

Transport Study in
Support of the Shipley
and Canal Road Corridor
AAP

May 2015

City of Bradford MDC

Our ref: 22669801

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Executive Summary

Overview

The Bradford City Centre and Shipley and Canal Road Corridor Area Action Plans (AAPs) are being produced as part of the Local Plan for the Bradford District. The AAPs will establish planning policies and land use allocations to guide development proposals in the city centre and the Shipley and Canal Road corridor.

This report focusses on the Shipley and Canal Road Corridor AAP and presents an analysis of the impact of forecast demands on existing networks and identifies a package of potential interventions, both physical and non-physical, that could be delivered to support growth and accommodate additional demand. The report should be read in conjunction with the Baseline Evidence Report.

The baseline report concluded that there are high levels of traffic currently travelling into and out of the city, and particularly along Canal Road, but offers no prediction of whether future growth in the study area driven in part by development proposals in each of the AAP areas can be delivered without adverse effects on the transport network.

The implications for growth and the introduction of existing AAP proposals have been evaluated using a SATURN traffic model of Bradford district, which has been updated to reflect forecast increases in demand both at specific sites and across the district.

Growth in demand

For both the City Centre AAP and the Shipley and Canal Road Corridor AAP, City of Bradford MDC published an Issues and Options Report in March 2013 which identified numerous sites for development in each of the areas. Although this report is specifically concerned with transport issues for the Shipley and Canal Road Corridor AAP, the level of development proposed in adjacent City Centre sites cannot be ignored as it will generate new trips which interact with corridor traffic. There follows a list of those development proposals to which specific quantum of changes in land-use, and associated increase in demand, can be allocated.

- City Centre
 - Various residential development sites
 - Broadway Shopping Centre development (on track for completion late 2015)
- Shipley and Canal Road Corridor
 - New Bolton Woods development (1000-1200 homes)
 - Bolton Woods Quarry (800-1000 homes)
 - Shipley East residential proposals (100 homes)
 - Dockfield Road Area proposals (400 homes)
 - Mixed use development in Shipley town centre (300 homes)

It has been agreed that the future year for assessment should be 2030, and by 2030 it is predicted that there will be up to 3,000 new residential units in the Shipley and Canal Road Corridor.

Overall, the numbers of trips expected to be generated by specific developments in each of the two AAP areas is summarised in the following table. City centre residential developments will generate increases in traffic levels out of city centre in the morning, and back in the evening, despite being aimed at 'city living' and a high level of public transport accessibility and proximity to jobs. It should also be noted that these are predominantly trips forecast to be

made to parts of the district beyond the immediate city centre, rather than to destinations outside the district.

Total trips – AAP developments	IN	OUT
AM peak:		
City Centre	592	1062
Shipley and Canal Road Corridor	539	1167
All Trips	1131	2229
PM peak:		
City Centre	1021	1168
Shipley and Canal Road Corridor	1178	770
All Trips	2199	1938

Although these forecasts seemingly represent a significant amount of additional traffic, the forecasts need to be considered alongside general predictions of traffic growth over the period between now and 2030. Where significant growth is concentrated in a relatively small number of sites, there is greater potential for impacts to be mitigated through the planning process and requirements for adequate access arrangements, contributions to public transport provision and the promotion of non-car modes of travel.

Department for Transport guidance indicates that growth in traffic between 2014 and 2030 is predicted to reach 35% in the Bradford district.

Implications for growth

The Bradford SATURN model has been used to assess the impact of growth in demand on the highway network in 2030. Assessment has been undertaken for both the AM and PM peak hour and it has been acknowledged that flows in the base year model are high when applying growth.

An initial analysis of the impacts of growth has identified a small number of ‘hot spots’ where improved highway infrastructure is considered critical to support growth in demand across the Shipley and Canal Road corridor.

- Canal Road –dualling between the Stanley Road and Hillam Road junctions.
- Leeds Road/Crag Road junction –reconfiguration of the layout to this junction to provide a new roundabout, as part of the approved planning conditions for the Shipley East development.
- The Queen’s Road/Manningham Lane and Shipley-Airedale Road/Bolton Road junctions would both benefit from a programme of monitoring, with a view to potential re-optimisation of signal timings as trip patterns change in future years.

For each time period, the model predicts that additional demand will be spread across the whole network with increases in flow predicted over the next 15 years along Canal Road, Valley Road, Bradford Road and in Shipley. Growth in traffic will also result in general increases in flow away from the immediate corridor, in areas such as Saltaire.

It is important to recognise that there will be some increase along A657 through the centre of Saltaire. It is also recognised that work to the Saltaire roundabout, as part of the Connecting Airedale initiative, has recently been completed.

Within the Shipley and Canal Road Corridor, increased demand will result in increases in delay in the City Centre Fringe area, at the Queen's Road/King's Road junction and, in Shipley, at the junction of Briggate and Valley Road and on approaches to the main Otley Road/Leeds Road junction in the centre of town.

The modelling supports a conclusion that the Shipley and Canal Road Corridor network is likely to be able to accommodate the level of development proposed in both AAPs, although there will be impacts on certain junctions which will require future interventions or mitigation.

This, of course, relies on the mode shares in Bradford and along the Canal Road corridor remaining at current levels, as a minimum. At current mode share, the New Bolton Woods, Bolton Woods Quarry and Shipley sites will between them generate 200 new bus trips, equivalent to 4 additional buses along Canal Road, in each hour. If target mode shares of 20% could be achieved, similar to shares crossing into the city as a whole, the requirements would increase to 6 new buses per hour.

Support from developers should be sought to help provide improvements to the public transport, cycling and walking networks. The cost of improvements should be gathered through Section 106 and/or Section 278 contributions.

The modelling provides support that future networks can support general growth in the district and specific growth in the two AAP areas. Growth in demand to 2030 is only expected to increase the length of an average trip across the network from 18 to 20 minutes and there will be a corresponding slight reduction in average speed.

Additional proposals

Given the conclusion that future growth, with mitigation, can be accommodated, a number of additional proposals have been identified which aim to address issues around safety and accessibility, rather than provide additional capacity. These proposals represent a combination of schemes already being pursued by the Council, as well as additional proposals identified during the course of the study. They are:

- Canal Road "Greenway" Cycle Route completion
- Shipley Station and Frizinghall Station access and car park improvements
- Valley Road closure to through traffic
- Shipley Eastern Relief Road

Schemes promoting improved walking, cycling and parking facilities cannot be tested in the SATURN model but can be delivered. The potential closure of Valley Road to through traffic will impact on current highway capacity and has been modelled. It has been demonstrated that there are no capacity reasons why such a scheme could not be pursued.

Delivery and funding

Throughout the assessment of anticipated transport conditions in 2030, and the specific implications for development sites in the City Centre and Shipley and Canal Road Corridor AAP, a number of assumptions have been made which will need policy support to deliver.

A number of the key schemes outlined in this report will be funded through the West Yorkshire Plus Transport Fund (WY+TF) or, on the case of the completion of the Greenway Cycle Route, using money made available through the Cycle City Ambition Grant Programme "CityConnect 2".

However, to support delivery of these schemes, all new development must require a detailed transport assessment and Travel Plan to be submitted in support of the proposals. Similarly there is a need to support the use of low vehicular trip rates in the current assessments, and to encourage use of the various cycling initiatives being implemented or proposed. The Council's parking standards must be upheld.

Developers should demonstrate, through their Travel Plans, real commitment to promoting non-car modes. They should also ensure that all major developments are 'PT ready' and that there are strong connections to local walking and cycling networks.

Section 106 and Section 278 contributions should be used to fund the requirements of individual development sites. For wider mitigation, which is only identified when a number of development proposals are considered together, a more holistic approach to funding is required.

A number of local authorities are developing a Community Infrastructure Levy (CIL), and it is considered an appropriate approach for Bradford to help secure the projects required to deliver the proposed growth in the AAP areas to 2030, and beyond. However it must be recognised that CIL, while being a valuable source of future funding to support delivery, will unlikely be sufficient on its own to enable delivery of major transport projects.

1 Introduction

Background

- 1.1 The Bradford City Centre and Shipley and Canal Road Corridor Area Action Plans (AAPs) are being produced as part of the Local Plan for the Bradford District. The AAPs will establish planning policies and land use allocations to guide development proposals in the city centre and the Shipley and Canal Road corridor.
- 1.2 Steer Davies Gleave has been commissioned to carry out a robust study of the area and, in line with the National Planning Policy Framework (NPPF), to determine ‘an adequate and up to date evidence base’ (NPPF 158) and to ‘assess the ability of infrastructure to meet forecast demands’ (NPPF 162).
- 1.3 This report focusses on the Shipley and Canal Road Corridor AAP and presents an analysis of the impact of forecast demands on existing networks and identifies a package of potential interventions, both physical and non-physical, that could be delivered to support growth and accommodate additional demand. The report should be read in conjunction with the Baseline Evidence Report¹.
- 1.4 The baseline report concluded that:
 - There are high levels of traffic into and out of the city in the peak hours, and in particular along the Canal Road corridor.
 - The percentage of people crossing the city centre cordon by bus has remained fairly consistent at around 15-20% since 2000, although the figures for the Canal Road corridor are slightly lower. This reflects the relatively poor bus provision along Canal Road, probably linked to the corridor being well served by rail and the fact that Manningham Lane is a densely populated parallel corridor that is well served by bus.
 - Over the past 5 years there has been a steady growth in rail passenger numbers using Shipley station, with average annual passengers at Frizinghall remaining at around 375,000 over the 5 years.
 - Walking and cycling numbers are relatively low, and less well defined than in the city centre. There is demand for walking in Shipley, and parts of the town centre have been pedestrianised, but pedestrian routes between the centre and the rail station are not straight forward. Further encouragement of walking and cycling should be considered.
 - Within the city centre, there are clusters of accidents at a number of key locations with high pedestrian activity. Within the corridor, accidents are more widely spread and the proportion involving pedestrians is significantly lower.

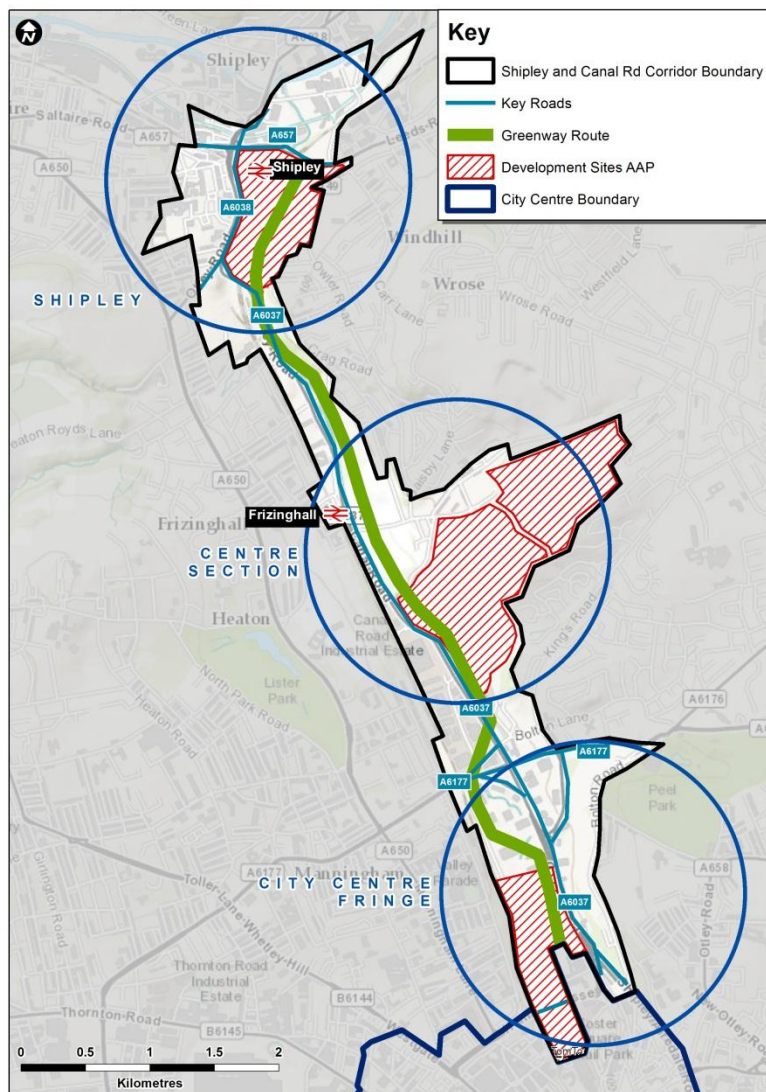
¹ Transport Study in Support of the Bradford City Centre and Shipley and Canal Road AAP, Baseline Evidence Report (Steer Davies Gleave, September 2014)

2 Current Situation

Overview

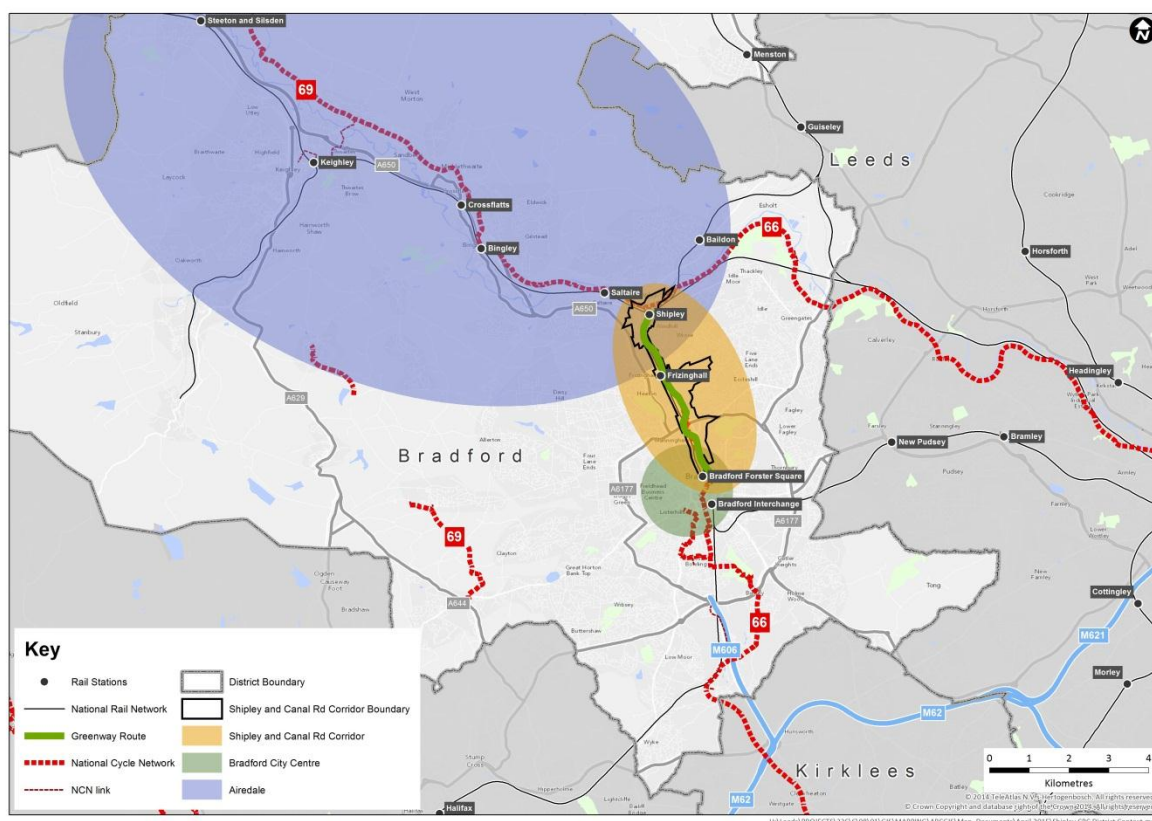
- 2.1 The Shipley and Canal Road Corridor is a traditional employment corridor containing a key transport route running northwards into and out of the city centre. Although the primary function of the corridor is for transport, the key objectives of the AAP aim to change this by delivering a range of well-designed high quality dwellings built to high sustainable design and construction standards to create an Urban Eco settlement by 2030. These objectives aim to provide an example development with excellent access to jobs, sustainable transport options and Greenspace that encourages healthy lifestyles and contributes to the key aims of delivering a low carbon economy
- 2.2 The corridor has been identified by the Council and Leeds City Region as an area with significant regeneration potential. A masterplan aimed at maximising the regeneration of the Corridor, through the reinstated Bradford Canal was produced in 2006. Since the publication of the 2006 masterplan, further work has been undertaken in to the feasibility of regenerating the corridor. A Joint Venture Company (JVCo) between the Council and Urbo Regeneration Ltd has been established and further detailed work undertaken. This has included the production of a Strategic Development Framework by the Council and the New Bolton Woods Masterplan by the JVCo. These have informed the emerging proposals in the Shipley and Canal Road Corridor AAP.
- 2.3 The corridor provides a link between the City Centre and Airedale, to Shipley and beyond to Saltaire, and can be defined as three sections
- Shipley – the town centre of Shipley, including the rail station, the canal and the main A567/A6038 junction
 - Central Section – the main area for future development, and containing Frizinghall railway station
 - City Centre Fringe – predominantly edge of city retail, containing Forster Square Retail, Park, numerous car showrooms and a large Tesco foodstore.
- 2.4 The majority of the corridor is formed by the A6037 Canal Road. A key junction in the corridor is at Stanley Road and, further north, there are important signalised junctions with A6038 Otley Road, with Market Street and at the A657 Briggate/Commercial Street junction in the centre of Shipley.
- 2.5 The area covered by the Shipley and Canal Road Corridor AAP, including the key road links and railway stations, is shown in Figure 2.1. Its more general location in relation to the wider district and main transport links is shown in Figure 2.2.

Figure 2.1: Shipley and Canal Road Corridor AAP



- 2.6 Daily flows on A6037 Canal Road in 2013 are seen to be consistent across weekdays, with approximately 11,500 vehicles in each direction. There are traffic queues along much of Canal Road and Valley Road in peak periods. It should be noted that a significant amount of traffic using the Canal Road corridor is from outside the study area, ie beyond Shipley to the North.
- 2.7 The A650 Bradford Road runs parallel to, and west of, the corridor. Here flows are lower, with around 8,000 per day northbound and 7,000 per day in the southbound direction.
- 2.8 More detailed analysis of the traffic count information demonstrates that travel by car dominates the corridor, with over 80% of journeys by car in each peak period. It is worth noting that these figures are higher than the average across the full Bradford city centre cordon. Average car occupancy figures for the corridor are also slightly below the Bradford average, with wider figures of 1.28 and 1.38 recorded in the AM and PM peaks.

Figure 2.2: Shipley and Canal Road Corridor – connections to the wider district



- 2.9 Canal Road itself is, in part, not particularly well served by bus. Leaving Bradford in the City Fringe area, there are a number of buses that leave the corridor before heading north-east towards Five Lane Ends, either to return towards Shipley or to destinations further east like Yeadon and the Airport. Between Stanley Road and Frizinghall Road there are no regular services operating along Canal Road. This is seen in comparison to the parallel Manningham Lane corridor with high frequency services 622-623 and 625-626 each operating a service of at least one every 10 minutes. Canal Road is the only major radial route into the City Centre which does not host a high frequency 10 minute service.
- 2.10 Average ‘% Bus’ figures for the corridor, and for Canal Road itself (up to 15%), are slightly lower than average across the full Bradford cordon (up to 18%).
- 2.11 The corridor is served by two rail stations; Shipley and Frizinghall. Shipley station is located a short walk from the town centre with three entry/exit points for pedestrians; to Station Road via an underpass, to Stead Street via a footbridge (with lifts), and to Leeds Road via steps to the car park access road. Frizinghall Station is located within the Central Section of the corridor and is the first stop for trains leaving Bradford Forster Square. From Forster Square, via Shipley, trains serve Leeds and Skipton on the Airedale Line, and Ilkley on the Wharfedale Line. In the morning peak (0800-0900) Shipley handles 19 train arrivals, 6 of which continue on the Bradford Forster Square, stopping at Frizinghall. This part of the rail network, between Shipley and Forster Square, has the capacity to accommodate additional services and, hence, growth in rail passenger numbers.
- 2.12 Since 2008-09, passenger numbers at Shipley have grown steadily to a total of just over 1.66 million passengers per year during 2012-13. At Frizinghall, passenger numbers appear to have

peaked at around 390,000 in 2011-12, before dropping back slightly to 375,000 in 2012-13, approximately the average figure over the 5 years.

- 2.13 Car parking at Shipley railway station is busy most days and could present a future constraint on rail growth. At Frizinghall, the station car park is small and many users park on adjacent streets. Whilst there is sufficient off-street parking available at Frizinghall to accommodate overspill rail users, better management, and signage off Canal Road, would be of benefit to existing and future rail users.



Shipley Station Car Park



Frizinghall Station Car Park

- 2.14 Key generators of walking and cycling trips are less well defined than in the City Centre. Clearly there is a demand for walking in the centre of Shipley, and parts of the town centre, particularly around the market square, have been pedestrianised. Shipley and Frizinghall rail stations also generate pedestrian and cycling trips.
- 2.15 The predominant cycle route through the corridor is National Cycle Route 66, which connects Bradford to Shipley and has, in the most part, been updated through construction of the Greenway. South of Stanley Road, the cycle route into the city is not attractive and requires use of some busy roads. The signed route diverts from Canal Road to Valley Road.
- 2.16 Cordon count data for the section of cordon bordering the Canal Road corridor indicates that pedestrian and cycle numbers are relatively low, both in terms of the modal split percentage and absolute numbers. Current low pedestrian numbers are reflective of the lack of residential and small scale retail frontage activity. This will change as major development sites in the corridor are delivered.
- 2.17 Information relating to road traffic accidents, and the severity of injuries reported, has been collated for a five year period between the start of 2008 and the end of 2012. The majority of accidents have resulted in just slight casualties and accident locations have been relatively spread out along the corridor. There is some evidence of accident clusters within Shipley town centre and along the southern part of Canal Road, at the City Centre Fringe.

Shipley and Canal Road Corridor AAP proposals

- 2.18 As set out in the Evidence Base report, the main development site along the Shipley and Canal Road Corridor is the proposed New Bolton Woods development, a joint-venture between Arnold Lavers and the District Council. The Masterplan sets out how between 1000 and 1500 new homes can be initially delivered, along with employment uses and associated leisure, retail and educational use. This includes a proposed new neighbourhood centre comprising a

medium sized supermarket and supporting retail, leisure and health issue. The AAP identifies a further large site at Bolton Woods Quarry with potential for a further 1000 homes.

