- **Do-Minimum (DM):** Existing highway network under **without scheme** conditions, with slight modifications to facilitate likely highway changes that would occur irrespective of the scheme, including access provision for future development under DM conditions; and
- **Do-Something (DS):** The overall proposed scheme defined in Table 2-1 (**with scheme** conditions) including all proposed interventions and highway changes, as well as minor highway changes at other locations to provide access to potential future development sites.

2.7 Traffic Demand Forecasting - Future Growth and Development

2.7.1 Introduction

The South East Blackburn Growth Corridor Scheme is aimed at improving traffic flow conditions across south east Blackburn, as well as facilitating housing and employment growth across the local area and unlock new areas for development.

Potential future housing and employment development sites across south east Blackburn within a reasonable proximity to the expected scheme impact area have been reviewed and summarised in an Uncertainty Log found in Appendix B. This considered the relative location, scale and likelihood of a given development site being realised under future forecast traffic flow conditions. Information on potential future developments has been obtained from a review of local planning applications, BwDBC Local plan site allocations, as well as growth and development information provided directly by the local authority.

In line with guidance provided in TAG Unit M4, any development considered 'Near Certain' or 'More Than Likely' to generate a significant number of vehicle trips within the modelled area has been explicitly modelled for the defined core scenario (see below). Any future trips from developments considered to be 'Reasonably Foreseeable' or 'Hypothetical' developments, as well as smaller scale developments and those located away from the schemes direct impact area are assumed to be within TEMPro growth factors applied to future forecast years.

2.7.2 Background Traffic Growth

Background levels of traffic across the local highway network will be forecast by the Department for Transport (DfT) through the National Trip End Model (NTEM) factors obtained from the Trip End Model Presentation Program (TEMPro). In the absence of a wider strategic model and given the context of the defined local highway network, including locally important transport corridors and arterial routes connecting key trip attractors across the Borough, a TEMPro growth factor for the BwD authority area will be applied across the study area.

Factors will be derived using the latest TEMPro 7.2 dataset between the base year and future forecast years. Growth factors will be derived for car drivers. Fuel and income adjustment factors will be applied to TEMPro growth factors between the base year and the forecast year, using the WebTAG Databook (May 2019).

Forecast background growth in HGV and freight traffic will be derived from the latest National Transport Model (NTM) Road Traffic Forecast (September 2018), with growth factors between

baseline and future forecast years established from predicted growth along urban principle routes.

2.7.3 Identified Committed Developments

A number of committed developments have been identified across the immediate scheme impact area. A list of developments considered committed can be found in Table 2-2 below. As of May 2019, these developments are either currently under construction, in a pre-construction phase or have been recently granted planning permission, with an expected completion prior to or during the scheme opening year (2021).

Not all committed developments have been explicitly modelled; smaller developments (such as the Beechwood Garden Centre and Crossfield Street developments) where forecast trip generation would be low, as well as sites located away from the modelled area will be considered as part of background traffic growth and applied TEMPro growth factors.

Table 2-2 - Identified Committed Developments

Site ID	LP Ref.	Planning App	Site Name	Site Type	Number of Homes	Employment Area
A	13/9	10/19/0555	Premier Way (Walker) Business Park	Employment	-	2.6 ha
B	-	10/18/0800	Roman Road (Nr Davyfield Site)	Employment	-	2400 (m^2)
C	-	10/18/0075	School Lane	Housing	45	-
D	13/7	10/16/1303	Shadsworth Plot C	Employment	-	1.9 ha
E	-	10/09/0414	Haslingden Road (Brandy House) Site	Housing	103	-
F	-	10/17/1083	Old Bank Lane (New RBH) Car Park	Other (Redistribution Only)	-	-
G	13/8	10/18/0871	EG Waterside (Parcel A)	Employment	-	4.7 ha
H	-	10/16/0838	Beechwood Garden Centre Site	Housing	13	-
I	-	10/07/0766	Crossfield Street	Housing	27	-

Explicitly modelled committed developments considered in future year forecast scenarios are highlighted in blue in Table 2-2 above. Trip generation and distribution information for these developments has been obtained from Transport Assessments (where available) or determined using the TRICS database and an appropriate gravity model derived from 2011 census data. Further details can be found in Sections 2.8 and 2.9.

As detailed in TAG Unit M4, forecast traffic across the modelled area, including explicitly modelled vehicle trips, has been controlled to the levels of growth predicted by the NTEM dataset, which represents the DfT's central assumption of growth in travel demand between any two given years.

2.7.4 Potential Future Development

A number of potential future developments have been identified across the immediate scheme impact area. These are detailed in Table 2-3 overleaf. The relative likelihood of individual development sites coming forward under various future forecast traffic flow scenarios has been reviewed, with a level of uncertainty captured in the uncertainty log.

