Bishop Auckland Bus Station and Car Park

TRANSPORT ASSESSMENT

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27/01/23

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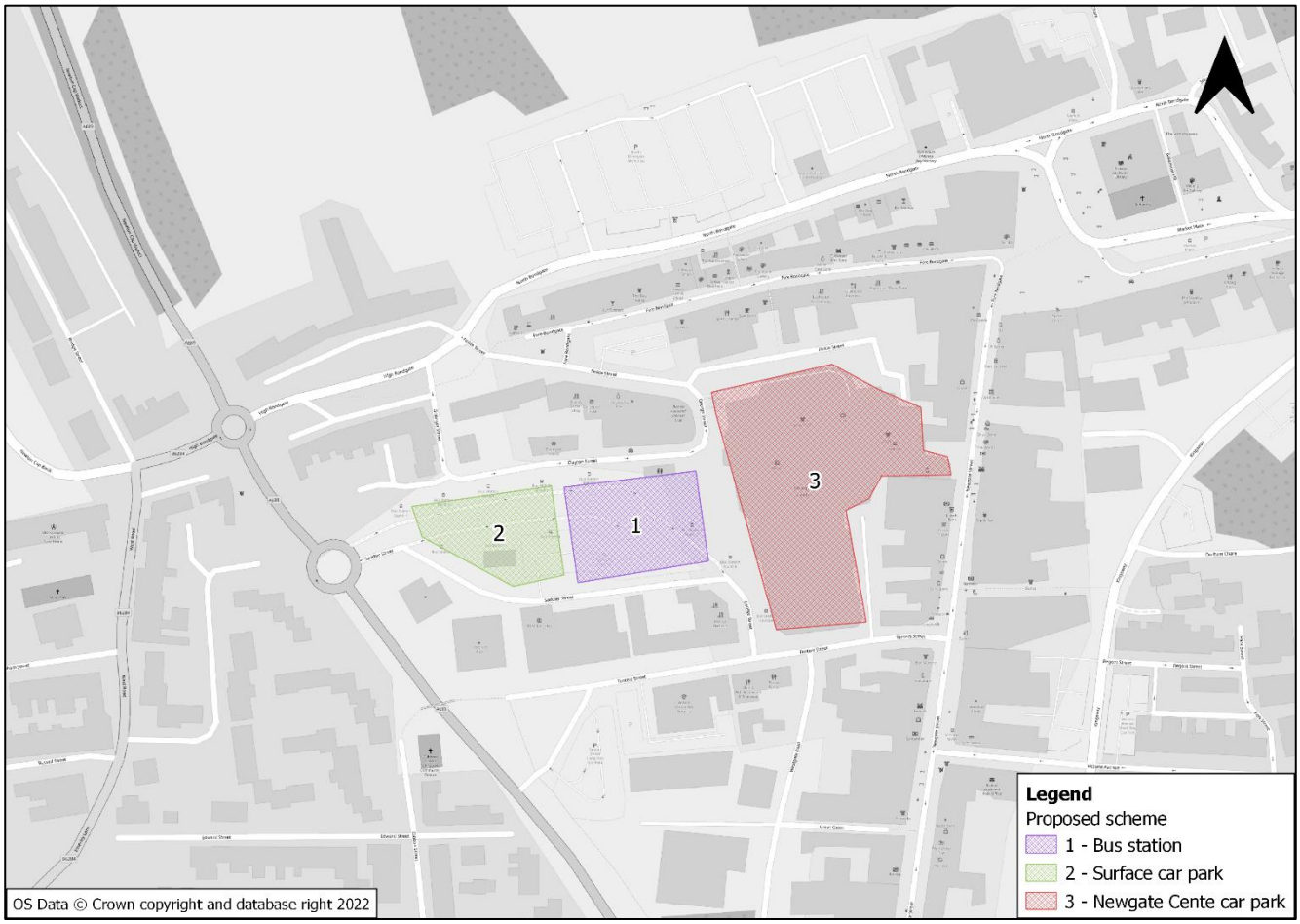
Contents

1. Introduction

1.1 Introduction

Durham County Council (the applicant) has submitted a planning application to redevelop Bishop Auckland bus station and the area around the existing site, including a 125-space car park adjacent to Saddler Street as shown in Figure 1.1. The redevelopment of the bus station site is expected to occur in tandem with alterations to the existing Newgate Centre car park to make it a more attraction and viable parking option. Changes to the Newgate Centre car park are covered by permitted development rights. This Transport Assessment (TA) supports the planning application for the proposed scheme and draws upon transport planning, modelling, and forecasting work undertaken during the assessment to date.

Figure 1.1: Components of the proposed scheme locations



Tourism and leisure aspirations of The Auckland Project (TAP) in Bishop Auckland represent a significant quantum of development and has the potential to generate additional annual visitors to the town, potentially generating a large volume of additional vehicular traffic.

Whilst supportive of the proposals, DCC is also keen to ensure that the aspirations do not have a detrimental impact upon the operation of the local road network in Bishop Auckland, which is understood to suffer from congestion at certain locations. Additionally, it is understood the town centre is ill-equipped to accommodate additional vehicular traffic and associated parking pressures resulting from an increase in visitor numbers.

As such, supporting transport infrastructure has been identified that could come forward alongside TAP aspirations to mitigate the impact of additional visitor numbers and associated traffic as well as potentially address residual traffic congestion issues in the town. This includes the re-designed bus station in the north of the town centre to

provide an improved gateway to the town and the nearby Auckland Castle, a new surface car park located on the existing bus station site and redevelopment of Newgate Centre car park.

Jacobs was previously commissioned by DCC to undertake transport modelling to inform a Business Case submission to the Future High Streets Fund for Bishop Auckland, of which it was successful in receiving funding. This modelling identified appropriate junction mitigations to facilitate additional users on the road network

The purpose of this Transport Assessment is to undertake a review of the transport implications of the increase in vehicular traffic due to TAP attraction visitors, alterations to Bishop Auckland bus station and parking within the town, and describe the likely impact of the proposed bus station redevelopment, car parks and associated facilitating work, on the local road network (LRN) at particular pinch points on the network.

1.2 The Applicant

The Applicant (Durham County Council) is the local highways authority, making it responsible for the local road network in County Durham, including all the roads in and around Bishop Auckland. Additionally, the council is responsible for the maintenance and general operation of the bus station in Bishop Auckland, although bus routes themselves are operated by several different private operators. The council will be responsible for maintenance and operation of the car parks.

1.3 Structure

Following this introduction, the remainder of this report is as follows:

- Chapter 2 situates the scheme within local and national policy discussions;
- Chapter 3 gives the details of the proposed scheme;
- Chapter 4 introduces the existing context and provides some background on Bishop Auckland;
- Chapter 5 outlines the future context and development trajectory of Bishop Auckland;
- Chapter 6 outlines the transport impact assessment, including modelling undertaken;
- Chapter 7 outlines the impact on sustainable transport; and
- Chapter 8 summarises and concludes.

2. Alignment with local and national policy context

A review of existing policy and strategy documents has been undertaken to assist in the identification of the current conditions in the Bishop Auckland study area. This review has provided an understanding of the local and national policies affecting the Bishop Auckland area, including transport policies, land use policies and approved/committed plans for development that will impact upon the travel and transport network in the town. This review has also helped to shape the need for the bus station redevelopment, which are consistent with the specific policies and strategies reviewed below.

The policy and strategy review includes the following:

- National Planning Policy Framework 2021;
- Future High Streets Fund and Bishop Auckland Submission
- Towns Fund and Bishop Auckland Stronger Towns Investment Plan;
- National Infrastructure Strategy 2020;
- North East Transport Plan;
- County Durham Plan 2020 and
- County Durham Vision 2035

2.1 National Policy Planning Framework (NPPF) 2021

The NPPF[1] sets out the Government's planning policies for England and how these should be applied. Planning Law requires applications for planning permission to be determined in accordance with the local development plan, which in this case is made up of the County Durham Plan, together with a number of supporting documents of varying relevance to these proposals.

The purpose of the planning system is to achieve sustainable development. In order to achieve this, three overarching objectives are laid out in NPPF 2021:

- To build a strong, responsive and competitive economy;
- To support strong vibrant and healthy communities; and
- To protect and enhance our natural, built and historic environment.

When assessing planning applications there is a presumption in favour of sustainable development.

The NPPF outlines that local authorities should develop plans and strategies relating to future development, which look to address the above objectives. Future projects should promote sustainable transport while providing the large scale transport needs required to support wider development within an area. Additionally, plans and projects should consider how projects will have an impact on the existing transport network and assess how any negative impacts can be mitigated in a cost-effective manner.

Additionally, aligned with recent funding initiatives, such as the Levelling-up Fund and Towns Fund, the NPPF encourages considered development to secure vitality in town centres. This should be achieved through

[1] National Planning Policy Framework, 2021: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

appropriate allocation of space for a range of uses within the town centre as well as taking "a positive approach to their growth, management and adaption" (p.25).

The Bishop Auckland Bus Station Redevelopment aligns with a number of wider objectives included in the NPPF 2021, including objectives 9 "Promoting Sustainable Transport" and 12 "Achieving well-designed places". The bus station is designed to create a pleasant experience for bus passengers in Bishop Auckland as well as improving the wider public realm surrounding the bus station. This process will facilitate the continued use of public transport in the town and add to the overall quality of the area.

2.2 Future High Streets Fund

The Future High Streets Fund was a UK Government funding stream which allowed local authorities to bid for a portion of a £675 million funding pot which was earmarked to support the renewal and regeneration of town centres and high streets which would support local economic growth and regeneration. This fund aimed to co-fund investment in physical infrastructure, such as access to public transport and regeneration of high streets, as well as improving retail unit utilisation.

Bishop Auckland has been awarded £19.9 million of funding for a range of projects to help facilitate the increased number of visitors to the town. These projects include the redesign of the existing bus station, the construction of new car parks in the town and a range of improvements to the public realm and walking routes in the town and relates directly to this Transport Assessment.

2.3 Towns Fund

The Towns Fund (initially called the Stronger Towns Fund)[2] sets out the Government's aim to address some of the inequality in place between towns and cities. The government has suggested that several factors, including poor transport connections and infrastructure can limit the successful economic growth of towns around the country. As a result, the Towns Fund gave towns the opportunity to bid for a portion of a £3.6 billion funding pot to support the development of locally important projects in towns around England. The Towns Fund aims to promote regeneration in towns to deliver long term economic growth through improved:

- Urban regeneration, planning and land use;
- Skills and enterprise infrastructure; and
- Connectivity

Bishop Auckland was awarded £33.2 million of Funding from The Towns Fund for a range of projects across the town. While not aligned with Bishop Auckland's Towns Fund Bid, the redevelopment of Bishop Auckland Bus Station also fulfils some of the aims outlined in the Towns Fund process including aiming to facilitate urban regeneration, planning and land use. The redevelopment of the bus station site can work in tandem with further redevelopment taking places using funds awarded during the Towns Fund funding round.

2.4 The Tourism Recovery Plan

In 2021, the UK government released the Tourism Recovery Plan. The Tourism Recovery Plan set out how the Government intended to support the reopening of the tourism sector following the Coronavirus pandemic and replaced the Tourism Sector Deal which had been introduced in 2019. Part of this strategy outlines the Government's commitment to addressing challenges to the tourism industry across the UK, attempting to encourage equitable growth across regions and nations of the UK. This includes ensuring that there is an appropriate transport network in place which will improve connectivity across the country and support efficient

[2] Towns Fund, 2019: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/924503/20191031_Towns_Fund_prospectus.pdf

connections to tourist areas, which could include Bishop Auckland. The Tourism Recovery Plan also demonstrates the UK Government's commitment to invest in tourist related areas by confirming that existing funding streams including the Levelling-up fund and Towns Fund could be used to support economic development and tourism related growth.

The Bishop Auckland bus station aligns with the Tourism Recovery Plan by creating an environment where improvements to public transport facilities create an improved experience for tourists using buses to arrive in the town. Providing a better passenger experience and capacity will allow additional passengers to use public transport services, encouraging more sustainable tourism growth. Additionally, additional car parking facilities will allow the full scale of Auckland Project attractions to go ahead, therefore maximising tourism and unlocking associated benefits.

2.5 National Infrastructure Strategy 2020

The National Infrastructure Strategy (NIS)[3] outlines the Government's plans to make a radical improvement in the quality of the UK's infrastructure to help level up the country, boost economic growth, encourage private investment, and support the net zero emissions agenda. The strategy outlines that infrastructure has a key role to play in the recovery of the country from the Covid-19 pandemic.

The NIS refers to the nation's roads and railways as "our full-fibre cables that join us together as one nation". Some of the villages, towns, and cities are experiencing traffic congestion and relief to this is needed. The strategy states that local roads make up 98% of the road network and are used in almost every journey. They are estimated to be worth £400 billion, one of the UK's most valuable public assets. Well-maintained local roads allow for faster and more reliable journeys, boosting local businesses, economic performance, and serving all road users. High quality local roads are also central to the future of transport, playing an important role in the take-up of autonomous vehicles and greener forms of transport such as buses and cycling.

2.6 North East Transport Plan

The North East Transport Plan[4] is the first regional Transport Plan for the North East and sets out the transport priorities for the region up to 2035, with a vision of "Moving to a green, healthy, dynamic and thriving North East". The objectives of the Transport Plan are:

- Carbon-neutral transport;
- Overcome inequality and grow our economy;
- Healthier North East;
- Appealing sustainable transport choices; and
- Safe, secure network.

The Plan identifies schemes for delivery in the next five years which require funding to be accelerated, those specific to Bishop Auckland are:

- Bishop Auckland to Barnard Castle active mode route improvements; and
- Bishop Auckland bus station and car park, including sustainable building measures.

Both schemes are expected to provide rural benefits by increasing potential to support accessibility.

[3] National Infrastructure Strategy, 2020: https://www.gov.uk/government/publications/national-infrastructure-strategy
[4] North East Transport Plan 2021-2035, https://www.transportnortheast.gov.uk/wp-content/uploads/2021/03/AST004-Transport-Plan-A4-v53clean-Ben-v2.pdf

As highlighted, the regeneration of Bishop Auckland bus station completes one of the key delivery objectives outlined in the North East Transport Plan, as well as helping to fulfil one of the wider objectives of the policy. The regeneration of the bus station and wider public realm will help create more appealing sustainable transport choices for passengers in the town, offering the potential to draw car users onto public transport for future journeys.

2.7 County Durham Plan (CDP) 2020

The CDP[5] is produced following the principles of the NPPF and sets out planning policies and proposals, and sites for new development. The Plan seeks to build a successful and sustainable future for all residents, with access good housing and employment in an environment which delivers a healthy and fulfilled lifestyle.

Bishop Auckland is identified in the CDP as a larger town which will provide a key location for local and regional businesses contributing to the employment base and local economy. Additionally, the increasing number of tourist attractions found in Bishop Auckland are highlighted in the County Plan as being important tourist attractions in the county. The Durham County Plan goes on to outline that any development related to visitor attractions in rural areas should ensure adequate infrastructure is available in the surrounding area, as well as provide additional support for local community services when needed.

The redevelopment of Bishop Auckland Bus Station aims to provide additional and improved public transport facilities in Bishop Auckland which will help ensure that adequate infrastructure is available to allow tourists to travel to attractions in the Bishop Auckland area. Additionally, the inclusion of a retail unit within the bus station will provide additional services and capacity within the town as tourist numbers increase.

2.8 County Durham Vision 2035

The County Durham Vision 2035[6] was released in 2019 by the County Durham Partnership (CDP), which is a group of key public, private and voluntary sector organisations who strive to improve the quality of life of residents in County Durham. The County Durham Vision 2035 plan sets out the aims and objectives of the CDP, designed to encourage better jobs into the county.

CDP highlights a desire to build upon Durham's successful tourist economy and encourage a wider culture-led regeneration to occur within the county. As part of this process, a good visitor experience is seen to be vital, with the county wanting to compete with comparable destinations across the country. Additionally, the County Durham Vision 2035 calls for improvements in the county's transport network allowing it to provide good access to employment and leisure developments while also reducing congestion on the network. Aligning closely with these objectives, the regeneration of Bishop Auckland Bus Station will improve the passenger experience for visitors using public transport to travel to the town.

2.9 Policy summary

The above transport and policy reviews have been undertaken to develop an understanding of the local, regional and national policies affecting Bishop Auckland, and how the proposed scheme is compliant with such policies. It is clear that the proposed scheme aligns closely with the suite of strategy and planning documents reviewed in supporting and promoting sustainable travel choices as well as acting as an anchor to regenerate and revitalise Bishop Auckland town centre.

[5] County Durham Plan, 2020: https://www.durham.gov.uk/article/3266/Development-Plan-for-County-Durham
[6] County Durham Vision 2035: https://countydurhampartnership.co.uk/county-durham-partnership/county-durham-vision-2035/

3. The proposed scheme

Bishop Auckland is in the process of undergoing a significant transformation, with TAP and DCC working to redevelop heritage features in the town, increasing levels of tourism. Additionally, DCC is attempting to redevelop large areas of the town to make it more attractive for both local people and visitors to the area, it is hoped that the regeneration of the town could lead to commercial and land use improvements, generating growth in the town and added vitality in the town centre. Bishop Auckland's high street has a retail unit vacancy rate of 27.7% meaning increased usage is a major target to support increased footfall and economic activity in the town centre. DCC hope that improvements in the public realm and increased occupation of retail units could lead to growth in the town centre and make Bishop Auckland a greater destination for both locals and tourists.

As a result of multiple tourism and heritage projects, including opening Bishop Auckland Castle to the public in 2019 and the creation of the outdoor theatre venue Kynren, it is expected that annual visitor number should reach 750,000 people by 2028[7]. As such, Durham County Council has investigated how best to improve transport and parking facilities in Bishop Auckland to accommodate the increasing visitor numbers. Part of this process saw Durham County Council make a Future High Street Fund bid on behalf of the town. Analysis provided by Vision has shown that it is expected that eight percent of tourist visitors to Bishop Auckland could travel to Bishop Auckland by bus, meaning that the expected increase in visitor numbers to the town could lead to an additional 57,920 bus users each year. As a result, Durham County Council has decided to assess the suitability of the existing bus station at Bishop Auckland.

In 2020, Durham County Council was awarded £19.9 million in relation to their Bishop Auckland Future High Street Fund proposal. One of the proposed schemes which has now been taken forward, was a plan for an upgraded bus station, new car parking facilities and an improved public realm on the site of the existing bus station adjacent to the Newgate Shopping Centre. Improvements to Bishop Auckland Bus Station were considered to be part of a wider range of interventions designed to improve the public realm and high street in Bishop Auckland which will allow the council to address some of the retail unit occupancy challenges currently being experienced in the town.

The proposal for which this Transport Assessment supports represents 2 elements, including a new bus station and new surface car park, each of which is summarised in more detail below. Whilst changes to the Newgate Centre car park are covered by permitted development rights, as this car park will facilitate a number of visitors travelling to Bishop Auckland and is located in close proximity to the proposed scheme, for completeness it is also referenced in this Transport Assessment and effectively considered a 'committed' development.

3.1 Bishop Auckland Bus Station upgrade

To improve the bus station and related facilities in Bishop Auckland, Durham County Council has proposed to build a new bus station on the eastern end of the existing site, with the remainder of the site being used for a new surface-level car park, which is discussed in Section 3.2. The new bus station will have eight Drive In Reverse Out (DIRO) stands, as well as two further layover bays, with passengers entering into a new indoor bus station, with public WC facilities and a retail unit. The proposed layout of the bus station and new surface car park are shown in Figure 3.1 and Figure 3.2. This space would also offer an enclosed waiting space for passengers. Additionally, the new bus station would also have improved facilities for drivers, with a management office and small breakroom space/kitchenette. The bus station would be designed to accommodate all bus services which use the existing bus station in a more efficient manner.

[7] Vision Capacity Report – Auckland Project, November 2019

Figure 3.1: Design sketch of proposed bus station and new surface car park layout

Figure 3.2: Proposed bus station design showing DIRO layout

As part of the redesign of the bus station, the entrance and exit routes for buses will change, Following the redevelopment, buses will enter the bus station via Tenters Street and George Street, rather than from the A689 roundabout to the west of the existing site as shown in Figure 3.3. After picking up/dropping off passengers, the buses will then be able to exit via either George Street and Tenters Street or via Saddler Street and the A689

roundabout as shown in Figure 3.4. While bus routing will be adjusted, this will not impact the passenger experience as no additional bus stops are located along these routes.

Figure 3.3: New bus arrival routing following the Bishop Auckland Bus Station redevelopment

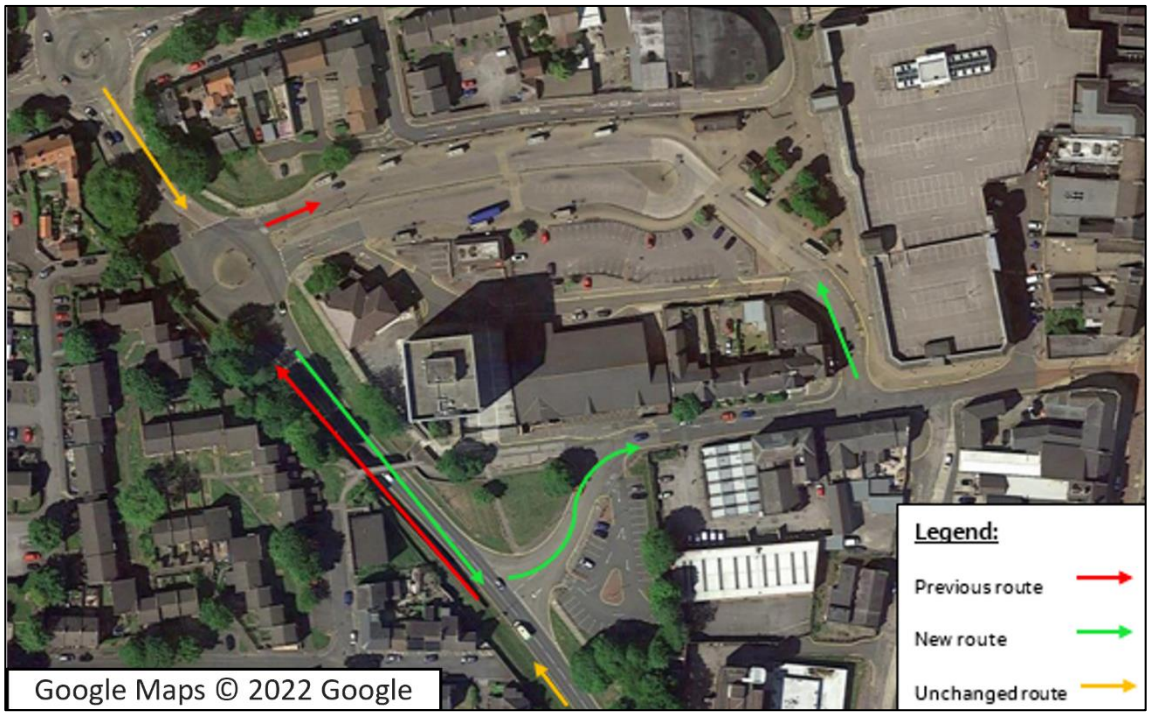
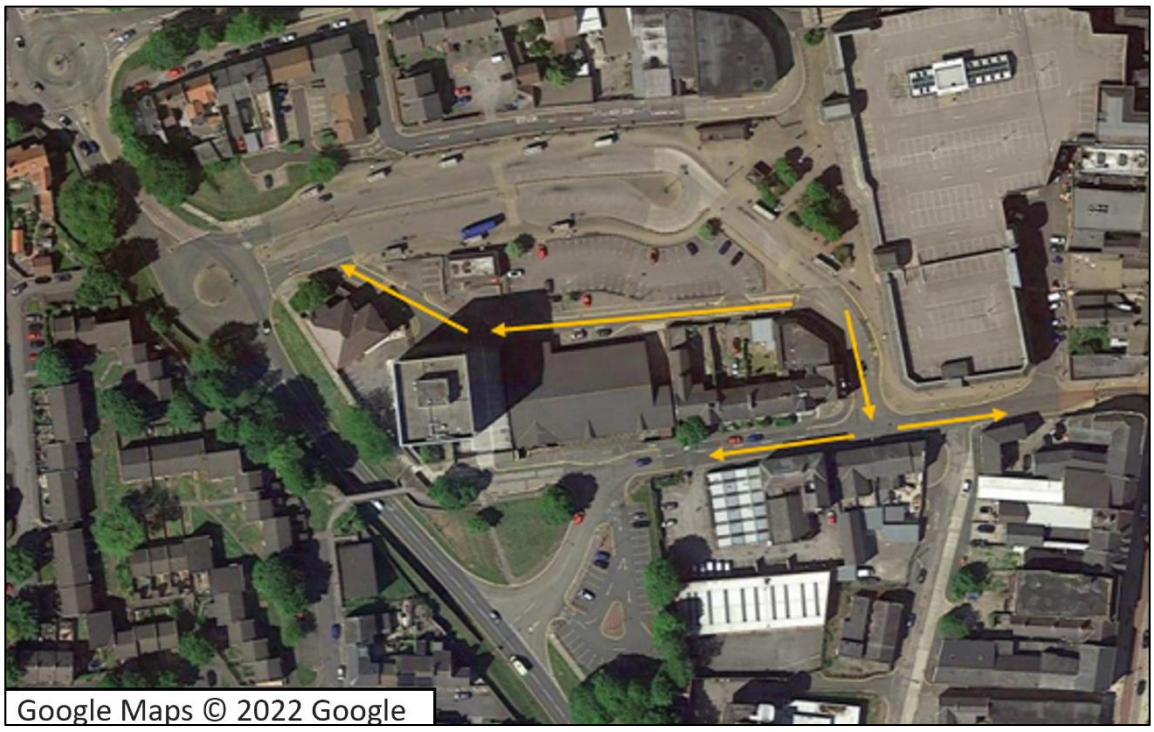


Figure 3.4: New bus departure routing following the Bishop Auckland Bus Station redevelopment



3.2 New surface car park

Following the redevelopment of the bus station, the western end of the existing site will no longer be used as part of the redeveloped bus station. As such, the application scheme also includes proposals for a new surface level

pay & display car park to the site as shown previously in Figure 3.1. The new car park will contain 125 spaces, including one dedicated space for accessing an on-site substation, 6 active EV charging spaces, 14 passive EV charging spaces, 9 accessible parking spaces (including 2 with EV charging capability) and 4 motorcycle spaces.

3.3 Newgate Centre car park upgrade

The current 300-space capacity Newgate Centre car park is an unattractive parking option for those parking in Bishop Auckland, with non-compliant spaces. The car park as shown in Figure 3.5 is to be redesigned to maximise usage of this convenient inner-town car park including accessible and EV spaces. At present, the redesign of the car park is likely to result in 325 spaces. Sixty spaces in the car park will be allocated to DWP staff who now work in the Newgate Centre. As mentioned previously, the redevelopment of Newgate Centre car park does not require planning permission, but is included in this document for completeness.

Figure 3.5: Newgate Centre car park location

4. The existing context

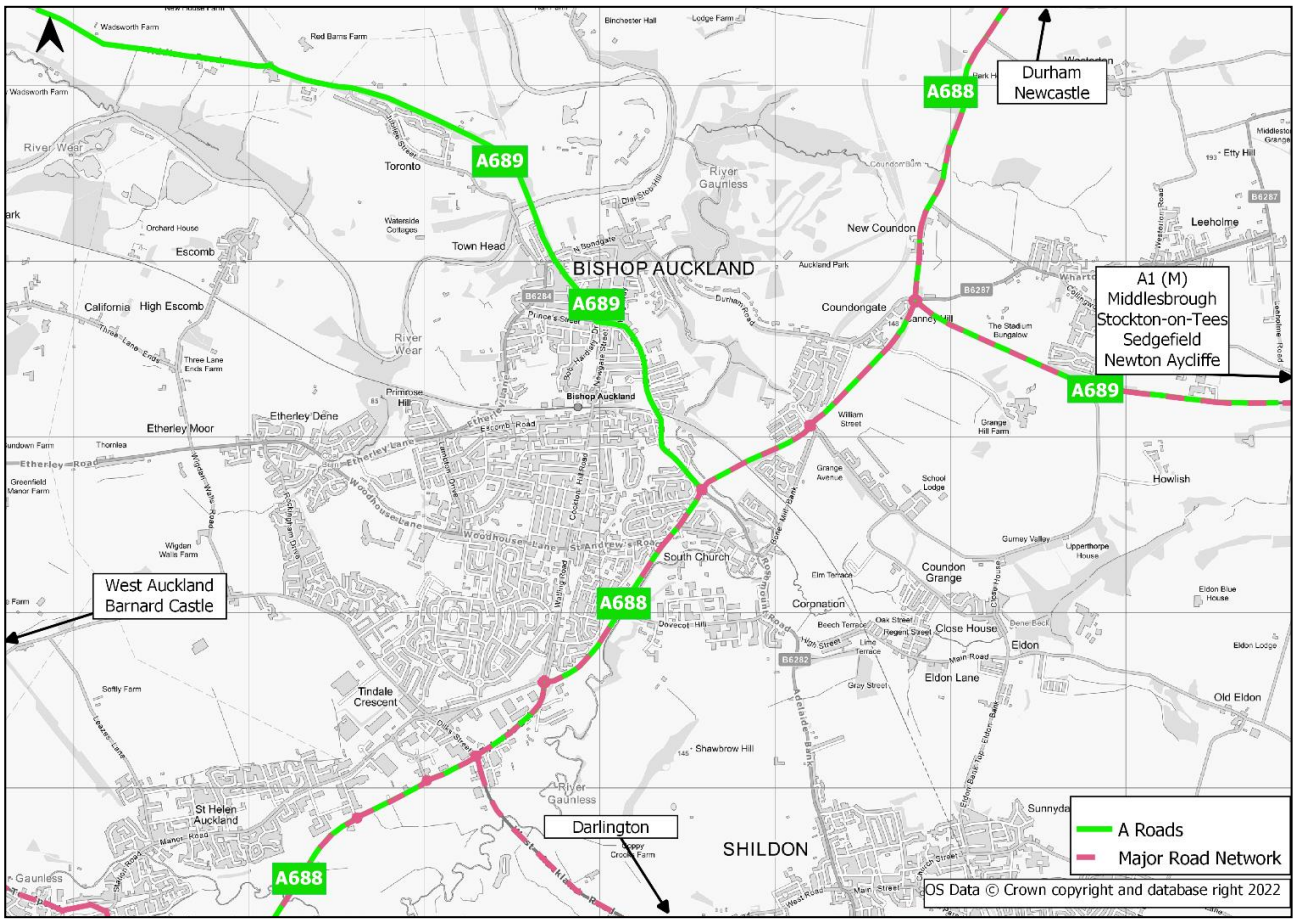
This chapter highlights the current conditions within the Bishop Auckland study area in terms of road network, public and sustainable transport, parking availability and road safety.