- 2.19 The Shipley Exchange development has secured planning approval. This will deliver a new Morrisons foodstore, and 100 new homes, to the east of the rail station in Shipley. The site will provide additional parking for the station and hence be both an attractor and generator of trips. Long standing proposals to provide a new highway route to the east of the town, Shipley Eastern Relief Road, can still be accommodated within the proposals for Shipley Exchange.
- 2.20 In terms of future infrastructure, it is the intention to complete the section of Greenway between Poplar Road and the King George V Memorial playing fields. Improvements to the section of National Cycle Route 66 between Stanley Road and the city centre have been considered as part of this study and are described in more detail in the associated Cycle Study. The improvements will be taken forward through the Cycle City Ambition Grant Programme “CityConnect 2”.
- 2.21 In addition, Pinch Point Funding was secured to upgrade the junction of Canal Road/ Stanley Road. The funding application specifies the proposals as “The provision of a new signalised junction which will replace an existing single lane carriageway priority junction between Stanley Road and Canal Road on the A6037. The new junction will provide additional capacity, pedestrian crossing facilities and cycle stop lines. The A6037 is the main strategic route into Bradford from the north of the city and the improved junction will reduce congestion on this stretch of Canal Road and provide improved safety for cyclists and pedestrians.” The scheme will be completed during 2015.

3 Future Demand for Travel

Growth in Demand

- 3.1 For the City Centre AAP and the Shipley and Canal Road Corridor AAP, City of Bradford MDC published an Issues and Options Report in March 2013 which identified and quantified numerous sites for development in each of the areas.
- 3.2 Although this report is specifically concerned with transport issues for the Shipley and Canal Road Corridor AAP, the level of development proposed in the city centre cannot be ignored as it will generate new trips which interact with traffic in the corridor. As such, this chapter provides a summary of development in each AAP area, the resulting growth in demand for travel and the predicted impact of that growth on local road, public transport and walking/cycling networks. A more detailed description of the future demand for travel is provided at Appendix A.
- 3.3 There follows a list of those development proposals to which specific quantum of changes in land-use, and associated increase in demand, can be allocated.
- City Centre
 - Various residential development sites
 - Broadway Shopping Centre development (on track for completion late 2015)
 - Shipley and Canal Road Corridor
 - New Bolton Woods development (1000-1200 homes)
 - Bolton Woods Quarry (800-1000 homes)
 - Shipley East residential proposals (100 homes)
 - Dockfield Road Area proposals (400 homes)
 - Mixed use development in Shipley town centre (150 homes)
- 3.4 Apart from the step change in retail provision that will be provided by the new Broadway Shopping Centre, our assessment of future demand is focussed on new residential development.

Specific development trips

- 3.5 To estimate the number of trips associated with this level of new development, TRICS has been used to derive trip rates for residential development sites, trips to and from the Broadway Shopping Centre development have been taken directly from the 2011 transport Assessment prepared by WSP, and trip forecasts for the New Bolton Woods development, which provides a mix of residential, retail, commercial and school uses, have been taken from the work undertaken to develop a microsimulation model of Canal Road, which form part of the Transport Assessment for the outline planning application for this site.

- 3.6 Overall, the numbers of vehicular trips associated with specific developments in each of the two AAP areas is summarised in Table 3.1.
- 3.7 The table also shows increases in traffic levels out of city centre residential sites in the morning, and back in the evening, despite being aimed at ‘city living’ and a high level of public transport accessibility and proximity to jobs. This is partly countered by the use of relatively low traffic trip rates but it should also be noted that although high levels of additional outbound car trips are predicted in the morning peak, for example, these are predominantly trips forecast to be made to parts of the district beyond the immediate city centre, rather than to destinations outside the district.

Table 3.1: Total trips – all specific development combined

Total Trips – AAP Developments	IN	OUT
<u>AM Peak</u>		
City Centre	592	1062
Shipley and Canal Road Corridor	539	1167
All Trips	1131	2229
<u>PM Peak</u>		
City Centre	1021	1168
Shipley and Canal Road Corridor	1178	770
All Trips	2199	1938

- 3.8 Although these forecasts seemingly represent a significant amount of additional traffic, the forecasts need to be considered alongside general predictions of traffic growth over the period between now and 2030. Where significant growth is concentrated in a relatively small number of sites, there is greater potential for impacts to be mitigated through the planning process and requirements for adequate access arrangements, contributions to public transport provision and the promotion of non-car modes of travel.

Background growth

- 3.9 It has been agreed that the future year for assessment should be 2030 in line with the Core Strategy, which sets out the aims and objectives for sustainable development within the Bradford District for the next 15 years.
- 3.10 Growth in traffic across the district up to 2030 is taken from standard guidance, and adjusted to account for traffic specifically associated with the major developments outlined above.
- 3.11 Revised factors for increased growth in traffic are calculated to be 1.26 in the morning and 1.21 in the evening peak.

Non-car modes

- 3.12 Background growth and growth associated with specific development sites will impact on public transport demand as well as the number of future car trips on the network.
- 3.13 General growth across the district up to 2030 is predicted to be +35% in the AM peak and PM peak. Applying these to current bus demand across the corridor gives the following predictions of overall increases in peak hour trips.

Table 3.2: Predicted increase in Canal Road corridor bus use, 2030

	Peak Period	Peak Hour
AM Peak		
Canal Road Corridor	526	210
PM Peak		
Canal Road Corridor	541	271

3.14 For these forecasts of additional bus demand to be realised, investment in new public transport capacity will be required.

3.15 Rail passenger data also shows strong growth in recent years at Shipley, although numbers using Frizinghall are more static. Observed passenger growth at Shipley was as high as 30% between 2008/09 and 2012/13. If growth in passengers continues at this rate, there will be increase in demand for car parking at the station which would not be met by the current station car park capacity. There is spare capacity on the rail network to accommodate additional passengers.

Impact of growth

Impact on the roads

3.16 The Bradford SATURN model has been used to assess the impact of growth in demand on the highway network in 2030. Assessment has been undertaken for both the AM and PM peak hour and it has been observed that flows in the base year model are high compared to current traffic levels. This has been acknowledged when applying growth.

3.17 Assigning updated 2030 demand to the existing network, updated to reflect specific infrastructure improvements associated with Broadway, New Bolton Woods and Shipley East, results in increased demand on most routes within the City Centre AAP and Shipley and Canal Road Corridor AAP areas.

3.18 This initial assignment of future year demands identified a number of locations where significant queues/delays would arise if growth was permitted without mitigation. In the most extreme cases definite proposals can be identified, as described below, and these have been included in all future modelling.

- Canal Road –dual Canal Road between the Stanley Road and Hillam Road junctions
- Leeds Road/Crag Road junction –reconfiguration of the layout to this junction to provide a new roundabout (part of approved planning conditions for the Shipley East development)

3.19 A more detailed description of the use of the SATURN model is provided in Appendix B.

3.20 For each time period, the model predicts that additional demand will be spread across the whole network with increases in flow predicted over the next 15 years along Canal Road, Valley Road, Bradford Road and in Shipley. Growth in traffic will also result in general increases in flow away from the immediate corridor, in areas such as Saltaire.

3.21 Within the Shipley and Canal Road Corridor, the future delays resulting from increased demand on the network in 2030 can be seen in three areas, broadly consistent with the three route sections highlighted in Figure 2.1.

- There are some increases in delay predicted in the City Centre Fringe area, close to where a number of city centre development proposals are located. In this area it must be ensured that appropriate mitigation is conditioned as part of the planning approval process.
- Further north, some increase in queueing is predicted to develop along the Queen's Road corridor and particularly at the junction with King's Road.
- In Shipley, peak hour delays are expected to increase at the junction of Briggate and Valley Road, and on approaches to the main Otley Road/Leeds Road junction in the centre of town.

3.22 In summary, the modelling indicates that the Shipley and Canal Road Corridor network is likely to be able to accommodate the level of development proposed in both AAPs, although there will be impacts on certain junctions which will require future interventions or mitigation.

Impact on public transport and walking/cycling networks

3.23 Earlier in this chapter we provide broad estimates of future public transport demand and conclude that investment in bus capacity will be required for these forecasts to be realised. There is every reason to also assume that AAP development sites will generate additional walking and cycle trips too, and improved access to Shipley and Frizinghall stations should be delivered.

3.24 Given the level of new residential development proposed for the corridor at New Bolton Woods and Bolton Woods Quarry, and the relative lack of existing bus provision along the corridor, we must target for increased bus provision and corresponding mode share as a condition of development approval. Main residential sites in the corridor must be designed to ensure that bus access is achievable.

3.25 The provision of extra peak hour buses and improved cycle and walking connections to and from new developments in the Shipley and Canal Road Corridor should be funded by developer contributions. It is recommended that Section 106 contributions, or equivalent, are secured from new sites, or those currently in the planning process, to support the delivery of initiatives required to promote the continued growth in non-car modes of transport.

Summary of key issues relating to increased demand for travel

- Movements into and out of the City from the north will become restricted without additional capacity provided on Canal Road, particularly between Stanley Road and Hillam Road.
- Key junctions should be further investigated to identify potential for re-configuration, to accommodate increased traffic.
 - Queen's Road / Manningham Lane
 - Shipley Airedale Road / Bolton Road
 - Queen's Road / King's Road
 - Valley Road / Briggate, Shipley
 - Otley Road / Leeds Road, Shipley
- New bus services will be required to serve new housing development at New Bolton Woods and Bolton Woods Quarry, and to achieve target mode shares of 20% by bus in the corridor.
- There is a need for improved cycle and walking routes, and connections to existing routes in Shipley town centre and along the Canal Road corridor, including Frizinghall Station, to encourage continued growth in cycle use.

- Increased growth in rail will require additional car parking capacity at Shipley railway station. This part of the rail network, between Shipley and Forster Square, has the capacity to accommodate additional growth in rail passenger numbers.

4 Issues Arising

Evidence Base

- 4.1 The Shipley and Canal Road Corridor AAP² sets out a series of Strategic Themes designed to achieve the AAP Vision. The key theme in relation to transport is:

Promoting sustainable transport options and connecting the Corridor

- 4.2 Canal Road is acknowledged to be a strategic transport link in the district and the objective is to maintain and improve this strategic link while also promoting sustainable transport options. Furthermore, there is a need to improve access for all modes to Shipley town centre, particularly from Shipley station, the Leeds Liverpool Canal and Saltaire.
- 4.3 The Baseline Evidence Report notes that travel by car currently dominates the corridor, with ‘%car’ figures for the Canal Road corridor and Canal Road itself both higher than the average across the full Bradford corridor. Car occupancy figures are also below the Bradford average. Across the corridor. The %car figures are 81.3% and 82.9% in the AM and PM peak respectively, compared to corresponding figures of 75.2% and 77.1% across the wider network.
- 4.4 The potential interventions described in the following Chapter are designed to address the issues and objectives identified in the Shipley and Canal Road Corridor AAP area.

Implications of growth in demand for travel

- 4.5 There are a number of changes to the highway network proposed, either linked to access to major development sites or to be delivered as conditions to existing planning permissions. These are described in more detail in the following Chapter and in Appendix A.
- 4.6 When compared to the Base Model, future growth in demand, up to 2030, is expected to reduce average speeds across the full District network from 44kph to 40kph in each of the morning and evening peaks. Combined with adding new trips of varying lengths, this would result in the average trip length increasing slightly from a 18 minute journey to a 20 minute journey. These represent only modest changes in speeds and journey length over a 16 year period.
- 4.7 In the Shipley and Canal Road Corridor traffic speeds are generally lower and the impact of growth in demand can be greater than seen across the District as a whole. The following table

² Shipley and Canal Road Corridor Area Action Plan, Issues and Options Report, City of Bradford MDC, March 2013

shows changes in delay (seconds) and speed (kph) between Base Year and anticipated conditions in 2030 for 4 key routes passing through the corridor. The four routes, shown in Figure 4.1, can be defined as follows:

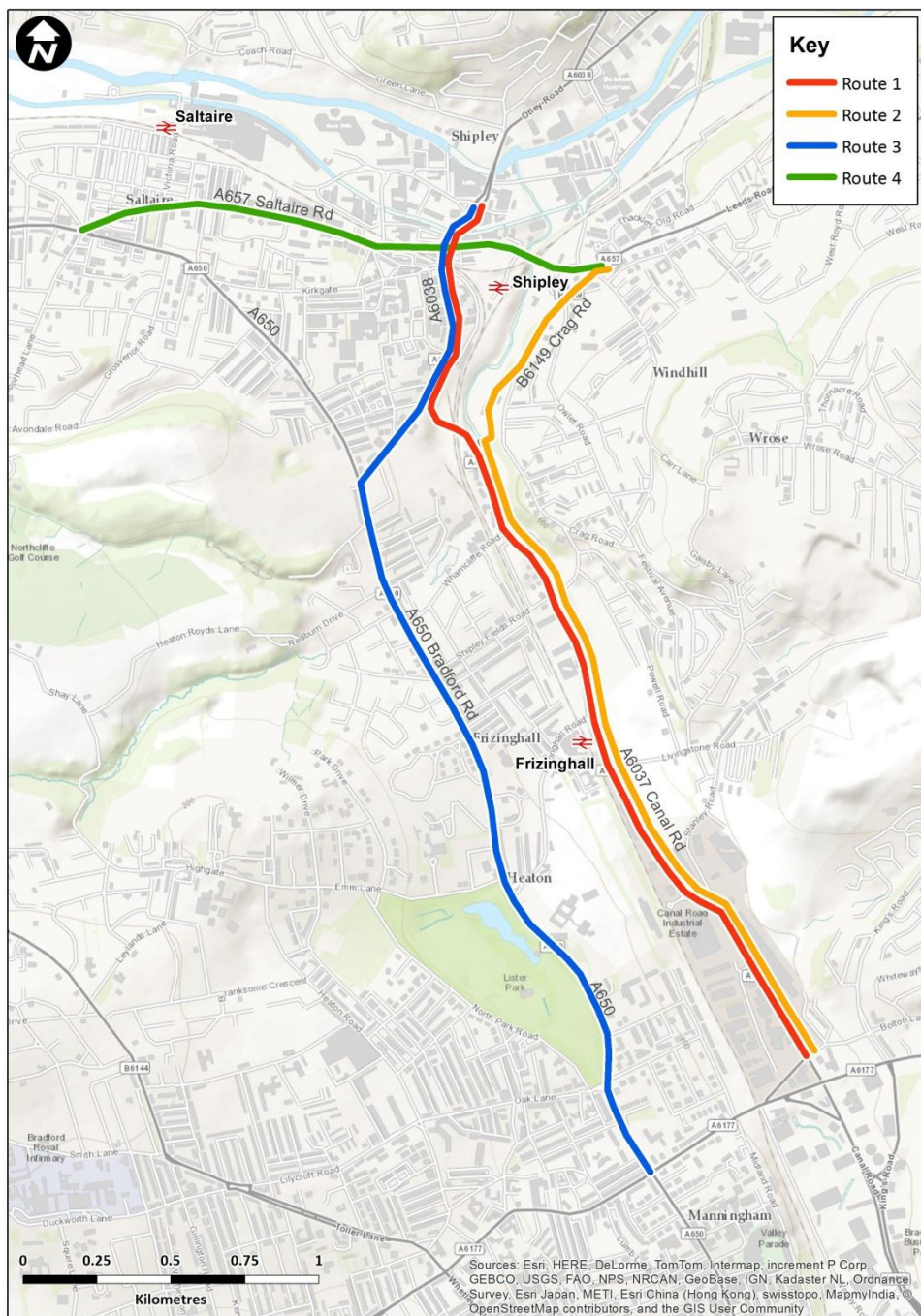
1. Between Canal Road/Bolton Lane junction and Otley Road/Salts Mill Road roundabout, via Canal Road and Shipley Town Centre
2. Between Canal Road/Bolton Lane junction and Leeds Road, via Canal Road and Crag Road
3. Between Queen’s Road/Manningham Lane junction and Otley Road/Salts Mill Road roundabout, via Manningham Lane, A650 Bradford Road and Otley Road
4. Between Leeds Road/Crag Road junction and Bingley Road/Saltaire Road junction, via Shipley Town Centre

Table 4.1: Impact on traffic speeds – Shipley and Canal Road Corridor

Route	Direction	AM Peak Base		AM Peak 2030		PM Peak Base		PM Peak 2030	
		Time (s)	Speed (kph)	Time (s)	Speed (kph)	Time (s)	Speed (kph)	Time (s)	Speed (kph)
1	N/B	441	28.0	454	26.3	340	35.3	357	34.6
	S/B	378	32.1	421	28.9	382	31.8	408	29.8
2	N/B	302	38.7	333	34.0	333	34.0	364	31.1
	S/B	348	32.5	454	24.9	398	28.4	632	17.9
3	N/B	469	28.0	552	23.8	444	29.5	515	25.5
	S/B	453	29.4	626	21.3	492	27.0	523	25.5
4	W/B	249	25.0	403	15.5	284	21.9	425	14.7
	E/B	320	19.4	356	17.5	346	18.0	390	16.0

4.8 We see reductions in average speeds across all 4 routes, and in each direction.

Figure 4.1: Key travel time routes



- 4.9 Although Routes 1 and 3 pass through the centre of Shipley, the main delay northbound is seen at the Otley Road/Valley Road junction. Southbound, the main delay is on approach to city in each peak; Canal Road/Bolton Road for Route 1 and Queen’s Road/Manningham Lane for Route 3.
- 4.10 For Route 2, passing to the southeast of Shipley, the main delay is observed at the Valley Road/Briggate junction, particularly in the southbound direction and this is a junction already identified as needing further investigation.

- 4.11 Route 4 passes east-to-west through the main Otley Road/Leeds Road junction in Shipley. Delays are shown in each direction passing through this junction, and support the findings presented in the previous chapter.

Summary of additional issues relating to increased demand for travel

- Traffic speeds in Shipley and in the Canal Road Corridor are predicted to reduce, including routes passing through Shipley Town Centre

5 Interventions

- 5.1 To accommodate growth in traffic to 2030, interventions will be required.
- 5.2 Capacity improvements have been identified (3.18 and Appendix A) to accommodate general growth in traffic levels.
- Canal Road – dualling between the Stanley Road and Hillam Road junctions
 - Leeds Road/Crag Road junction
 - Valley Road/Otley Road junction
 - Adjustment to the signal arrangements at Queen’s Road/Manningham Lane and Shipley-Airedale Road/Bolton Road junctions
- 5.3 Dualling of Canal Road and improvements to the Leeds Road/Crag Road junction will be taken forward to delivery through the WY+TF.
- 5.4 The above improvements are specifically related to the Shipley and Canal Road Corridor and it is assumed that each will be delivered. It is therefore important for them to be added to the model to derive a baseline scenario against which the implications of further proposed schemes can be assessed.
- 5.5 Assuming that these proposals will be delivered, and that access to major new sites are designed to accommodate traffic associated with those sites, the modelling demonstrates that the network will be able to accommodate demand levels associated with AAP sites and growth up to 2030.

Proposed schemes

- 5.6 Further interventions have then been identified which fall into three categories,
- Interventions linked to the delivery of major new development sites;
 - Schemes already being pursued by the Council; and
 - Additional proposals identified during the course of the study aimed at addressing specific issues.

Development related

- 5.7 As part of the proposals for the Crag Road “Shipley Exchange” commercial development consent, some 75 additional car parking spaces will be provided for station commuters, alongside local highway improvements.

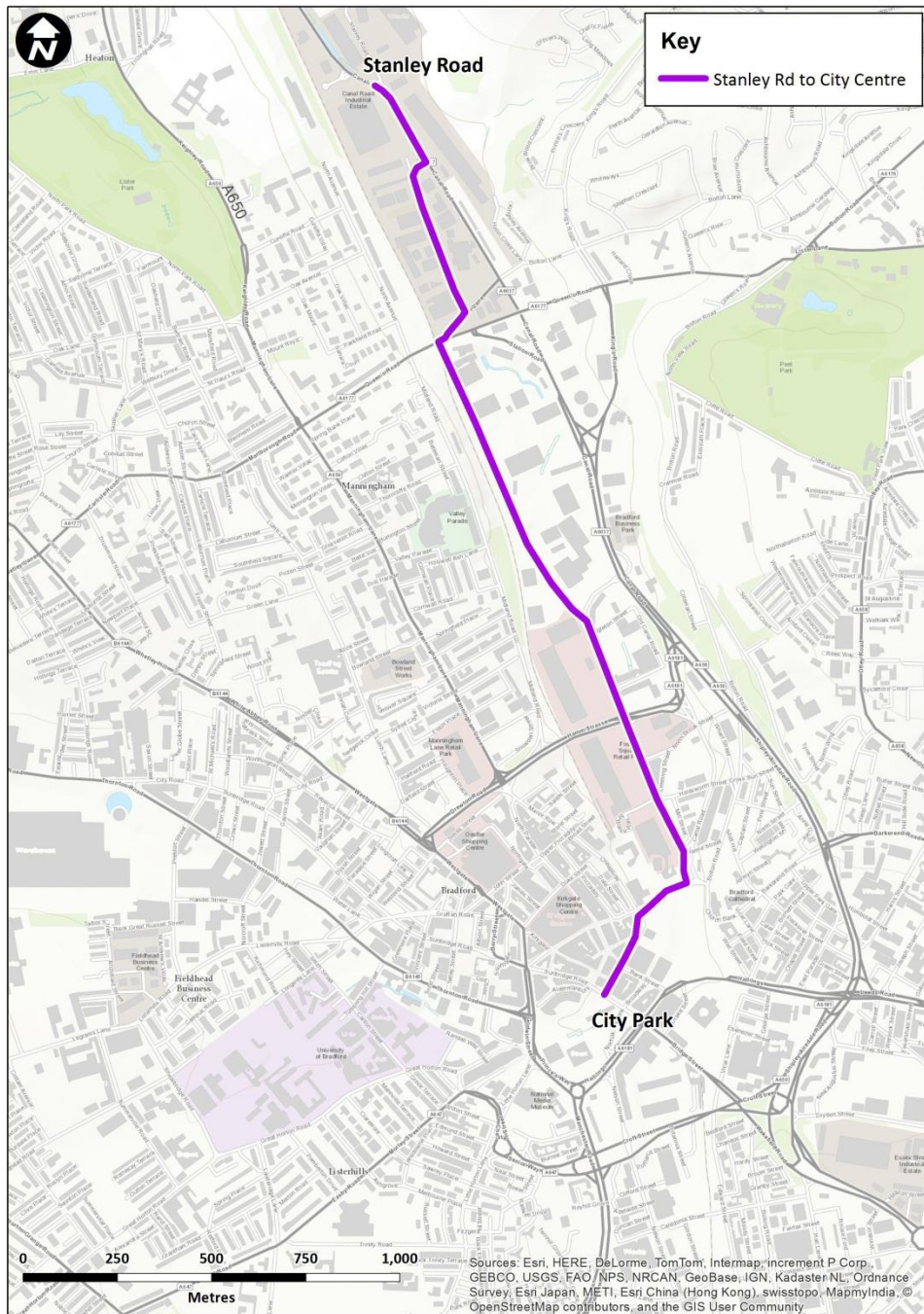
Council Schemes

- 5.8 In addition to the WY+TF highway schemes defined above, a number of schemes are being considered by the Council, with different levels of certainty.

Canal Road Cycle Route

5.9 Much of the Canal Road corridor is served by National Cycle Network (NCN) Route 66, the Greenway. The Cycle Route Study (carried out by Steer Davies Gleave in July 2014) has considered opportunities for routes from the southern section of Canal Road into the city centre in two parts; between City Park and the termination of the Leeds-Bradford CityConnect route on Lower Kirkgate, and onward connections to Forster Square. The proposed route is illustrated in Figure 5.1 below and a copy of the Cycle Route Study report is provided in Appendix C.

