Technical note

Project:	Birmingham Bus Stop Consolidation	**To:**	Matthew Till / Danny Gouveia
Subject:	6 Draft Report	**From:**	Andy Clark / Anna Little / Tim Colles
Date:	21st July 2017	**cc:**	Adrian Taylor

1. Introduction

Atkins has been commissioned by National Express West Midlands to undertake a study investigating the scope for bus stops on several routes in Birmingham to be rationalised. This is in response to growing concern from National Express West Midlands and Transport for West Midlands (TfWM) regarding increasingly long and unreliable bus journeys in the West Midlands.

Bus patronage is dropping sharply as congestion increases. The average speed of buses has reduced by 3% (Birmingham-wide) between 2014 and 2016 with patronage reducing by 4% in response. These delays are amplified at peak times with buses 13% slower in the morning peak and 10% slower in the evening peak.

The time that passengers spend on the bus impacts the likelihood of passengers using the bus in the future. An increase of in-vehicle time of 10% will result in a 5% reduction in journeys made. Reducing in-vehicle time will have the opposite effect, with additional passengers drawn to the route. This demonstrates the importance of journey times in determining whether a passenger chooses to make a journey by bus and the sensitivity associated with changes in journey time.

The increases in road congestion are a major cause of the increase journey times. To an extent, without significant infrastructure spending or a marked decrease in car usage, this is out of the direct control of the bus operators. However it is prudent to look at how services are routed to ensure that passengers are getting where they need to be expediently and without unnecessary delay. One element of delay is the amount of times a service stops along its route. The time it takes for a bus to slow to a stop and return to normal running speed is approximately 30 seconds. This is present despite the number of people that board a vehicle and a reduction in the number of times a vehicle stops can quickly decrease the in-vehicle time for passengers.

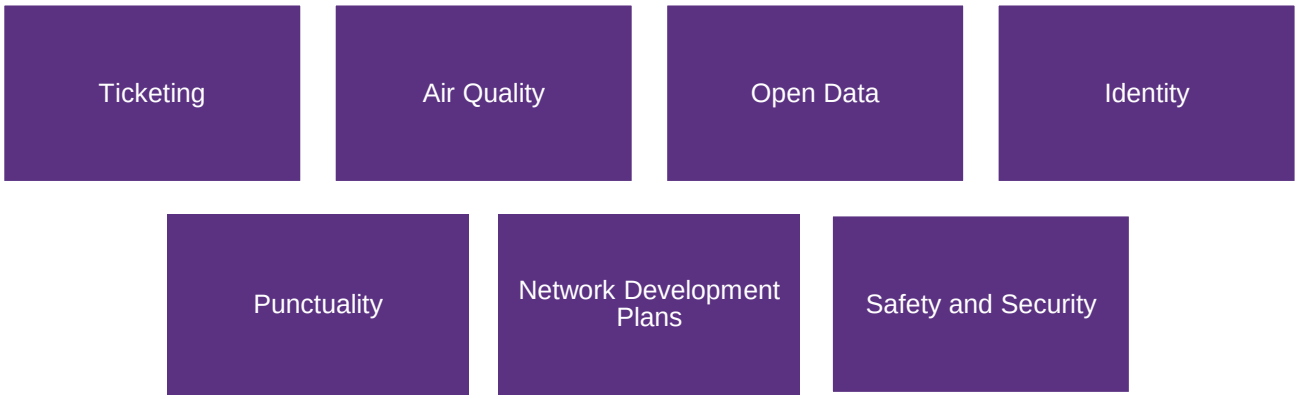
The locations of stops have evolved overtime with stops being relocated for new developments or road layouts meaning they are now in close proximity to other stops. In addition, some stop location result in buses being delayed when crossing junctions.

By removing stops along a route, bus operators can reduce journey times, however this does need to be considered in conjunction with the increase in walking time for passengers.

National Express West Midlands is part of the West Midlands Bus Alliance, consisting of representatives from the region's bus operators, the West Midlands Combined Authority, council highways and transportation departments, Local Enterprise Partnerships, the Safer Travel Partnership, councillors and Transport Focus.

The Alliance Board Members are responsible for identifying what the region's buses need to deliver and then putting policies and funding streams in place for this to be achieved. In March 2016, the board identified seven key actions which it will work together to deliver by 2020, as outlined in Figure 1.

Figure 1. Key Targets for West Midlands Bus Alliance



The potential impacts on these key targets are considered later in this technical note, with specific focus on punctuality (aiming to reduce delay minutes).

This technical note sets out the results from Atkins' analysis of Route 6. The results of the assessments of other routes are outlined in subsequent technical notes.

Route 6 is linear, with outbound services travelling from Birmingham City Centre to Solihull Railway Station and inbound services travelling from Solihull Railway Station to Birmingham City Centre. The route serves South-East Birmingham and West Solihull and interchanges with several key corridors including the circular 11A and 11C routes. The daytime frequency is approximately 10 buses per hour (BPH), with buses taking approximately 39 to 67 minutes to complete the route. Timetabled journey times vary considerably through the day, reflecting both congestion in the city and differing dwell times in response to demand.

Following this introduction, the technical note outlines the:

- Data Sources (**Section Two**);
- Methodology (**Section Three**);
- Key Findings (**Section Four**); and
- Summary (**Section Five**).

2. Data Sources

Table 1 outlines the data that has been used to inform this commission. The data has been provided by a combination of Transport for West Midlands (TfWM), the Department for Transport (DfT) and National Express West Midlands. Atkins has combined the data from all three sources to derive a database of information for each route, which includes information around the provision of infrastructure at each stop, levels of usage and the distance between stops.

With regard to usage, there are two key sources of data, both provided by National Express West Midlands:

- Proportion of buses calling at stops: The data shows indicative percentages of the proportion of buses stopping at each bus stop. At a high level, this helps to determine which are the most heavily used stops on the route, but the obvious shortcoming is that it is not possible to determine from this data how many boarders / alighters there are when a vehicle does stop; and
- Boarders by fare stage: The data shows the numbers of boarders by fare stage, which Atkins has used in combination with the proportion of buses calling to build up an understanding of the relative level of usage.

Table 1. Summary of Data and Sources

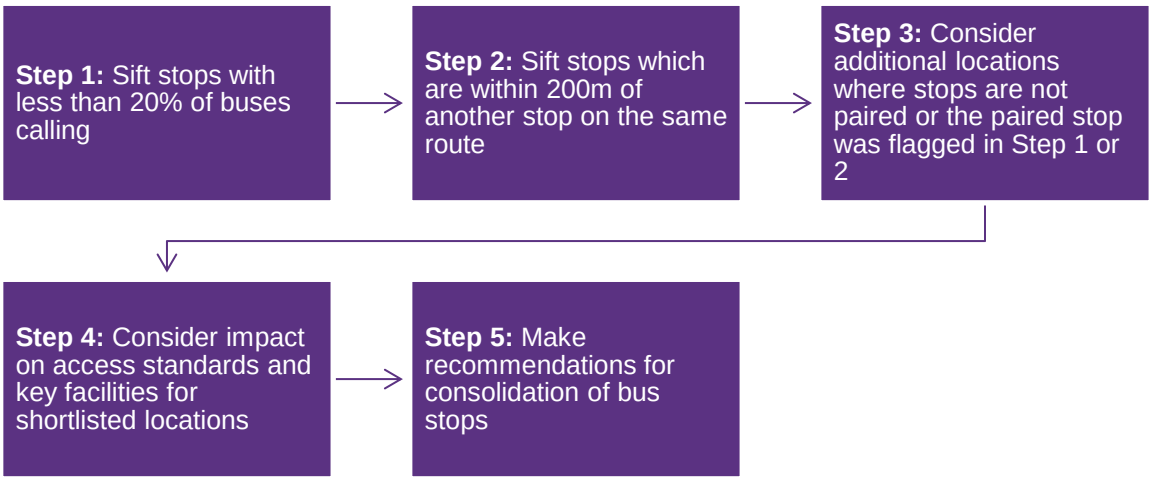
Data Type	Transport for West Midlands (TfWM)	Department for Transport (DfT)	National Express West Midlands
Stop name	✓		
ATCO (unique code)	✓		
Infrastructure type (whether the stop has a shelter or flag pole)	✓		
RTPI (Y / N)	✓		
Timing point (Y / N)	✓		
Services calling	✓		
Easting / northing		✓	
Distance between adjacent stops			✓
Proportion of buses calling			✓
Boarders by fare stage			✓

3. Methodology

Atkins has undertaken a sifting process based on the information outlined in the database. There are several credible approaches which could be taken to determine the optimum stops for removal, but through discussion with National Express West Midlands and TfWM, Atkins has agreed a five-step process. Further details on these steps are now provided. A summary is provided in Figure 2.

Steps 1 and 2 are first applied to the route in one direction, with the same steps then repeated for stops in the opposite direction. Step 3 then considers instances where the stop was flagged in one direction but not the other and issues around an imbalance of stops between the two directions.

Figure 2. Summary of Methodology



Step 1: Sift stops with less than 20% of buses calling

Atkins has first sifted out the stops where less than 20% of buses are calling (Step 1a). This level of usage indicates that the stop is lightly used and hence should be considered as part of any future rationalisation process. A high level sift (Step 1b) of the shortlisted locations has then been carried out to determine whether there are any clear reasons why it may not be appropriate to remove the stop. This takes account of the spacing between stops, the routes served (whether served by the 6 only or the 6 and other routes) and location relative to any local facilities or transport interchanges such as railway stations. This also takes account of any operational need for the stop to remain.

Step 2: Sift stops which are within 200m of another stop on the same route

The second sift entails identifying those stops which are within 200m of another stop on the same route (in the same direction). The figure of 200m has been chosen as, in broad terms, closer spacing suggests there may be some duplication of coverage in terms of the West Midlands Combined Authority Bus Service Access Standards (**see Appendix A**), which state that for residential areas, the maximum desirable walking distance to bus services in continuously built-up areas is 400m during the hours of 07:00 to 19:00 on Monday to Saturday and 700m at other times. Step 2a relates to this first sift.

The output of Step 2a is a list of bus stops that are within 200m of another stop on the same route in the same direction. An assessment has then been made (Step 2b), considering the same factors as per Step 1b, to determine which of the two stops would be more suitable for removal. In some instances, there may be three or more consecutive stops with distances of less than 200m, and in these situations, Atkins has considered how the stops could best be rationalised to provide more even spacing.