4.1 Existing highway conditions

Bishop Auckland is located in County Durham, southwest of Durham City. It is considered the county's second main town after the City of Durham, and is a major service and transport hub for South Durham. The network provides connectivity between Bishop Auckland, other settlements within County Durham and further afield for car users and public transport.

Figure 4.1 shows the Bishop Auckland road network, highlighting key roads which provide routing within and outside of Bishop Auckland.

Figure 4.1: Bishop Auckland road network



Adjacent to the town the A689 and A688 form part of the Major Road Network (MRN), with both of these roads connecting the town to the Strategic Road Network (SRN) the A1(M) via two junctions; the A688 / A689 / B6282 and Coundon Gate roundabout.

The A688 runs north-south to the east of the town and provides access to Durham City (12 miles to the north-east) and Darlington (12 miles to the south-east), and further afield to Newcastle-upon-Tyne and Penrith. As well as providing a crucial link to these locations, the A688 also provides access to neighbouring settlements

including Spennymoor north of the town, and West Auckland and Barnard Castle south of the town. Approximately 1,000 vehicles travel on the section of the A688 through Bishop Auckland during the AM and PM peaks of 08:00-09:00hr and 16:30-17:30hr respectively.

The A689 runs through the town from the south-east where it merges with the A688 at the A689/A688/B6282 roundabout. Approximately 1,000 vehicles enter Bishop Auckland via the northern section of the A689 during the AM peak and depart Bishop Auckland via this road during the PM peak, suggesting it is a key route used for those commuting into Bishop Auckland from settlements north-west of the town. These vehicles either continue along the A689 or travel along High Bondgate or Etherley Lane. The A689 intersects with the A688 again at the Coundon Gate roundabout, which runs east and connects to the strategic road network via the A1(M) accessed at junction 60. The A689 provides access to Newton Aycliffe, Sedgefield and further afield to Stockton-on-Tees and Middlesbrough.

The A689 and A688 intersect twice at the Coundon Gate roundabout and A688/South Church Road Roundabout. The former is a known pinch point, and the interaction at each of these junction approaches causes congestion which result in delays accessing Bishop Auckland. The A688 and eastern section of the A689 are identified as being part of the Northern MRN.

Newgate Street runs north-south through the centre of the town providing access to amenities including shops and cafes. This road is one-way until it meets Princes Street and A689 at the signalised junction in the middle of the town. The existing traffic data captured in Bishop Auckland in October 2019 including queue lengths surveys at junctions identified congestion at this junction and the adjacent South Church Road/Kingsway signalised junction during the AM, PM and Saturday peak periods.

The B6282 runs east-west to the south of the town centre and provides access to local schools, colleges and residential areas

The A688 is served by two lanes northbound until it approaches the Coundon Gate roundabout and is a single carriageway southbound, both with national speed limits. The A689 is a single carriageway with a 60mph speed limit, reducing to 30mph within Bishop Auckland in conjunction with most of the inner road network. Durham Road is a single carriageway with 40mph speed limits.

4.2 Bus network

Bishop Auckland bus station is situated on a site in the north of the town, adjacent to the Newgate Shopping Centre as shown in Figure 4.2. The site measures just less than 1ha and is surrounded by Clayton Street to the north, the Newgate Shopping Centre to the west, Saddler Street to the south and the A689/Saddler Street roundabout to the east. Despite being located near the town centre, Bishop Auckland's main high street (Newgate Street), is separated from the bus station by the Newgate Shopping Centre, meaning the bus station feels disconnected from other areas in the town.

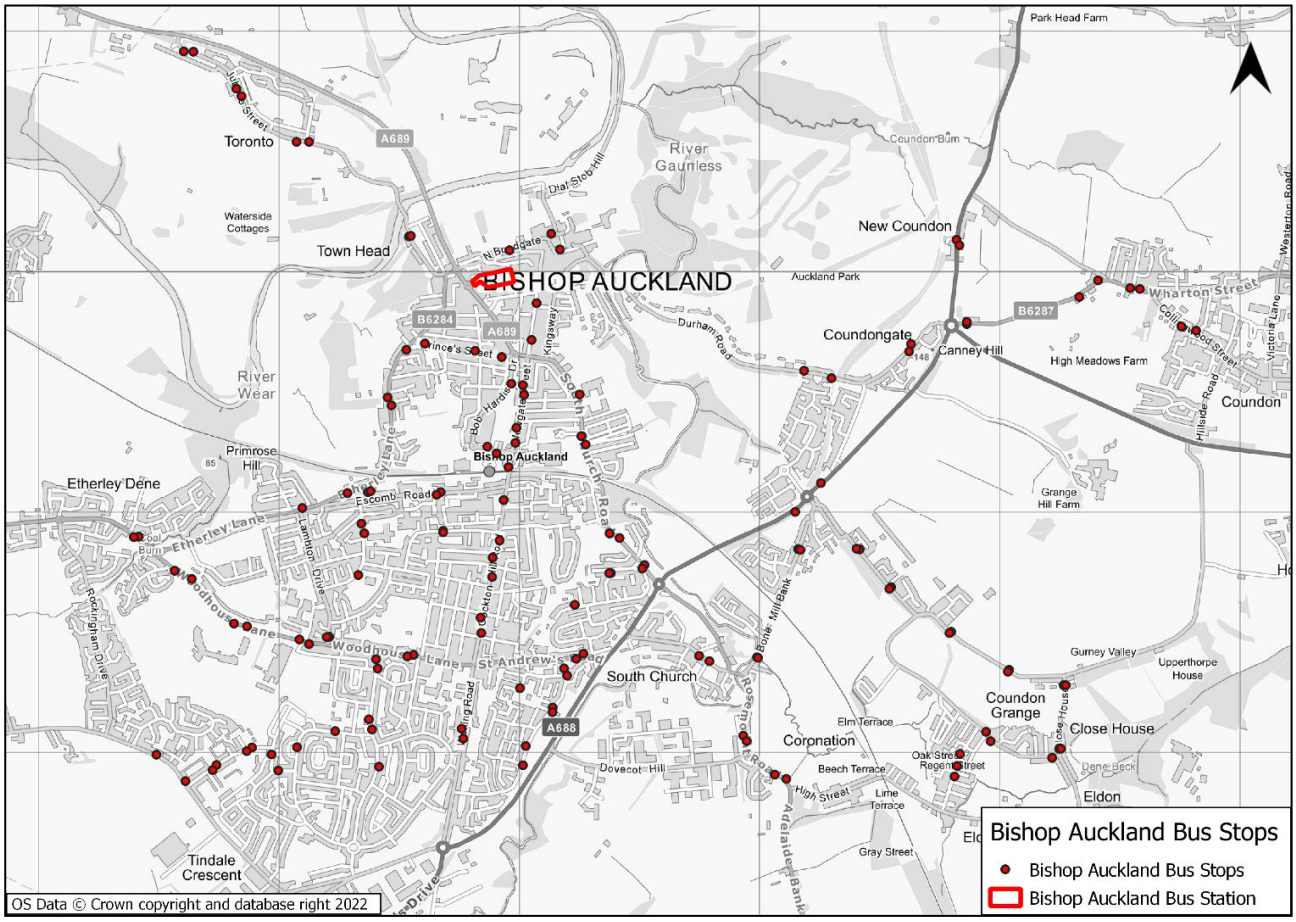
Figure 4.2: **Location of Bishop Auckland Bus Station**

Bishop Auckland's existing bus station is a dated open-air facility which currently accommodates 8, 12-metre-long buses in the loop arrangement, each stand has a small external shelter but is otherwise uncovered. A further 2 bus shelters are provided on the link road back to George Street, with an additional bus stop/bus waiting area at the southern end of George Street. The 10 bus stands are spaced apart allowing for bus operations to be drive in, drive out (DIDO). Due to each bus stand only having an external shelter, passengers are often expected to wait outside regardless of weather conditions. As such, the bus station does not represent a welcoming entry to Bishop Auckland and could be adjusted to make it a more appealing arrival location for tourists.

Figure 4.3: Existing layout of Bishop Auckland bus station

The locations of bus stops within and surrounding Bishop Auckland in relation to the bus station are shown in Figure 4.4. Buses are operated by Arriva North East, Go North East, Weardale Motor Services, Scarlet Bank and Rural Link Limited. Longer distance services are run by Arriva North East and Go North East, who run services to Darlington, Durham and Newcastle-upon-Tyne, with local services run by the remaining three companies.

Figure 4.4: Bishop Auckland bus stops and station



The key routes into Bishop Auckland are used by bus services typically for longer journeys. The section of the A688 north-eastern of Bishop Auckland is served by the X21 operated by Go North East, which provide a bus every 30 minutes between Bishop Auckland and Newcastle, taking approximately 90 minutes. The A688 is also served by the 6 operated by Arriva North East, which runs from Cockfield to Durham through Bishop Auckland providing services twice hourly.

The A689 west of Bishop Auckland is served by bus service 56 operated by Arriva North East. The service travels between Durham City bus and Bishop Auckland bus station in approximately 60 minutes with services running every 30 minutes.

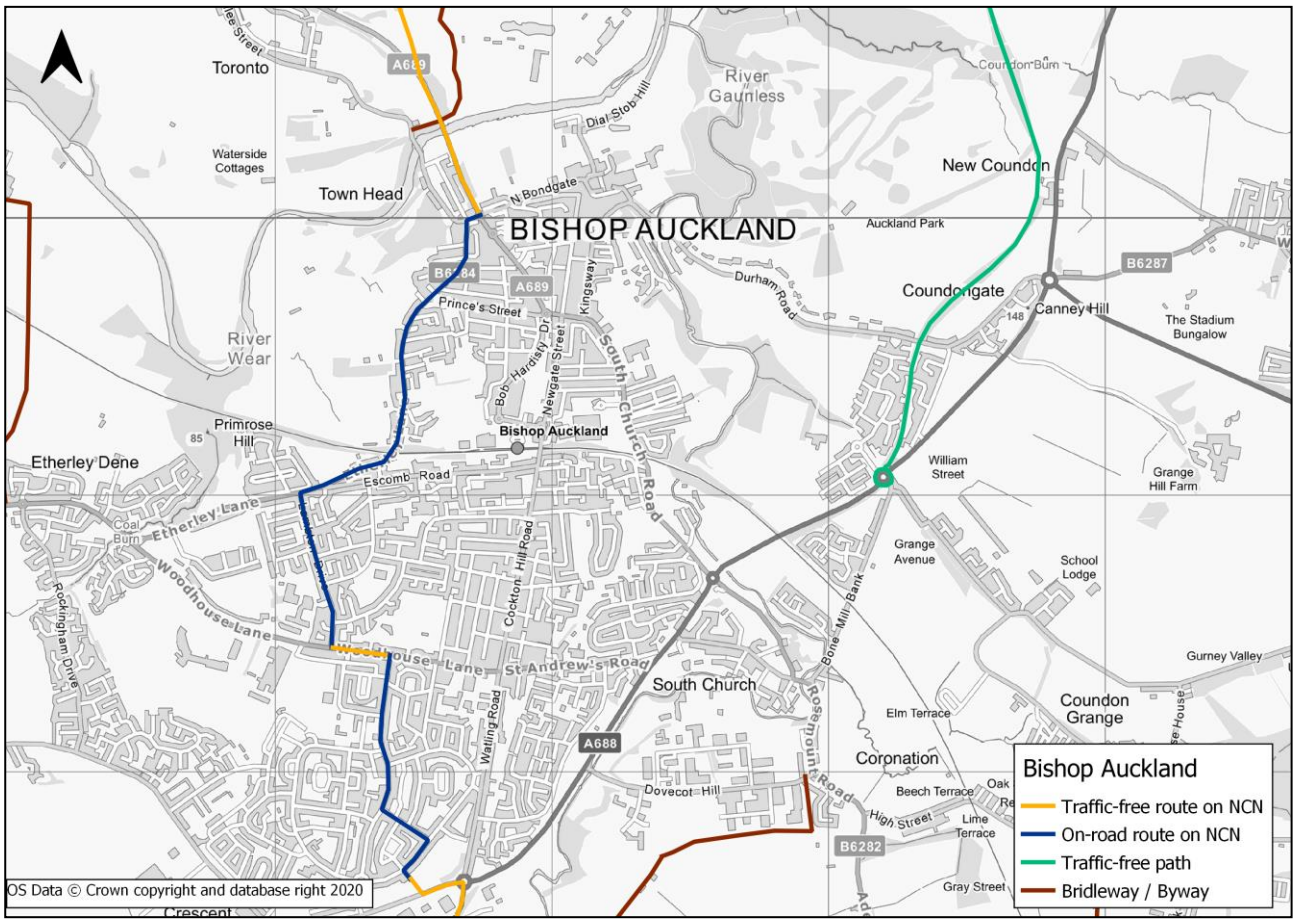
Bus service 1, operated by Arriva North East, travels between Bishop Auckland and Darlington in approximately 45 minutes with services running every 30 minutes. The service enters/leaves Bishop Auckland via Cockton Hill road and travels along the A688 only briefly.

Journeys under 60 minutes to surrounding areas including Barnard Castle and West Auckland are operated by smaller, local bus services which tend to be less frequent.

4.3 Sustainable transport networks

Bishop Auckland is a compact town, meaning that many journeys within the centre are walkable. Due to this compact nature, there is also availability for cycling within the town centre. National Route 715 of the National Cycle Network joins Whorlton and Willington via Bishop Auckland and is part of the Walney to Wear and Whitby (W2W) route. The cycling route is traffic-free as approaching Bishop Auckland from the north and joins the road network at the A689 / High Bondgate roundabout as shown in Figure 4.5 .

Figure 4.5: Cycling routes in Bishop Auckland



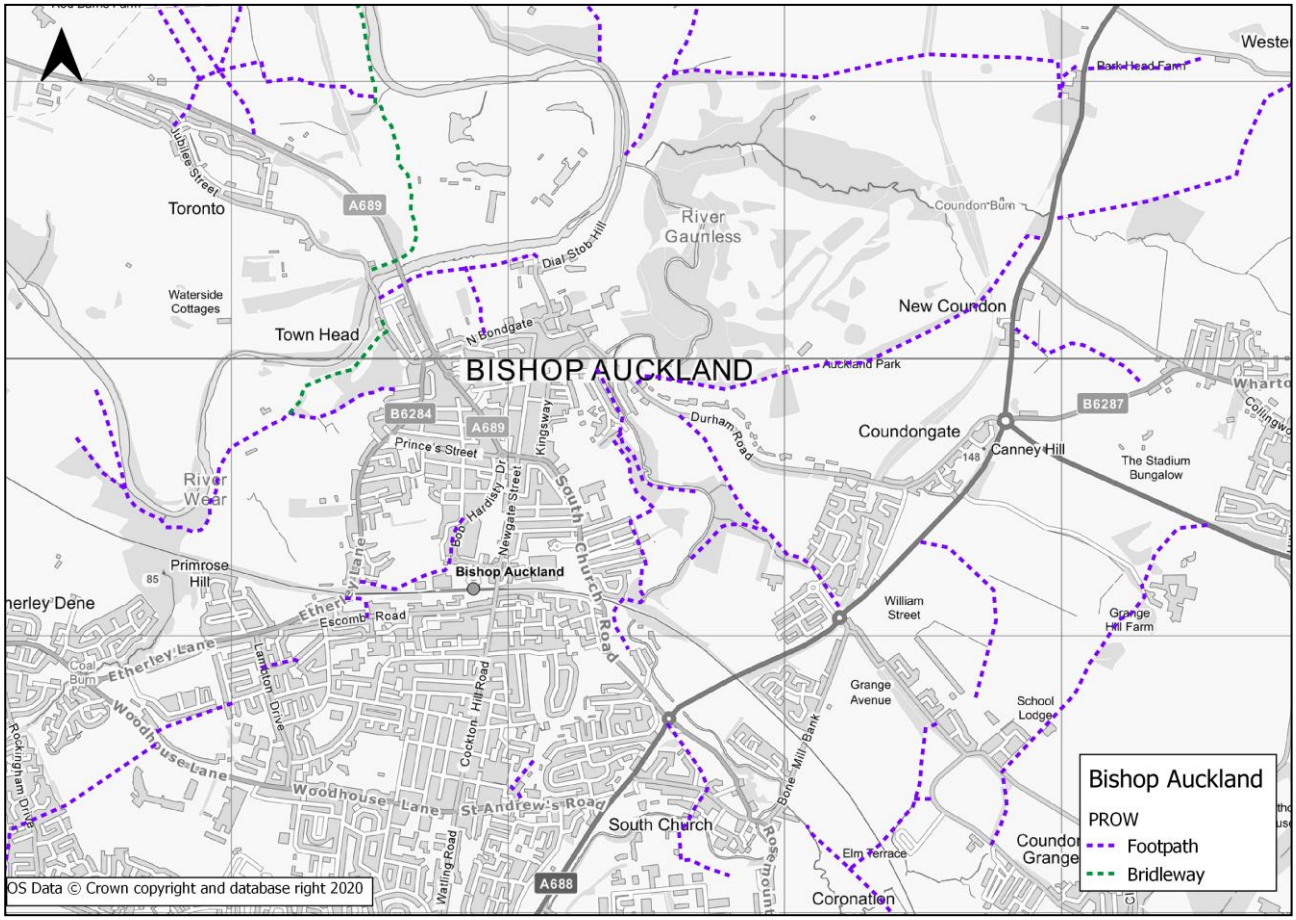
Although the NCN runs through Bishop Auckland dedicated cycling provision is generally inadequate. Cyclists travelling through Bishop Auckland via the NCN will share the road network with traffic for most of their journey. There is a lack of NCN coverage to the east of the town, with the nearest NCN (route 1) covering Sedgefield and further east.

The Auckland Way Railway Path is a traffic-free walking and cycling route east of Bishop Auckland which provides access into Spennymoor. Cyclists will need to join on-road traffic at the A688 / Bone Mill Bank roundabout. To access Bishop Auckland, cyclists will have to travel along the busy A-road in either direction until they reach either A689 / A688 roundabout.

Dedicated cycle parking does not appear to be available in any of the car parks in Bishop Auckland discussed in Section 4.4.

There is ample walking provision surrounding Bishop Auckland. Figure 4.6 shows the Public Rights of Way (PRoW) in Bishop Auckland and surrounding areas.

Figure 4.6: Public Rights of Way (PRoW) in Bishop Auckland

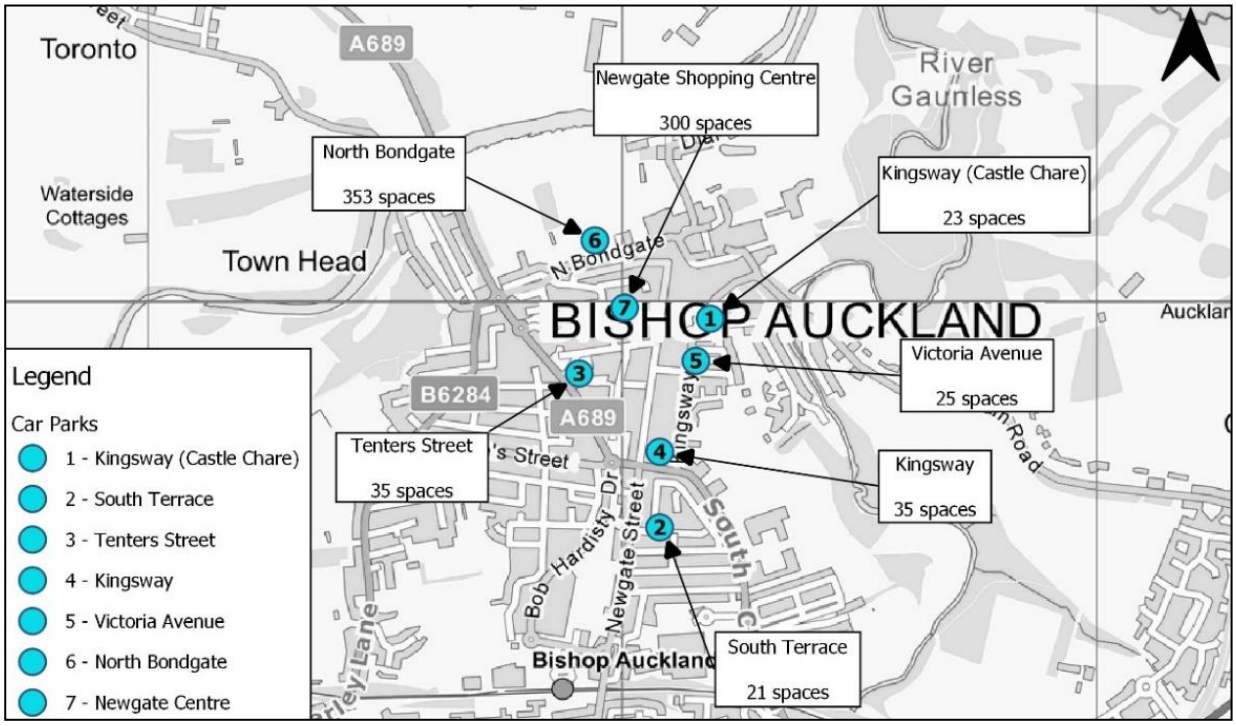


Footpaths provide good connectivity to Bishop Auckland from nearby settlements, and complement the walking infrastructure within the town centre providing access to shops, schools and residential areas.

4.4 Parking in Bishop Auckland

Bishop Auckland has seven car parks which are used for a range of purposes and have varying characteristics including: size, length of stay permitted, price, location and opening times. The car parks included have a combined capacity of 792 spaces. The locations of these car parks are shown in Figure 4.7.

Figure 4.7: Bishop Auckland car park locations and maximum capacity



North Bondgate Car Park is a 353-capacity car park located in the north of Bishop Auckland. It is the largest car park in the town and is privately operated by The Auckland Project but is not restricted to those visiting its attractions.

The Newgate Shopping Centre also has a large 300-space multi-storey car park (MSCP), also located in the north of Bishop Auckland. Being connected to the Newgate Centre, this site is the main location for people wishing to visit the shopping centre. However, the current design of the MSCP is constrained, with poor ramped access and egress arrangements and non-compliant parking space dimensions meaning that despite its location in the centre of the town, many drivers choose to park in other car parks in the town. As such, occupancy rates in the MSCP are often lower than most other car parks in the town.

The five other car parks, Tenters Street, Kingsway (2 car parks), Victoria Avenue and South Terrace are scattered across Bishop Auckland town centre and have a combined capacity of approximately 140 parking spaces.

4.4.1 Car park occupancy

Car park occupancy was calculated using ANPR data collected in 2019 to inform the development of the Bishop Auckland Transport Model (BATM) for the seven car parks in Bishop Auckland. The car parks included have a combined capacity of 792 spaces. The occupancy of these spaces is broken down hourly in Figure 4.8 and Figure 4.9.

Figure 4.8: Weekday occupancy rates of car parks in Bishop Auckland

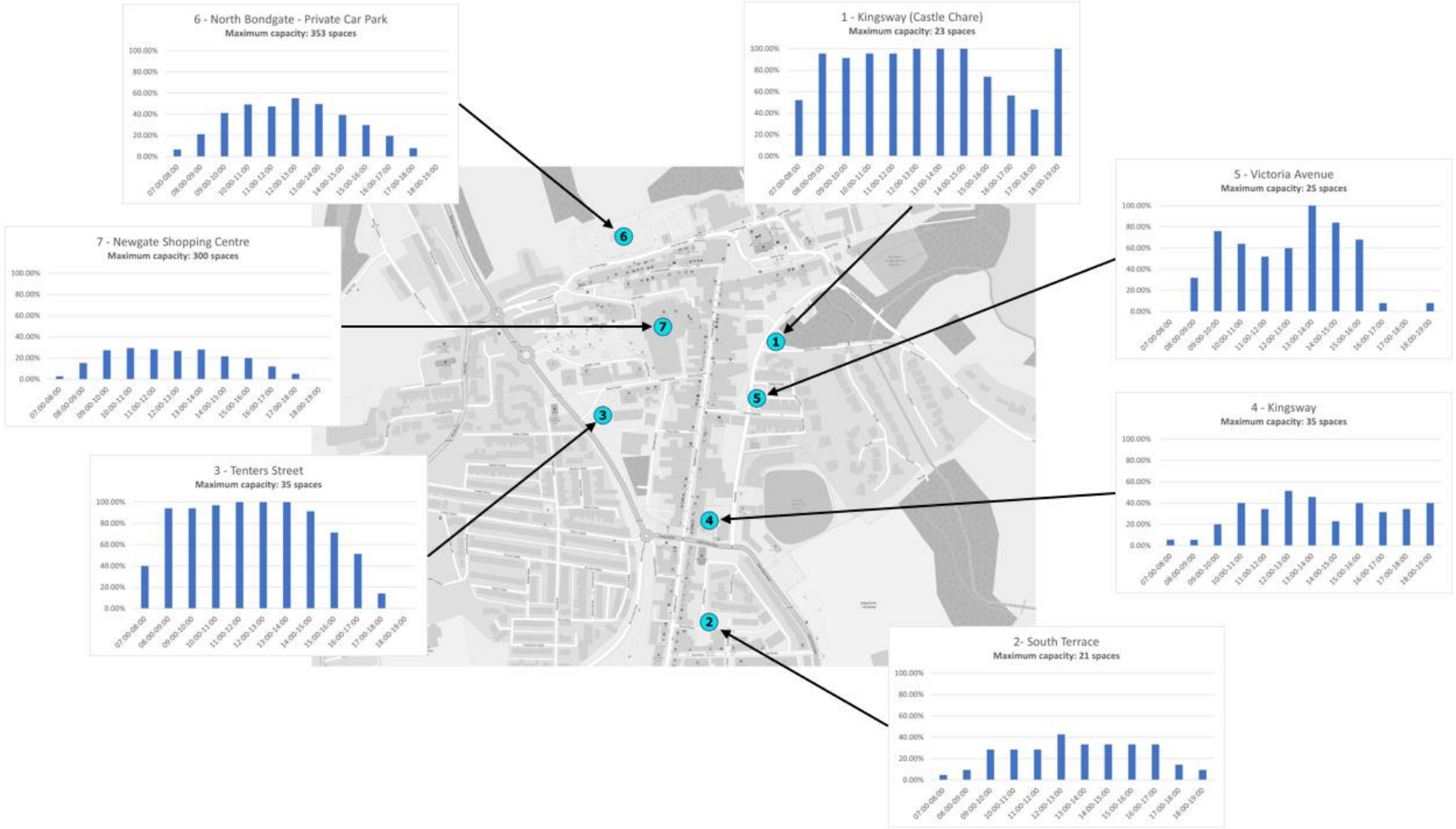


Figure 4.9: Weekend occupancy rates of car parks in Bishop Auckland

Figure 4.8 shows the car park occupancy at each car park in Bishop Auckland throughout the weekday. During the weekday overall car parking occupancy was less than 50% for each of the surveyed hours. The occupancy tends to increase throughout the morning and reaches its peak at 12:00-13:00, where 375 spaces are occupied. After this peak, the occupancy decreases until the end of the day. Car parks at Tenters Street and Kingsway (Castle Chare) are the busiest car parks in the town, with both either at or very near capacity between 09:00 and 15:00. Comparably, occupancy levels in the Newgate Shopping Centre MSCP did not exceed 30% at any point during the day.

Figure 4.9 shows the car park occupancy in Bishop Auckland throughout the weekend. Car parking occupancy was lower during the weekend than on a weekday, with weekend overall car parking occupancy less than 30% for each of the surveyed hours. Occupancy increased from the beginning of the day up to 11:00-12:00 where 227 spaces are occupied. This slightly decreased in the next hour and increased again during 13:00-14:00. Occupancy then decreased until the end of the surveyed day. Both Kingsway car parks and the car park on Victoria Avenue saw the highest rates of car park occupancy, with each car park exceeding 80% for at least one hour between 09:00 and 15:00. Again, occupancy rates were lowest in the Newgate Shopping Centre MSCP, with a maximum occupancy rate of 37% between 12:00 and 13:00.

Whilst total occupancy did not reach full capacity in the weekday or weekend assessed, the results show a trend of higher occupancy during the midday hours for both. Data from surveys undertaken at six of the car parks (excluding Newgate Street) suggests proximity to location is main purpose to parking across all car parks.