Figure 5.1: Canal Road Cycle Route



- 5.10 City Region funding for CityConnect2 has now been secured, which will deliver the 2.5km extension from the Leeds-Bradford route between Forster Square Rail Station and the Greenway on the National Cycle Network.
- 5.11 At the northern end of the corridor, permission has been granted for completion of a link from NCN Route 66 to Shipley. Funding for this link has come from a combination of DfT Cycle Route Information Fund and Shipley Hubs Money from the Local Transport Plan.

Shipley Station Car Park Improvements

- 5.12 The Council is proposing to provide additional parking capacity at Shipley railway station as part of the Shipley Station Car Park Improvements scheme. This is being funded by the WY+TF rail package. The construction of a new deck on top of the current car park is the preferred option and this will compliment developer led proposals for the Shipley Exchange application indicated earlier.
- 5.13 Improved car park access and better connections between the station and the town centre are also proposed.

Shipley Eastern Relief Road

- 5.14 Although unlikely to be delivered within the timescales of this study, the potential benefits of the proposed relief road are recognised and supported.
- 5.15 The key element of Connecting Airedale – Stage 4, Shipley Eastern Relief Road (SERR) will relieve congestion in Shipley town centre by creating a bypass to the east, connecting the A6037 Valley Road/Canal Road and A6038 Otley Road. The relief road will also provide a second crossing of the River Aire at Shipley. Although precise details are not available, a reduction in north-south traffic through the Fox Corner junction will allow reconfiguration of the signal timings to the benefit of continued east-west movements. As shown in previous chapters, east-west movements are expected to be most affected by increased demand in future years. Funding for a more detailed study of the benefits of the SERR has been secured and it is imperative that a route for SERR is safeguarded to enable future delivery of the scheme.

New Schemes

Canal Road Cycle Route from Stanley Road to the City Centre – Valley Road Closure

- 5.16 The Cycle Route Study, describes how, between the City Centre and Stanley Road, cyclists are routed along Valley Road between the Tesco store and Queen’s Road. Although not heavily trafficked, this is an acknowledged rat run for cars avoiding the busy parallel section of Canal Road, despite regular speed bumps along the route. Relatively free flowing traffic along this section, coupled with parked cars along most of the route make conditions difficult for cyclists.
- 5.17 To improve conditions for cyclists it is recommended that opportunities to restrict through traffic on this route are considered, while retaining existing on-street parking and access to employment sites. The improvements will be taken forward through the Cycle City Ambition Grant Programme “CityConnect 2”.

Testing of highway interventions

- 5.18 Schemes identified at the start of this chapter have been recognised as critical to deliver proposed growth in the Shipley and Canal Road Corridor and, as such, will be delivered and are

therefore included in the baseline against which additional impacts of further interventions can be tested.

5.19 It is only the proposed Valley Road Closure intervention recommended as part of the cycling scheme has been coded in to the SATURN model as a new scheme, and the impact of its introduction has been assessed through the assignment of the 2030 Forecast Year demand.

5.20 For the closure test, a full description of differences in traffic flows between the tested scheme and the 2030 Forecast Year reference case are provided in Appendix D. The findings are summarised here.

Intervention: Valley Road Closure

5.21 Different impacts are seen to result from a closure of Valley Road to through traffic in each of the AM and PM peaks, although in each case the impacts are constrained to the Canal Road corridor. In the morning peak, traffic is mainly diverted to corridors west of the railway, whereas in the evening peak the implications for increase in traffic on Canal Road would be greater.

Benefits

5.22 The removal of through traffic from Valley Road is entirely intended to improve conditions for cyclists connecting between the City Centre and the Greenway route.

Issues and feasibility

5.23 The model is not sufficiently detailed to assess the impacts on traffic heading to/from the Tesco store at the southern end of Valley Road, and more detailed analysis is recommended. Otherwise, the proposals would be relatively cheap to implement and could be timed to coincide with the timing of further improvements to the Greenway route.

5.24 The following table provides forecast changes in two-way flows on key links in the Shipley and Canal Road Corridor AAP area, and supplements the plots in Appendix B showing differences in traffic flows associated with a potential closure of Valley Road to through traffic.

5.25 The basic assessment of the impacts of each of closing Valley Road to through traffic has not identified any issues that might not have been expected given the nature and scale of the scheme. As such, there would seem no reason why the proposed interventions could not be introduced.

Table 5.1: Change in key link flows across between the future Baseline and the Valley Road Closure test – 2030, AM and PM peak

Key Routes	AM Peak flow (2-way)		PM peak flow (2-way)	
	2030 DM	Closure Test	2030 DM	Closure Test
Shipley and Canal Road Corridor				
Canal Road, south of Queen’s Road	4900	4950	4840	5040
Valley Road, south of Queen’s Road	270	190	370	210
Manningham Lane south of Queen’s Road	1930	1970	2030	2050
Canal Road, north of Queen’s Road	3200	3190	3340	3340
Keighley Road, north of Queen’s Road	2750	2780	2740	2730

Key Routes	AM Peak flow (2-way)		PM peak flow (2-way)	
Otley Road, Keighley Road-Valley Road	1830	1840	1740	1730
Bingley Road, north of Otley Road	2230	2240	2600	2600
Saltaire Road, Shipley	1850	1870	1970	1970
Briggate, Shipley	2220	2220	2620	2620

Matching interventions to issues

- 5.26 In the previous chapters, a number of issues have been identified which will need to be addressed if increased demand in future years is to be successfully managed.
- 5.27 Where possible, the interventions identified in this chapter are designed to address some of those issues.

Intervention	Issue
<u>Committed Schemes</u>	
Canal Road dualling	Requirement to provide additional capacity on Canal Road to meet future demand. To be delivered through WY+TF
Leeds Road/Crag Road junction	Requirement to provide additional capacity in the Canal Road corridor to meet future demand. To be delivered through WY+TF
Valley Road/Otley Road junction	Requirement to provide additional right turn from Valley Road towards Shipley. TO be delivered by the Shipley East developers
<u>Proposed Schemes</u>	
National Cycle Route 66 Extension from Shipley to the City Centre	Improved connections for cyclists in Shipley town centre
Valley Road closure	Improved routes along Canal Road to encourage continued growth in cycle use
Developer proposals for additional station parking associated with Crag Road, Shipley Exchange development	Shipley railway station car park capacity. To be delivered through WY+TF
Shipley Station Car Park Improvements	
Shipley Eastern Relief Road Options for better pedestrian/cycle connections between the town centre and Shipley railway station	Future reductions in traffic speeds in Shipley town centre associated with growth of the town
Additional bus services	To ensure development sites in the corridor can be delivered sustainably

Policy considerations

- 5.28 Throughout the assessment of anticipated transport conditions in 2030, and the specific implications for development sites in the City Centre and Shipley & Canal Road Corridor AAPs, a number of assumptions have been made which will need policy support to deliver.

Planning policy

- 5.29 Adequate local mitigation for each new development application should be ensured. The Council's should continue to enforce its policy that all new planning applications, and reserved matters applications if appropriate, will require a detailed transport assessment and Travel Plan to be submitted in support of the proposals.
- 5.30 Developers should be required to demonstrate how the impacts of development can be mitigated through the design of the development, the provision of user friendly access to bus networks and rail stations and to ensure that connections into key pedestrian and cycle routes are made available.

Car and cycle parking

- 5.31 There is a need to support the use of low vehicular trip rates in the current assessments, and to encourage use of the various cycling initiatives being implemented or proposed.
- 5.32 Parking standards for different types of development are presented in the Core Strategy. For residential development, the standards already establish a distinction between city centre developments and those elsewhere. Furthermore, there is an discretionary allowance for more restrictive levels of car parking provision in the case of multi-occupancy residences.
- 5.33 It is worth noting that on 25th March 2015 the Secretary of State for Communities and Local Government issued a written statement³ setting out that "Local planning authorities should only impose local parking standards for residential and non-residential development where there is a clear and compelling justification that it is necessary to manage their local road network".
- 5.34 The local parking standards as set out in the Core Strategy are considered justified in relation to the predicted growth in future traffic and the need to manage the local road network, It should be noted that these standards are designed to applied flexibly.
- 5.35 All developments should also offer cycle parking, as included in the standards, but further delivery of city centre cycle parking should also be secured to provide facilities for cyclists from surrounding areas who would like to cycle to the city centre for employment, retail or leisure and to support growth in cycle mode share.

Non-car modes

- 5.36 It should be made easier and more attractive for people – particularly occupants of new developments – to make an informed choice between using the private car or making alternative journeys by public transport, walking or cycling.
- 5.37 Developers should demonstrate, through their Travel Plans, real commitment to promoting non-car modes. In the case of public transport, and particularly bus, it is recommend that developers are encouraged to offer more than just Travel Passes over the first few months of a development. Section 106 contributions should be pursued towards the cost of new services, bus priority at key junctions and better bus stops.
- 5.38 Developers should also ensure that all major developments are 'PT ready' – ie the internal network is designed with a hierarchy of roads, designed to accommodate bus movements.

³ Written Statement HWC488 – Parking: helping local shops and preventing congestion

Similarly, all development proposals should demonstrate, or enhance, strong connections to local walking and cycling networks.

Funding

- 5.39 Section 106 contributions should be used to fund the requirements of individual development sites. For wider mitigation, which is only identified when a number of development proposals are considered together, a more holistic approach to funding is required.
- 5.40 The West Yorkshire Plus Transport Fund will provide the mechanism to delivery many of the schemes identified in this report, such as Canal Road widening, Leeds Road/Crag Road junction improvements and Shipley Station Car Park. New funding opportunities are likely to come forward, which could be pursued to deliver those schemes, such as the Shipley Eastern Relief Road, not dealt with by the WY+TF.
- 5.41 A more appropriate, or at least alternative, approach might be to secure contributions from developers of future sites against the cost of scheme delivery. Work is ongoing⁴ to prepare viability evidence on behalf of the Council towards the preparation of a Community Infrastructure Levy (CIL). Future developments would incur planning obligations to fund 'their share' of district-wide transport initiatives corresponding to the value of each particular site.
- 5.42 A number of local authorities are taking the CIL approach, and it is considered an appropriate approach for Bradford to secure the projects required to deliver the proposed growth in the AAP areas to 2030, and beyond. However, it should be recognised that CIL, while being a potential source of future funding to support delivery, will unlikely be sufficient on its own to enable delivery of major transport projects.

⁴ <http://www.bradfordchamber.co.uk/wp-content/uploads/CoreStrat-CIL-ViabilityConsultation-Sep14.pdf>

6 Delivery Plan

Programme for Delivery

Short term interventions

- 6.1 There are a number of interventions that can be delivered at relatively low cost and offer early 'wins' within the next 1-2 years.
- 6.2 Along Canal Road, proposals for the Stanley Road junction and the junction of Valley Road/Otley Road are directly linked with timescales for delivery of the New Bolton Woods development. Existing pinch point funding is being used to deliver the improvement to the Stanley Road junction as a catalyst for development. The scheme is on track for completion in 2015.
- 6.3 Further funding has been secured for cycling in the corridor. City Region funding for CityConnect2 will enable delivery of the 2.5km extension from the Leeds-Bradford route between Forster Square Rail Station and the Greenway on the National Cycle Network.
- 6.4 Similarly, at the northern end of the corridor, DfT Cycle Route Information Fund and Shipley Hubs Money from the Local Transport Plan will help complete the link from NCN Route 66 to Shipley.
- 6.5 Permission has also been granted for the foodstore development, Shipley Exchange, at Crag Road. This will provide additional commuter parking for Shipley rail users and local highway improvements.

Medium/longer term interventions

- 6.6 Schemes funded by WY+TF will be delivered by 2021. In the medium term, the dualling of Canal Road between Stanley Road and Hillam Road junctions should be delivered alongside delivery of the New Bolton Woods development. This will prepare Canal Road for the need to accommodate future demand for road traffic in the corridor.
- 6.7 In addition to further parking for rail users in Shipley being provided by the Crag Road foodstore development, the Shipley Station Car Park Improvements will increase existing on-station parking capacity and provide better connections between the station and the town centre for cyclists and pedestrians. Increased capacity at the Leeds Road/Crag Road junction will also support developments along Crag Road.
- 6.8 Also in the medium term, the aim should be to complete the cycle route between the city centre and Shipley, partly already provided by the Greenway. Improvement to the section between the city centre and Stanley Road is addressed above.

- 6.9 Further north, cyclists are routed along Valley Road between the Tesco store and Queen's Road. Although not heavily trafficked, this is an acknowledged rat run for cars avoiding the busy parallel section of Canal Road, despite regular speed bumps along the route. Relatively free flowing traffic along this section, coupled with parked cars along most of the route make conditions difficult for cyclists. It is recommended that opportunities to restrict through traffic on this route are considered, while retaining existing on-street parking. Furthermore, there is an existing toucan crossing of Queen's Road but general conditions for cyclists at the junction with Valley Road are poor. Current off-road cycle tracks are not wide enough, or sufficiently segregated from pedestrians, to create a high quality route for cyclists. As such, reconfiguration of provision for cyclists and pedestrians at this junction is recommended. Irrespective of whether the restriction to through traffic is imposed.
- 6.10 Finally, the Council should continue to support Connecting Airedale initiatives and, in particular, safeguard routes for the Shipley Eastern Relief Road. Funding to develop this scheme will be pursued as and when opportunities arise.

7 Recommendations

7.1 In a number of cases, there has been a limit to the level of detailed analysis that could be undertaken as part of this study, and areas for further work have been identified. In some cases, restrictions are linked to the age of the district traffic model, where in other cases work is outside the scope of the current study.

7.2 Aside from recommendations for additional analysis, it is also recommended detailed transport planning (including highways development control) commentary is added to each site allocations proposal statement, to address site specific impacts upon the highway, pedestrian, cycling and public transport network. This will give developers and landowners sufficient guidance on any potential impact of a development scheme and how best to overcome it.

Better Models

7.3 The SATURN model used as the basis of much of the analysis is getting old. In Appendix B it is acknowledged that there are some significant differences between observed and model flows both within the City Centre and on links in the Canal Road corridor, with the model generally overestimating flow. In addition, traffic count data made available to the study has been collected in different years. While it has been recognised that model flows are higher than observed when predicting growth in traffic levels to 2030, an upgrade to the model should be considered. Ideally the upgrade should include highways, public transport and mode shift, but it should be possible to upgrade in stages, starting with the highway model.

7.4 Model upgrades can involve significant levels of data collection, such as traffic counts on links and junctions, origin-destination surveys and journey time surveys. While this can be costly and time consuming, progress in the use and understanding of 'big data' to create a pattern of traffic conditions across an defined area should present opportunities for reductions in costs over time.

7.5 There is also merit in further analysis of impacts of growth on individual junctions. Our analysis of key traffic routes through Shipley and the Canal Road Corridor has highlighted that the following junctions will become more congested by 2030.

- Queen's Road / Manningham Lane
- Shipley Airedale Road / Bolton Road
- Queen's Road / King's Road
- Valley Road / Briggate, Shipley
- Otley Road / Leeds Road, Shipley

7.6 A more detailed study of current operation, through new surveys and more detailed modelling, is recommended to establish any scope for increasing capacity through, for

example, reconfiguration of signal timings or to establish the amount of land that would be required to accommodate future growth in traffic in these part of the network.

- 7.7 Detailed junction analysis should be carried out using the Canal Road Aimsum model. This is a microsimulation model developed for the Council to a base year of 2013, and was the model used to inform the transport assessment for the outline planning application for the New Bolton Woods development proposals.

Conclusion

- 7.8 The conclusion of this transport study is that demand levels associated with AAP sites, and growth up to 2030, can be accommodated in the Shipley and Canal Road Corridor, so long as each of the committed and proposed schemes are taken forward and that access to major new sites are designed to encourage all modes and to accommodate traffic associated with those sites.

A Future Demand for Travel

Growth in Demand

- A.1 For the City Centre AAP and the Shipley and Canal Road Corridor AAP, City of Bradford MDC published an Issues and Options Report in March 2013 which identified and quantified numerous sites for development in each of the areas.
- A.2 Although this report is specifically concerned with transport issues for the Shipley and Canal Road Corridor AAP, the level of development proposed in the city centre cannot be ignored as it will generate new trips which interact with traffic in the corridor. As such, this chapter provides details of development in each AAP area.
- A.3 There follows a list of those development proposals to which specific quantum of changes in land-use, and associated increase in demand, can be allocated.
- City Centre
 - Various residential development sites
 - Broadway Shopping Centre development (on track for completion late 2015)
 - Shipley and Canal Road Corridor
 - New Bolton Woods development (1000-1200 homes)
 - Bolton Woods Quarry (800-1000 homes)
 - Shipley East residential proposals (100 homes)
 - Dockfield Road Area proposals (400 homes)
 - Mixed use development in Shipley town centre (150 homes)
- A.4 Included in the list, are a number of sites identified for residential development in the Shipley and Canal Road Corridor. Planning permission has been granted for Shipley East and the application has been submitted for New Bolton Woods. The distribution of these sites across the corridor is shown in Figure A.1.

Specific development trips

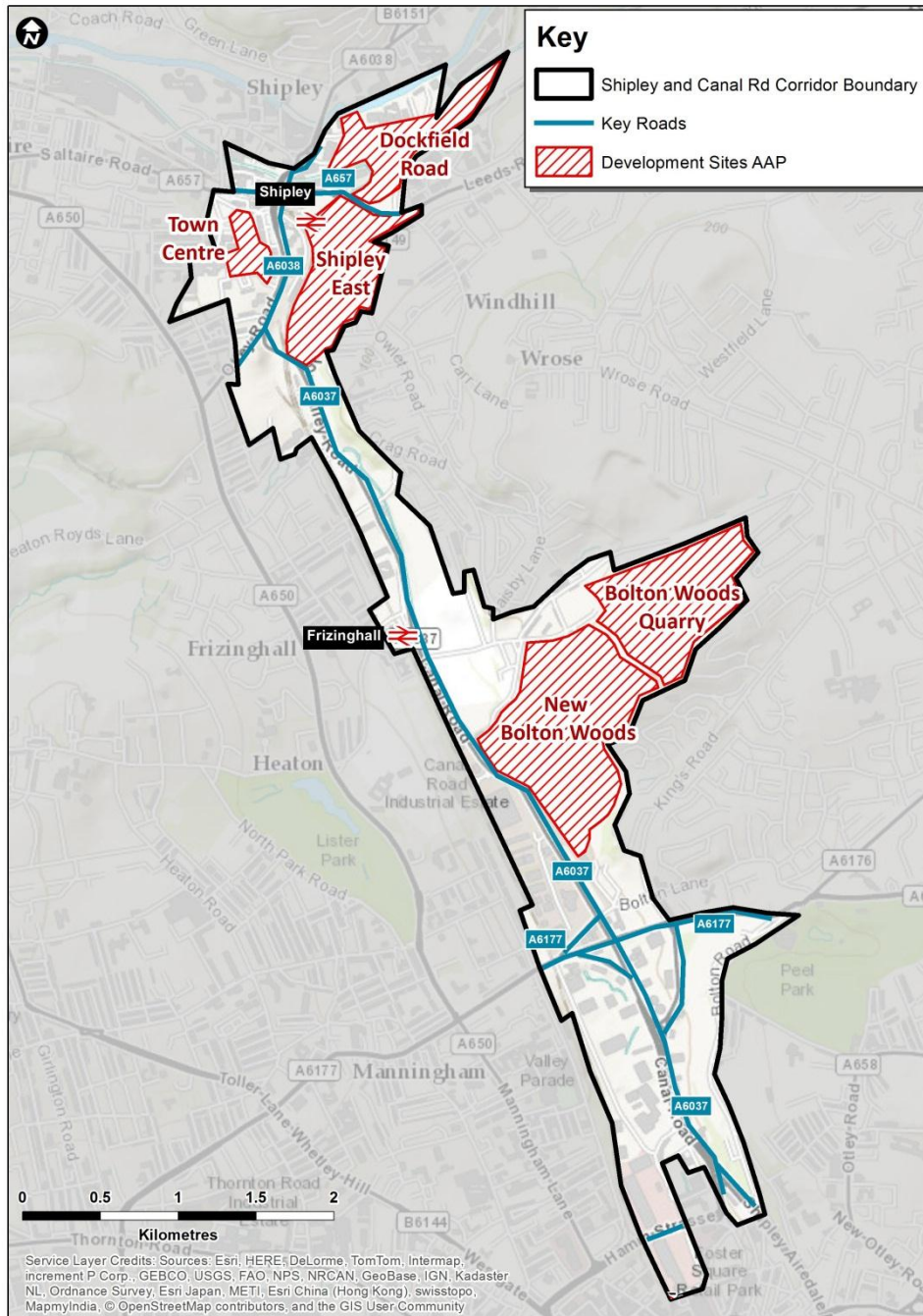
- A.5 To estimate the number of trips associated with this level of new development, TRICS has been used to select residential development sites for a mix of tenures in the Yorkshire region. It is not known what type of residential development is proposed for each zone, so a weighted average trip rate has been derived across houses, flats and mixed use sites, both private and for rent. The following table provides the resulting vehicle trip rates, per unit, derived.

Table A.1: Trip rates – residential developments

Trip rates, per unit – residential	IN	OUT
AM peak	0.088	0.217
PM peak	0.189	0.150

A.6 The above trip rates are relatively low for residential developments. However, it is reasonable to expect that car trips to/from the city centre will be relatively low given the level of public transport accessibility and proximity to jobs and services in Bradford and Shipley.

Figure A.1: Sites identified for potential residential development in the Shipley and Canal Road Corridor



A.7 Application of the trip rates in Table A.1 across all city centre residential sites is expected to generate the following numbers of additional trips. As shown, the greatest impact is expected

in the PM peak. The table also shows increases in traffic levels out of city centre residential sites in the morning, and back in the evening, despite being aimed at ‘city living’ and a high level of public transport accessibility and proximity to jobs. This is partly countered by the use of relatively low traffic trip rates (see A.6) but it should also be noted that although high levels of additional outbound car trips are predicted in the morning peak, these are predominantly trips forecast to be made to parts of the district beyond the immediate city centre, rather than to destinations outside the district.

Table A.2: City Centre trips – residential sites

Total trips – city centre residential	IN	OUT
AM peak	432	1061
PM peak	927	735

A.8 Total trips to and from the Broadway Shopping Centre development have been taken directly from the 2011 transport Assessment prepared by WSP⁵, and it has been agreed that the distribution of those trips should be based on trips to and from the Forster Square Retail Park.

Table A.3: City Centre trips – Broadway Shopping Centre

Broadway trip generation	IN	OUT
AM peak	160	1
PM peak	94	433

A.9 The main development along the Canal Road corridor is New Bolton Woods, which will deliver 1200 new homes, 3000m² GFA of new retail, 1500m² commercial and a new school for 200 pupils. The most recent analysis of the development’s impacts on Canal Road is described in Fore Consulting’s Aimsun Modelling Report from June 2014⁶ and includes the following trip forecasts.

