Upper Brook Street Masterplan Williams / Alliance UBS Limited TRANSPORT ASSESSMENT

Focus Transport Planning

J000370-TA01c
June 2023

Upper Brook Street, Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited)

Full planning permission for the demolition of existing buildings and erection of three ground floor + 12/14/41 storey buildings to be used for Purpose Built Student Accommodation (Use Sui Generis), comprising 1,100 bedrooms in total and 506sqm of ground floor ancillary uses (café/ commercial and convenience store - Use Classes E (a)/(b)/(c)), three buildings comprising ground floor + 5/7/9 storeys for Science and Innovation uses (Use Class E (g)(i) & (ii)) and 834sq.m ground floor community uses (retail/café and medical facility (Use Classes E (a/b) and (e)) and the provision of new public realm, two new public squares, new access and parking, and associated works to be on Phase Two of the Upper Brook Street Masterplan.

Transport Assessment

Prepared on behalf of:

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1.0 INTRODUCTION

1.1 Overview

1.1.1 This Transport Assessment (TA) report has been prepared by Focus Transport Planning (Focus TP) on behalf of Williams Motor Co (Holdings) and Alliance UBS Limited (the applicant) to consider highways and transport matters associated with a full planning application to deliver a mixed-use regeneration scheme, including Purpose Built Student Accommodation (PBSA) & Life Sciences based employment development, along with ancillary commercial & community uses and on-site landscaping and public open space. The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application scheme would deliver up to 1,100 student beds and 46,643sqm of life-sciences based employment space and is to be promoted as sustainable 'car-free' development in line with Manchester City Council (MCC) objectives for this part of the city. The development forms part of a wider Upper Brook Street Masterplan and effectively represents phase 2 of the delivery of this vision for the area, with phase 1 located immediately to the south.

1.1.2 The TA report has been prepared to apprise the Local Planning & Highway Authority (MCC) as to the design & nature of the proposed site access and servicing arrangements, the accessibility of the site by sustainable transport modes and the ability of the surrounding highway network to accommodate changes in local traffic routeing as a consequence of the delivery of key access strategy elements.

1.1.3 The report is to be submitted alongside a planning application for the proposals and reflects guidance for transport assessment set out in National Planning Policy Guidance (NPPG) "Travel Plans, Transport Assessments and Statements in Decision Taking". This guidance notes that Travel Plans, Transport Assessments and Statements are all ways of assessing and mitigating the negative transport impacts of development in order to promote sustainable development. They are required for all developments which generate significant amounts of movements.

1.1.4 Transport Assessments and Transport Statements primarily focus on evaluating the potential transport impacts of a development proposal and may propose mitigation measures where these are necessary to avoid unacceptable or "severe" impacts. Travel Plans can play an effective role in taking forward those mitigation measures which relate to on-going occupation and operation of the development. Transport Statements & Transport Assessments can be used to establish whether the residual transport impacts of a proposed development could be "severe", which is the critical threshold for determining whether a project should be refused on highways ground, in accordance with guidance set of in NPPF Para 111.

1.1.5 The scope and nature of issues considered within this TA report reflects the extent of matters which are understood to be of material interest to local stakeholders following pre-application scoping discussions with MCC officers during Spring 2023. The carrying out of such pre-application consultation reflects good practice for the traffic and transport appraisal of development projects, as set out in NPPG which states in paragraph 14 of "Travel Plans, Transport Statements and Travel Plans'" (Ref: 42-014-20140306).

1.1.6 **Appendix TA1** to this report sets out a schedule of the discussions held with LHA / LPA officers and the scope of assessment approach ultimately identified as appropriate to support an outline planning application for comprehensive mixed-use redevelopment of the site.

1.2 Report Structure

1.2.1 The structure of the remainder of this TA is therefore as follows:

- A description of the location of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site & a review of extant conditions, planning history & relevant transport related planning policy.

- A review of existing local highway network conditions – including a description of the local highway network immediately adjacent to the application site, recorded local traffic volumes and a review of historical road safety records.

- An audit of sustainable transport opportunities available in the immediate vicinity of the application site, including a review of local walking, cycling and public transport connections and a review of the nature & quality of this infrastructure.

- A description of the main development elements proposed as part of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application scheme – including a review of the proposed vehicle and pedestrian / cycle access strategy, the nature of supporting highway network improvement works, details of proposed vehicle servicing & identification of relevant site management arrangements to support the car-free operation of the site.

- A review of the anticipated local traffic re-assignment effects anticipated to take place as a result of the proposed changes to the immediate local highway network to the site (closure of Inchley Road and extended one-way operation of Kincardine Road).

- An assessment of the anticipated travel demand associated with the application scheme and the assignment of core development related traffic movements over the immediate local highway network to the site.

- An assessment of the operational performance of key local highway routes & junctions following delivery of the development scheme and the supporting highway improvements.

- Consideration of the cumulative local highway network operational effects, including for delivery of both the application site and other proposed major mixed-use development on the immediately adjacent site to the south.

- A review of the anticipated construction phasing approach for the scheme and consideration of key local highway network effects associated with key construction tasks and related construction traffic movements.

- Summary and conclusions.

1.2.2 The TA report should be read alongside the other relevant supporting planning application documents i.e. Planning Statement, Environmental Statement and other technical documents, along with Framework / Interim Travel Plans prepared for the core development scheme elements.

2.0 SITE LOCATION, EXISTING SITE USE & RELEVANT PLANNING POLICY

2.1 Site Location

2.1.1 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site is located to the south of Manchester City Centre, immediately to the south of the A57 (M) Mancunian Way. A plan illustrating the strategic location of the application site in relation to surrounding University of Manchester Campus areas, the local residential areas of Brunswick & Ardwick and the distributor road routes of A34 Upper Brook Street & A57(M) Mancunian Way is included as **Figure TA1** to this report.

2.2 Existing Site Layout and Land Use

2.2.1 The core study area considered by this TA includes for the section of A34 Upper Brook Street immediately to the south of the A57(M) Mancunian Way between the junctions with Grosvenor Street & Brunswick Street, along with the operation of the parallel local access road route of Kincardine Road and connecting routes – see **Figure TA2** to this report. An aerial image of the study area, including for the current alignment of the local road route of Inchley Road (proposed for closure) is included as **Figure TA3**.

Existing Site Land Use

2.2.2 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site extends to approximately 2.13(ha) and comprises an irregular shaped area of land, split into two main development parcels. The northern section of the site, primarily proposed for development for PBSA land use, is bounded by Grosvenor Street to the north and Inchley Road to the south, with Upper Brook Street and Kincardine Road forming the western and eastern boundaries respectively, and represents the site of a large former car dealership business (Williams Jaguar). The land parcel is characterised by car showroom related buildings and large areas of external hardstanding, previously used for the

storage and display of vehicles. Vehicle access to this portion of the site is available via a number of kerbed access points from both Inchley Road and Kincardine Road. No vehicle access is available from Upper Brook Street or Grosvenor Street.

2.2.3 The southern portion of the site is an L-shaped parcel of land which wraps around the former Unitarian Chapel (now utilised for student accommodation) and is also characterised by two large former car showroom related buildings (Williams BMW) and associated external car parking areas. Primary vehicle access to this southern land parcel is taken from a rear kerbed formal side access point to / from Kincardine Road.

Estimate of Permitted Land-Use Traffic Demand

2.2.4 Focus TP are unaware of any available operational traffic data relating to the historical use of the two land parcels, as the buildings on both sites have not been in commercial use since 2019. Estimates of potential traffic demand associated with the extant car sales use of the buildings have therefore been calculated via reference to data for example large vehicle salesroom sites held within the TRICS traffic generation database. TRICS is a nationally regarded source of historical trip demand data and contains observed traffic data for a variety of development-type sites and, as such, can be considered to produce reliable trip rate data for typical baseline situations.

2.2.5 Details of the reference sites chosen from the TRICS database to inform the review of continued operation of the application site units under car sales land use are set out in **Appendix TA2** to this report, with sites selected for their general locational characteristics similar to those for the Upper Brook Street site, i.e.:

- Car Sales Development Sites of Size 1,000 to 5,000sqm GFA;
- Edge of town centre, suburban and edge of town sites,
- Not including sites in Greater London or Eire.

2.2.6 Average 'all-vehicle' trip rates (per 100sqm) derived from TRICS for weekday AM / PM 'rush hour' time periods and the core weekday day-time 12-hour period (07:00-19:00) for are illustrated in **Table TA2.1** to this report.

Table TA2.1: Calculated Car Sales Development Trip Rates from TRICS

Time Period	Average Trip Rates		
	Arrive	Depart	Total
AM Peak (08:00-09:00)	1.165	0.382	1.547
PM Peak (17:00-18:00)	0.347	0.914	1.261
12h hour (07:00-19:00)	7.603	7.518	15.121

Trip Rate (Per 100sqm GFA)

2.2.7 The above trip rates have been applied to the combined floor areas of the existing buildings at Upper Brook Street (northern land parcel 2,395sqm GFA and southern parcel 2,687sqm), with the results set out in **Table TA2.2** below.

Table TA2.2: Predicted Trip Demand for Extant Car Sales Use of Application Site Buildings (Average Trip Rates)

Time Period	Average Trip Demand (Combined Site 5,082sqm GFA)		
	Arrive	Depart	Total
AM Peak (08:00-09:00)	49	28	77
PM Peak (17:00-18:00)	18	46	64
12h hour (07:00-19:00)	386	382	768

All vehicle movements

2.2.8 The above exercise demonstrates that, based on representative TRICS average trip rates, the baseline car sales 'fall-back' use of the existing site buildings could be expected to generate of the order of almost 80 two-way vehicle movements per hour during traditional AM & PM rush hour periods. Core 12-hour (07:00-19:00) weekday trip demand is predicted to be just under 770 vehicle movements per day (386 in / 382 out).

2.2.9 It is therefore clear that the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site already has the potential to

generate a substantive level of day-to-day traffic if brought back into use under the existing care sales permissions. Such fall-back traffic levels are a material consideration when reviewing the potential traffic and highway implications of the proposed change of use application scheme to alternative, predominantly 'car free' development.

2.3 Relevant Planning Policy Framework

2.3.1 The following paragraphs provide a summary of transport related planning policy matters that are considered relevant to the application scheme. This review includes consideration of transport policy guidance set out in both national and local planning and transport policy documentation.

National Planning Policy

2.3.2 July 2021 National Planning Policy Framework (NPPF) seeks to encourage development which accords with the sustainable transport objectives of minimising the need for travel, particularly road journeys, and promoting the efficient delivery of goods and supplies. Key sustainable policy objectives stated in the NPPF are as follows:

> ***"Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:***
>
> ***a) the potential impacts of development on transport networks can be addressed;***
>
> ***b) opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;***
>
> ***c) opportunities to promote walking, cycling and public transport use are identified and pursued;***
>
> ***d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and***

e) patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places." (Para 104)

"The planning system should actively manage patterns of growth in support of these objectives (para 104). Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making." (para 105)

"Applications for development should:

a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;

b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;

c) create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;

d) allow for the efficient delivery of goods, and access by service and emergency vehicles…"(Para 112)

2.3.3 Paragraphs 110 and 113 to NPPF also provides guidance on the nature and detail of transport appraisal to be carried out to support development and those key matters to be considered when determining the suitability of development proposals:

"In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:

- ***appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;***
- ***safe and suitable access to the site can be achieved for all users;***

- ***the design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code; and***

- ***any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree." (Para 110)***

"All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed."(Para 113)

2.3.4 Ultimately NPPF concludes the following with respect to the technical consideration of highways and transport related effects:

"Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe." (Para 111)

2.3.5 Paragraph 111 to the NPPF is considered to be of key importance in the context of the assessment of the operation of the immediate local highway network. The NPPF clearly identifies that development should only be refused in those cases where highways impact would be 'severe' (our underlining) - which is typically understood to mean situations where development is likely to result in a material detrimental 'step change' in circumstances when compared to predicted Baseline 'Do-Nothing' conditions. Should the operational effects as a consequence of development traffic be marginal in nature, then highway authorities are directed not to seek to prohibit development on highways and traffic grounds.

2.3.6 Whilst the NPPF does not seek to define the nature of what is considered to represent a 'severe' impact, thereby allowing for some flexibility to reflect site specific circumstances, it is clear that the guidance has the effect of setting a 'high-bar' for planning & highway authorities in terms of their ability to identify and successfully sustain objections to planning applications on highways grounds.

The very nature of the wording of NPPF paragraph 111 inherently suggests that some measure of highways impact must be viewed as being 'acceptable' and that it is only when a 'severe' detrimental highways position is identified, that a refusal of planning permission on such grounds is appropriate.

Local Planning Policy: Local Development Framework Core Strategy

2.3.7 The adopted development plan for Manchester is the Local Development Framework Core Strategy (April 2012), which covers the period 2012 - 2027. The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited)application site represents land identified as representing 'a city centre fringe employment area'.

2.3.8 Policy SP1 'Spatial Principles' to the Core Strategy sets out the key matters that will guide development in the City during the plan period to 2027. One of these core spatial principles is to ensure that:

> ***'New development will maximise the potential of the City's transport infrastructure, in particular promoting walking, cycling and the use of public transport.'***

2.3.9 In addition, policy SP1 goes on to state that developments in all parts of the city should create well designed places that:

> ***'improve access to jobs, services and education and open space by being located to reduce the need to travel and provide good access to sustainable transport provision'.***

2.3.10 These core development principles are reinforced through policy DM1 'Development Management' of the Core Strategy, which identifies that new development should pay specific regard to matters such as:

- Accessibility for disabled persons and sustainable transport modes;
- Vehicle access and car parking;
- Servicing and refuse collection.

2.3.11 The key transport related policy in the Core Strategy to the consideration of the application scheme is Policy T1 'Sustainable Transport' which states the following:

> ***"T1 Sustainable Transport***
>
> ***To deliver a sustainable, high quality, integrated transport system to encourage modal shift away from car travel to public transport, cycling and walking, to support the needs of residents and businesses and to prepare for carbon free modes of transport, the Council will support proposals that:***
>
> - ***Improve choice by developing alternatives to the car.***
> - ***Promote regeneration and economic vitality by relieving traffic congestion and improving access to jobs and services, particularly for those most in need and for those without a car.***
> - ***Improve access to transport services and facilities in order to enable disabled people and people with mobility impairments to participate fully in public life.***
> - ***Improve pedestrian routes and the pedestrian environment.***
> - ***Improve and develop further Manchester's cycle network (for example the Manchester Cycleway and the Trans Pennine Trail).***
> - ***Contribute to improvements to the extent and reliability of the public transport network through safe and attractive waiting and interchange facilities, better priority, improved services and information provision.***
> - ***Improve and develop appropriate road, rail and water freight transport routes and associated intermodal freight transport facilities in order to assist in the sustainable and efficient movement of goods.***
> - ***Facilitate modes of transport that reduce carbon emissions e.g. by incorporating charging points for electric vehicles, subject to their appropriate design and location.***
> - ***Would reduce the negative impacts of road traffic, for example, congestion, air pollution and road accident casualties.***
> - ***Take account of the needs of road users according to a broad hierarchy consisting of, in order of priority:***
>
> 1. ***pedestrians and disabled people***
> 2. ***cyclists, public transport,***
> 3. ***commercial access,***
> 4. ***general off-peak traffic,***
> 5. ***general peak time traffic."***

2.3.12 In addition to Policy T1, Core Strategy Policy T2 'Accessible Areas of Opportunity & Need' identifies that the Council will actively manage pattens of development to ensure that new development is located close to the City's main economic

drivers including the regional centre and the Universities at Oxford Road. The policy also notes that new development should be easily accessible by walking, cycling and public transport, connecting residents and users to jobs, leisure, open space and educational opportunities. Particular priority is to be given to schemes that provide city residents access to strategic employment sites, including the Oxford Road corridor.

2.3.13 Policy T2 also notes that within city centre areas, parking levels should reflect the highly accessible nature of the location, as well as the realistic requirements of the users of the development, and that all developments should have regard to the need for appropriate disabled and cycle parking. Policy T2 also directly states the need for the direct transport appraisal of new development, requiring:

> ***"proportionate Traffic Impact Assessments and Travel Plans to be prepared for all major applications and for any proposals where there are likely to be access or transport issues."***

Local Planning Policy: Guide to Development in Manchester Supplementary Planning Document (SPD) & Planning Guidance (April 2007)

2.3.14 The key accessibility matters highlighted above and the need for appropriate assessment and supporting management of travel, are further reinforced by the April 2007 'Planning Guidance' SPD. This document sets out the core development principles that apply to new developments in Manchester. Paragraph 2.22 and 2.23 of the document note that:

> ***"In order to reduce reliance on the car, residents and workers should be within easy walking distance of facilities such as clinics, corner shops, newsagents and public transport.'***
>
> ***….hierarchy of road users which gives priority to pedestrians, disabled people and then cyclists… the aim will be to cater for the needs of those who use the area, rather than pass through it."***

2.3.15 Paragraph 2.28 also notes that:

> ***"The identification of key routes for pedestrians and cyclists will be required as an integral part of the design of new development schemes. Routes which do not follow the street network should not mean taking long detours; they should, where possible, take short convenient routes with many options for joining the road network. Care should be taken to ensure that they are not unobserved, narrow or badly lit."***

2.3.16 The guidance also highlights the need for and importance of Travel Planning in supporting sustainable new development, noting (para 2.30):

> ***"A Travel Plan is a package of measures and actions aimed at reducing the need to travel by car by providing alternative choices and encouraging walking, cycling, and public transport use. At the planning stage consideration should be given to the proximity of the development to existing travel facilities and services, site layout, suitable density, cycling, pedestrian facilities and potential for parking restraint."***

2.3.17 The guidance also notes the following with respect to the need for site servicing considerations to form a key part of development design, in order to deliver practical schemes that are sympathetic to their surroundings (para 2.31):

> ***"Developers should consider the servicing needs of any development at an early stage to ensure that adequate servicing is provided on site. Poor on-site provision can lead to a reduction in pedestrian safety on adjacent roads as well as higher costs in the maintenance of an attractive street environment."***

Local Planning Policy: Oxford Road Corridor Strategic Regeneration Framework (SRF) Guidance

2.3.18 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site forms part of the area covered by the Oxford Road Corridor SRF - lying within the 'Upper Brook Street' zone. This zone is identified as a transformational opportunity, offering the potential for increased density mixed use development, with its location adjacent to the University of Manchester being considered appropriate for Science, Research and Innovation sectors. The

Oxford Road Corridor SRF identifies a number of key priorities for the Upper Brook Street site, including the following transport related matters:

- *Economy* – commercially led masterplan focussed on workspace in R&D sector with learning facilities, along with potential for residential uses on the northern portions of the site.
- *Place* – calm the vehicle dominated environment of Upper Brook Street and create an appropriate environment for pedestrians. Enhance pedestrian crossing opportunities of Upper Brook Street and strengthen east – west connections. Re-alignment of Kincardine Road to facilitate longer range north-south cycle connectivity.
- *People* – enhance east to west connections and integrate new public realm with existing, including the upgraded Gartside Gardens and new Brunswick Park.

2.3.19 The SRF sets out the following guidance with respect to core access and movement principles as part of the development of a masterplan for the Upper Brook Street area:

- Upper Brook Street to remain the primary vehicular route as a strategic movement corridor, but subject to environmental enhancements to ensure that it is also attractive as a primary pedestrian route. New development should have a 3-metre set back from the footpath along Upper Brook Street to provide for a more generous pedestrian route and help to facilitate an improved relationship between the new buildings and street level, thereby encouraging reduced vehicle speeds.

- Kincardine Road to be retained as a secondary movement route, providing access into the new developments and local streets within the Brunswick masterplan, supporting the integration of the two areas. Future geometry of Kincardine Rd should seek to achieve a more balanced nature between pedestrians and vehicles.

- Local access routes for servicing of the future development should be provided, east to west.

- MCC residents parking scheme, allowing local residents are able to park near their homes and to facilitate the management of on-street car parking, must be protected as new development comes forward.

- Future planning applications at the Upper Brook Street site would therefore need to be supported by a Framework Travel Plan, which provides for the incorporation of sustainable transport choices.

- New development proposals should be accompanied by an appropriate car parking strategy, which allows the potential demand to be met, whilst also reflecting the site's excellent accessibility by a variety of modes of transport, particularly public transport, and the promotion of alternative sustainable forms of transport. Where new car parking is provided, it should incorporate a proportion of disabled bays and electric vehicle charging points, together with options for motorcycles.

- Ancillary amenity uses such as networking and collaboration space, retail, leisure and community uses will be encouraged on key frontages, in accordance with the following hierarchy: 1) Upper Brook Street, Brunswick Street and Inchley Road; 2) Kincardine Road, the new public realm adjacent to Mawson Hotel and secondary east to west streets; and, 3) adjacent to the former Unitarian Chapel and along local access routes.

2.3.20 A copy of the core movement strategy for the Upper Brook Street area as envisaged by the SRF guidance is set out in **Appendix TA3** to this report. The emerging Upper Brook Street Masterplan, which the proposals considered by this TA report form part of, has been prepared to respond to this principles plan and includes the core requirements set out in the above bullet points.

Local Planning Policy: Greater Manchester Transport Strategy 2040

2.3.21 The Greater Manchester Transport Strategy 2040 has been developed by TfGM on behalf of the Greater Manchester Combined Authority (GMCA) and Greater Manchester Local Enterprise Partnership (LEP). This document sets out a plan to establish a fully integrated, high-capacity transport system across Greater Manchester, including both short-term and long-term infrastructure objectives and to achieve a 'Right Mix Target' of a minimum of 50% of all journeys across Greater Manchester being undertaken by walking, cycling & public transport. The vision is for Greater Manchester to have 'World class connections that support long-term, sustainable economic growth and access to opportunity for all'. The Transport Vision aims are as follows:

- Supporting Sustainable Economic Growth.
- Protecting Our Environment.
- Improving Quality of Life for All.
- Developing an Innovative City Region.

2.3.22 The 2040 Vision is supported by policies and proposals for improving the transport network in the medium term up to 2025 structured around spatial themes. A common theme is the need to tackle congestion on Manchester's transport networks and minimise the negative impacts of traffic on communities. The GMTS notes the following with respect to supporting the rapidly growing regional centre of Manchester city centre:

> ***"We will continue to support the transformation of brownfield sites on the periphery of the city centre, many of which are currently used for low-cost, informal car parks, into high-quality and high-density development. The loss of informal parking provision will be a major catalyst in reducing the attractiveness of car travel to the Regional Centre, but will need to be supported by alternative travel options.***
>
> ***There are regeneration frameworks already in place for many of these sites, containing ambitious plans for a variety of mixed-use developments, including significant volumes of new housing. As more peripheral Regional Centre sites are developed, we must ensure they are carefully stitched into the fabric of the surrounding urban area and***

ensure excellent connectivity to our major city centre transport interchanges. We will fully embed sustainable travel into new developments by ensuring excellent walking and cycling facilities are provided; developing tailored parking and servicing management strategies; engaging with occupiers to encourage sustainable travel behaviour from the outset; and providing other supporting interventions, such as car clubs…."

"…Streets leading to the city centre require significant improvement for people using public transport and cycling in particular. Greater Manchester's emerging City Centre Transport Strategy, and Our Five Year Transport Delivery Plan, set out plans to improve these radial routes.

The rapidly expanding city centre will quickly extend beyond the confines of our existing major transport infrastructure, and particularly the MSIRR, which comprises the Mancunian Way, Miller Street, Great Ancoats Street and Trinity Way and which in some areas creates a significant barrier to movement between the city centre and the wider Regional Centre."

2.3.23 The Upper Brook Street Masterplan has been developed with cognisance of the strategy and goals as set out within the 2040 Vision Document and directly responds to these challenges by focussing on the principle of car-free development, accessible by a wide range of sustainable transport modes. Delivery of these goals will allow for the delivery of a high-quality development, that enhances the local environment and delivers a new neighbourhood directly connected to both immediately surrounding residential and educational focussed areas and the wider regional centre.

3.0 REVIEW OF EXISTING LOCAL HIGHWAY NETWORK CONDITIONS

3.1 Description of the Local Highway Network to the Application Site

3.1.1 As noted in section 2.2 to this report, existing primary vehicle access points to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site are via the former commercial site access points taken from the adjacent local routes of Inchley Road and Kincardine Road. No direct vehicle access to the site is available from A34 Upper Brook Street. Pedestrian access is available from all site frontage links, via both formal path connections and other informal opportunities.

3.1.2 The study area section of A34 Upper Brook Street in the vicinity of the application site is of multi-lane single carriageway character, with the route acting as one of the key southern distributor roads serving Manchester city centre. The route provides two southbound lanes over the length of the immediate study area and three northbound lanes (except for the section immediately north of the junction with Brunswick Street, which is of a two-lane layout), plus a ghost-island right turn lane serving the local route of Cottenham Street.

3.1.3 All of the main local intermediate junctions along the study area section of A34 Upper Brook Street are of traffic signal-controlled layout, providing the following lane arrangements:

- *A34 Upper Brook Street / Grosvenor Street* – traffic signal-controlled crossroads junction, including for segregated push-button walk / cycle crossing points. The eastern connection of Grosvenor Street operates as a one-way entry only, with the western section operating as a one-way exit from the junction. The northbound Upper Brook Street arm is a 3-lane approach (10.2m width), with the inside lane being for ahead (to A57(M)) and left turn (to Grosvenor Street (W)) movements and the two outer lanes 'ahead only'. The southbound approach arm is also a 3-lane approach (10.2m) with the two inside lanes being signed as 'ahead only' and the outer lane for 'right turn only' movements to Grosvenor Street (W). This right turn lane operates under a separate right turn filter arrow as part of the traffic signal cycle. Grosvenor Street (E) provides two approach lanes to the junction (left turn only and ahead & right). These

lanes are physically segregated on the approach to the junction, allow for separate traffic signal phasing.

- *A34 Upper Brook St / Inchley Road / Booth Street East* – traffic signal-controlled crossroads junction, including for push-button pedestrian crossing facilities. The Upper Brook Street northbound arm to this junction is a three-lane (9m width) approach (ahead & left, ahead only and ahead & right), with the southbound approach (6.2m width) being of just two approach lane character (ahead & left and ahead only). Right turning traffic from the A34 to Booth Street East is prohibited at this junction, with any such right turn traffic required to turn left into Inchley Road and perform a U-turn at the nearby mini-roundabout with Kincardine Road, before continuing across Upper Brook Street through the traffic signal junction. The Inchley Road approach to the traffic signals is of single lane character (no turning restrictions). The Booth Street East approach is characterised by two approach lanes, which are separately signalled and physically separated by a pedestrian splitter island at the connection point to Upper Brook Street. The inside lane to the Booth Street East approach is marked for left turn only movements and the outer lane for ahead & right traffic.

- *A34 Upper Brook St / Brunswick Street* - traffic signal-controlled T-junction junction, including for push-button pedestrian crossing facilities. The Upper Brook Street northbound arm to this junction is a three-lane approach (2 * ahead only and an additional right turn only 'pocket' (not segregated or right turn filter arrow)), with the southbound approach being of just two approach lane character (ahead & left and ahead only). The Brunswick Street approach arm is of a single lane character, with a short left turn flare. Historically this junction also included for an additional arm to the west (also known as Brunswick Street), however, this arm appears to have been effectively closed to general day-to-day traffic as part of works within the University campus.

3.1.4 The remaining local side road connections to the study section of A34 Upper Brook Street include:

- *Clifford Street* (western side, between Booth Street East signals & Cottenham Street) – retained as a gated left turn exit only road and used for servicing adjacent University buildings.

- *Cottenham Street* (eastern side between Clifford Street & Brunswick Street signals) local side road access serving a limited number of frontage buildings and ultimately connecting to Cabot Street and Brunswick Street. Right turn movements from Upper Brook Street to Cottenham Street are supported by a ghost-island right turn lane. In practice traffic movements to / from Cottenham Street are currently low, with the side road predominately used by traffic to / from the frontage commercial properties, some of which appear not to be in regular use.

3.1.5 Kincardine Road runs broadly parallel to A34 Upper Brook Street and is a local single carriageway (5.5m width, plus marked parking bays) access road connecting Grosvenor Street to the north and Brunswick Street to the south. The section of route between Brunswick Street and Whitekirk Close to the south east of the study area operates as a one-way northbound link only (with unprotected contra-flow southbound cycle lane), with the remainder of the route being two-way in nature and open to all traffic. Kincardine Road is accessed by a number of side road connections (Arkley Street, Whitekirk Close, Inchley Road & Hanworth Close) and is characterised by on-street parking bays (combined residents parking / short-stay pay-and-display parking), to the eastern side of the route and private gated access points to parking / servicing areas to the west, associated with commercial buildings fronting Upper Brook Street, including land parcels associated with the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site. The route is currently generally lightly trafficked and is noted to be a local signed 'quiet street' cycle route, providing an alternative cycle option to the busy A34 Upper Brook Corridor. The route forms part of the Brunswick 20mph zone, along with connecting residential routes.

3.1.6 Arkley Street, Whitekirk Close (5.5m width) & Hanworth Close (5.5m width) are local estate road routes serving the adjacent New Brunswick residential area and are of give-way side road T-junction layout at their connections to Kincardine Road. The junction of Kincardine Road with Inchley Road is of mini-roundabout design (allowing for the U-turning of light vehicle traffic), with Inchley Road providing a direct two-way connector road link from Kincardine Road to A34 Upper Brook Street.

3.1.7 The northern terminal junction connection of Kincardine Road to Grosvenor Street is of a T-junction layout, with movements to / from Kincardine Road being restricted to left-in / left-out turns only, reflecting the one-way (westbound) nature of the immediate section of Grosvenor Street. Grosvenor Street is an important one-way (westbound) local distributor road connection, linking between the A6 London Road and A34 Upper Brook Street. The route is of circa 5.6m single carriageway one-way layout but includes for 1.2m advisory cycle lanes both in the

westbound and eastbound (contra-flow) directions. The contra-flow cycle lane does not include for any physical segregation from opposing traffic. This route also operates under 20mph controls as part of the Brunswick 20mph zone.

3.1.8 The study area also considers the western section of Brunswick Street between A34 Upper Brook Street and Kincardine Road. This route operates as a local distributor route between the A6 and A34 corridors and is of circa 9.5m single carriageway, incorporating advisory cycle lane markings in both travel directions and wide footways to both sides. The route operates under a 20mph speed limit as part of the Brunswick 20mph zone.

3.2 Review of Existing Baseline Local Traffic Conditions

3.2.1 Background operating conditions on immediate highway links to the application have been established by the undertaking of a comprehensive 12-hour weekday daytime (07:00-19:00) traffic survey exercise undertaken on Wednesday 16 November 2022. This survey exercise included for the following count schedule (see also **Figure TA4**):

1. Upper Brook Street / Grosvenor Street Traffic Signals – All movements & queues
2. Upper Brook Street / Inchley Road / Booth Street East Traffic Signals – All movements & queues*
3. Upper Brook Street / Brunswick Street – All movements & queues
4. Kincardine Road / Hanworth Close – side road turning movements only
5. Kincardine Road / Inchley Road – all turning movements*
6. Kincardine Road / Whitekirk Close – side road turning movements only

* Junctions 2 & 5 effectively undertaken as a linked survey, to ensure full understanding of extent of U-turn movements for right turn southbound Upper Brook Street traffic to Booth Street East.

3.2.2 This survey schedule allowed for a full understanding of traffic patterns across the study area, including for all side road junction connections along the immediate section of Kincardine Road to the application site.

3.2.3 **Figure TA5** to this report illustrates total 'rolling hourly' total traffic movements recorded across all of the survey junctions over the survey period. Review of this exercise demonstrates a clear AM & PM 'rush hour' peak demand profile, with the hours 08:15 – 09:15 during the AM peak period and 16:45 - 17:45 during the PM peak demonstrating highest recorded demand levels. Traffic demand at the junctions during core weekday off-peak periods (09:00 – 15:00) was noted to be only circa 65% - 85% those recorded at peak times.

3.2.4 Recorded November 2022 turning movements at the key junctions across the study area for the above identified maximum AM peak (08:15 - 09:15) and PM peak (16:45 - 17:45) hours are illustrated in **Figure TA6** to this report. Review of this information identifies the following trends:

- Traffic flow on A34 Upper Brook Street demonstrates strong tidal peak demand in the AM peak, with northbound demand (to Manchester city centre) being the dominant movement during this peak period. PM peak traffic levels show a more equal balance in directional traffic demand.

- There is a relatively high demand for turning movements between A34 Upper Brook Street (S) and Booth Street East during both peak periods. During the AM peak this movement represented 518 left turn movements from A34 Upper Brook Street (S) to Booth Street East and 300 movements in the reverse right turn direction. In the PM peak these movements showed demand levels of 401 (left turn) and 490 (right turn) respectively.

- Traffic levels on Kincardine Road are relatively low, particularly to the south of the Inchley Road mini-roundabout – at less than 100 vehicles per hour (two-way) in the AM peak and less than 140 vehicles per hour (two-way) during the PM peak period. Demand to the north of the mini-roundabout is influenced by the local Grosvenor Street - Inchley Road rat-run movement, which results in a more substantive southbound demand on this part of Kincardine Road. Indeed the left turn movement from Grosvenor Street to Kincardine Road was noted to be of the order of 157 and 204 movements for the AM & PM peak hours respectively, when compared to just 35 and 19 movement for the reverse Kincardine Road – Grosvenor Street movement.

- Traffic levels on Inchley Road are of the order of 360 (AM peak) to 400 (PM peak) vehicles per hour during peak periods, with almost negligible HGV traffic. The majority of traffic using Inchley Road seeks to access Booth Street East at the Upper Brook Street / Booth Street East / Inchley Road traffic signals.

- Existing Inchley Road traffic shows uneven directional demand, with circa two-thirds of recorded movements on the link travelling west from Kincardine Road

to Booth Street East / A34 Upper Brook Street, with a much lower level of demand in the reverse direction. This directional demand trend is likely to reflect the potential for local rat-run movements from Grosvenor Street (W) to Booth Street East / A34 Upper Brook Street via Kincardine Road & Inchley Road, with this rat-run movement noted to be heavier during the PM peak, reflecting tidal movements away from Manchester city centre at this time. Traffic flow is low in the reverse directions as movements from Booth Street East / Upper Brook Street to Grosvenor Street do not offer the same rat-run advantages due to the one-way nature of Grosvenor Street.

- Existing 'right turn' demand for movements from Upper Brook Street (N) to Booth Street East (involving a U-turn at the Inchley Road / Kincardine Road mini-roundabout) is of the order of 58 vehicle trips in the AM peak (56 light vehicles and 2 HGVs) and 24 light vehicle movements (no HGVs) during the PM peak. The AM peak U-turn demand represents over 45% of total recorded eastbound traffic demand on Inchley Road.

- Traffic demand to / from the local residential estate roads of Hanworth Close and Whitekirk Close show no obvious signs of substantive local rat-run demand, with traffic flows on both links during AM & PM peak periods being less than 100 vehicles per hour (2-way).

3.2.5 In addition to the above recorded traffic volumes, the November 2022 traffic survey exercise also included for surveys of traffic queues on all of the approach arms to the main traffic signal-controlled junctions on the A34 Upper Brook Street corridor. These surveys recorded the maximum queue on each junction approach (by lane) at the end of each red signal phase across the full survey period. The results of these queue surveys are summarised in **Figure TA7(a-c).**

3.2.6 Review of this recorded queue survey data identifies the following core trends:

A34 Upper Brook Street / Grosvenor Street

- Queuing on all junction arms is generally at low levels – with total queuing on each approach arm (totalled across multiple lanes) being typically less than 15 queued vehicles for the majority of the day. Maximum total queuing was recorded on the A34 Upper Brook Street (S) approach, during the PM peak (typically between 15-20 vehicles queued across 3-lanes). The majority of the queuing on this link is experienced on the inside lane (ahead & left), which effectively accommodates movements to Grosvenor St (W) and A57(M) Mancunian Way. The ahead only lanes to Manchester city centre generally show low levels of queuing, even during traditional rush hour peak periods.

- Total queuing demand on the Grosvenor Street (E) approach was noted to be relatively low (less than 5 vehicles across both lanes) during off-peak periods,

increasing to circa 10 vehicles for a short period in the AM peak and for the PM peak period 16:25 – 18:25.

- Queuing on the A34 Brook Street (N) approach arm was noted to be low across the full survey period, typically being below 10 vehicles (over three lanes). Right turn related queuing is negligible on this arm.

A34 Upper Brook Street / Inchley Road / Booth Street East

- Maximum queue levels at the junction were observed on the A34 Upper Brook Street (S) approach, with peak hour queuing being of the order of 15 – 25 vehicles (across three lanes). In practice the majority of this approach queuing is concentrated on the inside lane (ahead and left), reflecting the combined effects of i) relatively high left turn movement to Booth Street East and, ii) drivers looking to take up preferred lane position for the approach to the subsequent A34 Upper Brook Street / Grosvenor Street signals and the exit at this junction towards A57(M) Mancunian Way. Queuing in the outer two existing lanes was noted to be generally less than 5 vehicles.