4.5 Road safety

4.5.1 Overview

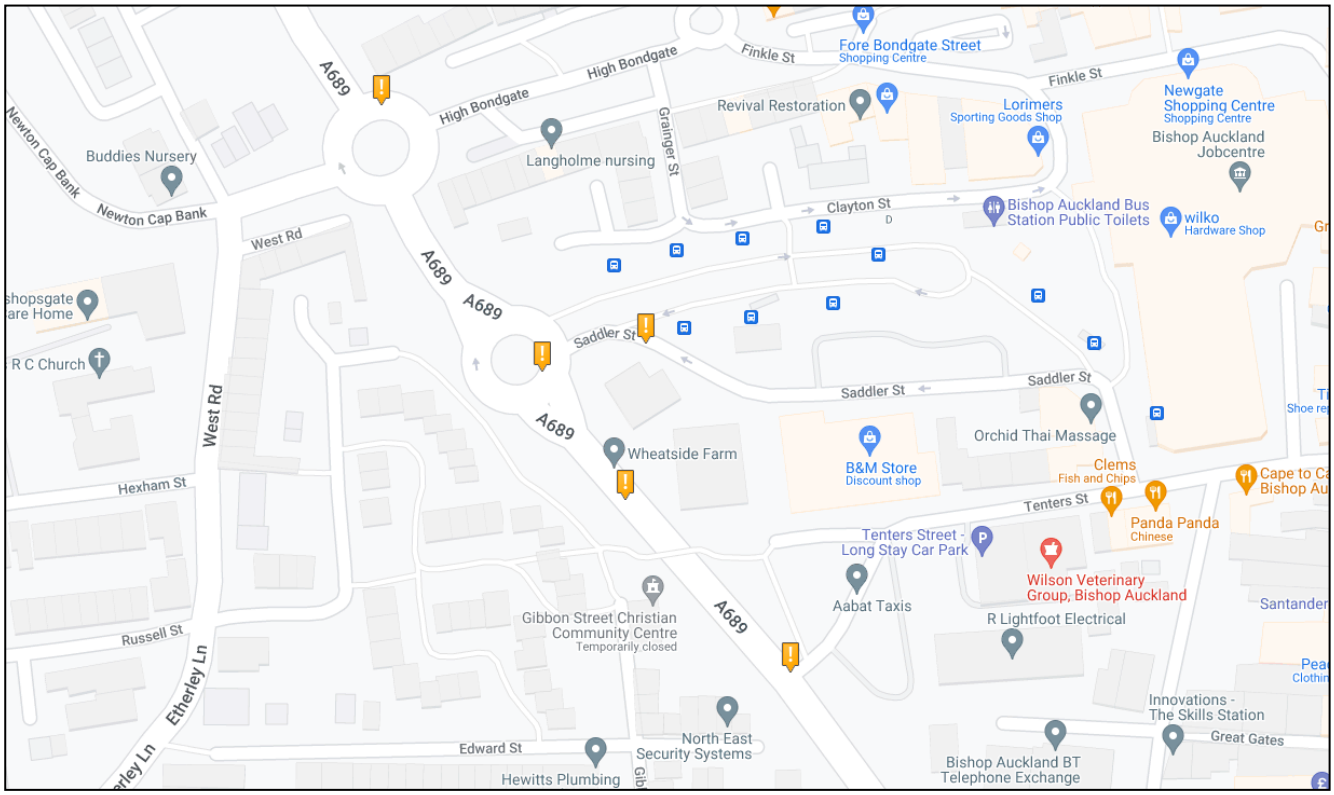
This chapter gives information on the existing road safety and collision statistics in Bishop Auckland. It then goes on to discuss how alterations to Bishop Auckland Bus Station could have the potential to influence road safety in the future. Data has been collected using CrashMap software and DfT statistics. A focussed survey has been undertaken to look at the cause of collisions which have occurred in the immediate vicinity of the site, where traffic increases resulting from the new car park will be most apparent.

4.5.2 Existing situation

In the immediate vicinity of Bishop Auckland Bus Station, five collisions have occurred. All of the collisions were slight and involved two cars, recorded information suggests that no other vehicle types or pedestrians were involved in any of the collisions. The locations of the collisions are outlined below and shown in Figure 4.10:

- A689/Newton Cap Bank/High Bondgate roundabout ;
- A689/Saddlers Street roundabout ;
- A689 between the Saddler Street roundabout and Tenters Street junction;
- A689 Tenters Street junction; and
- Saddlers Street, adjacent to the current bus station exist towards the A689 roundabout.

Figure 4.10: Location of collisions in the vicinity of Bishop Auckland Bus Station Future situation with the proposed scheme



Focussing on the bus station redevelopment itself, the road layout/usage at two of the locations adjacent to Bishop Auckland Bus Station will be impacted by the bus station redevelopment. Saddlers Street and the A689/Tenters Street Junction will see different traffic flows as a result of the work, however, this is not expected to have an impact on the risk of a collision in the area. Traffic volumes at both locations are unlikely to change significantly. Instead, minor alterations to bus routes will take place to allow buses to access the new bus station, while private cars will remain on the A689 to enter the new surface car park, rather than travelling via Tenters Street and Saddler Street. This means that private vehicles are in less conflict with pedestrian traffic than under the existing arrangement.

4.5.3 Summary

This analysis shows that over the past five years, only five collisions have occurred near Bishop Auckland bus station i.e. the immediate vicinity of the proposed development. Of these five collisions, all have been 'slight' collisions between two cars, with no other vehicles or pedestrians involved. None of these collisions have been classified as 'serious' or 'fatal' meaning that any injuries caused by the collisions are minor. When assessing the wider collision trends across the rest of Bishop Auckland it is possible to identify three areas where incidences are common. Each of these locations are disconnected from the bus station site, meaning there is little direct relationship between the bus station and the collisions at these locations. Combined with the fact that the bus station redevelopment is unlikely to generate significant extra traffic, alterations to Bishop Auckland bus station and the surrounding site are unlikely to generate additional collisions in Bishop Auckland.

5. The future context

5.1 Residential and employment development in Bishop Auckland

The future development context in Bishop Auckland is shaped by the County Durham Plan (CDP) which presents a vision for housing, jobs and the environment, supported by transport, education and healthcare considerations up to 2035.

The CDP and an uncertainty log provided by DCC have been examined to understand the future housing and employment situation within Bishop Auckland and surrounding areas, to identify areas where additional traffic may travel on the local road network.

In Bishop Auckland and the surrounding area, proposals are in place to build up to 1699 dwellings across 19 locations in the town. Many of these developments are small in size, so are expected to have little impact on traffic levels. However, 8 sites are larger than 50 dwellings and as such will generate significant additional traffic. The locations of these development are shown in Figure 5.1.

Figure 5.1: Location of major future residential developments within and in close proximity to Bishop Auckland

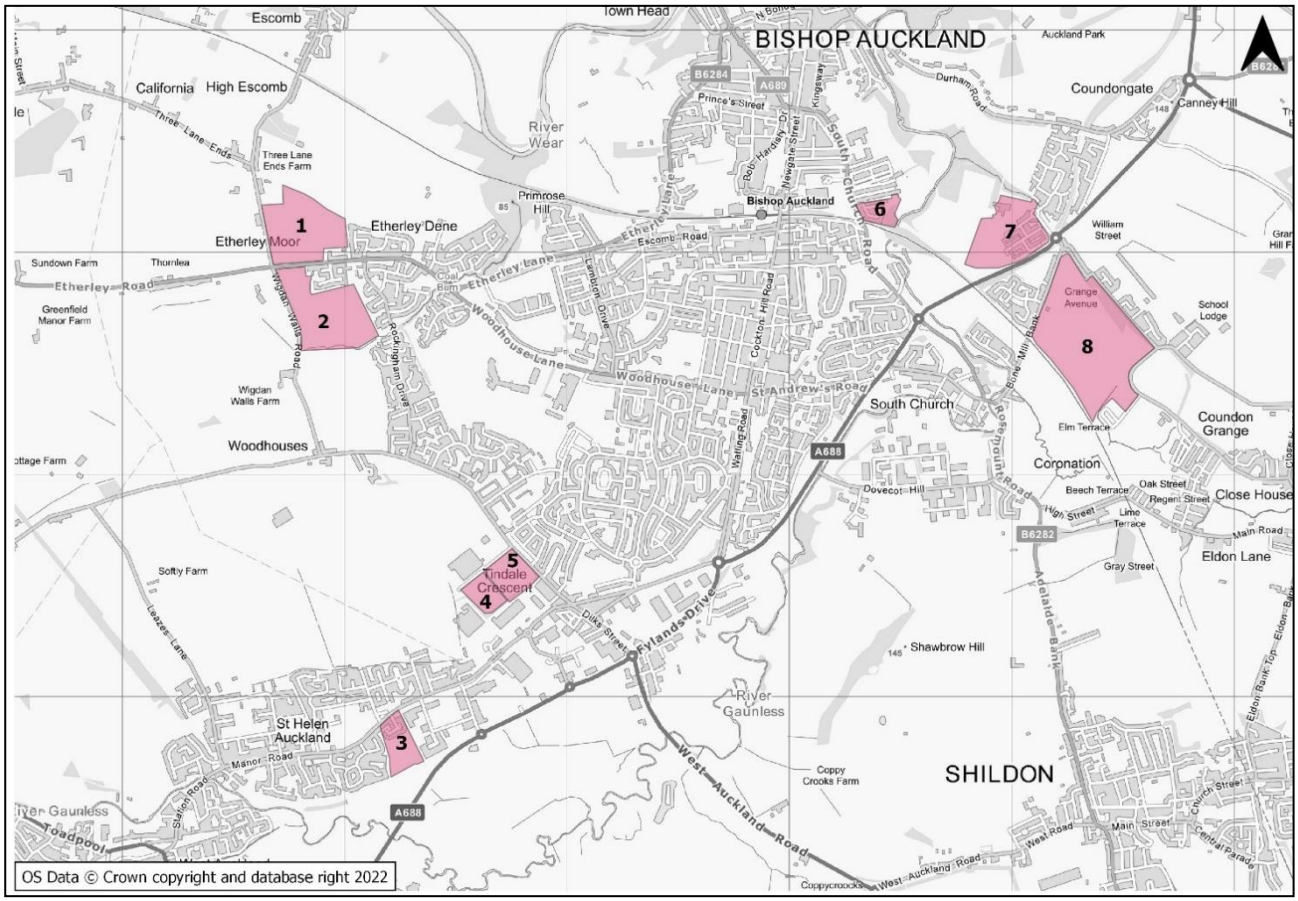
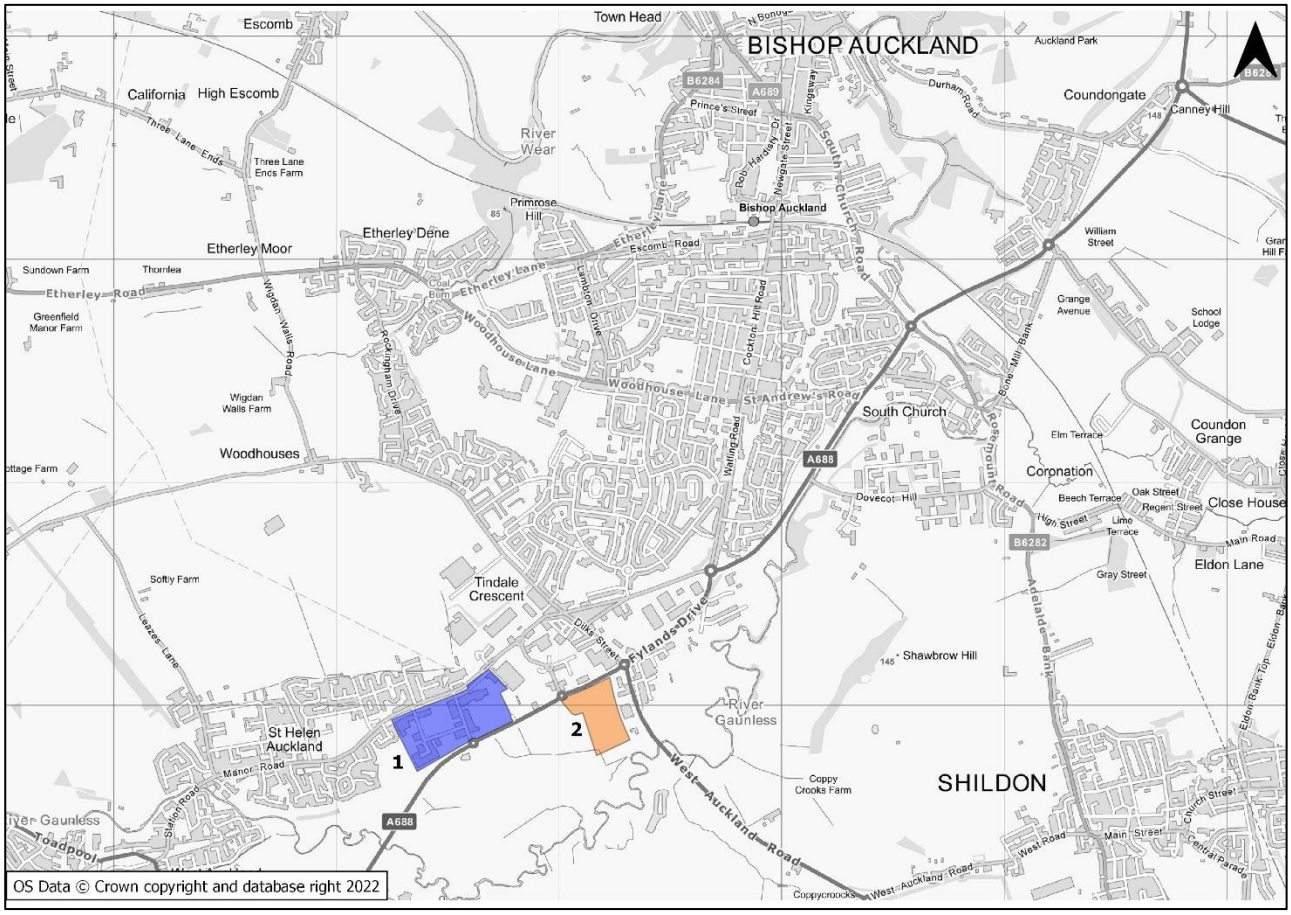


Figure 5.2 shows two employment developments within the study area, both located in or adjacent to St Helen Auckland.

Figure 5.2: Future employment developments within and in close proximity to Bishop Auckland



St Helen Auckland Industrial Estate is a developed industrial estate, home to a large number of existing businesses. One of these businesses, Durham Box Co Ltd, has a pending planning application for the expansion of their existing factory. If approved, it is expected that this development will create 20 new jobs as well as increasing the floor area of the factory by 2030sqm. St Helen Auckland Industrial Estate is listed as an area of protected employment land within the Durham County Plan, as well as leaving 25000sqm space for further development in the future.

Fieldon Bridge Retail Park is a new mixed-use leisure and retail development to the south of the A688, adjacent to the existing Premier Inn – Bishop Auckland hotel.

5.2 Tourism in Bishop Auckland

Durham County Council (DCC) and The Auckland Project (TAP) believe Bishop Auckland has an opportunity for significant visitor led regeneration. More than £56m has already been invested by TAP and Eleven Arches to increase the number of tourist attractions in Bishop Auckland. The success of Kynren has proved that Bishop Auckland can draw visitors in, having attracted over 250,000 spectators since opening in 2016, with the shows being listed as a TripAdvisor top five UK attraction in both 2018 and 2019. A pipeline of further investment in visitor attractions has been developed to enable Bishop Auckland to become an internationally important visitor destination and drive future economic growth for the town, with attractions operational and visitor demand peaking from 2028.

The development of the tourist sector is expected to significantly increase the number of tourists visiting Bishop Auckland. An assessment of expected visitor capacity at visitor attractions in Bishop Auckland, produced by Vision in 2019, outlined five potential day types in Bishop Auckland, influenced by the number of visitors visiting

attractions in the town and details the predicted number of daily visitors to Bishop Auckland for different 'day types' across a regular year. These are shown in Table 5.1.

Table 5.1: Predicted daily visitor numbers in Bishop Auckland

Likely number of days per year	Attendance	Times of year	Low model implications – number of tourists in the town	High model implications – number of tourists in the town
70-120	Low day	Weekdays in Nov, early Dec, Jan, Feb, March	200	340
40-100	Base day	Winter weekends	575	960
80-120	Mid day	Feb Half Term, late spring, early summer, September & October	1,060	1,800
50-70	Design day	Summer Holiday period, Easter Holidays, May and Oct Half Term	2,870	4,810
10-25	Peak day (including Kynren Performance	Easter Weekend, Bank Holidays, late August, October Half Term weekend	5,170	8,650

Visitors are categorised into four main 'groups' of visitors:

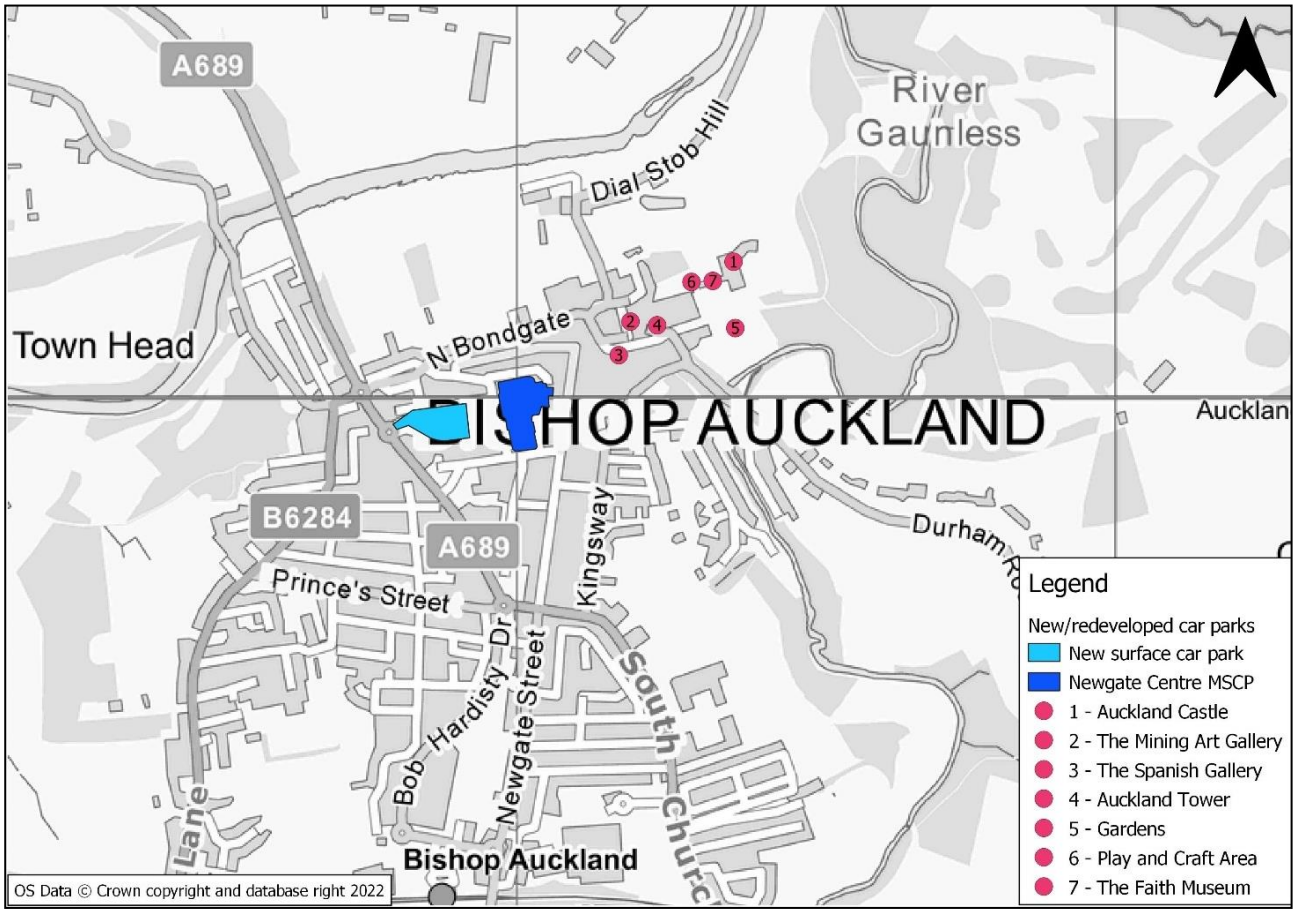
1. **Day visitors to TAP daytime attractions located in the town centre**
2. Nature farm visitors (assumed to park in additional outer town parking which does not lie within the study area)
3. Kynren visitors (assumed to park in additional outer town parking which does not lie within the study area)
4. Weardale railway visitors (included in overall model demand but assumed to have separate parking provision allocated at the site)

The town centre based attractions expected to be visited by 'day visitors' include Auckland Castle, The Mining Art and Spanish Galleries, Walled Gardens, a children's Play and Craft Area, The Auckland Tower and a new Faith Museum which is opening in 2023. All of these attractions are located in and around Bishop Auckland town centre as shown in Figure 5.3 and do not have designated parking or alternative access arrangements which already exist for Kynren or will be provided for the Weardale Railway. As a result, additional visitors generated by these attractions would need to be accommodated in new or existing car parks in the town centre.

It is therefore expected that visitors with a day ticket for attractions in the centre of Bishop Auckland are most likely to use the new surface level car park and upgraded Newgate Centre MSCP.

Visitors to the Nature Farm and Kynren have been excluded as these sites are located outside of the town and additional parking for these attractions is expected to be provided as part of a separate scheme.

Figure 5.3: **Location of The Auckland Project attractions included in the Day Ticket and new/upgraded car parks in Bishop Auckland Town Centre**



5.2.1 Implications on parking

The tourism visitor forecasts provided by TAP suggest that without additional provision the current car parks will be able to only accommodate a proportion of the forecast visitors to Bishop Auckland's new town centre attractions. A study of existing parking availability, based on the proposed visitor forecasts and current car parking occupancy levels across the town, has been undertaken to determine the following:

- The number of spaces required to accommodate visitors to Auckland Project day attractions across both Mid and Design Days, which represent over 50% of visitor days across a year where visitor numbers are highest.

- Examine the worst-case scenario to obtain the percentage of 2028 day visitors who would be able to park in current Bishop Auckland car parks, and therefore visit associated attractions.

In addition, staff working at day attractions will be included in the parking assessment.

5.2.1.1 Pre-visitor existing and future occupancy of Bishop Auckland car parks

To determine the number of parking spaces available for visitors, existing occupancy of the seven car parks was considered. The 2019 ANPR surveys showed that most of the smaller car parks (Kingsway (Castle Chare), Tenters Street and Victoria Avenue) reached full capacity at least once during the weekday. It is therefore assumed these smaller car parks would also be fully occupied by 2028. Whilst the surveys showed there was availability in Newgate Centre car park, in its current state, it was agreed with DCC that the car park is seen as an unattractive

option to users and therefore has been disregarded in the parking assessment. Therefore, North Bondgate is considered as the only viable car park for future visitors without further intervention.

Data collected at North Bondgate car park was used to determine the number of vehicles forecasted to park in North Bondgate in the future, and therefore the number of spaces available for visitors. Data collection took place on a weekday and weekend in October (24/10/2019 and 26/10/2019) and consisted of:

- ANPR survey data, undertaken between 07:00-19:00; and
- Car park user surveys.

ANPR surveys at North Bondgate car park captured vehicle volumes entering and leaving the car parks to provide car park occupancy figures, which has been used to calculate an hourly arrival and departure profile of car park users throughout the day. These are shown in Table 5.2 and Table 5.3.

Table 5.2: Weekday occupancy in North Bondgate, converted into hourly arrivals and departures

Time period	Spaces occupied (provided by ANPR data)	Arrivals	Departures
07:00-08:00	24	24	0
08:00-09:00	75	51	0
09:00-10:00	146	71	0
10:00-11:00	174	28	0
11:00-12:00	167	0	7
12:00-13:00	195	28	0
13:00-14:00	175	0	20
14:00-15:00	139	0	36
15:00-16:00	105	0	34
16:00-17:00	69	0	36
17:00-18:00	28	0	41
18:00-19:00	0	0	28
		202	202

Table 5.3: Weekend occupancy in North Bondgate, converted into hourly arrivals and departures

Time period	Spaces occupied (provided by ANPR data)	Arrivals	Departures
07:00-08:00	4	4	0
08:00-09:00	27	23	0
09:00-10:00	65	38	0
10:00-11:00	96	31	0
11:00-12:00	138	42	0
12:00-13:00	126	0	12
13:00-14:00	150	24	0
14:00-15:00	100	0	50
15:00-16:00	78	0	22
16:00-17:00	41	0	37
17:00-18:00	17	0	24
18:00-19:00	0	0	17
		162	162

It is assumed occupancy between 19:00-07:00 is 0 across both days, due to the time period covered by the ANPR data, and there are no spaces occupied in the final survey hour (18:00-19:00) across both days.

Car park user surveys were undertaken with users of the key car parks using a bespoke survey designed to capture user behaviour and experience of parking provision in the town. The surveys were conducted through a combination of face-to-face interviews and a postcard questionnaire. A small number of users stated 'tourism' as their reason for parking in North Bondgate, as shown in Table 5.4.

Table 5.4: Car park user survey results

	% of users surveyed in North Bondgate who parked for 'tourism' purposes	
Time period	Weekday	Weekend
07:00-08:00	0%	0%
08:00-09:00	0%	0%
09:00-10:00	2%	0%
10:00-11:00	1%	1%
11:00-12:00	2%	0%
12:00-13:00	2%	0%
13:00-14:00	0%	1%
14:00-15:00	1%	0%
15:00-16:00	1%	0%
16:00-17:00	3%	0%
17:00-18:00	7%	0%

The data outlined above was then uplifted to generate a parking profile for 2028.

TEMPro growth rates calculated for the MSOAs covering Bishop Auckland were applied to the existing parking profile. The growth rates are shown in Table 5.5

Table 5.5: TEMPro growth rates for Bishop Auckland MSOAs, 2019 to 2028

Time period	Hours covered	Origin	Destination	Average
Weekday AM	(0700-0959)	1.0815	1.0779	1.0797
Weekday IP	(1000-1559)	1.0764	1.0766	1.0765
Weekday PM	(1600-1859)	1.0767	1.0782	1.07745
Weekday OP	(0000-0659 and 1900-2359)	1.0739	1.0759	1.0749
Saturday	All day	1.0761	1.0761	1.0761

The percentage of car park users who parked in North Bondgate for 'tourism' purposes in each hour was then applied to the uplifted hourly profile. As mentioned above, the car park data collection was undertaken in October. The number of car park users currently parking in North Bondgate car park for tourism purposes needs to be uplifted to account for changes in seasonality between day types outlined in the Vision report. The surveyed days in October would lie in the 'Mid Day' category in Table 5.1, and therefore need to be uplifted to represent a 'Design Day'. The High Case maximum number of tourists in the town for these day times has been used to determine the factor to account for seasonality.

Table 5.6: 'Day type' factor to uplift existing tourists in North Bondgate

Day Type	Low Model - no of tourists in town max	High Model - no of tourists in town max	Factor to uplift Mid to Design
Low	200	340	2.67
Base	575	960	
Mid	1060	1800	
Design	2870	4810	
Peak	5170	8650	

The occupancy of North Bondgate (prior to Auckland Project visitors) for both a weekday and weekend Design Day is shown in Table 5.7.

Table 5.7: Predicted 2028 Design Day arrival and departures profiles of North Bondgate car park users

	Weekday		Weekend	
Time period	Arrivals	Departures	Arrivals	Departures
07:00-08:00	26	0	5	0
08:00-09:00	55	0	25	0
09:00-10:00	72	0	40	0
10:00-11:00	33	0	32	0
11:00-12:00	0	11	47	0
12:00-13:00	30	0	0	13
13:00-14:00	0	16	22	0
14:00-15:00	0	41	0	50
15:00-16:00	0	36	0	24
16:00-17:00	0	41	0	39
17:00-18:00	0	44	0	26
18:00-19:00	0	27	0	19
19:00-20:00	0	0	0	0
20:00-21:00	0	0	0	0
21:00-22:00	0	0	0	0
22:00-23:00	0	0	0	0
23:00-24:00	0	0	0	0
	216	216	171	171

5.2.1.2 Visitor and staff demand for parking

The visitor arrivals and departures from the Vision Report for Day Attractions were then used to determine those who would be able to park in North Bondgate taking into account the future residual occupancy summarised in Table 5.7. The 2028 Design Day visitor figures provided in the Vision report are shown in Table 5.8. Additionally, the Mid Day 2028 equivalent figures have been calculated using the factor determined by the maximum number of Mid and Design Day tourists in the 'High Case' model scenario and are shown in Table 5.9.

Table 5.8: Hourly visitor profile for visitors to 'Day Ticket' attractions on a Design Day in 2028, provided by Vision report

	Design Day	
Time	Arrivals	Departures
08:00-09:00	28	0
09:00-10:00	142	0
10:00-11:00	178	0

	Design Day	
11:00-12:00	164	21
12:00-13:00	121	36
13:00-14:00	36	57
14:00-15:00	36	78
15:00-16:00	7	92
16:00-17:00	0	85
17:00-18:00	0	85
18:00-19:00	0	85
19:00-20:00	0	36
20:00-21:00	0	50
21:00-22:00	0	50
22:00-23:00	0	37
23:00-24:00	0	0
	712	712

Table 5.9: Equivalent hourly visitor profile for visitors to 'Day Ticket' attractions on a Mid Day in 2028, derived using factors

	Mid Day	
Time	Arrivals	Departures
08:00-09:00	10	0
09:00-10:00	53	0
10:00-11:00	67	0
11:00-12:00	61	8
12:00-13:00	45	13
13:00-14:00	13	21
14:00-15:00	13	29
15:00-16:00	3	34
16:00-17:00	0	32
17:00-18:00	0	32
18:00-19:00	0	32
19:00-20:00	0	13
20:00-21:00	0	19
21:00-22:00	0	19
22:00-23:00	0	14
23:00-24:00	0	0
	266	266

The staff numbers provided in the Vision report are across all attractions, including the Weardale Railway and Nature Farm whose numbers are not included for the purpose of this Transport Assessment. The proportion of Day Ticket visitors of all visitors to Bishop Auckland on a Design Day in 2028, as shown in Table 5.10

Table 5.10: Calculations used to obtain staff numbers for 2028 Design Day

Design Day	Total vehicle movements
Weardale Railway	248
Nature Farm	595
Day Ticket	711
Total	1554
Staff	247

Design Day	Total vehicle movements
Proportion of Day Ticket visitors as total visitors	0.46
Proportion applied to staff numbers	113

The same factor used to obtain the Mid Day visitor numbers has been applied to the reduced staff numbers for the Design Day. The staff and service vehicles hourly profile in Vision has been applied to these reduced staff numbers and are shown in Table 5.11.