Table A.4: Canal Road trips – New Bolton Woods development

New Bolton Woods Trip Generation	IN	OUT
AM peak	278	519
PM peak	564	397

A.10 The modelling of these trips has assumed the distribution to/from the site described in the same Aimsun modelling report. The same proportions are assumed for each peak and for each direction of travel.

⁵ Westfield Shoppingtowns Limited – Broadway, Bradford – Transport Assessment (WSP, July 2011)

⁶ New Bolton Woods Development, Aimsun Modelling Report, Version 0.1, Draft (Fore, June 2014)

Table A.5: Trip distribution – New Bolton Woods development

Route Section	%
North via Canal Road	25
North and east via Gaisby Lane	10
East via Kings Road	15
South via Canal Road	40
West via Frizinghall Road	10
Total	100

A.11 The same methodology has been used to derive a forecast for the residential elements of the New Bolton Woods development. These have been used to derive forecast of the number of trips to and from the proposed Bolton Woods Quarry site, a longer term proposal for 1000 new homes to the north-east of New Bolton Woods.

Table A.6: Canal Road trips – Bolton Woods Quarry development

Bolton Woods Quarry Trip Generation	IN	OUT
AM peak	158	393
PM peak	372	226

A.12 Finally, guidance on other development in the Shipley and Canal Road Corridor AAP area has been taken from the Issues And Options Report.

A.13 For Shipley Town Centre, the stated proposals are largely for “increases” in the retail, leisure and business offer. However, 150 new residential units are identified as part of mixed use redevelopments which will be added as specific growth in the town centre.

A.14 At Shipley East, there are proposals for up to 100 new homes to the east of the rail station, with a further 400 homes in the Dockfield Road area to the north east of the town centre. Again, these were added to the model as specific growth zones.

A.15 The trip rates for those increases in residential development outlined above, are taken from those used in the New Bolton Woods analysis and result in the following increase in demand.

Table A.7: Shipley trips – residential sites

Total trips – Shipley residential	IN	OUT
AM peak	103	255
PM peak	242	147

A.16 Overall, the numbers of trips associated with specific developments in each of the two AAP areas is summarised in Table A.8. As described earlier, additional outbound car trips predicted in the morning peak are predominantly trips forecast to be made to parts of the district beyond the immediate city centre, rather than to destinations outside the district.

Table A.8: Total trips – all specific development combined

Total trips – AAP developments	IN	OUT
AM peak:		
City Centre	592	1062
Shipley and Canal Road Corridor	539	1167
All Trips	1131	2229
PM peak:		
City Centre	1021	1168
Shipley and Canal Road Corridor	1178	770
All Trips	2199	1938

A.17 Although these forecasts seemingly represent a significant amount of additional traffic, the forecasts need to be considered alongside general predictions of traffic growth over the period between now and 2030. Where significant growth is concentrated in a relatively small number of sites, there is greater potential for impacts to be mitigated through the planning process and requirements for adequate access arrangements, contributions to public transport provision and the promotion of non-car modes of travel.

Background growth

- A.18 It has been agreed that the future year for assessment should be 2030 in line with the Core Strategy, which sets out the aims and objectives for sustainable development within the Bradford District for the next 15 years.
- A.19 Growth in traffic across the district up to 2030 is taken from standard guidance, and adjusted to account for traffic specifically associated with the major developments outlined above.
- A.20 Revised factors are calculated to be 1.26 in the morning and 1.21 in the evening peak.
- A.21 In effect, this demonstrates that while growth in the two AAP areas will increase demand for travel in those specific areas, the new trips associated with these proposals fall comfortably within the overall growth expected to be delivered in the district over the assessment period.

Non-car modes

- A.22 Background growth and growth associated with specific development sites will impact on public transport demand as well as the number of future car trips on the network.
- A.23 In 2014, the following table shows the number of people crossing into the city centre along the Shipley and Canal Road Corridor by different modes across each of the morning and evening peak periods.

Table A.9: Canal Road Corridor, by mode, 2013

	Pedestrians	Cyclists	Motorcyclists	Car	Bus
<u>AM Peak</u>					
Canal Road Corridor	294	71	36	9021	1502
<u>PM Peak</u>					
Canal Road Corridor	287	50	23	8308	1546

A.24 General growth across the district up to 2030 is predicted to be +35% in the AM peak and PM peak. Applying these to current bus demand across the corridor gives the following predictions

of overall increases in peak hour trips. The morning peak period represents 0700-0930 and the PM peak is 1600-1800.

Table A.10: Predicted increase in Canal Road corridor bus use, 2030

	Peak Period - Bus	Peak Hour – Bus
AM Peak		
Canal Road Corridor	526	210
PM Peak		
Canal Road Corridor	541	271

- A.25 These forecasts present a significant increase in bus passengers by 2030, in both the AM and PM peak hour.
- A.26 In addition, these forecasts are based on the assumption that current mode shares will remain unchanged in future years. Of course, if we are successful in reducing car use there will be an uplift in the predictions in over time.
- A.27 For these forecasts of additional public transport demand to be realised, investment in new public transport capacity will be required.
- A.28 Rail passenger data also shows strong growth in recent years at Shipley, although numbers using Frizinghall are more static. Observed passenger growth at Shipley was as high as 30% between 2008/09 and 2012/13. If growth in passengers continues at this rate, there will be increase in demand for car parking at the station which would not be met by the current station car park capacity.
- A.29 Data held by West Yorkshire Combined Authority, provided by network Rail, indicates that the average occupancy of trains arriving into Bradford Forster Square between 0730 and 0900 in the morning peak is 100 passengers. The capacity of trains operating those services is 360 seated, plus standing room. As such, there is spare capacity on existing rail services to accommodate additional passengers.

Table A.11: Annual rail passenger numbers – Shipley and Frizinghall railway stations

Station	2008-09	2009-10	2010-11	2011-12	2012-13
Shipley	1,275,264	1,303,096	1,482,972	1,531,872	1,666,542
Frizinghall	359,146	353,326	384,626	389,820	375,240

Impact of growth

Impact on the roads

- A.30 The Bradford SATURN model has been used to assess the impact of growth in demand on the highway network in 2030. Assessment has been undertaken for both the AM and PM peak hour and it has been observed that flows in the base year model are high compared to current traffic levels. This has been acknowledged when applying growth.

A.31 Specific infrastructure proposals associated with the Broadway Shopping Centre, New Bolton Woods and Shipley East developments are included in the model network. These can be summarised as:

- Broadway Shopping Centre
 - A new signalised junction on Hall Ings to provide access and egress to/from the Broadway car park;
- New Bolton Woods
 - A6037 Canal Road / Stanley Road junction – signalisation and provision of pedestrian crossing facilities, and provision of additional lane on Stanley Road approach and two lanes for through traffic on each of the Canal Road approaches (this is being delivered);
 - A new access to the site via an upgrade of the A6037 Canal Road/Hillam Road junction to provide signal control and a new approach road from the site, with right turn lanes in both directions from Canal Road; and
- Shipley East
 - A6037 Valley Road / A6038 Otley Road junction – additional right turn lane on Canal Road approach to provide double right turn to Otley Road.

A.32 A more detailed description of the use of the SATURN model is provided in Appendix B.

A.33 Assigning updated 2030 demand to the existing network, updated to reflect specific infrastructure improvements associated with Broadway, New Bolton Woods and Shipley East, results in increased demand on most routes within the City Centre AAP and Shipley and Canal Road Corridor AAP areas.

A.34 This initial assignment of future year demands identified a number of locations where significant queues/delays would arise if growth was permitted without mitigation. In the most extreme cases definite proposals can be identified, as described below, and these have been included in all future modelling. In other cases, major land take would be required to increase physical capacity at junctions and, apart from optimisation of signal timings where applicable, no solutions are proposed at this stage. A discussion of base mitigation required to accommodate growth is provided below.

- Canal Road – increases in flows along the Canal Road Corridor creates additional pressure on the Canal Road/Hillam Road junction as proposed as part of the New Bolton Woods development. Given the widening already being delivered on approach to the Stanley Road junction, the most appropriate solution is to dual Canal Road between the Stanley Road and Hillam Road junctions, rather than introduce further isolated widening at the Hillam Road junction alone.
- Leeds Road/Crag Road junction – without mitigation, significant increases in queues and delay are proposed at this junction. These findings support proposals for reconfiguration of the layout to this junction to provide a new roundabout, as part of the approved planning conditions for the Shipley East development. The proposals involve land-take at the west side of Crag Road and removal of the former library building.
- The Queen’s Road/Manningham Lane and Shipley-Airedale Road/Bolton Road junctions would both benefit from a programme of monitoring, with a view to potential re-optimisation of signal timings as trip patterns change in future years.

- A.35 Figures A.2 and A.3 show differences in flow in the Shipley and Canal Road Corridor AAP area between the Base Year and the 2030 Forecast Year for the AM and PM peak hour periods respectively.
- A.36 For each time period, the model predicts that additional demand will be spread across the whole network with increases in flow predicted over the next 15 years along Canal Road, Valley Road, Bradford Road and in Shipley. Growth in traffic will also result in general increases in flow away from the immediate corridor, in areas such as Saltaire.
- A.37 It is important to recognise increases in traffic in Saltaire and, although not shown, 2-way flows along A657 through the centre of Saltaire are forecast to increase by 160 per hour in each of the morning and evening peaks. This is equivalent to an increase of less than 3 vehicles per minute. It is also recognised that work to the Saltaire roundabout, as part of the Connecting Airedale initiative, has recently been completed.
- A.38 These increases in flow are reflected in Table 3.13 which provides a summary of changes in AM and PM peak hour flow on selected key routes within the two AAP areas and, in the case of Manningham Lane, competing routes.

Table A.12: Impact of growth on key routes

Key Routes	AM Peak flow (2-way)			PM peak flow (2-way)		
	Base	2030	Diff.	Base	2030	Diff.
City Centre						
Hall Ings, west of Bridge Street	1650	1880	230	1440	1920	480
Leeds Road, west of Shipley Airedale Road	1060	1740	680	1780	2510	730
Godwin Street, south of Thornton Road	3720	4460	740	3820	3880	60
Croft Street	3240	3930	690	2880	2990	110
Shipley Airedale Road, north of Barkerend Road	5010	5010	0	5110	5260	150
Hamm Strasse	2150	2320	170	2230	2460	230
Westgate	1910	2530	620	1970	2630	660
Thornton Road	1460	1810	350	1450	1570	120
Sunbridge Road	560	320	-240	490	600	110
Shipley and Canal Road Corridor						
Canal Road, south of Queen's Road	4150	4900	750	4500	4840	340
Valley Road, south of Queen's Road	340	270	-70	280	370	90
Manningham Lane south of Queen's Road	1600	1930	330	1830	2030	200
Canal Road, north of Queen's Road	2700	3200	500	3150	3340	190
Keighley Road, north of Queen's Road	2290	2750	460	2450	2740	290
Otley Road, Keighley Road-Valley Road	1500	1830	330	1520	1740	220
Bingley Road, north of Otley Road	1930	2230	300	2030	2600	570
Saltaire Road, Shipley	1720	1850	130	1890	1970	80
Briggate, Shipley	1990	2220	230	2230	2620	390

Figure A.2: Differences in flow – 2030 Forecast Year minus Base Year - AM peak hour

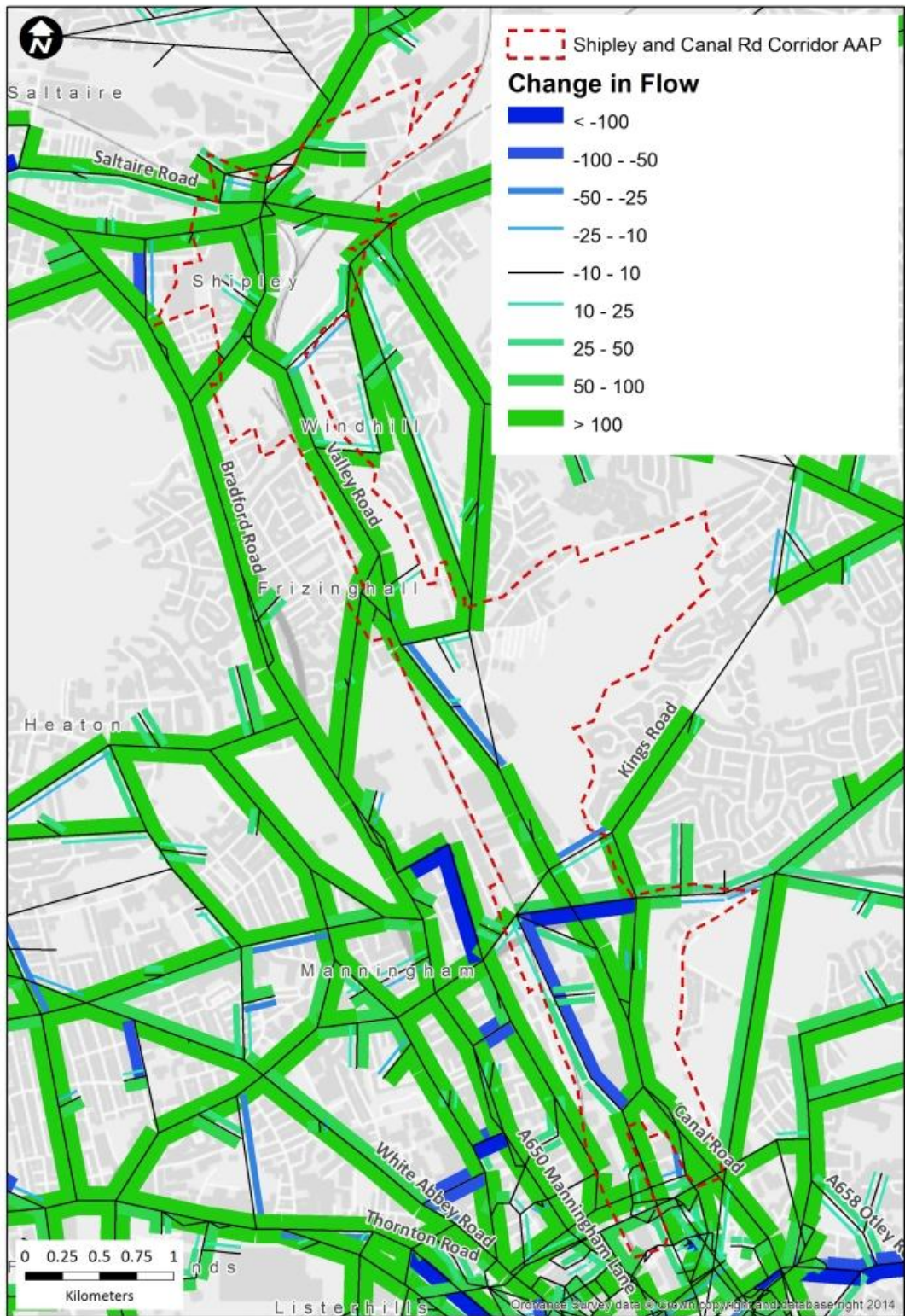
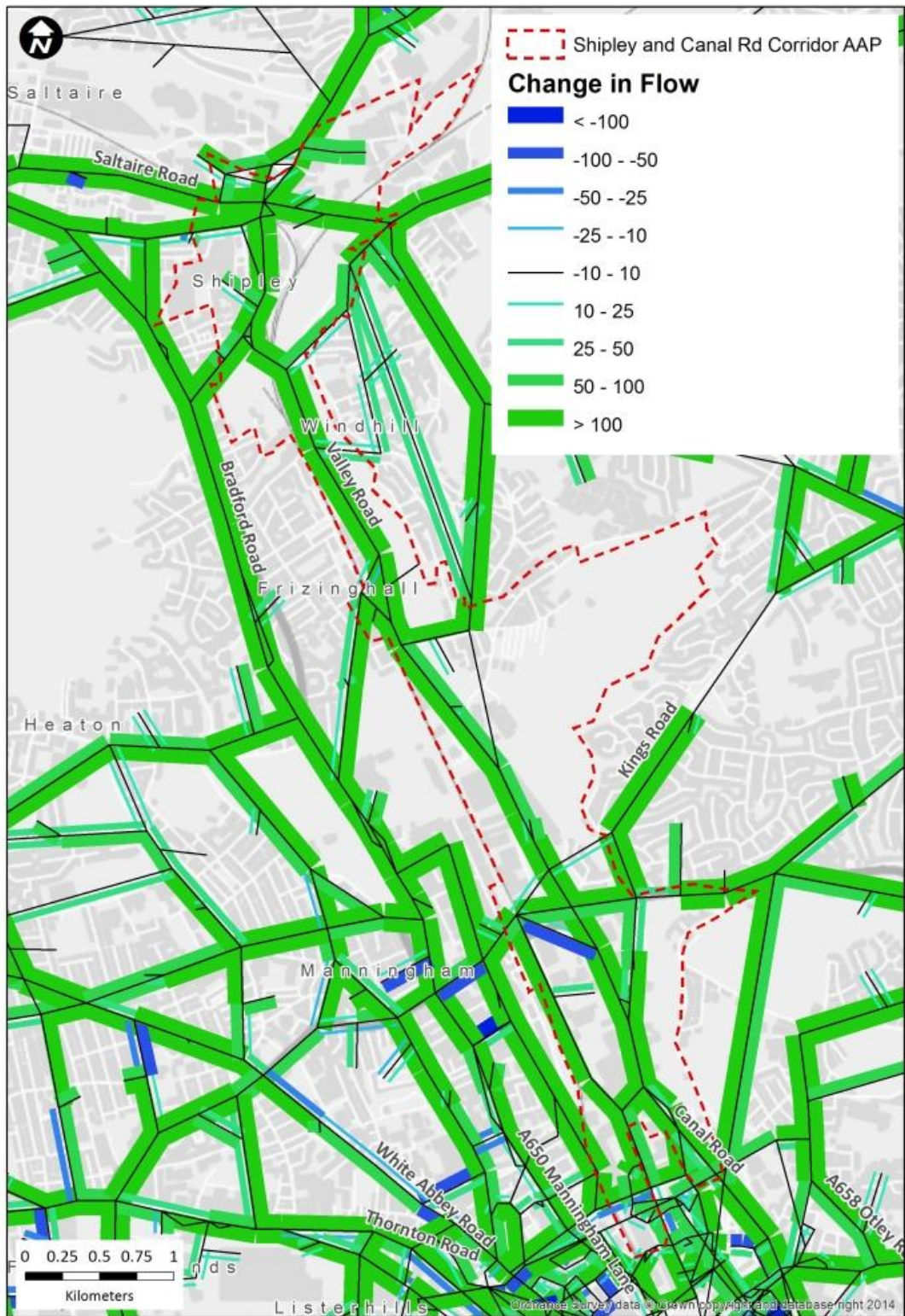


Figure A.3: Differences in flow – 2030 Forecast Year minus Base Year – PM peak hour



- A.39 The following figures show those parts of the network where the model predicts increases in delay. The figures suggest some increases in delay in the wider district, away from the two AAP areas under consideration. It is likely that these result from the application of growth in demand across the wider area. For this study, these impacts are noted but there has been no further analysis of the reasons for these delays.
- A.40 Within the Shipley and Canal Road Corridor, the future delays resulting from increased demand on the network in 2030 can be seen in three areas, broadly consistent with the three route sections highlighted in Figure 2.1.
- There are some increases in delay predicted in the City Centre Fringe area, close to where a number of city centre development proposals are located. In this area it must be ensured that appropriate mitigation is conditioned as part of the planning approval process.
 - Further north, some increase in queueing is predicted to develop along the Queen's Road corridor and particularly at the junction with King's Road.
 - In Shipley, peak hour delays are expected to increase at the junction of Briggate and Valley Road, and on approaches to the main Otley Road/Leeds Road junction in the centre of town.
- A.41 In summary, the modelling indicates that the Shipley and Canal Road Corridor network is likely to be able to accommodate the level of development proposed in both AAPs, although there will be impacts on certain junctions which will require future interventions or mitigation.