Table 2-3: Potential Future Development Sites

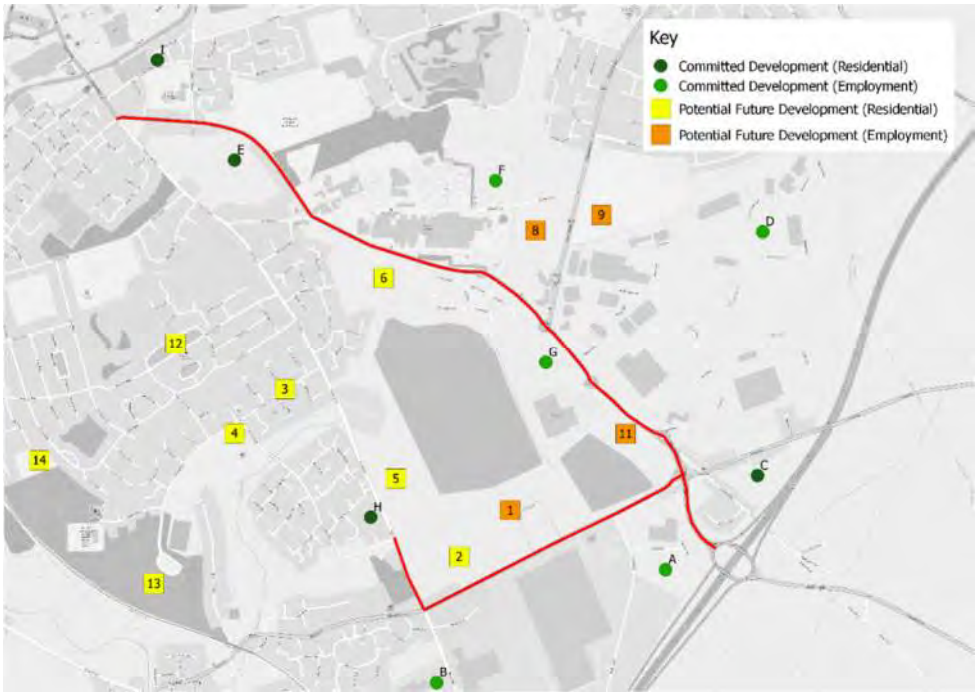
Site ID	LP Ref.	Site Name	Site Type	Number of Homes	Employment Area
1	16/8	Blackamoor Road Development Site	Employment	-	3.7 ha
2	16/8	Blackamoor Road Development Site	Housing	70	-
3	28/6	Fishmoor Drive (Parcel 1) - Former THL Land	Housing	201	-
4	28/6	Fishmoor Drive (Parcel 2) - Former T2000	Housing	65	-
5	28/6 + 16/8	Fishmoor Drive (Parcel 3) Newfield School	Housing	101	-
6	16/7	Haslingden Road (Fishmoor Reservoir) Site	Housing	140	-
7	16/11	Johnson Road	Housing	70	-
8	13/6	Medipark Site	Employment	-	3.8 ha
9	-	TIBS / Fmr Blakewater College (Employment)	Employment	-	4.0 ha
11	13/8	Waterside Employment Site (Parcel B)	Employment	-	1.6 ha
12	28/6	Manxman Road, Highercroft	Housing	45	-
13	28/6	Fishmoor Drive (Parcel 4) - South Site	Housing	200	-
14	28/6	Fishmoor Drive (Parcel 5) - Longshaw HOP	Housing	30	-

Forecast models will include explicitly modelled development sites deemed likely to proceed under a given forecast scenario. Details of trip generation, distribution and assignment of explicitly modelled future development sites under specific forecast scenarios is detailed in

Sections 2.8 and 2.9. Explicitly modelled car trips across the network under future year forecast scenarios has been constrained to levels of growth forecast by the NTEM, in-line with TAG guidelines.

The relative locations of both committed and potential future development sites is highlighted in Figure 2.2 overleaf.

Figure 2.2 - Location of Committed and Potential Future Development Sites



2.8 Traffic Demand Forecasting – Trip Generation

2.8.1 Committed Development Trip Generation

Levels of trip generation from the committed developments identified in Section 6.2 has been taken from Transport Assessments and planning documentation submitted with the planning application for each development.

Each committed development employment site was submitted with a Transport Assessment. For smaller housing sites where a Transport Assessment and estimated trip generation levels were not available, TRICS trip generation values per dwelling for 'Housing – Privately Owned' (see below, Table 2-4) were applied to the levels of housing proposed for each site. This was the case for smaller housing sites, specifically 10/18/0075: School Lane and 10/09/0414:

Haslingden Road (Brandy House) Site, where housing levels at each site are relatively low, and the overall traffic impact of each site would be minimal.

2.8.2 Potential Future Development Trip Generation

Trip generation from both housing and employment sites will be estimated using the Trip Rate Information Computer System (TRICS). Trip rate units for housing development sites will be estimated per dwelling. For identified housing sites, without further details of the relative breakdown in proportions private and affordable housing, a trip rate for 'Housing – Privately Owned' will be applied across each site.

Trip rate units for employment sites will be estimated per hectare, based on an 'Employment - Industrial Estate' land use. AM and PM development peak trip rates will be applied to the identified network peak hour forecasts. Trip rates per unit for each allocation type are summarised in Table 2-4 below.

Table 2-4. Site Allocation Car Trip Rates

Allocation Type	Units	AM Peak Hour (per unit)			PM Peak Hour (per unit)		
		Arr	Dep	Tot	Arr	Dep	Tot
Employment	Hectares	10.819	2.084	12.903	2.854	11.618	14.472
Housing	Dwellings	0.096	0.305	0.401	0.283	0.118	0.401

TRICS outputs for both residential and employment site allocations can be found in Appendix C. Not all trips from a given site have been distributed and assigned to routes within the defined study area, with the majority of identified committed and potential future development sites not located directly adjacent to the defined local highway network. Distribution and assignment of development trips will be considered in Section 2.8 below.

