Addressing Headingley's Traffic Problems

1 Introduction

1.1 The problem

Headingley suffers from an excess of traffic – be it passing through or inconsiderately parked. Congestion is a particularly serious issue on the A660 during the pm peak. Traffic seeks to avoid the almost stationary queue on Headingley Lane by using Victoria Rd, Cardigan Rd, Meanwood Rd, Burley Rd etc. so that they too are becoming congested.

It would clearly be better if, instead of travelling by car, more people walked, cycled or used public transport. However, as things stand, they have little incentive to do so; pedestrians and cyclists are exposed to unacceptable levels of pollution and an unfriendly infrastructure while bus users suffer from slow journeys because buses cannot escape the congestion on Headingley Lane and Cardigan Rd and because boarding delays are frustratingly long.

1.2 The purpose of this document

This document builds on previous work, for example by the North West Leeds Transport Forum and Leeds Civic Trust, by identifying practical proposals which could make a significant contribution to the solution of Headingley's traffic problems. It identifies a number of schemes which appear to have great potential and identifies the steps required to progress them. Its focus is on the area between Hyde Park Corner and Shaw Lane but reference is also made to the wider area where appropriate.

1.3 The strategic approach

The proposals in this document are designed to improve the attractiveness of public transport, walking and cycling through a combination of generic measures and local interventions. The individual proposals, detailed in Section 2, include:

- Generic measures designed to benefit bus users, pedestrians and cyclists and thereby encouraging modal shift from cars and contributing to the reduction of pollution in the Clean Air Zone;
- Measures to reduce the amount of outbound traffic on Headingley Lane during peak periods;
- Schemes designed to give priority to outbound buses (most obviously an outbound bus lane from the Elinor Lupton Building to St Michael's Church);
- Schemes designed to give priority to inbound buses;
- Redesign of various junctions along the A660; and
- Measures to reduce outbound congestion on Cardigan Rd.

1.4 The impacts

The main first-round impacts of full implementation of the proposals would be:

- very significant reduction in journey time for buses outbound on the A660 (upwards of 30 minutes in the pm peak);
- significant reductions in journey times for buses inbound on the A660 (perhaps 10-15 minutes in the morning peak);

- some reduction in delay to buses outbound on Cardigan Rd in the pm peak;
- reductions in pollution associated with stop-start traffic;
- improved conditions for pedestrians (removal of obstacles, reduction in delays, traffic-related hazard, noise and pollution) at several locations but most particularly in central Headingley and at Hyde Park Corner;
- improved conditions for cyclists (most particularly if the proposed cycle path from Alma Rd to a point near Hinsley Hall Lodge were constructed); and
- reduced delays to traffic (including buses) *en route* between Kirkstall and Meanwood.

The second-round impacts of the significant reductions in bus journey times can be expected to promote a mode shift from car to bus, particularly if a park-and-ride facility were provided at Bodington Fields, and this would result in reduced road traffic and associated pollution. Similarly, the improved conditions for pedestrians and cyclists would encourage more people to use those modes and the reduction in congestion-related pollution, improved ambience and public realm should contribute to an increase in economic activity in the area.

1.5 The next steps

This is a crucial stage in the development and implementation of transport policy in Leeds. The City has come together to debate the way forward and a consensus has emerged which emphasises the central role that buses must play in Leeds' transport system. Time is particularly ripe for action to be taken in the A660 corridor where, after many years of frustration, there is a public appetite for real progress to be made. Funds are available, not least the £173m which is earmarked for the improvement in public transport over the next few years, and consultants have been engaged to study the needs of each of Leeds radial corridors. If progress is not made now, the opportunity may be lost for decades.

Some commentators on earlier drafts of this document have suggested that it is not radical enough and that stronger action should be taken, across the whole city, to reduce car use. Others have argued that nothing much can be achieved until and unless public transport comes back under local control. These ideas should not be ignored but nor should they be used to delay the implementation of improvements which are long overdue.

It is essential that the corridor studies are appropriately ambitious and that they give full consideration to ideas that are on the table. In the meantime, nothing should be done which might compromise implementation of these and other ideas. Most particularly, the option of developing a park-and-ride site at Bodington must be kept open, relevant land in the ownership of the Council or Metro should not be sold and planning consents should not be given to proposals which might then limit what can be achieved.

Respecting the ideas in this document, the key issues to be determined at an early stage are:

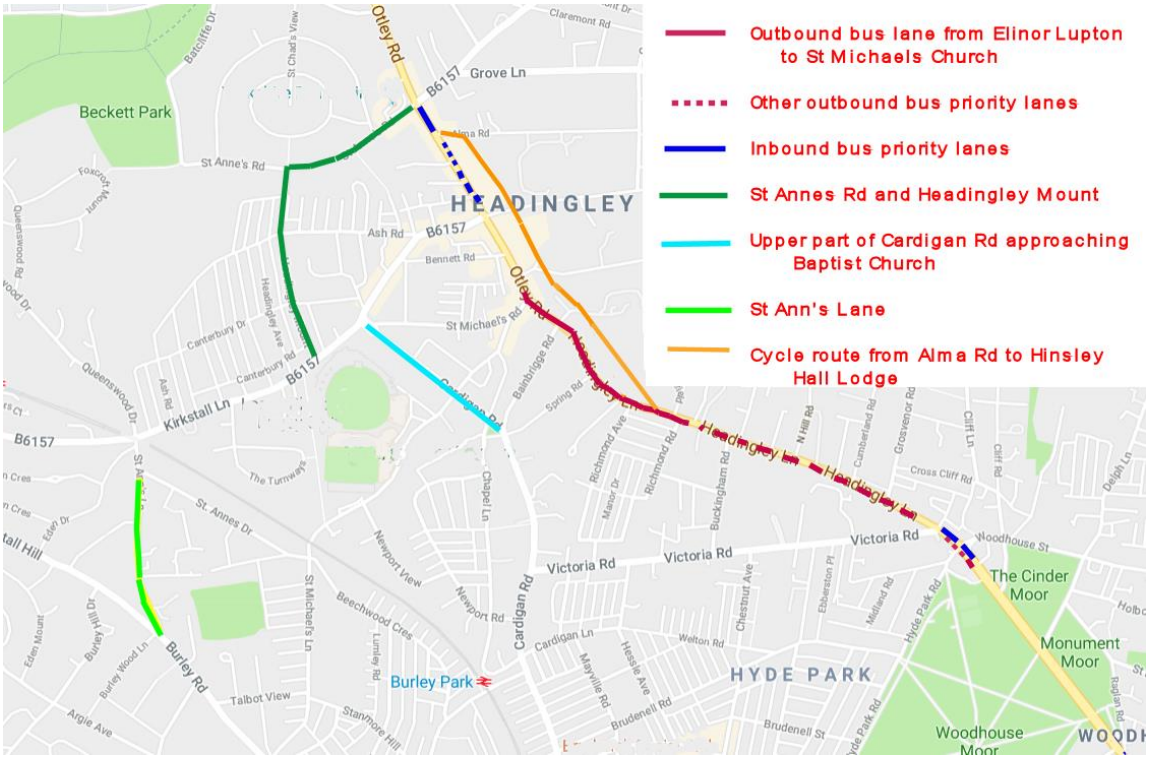
- the costs and legal issues involved in achieving stretches of outbound bus lane on the A660 between Victoria Rd and the Elinor Lupton Building;
- the maximum outbound capacity which can be created for traffic exiting the north-west end of Cardigan Rd without making the road one-way outbound; and
- the implications that designation of part of Cardigan Rd as one-way outbound would have on bus services and traffic movements in the wider network (the concept has been validated by desk-based analyses by people with great familiarity with the local network but have not been tested with traffic assignment models or submitted for comment by the bus operators).

2 The proposals

The proposals introduced in this document are the result of many months of work and consultation. They range from generic actions to speed up bus boarding times to site-specific schemes designed to address a particular local issue and from almost costless suggestions to change signal timings through to more significant suggestions for re-design of key junctions. Some have no discernible downside while others will require a trade-off of competing considerations.