Figure A.4: Differences in delay (seconds) – 2030 Future Year minus Base Year – AM peak hour

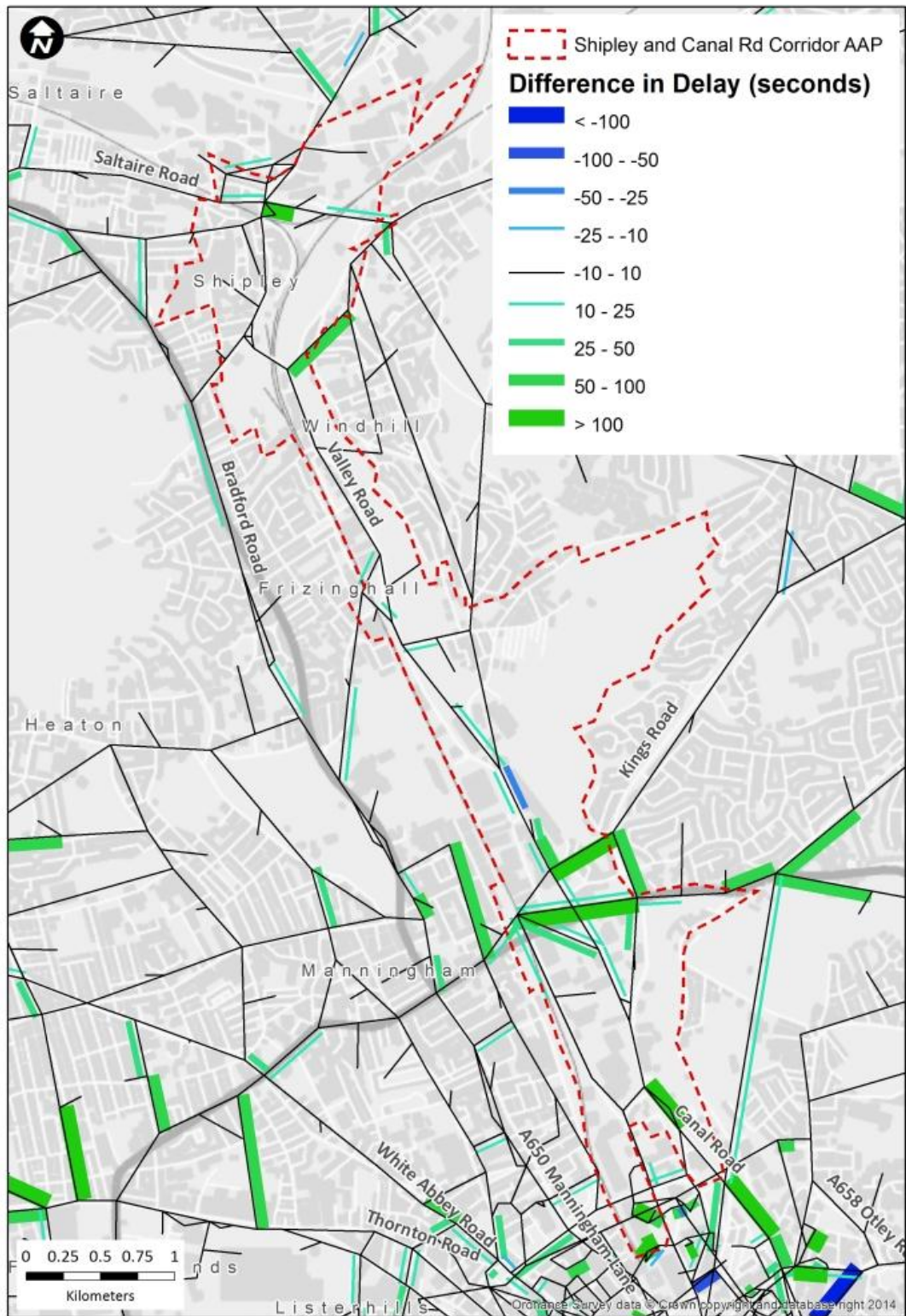
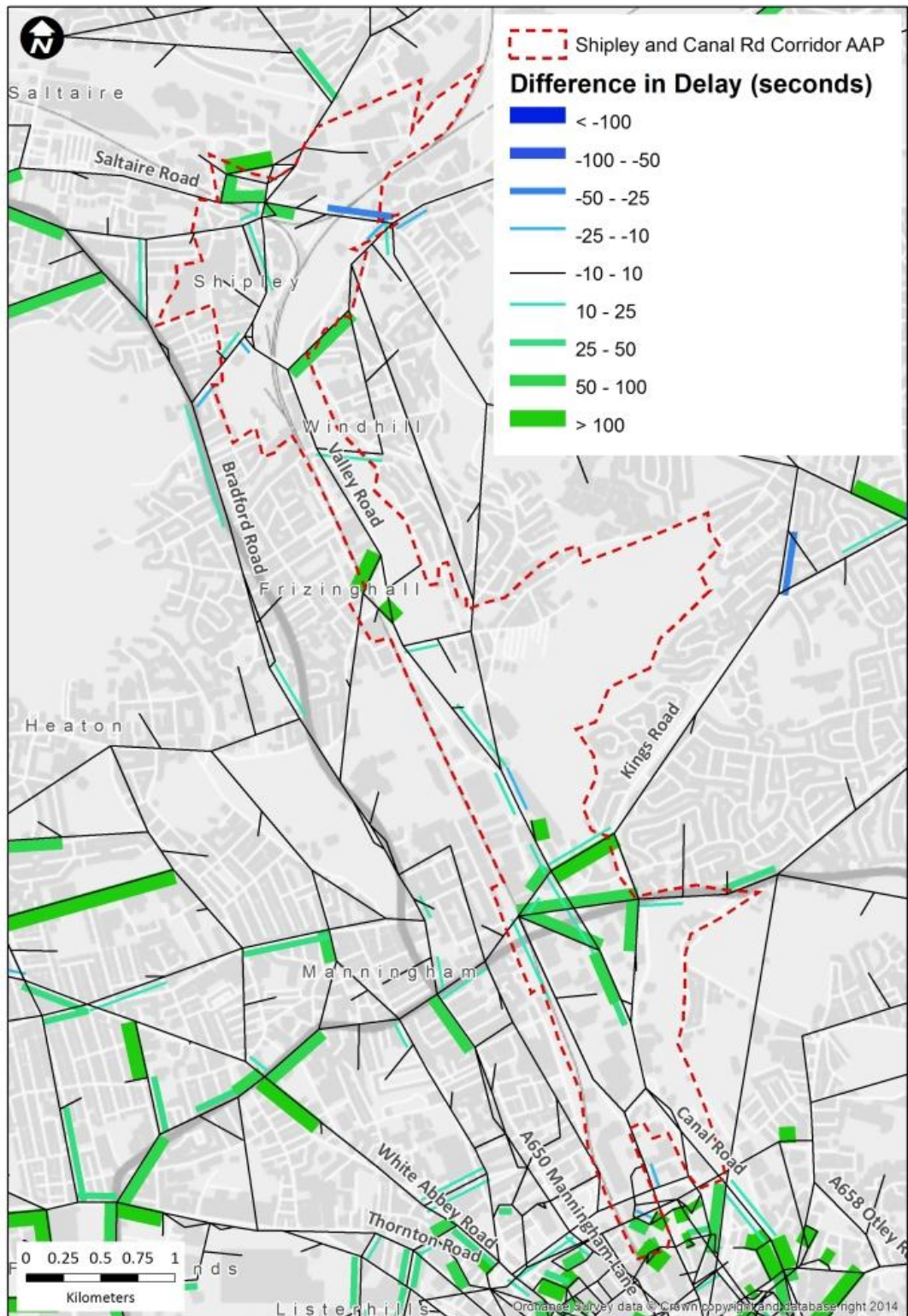


Figure A.5: Differences in delay (seconds) – 2030 Future Year minus Base Year – PM peak hour



Impact on public transport and walking/cycling networks

- A.42 Earlier in this chapter we provide broad estimates of future public transport demand and conclude that investment in bus capacity will be required for these forecasts to be realised. There is every reason to also assume that AAP development sites will generate additional walking and cycle trips too, and improved access to Shipley and Frizinghall stations should be delivered.
- A.43 This, of course relies on the mode shares in Bradford and along the Canal Road corridor remaining at current levels. Given the level of new residential development proposed for the corridor at New Bolton Woods and Bolton Woods Quarry, and the relative lack of existing bus provision along the corridor, we must target for increased bus provision and corresponding mode share as a condition of development approval. Main residential sites in the corridor must be designed to ensure that bus access is achievable.
- A.44 In the busiest direction of travel, the trip generation forecasts presented earlier in this chapter indicate that New Bolton Woods, Bolton Woods Quarry and Shipley sites will between them generate 1150-1200 additional car trips onto the network. At current mode share, this equates to between 1400 and 1450 total trips across all modes, of which around 200 trips would be by bus. Assuming an average number of peak hour passengers by bus, this would require 4 additional buses along Canal Road, in each hour, to maintain currently achieved mode shares. If target mode shares of 20% could be achieved, similar to shares crossing into the city as a whole, the number of bus users would increase to close to 300, requiring 6 new buses per hour.
- A.45 Table A.10 shows current totals of 121 cyclists into city in the AM Peak and out again in the PM peak along the Canal Road corridor. Improved cycle facilities, either from direct initiatives linked to development proposals or through the completion of the Greenway route should be expected to increase cycle use along the corridor beyond existing levels.
- A.46 The provision of extra peak hour buses and improved cycle and walking connections to and from new developments in the Shipley and Canal Road Corridor should be funded by developer contributions. It is recommended that Section 106 contributions, or equivalent, are secured from new sites, or those currently in the planning process, to support the delivery of initiatives required to promote the continued growth in non-car modes of transport.

Summary of key issues relating to increased demand for travel

- Movements into and out of the City from the north will become restricted without additional capacity provided on Canal Road, particularly between Stanley Road and Hillam Road.
- Key junctions should be further investigated to identify potential for re-configuration, to accommodate increased traffic.
 - Queen's Road / Manningham Lane
 - Shipley Airedale Road / Bolton Road
 - Queen's Road / King's Road
 - Valley Road / Briggate, Shipley
 - Otley Road / Leeds Road, Shipley
- New bus services will be required to serve new housing development at New Bolton Woods and Bolton Woods Quarry, and to achieve target mode shares of 20% by bus in the corridor.

- There is a need for improved cycle and walking routes, and connections to existing routes in Shipley town centre and along the Canal Road corridor, including Frizinghall Station, to encourage continued growth in cycle use.
- Increased growth in rail will require additional car parking capacity at Shipley railway station. This part of the rail network, between Shipley and Forster Square, has the capacity to accommodate additional growth in rail passenger numbers.

B Use of the SATURN Model

The Base Model

- B.1 The Base Model provided by CBMDC for use in this study represents AM (08:00-09:00) and PM (17:00-1800) conditions in 2013. Although the model is set up to represent 3 user classes (UC), the third class is blank. Effectively the model includes cars and vans as UC1 and heavy goods vehicles as UC2.

	Time period	AM Peak	PM Peak
Matrix Filename		BW_A_2013_DN.ufm	BW_P_2013_DN.ufm
UC1 trips		96253.7	121313.7
UC2 trips		33113.1	42502.5
UC3 trips		0	0
Total Base Demand		129366.8	163816.2

- B.2 The following table presents summary statistics from the Base Model.

	Time period	AM Peak	PM Peak
Total Travel Time (pcu hrs)		39,467	50,702
Ave time per trip (hrs)		0.31	0.31
Total Travel Distance (pcu kms)		1,727,237	2,244,650
Ave distance per trip (kms)		13.35	13.70
Average Speed (kph)		43.8	44.3

Base Model Validation

- B.3 Although total time and distance on the network is greater in the PM peak than the AM peak, this is totally a result of the greater overall matrix demand; average values per trip are essentially the same in each time period. The average journey time is 0.3 hours (18 minutes) and the average distance is between 13 and 14 km.
- B.4 In addition to the model, CBMDC provided a collection of traffic counts over a period between 2010 and 2013.
- B.5 The following table provides a summary comparison of model flows against observed data for parts of the network in both the City Centre and along the Canal Rd corridor.
- B.6 As shown, there are some significant differences between observed and model flows on City Centre links, with the model generally overestimating flow even accounting for differences in the year of each count.
- B.7 Along the Canal Road corridor, a much closer match is achieved.

<u>Qty Centre</u>														
			A-node	B-node	AM Obs	AM Mod	Abs	%	geh	PM Obs	PM Mod	Abs	%	geh
Bolton Lane	Sep-10	EB	1789	7106	141	16	-125	-89%	14.11	332	19	-313	-94%	23.63
		WB	7106	1789	82	2	-80	-98%	12.34	32	6	-26	-81%	5.96
Skipton Rd slip	Apr-11	NB	1759	1789	202	94	-108	-53%	8.88	122	75	-47	-39%	4.74
		SB	1789	1759	75	1	-74	-99%	12.00	89	7	-82	-92%	11.84
Canal Rd, s of A6177	Apr-12	NB	1737	1759	1309	1751	442	34%	11.30	1150	1988	838	73%	21.16
		SB	1759	1737	1208	1061	-147	-12%	4.36	1050	1057	7	1%	0.22
Canal Rd, s of King's I	Oct-13	NB	2296	1741	1591	1832	241	15%	5.83	1483	2652	1169	79%	25.71
		SB	1741	2296	1820	2233	413	23%	9.17	1471	1794	323	22%	7.99
Canal Rd, s of Valley I	May-12	NB	2295	2296	1536	1778	242	16%	5.95	1751	2108	357	20%	8.13
		SB	2296	2290	1844	1634	-210	-11%	5.04	1531	1871	340	22%	8.24
Ham m Strasse	Nov-13	EB	2034	2031	656	405	-251	-38%	10.90	939	286	-653	-70%	26.39
		WB	2031	2034	785	698	-87	-11%	3.19	852	308	-544	-64%	22.59
Shipley Airedale	Mar-12	NB	2292	2294	1939	2268	329	17%	7.17	2312	2602	290	13%	5.85
		SB	2294	2292	2355	2394	39	2%	0.80	1835	2284	449	24%	9.89
Shipley Airedale	May-13	NB	2276	2281	2492	2280	-212	-9%	4.34	2343	1853	-490	-21%	10.70
		SB	2281	2280	2411	2655	244	10%	4.85	2351	2346	-5	0%	0.10
Wakefield Rd	Nov-13	NB	7150	1607	2018	2000	-18	-1%	0.40	1534	1922	388	25%	9.33
		SB	1607	7150	1356	1631	275	20%	7.12	1795	1773	-22	-1%	0.52
Godwin St	Nov-13	NB	2044	2060	992	978	-14	-1%	0.45	1011	978	-33	-3%	1.05
		SB	2060	2044	1005	1373	368	37%	10.67	1073	1407	334	31%	9.48
Hall lngs	Sep-10	EB	1989	1969	670	1032	362	54%	12.41	595	943	348	58%	12.55
		WB	1969	1987	527	416	-111	-21%	5.11	576	683	107	19%	4.26
Croft St wb only	Nov-13	WB	2273	1985	1466	1316	-150	-10%	4.02	1498	1812	314	21%	7.72
<u>Canal Road Corridor</u>														
Keighley Rd	Oct-11	NB	2166	4271	699	761	62	9%	2.29	927	913	-14	-2%	0.46
		SB	4271	2166	1072	1011	-61	-6%	1.89	864	708	-156	-18%	5.56
Bradford Rd	2013	NB	2167	2238	1005	913	-92	-9%	2.97	740	917	177	24%	6.15
		SB	2238	2167	341	1089	748	219%	27.97	628	796	168	27%	6.30
Valley Rd	2013	NB	1774	1775	951	1113	162	17%	5.04	1081	1482	401	37%	11.20
		SB	1775	1774	821	868	47	6%	1.62	961	1111	150	16%	4.66
Otley Rd	Jun-10	EB	2239	7380	511	607	96	19%	4.06	666	656	-10	-2%	0.39
		WB	7380	2239	675	947	272	40%	9.55	676	859	183	27%	6.61
Brigate	Sep-08	EB	1794	7624	879	949	70	8%	2.32	970	1075	105	11%	3.28
		WB	7624	1794	958	1041	83	9%	2.63	1081	1140	59	5%	1.77
Bingley Rd	May-10	EB	2173	7780	1361	1196	-165	-12%	4.61	1240	1155	-85	-7%	2.46
		WB	7780	2173	1137	1179	42	4%	1.23	1323	1636	313	24%	8.14

B.8 It has been agreed that the purpose of this study is not to revalidate the base model, but to understand any weaknesses and to recognise those weaknesses in future analyses.

B.9 In the morning peak, it has been calculated that model flows are approximately 5% greater than observed 2013 data, and this 'head start' is reflected when applying future growth to the base matrices. The corresponding figure in the PM peak is 8%.

Little Germany

B.10 The only update to the Base Model has been to better reflect network conditions in Little Germany (undertaken in respect of a separate query by Members with regards to flows in this part of the City).

B.11 The original Base Model network did not include the Vicar Lane connection between Leeds Road, Peckover Street (via Burnett Street) and Barkerend Road. This has now been included in the Base Model, as has the extension of Upper Park Gate to connect to Barkerend Road. Slightly further north, the Holdsworth Street connection between Canal Road and Bolton Road has also been added.

- B.12 Although the changes made to the network obviously impact on traffic routing through the Little Germany area, through the inclusion of additional model links, as shown below the impact on summary statistics across the network is negligible.

Time period	AM Peak	PM Peak
Total Travel Time (pcu hrs)	39,412	50,639
Ave time per trip (hrs)	0.30	0.31
Total Travel Distance (pcu kms)	1,727,741	2,245,114
Ave distance per trip (kms)	13.36	13.71
Average Speed (kph)	43.8	44.3

Future Year – Demand

- B.13 During the course of the study it has been agreed to model a future year representing 2030 conditions.
- B.14 For each of the future year development proposals described in Section 2, trips are added to the demand matrices according to the following summary table.

Development Proposal	AM in	AM out	PM in	PM out
City Centre – residential	432	1061	927	735
City Centre – Broadway Shopping Centre	160	1	94	433
Corridor - New Bolton Woods	278	519	564	397
Corridor – Bolton Woods Quarry	158	393	372	226
Corridor – Shipley	103	255	242	147
TOTAL	1131	2229	2199	1938

- B.15 By 2030, it is predicted that there will be 4,894 new residential units in the City Centre. For each site, the corresponding SATURN model zone is identified, and the relevant number of trips added to/from that zone.
- B.16 The City Centre zones to which development trips are added are:
5, 7, 12, 14-22, 27-29, 39, 41, 42, 422 and 423
- B.17 For all but one site, the distribution of new trips is assumed to according to the relevant existing zone to which the development is added. The large site on Sunbridge Road (CC/072, 400 dwellings) has been added to the model as a new zone (zone 431), on the basis that none of the existing zones adequately addressed the likely connection from that site onto the road network. The distribution of trips to that new zone is copied from an adjacent zone.
- B.18 The only commercial site to be considered in this analysis is the Broadway Shopping Centre development and total peak hour trip forecasts are taken from the 2011 Transport Assessment report prepared by WSP. Trips are added as a new zone 432.
- B.19 The TA report does not provide adequate information relating to the distribution of those trips and, as such, model distributions are taken from the Forster Square Retail Park zones. These zones provide a fairly wide spread of origins and destinations, including a proportion external to city, similar to what we might expect for Broadway. The Kirkgate Centre and other city

centre retail zones were also considered, but in each case the modelled distribution was more localised.

- B.20 In the Shipley and Canal Road Corridor the New Bolton Woods development will be added to the SATURN model as a new zone (433).
- B.21 Distribution of trips to/from the New Bolton Woods site has been taken from previous studies and are summarised in the table below. The same proportions are assumed for each peak and for each direction of travel, and these distributions are added to the SATURN model based on select link analyses on the relevant route section.

Route Section	%
North via Canal Road	25
North and east via Gaisby Lane	10
East via Kings Road	15
South via Canal Road	40
West via Frizinghall Road	10
Total	100

- B.22 New demand associated with the Bolton Woods Quarry deposit are also added as a new zone number 435. The distribution of those trips follows the pattern of trips to/from existing zone 101, representing established residential areas to the south of Wrose Road.
- B.23 For Shipley Town Centre, the stated proposals are largely for “increases” in the retail, leisure and business offer. However, 150 new residential units are identified as part of mixed use redevelopments which are added to zone 173 as specific growth in the town centre.
- B.24 At Shipley East, there are proposals for up to 100 new homes to the east of the rail station, with a further 400 homes in the Dockfield Road area to the north east of the town centre. Shipley East is added as new zone 434 and development at Dockfield Road is split equally between existing zones 220 and 419.

Future Year – Growth

- B.25 In addition to new trips associated with the major developments outlined above, there will be also be more general background growth in traffic across the district.
- B.26 TEMPRO Dataset 62 has been used to derive local production-attraction growth factors for car drivers in Bradford. In accordance with TAG Unit M4 guidance, these local factors are used to adjust NTM Regional Forecasts to derive factors for use in the 2030 modelling. The TAG formula is:

$$\text{Local Growth} = \text{NTM Region} * (\text{peak local} / \text{average day region})$$

B.27 The following table presents the various factors used and the resulting growth forecasts between 2014 and 2030 of 1.350 for each of the morning and evening peaks.

	AM Peak			PM Peak			Average Weekday		
	Prod	Att	Ave.	Prod	Att	Ave.	Prod	Att	Ave.
TEMPRO-Bradford	1.213	1.189	1.201	1.211	1.192	1.201	-	-	-
TEMPRO - Y&H	-	-	-	-	-	-	1.156	1.156	1.156
NTM – Y&H					1.300				
Growth Factor		1.350			1.350			-	

B.28 Before applying background growth, consideration must be given both to discrepancies between model flows and observed count data, and trips already added for major development proposals. In effect, the above factors represent a cap on growth in the district between 2014 and 2030.

B.29 Model flows are calculated to be 5% and 8% higher than observed in the morning and evening peak respectively. This has the effect of reducing the growth cap from 1.350 to 1.288 in the morning peak and 1.244 in the evening peak.

B.30 When accounting for development trips already added, the growth factor is reduced further to 1.26 in the morning and 1.21 in the evening. These factors are applied only to those zones to which specific new development related trips have not been allocated.

Future Year – Network

B.31 Inclusion of the Broadway Centre, and its associated access, requires the addition of a new signalised junction to be added to the model to reflect access to the centre car park off Hall Ings.

B.32 There are two committed highway schemes in the Shipley & Canal Road Corridor which are included in the future year network.

- A6037 Canal Road / Stanley Road junction – signalisation and provision of pedestrian crossing facilities, and provision of additional lane on Stanley Road approach and two lanes for through traffic on each of the Canal Road approaches
- A6037 Canal Road / A6038 Otley Road junction – additional right turn lane on Canal Road approach to provide double right turn to Otley Road

B.33 The New Bolton Woods development is added to the SATURN model as a new zone connecting to Stanley Road, Gaisby Lane, Kings Road and a new junction opposite Hllam Road.

B.34 Junctions to be improved as part of the proposals, and to be reflected in the future year model, are described in the Fore report as:

- A6037 Canal Road / Gaisby Lane
- A6037 Canal Road / Hllam Road
- A6037 Canal Road / Bolton Lane

B.35 The Bolton Woods Quarry site has been connected to the network at Gaisby Lane, Wrose Road and King’s Road.

B.36 Development in Shipley Town Centre and at Dockfield Road is added to existing zones and no additions to the network are required. At Shipley East, trips are assumed to assign along Crag Road.

Future Year – Assignment

- B.37 An initial assignment of the resulting future year model identified a number of ‘hot spots’ where improved highway infrastructure is considered critical to support growth in demand across the City Centre and Shipley & Canal Road Corridor network.
- Canal Road – dualling between the Stanley Road and Hillam Road junctions
 - Leeds Road/Crag Road junction – without mitigation, significant increases in queues and delay are proposed at this junction. An option should be found to reconfigure the layout and increase capacity at this junction, perhaps involving land-take at the west side of Crag Road.
 - The Queens’s Road/Manningham Lane junction and Shipley-Airedale Road/ Bolton Road junction both benefit from signal optimisation, without the need for any reconfiguration, in the PM peak.
- B.38 Increased demand for the Shipley-Airedale Road/Barkerend Road and Godwin Street/Thornton Road junctions is also identified, but no obvious improvements can be identified without the need for significant land-take and demolition. In the case of the Thornton Road junction, this helps make the case for the City Ring Road Extension proposals outlined below.
- B.39 The impact of future growth, and mitigation proposals, results in average speeds across the network reducing from 44kph to 40kph. The average time per trip increases slightly from around 18 minutes to 20 minutes, despite the average trip length reducing slightly across all trips.

Time period/Year	AM Peak		PM Peak	
	Base	2030	Base	2030
Total Travel Time (pcu hrs)	39,412	54,103	50,639	67,015
Ave time per trip (hrs)	0.30	0.33	0.31	0.33
Total Travel Distance (pcu kms)	1,727,741	2,152,063	2,245,114	2,687,899
Ave distance per trip (kms)	13.36	13.12	13.71	13.36
Average Speed (kph)	43.8	39.8	44.3	40.1

C Cycle Route Study



Canal Road-Stanley Road
to City Centre Cycle
Route Study

City of Bradford MDC

Report
July 2014

Our ref: 22669801
Client ref:





Canal Road-Stanley Road
to City Centre Cycle
Route Study

City of Bradford MDC

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Our ref: 22669801
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1 Stanley Road to City Centre

Introduction

- 1.1 This report has been prepared to review existing conditions and options for the routing of the cycle connection between Shipley and Bradford.
- 1.2 In broad terms it recommends that the current partially provided route using alternative parallel routes to Canal Road is the best routing. However, there are a number of key decisions about the quality of the cycle facilities and this will impact on the options for junctions.

Route quality aspirations

- 1.3 The review of the cycle connections along the Canal Road corridor has been undertaken with a view to consistency with work also being undertaken for the CityConnect route between Leeds and Bradford.
- 1.4 The aim of the CityConnect programme is to create an example of quality provision and it is recommended that similar standards are used for this route, namely;
 - Cyclists are segregated from traffic where there is significant threat.
 - 2m lane width for with-flow lanes
 - 3m for two way lanes
 - Junctions are treated to give cyclists provision
 - A continuous route is created.
- 1.5 The CityConnect route has 2 main types of cycle route provision:
 - Type 1 – a segregated cycle lane at the same level as the carriageway with a separator – mostly kerbed
 - Type 2 – a cycle track stepped down from the footway (100mm) but raised from carriageway by a kerb.