- Queuing on the A34 Upper Brook Street (N) approach was noted to be typically low (less than 15-20 vehicles across two lanes), apart from a short 'spike' in queuing demand for part of the PM Peak period (17:30 – 18:00), when total approach queuing was recorded at circa 30 – 40 vehicles, albeit spread quite evenly across both available approach lanes.

- Queuing on Inchley Road was noted to be well below 5 vehicles during off-peak periods, rising to circa 10 vehicles (during rush hour peak times).

- Booth Street East approach queuing was noted to be at levels of circa 10 – 15 vehicles during rush hour peak periods, with the majority of this queuing related to the ahead & right turn approach lane. This queuing distribution reflects the relatively high demand for the Booth Street East – A34 Upper Brook Street (S) turning movements recorded during peak times.

Upper Brook Street / Brunswick Street

- Queuing levels for the A34 Upper Brook Street approach arms were noted to be at generally similar levels to those recorded at the other A34 Upper Brook Street study junctions – with rush hour peak total approach queuing being typically of the order of 20 -25 vehicles on each approach arm (two lanes southbound, 3 lanes northbound (including right turn lane)

- Queuing on Brunswick Street was noted to be at below 10 vehicles during off-peak periods, rising to 10 – 15 vehicles during rush-hour peak periods. On-site observations of rush hour queuing at this junction noted that, on occasion two lanes of traffic queuing formed on Brunswick Street, despite this link being marked as a single lane approach. This potentially increases the practical capacity of the junction when compared to its formal layout.

3.2.7 Based on the above review of recorded junction queuing, it is considered that there is no evidence to suggest that the core study area traffic signal junctions on the A34 Upper Brook Street corridor are currently showing signs of significant over-capacity / congestion issues. Indeed observed peak hour queuing levels are considered to be relatively low for intermediate junctions on key distributor routes linking to Manchester city centre and generally suggest satisfactory operational performance.

3.3 Results of Baseline 'Do-Nothing' Network Junction Modelling

3.3.1 In order to provide reference network operational performance criteria to compare future network operation following the delivery of the Upper Brook Street scheme re-development, this section of the report sets out the results of preliminary traffic modelling of key local junctions within the Upper Brook Street study area. This assessment has been undertaken for November 2022 'Do-Nothing' traffic flows, using the following industry standard computer software programs.

- LINSIG3 for traffic signal junctions.
- JUNCTIONS (PICADY (T-junction) module) for stand-alone give-way controlled junctions.

Interpretation of Results: LINSIG3

3.3.2 LINSIG modelling has been carried out for the key traffic signalised junctions along the Upper Brook Street corridor as set out below, and have been prepared based on signal timing and staging data supplied by Transport for Greater Manchester Urban Traffic Control (TfGM UTC).

- A34 Upper Brook Street / Grosvenor Street.
- A34 Upper Brook Street / Booth Street East / Inchley Road.
- A34 Upper Brook Street / Brunswick Street.

3.3.3 Junction layout features were validated by site visit observations. It should be noted that all of the traffic signal junctions currently work on individual fixed signal timings (80 second cycle times at each junction). Core model input details were discussed with TfGM UTC during the pre-application scoping stage and ultimately agreed as being suitable for use. All of the Baseline 'Do-Nothing' assessment runs summarised in this chapter of the TA have been undertaken based on the existing TfGM signal setting data and run on an 80 second cycle time basis.

3.3.4 LINSIG software presents network modelling results in terms of a percentage 'Degree of Saturation' (DoS) value and corresponding predicted traffic queues for each modelled link. For traffic signal-controlled junctions, it is generally accepted that degrees of saturation of 90% or less on individual links represent satisfactory link operation, with values above this threshold representing 'variable operation' and therefore increasing the potential for regular congestion and delay. LINSIG also provides a further reference value, Practical Reserve Capacity (PRC), which provides an overall indicative measure of the general operation of a junction within the network. PRC values of 0% or above are generally considered to represent acceptable junction operating conditions, with values of less than 0% (negative PRC) indicating a propensity for more variable junction operation and the potential for some congestion and queue build up.

3.3.5 It should be noted that negative junction PRC values can be obtained when a number of individual junction arms are operating at less than 100% degree of saturation i.e. the point where theoretical operating capacity is reached on an approach arm, and therefore the PRC value provides only a general guide to overall junction performance.

3.3.6 For the purposes of the network modelling included in this TA report, full LINSIG summary output is available for key assessment runs, setting out information on the operation of individual junction approach arms. The junction PRC value output for each key junction node has, however, been utilised as a first point of reference / guide to overall junction performance for each future year demand scenario.

Interpretation of Results: TRL JUNCTIONS Software (PICADY & ARCADY modules)

3.3.7 Additional detailed assessment of the operating capacity of other key local 'give-way' junctions has been carried out using industry standard TRL JUNCTIONS (PICADY module) analysis software. This includes for the following locations:

- Kincardine Road / Hanworth Close - T-junction layout.
- Kincardine Road / Whitekirk Close - T-junction layout.

NB - Junction modelling for the Kincardine Road / Inchley Road mini-roundabout was not undertaken, as this junction would be removed as part of the proposed Inchley Road closure arrangements and so the understanding of the Baseline operation of this junction is not critical.

3.3.8 The PICADY module consider junction performance with respect to the Ratio of Flow to Capacity (RFC) and associated traffic queuing. RFC values for junction approaches of between 0.00 and 0.85 are generally considered to represent stable and acceptable operating conditions. Values between 0.85 and unity (1.0) represent variable operation (i.e. possible queues building up at the junction during the period under consideration and increases in vehicular delay moving through the junction). RFC values in excess of unity represent overloaded conditions (i.e. congested conditions).

3.3.9 Guidance as to the interpretation of results identifies that it is possible for a junction to operate with individual RFC levels of above 0.85 without unacceptable congestion and delay taking place. The 0.85 threshold identifies the optimum position at which operational capacity is maximised when viewed against the likely frequency of queuing and delay events. RFC values of above 0.85 simply demonstrate a greater potential for congestion and delay to occur, which must be viewed in the context of the future year horizon under assessment and surrounding general network wide conditions. An RFC of in excess of 0.85 does not, by definition, suggest over-capacity / unacceptable operational junction performance.

November 2022 Baseline 'Do-Nothing' Junction Capacity Modelling Results

3.3.10 The paragraphs below set out the results of the junction capacity analysis for the identified study junctions under 2022 Baseline 'Do-Nothing' network demand conditions. Review of these results provides an understanding of junction performance under existing traffic demand patterns, which reflects the current position of Inchley Road being open and available for use by vehicles.

3.3.11 The AM & PM Peak traffic flow data used to inform this junction modelling is the pcu values presented in **Figure TA6**, with key 'Do-Nothing' model results summarised in **Appendix TA4** to this report. Full model output for all model runs can be made available on request.

3.3.12 Review of the results of the 'Do-Nothing' Baseline junction capacity modelling highlights the following:

Upper Brook Street Traffic Signal Junctions

- *Upper Brook Street / Grosvenor Street:* The junction is operating with a level of spare operational capacity during the AM peak period (junction PRC of 14.9% and total delay of 10.2 pcuHr) and a greater level of spare capacity in the PM peak (35.2% junction PRC and 10.29 pcuHr junction delay).

- *Upper Brook Street / Inchley Road / Booth Street East:* The junction is demonstrated to be just over practical capacity demand levels and approaching theoretical junction capacity, represented by a junction PRC value of -4.6% in the AM peak and -7.1% in the PM peak. Maximum approach arm PRC is experienced on the Inchley Road side road arm, at circa 94 – 96% degree of saturation, with an associated total mean-max queue of circa 10 – 12 vehicles. Total junction delay is at higher levels, circa 22.92 pcuHr for the AM peak and 32.74 pcuHr under PM peak demand. It is anticipated that some rebalancing of junction operation could be possible by use of optimised signal timings, rather than using the current fixed signal cycle and stage time approach.

- *Upper Brook Street / Brunswick Street:* The junction is approaching practical capacity under AM peak demand (0% junction PRC), but operating with some spare capacity in the PM peak (17.4% junction PRC), based on the assumption that the 'all red' pedestrian side road stage is called every-other signal cycle. Maximum approach link PRC is experienced on the Brunswick Street side road arm in the AM peak period, with a degree of saturation value of 90% and mean max queue of 17 pcu. Again, it is anticipated that some potential improvements

in junction performance might be possible through the individual optimisation of this junction, in preference to current signal settings.

Kincardine Road Junctions

- *Kincardine Road / Hanworth Close (T-junction):* The junction is predicted to operate with significant levels of spare capacity, with maximum give-way movement RFCs being well below critical 0.85 values and strictly limited queuing.
- *Kincardine Road / Whitekirk Close (T-junction):* The junction is predicted to operate with substantial spare capacity. Maximum predicted RFCs for all give-way movements are noted to be below 0.1, with little to no related queuing.

3.3.13 It is considered that the above modelling results provide good correlation with observed junction operational performance. Junction modelling of Kincardine Road T-junctions confirms that these junctions are currently operating with significant spare capacity. The A34 Upper Brook Street corridor junctions are busier, reflecting A34 Upper Brook Street's distributor road status, however, the modelling does not suggest significant existing capacity / congestion issues, reflective of surveyed conditions. Furthermore, the modelling suggests that improved operational performance could potentially be delivered at these Upper Brook Street junctions via relatively minor changes in signal timings or the individual 'optimisation' of junction nodes. This suggests that there could be inherent flexibility within the immediate route corridor and surrounding streets to accommodate any local traffic re-assignments associated with road closures / extension of one-way controls. This will be explored further in section 8 to this report.

3.4 Existing Public Car Parking Provision

3.4.1 There are a number of opportunities for public car parking within the immediate vicinity of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site, ranging from a relatively limited number of on-street parking bays, to dedicated off-street multi-storey car park provision. The location of key local parking infrastructure is illustrated in **Figure TA8** to this report, which demonstrates the following:

A. *On-Street Marked Parking Zones to Kincardine Street* – currently operating as mixed resident permit holder parking and short-stay pay & display public parking (3 hrs max stay, return prohibited within 1 hour). It is estimated that the parking bays provide the potential for the parking of up to 28 vehicles (circa 175m of marked bays, assuming circa 6m per vehicle).

B. *On Street Marked Parking Bays to New Brunswick Estate & Cottenham Street / Cabot Street* - currently operating as mixed resident permit holder parking as part of the Brunswick Controlled Parking Zone (CPZ) and short-stay public parking (3 hrs max stay, return prohibited within 1 hour).

C. *On Street Marked Parking Bays to Grosvenor Street (W)* - currently operating as short-stay public parking (2 hrs max stay, return prohibited within 1 hour). It is estimated that the parking bays on this route provide capacity for up to just 4 vehicles (circa 24m of available parking).

D. *On Street Marked Parking Bays to Sackville Street (W)* - currently operating as short-stay 'Zone 2' public pay & display parking (up to 2 hrs max stay). The marked parking bays in this area provide capacity for up to just 7 vehicles and a further 1 disabled bay.

E. *NCP Circle Square Multi-Storey Car Park* – 1018 spaces (including 38 disabled standard spaces) located circa 220m walk to the north of the northern boundary of the application site. Linked to the application site by the eastern footway to A34 Upper Brook Street, with the walking route including push-button traffic-signalised crossing facilities as part of local junctions, to allow safe crossing of Grosvenor Street & A34 Upper Brook Street.

F. *APCOA Aquatics Centre Multi-Storey Car Park* – 380 public spaces (including 4 mobility impaired standard spaces) with a further 580 spaces set aside for contract parking, located circa 170m walk from to the west from the centre of the application site (Inchley Road). Linked to application site by footways to

Inchley Road, A34 Upper Brook Street & Booth Street East, with the route to the car park from the application site including push-button traffic-signal controlled crossing points of A34 Upper Brook Street, as part of the junction with of Upper Brook Street / Booth Street East / Inchley Road.

G. *Charles Street Multi-Storey Car Park* – 808 spaces (including 4 disabled standard spaces) located circa 500m walk to the northern boundary of the application site. Linked to application site by footways to A34 Upper Brook Street & Sackville Street, with the walking route including push-button traffic-signalised crossing facilities as part of local junction to allow safe crossing of Grosvenor Street & A34 Upper Brook Street.

3.4.2 In addition to the above parking it is also worth noting the University Multi-Storey Car Park D (Upper Cambridge Street) is also located within a 10-minute walk from the majority of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site, providing a further 965 public pay & display spaces (17 disabled & 8 EV).

3.4.3 Ultimately over 3,000 public pay & display multi-storey based car parking spaces are located within a 10-minute walk catchment from the Upper Brook Street site. It is understood from a recent 2023 base review of occupancy of city centre car park facilities, that many of these local car park site are operating at below 60% utilisation, suggesting that there is a level of practical capacity to accommodate any additional parking demand generated by the application scheme elements.

3.4.4 All other local streets within an immediate catchment of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site, including the A34 Upper Brook Street & Oxford Road corridors and those streets within the adjacent main University campuses, are subject to yellow line parking restrictions, making them effectively unavailable for parking.

3.5 Road Safety: Review of Personal Injury Accident Records

3.5.1 An appraisal of the operational safety of the immediate local highway network to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site has been carried out through a review of historical Personal Injury Accident (PIA) data obtained from the TfGM database for the most recently available 5-year search period (1 November 2017 to 31 October 2022 inclusive). This database includes for all accident incidents as recorded by the police & emergency services and therefore represents 'industry standard' data utilised for the calculation of accident rates and the assessment of highway safety. The specification of a minimum five-year search period accords with criteria recommended in NPPG good practice guidance, with the study area including for the length of A34 Upper Brook Street and Kincardine Road between Brunswick Street to the south and Grosvenor Street to the north.

3.5.2 Details of the extent of the search area and the number & location of recorded accident events are illustrated in **Figure TA9** to this report.

3.5.3 Review of the recorded accident data demonstrates that no accident events have taken place over the full length of Kincardine Road during the survey period, including the terminal junctions with Brunswick Street and Grosvenor Street. This is likely to reflect the relative low intensity / low speed use of this route at present.

3.5.4 Only one injury accident event has was recorded at the junction on the study section of Grosvenor Street. This incident was of a 'serious' accident classification and took place circa 30m to the east of the Kincardine Road / Grosvenor Street junction. Review of the accident information notes that this event took at 13:20 on a weekday in October 221 and was related to an incident between two pedal cycles, with no motor vehicles involved.

3.5.5 A number of accident events have been recorded along the study section of A34 Upper Brook Street. Review of these corridor incidents notes that these accidents

mainly took place in 'clusters' associated with the three main traffic signal junctions on A34 Upper Brook Street with Grosvenor Street, Booth Street East / Inchley Road and Brunswick Street. Only two accidents took place away from these main junction locations, both of which were 'slight' injury classification events and involved an incident between two pedal cycles at a location to the south of the junction with Inchley Road and a minor car / pedestrian incident at a point 50m north of Cottenham Street.

3.5.6 **Appendix TA5** to this report provides a summary of core accident details recorded at each of the three cluster points. Review of this information highlights the following trends:

A34 Upper Brook Street / Grosvenor Street Traffic Signals: 7 accidents (7 Slight, 0 Serious).

- All incidents involved vehicle / vehicle conflicts. No pedal cycle or pedestrian incidents.
- Majority incidents took place outside of core weekday day-time periods. Either at weekends or weekday evenings.
- Causation mainly rear shunt or poor turning manoeuvres, including failure to observe red signal aspect.

A34 Upper Brook Street / Booth Street East / Inchley Road Traffic Signals: 2 accidents (1 Slight, Serious).

- Both incidents took place during weekday rush hour periods and involved vehicle / pedal cycle interactions on main A34 Upper Brook Street carriageway.

A34 Upper Brook Street / Brunswick Street Traffic Signals: 4 accidents (4 Slight, 0 Serious).

- Majority of incidents took place during weekday rush-hour demand periods.
- Involvement of pedal cycle, pedestrian and motor cycle.
- Range of accident types an no obvious common causation factor.

3.5.7 Based on the above review of issues, it is ultimately concluded that there are no clear & substantive prevailing road safety issues associated with the Kincardine Road corridor or other surrounding local road routes. Whilst a number of accident events have been recorded at key junction nodes to the A34 Upper Brook Street corridor, reflecting the busy nature of this route, review of these accident events does not highlight any significant accident trends that could be expected to be materially exacerbated by the mixed-use scheme proposals or call the scheme into

question. Indeed, the application scheme includes for the introduction of local active travel measures along the A34 Upper Brook Street and Kincardine Road corridors that should enhance active travel accessibility and improve safety for these key site users. The delivery of enhanced cycle measures on Kincardine Road and improved connections to other local cycle infrastructure and routes may also encourage cycle users away from the A34 Upper Brook Street corridor and therefore reduce the potential for pedal cycle related conflicts on this route.

4.0 SITE ACCESSIBILTY AUDIT

4.1 Introduction

4.1.1 Development of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site for a residential and employment led mixed use scheme would need to satisfy the key planning and transport related sustainability objectives of:

- Reducing the need to travel, especially by private car;
- Ensuring accessibility to a range of sustainable travel options.

4.1.2 The nature of local sustainable transport connections available within the immediate catchment of the application site are summarised in the paragraphs below.

4.2 Access to Public Transport

Bus Links

4.2.1 Nearest bus stops to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site are located to the site's western frontage to A34 Upper Brook Street. These stops include:

- Formal lay-by provision with passenger waiting shelters, raised bus border kerbs and information panels for those stops located to the front of the northern section of the site (i.e. between Grosvenor Street & Inchley Road).

- Simple marked on-carriageway bus stop 'cage' markings, with passenger shelter, bus boarder kerbs and information panel for the stop to the south of Inchley Road (southbound services only).

4.2.2 The frontage bus stops on A34 Upper Brook Street are served by the regular frequency number 50 bus route between Media City & East Didsbury, via Salford & Manchester city centre (St Peters Square). This bus route provides a 12-minute day-time service frequency Monday - Saturday and 15-minute evening frequency. Sunday services provide a 15-minute day-time service and 20-minute evening service.

4.2.3 In addition to this available direct site frontage bus service, a wide range of other bus routes are available within a 5 – 7 minute walk of the site at stops on both the Oxford Road corridor and A6 London Road corridors. The Oxford Road stops are located circa 350m to the west of the site, via walking connections using Grosvenor Street (W) or Booth Street East, including dedicated pedestrian crossing opportunities of A34 Upper Brook Street.

4.2.4 The Oxford Road corridor operates as a high frequency bus corridor and offers modern high quality passenger infrastructure, reflecting its role as main bus route serving the city centre from South Manchester. Regular services available from the stops closest to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site are as summarised below, with these routes providing links to a wide range of destinations across south and west Manchester, as well as cross-city connections to Middleton, Blackley and Leigh (see also **Figure TA10** to this report):

- 15: Flixton – Urmston – Stretford – Hulme - Manchester
- 18: MRI – Manchester - Blackley – Middleton - Langley
- 41: Sale – Didsbury – Manchester – Bowker Vale – Higher Blackley - Middleton
- 42: Stockport – Heaton Mersey – Didsbury – Manchester (Piccadilly Gdns)
- 42A: North Reddish – Heaton Chapel – Manchester (Piccadilly Gdns)
- 42B: Woodford – Cheadle Hulme – Cheadle – Manchester (Piccadilly Gdns)
- 43: Manchester Airport – Wythenshawe - Manchester (Piccadilly Gdns)
- 44: Bowdon – Altrincham – Didsbury - Manchester (Piccadilly Gdns)
- 53: Cheetham Hill – Crumpsall – University – Old Trafford - Pendleton
- 111: Chorlton – Moss Side – Fallowfield - Manchester (Piccadilly Gdns)

- 142: East Didsbury – Withington – Moss Side - Manchester (Piccadilly Gdns)
- 143: West Didsbury – Withington – Moss Side - Manchester (Piccadilly Gdns)
- 197: Stockport – Burnage – Heaton Moor – University - Manchester (Piccadilly Gdns)
- V1: MRI – Manchester – Salford – Tyldesley - Leigh

4.2.5 Further bus connections are available to the east of the site at stops on A6 London Road at Ardwick Green. These stops are located circa 500m from the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site, via walking connections through the adjacent Brunswick residential area (walking route using Hanworth Close / Wadeson Road / Kale Street and central-refuge-island crossing points of A6 London Road. The stops at Ardwick Green provide passenger shelters, raised bus border kerbs and information boards in both directions, with the southbound stops forming part of a short section of bus only lane. Bus routes available from the Ardwick Green stops provide high frequency connections towards Stockport & south west Tameside (Hyde / Denton), viz:

- 192: Hazel Grove – Heavily – Stockport – Levenshulme – Manchester (Piccadilly Gdns)
- 201: Hattersley – Hyde – Denton – Belle Vue - Manchester (Piccadilly Gdns)
- 202: Gee Cross – Hyde – Haughton Green - Manchester (Piccadilly Gdns)
- 203: Stockport – Reddish – Debdale Park – Gorton - Manchester (Piccadilly Gdns)
- 205: Dane Bank – Denton – Debdale Park – Gorton - Manchester (Piccadilly Gdns)

4.2.6 In addition to the above scheduled services, the northern section of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site is located within circa 650m walk of stops served by the 10-minute day-time frequency Manchester City Centre Free Bus (Line 2). This service calls at stops on Whitworth Street and provides connections to Piccadilly, Northern Quarter, Deansgate & St Peters Square. The Whitworth Street stop is also served by the Line 3 free evening bus service, providing similar frequency connections and additional links to Deansgate-Castlefield.

Rail Links

4.2.7 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site is also well located to provide opportunities for walking connections to the central Manchester national rail stations of Manchester Piccadilly and Manchester Oxford Road.

4.2.8 Manchester Piccadilly is the main rail hub for Manchester, providing services to a range of destinations including, London, Birmingham, Sheffield, Leeds, Liverpool, Scotland and Wales. The station is located circa 900m walk to the north east of the northern boundary of the application site, with a number of walking routes available. It is considered that the main walking route would involve links via Upper Brook Street – Sackville Street – Granby Row – A6 London Road, which is characterised by good standard footway routes adjacent to key roads and sections of segregated off-road walking routes. The crossing of key main road routes is supported by push-button traffic signal-controlled facilities. Alternative walking connections are available through the adjacent Brunswick residential area via Grosvenor Street and footways linking to the main A6 London Road corridor.

4.2.9 Manchester Oxford Road station is located circa 800m to the north west of the northern boundary to the application site and is served by a wide range of local commuter services to south Manchester and more strategic links to Liverpool, Leeds, Sheffield, East Anglia, the North West and Scotland. The main walking route from the application site to the station would be via either Grosvenor Street or Booth Street East, connecting to the walking routes along Oxford Road. These walking routes are of good quality, with push-button traffic signal-controlled crossing points available to allow safe and controlled crossing of Upper Brook Street and Oxford Road.

Greater Manchester Accessibility Level (GMAL) Rating

4.2.10 The application site's excellent potential for connectivity by public transport is reflected by its Greater Manchester Accessibility Level (GMAL) rating of 8 (see **Figure TA11** to this report), placing it in the top accessibility category. This GMAL score highlights the highly accessible nature of the site location and practical opportunities for the promotion of car-free living and working.

4.3 Accessibility By Walking and Cycling

Access on Foot

4.3.1 In addition to the above identified local public transport connections, the location of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site also provides the opportunity for easy access to a wide range of local shops, services and educational areas by foot or cycle. Whilst accessibility to 'every-day' services are most relevant to the considering the proposed PBSA element of the mixed-use scheme, the ability to be able to access such facilities would also be attractive and useful for staff based at the Life Science employment units. It must also be recognised that the Upper Brook Street proposals would also deliver a small range of ancillary facilities on-site for use by residents and staff with future uses anticipated to include an 'essentials' convenience store, coffee-shop / food-outlets and potentially a medical use / pharmacy.

4.3.2 National planning guidance notes that walking is the most important mode of travel at the local scale, offering the greatest potential to replace short distance car trips of under 2km. Guidance produced by CIHT also notes that 800m represents an 'acceptable' walking distance to community facilities and shops, with 1.2km representing a 'preferred maximum'. 2km has been identified as a suitable walk distance for regular commuting trips and journeys to / from educational facilities.

4.3.3 **Figure TA12** to this report illustrates the extent of such suitable walking catchments from the site and demonstrates that 1.2km & 2km walking catchments

would effectively include the full University of Manchester & Manchester Metropolitan University teaching campuses, key rail stations, the shops and services along the Oxford Road & Whitworth Street corridors and parts of Manchester city centre. As noted above, key local routes to the application site (Upper Brook Street, Oxford Road, Sackville Street and Grosvenor Street) all provide a good baseline standard of pedestrian infrastructure, being characterised by wide footways and traffic-signal controlled interchanges at local junctions.

4.3.4 All of the local traffic signal-controlled crossing points of A34 Upper Brook Street provide a good level of dedicated pedestrian / cycle crossing capacity. At present the following crossing widths are available:

A34 Upper Brook Street / Grosvenor Street

- Crossing of Grosvenor Street to East of A34 Upper Brook Street: 3.7m with 3.6m central island.
- Crossing of A34 Upper Brook Street North of Grosvenor Street: 4m with 4m staggered central island.
- Crossing of A34 Upper Brook Street South of Grosvenor Street: 2.4m with 4m staggered central island.
- Crossing of Grosvenor Street to East of A34 Upper Brook Street: 3m straight across.

Footway to A34 Upper Brook Street to application site-side: 2.2 to 2.4m

A34 Upper Brook Street / Booth Street East / Inchley Road

- Crossing of Inchley Road to East of A34 Upper Brook Street: 2.7m straight across.
- Crossing of A34 Upper Brook Street North of Booth Street East: 1.5m with 2m central island.
- Crossing of A34 Upper Brook Street South of Booth Street East: 2.7m with 1.8m central island.
- Crossing of Booth Street East to West of A34 Upper Brook Street: 2.7m with minimum 2.9m staggered crossing island.

A34 Upper Brook Street Toucan Crossing north of Cottenham Street: 4.2m with 3.5m staggered crossing island.

4.3.5 Furthermore, as noted, the Kincardine Road corridor is to be improved to deliver an active travel orientated enhance corridor as part of the wider Upper Brook Street proposals, along with additional walk / cycle east-west links between University of Manchester and the Brunswick residential area.

Cycle Access

4.3.6 National Planning Guidance also notes that cycling has the potential to substitute for short car trips – particularly those journeys of less than 5km or which could form part of a longer journey by public transport. The location of the application site allows for practical cycling access to a range of local areas including all of Manchester city centre, as well as Old Trafford, Chorlton, Fallowfield, Levenshulme, Gorton, and northern suburbs such as Cheetham Hill (**Figure TA13**).

4.3.7 A plan of available local cycle infrastructure to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site (as identified by TfGM) is illustrated in **Figure TA14**. This demonstrates that the Kincardine Road corridor is already recognised as an important local 'quiet street' cycling corridor, linking the Plymouth Grove residential areas, with the Sackville Street corridor and Manchester city centre to the north. Furthermore, the site is located close to the Oxford Road 'beeline' cycling corridor, which provides high quality segregated cycle infrastructure for journeys to / from Manchester city centre, the main University of Manchester & Manchester Metropolitan University campuses and Rusholme / Fallowfield / Didsbury / South Manchester. It is anticipated that the delivery of the application scheme would allow for further enhancement of Kincardine Road as a key cycling corridor, thereby improving wider cycle connectivity.

GM Bee Network Cycle Hire

4.3.8 The Greater Manchester Authorities support a public cycle hire scheme, operated by Beryl Bikes, with cycle hire docking stations located all over the city centre and surrounding areas to support potential cycle trips, especially those that are unplanned. **Figure TA15** to this report illustrates that there are a number of hire stations located within a short walk of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site, with the nearest facility on Grosvenor Street, to the west of Upper Brook Street (6 bike docking station). Other local facilities include 8 bike docks at Ardwick Green and 4 bikes at Brunswick Street.

4.4 Accessibility Summary

4.4.1 Overall it is concluded that the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site represents an entirely suitable location for mixed use student residential and Life Sciences based employment development, being located adjacent to established educational and residential zones, close to core active travel infrastructure and within a short walk of key high frequency public transport corridors and travel nodes. Furthermore the site is located within a practical walking distance of local shops & services and would provide additional on-site ancillary facilities to reduce the need to travel to access key 'every-day' facilities.

4.4.2 Such locational characteristics, along with the core 'car-free' development strategy underpinning the re-generation proposals, would deliver the potential for both student residents, and staff based at employment units at the site, to utilise sustainable transport for a range of regular journeys, therefore meeting the core planning sustainability objectives of promoting opportunities for the use of alternative travel modes to the private car and managing the overall traffic impact associated with new development.

5.0 REVIEW OF THE DEVELOPMENT PROPOSALS

5.1 Introduction

5.1.1 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme represents comprehensive re-generation of the application site to deliver mixed-use development, primarily comprising of Purpose Built Student Accommodation (PBSA), Life Sciences based employment floorspace and ancillary retail, commercial and community uses, along with on-site landscaping and public open space. The scheme would be delivered across six buildings of varying heights, located to the west of Kincardine Road and extending to Grosvenor Street. Illustrative plans of key development elements are included as **Appendix TA6** to this report, with a summary schedule of development set out below:

- 1,100 Student Accommodation beds across 3 buildings (A1 & A2 – 880 beds & A3 – 220 beds).
- 46,643sqm floorspace (combined laboratory and office space) for Life Science Uses across three buildings (B1, B2 & B3).
- Ancillary ground floor uses – likely to include café, food retail & community / medical uses spread across a range of buildings;
- Two new public squares; and
- Other areas of public realm and landscaping.

5.1.2 To reflect key sustainable development principles and to respond to the priorities for the area identified within the Oxford Road Corridor SRF, the development is to be promoted as being 'car-free', with no permanent general car parking to be provided on site, with on-site parking restricted for accessibility use only. Vehicle servicing would be delivered by integrated loading bay areas to Kincardine Road (primarily serving the PBSA element of the scheme and ancillary uses within these buildings) and dedicated internal loading areas within the Life Sciences zone.

PBSA Development

5.1.3 The PBSA element of the masterplan is proposed to be delivered over two plots and three main buildings (see **Appendix TA6**). These buildings would accommodate a combined student population of 1,100 students across a range of residential settings, as summarised below.

- *Building A1:* Gnd + 41 storey tower (inc roof parapet) accommodating 649 student residents
  306 * standard studio apartments;
  25 * accessible studio apartments;
  45 * large studio apartments
  9 * duplex studio apartments
  40 * 3-bedroom cluster apartment units
  36 * 4-bedroom cluster apartment units

- *Building A2:* Gnd + 14 floor building accommodating 231 student residents
  101 * standard studio apartments
  26 * 5-bedroom cluster apartment unit

- *Building A3:* Gnd + 12 floor building accommodating 220 student residents
  10 *6-bed cluster apartment units
  20 *8-bed cluster apartment units

5.1.4 The design of the buildings includes for a range of on-site facilities including the following:

- Reception areas / management suite;
- Parcel Room and Post Area;
- Amenity zones;
- Gym / workout zone;
- Laundry facilities;
- Residents lounge;
- Study / Meeting Rooms;
- Secure cycle storage areas
- Staff rooms and staff changing / showering areas.

5.1.5 In addition to these PBSA specific facilities, the buildings would also include for additional lettable ground floor commercial space. It is anticipated that this space would be utilised for the following complementary land uses:

- Unit A2: Café / Bar food & beverage outlet (circa 121sqm).
- Unit A3: 'Metro' style convenience / foodstore (circa 385sqm).

Life Science Employment Units

5.1.6 The Life Sciences based employment element of the masterplan is proposed to be delivered across three main buildings (see **Appendix TA6**). These buildings would provide the following schedule of employment / ancillary accommodation (GIA):

- Building B1: 20,933 sqm
- Building B2: 14,079 sqm
- Building B3: 11,631 sqm

  Total: 64,643 sqm

5.1.7 The design of the buildings includes for a range of on-site facilities including the following:

- Reception areas / management suite;
- Secure cycle stores;
- Staff changing / showering areas;
- Staff café / food preparation areas.

5.1.8 In addition to the core Life Sciences employment facilities, the buildings would also include for additional ground floor commercial & community space, viz:

- Unit B1 or B3: Potential community medical or pharmacy use;
- Unit B2: Café / Bar food & beverage outlet.

5.1.9 These ancillary ground floor uses would provide an active frontage to the buildings and also complement the core site land uses and reduce the need for staff and visitors to travel off-site during break / lunch-time periods.

New Public Squares & Public Realm

5.1.10 A new public square is proposed to be provided to the centre of the regeneration site, located immediately north of the Grade II* Listed Unitarian Chapel - to be delivered via the formal 'stopping up' of Inchley Road. Additional linear areas of public realm, including a further public square style area, are proposed between the main site buildings, running in a north-east to south-west alignment. Alongside its use as an amenity space for site users, the new main public square would also serve as a pedestrian and cyclist thoroughfare across the site and would enhance connections between Upper Brook Street and Kincardine Road. Additional environmental improvements are proposed for the Kincardine Road corridor (see section 5.2 below) along with supporting improvements and linkages to the adjacent Gartside Gardens community park.

5.2 Proposed Supporting Highway Improvement Works

5.2.1 The application scheme is to be supported by a comprehensive package of highway and environmental improvements to those roads immediately surrounding the site. These improvements would include the following key elements:

- Closure of Inchley Road between Kincardine Road and Upper Brook Street to traffic and conversion to new public square including enhanced walk / cycle connections to Gartside Gardens.
- Amendments to Kincardine Road corridor to deliver enhanced pedestrian areas, improved parking and servicing arrangements, a segregated contra-flow cycle land and one-way northbound general traffic operation from Brunswick Street to Grosvenor Street.
- Removal of southbound bus layby on A34 Upper Brook Street at the PBSA site frontage and replacement with widened footway and revised bus stop layout.

- Junction improvement at the A34 Upper Brook Street / Booth Street East traffic signals to respond to the closure of Inchley Road and creation of the new public square - including improved pedestrian & cycle crossing arrangements and new right turn lane for southbound traffic on A34 Upper Brook Street to connect to Booth Street East.

5.2.2 The above highway works would be delivered in parallel to an integrated landscaping strategy delivering new street trees & areas of planting and providing direct linkages to the areas of public realm within the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site. Plans illustrating the core principles of these highway works and the linking landscaping strategy are included as **Appendix TA7** to this report.

Improved Kincardine Road Corridor

5.2.3 As part of the works required to support the closure of Inchley Road and conversion of this area into a new public square, environmental enhancements would be implemented on Kincardine Road, including extension of the one-way (northbound) operation of the route from the junction with Whitekirk Close to Grosvenor Street. This core section of Kincardine Road to be amended to one-way operation would be subject to comprehensive improvements to deliver the following key highway arrangements (see **Appendix TA7**):

- 4m carriageway width allowing for use by northbound car and service traffic as well as cyclists;
- 2m - 2.5m pedestrian footway to the application site side of the route;
- 2m pedestrian footway to the Gartside Gardens side of the route;
- 2m segregated contra-flow cycle lane to Gartside Gardens side of the route;
- 24 * public pay & display / residents car parking bays, plus 2 additional bays that could be assigned specifically for use by car club vehicles.
- Vertical traffic calming features at key side road junctions and main pedestrian crossing points, to support 20mph operation of the route and to encourage a safe environment for walking & cycling.

5.2.4 In addition to the above, the section of Kincardine Road forming a direct frontage to the application site would also deliver the following infrastructure to the site-side of the route:

- 9 * (3.2m by 6m) disabled parking bays across two dedicated lay-by parking zones;
- 3.0mm by 22.5m servicing lay-by adjacent to unit A1 & A2 to serve the core PBSA building;
- 3.5m by 25m servicing lay-by adjacent to unit A3 to serve the other PBSA unit and anticipated ancillary local foodstore floorspace.

5.2.5 Further disabled bay and on-street servicing opportunities for the section of Kincardine Road to the immediate south of the application scheme are expected to be delivered in relation to the adjacent UBS South redevelopment scheme (see also section 9 to this report).

5.2.6 Additional improvements would also be delivered at the Kincardine Road / Grosvenor Street terminal junction to provide improved cycle connections to the existing cycle infrastructure on Grosvenor Street and the adjacent toucan crossing facilities at the junction of Grosvenor Street / Upper Brook Street. These improvements would include a new zebra crossing arrangement on Grosvenor Street and improvements to adjacent shared surface connections.

5.2.7 The core principles of the one-way arrangements for Kincardine Road have been discussed with MCC highway officers and the anticipated local traffic re-assignment effects associated with such one-way operation and closure of Inchley Road are set out in detail in section 6 to this TA report.

Amended Bus Stop Arrangements and Junction Layout Improvements to A34 Upper Brook Street

5.2.8 In addition to the Kincardine Road corridor enhancements, the Upper Brook Street regeneration proposals would also deliver highway improvements to the A34 Upper Brook Street corridor, including additional footway width and bus stop amendments and a revised A34 Upper Brook Street / Booth Street East traffic signal junction layout.