2.9 Traffic Demand Forecasting – Trip Distribution and Assignment

Trip distribution and route assignment for potential future development sites across the defined local highway has been based on a combination of existing MCC turning proportions through junctions and 2011 Census Travel to Work data. The majority of the wider south east Blackburn study area, including the majority committed developments and potential future housing sites is covered by census Middle Layer Super Output Area (MSOA) BwD 011, which is shown in Figure 2.3 overleaf.

2011 Census relative place of residence and place of work origin and destination data between MSOAs has been used to inform likely trip distributions and relative demand for movements beyond the extent of the defined local highway network. This has been undertaken for the 'car (driving)' method of travel to work. For housing sites, BwD 011 was selected as the 'place of usual residence' (origin), with all other areas nationally selected as 'place of work' (destination). For employment sites BwD 011 was selected as the 'place of work' (destination), with all other areas nationally selected as the 'place of usual residence' (origin).

Figure 2.3. Census MSOA BwD 011

Traffic has been assigned to the most likely direct route through the network between origins and destinations. Relative movements to/ from areas beyond Blackburn with Darwen have been assumed to use strategic route network via the M65. For smaller turning movements towards the extent of the defined local highway network and where multiple routes can be taken to reach a destination MSOA, existing turning proportions through junctions identified through MCCs have been applied to development trips.

Where available for committed developments, trip distribution and assignment of committed development trips has been taken from Transport Assessments produced in support of the identified committed developments where available. For movements through the defined local highway network beyond the extend of a given development's Traffic Impact Assessment, trip

distributions and route assignments have been informed by a combination of existing turning proportions through junctions, as well as 2011 Census origin-destination journey to work data as detailed above. It should be noted that identified movements beyond those defined within a given TA are generally five vehicles per hour or fewer and form relatively minor flows in the context of the local highway network.

In relation to the proposed EG waterside site located to the south-west of the A6077 Haslingden Road (Site G in Figure 2.2), development proposals have been recently updated to include a secondary access/ egress as a new fourth arm from the existing Haslingden Road/ Shadsworth Road Junction. In lieu of an updated trip distribution in relation to the new access, it has been assumed that 65% of trips will use the original site access as a primary staff and visitor access, with 35% utilising the staff only secondary access. Proposed trip generation levels have been re-distributed between the accesses accordingly.

Similarly for smaller housing sites where a Transport Assessment was not available, site trip generation distribution and assignment has been informed by existing junction turning proportions and relative 2011 Census origin-destination journey to work data as detailed above.

As part of ongoing development and a review of vehicle access to the RBH site, including new access arrangements proposed as part of this TA, a number of trip redistributions have been considered across both DM and DS future year forecasts. The TA written in support of committed development 10/17/1083: *Royal Blackburn Teaching Hospital Car Park,* defines specific trip redistributions between the existing RBH access from Haslingden Road and a new car park accessed from Shadsworth Road (via the A6077 Haslingden Road/ Shadsworth Road Roundabout).

Construction of this car park was recently completed, with defined levels of utilisation and trip redistribution expected to be realised by the 2021 scheme opening year. As a result, trip redistributions defined in the TA for planning application 10/17/1083 have been applied across DM and DS forecasts.

2.10 With-Scheme Redistribution

2.10.1 A6077 Haslingden Road and Royal Blackburn Hospital Access

In line with the fixed demand and assignment approach undertaken during future year forecast modelling in VISSIM, widening of the A6077 Haslingden Road and associated junction improvements are not anticipated to cause traffic redistribution from the wider highway network. This approach is considered appropriate to the scale of the scheme as a minor highway

scheme and the travel time savings resulting from the intervention. The scheme is aimed at providing delay savings and capacity improvements to existing users of the route and alleviate congestion and link capacity issues during AM and PM peak travel periods.

In relation to junction improvements proposed at the A6077 Haslingden Road/ Old Bank Lane Junction, improvements at this location involve the creation of a new four-arm roundabout junction designed to improve access to RBH and provide an alternative to the existing access to the west of the hospital site.

It is expected that there will be no net increase in trip generation associated with RBH as a result of the new access. Its primary function to cater for existing trips to/ from the RBH site currently utilising the existing access. In the absence of further details in relation to likely redistribution of trips as a result of improvements to the Old Bank Lane junction, the following assumptions have been made across 2021 and 2026 with scheme future forecast scenarios:

- At the existing RBH access junction, 30% of trips turning right from Haslingden Road (east) towards the RBH site will redistribute ahead towards Old Bank Lane, turning right into the new RBH access;
- At the existing RBH access junction, 30% of trips turning left out of the RBH site will be reassigned to exit via the new RBH access, turning left onto Haslingden Road and continuing ahead at the existing RBH access junction;
- At the existing RBH access junction, 30% of trips turning right out of the RBH site will be reassigned to exit via the new RBH access, 95% of which will turn right onto Haslingden Road (west) and 5% will travel ahead onto Old Bank Lane; and
- At the existing RBH access junction, 30% of trips turning left from Haslingden Road (west) towards the RBH site will be reassigned to the new RBH access opposite Old Bank Lane. 95% of reassigned trips will turn right from Haslingden Road (west) into the new RBH site access. 5% will be reassigned to Old Bank Lane, travelling ahead into the new RBH site access.