City Centre

- 1.6 One key area to be addressed is the opportunities for cycle routes and connectivity in the centre of Bradford.
- 1.7 The Leeds-Bradford CityConnect route enters the city from the east, and there is also some connectivity with Thornton Road for a western route which connects with the city park.
- 1.8 It would be an opportunity lost if the Canal Road route did not connect to each of these.
- 1.9 Figures 1.1 provides a summary of options between City Park and the termination of the CityConnect route and Figure 1.2 illustrates onward connections to Forster Square railway station.
- 1.10 Leaving City Park towards the north cyclists will face a choice of routes. Arguably the most direct route is via Market Street, and despite the high level of activity along this route, particularly buses, it is thought that regular, confident cyclists may take this option. An option that is completely segregated from motorised traffic is offered by the route through the heritage streets area along Tyrell Street and Hustlergate. This is a pedestrianised area and is the route favoured by CBMDC. A sketch of this section of route is provided in Appendix A.
- 1.11 A further option for cyclists exists along the existing cycle lane on Broad Street, picking up the pedestrianised section of Braodway and reconnecting to the northern end of Market Street alongside the Westfield Centre.
- 1.12 The current proposals for the Leeds to Bradford CityConnect route terminate at Lower Kirkgate.
- 1.13 Connections to Forster Square from the city can be made via Cheapside and then via the cobbled approach to the station to the rear of the Midland Hotel. From the north or east, cycle signage off Valley Road should be provided.
- 1.14 Proposals to restrict the use of Lower Kirkgate to buses, taxis and cyclists only will benefit not only connections for cyclists between the city and Valley Road, but also the western end of the CityConnect route.
- 1.15 There is the potential to convert the section of Valley Road to the south of St Blaise Road to bus and cycle use only, depending on redevelopment of the Sorting Office site. Furthermore, conflict between cyclists and vehicles entering Forster Square station at the St Blaise roundabout could be reduced through the closure of Leeming Street to through traffic. Sketch drawings of these proposals are provided in Appendix A.

Figure 1.1: City Park to Lower Kirkgate

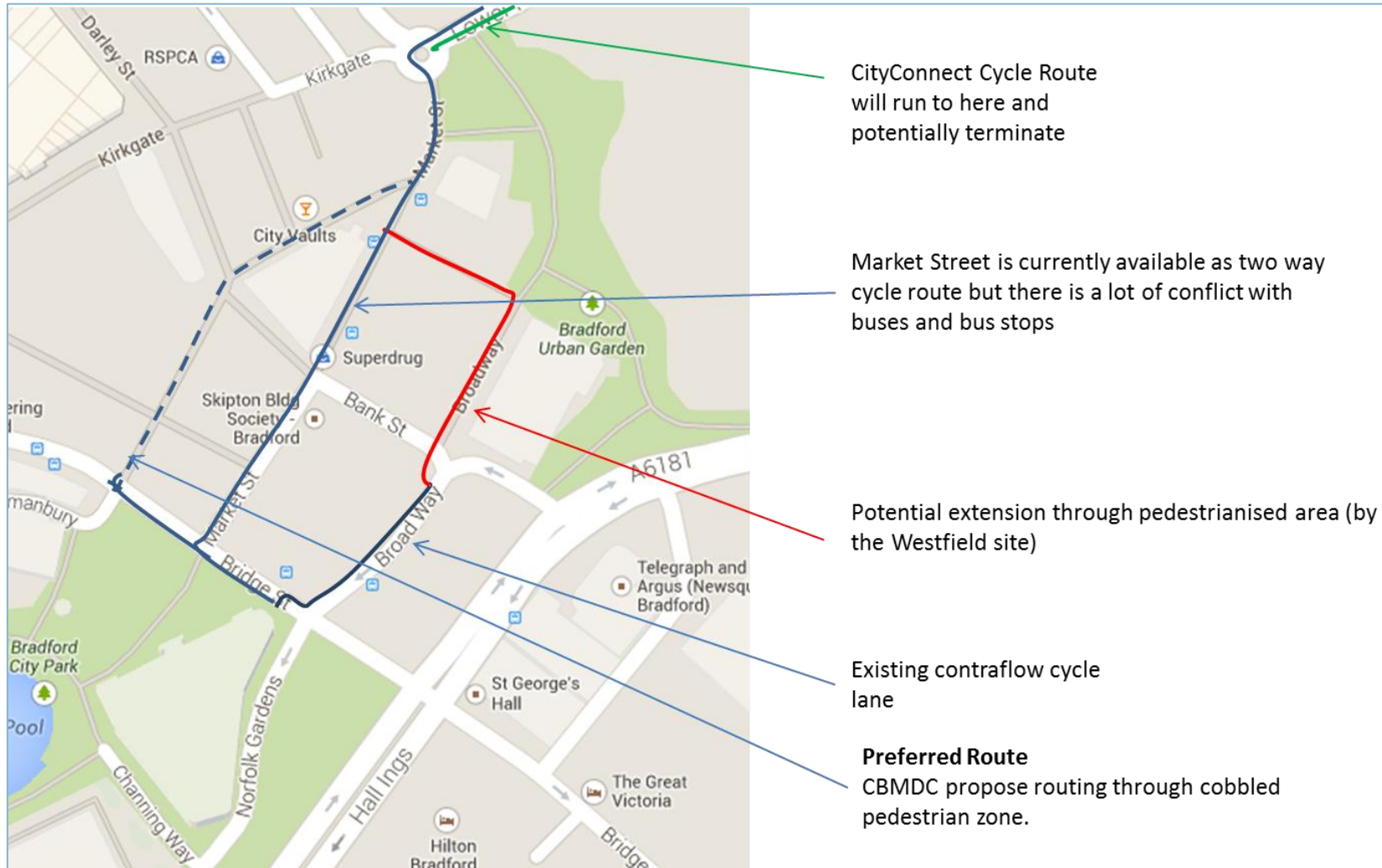
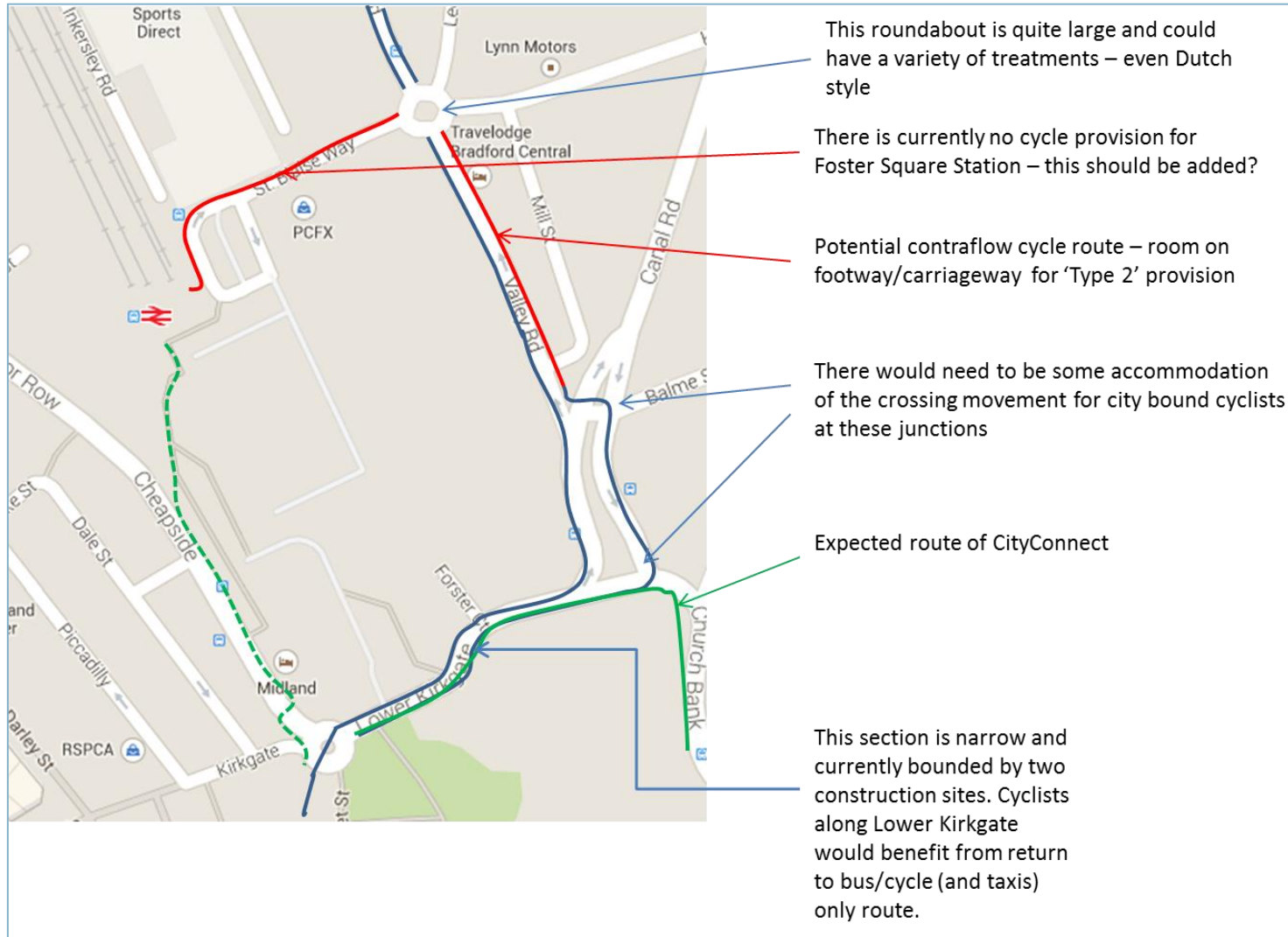


Figure 1.2: Lower Kirkgate to Forster Square



Valley Road

- 1.16 Valley Road provides access to the Forster Square Retail Park car parks and there is a degree of conflict between cyclists and traffic entering/exiting these car parks.
- 1.17 The route also crosses Hamm Strasse, a major east-west traffic route across the north of the city centre. This is a large signalised junction with multiple lanes on each approach.
- 1.18 Currently, inexperienced cyclists (and pedestrians) must make multi-stage crossings on all arms of the junction. Valley Road has an advanced stop line for northbound cyclists but this would be difficult to access for inexperienced cyclists.

Figure 1.3: Valley Road – Advanced Stop Line (Northbound)



- 1.19 Figure 1.4 below recommends cycle lanes on each side of the road along the length of Valley Road between the railway station to a point beyond the retail parks. Appendix A provides a sketch drawing of enhanced on-carriageway cycle lanes on Valley Road, along with improved options for cyclists at the Hamm Strasse junction.
- 1.20 Figure 1.5 shows the continuation of Valley Road past Tesco and on towards Queen’s Road. This is a route with parking along much of the western side and carrying a significant amount of rat-running traffic. Opportunities to restrict through traffic on this route would benefit cyclists, to the extent that existing parking could be retained.
- 1.21 The third sketch in Appendix A shows potential reconfiguration of the roundabout access to the retail park, along with options for a point closure on Valley Road, north of Tesco, to restrict through movements for vehicular traffic.

Figure 1.4: Valley Road, crossing Hamm Strasse

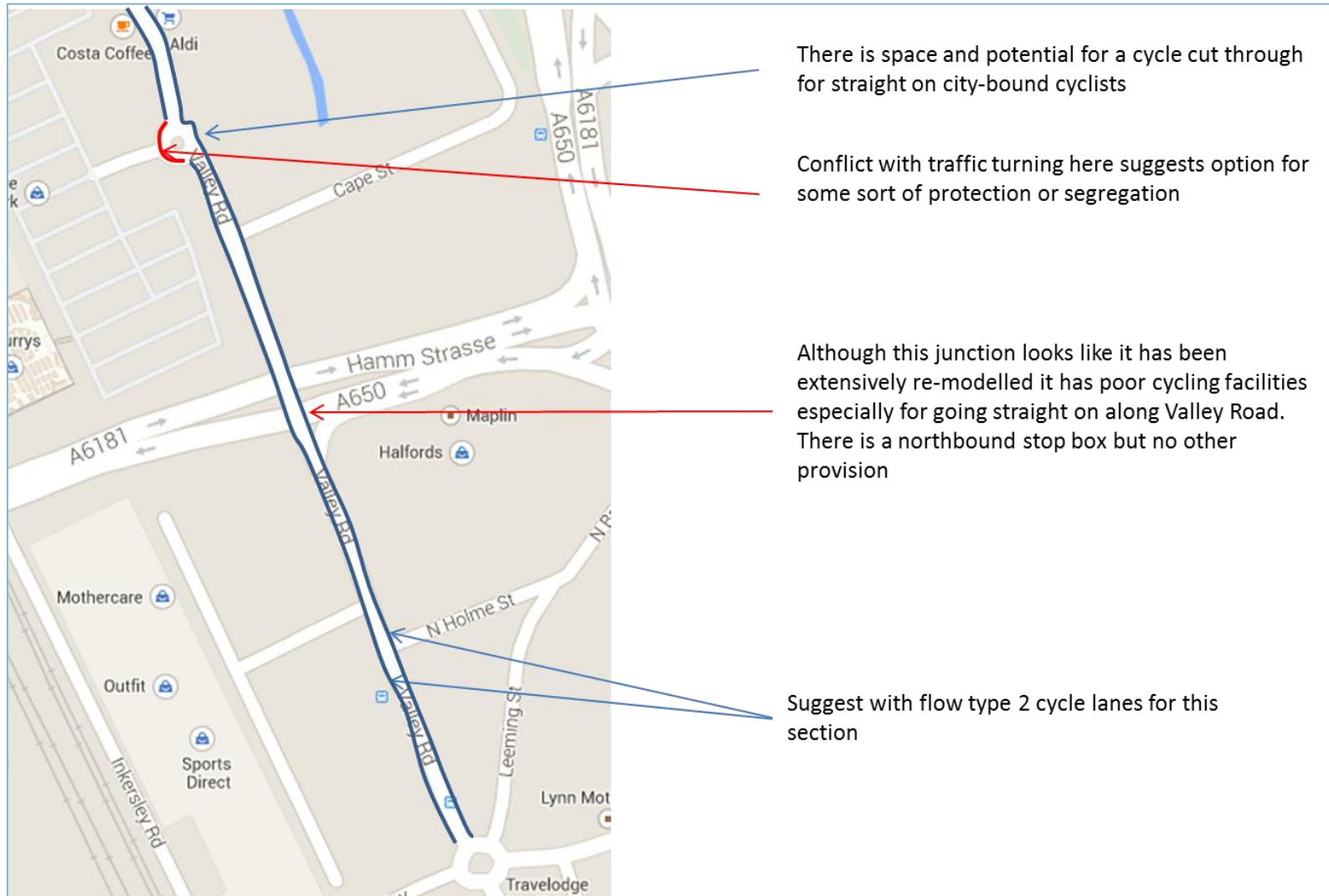
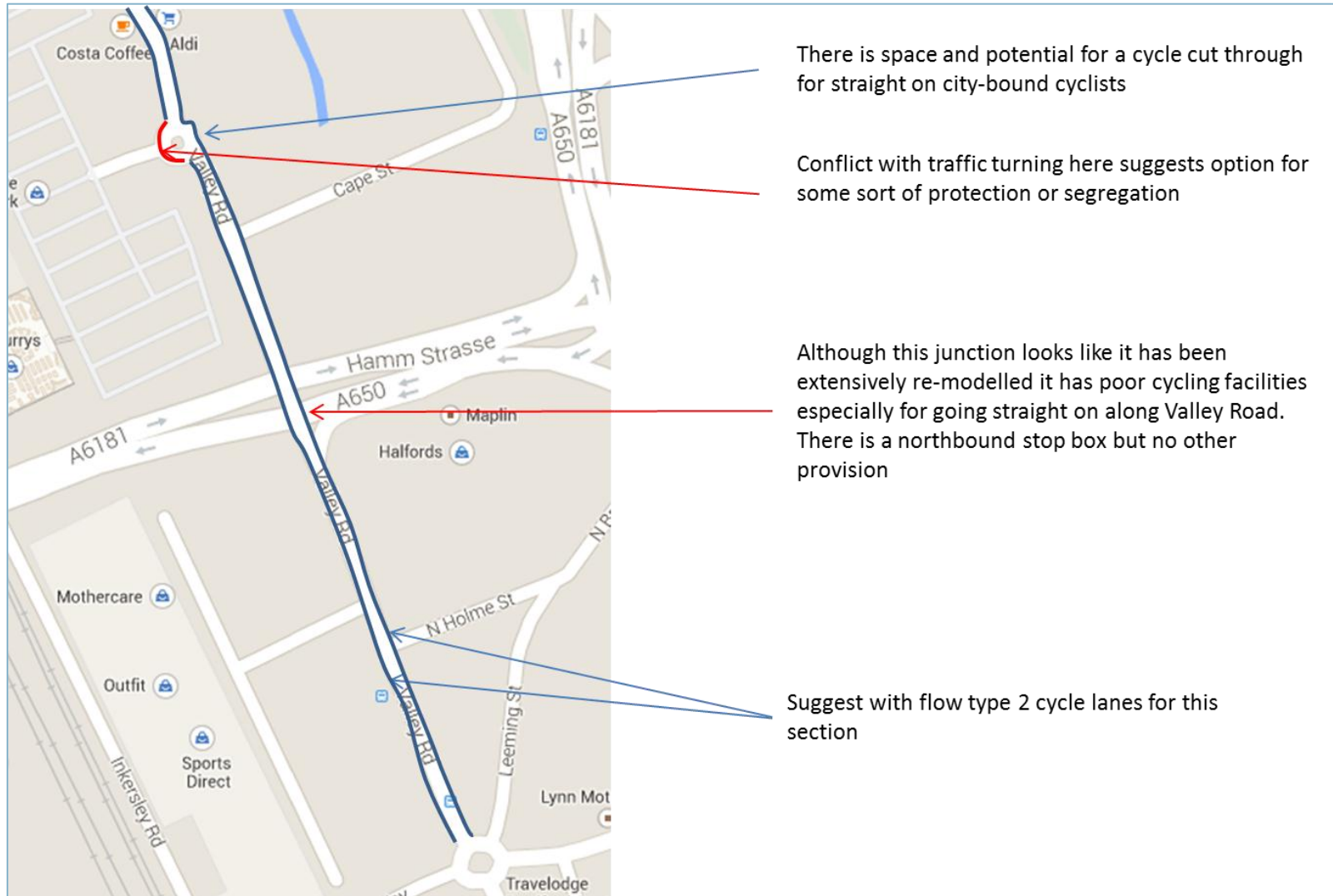


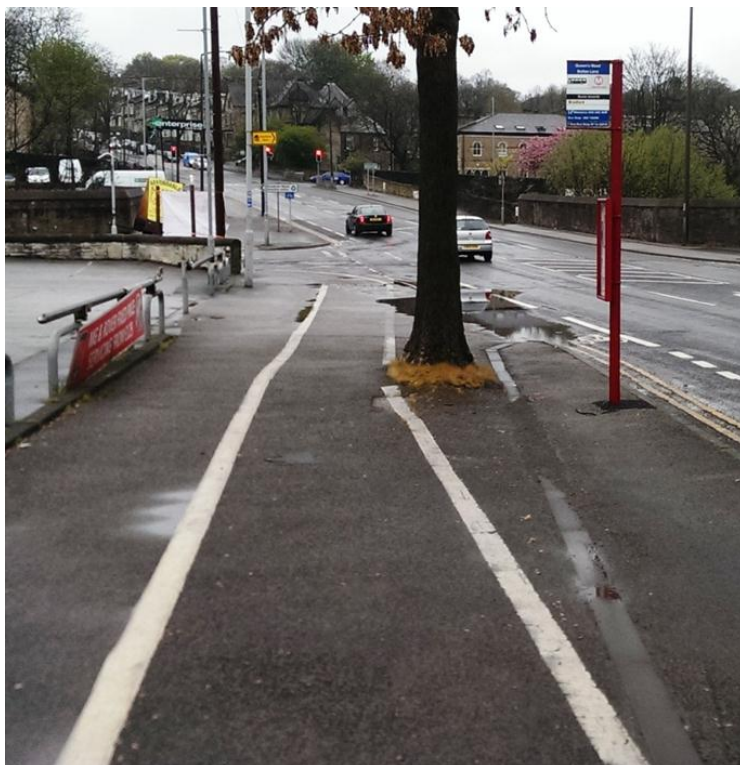
Figure 1.5: Valley Road, south of Queens Road



Valley Road/Queen's Road

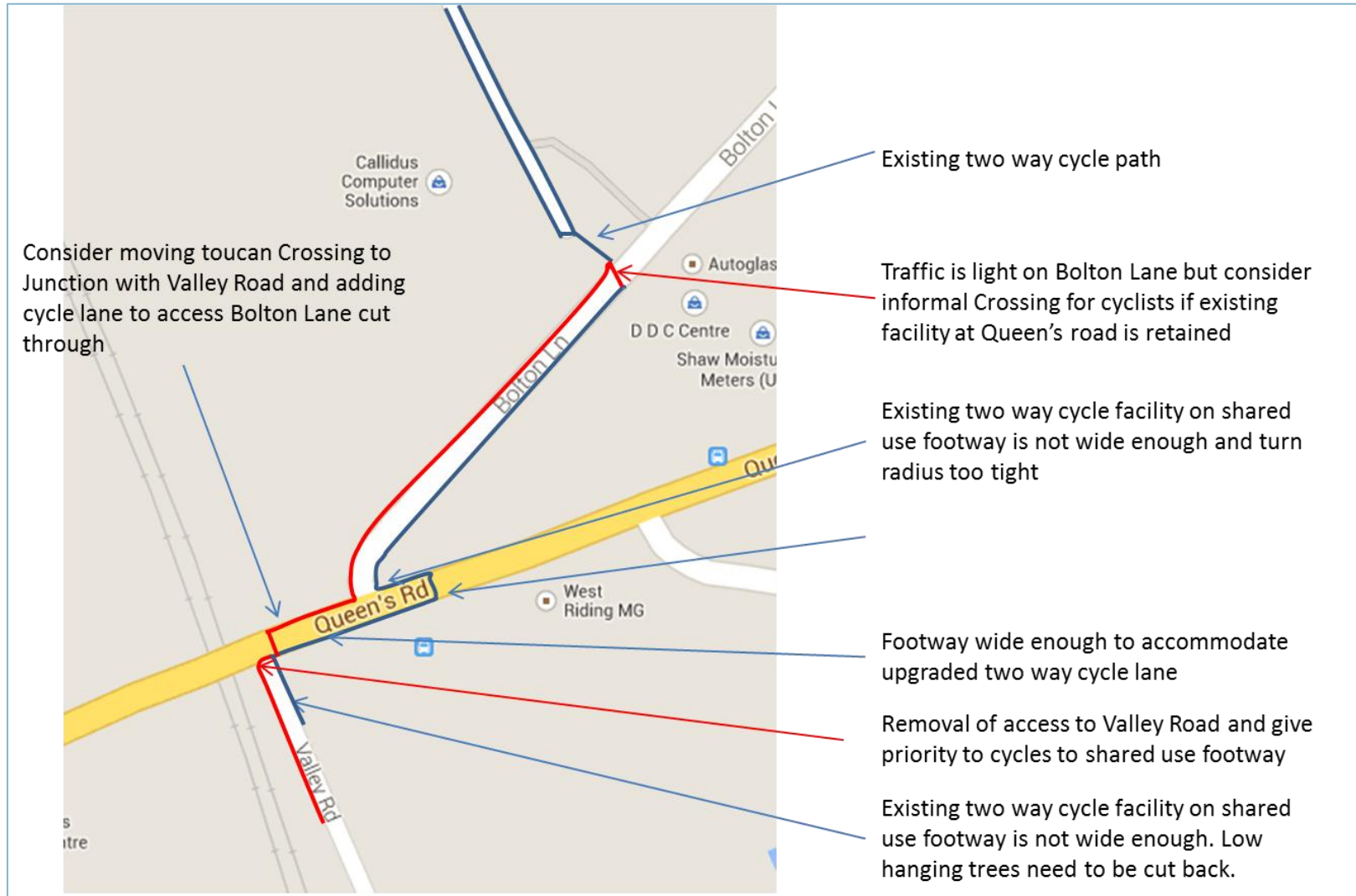
- 1.22 There is an existing toucan crossing of Queen's Road but general conditions for cyclists at this junction are poor.
- 1.23 For example, current off-road cycle tracks are not wide enough, or sufficiently segregated from pedestrians, to create a high quality route for cyclists. This is illustrated by the photograph below, showing the westbound approach to Valley Road from Queen's Road.