Step 3: Consider additional locations where stops are not paired or where the paired stop was identified in Step 1 or Step 2

In some cases, there may be an imbalance of stops in one direction relative to the other, which may be a function of the highway layout (for example, a one-way system or proximity to a major junction) or a function of the specific location relative to key attractors. Step 3a in the technical process has entailed Atkins considering any locations not flagged by either Step 1 or Step 2 where some rationalisation of stops may be appropriate because of the imbalance of stops in one direction relative to the other.

Finally, as Step 3b, there may be some instances where the gap between stops in one direction is slightly below 200m whilst it is slightly above 200m in the opposite direction. In this instance, it would be prudent to consider the opportunity to rationalise the stops in both directions rather than suggesting rationalisation in one direction but not the other. Another such instance relates to the proportion of buses calling. The level of usage may be below the 20% threshold in one direction (and hence would be flagged up in Step 1) but above 20% in the above direction. Again, in this instance, it is prudent to consider the pair of stops for rationalisation.

Note that the methodology assumes that a bus stop needs to be flagged in either Step 1, Step 2 or Step 3 to be considered for removal in Step 4. A bus stop therefore does not need to satisfy all criterion.

Step 4: Consider impact on access standards and key facilities for shortlisted locations

Having used Steps 1-3 to derive a shortlist of locations for potential rationalisation, Atkins has then considered the impact on both the West Midlands Combined Authority Bus Service Access Standards and the accessibility to key facilities, focussing on education and health facilities.

Step 5: Make recommendations for consolidation of bus stops

Finally, taking on board the outcomes of Steps 1 to 4, Atkins has made recommendations to National Express West Midlands around the locations where consolidation may be appropriate.

4. Key Findings

The findings for Route 6 are now outlined.

Mapping Outputs

To support the sifting process, elements of the database have been developed into mapping outputs. These maps have been placed in **Appendix B**. For Route 6, the maps are as follows:

- **Map A:** Showing the proportion of buses calling. Red shading of a stop denotes less than 20% of buses calling. These maps have been used to inform Step 1 of the process;
- **Map B:** Showing distances (metres) between stops. Stops that are within 230m (see notes below re- use of 230m rather than 200m) of another stop in the same direction are shown in red, with all other stops shown in green. These maps have been used to inform Step 2 of the process;
- **Map C:** Showing the infrastructure type (whether a pole or a shelter is provided);
- **Map D:** Showing whether the stop is a timing point; and
- **Map E:** Showing the location of bus stops relative to schools[1], GP surgeries[2] and hospitals[3]. Note that this has been based upon data provided by the DfT.

Tabulated Outputs

Tabulated outputs are now provided to show how the database has been used to derive a shortlist of locations for consolidation.

Step 1: Sift stops with less than 20% of buses calling

Table 2 outlines the stops on the 6 route that have been shortlisted based on less than 20% of buses calling.

The sift (Step 1a) gives rise to five stops outbound and four stops inbound. Having undertaken further analysis on these locations (Step 1b), Atkins has recommended that four stops (two in each direction) are considered later in the process, as there are reasons why the remainder of the stops should be retained. These reasons are outlined in Table 2.

Step 2: Sift stops which are within 230m of another stop on the same route

For Route 6, it was decided that 230m was a more appropriate distance to judge distance between stops, rather than the originally suggested 200m. This is due to the high number of stops falling into the 200-230m category which are just outside the 200m sifting threshold.

Table 3 outlines the stops on Route 6 that have been shortlisted based on a bus stop being within 230m of another stop on the same route in the same direction (Step 2a).

Note that Table 3 lists all the stops based on this criterion and hence it includes the stops either side of the 230m distance threshold. For example, if Stop B is 230m downstream of Stop A, then the table lists both Stop A and Stop B. In some cases, there are more than two consecutive stops. Solid black lines in Table 3 have been used to highlight the consecutive stops.

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[1] Schools in England dataset, Department for Education, last updated 9 March 2017 (downloaded May 2017)
[2] Details of GPs, GP Practices, Nurses and Pharmacies dataset from Organisation Data Services, published by NHS Digital, available from data.gov.uk (downloaded May 2017)
[3] Hospitals dataset, published by NHS Choices, available from data.gov.uk (downloaded May 2017)

In order to provide a shortlist of locations for detailed assessment under Step 4, a column in Table 3 identifies the suggested stop(s) for removal. This is based on a range of factors, but typically centres on the spacing that remains if a given stop is removed. In some cases, Stop A may be served by Route 6 only whereas Stop B is served by multiple routes. In such instances, the decision has been made, unless specific operational reasons are known, to suggest that Stop A is removed. The specific reasons for choosing one stop over another are outlined in the right-most column of Table 3.

Step 3: Consider additional locations where stops are not paired or where the paired stop was identified in Step 1 or Step 2

Finally, Atkins has undertaken a process to identify any additional locations. The results are outlined in Table 4, with the right-most column providing justification. The table shows that of the nine stops, the majority were identified as a result of the stop in the opposite direction being shortlisted in either Step 1 or Step 2.

Table 2. <20% of buses calling (Step 1)

Stop Name *(Yellow = Outbound, Blue = Inbound)*	ATCO	Proceed to Step 4?	Suggested Removal?
STRATFORD RD, Brandon Rd	43000430101	Yes	Subject to mapping against the access standards and further interrogation of facilities
STRATFORD RD, Hall Green School	43000430901	No	Interchange with 6A and X20/A. If the stop was removed, the distance between adjacent stops would be 400m. In addition, the stop serves Hall Green Infant and Nursery School and Hall Green Junior School
BLOSSOMFIELD RD, Charles Road	43000149201	No	Interchange with several other routes at both stops. If the Charles Road stop was removed, the distance between adjacent stops would be 820m. If the Dingle Lane stop was removed, the distance between adjacent stops would be 950m in an area where there are several educational establishments. Suggest keeping both stops as the distance between stops would be too large if one was removed or they were consolidated
BLOSSOMFIELD RD, Dingle Lane	43000154302	No	
BLOSSOMFIELD RD, Alderbrook Rd	43000156101	Yes	Subject to mapping against the access standards and further interrogation of facilities
BLOSSOMFIELD RD, Alderpark Road	43000154501	Yes	Subject to mapping against the access standards and further interrogation of facilities
BLOSSOMFIELD RD, Charles Road	43000149202	No	Interchange with several other routes. If the stop was removed, the distance between adjacent stops would be 900m
STRATFORD RD, Hall Green School	43000430902	No	Interchange with 6A/E and X20. If the stop was removed, the distance between adjacent stops would be 410m. In addition, the stop serves Hall Green Infant and Nursery School and Hall Green Junior School
STRATFORD RD, Brandon Rd	43000430102	Yes	Subject to mapping against the access standards and further interrogation of facilities

Table 3. Stops within 230m of another stop (Step 2)

Stop Name *(Yellow = Outbound, Blue = Inbound)*	ATCO	Proceed to Step 4?	Suggested Removal?
DERITEND HIGH STREET, Gibb Street	43000211402	Yes	Remove ATCO xx402 given large spacing to the stops and after (Trinity Terrace and Bordesley Middleway). Also ATCO xx501 used for operational reasons
DERITEND HIGH STREET, Adderley Street	43000211501	No	
STRATFORD RD, Poplar Road/Sparkhill	43000220903	No	Remove ATCO xx802 given higher usage of ATCO xx903 and its proximity to Highgate Road / Walford Road for interchange onto the 8A / 8C routes
STRATFORD RD, Wilton Road	43000221802	Yes	
STRATFORD RD, Avondale Rd/Sparkhill	43000222202	No	Stops have been grouped as they are consecutive. Keep ATCO xx202 given its proximity to two schools. Keep ATCO xx501 given its proximity to a school. Suggest relocating ATCO xx501 closer to the junction with Springfield Road. Keep ATCO xx601 given proximity to Shaftmoor Lane where passengers can interchange with other routes
STRATFORD RD, Formans Road	43000225102	Yes	
STRATFORD RD, Grove Rd	43000225403	Yes	
STRATFORD RD, Solihull Rd	43002102501	No	
STRATFORD RD, The College Arms	43000225601	No	
STRATFORD RD, Brandon Rd	43000430101	Yes	
STRATFORD RD, Hall Green Rail Station	43000430301	No	Keep ATCO xx301 given its proximity to a railway station. Keep ATCO xx703 given its proximity to a college. Keep ATCO xx901 given its proximity to a school – see Table 2 above for information
STRATFORD RD, South and City College	43000430703	No	
STRATFORD RD, Petersfield Rd	43000430802	Yes	
STRATFORD RD, Hall Green School	43000430901	No	
STRATFORD RD, Highfield Rd	43000433101	Yes	
STRATFORD RD, Robin Hood Island Southside	43000434302	No	Remove ATCO xx401 given spacing between three consecutive stops
STRATFORD RD, Green Hill Way	43000434401	Yes	
STRATFORD RD, Sandy Hill Road	43000145102	No	
STRATFORD RD, Union Road	43000146502	Yes	Remove ATCO xx502 given proximity of ATCO xx101 to a school and its higher usage
STRATFORD RD, Bishopton Close	43000147101	No	
MARSHALL LAKE RD, Stratford Rd/Dallas	43000141801	No	Remove ATCO xx404 given spacing between three consecutive stops
STRATFORD RD, Marshall Lake Rd	43000147404	Yes	
STRATFORD RD, Sainsbury`s	43000147301	No	
STRATFORD RD, Hall Green School	43000430902	No	Remove ATCO xx801 given proximity of ATCO xx902 to a school (see Table 2 above for justification) and ATCO xx704 to a College
STRATFORD RD, Petersfield Rd	43000430801	Yes	
STRATFORD RD, South and City College	43000430704	No	
STRATFORD RD, Ladypool Rd/Sparkbrook	43000221102	No	Both stops to remain given their proximity to a number of trip attracting land uses. Consolidation unlikely to be appropriate at this location
STRATFORD RD, Main Street	43000220202	No	
DERITEND HIGH STREET, Adderley Street	43000211504	No	Remove ATCO xx401 given large spacing to the stops and after. Also ATCO xx401 used for operational reasons
DERITEND HIGH STREET, Gibb Street	43000211401	Yes	

Table 4. Additional locations (Step 3)

Stop Name *(Yellow = Outbound, Blue = Inbound)*	ATCO	Proceed to Step 4?	Supporting Comment
BORDESLEY, adj Trinity Place	43000215901	Yes	Imbalance of stops
SHIRLEY, before Longmore Road	43001460001	No	Imbalance of stops. Keep stop given proximity to supermarket and Solihull Road where passengers can access other bus services
SPARKBROOK, Palmerston Road	43000221403	Yes	Imbalance of stops
STRATFORD RD, Wilton Road	43000221801	Yes	Shortlisted in opposite direction in Step 2
STRATFORD RD, Formans Road	43000225103	Yes	Shortlisted in opposite direction in Step 2
STRATFORD RD, Grove Rd	43000225402	No	Shortlisted in opposite direction in Step 2. Keep stop given previous rationalisation and consider new pairing with Springfield Road outbound stop
STRATFORD RD, Highfield Rd	43000433102	Yes	Shortlisted in opposite direction in Step 2
STRATFORD RD, Green Hill Way	43000434402	Yes	Shortlisted in opposite direction in Step 2
STRATFORD RD, School Road	43000147203	Yes	Shortlisted in opposite direction in Step 2 (Union Road)

Step 4: Consider impact on access standards and key facilities for shortlisted locations

The shortlisted locations from Steps 1, 2 and 3 are outlined in Table 5.