Table 5.11: Staff vehicle arrival and departure profile for those working at day attractions on 2028 Design Days, based on Vision report

	Design Day	
Time	Arrivals	Departures
08:00-09:00	31	
09:00-10:00	22	3
10:00-11:00	11	3
11:00-12:00	11	2
12:00-13:00	0	2
13:00-14:00	0	2
14:00-15:00	0	5
15:00-16:00	0	5
16:00-17:00	0	14
17:00-18:00	17	19
18:00-19:00	17	9
19:00-20:00	0	5
20:00-21:00	0	5
21:00-22:00	0	5
22:00-23:00	0	17
23:00-24:00	0	12
	113	113

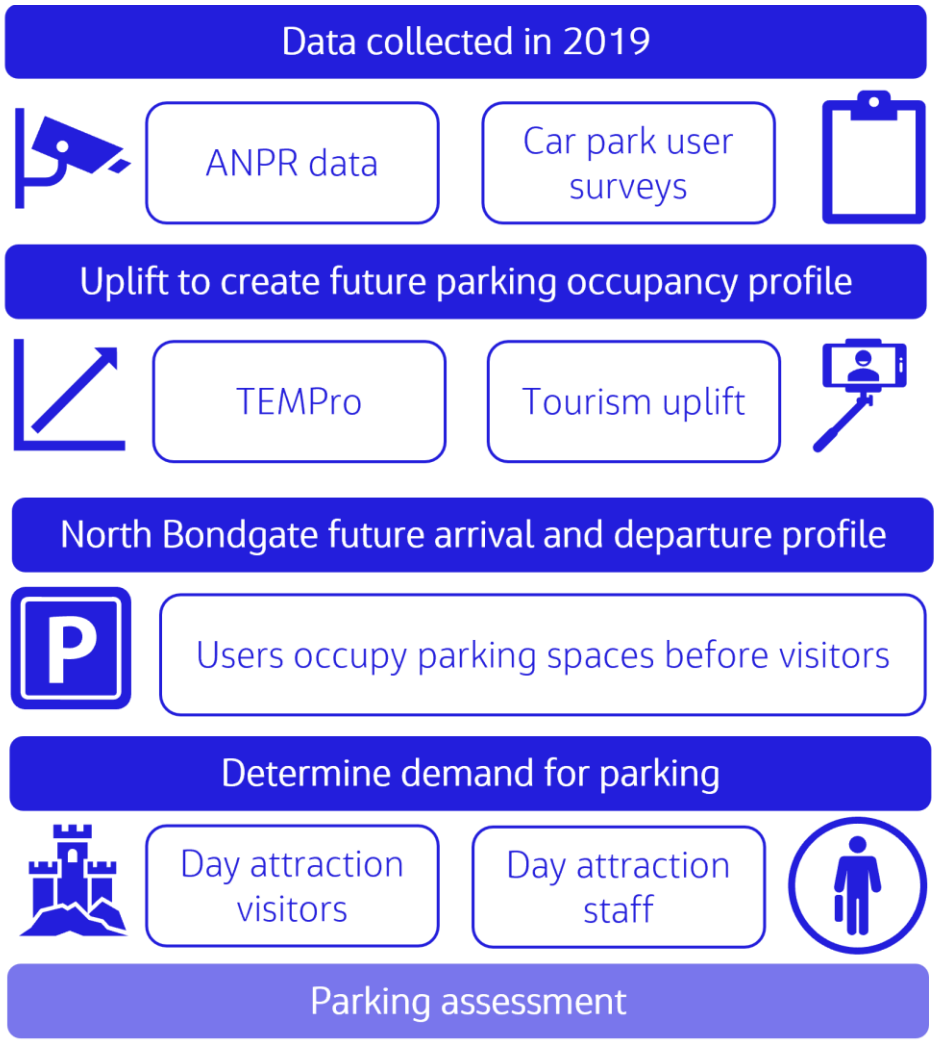
Table 5.12: Equivalent staff vehicle arrival and departure profile for those working at day attractions on 2028 Mid Days, derived using factors

	Mid Day	
Time	Arrivals	Departures
08:00-09:00	13	1
09:00-10:00	8	1
10:00-11:00	4	1
11:00-12:00	4	1
12:00-13:00	0	1
13:00-14:00	0	1
14:00-15:00	0	2
15:00-16:00	0	2
16:00-17:00	0	5
17:00-18:00	6	7
18:00-19:00	6	3
19:00-20:00	0	2
20:00-21:00	0	2
21:00-22:00	0	2
22:00-23:00	0	6
23:00-24:00	0	4

	Mid Day	
	42	42

The steps outlined in this section are summarised in Figure 5.4.

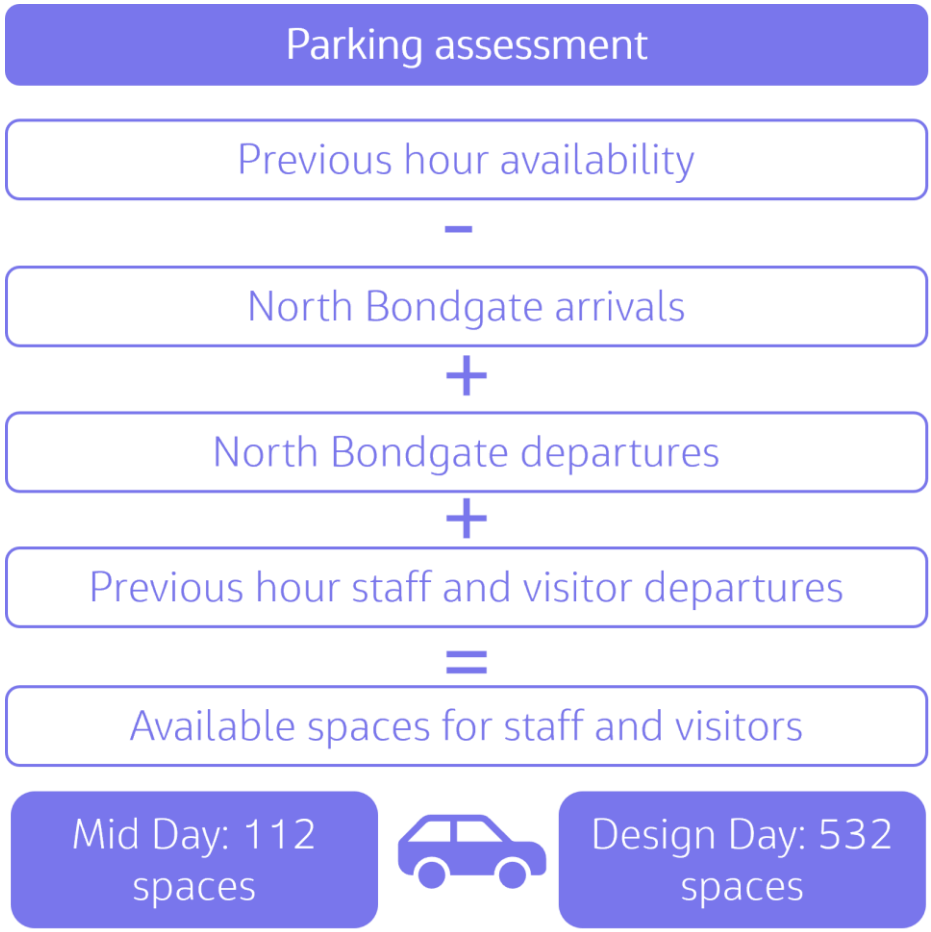
Figure 5.4: Steps taken to establish future usage of North Bondgate to inform the parking assessment



5.2.1.3 Parking assessments

The following steps outlined in Figure 5.5 were undertaken for the 2028 Mid and Design Day using a parking assessment spreadsheet developed by Jacobs, and determined the number of spaces required over and above the existing North Bondgate car park:

Figure 5.5: Parking assessment steps undertaken to determine the additional parking required in Bishop Auckland



The parking assessment showed that for a Mid Day, 112 additional spaces would be needed to accommodate 266 visitors and 42 day attraction staff associated with the day type. For the Design Day, an additional 532 spaces would be needed to accommodate 712 visitors and 113 day attraction staff associated with the day type.

The findings of the parking assessment were discussed with DCC and it was agreed that:

- The new surface car park (125 spaces) would be sufficient in accommodating visitors to Bishop Auckland on a Mid Day
- The new surface car park and redeveloped Newgate Centre car park would accommodate the majority of visitors on a Design Day. Those unable to park in these car parks would be expected to use other overflow parking arrangements linked to Auckland Project attractions.

The number of visitors and staff who could park without the two proposed car parks was also examined, to determine the non-dependent development, i.e. the percentage of visitors and staff who could all park in North Bondgate throughout the entire day. A similar assessment outlined in Figure 5.5 was undertaken, identifying the threshold of visitors and staff which North Bondgate car park could accommodate. The study revealed that only 28% of visitors would be able to find a parking space in North Bondgate car park during the busiest modelled period (2028 Design Day using weekend occupancy).

5.2.1.4 Summary

The above parking assessments have identified the need for additional spaces for visitors and staff associated with Mid and Design Days in 2028, where visitor attendance is expected to peak. The parking assessment has shown that 112 additional spaces are needed for a Mid Day, and 532 for a Design Day, of which the majority can be

accommodated by the capacity of the proposed car parks associated with this Transport Assessment. Without intervention, only 28% of Design Day visitors in 2028 would be able to park in North Bondgate car park.

Day Type		Mid Day	Design day
Number of days throughout year		80 -120	50-70
Attractions visited		Day ticket attractions: • Auckland Castle • Mining Art Gallery • Spanish Gallery • Walled Gardens • Play and craft area • Auckland Tower • Faith museum *All day attractions located within close proximity to the market place / town centre and therefore demonstrates a need for inner parking* *Nature farm and Kynren visitors likely to park outside of the town centre to be closer to the attraction. Weardale visitors will park at the station.*	
Daily number of visitors requiring parking		266	712
Daily number of staff requiring parking		42	113
Total number of vehicles requiring parking		**308**	**825**
Additional spaces required to facilitate		112	532
Parking utilised	North Bondgate (353 spaces)	Y	Y
	Surface car park (125 spaces)	Y	Y
	Newgate Centre (205 spaces available for tourists)	N	Y
	Overflow parking (required for 182 vehicles)	N	Y

6. Transport Impact Assessment

6.1 Overview

The predicted traffic flows resulting from future developments in Bishop Auckland, namely those involved with the increased tourism offer, have been used to assess the future operation of junctions on the local network.

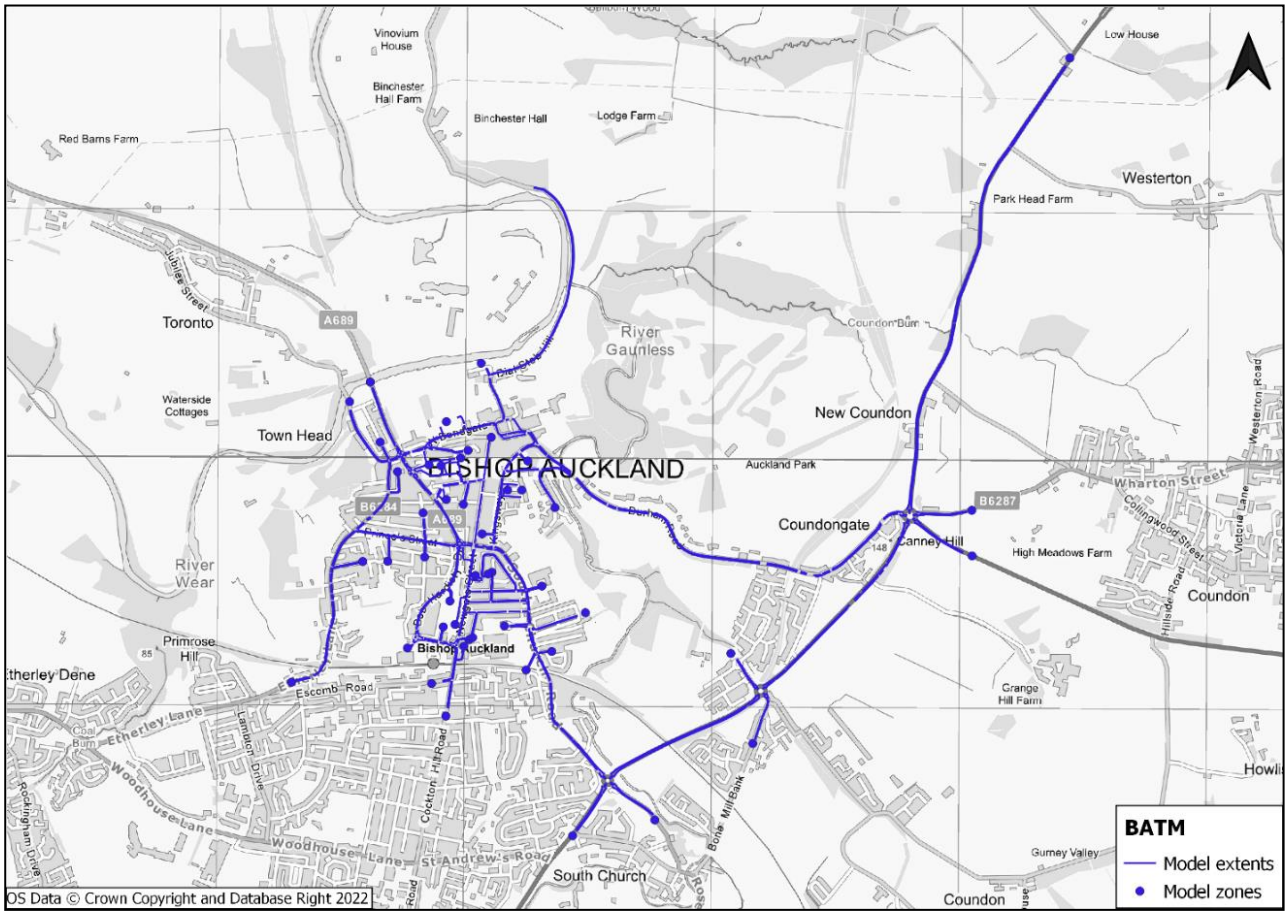
6.2 Transport modelling

The Bishop Auckland Transport Model (BATM) will be used to support the Transport Assessment to consider how changes in Bishop Auckland will impact traffic levels and demand across the town, and the impact of intervention. The BATM is a fully validated and calibrated transport model that has been used to support various recent funding bids in Bishop Auckland; as such it has been developed in accordance with DfT TAG and represents a robust modelling tool on which to base the assessment of this scheme.

Traffic flows will be forecast with and without the proposed scheme, assessing the potential impact the development of the scheme could have on traffic demand in Bishop Auckland. Once areas of delay are identified, flows taken from the BATM for all scenarios will then be inputted into junction specific software, including ARCADY, PICADY and Linsig for a more detailed junction assessment at pinch points on the network.

As outlined in Section 6.4, the study area for this assessment is focussed on Bishop Auckland town centre and the main routes into and out of the town including the A689, Newton Cap Bank, Wear Chare, Durham Road, Cockton Hill Road and Etherley Lane. The model also includes the stretch of the A688 to the south-east of Bishop Auckland which connects Durham Road to the A689. Residential areas within the town have not been modelled in detail but vehicle trips with origins and destinations in these areas will enter and exit the modelled network via relevant model zonal loading points. The extent of the BATM is displayed in Figure 6.1.

Figure 6.1: BATM Model extents



6.3 Forecasting

To demonstrate the benefits of the scheme and future traffic conditions, the forecast years were agreed with DCC, which are shown below:

- Opening year: 2024
- Design year: 2029

The traffic model used for assessing the impact of the proposed development includes the day types that are expected to most significantly impact traffic operations in Bishop Auckland, representing:

- Mid Attendance day, which represents between 80 and 120 days per year corresponding to February Half Term, late spring, early summer, September and October; and
- Design Attendance day, representing between 50 and 70 days per year during the Summer Holiday Period, Easter Holidays, October Half Term and May Half Term.

Combined, the 'Mid' and 'Design' attendance days represent over 50% of visitor days across a year, with the low and base attendance days representing a much lower scale of impact during 'off season' periods and therefore not modelled from a transport and traffic impact perspective due to demand being accommodated within existing parking supply and therefore not expected to impact on the wider road network over and above current permitted uses.

6.3.1 Future year demand

6.3.1.1 Background growth

To appropriately model changes in traffic demand within Bishop Auckland, the DfT TEMPro dataset 8 has been used to provide the future growth factors which have been used to uplift the number of journeys made by light vehicles (cars and LGVs) on the road network. TEMPro software contains a set of adjustable planning assumptions which predict the number of households and jobs per TEMPro zone for each year.

The TEMPro dataset is geographically set by regions and counties. County Durham was selected as the scale for uplift which was then used within the Bishop Auckland Transport Model. The factors were exported for each modelled period (Weekday AM Peak, Weekday PM Peak and Saturday IP) for 2024 and 2029 for each journey type and are presented in Table 6.1 and Table 6.2.

Table 6.1: County Durham Growth rates 2019-2024

Journey type	Weekday AM	Weekday PM	Saturday all day
Commute	1.0400	1.0375	1.0314
Business	1.0415	1.0408	1.0381
Other	1.0421	1.0412	1.0415

Table 6.2: County Durham Growth rates 2019-2029

Journey type	Weekday AM	Weekday PM	Saturday all day
Commute	1.0765	1.0720	1.0622
Business	1.0794	1.0782	1.0735
Other	1.0784	1.0774	1.0784

Future HGV growth rates have been calculated using national Road Traffic Forecasts (RTFs) which outline the expected change in traffic volumes as far as 2050. HGV growth values are available at the national level and are given for 5 year periods from 2015 to 2050. The data has then been interpolated to find an appropriate value for the model years of 2024 and 2029. HGV growth rates are shown in Table 6.3.

Table 6.3: RTF growth rates for HGVs, interpolated for 2024 and 2029

2019 – 2024	2019 - 2029
0.9947	0.9943

6.3.2 Committed development trips

In addition to the background growth, the traffic generated by developments within the study area also needs to be incorporated into the forecasts.

Three residential development allocations lie within the model extents which are therefore additional trips likely to load onto the model network. These include:

- Bracks Farm
- Land South of Douglas Crescent
- Former BBH Windings Ltd, South Church Road

Trip rates applied to the development sizes were utilised to estimate the likely number of trips that each explicitly modelled development site would generate. For this purpose, the TRICS database is the national system for trip generation analysis in the UK and Ireland and is integral to the transport assessment process.

TRICS was used to obtain appropriate origin and destination trip rate factors by land use type and applied to development quantum expressed in number of houses for residential sites and GFA for employment, retail and leisure sites, thus generating total number of arrivals and departures for each development by time period. TRICS version 7.9.2 was used, which was the latest at the time the work was undertaken.

The TRICs rates used for all three residential sites are show in Table 6.4.

Table 6.4: TRICS trip rates for Car, LGV and HGV used for future developments

Vehicle	TRICS Code	08:00-9:00		16:30-17:30		Weekend 11:00-12:00	
		Arrivals	Departure	Arrivals	Departure	Arrivals	Departure
Car	03/A	0.075	0.236	0.1935	0.1	0.071	0.071
LGV		0.012	0.014	0.0155	0.0085	0.01	0.01
HGV		0.002	0.001	0.001	0.001	0.002	0.002

Analysis of Census data for the study area was undertaken to understand the origins/destinations of vehicles to/from the future development zones. Location of usual residence and place of work data for the two MSOAs covering the study area showed that development trips would be distributed between existing zones in the model.

For OD trips which included development in one of the zones, the background growth discussed in Section 6.3.1.1 was not applied, to avoid overestimating the number of trips to be generated to/from new developments.

6.3.3 Tourist attraction visitor and staff numbers

The parking assessment demonstrates that only 28% of design day visitors on a weekend will be able to park in 2028, when visitors are expected to peak if the new surface car park and redesign of Newgate Centre car park is not provided. Taking this into account, it is assumed that only 28% of the planned TAP day attractions can go ahead without providing additional parking, while the part of the development that is dependent on the surface car park and Newgate Centre car park is the remaining 72%.

The parking analysis shows that if current parking infrastructure could only accommodate a proportion of forecast total visitor numbers; then elements of the development simply would be unable to come forward. This assumption is therefore applicable to all scenarios and hours, i.e. if only 28% of 'Day Attraction' visitors can be accommodated in the 2028 inter-peak Design Day; it would be impossible for a larger proportion of TAP visitors to be accommodated at other times of day or years even if the capacity existed; as the additional elements of the TAP developments generating this traffic would be unable to come forward.

The parking analysis demonstrates dependency and therefore only the non-dependent development demand (28% of visitors) will be included in the model scenarios which do not include additional parking facilities (i.e. Do Nothing).

6.3.4 Visitor and staff trip assignment

Analysis of the catchment area of TAP developments as presented in the Vision report has been undertaken to understand the origins of visitor arrivals and the routing assignment.

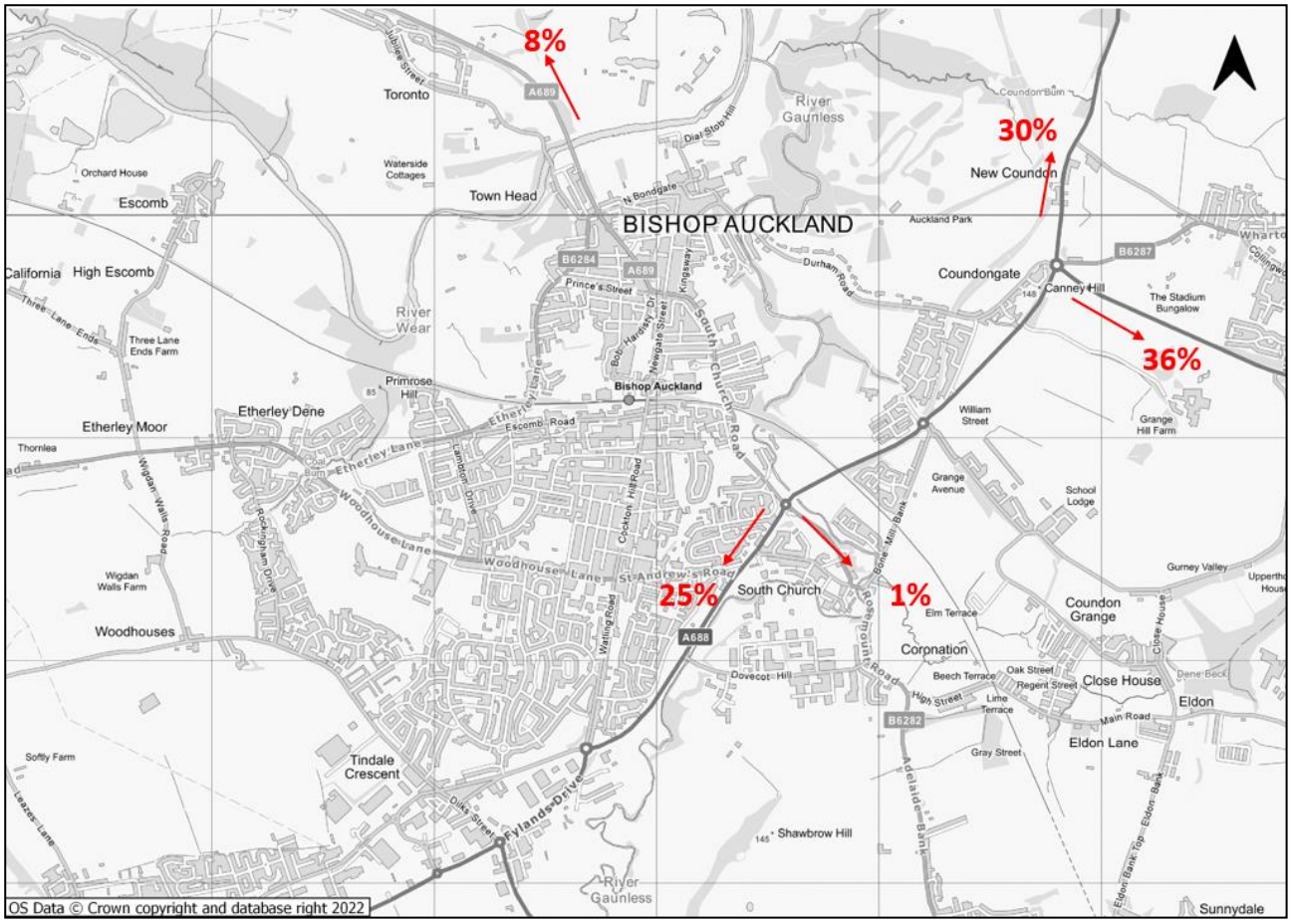
The population of towns in the 60-minute market were obtained using NOMIS and 2011 Census Data. Towns for which a population could not be obtained (often due to small size) were excluded from the analysis. Google Maps was then used to determine the route/s from these towns and Bishop Auckland, and therefore from which zone

they would enter the model. County Durham was broken down further into towns to capture the different zones and locations of these towns in relation to Bishop Auckland as it is situated within the county. All towns were then categorised by zone and the populations summed. For towns where two route options with the same journey times were identified, these populations were split between the two zones.

The same process was repeated for the 60-120 minute market. The proportions of the 60 and 60-120-minute markets were then combined using information provided in the Vision report. Combined Day visits in the High Case model (as defined in the Vision report) predict that the 60-120-minute market would be set at 25% of the 60-minute market, which would be the highest case seen in the UK.

The final proportions were consistent across all day types, peak hours and years and are shown in Figure 6.2.

Figure 6.2: Distribution profile used to assign visitors' 'home' zones



Visitors were then assigned to a car park zone depending on the modelled scenario:

- Do Nothing – all visitors were assigned to North Bondgate; this is the only available car park in these model scenarios
- Do Minimum and Do Something – 2019 parking surveys showed proximity to destination is the main reason users choose a particular car park. Due to North Bondgate and the new surface car park lying within close proximity to each other it is assumed visitors would be indifferent between parking in these two car parks, and so 50% were assigned to each. If there was not availability in one of these car parks, then visitors were assigned to the Newgate Centre car park, it was assumed this car park would be less attractive to visitors due to the multi-storey design.

The tourist developments are expected to increase job opportunities for Bishop Auckland. It was therefore agreed with DCC, that an assumption of 80% of day attraction staff would live in, and therefore commute from, the town itself.

The 80% of staff assumed to work and live in Bishop Auckland were distributed between inner town residential zones based on their proportion of 'commuting trips' in relation to total commuting trips of these residential zones. The remaining 20% were allocated between zones based on census journey to work data for the Bishop Auckland MSOAs.

The staff were then assigned to a car park zone using the same assignment implicated for visitors.

6.3.5 Forecast model scenarios

The forecast model scenarios are outlined in Table 6.5.

Table 6.5: Forecast scenarios used in the transport impact assessment

Scenario	Demand	Network
Do Nothing	Background growth, committed development traffic and 28% of Bishop Auckland tourist attraction visitors i.e. the non-dependent development	2019 base year network including additional zone for one committed development
Do Minimum	Background growth, committed development traffic and 100% of Bishop Auckland tourist attraction visitors	Do Nothing network plus redesigned bus station, 125 space surface car park and redesigned Newgate Centre car park
Do Something		Do Minimum model plus junction mitigations

6.3.6 Matrix totals

The matrix totals for the 2019 base year scenario and forecast model scenarios are shown in Table 6.6 to Table 6.10.

Table 6.6: Matrix totals for 2019 base year scenarios

Base 2019	AM	PM	Weekday IP
Car - Commute	2506	2287	546
Car - Business	464	360	131
Car - Other	3519	4383	5767
HGV	145	52	56
Visitors and staff		0	
Total	**6634**	**7082**	**6500**

Table 6.7: Matrix totals for Do Nothing 2024 scenario

Do Nothing 2024	AM		PM		Weekend IP	
	Mid	Design	Mid	Design	Mid	Design
Car - Commute	2661		2415		569	
Car - Business	493		381		137	
Car - Other	3743		4644		6062	
HGV	146		53		57	

Do Nothing 2024	AM		PM		Weekend IP	
Visitors and staff	14	38	21	58	44	119
Total	7057	7081	7514	7551	6869	6944

Table 6.8: Matrix totals for Do Minimum and Do Something 2024 scenarios

Do Minimum and Do Something 2024	AM		PM		Weekend IP	
	Mid	Design	Mid	Design	Mid	Design
Car - Commute	2661		2415		569	
Car - Business	493		381		137	
Car - Other	3743		4644		6062	
HGV	146		53		57	
Visitors and staff	27	74	47	128	91	269
Total	**7070**	**7117**	**7540**	**7621**	**6916**	**7094**

Table 6.9: Matrix totals for Do Nothing 2029 scenario

Do Nothing 2029	AM		PM		Weekend IP	
	Mid	Design	Mid	Design	Mid	Design
Car - Commute	2789		2522		589	
Car - Business	518		399		143	
Car - Other	3921		4865		6312	
HGV	146		53		59	
Visitors and staff	7	18	12	31	56	21
Total	**7381**	**7392**	**7851**	**7870**	**7158**	**7124**

Table 6.10: Matrix totals for Do Minimum and Do Something 2029 scenarios

Do Minimum and Do Something 2029	AM		PM		Weekend IP	
	Mid	Design	Mid	Design	Mid	Design
Car - Commute	2789		2522		589	
Car - Business	518		399		143	
Car - Other	3921		4865		6312	
HGV	146		53		59	
Visitors and staff	22	59	41	110	74	199
Total	**7397**	**7433**	**7880**	**7950**	**7177**	**7301**

6.4 Bishop Auckland Transport Model

Jacobs have previously developed a traffic model of Bishop Auckland in Aimsun Next software at the microscopic level. The purpose of the BATM was to be used as a planning tool for the assessment of the operational impacts of the proposed tourism and leisure developments and for the testing of potential transport infrastructure schemes.