5.2.9 The proposed bus stop amendments involve the removal of the existing southbound bus lay-by to the front of PBSA buildings A1 & A2 and relocation of this bus stop immediately to the south to minimise conflict with the new pedestrian entrance to the PBSA buildings and to maximise separation from the Upper Brook Street Grosvenor Street signals (see **Figure TA16**). Removal of the bus lay-by would also provide increased pedestrian footway space in this area, close to the main entrance to the core PBSA buildings and address the issue of buses sometimes struggling to exit the bus lay-by during times of peak passing traffic demand.

5.2.10 The proposed improvements to the A34 Upper Brook Street / Booth Street East traffic signal junction reflect the need for both revised Upper Brook Street – Booth Street East arrangements following closure of Inchley Road (see section 6.2 to this report) and the requirement to improve pedestrian & cycle crossing opportunities at this location, given the scale of the regeneration scheme and proximity of this junction to the proposed new public square and associated pedestrian / cycle desire lines. The proposed junction improvements include for the following core elements (see **Figure TA17**).

- Closure and removal of the Inchley Road side road arm connection.

- A34 Upper Brook Street (N) approach to the junction increased from two approach lanes (ahead & left only) to three lanes (2 ahead lanes, 1 right turn lane), via the introduction of a short dedicated right turn flare lane to accommodate Upper Brook Street (N) to Booth Street East traffic. The length

of this flare lane has been sized to accommodate predicted right turn traffic demand and associated queue length, in order to avoid any potential for queuing in this lane to 'block back' and impact the free-flow of traffic in the adjacent southbound through lanes. The layout in **Figure TA17** assumes for a circa 100m length of right turn flare queueing length (i.e. suitable to accommodate a minimum of up to 16 light vehicles).

- A34 Upper Brook Street (S) approach reduced from three approach lanes to a two-lane approach, via the removal of the existing outer 'Ahead & Right' lane. The removal of this lane reflects the fact that under the Inchley Road closure scenario there would be no requirement for right turn movements from Upper Brook Street (S) to Inchley Road. This outer lane on Upper Brook Street (S) would effectively be removed via the northward extension of hatching from the existing pedestrian crossing island located to the north of the junction with Cottenham Street, which already restricts this part of the northbound carriageway of A34 Upper Brook Street to two lanes.

- New central pedestrian / cycle (Toucan) crossing point of Upper Brook Street and improvements of Booth Street East crossing points to Toucan standard.

- Increased size crossing island to Booth Street East and amendments to approach lanes to allow for double right turn exit arrangement (inside lane left / right run and outside lane right turn only).

5.2.11 The above changes would require the re-staging of the traffic signals in conjunction with the re-positioning of vehicle stop-lines and the pedestrian / cycle crossing facilities – to help reinforce approach lane discipline and to deliver the appropriate re-designation of carriageway space. It is proposed that as part of these amendments to the crossing islands, a new pedestrian crossing facility of A34 Upper Brook Street is provided, across the centre of the junction. This crossing would be suitable to accommodate both pedestrian and cycle movements and would effectively act as a replacement route for existing cycle movements between Booth Street East & Inchley Road. The development of this high standard crossing

facility would allow for the removal of the existing sub-standard pedestrian crossing facility to the Upper Brook Street (N) approach.

5.2.12 The above changes to the A34 Upper Brook Street / Booth Street East junction would not require any additional supporting changes to the layout of upstream or downstream junction nodes along the A34 Upper Brook Street corridor.

5.3 Car Parking & Cycle Parking

Car Parking

5.3.1 As noted, the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme is to be promoted as being essentially 'car free' development, with no general car parking to be provided on site. New accessible standard car parking is to be provided as part of the regeneration scheme, with 9 new mobility impaired person spaces to be provided across two dedicated accessible parking lay-bys to the site-side of Kincardine Road. In addition to the above, the Kincardine Road enhancements would also include for the retention of 24 public pay & display / residents parking bays on Kincardine Road (non-site side), with potentially 2 of these spaces designated for future use by car club vehicles if demand is established.

5.3.2 In support of the delivery of the Kincardine Road enhancements, the developer of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme has confirmed that they would be willing to work with the Council and key stakeholder representatives, to explore appropriate amendments to the Brunswick element of the Ardwick Controlled Parking Zone (CPZ). Any such amendments would seek to protect existing local resident parking opportunities and prevent any potential for 'overspill' parking associated with the day-to-day operation of the application scheme. All relevant administration & delivery costs related to any changes to the CPZ would be funded by the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme and secured via legal agreement.

Cycle Parking

5.3.3 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme has been designed to allow for good site accessibility to / from surrounding routes, with buildings providing an active frontage to both A34 Upper Brook Street and Kincardine Road where practical. The scheme also includes for new public realm running through the site, which alongside the closure of Inchley Road, would deliver excellent site permeability and enhance east – west pedestrian and cycle movements through the site, helping to link the Brunswick residential area to the Oxford Road corridor and University zones.

5.3.4 Cycle access to the site would be supported via a range of on-site cycle provision as summarised below:

PBSA Development

5.3.5 Secure cycle stores within the PBSA buildings for up to 275 cycles, representing a cycle parking supply of 1 secure cycle space per 4 student bedrooms. Provision would be located as follows:

- Building A1 & A2 Basement cycle store: 220 cycles
- Building A3 Ground Floor cycle store: 55 cycles

5.3.6 It is considered that such a level of cycle parking provision is appropriate to support PBSA development at Upper Brook Street, given the close proximity of the site to the core University of Manchester and Manchester Metropolitan University campus zones (within 500m of the site), with such journeys being typically related to pedestrian trips.

Life Sciences Employment

5.3.7 Cycle access to the site would be supported via the provision of secure cycle stores within each of the proposed Life Science buildings. It is proposed that secure

parking for 270 cycles is delivered across the Life Sciences site (not including additional external short stay cycle parking areas), as set out below, delivering an overall cycle parking supply of inn excess of 1 secure cycle space per 10 staff members, based on a potential maximum staffing level across the site of 2,600 staff – see section 7.3 to this report. In practice, however, given the influence of flexible working, shift working, illness and alternative staffing compositions in reducing this practical daily maximum staff number, it can be expected that the realistic day-to-day cycle parking to staff ratio would be much greater and in accordance with GMTS 2040 targets of 12% of future journeys to be undertaken by cycling.

- Building B1 cycle store: 110 cycles
- Building B2 cycle store: 90 cycles
- Building B3 cycle store: 70 cycles.

5.3.8 In addition to these dedicated parking stores, each of the Life Sciences employment buildings would also include for showering, changing and locker / drying areas to promote cycle use and allow staff to store cycle kit and clothing whilst at work.

Short Stay Visitor Cycle Parking

5.3.9 In addition to this secure long-stay formal cycling provision, it is proposed that short-stay visitor cycle parking (sheffield stands) would be located close to the main entrances of all of major buildings across the site, to allow for ad-hoc cycle trips to / from the development – typically a minimum of 5 stands (10 cycle spaces) close to each main building access point. Other ground floor ancillary development units within the site would also be required to include for secure staff cycle parking areas and short stay parking where appropriate.

MCC Bike Hire Scheme (Beryl Bikes)

5.3.10 It is anticipated that the Upper Brook Street site is likely to represent an attractive future location for the siting of at least one MCC (Beryl Bike) cycle hire hub / docking station. The site developer would encourage the delivery of such infrastructure at application site, which would encourage the potential for unplanned local cycle journeys to / from site, as part of the package of measures promoting sustainable travel options. It is anticipated that there would be a number of locations within the public realm areas across the site, where bike hubs / docking stations could be located. These would be explored with the bike hire operator as the development phases are delivered.

Car Club Parking Bays

5.3.11 As noted above it is anticipated that new dedicated car club parking opportunities in support of the regeneration scheme would be provided on Kincardine Road as part of the proposed corridor enhancements. It is considered that these car club bays could be useful for occasional one-off car trip requirements for residents of the PBSA buildings, as well as offering flexibility for ad-hoc employee / business use associated with the Life Sciences use. The location of the car club bays on Kincardine Road would also mean that they would be available for use by the local community of Brunswick & Ardwick, improving car club accessibility when compared to the current situation (nearest car club bay on Granby Row, circa 10-15 walk from the centre of the Brunswick estate). The developer of the Upper Brook Street scheme would look to support the delivery of these car club bays via financial contribution, including the initial promotion of the scheme to site users and the local community to encourage its success.

5.4 Large Vehicle & Van Servicing

5.4.1 The proposed core PBSA and Life Sciences employment land uses do not represent development that is traditionally expected to generate high volumes of large HGV servicing demand. Whilst both uses will require regular waste collection and the occasional delivery of materials and products to site, such demand would not typically represent more than a handful of vehicle movements per day.

5.4.2 It is also acknowledged that the PBSA element of the application scheme could also be expected to generate additional demand associated with van / motorcycle / cycle based resident services movements (deliveries of food and general parcels (Amazon / Evri, etc). Furthermore, there could also be expected to be additional predominantly van, or occasional HGV based servicing, associated with the ancillary ground floor commercial units, in particular to the food & drink / local convenience store elements. Total anticipated movements associated with this range of site servicing trips are considered further in section 7 to this report and by a parallel site management report related to the core PBSA land use and ancillary developments, as prepared by consultants Curtins (see **Appendix TA8**).

5.4.3 The proposed infrastructure proposed to accommodate predicted the regeneration site servicing demand is as follows (plans illustrating anticipated typical HGV access to / from these facilities are included as part of **Appendix TA7** to this report):

PBSA Buildings

5.4.4 The PBSA buildings are to be serviced by two lay-by loading facilities located to the site side of the Kincardine Road carriageway, viz:

- *3.0m by 22.5m service layby to northern section Kincardine Road close to PBSA buildings A1 & A2*. This lay-by has been sized to allow for accommodation of up to regular 3 transit van sized units and / or 2 larger delivery vehicles or circa 10m – 11m length.

- *3.5m by 25m service layby to Kincardine Road close to PBSA buildings A2 (also accommodating likely ancillary local convenience store unit).* This lay-by has been sized to allow for the accommodation of up to regular 3 transit van sized units and / or 2 larger delivery vehicles of circa 10m – 11m length.

5.4.5 Where practical, footway space to the rear of these lay-by features is to be provided at 2.5m to assist the transfer of larger goods or refuse containers. Both lay-bys are well located to allow ease of access to proposed building bin store areas. The PBSA schemes have also been designed to specifically include for bespoke parcel delivery / management areas that would allow for multiple parcel drop-offs by delivery firms, thereby minimising the number of times parcel couriers will need to visit the site, along with overall waiting times required by delivery contractors.

Life Sciences Buildings

5.4.6 The Life Sciences buildings are to be serviced by two private off-road servicing areas, viz:

- *Building B1:* to be served by a short internal access road and loading area access from Kincardine Road to the side of the building, between Building A3 and B1. Access to this loading area would be via a drive-in / reverse-out manoeuvre and has been designed for access by a large HGV / pantechnicon, large Refuse Collection Vehicle (RCV) or specialist liquid gas delivery vehicles. The requirement for reverse out manoeuvres would likely need for delivery management to be overseen by a banksman / site manager, in cases where deliveries are undertaken by a lone driver.

- *Buildings B2 & B3* to be served by an internal servicing area accessed from Kincardine Road. This servicing area has been designed to allow for entry / exit in forward gear by rigid HGV / pantechnicon, large Refuse Collection Vehicle (RCV) or specialist liquid gas delivery vehicles. The servicing area adjacent to building B3 allows for the storage / servicing for up two large vehicles.

5.4.7 It is anticipated that access to the Life Sciences servicing areas would be managed via a formal service vehicle booking system, with entry exit to servicing areas controlled by security bollard entry, to deter unauthorised vehicular use / access.

5.5 Site Management & Travel Planning

5.5.1 The implementation and management of day-to-day initiatives to promote / maximise the use of sustainable travel modes for journey to / from the site and to directly support the 'car free' principles of the development would be delivered by the operation of bespoke Travel Plan strategies for the core Upper Brook Street site elements. An Interim Travel Plan covering the operation of the PBSA units is included as **Appendix TA9** to this report**,** with an additional Framework Travel Plan, the key principles of which would be adopted by the main employment operators at the Life Sciences buildings, included as **Appendix TA10**.

5.5.2 The operation of the PBSA development is expected to require the implementation of a detailed management regime to provide efficient student move in / move out demand at the beginning and end of the academic year. The key principles associated with such resident traffic management arrangements are set out in section 3 to the Curtins PBSA Site Logistics Management Report included as **Appendix TA8** and include for:

- Use of the PBSA related loading zones to provide a managed booking system for resident access.
- Operation of this booking system over two weekends.
- Use of dedicated site marshals in combination with information campaign to ensure no unauthorised parking or loading / unloading activities and to protect local residents parking areas.

6.0 PREDICTED LOCAL TRAFFIC RE-ASSIGNMENT ASSOCIATED WITH THE CLOSURE OF INCHLEY ROAD AND EXTENDED ONE-WAY OPERATION OF KINCARDINE ROAD

6.1 Existing Role of Inchley Road within the Study Network

6.1.1 The evolution of the wider Upper Brook Street Masterplan identified that comprehensive redevelopment of the site was best facilitated by the closure of Inchley Road to through traffic between A34 Upper Brook Street and Kincardine Road. Such a closure would remove internal traffic conflicts within the site and deliver the opportunity for the creation of new high quality public square. Whilst Inchley Road is not a primary route utilised by a significant number of vehicles, the November 2022 surveys identified that two-way traffic on the link is at circa 360 - 400 vehicle movements per hour during peak hour periods - therefore its closure, alongside supporting future one-way operation of Kincardine Road could be expected to have some knock-on local network traffic operational effects.

6.1.2 Based on the analysis of existing traffic demand trends, it is considered that Inchley Road currently performs the following core local network functions:

- Directly facilitates right turn movements from Upper Brook Street (N) to Booth Street East, by allowing traffic to U-turn at the nearby Kincardine Road / Inchley Road mini roundabout junction. Such right turn movements are currently prohibited at the traffic signals, with the U-turn manoeuvre being the signed route for such A34 Upper Brook Street (N) - Booth Street East movements.

- Provides a local connection between A34 Upper Brook Street & Booth Street East and immediate parts of the adjacent New Brunswick residential area (i.e. traffic to / from Whitekirk Close and Hanworth Close);

- Offers the potential for a local ‘rat-run’ opportunity for traffic between Grosvenor Street (E) and Booth Street East (westbound) & A34 Upper Brook Street (southbound), thereby providing some level of relief to the Grosvenor

Street (E) approach to A34 Upper Brook Street / Grosvenor Street traffic signals and corresponding Upper Brook Street (N) approach to the Booth Street East signals.

6.2 Changes to Highway Infrastructure Required to Support the Closure of Inchley Road

6.2.1 The closure of Inchley Road to through traffic would require those vehicle movements currently utilising this route for the core trip purposes identified in section 4.1 above, to have to re-assign to an alternative route. For those local residential trips and 'rat run' movements, this re-assignment would likely be achieved by relatively simple local re-routing, primarily using the available alternative connections to A34 Upper Brook Street via Kincardine Road and Grosvenor Street (E) / Stockland Close. In the case of those traffic movements from A34 Upper Brook Street to Booth Street East (currently involving a U-turn at the Inchley Road / Kincardine Road mini-roundabout), however, alternative routing would not be possible under existing network arrangements, unless supported by direct changes to the A34 Upper Brook Street / Booth Street East junction to facilitate the right turn movement.

6.2.2 Illustrative details of the necessary junction amendment scheme required at the A34 Upper Brook Street / Booth Street East traffic to support the closure of Inchley Road and deliver replacement direct right turn opportunities for A34 Upper Brook Street (N) / Booth Street East traffic, is included as **Figure TA17** and discussed in detail in section 5.2 to this report. Key changes to the junction include:

- Closure and removal of the Inchley Road side road arm connection.
- New right turn flare lane from Upper Brook Street (N) to Booth Street East.
- Amendments to Upper Brook Street approach lane designations to both north and south of junction.

- Improved pedestrian and cycle crossing arrangements of Upper Brook Street.

- Amendments to Booth Street East approach to deliver wide island and re-marking of lanes to allow for double right turn exit.

6.2.3 In addition to the above changes at the A34 Upper Brook Street / Booth Steet East junction, the closure of Inchley Road to through traffic would also require local amendments to Kincardine Road, to remove the existing mini-roundabout junction with Inchley Road and the extension of one-way operation of Kincardine Road, between Whitekirk Close and Grosvenor Street (see also section 5.2 to this report and **Appendix TA7**), to deliver full one-way northbound controls between Brunswick Street & Grosvenor Street.

6.3 Predicted Local Traffic Re-Assignment Related to the Closure of Inchley Road & Extended One-Way Operation on Kincardine Road

6.3.1 The paragraphs below set out the extent of predicted local network re-assignment expected to take place (based on November 2022 traffic surveyed flow levels) as a result of the closure of Inchley Road to through traffic and the implementation of the supporting environmental improvements to Kincardine Road and junction layout changes at the A34 Upper Brook Street / Booth Street East traffic signals described above. These re-assignment changes have been assessed in terms of the three core trip purposes associated with traffic movements currently using Inchley Road and the residual effects including for one-way operation of Kincardine Road, as described below. This assessment methodology and the final calculated estimates have been discussed and agreed with officers of MCC Highways & TfGM as part of the pre-application consultation process, via the submission and review of Focus TP Highways Technical Report HTN01a.

A34 Upper Brook Street (N) – Booth Street East Traffic

- **Figure TA18** to this report identifies the level of traffic movements currently associated with the local signed U-turn movements via Inchley Road associated with A34 Upper Brook Street (N) – Booth Street East turning movements. Closure of Inchley Road would mean that in future these traffic movements would be

accommodated by a new right turn lane at the A34 Upper Brook Street / Booth Street East junction.

Local New Brunswick Residential Traffic:

- Traffic movements using Inchley Road associated with the residential side road routes of Hanworth Close and Whitekirk Close and the subsequent local re-assignment of this traffic is illustrated in **Figure TA19(a&b)** and **Figure TA20(a&b)** respectively. This re-assignment requires traffic to re-route via Kincardine Road (S), with related changes in connecting trip movements at the A34 Upper Brook Street corridor junctions with Booth Street East & Brunswick Street

Grosvenor Street (E) – A34 Upper Brook Street / Booth Street East Traffic 'Rat-Run' Traffic

- The re-assignment of existing local rat-run traffic between Grosvenor Street & Booth Street East / A34 Upper Brook Street (S) via Inchley Road is illustrated in **Figure TA21** to this report. This re-assignment involves traffic re-routeing from Kincardine Road (N) to the Grosvenor Street (E) approach to A34 Upper Brook Street and changes to turning movements at the A34 Upper Brook Street / Booth Street East junction (additional A34 Upper Brook Street (N) – Booth Street East movements).

Extended One-Way Operation on Kincardine Road between Whitekirk Close & Grosvenor Street

- The supporting conversion of Kincardine Road to one-way northbound operation would also result in a local re-assignment of existing traffic using Kincardine Road (southbound) to access the local New Brunswick estate roads of Hanworth Close & Whitekirk Close. In practice such traffic levels are very low (see **Figure TA22**) and so it is assumed that such movements would easily transfer to other connecting local estate roads such as Stockland Close / Mawson Road / Statham Road.

6.3.2 The combination of all of the above re-assignment effects over the study area highway network is illustrated in **Figure TA23** to this report.

6.3.3 The application of this predicted combined re-assignment (**Figure TA23**) to the observed 2022 November Baseline 'Do-Nothing' traffic levels (as per **Figure TA6**) allows for the calculation of November 2022 'With Inchley Road Closure' traffic volumes, which are presented as **Figure TA24** to this report. These 'With Closure' traffic volumes will be utilised as part of the calculation of 'Do-Something' future

traffic conditions, including for the full delivery of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme.

6.3.4 To provide a degree of context as to the practical local traffic changes associated with the above re-assignment, **Table TA6.1** to this report provides a comparison between 'Do-Nothing' and 'With Inchley Road Closure' flow estimates on key study area routes.

Table TA6.1: Comparison of Predicted 'Do-Nothing' & 'With Inchley Road Closure' Traffic Volumes on Key Network Study Links

	AM Pk Do-Noth	AM Pk With IR Closed	AM Peak Diff (%)	PM Pk Do-Noth	PM Pk With IR Closed	PM Peak Diff (%)
Grosvenor St W of Kincardine Rd	311	498	**60.1%**	447	688	**53.9%**
Grosvenor St E of Kincardine Rd	428	417	**-2.6%**	629	593	**-5.7%**
Kincardine Road S of Grosvenor St	187	81	**-56.7%**	220	95	**-56.8%**
Kincardine Road N of Whitekirk Cl	97	90	**-7.2%**	136	138	**1.5%**
A34 Upper Brook N of Booth St East	1576	1757	**11.5%**	1682	1911	**13.6%**
A34 Upper Brook S of Booth St East	2275	2322	**2.1%**	2472	2519	**1.9%**
Booth St East W of A34 Upper Brook	1131	1131	**0.0%**	1280	1280	**0.0%**
A34 Upper Brook N of Brunswick St	2277	2324	**2.1%**	2450	2497	**1.9%**
A34 Upper Brook S of Brunswick St	2286	2286	**0.0%**	2248	2248	**0.0%**
Brunswick St E of A34 Upper Brook	849	930	**9.5%**	808	923	**14.2%**

6.3.5 Review of this exercise demonstrates that the main change in local demand is the removal of 'rat-run' traffic on the northern section of Kincardine Road and its relocation to the eastern Grosvenor Street approach and the section of A34 Upper Brook Street between Grosvenor Street and Booth Street East. This is considered to represent an overall improvement, as it effectively represents the re-assignment

of more strategic traffic passing through the study area cordon, from local streets to designated distributor road corridors. In practice such re-assignment would result in a circa 11.5% - 13.6% increase in peak hour trip movements on A34 Upper Brook Street between Grosvenor Street & Booth Street East.

6.3.6 Some local increases in traffic are predicted on Brunswick Street, associated with the re-assignment of some local traffic to this route, rather than utilising existing connections via Inchley Road and connections to Kincardine Road. In practice, however, such changes in traffic on this route are relatively low, being less than 2 vehicles per minute (two-way) on this local distributor route corridor. Traffic impacts on other local route corridors within the study area are anticipated to be generally limited (below less than 5% change).

7.0 PREDICTED UPPER BROOK STREET APPLICATION SCHEME TRAFFIC GENERATION AND LOCAL TRIP ASSIGNMENT

7.1 Person Based Multi-Modal Trip Generation Approach

7.1.1 The Upper Brook Street scheme has been designed to operate as essentially 'car-free' development, with no general staff / visitor / resident car parking to be provided on site. The scheme would be supported by some new disabled / mobility impaired parking provision to ensure that the site is fully accessible to all, however, these spaces would be limited in number and their use restricted to authorised 'blue-badge' users. It is therefore anticipated that the vast majority of day-to-day users of the site would travel to / from the core scheme elements using sustainable travel modes (walk / cycle / public transport), reflecting the site's highly accessible location (GMAL rating of 8 – see **Figure TA11** to this report) and the immediate proximity of the proposed PBSA land use to the main University of Manchester and Manchester Metropolitan University campuses.

7.1.2 Notwithstanding the above, it is accepted that even taking account of the fundamental car-free principles of the scheme, there may still be some vehicle trip movements associated with the site - primarily taxi, delivery vehicle and general site servicing related trips, which would seek to directly access the site - but also reflecting that a number of site users may still choose to utilise the car when travelling, albeit that they would be directed / required to park at nearby available public car park sites within a reasonable walking catchment – see section 3.4 to this report.

7.1.3 To provide the most comprehensive illustration of the likely future travel characteristics of core site elements and to help identify the extent of anticipated car, cycle and pedestrian based trip demand, trip generation estimates for the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme have been calculated based on multi-modal trip data extracted from the TRICS trip generation database. TRICS is a nationally accepted database of historical trip demand data and contains observed traffic data for a variety of

development-type sites and, as such, can be considered to produce reliable base trip rate data. In the case of the Upper Brook Street scheme, estimates for the core land use elements of PBSA and Life Sciences employment have been calculated based on a 'person' based trip rate approach. This ensures an understanding of the maximum overall site trip demand levels (over key travel modes), based on full operation of the site.

7.1.4 Although Focus TP would typically not seek to use Gt London based sites as part of TRICS analysis for the assessment of sites located outside of the Gt London area, it is not possible to adopt such a filtering of sites in this case, as it would result in too few remaining reference sites within the database to generate meaningful trip rates. Ultimately, however, it is not considered that the inclusion of Gt London sites for the analysis of the Upper Brook Street proposals, would result in unrepresentative trip rate estimates, given, a) the car-free nature of the application site proposals, b) the excellent GMAL accessibility rating of the Upper Brook Street site; and, c) the proximity of the student development to main University campus destinations. These are positive accessibility characteristics common to the TRICS sites selected, regardless of geographical location, as part of the trip generation review.

7.1.5 The inclusion of sites with such key characteristics is considered to reflect TRICS good practice advice, which suggests that site selection should be undertaken on the basis of good matches to key site criteria such as accessibility factors and site characteristics, and should not be undertaken simply due to region.

7.1.6 The paragraphs below set out the site search principles adopted when carrying out the TRICS analysis and the reasons for the removal of any sites, where relevant. This information reflects trip generation data submitted and agreed with officers of MCC Highways & TfGM, as part of pre-application scoping discussions (Focus TP Report HTN03 – see **Appendix HTN1**).

7.2 PBSA Land Use Trip Generation

7.2.1 Trip rate estimates from TRICS for the PBSA element of the Upper Brook Street redevelopment have been based on multi-modal survey sites for the TRICS category "Residential/G – Student Accommodation', with the survey search criteria including for a) sites of between 100 – 1100 students, b) town centre or edge of town centre sites and, c) sites with excellent PTAL ratings (if available). The survey search period was also extended to cover all sites surveyed since 2010, to ensure a reasonable volume of available reference sites.

7.2.2 A number of sites were removed from final TRICS calculation exercise, for the following reasons:

- *KI-03-G-01:* Survey noted to have been undertaken post exam period and therefore potentially under-estimates student demand to / from the site.
- *KI-03-G-02:* Survey noted to have been undertaken post exam period and therefore potentially under-estimates student demand to / from the site.
- *HM-03-G-02:* Survey undertaken during Covid restrictions.
- *IS-03-G-01:* Insufficient multi-modal records to allow for production of trip rates.

7.2.3 The core TRICS output for the selected PBSA sites is included as **Appendix TA11** to this note, along with summary tables illustrating hourly weekday trip demand by key travel mode, across the available survey hours. This exercise identifies AM Peak (08:30-09:30), PM Peak (17:00-18:00) and core 12-hour (07:00-19:00) person trip rates set out in **Table TA7.1** below. *NB - AM peak (08:30-09:30) estimates have been calculated by averaging 08:00-09:00 and 09:00-10:00 trip rates*. These identified trip rates have been applied to the proposed PBSA development capacity at the Upper Brook Street site of 1100 students, in order to derive predicted AM & PM peak hour and core 12hr trip demand levels.

Table TA7.1: Calculated Average PBSA Multi-Modal Trip Rates from TRICS & Trip Demand for 1100 Students

AM Peak (08:30-09:30)

Time Period	Average Trip Rates (Per person)			Predicted Trip Demand (1100 students)		
	Arrive	Depart	Total	Arrive	Depart	Total
Total People	**0.014**	**0.098**	**0.111**	**15**	**107**	**122**
Pedestrians	0.005	0.054	0.058	5	59	64
Cyclists	0.001	0.001	0.001	1	1	1
Public Transport	0.007	0.043	0.049	7	47	54
Car	0.001	0.001	0.002	1	1	2
Taxi	0.000	0.000	0.000	0	0	0
Motorcycle	0.000	0.000	0.000	0	0	0
Other	0.001	0.001	0.002	1	1	2

PM Peak (17:00-18:00)

Time Period	Average Trip Rates (Per person)			Predicted Trip Demand (1100 students)		
	Arrive	Depart	Total	Arrive	Depart	Total
Total People	**0.108**	**0.063**	**0.171**	**119**	**69**	**188**
Pedestrians	0.066	0.041	0.107	73	45	118
Cyclists	0.001	0.001	0.002	1	1	2
Public Transport	0.039	0.018	0.057	43	20	63
Car	0.000	0.002	0.002	0	2	2
Taxi	0.001	0.001	0.002	1	1	2
Motorcycle	0.000	0.000	0.000	0	0	0
Other	0.001	0.000	0.001	1	0	1

Weekday 12-hour (07:00-19:00)

Time Period	Average Trip Rates (Per person)			Predicted Trip Demand (1100 students)		
	Arrive	Depart	Total	Arrive	Depart	Total
Total People	**0.708**	**0.803**	**1.511**	**779**	**883**	**1662**
Pedestrians	0.402	0.454	0.856	442	499	942
Cyclists	0.011	0.011	0.022	12	12	24
Public Transport	0.253	0.305	0.558	278	336	614
Car	0.008	0.011	0.019	9	12	21
Taxi	0.012	0.012	0.024	13	13	26
Motorcycle	0.002	0.002	0.004	2	2	4
Other	0.020	0.008	0.028	22	9	31

7.2.4 Review of the above results demonstrates that, as anticipated, vehicle related trip demand to / from the PBSA element of the Upper Brook Street site is predicted to

be generally very low - being of the order of circa 74 vehicle trips (in + out, including for LGV & OGV trips - see **Table TA7.2 below**) over the core weekday daytime 12-hour period and at negligible levels during AM & PM 'rush hour' peak times. Few private car trips are predicted associated with day-to-day use of the student residences (25 movements, in + out over the 12-hour weekday daytime period), with the majority of vehicle trips being either associated with taxi movements or light goods delivery vans.

Table TA7.2: Predicted PBSA Vehicle Trip Demand & Demand Accessing Site By Foot

	AM Peak			PM Peak			12-Hour (07:00-19:00)		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
Car & M-Cyc	1	1	2	0	2	2	11	14	25
Taxi	0	0	0	1	1	2	13	13	26
OGV	0	0	0	0	0	0	0	0	0
LGV	0	0	0	0	1	1	10	12	22
Total Vehs	**1**	**1**	**2**	**1**	**4**	**6**	**34**	**40**	**74**
By Foot	*12*	*106*	*118*	*116*	*65*	*180*	*721*	*835*	*1555*

7.2.5 Direct pedestrian access to the site (related to pedestrian and public transport trips from nearby stops / stations) is expected to be much more significant, being in excess of 1550 movements for the core weekday daytime 12hr-period and 120 – 180 movements per hour, during AM & PM peak hours, reflecting the short / close proximity nature of the majority of PBSA related journeys.

7.3 Life Sciences Employment Use Trip Generation

7.3.1 The TRICS database does not include for direct comparison Life Sciences based employment sites, with no TRICS category available for laboratory or research land use, which can be expected to make up a substantive proportion of the Life Sciences buildings floorspace. Notwithstanding this, however, Life Sciences based employment typically operates on a similar basis to 'office' style business hours and travel patterns (i.e. typically weekday daytime based and with generally low levels of HGV servicing / deliveries).

7.3.2 Trip rate estimates for the Life Sciences employment element of the Upper Brook Street site have therefore been derived from TRICS via reference to appropriate multi-modal survey sites (sites located in highly accessible areas & with limited or no on-site parking) for the TRICS category "Employment/A – Office'. In order to best replicate maximum site operation, trip demand estimates have again been based on 'person' based trip rates and applied to the predicted future total staffing levels anticipated at the Life Sciences buildings (calculated via reference to industry standard staff / GFA ratios for office / laboratory / ancillary floorspace). It is expected that the proposed life sciences buildings at the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site could be expected to support up to 2,600 jobs (including for staffing of ground floor areas).

7.3.3 The core TRICS multi-modal output for the selected office sites, is included as **Appendix TA12** to this note, along with summary tables illustrating half-hourly weekday trip demand by key mode, across the available survey hours. These trip rates have been applied to the anticipated Life Sciences maximum future staffing levels of 2,600 persons, to derive predicted peak hour and core 12hr trip demand levels (see **Table TA7.3** below). It should be noted that the TRICS data does not suggests that all of the 2600 site-based staff would be expected to be present on site at any one time, reflecting the effects of staff leave, staff illness, modern flexible working patterns and some degree of shift working / flexible hours.

7.3.4 As noted above, the sites chosen from TRICS are sites located in highly accessible town centre / city centre locations, with all but one of the sites having next to no available on-site car parking on site (i.e. operating as effectively 'car free' development). The selected TRICS site that does include for some on-site car parking, is an office site in central Manchester (St Peters Square), which includes a small basement car park of just 60 spaces in total. Given that this is a local site to the Upper Brook Street area and the relatively small level of on-site parking available when compared to available development space, it was considered reasonable to include this site within the TRICS analysis, as it ensures a robust estimate of potential car-based employment trip demand.

Table TA7.3: Calculated Average Life Science Multi-Modal Trip Rates from TRICS & Trip Demand for 2580 Staff Capacity

AM Peak (08:30-09:30)

Time Period	Average Trip Rates (Per person)			Predicted Trip Demand (1100 students)		
	Arrive	Depart	Total	Arrive	Depart	Total
Total People	**0.336**	**0.037**	**0.363**	**848**	**96**	**94**
Pedestrians	0.037	0.020	0.057	96	52	148
Cyclists	0.023	0.001	0.024	60	3	62
Public Transport	0.246	0.007	0.253	640	18	658
Car	0.011	0.006	0.017	29	16	44
Taxi	0.004	0.003	0.007	10	8	18
Motorcycle	0.001	0.000	0.001	3	0	3
Other	0.004	0.000	0.004	10	0	10

PM Peak (17:00-18:00)

Time Period	Average Trip Rates (Per person)			Predicted Trip Demand (1100 students)		
	Arrive	Depart	Total	Arrive	Depart	Total
Total People	**0.018**	**0.265**	**0.283**	**47**	**689**	**736**
Pedestrians	0.005	0.022	0.027	13	57	70
Cyclists	0.000	0.019	0.019	0	49	49
Public Transport	0.010	0.209	0.219	26	543	569
Car	0.000	0.008	0.008	0	21	21
Taxi	0.001	0.003	0.004	3	8	10
Motorcycle	0.000	0.002	0.002	0	5	5
Other	0.002	0.002	0.004	5	5	10

Weekday 12-hour (07:00-19:00)

Time Period	Average Trip Rates (Per person)			Predicted Trip Demand (1100 students)		
	Arrive	Depart	Total	Arrive	Depart	Total
Total People	**1.050**	**1.033**	**2.083**	**2730**	**2686**	**5416**
Pedestrians	0.312	0.311	0.623	811	809	1620
Cyclists	0.051	0.049	0.100	133	127	260
Public Transport	0.603	0.585	1.188	1568	1521	3089
Car	0.043	0.047	0.090	112	122	234
Taxi	0.012	0.014	0.026	31	36	68
Motorcycle	0.002	0.003	0.005	5	8	13
Other	0.027	0.024	0.051	70	62	133

7.3.5 Review of this calculated trip demand information again demonstrates a relatively low level of anticipated vehicle trip movements to / from the Upper Brook Street site – of the order of 340 vehicle trips (in + out), including for taxi, LGV and HGV

servicing, over the core 12-hour weekday daytime period 07:00-19:00 – see **Table TA7.4** below. Car & M-Cyc trip demand during AM and PM rush hour peak periods is predicted to be less than 1 vehicle movement per minute (47 trips during the AM peak and 26 trips during the PM peak).

Table TA7.4: Predicted Life Sciences Employment Vehicle Trip Demand & Demand Accessing Site By Foot

	AM Peak			PM Peak			12-Hour (07:00-19:00)		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
Car & M-Cyc	32	16	47	0	26	26	117	130	247
Taxi	10	8	18	3	8	10	31	36	67
OGV	3	0	3	0	0	0	3	0	3
LGV	0	0	0	0	0	0	16	13	29
Total Vehs	**44**	**23**	**68**	**3**	**34**	**36**	**166**	**179**	**346**
By Foot	*736*	*70*	*806*	*39*	*601*	*640*	*2379*	*2330*	*4709*

7.3.6 Direct pedestrian access to the site (combined pedestrian and public transport trips, which would involve a walk trip into the site) would be significant, being circa 4,709 movements across the core weekday daytime 12hr-period (07:00-19:00) and circa 800 movements per hour during the identified AM peak period. These results reflect the 'car-free' nature of the development and the predicted high level of trip demand using sustainable travel modes, that would result in the majority of staff and visitors directly arriving / departing the site on foot.

7.4 Other Ancillary Land Use Trip Generation

7.4.1 In addition to the core PBSA and Life Sciences land uses at the site, it can be expected that there would be some external travel demand associated with those ancillary commercial and community uses to be based in the flexible ground floor units to the main buildings. It is anticipated that the majority of the day-to-day travel demand associated with these uses would be generated either by the core on-site uses, reflecting the ancillary / complementary nature of these additional businesses / facilities, or from directly within the immediate surrounding community / catchment. On this basis general vehicle trip demand associated with the operation of this ancillary / complementary space is anticipated to be negligible.

7.4.2 Some limited vehicle trip demand can still be expected, however, associated with servicing or delivery trips to / from these uses, with the local convenience store use in particular expected to generate regular scheduled stock delivery trips. To ensure the most robust estimate of total Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site related traffic vehicle movements over the immediate local highway network, estimates of service vehicle traffic to these ancillary units have been incorporated into the highway network modelling.