For each location, Atkins has then undertaken a process of considering whether removing the stop will have an impact on the West Midlands Combined Authority Bus Access Standards. Through agreement with National Express West Midlands and TfWM, Atkins has mapped the impact of removing the bus stop using ArcGIS software. Note that this analysis is based on the highway network only[4] and hence in a situation where the access standard (by highway) is no longer being met, it is necessary to consider whether footways may mean that the access standard is in fact being met. The results of the analysis are outlined in Figure 6 onwards.

Note that rather than considering each stop in isolation, Atkins has mapped the entirety of the impact of all stops in Table 5 being removed. Figures 6 onwards show that in virtually all cases, there has been very little impact on the access standards, with the density of bus stops on other routes meaning that even once a Route 6 stop is removed, adjacent residential areas are still within 400m of another bus stop, which means that the access standard is still being met. There are a few exceptions to this where it appears that the access standard is no longer being met, as identified in Figures 7 and 8. Figure 7, Map 002, shows that with the removal of the two Petersfield Road stops, parts of Petersfield Road, Staplehurst Road and Ferndale Road no longer meet the access standard, which means that they are no longer within 400m by highway of another bus stop. However, further interrogation of the layout of Staplehurst Road and Ferndale Road shows that there is a footpath (see Figure 3) which provides access to School Road which is served by the 11A and 11C bus services. For this reason, it is reasonable to conclude that the changes outlined in Table 5 do not have any adverse impact in regard to the access standards for Staplehurst Road and Ferndale Road.

Figure 3. Ferndale Road – footway access to School Road

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[4] https://www.ordnancesurvey.co.uk/business-and-government/products/meridian2.html

For the area of Petersfield Road that is no longer within 400m of a bus stop (see Figure 7), further investigation has found that there are no additional footways that can reduce the distance to the nearest bus stop. However, as it such a small area of the road that is affected, it is reasonable to conclude that the changes outlined in Table 5 will have a minimal impact in regard to the access standard.

Figure 8, Map 003, shows that with the removal of the two Green Hill Way stops, parts of Green Hill Way will no longer meet the access standard, which means that it is no longer within 400m by highway of another bus stop. However, further interrogation of the layout of Green Hill Way shows that there is a footpath (see Figure 4) which provides access to The Bridle Path from which pedestrians can access Streetsbrook Road which is served by Route 31. For this reason, it is reasonable to conclude that the changes outlined in Table 5 do not have any adverse impact in regard to the access standards for Green Hill Way.

Figure 4. Green Hill Way (footway access to The Bridle Path / Streetsbrook Road)

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In addition, Figure 8 shows that with the removal of the Alderbrook Road stop (outbound), parts of Alderbrook Road, Arley Road, and Rollswood Drive no longer meet the access standard, which means that they are no longer within 400m by highway of another bus stop. Further investigation has found that there are no additional footways that can reduce the distance to the nearest bus stop. However, as it such a small area that is affected, it is reasonable to conclude that the changes outlined in Table 5 will have a minimal impact in regard to the access standard. In addition, this area is located close to a key rail interchange, Solihull Railway Station, which provides good access for local residents.

Finally, for the shortlisted locations outlined in Table 5, Atkins has made an assessment to determine whether removal of the stop will have an implication in regard to access to key facilities, focussing on schools, hospitals and GP surgeries. This assessment uses Map E in **Appendix A**.

The assessment has shown that the proposed stops for removal are not adversely impacting accessibility to key facilities. Even with removal of some stops, the spacing of stops remains relatively dense and therefore key facilities are still adequately served. An overview map of the proposed consolidation, alongside the key facilities, is shown in Figure 9.

Step 5: Make recommendations for consolidation of bus stops

On the basis of the analysis presented to date, Atkins recommends that the full list of stops in Table 5 is considered by National Express West Midlands for rationalisation.

A reasonable working assumption[5] is that removal of one stop can save in the order of 30 seconds, given the need for the bus to decelerate / accelerate and the dwell time associated with passengers boarding and alighting. Clearly the exact extent of the saving will be dependent upon local conditions, including the ability for the bus to merge back into general traffic. We have used the 30 saving in conjunction with the information around proportion of buses calling to determine how much time could practically be saved per stop. For example, if only 30% of buses call at the stop, then it is reasonable to assume that 30% of 30 seconds will be saved at that stop, rather than the full 30 seconds. If 100% of buses stop, then the full 30 seconds saving would be appropriate.

When considering the usage of the 22 stops suggested for removal, it is reasonable to assume that approximately 2 minutes could bus saved per bus outbound on Route 6. Inbound, it is reasonable to assume that approximately 2 minutes, 10 seconds could bus saved per bus on the route. This journey time saving may enable a reduction in the peak vehicle requirement (PVR) for National Express West Midlands. Reducing the number of stops is also expected to lead to an increase in punctuality, which was one of the stated targets of the West Midlands Bus Alliance.

[5] Working assumption for National Express West Midlands

Table 5. List of Locations for Assessment in Step 4

Stop Name	ATCO	Identified in:	Access Standard Met based on proposal?	Access to Key Facilities Maintained?
DERITEND HIGH STREET, Gibb Street	43000211402	Step 2	✓ (Figure 6)	✓ (See Figure 9 for all)
BORDESLEY, adj Trinity Place	43000215901	Step 3	✓ (Figure 6)	✓
STRATFORD RD, Wilton Road	43000221802	Step 2	✓ (Figure 6)	✓
STRATFORD RD, Formans Road	43000225102	Step 2	✓ (Figure 7)	✓
STRATFORD RD, Grove Rd	43000225403	Step 2	✓ (Figure 7)	✓
STRATFORD RD, Brandon Rd	43000430101	Step 1	✓ (Figure 7)	✓
STRATFORD RD, Petersfield Rd	43000430802	Step 2	× (Figure 7)	✓
STRATFORD RD, Highfield Rd	43000433101	Step 2	✓ (Figure 7)	✓
STRATFORD RD, Green Hill Way	43000434401	Step 2	✓ (Figure 8)	✓
STRATFORD RD, Union Road	43000146502	Step 2	✓ (Figure 8)	✓
BLOSSOMFIELD RD, Alderbrook Rd	43000156101	Step 1	× (Figure 8)	✓
BLOSSOMFIELD RD, Alderpark Road	43000154501	Step 1	✓ (Figure 8)	✓
STRATFORD RD, Marshall Lake Rd	43000147404	Step 2	✓ (Figure 8)	✓
STRATFORD RD, School Road	43000147203	Step 3	✓ (Figure 8)	✓
STRATFORD RD, Green Hill Way	43000434402	Step 3	✓ (Figure 8)	✓
STRATFORD RD, Highfield Rd	43000433102	Step 3	✓ (Figure 7)	✓
STRATFORD RD, Petersfield Rd	43000430801	Step 2	× (Figure 7)	✓
STRATFORD RD, Brandon Rd	43000430102	Step 1	✓ (Figure 7)	✓
STRATFORD RD, Formans Road	43000225103	Step 3	✓ (Figure 7)	✓
STRATFORD RD, Wilton Road	43000221801	Step 3	✓ (Figure 6)	✓
SPARKBROOK, Palmerston Road	43000221403	Step 3	✓ (Figure 6)	✓
DERITEND HIGH STREET, Gibb Street	43000211401	Step 2	✓ (Figure 6)	✓

Figure 5. Proposed Rationalisation (Overview)