The base model was developed, and it was shown that the model has been calibrated and validated to a level appropriate with its intended use for future year demand forecasting, in accordance with TAG.

The BATM provides in-depth modelling of individual junction operation, traffic congestion, queue formation and the overall operation of the highway network in Bishop Auckland. Data collection and analysis used to inform the model and findings from the base year model runs will be included in this section of the report to describe various aspects of the current transport situation.

The 2019 base year model is considered to be reliable to inform the current situation for the purpose of this report. The data collection undertaken to create the model occurred in 2019 and therefore still considered sufficiently recent. Additionally, although 2019 represents pre-Covid traffic conditions, traffic counts undertaken elsewhere in Bishop Auckland (Tindale Triangle area) in 2023 have been compared to 2019 data from the same locations and found to be within 17%, 2% and 4% in the AM, PM and IP periods respectively.

A summary of the model is shown in Table 6.11.

Table 6.11: Bishop Auckland Transport Model specification

Bishop Auckland Transport Model	
Base Year	2019
Time periods	Weekday AM (0800-0900) Weekday PM (1630-1730) Weekend IP (1100-1200)
User Classes	Light vehicles consisting of cars and light good vehicles Heavy good vehicles
Trip Purpose	Commute Work Others
Network coverage	Bishop Auckland town centre and all the main routes to/from the town including the A689, Newton Cap Bank, Wear Chare, Durham Road, Cockton Hill Road and Etherley Lane. The stretch of the A688 connecting Durham Road and the A689 is also included in the model.
Data sources	Automatic Number Plate Recognition (ANPR) surveys at 21 locations, including 8 network outer cordon areas, 6 network inner cordon areas and 7 car park ANPR surveys. Manual classified counts (MCCs) and queue length (QL) surveys at 11 junctions

Further information on the Bishop Auckland Transport Model and trip generation can be found in the Local Model Validation Report (LMVR).

6.5 Areas for assessment

Areas of the Bishop Auckland network to focus this assessment on have been identified by considering the Do-Minimum and Do-Something traffic modelling in two parts:

1) The immediate road network adjacent to the proposed bus station, new surface car park and upgraded Newgate Centre car park that will be directly impacted by the increase in trips resulting from increased car parking supply and re-routed bus movements;

2) The wider network impacts across Bishop Auckland resulting from the increase in tourism based traffic on Mid and Design days. It is an important distinction, as the highway and traffic impacts directly linked to the proposed scheme are considered in Part 1 above, however the wider network impacts resulting from the tourism attractions that the car park schemes aim to serve are considered separately. This is due to the fact the successful FHSF bid also included funding for junction mitigation schemes across the wider network, determined by traffic data supporting the original 2020 FHSF bid. For completeness, these committed improvement schemes will be included in the Do-Something scenarios and impacts across these locations reported.

Confirmation of the Bishop Auckland network to focus this assessment on have been identified using the Do Minimum 2029 scenario. This scenario includes the redeveloped Bishop Auckland Bus Station, along with the development of the new surface car park and upgrade of the Newgate Centre MSCP with 100% of visitor demand. As a result, the Do Minimum model for 2029 gives the worst-case indication of the likely operation of the highway network, and will identify junctions which are likely to suffer from congestion in the future, and if proposed mitigation addresses these. Figure 6.3 to Figure 6.5 show the location of delays around the model for each of the modelled time periods.

Figure 6.3: Do Minimum 2029 Design Day delay, AM

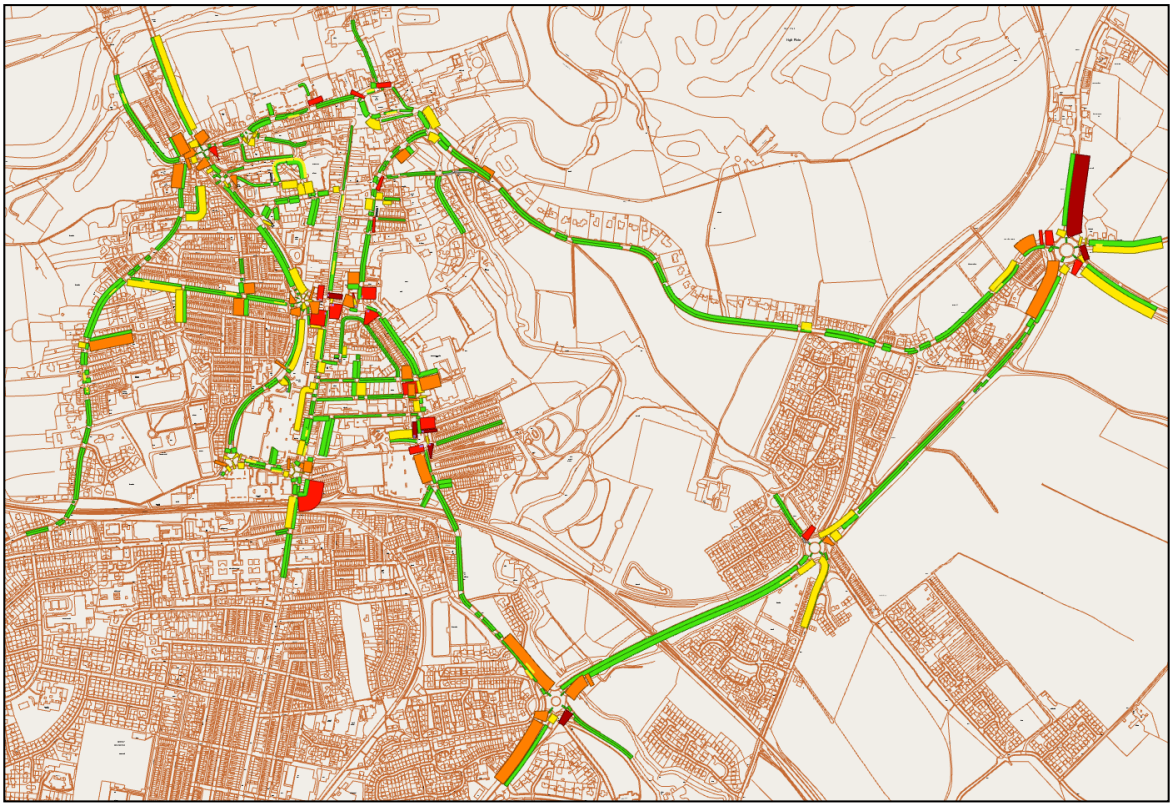


Figure 6.4: Do Minimum 2029 Design Day delay, PM

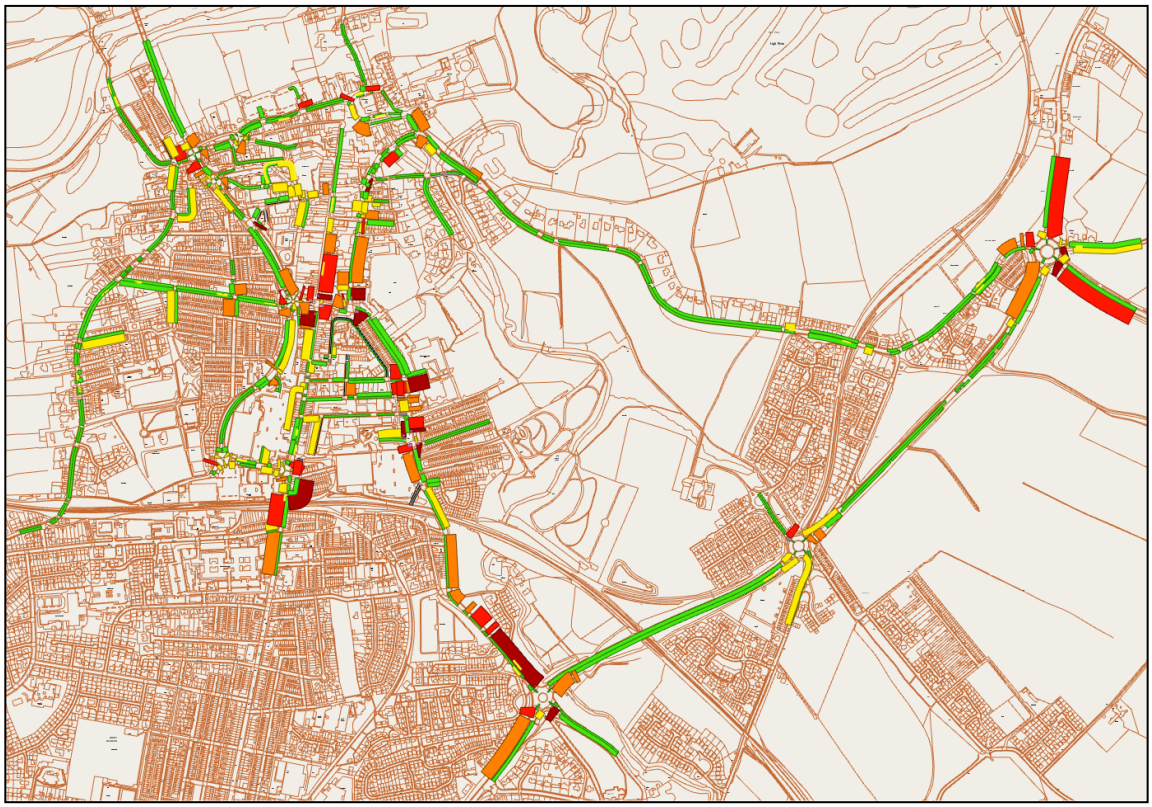
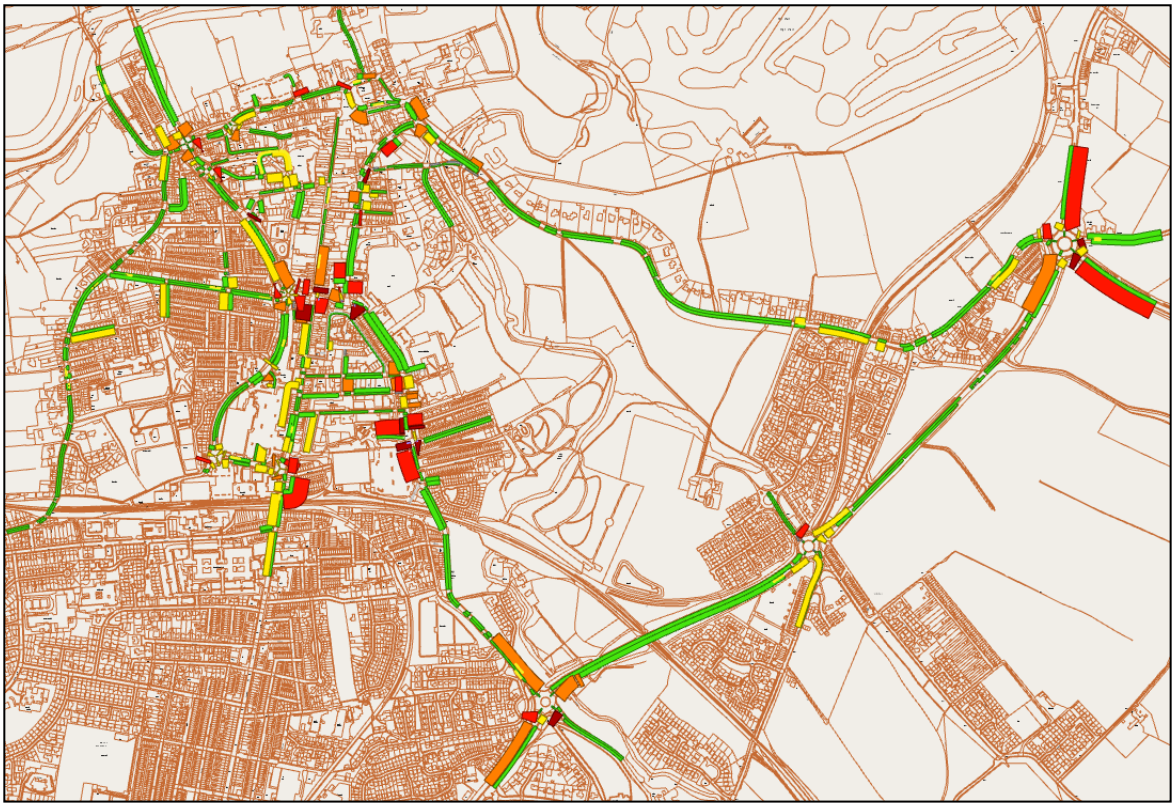


Figure 6.5: Do Minimum 2029 Design Day delay, Weekend IP



The areas of greatest congestion are:

- **Coundon Gate roundabout (A688, A689, B6287)**
- **A688 / A689 / B6282 roundabout**
- Newgate Street / South View junction (the South View arm of the junction appears to be mainly used for parking and is therefore not considered a junction which requires mitigation).
- A689 South Church Road / Woodlands Road (the delay at this junction is largely attributed to the King James I Academy traffic which is also prominent in the base models).
- **A689 / Kingsway junction**
- A689 Kingsway / Princes Street/ Newgate Street junction (mitigations for junctions either side of this junction have been proposed and are therefore expected to alleviate delay for this junction).
- **A689 / Princes Street Roundabout**

The above modelling confirms that the four junctions identified in the original Future High Streets Fund submission require mitigation (highlighted in bold). The proposed mitigations (as shown in the appendices) have then been coded into the Bishop Auckland Transport Model and used within the Do Something model runs, to assess how these changes have affected the highway network and flows of traffic around the town, and will be examined in greater detail across all model scenarios.

Where necessary, these have also been combined with proposed mitigation as part of the development proposal (such as A689/Kingsway/Princes Street/Newgate Street junction.

6.5.1 Junction mitigations

In addition to the changes directly associated with the bus station upgrade, a general increase in the volume of traffic in the town is assumed to require wider upgrades to the Bishop Auckland road network. The 2020 FHSF bid proposed mitigations at four junctions based on observed and modelled demand at the time. This data, compared to the data used to inform this Transport Assessment, are summarised in Table 6.12.

Table 6.12: Differences between original FHSF modelling (used to inform junction mitigations) and current development assessment

	Original FHSF bid	Current Development Assessment
Modelled years	2022 and 2028	2024 and 2029
Attractions (and associated visitors) considered for parking assessment	• Day ticket attractions • Nature Farm • Weardale Railway	• Day ticket attractions
Visitor trips included in modelling	• Day ticket attractions • Nature Farm • Weardale Railway	• Day ticket attractions • Weardale Railway

The table shows that in the original FHSF bid, visitors to day ticket attractions, the Nature Farm and Weardale Railway were included in the parking assessment and their vehicles included in demand matrices in the Aimsun modelling. In addition to existing traffic data captured in Bishop Auckland (including queue length surveys and turning counts), the modelled flow data was used to identify congested junctions where intervention was considered necessary to enable the network to accommodate these additional trips. Mitigations, and where appropriate signal optimisation, were designed based on this demand. The demand considered for this Transport Assessment is lower, due to the exclusion of Nature Farm visitors (who are assumed to park outside of the model extents).

In addition, the modelled scenarios differ between the original FHSF bid and modelling used to inform this Transport Assessment, outlined in Table 6.13.

Table 6.13: Modelled scenarios for original FHSF bid (used to test effectiveness of mitigations) and current development assessment

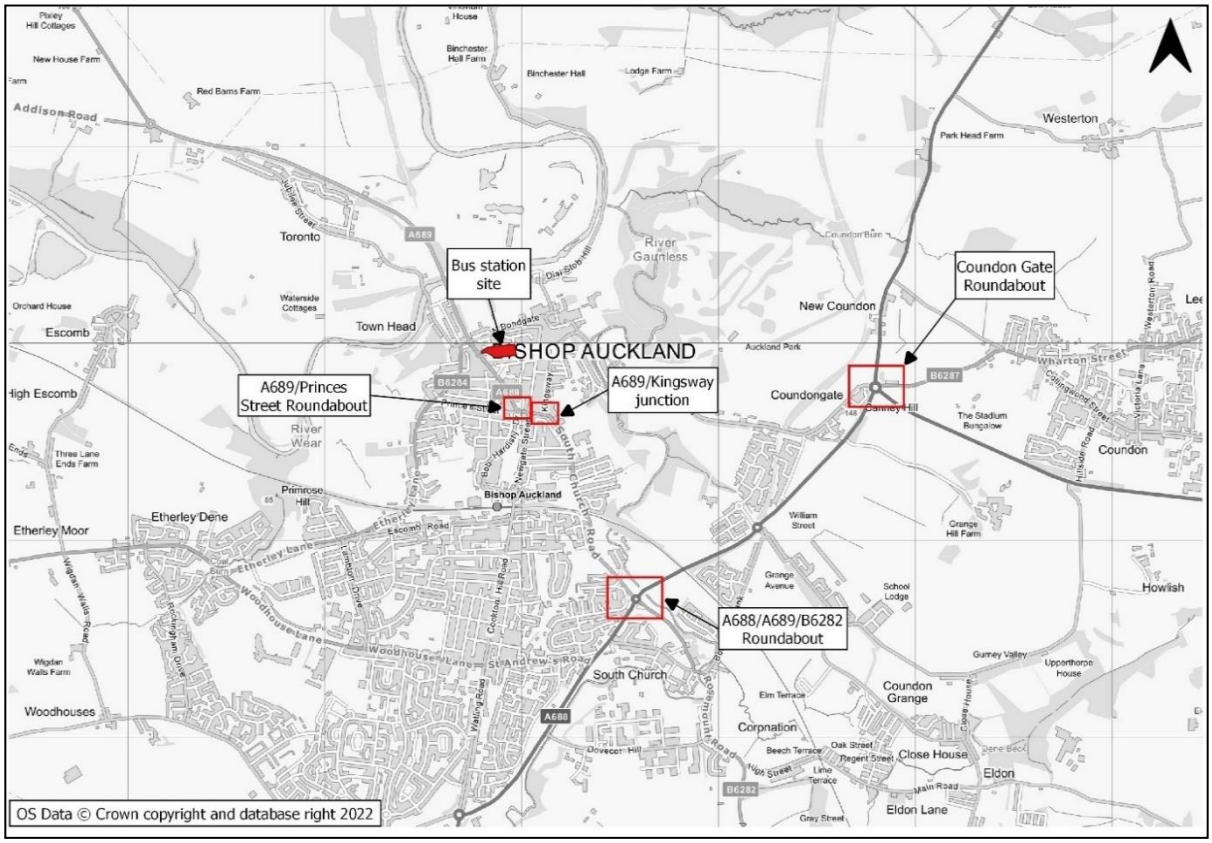
	Original FHSF bid		Current development assessment
P	**Demand**: 14% of visitors **Network:** Existing base network	Do Nothing	**Demand:** 28% of visitors **Network:** Existing base network
S	**Demand**: 14% of visitors **Network:** Redesigned bus station, car parks and junction mitigations	Do Minimum	**Demand**: 100% of visitors **Network:** Redesigned bus station and car parks
R	**Demand**: 100% of visitors **Network:** Redesigned bus station, car parks and junction mitigations	Do Something	**Demand**: 100% of visitors **Network:** Redesigned bus station, car parks and junction mitigations

The table shows that the effectiveness of the junction mitigations were not exclusively tested in the previous modelling, and that the Do Something scenarios used to inform this Transport Assessment is the first formal assessment of such junction operations.

The mitigations designed at concept stage for the 2020 submission and have been taken forward for the purposes of this Transport Assessment, with proposals at the detailed design stage likely to be similar. As a result of the differences in demand and modelled scenarios outlined in the two tables, some of the junctions previously identified at the high level of requiring mitigation may appear to be operating well within capacity in the Do Nothing and Do Minimum scenarios.

Upgrades have been planned at the A688 / A689 / B6282 and Coundon Gate roundabouts on the A688 to the south east of Bishop Auckland, as well as at the A689/Kingsway junction and A689/Princes Street Roundabout in the centre of the town. The locations of these alterations are shown in Figure 6.6, with technical diagrams of the alterations being made to each junction included in Appendices B-E.

Figure 6.6: Locations of junctions which require mitigation following initial modelling of worst case scenarios



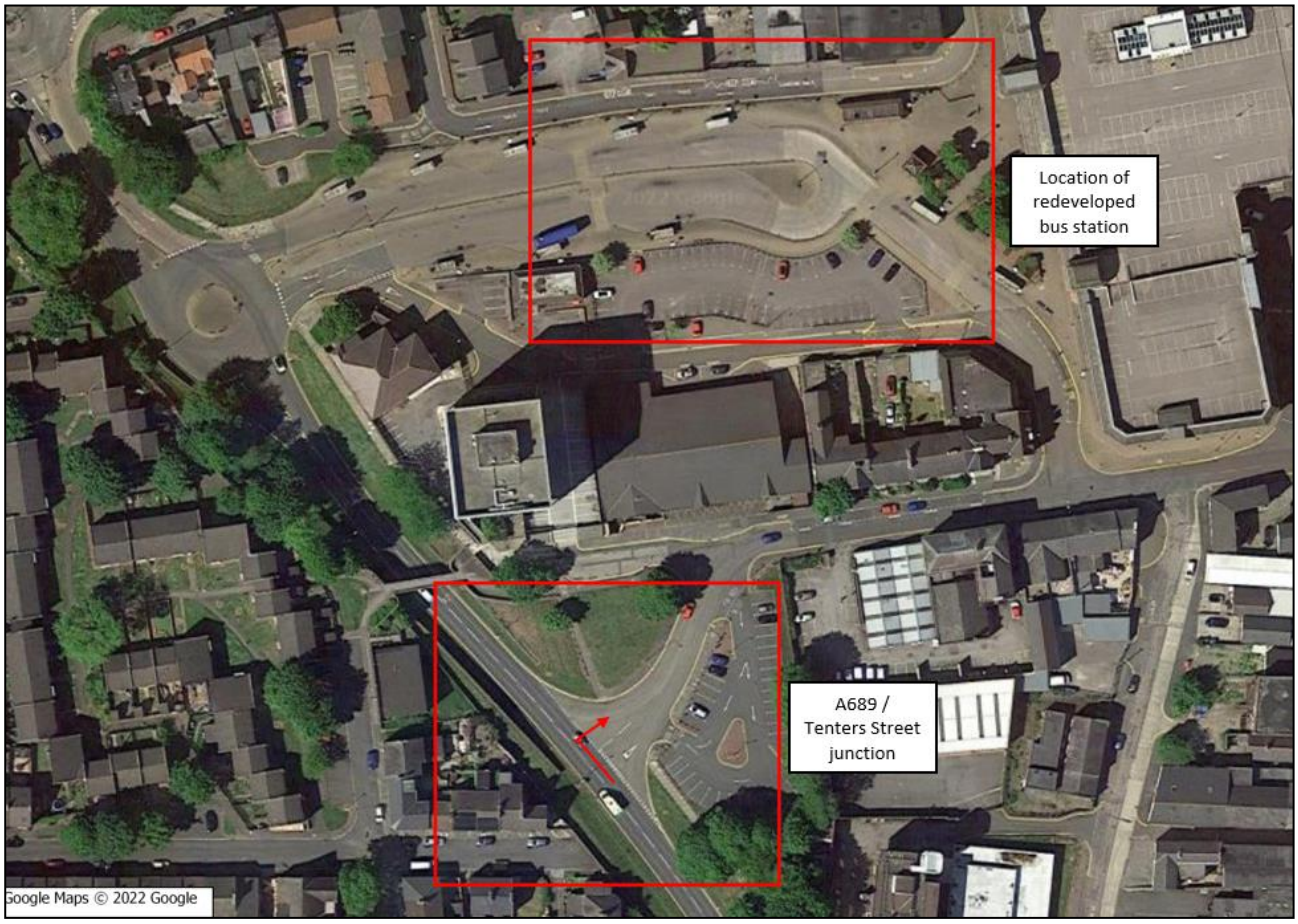
As with the alterations to the bus station and car park layout, these changes are unlikely to influence bus routes into and out of Bishop Auckland, however, they intend on helping to reduce congestion on roads in Bishop Auckland, improving journey times and reducing service delays.

The impact of the combined changes on the journey times and routing decisions made by other vehicles has been considered in the modelling undertaken as part of this transport assessment and will be discussed.

6.5.1.1 A689 / Tenters Street T-junction

To further accommodate the new bus routing and alleviate congestion on the network, it is proposed that a new protected right-hand turn lane will be added to the A689/Tenters Street junction as shown in Figure 6.7 to prevent a build-up of traffic along the A689 back to the A689/Princes Street roundabout. At the moment, traffic wishing to turn right into Tenters Street is required to wait in the main carriageway until it is safe to turn.

Figure 6.7: Tenters Street / A689 junction



A PICADY assessment of the protected right turn was undertaken using 2028 Design Day Do Minimum flows at this junction to ensure the mitigation was sufficient. Due to the low modelled flow of vehicles turning right into Tenters Street, this mitigation has been deemed sufficient, with detail provided later in this report.

6.5.2 Junctions within close proximity of the scheme

Previous modelling as part of the Future High Street Fund submission identified junctions of concern and appropriate mitigation. Despite additional flows due to visitors travelling to / from the new car parks, the two roundabouts within close proximity of the scheme (A689 / High Bondgate and A689 / Saddler Street) were not identified previously as areas of concern based on modelling undertaken using the BATM at the time. However, for completeness and due to their proximity to the proposed development scheme, they will be considered in more detail in this assessment alongside the wider junctions previously identified.

6.5.3 Summary

Each of the identified junctions has been modelled using the Junctions 10 modelling suite (PICADY and ARCADY). PICADY and ARCADY within the Junctions 10 software package are the industry standard for modelling priority junctions and roundabouts respectively. The software is able to predict the capabilities and potential delays at junctions that are being designed for the road network. Junctions 10 is able to test new or upgraded junctions, as well as assessing the impact of alterations to other parts of the road network on an un-altered junction. The junctions to be assessed are shown in Figure 6.8.

Figure 6.8: Junctions to be examined for assessment

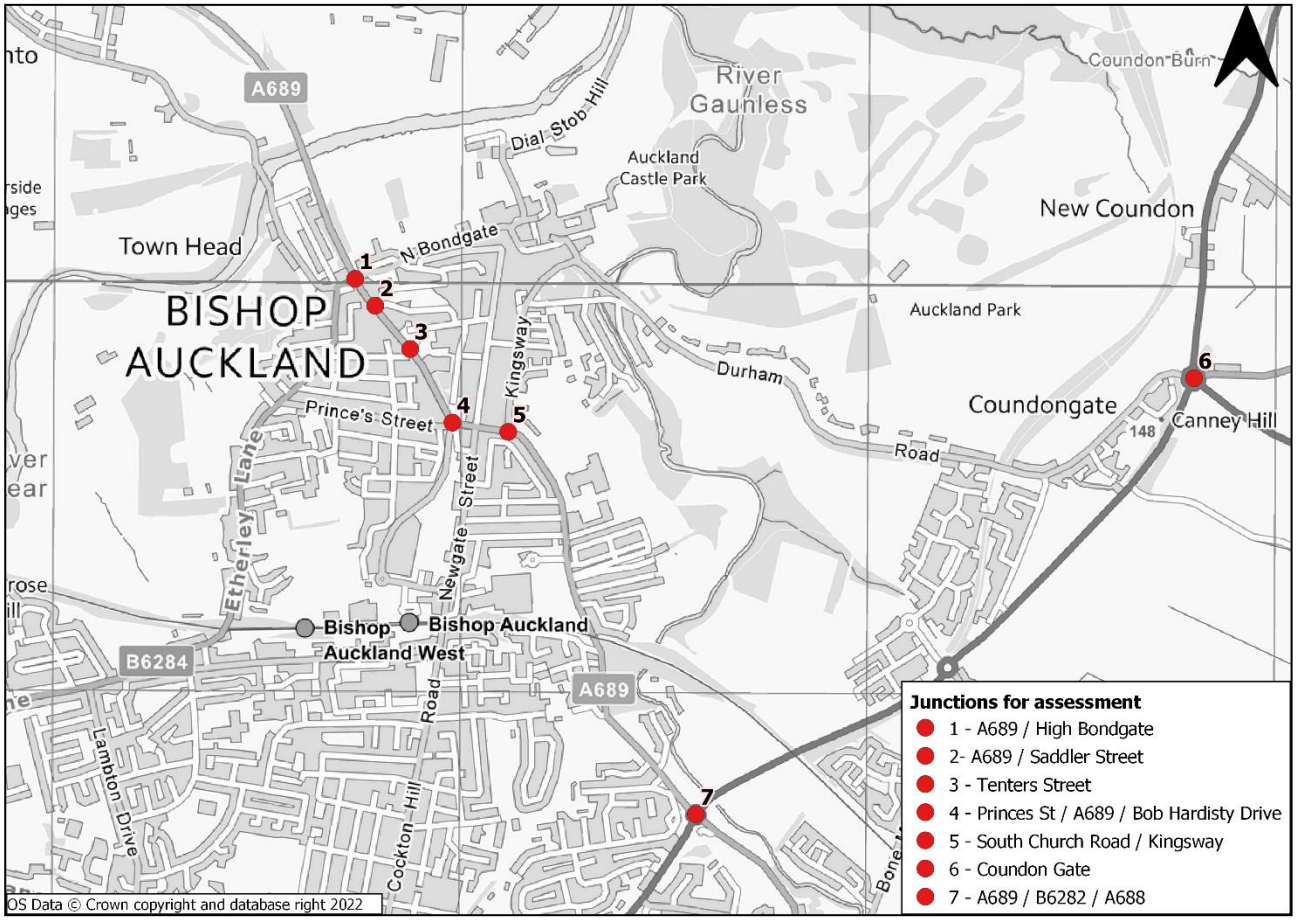


Table 6.14: Junction mitigations

ID	Junction	Mitigation
1	A689 / High Bondgate	N
2	A689 / Saddler Street	N - but changes in access
3	A689 / Tenters Street	Y
4	Princes Street / A689 / Bob Hardisty Drive	Y
5	A689 / Kingsway	Y
6	Coundon Gate	Y
7	A689 / B6282 / A688	Y

Outputs from the junction modelling undertaken using PICADY and ARCADY are discussed in sections 6.6.1 to 6.6.7.