7.4.3 Service vehicle volumes for the ancillary land uses have been based on the following assumptions:

- *Café / food & drink establishments* – via reference to the food & drink unit service vehicle estimates derived by Curtins in their PBSA site logistics management report.
- *Convenience store* - via reference to the food & drink unit service vehicle estimates derived by Curtins in their PBSA site logistics management report.
- *Medical Use / Pharmacy / Community Use* – application of a 1 HGV & 4 LGV arrivals / departures per day 'worst case' estimate, with none of these trips taking place during AM & PM peak hours (some person-based trip demand for staff at this facility already included within the Life Sciences person based trip analysis).

7.4.4 Predicted AM peak, PM peak & daily service vehicle trip demand derived from the above approach is set out in **Table TA7.5** to this approach. Review of this exercise suggests that, in practice, ancillary service vehicle trips, demand during peak hours is unlikely to be substantive.

7.4.5 To ensure a robust assessment of non vehicle related trip demand associated with these ancillary uses, and additional 40 external (i.e. from outside the side boundary) non-vehicle based (on-foot) arrivals & departures trips per hour has been included within the analysis to reflect potential combined non-car traffic volumes.

Table TA7.5: Predicted Ancillary Development Vehicle Trip Demand & Demand Accessing Site By Foot

PBSA Café Unit

	AM Peak			PM Peak			12-Hour (07:00-19:00)		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
OGV	0	0	0	0	0	0	1	1	1
LGV	0	0	0	0	0	0	1	1	1
Total Vehs	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**2**

PBSA Convenience Store

	AM Peak			PM Peak			12-Hour (07:00-19:00)		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
OGV	0	0	0	0	0	0	1	1	2
LGV	1	1	2	1	1	2	5	5	10
Total Vehs	**1**	**1**	**2**	**1**	**1**	**2**	**6**	**6**	**12**

Life Sciences Café Unit

	AM Peak			PM Peak			12-Hour (07:00-19:00)		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
OGV	0	0	0	0	0	0	1	1	1
LGV	0	0	0	0	0	0	1	1	1
Total Vehs	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**2**

Life Sciences Medical / Community Facility

	AM Peak			PM Peak			12-Hour (07:00-19:00)		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
OGV	0	0	0	0	0	0	1	1	1
LGV	0	0	0	0	0	0	4	4	4
Total Vehs	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**5**	**5**

Total Ancillary Development Traffic Demand

	AM Peak			PM Peak			12-Hour (07:00-19:00)		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
OGV	0	0	0	0	0	0	4	4	8
LGV	1	1	2	1	1	2	11	11	22
Total Vehs	**1**	**1**	**2**	**1**	**1**	**2**	**15**	**15**	**30**
By Foot	*40*	*40*	*80*	*40*	*40*	*80*	*480*	*480*	*960*

7.5 Total Combined Upper Brook Street Site Trip Generation

7.5.1 **Table TA7.6** below sets out the predicted combined Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme trip demand levels, including for the core PBSA & Life Sciences elements, plus the ancillary / complementary uses at the site. This has effectively been calculated by the summation of the trip estimates set out in Tables TA7.2, TA7.4 & TA7.5.

Table TA7.6: Predicted Combined Upper Brook Street Development Vehicle Trip Demand & Demand Accessing Site By Other Modes

	AM Peak			PM Peak			12-Hour (07:00-19:00)		
	Arr	Dep	Total	Arr	Dep	Total	Arr	Dep	Total
Car & M-Cyc	33	17	49	0	28	28	128	144	272
Taxi	10	8	18	4	9	12	44	49	93
OGV	3	0	3	0	0	0	7	4	11
LGV	1	1	2	1	2	3	37	36	73
Total Vehs	**47**	**26**	**72**	**5**	**39**	**43**	**216**	**233**	**449**
By Other Modes on Foot	*788*	*216*	*1004*	*195*	*706*	*900*	*3580*	*3645*	*7224*

7.5.2 Review of this exercise demonstrates that, overall the application scheme is only predicted to generate of the order of just 43 – 72 vehicles per hour during AM & PM peak rush hour periods and circa 450 trip movements during the core 12-hour peak period. Furthermore, only a small percentage of these trips would directly seek to access the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site itself, with the majority (car trips) being directed to surrounding existing car park sites (see section 7.7).

7.5.3 The majority of trips to / from the site would be undertaken by more sustainable modes of transport walk / cycle / public transport, but could be expected to arrive / depart the site on foot. The above analysis suggests that the proposals could be expected to generate of the order of 900 – 1000 trips by foot associated with these other modes of transport during peak demand periods, with a clear tidal demand pattern during these times (majority of trips being arrival movements during the AM peak and departures during the PM peak). It could be expected that these local

walk arrival / departures trips could be spread over a number of local walking routes, but with the key corridors being as follows:

- *Grosvenor Street West* - to Oxford Road bus corridor, Oxford Road Station and Manchester Metropolitan University campus.
- *Grosvenor Street East* – to Piccadilly rail and tram stops & Ardwick Green.
- *A34 Princess Street North* – to Manchester city centre, University of Manchester former UMIST campus and Piccadilly rail and tram stops.
- *Booth Street East* - to Oxford Road bus corridor and University of University main campus.
- *A34 Upper Brook Street South* – to University of University main campus and Manchester Royal Infirmary.
- *Via Kincardine Road & Gartside Gardens* - local community-based trips.

7.5.4 As noted above, walking trips via these corridor destinations are supported by good capacity pedestrian crossing points of key local road routes as part of local traffic signal-controlled junction layouts (see section 4.3). Even if one were to assume that one of these identified individual walking routes were to accommodate 40% of all Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site generated local foot trips ('other modes' + trips associated with car / motorcycle trips to local car parks), this would represent 375 – 420 (two-way) walking movements per hour. Based on the 80 second traffic signal staging operated on the A34 Upper Brook Street corridor (i.e. potential for circa 45 signal cycles per hour), this would represent an average crossing demand of circa 8-10 development related pedestrian movements per crossing stage, at key locations, during peak travel demand periods. It is considered that such demand could be satisfactorily accommodated by either existing crossing infrastructure or the proposed enhanced new crossing facilities to be delivered at the Upper Brook Street / Booth Street East junction and along the Kincardine Road corridor.

7.6 Comparison of Predicted Development Trip Demand v Potential Traffic Levels Under Extant Car Sales Land Use

7.6.1 As noted in section 2.2 to this report, the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site has historically been utilised for intensive car sales land-use and there are no obstructions to the re-use of the site for such operations, should the current regeneration proposals not ultimately be taken forward. In order to be provide some context to the above application scheme trip estimates **Table TA7.7** provides a comparison of predicted re-generation vehicle trip levels to traffic estimates for future use of the site based on recommencement of the extant car sales land use.

Table TA7.7: Comparison of Proposed Mixed Use Re-development Traffic Demand to Extant Car Sales Use

Time Period	Future Mixed-Use v Extant Car Sales		
	Arrive	Depart	Total
AM Peak (8-9)	47 / 49 = -4	26 / 28 = -2	72 / 77 = -6
PM Peak (17-18)	5 / 18 = -13	39 / 46 = -7	43 / 64 = -21
12h hour (07-19)	216 / 386 = -170	233 / 382 = -149	449 / 769 = -320

(Mixed Use / Car Sales / Difference – Vehicles per hour)

7.6.2 Review of this exercise identifies that traffic demand associated with the operation of the application scheme could be expected to be lower than for use of the site under extant car sales land use. Indeed, future vehicle trip levels under the mixed-use scheme are predicted to only be of the order of circa 58% of the trip generating potential of the site under extant car sales use, when considered over the core 12-hour weekday day time period (07:00-19:00). Whilst AM & PM peak regeneration v extant land use traffic levels are more comparable, it is clear that the underlying 'net' traffic generation effects of the proposed regeneration scheme could be expected to be positive, when compared to re-use of the site under existing planning consents. This is a material planning consideration when considering the predicted detailed traffic operational implications of the application scheme, particularly given that the baseline 'Do-Nothing' traffic demand levels utilised in this assessment do not include for any 'existing' traffic demand at the site – a relatively recent situation, with the site having been used for commercial car sales operations until 2019.

7.7 Predicted Development Traffic Assignment

7.7.1 To ensure a robust assessment of Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) development traffic effects, it has been assumed that all predicted development related vehicle traffic demand is essentially 'new' to the study network, when compared to 'Do-Nothing' traffic conditions. In practice this could represent a slight over-estimate of network wide effects, as some future taxi and delivery vehicles serving the site may already be operating within the immediate core study area, undertaking other baseline trips.

7.7.2 The assignment of predicted Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site traffic has been undertaken via a cordon-based approach discussed and agreed with MCC Highways & TfGM, with development related vehicle movements predicted to enter / exit the wider study area cordon via the following main approach / exit routes:

Vehicle Arrivals
- Grosvenor Street (E)
- A34 Princess Street (N of Grosvenor Street)
- Booth Street East
- A34 Upper Brook Street (S of Brunswick Street)
- Brunswick Street (E) via Whitekirk Close

Vehicle Departures
- Grosvenor Street (W)
- A34 Princess Street (N of Grosvenor Street)
- Booth Street East
- A34 Upper Brook Street (S of Brunswick Street)
- Brunswick Street (E)

NB - As right turn movements from Brunswick Street into Kincardine Road are currently prohibited and the removal of this restriction could potentially encourage additional rat-run use of Kincardine Road for background Brunswick Street to city centre traffic movements, any development predicted as arriving at the site from Brunswick Street (E), has been modelled as using Whitekirk Close.

7.7.3 No development traffic to / from the application site has been assumes to have a trip origin / destination from within the immediate Brunswick Estate.

7.7.4 Trip assignment proportions to / from the external cordon entry / exit links have been calculated based on AM & PM peak approach / exit traffic levels recorded during the November 2022 surveys, but taking account of relevant local re-assignment requirements associated with the proposed future closure of Inchley Road / extended Kincardine Road one-way operation required to support the Upper Brook Street regeneration proposals. These proportions are summarised in **Table TA7.8** below:

Table TA7.8: Predicted Approach / Exit Route Proportions Used for the Assignment of Upper Brook Street Mixed-Use Development Traffic

	AM Peak			
	Car / Light Arrival	Car / Light Depart	HGV Arrival	HGV Depart
Grosvenor St (W)	13.6%	4.9%	12.7%	15.7%
A34 Princess St (N)	21.5%	32.3%	36.7%	20.5%
Booth Street East	13.4%	23.7%	12.7%	14.5%
A34 Upper Brook St (S)	42.3%	32.8%	3.8%	7.2%
Brunswick St (E)	9.3%	6.3%	34.2%	42.2%
	PM Peak			
	Car / Light Arrival	Car / Light Depart	HGV Arrival	HGV Depart
Grosvenor St (W)	18.2%	4.3%	10.0%	25.0%
A34 Princess St (N)	24.6%	26.8%	43.3%	7.1%
Booth Street East	19.7%	19.6%	10.0%	25.0%
A34 Upper Brook St (S)	30.7%	38.2%	6.7%	10.7%
Brunswick St (E)	6.9%	11.1%	30.0%	32.1%

7.7.5 The cordon entry / exit traffic has then assigned to relevant internal links within the study area to allow appropriate access to / from the core mixed-use site development elements at Kincardine Road (for taxi, LGV and HGV trips).

7.7.6 Private car trip movements (i.e. those trips associated with staff / visitors / residents that chose to drive to access the site and therefore would be required to park in locally available public car parking areas), have been assigned to the network on the basis of 50% of these car trips travelling to / from the Aquatics Car Park or University D car park (accessed off Booth Street East) and 50% to the Circle Square / Charles Street car parks, available via A34 Princess Street.

7.7.7 Car / Taxi & LGV development trips have been assigned on the basis of recorded car / light vehicle cordon proportions and HGV service vehicle trips on the basis of the recorded OGV cordon proportions.

7.7.8 **Appendix TA7** to this report illustrates the resultant AM & PM 'rush hour' mixed-use re-development related trip demand across the study area taking account of all of the above development related vehicle trip movements (presented for PBSA, Life Sciences & Ancillary development elements separately. The combined development vehicle trip assignment of all of these elements is included as **Figure TA25.**

7.7.9 Review of this exercise demonstrates that development related traffic is unlikely to generate significant levels of new traffic demand on Kincardine Road during peak hour periods and that maximum traffic demand on the A34 Upper Brook Street corridor is likely to be of the order of 21 – 22 vehicle trip movements on the section between Grosvenor Street and Booth Street East. Additional development related traffic on the section of Brunswick Street between A34 Upper Brook Street and Kincardine Road could be expected to be of the order of 8 – 12 vehicle trips per hour.

8.0 PREDICTED NETWORK OPERATION INCLUDING FOR THE DELIVERY OF THE UPPER BROOK STREET APPLICATION SCHEME

8.1 Calculation of 'With Development' Local Network Development Traffic Forecasts

8.1.1 This section of the TA sets out the results of local highway network testing for future local network conditions including for delivery of the Upper Brook Street regeneration scheme. Such 'With Development' traffic estimates include for the application of the following elements when compared to Baseline 'Do-Nothing' conditions:

- The local network re-assignment effects associated with the closure of Inchley Road / extension of one-way operation on Kincardine Road (**Figure TA23**), and,

- The addition of predicted total future development traffic levels (**Figure TA25**).

8.1.2 Discussions with officers of MCC Highways and TfGM identified that future operational testing including for development traffic effects should be undertaken based on a position of no future additional background traffic growth, in line with MCC objectives for controlling traffic growth within the regional centre. Indeed, the 'right mix' targets set out in the GMTS 2040 strategy, identify the objective to reduce overall vehicle trip to / from the regional centre. On this basis, the above predicted 'With Development' network demand changes have been applied to the Baseline 2022 Traffic Count data summarised in **Figure TA6**.

8.1.3 The resultant Future AM & PM peak 'With Development' traffic flow estimates used as the reference traffic flows for the network appraisal set out in the remainder of this chapter, are included as **Figure TA26** to this report.

8.2 Network Impact Assessment Approach

8.2.1 Network operational conditions and the anticipated development traffic impact associated with the delivery of the Upper Brook Street regeneration scheme have been considered by reference to the following matters:

- Comparison of 'Do-Nothing' and 'With-Development' network demand flows (link impact – percentage change); and,
- Detailed network capacity modelling using appropriate industry standard computer modelling software and agreed model parameters.

8.2.2 Details of each approach are set out below.

Link Impact Assessment (Percentage Change)

8.2.3 Traditionally, link flow assessment criteria have been based on those percentage impact thresholds identified in 1994 Institution of Highways and Transportation report 'Guidelines for Traffic Impact Assessment'. This document suggested that more detailed analysis of highway impact and / or capacity improvements was only likely to be required for situations when either:

- Traffic to / from the development exceeds 10% of existing two-way traffic on the adjoining highway; or,
- Where traffic to / from the development exceeds 5% of the existing two-way traffic flow on the adjoining highways at locations where traffic congestion exists within the assessment period or in other sensitive locations.

8.2.4 This position was reviewed and updated in March 2007 DfT document "Guidelines for Transport Assessment", subsequently withdrawn in 2014, which notes:

> ***"If the TA confirms that a development will have material impact on the highway network, the level of impact at all critical locations on the network should be established. A particular example of material impact would be a worsening of congestion. In congested areas, the percentage traffic impact that is considered significant or detrimental to the network***

may be relatively low (possibly below the average daily variation in flow), and should have been determined in discussions with the relevant highway authorities. For the avoidance of doubt, the 1994 guidance regarding the assessment thresholds of 10 per cent and 5 per cent levels of development traffic relative to background traffic is no longer deemed an acceptable mechanism, since it creates an incentive in favour of locating development where high levels of background traffic already exist."

8.2.5 Notwithstanding these observations, in the case of the immediate local highway network to the application site, it is considered that the traditional 5% & 10% thresholds still represents a reasonable 'contextual guide' as to the level / extent of proposed development traffic impact on immediate local routes. The use of these assessment thresholds should, of course, be viewed in the context of the predicted total development traffic levels – with section 7 to this report having identified that total (in + out) direct development traffic demand on any link is likely to be of the order of less than 1 additional vehicle movement every 2-3 minutes (21 - 22 vehicle trips), albeit that other local re-assignment effects due to road closure may result in additional changes to total traffic demand levels (see section 8.3 below).

Detailed Network Junction Capacity Modelling (using appropriate computer modelling software).

8.2.6 Network capacity assessment for key junctions across the study area has been undertaken using the following industry standard computer software programs:

- JUNCTIONS (PICADY / ARCADY module) (stand-alone give-way / roundabout junctions);
- LINSIG3 (traffic signal junctions).

8.2.7 This capacity modelling has been undertaken via reference to the pcu demand flows and based on the core junction models used in the appraisal of the current 'Do-Nothing' Baseline highway network testing (see section 3.3 to this note). The only deviation from this core approach is that capacity testing of the A34 Upper Brook Street / Booth Street East junction has been undertaken based on the

proposed revised junction arrangements illustrated in **Figure TA17** and described in section 5.2. This revised junction modelling also includes for necessary amendments to the existing traffic signal staging in order to incorporate the junction changes. To provide a full understanding of potential future changes in junction operation, the results of the 'With-Development' modelling have been directly compared to the results of the 'Do-Nothing' scenarios.

8.3 Predicted Changes in Study Link Traffic Flows (Link Flow Assessment) 'Do-Nothing' v 'With Development'

8.3.1 **Table TA8.1** to this report provides a comparison of predicted AM & PM peak traffic flows at a range of locations across the study area between 'Do-Nothing' and 'With Development' scenarios.

Table TA8.1: Comparison of Predicted 'Do-Nothing' & 'With Development' Traffic Volumes on Key Network Study Links

	AM Pk Do-Noth	AM Pk With Dev	AM Peak Diff (%)	PM Pk Do-Noth	PM Pk With-Dev	PM Peak Diff (%)
Grosvenor St W of Kincardine Rd	311	514 (203)	**65.1%**	447	700 (253)	**56.6%**
Grosvenor St E of Kincardine Rd	428	424 (-4)	**-1.0%**	629	594 (-35)	**-5.6%**
Kincardine Road S of Grosvenor St	187	90 (-97)	**-51.9%**	220	106 (-114)	**-51.8%**
Kincardine Road N of Whitekirk Cl	97	104 (7)	**7.2%**	136	143 (7)	**5.1%**
A34 Upper Brook N of Booth St East	1576	1793 (217)	**13.8%**	1682	1935 (253)	**15.0%**
A34 Upper Brook S of Booth St East	2275	2356 (81)	**3.6%**	2472	2541 (69)	**2.8%**
Booth St East W of A34 Upper Brook	1131	1160 (29)	**2.6%**	1280	1297 (17)	**1.3%**
A34 Upper Brook N of Brunswick St	2277	2358 (81)	**3.6%**	2450	2519 (69)	**2.8%**
A34 Upper Brook S of Brunswick St	2286	2314 (28)	**1.2%**	2248	2264 (16)	**0.7%**
Brunswick St E of A34 Upper Brook	849	948 (99)	**11.6%**	808	932 (124)	**15.3%**

Total Vehicles (Development Related Traffic Movements)

8.3.2 Review of the results of this exercise demonstrates that predicted key changes in network traffic demand associated with the delivery of the Upper Brook Street regeneration scheme:

- New development related traffic volumes on local links are predicted to be low. In practice, any substantive changes in traffic flow on individual links are related to the re-assignment effects associated with the proposed road closure / extended one-way operation.
- Reduction in traffic on the northern section of Kincardine Road, primarily as a result of the removal of rat-run traffic on this link through the closure of Inchley Road.
- Increases on the immediate section of Grosvenor Street west of Kincardine Road and A34 Upper Brook Street between Grosvenor Street and Booth Street East – primarily as result of the re-assignment of rat-run traffic to these designated distributor road corridors. Maximum increases on the key section of A34 Upper Brook Street can be expected to be of the order of 13.8% - 15.0% of 'Do-Nothing' traffic levels.
- Increases elsewhere on the A34 Upper Brook Street corridor, when compared to 'Do-Nothing' traffic levels can be expected to be well below 5% threshold levels.
- Impact on the section of Brunswick Street between Upper Brook Stret and Kincardine Road is predicted to be of circa of 11.5% - 15.5%, when compared to Baseline 'Do-Nothing' traffic levels. Again this is primarily as a result of re-assignment effects following the closure of Inchley Road, but does also reflect that this route would also act as the main southern approach for vehicles seeking to directly access the application site.

8.3.3 It should be noted that the above 'With Development' comparison exercise, represents a 'worst case' review of development related network percentage change, as it has been carried out against a Baseline 'Do-Nothing' exercise of no extant trip demand associated with the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site. Whilst this methodology directly reflects predicted change when compared to Baseline traffic

conditions observed during the November 2022 traffic surveys, as noted in section 7.6 to this report, it does not reflect the principle of the positive 'net traffic impact' case of replacing a higher extant trip generating use on the site (car sales) with the current proposed 'car-free' mixed use regeneration proposals.

8.4 Results of Baseline + Application Scheme 'With Development' Junction Capacity Modelling

8.4.1 The paragraphs below summarise the results of junction capacity analysis for the core study area junctions under predicted 'With Development' conditions. it should be noted that, in the case of the A34 Upper Brook Street traffic signal junctions, analysis has been undertaken assuming for LINSIG optimisation of individual junction nodes, albeit with the constraint of retaining the existing 80 second signal cycle time. It is considered that optimisation of these junction nodes is appropriate, given the significant changes to junctions and local traffic conditions proposed.

8.4.2 Review of the results of this junction testing (full model output included in **Appendix TA14**, plus reference summary tables), demonstrates the following:

A34 Upper Brook Street Traffic Signal Junctions

- *A34 Upper Brook Street / Grosvenor Street:* The junction is predicted to continue to operate with a level of spare operational capacity under 'Do-Something' peak period conditions. Indeed, optimisation of the traffic signal staging is predicted to deliver material improvements, compared to the Baseline 'Do-Nothing' model results. The 'With Development' modelling indicates AM Peak junction PRC of 42.6% (total delay of 12.24 pcuHr) and PM peak junction PRC of 19.0% (total delay 15.45 pcuHr). Predicted mean / max queuing on Grosvenor Street (East) could be expected to be of the order of 6pcus in the AM peak and 9 pcus in the PM peak.

- *A34 Upper Brook Street / Booth Street East:* The amended junction design including for the closure of Inchley Road and introduction of separate traffic signal stages to support a) right turn movements from A34 Upper Brook Street (N) to Booth Street East; and b) 'all-red' pedestrian / cycle crossing of Upper Brook Street; is predicted to operate at close to capacity for 'Do-Something' traffic re-assignment scenarios. (NB – Assumed that the 'all-red' phase would be called every signal cycle). The 'Do-Something' LINSIG modelling suggests a

junction PRC of -4.1% in the AM peak (total junction delay of 41.55 pcuHr) and -1.9% in the PM peak (total junction delay of 38.27 pcuHr). Maximum queuing on the new right turn lane for A34 Upper Brook Steet (S) is predicted to be circa 10 vehicles, less than the proposed storage capacity for this flare lane (16 vehicles). This represents broadly similar operation when compared to the current four arm junction arrangements (including for continued access to Inchley Road), albeit with some additional overall delay during the AM peak. Ultimately such traffic performance needs to be balanced against the major walk / cycle access improvements delivered by the new layout.

- *Upper Brook Street / Brunswick Street:* The current junction layout is predicted to operate at or close to practical capacity under 'Do-Something' PM peak demand conditions, including for the closure of Inchley Road and local traffic re-assignment. Junction PRC in the AM peak (including for optimisation of signal settings) is actually predicted to improve to 9.6% (total junction delay of 23.84 pcuHr), but PM peak performance would reduce to junction PRC of -7.4% (total junction pcuHr 24.82). Main PM peak issues are noted to relate to a 96.7% degree of saturation for the A34 (S) approach lane including for the right turn flare. Whilst this lane does not show unacceptable queuing and, in practice, some additional flow balancing between this lane and the inside (straight-on lane) would result in improved performance, some congestion is predicted associated with the right turn movement, which at present is based on turning in gaps or the inter-green at the end of the stage.

Kincardine Road Junctions

- Both local side road junction connections to Kincardine Road (serving Hanworth Close and Whitekirk Close) are predicted to continue to operate with significant spare capacity under 2022 'Do-Something' traffic conditions, including for the closure of Inchley Road and supporting northbound one-way operation of Kincardine Road.

8.4.3 To assist the review of future network performance under 'With Development' conditions, **Appendix TA14** to this TA, provides a direct comparison of key junction operational metrics (Junction PRC and Junction Delay) for junctions on the A34 Upper Brook Street corridor under 'Do-Nothing' Baseline and 'With Development' operational conditions. This analysis includes for the effects of the optimisation of the individual signal junction nodes as part of the 'With Development' analysis.

8.4.4 Review of this comparison exercise identifies the following:

- *A34 Upper Brook Street / Grosvenor Street:* Even including for 'Do-Something' changes in local traffic demand conditions, the junction has the potential to operate with spare capacity when optimised for best performance.

- *A34 Upper Brook Street / Booth Street East:* The amended junction design and optimisation could be expected to generate broadly similar junction performance under 'With Development' conditions, when compared to current 'Do-Nothing' operation, when considered in terms of junction PRC. Overall used delay is expected to increase, but it must be recognised that this is based on the assumption that the proposed new 'all-red' pedestrian / cycle stage is called every signal cycle. Furthermore, the 'With Development' assessment does not include for any future reductions in overall traffic levels in line with GMTS 2040 targets.

- *A34 Upper Brook Street / Brunswick Street:* The local traffic re-assignment associated with closure of Inchley Road and delivery of the proposed site regeneration, could be expected to result in some worsening of performance during the PM peak period, associated with the right turn from A34(S) to Brunswick Street. Notwithstanding this, queueing on this link is still predicted to remain within available lane space.

8.4.5 It is noted that the above core analysis of the A34 Upper Brook Street traffic signals is based on the modelling of the junctions on the basis of a fixed 80 second cycle time at each location, reflecting the existing fixed 80 second cycle time operation that is currently employed at junctions on this part of the corridor. It is considered that there may be the potential for additional operational efficiencies to be delivered at these junctions, however, through further investigation into changes in signal timings / junction layout. By way of example, Focus TP have undertaken preliminary investigation into the effects of the following additional changes:

- Increase traffic signal cycle time to 90 seconds at all three junctions and individually optimise signal stage times for each junction.

- Introduce an additional 'indicative green arrow' traffic signal stage for the A34 (S) to Brunswick Street turning movement at the A34 Upper Brook Street / Brunswick St junction.

8.4.6 A summary of the results of 'With Development' LINSIG model runs at the A3 Upper Brook Street junctions including for the additional amendments identified above is included as **Appendix TA15**. Review of the results of this exercise demonstrates the potential for improved performance at all locations, including all individual junction approach arms at under 90% degree of saturation and positive junction

PRC values. Material improvements in approach degree of saturation are potentially possible at the A34 Upper Brook Street / Brunswick Street junction, including for the additional IGA stage. The application would therefore be willing to work with MCC / TfGM to explore whether the delivery of such additional local junction changes in support of the development proposals would be of merit.

8.5 Analysis Summary

8.5.1 Based on the above detailed network testing, it is considered that, if supported by an appropriate junction improvement works, there is no evidence to suggest that the delivery of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme would result in severe / unacceptable future network operating conditions over the local study area.

9.0 NETWORK SENSITIVITY TESTING: CUMULATIVE DEVELOPMENT TRAFFIC EFFECTS INCLUDING ADDITIONAL DEVELOPMENT ON ADJACENT SITE

9.1 Principles of Adjacent Mixed Use Development Proposals

9.1.1 Proposals for additional major mixed-use PBSA / Sci-Tech employment development are being progressed by developers McLaren / Kadans on land immediately to the south of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site, on plots fronting Kincardine Road and A34 Upper Brook Street. This emerging development, (henceforth to be referred to as "Upper Brook Street Masterplan – McLaren / Kadans"), is also to be delivered as an essentially 'car-free' regeneration project, in line with the core principles of the Oxford Road Corridor SRF and effectively represents the southern element of the wider Upper Brook Street Masterplan area (Phase 1).

9.1.2 A planning application for PBSA / Sci-Tech development at the Upper Brook Street Masterplan – McLaren / Kadans site is understood to be submitted imminently, with discussions with the developer of the scheme, identifying that the proposals are expected to include for the following core elements:

- 737 bed student resident building;
- 15,376sqm of Sci-Tech employment space;
- Ancillary ground floor food / drink space;
- Ancillary flexible community space.

9.1.3 The submitted Upper Brook Street Masterplan – McLaren / Kadans scheme also identifies opportunities for the delivery of improved public realm / public open space and the potential for enhanced crossing facilities to A34 Upper Brook Street (improvement of existing Toucan crossing arrangements).

9.1.4 In line with the car-free principles of the scheme, the Upper Brook Street Masterplan – McLaren / Kadans proposals do not include for any general car-parking across the site, but would be supported by 7 new accessible parking bays to the

site's Kincardine Road frontage and additional servicing & drop-off / pick-up areas, along with a dedicated servicing area to the side of the proposed Sci-Tech building, served from Cottenham Street. Whilst the adjacent Upper Brook Street Masterplan – McLaren / Kadans development is an independent scheme from the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) regeneration proposals, it forms part of the wider Upper Brook Street Masterplan and therefore dialogue has taken place between the respective development partners, to ensure a package of integrated highways and access arrangements on Kincardine Road that can be delivered both independently and as parallel schemes.

9.1.5 As planning applications for both Upper Brook Street Masterplan developments are to be effectively considered by MCC in parallel, the Council have requested that a review of combined / cumulative highways operational effects is carried out as a sensitivity test to the core Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) related submissions. Such work will allow for an understanding of the ability of the local highway network to accommodate the traffic and transport requirements of both schemes and is set out below.

9.2 Predicted Adjacent Mixed Use Scheme Traffic Demand & Assignment

9.2.1 The detailed highways and transport case for the development of the adjacent Upper Brook Street Masterplan – McLaren / Kadans mixed use proposals has been considered in a separate TA document prepared by consultants Civic Engineers. This report provides information on predicted two-way car trip and non-car trip demand levels anticipated to generated by the Upper Brook Street Masterplan – McLaren / Kadans site, as summarised below:

AM Peak Period
- Cars (Off Site) 40
- Taxi (To Site) 3
- LGV (To Site) 6
- HGV (To Site) 2

PM Peak Period
- Cars (Off Site) 41
- Taxi (To Site) 3
- LGV (To Site) 0
- HGV (To Site) 0

12 hour (07:00-19:00)
- Cars (Off Site) 388
- Taxi (To Site) 46
- LGV (To Site) 92
- HGV (To Site) 4

9.2.2 In order to provide a consistent network assessment approach and to reflect that any cumulative impact assessment would need to be based on the assumption of delivery of the Inchley Road closure and extended Kincardine Road one-way system that underpins the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme, the predicted Upper Brook Street Masterplan – McLaren / Kadans traffic has been assigned to the local highway network on the same cordon-based approach as set out in section 7 to this TA - with non site-based car traffic being assigned to local off-site multi-storey car park facilities. Some minor adjustments in local traffic routing has been included to reflect the site servicing arrangements for the Upper Brook Street Masterplan – McLaren / Kadans site, which involve main service access to the Sci-Tech building via Cottenham Street. This assignment process is summarised in **Appendix TA16** to this report, with predicted Upper Brook Street Masterplan – McLaren / Kadans network traffic over the study area network, set out in **Figure TA27** to this report.

9.3 Sensitivity Test 'With Cumulative Development' Local Network Forecasts

9.3.1 It should be noted that parts of the Upper Brook Street Masterplan – McLaren / Kadans scheme are currently being utilised for informal pay & display parking, with regular car & light vehicle movements taking place to / from the site across the day, including AM & PM peak rush hour periods. These existing movements were recorded as part of the November 2022 Baseline traffic surveys and therefore are inherent within the recorded 'Do-Nothing' network flows. **Figure TA28** to this report, provides an indication as to the extent of such observed Baseline pay &

display related traffic and the anticipated local network assignment associated with these trips.

9.3.2 In order to provide a true understanding of the impacts of the future re-development of the Upper Brook Street Masterplan – McLaren / Kadans site, in combination with the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application scheme, the following adjustments have been made to the core 'With Development' traffic flows, in order to generate combined 'With Cumulative Development' forecasts:

- Removal of the observed informal pay & display traffic associated with the Upper Brook Street Masterplan – McLaren / Kadans site (Figure TA28);

- Addition of the predicted Upper Brook Street Masterplan – McLaren / Kadans re-development traffic estimates (Figure TA27).

9.3.3 The resultant 'With Cumulative Development' traffic estimates are presented in **Figure TA29** to this report.

9.3.4 To provide a level of context as to the extent of predicted local study area traffic changes associated with the delivery of the Upper Brook Street Masterplan – McLaren / Kadans scheme, **Table TA9.1** to this report below provides a comparison between the 'With Development' scenario traffic considered in section 8 of this report, and the calculated 'With Cumulative Development' traffic estimates.

Table TA9.1: Comparison of Predicted 'With Development' & 'With Cumulative Development' Traffic Volumes on Key Network Study Links

	AM Pk With Dev	AM Pk Cumul Dev	AM Peak Diff (%)	PM Pk With Dev	PM Pk Cumul Dev	PM Peak Diff (%)
Grosvenor St W of Kincardine Rd	514	496	**-3.4%**	700	671	**-4.2%**
Grosvenor St E of Kincardine Rd	424	416	**-1.8%**	594	597	**0.5%**
Kincardine Road S of Grosvenor St	90	80	**-11.1%**	106	74	**-30.2%**
Kincardine Road N of Whitekirk Cl	104	94	**-9.6%**	143	111	**-22.4%**
A34 Upper Brook N of Booth St East	1793	1787	**-0.4%**	1935	1919	**-0.8%**
A34 Upper Brook S of Booth St East	2356	2356	**0.0%**	2541	2532	**-0.4%**
Booth St East W of A34 Upper Brook	1160	1174	**1.2%**	1297	1283	**-1.1%**
A34 Upper Brook N of Brunswick St	2358	2358	**0.0%**	2519	2510	**-0.4%**
A34 Upper Brook S of Brunswick St	2314	2327	**0.5%**	2264	2274	**0.4%**
Brunswick St E of A34 Upper Brook	948	923	**-2.6%**	932	910	**-2.3%**

Total Vehicles

9.3.5 Review of this exercise demonstrates that the 'net' traffic effects of the addition of the Upper Brook Street Masterplan – McLaren / Kadans development, including for removal of the existing traffic associated with the baseline Pay & Display use of this site, is a reduction in traffic movements on many study area links, when compared to the 'With Development' scenario. In particular, 'With Cumulative Development' traffic estimates are generally lower on Grosvenor Street & Kincardine Road during predicted AM & PM peak hour periods. Some small increases are predicted on sections of the A34 Upper Brook Street corridor and Booth Street East (primarily associated with 'off-site' Upper Brook Street Masterplan – McLaren / Kadans related trips to / from local car parks), but in practice, these changes are generally low, being less than 2% of 'With Development' traffic volumes.

9.3.6 Notwithstanding the results of the above exercise, which suggests that the practical cumulative effects of the additional of changes in traffic associated with the Upper Brook Street Masterplan – McLaren / Kadans site are likely to be generally limited, Focus TP have carried out a full analysis of predicted network operation under such cumulative conditions. This assessment is set out in detail in the sections below.

9.4 Predicted Changes in Study Link Traffic Flows (Link Flow Assessment)

9.4.1 **Table TA9.2** to this report provides a comparison of AM & PM peak traffic flows between predicted 'Do-Nothing' and 'With Cumulative Development' scenarios. This exercise demonstrates that the predicted cumulative effects of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application scheme & the Upper Brook Street Masterplan – McLaren / Kadans scheme, including for associated closure of Inchley Road and extended one-way operation on Kincardine Road, are similar to those already considered in Section 8 to this report (i.e. under core 'With Development' conditions). This reflects that the main traffic effects of the Upper Brook Street Masterplan proposals relate to the local re-assignment of traffic associated with the closure of Inchley Road and not new traffic demand to / from the development sites, due to their essentially car-free nature.

9.4.2 As previously identified, the main effects of closure of Inchley Road and associated extension of one-way controls would be the re-routeing of rat-run traffic away from Kincardine Road and onto immediate sections of Grosvenor Street & A34 Upper Brook Street. In addition, there would be some traffic increases on the section of Brunswick Street between A34 Upper Brook Street and Kincardine Road, as a result of additional local Brunswick Estate traffic requiring to utilise this route, as access to Booth Street East via Inchley Road would not be available following redevelopment.

9.4.3 In general, under the 'With Cumulative Development' scenario the changes in traffic flow associated with local re-assignment can be expected to be slightly

reduced in intensity, due to the removal of the existing Pay & Display traffic demand, which is not off-set by the low levels of traffic demand anticipated with the replacement 'car-free' redevelopment proposals.