This Section begins by outlining some generic measures before moving on to site-specific schemes and proposals. Many of the proposals are interlinked or co-dependent and the individual schemes should be judged in the context of the overall package. There is, accordingly, no ideal order in which to present the proposals but, for simplicity they have been ordered so that attention is first focussed on outbound traffic, then on inbound traffic and finally on junctions and other features along the route. Figure 1 is included simply to facilitate orientation – it does not identify the individual schemes.

Figure 1: Orientation map



2.1 Generic measures

A number of generic measures have been identified as desirable in previous documents. Briefly, they comprise:

- actions to reduce bus boarding times (smarter ticketing, simplified fares, a ban on on-bus cash transactions and the introduction of two-door buses);
- provision of multi-modal, multi-operator tickets to facilitate journeys involving a change of vehicle or mode (bus-train, bus-bus, bus-train-bus etc.);
- improved public transport information;
- improved priority for buses, particularly for those which are running late, at signalised junctions;
- progressive introduction of more comfortable, less polluting, buses;
- a peak period ban on HGVs on the A660 within the outer ring-road;
- a comprehensive review of parking restrictions (there are several locations where parked vehicles obstruct the passage of buses and emergency vehicles, others where shorter maximum stays would free up space for customers and others where some relaxation of restrictions could be afforded without causing obstruction or problems for adjacent premises); and

- removal of unnecessary obstacles to pedestrians (e.g. poorly-sited street furniture, kerb-steps at low volume side roads or driveways, and excessive delays at signalised crossings)[1].

Although progress has begun on some of these issues (notably in ticketing technology and the introduction of less polluting buses), significant potential for improvement remains untapped.

2.2 An outbound lane for exclusive use by buses and cycles

The lane, whose implementation has long been advocated by North West Leeds Transport Forum and more recently by Leeds Civic Trust, would start near the Elinor Lupton Building and stretch to a point just before the junction with St Michael's Rd. The existing carriageway is wide enough to accommodate this lane except perhaps just before Spring Road (this pinch point could be overcome by moving a short stretch of the wall back by about a metre on the inside of the bend near the southern exit from St Columba's Church but, if this is not possible, the lane could be interrupted at this point). Where interruptions in the lane are necessary, for example to provide access to/from side roads, road markings could indicate that general traffic should keep clear and give way to buses and cycles.

Designation of this lane would require very modest expenditure but would provide significant time savings for outbound buses on routes 1, 6, 28, 97, X84 and X85 during much of the day (time savings are likely to be in the order of 5 minutes during the am peak and inter-peak and up to 10 minutes in the pm peak).

2.3 Other outbound bus priority measures on the A660

Additional priority for outbound buses on the A660 could be provided at various points along the route:

2.3.1 ***At Hyde Park Corner*** - by means of pre-signals on Woodhouse Lane which, while the main lights are at red, hold back other traffic to allow buses emerging from the existing bus lane or bay to move up to the main stop line ahead of other traffic. The priority lane could then continue through to the junction with Victoria Rd (see further discussion in Section 2.11).

2.3.2 ***At St Michael's Church*** - by moving the pedestrian crossing about 20 metres further south and moving the outbound bus stop to a point just north of the re-sited pedestrian crossing. This would make it possible to ensure that maximum green time can be given to pedestrians without delaying buses (approaching buses can be detected whilst in the bus lane and their arrival time at the crossing predicted more accurately than can be done for buses leaving a bus stop). If re-sited in this way, the pedestrian crossing lights could also be used to restrict the flow of non-bus traffic into Otley Rd – thereby lessening the build-up of queues which would otherwise delay buses approaching the North Lane junction.

2.3.3 ***On Headingley Lane between its junction with Victoria Rd and the Elinor Lupton Building***. The bus lane described in 2.2 above would be extremely beneficial but would not isolate buses from those queues which, at peak times, extend back beyond the Elinor Lupton Building down towards Hyde Park Corner. Unfortunately, the existing carriageway is probably not wide

[1] Particular problems have been identified near the former site of Leeds Girls High School (where the pavement dips dramatically to accommodate redundant entrances and where barriers installed outside the former school entrance now simply obstruct pedestrians), and at various junctions along the A660 but others will doubtless be highlighted in the consultation exercise planned for June 2018.

enough to accommodate a bus lane on this stretch of road and any widening would have to take account of the heritage assets (some listed walls on the NE side, listed buildings and stone gate pillars on the SW side), streetscape quality, topography (significant drop to ground level on the SW side) and the time and money involved in obtaining any necessary compulsory purchase or easement.

However, despite these problems, the potential benefit to buses is such that careful consideration should be given to what might reasonably be achieved and what obstacles exist. The following points should be taken into account:

- Extension of the bus lane back by about 70 metres from the Elinor Lupton Building to Buckingham Rd might be achieved by reconstructing the wall and railings in front of Buckingham House about 1.5 metres further back.
- Extension of the lane by a further 70 metres or so from Buckingham Rd back to the stone building in the NW corner of Headingley Office Park would probably entail reconstructing the listed wall on the NE side of Headingley Lane about 1.5 metres further back (and would probably involve loss of one or more trees).
- Extension of the lane by a further 100 metres or so from the stone building in the NW corner of Headingley Office Park back to the ruin in the NE corner of Headingley Office Park might be best achieved by moving back the wall and railings in front of the Office Park.
- Following the development of Victoria Gardens it would now be more difficult to widen Headingley Lane for the 150 metre stretch between the ruin in the NE corner of Headingley Office Park and the bus stop opposite the bottom of Cumberland Rd.
- About 200 metres of bus lane could be accommodated between the old garage now housing Hyde Park Book Club and the bus stop opposite the bottom of Cumberland Rd by moving back the rendered brick wall on the SW side of the road (note that provision would need to be made for moving the listed gate pillars and for a significant retaining wall).
- Where widening is not feasible or desirable, it might still be possible to accommodate a bus lane if attractive alternative space could be found for pedestrians or cyclists (e.g. if routes could be established by agreement or compulsory purchase to the NE of Headingley Lane or down through Victoria Gardens to Victoria Rd).
- With or without a bus lane, the flow of buses up Headingley Lane would be facilitated if the number of separate bus stops were reduced and, ideally, concentrated near the pedestrian crossing.
- Even if it is not possible to achieve a continuous stretch of bus lane, disconnected sections can still give useful benefits to buses. Where the gap between two stretches of bus lane is short (up to about 10 metres) any tendency of general traffic to fill the gap can be reduced by use of “Keep Clear” or, where permitted, yellow box markings. Where the gap is longer the flow of traffic into the gap could be restricted by use of traffic signals - provided that there is space upstream for the traffic to queue without impeding buses (see Appendix 1).

2.4 Measures to reduce the amount of outbound traffic on Headingley Lane during the pm peak.

If it proves impossible to provide an outbound bus lane from Victoria Rd to the Elinor Lupton Building, the only way to avoid buses getting delayed in the queues which form here in the pm peak would be to find some means of reducing the amount of traffic seeking to use this stretch of road. There are three ways of doing this; provision of information, imposition of charges and prohibition.

2.4.1 Provision of information. Many drivers who would otherwise choose to drive out along Headingley Lane are aware of its reputation for queues and so choose to use alternatives such as Cardigan Rd, Meanwood Rd or Burley Rd. Others are unaware of the alternatives or believe them to be no quicker. Provision of real-time information via a prominent variable message sign at Hyde Park Corner (e.g. on the end wall of the building between Victoria Rd and Headingley Lane) could

indicate the current duration of delays on Headingley Lane and this would encourage some drivers to use alternative routes (or modes!) and thereby reduce the length of the queue on Headingley Lane.
Of course, for these messages to be really effective, the alternative routes or modes need to be thought more attractive than the Headingley Lane route with the posted times. Hence the importance of the generic actions to reduce bus boarding times described in Section 2.1, the bus priority measures listed in Sections 2.2 and 2.3, and the reductions in delays on Cardigan Rd to be described in Section 2.6. In an ideal scenario it would be possible to post messages which could legitimately state that the journey by bus or cycle was quicker than that by car and that the route via Cardigan Lane was quicker than that via Headingley Lane.