6.6 Junction assessment

For the purpose of this report two scenarios will be assessed. Firstly, the 2024 Mid Day will be considered, as this is when construction of the scheme will be complete for the most commonly occurring day type. Secondly, the 2029 Design Day will be assessed as this is the worst-case scenario.

The Do Nothing, Do Minimum and Do Something scenarios for each of the seven junctions are summarised within this section. A summary of the scenarios is repeated in Table 6.15.

Table 6.15: Forecast scenarios used in the transport impact assessment

Scenario	Demand	Network
Do Nothing	Background growth, committed development traffic and 28% of Bishop Auckland tourist attraction visitors i.e. the non-dependent development	2019 base year network including additional zone for one committed development
Do Minimum	Background growth, committed development traffic and 100% of Bishop Auckland tourist attraction visitors	Do Nothing network plus redesigned bus station, 125 space surface car park and redesigned Newgate Centre car park
Do Something		Do Minimum model plus junction mitigations

Turning flows will be extracted from the BATM. These modelled flows may differ across scenarios with similar input demands due to the dynamic nature of the model, which, includes a 30-minute warm up period. This means there are some vehicles on the network when the simulation starts. This number varies across scenarios and may explain some counter-intuitive results in the junction assessments.

A comparison of the Do Nothing and Do Minimum scenarios will assess the impact of additional visitors on the network and the increase in available parking, whilst a comparison of the Do Minimum and Do Something scenarios will assess the impact of the proposed junction mitigations.

The results highlight the capacity at each junction, and are split by junction arm, time periods (AM, IP, PM), and by forecast year (2024 and 2029).

The amber RFC results indicate when a junction arm is reaching capacity, using the industry standard threshold of 0.85 Ratio to Flow Capacity (RFC) for roundabouts and priority junctions and 90% Degree of Saturation (DoS) for signal controlled junctions.

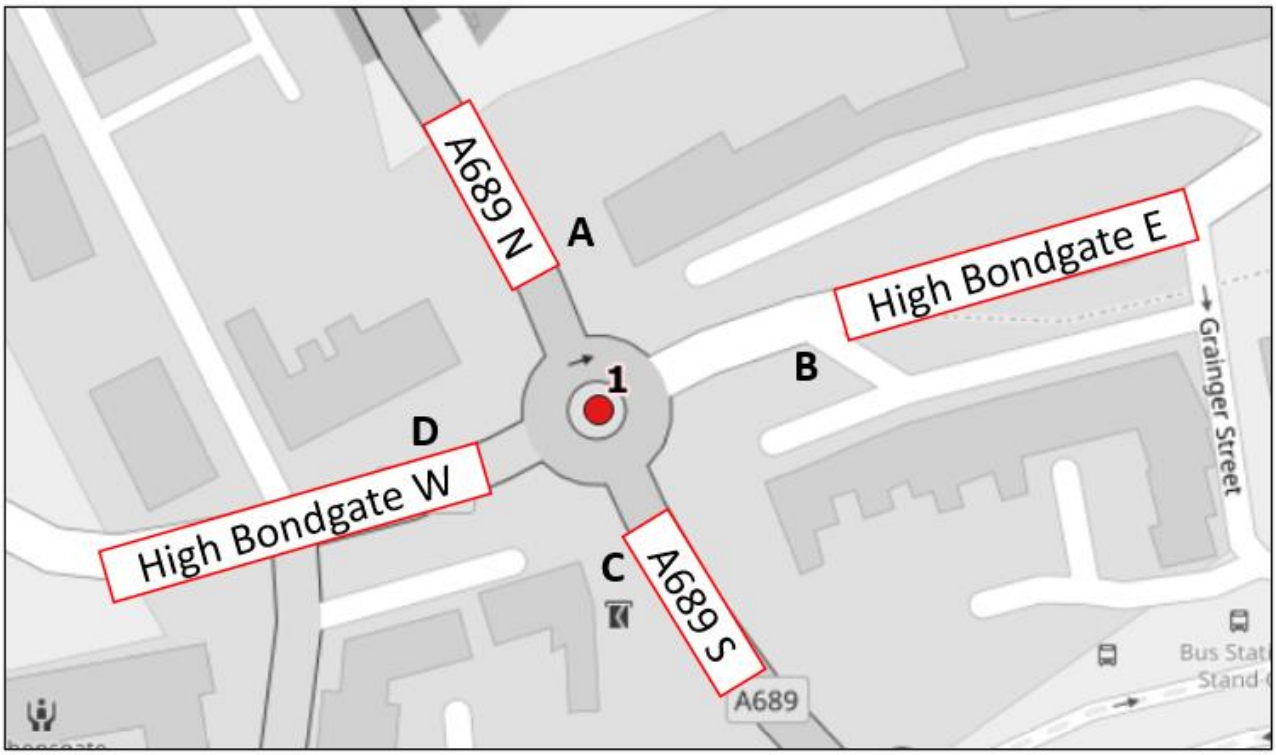
Outputs from the respective modelling software are provided in Appendix F.

6.6.1 A689 / High Bondgate roundabout

The A689 / High Bondgate roundabout is located in the north of the town. Visitors travelling from the north will pass through this junction, exiting at the A689 southbound arm to access the surface car park in the future. Whilst this roundabout was not considered for mitigations in the initial FHSF bid, due to its proximity to the proposed scheme its operation has been assessed across the modelled periods and years.

The Do Nothing, Do Minimum and Do Something scenarios for the A689 / High Bondgate roundabout are displayed within this section.

Figure 6.9: A689/ High Bondgate roundabout



6.6.1.1 Do Nothing

Table 6.16 and Table 6.17 show the Do Nothing model results for the A689 / High Bondgate roundabout. Throughout each of the time periods and forecast years, Arm A is the busiest, with traffic continuing along the A689 N to the Newton Cap Viaduct, Kynren, and Toronto village. This junction operates within capacity for both day types and respective forecast years.

Table 6.16: A689 / High Bondgate Roundabout Do Nothing Model results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.76	9.98	3.1	0.40	4.01	0.7	0.51	4.8	1
B	0.28	3.81	0.4	0.33	3.46	0.5	0.27	3.44	0.4
C	0.26	3.24	0.3	0.48	4.49	0.9	0.35	3.28	0.5
D	0.33	4.63	0.5	0.35	6.27	0.5	0.26	4.59	0.3

Table 6.17: A689 / High Bondgate Roundabout Do Nothing Model results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.84	15.12	5	0.58	5.74	1.4	0.45	4.42	0.8
B	0.27	3.9	0.4	0.28	3.53	0.4	0.41	4.06	0.7
C	0.27	3.28	0.4	0.39	3.46	0.6	0.50	4.95	1
D	0.36	4.86	0.6	0.27	4.77	0.4	0.45	7.78	0.8

6.6.1.2 Do Minimum

Table 6.18 and Table 6.19 show the Do Minimum model results for the High Bondgate roundabout. The Delay at arm A in the 2029 scenario has increased from 15.12 seconds in the Do Nothing to 16.11 seconds in the Do minimum. Similarly, it now has a ratio of flow to capacity of 0.85, which suggests this junction arm is reaching capacity. All other arms operate with an RFC at or below 0.43 in each time period and forecast year, showing that despite the increase of visitors on the network, the junction continues to operate within capacity in the Do Minimum.

Table 6.18: A689 / High Bondgate Roundabout Do Minimum Model Results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.82	13.8	4.5	0.54	5.28	1.2	0.42	4.13	0.7
B	0.34	4.69	0.5	0.27	3.52	0.4	0.29	3.39	0.4
C	0.38	4.01	0.6	0.36	3.24	0.6	0.43	4.02	0.8
D	0.34	4.64	0.5	0.28	4.77	0.4	0.37	6.31	0.6

Table 6.19: A689 / High Bondgate Roundabout Do Minimum Model Results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.85	16.11	5.4	0.61	6.26	1.6	0.44	4.31	0.8
B	0.20	3.68	0.2	0.30	3.73	0.4	0.30	3.46	0.4
C	0.28	3.22	0.4	0.42	3.69	0.7	0.42	3.88	0.7
D	0.37	4.97	0.6	0.29	5.2	0.4	0.36	6.09	0.6

6.6.1.3 Do Something

Table 6.20 and Table 6.21 show the Do Something model results for the A689 / High Bondgate roundabout. In the Do Something results, delay at arm A in 2029 has reduced from 16.11 seconds in the Do Minimum to 15.66 seconds in the Do Something. This suggests the improvements at other junctions on the road network have a small impact on the overall network performance and, albeit slightly, reduce delay at this junction. The RFC value for arm A in the 2029 AM scenario remains at 0.85. With the exception of arm A in both forecast years, all other junction arms in both 2024 and 2029 run with an RFC less than 0.5. Overall, the junction continues to operate within capacity.

Table 6.20: A689 / High Bondgate Roundabout Do Something Model Results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.79	11.61	3.7	0.55	5.53	1.3	0.43	4.18	0.7
B	0.29	3.98	0.4	0.29	3.61	0.4	0.39	4	0.6
C	0.28	3.31	0.4	0.39	3.44	0.6	0.46	4.48	0.9
D	0.33	4.7	0.5	0.30	4.98	0.4	0.40	6.68	0.7

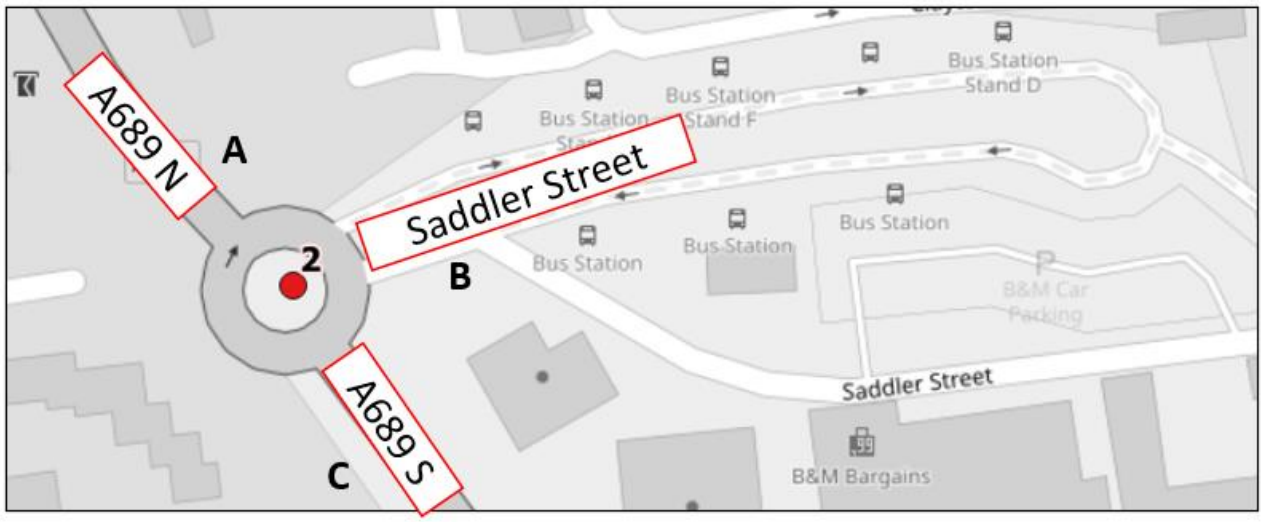
Table 6.21: A689 / High Bondgate Roundabout Do Something Model Results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.85	15.66	5.3	0.58	5.86	1.4	0.45	4.41	0.8
B	0.33	4.46	0.5	0.29	3.67	0.4	0.40	4.12	0.7
C	0.29	3.47	0.4	0.41	3.64	0.7	0.49	4.65	0.9
D	0.35	4.88	0.5	0.33	5.38	0.5	0.43	7.16	0.7

6.6.2 A689 / Saddler Street roundabout

The A689 / Saddler Street junction currently provides access to the bus station in its existing layout, and for those exiting the bus station and Saddler Street to access the A689. However, the access arrangements of this roundabout are to be altered as part of the proposed scheme (and therefore the Do Minimum and Do Something will differ to the Do Nothing layout) as outlined in Section 3. Arm B, as shown in Figure 6.10, will provide access to / from the proposed surface car park and will be used by those exiting Saddler Street to access the A689. The redeveloped bus station will be accessed via the A689 / Tenters Street junction, which is discussed in the following section.

Figure 6.10: A689/ Saddler Street Roundabout current layout



The Do Nothing, Do Minimum and Do Something scenarios for the A689 / Saddler Street roundabout are displayed within this section.

6.6.2.1 Do Nothing

Table 6.22 and Table 6.23 show the Do Nothing model results for the A689 / Saddler Street roundabout. The ratio of flow to capacity is lower than 0.39 in all scenarios and time periods, suggesting the junction is operating well within its capacity. The highest queue length experienced at the junction across all scenarios is only 0.6 PCUs in the 2029 PM peak, and the highest delay is 2.98 seconds, also experienced within the 2029 PM peak.

Table 6.22: A689 / Saddler Street Roundabout Do Nothing Model Results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.21	1.57	0.3	0.16	1.47	0.2	0.26	1.66	0.3
B	0.01	2.47	0	0.00	0	0	0.01	2.63	0
C	0.20	2.31	0.3	0.38	2.96	0.6	0.31	2.69	0.5

Table 6.23: A689 / Saddler Street Roundabout Do Nothing Model Results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.22	1.59	0.3	0.27	1.68	0.4	0.19	1.52	0.2
B	0.01	2.51	0	0.01	2.67	0	0.00	0	0
C	0.21	2.35	0.3	0.34	2.81	0.5	0.38	2.98	0.6

6.6.2.2 Do Minimum

In the Do Minimum (and Do Something) scenario, the layout and users of roundabout change. Currently, Arm B (Saddler Street) would have been used only by buses entering the bus station, and buses exiting the bus station and other users existing Saddler Street to access the A689. The proposed scheme would result in buses no longer routing this way, with visitors to Bishop Auckland attractions using the roundabout instead to access / exit the surface car park.

Table 6.24 and Table 6.25 show the Do Minimum model results for the A689 / Saddler Street roundabout. The junction continues to operate well within its capacity with the additional visitors on the network. All scenarios have a ratio of flow to capacity which is at or below 0.36. The highest queue length experienced across all situations is 0.6 PCUs as in the Do Nothing scenario, and the highest delay is 2.9 seconds.

Table 6.24: A689 / Saddler Street Roundabout Do Minimum Model Results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.27	1.68	0.4	0.28	1.71	0.4	0.18	1.49	0.2
B	0.01	2.68	0	0.01	2.72	0	0.01	2.39	0
C	0.28	2.59	0.4	0.31	2.69	0.5	0.34	2.81	0.5

Table 6.25: A689 / Saddler Street Roundabout Do Minimum Model Results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.24	1.63	0.3	0.29	1.73	0.4	0.19	1.54	0.2
B	0.00	2.54	0	0.02	2.8	0	0.01	2.43	0
C	0.23	2.41	0.3	0.36	2.9	0.6	0.34	2.8	0.5

The results suggest that, whilst the numbers of users (predominantly visitors) travelling via the A689 / Saddler Street will increase, the junction is still operating within capacity.

6.6.2.3 Do Something

Table 6.26 and Table 6.27 show the Do Something model results for the A689 / Saddler Street roundabout, with the same layout as the Do Minimum scenario. The junction operates well within capacity, with all arms operating at or below 0.36 RFC, this is 0.02 lower than in the DN scenario. Between 2024 and 2029 the RFC value only increases by approximately 0.02 or less in most cases. This suggests that any additional traffic can be accommodated at this junction with the Do Something improvements.

Table 6.26: A689 / Saddler Street Roundabout Do Something Model Results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.23	1.6	0.3	0.28	1.71	0.4	0.19	1.54	0.2
B	0.01	2.53	0	0.04	2.8	0	0.04	2.5	0
C	0.21	2.35	0.3	0.32	2.77	0.5	0.33	2.81	0.5

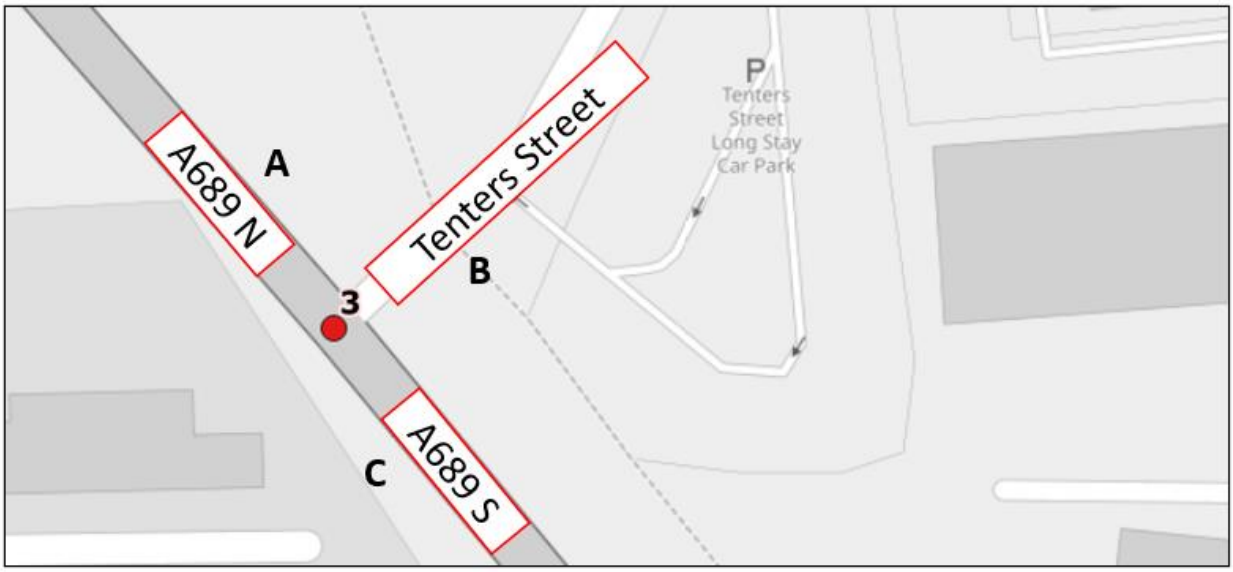
Table 6.27: A689 / Saddler Street Roundabout Do Something Model Results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.25	1.66	0.3	0.28	1.7	0.4	0.21	1.57	0.3
B	0.01	2.61	0	0.04	2.81	0	0.04	2.56	0
C	0.22	2.37	0.3	0.34	2.84	0.5	0.36	2.91	0.6

6.6.3 A689 / Tenters Street

The A689 / Tenters Street junction will be used by buses in future years to access the redeveloped bus station, these arrangements are outlined in Section 3. Buses travelling from the south will need to turn right to access Tenters Street. To prevent queueing for other road users travelling from the southern A689 approach (Arm C in Figure 6.11), DCC requested the testing of a protected right turn into Tenters Street, which is included in the Do Something scenario. The A689 / Tenters Street has been modelled using PICADY.

Figure 6.11: A689/ Tenters Street Junction



The Do Nothing, Do Minimum and Do Something scenarios for the Tenters Street junction are displayed within this section.

6.6.3.1 Do Nothing

Table 6.28 and Table 6.29 show the Do Nothing model results for the Tenters Street Junction. Traffic stream B-A creates the largest amount of delay in both forecast years. In 2029 this traffic stream has a delay of 12.3 seconds in the AM, 16.31 seconds in the IP, and 13.93 seconds in the PM peak.

Overall, both forecast years show the junction operating within capacity, with an RFC at or below 0.17 in both forecast years.

Table 6.28: Tenters Street Junction Do Nothing Model Results Mid Day 2024

Traffic Stream	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
B-C	0.05	6.29	0.1	0.20	7.36	0.3	0.13	7.65	0.1
B-A	0.01	11.62	0	0.13	12.97	0.1	0.09	15.02	0.1
C-AB	0.10	5.36	0.2	0.06	4	0.1	0.14	4.87	0.4

Table 6.29: Tenters Street Junction Do Nothing Model Results Design Day 2029

Traffic Stream	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
B-C	0.07	6.5	0.1	0.15	7.93	0.2	0.17	7.43	0.2
B-A	0.01	12.3	0	0.09	16.31	0.1	0.13	13.93	0.1
C-AB	0.16	5.48	0.4	0.19	4.81	0.6	0.08	4.26	0.1

6.6.3.2 Do Minimum

Table 6.30 and Table 6.31 show the Do Minimum model results for the Tenters Street Junction. As in the Do Nothing, traffic stream B-A shows the highest numbers of delay, however the IP value improves from 16.31 seconds of delay in the Do Nothing, to 15.61 seconds in the Do Minimum. Despite the additional buses turning right into Tenters Street to access the bus station, due to the low number of vehicles initially turning right into Tenters Street, the increase in delay for stream C-AB is small.

As a whole, the junction operates within capacity, with space for traffic growth. All RFC values are at or below 0.21, and the queue lengths experienced are no higher than 0.7 PCUs.

Table 6.30: Tenters Street Junction Do Minimum Model Results Mid Day 2024

Traffic Stream	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
B-C	0.00	7.7	0	0.01	6.58	0	0.01	6.76	0
B-A	0.02	12.03	0	0.00	0	0	0.02	10.64	0
C-AB	0.12	4.9	0.3	0.17	4.83	0.5	0.11	4.46	0.2

Table 6.31: Tenters Street Junction Do Minimum Model Results Design Day 2029

Traffic Stream	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
B-C	0.00	0	0	0.01	7.3	0	0.01	6.68	0
B-A	0.00	0	0	0.01	15.61	0	0.01	11.28	0
C-AB	0.17	5.4	0.4	0.21	4.7	0.7	0.09	4.42	0.2

6.6.3.3 Do Something

Table 6.32 and Table 6.33 show the Do Something model results for the Tenters Street junction, including the protected right turn from the A689 turning right into Tenters Street. An initial test, prior to this junction assessment, was undertaken to show the low traffic flows turning into Tenters Street. However, as requested by DCC, the protected right turn has been included in the Do Something modelling.

All junction arms continue to operate within capacity in the DS model. However, delay in the 2029 IP has increased slightly from the DN and DM scenarios, with 17.68 seconds in the DS, compared to 16.31 in DN and 15.61 in DM. Each scenario presents an RFC value at or below 0.18 in both forecast years.

Traffic stream C-AB has improved in the AM and IP for both forecast years compared to the DN and DM. In the AM peak the RFC value has reduced from 0.12 in the DM to 0.10 in the DS in the 2024 forecast year. Similarly, it has reduced from 0.17 to 0.15 RFC respectively in the 2029 AM peak. However, delay has increased across all time periods, driven by the queue of vehicles which will now wait in the protected right turn lane. However, given the small number of vehicles turning right from the southern approach of the A689 at this junction, changes to delay are likely to be highly sensitive and therefore are not considered a concern.

In the IP, the 2024 forecast scenario has decreased from 0.17 (DM) to 0.12 RFC (DS), and the 2029 forecast scenario has decreased from 0.21 to 0.12 respectively. The PM peak has increased by 0.02 in the 2024 scenario, and stayed the same with 0.09 RFC in the 2029 forecast year.

Table 6.32: Tenters Street Junction Do Something Model Results Mid Day 2024

Traffic Stream	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
B-C	0.07	6.45	0.1	0.18	7.87	0.2	0.15	6.86	0.2
B-A	0.00	12.92	0	0.00	0	0	0.00	13.71	0
C-AB	0.10	8.68	0.1	0.12	9.24	0.1	0.09	7.88	0.1

Table 6.33: Tenters Street Junction Do Something Model Results Design Day 2029

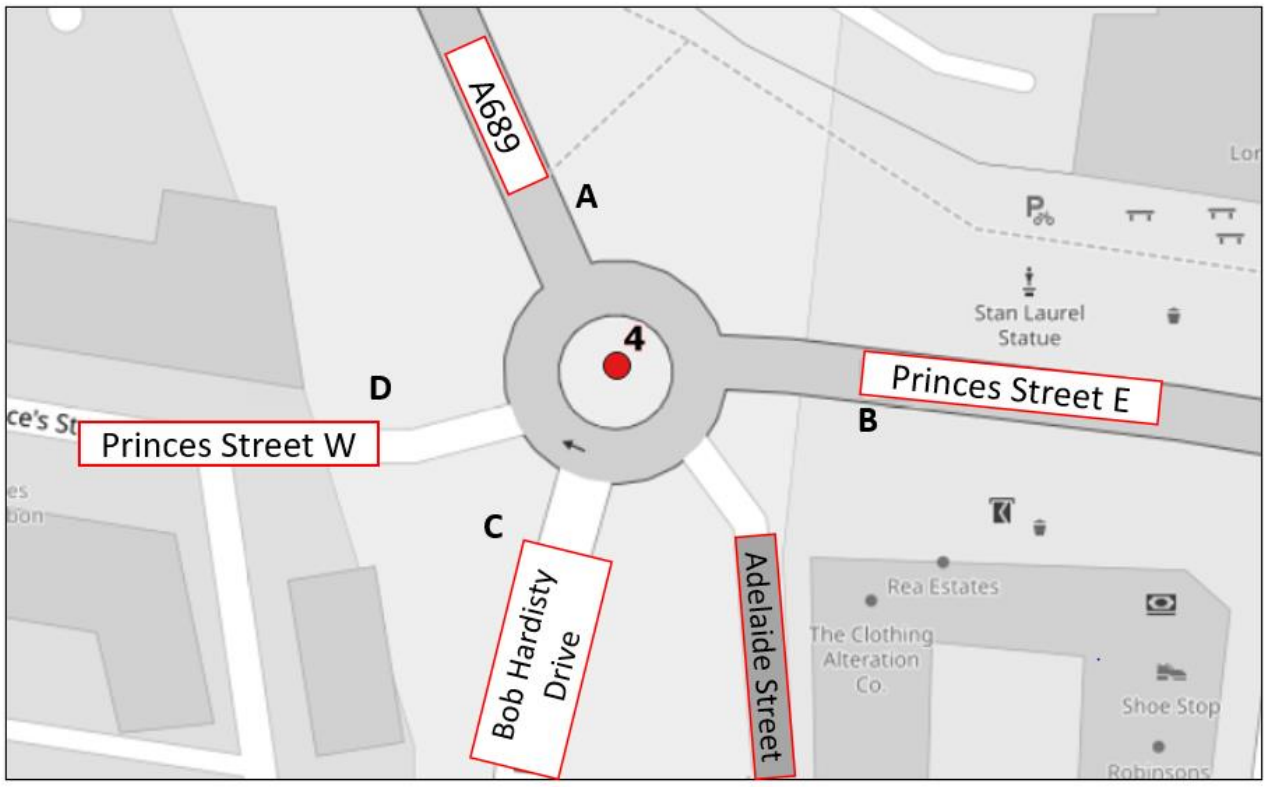
Traffic Stream	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
B-C	0.05	6.49	0.1	0.17	7.88	0.2	0.17	7.24	0.2
B-A	0.00	13.92	0	0.01	17.68	0	0.04	15.02	0
C-AB	0.15	9.34	0.2	0.12	9.27	0.1	0.09	8.15	0.1

Overall, the Tenters Street junction operates well within capacity in the DS model for both forecast years.

6.6.4 Princes Street / A689 / Bob Hardisty Drive roundabout

residential areas west of the junction (accessed via Princes Street) to the A689. This roundabout was identified in the initial FHSF submission as one requiring mitigation, as shown in Appendix B. This mitigation includes the widening and extension of both lanes of the northern A689 approach (Arm A in Figure 6.12) and is included in the Do Something scenario.

Figure 6.12: Princes Street/A689/Bob Hardisty Drive Roundabout



6.6.4.1 Do Nothing

Table 6.34 and Table 6.35 show the Do Nothing model results for the Princes Street Roundabout. This junction operates within capacity, with no junction arms at risk of reaching capacity. The highest RFC value is 0.59 across all scenarios. The highest delay is 7.75 seconds which occurs in the IP 2029 at arm C, and the longest queue length is 1.4 PCUs which also occurs in the IP 2029 at arm C.

Table 6.34: Princes Street Roundabout Do Nothing Model Results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.35	3.5	0.5	0.34	3.65	0.5	0.48	4.54	0.9
B	0.19	2.59	0.2	0.29	2.86	0.4	0.35	3.28	0.5
C	0.26	4.06	0.4	0.56	7.46	1.3	0.55	6.99	1.2
D	0.24	4.68	0.3	0.30	6.49	0.4	0.18	5.41	0.2

Table 6.35: Princes Street Roundabout Do Nothing Model Results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.37	3.58	0.6	0.49	4.61	1	0.36	3.7	0.6
B	0.22	2.63	0.3	0.35	3.26	0.5	0.28	2.85	0.4
C	0.30	4.36	0.4	0.59	7.75	1.4	0.54	7.09	1.2
D	0.23	4.66	0.3	0.15	5.47	0.2	0.28	6.31	0.4

6.6.4.2 Do Minimum

Table 6.36 and

Table 6.37 show the Do Minimum model results for the Princes Street Roundabout. The DM results show the roundabout continuing to operate within capacity. The highest RFC value remains at 0.59, which is the same in the DN.