2.10.2 Blackamoor Road Link Road

Following completion of all aspects of the proposed scheme in 2021, including construction of the new link road, associated junctions and stopping up of the B6231 Blackamoor Road, all traffic travelling along the B6231 Blackamoor Road between its junction with Roman Road to the west and its junction with Walker Road to the east will redistribute to utilise the new link road. Specific assumptions made in relation to the with scheme traffic redistribution from the without scheme scenario can be found below:

- All existing and forecast trips turning left from Roman Road (north) to Blackamoor Road will redistribute via the link road;
- All existing and forecast trips turning right from Blackamoor Road to Roman Road (north) will redistribute via the link road;
- All existing and forecast trips turning right from Roman Road (south) and ahead from Stopes Brow to Blackamoor Road, will travel via Roman Road (northbound), turning right at the new Roman Road/ne link road junction towards Blackamoor Road;
- All existing and forecast trips turning left from Blackamoor Road to Roman Road (south) and ahead from Blackamoor Road to Stopes Brow will redistribute via the new link road and approach via Roman Road (north); and
- 2% of trips from Blackamoor Road (east) and the link road will be distributed onto the minor arm (Blackamoor west) of the new link road/Blackamoor Road junction, to represent traffic accessing the small number of residential buildings and employment sites gaining access to the highway network via this junction.

2.11 Future Year Modelling Approach

Future year traffic modelling will be undertaken from the calibrated and validated 2019 baseline VISSIM model, using VISSIM version 11.00-09. In line with baseline modelling, all future forecast modelled scenarios will be simulated across 20 model runs utilising the random seed profile defined in Table 2.5 below.

Table 2.5: Random Seed Details

Initial Random Seed	5
Random Seed Increment	5
Number of Model Runs	20

2.11.1 Vehicle Inputs

A total of 21 vehicle inputs are present in the DM (without scheme) forecast modelled network. A total of 23 vehicle inputs are present in the DS (with scheme) forecast modelled network. These are summarised in Table 2-6 overleaf. A growth factor, estimated from relative levels of background, committed and potential future development traffic growth for a given vehicle input location, has been derived to factor inputs from the base year to a given future forecast scenario.

For vehicle inputs present in the base year, an input profile consistent with the validated baseline model was applied across each modelled time period. For new vehicle inputs to a

given future forecast scenario, a flat input profile is applied across the modelled period based on estimated levels of demand to a given input.

Table 2-6: VISSIM Network Vehicle Inputs

Input Number	Input Name	Base Year Network	DM (without scheme) Network	DS (with scheme) Network
1	A6077 Haslingden Road	X	X	X
2	RBH	X	X	X
3	Shadsworth Road	X	X	X
4	Existing EG Office/ PFS	X	X	X
5	Lions Drive	X	X	X
6	School Lane	X	X	X
7	M65 SWB Off-slip	X	X	X
8	B6232 Haslingden Road	X	X	X
9	M65 NEB Off-slip	X	X	X
10	Roman Road (South)	X	X	X
11	Stopes Brow	X	X	X
12	Newfield Drive	X	X	X
13	Roman Road (North)	X	X	X
14	Willows Public House	X	X	X
15	Soccerdome/ New EG Office	X	X	X
16	Old Bank Lane	X	X	X
17	Walker Road	X	X	X
18	New EG Secondary Access	-	X	X
19	Fishmoor Development (Residential Access)	-	X	X
20	Fishmoor Development (Employment Access)	-	X	X
21	Local Plan Site 16-7 (Haslingden Road Residential)	-	X	X
22	New RBH Access	-	-	X
23	Blackamoor Road (stopped up)	-	-	X

2.11.2 *Vehicle Compositions*

Vehicle compositions applied to vehicle inputs present in each forecast future scenario have been updated to reflect relative changes in forecast levels of car and HGV traffic across the modelled network.

2.11.3 *Relative Flows*

In line with baseline modelling, future year modelling has been undertaken using static route choice to estimate relative flows through junctions across the network. Relative flows have been updated to reflect forecast changes in turning movements at junctions across the network, including the estimated trip distribution and assignment of explicitly modelled future development traffic and the redistribution of traffic under with scheme conditions in appropriate modelled scenarios.

2.11.4 *Do-Minimum and Do-Something Scenario Modelling*

Minor highway network changes have been undertaken from the validated base year network under future forecast DM (without scheme) modelled scenarios to facilitate new development accesses to the modelled network under certain future year forecasts. No further changes have been made to the VISSIM road network under DM conditions.

Highway network changes proposed under DS (with scheme) forecast scenarios have been added to the VISSIM modelled network, with efforts made to ensure the performance of road links and junctions matches the likely performance following implementation of the scheme. Priority markers, reduced speed areas and link behaviours types have been coded following best practice guidance and the VISSIM user manual.

For new and upgraded signalised junctions at the Roman Road/ Link Road junction and the Roman Road/ Stopes Brow junction, LinSig models were constructed based on the proposed junction arrangement, phasing and staging plan to provide optimised green times for each approach arm. Slight adjustments were made to signal timings in VISSIM to ensure optimised performance of the proposed with scheme network.

3. Economic Appraisal Methodology

3.1 Introduction

Cost-benefit analysis has been undertaken for the proposed South East Blackburn Growth Corridor, which assesses the relative difference in transport user costs and benefits between development scenarios. This process produces a Benefit-Cost Ratio (BCR) for the proposed scheme for a given traffic forecasting scenario.

The BCR provides the foundation of economic appraisal of the proposed scheme and determines its relative Value for Money (VfM). The BCR has been devised in accordance with the following DfT WebTAG guidance documents:

- TAG unit A1-1 Cost-Benefit Analysis;
- TAG unit A1-2 Scheme Costs; and
- TAG unit A1-3 User and Provider Impacts.