2.4.2 Charging. The camera-based system being considered to enforce the Leeds Clear Air Zone at the Outer Ring Road could be also used to impose charges on vehicles using Headingley Lane during the pm peak period. The charge could be levied on outbound vehicles passing the Hyde Park Book Club and exemptions could be given to residents of properties along the road or on cul-de-sacs opening off it. The charge could be fine-tuned to be no higher than is required keep the queues from hindering buses or could be set to maximise revenue. If the backroom costs had been covered by the CAZ system, the marginal costs of running a scheme on the A660 would not be an issue and the decision could be based solely on political considerations.

2.4.3 Prohibition. This could be achieved by installing traffic signals which could be activated to prevent vehicles (other than buses, cycles and emergency vehicles) from proceeding through to Headingley via Headingley Lane. Closure of this "gate" would only be necessary when the outbound queue of traffic extends back beyond the end of the bus lane (i.e. when the queue is beginning to delay buses). Under current conditions, and assuming that the bus lane begins at the Elinor Lupton Building, the gate would probably need to be closed between about 1600 and 1830 on weekdays in term time. However, if the bus lane can begin closer to Hyde Park Corner or if the delays on Cardigan Rd can be reduced and the extent of delays on Headingley Lane are made apparent to drivers, the required period of closure would be reduced and closure could become a rare event. Further discussion of the issues involved is included in Section 3.2.

2.5 Measures to reduce outbound delays up Cardigan Rd

Whether achieved by provision of information, charging or prohibition, a reduction in outbound traffic on Headingley Lane traffic would probably result in increased use of Victoria Rd and Cardigan Rd and, given that Cardigan Rd is already congested during the pm peak, attention needs to be given to ways of dealing with this. Buses outbound on routes 56, 19 and 19A would clearly benefit if the existing delays on Cardigan Rd in the pm peak can actually be reduced.

2.5.1 The minimum change. Careful observation suggests that there is considerable scope for improvement on the current situation without any significant expenditure. Firstly, it appears that the traffic signals installed at the junction between Cardigan Rd and St Michael's Lane have very lengthy inter-greens, a very short cycle time and give no particular priority to the Cardigan Rd traffic. This may be justified when there is a large flow of pedestrians to or from the Stadium but seems inappropriate at other times. It is therefore suggested that more green time be given to outbound traffic on Cardigan Rd during the pm peak. Secondly, it is clear that the signals at the junction of Cardigan Rd with Kirkstall Lane/North Lane could give more priority to traffic exiting from Cardigan Rd during the pm peak. If this were done in combination with the proposed changes to signal settings at St Michael's Lane, and if the two sets of signals were co-ordinated, it is likely that the outbound congestion could be reduced quite considerably. Further increases in the outbound capacity might be achieved by:

- banning the right turn from Cardigan Rd into St Michaels Lane (traffic seeking to do this presents an obstacle to the straight-on traffic);

- moving the kerb-line back very slightly just east of the junction of Cardigan Rd with St Michael's Rd (to accommodate a longer lane for right-turning traffic); and
- moving the pedestrian crossing near South Parade to a new position further up North Lane (so that its activation need not require curtailment of the traffic turning right out of Cardigan Rd).

2.5.2 A more radical change - designation of Cardigan Rd, between Bainbrigge Rd and Kirkstall Lane, as one-way outbound. If this part of Cardigan Rd simply comprised two outbound lanes, its junctions with St Michael's Lane (see Figure 3) and with Kirkstall Lane (see Figure 4) could be re-designed to be much more efficient and it is likely that the outbound congestion could be eliminated completely and/or capacity created for increased flow. Note that pedestrians would benefit from reduced delay at the designated crossing points and also from it becoming easier and safer to cross at other places (it is generally easier to cross two lanes of traffic when they are both heading in the same direction).

Figure 3: The Cardigan Rd/ St Michael's Lane junction – if Cardigan Rd is one-way

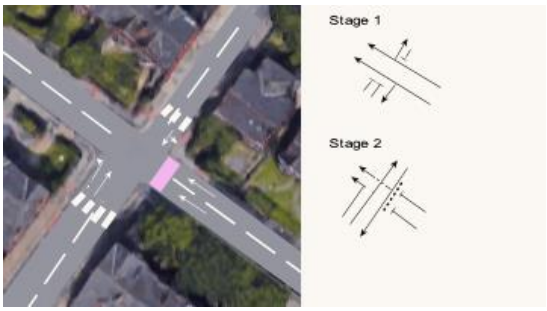
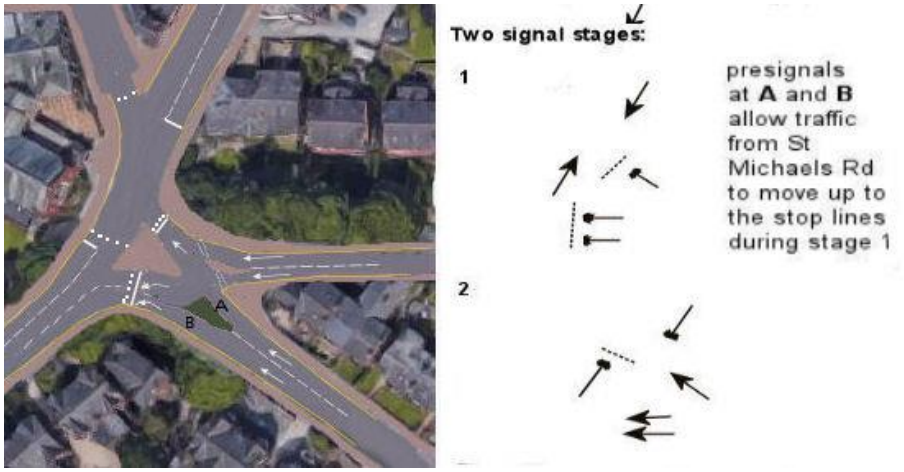


Figure 4: The Cardigan Rd/Kirkstall Lane/St Michael's Rd junction – if Cardigan Rd is one-way



The closure of this part of Cardigan Rd to inbound traffic would of course have implications for the traffic which currently uses it. A fuller discussion of the implications of designating this part of Cardigan Rd as one-way is provided in Section 3.1.

2.6 Inbound bus priority measures on the A660

Inbound buses could be given additional priority at various points along the route and, taken together, they might reduce inbound bus journey times by around 10 minutes in the am peak. The potential locations are:

2.6.1 ***At the approach to the Shaw Lane junction*** (see Section 2.7 which details potential improvements at this junction).

2.6.2 ***Between Shaw Lane and Alma Rd*** (if the proposed changes to the Shaw Lane junction were implemented, the inner lane at this point could be designated for use only by buses, cycles and traffic turning left into Alma Rd).

2.6.3 ***Between Alma Rd and the bus bay at the Arndale Centre*** (the changes discussed in Section 2.7 should reduce the required length of the lane for traffic waiting to turn right into North Lane, in which case the bus lane could be accommodated in the existing carriageway, otherwise it would require some space to be taken from the existing pavement).

2.6.4 ***Between the bus bay at the Arndale Centre and the traffic lights at North Lane*** (by taking some space from the existing pavement - see Section 2.8 for ideas of how to achieve this without compromising the pedestrian space).

2.6.5 ***At Hyde Park Corner*** (if the right turn into Hyde Park Road were banned, the inside lane, between Regent Park Terrace and Woodhouse Street could be designated for use only by buses, cycles and traffic turning left into Woodhouse Street, and the inside lane between Woodhouse Street and Cliff Lane could be designated as a bus/cycle lane. See Section 2.11 for further discussion of the scope for improvements at Hyde Park Corner).