Table 6.36: Princes Street Roundabout Do Minimum Model Results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.38	3.71	0.6	0.48	4.46	0.9	0.31	3.36	0.4
B	0.31	2.96	0.4	0.35	3.31	0.5	0.33	2.98	0.5
C	0.31	4.71	0.4	0.56	7.17	1.3	0.50	6.74	1
D	0.26	5.24	0.4	0.16	5.29	0.2	0.29	6.02	0.4

Table 6.37: Princes Street Roundabout Do Minimum Model Results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.38	3.67	0.6	0.51	4.72	1	0.34	3.51	0.5
B	0.26	2.82	0.4	0.41	3.65	0.7	0.30	2.86	0.4
C	0.35	4.93	0.5	0.59	7.89	1.4	0.51	6.6	1
D	0.24	4.86	0.3	0.19	5.76	0.2	0.26	5.81	0.4

6.6.4.3 Do Something

Table 6.38 and Table 6.39 show the Do Something model results for the Princes Street Roundabout. The highest ratio of flow to capacity reduces to 0.56 across all scenarios within the DS model results, compared to the highest RFC value in the DM presenting as 0.59.

The highest delay experienced at the junction in the DS 2024 forecast year is the IP at arm C with a delay of 7.86 seconds. Arm C also experiences the highest delay in the 2029 forecast year, with a delay of 7.36 seconds in the PM peak. This compares to the highest delay experienced across all DM scenarios for the Princes Street junction at 7.89 seconds, suggesting that overall delay has improved across the junction.

In most cases the RFC values have reduced between the DM and DS, with the exception of some RFC values at arm C. Overall, the junction operates well within capacity, suggesting that with the DS improvements, the junction can accommodate any additional traffic in the future forecast years. The reduction in RFC and delay at arm A suggests the junction mitigations associated with this arm are successful.

Table 6.38: Princes Street Roundabout Do Something Model results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.23	1.78	0.3	0.33	2.12	0.5	0.24	1.84	0.3
B	0.21	2.65	0.3	0.34	3.33	0.5	0.27	2.73	0.4
C	0.31	4.43	0.5	0.60	7.86	1.5	0.53	6.76	1.1
D	0.23	4.66	0.3	0.18	5.65	0.2	0.24	5.83	0.3

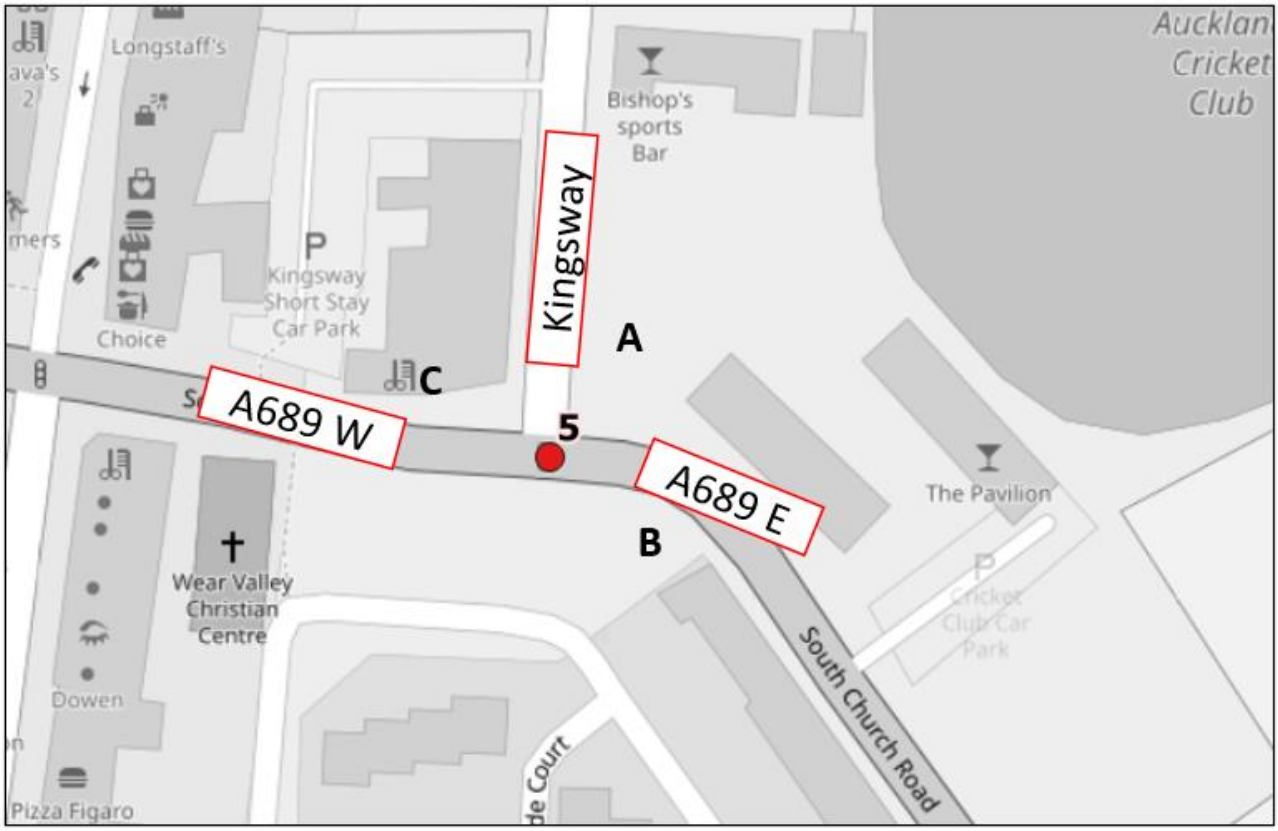
Table 6.39: Princes Street Roundabout Do Something Model results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.25	1.83	0.3	0.33	2.09	0.5	0.26	1.94	0.4
B	0.22	2.7	0.3	0.38	3.51	0.6	0.31	2.95	0.4
C	0.31	4.52	0.5	0.56	7.26	1.3	0.56	7.36	1.2
D	0.24	4.83	0.3	0.19	5.74	0.2	0.29	6.52	0.4

6.6.5 A689 / Kingsway junction

The signalised A689 / Kingsway junction is located in the centre of the town, and was identified as requiring mitigation in the original FHSF submission. This mitigation includes the removal of the existing traffic island, the existing pedestrian crossing to be moved forward to a new traffic island, the widening and extension of the right turn into Kingsway, and the existing stop line to be moved forward. The proposed mitigations are shown in Appendix C. Traffic travelling via the eastern A689 approach of the junction (Arm B in Figure 6.13) is therefore likely to improve as a result of the mitigation, which is included in the Do Something scenario.

Figure 6.13: South Church Road/Kingsway Junction



The A689 / Kingsway signals have been modelled using LinSig v3, the industry standard software package for modelling signalised junction. The junction has been modelled based on the information contained in the signal controller specification, but using fixed signal timings as the LinSig software cannot model demand reactive and vehicle actuated signal controllers.

The results using optimised signals, based on the flows from the Aimsun modelling, for the Do Nothing, Do Minimum and Do Something scenarios are displayed within this section.

In LinSig, the performance of each arm is measured through the degree of saturation (DoS) and presented as a percentage. A DoS below 90% shows the junction is performing below capacity, a DoS between 90% and 100% shows the junction is nearing capacity, and a DoS over 100% shows the junction is performing over capacity. The overall performance of the junction is measured using the Practical Reserve Capacity (PRC), which provides an indication of the remaining 'spare' capacity.

6.6.5.1 Do Nothing

show the model results for the signalised junction for the Do Nothing scenario. Across both years the IP and PM periods within the Do Nothing scenario arm C is the busiest, and arm A is the busiest in the AM.

The highest degree of saturation experienced across all scenarios is arm C in the PM 2029 scenario with 90% which is classified as nearing capacity. Similarly, the highest total delay across all scenarios is 13.36 pcuHr, which is experienced in the PM 2029 scenario, and the lowest PRC is 0.5%, experienced in the PM 2029 scenario.

Overall, the junction operates within capacity.

Table 6.40 and Table 6.41 show the model results for the signalised junction for the Do Nothing scenario. Across both years the IP and PM periods within the Do Nothing scenario arm C is the busiest, and arm A is the busiest in the AM.

The highest degree of saturation experienced across all scenarios is arm C in the PM 2029 scenario with 90% which is classified as nearing capacity. Similarly, the highest total delay across all scenarios is 13.36 pcuHr, which is experienced in the PM 2029 scenario, and the lowest PRC is 0.5%, experienced in the PM 2029 scenario.

Overall, the junction operates within capacity.

Table 6.40: South Church Road/Kingsway Junction Do Nothing Model Results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	DoS	Delay (s)	Queue Length (PCU)	DoS	Delay (s)	Queue Length (PCU)	DoS	Delay (s)	Queue Length (PCU)
A	61%	28.8	5.5	76%	36.6	7.3	80%	41.0	7.7
B	27%	15.8	2.0	32%	15.7	2.6	24%	14.6	2.2
C	58%	15.7	5.2	80%	22.1	10.1	83%	24.8	12.0
PRC %	48.2			12.7			8.3		
Total Delay (pcuHr)	5.56			9.17			10.19		

Table 6.41: South Church Road/Kingsway Junction Do Nothing Model Results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	DoS	Delay (s)	Queue Length (PCU)	DoS	Delay (s)	Queue Length (PCU)	DoS	Delay (s)	Queue Length (PCU)
A	68%	31.2	4.9	81%	41.2	8.4	85%	43.9	9.8
B	28%	16.0	2.8	31%	15.5	2.5	28%	16.1	2.2
C	65%	17.9	5.9	86%	27.9	12.7	83%	25.7	11.3
PRC %	32.8			4.7			5.9		
Total Delay (pcuHr)	6.67			11.33			11.29		

6.6.5.2 Do Minimum

Table 6.42 and Table 6.43 show the model results for the signalised junction for the Do Minimum scenario. Across all time periods in both forecast years, the PRC is reduced and total delay increased. The greatest change is experienced in the PM peak of the 2029 Design day, where arm C degree of saturation is 90% which is classified as approaching capacity. The overall PRC for this junction is 0.5%, a reduction from 5.9% in the Do Nothing scenario.

Table 6.42: South Church Road/Kingsway Junction Do Minimum Model Results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	DoS	Delay (s)	Queue Length (PCU)	DoS	Delay (s)	Queue Length (PCU)	DoS	Delay (s)	Queue Length (PCU)
A	72%	37.1	3.4	60%	28.6	5.4	82%	38.8	2.2
B	37%	14.8	6.1	64%	34.1	4.3	28%	16.8	9.4
C	68%	18	8.1	84%	26.4	11.5	84%	26.8	11.1
PRC %	25.9			7.6			7.1		
Total Delay (pcuHr)	7.50			10.22			10.86		

Table 6.43: South Church Road/Kingsway Junction Do Minimum Model Results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	DoS	Delay (s)	Queue Length (PCU)	DoS	Delay (s)	Queue Length (PCU)	DoS	Delay (s)	Queue Length (PCU)
A	71%	33.6	6.6	82%	43.9	8.4	84%	44.4	9.2
B	54%	18.6	3.3	40%	15.9	3.7	35%	15.8	2.8
C	73%	19.2	8.3	88%	28.9	13.9	90%	33.4	14.7
PRC %	22.8			2.9			0.5		
Total Delay (pcuHr)	8.68			12.28			13.36		

6.6.5.3 Do Something

The Do Something flows have been loaded into the Do Minimum network, and compared with those in the Do Something network, which includes junction mitigation and signal optimisation. Aimsun modelling of the Do Something scenario showed an increase in flow from arm C (A689 from the east) as a result of the mitigations, which results in increases in delay across the junction, and DoS at this particular arm. However, the overall RFC of the junction improves as a result of the mitigations across all time periods.

Table 6.44 and Table 6.45 show the model results for the South Church Road/Kingsway signalised junction for the Do Something scenario. PRC considers the junction as a whole when optimised. In all scenarios the junction operates under capacity. The mitigations made to the Do Something network have reduced the PRC in the 2029 scenarios from 22.8% to 30.1% in the AM, 2.9% to 4.3% in the IP, and 0.5% 4.3% in the PM. Therefore, all time periods are operating under capacity, with scope for additional traffic demand.

Each junction arm, across all time periods and both forecast years run under capacity at the signalised junction as a result of the mitigations made, meaning it is under capacity and can accommodate additional traffic demand in the future scenarios.

Table 6.44: South Church Road/Kingsway Junction Do Something model results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	DoS (%)	Delay (s)	Queue Length (PCU)	DoS (%)	Delay (s)	Queue Length (PCU)	DoS (%)	Delay (s)	Queue Length (PCU)
A	65%	31.5	5.9	70%	36.2	5.9	77%	39.4	7.3
B	51%	18.1	3.3	69%	20.4	5.8	70%	22.7	5.9
C	65%	16.2	6.5	74%	19.8	9.5	75%	21.1	9.7
PRC %	37.6			21.8			16.5		
Total Delay (pcuHr)	7.32			9.92			10.80		

Table 6.45: South Church Road/Kingsway Junction Do Something model results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	DoS	Delay (s)	Queue Length (PCU)	DoS	Delay (s)	Queue Length (PCU)	DoS	Delay (s)	Queue Length (PCU)
A	69%	31.8	6.7	86%	51.7	9.0	83%	43.6	9.0
B	33%	16.5	2.7	82%	27.3	8.2	84%	32.0	7.9
C	68%	18.5	7.3	77%	20.4	10.1	86%	29.1	13.1
PRC %	30.1			4.3			4.3		
Total Delay (pcuHr)	7.31			14.12			15.75		

6.6.5.4 Impacts on adjacent junctions

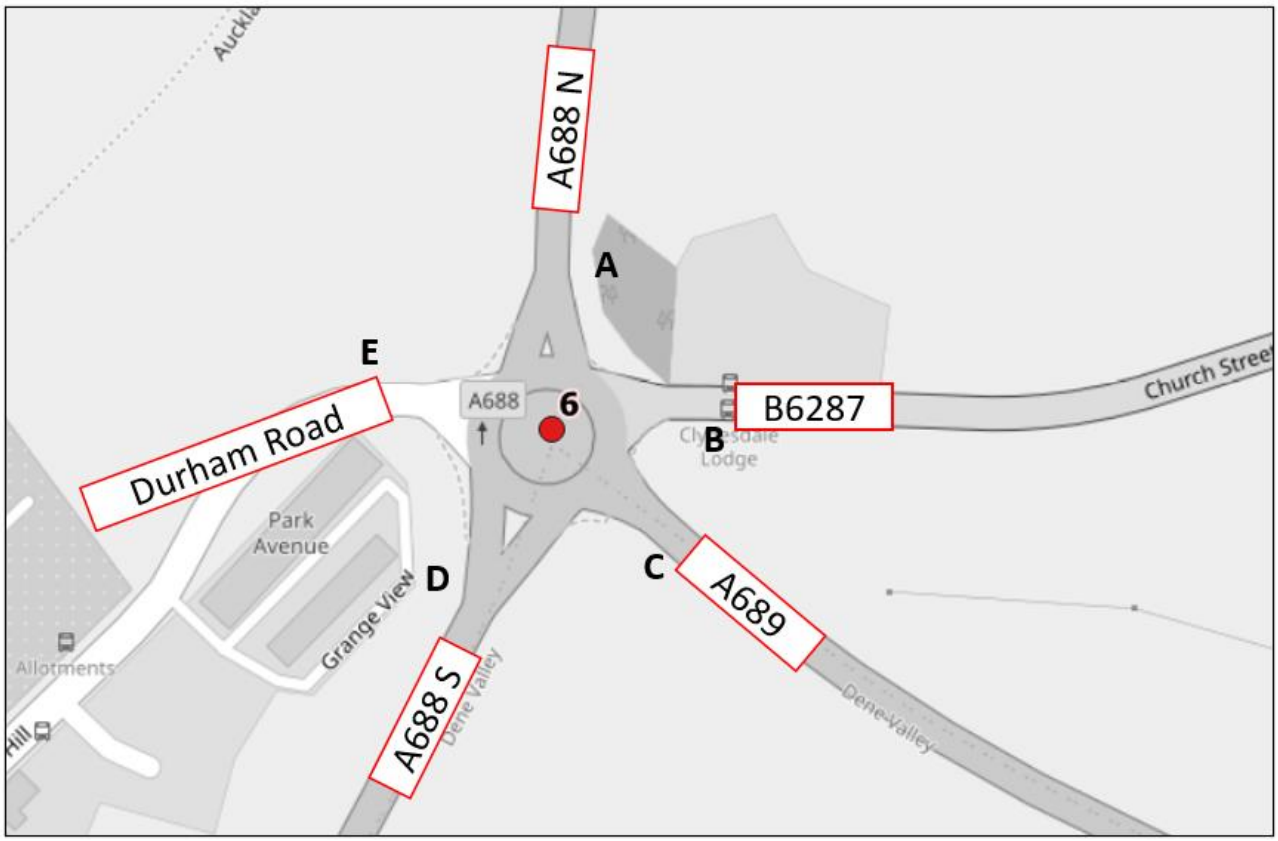
It should be noted the A689 Kingsway / Princes Street/ Newgate Street junction is situated within the A689 / Kingsway junction discussed in this section and A689 / Princes Street roundabout discussed in the Section 6.6.4. Whilst this junction was not considered for individual assessment due to it not requiring mitigation or lying within close proximity of the scheme, Aimsun modelling has shown that the mitigations proposed in the Do Something model scenarios alleviate delay at this junction.

6.6.6 Coundon Gate roundabout

The Coundon Gate roundabout is located east of the town, connecting the A688 to the A689, B6287 and Durham Road, which provides access to / from the centre of Bishop Auckland. This key access point was identified as requiring mitigation in the original FHSF submission. This mitigation includes an additional lane on the circulatory and an additional third lane for all junction approaches, as shown in Appendix D.

The Do Nothing, Do Minimum and Do Something scenarios for the Coundon Gate roundabout are displayed within this section.

Figure 6.14: Coundon Gate roundabout



6.6.6.1 Do Nothing

show the Do Nothing model results for the Coundon Gate roundabout. Arm A is the busiest arm in all scenarios, with it starting to reach capacity in the 2029 AM scenario, with an RFC value of 0.80. Delay experienced here is 13.28 seconds. Arm E also experiences large delay, with delay of 14.01 seconds in the 2029 AM peak period.

Despite arm D starting to reach capacity in the 2029 forecast year, overall, the junction operates within its capacity in both 2024 and 2029.

Table 6.46 and

Table 6.47 show the Do Nothing model results for the Coundon Gate roundabout. Arm A is the busiest arm in all scenarios, with it starting to reach capacity in the 2029 AM scenario, with an RFC value of 0.80. Delay experienced here is 13.28 seconds. Arm E also experiences large delay, with delay of 14.01 seconds in the 2029 AM peak period.

Despite arm D starting to reach capacity in the 2029 forecast year, overall, the junction operates within its capacity in both 2024 and 2029.

Table 6.46: Coundon Gate Roundabout Do Nothing Model results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.78	12.63	3.7	0.57	5.35	1.3	0.65	6.75	1.8
B	0.29	7.84	0.4	0.18	4.80	0.2	0.21	5.52	0.3
C	0.44	5.45	0.8	0.35	4.35	0.6	0.42	5.03	0.7
D	0.70	7.53	2.4	0.46	3.83	0.9	0.54	4.55	1.2
E	0.67	10.45	2.0	0.39	4.90	0.6	0.42	5.33	0.7

Table 6.47: Coundon Gate Roundabout Do Nothing Model results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.80	13.28	4.0	0.64	6.81	1.8	0.79	11.59	3.7
B	0.33	8.53	0.5	0.20	5.44	0.3	0.26	6.96	0.3
C	0.44	5.61	0.8	0.44	5.17	0.8	0.55	7.25	1.2
D	0.75	8.99	3.0	0.56	4.98	1.3	0.64	6.25	1.8
E	0.74	14.01	2.8	0.42	5.34	0.7	0.60	8.42	1.5

6.6.6.2 Do Minimum

Between the Do Nothing and Do Minimum, arm A in the PM peak has also increased, having risen from 0.79 RFC to 0.85 RFC in the 2029 scenario, therefore suggesting it is reaching capacity. Similarly, delay has increased from 11.59 to 16.39 seconds.

Overall, the junction remains within its capacity in the DM scenario in both future forecast years, however in 2029 arms A and D approaching capacity are of concern and highlight a need for mitigation.

Table 6.48 and

Table 6.49 show the Do Minimum model results for the Coundon Gate roundabout. The 2024 Do Minimum results show an increase in RFC and delay for arm A compared to the Do Nothing scenario, across all time periods. The AM 2024 is now considered to be reaching capacity, with an RFC of 0.93, compared to 0.73 in the DN. Delay has also increased from 12.63 to 36.07 seconds.

Arm A in the 2029 Do Minimum AM peak has increased from 0.80 in the Do Nothing 2029 scenario, to 0.99 in the Do Minimum scenario, therefore showing that the junction is almost at capacity. Delay has also increased, from 13.28 seconds to 64.44 seconds, and the queue length has increased from 4.0 PCUs to 23.6 PCUs. Arm A remains the busiest junction arm across all scenarios and time periods. Increases in the RFC and delay at arm A can be attributed to the additional visitors travelling into Bishop Auckland.

Between the Do Nothing and Do Minimum, arm A in the PM peak has also increased, having risen from 0.79 RFC to 0.85 RFC in the 2029 scenario, therefore suggesting it is reaching capacity. Similarly, delay has increased from 11.59 to 16.39 seconds.

Overall, the junction remains within its capacity in the DM scenario in both future forecast years, however in 2029 arms A and D approaching capacity are of concern and highlight a need for mitigation.

Table 6.48: Coundon Gate Roundabout Do Minimum Model results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.93	36.07	11.2	0.69	7.70	2.2	0.78	10.77	3.5
B	0.31	7.76	0.4	0.19	5.55	0.2	0.31	7.17	0.5
C	0.50	6.49	1.0	0.35	4.58	0.5	0.36	5.24	0.6
D	0.75	9.43	3.1	0.51	4.30	1.1	0.56	4.92	1.3
E	0.77	15.83	3.3	0.39	4.94	0.6	0.49	6.24	1.0

Table 6.49: Coundon Gate Roundabout Do Minimum Model results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.99	64.44	23.6	0.73	9.10	2.7	0.85	16.39	5.5
B	0.38	12.03	0.6	0.20	5.94	0.2	0.30	8.00	0.4
C	0.33	5.12	0.5	0.39	5.06	0.39	0.34	5.24	0.5
D	0.79	10.39	3.7	0.56	5.04	0.56	0.63	5.67	1.7
E	0.79	18.15	3.6	0.44	5.51	0.44	0.60	8.59	1.5

6.6.6.3 Do Something

show the Do Something model results for the Coundon Gate Roundabout. The junction arms which were reaching capacity in the DM forecast years are no longer under pressure in the Do Something results, with a ratio of flow to capacity of 0.70 in the 2029 AM peak for arm A, compared to 0.99 in the Do Minimum. Similarly, arm A in the Do Something PM 2029 scenario has an RFC of 0.64, compared to 0.85 in the Do Minimum model. With the Do Something improvements, arm A is no longer under pressure and the junction has scope for additional demand.

Across all time periods and junction arms the highest RFC in 2024 is 0.67, and the highest in 2029 is 0.70. The Do Something junction measures have significantly improved the junction, with the highest RFC value presenting 0.70 across all scenarios in both future years, compared to 0.99 in the Do Minimum and 0.80 in the Do Nothing. Similarly, the highest delay in all scenarios is 9.48 seconds, and the longest queue length is 2.5 PCUs in all Do Something scenarios. This compares to 64.44 seconds and 23.6 PCUs respectively in the Do Minimum scenarios, along with 14.01 seconds and 4.0 PCUs respectively in the Do Nothing scenarios. Therefore, the Do Something results highlights the impact which the junction improvements make to the junction capacity.

Table 6.50 and

Table 6.51 show the Do Something model results for the Coundon Gate Roundabout. The junction arms which were reaching capacity in the DM forecast years are no longer under pressure in the Do Something results, with a ratio of flow to capacity of 0.70 in the 2029 AM peak for arm A, compared to 0.99 in the Do Minimum. Similarly, arm A in the Do Something PM 2029 scenario has an RFC of 0.64, compared to 0.85 in the Do Minimum model. With the Do Something improvements, arm A is no longer under pressure and the junction has scope for additional demand.

Across all time periods and junction arms the highest RFC in 2024 is 0.67, and the highest in 2029 is 0.70. The Do Something junction measures have significantly improved the junction, with the highest RFC value presenting 0.70 across all scenarios in both future years, compared to 0.99 in the Do Minimum and 0.80 in the Do Nothing. Similarly, the highest delay in all scenarios is 9.48 seconds, and the longest queue length is 2.5 PCUs in all Do Something scenarios. This compares to 64.44 seconds and 23.6 PCUs respectively in the Do Minimum scenarios, along with 14.01 seconds and 4.0 PCUs respectively in the Do Nothing scenarios. Therefore, the Do Something results highlights the impact which the junction improvements make to the junction capacity.

Table 6.50: Coundon Gate Roundabout Do Something Model results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.67	6.42	2.2	0.53	4.02	1.2	0.58	4.54	1.4
B	0.30	8.52	0.4	0.20	5.60	0.2	0.26	6.43	0.4
C	0.33	3.88	0.5	0.28	3.41	0.4	0.40	4.31	0.7
D	0.43	2.57	0.8	0.33	2.11	0.5	0.41	2.43	0.7
E	0.64	8.11	1.5	0.37	4.47	0.6	0.49	6.15	0.9

Table 6.51: Coundon Gate Roundabout Do Something Model results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.70	7.09	2.5	0.57	4.43	1.3	0.64	5.40	1.8
B	0.34	9.48	0.5	0.20	5.89	0.2	0.31	7.66	0.4
C	0.39	4.36	0.6	0.33	3.70	0.5	0.43	4.82	0.8
D	0.47	2.85	0.9	0.35	2.24	0.5	0.43	2.60	0.8
E	0.64	9.37	1.8	0.42	5.00	0.7	0.54	7.08	1.2

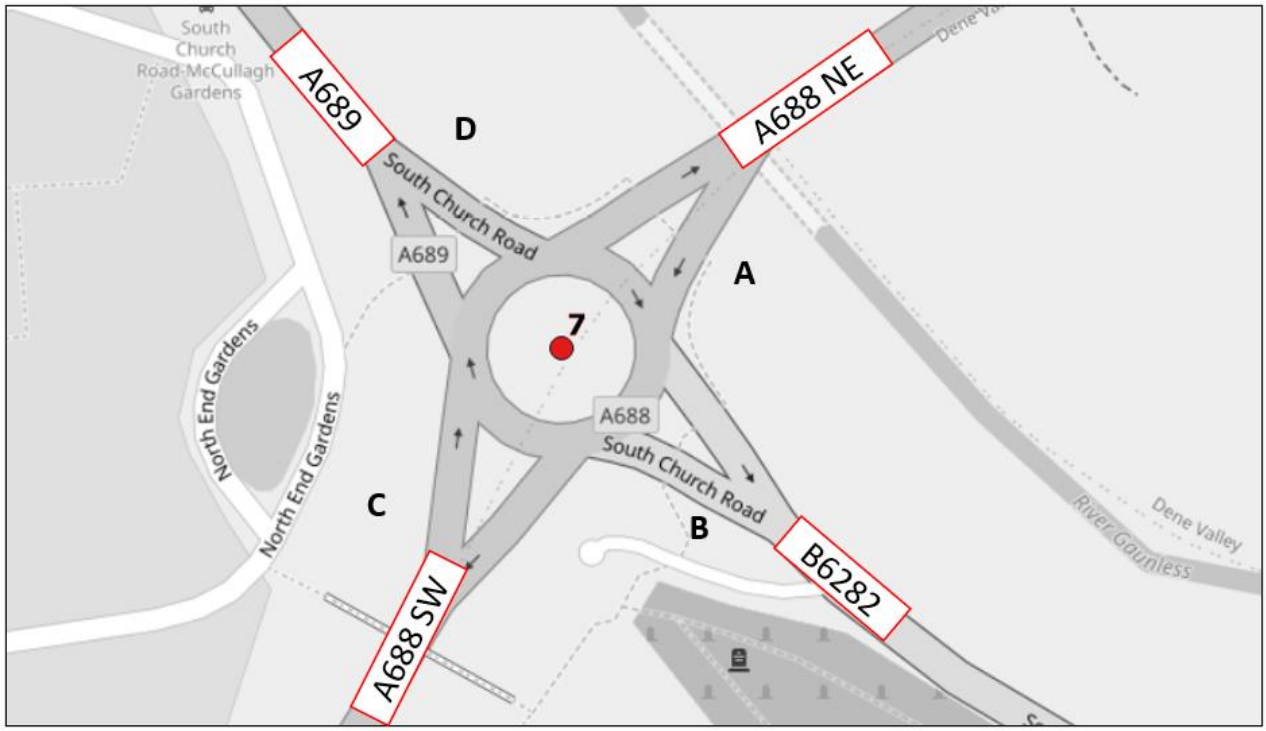
The results show the junction mitigations not only remove the impacts of additional visitors on the network, but greatly improve the junction operation when compared to the Do Nothing and Do Minimum scenarios.

6.6.7 A689 / A688 / B6282 roundabout

The A689 / A688 / B6282 roundabout is located south-east of the town, connecting the A688 to the stretch of the A689 which runs through the town centre, and the B6282. It provides access to Bishop Auckland for visitors travelling from the south. This key access point was identified as requiring mitigation in the original FHSF submission. This mitigation includes an additional lane on the circulatory and an additional third lane for all junction approaches, as shown in Appendix E.

The Do Nothing, Do Minimum and Do Something scenarios for A689 / A688 /B6282 roundabout are displayed within this section.