Figure 1.6: Sus-standard cycling facilities at the Queen's Road/Valley Road junction



- 1.24 Figure 1.7 provides a summary of existing facilities and recommendations for improvements. A sketch diagram illustrating potential reconfiguration of the existing cycling facilities at the northern end of Valley Road are shown in Appendix A.

Figure 1.7: Queen's Road / Valley Road junction



Hallam Road

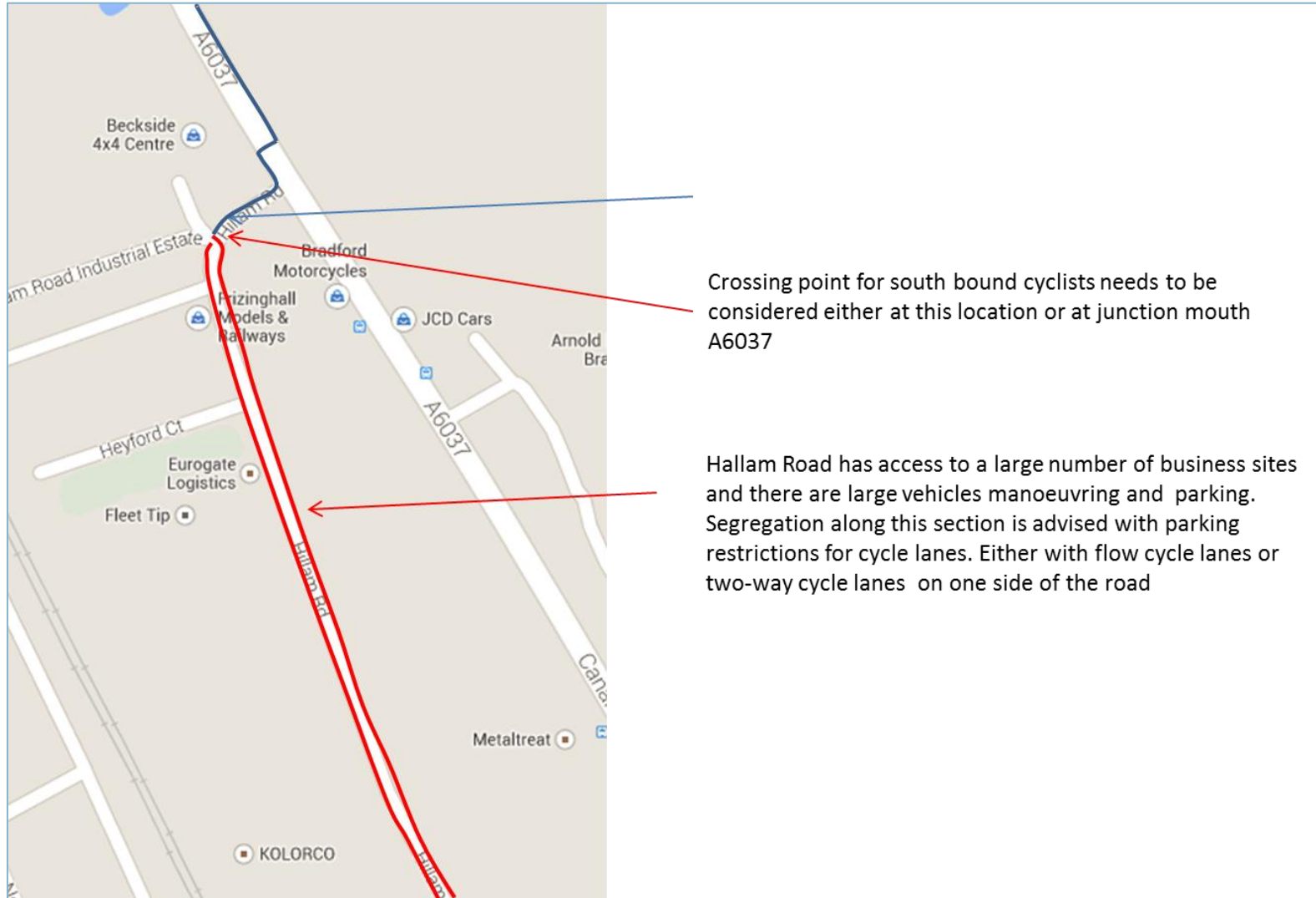
- 1.25 To the north of Queens Road, an existing cycle route off Bolton Road provides direct access to Hallam Road.
- 1.26 Hallam Road has access to a large number of business sites and there are large vehicles manoeuvring and parking along the length of the road.
- 1.27 Segregation of cyclists from general traffic along this section is recommended with parking restrictions to allow installation of cycle lanes. This could either be the provision of with-flow cycle lanes or two-way cycle lanes on one side of the road.
- 1.28 Entering Hallam Road from the north, the current cycle track terminates on the bend, soon after leaving Canal Road. There is no provision for cyclists beyond this point.

Figure 1.8: Hallam Road, termination of existing cycle track



- 1.29 Figure 1.9 provides a summary of conditions along Hallam Road and recommendations for future improvements.

Figure 1.9: Hallam Road



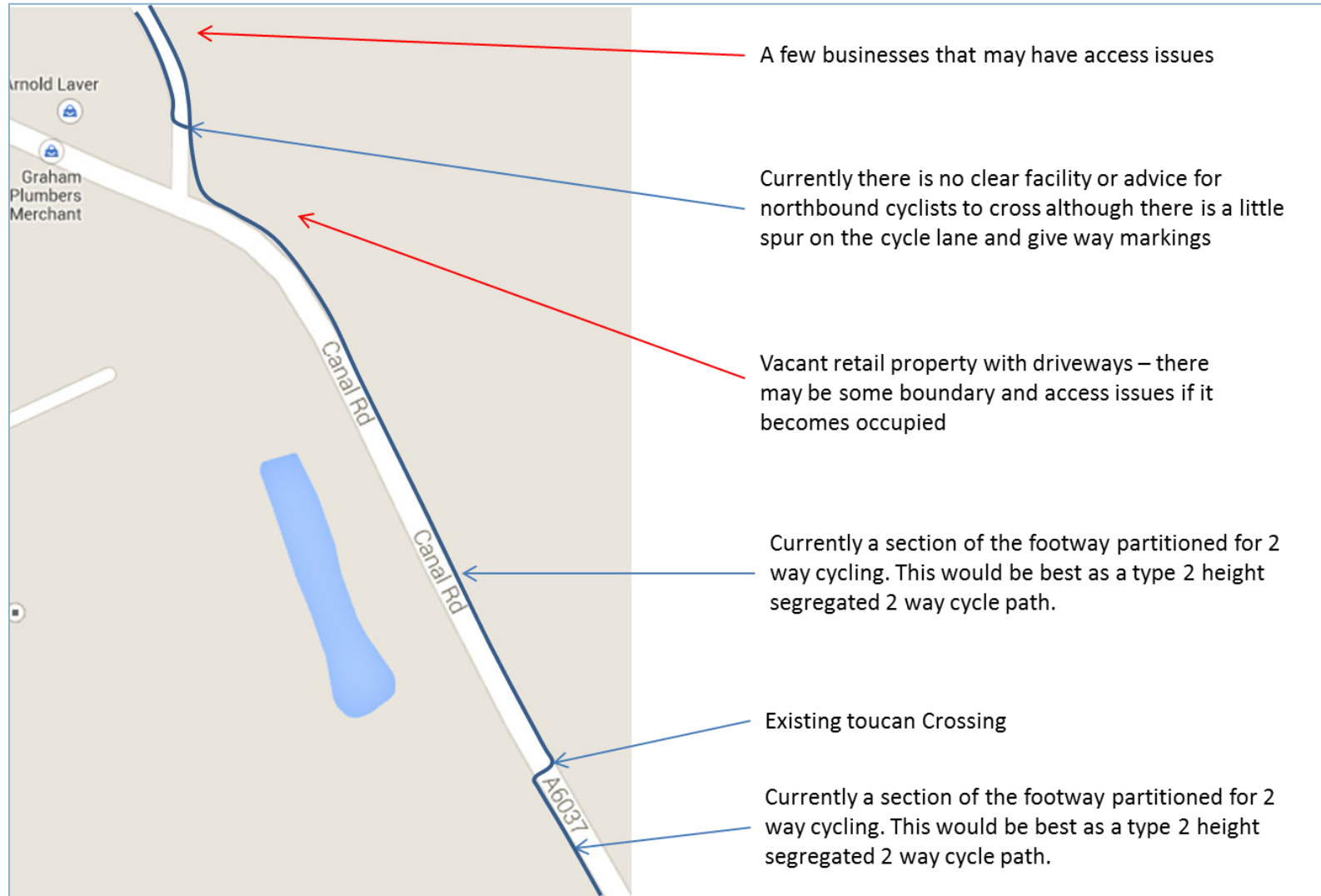
Canal Road

- 1.30 North of Hallam Road, the cycle route joins A6037 Canal Road.
- 1.31 Canal Road has cycle lanes either side of the road, connected via a toucan crossing. Existing provision is for two-way cycling but the section from Hallam Road to the toucan crossing is poorly delineated and confusing. A two-way segregated track could be provided at the expense of a small section of carriageway.
- 1.32 Similarly the section between the toucan crossing and Stanley Road could be turned into a segregated two-way crossing if a small amount of carriageway was made available.
- 1.33 The existing two-way cycle lane southbound from Stanley Road towards the toucan crossing is shown in Figure 1.10 below. A summary of conditions along this section of Canal Road is provided in Figure 1.11.

Figure 1.10: Existing two-way cycle lanes on Canal Road



Figure 1.11: Canal Road, between Hallam Road and Stanley Road



Stanley Road

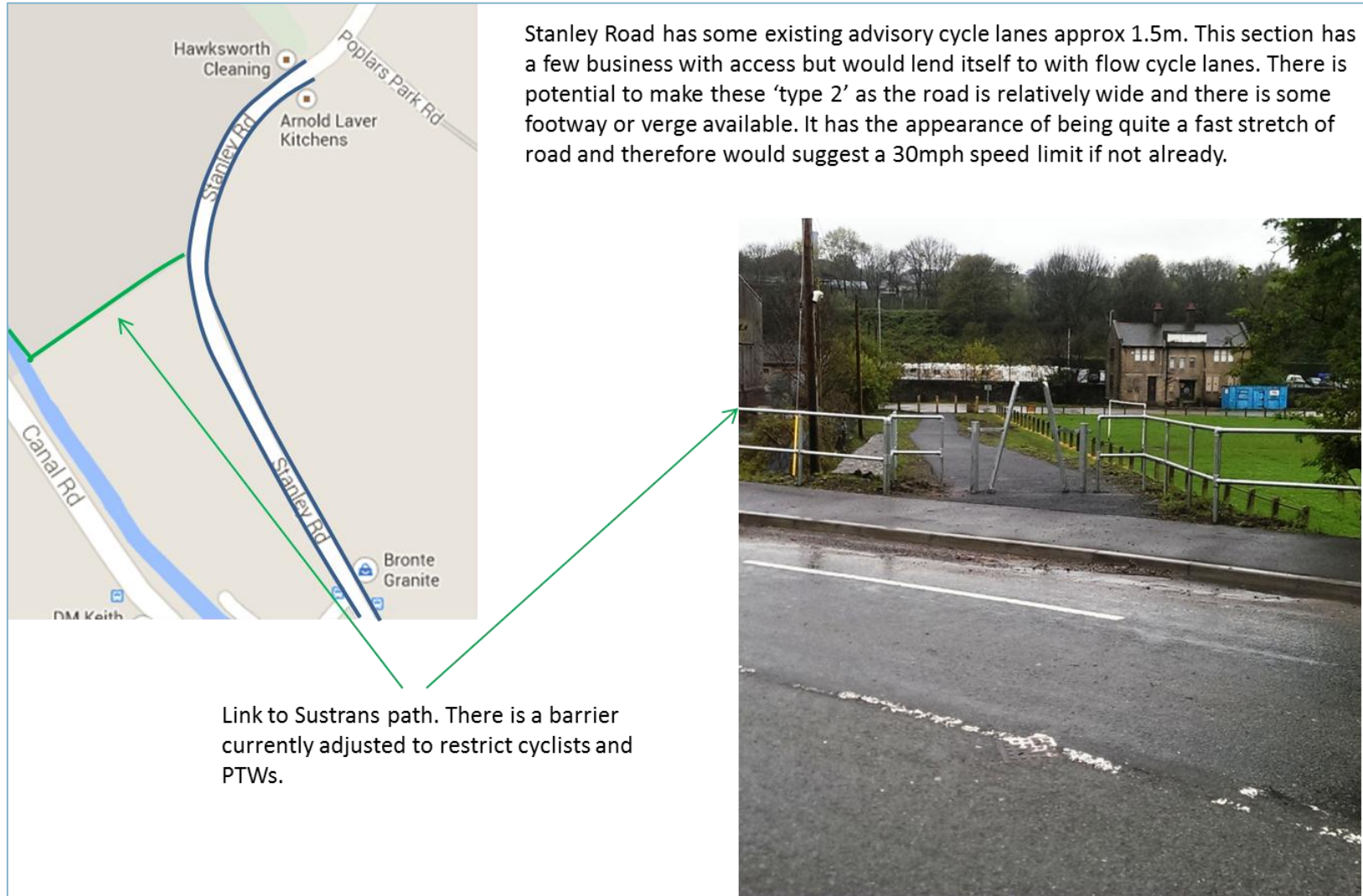
- 1.34 The two-way cycle lane connects direct to the eastern side of Stanley Road. Although southbound cyclists on Stanley Road have a clear entrance to the cycle lane, northbound cyclists are left in an ambiguous instruction to re-join the carriageway. A crossing of Stanley Road, possibly raised, could be provided to direct cyclists to the northbound carriageway to connect with the existing cycle lane.

Figure 1.12: Cycle lane connection at Stanley Road



- 1.35 From Stanley Road, the route would join the Greenway route through the King George V Memorial playing fields.
- 1.36 There is currently a barrier at the entrance to the Sustrans route, adjusted to restrict access to cyclists and powered two wheelers, as shown in Figure 1.13. This would clearly have to be opened up to allow continued access between the city centre, Canal Road and the Greenway.

Figure 1.13: Stanley Road and connection to the Greenway

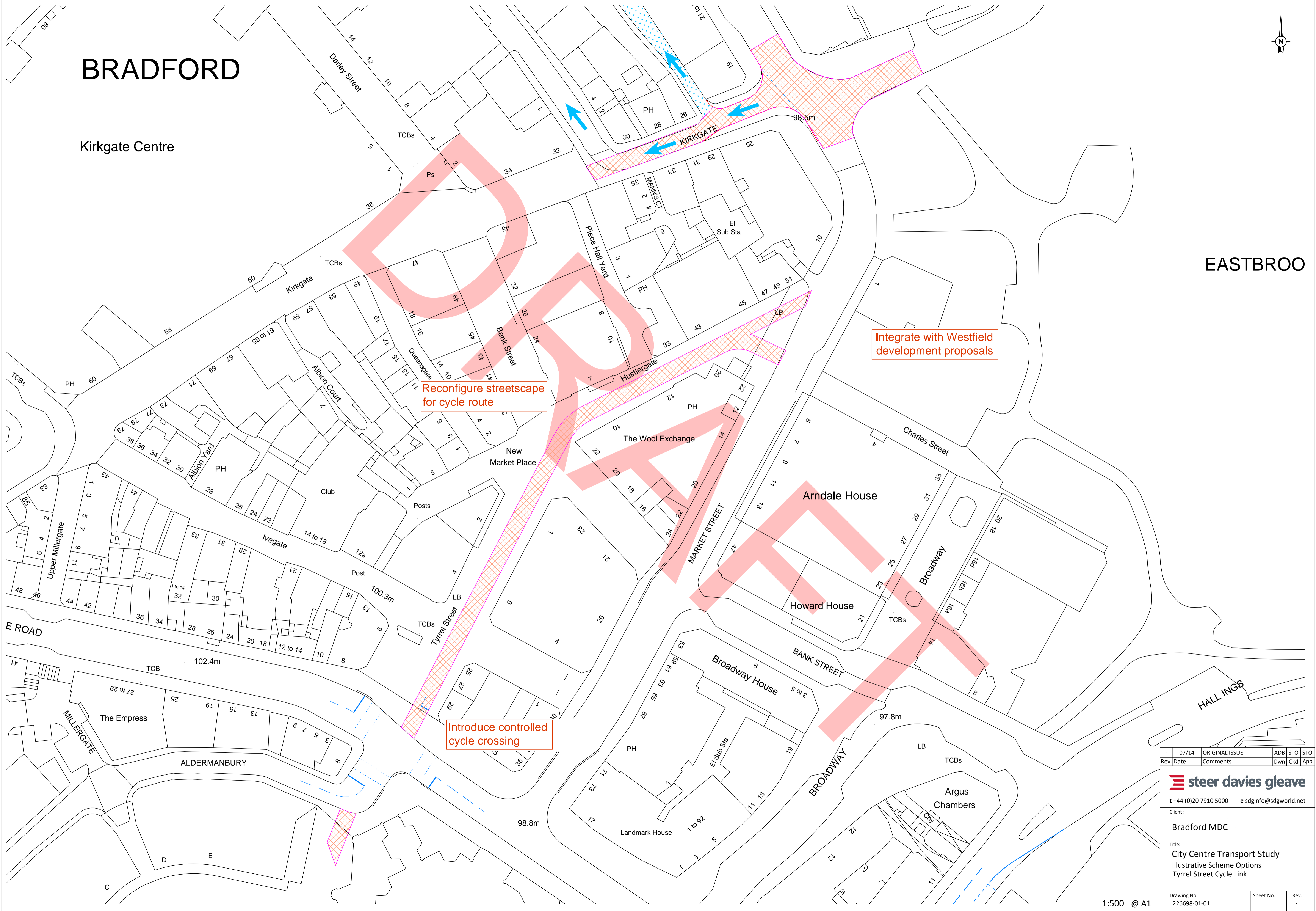
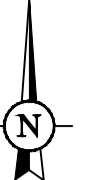


A Sketch Drawings – Route Options

BRADFORD

Kirkgate Centre

EASTBROO



Reconfigure streetscape for cycle route

Integrate with Westfield development proposals

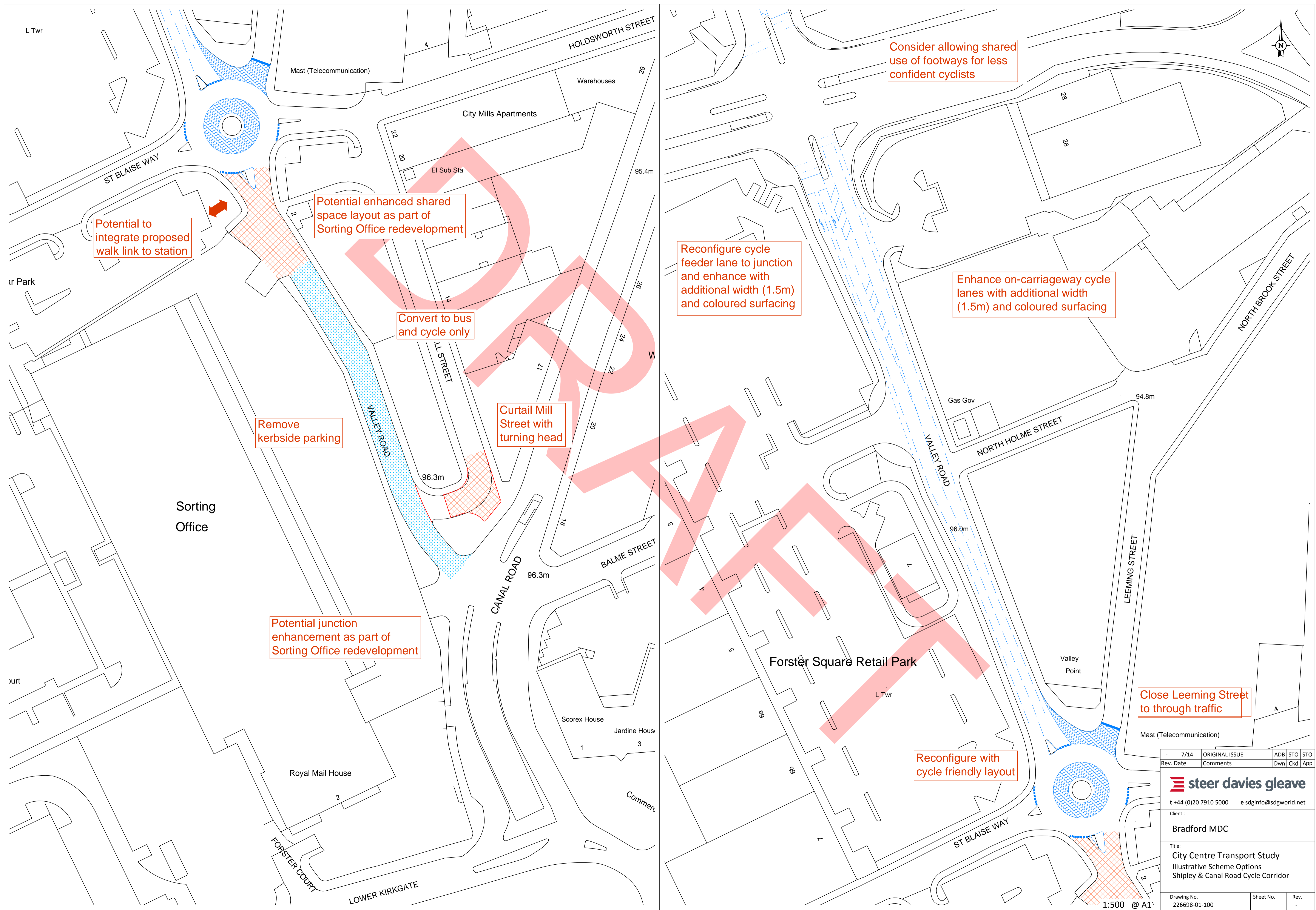
Introduce controlled cycle crossing

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Date		Comments	Dwn	Ckd	App
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Title:					
City Centre Transport Study					
Illustrative Scheme Options					
Tyrrel Street Cycle Link					
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Potential to integrate proposed walk link to station