Table TA9.2: Comparison of Predicted 'Do-Nothing' & 'With Cumulative Development' Traffic Volumes on Key Network Study Links

	AM Pk Do-Noth	AM Pk Cumul Dev	AM Peak Diff (%)	PM Pk Do-Noth	PM Pk Cumul Dev	PM Peak Diff (%)
Grosvenor St W of Kincardine Rd	311	496	**59.5%**	447	671	**50.0%**
Grosvenor St E of Kincardine Rd	428	416	**-2.8%**	629	597	**-5.1%**
Kincardine Road S of Grosvenor St	187	80	**-57.2%**	220	74	**-66.4%**
Kincardine Road N of Whitekirk Cl	97	94	**-3.1%**	136	111	**-18.4%**
A34 Upper Brook N of Booth St East	1576	1787	**13.4%**	1682	1919	**14.1%**
A34 Upper Brook S of Booth St East	2275	2356	**3.6%**	2472	2532	**2.4%**
Booth St East W of A34 Upper Brook	1131	1174	**3.8%**	1280	1283	**0.2%**
A34 Upper Brook N of Brunswick St	2277	2358	**3.6%**	2450	2510	**2.5%**
A34 Upper Brook S of Brunswick St	2286	2327	**1.8%**	2248	2274	**1.2%**
Brunswick St E of A34 Upper Brook	849	923	**8.7%**	808	910	**12.7%**

9.5 Results of 'With Cumulative Development' Junction Capacity Modelling

9.5.1 The paragraphs below summarise the results of the junction capacity analysis for the core study area junctions under predicted 'With Cumulative Development' conditions. Review of the results of this junction testing (full model output included in **Appendix TA17**, plus reference summary tables), demonstrates the following (based on 80 second cycle time and junction optimisation):

A34 Upper Brook Street Traffic Signal Junctions

- *A34 Upper Brook Street / Grosvenor Street:* the junction is predicted to operate with a level of spare capacity during both AM & PM peak periods.

- *A34 Upper Brook Street / Booth Street East:* The amended junction design is predicted to demonstrate slightly worse performance under 'With Cumulative Development' than for 'With Development' demand. Junction PRC is predicted to be -6.6% in the AM peak (-4.1 for 'With Development') and -2.3% in the PM peak (-1.9% for 'With Development'). This would result in a marginal increase in queuing and delay. Again it should be noted that this is based on an assessment that assumes the calling of an all-red pedestrian stage every traffic signal cycle.

- *Upper Brook Street / Brunswick Street:* 'With Cumulative Development' conditions are predicted to be marginally improved when compared to 'With Development' operations. The junction is still predicted to be operating at close to practical capacity under PM peak demand.

Kincardine Road Junctions

- Both local side road junction connections to Kincardine Road (serving Hanworth Close and Whitekirk Close) are predicted to continue to show significant spare capacity including for 'With Cumulative Development' network operation.

9.5.2 Similar to the 'With Development' analysis, Focus TP have also run additional junction modelling for the A34 Upper Brook Street corridor including for changes in signal cycle time (increase to 90 seconds) and an additional IGA stage at A34 Upper Brook Street / Brunswick Street. Summary results for this additional preliminary testing are set out in **Appendix TA18**. Review of this exercise demonstrates that there is the potential for these amendments to allow all of the junctions to operate with further improved operation, with worst case operation under the 'With Cumulative Development' scenario related to a predicted junction PRC of -1.1% under AM peak conditions at the A34 Upper Brook Street / Booth Street East junction. All queuing at this junction under this scenario would lie within acceptable limits and is not predicted to result in blocking back events.

9.6 Analysis Summary

9.6.1 Based on the above review of issues, it is concluded that the cumulative traffic effects of the delivery of the full Upper Brook Street Masterplan regeneration (i.e. Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) + Upper Brook Street Masterplan – McLaren / Kadans) can be accommodated by the proposed package of local network improvements identified in this TA report.

10.0 CONSTRUCTION TRAFFIC MATTERS

10.1 Introduction & Key Construction Approach

10.1.1 Details of the proposed approach to be adopted for the delivery of the application scheme construction works are set out in the Construction Management Plan and Method Statement prepared by the applicant. This document sets out the overall method of delivery for construction works at the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site, including details of site logistics and the environmental management processes required to be implemented on site by the appointed Principal Contractor. The method statement notes that given the early (pre-planning consent) nature of the document and the range of factors that can be ultimately expected to influence the final delivery of scheme works, the exact approach to be implemented as part of the construction scheme can be expected to be subject to further development, including contributions from the final appointed Principal Contractor and via consultation with MCC, the wider project team and other key local stakeholders.

10.1.2 It is anticipated that, assuming granting of planning consent in late 2023, preliminary construction works (site clearance and demolition) could potentially commence on site during Q2 2024, with full delivery of all proposed elements of the project expected to require up to a 96 month programme - as calculated based on a typical 5.5 day working week (Mon – Fri, with Sat mornings as required).

10.1.3 It is envisaged that the development scheme would be delivered over three distinct consecutive construction phases, following initial site enabling works, viz (see also **Figure TA30** to this report):

- *Phase 1* – Units A1, A2 A3 & B1 and associated public open space and related highway works (delivering 1100 student bed spaces and an 11 storey life sciences building);
- *Phase 2* – Unit B2 & associated public realm (9 storey life sciences building);

- *Phase 3* – Unit B3 & associated public realm and completion of supporting highway works (7 storey life sciences building).

10.1.4 It is anticipated that the delivery of initial Phase 1 project would require a circa 36 month build programme, with Phases 2 & 3, 24 - 30 month programmes each. It is proposed that in order to deliver practical and efficient site logistics, the phases would effectively run consecutively, albeit that there could be some minor overlap between individual phase completion and preliminary site enabling tasks related to the next delivery phase.

10.1.5 It is proposed that normal site working hours (all construction work and ancillary operations, including deliveries and vehicle dispatch) would be restricted to the following core time periods for the duration of all the construction project phases:

- Monday – Fridays: 07:30 – 18:00
- Saturdays: 08:30 – 14:00
- Sundays & Bank Holidays: No planned works

10.1.6 The operation of plant / machinery / power tools and any other noisy operations would be limited to the above core hours, unless specifically agreed with MCC and stakeholders in exceptional circumstances.

10.1.7 It is anticipated that 'quiet works', such as office working or site administration / inspection tasks, could continue on site outside of these stated hours.

10.2 **Key Construction Enabling Works & Servicing Arrangements**

10.2.1 As noted above, it is proposed that the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme would be delivered over three distinct phases. Further details the site management & servicing strategy to be adopted to deliver each phase are set out in the paragraphs below.

Site Mobilisation & Hoarding

10.2.2 Construction of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site is to be based on a site access strategy of main site vehicle deliveries being undertaken via Kincardine Road. This reflects the restricted nature of the site, in terms of limited available active highway frontage for deliveries, given that the northern and western site boundaries are formed by the local distributor road routes of Grosvenor Street and A34 Upper Brook Street, which are likely to be unsuitable for long term lane closures. Some servicing of the site could possibly be carried out via Inchley Road during the delivery of Phase 1 works, but this would not be available for later stages.

10.2.3 Servicing via Kincardine Road would be delivered via footway and lane closures along the site side of the route, to form pit lanes and materials storage areas, along with the parallel conversion of the road to one-way access (northbound) and the closure of Inchley Road (to be closed and converted to a public square as part of supporting Phase 1 external works). This local road closure and one-way strategy effectively replicates the proposed permanent local traffic management strategy to be adopted to support the completed application scheme (see section 5 to this report) and the local traffic re-assignment implications of these changes are considered in detail in Section 6 to this report.

10.2.4 The following local highway works would be required to be implemented in advance of the commencement of the Phase 1 construction works (i.e post demolition and site clearance) , in order to deliver this site servicing strategy (see also **Figure TA31**):

- Closure of Inchley Road to through traffic and formal stopping-up of this route.

- Temporary Traffic Regulation Orders (TTRO) to allow for closure of site side footway and northbound lane to Kincardine Road to allow for formation of site logistics ‘pit lanes’ and site hoarding along Kincardine Road frontage. TTRO to also include for conversion of Kincardine Road to one-way northbound controls

and temporary closure of affected existing parking bays along this route. The extent of the required hoarding will vary across the phased lifetime of the construction project.

- Delivery of improvements to A34 Upper Brook Street / Booth Street East junction to support the closure of Inchley Road – i.e. delivery of new right turn lane for A34 Upper Brook Street to Booth Street East traffic and associated amendments to approach lanes to A34 Upper Brook Street ad Booth Street East. It is anticipated that these enabling works would deliver the majority of the proposed permanent improvements as set out in **Figure TA17** to this report, albeit that the final central pedestrian crossing of A34 Upper Brook Street would not be implemented until completion of Phase 1 and the opening of the public square. It is anticipated that the interim junction improvement layout would allow for construction delivery vehicle entry access to the Inchley Road site compound (gates set well back within the site to allow for off-carriageway storage – see **Figure TA31**) from A34 Upper Brook Street (N) and Booth Street East. No entry access to the Inchley Road construction compound access would be permitted from A34 Upper Brook Street (S) with delivery vehicles approaching from the south, required to access the site via Brunswick Street & Kincardine Road.

- Amendments to traffic islands and road markings at junction of Kincardine Road / Grosvenor Street to assist the swept path of large construction vehicle turning movements. Traffic light controls and locations of pedestrian crossings / stoplines would not be affected.

- Potential minor amendments to the traffic island and road markings at junction of Brunswick Street / Kincardine Road to assist the swept path of large construction vehicle turning movements and to avoid any potential conflicts with cycle users.

10.2.5 In addition to these general enabling works, delivery of the Phase 1 construction project would require the closure of the bus lay-by on A34 Upper Brook Street to

the immediate west of proposed buildings A1 & A2 and use of this area and associated frontage footway as an additional logistics pit lane. Delivery of this pit lane would effectively require the closure of site-side Upper Brook Street footway between Grosvenor Street and Inchley Road during Phase 1 (see section 10.6) This pit lane and footway closure would not be required for Phases 2 & 3 and the affected area would be subject to environmental improvements as part of the completion of the Phase 1 external works package.

10.2.6 **Figure TA31** to this report illustrates the principles of the proposed temporary construction access works and the anticipated site hoarding approach to be adopted (based on Phase 1 operations). This illustrates that Kincardine Road would be reduced to a minimum 3.5m - 4.0m one-way carriageway via the introduction of hoarding and temporary closure of parking bays. Site hoardings would also be extended to incorporate the site frontage footway to Grosvenor Street between Kincardine Road and A34 Upper Brook Street and on A34 Upper Brook Street between Grosvenor Street and Inchley Road. These footway closures would also require TTRO's.

10.2.7 Site pedestrian access security gates would be delivered at key locations across the site, connecting to important local walking routes linking towards key public transport corridor and surrounding main public car parks.

10.2.8 Advance planning and liaison on hoarding and construction vehicle movement would be negotiated with MCC highways in order to manage the constraints of the site and to best facilitate the construction of the project whilst being mindful of seeking minimal disruption to the local community and environment. The site boundary and hoarding strategy set out in the Preliminary Construction Management Plan has been developed to deliver full site enclosure and to reduce interface with the public on key elevations. Anticipated local highway network effects associated with the delivery of the local traffic management & hoarding strategy are set out in section 10.6 to this report.

10.2.9 As a result of the proposed site hoarding and local traffic management strategy, the access routes for construction delivery vehicles accessing the site under Phase 1 would be as follows:

- Approach via or Grosvenor Street or A34 Princess Street: via A34 Upper Brook Street (N) & Inchley Road entry;
- Approach via Booth Street East: via Inchley Road entry;
- Approach via A34 Upper Brook Street (S): via Brunswick Street & Kincardine Road.

Exit from the site would be via Kincardine Road – Grosvenor Street – A34 Upper Brook Street.

10.2.10 The Phase 2 & 3 access strategy, following delivery of Phase 1 and completion of public square works on Inchley Road would be as follows:

- Approach via or Grosvenor Street or A34 Princess Street: via A34 Upper Brook Street – Brunswick Street – Kincardine Road;
- Approach via Booth Street East: via A34 Upper Brook Street – Brunswick Street – Kincardine Road
- Approach via A34 Upper Brook Street (S): via Brunswick Street & Kincardine Road.

Exit from the site would be via Kincardine Road – Grosvenor Street – A34 Upper Brook Street.

10.2.11 All construction delivery vehicles arriving at the site would be pre-informed as to the access route options and the site vehicle management system and would be required to comply with these directives. It is anticipated that delivery vehicle access to the site would ultimately be managed by a formal book-in / book out system, with all delivery vehicles required to be registered and 'booked-in' before seeking to access the site. Vehicles would be allocated a timed slot to ensure that excess demand and local on-street queuing / vehicle lay-over does not take place.

A driver penalty / disciplinary system would be enforced to ensure that delivery vehicles are operated in accordance with the defined delivery procedures.

Site Demolition Phasing & Site Compound / Servicing Strategy

10.2.12 It is proposed that site demolition would be carried out on a phased basis, with some existing buildings being retained and utilised for site offices during initial phases.

10.2.13 **Figure TA32** indicates the indicative demolition phasing approach proposed, viz:

- Phase 1 – Demolition of all site buildings to north of Inchley Road and the existing car sales building to the immediate south east of Inchley Road. It is proposed that areas associated with Inchley Road and the southern building would be utilised as site compound areas for the storage of materials and equipment. The retained car sales building to the south east corner of the site (Phase 3 area) would be utilised as site offices.

- *Phase 2* – Demolition of former car sales building to the south-western corner of the site and implementation of stacked site cabins as replacement site offices.

- *Phase 3* – Removal of Phase 2 temporary site office cabins.

Phased Site Serving Strategy & Compounds

10.2.14 As noted above, construction site servicing would be achieved across the construction phases via a mixture of loading / unloading pit lanes and additional on-site storage compounds. The proposed servicing approach to be adopted is set out below:

- *Phase 1* - During Phase 1 pit lane loading areas would be sited at a number of locations along Kincardine Road and at the location of the proposed bus lay-by

closure to the A34 Upper Brook Street site frontage (to west of proposed buildings A1 & A2). In addition to these loading / unloading zones, it is also anticipated that, during the main Phase 1 build period (i.e. before conversion of this land to the public square during the external works stage towards the end of Phase 1), additional site materials storage could take place on the former alignment of Inchley Road and adjacent land to the south east. Vehicle access to this materials storage area could be delivered either by controlled gated access from A34 Upper Brook Street (left turn in and access from Booth Street East only) or via Kincardine Road.

The retained existing car-sales building to the southeastern corner of the wider site (land associated with Phase 3) would be utilised as site offices during Phase 1, with the existing car-parking area associated with this building to be available for use site office / management staff and visitors (area suitable for circa 30-40 managed car parking spaces, via 'double stacking').

- *Phase 2* - The additional site area created via by the demolition of the southeastern car sales building and the implementation of a stacked, more space efficient, construction office cabins layout in this area, would allow for material storage to take place to the immediate south of the Phase 2 construction area. Vehicle loading / unloading to support Phase 2 would take place using new pit lane arrangements on Kincardine Road located to the immediate frontage section of the Phase 2 & 3 sites. It is expected that site management staff parking would be reduced / potentially completed removed during Phase 2, with affected site management / office staff being required to park at surrounding off-site car parking locations, in line with the same practice required to be adopted by general construction operatives for the full duration of the construction project.

- *Phase 3* – In order to support the delivery of the Phase 3 works, the temporary stacked site office cabins would be removed from site and the construction office function relocated to the ground floor ancillary commercial space delivered as part of adjacent building B2 (Phase 2). Site servicing would be

undertaken via pit lane arrangements to the immediate Phase 3 frontage section of Kincardine Road and the former site management car park utilised as the site compound / materials store.

10.3 Anticipated Construction Staff Traffic Demand

10.3.1 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) project team has prepared estimates of anticipated staffing levels associated with the delivery of the three main construction phases. This exercise has been informed by project experience at other similar space constrained city centre construction schemes (Axis, Oxygen & Renaissance) and suggests that a total of circa 370 construction staff is likely to be required over the duration of Phase 1, 200 staff during Phase 2 and 275 staff during Phase 3.

10.3.2 In practice, however, it is unlikely that these identified full construction staff totals would be required to be present on site at any one time (particularly as each Phase of the building delivery programme would be staged (demolition, construction of building frame, building façade, building fit-out, external works) such that many tasks would not directly overlap. To provide an indication of anticipated maximum construction staff levels the applicant has suggested that at peak operating levels (during Phase 1), the site could be expected to be staffed by up to 250 construction operatives and circa 40 on-site management / office based staff.

10.3.3 **Appendix TA19** to this report provides an illustrative breakdown of anticipated construction staff traffic related movements associated during this identified the Phase 1 peak construction period. This exercise has been based on the following robust 'first principles' assumptions with respect to site operation, which reflects experience of the delivery of similar large commercial construction projects, viz:

- Typical core construction operative shift period of 07:30-16:00, but with some staff, particularly site management roles, present on site before and after

these general construction task periods - undertaking construction related administration / design / security duties.

- Only staff management / site office based staff and visitors able to park at the site compound, with general construction operatives required to either travel to / from the site by sustainable alternative non-car based travel modes or by parking at off-site public car parks and walking in to site.
- Construction operative staff car trip demand at 40.2% of staff (based on car demand levels recorded entering the Manchester City Centre cordon in 2019). In practice this is considered a robust level of potential car trip demand, based on the highly accessible nature of the Upper Brook Street site, but reflects that construction staff often travel in groups that are vehicle based. Robust staff vehicle occupancy level of 1.24 staff per vehicle (again based on 2019 cordon study data).
- Construction site management staff car trip demand at 80% of anticipated staff numbers and car occupancy of 1.
- Some additional ad-hoc management staff / visitor car movements throughout the core day-time period.

NB - No impact assessment has been carried out for weekend construction operations, as such days typically experience much lower levels of baseline traffic demand and no obvious peak demand periods at a level close to those maximums experienced during core weekday 'rush hour' peaks.

10.3.4 Review of the above exercise suggests that predicted weekday construction staff traffic demand levels during peak (Phase 1) staff demand periods could be expected to be of the order of 280 vehicle movements per day (in + out) and of a relatively low level during traditional AM & PM 'rush hour' periods – i.e. below 1 vehicle movement per minute at these times. Maximum morning construction related trip movements associated with the site would typically take place before 08:00 (77 vehicle movements in hour 07:00-08:00), with relatively few trip movements taking place during the critical 08:00-09:00 AM 'rush hour' period. Trip movements during the 17:00-18:00 'rush hour' PM peak period could be expected to be of the order of 45 vehicles per hour (in + out), with peak construction site related afternoon traffic volumes likely to take place during the afternoon period

16:00 - 17:00 (57 vehicle movements), with most construction operative shifts expected to be completed before 17:00.

10.4 Anticipated Construction HGV Demand

10.4.1 Based on the operational experience of delivering space constrained construction projects elsewhere within the city centre, the applicant has estimated the following typical maximum daily HGV (i.e. vehicles above 3.5t mgw) delivery traffic demand levels across the site construction period:

- Demolition & Excavation / Enabling Works (per phase): up to 20 tipper movements (i.e. 20 in / 20 out) per day.

- *Phase 1 Construction HGV Traffic*: up to 120 HGV movements (60 in / 60 out) per day.
- *Phase 2 Construction HGV Traffic*: up to 60 HGV movements per day (30 in / 30 out) per day.
- *Phase 3 Construction HGV Traffic*: up to 60 HGV movements per day (30 in / 30 out) per day.

10.4.2 Due to the restricted nature of the construction site, which will limit opportunities for practical loading / unloading and material storage space, it is anticipated that all construction HGV delivery movements to / from the site would be directly managed via a formal booking system. Implementation of such a booking system would support 'just in time' material supply at the site and allow for delivery HGV movements to be spread across the day in a controlled manner, avoiding unregulated 'surges' in demand and associated site and local road congestion. This delivery booking system represents a key site management approach, as due to the nature of Kincardine Road and the immediate surrounding local highway network, there are no immediate locations for delivery vehicles to lay-over or wait for access to the site.

10.4.3 **Appendix HTN19** to this report sets out the anticipated operational HGV demand to the Upper Brook Street site, based on maximum Phase 1 operation of up to 120 delivery HGV movements per day (60 in / 60 out). This exercise illustrates that maximum managed hourly HGV delivery demand is likely to be of the order of 5 - 8 HGV arrivals and 5 - 8 HGV departures per hour during core construction periods (07:00-15:00), with lower levels of HGV traffic at other times. These HGVs would travel to / from the site via a variety of routes.

10.5 Review of Construction Traffic Effects

10.5.1 Based on the above review of anticipated construction staff and HGV traffic levels, it is estimated that peak construction operation of the site (Phase 1) could generate the following combined traffic levels during key demand periods, viz:

- AM Construction Peak (07:00-08:00): Arr 82 (77 / 5), Dep 5 (0 / 5)
- AM Network Peak (08:00-09:00): Arr 44 (36 / 8), Dep 8 (0 / 8)

- PM Construction Peak (16:00-17:00): Arr 2 (0 / 2), Dep 59 (57 / 2)
- PM Network Peak (17:00-18:00): Arr 2 (0 / 2), Dep 46 (44 / 4)

- 24 Hour Traffic: Arr 200 (140 / 60), Dep 200 (140/60)

(Total vehicles / HGVs)

10.5.2 Review of this information suggests that construction related traffic demand during key network AM & PM 'rush hour' peak periods is likely to be similar, if not slightly lower, than the traffic levels predicted for day-to-day operation of the completed Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme (see section 8 to this report), albeit it is acknowledged that HGV delivery traffic levels during the construction period will be higher, viz:

AM Network Peak:

- Predicted Peak Construction Traffic: Arr 44 (36 / 8), Dep 8 (0 / 8)
- Predicted Day-to-Day Operational Traffic: Arr 44 (43 / 1), Dep 26 (25 / 1)

PM Network Peak:

- Predicted Peak Construction Traffic: Arr 2 (0 /2), Dep 46 (44 / 4)
- Predicted Day-to-Day Operational Traffic: Arr 5 (5 / 0), Dep 43 (43 / 0)

10.5.3 Based on the conclusions of the analysis of local network operational performance associated with similar development related traffic levels, as set out in section 9 to this report, it is considered that there is little evidence to expect that the predicted 'peak' construction related traffic volumes identified above, would give rise to severe detrimental network operational capacity effects.

10.5.4 Notwithstanding the above conclusion and in order to help understand likely local network route assignment of construction traffic, Focus TP have undertaken a detailed review of anticipated construction traffic routeing within the local study area and predicted changes in daily traffic levels during peak Phase 1 construction periods. This exercise has been carried out based on the following assumptions (see also **Appendix TA20**):

- Closure of Inchley Road to general traffic and operation of Kincardine Road as one-way northbound route.
- All site management traffic & visitor traffic to access the construction site parking area via Kincardine Road.
- All construction site operative traffic to utilise local car parks at Circle Square / Aquatics Centre / Charles Street and University. No construction operative vehicle access to the construction site.
- Construction HGV traffic to access site via Kincardine Road & Inchley Road as per the routing options set out in section 10.2 to this report.
- Staff and HGV traffic to approach the site on the basis of the same 'cordon' approach route proportions derived from existing observed light vehicle / HGV traffic trends (see section 7.7 to this report) and manual assignment of these trips to the network from these cordon origin / destination points.

10.5.5 Predicted future year 'with Peak Construction Traffic' flows are illustrated in **Figure TA33** to this report. These estimates also include for general background

local network traffic re-assignment effects related to the closure of Inchley Road and one-way operation on Kincardine Road (see section 6 to this report).

10.5.6 To provide an understanding of the combined construction traffic effects (i.e. both construction traffic + local re-assignment) during the construction period, these 'With Peak Construction' traffic estimates have been compared to Baseline 'Do-Nothing' traffic flows (i.e. assuming no changes to the highway network and no development on the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site (see also **Figure TA33)**). This comparison exercise is summarised in **Table TA10.1** below, for daily traffic volumes (total vehicles and HGVs):

Table TA10.1: Comparison of Baseline 'Do-Nothing' Traffic Volumes With Predicted 'With Peak Construction Traffic' on Key Network Study Links

	Total Vehicles			HGVs		
	24hr Do-Noth	24hr Peak Constrct	24hr Diff (%)	24hr Do-Noth	24hr Peak Constrct	24hr Diff (%)
Grosvenor St W of Kincardine Rd	3353	5268	**57.1%**	51	140	**176.7%**
Grosvenor St E of Kincardine Rd	4286	4166	**-2.8%**	62	67	**8.5%**
Kincardine Road S of Grosvenor St	1636	1102	**-32.6%**	25	73	**186.9%**
Kincardine Road N of Whitekirk Cl	1197	1253	**4.6%**	13	38	**199.5%**
A34 Upper Brook N of Booth St East	19847	21669	**9.2%**	437	517	**18.2%**
A34 Upper Brook S of Booth St East	26777	27642	**3.2%**	563	598	**6.2%**
Booth St East W of A34 Upper Brook	11602	11720	**1.0%**	199	216	**8.3%**
A34 Upper Brook N of Brunswick St	26509	27374	**3.3%**	563	598	**6.2%**
A34 Upper Brook S of Brunswick St	26216	26371	**0.6%**	533	581	**9.1%**
Brunswick St E of A34 Upper Brook	9367	10573	**12.9%**	175	215	**22.7%**

10.5.7 Review of the results of this comparison exercise demonstrate similar trends in changes in general traffic movements as already identified for the operation of the full completed development (see section 9 to this report). Total traffic volumes can be expected to reduce on Kincardine Road (as a result of the removal of background rat run traffic), with associated increases on Grosvenor Street to the west of Kincardine Road, the section of A34 Upper Brook Street between Grosvenor Street and Booth Street East and the section of Brunswick Street between A34 Upper Brook Street and Kincardine Road. Traffic increases on all links apart from the very short section of Grosvenor Street can be expected to be well below IEMA 'rule 1' thresholds for significant environmental effects.

10.5.8 **Table TA10.1** also illustrates predicted changes in daily HGV movements across the local highway network. This comparison exercise highlights very high percentage change increases on the Kincardine Road and Grosvenor Street (section west of Kincardine Road). The increases on Kincardine Road are not unexpected, given that this route would be required to act as the main delivery vehicle route serving the site during the construction phase, but also reflects that the route currently experiences a very low level of HGV flow (typically less than 30 vehicles per day). Peak construction traffic could be expected to result in a net increase of up to 20 additional HGV movements on the section of Kincardine Road south of Inchley Road and 48 HGVs on the northern section between Inchley Road and Grosvenor Street (reflecting the net increase following removal of existing rat-run HGV trips as part of the local re-assignment effects of the closure of Inchley Road). These additional construction related HGV movements would be spread relatively evenly across the core working day due to the proposed booking system to be implemented.

10.5.9 The predicted increases in HGV traffic movements on the short section of Grosvenor Street west of Kincardine Road relates to the need for all HGV exit traffic from the construction site to access this route corridor from Kincardine Road as part of local one-way traffic management arrangements.

10.5.10 In practice, whilst the predicted additional construction related HGV traffic on Kincardine Road and Grosvenor Street (W) would result in some traffic local environmental effects when compared to baseline conditions, it is not anticipated that these would be greater than minor adverse in impact significance. In practice these movements would take place at slow speed, reflecting the 20mph speed limit on this route, would not directly interact with pedestrians (reflecting closure of the site side footway and the availability of a segregated footway to the opposite side of the routes) and few existing residential properties directly front these routes. Most properties along Kincardine Road for example are set well back from the operational carriageway edge and typically represent rear or gabled end elevations - with rear elevations characterised by high close boarded fence boundary treatment. Closest properties to the carriageway edge on Kincardine Road relate to the student resident block adjacent to Haymans Walk.

10.5.11 There are no frontage properties / receptors to the key section of Grosvenor Street west of Kincardine Road.

10.5.12 Predicted HGV increases on other surrounding study area routes are predicted to be at levels below IEMA 'rule 1' thresholds. Maximum predicted HGV increase on these other routes is predicted to take place on the section of Brunswick Street between A34 Upper Brook Street and Kincardine Road (22.7% increase in background HGV movements). This high percentage change value must be viewed in the context that this percentage impact represents a predicted daily HGV increase of just 40 vehicles on this route, which currently already experiences background traffic levels of over 9,500 vehicle movements per day. Such HGV traffic increases would therefore represent less than a 0.5% increase in existing overall total traffic levels. It is therefore not anticipated that such relatively low levels of actual day-to-day construction HGV demand would give rise to greater than minor adverse traffic related environmental effects.

10.6 Other Construction Related Local Transport Network Impacts

10.6.1 It is acknowledged that the construction of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site would require a range of temporary network interventions that could be expected to give rise to additional effects on the local highway network, over and above those simply related to construction related vehicle movements and operational capacity. The paragraphs below set out these potential anticipated additional network effects and those measures proposed to manage these issues, where practical.

- *Closure of site side footpaths to Kincardine Road, Grosvenor Street & Upper Brook Street to facilitate site hoardings* – these footway closures would be required for almost the full duration of Phase 1 and would result in inconvenience and potential minor delays for users of these routes. Ultimately, alternative walking routes would remain available via the non-site side footways to all of these routes, thereby maintaining pedestrian access along these corridors. Suitable safe crossing provision to access the non-site side footway sections is available at key local traffic signal junctions to A34 Upper Brook Street and Grosvenor Street. Traffic levels will be reduced on Kincardine Road, helping to assist any necessary crossing movements on this route. The Phase 3 element would likely result in a section of additional footpath closure to A34 Upper Brook Steet at the site boundary - again alternative walking routes would be available to the non-site side of the route corridor, with local safe crossing points available at local junctions and retained pedestrian crossing facilities.

- *Implementation of one-way operation & construction site hoarding on Kincardine Road would result in temporary loss of southbound 'quiet road' cycle linkages* – southbound cycle linkages on Kincardine Road are unlikely to be practical during Phase 1 of the construction project, due to need for conversion of the route to one-way northbound operation and the introduction of more restricted carriageway width to deliver construction site pit lanes and

site safety hoarding. In practice it is anticipated that an alternative cycle route diversion, using other local parallel quite road routes within the Brunswick estate, would need to be identified and implemented through signage and supporting road markings. Following completion of Phase 1 and the delivery of the Phase 1 external works to the northern section of Kincardine Road, local diversion routes can be revisited and tailored to meet the requirements of the Phase 2 & 3 construction access strategy. This could include alternative routes utilising the completed section of Kincardine Road and connections through Gartside Gardens and / or potentially temporary contra-flow options on the southern section of Kincardine Road, should available highway carriageway space permit.

- *Temporary closure of bus lay-by to Upper Brook Street* – closure of the southbound bus lay-by on A34 Upper Brook Street to deliver a temporary construction site pit lane and safety hoardings during Phase 1 construction, would require passengers currently using this stop to need to utilise alternative bus stop options. The closest southbound bus stop from the lay-by proposed for temporary closure is located 240m (circa 3-4 additional minutes' walk) to the south on A34 Upper Brook Street, adjacent to the former chapel building (now student residence). This bus stop can be accessed by walking routes to the non-site side of A34 Upper Brook Street and accessed via retained crossing facilities at the A34 Upper Brook Street / Booth Street East junction.

- *Potential community severance issue associated with closure of Inchley Road* – Inchley Road is noted to be an important community walk and cycling route between the Brunswick estate and local destinations to the west, including the Oxford Road corridor, the Universities and Hulme. Indeed delivery of the final Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme proposes to specifically enhance such linkages through the delivery of improved walk / cycle infrastructure and enhanced connections via the new public squares. Closure of Inchley Road as part of the Phase 1 construction works could therefore result in a practical barrier to local / walking and cycling trips unless directly addressed. Whilst due to site

operational & safety reasons, it is not practical to provide a direct walking route through the Phase 1 construction area, it is proposed that a temporary replacement walking connection would be provided through the wider Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site between the Phase 2 and Phase 3 areas (see **Figure TA31**). This temporary walking route would maintain a direct local connection between Kincardine Road and A34 Upper Brook Street / Booth Street East and would link to existing retained crossing opportunities on A34 Upper Brook Street at the Booth Street East junction. The link would also provide access to the southbound bus stop on A34 Upper Brook Street adjacent to the former chapel building.

- *Potential transfer of dust and dirt to the local highway network* – Major demolition and construction projects have the potential to generate dust / dirt emissions, either related to vehicle transported products and materials, or related to the transfer of loose materials / mud from the construction site servicing areas via vehicle wheels / bodies to the highway, unless carefully managed. Such risks are well understood and there are a range of good practice mitigation measures that can be implemented to address such issues occurring, including wheel washing at site exit points, the operation of street cleansing vehicles covering the immediate site access roads & connecting adopted highway routes, and a struct vehicle cover / sheeting policy. Such industry standard measures would be employed as part of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) construction project in order to minimise any dust and dirt effects.

10.7 Construction Traffic Management Plan

10.7.1 It is important that any disturbance to neighbours and the local community should be minimised during the construction period where at all practical. To this end a detailed Construction Traffic Management Plan (CTMP) would need to be prepared to ensure that necessary best available techniques are adopted at all times. It is anticipated that the CTMP would form part of the wider Construction Management Plan process and would encompass matters such as:

- Agreed construction operating hours and vehicle delivery hours.
- Location of proposed pit lane access points, construction compounds and material lay-down areas.
- Any on-site construction vehicle parking and manoeuvring and relevant details as to how delivery vehicle approach to the site is to be managed to avoid any issues associate with vehicle lay-over or waiting nuisance issues on surrounding streets.
- Details of construction HGV delivery booking in / booking out procedures to ensure efficient site loading practice and to avoid on-site congestion or uncontrolled 'surges' in construction HGV demand.
- Staff parking arrangements (on-site where relevant & alternative formal off-site parking opportunities and related initiatives to deter overspill on-street parking onto surrounding residential estate roads) and details of supporting staff / operative travel management initiatives, including tailoring staff shifts to encourage staff travel outside of the traditional AM & PM 'rush hour' periods & Travel Plan measures to promote use of non-car modes.
- Off-site construction HGV routing and driver incentive / disciplinary procedures to ensure suitable HGV routing.
- Construction HGV haulage route signage strategy.
- Construction vehicle cleansing procedures and details of load sheeting / covered load policy.
- Management and procedures for access by abnormal loads (as relevant).
- Programmed duration and timing of short-term material import / export HGV campaigns such as concrete pours.
- Programmed temporary road closure / temporary traffic management works and details of supporting information campaigns as relevant.

10.7.2 As part of the delivery of the CTMP and the site construction strategy it would be necessary to identify final arrangements associated with local temporary road and footpath closures related to the delivery of site hoardings / safe working areas.

10.8 Cumulative Construction Traffic Related Effects

10.8.1 It is likely that elements of the construction of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site and the adjacent Upper Brook Street Masterplan – McLaren / Kadans development could take place concurrently, generating combined construction traffic effects over the immediate highway network. Ultimately the nature of any combined effects would likely fluctuate across the duration of the construction period, directly related to the delivery programming of each project and the construction tasks taking place on both sites at any one time.

10.8.2 Information available for the adjacent Upper Brook Street Masterplan – McLaren / Kadans scheme suggests that, if approved, construction works associated with that site could commence in early 2024 and extend over an approximate three year build period – with construction completion envisaged in December 2026. This delivery timetable would broadly coincide with the majority of the envisaged Phase 1 constriction works at the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site. On this basis, cumulative construction effects have been considered based on the potential for peak construction traffic demand to occur at both sites simultaneously, therefore ensuring for the most robust appraisal of local network effects.

10.8.3 Preliminary information for the Upper Brook Street Masterplan – McLaren / Kadans site suggests that the site would operate on a 5.5 day construction week, operating similar hour to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) – i.e. weekdays 07:30-18:00 and Saturdays 08:30–14:00. During peak demand periods the Upper Brook Street Masterplan – McLaren / Kadans site could be expected to generate up to 50 HGV arrival movements per day (25 per day outside of peak periods), with these HGV deliveries operated on a strict booking system, with all deliveries required to be booked in a minimum of 24hrs prior to the assigned delivery slot.

10.8.4 At the time of preparation of this report, only relatively limited staffing level information is available for the Upper Brook Street Masterplan – McLaren / Kadans project, however, given the nature of the proposals, (delivery of multi-storey PBSA and employment buildings), it is not unreasonable to expect that construction staffing levels could ultimately be similar to those predicted for delivery of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited), i.e. up to circa 250 staff based (management and operatives) based on site at peak times. These staff would be encouraged to utilise alternative travel modes to the private car when travelling to / from the site, reflecting the sites' accessible edge of city centre location, or if driving, would be encouraged to park in surrounding available forma public car parking facilities.

10.8.5 Review of the Upper Brook Street Masterplan – McLaren / Kadans preliminary CMP identifies that it is anticipated that HGV deliveries to / from the site would be managed via a primary east / west routing strategy through the site, as follows:

- *HGV entry* – via main access gate from Kincardine Road, with a central delivery route between the two main building plots.

- *HGV exit* – via a temporary new construction HGV access to A34 Upper Brook Street, with a secondary route potentially available to the east of the proposed Sci-Tech building, allowing access to Cottenham Street and connections to the A34 Upper Brook Street. It is anticipated that exiting traffic from the site would be restricted to a southbound only connection to the A34 corridor.