Figure 6.15: A689/A688/B6282 Roundabout



6.6.7.1 Do Nothing

Table 6.52 and Table 6.53 show the Do Nothing model results for the A689 / A688 / B6282 roundabout. At this junction, all RFC values are at or below 0.58 in all cases, suggesting the junction operates well within capacity. Arm

D operates below 0.5 RFC across all time periods and junction arms, whilst arm B operates below 0.14 RFC. Of the four junction arms, C is the busiest in both 2024 and 2029, with RFC values between 0.49 and 0.58.

Table 6.52: A689 / A688 / B6282 Roundabout Do Nothing Model results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.49	3.45	1	0.51	3.64	1.1	0.45	3.2	0.8
B	0.07	3.21	0.1	0.09	3.43	0.1	0.02	2.99	0
C	0.51	3.44	1.1	0.49	3.28	1	0.49	3.21	1
D	0.32	4.01	0.5	0.41	4.57	0.7	0.43	4.36	0.7

Table 6.53: A689 / A688 / B6282 Roundabout Do Nothing Model results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.56	4.04	1.3	0.45	3.31	0.8	0.50	3.54	1
B	0.12	3.67	0.1	0.04	3.09	0	0.13	3.55	0.2
C	0.58	4.05	1.4	0.51	3.41	1.1	0.53	3.59	1.1
D	0.36	4.62	0.6	0.49	4.92	1	0.45	5.13	0.8

6.6.7.2 Do Minimum

Table 6.54 and Table 6.55 show the Do Minimum model results for the A689-A688-B6282 Roundabout. Arm C remains the busiest junction arm in the DM model as well as in the DN. The RFC in the 2029 AM scenario has risen from 0.58 in the DN to 0.70 in the DM, and delay has increased from 4.05 seconds to 6.58 seconds. Queue lengths have also increased from 1.4 PCUs to 2.4 PCUs.

Whilst continuing to operate well under capacity, arm B has significantly increased in ratio of flow to capacity from the DN model results. In each time period; AM, IP and PM within the 2029 scenario, the RFC value has increased from 0.12 to 0.52, 0.04 to 0.44, and 0.13 to 0.48 respectively.

The ratio of flow to capacity and delay has also increased from the DN model results for arm D across all time periods within the 2029 scenario. This is likely to be attributed to the additional visitors travelling from areas south of Bishop Auckland and accessing the town via this junction arm.

Overall, the highest RFC experienced at this junction is 0.70 in the 2029 AM scenario, and the highest delay is 7.07 seconds at arm B in the 2029 AM peak.

Table 6.54: A689 / A688 / B6282 Roundabout Do Minimum Model results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.45	3.15	0.9	0.44	3.24	0.8	0.46	3.2	0.8
B	0.29	3.97	0.4	0.54	6.41	1.2	0.43	5.06	0.7
C	0.47	3.79	0.9	0.61	5.43	1.6	0.53	4.06	1.1
D	0.29	3.62	0.4	0.50	5.72	1	0.43	5.01	0.8

Table 6.55: A689 / A688 / B6282 Roundabout Do Minimum Model results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.61	4.6	1.6	0.42	3.2	0.7	0.48	3.4	0.9
B	0.52	7.07	1.1	0.44	5.17	0.8	0.48	5.86	0.9
C	0.70	6.58	2.4	0.56	4.56	1.3	0.62	5.06	1.6
D	0.43	5.8	0.7	0.55	6.05	1.2	0.49	6.06	1

6.6.7.3 Do Something

Table 6.56 and Table 6.57 show the Do Something model results for the A689 / A688 / B6282 Roundabout. The highest ratio of flow to capacity across both future years is 0.46 as a result of the DS improvements, this compares to the highest RFC value in the DM model of 0.70, and 0.58 in the DN model. This suggests that the junction is performing under its capacity with the DS improvements, therefore providing scope for additional demand.

The highest delay experienced at this junction across both forecast years is 5.63 seconds, and the longest queue length is 0.9 PCUs. Between 2024 and 2029, the RFC values increase by 0.01 to 0.06 in most cases, with the exception of arm B in the IP which has a reduction of 0.02, arm C in the IP which has no change, and arm B in the PM peak which has an increase of 0.10 RFC between 2024 and 2029.

With the DS improvements, this junction can comfortably accommodate the additional traffic demands in 2024 and 2029.

Table 6.56: A689 / A688 / B6282 Roundabout Do Something Model results Mid Day 2024

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.43	2.35	0.8	0.36	2.21	0.6	0.42	2.41	0.7
B	0.26	3.88	0.3	0.26	3.43	0.4	0.35	4.49	0.5
C	0.35	1.95	0.6	0.30	1.99	0.4	0.36	2.11	0.6
D	0.31	3.86	0.5	0.35	3.11	0.5	0.41	4.38	0.7

Table 6.57: A689 / A688 / B6282 Roundabout Do Something Model results Design Day 2029

Arm	AM Peak			Interpeak			PM Peak		
	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)	RFC	Delay (s)	Queue Length (PCU)
A	0.46	2.51	0.9	0.38	2.37	0.6	0.44	2.45	0.8
B	0.28	4.22	0.4	0.24	3.5	0.3	0.45	5.63	0.8
C	0.36	2	0.6	0.30	1.95	0.4	0.40	2.38	0.7
D	0.34	4.07	0.5	0.41	3.59	0.7	0.46	5.19	0.9

6.7 Summary

Seven junctions within the study area have been assessed using industry software to ensure the junctions can still operate with additional vehicles on the road network as a result of tourism-led development in Bishop Auckland.

Flows taken from Aimsun models of each scenario at the microsimulation model have been extracted and loaded into the individual junction models to assess operation, demonstrating the mitigations serve a purpose in facilitating additional vehicles on the network. Additionally, the mitigations coded into the Aimsun models show the overall network continues to operate.

Overall, there is an increase in delay and ratio of flow to capacity / degree of saturation when comparing the Do Nothing and Do Minimum scenarios, due to the additional vehicles on the network, who travel to the town centre to park in North Bondgate car park (353 spaces), the new surface car park (125 spaces) or Newgate Centre car park (205 spaces available for tourists). For the junctions in close proximity to the proposed scheme, the increases are relatively small, whereas for those previously identified as requiring mitigation, increases tend to be greater due to higher residual flow/capacity, with some arms approaching capacity (RFC >0.85) at the Coundon Gate roundabout as a result of increased traffic.

When comparing the Do Minimum and Do Something scenarios, overall the junction mitigations serve a purpose of ensuring junctions operate within capacity and that the additional traffic does not worsen conditions on the network. The greatest improvements to operation are observed at the Coundon Gate roundabout, a key access point into Bishop Auckland and a key route for those travelling along the east of the town.

7. Impact on sustainable transport

7.1 Overview

This chapter provides an overview of the available options for using sustainable transport options to move around Bishop Auckland and the surrounding area. It identifies the current available sustainable transport options, as well as the proposed improvements and changes that will occur as part of the bus station redevelopment scheme. Whilst the development of the car parks do not directly encourage active modes or sustainable transport, accompanying schemes as part of the Future High Streets Fund package including public realm and pedestrian route improvements will assist sustainable mode permeability.

7.2 Existing network / pedestrian environment

Given Bishop Auckland is an urban environment, a wide-spread pedestrian environment already exists, with pavements along the edge of most streets and a wider pedestrianised area in the Market Place. However, pedestrians are not as well catered for on the bus station site, especially when looking to connect the Bus Station with Newgate Street and the Market Place. Currently, passengers alighting or boarding buses from Stands J, K or L are required to cross either the bus station forecourt or Saddler Street to exit the bus station. These stands are used for long distance bus services to Durham (routes 6 and 56) and Newcastle-upon-Tyne (route X21) meaning that 8 buses an hour depart from this central area. As a result, a large number of bus passengers are put in direct conflict with either bus traffic or private vehicle traffic when leaving the bus station.

7.3 Proposals and improvements to the pedestrian environment

The redevelopment of the bus station is designed to improve the experience for passengers moving around the site, as well as make the area more welcoming for pedestrians.

Primarily, the scheme will create various new pedestrian routes, to integrate the new transport infrastructure into the town centre, linking to the car park and bus station including:

- New pedestrian route connecting new key arrival points and Fore Bondgate
- Demolition of the vacant amusements to create a pedestrian route from arrival points on North Bondgate to Fore Bondgate
- Structural improvements to the connection between the Newgate Centre shopping centre and Fore Bondgate
- Public realm improvements from the Market Place to Tenters Street extending previous works to the Market Place along Newgate Street

The bus station site and car park will be surrounded with trees and grassed areas, as well as relaying paved areas around the site.

Additionally, alterations to be bus station to arrange it in a DIRO layout will mean that there will no longer be a conflict between passengers using the bus station and buses. This will increase passenger safety and lower the risk of a collision between pedestrians and buses.

7.4 Public transport – Bus

Bishop Auckland has a significant number of bus services as shown in Table 7.1 which use the existing bus station in the town. On a weekday more than 350 buses arrive and depart from Bishop Auckland bus station, with more than 300 arrivals and departures on a Saturday and more than 75 on Sundays and Bank Holidays.

Table 7.1 - Number of arrivals and departures at Bishop Auckland Bus Station by service number and day

Bus Service	Service Provider	Weekday		Saturday		Sunday/Bank Holiday	
		Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
1	Arriva North East	37	37	35	35	21	21
5	Arriva North East	16	17	15	17	10	10
6	Arriva North East	98	98	91	91	40	31
9	Weardale Motor Services	5	4	5	4	0	0
6	Arriva North East	23	24	22	23	0	0
81	Weardale Motor Services	6	6	4	3	0	0
81A	Weardale Motor Services	2	0	0	0	0	0
84A	Scarlet Band	1	0	0	0	0	0
85	Scarlet Band	6	7	5	6	0	0
86	Arriva North East	2	2	0	0	0	0
87	Rural Link Limited	13	13	13	13	0	0
88	Weardale Motor Services	2	2	0	0	0	0
89	Weardale Motor Services	6	6	4	4	0	0
101	Weardale Motor Services	23	23	20	20	0	0
104	Gateshead Central Taxis	6	6	6	3	0	0
108/109	Scarlet Band	15	15	14	13	0	0
5A	Arriva North East	13	12	13	11	0	0
X1	Arriva North East	41	41	20	20	0	0
X21	Go North East	50	50	46	46	14	14
35A	Scarlet Band	3	3	3	3	0	0
Total		368	366	316	312	85	76

The redevelopment of Bishop Auckland Bus Station is designed to accommodate the bus services that run via the existing bus station. As such, no service alterations are expected as a result of the redevelopment. However, changes to bus routes and timetables could occur due to other operational reasons, meaning demand for space within the bus station could change before the point of opening.

7.5 Public transport – Rail

Bishop Auckland is served predominantly by the local Northern Rail station located towards the south of the town on Newgate Street. It is a small station with only one platform. The station has a 20-space car park which is free of charge for railway users. Taxi ranks are adjacent to the station and a bus stop 110 yards from the station provides connections to the local bus services.

The Northern line provides an hourly service to Darlington, linking to the East Coast mainline and from there long-distance travel across the rest of the UK. This service stops at local stations and continues to Middlesbrough and Saltburn. As part of upgrades to Darlington Station, it has been proposed that Bishop Auckland see services

upgraded to run half hourly, but this has not been confirmed and if implemented would be expected to start operating after 2025.

Additionally, Bishop Auckland is the Eastern terminus of The Weardale Railway. The Weardale Railway is a single-track heritage railway, operated by The Auckland Project, which runs between Bishop Auckland and Stanhope, calling at Witton-le-Wear, Wolsingham, Frosterley and Stanhope. This tourist railway service is served by Bishop Auckland West, a separate platform located west of the main rail station. Whilst this is currently a heritage railway line, there are aspirations to open the line to commuters in the future.

Due to the location of Bishop Auckland Railway Station approximately 0.6 miles away from the bus station, it is not expected that changes being made to the bus station will have any direct impact on the railway station or services to or from it.

7.6 Summary

The proposed bus station will provide a much-improved gateway and passenger experience for bus users in Bishop Auckland. Although the current schedule of services will transition to operate from the new bus station, it is hoped that the new facility will provide greater incentive for local trips to be made by bus with improved amenity, sheltered waiting areas and more legible user experience promoting bus services in the area.

Rail services to Bishop Auckland are likely to be unaffected by the changes to the bus station. Bishop Auckland train station is 0.6 miles away from the bus station, and while a bus stop is located near the station on Newgate Street, changes are very unlikely to impact rail journeys in the area.

The proposed scheme will also provide improvements in relation to the local pedestrian environment. Around the bus station site, a significant improvement to the public realm will be facilitated, with greater segregation between pedestrians and vehicles. The potential for conflicts between buses and passengers is reduced, with the new bus station no longer requiring passengers to cross a road when leaving the bus stands.

8. Summary

Jacobs has been commissioned by Durham County Council to undertake a Transport Assessment (TA) to support a planning application for the redevelopment of Bishop Auckland bus station on the current site within the town centre. The addition of a new surface car park on the existing bus station site, alongside a refurbishment of the existing Newgate Centre car park (which does not require planning permission) is deemed vital to allow tourist developments and associated benefits to come forward. The purpose of this TA is not only to support the redesign of the bus station, but to demonstrate that the increase in users on the local road network as a result of such tourist developments are not detrimental, and if so that appropriate mitigation is undertaken.

The parking assessment has demonstrated that:

- Without intervention, predicted visitor numbers to Bishop Auckland cannot be accommodated by the town's current parking provisions, with only 28% of Design Day visitors in 2028 (worst case scenario) able to park in the current parking provision.

- An additional 112 car parking spaces are required to accommodate visitors to Bishop Auckland day attractions on a Mid Day. Visitors on a Mid Day would park in North Bondgate (353 spaces) and the new surface car park (125 spaces).

- An additional 532 car parking spaces are required to accommodate visitors to Bishop Auckland day attractions on a Design Day. Visitors on a Design Day would be accommodated by the same car parks as those attending on a Mid Day, with the addition of the redeveloped Newgate Centre (205 spaces available for visitors) with additional overflow parking also required.

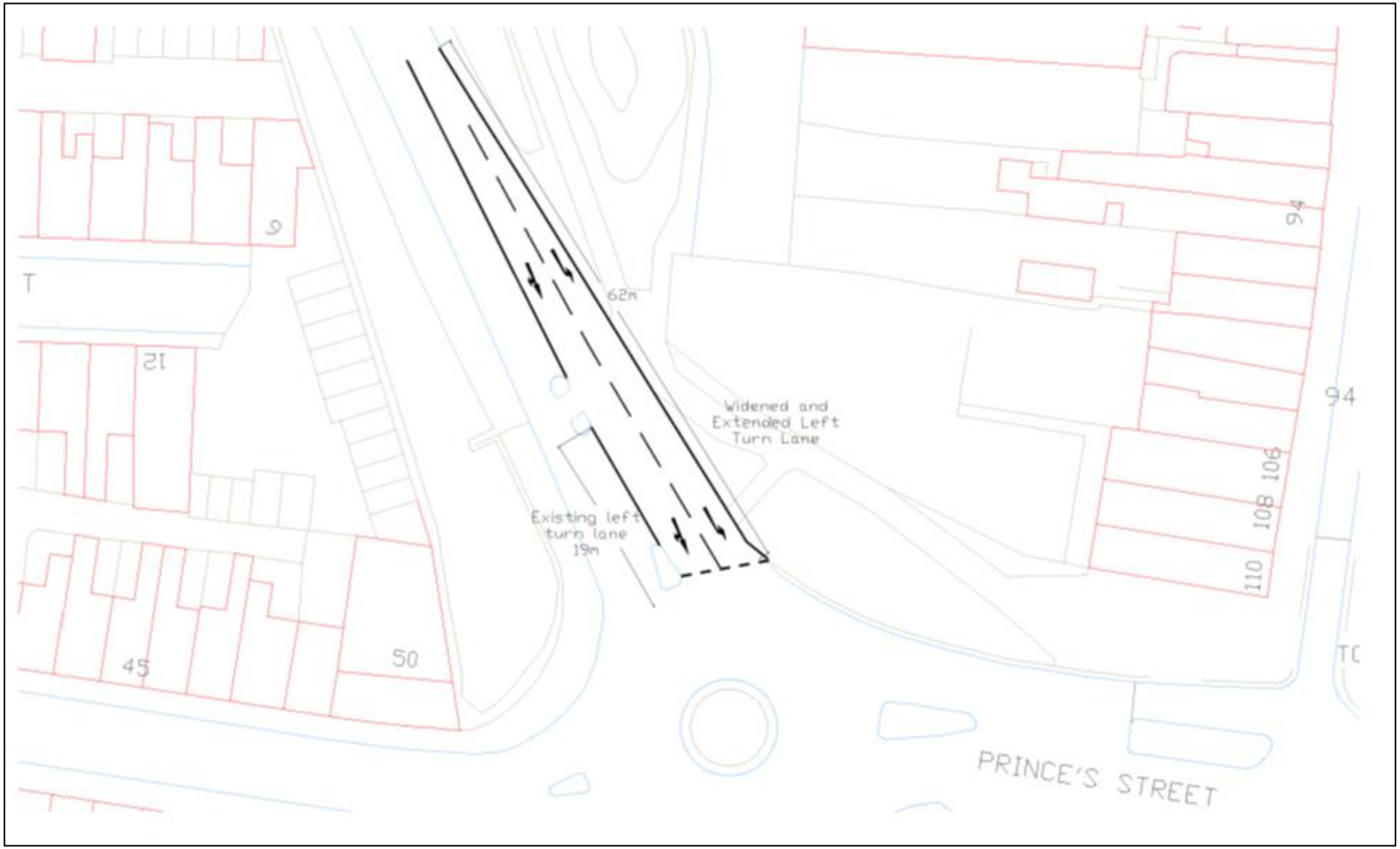
The transport assessment has demonstrated that:

- The transport schemes and network mitigations provide sufficient capacity to accommodate the forecast visitor demand in the modelled peak hours, in addition to the background growth predicted in Bishop Auckland.

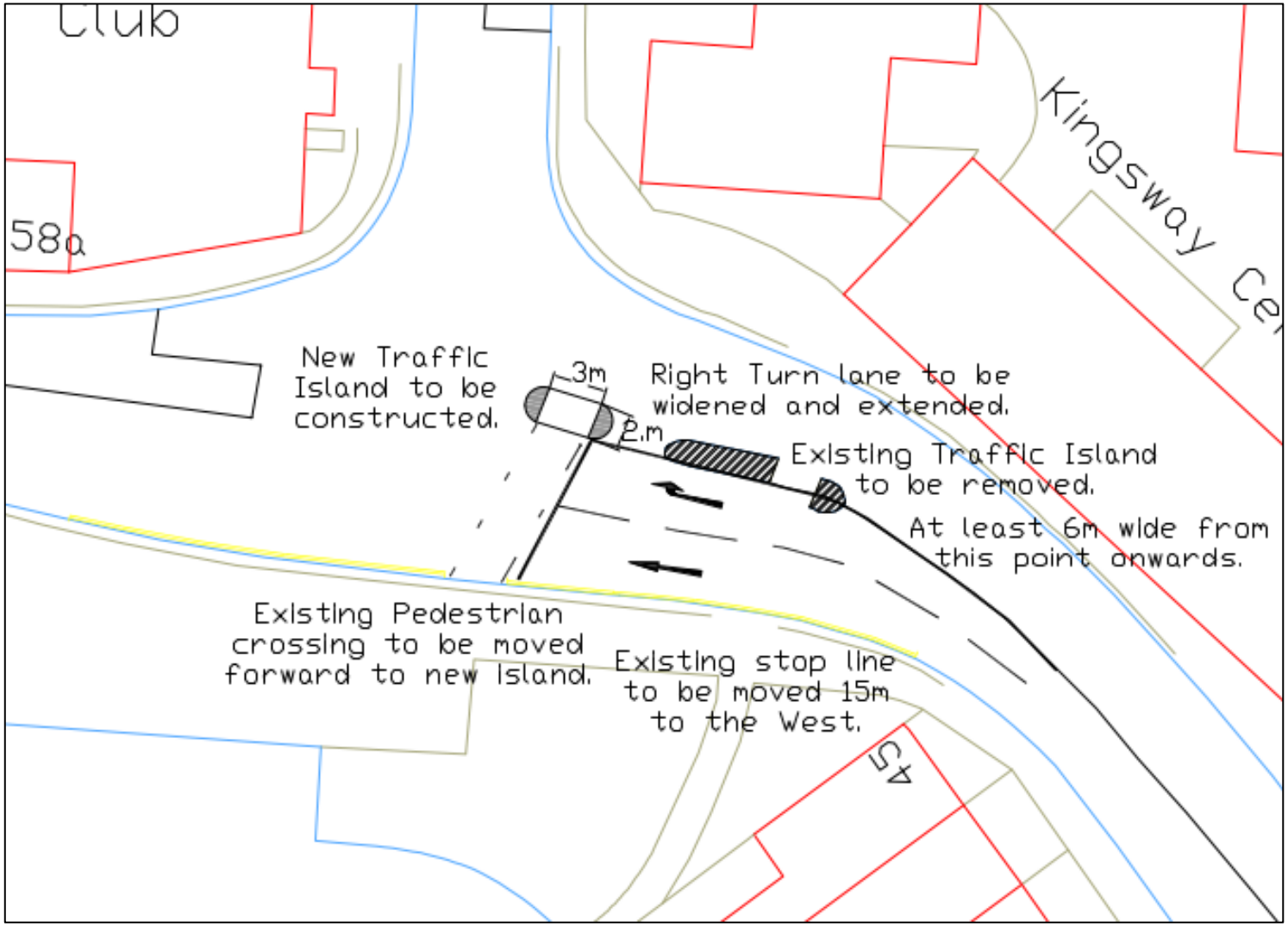
- The network performance has been maintained (and in many cases improved) by network mitigation improvements at several junctions, resulting in an efficient network despite the forecast increase in visitor demand.

Appendix A. Vision XS Capacity Report

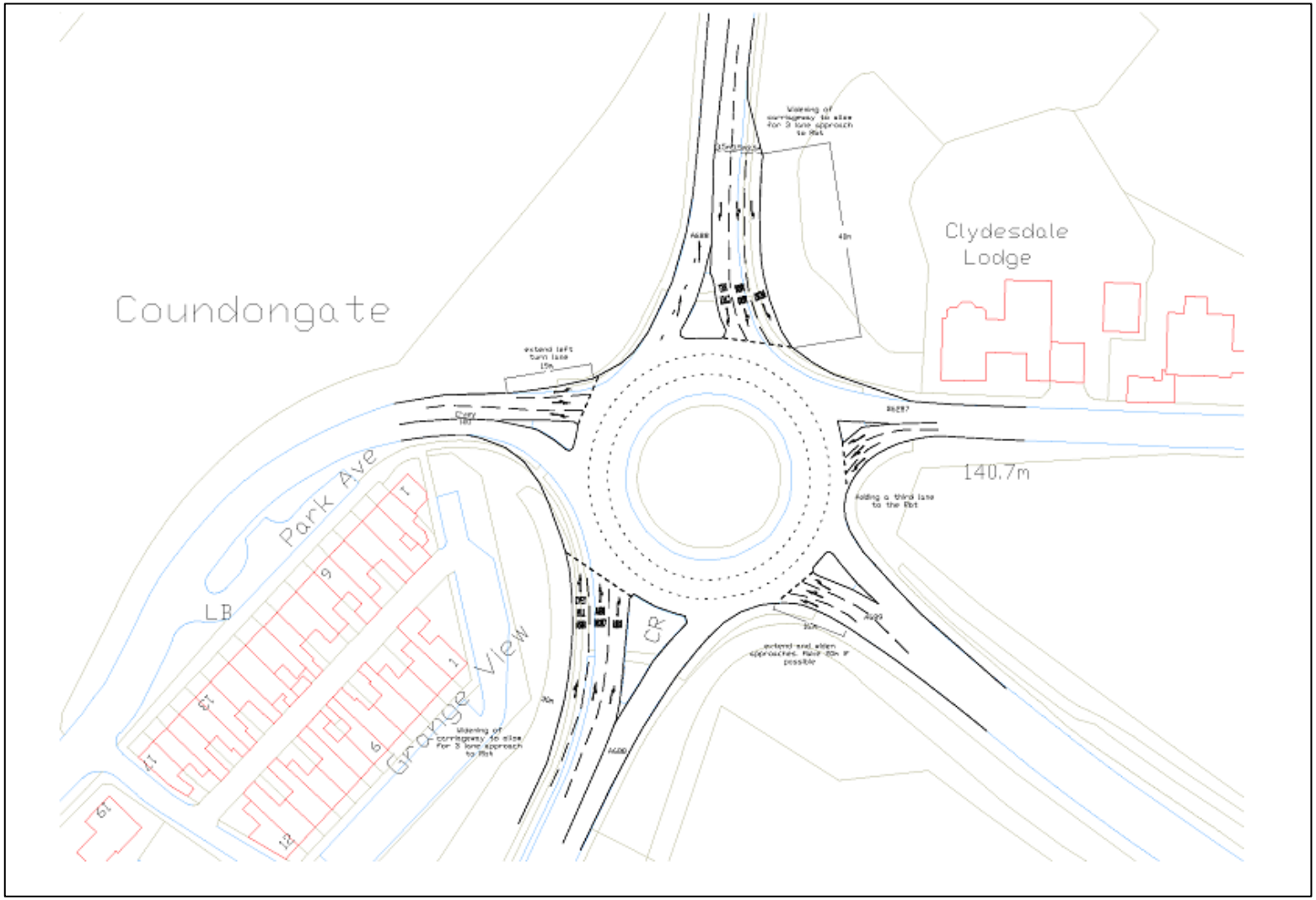
Appendix B. Princes Street / A689 / Bob Hardisty Drive roundabout mitigations



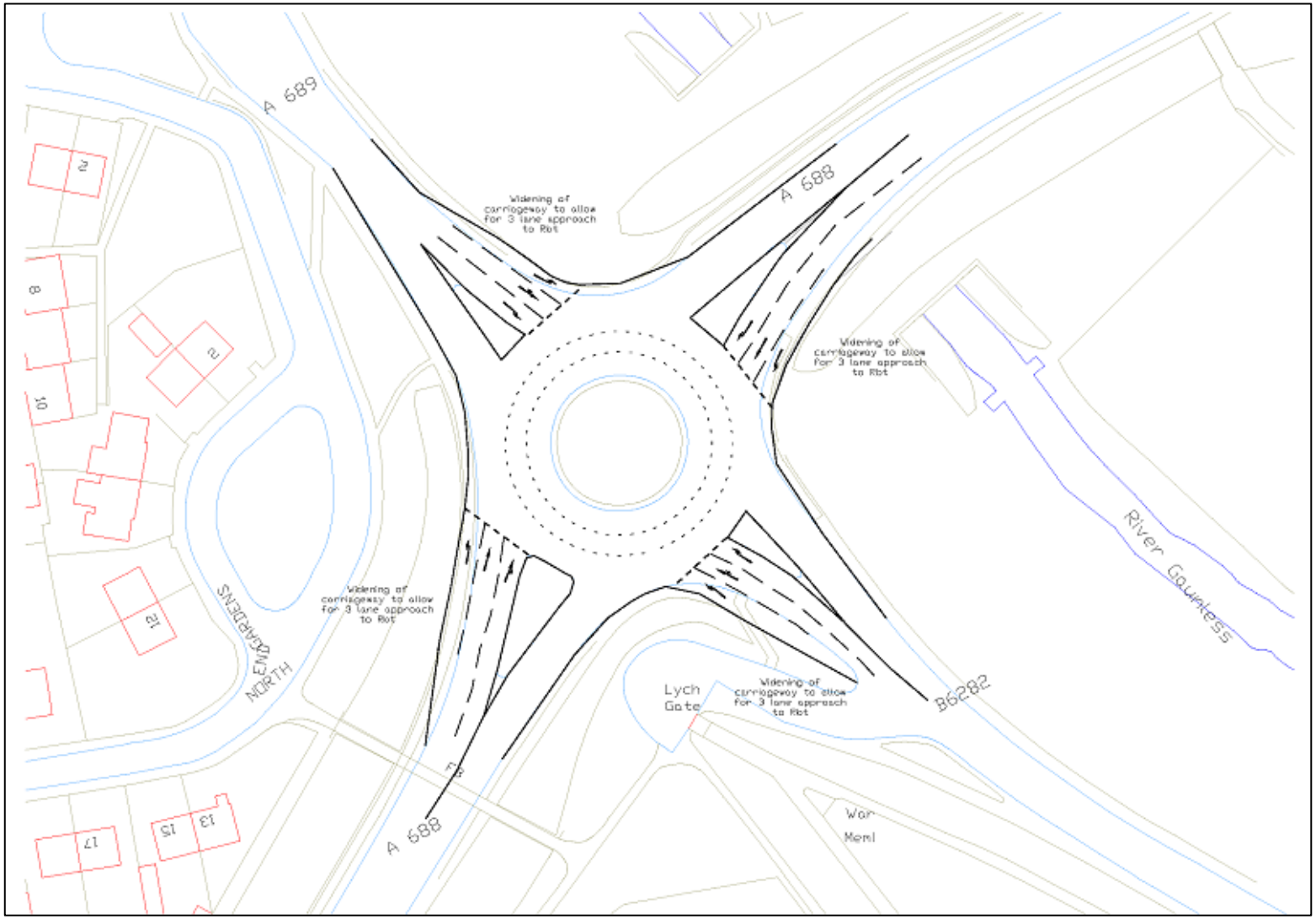
Appendix C. A689 / Kingsway junction mitigations



Appendix D. Coundon Gate roundabout mitigations



Appendix E. A689 / A688 / B6282 roundabout mitigations



Appendix F. Junctions 10 and Linsig outputs