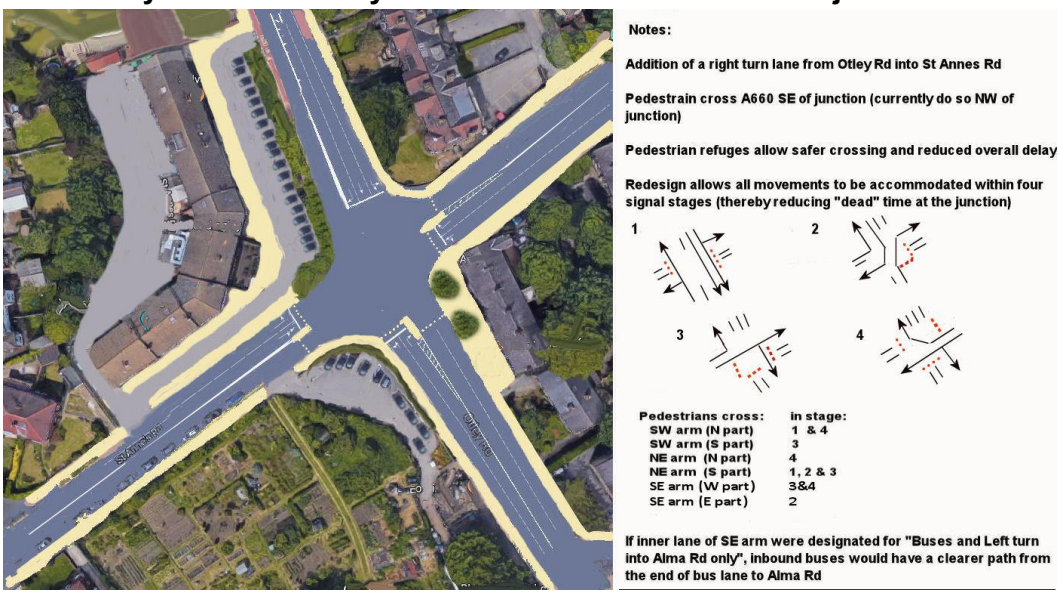
2.7 Redesign of the junction of the A660 with Shaw Lane and St Anne's Road

This junction, as currently configured, struggles to accommodate the demands put upon it. This has several unfortunate consequences:

- traffic attempting to turn right into St Anne's Road interferes with the inbound flow of traffic and the prospect of that interference persuades some of the straight-on traffic to switch into the inner lane and so delay the inbound buses (perhaps mindful of the inconvenience they would cause by turning right at this point, some drivers turn instead at St Chads' drive and then cut through the Beckett Park estate);
- delay to traffic turning left out of St Anne's Road persuades many drivers to cut through the Beckett Park estate to emerge via St Chad's Drive or to use North Lane;
- delay to traffic emerging from Shaw Lane causes significant queues which affect buses on routes 29, 38 and 91;
- pedestrians are subject to long delays and, particularly when crossing St Anne's Road, frequently resort to crossing on red.

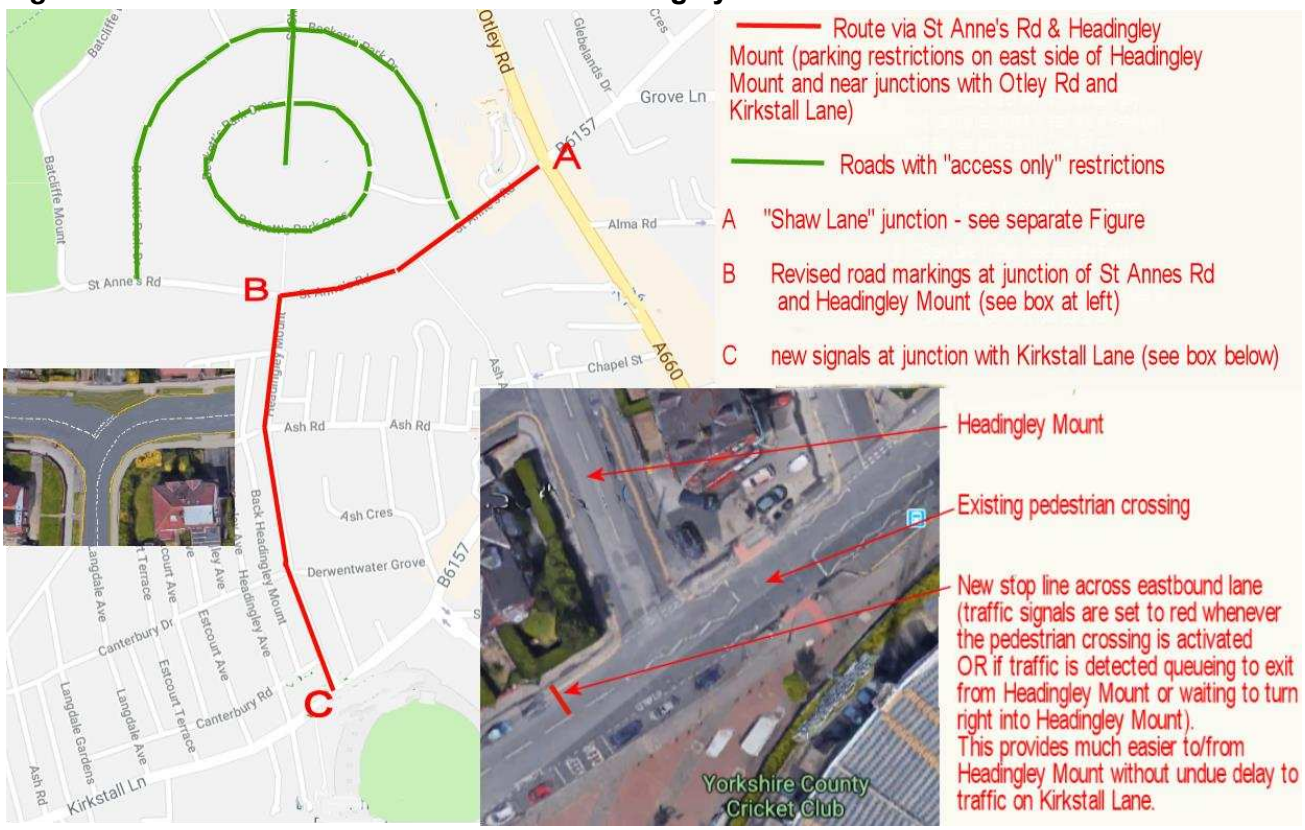
Figure 5 shows an alternative layout for this junction providing dedicated lanes for traffic turning right into, and left out of, St Anne's Road.

Figure 5: New layout for the Otley Rd/ Shaw lane/ St Anne's Road junction



This layout promises to increase safety, to reduce delays to traffic and pedestrians, to remove the incentive to rat-run through the Beckett Park estate and to provide for more orderly parking at St Anne's Parade. Inbound buses benefit from the overall increase in junction efficiency but more particularly from reduced incursion of traffic into the inside lane prior to the junction and from the designation of the inside lane between the junction and Alma Rd as being only for buses and traffic turning into Alma Rd (traffic seeking to pass on down the A660 has no reason to use the inside lane at any point between the end of the bus lane and Alma Rd and so will no longer obstruct the free movement of inbound buses).
More broadly, and particularly if additional measures were taken to facilitate the movement of traffic via St Anne's Rd and Headingley Mount (see Figure 6), the changes at this junction would help reduce the amount of traffic past the Arndale Centre and along North Lane. This would free-up space for an inbound bus lane in front of the Arndale Centre, reduce the demands on the A660/North Lane junction (thereby benefitting buses on the A660 and pedestrians wanting to cross at that junction) and improve the ambience of North Lane.

Figure 6: Treatment of St Anne's Rd and Headingley Mount



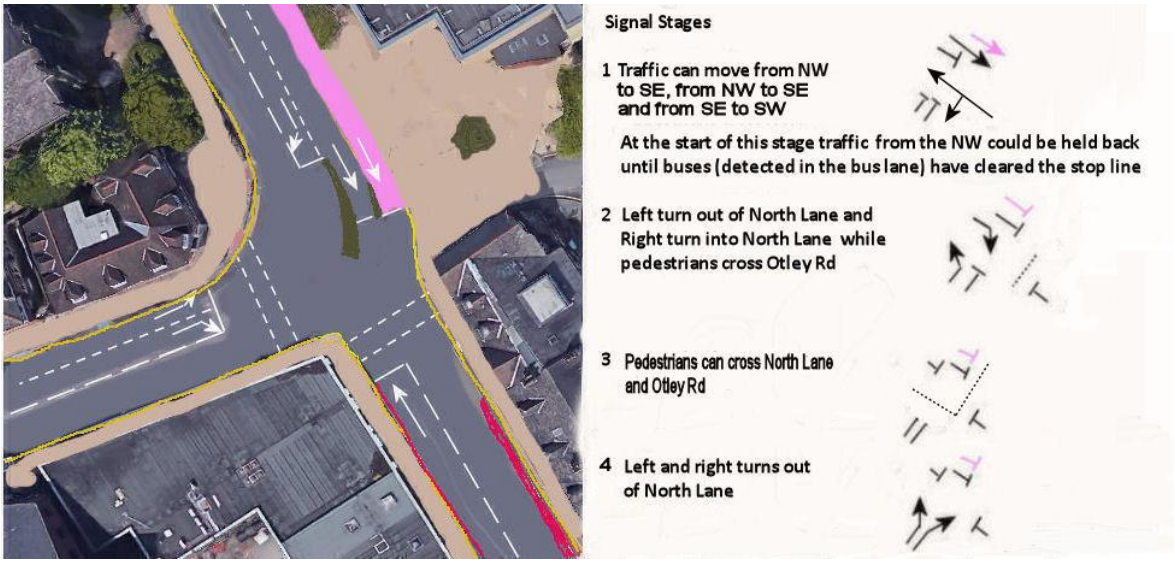
Further discussion of the proposed redesign of the Shaw Lane junction and of the treatment of St Anne's Rd and Headingley Mount is included in Section 3.3.