10.8.6 Some limited ad-hoc management staff / visitor light vehicle traffic could be expected to directly access the site, but given anticipated on-site space constraints, such traffic is likely to be of a strictly limited scale.

10.8.7 It is considered that the proposed Upper Brook Street Masterplan – McLaren / Kadans construction access arrangements would be capable of operating alongside the proposed closure of Inchley Road and extended one-way controls on Kincardine Road, proposed for implementation associated with the delivery of the Upper Brook

Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) Phase 1 works. Under such arrangements, Upper Brook Street Masterplan – McLaren / Kadans related HGV traffic would access the site via Kincardine Road and exit via the proposed temporary connections to the A34 Upper Brook Street.

10.8.8 In practice, given the similar nature of the Upper Brook Street Masterplan – McLaren / Kadans construction project, it is anticipated that the peak cumulative construction traffic impact of this scheme, operating in parallel to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) Phase 1, would lead to just under a doubling of construction related traffic over the wider study area, when compared to this estimates set out in section 10.3-10.5 to this report. In practice, the main surrounding distributor road corridors are considered capable of accommodating such additional temporary construction traffic levels, without significant detrimental effects, reflecting the higher standard nature of these routes and the fact that the majority of staff traffic movements could be expected to take place outside of key 'rush hour' network peak periods.

10.8.9 Notwithstanding this, substantive additional HGV related traffic could be expected to be experienced on the immediate local access road routes linking to the construction sites, i.e. on Kincardine Road (to Whitekirk Close) and Brunswick Street (between Kincardine Road & A34 Upper Brook Street). Given the nature of the proposed one-way arrangements that could be expected to be implemented to support the Phase 1 Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited), the Upper Brook Street Masterplan – McLaren / Kadans scheme could result in an additional 50 HGV trips per day on Kincardine Road (between Brunswick Street & Whitekirk Close) during peak demand periods and potentially between 50 – 75 additional HGV movements on Brunswick Street - when compared to the estimates set out in **Table TA10.5** to this report (i.e. for Phase 1 Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited traffic only). This would result in cumulative 'peak' construction traffic increases in HGV trip levels on these links of in excess of the 30% IEMA threshold, when compared to 'Do-Nothing' baseline traffic levels.

10.8.10 Ultimately both of these key local access road routes are physically capable of accommodating such large service vehicle movements and, as noted in section 10.6 above, the directly affected sections of each route corridor are characterised by relatively limited extents of direct frontage development. For example, the affected section of Brunswick Street only includes for 13 frontage facing residential properties (to the southern side of the route), with open servicing areas / commercial properties to the northern side of the route. Kincardine Road is generally characterised by rear or side elevations to residential properties, that are also set well back from the edge of carriageway, with the majority of properties including for high sided close boarded fences or wall boundaries.

10.8.11 Whilst the identified daily percentage HGV increases associated with cumulative construction effects would, at first review, appear to be substantive, it must be noted that these estimates represent combined 'peak' traffic effects that are unlikely to occur for any significant period time, if at all. In practice combined day-to-day construction HGV traffic levels could be expected to be lower than these worst case estimates. Furthermore, the predicted combined HGV traffic levels must be considered in the context of existing traffic demand levels on these routes. For example, Brunswick Street is already a busy local distributor road route, that experiences daily traffic flows of almost 9,500 vehicles per day. In practice day-to-day traffic increases associated with combined peak construction HGV movements are unlikely to represent an overall increase of more than 1% of total baseline traffic levels on this route and would be managed across the day via the proposed booking systems to avoid any 'surges' in demand. Overall baseline traffic flow levels on the primary affected section of Kincardine Road (south of Whitekirk Close) are generally low, with little potential for vehicle / vehicle conflicts and, due to the layout of the route, few locations of direct interaction between pedestrian and vehicle movements.

10.8.12 Based on the above review, it is ultimately concluded that cumulative construction traffic effects are likely to be limited to minor / moderate adverse temporary local network effects - with the potential for moderate effects only likely should 'peak' construction site traffic demand occur on both sites concurrently and without the

management of these peak events. In practice, it is anticipated that the delivery of the projects would require the principal contractors to both sites working in close liaison to minimise combined construction effects and to ensure that suitable access to each site is available at all times. Such liaison and combined vehicle management can be incorporated in the final CTMPs for both projects to ensure that cumulative construction effects can be limited to minor adverse impact levels.

11.0 SUMMARY AND CONCLUSIONS

11.1 This Transport Assessment (TA) report has been prepared by Focus Transport Planning (Focus TP) on behalf of Williams Motor Co (Holdings) and Alliance UBS Limited to consider highways and transport matters associated with a full planning application to deliver a mixed-use regeneration scheme, including Purpose Built Student Accommodation (PBSA) & Life Sciences based employment development, along with ancillary commercial & community uses and on-site landscaping and public open space. The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application scheme would deliver up to 1,100 student beds and 46,643sqm of life-sciences based employment space and is to be promoted as sustainable 'car-free' development in line with Manchester City Council (MCC) objectives for this part of the city.

11.2 The TA report has been prepared to apprise the Local Planning & Highway Authority (MCC) as to the design & nature of the proposed site access and servicing arrangements, the accessibility of the site by sustainable transport modes and the ability of the surrounding highway network to accommodate changes in local traffic routeing as a consequence of the delivery of key access strategy elements.

Site Location & Extant Site Use

11.3 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site is located to the south of Manchester City Centre, immediately to the south of the A57 (M) Mancunian Way and comprises an irregular shaped area of land, split into two main development parcels. The northern section of the site, primarily proposed for development for PBSA land use, is bounded by Grosvenor Street to the north and Inchley Road to the south, with Upper Brook Street and Kincardine Road forming the western and eastern boundaries respectively, and represents the site of a large former car dealership business (Williams Jaguar). The southern portion of the site is an L-shaped parcel of land which wraps around the former Unitarian Chapel (now utilised for student

accommodation) and is also characterised by two large former car showroom related buildings (Williams BMW) and associated external car parking areas.

11.4 The buildings associated with the former car sales use of the site are still in-situ and could be brought back into use, should re-development of the scheme not be taken forward. It is estimated that this 'fall-back' car sales use of the buildings could be expected to generate of the order of almost 80 two-way vehicle movements per hour during traditional AM & PM rush hour periods. Core 12-hour (07:00-19:00) weekday trip demand for re-use of the site is predicted to be just under 770 vehicle movements per day (386 in / 382 out).

Local Highway Network Conditions

11.5 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site land parcels lie adjacent to the following local road corridors:

- *A34 Upper Brook Street* – multi-lane distributor road, characterised by traffic intermediate signal junction connections and traffic signal-controlled pedestrian / cycle crossing points. The route acts as one of the key access routes to / from Manchester city centre serving southern suburbs.

- *Kincardine Road* – local single carriageway access road, providing frontage development access and local access road connections to the adjacent Brunswick estate. The route is generally lightly trafficked and is a singed local 'quiet street' cycle route. The northern section of the route does, however, experience some rat-run traffic between Grosvenor Street / Booth Street East, using the connecting route of Inchley Road.

- *Grosvenor Street* - a one-way (westbound) local distributor road connection, linking between the A6 London Road and A34 Upper Brook Street. The route is

of single carriageway one-way layout but includes for 1.2m advisory cycle lanes both in the westbound and eastbound (contra-flow) directions.

11.6 Prevailing local highway network operating conditions have been established by comprehensive traffic surveys carried out in November 2022. These surveys did not include for any trip movements to / from the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site, with the site vacant at the time of survey. Review of the collected traffic survey information identifies AM & PM peak 'rush hour' periods as being 08:15-09:15 and 16:45-17:45 respectively. Parallel queue surveys suggest local junctions on the A34 Upper Brook Street are currently operating with some level of spare capacity, with observed queuing and congestion levels relatively low for comparable intermediate junctions on other key distributor routes linking to Manchester city centre.

11.7 Baseline junction capacity modelling for such 'Do-Nothing' November 2022 conditions reinforces these site observations, suggesting:

- *Kincardine Road junctions* - currently operating with significant spare capacity.
- *A34 Upper Brook Street junctions* - busier, reflecting A34 Upper Brook Street's distributor road status, however, the modelling does not suggest significant existing capacity / congestion issues, reflective of surveyed conditions. Furthermore, the modelling suggests that improved operational performance could be experienced at these junctions via relatively minor changes in signal timings or the individual 'optimisation' of junction nodes.

11.8 This suggests that there is likely to be inherent flexibility within the immediate route corridor and surrounding streets to accommodate any local traffic re-assignments associated with road closures / extension of one-way controls.

11.9 A review of the operational safety of the immediate local highway network to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site has been carried out through a review of historical Personal Injury Accident (PIA) data obtained from the TfGM database for the most

recently available 5-year search period (1 November 2017 to 31 October 2022 inclusive). This demonstrates that no accident events have taken place over the full length of Kincardine Road during the survey period, including the terminal junctions with Brunswick Street and Grosvenor Street. This is likely to reflect the relative low intensity / low speed use of this route.

11.10 A number of accident events have been recorded along the study section of A34 Upper Brook Street. Review of these incidents notes that accidents mainly took place in 'clusters' associated with the three main traffic signal junctions with Grosvenor Street, Booth Street East / Inchley Road and Brunswick Street. There are no significant accident trends at these locations that that could be expected to be materially exacerbated by the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) proposals. Indeed, the application scheme includes for the introduction of local active travel measures along the A34 Upper Brook Street and Kincardine Road corridors that should enhance active travel accessibility and improve safety for these key users. The delivery of enhanced cycle measures on Kincardine Road and improved connections to other local cycle infrastructure and routes may also encourage cycle users away from the A34 Upper Brook Street corridor and therefore reduce the potential for pedal cycle related conflicts on this route.

Available Local Car Parking Opportunities

11.11 There are a number of opportunities for public car parking within the immediate vicinity of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site, ranging from a relatively limited number of on-street pay & display parking bays, to dedicated off-street multi-storey car park provision. Ultimately over 3,000 public pay & display multi-storey based car parking spaces are located within a 10-minute walk catchment from the Upper Brook Street site. All other local streets within an immediate catchment of the application site, including the A34 Upper Brook Street & Oxford Road corridors and those streets within the adjacent main University campuses, are subject to yellow line parking restrictions, making them effectively unavailable for parking.

Site Accessibility / Sustainable Transport

11.12 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site represents an entirely suitable location for mixed use student residential and Life Sciences based employment development, being located adjacent to established educational and residential zones, close to core active travel infrastructure and within a short walk of key high frequency public transport corridors and travel nodes. Furthermore the site is located within a practical walking distance of local shops & services and would provide additional on-site ancillary facilities to reduce the need to travel to access key 'every-day' facilities.

11.13 Such locational characteristics, along with the core 'car-free' development strategy underpinning the regeneration proposals, would deliver the potential for both student residents, and staff based at employment units at the site, to utilise sustainable transport for a range of regular journeys, therefore meeting the core planning sustainability objectives of promoting opportunities for the use of alternative travel modes to the private car and managing the overall traffic impact associated with new development.

Development Principles

11.14 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme represents the comprehensive re-generation of the site to deliver mixed-use development, primarily comprising of Purpose Built Student Accommodation (1100 resident beds), Life Sciences based employment floorspace (46,643sqm GIA) and other ancillary retail, commercial and community uses, along with on-site landscaping and public open space. The scheme would be delivered across six buildings of varying heights, located to the west of Kincardine Road and extending to Grosvenor Street. To reflect key sustainable development principles and to respond to the priorities for the area identified within the Oxford Road Corridor SRF, the development is to be promoted as being 'car-free', with no permanent general car parking to be provided on site, with on-site parking restricted for accessibility use only (9 spaces). Vehicle servicing would be delivered

by integrated loading bay areas to Kincardine Road (primarily serving the PBSA element of the scheme and ancillary uses within these buildings) and dedicated internal loading areas within the Life Sciences zone.

Supporting Highway Improvements

11.15 The application scheme is to be supported by a comprehensive package of highway and environmental improvements to those roads immediately surrounding the site. These improvements would include the following key elements:

- Closure of Inchley Road between Kincardine Road and Upper Brook Street to traffic and conversion to new public square including enhanced walk / cycle connections to Gartside Gardens.
- Amendments to Kincardine Road corridor to deliver enhanced pedestrian areas, improved parking and servicing arrangements, a segregated contra-flow cycle land and one-way northbound general traffic operation from Brunswick Street to Grosvenor Street.
- Removal of southbound bus layby on A34 Upper Brook Street at the PBSA site frontage and replacement with widened footway and revised bus stop layout.
- Junction improvement at the A34 Upper Brook Street / Booth Street East traffic signals to respond to the closure of Inchley Road and creation of a new public square - including improved pedestrian & cycle crossing arrangements and new right turn lane for southbound traffic on A34 Upper Brook Street to connect to Booth Street East.

11.16 The above highway works would be delivered in parallel to an integrated landscaping strategy delivering new street trees & areas of planting and providing direct linkages to the areas of public realm within the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site.

Supporting Management Measures

11.17 The implementation and management of day-to-day initiatives to promote / maximise the use of sustainable travel modes for journey to / from the site and to directly support the 'car free' principles of the development would be delivered by the operation of bespoke Travel Plan strategies for the core Upper Brook Street site elements. The operation of the PBSA development would also be supported by the implementation of a detailed management regime to provide efficient student move in / move out demand at the beginning and end of the academic year as necessary.

11.18 In addition to these key management measures the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) proposals would also be supported by the following initiatives:

- Integrated cycle parking within all buildings – including staff changing and locker areas at the Life Sciences facilities.
- Other short stay cycle parking located close to main building entry points for use by visitors to the scheme.
- Areas set aside for the delivery of GM Bee Network cycle hire docking stations.
- Support to the principle of the delivery of two car-club bays within the retained public parking along Kincardine Road.
- Financial support, as necessary, to the amendment of the surrounding controlled parking zone to avoid any potential for development overspill parking onto local residential estate roads.

Re-Assignment Effects of Inchley Road Closure & Extended Kincardine Road Operation

11.19 The evolution of the wide Upper Brook Street Masterplan identified that comprehensive redevelopment of the site was best facilitated by the closure of Inchley Road to through traffic between A34 Upper Brook Street and Kincardine Road. Such a closure would remove internal traffic conflicts within the site and

deliver the opportunity for the creation of new high quality public square. It is recognised, however, that Inchley Road currently delivers the following local highway network roles:

- Directly facilitates right turn movements from Upper Brook Street (N) to Booth Street East, by allowing traffic to U-turn at the nearby Kincardine Road / Inchley Road mini roundabout junction. Such right turn movements are currently prohibited at the traffic signals.

- Provides a local connection between A34 Upper Brook Street & Booth Street East and immediate parts of the adjacent New Brunswick residential area;

- Offers the potential for a local 'rat-run' opportunity for traffic between Grosvenor Street (E) and Booth Street East (westbound) & A34 Upper Brook Street (southbound), thereby providing some level of relief to the Grosvenor Street (E) approach to A34 Upper Brook Street / Grosvenor Street traffic signals.

11.20 The closure of Inchley Road to through traffic would require those vehicle movements currently utilising the route to have to re-assign to an alternative. For those local residential trips and 'rat run' movements, this re-assignment would likely be achieved by relatively simple local re-routing, primarily using the available alternative connections to A34 Upper Brook Street. In the case of those traffic movements from A34 Upper Brook Street to Booth Street East, alternative routing would not be possible under existing network arrangements, unless supported by direct changes to the A34 Upper Brook Street / Booth Street East, viz:

- Closure and removal of the Inchley Road side road arm connection.

- New right turn flare lane from Upper Brook Street (N) to Booth Street East.

- Amendments to Upper Brook Street approach lane designations to both north and south of junction.

- Improved pedestrian and cycle crossing arrangements of Upper Brook Street.

- Amendments to Booth Street East approach to deliver wide island and re-marking of lanes to allow for double right turn exit.

11.21 In addition to the above changes at the A34 Upper Brook Street / Booth Steet East junction, the closure of Inchley Road to through traffic would also require local amendments to Kincardine Road, to remove the existing mini-roundabout junction with Inchley Road and extension of one-way operation of Kincardine Road, between Whitekirk Close and Grosvenor Street to deliver full one-way northbound controls.

11.22 Detailed local network modelling has been carried out to understand the predicted effects of these local changes to the road network. This work identified the following:

- The main change in local demand conditions would be the removal of 'rat-run' traffic on the northern section of Kincardine Road and its relocation to the eastern Grosvenor Street approach and the section of A34 Upper Brook Street between Grosvenor Street and Booth Street East. In practice such re-assignment would result in a circa 11.5% - 13.6% increase in peak hour trip movements on A34 Upper Brook Street between Grosvenor Street & Inchley Road and a halving of traffic on the northern section of Kincardine Road.

- Some local increases in traffic are predicted on Brunswick Street, associated with the re-assignment of local traffic to this route, away from existing connections via Inchley Road and connections to Kincardine Road. In practice, however, such changes in traffic on this route are relatively low, being less than 2 vehicles per minute (two-way) on this local distributor route corridor.

- Traffic impacts on other local route corridors within the study area are anticipated to be generally limited (below less than 5% change).

Predicted Development Travel Demand

11.23 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme has been designed to operate as essentially 'car-free' development, with no general staff / visitor / resident car parking to be provided on site. It is therefore anticipated that the vast majority of day-to-day users of the site would travel to / from the core scheme elements using sustainable travel modes (walk / cycle / public transport), reflecting the site's highly accessible location. Notwithstanding this, it is accepted that even taking account of the fundamental car-free principles of the scheme, there may still be some vehicle trip movements associated with the site - primarily taxi, delivery vehicle and general site servicing related trips, which would seek to directly access the site - but also reflecting that a proportion of site users may still choose to utilise the car when travelling, albeit that they would be directed / required to park at nearby available public car park sites within a reasonable walking catchment.

11.24 Trip generation estimates for the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme have been calculated based on multi-modal person-based trip data, in order to ensure an understanding of maximum overall site trip demand levels over key travel modes. Trip rate estimates have been prepared for the core development elements for the site and identify the following key findings:

- *PBSA Development:* vehicle related trip demand to / from the PBSA element of the Upper Brook Street site is predicted to be generally very low - being of the order of circa 74 vehicle trips (in + out, including for LGV & OGV trips), over the core weekday daytime 12-hour period and at negligible levels during AM & PM 'rush hour' peak times. Few private car trips are predicted associated with day-to-day use of the student residences (25 movements, in + out over the 12-hour weekday daytime period), with the majority of vehicle trips being either

associated with taxi movements or light goods delivery vans. Direct pedestrian access to the site (related to pedestrian and public transport trips from nearby stops / stations) is expected to be much more significant, being in excess of 1550 movements for the core weekday daytime 12hr-period and 120 – 180 movements per hour, during AM & PM peak hours, reflecting the short / close proximity nature of the majority of PBSA related journeys.

- *Life Sciences Employment:* a relatively low level of anticipated vehicle trip movements to / from the Upper Brook Street site – of the order of 340 vehicle trips (in + out), including for taxi, LGV and HGV servicing, over the core 12-hour weekday daytime period 07:00-19:00. Car & M-Cyc trip demand during AM and PM rush hour peak periods is predicted to be less than 1 vehicle movement per minute (47 trips during the AM peak and 26 trips during the PM peak). Direct pedestrian access to the site (combined pedestrian and public transport trips, which involve a walk trip into the site) would be significant, being circa 4,709 movements across the core weekday daytime 12hr-period (07:00-19:00) and circa 800 movements per hour during the identified AM peak period.

- *Ancillary Development Elements:* whilst it can be anticipated that there would be some external travel demand associated with those ancillary commercial and community uses to be based in the flexible ground floor units to the main scheme buildings, it is anticipated that the majority of the day-to-day travel demand associated with these uses would be generated either by the core on-site uses, reflecting the ancillary / complementary nature of these additional businesses / facilities, or from directly within the immediate surrounding community / catchment. On this basis, general vehicle trip demand associated with the operation of this ancillary / complementary space is anticipated to be negligible, being mainly related to delivery and servicing trips, which are unlikely to be more than a handful of movements per day.

11.25 Overall, the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme is only predicted to generate a combined vehicle trip demand of circa 43 - 72 vehicle trips per hour, during AM & PM peak rush hour periods and

circa 450 vehicle movements for the core 12hr weekday day time period. Furthermore, only a relatively small percentage of these trips would seek to directly access the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site itself, with the majority, (car trips) being directed to surrounding existing public car park facilities.

11.26 The majority of trips to / from the site would be undertaken by more sustainable walk / cycle / public transport modes, but could be expected to arrive / depart the site on foot. The above analysis suggests that the proposals could be expected to generate of the order of 900 – 1000 trips by foot associated with these other modes of transport during peak demand periods, with a clear tidal demand pattern during these times (majority of trips being arrival movements during the AM peak and departures during the PM peak). It could be expected that these local walk trips could be spread over a number of local walking routes, the majority involving a requirement to utilise local traffic signal crossing points at junctions with the A34 Upper Brook Street.

11.27 Even if one were to assume that any of these individual walking routes were to accommodate 40% of all Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site generated local foot trips, including walking trips to / from nearby car parks for car & motorcycle users, this would represent 375 – 420 (two-way) walking movements per hour. Based on the 80 second traffic signal staging operated on the A34 Upper Brook Street corridor (i.e. potential for 45 signal cycles per hour), this would represent an average crossing demand of circa 8-10 development related pedestrian movements per crossing stage, at key locations during peak travel demand periods. It is considered that such demand could be satisfactorily accommodated by either existing crossing infrastructure or the proposed enhanced new crossing facilities to be delivered at the Upper Brook Street / Booth Street East junction and along the Kincardine Road corridor.

Net Changes in Site Based Vehicle Trip Demand

11.28 It must be recognised that the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site has historically been utilised for intensive car sales land-use and that there are no obstructions to the re-use of the site for such operations in future, should the current regeneration proposals not ultimately be taken forward. A comparison of the predicted trip demand associated with the proposed mixed-use regeneration scheme compared to anticipated re-use of the site under permitted car sales land use, identifies that traffic demand associated with the operation of the application scheme could be expected to be lower. Indeed, future vehicle trip levels under the proposed mixed-use scheme are predicted to only be of the order of circa 58% of the trip generating potential of the site under extant car sales use, when considered over the core 12-hour weekday day time period (07:00-19:00). Whilst AM & PM 'rush hour' peak regeneration v extant land use traffic levels are more comparable, it is clear that the underlying 'net' traffic generation effects of the proposed regeneration scheme could be expected to be positive, when compared to re-use of the site under existing planning consents.

11.29 This positive 'net' traffic generation case is a material planning consideration when considering the predicted detailed traffic operational implications of the application scheme, particularly given the baseline 'Do-Nothing' traffic demand levels utilised in this TA analysis do not include for any 'existing' traffic demand at the site – which is a relatively recent situation, with the site having been used for commercial car sales operations until 2019.

Development Related Vehicle Trip Assignment

11.30 To ensure a robust assessment of regeneration development traffic effects it has been assumed that all predicted development related vehicle traffic demand is essentially 'new' to the study network, when compared to 'Do-Nothing' traffic conditions. The assignment of predicted Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site traffic has been

undertaken via a cordon-based approach discussed and agreed with MCC Highways & TfGM and based on the results of the November 2022 traffic surveys, with development related vehicle movements predicted to enter / exit the wider study area cordon via an agreed set of main approach / exit routes. No development traffic to / from the application site has been assumed to have a trip origin / destination from within the immediate Brunswick Estate.

11.31 Trip assignment proportions to / from the external cordon entry / exit links have been calculated based on AM & PM peak approach / exit traffic levels recorded during the November 2022 surveys, but taking account of relevant local re-assignment requirements associated with the proposed future closure of Inchley Road / extended Kincardine Road one-way operation required to support the Upper Brook Street regeneration proposals. The cordon entry / exit traffic has then been assigned to relevant internal links within the study area to allow appropriate access to / from the core mixed-use site development elements at Kincardine Road (for taxi, LGV and HGV trips).

11.32 This assignment exercise demonstrates that predicted AM & PM peak hour related development related traffic is unlikely to generate significant levels of new traffic demand on Kincardine Road and that maximum traffic demand on the A34 Upper Brook Street corridor is likely to be of the order of 21 – 22 vehicle trip movements on the section between Grosvenor Street and Booth Street East. Additional development related traffic on the section of Brunswick Street between A34 Upper Brook Street and Kincardine Road could be expected to be of the order of 8 – 12 vehicle trips per hour or 1 new vehicle every 5 – 7 minutes.

'With Development' Local Highway Network Performance

11.33 An assessment of network performance under the 'With Development' scenario has been undertaken, to help understand the ability of the local highway network to accommodate future development traffic conditions. This scenario includes for the direct effects of the following changes to observed baseline 'Do-Nothing' conditions:

- Local network re-assignment associated with the closure of Inchley Road / extension of one-way operation on Kincardine Road, and,

- The addition of predicted total future development traffic levels.

11.34 A review of predicted changes in traffic flow between 'Do-Nothing' and 'With-Development' scenarios for key local study area links identifies the following:

- New development related traffic volumes on local links are predicted to be low. In practice, any substantive changes in traffic flow on individual links are related to the re-assignment effects associated with the proposed road closure / extended one-way operation.
- Reduction in traffic on the northern section of Kincardine Road, primarily as a result of the removal of rat-run traffic on this link through the closure of Inchley Road.
- Increases on the immediate section of Grosvenor Street west of Kincardine Road and A34 Upper Brook Street between Grosvenor Street and Booth Street East – primarily as result of the re-assignment of rat-run traffic to these designated distributor road corridors. Maximum increases on the key section of A34 Upper Brook Street can be expected to be of the order of 13.7% - 15.0% of 'Do-Nothing' traffic levels.
- Increases elsewhere on the A34 Upper Brook Street corridor, when compared to 'Do-Nothing' traffic levels can be expected to be well below 5% threshold levels.
- Impact on the section of Brunswick Street between Upper Brook Stret and Kincardine Road is predicted to be of circa of 11% - 15%, when compared to Baseline 'Do-Nothing' traffic levels. Again this is primarily as a result of re-assignment effects following the closure of Inchley Road, but does also reflect that this route would also act as the main southern approach for vehicles seeking to directly access the application site.

11.35 In practice, new Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) development related traffic volumes on local links are

predicted to be low, with any substantive changes in traffic flow identified related to the re-assignment effects associated with the proposed road closures / extended one-way operation, rather than 'new' traffic demand.

11.36 Detailed junction capacity modelling at key study area junctions under 'With Development' conditions identifies the following:

- *A34 Upper Brook Street / Grosvenor Street:* The junction is predicted to continue to operate with a level of spare operational capacity under 'Do-Something' peak period conditions.

- *A34 Upper Brook Street / Booth Street East:* The amended junction design is predicted to operate at close to capacity for 'Do-Something' traffic re-assignment scenarios, assuming that the 'all-red' phase would be called every signal cycle. This represents broadly similar operation when compared to the current four arm junction arrangements (including for continued access to Inchley Road), albeit with some additional overall delay during the AM peak. Ultimately such traffic performance needs to be balanced against the walk / cycle access improvements delivered by the new layout.

- *Upper Brook Street / Brunswick Street:* The current junction layout is predicted to operate at or close to practical capacity under 'Do-Something' PM peak demand conditions, relating to a 96.7% degree of saturation for the A34 (S) approach lane including for the right turn flare. Whilst this lane does not show unacceptable queuing and, in practice, some additional flow balancing between this lane and the inside (straight-on lane) within he modelling would result in improved performance predictions, some congestion is anticipated associated with the right turn movement, which at present is required to either turn in gaps in opposing traffic or during the inter-green at the end of the stage.

- Both local side road junction connections to Kincardine Road (serving Hanworth Close and Whitekirk Close) are predicted to operate with significant spare capacity.

11.37 It is considered that there may be the potential for additional operational efficiencies to be delivered at all of the traffic signal junctions via further investigation into changes in signal timings / junction layout. Focus TP has undertaken modelling runs based on an individually optimised 90-second traffic signal cycle time at all locations and the introduction of an additional IGA stage at the A34 Upper Brook Street / Brunswick Street junction. This work identifies additional material improvements in junction performance, such that all junctions are predicted to be able to operate with positive junction PRC values for all peak hour demand scenarios. The applicant would therefore be willing to work with MCC / TfGM to explore whether the delivery of such additional local junction changes in support of the development proposals would be of merit.

11.38 Based on the above detailed network testing, it is considered that, if supported by an appropriate junction improvement works package, there is no evidence to suggest that the delivery of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme would result in severe / unacceptable future network operating conditions over the local study area.

Sensitivity Test: Local Highway Network Performance Including for Cumulative Development Effects

11.39 It is known that proposals for additional major mixed-use PBSA (737 bed spaces) / Sci-Tech employment (15,376sqm) development are being progressed by developers McLaren / Kadans on land immediately to the south of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application site. MCC have therefore requested that review of combined / cumulative highways operational effects is carried out as a sensitivity test to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) submissions. Such work allows for an understanding of the ability of the local highway network to accommodate the traffic and transport requirements of both schemes.

11.40 Delivery of adjacent Upper Brook Street Masterplan – McLaren / Kadans proposal are anticipated to result in the following local highway network effects:

- Addition of new trips associated with proposed mixed use scheme elements (predicted to be relatively low, due to car-free nature of the proposals);

- Removal of existing baseline traffic associated with current pay & display parking use associated with the site, which generates traffic movements across the day.

11.41 In practice the 'net' traffic effects of the Upper Brook Street Masterplan – McLaren / Kadans development, is a slight reduction in traffic movements on some study area links, when compared to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) 'With Development' scenario. In particular, 'With Cumulative Development' traffic estimates are generally lower on Grosvenor Street & Kincardine Road during predicted AM & PM peak hour periods. Some small increases are predicted on sections of the A34 Upper Brook Street corridor and Booth Street East (primarily associated with 'off-site' Upper Brook Street Masterplan – McLaren / Kadans related trips to / from local car parks), but in practice, these changes are generally low, being less than 2% of 'With Development' traffic volumes.

11.42 Detailed network testing under the 'With Cumulative Development' ultimately indicates very similar results to the core 'With Development' analysis. This is because the main traffic effects of the Upper Brook Street Masterplan scheme relate to the re-assignment of local traffic due to the closure of Inchley Road and not future development traffic volumes. In general, under the 'With Cumulative Development' scenario the changes in traffic flow associated with local re-assignment can be expected to be slightly reduced in intensity, due to the removal of the existing car park traffic demand at the McLaren / Kadans site, which is not off-set by the low levels of traffic demand anticipated with the replacement 'car-free' redevelopment proposals.

11.43 This is confirmed by the results of the detailed junction capacity testing, which demonstrates broadly similar results to the core 'With Development' analysis. It is therefore considered that the cumulative traffic effects of the delivery of the full

Upper Brook Street Masterplan regeneration (i.e. Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) + Upper Brook Street Masterplan – McLaren / Kadans) can be accommodated by the proposed package of local network improvements identified and there would be no severe residual highways and transport effects.

Development Construction Matters

11.44 It is envisaged that construction of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme would be delivered over three distinct & consecutive phases, following initial site enabling works.

- *Phase 1* – Units A1, A2 A3 & B1 and associated public open space and related highway works (36 months);
- *Phase 2* – Unit B2 & associated public realm (24 – 30 months);
- *Phase 3* – Unit B3 & associated public realm and completion of supporting highway works (24 - 30 months).

11.45 Normal site working hours (all construction work and ancillary operations, including deliveries and vehicle dispatch) would be restricted to the following core time periods for the duration of all the construction project phases:

- Monday – Fridays: 07:30 – 18:00
- Saturdays: 08:30 – 14:00

11.46 Construction of all phases would be based on a site access strategy of main site vehicle deliveries being undertaken via Kincardine Road. Servicing via Kincardine Road would be delivered via footway and lane closures along the route, to form pit lanes and materials storage areas, along with the parallel conversion of the road to one-way access (northbound) and the closure of Inchley Road. This local road closure and one-way strategy effectively replicates the proposed permanent local traffic management strategy to be adopted to support the completed application scheme.

11.47 A range of supporting highway measure would need to be implemented in advance of the commencement of the Phase 1 construction works to deliver this site servicing strategy, including TTROs to deliver necessary road and footway closures to accommodate loading areas and safe working zones, improvements at the A34 Upper Brook Street / Booth Street East junction to deliver new right turn facilities, closure of a southbound bus lay-by on A34 Upper Brook Street and amendments to traffic islands and road marking at the junction of Kincardine Road / Grosvenor Street and Brunswick Street / Kincardine Road.

11.48 As part of the construction enabling works, Kincardine Road would be reduced to a minimum 3.5m - 4.0m one-way carriageway via the introduction of hoarding and temporary closure of parking bays on affected sections. Site hoardings would also be extended to incorporate the site frontage footway to Grosvenor Street between Kincardine Road and A34 Upper Brook Street and on A34 Upper Brook Street between Grosvenor Street and Inchley Road. It is anticipated that site delivery HGV access could also be possible via Inchley Road (from A34 Upper Brook Street southbound and Booth Street East approaches only) during Phase 1, but that this access would not be available during later phases of the project, following the conversion of this area to the new public square as part of the Phase 1 external works.

11.49 Advanced planning and liaison on hoarding and construction vehicle movement would be negotiated with MCC highways in order to manage the constraints of the site and to best facilitate the construction of the project whilst being mindful of trying to result in minimal disruption to the local community and environment.

11.50 It is anticipated that maximum construction staff and HGV traffic levels would take place during Phase 1 of the project. Estimates provided by the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) project team, based on recent experience of delivering similar constrained city centre construction projects, suggests peak construction staff levels of circa 250 operatives and 40 management staff and up to 60 HGV arrivals per day. Based on typical construction staff operating practice and taking account of the highly

accessible site location and limited car parking opportunities that will be available at the site, which will encourage a significant proportion of construction staff to travel to the site by non car modes, it is estimated that peak daily construction staff & visitor trip levels are likely to be of the order of 280 trips (in + out), of which circa 120 would travel to / from the site directly and 160 would be based at public car parks off site. Typically construction shift patterns would result in peak travel demand taking place outside of traditional AM & PM 'rush hour' periods.

11.51 Due to the restricted nature of the construction site, which would limit opportunities for practical loading / unloading and material storage space, it is anticipated that all construction HGV delivery movements to / from the site would be directly managed via a formal booking system. Implementation of such a booking system would support 'just in time' material supply at the site and allow for delivery HGV movements to be spread across the day in a controlled manner, avoiding unregulated 'surges' in demand and associated site and local road congestion. It is anticipated that maximum managed hourly HGV delivery demand is likely to be of the order of 5 - 8 HGV arrivals and 5 - 8 HGV departures per hour during core construction periods (07:00-15:00), with lower levels of HGV traffic at other times.

11.52 A review of daily construction traffic movements over the wider local highway network, including local background traffic re-assignment associated with the proposed local road closures, when compared to baseline 'Do-Nothing' conditions of current network operation, demonstrates similar trends in general traffic movements as identified for the operation of the completed development. Total traffic volumes can be expected to reduce on Kincardine Road (as a result of the removal of background rat run traffic), with associated increases on Grosvenor Street to the west of Kincardine Road, the section of A34 Upper Brook Street between Grosvenor Street and Booth Street East and the section of Brunswick Street between A34 Upper Brook Street and Kincardine Road. Traffic increases on all links apart from the very short section of Grosvenor Street to the west of Kincardine Road (no frontage receptors) can be expected to be well below IEMA 'rule 1' thresholds for significant environmental effects.

11.53 Predicted changes in HGV demand highlights high percentage change increases on the Kincardine Road and Grosvenor Street - which is not unexpected as these routes are required to act as the main delivery route to / from the site and currently only experience low levels of HGV demand. In practice peak construction demand would only result in the net increase of up to 20 additional HGV movements on the section of Kincardine Road south of Inchley Road and 48 HGVs on the northern section between Inchley Road and Grosvenor Street and would be spread evenly across the day, as a result of the HGV booking system that would be operated. It is considered that these routes are capable of accommodating such HGV levels without generating significant detrimental effects. Predicted HGV increases on other surrounding study area routes are predicted to be at levels below IEMA 'rule 1' thresholds and therefore would not give rise to greater than minor adverse traffic related effects.

11.54 It is acknowledged that the construction of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) application scheme would require a range of temporary network interventions that could be expected to give rise to additional effects on the local highway network over and above those simply related to vehicle movements and operational capacity. These include the issues set out below. Mitigation measures would be required to be implemented, where possible, to respond to these matters:

- *Closure of site side footpaths to Kincardine Road, Grosvenor Street & Upper Brook Street to facilitate site hoardings* – resulting in inconvenience and potential minor delays for users of these routes.

- *Implementation of one-way operation & construction site hoarding on Kincardine Road would result in temporary loss of southbound 'quiet road' cycle linkages* – southbound cycle linkages on Kincardine Road are unlikely to be practical during Phase 1 of the construction project and therefore alternative quiet road cycle diversion routes would need to be identified and implemented.

- *Temporary closure of bus lay-by to Upper Brook Street* – the closest alternative bus stop is located circa 240m to the south.