Potential enhanced shared space layout as part of Sorting Office redevelopment

Convert to bus and cycle only

Remove kerbside parking

Curtail Mill Street with turning head

Potential junction enhancement as part of Sorting Office redevelopment

Consider allowing shared use of footways for less confident cyclists

Reconfigure cycle feeder lane to junction and enhance with additional width (1.5m) and coloured surfacing

Enhance on-carriageway cycle lanes with additional width (1.5m) and coloured surfacing

Close Leeming Street to through traffic

Reconfigure with cycle friendly layout

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Bradford MDC

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**City Centre Transport Study
Illustrative Scheme Options
Shipley & Canal Road Cycle Corridor**

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L Twr

Mast (Telecommunication)

HOLDSWORTH STREET

Warehouses

City Mills Apartments

El Sub Sta

95.4m

ST BLAISE WAY

ir Park

VALLEY ROAD

LL STREET

96.3m

Sorting Office

CANAL ROAD

96.3m

BALME STREET

VALLEY ROAD

NORTH HOLME STREET

94.8m

NORTH BROOK STREET

Gas Gov

LEEMING STREET

Forster Square Retail Park

Valley Point

Mast (Telecommunication)

Royal Mail House

Scorex House

Jardine House

Commerc

FORSTER COURT

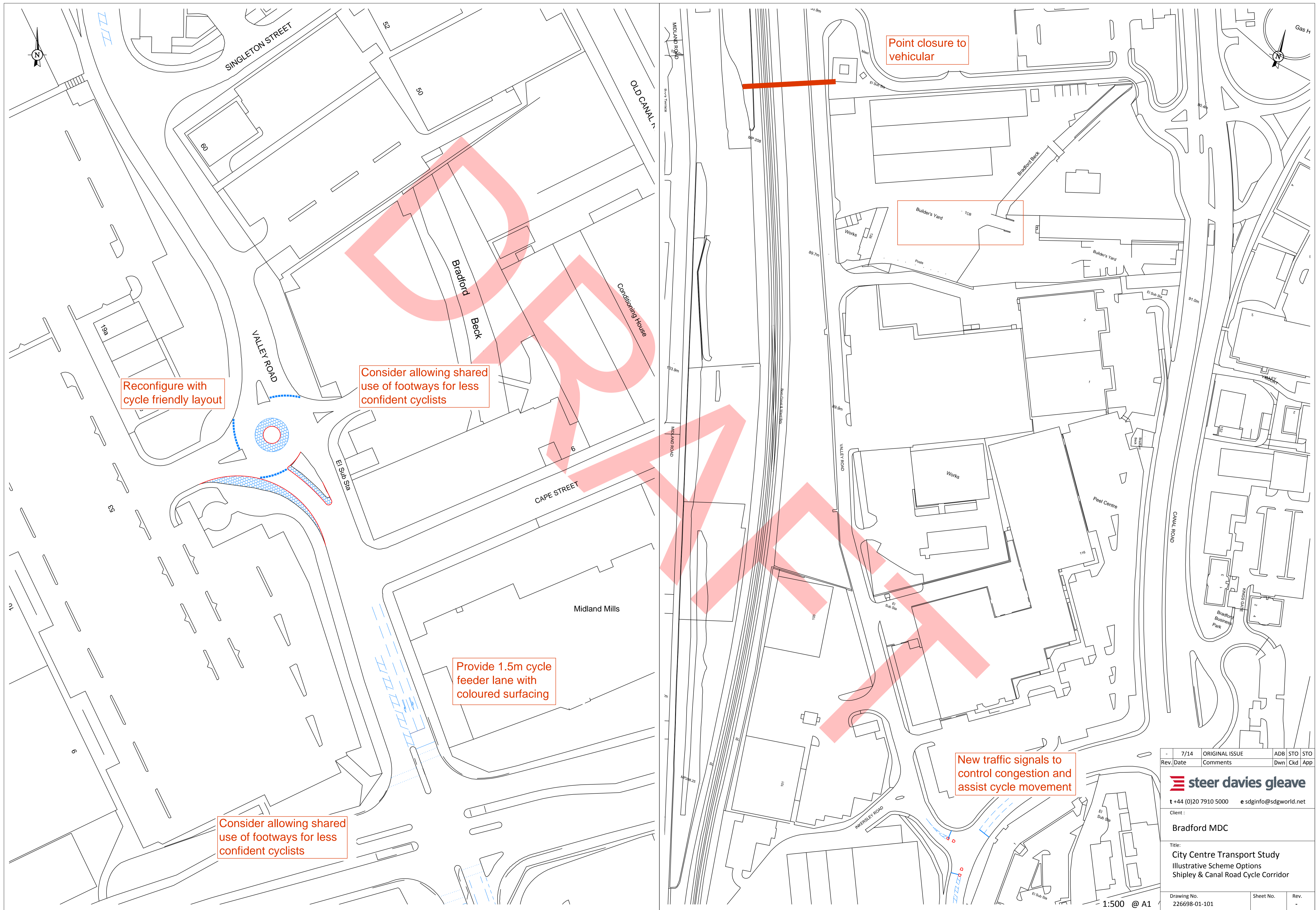
LOWER KIRKGATE

ST BLAISE WAY

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DATE: 21/07/2014



Reconfigure with cycle friendly layout

Consider allowing shared use of footways for less confident cyclists

Provide 1.5m cycle feeder lane with coloured surfacing

Point closure to vehicular

New traffic signals to control congestion and assist cycle movement

Consider allowing shared use of footways for less confident cyclists

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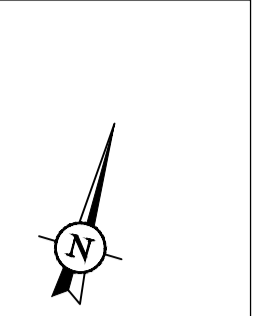
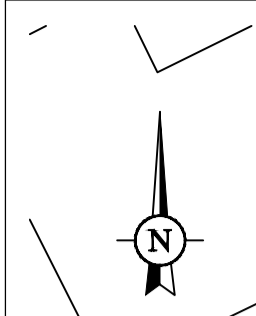
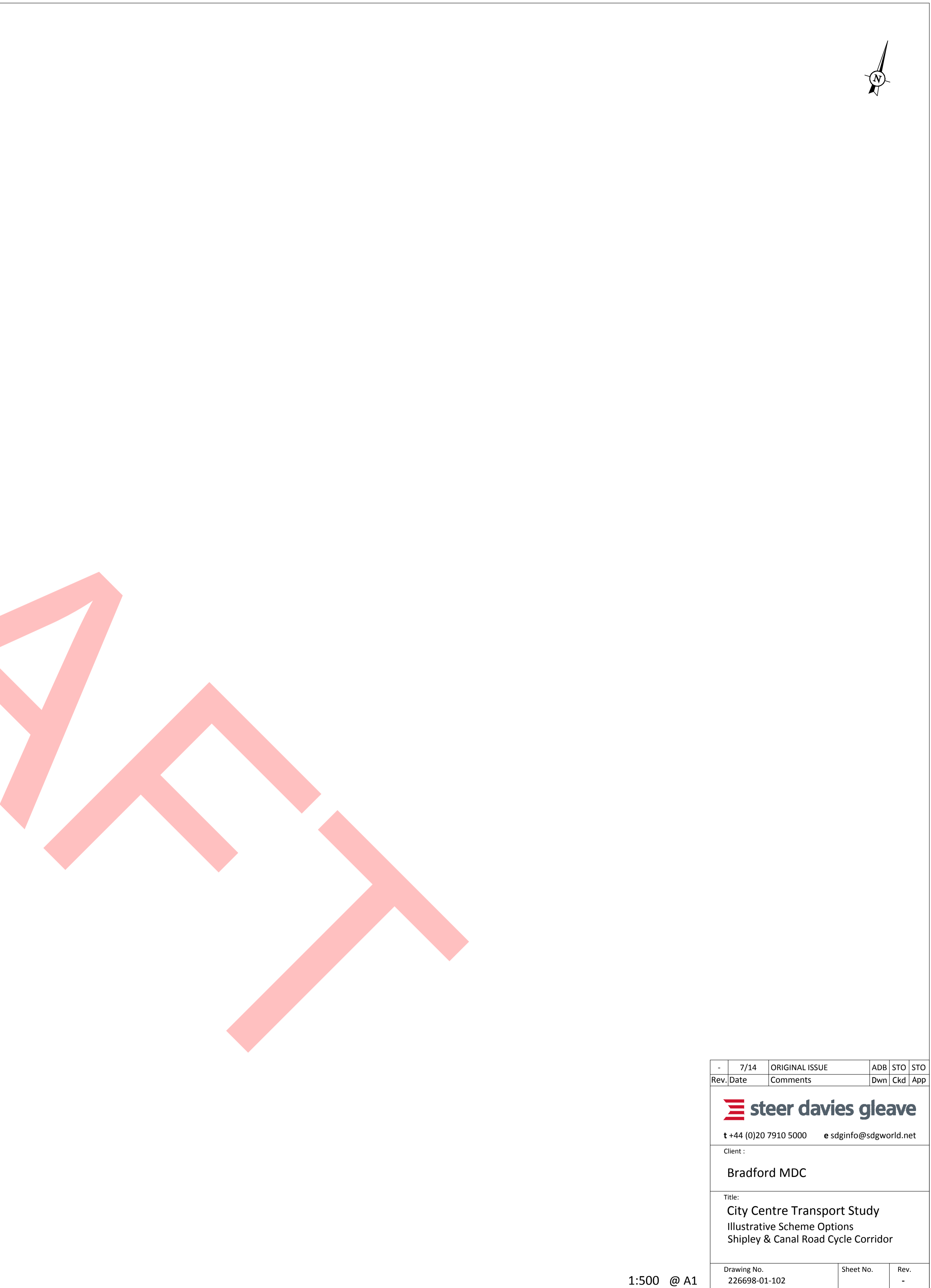
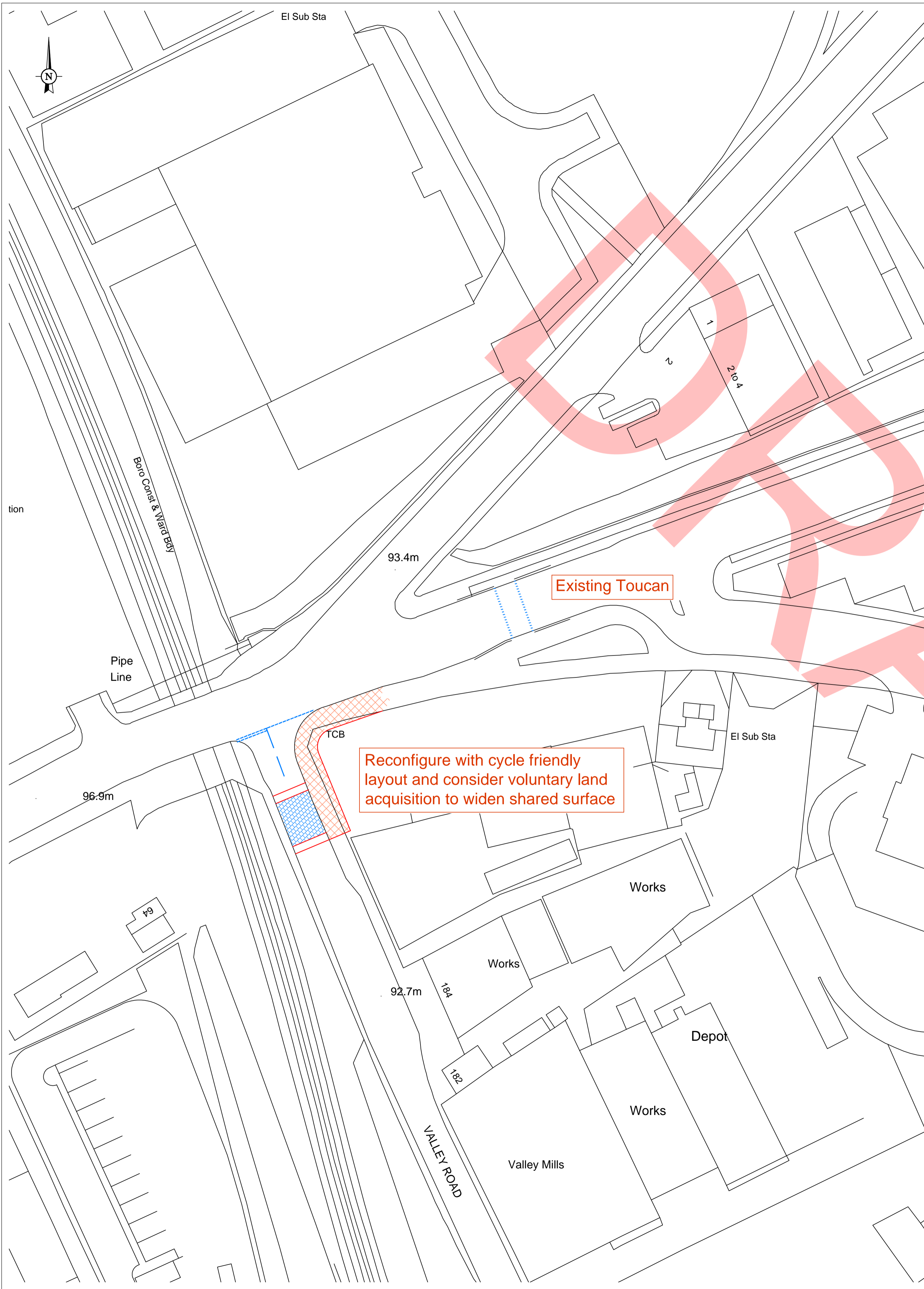
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Illustrative Scheme Options
Shipley & Canal Road Cycle Corridor**

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tion

El Sub Sta

Bus
Conduit & Manhole

Pipe
Line

93.4m

Existing Toucan

96.9m

TCB

Reconfigure with cycle friendly
layout and consider voluntary land
acquisition to widen shared surface

El Sub Sta

Works

Works

92.7m

184

Depot

Works

Valley Mills

VALEY ROAD

182

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CBMDC



D Test of Interventions

D.1 The potential closure of Valley Road has been tested in the 2030 SATURN model, as described in Chapter 5 of the main report.

D.2 The implications for each time period is outlined below.

Valley Road Closure

AM Peak

- Flows along Valley Road are relatively modest (approx 180 sb, 95 nb). Transfer of traffic mainly to corridors west of the railway – Manningham Lane and Midland Road – with some increase in traffic on Canal Road. North of A6177 Queens Road the change in flows is minimal.
- In the City, the transfer between corridors manifests itself into relatively small increases in flow (1 per minute) along Cheapside and Lower Kirkgate

PM Peak

- PM Peak flows are higher – and impacts for Canal Road are greater. Northbound flow on Midland Road also set to increase +120 (about half as much again as the Baseline flow).
- Impacts in the City not as great, with traffic ‘rebalancing’ at the ring road.
- Again, no impact further up the Canal Road corridor.

Figure D.1: Valley Road Closure – AM Peak

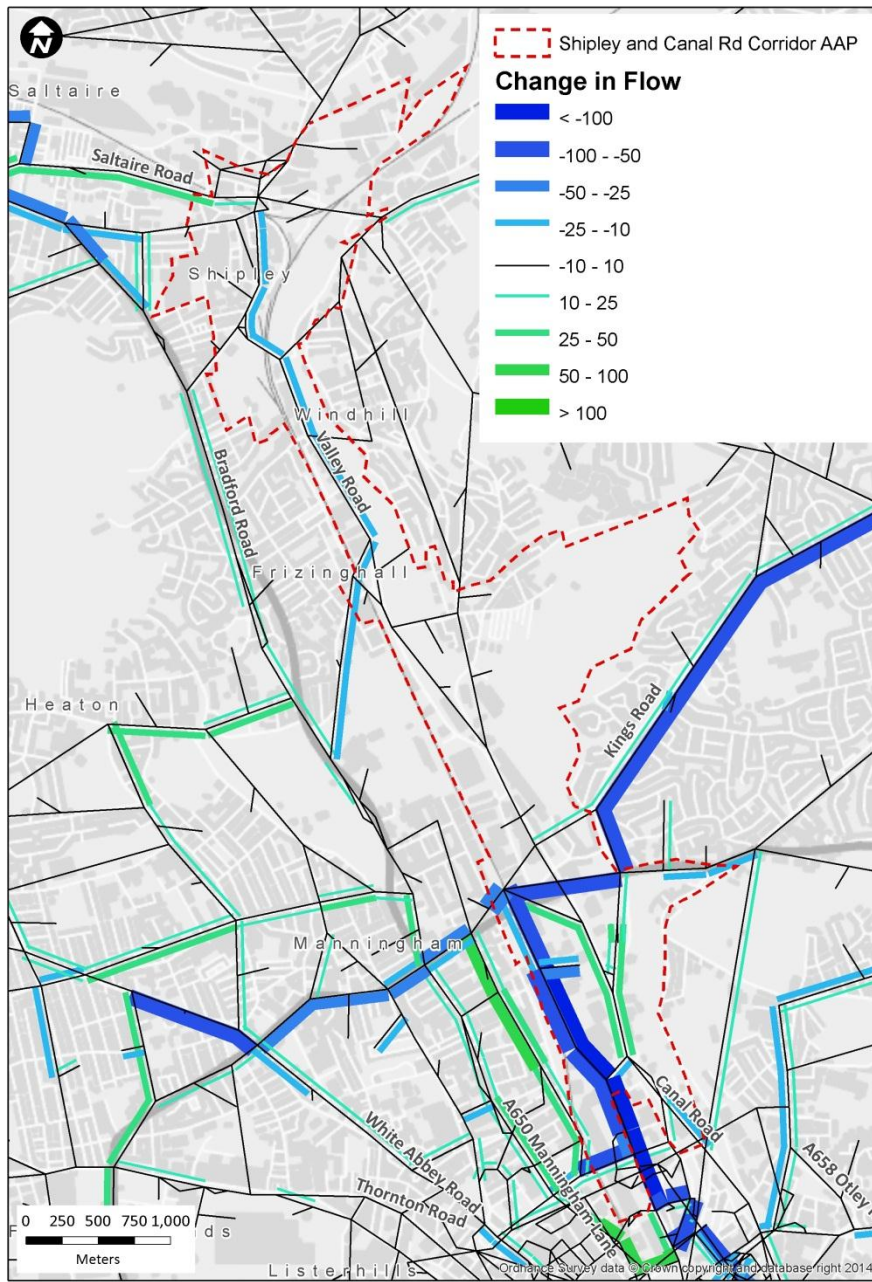
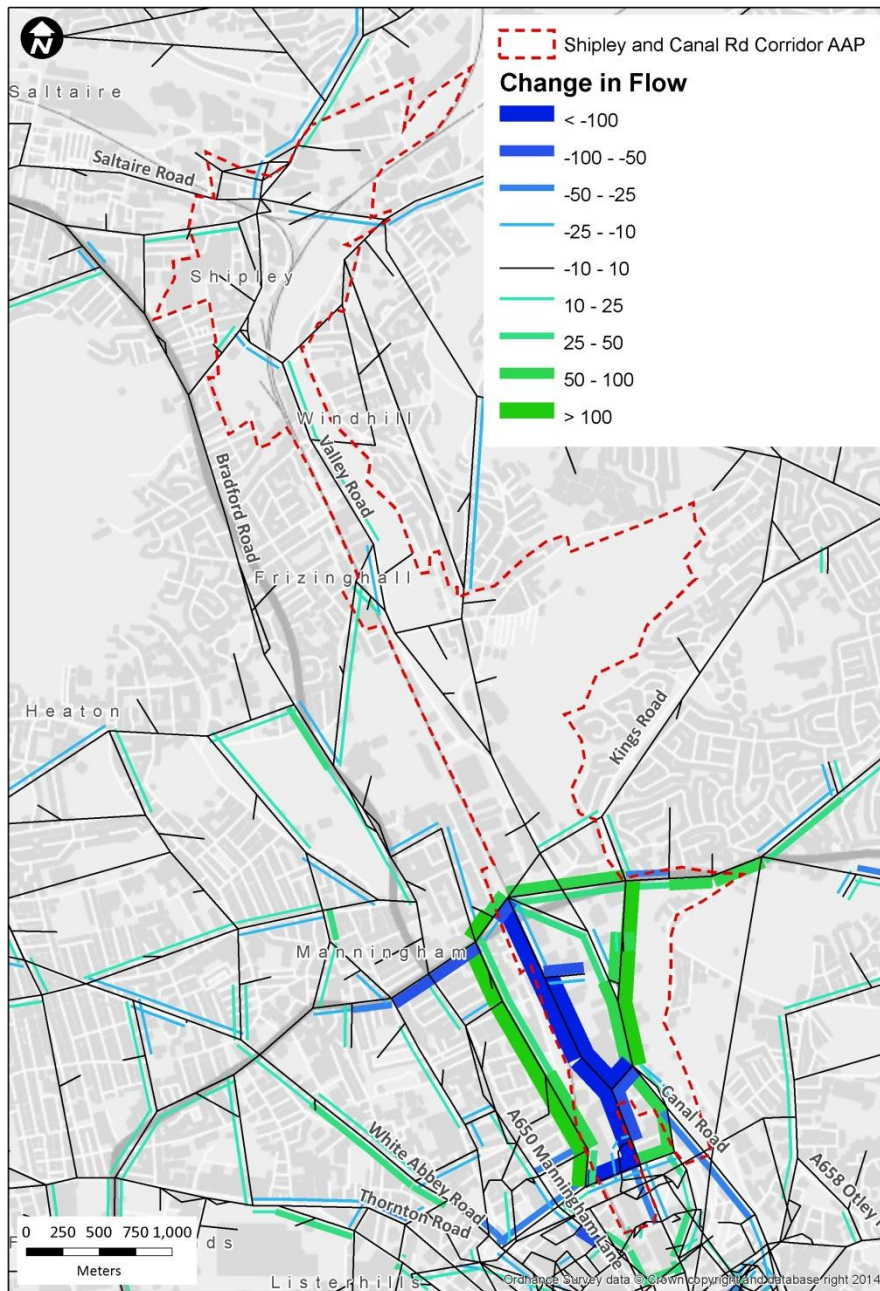


Figure D.2: Valley Road Closure – PM Peak



Control Sheet

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Steer Davies Gleave



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