2.8 Changes near the Arndale Centre in Headingley

The possibility of providing inbound bus lanes at this point has already been identified in Section 2.6. Some further benefit to buses, but more particularly to pedestrians, could be achieved if the junction between Otley Rd and North Lane did not have to cope with traffic in and out of Wood Lane. Figure 7 indicates a design which gives inbound buses priority access to the stop-line while providing additional space for pedestrianised public realm space and additional green time to pedestrians crossing Otley Rd. This is achieved with fewer signal stages than are currently required and thus reduces the amount of "dead" time in the cycle – thereby benefiting all road users[2].

[2] Further increases in junction efficiency could be achieved if the left turn into North Lane were banned but, given the inconvenience this would cause (even if, under the plan summarised in Figure 4, it were possible to access North Lane via St Michael's Rd) this is probably not warranted.

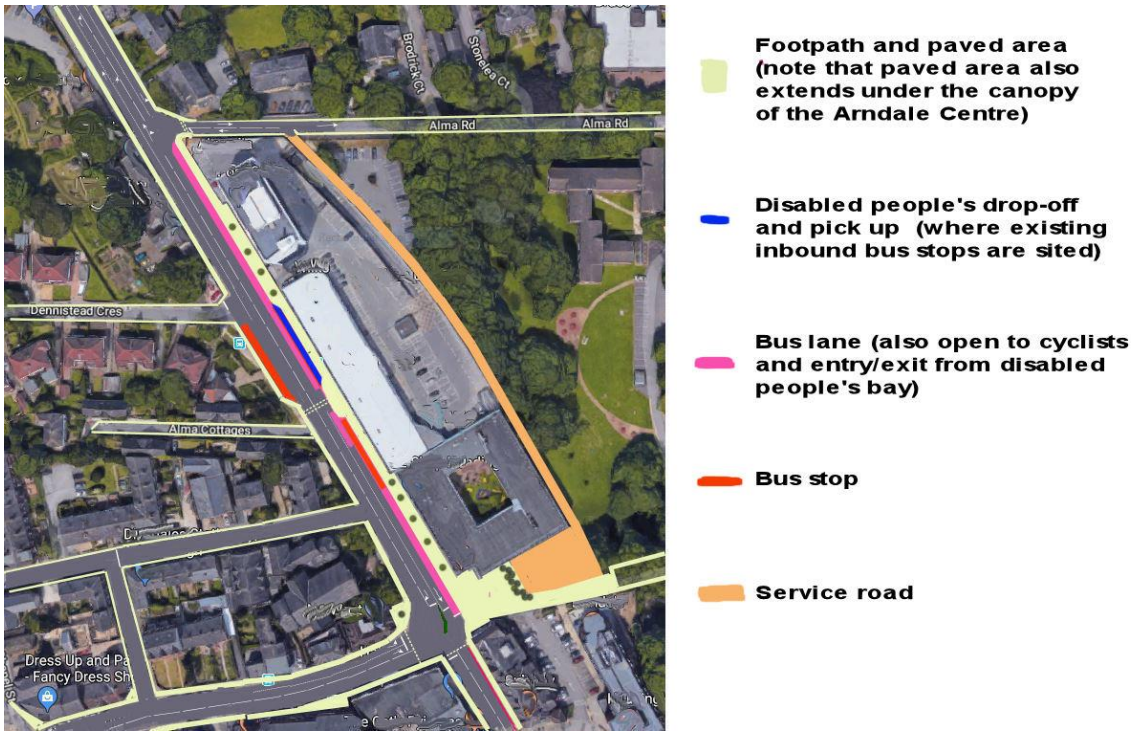
Figure 7: The North Lane/A660 junction.



The design indicated in Figure 7 would require closure of Wood Lane. Wood Lane is currently used by traffic leaving the Medical Centre car park, by light traffic entering or leaving the parking space underneath the Arndale Centre and by goods vehicles servicing shops and other premises in the Arndale Centre[3].

If Wood Lane were closed, this traffic would need alternative means of access/egress. Traffic leaving the Medical Centre car park could exit via Shire Oak Street. Vehicles parked under the Arndale Centre could enter/leave via the existing tunnel which passes through the back of the Arndale Centre between Wood Lane and Alma Rd. Although service traffic could, in theory, use this same tunnel, problems would undoubtedly arise on Alma Rd if incoming vehicles were held up there waiting for other vehicles to exit from the tunnel. A better plan would therefore be to provide a new service road from Alma Rd along behind the Arndale Centre to an extended turning area at the Wood Lane end (see Figure 8).

Figure 8: Changes around the Arndale centre



[3] A fourth, not inconsiderable, element of traffic using Wood Lane is that which is searching for a parking space and, failing to do so, does a three-point turn before heading back out again .

Were such a road to be built, it might provide the starting point for a cycle route running along the off-road alignment which was to be used for the trolleybus (see Section 2.9). It might also provide access to a site for the additional parking which is called for by businesses in Headingley. There is already a case, on the grounds of safety, for provision of a pedestrian crossing and improved visibility at the mouth of Alma Rd**.** This case is strengthened by the prospect of additional traffic associated with the new *Premier Inn* and would be further strengthened if the service traffic which currently uses Wood Lane were instead to use Alma Rd. It is, accordingly, shown in Figure 8.

2.9 Along the off-road alignment previously envisaged for the trolleybus

This alignment could be used as a cycle path leaving the A660 at Alma Rd and re-joining just before Hinsley Hall Lodge. Outbound cyclists wishing to join the route at Hinsley Hall Lodge would have to cross two lanes of traffic on Headingley Lane but provision for this might usefully be combined with a new pedestrian crossing associated with the inbound bus stop near that point.

Consideration should be given to whether the route should be open to pedestrians, whether it should be lit and whether a "pocket park" might be created between this alignment and Headingley Lane (to the East of St Columba's Church). The scope for creating an attractive and environmentally positive asset is clearly considerable. Its designation as "the Headingley Green Route" would seem very appropriate.

2.10 On the Otley Rd between North Lane and St Michael's Road

The current layout at the east end of Bennett Rd leaves much to be desired; pedestrians passing along Otley Rd are inconvenienced by the kerb-drop and are subject to delay and hazard by traffic turning into or out of the stub end of Bennett Rd, buses and other traffic on Otley Rd are held up by vehicles waiting to turn in or out, and the efficiency of the North Lane signals is compromised. An obvious and long overdue solution would be to close the stub end and remove the existing barrier across Bennett Rd so that Cross Granby Terrace can be accessed from North Lane via Bennett Rd. The stub end could, if paved over for pedestrian use, and perhaps planted up with a semi-mature tree, become a valuable addition to Headingley's public realm (see Figure 9).

Figure 9: Bennett Rd stub end

There is currently no crossing facility on Otley Rd between North Lane and St Michael's Church. If one were introduced near the junction with Shire Oak Rd it would also help traffic to enter/exit that road.

2.11 At Hyde Park Corner

The possibility of providing additional bus priority at this location has been identified in Sections 2.3.1 and 2.6.5. Further benefit to buses, but more particularly to pedestrians, could be achieved if the junction were redesigned. Figure 10 summarises a design which includes the bus priorities

identified in Sections 2.3.1 and 2.6.5 together with additional pedestrian crossings and additional paved space for public use. It also makes specific provision for the currently hazardous right turn out of Victoria Rd. Figure 11 provides a close-up of the space between the two main junctions.