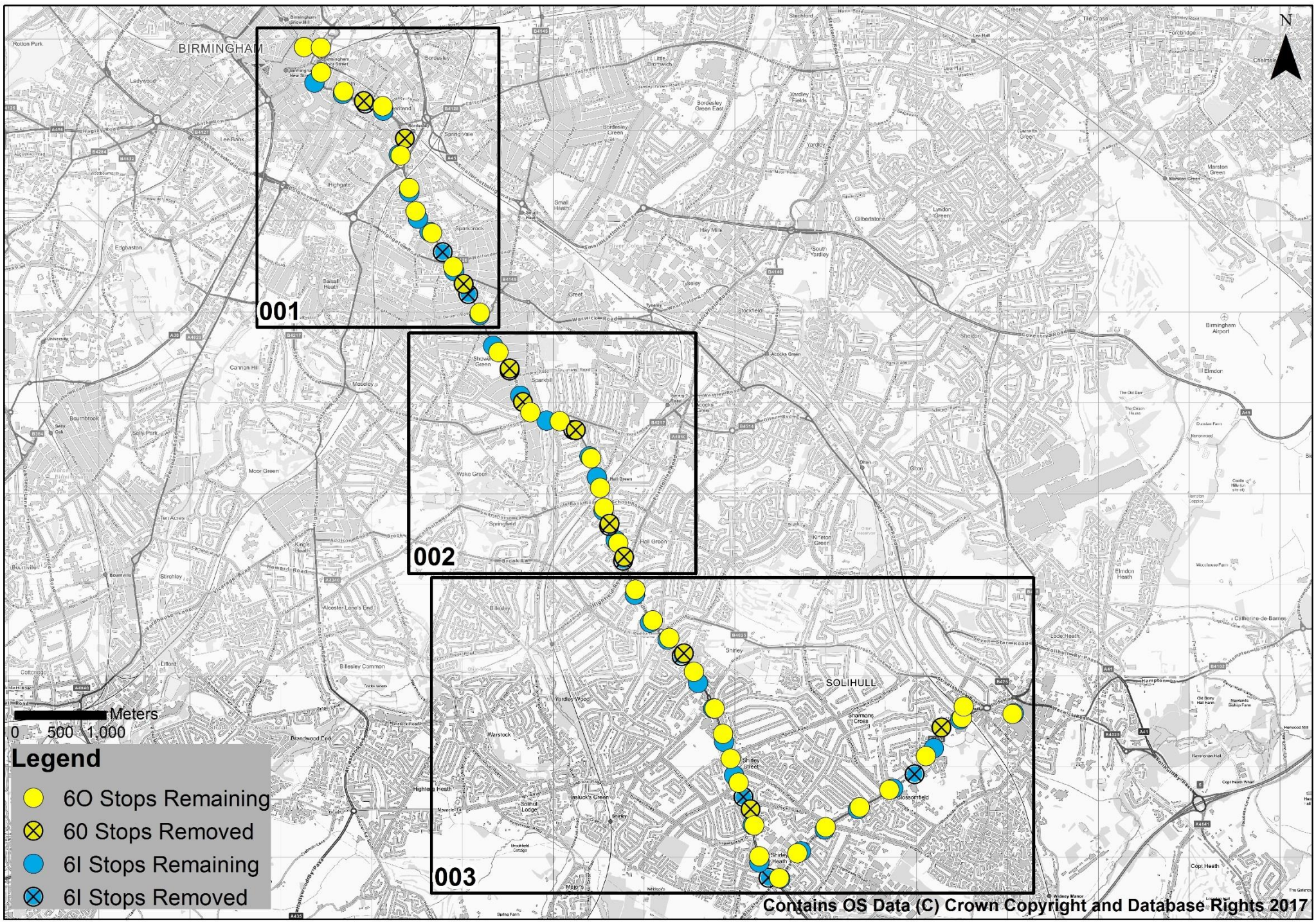


Figure 6. Supporting Map - 001

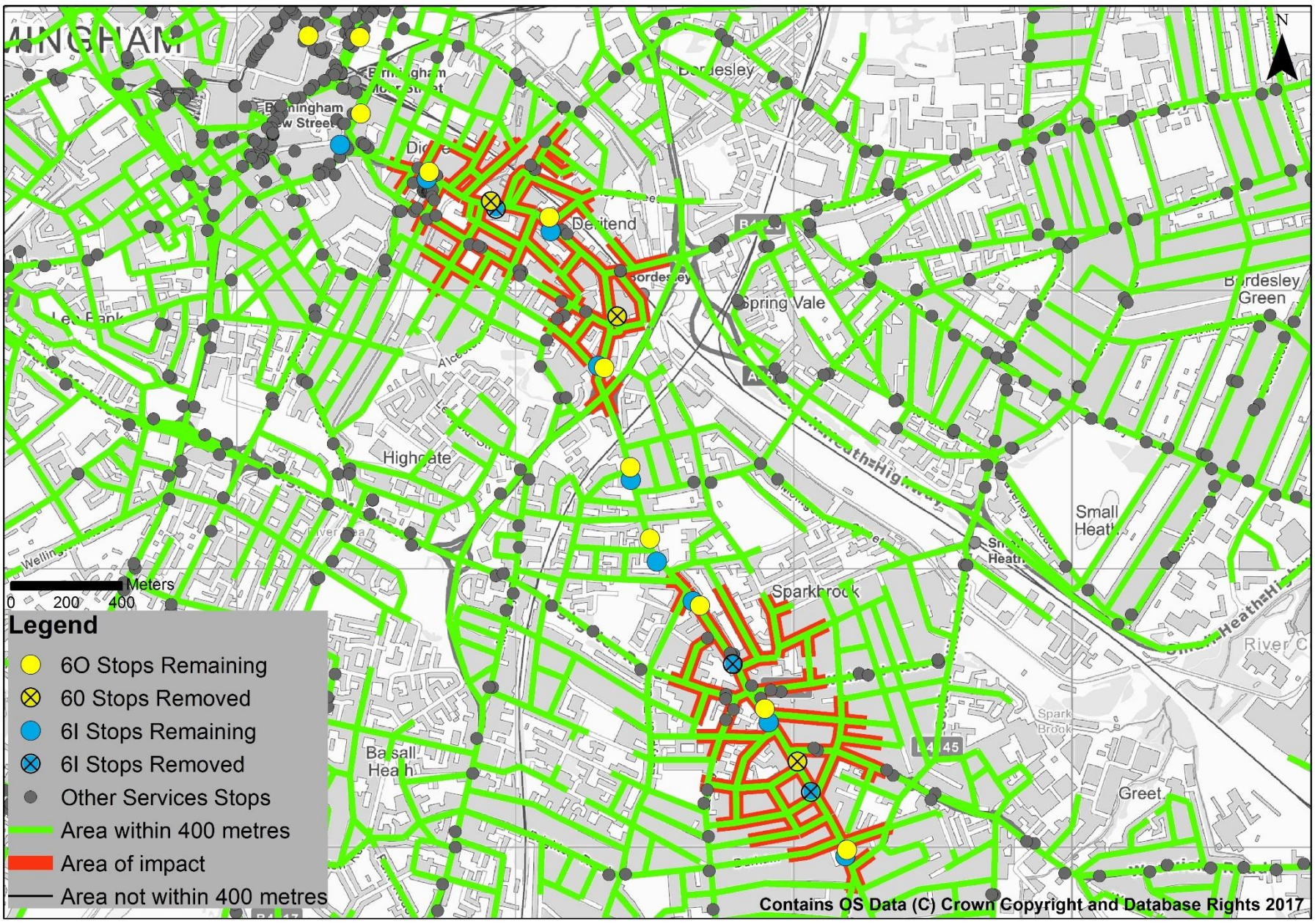


Figure 7. Supporting Map - 002

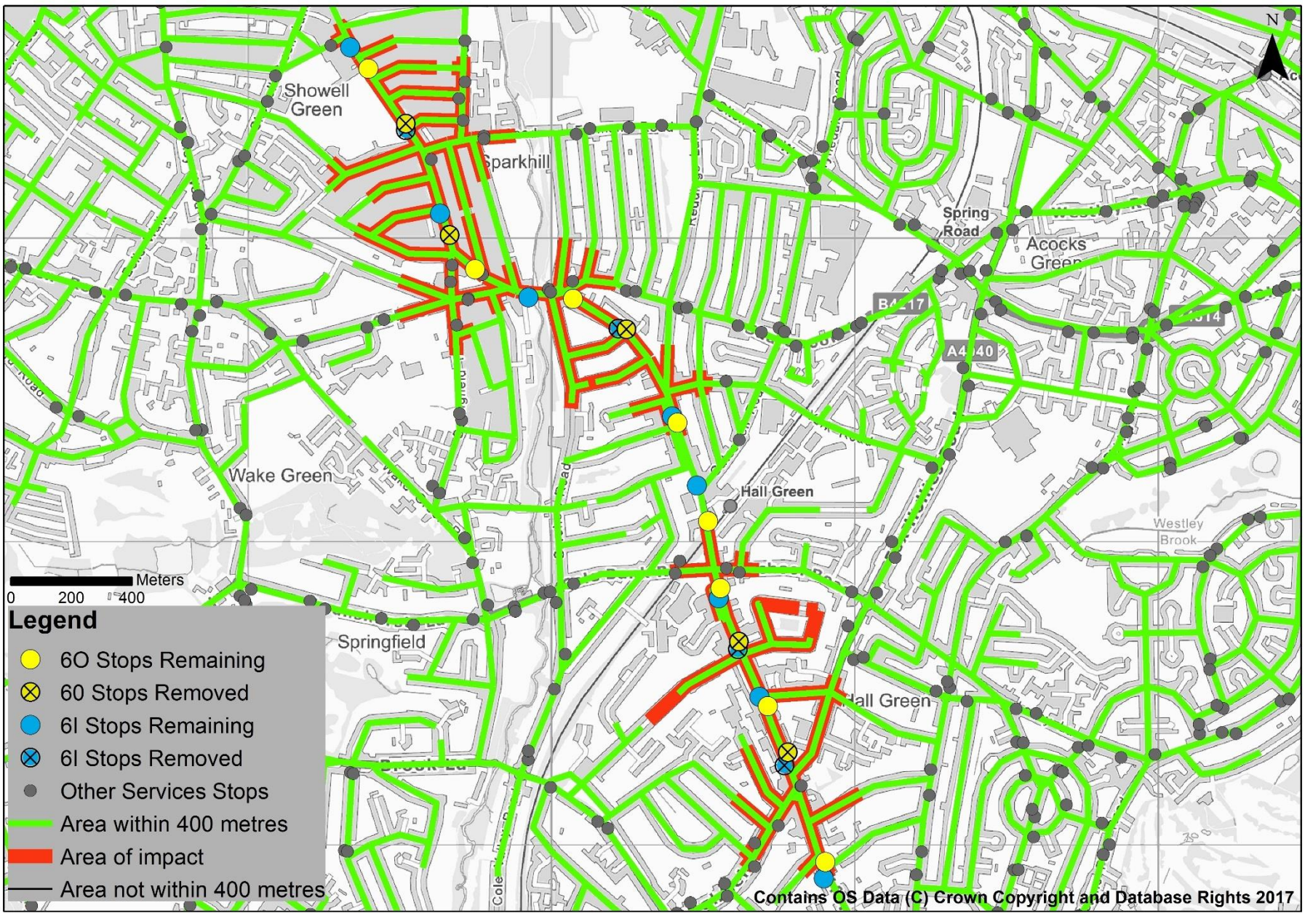


Figure 8. Supporting Map - 003

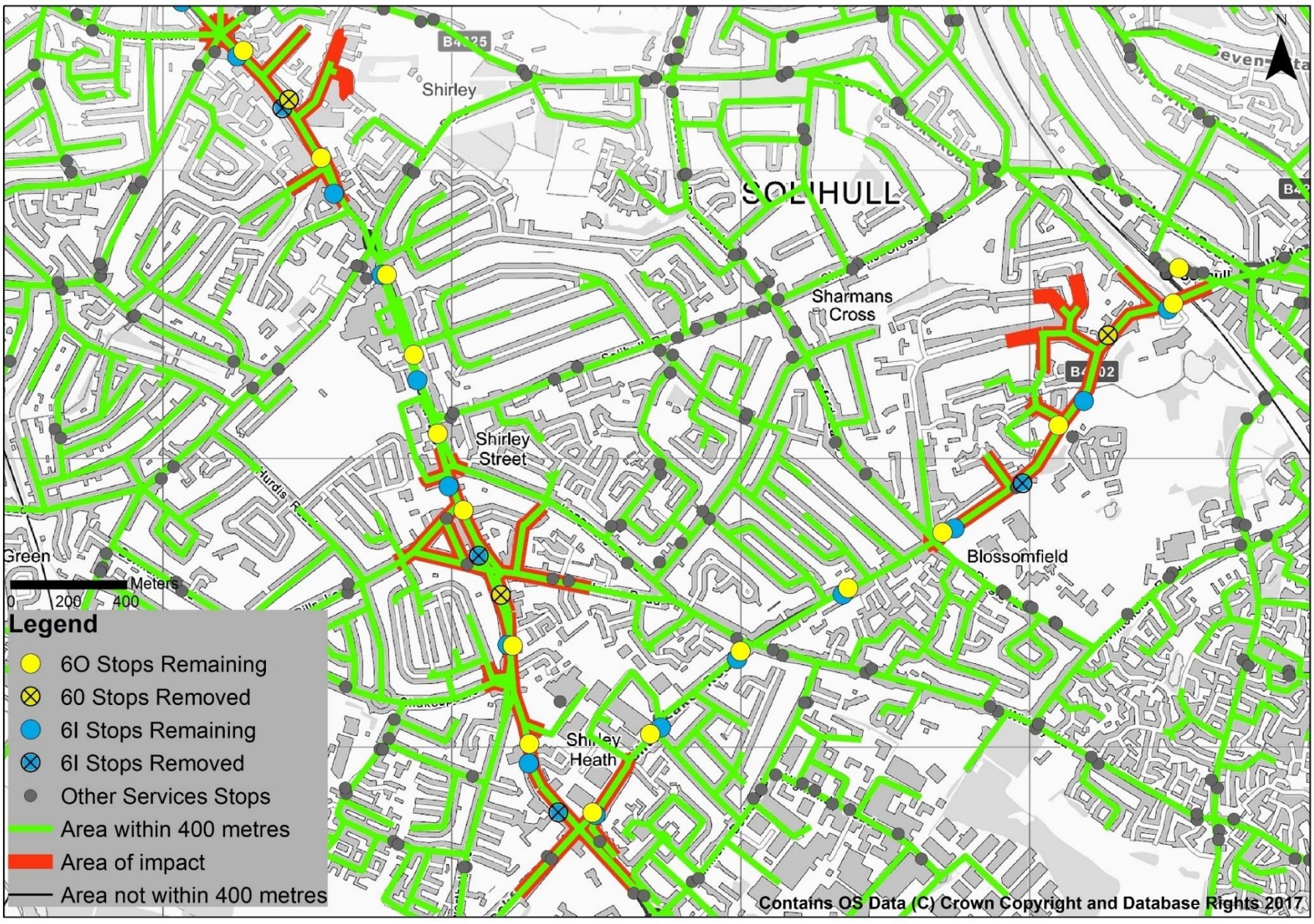
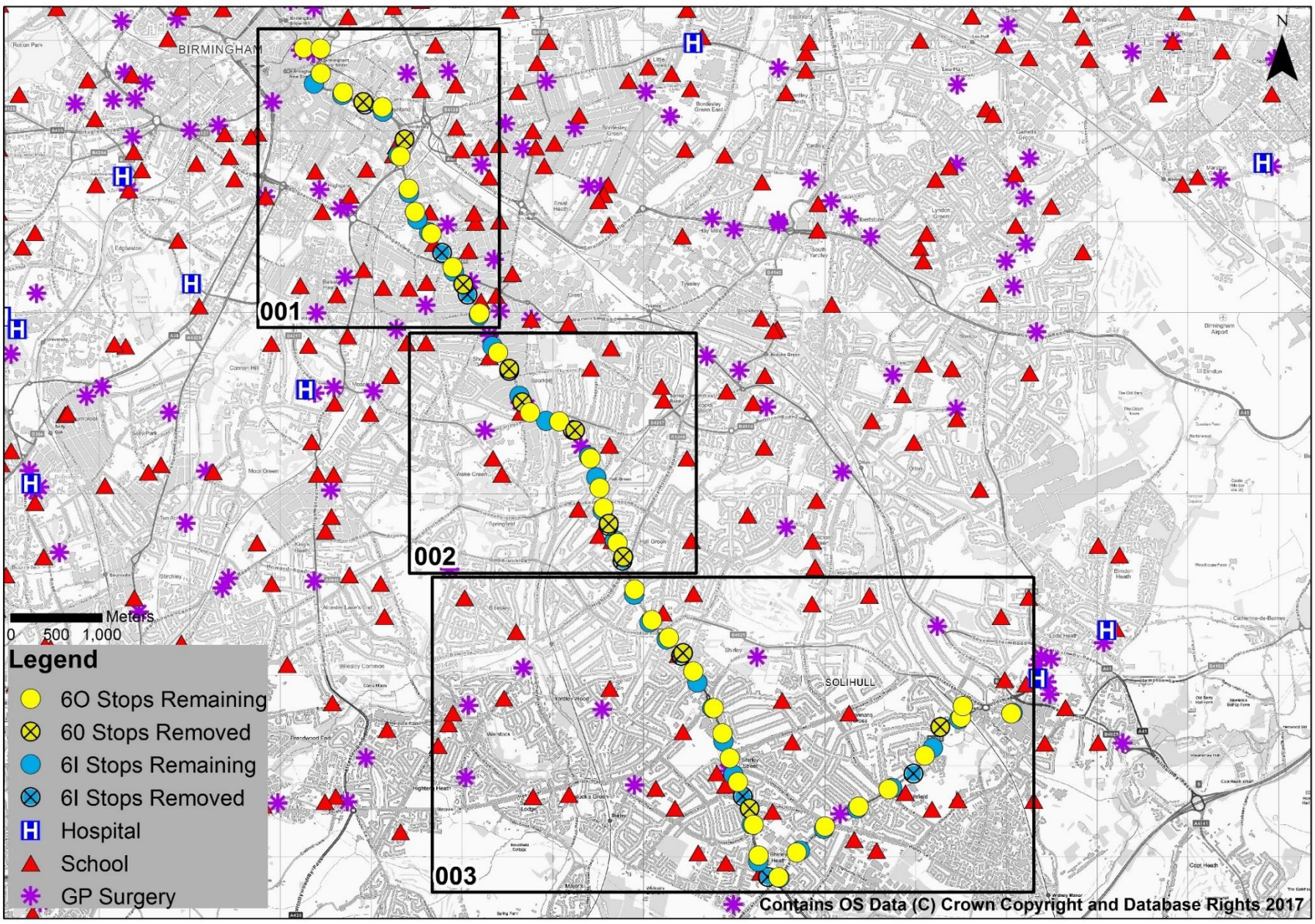


Figure 9. Proposed Rationalisation alongside Key Facilities



5. Summary

Atkins was commissioned by National Express West Midlands to undertake a study investigating the scope for bus stops on several routes in Birmingham to be rationalised. This was in response to growing concern from National Express West Midlands and TfWM regarding increasingly long and unreliable bus journeys in the West Midlands.

There are several credible approaches which could be taken to determine the optimum stops for removal, but through discussion with National Express West Midlands and TfWM, Atkins has agreed a five-step process. This process has been informed by data provided by a combination of TfWM, the DfT, and National Express West Midlands.

The focus of this commission has been on Route 6 which is a linear route, with outbound services travelling from Birmingham City Centre to Solihull Railway Station and inbound services travelling from Solihull Railway Station to Birmingham City Centre. The route serves South-East Birmingham and West Solihull and interchanges with several key corridors including the circular 11A and 11C routes. The daytime frequency is approximately 10 buses per hour (BPH), with buses taking approximately 39 to 67 minutes to complete the route. Timetabled journey times vary considerably through the day, reflecting both congestion in the city and differing dwell times in response to demand.

Having undertaken the five-step process, Atkins has recommended a list of stops (11 in each direction) which could be removed / relocated in the future. A reasonable working assumption is that removal of one stop can save of the order of 30 seconds, given the need for the bus to decelerate / accelerate and the dwell time associated with passengers boarding and alighting. When considering the usage of the 22 stops suggested for removal in conjunction with the 30 second saving, it is reasonable to assume that approximately 2 minutes could bus saved per bus outbound on Route 6. Inbound, it is reasonable to assume that approximately 2 minutes, 10 seconds could bus saved per bus on the route. This journey time saving may enable a reduction in the peak vehicle requirement (PVR) for National Express West Midlands. Reducing the number of stops is also expected to lead to an increase in punctuality, which was one of the stated targets of the West Midlands Bus Alliance.