A key scheme objective is to unlock the housing and growth potential of south east Blackburn to new development opportunities. Guidelines defined in the following TAG documentation has been reviewed in relation to wider economic impacted and dependent development:

- TAG unit A2-1 Wider Economic Impacts; and
- TAG unit A2-2 Induced Investments.

The approach taken is considered proportionate to the scale of the scheme and the likely benefits resulting from the proposed intervention

3.2 Scheme User Benefit Estimates

A summary of key economic appraisal assumptions can be found in Table 3.1 overleaf.

Table 3.1 – Appraisal Assumptions Summary

Specification	Criteria/ Assumption
Base Year	*2019*
Scheme Opening Year	*2021*
Future Modelled Year	*2026*
Appraisal Period	*60 years (2021 – 2080)*
Economic Price Base	*2010*
WebTAG Databook Version	*May 2019*

The DfTs Transport User Benefit Analysis (TUBA) software (v1.9.12) has been used to derive economic benefit over a 60-year appraisal period arising from travel time savings, vehicle operating costs and greenhouse gases, as well as derive an estimate of the overall South East Blackburn Growth Corridor scheme BCR.

Vehicle Travel time savings are estimated from VISSIM model runs between scenarios, used to assess the relative performance of the scheme between comparable DM and DS future forecast traffic flow conditions.

AM and PM peak hour travel time data from VISSIM modelling has been annualised within TUBA to consider relative delay across 253 weekdays over a 12 month period and levels of delay during peak periods beyond the modelled AM and PM peak hours.

Vehicle type splits have been calculated for each future forecast scenario year. Transport user benefits will be applied to the following vehicle types:

- Car;
- Light Goods Vehicles (LGVs); and
- Heavy Goods Vehicles (HGVs).

Journey purpose splits were applied to each user class and sourced from the TAG Databook (May 2019). The following user class vehicle splits have been used for appraisal of scheme benefits:

- Car Employers Business;
- Car Commute;
- Car Other;

- LGV (Employers Business);
- LGV (Commute); and
- HGV (Employers Business);

Values of Time (VoT) applied to each user class are included in the economic parameters file within TUBA software sourced from the TAG Databook, as well as relative growth in VoT in future forecast years across the appraisal period. Monetised benefits are estimated by TUBA in 2010 market prices and values to provide a TAG compliant estimate of the overall scheme BCR.

Traffic volume, travel distance and travel time matrices for input into TUBA have been derived from VISSIM model outputs using travel time counters at all points of entry/ exit to and from the modelled network for each defined user class. These record the total vehicle flows, travel distance and travel time movements across AM and PM peak hour assessment periods.

The DfTs Cost Benefit Analysis Light Touch (COBALT) software has been used to assess the relative change in expected traffic collision rates following implementation of the scheme.

TUBA provides estimates of Greenhouse Gas (GHG) reduction benefits from improved traffic travel times across the scheme area. These are monetised and included in the estimate of the overall scheme BCR.

3.3 Scheme Cost Estimates

A summary of total scheme costs can be found in Table 3-2 below. Scheme costs are based on tendered design and construction costs for the proposed scheme. Costs are listed are in 2019 prices.

Table 3-2: Proposed Scheme Costs

Cost Element	2018/19	2019/2020	2020/2021	Total
Scheme Overall				
Construction		£1,735,713	£7,000,000	£8,735,713
Land		£620,500		£620,500
Preparation	£160,000	£750,956		£910,956
Supervision		£77,076	£150,000	£227,076
Risk		£315,755	£750,000	£1,065,755
Total	**£160,000**	**£3,500,000**	**£7,900,000**	**£11,560,000**

Scheme development and construction is expected to take place across 2019/20 and 2020/21 financial years. In addition to the costs defined above, a further £448,500 estimated maintenance cost has been included in scheme costs for input into TUBA to provide an estimate of full scheme costs, based on the creation of new highway along the Blackamoor Road Link Road. These are based on values per km defined in the *QUADRO Manual Part 2, Table 4/1*. Value stated is the total expected maintenance cost of new highway over a 60 year appraisal period expressed in 2010 prices.

The DfTs TUBA software requires total scheme cost estimates in undiscounted 2010 factor cost values. This figure is converted into a Present Value of Costs (PVC) figure in line with guidance provided in TAG unit A1-1 with an estimation of scheme BCR presented.

A summary of key steps in defining the PVC is inclusive of, but not limited to the following:

- The contribution of real cost increases between the price year (2019) and the relative construction years is applied to 2020 construction cost estimates;
- A quantified risk contribution value and allowance for contingency added to total scheme costs (estimated at approximately 12%);
- An allowance for optimism bias (3%) applied in line with TAG unit A1-2 for tendered design and construction cost estimates;
- A conversion to real prices to account for the effects of inflation, applied using a Gross Domestic Product (GDP) deflator as detailed in TAG unit A1-1; and
- A 'discount rate' of 3.5%, representing the extent to which people prefer current over future consumption, applied to convert future costs into their 'present value' (undertaken in TUBA).

The total PVC across each of the scheme elements across the South East Blackburn Growth Corridor package is estimated as £7,721,000.