Figure 10: Possible re-design for junctions at Hyde Park

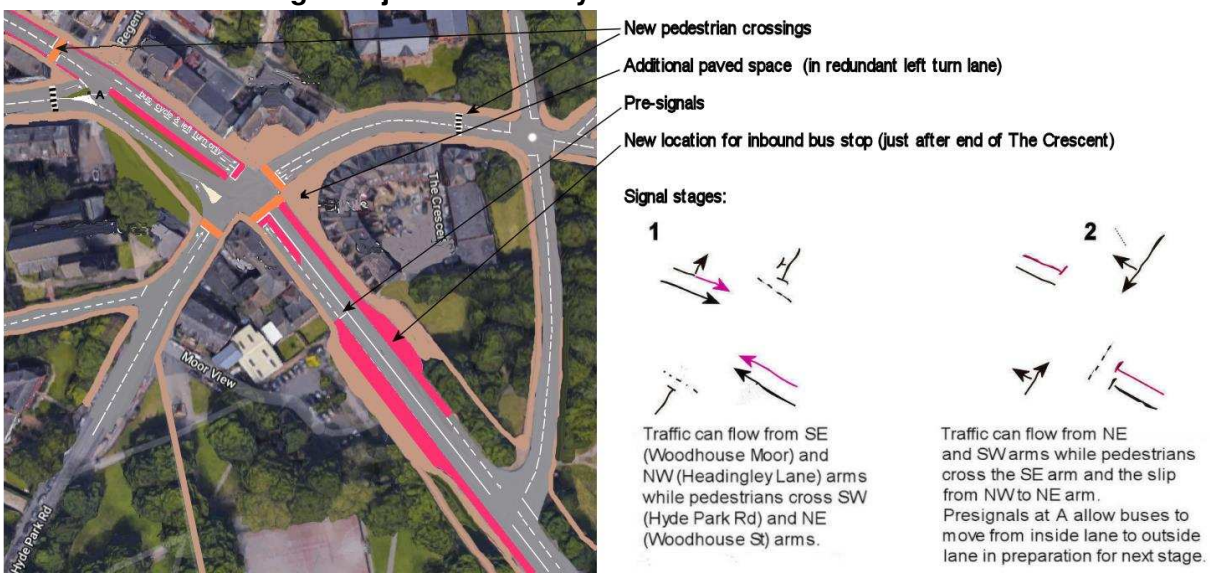
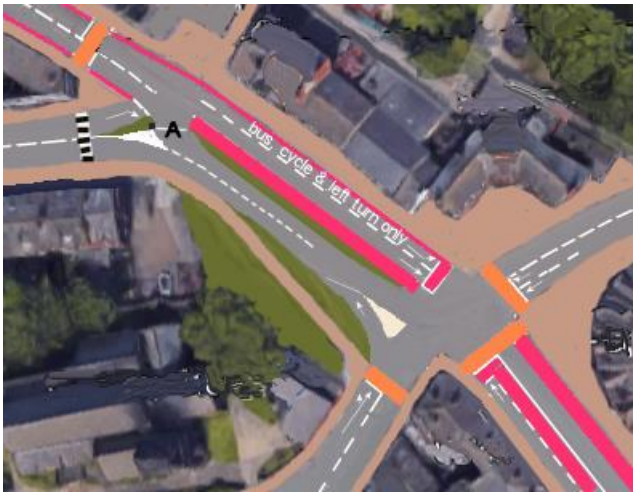


Figure 11: Close-up of main Hyde Park junctions



Safety and efficiency is achieved by prohibiting some turning movements in the main junction:

- the left turn from Woodhouse St into Woodhouse Lane (this traffic would, as now, be able to use Cliff Rd);
- the right turn from Woodhouse Lane into Woodhouse St (as now, this traffic should turn right into Cliff Rd);
- the right turn from Hyde Park Rd into Woodhouse Lane (this traffic should pass straight through the junction and then turn right into Cliff Rd);
- the left turn from Woodhouse Lane into Hyde Park Rd (this traffic should turn right into Cliff Rd, left into Woodhouse Street and then straight through the junction);
- the right turn from Headingley Lane into Hyde Park Rd (this traffic would proceed straight through the junction before turning left into Cliff Rd, left again into Woodhouse St and then straight through to Hyde Park Rd); and
- the (rare but hazardous and disruptive) right turn from Headingley Lane into Victoria Rd and the left turn from Victoria Rd into Headingley Lane (traffic making these turns should use Buckingham Rd but, failing that, it could pass through the Hyde Park junction, turn left into Cliff Rd, left again into Woodhouse St and then right into Headingley Lane).

The existing left turn into Hyde Park Rd presents a particular hazard to pedestrians crossing Hyde Park Rd. The proposed route via Cliff Rd overcomes this problem. An alternative solution would be to re-open Moor View (a short road which used to run from Woodhouse Lane past the disused public conveniences out onto Hyde Park Rd) and require left turning traffic to use that rather than turn at the main junction. However, the suggested re-opening of this route has met with opposition.

The greater efficiency achieved by prohibiting these turns would yield additional "green" time which could be distributed evenly to all road users or could be used to the particular benefit of pedestrians and/or traffic streams containing buses.

Although not essential to the overall plan, closure of Regent Park Avenue would remove some conflicting movements and provide additional public realm space. It would, however, be dependent on it being possible to service local premises via Grosvenor Rd or Cross Cliff Rd. Further improvement to the public realm could be achieved by removing the advertising hoardings to open up a view of Wrangthorn Church. Access to and from the City of Leeds Academy is made safer by provision of a new crossings across Woodhouse Street (en route to/from the bus stops on Woodhouse Lane) and across Headingley Lane (en route to/from the housing in South Headingley). Finally, the proposed re-location of the inbound bus stop closer to The Crescent would be more convenient for passengers and increase safety at the junction of Cliff Rd with Woodhouse Lane.

The layout includes features which would be required if, in the absence of an outbound bus lane on Headingley Lane prior to the Elinor Lupton Building, it becomes necessary to use a "gate" (in the form of signals at point "A" in Figure 11) or charges to restrict the flow of general traffic up Headingley Lane in the pm peak. The inclusion of an outbound bus/cycle lane from the pre-signals on Woodhouse Lane through to the junction with Victoria Rd and a separate lane approaching the gate line ensures that buses and cycles could access Headingley Lane even if vehicles slow down before passing through the gate (see Section 3.2). Note that, while the gate is closed, an adjacent VMS sign should indicate that there is no through route to Headingley via Headingley Lane.

2.12 Changes designed to benefit buses elsewhere on the A660

This document focusses on the area between Hyde Park Corner and Shaw Lane but, as noted in documents produced by Leeds Civic Trust and the North West Leeds Transport Forum, buses would also benefit from improvements elsewhere along the A660. For the sake of completeness, the relevant locations are listed here.

2.12.1 At Woodhouse Lane's junctions with Clarendon Rd, St Marks Rd and Blackman Lane. The NWLTF's "Alternatives" document described possible changes at these junctions which would reduce delays to inbound buses and to pedestrians wishing to cross Woodhouse Lane. The case for these changes remains strong.

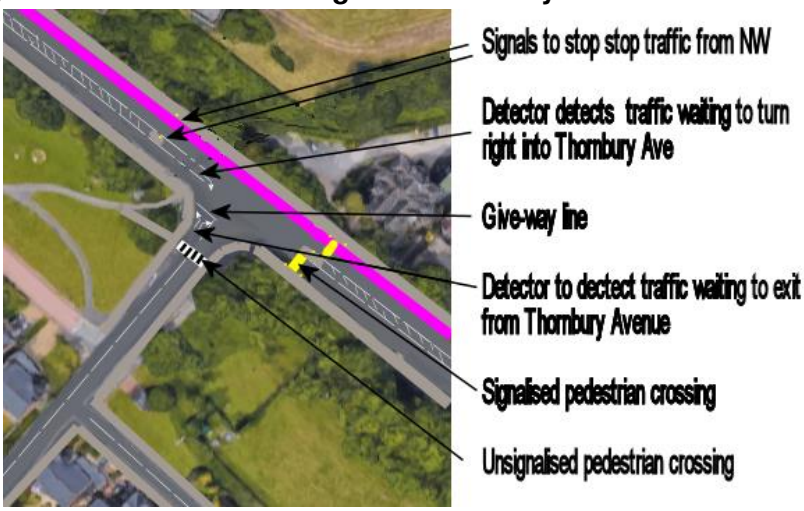
2.12.2 Between Cliff Rd and Raglan Rd. Buses would benefit from an inbound bus lane along this stretch of Woodhouse Lane. Thought should be given to ways of achieving this without detracting from the character of Woodhouse Moor. Suggestions on the table include:

- construction of a lane along the edge of Monument Moor, screened from the moor with new planting, from the top of Rampart Rd to the bus bay in the mouth of Raglan Rd; and
- incorporation of the footpath along the SW side of Woodhouse Lane into the main carriageway and then shifting all the lanes across such that the existing lane on the NE side can become a bus lane.