Appendix A. West Midlands Combined Authority Bus Service Access Standards

West Midlands Combined Authority Bus Service Access Standards

Accessibility to the bus network

1.1 Residential Areas – The maximum desirable walking distance to bus services in continuously built-up areas is 400 metres during the hours of 07.00 to 19.00 on Monday to Saturday and 700 metres at other times. Wherever possible the services should provide links to local centres (post office, shops, services etc) and to interchanges with the public transport network.

1.2 The above distances are reduced in areas of severe gradients or where a high proportion of elderly people or people with mobility difficulties reside.

1.3 In lower density built-up areas the maximum desirable walking distance at all times is 700 metres, and in rural areas 1.5km.

1.4 Hospitals – minimum standards of service calculated according to total trips per annum using all modes of transport, to individual sites.

1.5 Major Urban Centres – bus access arrangements should be equivalent to or better than those provided for car users.

1.6 Suburban District Shopping Centres – to be served as closely as road layout will allow during main shop opening periods.

1.7 Places of Entertainment and Recreation – attractions be within 400/700 metres of a bus service during the hours of opening. Where this is not met, a special service with partnership funding will be considered.

1.8 Normal bus access standards will apply in Midland Metro and Bus Rapid Transit corridors unless adapted to reflect agreed local circumstances in relation to the provision of these rapid transit modes.

Frequency

2.1 Mondays to Saturdays - Minimum standard frequency for:

(a) Continuously built up areas: between 07.00 and 19.00 is two journeys per hour.
(b) Low density residential areas: between 07.00 and 19.00 is one journey per hour.
(c) Rural areas: between 07.00 and 19.00 is one journey per hour.

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2.2 Sundays – One journey per hour in continuously built up areas between noon and 19.00 hours, and subject to demand at other times, and elsewhere. As funding allows, this will be increased to a half hour frequency in continuously built-up areas between 10.00 and 18.00 hours.

2.3 Bank Holidays – As Sunday Services, excluding Christmas Day and Boxing Day. Special arrangements will apply for Boxing Day and New Year's Day.