3.4 Assessment of Dependent Development Methodology

A number of the development sites listed in Table 2-2 are considered to be 'deadweight', and represent committed developments not considered dependent on current scheme proposals. For clarity these are detailed as follows:

- Premier Way (Walker) Business Park (Site A, planning app 10/19/0555)
- Roman Road (Nr Davyfield Site) (Site B, planning app 10/18/0800)
- School Lane (Site C, planning app 10/18/0075)

- Shadsworth Plot C (Site D, planning app 10/16/1303)
- Haslingden Road (Brandy House) Site (Site E, planning app 10/09/0414)
- Old Bank Lane (New RBH) Car Park (Site F, planning app 10/17/1083)

Committed developments are assumed to be complete and fully occupied by the scheme opening in 2021. Future development with the prospect of significant trip generation onto the local highway network, beyond that listed above, is considered to be dependent on the current package of transport schemes to improve traffic flow conditions along the A6077 Haslingden Road and along Blackamoor Road corridors.

Details of identified potential future development sites considered to be dependent on the proposed intervention can be found in Table 3.3 overleaf. These represents all explicitly modelled potential future development sites listed in Table 2-3, as well as the EG Waterside development listed in Table 2-2. The planning permission granted for the EG Waterside development is subject to a S106 agreement between the developer and BwDBC, contributing land adjacent the A6077 Haslingden Road to facilitate widening of the carriageway and site development.

Current scheme proposals are considered to be the minimum transport scheme required to restore the network to a reasonable level of service and represent the preferred highway intervention option at specific locations across south east Blackburn.

Table 3.3 - Dependent Development Sites

LP Ref.	Site Name	Site Type	Number of Homes	Employment GFA (sq m)	Dependency Level
16/8	Blackamoor Road Development Site	Employment	-	37,600	100%
16/8	Blackamoor Road Development Site	Housing	70	-	100%
28/6	Fishmoor Drive (Parcel 1) - Former THL Land	Housing	201	-	100%
28/6	Fishmoor Drive (Parcel 2) - Former T2000	Housing	65	-	100%
28/6 + 16/8	Fishmoor Drive (Parcel 3) Newfield School	Housing	101	-	100%
16/7	Haslingden Road (Fishmoor Reservoir) Site	Housing	140	-	100%
16/11	Johnson Road	Housing	70	-	100%
13/6	Medipark Site	Employment	-	18,500	100%
-	TIBS / Fmr Blakewater College (Employment)	Employment	-	19,500	100%
13/8	Waterside Employment Site (Parcel A) - EG Waterside	Employment	-	11,495	100%
13/8	Waterside Employment Site (Parcel B)	Employment	-	4,500	100%

3.5 Dependent Development Appraisal Scenarios

The following forecasting scenarios have been derived as defined in TAG Unit A2.2:

- **'P' Scenario**: *Without* Transport Scheme (DM), *without* Dependent Development
  - Base year demand + 'deadweight' (committed and non-dependent development)
- **'Q' Scenario**: *Without* Transport Scheme (DM), *with* Dependent Development
  - The 'core' scenario, with traffic growth across the network controlled to NTEM forecasts
  - Base year demand + Background growth and 'deadweight' + Dependent development

- **'S' Scenario**: *With* Transport Scheme (DS), *without* Dependent Development
    - Base year demand + 'deadweight' (committed and non-dependent development)
- **'R' Scenario**: *With* Transport Scheme (DS), *with* Dependent Development
    - The 'core' scenario, with traffic growth across the network controlled to NTEM forecasts
    - Base year demand + Background growth and 'deadweight' + Dependent development

Appraisal of each of the above scenarios will be undertaken for both future year forecasts and modelled time periods.

4. Traffic Modelling and Appraisal Results

4.1 Modelling Results

A summary of key network performance statistics can be found in Table 4-1 below. This highlights the number of vehicles arriving into the network within the defined peak hours, as well as the relative average delay per vehicle between forecast scenarios. Average delay per vehicle values represent the global network performance derived from the following methodology:

Total delay / (number of vehicles in the network/ number that have arrived)

Figures presented represent the 'average' value undertaken across the 20 simulation runs across each time period.

Table 4-1: Future Forecast Modelling Results

Scenario	Year	Time Period	Number of Vehicles	Average Delay Per Vehicle (s)	Change From DM (s)
Baseline	**2019**	**AM**	7797	105.9	-
		PM	7536	157.5	-
P (DM)	**2021**	**AM**	7756	133.5	-
		PM	7402	188.0	-
	2026	**AM**	7758	134.0	-
		PM	7429	184.1	-
Q (DM)	**2021**	**AM**	7834	129.1	-
		PM	7459	185.8	-
	2026	**AM**	7982	189.6	-
		PM	7359	299.2	-
S (DS)	**2021**	**AM**	7866	102.0	-31.5
		PM	7442	169.7	-18.3
	2026	**AM**	7891	101.3	-32.7
		PM	7446	164.2	-19.9
R (DS)	**2021**	**AM**	7979	96.4	-32.8
		PM	7525	153.2	-32.6
	2026	**AM**	8202	133.4	-56.2
		PM	7792	203.2	-96.0

Table 4-1 indicates a relative average delay per vehicle saving between comparable DM and DS scenarios across both future forecast years. This indicates an overall delay saving across both AM and PM peak travel periods as a result of the proposed package of interventions relative to without scheme conditions. The results also indicate an increase in the relative delay saving in 2026 relative to 2021 as a result of increasing levels of congestion.

4.2 COBALT

An initial accident analysis exercise has been undertaken using the DfTs COBALT software for assessing the relative costs and benefits of transport schemes on the rate of traffic collisions. The outputs from the COBALT analysis over a 60-year appraisal period are shown in Table 4.2 below.