2.12.3 At Thornbury Avenue. The traffic signals which were introduced when housing was built on the former filter beds site cause delay to buses as well as to other traffic. Adjustment to the signal settings to give less time to Thornbury Avenue traffic seems warranted but would not be popular with those who use Thornbury Avenue. A better solution, which could leave all parties,

including pedestrians, better off might involve removal of some of the signals to create a signal-assisted priority junction such as that shown in Figure 12.

Figure 12: Possible re-design at Thornbury Avenue



2.12.4 At the Outer Ring Road. It is assumed that, particularly if a park-and-ride site can be constructed at Bodington Fields, the signalisation of the intersection between the A660 and the Outer Ring Road will include provision for bus priority.

2.12.5 At Bodington Fields. The improvements to bus journey times which would result from the proposed measures along the A660 should, if combined with reductions in boarding times, be sufficient to support introduction of bus-based park-and-ride at Bodington Fields. However, despite its large potential, it would be wise to start with a relatively small facility served by the existing bus services (numbers X84, X85 and 1) but to be ready to expand this, and to provide dedicated shuttles, when the demand warrants it.

3 Discussion

3.1 The consequences of designating part of Cardigan Rd as one-way outbound

The designation of Cardigan Rd as one-way outbound was identified in Section 2.4 as a radical way to accommodate additional outbound traffic without increasing the existing delays. It would only be introduced if further analyses indicate that this cannot be achieved by less dramatic means. If the designation were to go ahead this would obviously have implications for inbound traffic. Several questions emerge.

3.1.1 What changes elsewhere in the network would be required to mitigate the impact on inbound traffic? Three actions can be identified. *Viz*:

- Removal of the current restriction on traffic turning right into Bainbrigge Rd from Headingley Lane. The restriction was introduced to prevent turning traffic from colliding with cyclists emerging from behind stationary traffic in the outbound queue on Headingley Lane. Introduction of the outbound bus lane described in Section 2.2 should reduce this hazard and so allow removal of a restriction which has resulted in extra traffic on St Michael's Lane and Chapel Lane and which would be particularly inconvenient if Cardigan Rd were to be made one-way outbound.
- Designation of St Ann's Lane as one-way from St Anne's Drive to Burley Rd. This narrow road has a hazardous entry from Burley Rd and is already unsuitable for two-way traffic. Any additional load occasioned by restrictions on Cardigan Rd would make the case even stronger.

- Improvement of the junction between Ashville Rd and Cardigan Rd. Traffic turning in or out of Ashville Rd is often delayed until the flow on Cardigan Rd is interrupted by activation of the adjacent pedestrian crossing. The situation could be eased if the crossing lights were set to respond also to the presence of traffic waiting more than a short time to enter or leave Ashville Rd or by creation of a mini-roundabout .

3.1.2 Buses would no longer be able to travel inbound via the upper part of Cardigan Rd. What can be done about that? It would be up to the bus operators to decide what to do, but the most obvious alternative inbound route would go via St Anne's Drive, Beechwood Crescent and Ashville Rd before emerging onto Cardigan Rd near the Co-op at which point the #19 and #19A would turn right and the #56 would turn left.
These new routings would provide bus services to roads which currently have none, and might reduce the overall inbound journey time from Queenswood Drive and beyond, but they would mean the loss of a convenient service from Kirkstall Lane near Headingley Stadium to the University and city centre. Bus operators would be keen not to lose this source of revenue and would seek solutions. One such might be to introduce a variant on the #56 service (the 56A?) which, after running up Cardigan Rd and past the Stadium, turns back towards town via St Anne's Drive rather than continuing up Queenswood Drive to Moor Park.

3.1.3 What about other traffic which is no longer able to travel inbound on this part of Cardigan Rd? Different routes would be used depending on the traffic's precise origin and destination but it appears that no-one would be without a reasonable alternative:

- Traffic from North Lane which is no longer be able to turn left into Cardigan Rd could go via Kirkstall Lane and St Ann's Lane to Burley Rd; via Kirkstall Lane, St Annes Drive and Beechwood Crescent to Cardigan Rd; or via Otley Rd and Bainbrigge Rd to Cardigan Rd.
- Traffic from Kirkstall Lane which is no longer be able to turn right into Cardigan Rd could go via St Ann's Lane to Burley Rd; via St Annes Drive and Beechwood Crescent to Cardigan Rd; or via North Lane, and Otley Rd (whence via Bainbrigge Rd to Cardigan Rd or via Headingley Lane to Hyde Park Corner).
- Traffic from St Michaels Lane (N) which is no longer be able to turn left into Cardigan Rd could reach the lower end of Cardigan Rd via Bainbrigge Rd or via St Michaels Lane (S) and Beechwood Crescent.
- Traffic from St Michaels Lane (S) which is no longer be able to turn right into Cardigan Rd could reach the lower end of Cardigan Rd via Beechwood Crescent or via Newport View and Newport Rd.

3.1.4 What about the traffic from Kirkstall Lane and North Lane which would no longer be able to turn into St Michael's Rd (the layout in Figure 4 would allow traffic from St Michael's Rd to access Kirkstall Lane/North Lane but not vice versa)? Depending on its destination, it would probably go via St Michael's Terrace or Otley Rd.

3*.1.5 What would be the effect on the existing queues on Cardigan Rd?* Under the current arrangements, Cardigan Rd suffers from a stop-start outbound queue which, at peak times, stretches from Kirkstall Lane all the way back to Newport Rd. Under the proposed plan the traffic should move more steadily and, with two outbound lanes available for much of its length, is unlikely to tail back much further than the Bear Pit even at the busiest times.

3.1.6 Is it necessary to make the one-way restrictions on Cardigan Rd permanent – why not have them operating only during the evening peak? The benefits of the one-way designation come from the opportunity to simplify the layouts of the junctions at St Michael's Lane and at Kirkstall Lane. The layouts could not be varied by time of day. Also, a scheme involving time-dependent reversals of flow would be very hazardous.

3.1.7 The advisory cycle route from West Park to the City Centre uses Cardigan Rd (with a variant along St Michael's Rd). How would it be affected? The outbound route would have a slightly easier passage from Cardigan Rd across to South Parade but the inbound route would be unable to use Cardigan Rd. Provision could be made to access the inbound St Michaels Rd Variant by means of a marked out route across the pedestrian area and then a contra-flow lane along St Michaels Rd as far as the Junction St Michael's Terrace (beyond which the road would be two way – as now). However, an alternative, slightly longer but safer, way to access the St Michael's Rd Variant would use Ash Rd, North Lane and St Michaels Terrace (rather than via Ash Gardens, Ash Crescent, South Parade and North Lane and the new contra-flow). In fact, given the unpopularity of the St Michael's Rd Variant, the opportunity might be taken to undertake a more radical re-specification of the route. Some ideas for this are included in Appendix 2.

3.2 Consequences of using a gate to close Headingley Lane to general traffic outbound

Section 2.4.3 describes the use of a gate to restrict the flow of traffic into Headingley Lane while Figure 11 indicates a lane layout at Hyde Park Corner which could accommodate it. However, a number of questions remain about the operational detail.