Value for money requirements

3.1 Research will identify demand for services which are deemed to be socially necessary.

3.2 Services are categorised in the following order of priority, to be provided subject to available finance.

1. Journeys to work
2. Shopping and medical journeys
3. Sundays and Bank Holidays
4. Evenings
5. Town and City Centre distributor services
6. Night Services

3.3 Specific Journey Requirements – per trip

(a) 8 people or less: no service
(b) 8 – 10 people: feeder facility considered
(c) more than 10 people: through facility considered

3.4 Regular Journey Requirements – per hour

(d) 8 people or less: no service
(e) 8 – 10 people: feeder facility considered
(f) more than 10 people: minimum hourly service

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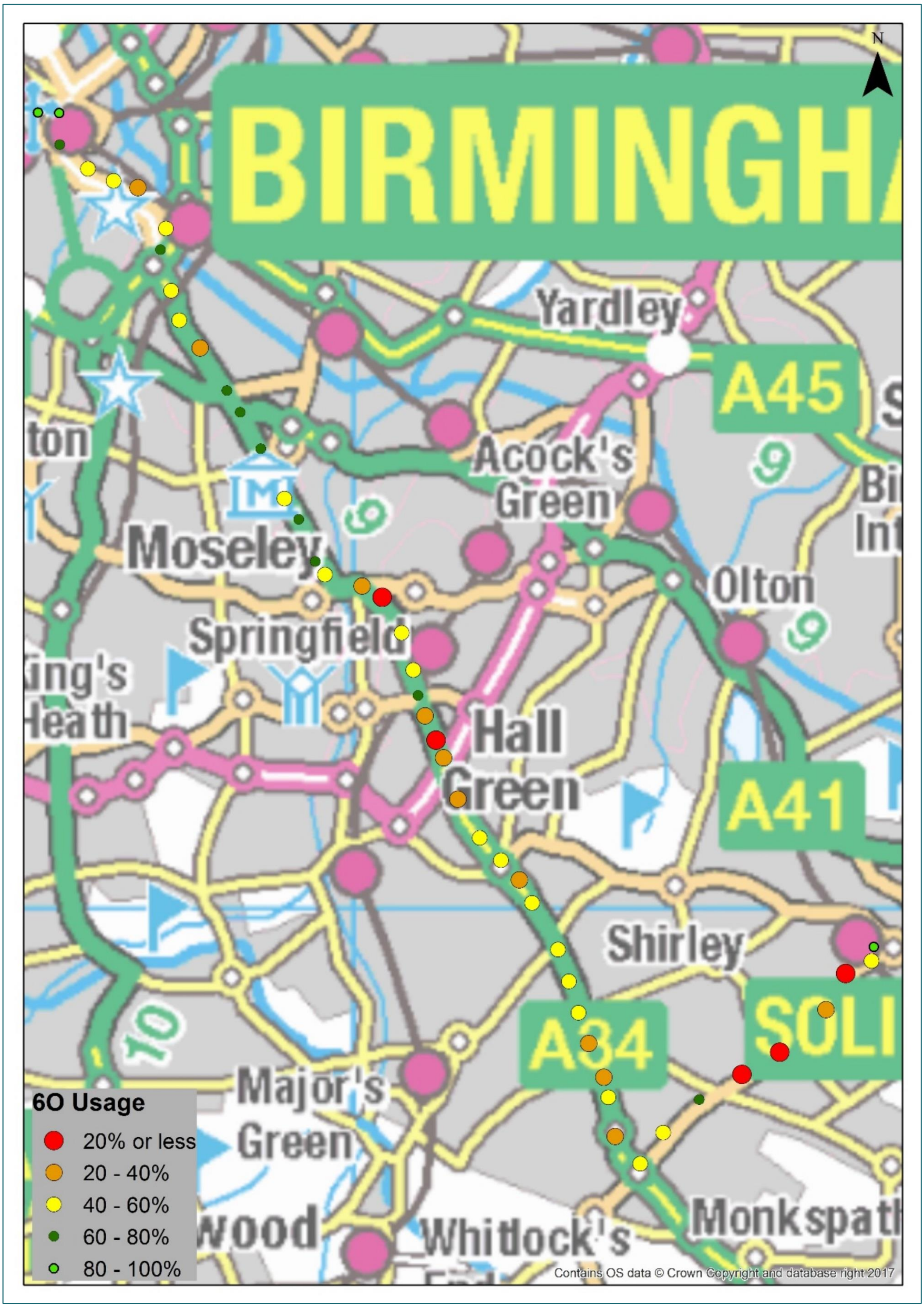
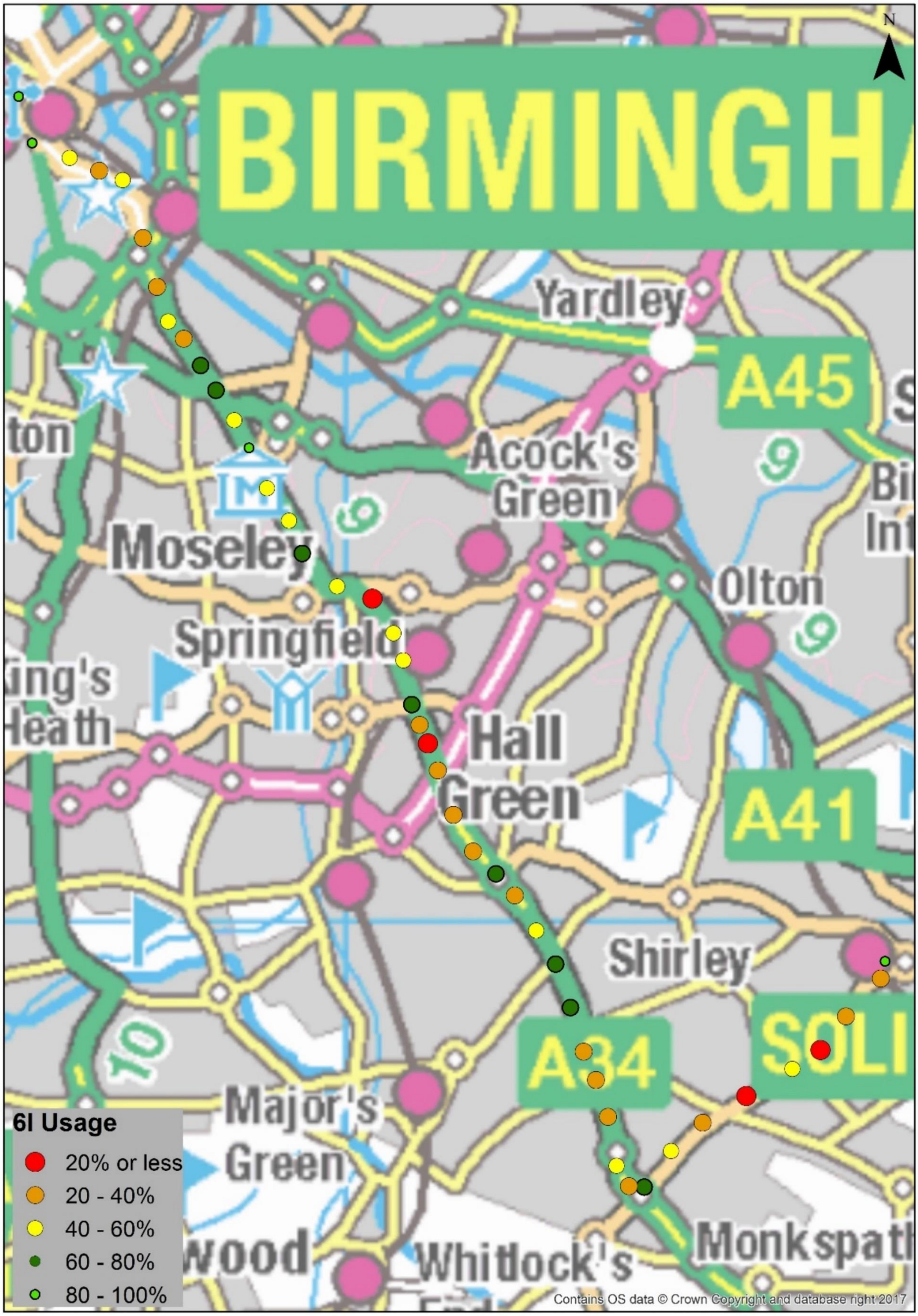
Appendix B. Supporting Mapping for Route 6

- **Map A:** Showing the proportion of buses calling. Red shading of a stop denotes less than 20% of buses calling. These maps have been used to inform Step 1 of the process;
- **Map B:** Showing distances (metres) between stops. Stops that are within 230m of another stop in the same direction are shown in red, with all other stops shown in green. These maps have been used to inform Step 2 of the process;
- **Map C:** Showing the infrastructure type (whether a pole or a shelter is provided);
- **Map D:** Showing whether the stop is a timing point;
- **Map E:** Showing the location of bus stops relative to schools, GP surgeries and hospitals. Note that this has been based upon the DfT layer.

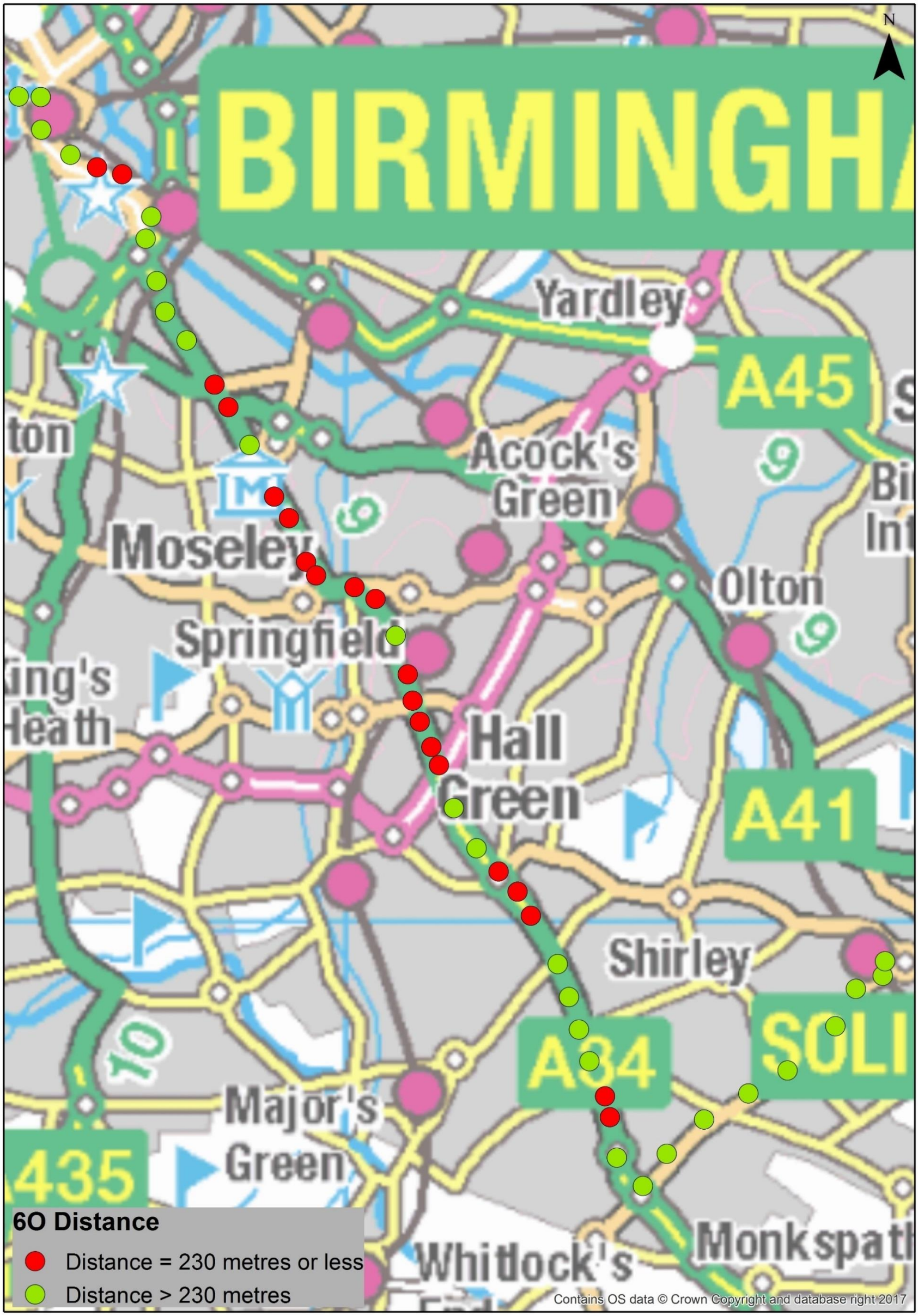
Map A (Proportion of Buses Calling) – 6 Outbound