Table 4.2. COBALT Accident Analysis Results

Location	Accidents Without Scheme	Accidents With Scheme	Total Accidents Saved by Scheme	Accident Benefits Saved by Scheme (£)*
Old Bank Lane/A6077 Haslingden Road Junction	66.4	71.7	-5.3	£191,900
Blackamoor Link Road and Roman Road Junctions	295.4	411.9	-116.5	-£4,339,100
A6077 Haslingden Road Corridor	449.3	443.9	5.5	£130,300
Total	**811.1**	**927.5**	**-116.3**	**-£4,016,900**

*Benefits in 2010 market prices and values

The slight monetised disbenefit estimated from COBALT analysis will be incorporated in the overall scheme BCR calculation. A more detailed review of COBALT analysis and the relative impact of the scheme on traffic collisions can be found in the Social and Distributional Impacts Appraisal submitted in conjunction with the main business case document.

4.3 Economic Appraisal Results

4.3.1 DM + DS scenarios (with Dependent Development)

A summary of TUBA results presenting the relative monetised costs and benefits comparing the defined 'Q' DM scenario (without scheme and with dependent development) and 'R' DS scenario (with scheme and with dependent development) can be found in Table 4-3 below. This includes an estimation of the total scheme Present Value of Benefit (PVB), as well as the Net Present Value (NPV), which represents the current value of the scheme, defined by PVB – PVC. All values are listed in 2010 market prices and values across the defined 60 year appraisal period.

As defined in WebTAG guidance, the output BCR determines the VfM category the scheme falls within, as defined below:

- **Poor** VfM if the BCR is less than 1.0;
- **Low** VfM if the BCR is between 1.0 and 1.5;
- **Medium** VfM if the BCR is between 1.5 and 2.0;
- **High** VfM if the BCR is between 2.0 and 4.0; or
- **Very High** VfM if the BCR is greater than 4.0.

Table 4-3: Q-R Scheme PVB Summary

Q-R Scenario	Value (£,000)
Total PVC	**£7,721**
Commuting User Benefits	£14,280
Employers Business User Benefits	£7,527
Other User Benefits	£13,934
Greenhouse Gas Benefits	£951
Wider Public Finances (Indirect Taxation Revenues)	-£2,238
Monetised COBALT Benefits	-£4,017
Total PVB	**£30,437**
BCR	**3.94**
NPV	**£22,716**

This scenario is taken to represent the 'core' scenario, with future year forecast traffic growth, including background traffic and explicitly modelled development traffic, controlled to levels of growth forecast by the NTEM.

Based on TAG criteria, a BCR of 3.94 provides '**high**' value for money.

The Transport Economic Efficiency (TEE) Table, Impact on Public Accounts (PA) Table and the Analysis of Monetised Costs and Benefits (AMCB) table for this scenario is provided in Appendix D.

4.3.2 Sensitivity Test - DM + DS scenarios (without Dependent Development)

A summary of TUBA results presenting the relative monetised costs and benefits comparing the defined 'P' DM scenario (without scheme and without dependent development) and 'S' DS scenario (with scheme and without dependent development can be found in Table 4-4 below.

All values are listed in 2010 market prices and values across the defined 60 year appraisal period.

Table 4-4: P-S Scheme PVB Summary

P-S Scenario	Value (£,000)
Total PVC	**£7,721**
Greenhouse Gas Benefits	£11,866
Commuting User Benefits	£6,027
Employers Business User Benefits	£13,190
Other User Benefits	£762
Wider Public Finances (Indirect Taxation Revenues)	-£1,827
Monetised COBALT Benefits	-£4,017
Total PVB	**£26,001**
BCR	**3.37**
NPV	**£18,280**

Based on TAG criteria, a BCR of 3.37 provides '**high**' value for money. This represents a relatively low growth scenario, with no background traffic growth added to future forecast year, only explicitly modelled committed development traffic from sites listed in Table 2-2.

The TEE Table, PA Table and the AMCB table for this scenario is provided in Appendix E.

5. Gross Value Added Methodology and Results

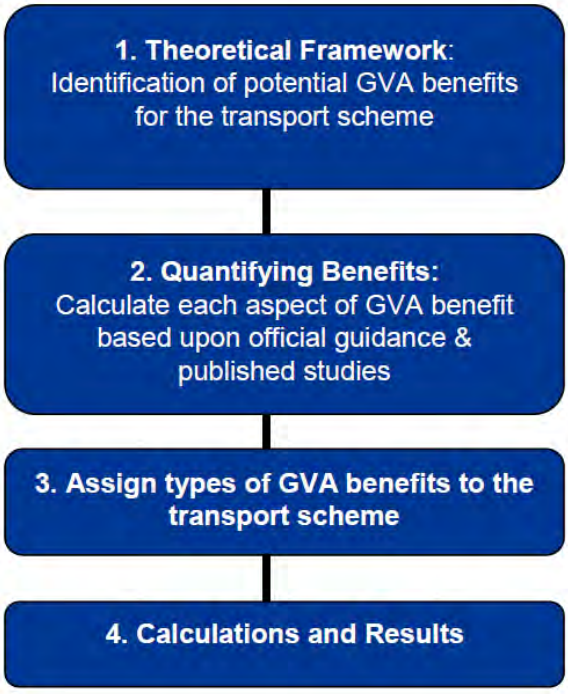
5.1 Introduction

This section of the report outlines the methodology used to quantify the potential Gross Value Added (GVA) benefits associated with the scheme.

5.2 Methodology

The analysis of potential GVA benefits has been undertaken in the following stages, as summarised in Figure 5-1 below.