3.2.1 When would the gate be closed? The frequency and duration of closure will depend on the extent of the outbound bus lane on Headingley Lane, the amount of traffic outbound from Hyde Park Corner, the attractiveness of the alternative route via Cardigan Lane and the objectives of the gating strategy. If the bus lane is extensive and the changes on Cardigan Rd are sufficient to make that route an attractive option (and if this fact generally known), it might rarely be necessary to close the gate.

Although the guiding principle should be that the gate is closed whenever the back of the queue is near the start of the bus lane (i.e. when there is a risk that the queue could begin to cause delay to the buses), differing gating strategies could be adopted. If the aim is to achieve the most efficient use of available road-space, the best strategy would be to leave the gate open until the last minute and, having closed it, to re-open it as soon as the back of the queue retreats by a hundred metres or so. The result would be an oscillation whereby the gate closed and re-opened at fairly short intervals - though not so short that drivers are encouraged to queue at the approach to the gate waiting for it to re-open.

An alternative strategy can be envisaged whereby the gate is left closed for long periods in order to try and create a pleasantly empty space for pedestrians and cyclists further up Headingley Lane. However, such a strategy would be inherently flawed because drivers would come to realise that they can re-join a fairly empty Headingley Lane via Buckingham Rd and many would choose to do. The eventual equilibrium would represent an inefficient use of road-space - particularly if it involved traffic queuing to get out of the top of Buckingham Rd - and would bring the entire scheme into disrepute.

3.2.3 How would closure of the gate affect access to/from properties on the cul-de-sacs opening off Headingley Lane? Access to and from Headingley and towards Hyde Park Corner would be unaffected but access from Hyde Park Corner would be via Buckingham Rd. This would cause some inconvenience to those wishing to access properties on Grosvenor Rd and Cumberland Rd and, to a lesser extent, on North Hill Rd and North Grange Rd, because they would have to double back down from Buckingham Rd but this would presumably be tolerable if the gate is only rarely closed. However, if the closures are lengthy, whether because the bus lanes are short and the alternative route is unattractive, or if there is a deliberate policy to create empty space further up Headingley Lane, it might become necessary to consider allowing residents of the cul-de-sacs to pass through the gate even when it is closed.

3.2.4 How would the gate be enforced? The basic gate would comprise traffic signals set to red. Prominent signage would explain why the signals are at red and the penalties for transgression. Prominent cameras would indicate that transgressions would not go un-noticed and publicity could be given to any prosecutions.
Enforcement would be easiest if the gate applies to all vehicles other than buses, cycles and emergency vehicles because exemptions, e.g. for taxis or for residents of the cul-de-sacs, would cause some confusion and might be resented by other drivers. Exemptions for taxis, even though indefensible in terms of equity or efficiency, might be understood by other drivers because the vehicles are recognisable as a separate category. Exemption for local residents, although actually more justified, might create more confusion and resentment.
If exemptions are to be allowed, the gate would need to include Automatic Number Plate Recognition technology so that, when a registered-exempt vehicle is detected in the approach to the closed gate, the signal can briefly be set to green to allow it to pass through. It is possible that other drivers, observing some vehicles being let through the gate, would decide to approach the gate in case they too can be let through. This possibility needs to be minimised because it would create queues and frustration. This could be achieved by appropriate signage and prominent display of a message such as “REGISTERED VEHICLE” whenever the gate is opened to let an exempted vehicle through and of a message such as “VEHICLE NOT RECOGNISED – USE DIVERSION ROUTE” whenever an unregistered vehicle is detected waiting outside the gate.

3.3 Aspects of the proposed changes at Shaw Lane junction and on St Anne’s Rd and Headingley Mount

3.3.1 Is it right to encourage traffic to use Headingley Mount and part of St Anne’s Rd given that they are, primarily, residential roads? This route has been used as a short cut for many years. The proposed changes are likely to result in increased usage of the route but would result in reduced traffic on North Lane and past the Arndale Centre (where footfall and pedestrian activity is much greater) and by reduced use of other roads on the Beckett Park estate. It can clearly be argued that any disbenefit to residents along the route are more than offset by benefits created elsewhere.

3.3.2 How can it make sense to remove existing crossing across Otley Rd? The existing crossing would be replaced by another on the Headingley side of the junction. The new site is closer to the main desire line (this was the case even before installation of an island which facilitates crossing near St Chad’s Drive and is now even more so). The removal of the old crossing is necessary in order to accommodate the right turn lane into St Anne’s Rd. Accommodation of the new crossing on the Headingley side of the junction is made possible by rebuilding the (relatively new) wall below the car park slightly further back.

3.3.3 Why are the pedestrian crossings in two parts – surely this means that it will take longer to cross? The alternative, single crossings without central refuges, is inappropriate on wide roads because time has to be allowed for the slowest pedestrians to get across and this inevitably results in long delays to traffic and/or very long gaps between green lights for pedestrians. The design summarised in Figure 5 should reduce the average time between arriving at the kerb and completing the crossing.

3.4 Alternative Approaches

3.4.1 There is room for three lanes all the way up Headingley Lane, why not designate one of them as a tidal lane (inbound in the morning and outbound in the evening)? That idea has been considered but, given the number of side roads and the need to accommodate bus stops, it has proved impossible to design a scheme which would be safe and effective.

3.4.2 Why not designate the whole of Headingley Lane, from North Lane to Hyde Park as one way inbound and the whole of Victoria Rd and the upper part of Cardigan Lane as one way outbound? That idea has been considered but the implications for local access (by car) were found to be serious and unsurmountable.

3.4.3 Why do the proposals not include any mention of rail services? The generic changes listed in Section 2.1 include introduction of multimodal tickets to facilitate journeys involving bus and train. Such tickets could be particularly useful in Cookridge and Horsforth where the existing bus services could be modified to take passengers to and from the rail station and this might make some contribution, all be it limited, towards reducing traffic volumes in the A660 Corridor. More ambitiously, if budget were available to open additional stations (e.g. a park and ride at Horsforth Woodside, and halts at Hawksworth and Headingley Stadium), the Horsforth-Leeds line could perhaps be remodelled as a suburban rail line offering high frequency services in and out of Leeds and this might begin to attract significant numbers of people out of their cars. Such a development would be welcomed but could not be achieved with the scale of funding likely to be available in the short term. The current proposals, by contrast, are achievable in the short term and within existing budgets.

APPENDICES

1: Schematic diagram to indicate how usefulness of an interrupted bus lane can be maximised

Traffic is flowing from left to right
Two stretches of bus lane (B1 and F1) can be accommodated beside the main carriageway but, between D and E, there is space only for a cycle lane (cycles can also use the bus lanes)
Signals at C (at the end of lane B2) are generally set to green but flash amber when a bus is approaching in lane B1
Road markings after C indicate that general traffic from B2 should give way to buses emerging from B1
When general traffic queuing in lane F2 begins to back up towards E, and provided that there is spare capacity in lane B2, the lights at C are set to red so that buses proceed freely from B1 to F1
When the back of the queue in F2 moves away from E, the lights at C revert to green or flashing amber to allow general traffic to proceed

2: Some ideas for re-design of the Advisory Cycle route from West Park to the City Centre

a. Designate a new route from Headingley Mount to Brudenell Rd via the ginnel beside the Cricket Ground, St Michaels Lane, Stanmore Hill, Park View Rd and Ashville View (instead of via Ash Rd, Ash Gardens, Ash Crescent, South Parade, North Lane, Cardigan Rd, Chapel Lane, Cardigan Lane and Welton Rd) – quieter and more direct than the current route but only possible if it is safe to allow cyclists access to the ginnel.

b. Designate a new route from Headingley Mount to Brudenell Rd via Ash Rd (W), Kirkstall Lane, St Annes Drive, St Michaels Lane, Stanmore Hill, Park View Rd and Ashville View – quieter but marginally longer than the current route.

c. Designate a new route from Batcliffe Rd to Brudenell Rd via Batcliffe Wood, St Annes Drive, St Michaels Lane, Stanmore Hill, Park View Rd and Ashville View – quieter and more direct than the current route but requires the track through Batcliffe Wood to be upgraded.

d. Designate a new route from Batcliffe Rd to Brudenell Rd via the existing cycle route across Beckett Park to Queenswood Drive and thence via St Annes Drive, St Michaels Lane, Stanmore Hill, Park View Rd and Ashville View – quieter but slightly longer than the current route.