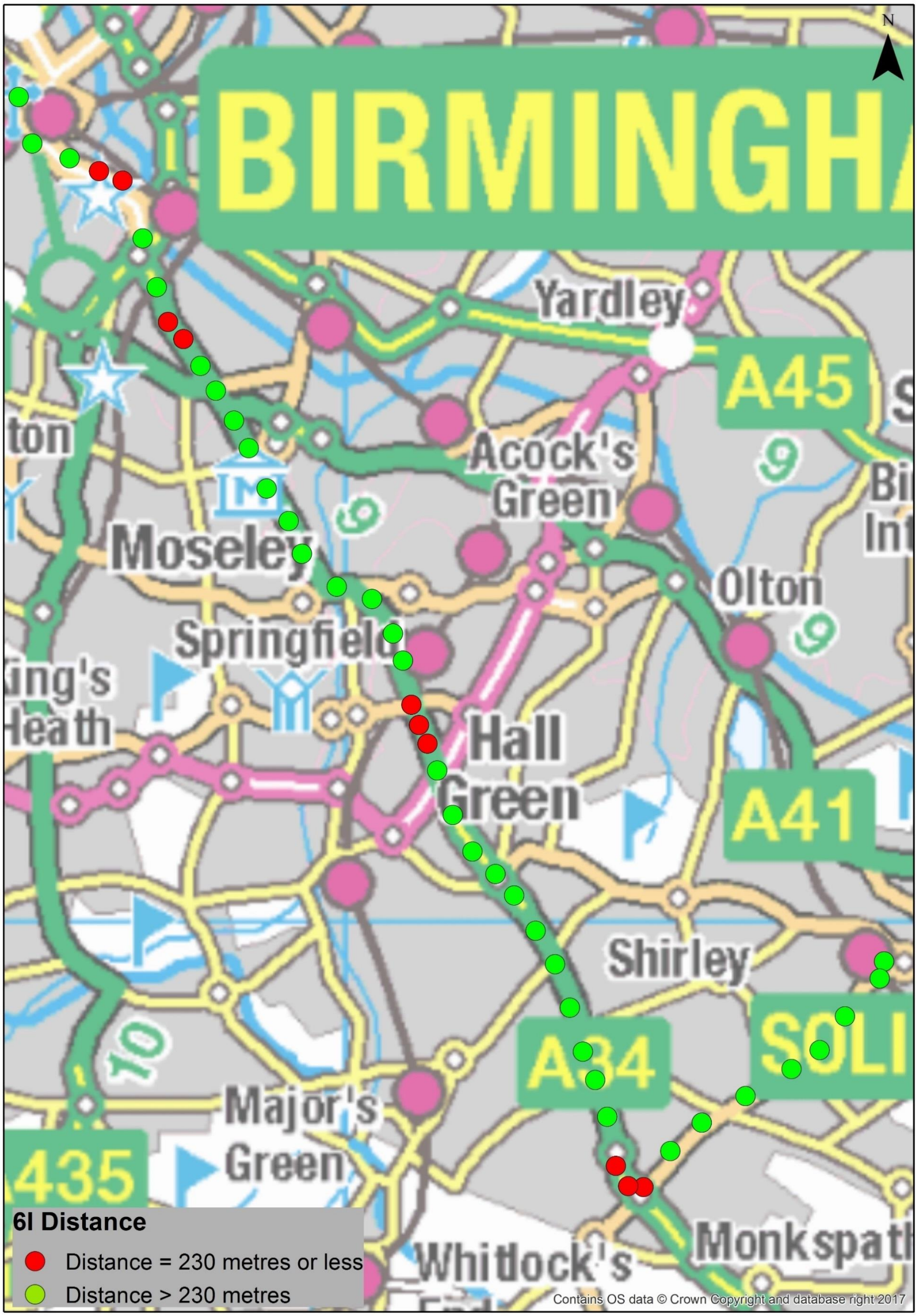
Map A (Proportion of Buses Calling) – 6 Inbound



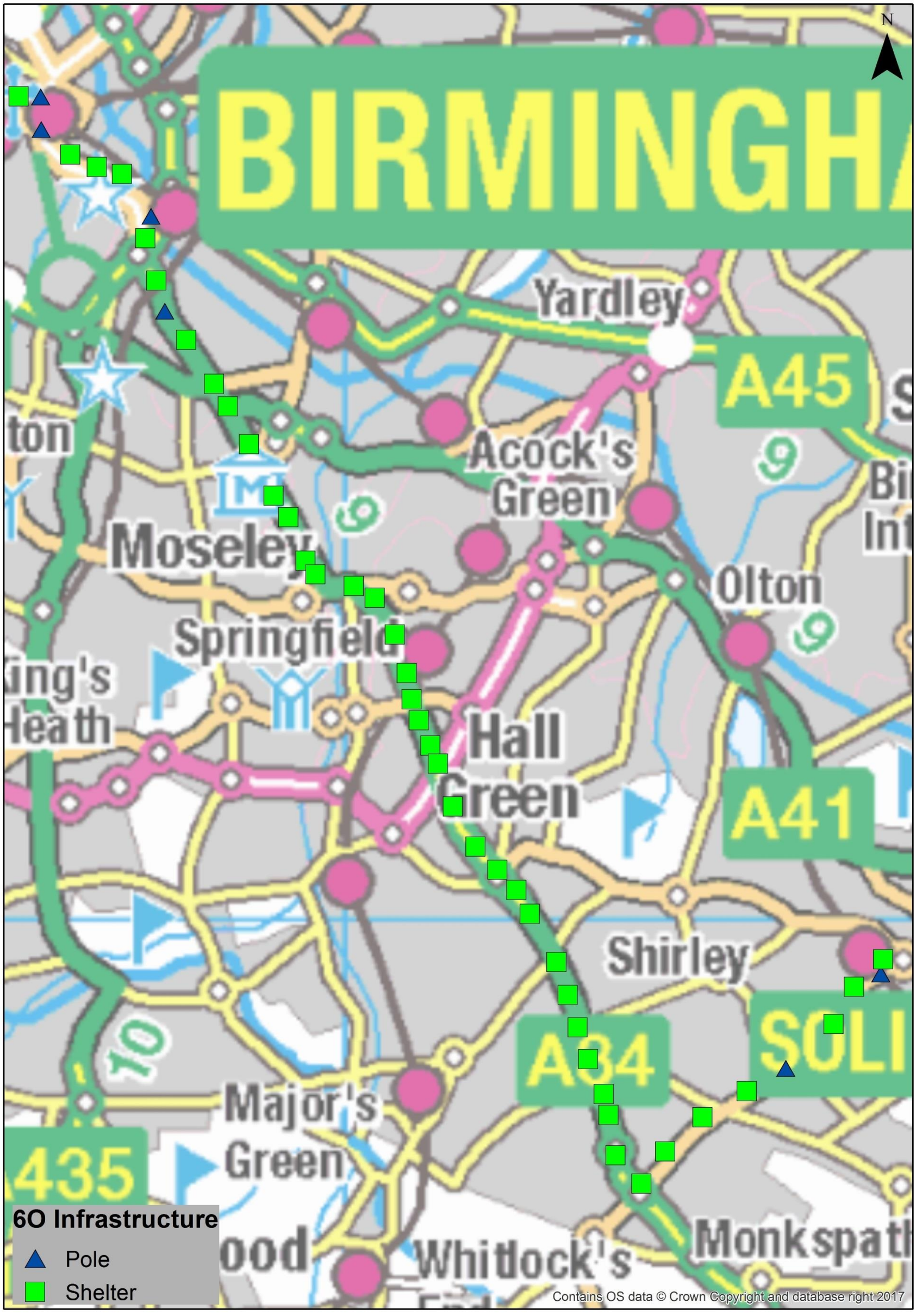
Map B (Distances between Stops) – 6 Outbound