Figure 5-1 – Theoretical GVA Framework



5.3 Theoretical Framework

The GVA analysis seeks to complement standard transport appraisals. The wider economic impacts of the proposed transport schemes are particularly important to understand in terms of the potential benefits for the locality and the Government's economic growth agenda.

GVA measures the total value of goods and services; i.e. economic activity. In its simplest terms, it is therefore GDP at a local/regional level, minus indirect taxation.

There are three key mechanisms by which transport schemes produce GVA benefits; the number of new jobs created, the enhanced productivity of existing jobs and the direct cost savings brought about by a transport scheme, as summarised below:

1. More jobs = Additional wages = Greater GVA

2. Higher productivity = Higher profits = Greater GVA

3. Direct cost savings = Greater GVA

5.4 GVA Benefit Quantification

Unlike standard transport appraisals, there is not a single methodology for estimating the impacts of a scheme on GVA, employment, or similar measures of the performance of the real economy. Methodologies often vary considerably across studies.

Almost all methods reviewed have particular strengths and weaknesses, and thus there is no single definition of what GVA is or how it should be quantified in the context of transport appraisal.

In this context, a bespoke methodology has been developed based on the above definition and consistent theoretical framework for assessing additional economic benefits. This ensures that the scheme is subject to a standard process and quantification of benefits; albeit using local variations in GVA per job, and local transport capacity constraints overcome.

Not all elements of GVA benefits are applicable for every type of scheme. The change as a result of unlocked development from increased capacity was considered appropriate for the South East Blackburn Growth Corridor and has subsequently been assessed.

Benefits generated by unlocked development and employment, are quantified by multiplying the number of jobs expected to be generated by GVA per employee (by district area, and employment sector, using standard industrial categories).

The number of jobs generated by future employment opportunities has been referred to as direct employment and is obtained directly from business survey and direct empirical sources that estimate how much employment will be generated from local businesses.

A total of 647 houses would be scheme dependent, comprising 70 dwellings at the Blackamoor Road Development site, 70 dwellings at Johnson Road, 140 on Haslingden Road and 367 across the Fishmoor Drive parcels.

The scheme is also expected to deliver 3,857 jobs across new employment developments at Waterside Employment Site, Blakewater College, Medipark and the Blackamoor Road development site.

The annual benefits obtained in the GVA analysis have been forecast over a 60 year period to be consistent with the rest of the appraisal, and to ensure consistency with the BCR outputs derived for the highway improvements schemes, which already incorporate user benefits of the scheme. However it is apparent from the methodology applied that there are no GVA benefits from the acceleration of jobs and housing after 25 years.

The benefits over the 25 year period have then been discounted using a 3.5% discount rate as defined in WebTAG. This is in line with Treasury Green Book guidance and is applicable to years 1 – 30 where appropriate.

5.5 GVA Calculation Results

The results of the GVA assessment undertaken produce various GVA measures which are defined in Table 5-1. The preferred and most useful measure is likely to be the discounted, average annual GVA benefits for the locality, so as it is presented in a similar way to GDP.

Table 5-1 – GVA Measures

GVA Measure	Explanation
Total GVA benefits over 60 years (undiscounted)	60-year values are provided over the lifetime of the scheme and which align with the same period of analysis associated with traditional transport appraisals. This figure shows the total 60 year GVA benefits undiscounted in 2010 prices.
Annual GVA benefits averaged over 60 years (undiscounted)	An annual GVA benefit averaged over 60 years is also presented. This is presented in 2010 prices and is undiscounted.
Total GVA benefits over 60 years (discounted)	This figure shows total benefits discounted over 60 years in 2010 prices. Discounting takes into

	account the effect of inflation at 3.5% for the first 30 years and 3% for the remainder of the appraisal period.
Annual GVA benefits over 60 years (discounted)	An annual GVA benefit averaged over 60 years is also presented. This is presented in 2010 prices and is discounted.

The following results have been obtained from the GVA analysis:

- Scheme Case Discounted Total GVA 60 years (2010 prices): £1,383,490,644
- Scheme Case Discounted Total Adjusted GVA 60 years (2010 prices): £539,561,351
- Average GVA per annum (2010 prices discounted adjusted): £8,992,689

6. Summary and Conclusions

6.1 Report Summary and Conclusions

This report provides details of the methodology and results of future year traffic forecasting, modelling and economic appraisal of the proposed scheme. These have been completed in line with best practice guidance detailed in TAG documentation. It presents the results of the BCR and GVA analysis undertaken for the South East Blackburn Growth Corridor package of schemes.

The DfTs TUBA software was used to assess the relative costs and benefits of future forecast traffic flow scenarios under with and without scheme conditions. Standard TAG and Treasury Green Book approaches have been used to undertake an assessment of the BCRs for the scheme. All benefits quoted are in 2010 market prices and values over a 60 year appraisal period.

TUBA analysis outputs indicate that under both with and without dependent development scenarios, the scheme as having a BCR value of greater than 3.00, indicating high value for money from the proposed package of schemes.

In the absence of a singly recognised and adopted methodology for estimating potential GVA benefits, the GVA analysis has been undertaken using an evidence-led, theoretically consistent framework approach, based on available studies and parameters, as well as collaborative working with the client.

The analysis has quantified the potential GVA benefits that would be generated by the scheme. The results from the analysis, presented in this report, indicate that the scheme will have a positive impact on the local economy.

Appendix A – Proposed Scheme Drawings