- *Potential community severance issue associated with closure of Inchley Road* – closure of this route and erection of site hoardings to deliver a safe site compound and working area during Phase 1 could limit convenient walking connections to / from the Brunswick residential estate. Construction site design will be required to provide an alternative walking route to maintain connections between Kincardine Road and A34 Upper Brook Street.

- *Potential transfer of dust and dirt to the local highway network* – Major demolition and construction projects have the potential to generate dust / dirt emissions, either related to carried products and materials or related to the transfer of loose materials / mud from the construction site servicing areas via vehicle wheels / bodies, unless carefully managed.

11.55 It is important that any disturbance to neighbours and the local community should be minimised during the construction period where at all practical. To this end a detailed Construction Traffic Management Plan (CTMP) would need to be prepared to ensure that necessary best available techniques are adopted at all times.

Cumulative Construction Effects

11.56 It is likely that elements of the construction of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site and the adjacent Upper Brook Street Masterplan – McLaren / Kadans development could take place concurrently, generating combined construction traffic effects over the immediate highway network. Ultimately the nature of any combined effects would likely fluctuate across the duration of the construction period, directly related to the final programming of each project and the construction tasks taking place on both sites at any one time. Given the similar nature of the constriction projects, it is anticipated that peak cumulative construction traffic impact could represent a doubling of construction related traffic over the wider study area, when compared

to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme in isolation. In practice, the main surrounding distributor road corridors are considered capable of accommodating such additional temporary construction traffic levels, without significant detrimental effects - reflecting the higher standard nature of these routes and the fact that the majority of staff traffic movements could be expected to take place outside of key 'rush hour' network peak periods.

11.57 Cumulative 'peak' increases in construction HGV trip levels on the key local links of Kincardine Road & Brunswick Street, which provide direct access to both construction sites, could be in excess of the 30% IEMA threshold, when compared to 'Do-Nothing' baseline traffic levels. Ultimately, however, both of these key local access road routes are physically capable of accommodating such large service vehicle movements and are not considered to represent sensitive routes. Whilst the identified daily percentage HGV increases associated with cumulative construction effects would, at first review, appear to be substantive, it must be noted that these estimates represent combined 'peak' traffic effects that are unlikely to occur for any significant period of time, if at all. In practice combined day-to-day construction HGV traffic levels could be expected to be lower than these worst case estimates. Furthermore, the predicted combined HGV traffic levels must be considered in the context of existing traffic demand levels on these routes.

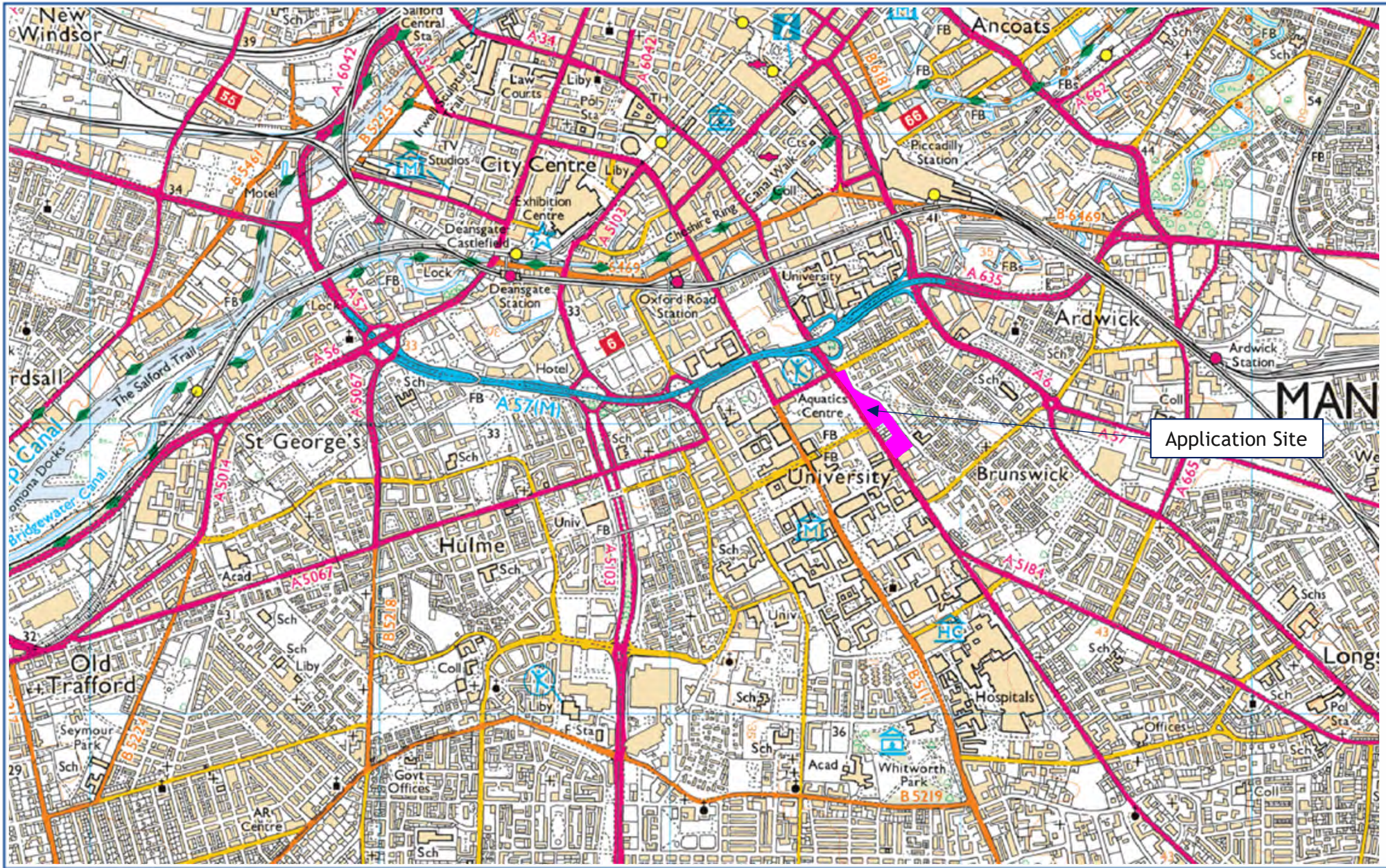
11.58 Ultimately it is considered that without suitable direct management there could be the potential for moderate adverse cumulative construction traffic impacts, should 'peak' construction site traffic demand occur on both sites concurrently. In practice, however, any such potential effects are capable of being addressed by the implementation of regular structured liaison between the two project Principal Contractors, MCC in the role of highway authority and key local stakeholders to identify appropriate management measures in advance of programmed project tasks. It is considered that appropriate liaison and management formalised via CTMP arrangements, would allow for both projects to move forward without giving rise to greater than minor cumulative traffic and transport effects.

Conclusions

11.59 Overall, based on the above review of issues, it is concluded that the comprehensive regeneration of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site for mixed use PBSA / Life Sciences development would not result in a severe impact on the future operation of the immediate local highway network. The proposals would not result in a significant increase in development flow related traffic on local links, with key immediate junctions and sections of the A34 Upper Brook Street & Kincardine Road corridors capable of accommodating future development traffic volumes without substantive operational concerns. The development scheme would also deliver significant local highway network environmental enhancements and improved pedestrian and cycle accessibility.

11.60 The location and design of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) proposals would support the objective of car-free development and deliver the potential for all site users to utilise sustainable transport for a wide range of day-to-day journeys, therefore meeting the core planning sustainability objectives of promoting the use of alternative travel modes to the private car and managing the overall traffic impact associated with new development.

FIGURES



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Figure TA1 **Site Location: Strategic Context**

J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023

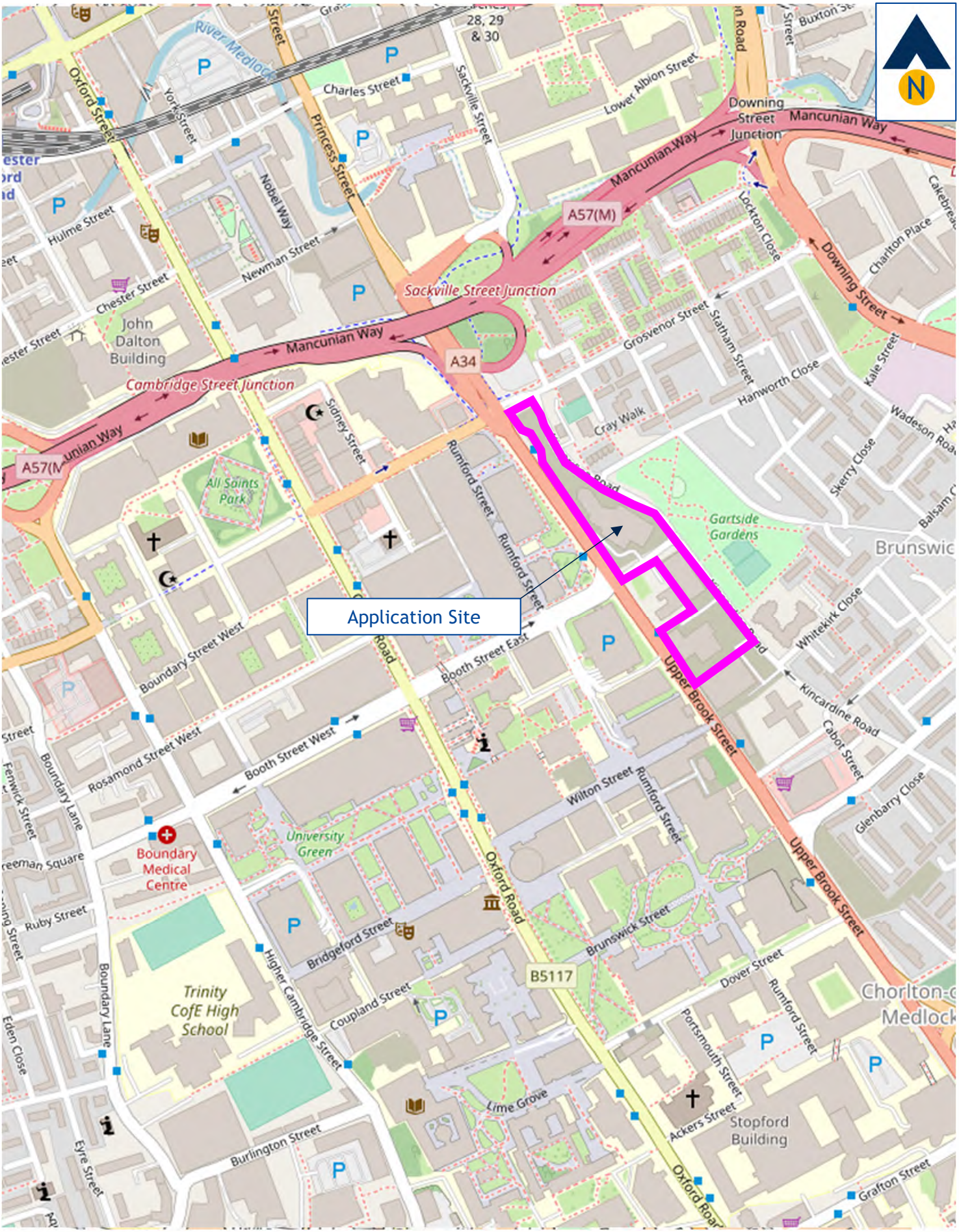
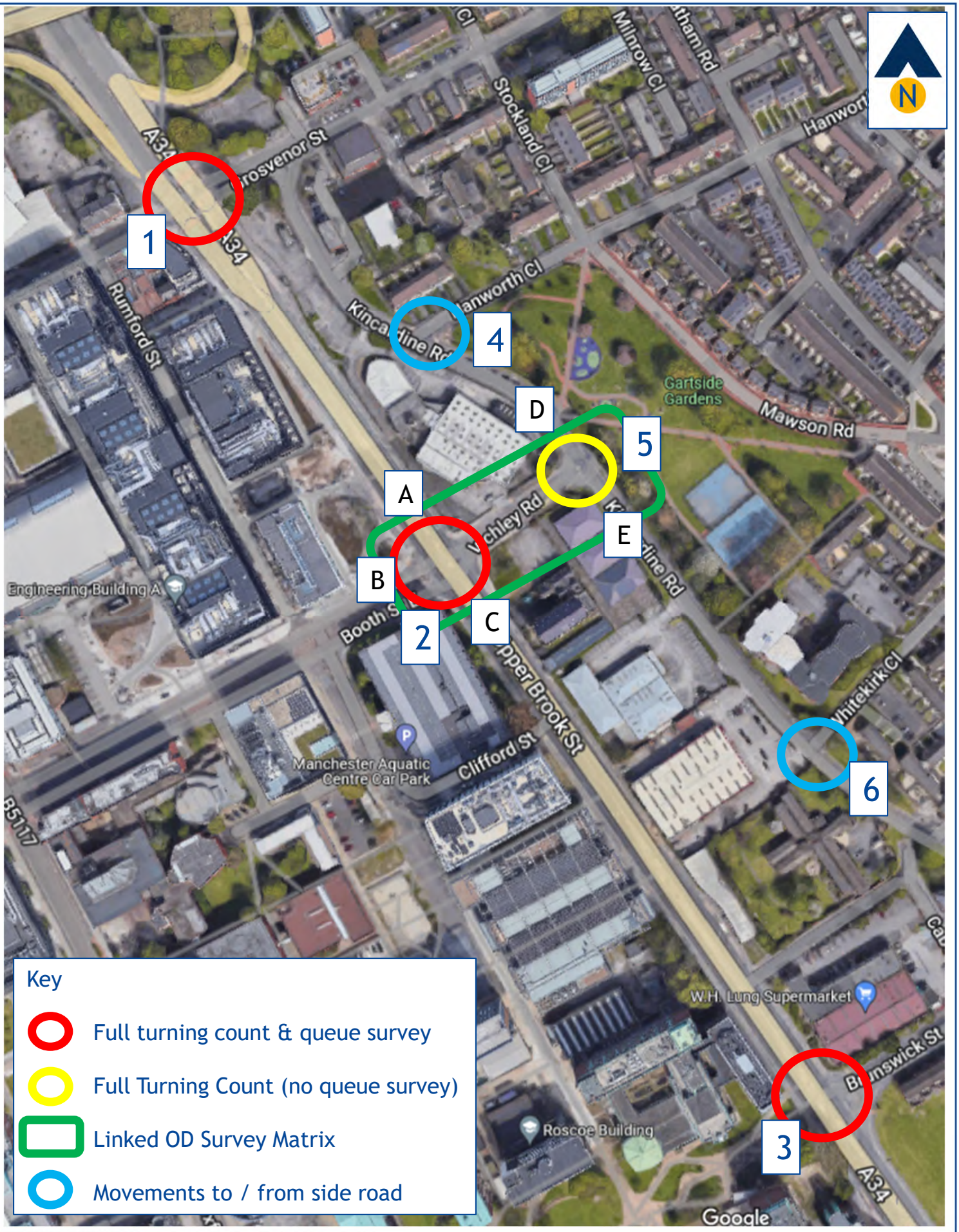
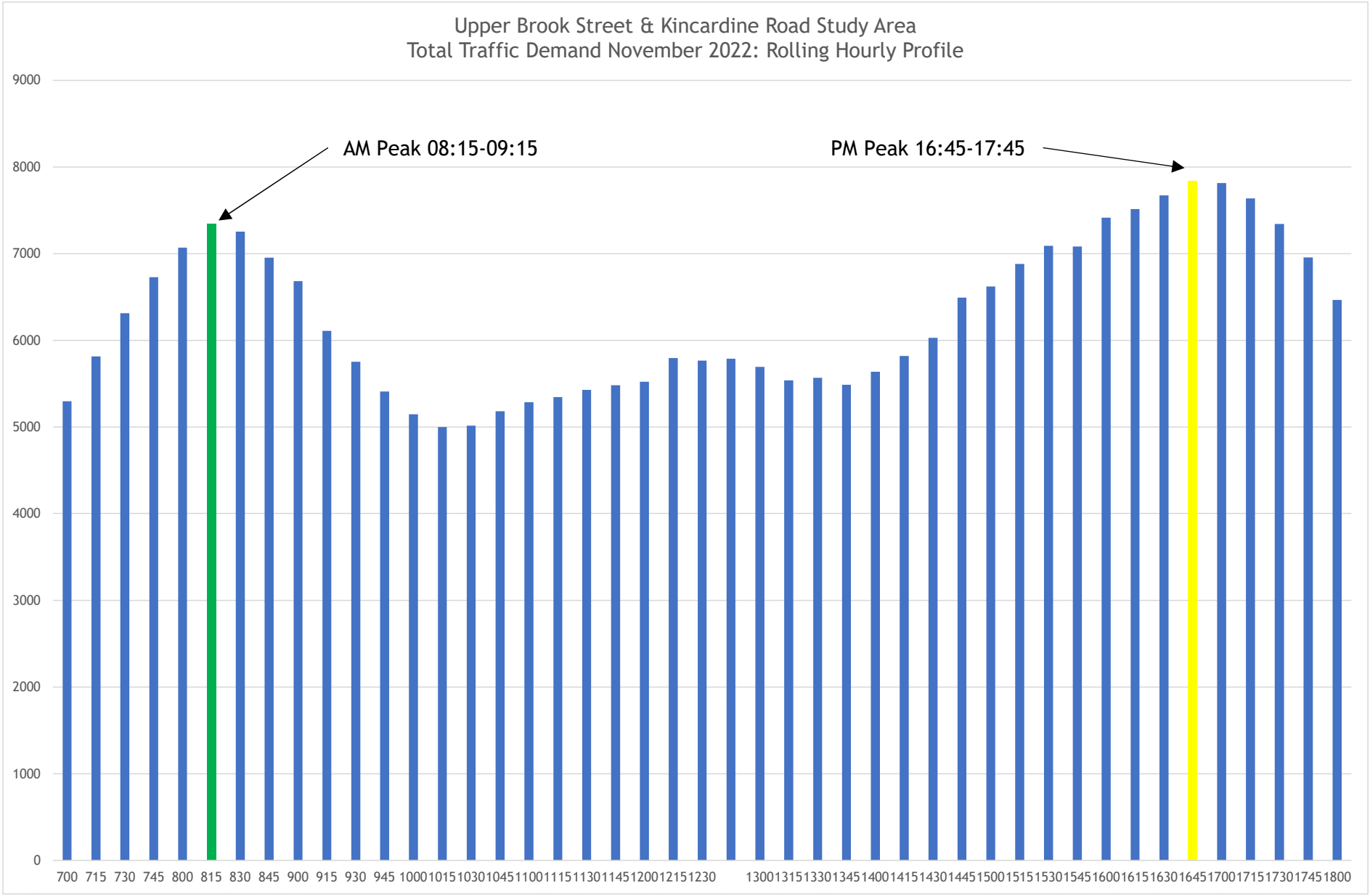


Figure TA2	**Site Location: Local Context**	
J000370	Upper Brook Street Masterplan (Williams / Alliance UBS)	June 2023



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Figure TA4	**Location of November 2022 Traffic Surveys**	
J000370	Upper Brook Street Masterplan (Williams / Alliance UBS)	June 2023



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Figure TA5

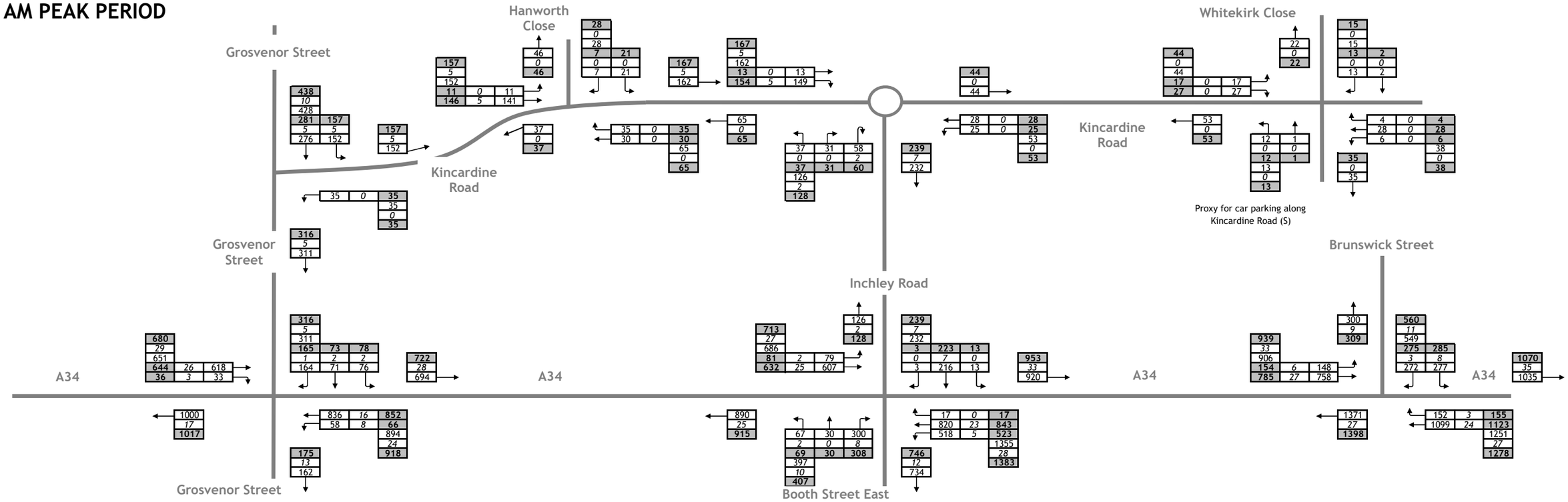
Upper Brook St / Kincardine Rd Study Area
Total Traffic Demand November 2022:
Rolling Hourly Profile

J000370

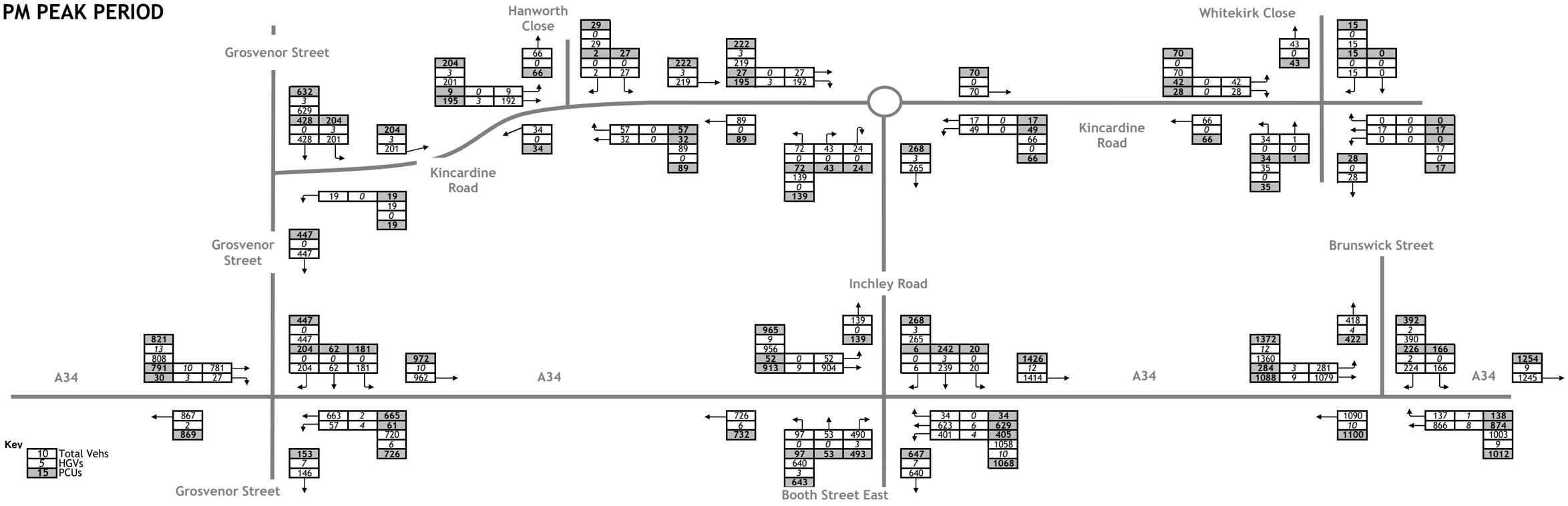
Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023

AM PEAK PERIOD



PM PEAK PERIOD



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Figure TA6 **November 2022 AM & PM Peak Observed Traffic Survey Flows**

J000370 Upper Brook Street Masterplan June 2023



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Figure TA7a **Observed Max Queues at Upper Brook Street / Grosvenor Street Traffic Signals - November 2022**

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023

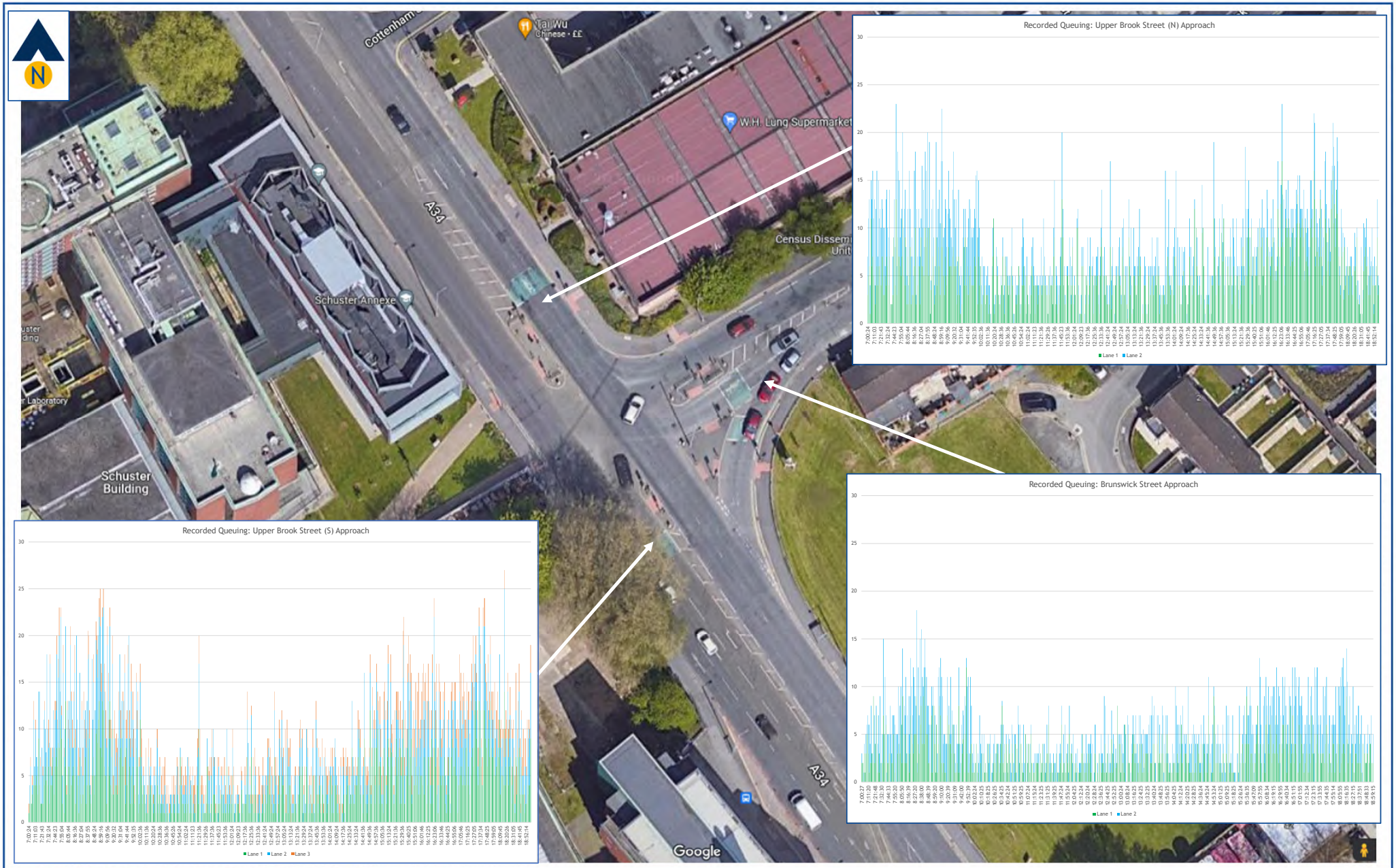


Figure TA7b **Observed Max Queues at Upper Brook Street / Booth Street East / Inchley Road Traffic Signals - November 2022**

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023



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Figure TA7c **Observed Max Queues at Upper Brook Street / Brunswick Street Traffic Signals - November 2022**

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

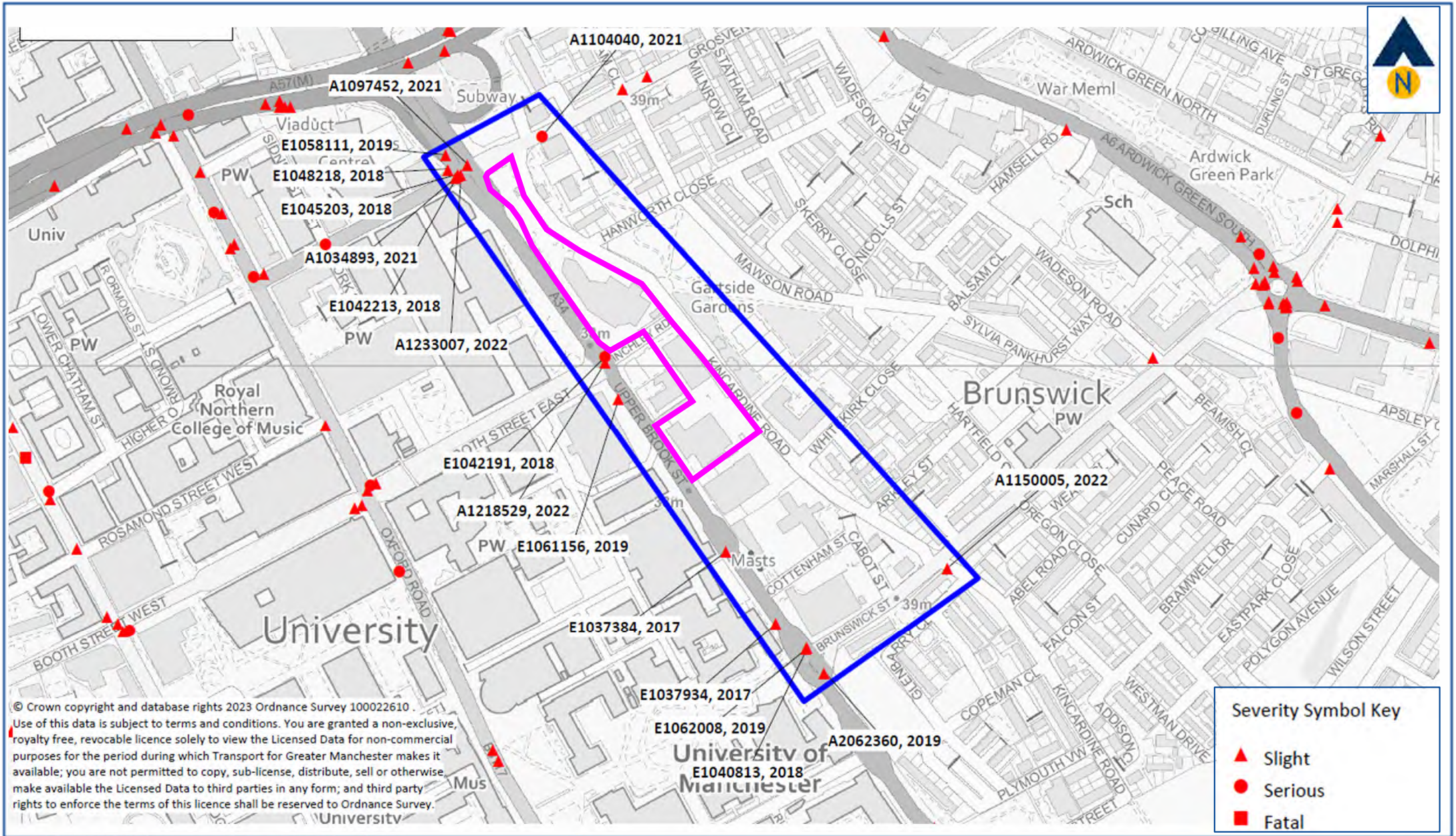
June 2023



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FIGURE TA8 **Location & Nature of Local Car Parking Opportunities to the Application Site**

J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023



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Figure TA9

Recorded Local Personal Injury Accident Events to the Application Site (1 November 2017 to 31 October 2022)

J000370

Upper Brook Street Masterplan (Williams / Alliance UBS)

June 2023

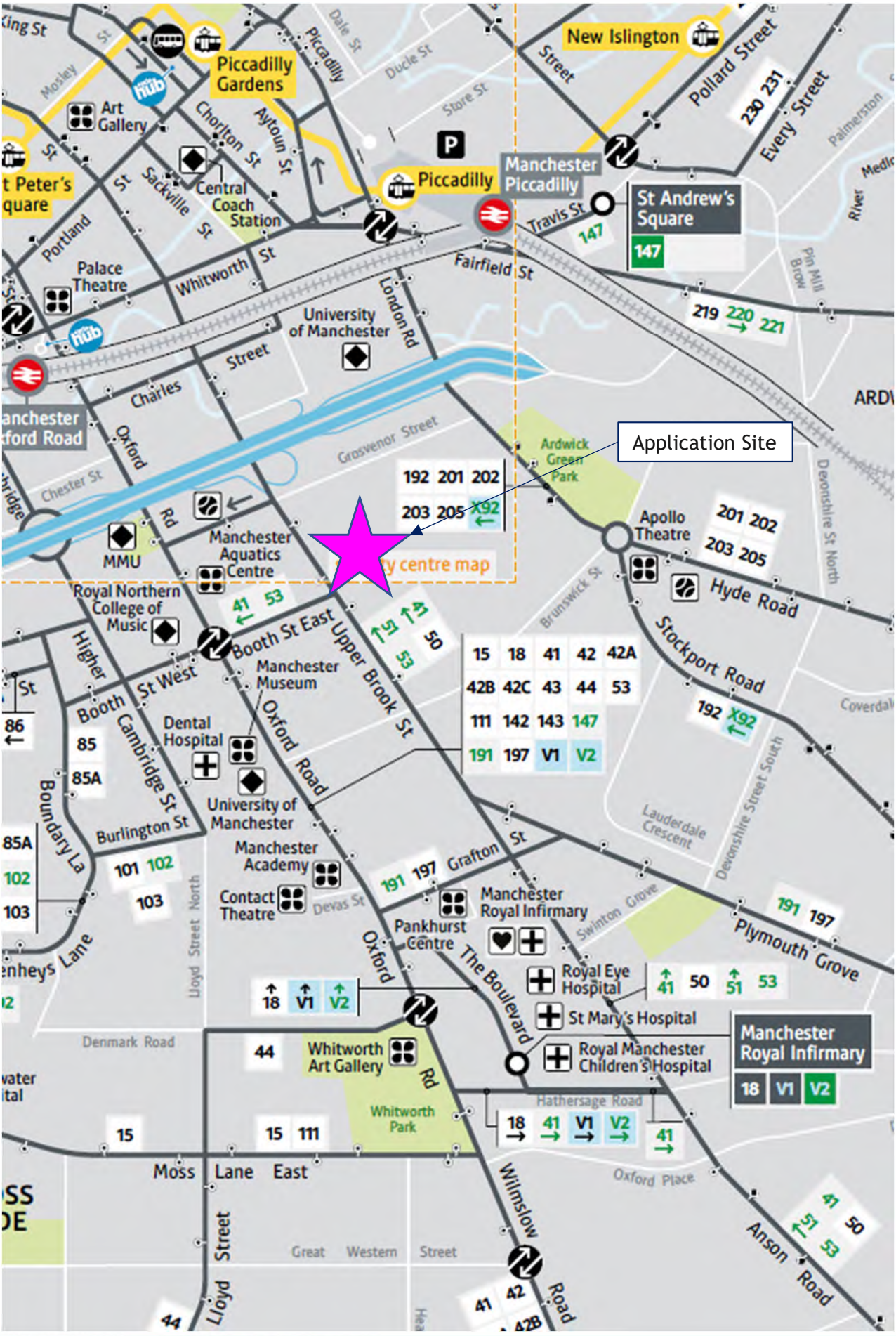


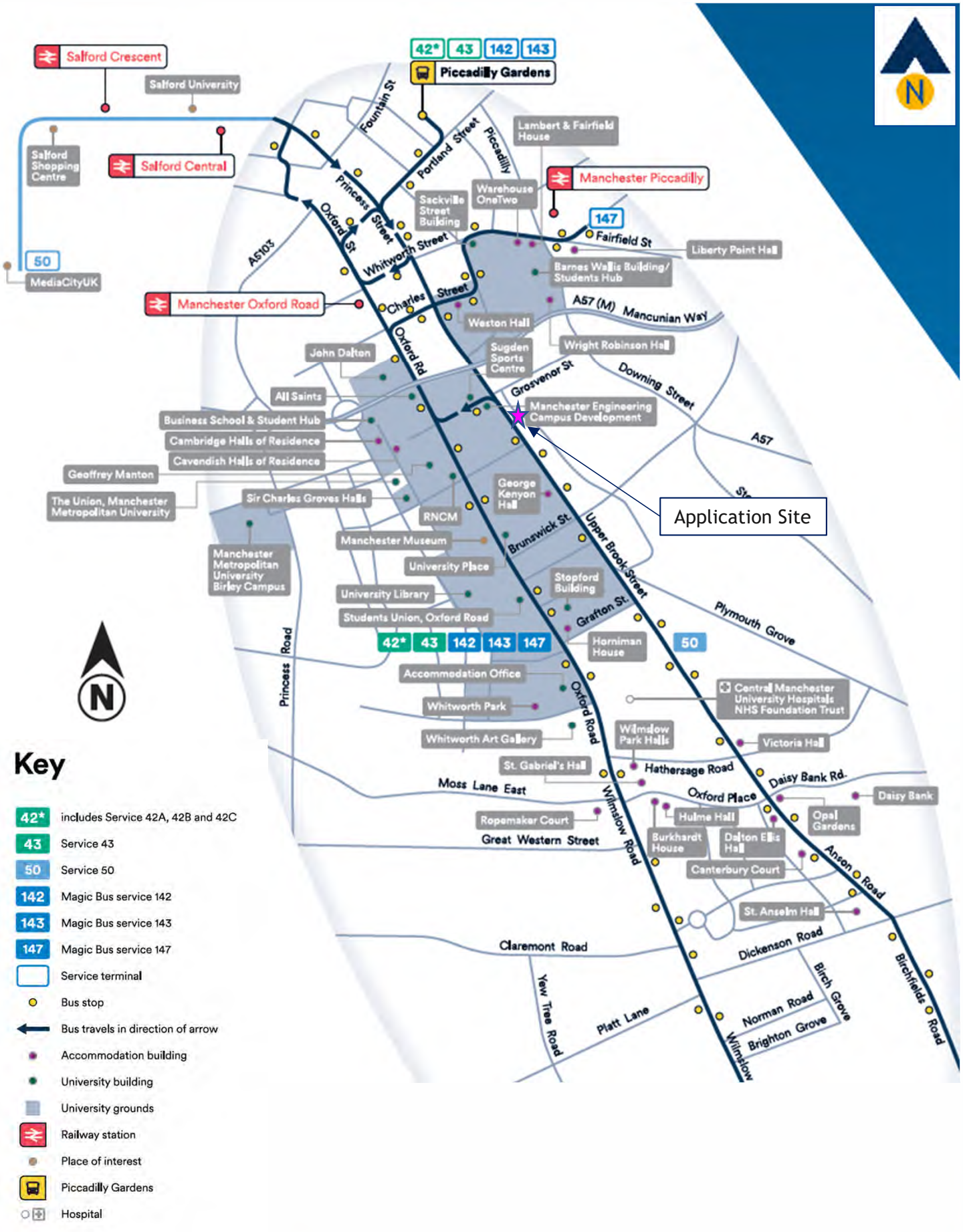
FIGURE TA10a

Local Public Transport Connections to the Application Site

J000370

Upper Brook Street Masterplan (Williams / Alliance UBS)