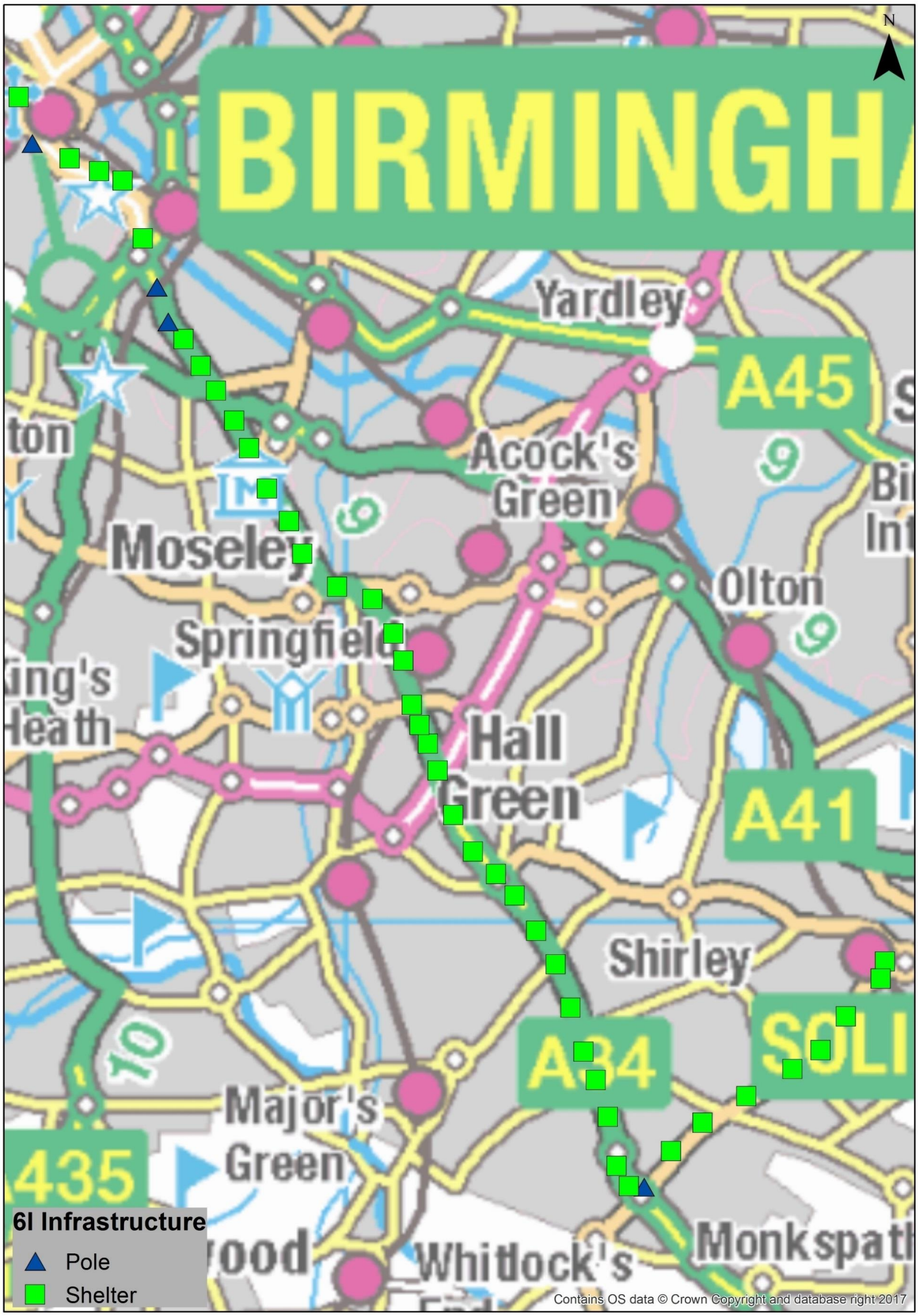
Map B (Distances between Stops) – 6 Inbound



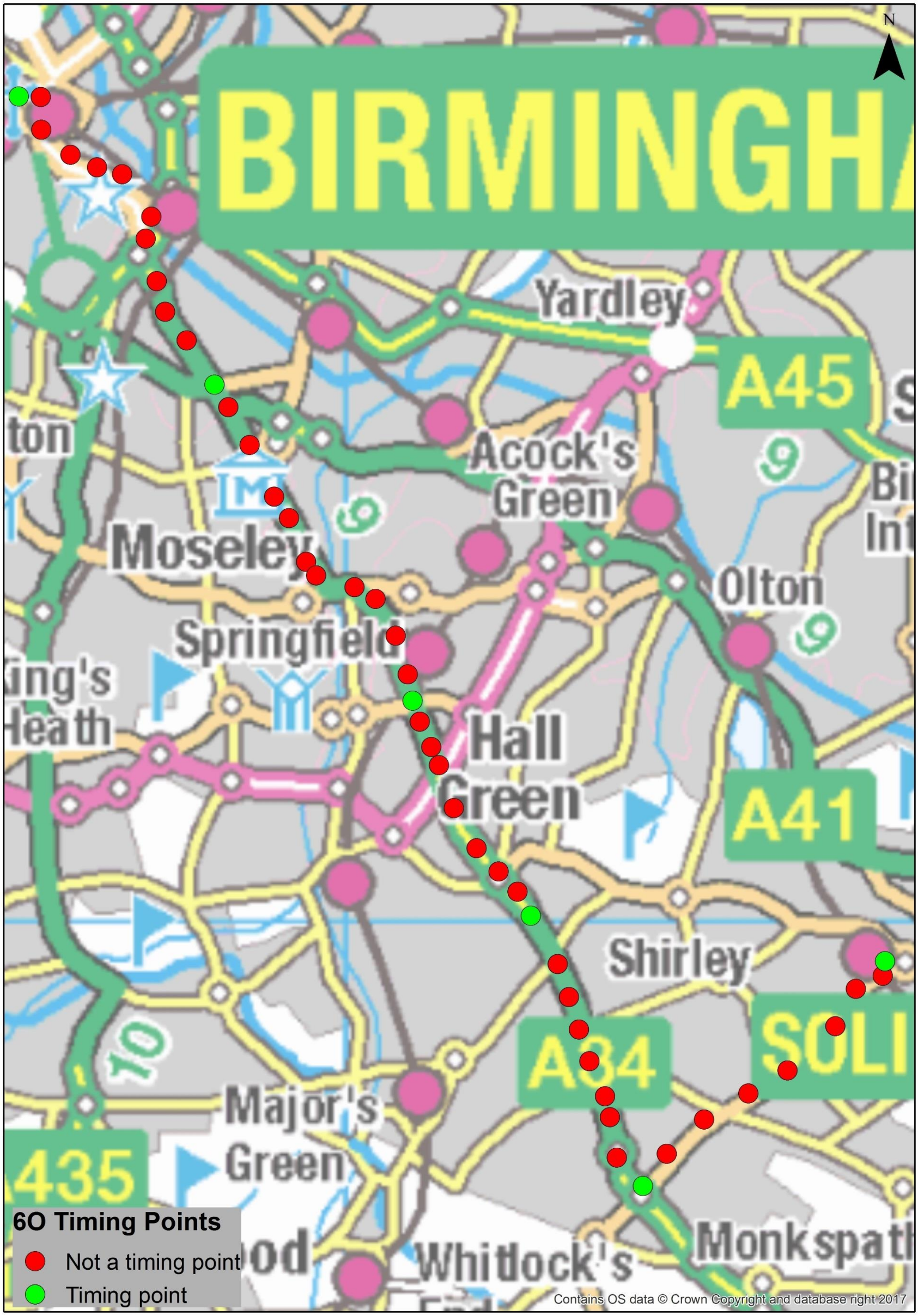
Map C (Infrastructure Type) – 6 Outbound



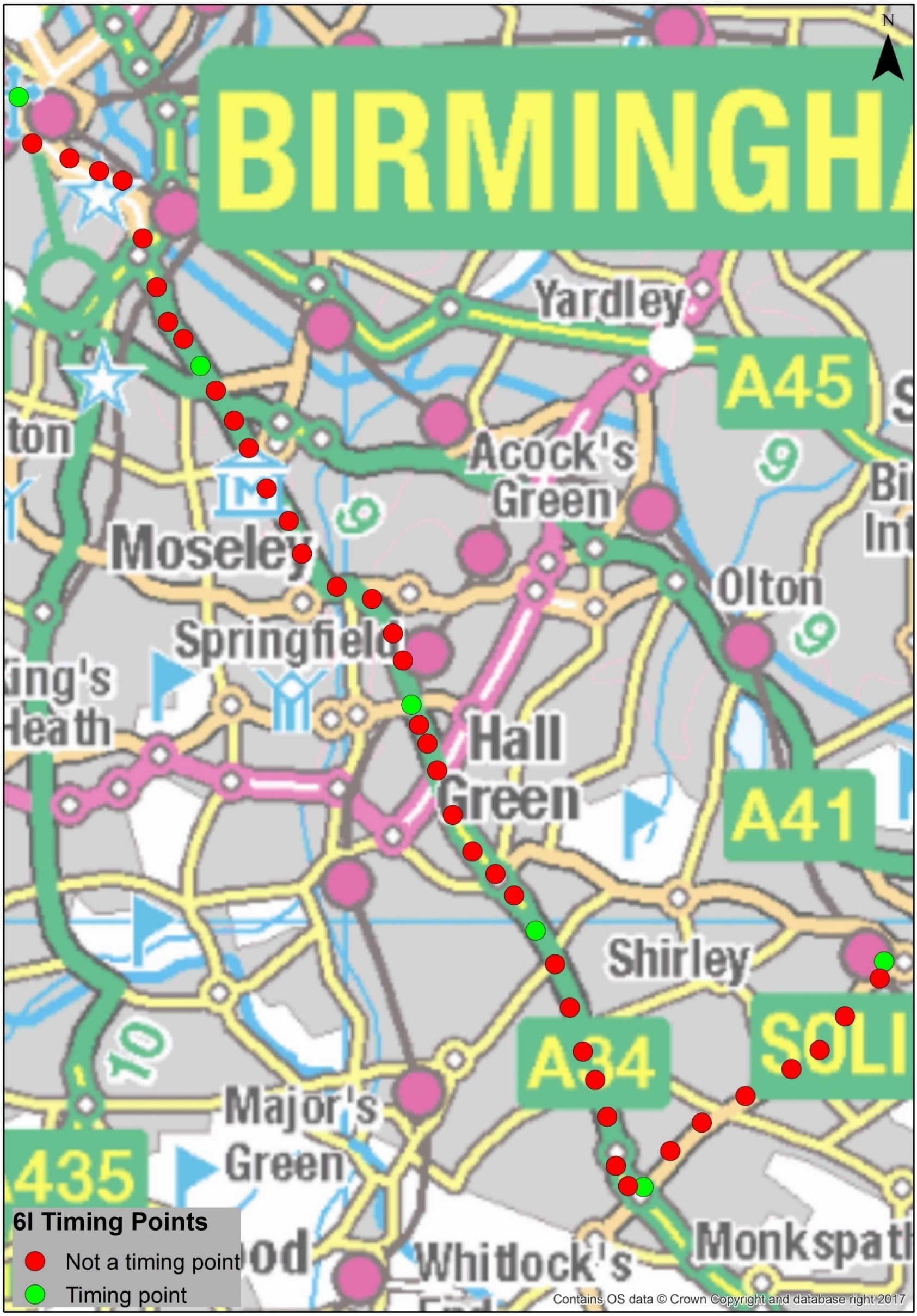
Map C (Infrastructure Type) – 6 Inbound



Map D (Timing Points) – 6 Outbound



Map D (Timing Points) – 6 Inbound



Map E (Key Facilities) – Route 6