June 2023



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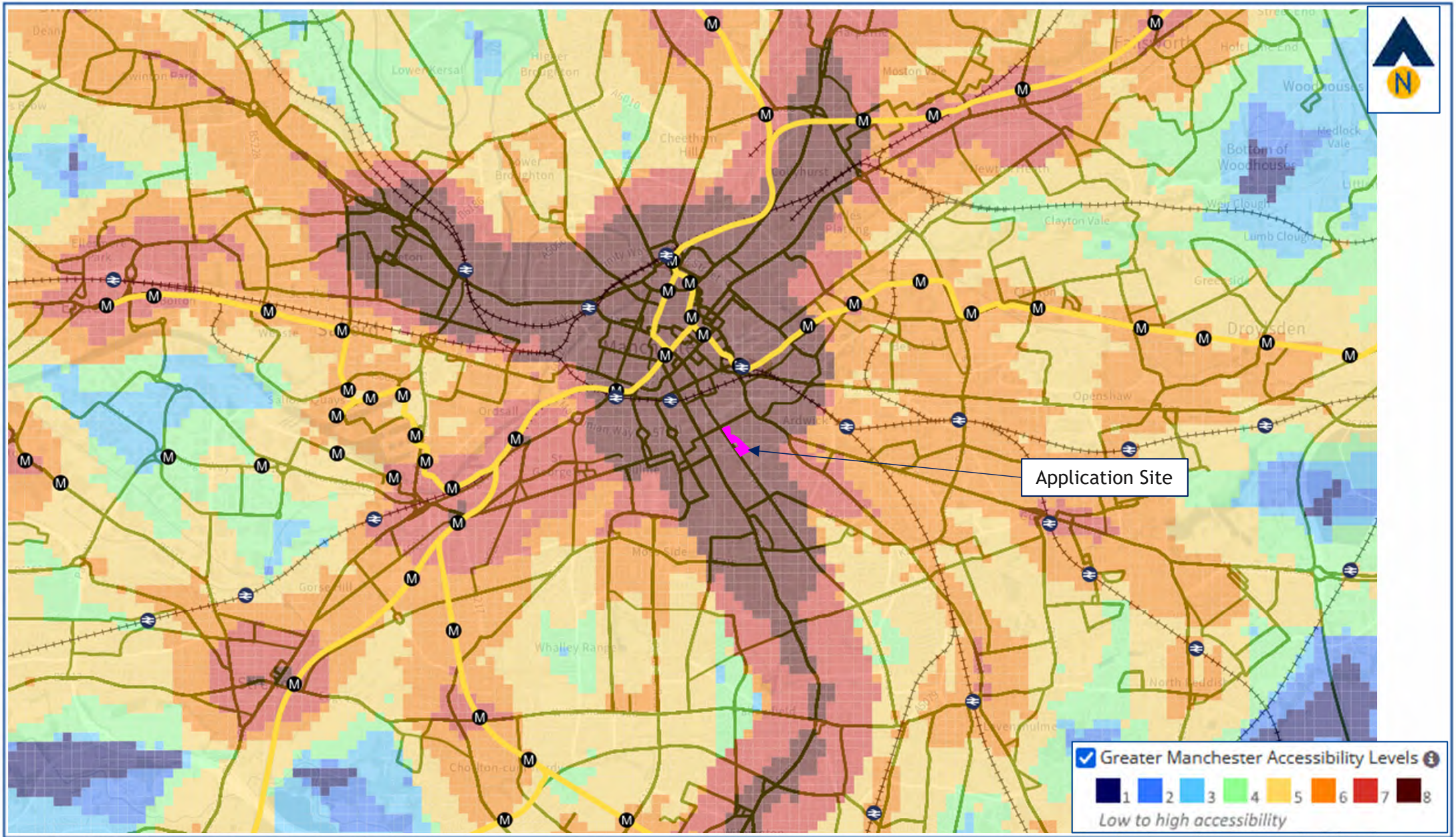
FIGURE TA10b

Local Public Transport Connections (University Zone) to the Application Site

J000370

Upper Brook Street Masterplan (Williams / Alliance UBS)

June 2023



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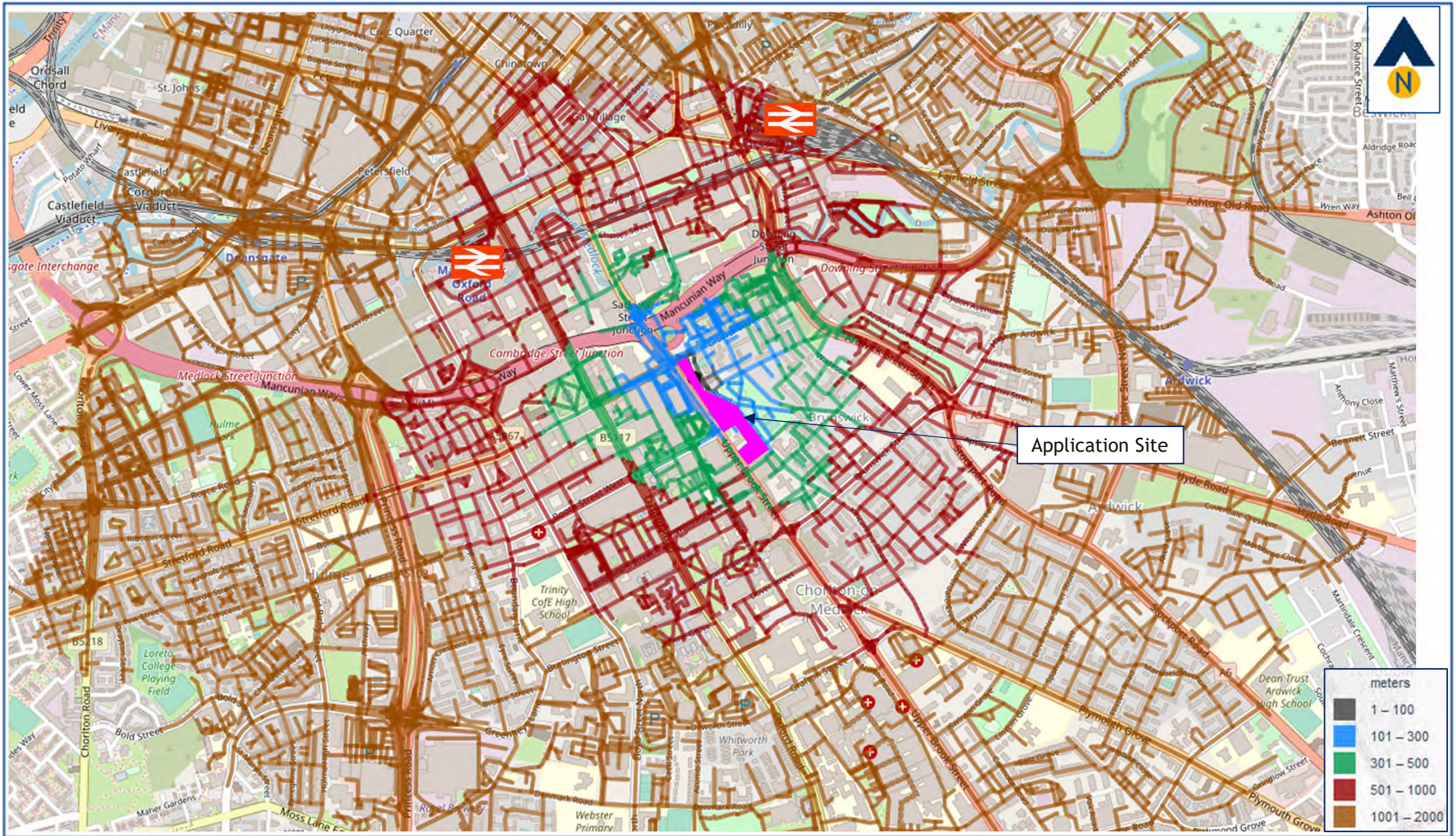
Figure TA11

Greater Manchester Accessibility Levels for Manchester City Centre and Surrounding Areas

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023



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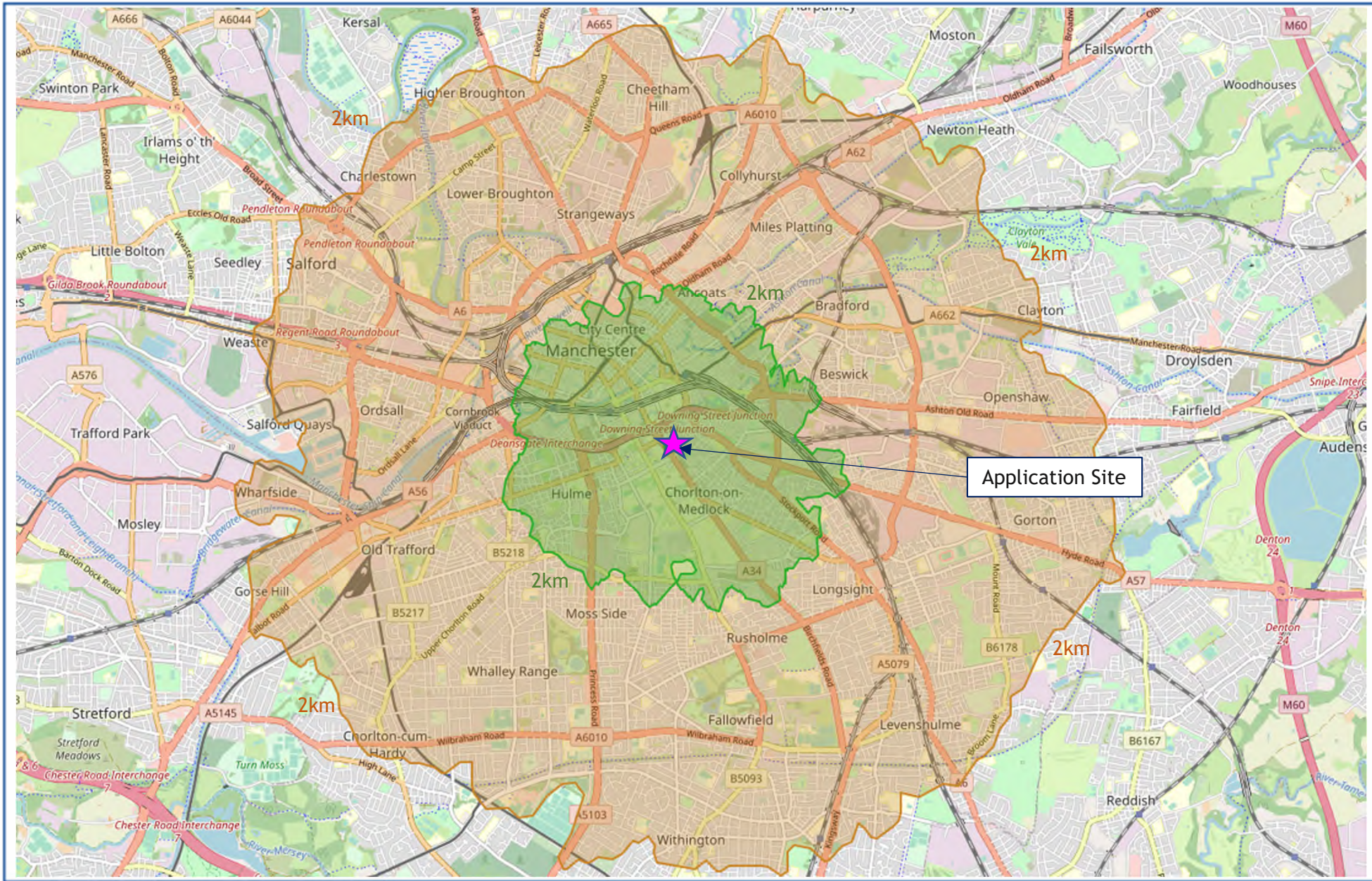
Figure TA12

2km Walk Catchment from Application Site (Measured from Northern Land Parcel)

J000370

Upper Brook Street Masterplan (Williams / Alliance UBS)

June 2023



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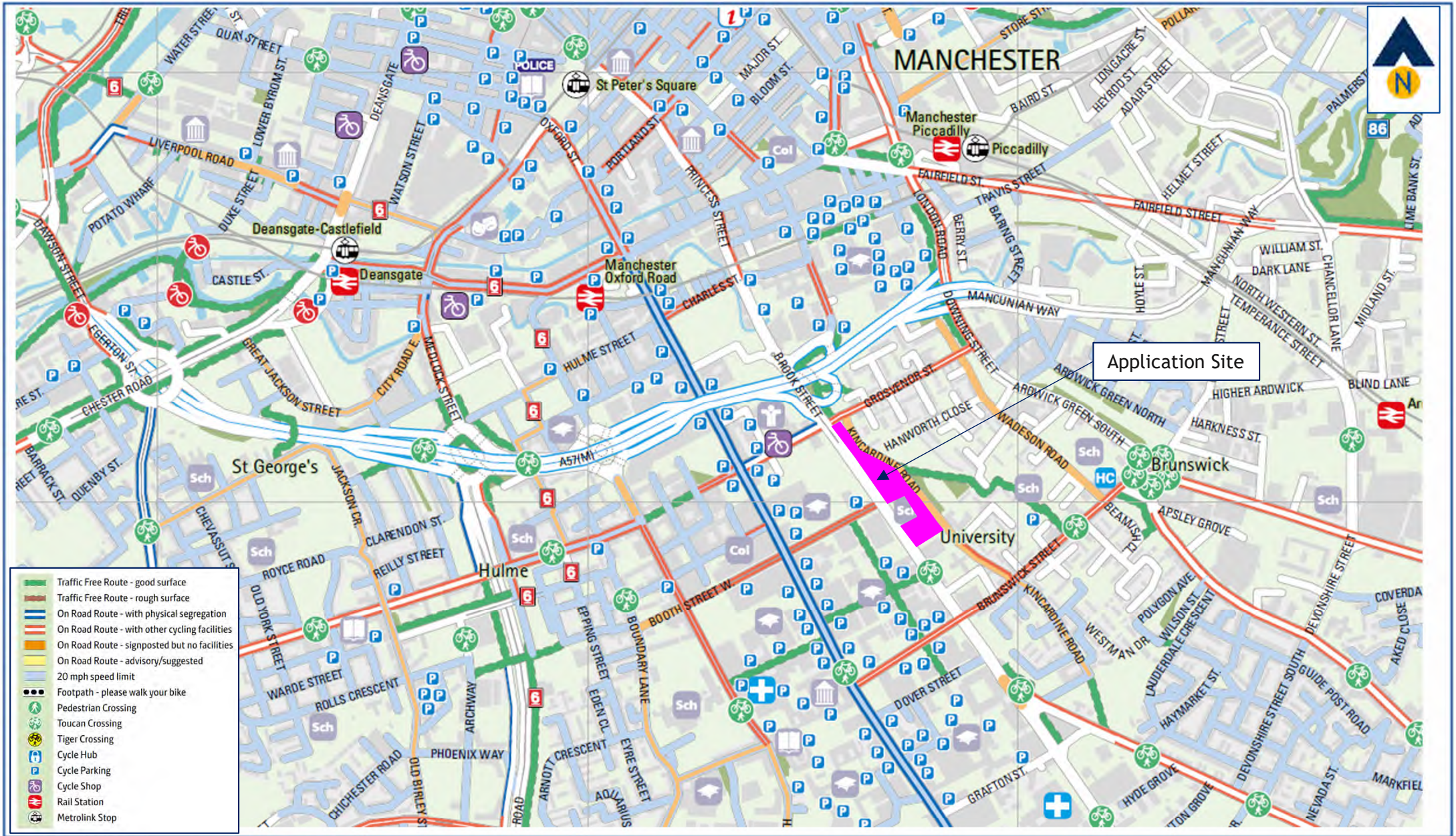
Figure TA13

2km & 5km Cycle Catchment from Application Site (Measured from Northern Land Parcel)

Upper Brook Street Masterplan (Williams / Alliance UBS)

J000370

June 2023



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Figure TA14

Available Local Cycling Infrastructure to the Application Site

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023

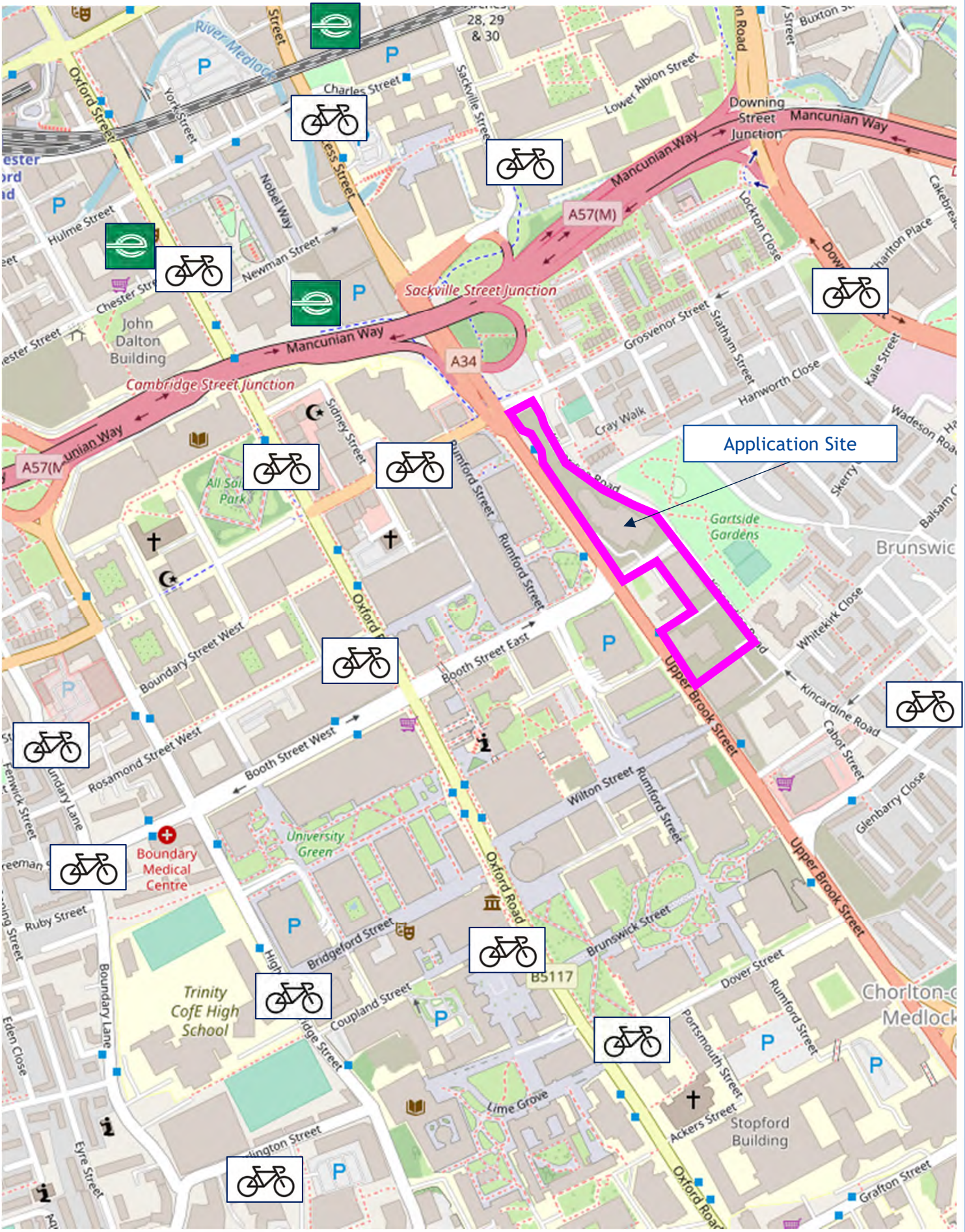


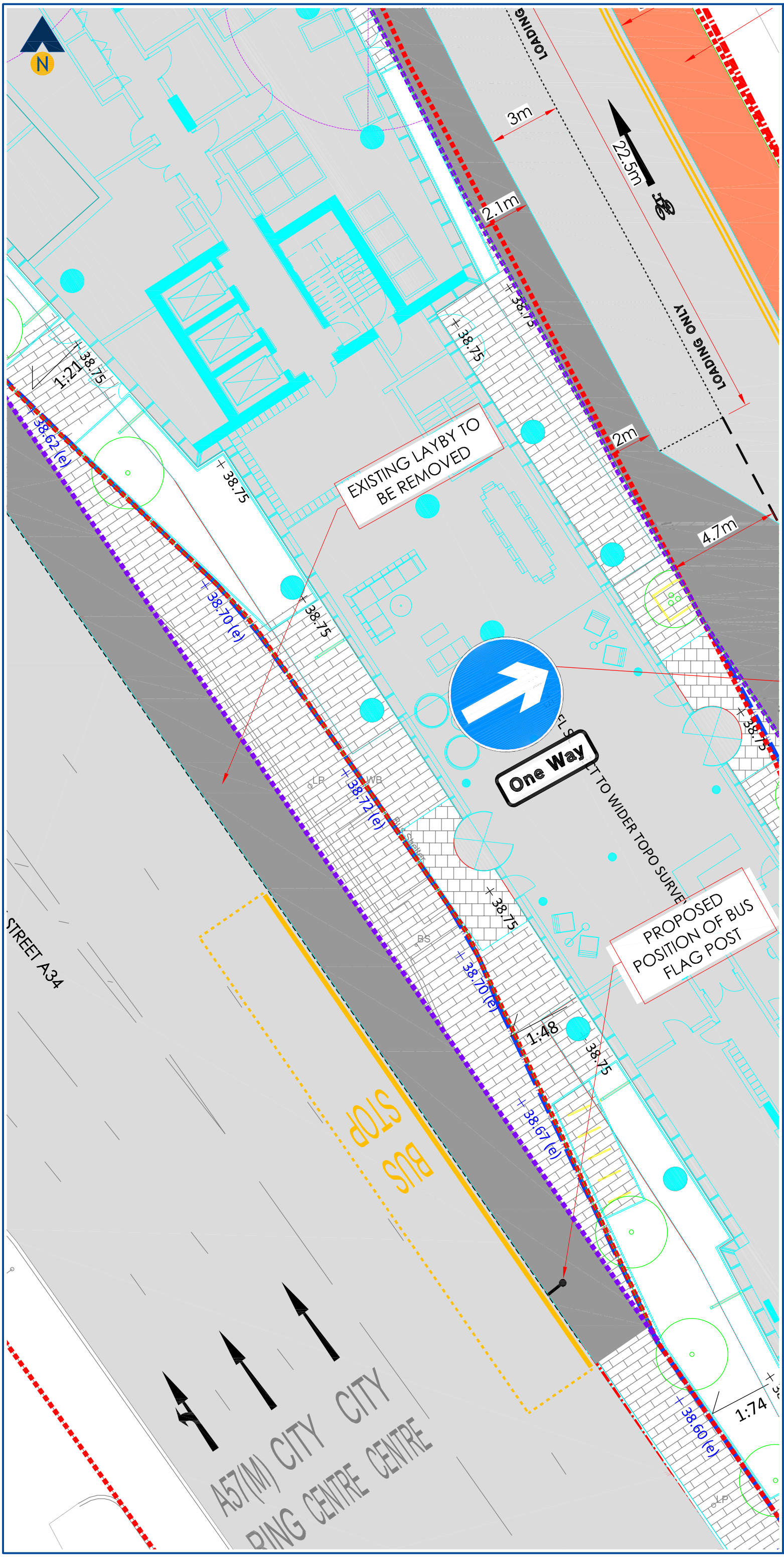
FIGURE TA15

Location of GM Bee Network Cycle Hire Docking Stations & Enterprise Car Club Spaces

J000370

Upper Brook Street Masterplan (Williams / Alliance UBS)

June 2023



Revision:
A -

-

Client:
Williams Motor Co (Holdings)
and Alliance UBS Limited

Project:
Upper Brook Street Masterplan
Williams Motor Co (Holdings) / Alliance UBS Ltd

Drawing Title:
Proposed Bus Stop Improvement Works to
A34 Upper Brook Street Frontage
to PBSA Development

Drawing Number: Figure TA16

Revision: -

Date: 16/06/23

Scale: 1:250@A3

Drawn By: APB

Checked By: -

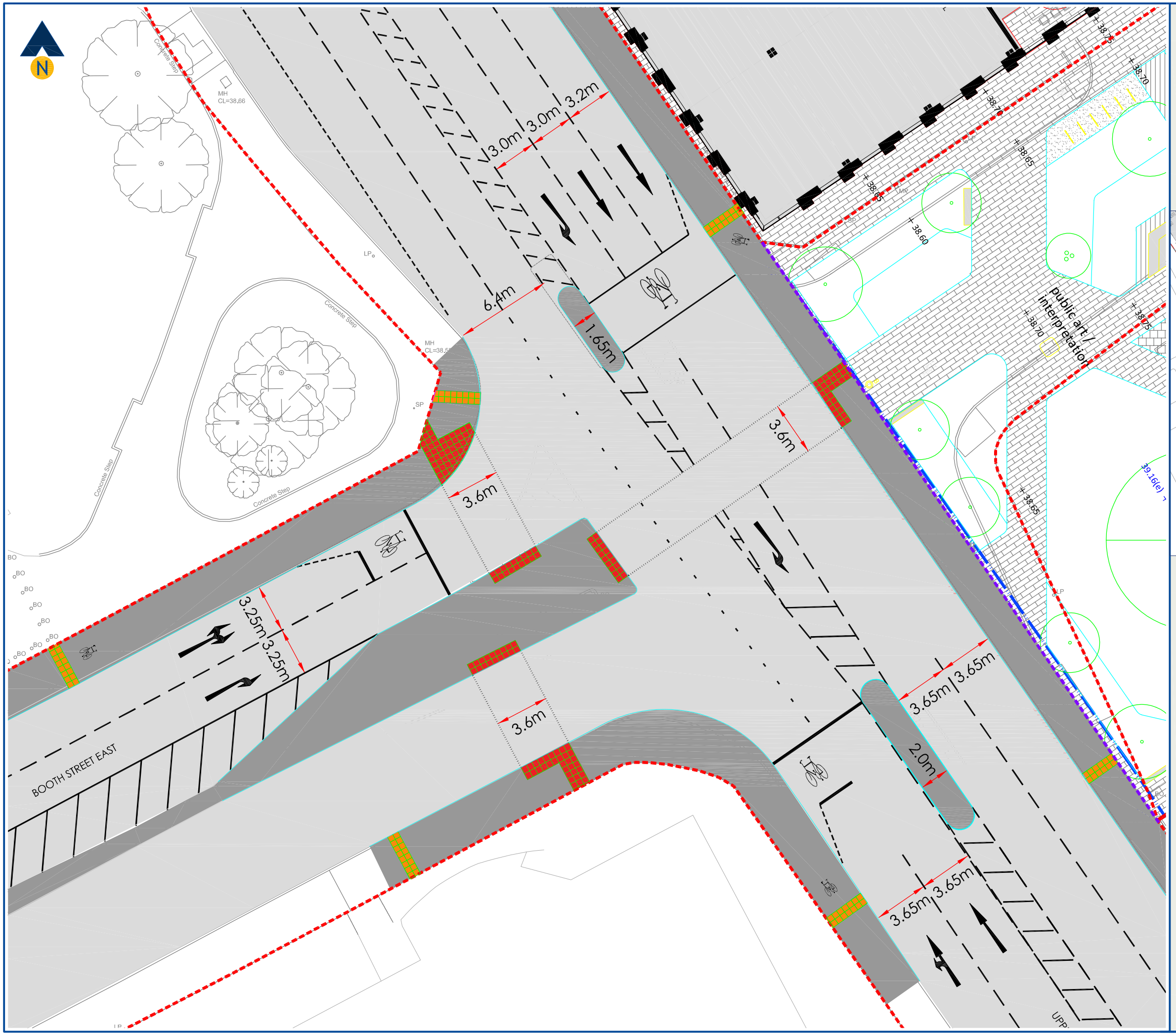
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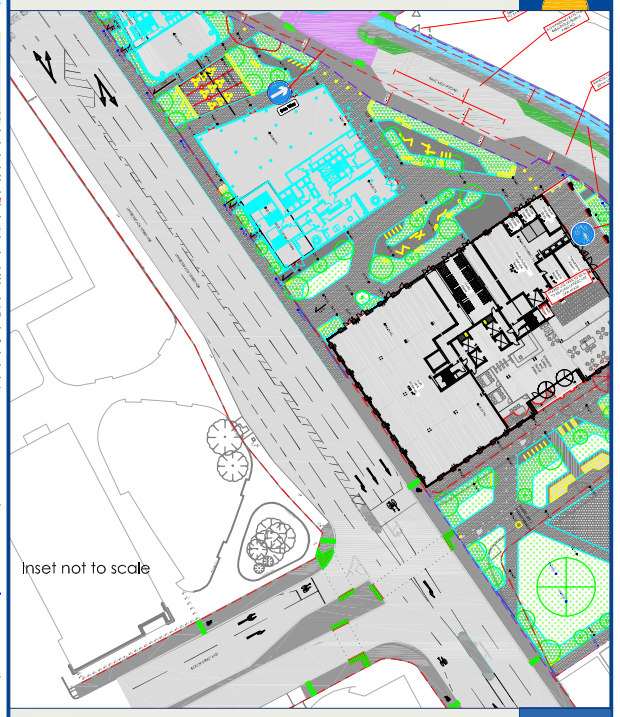
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Revision:
A -

-

Client:
Williams Motor Co (Holdings)
and Alliance UBS Limited

Project:
Upper Brook Street Masterplan
Williams Motor Co (Holdings) / Alliance UBS Ltd

Drawing Title:
Proposed Traffic Signal Junction Improvements at A34 Upper Brook Street / Booth Street East

Drawing Number: Figure TA17a

Revision: -

Date: 16/06/23

Scale: 1:250@A3

Drawn By: APB

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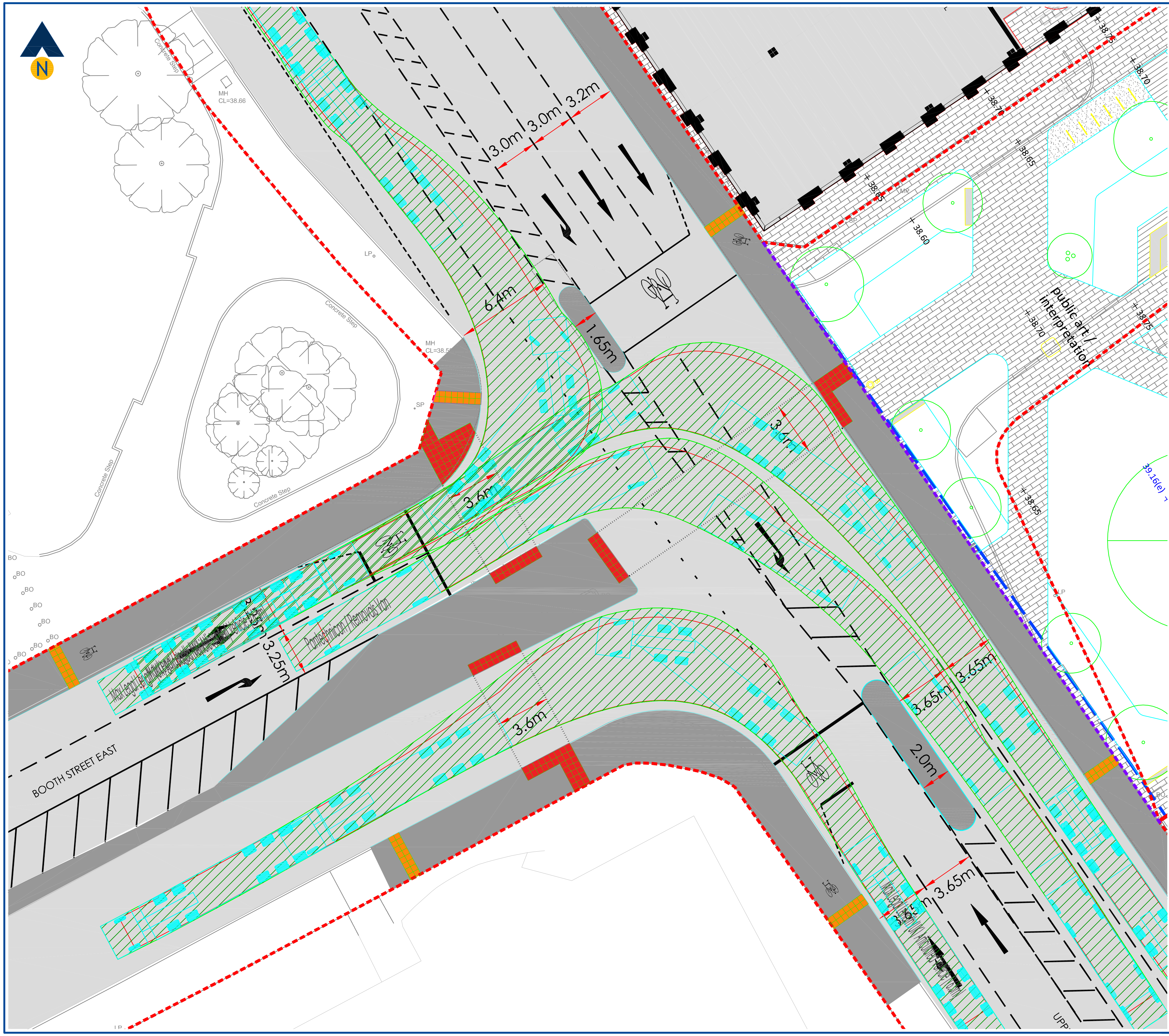
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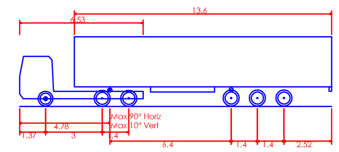
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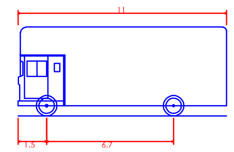


Revision:

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Max Legal Length (UK) Articulated Vehicle (16.5m)	
Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.530m



Pantechnicon / Removals Van	
Overall Length	11.000m
Overall Width	2.500m
Overall Body Height	4.730m
Min Body Ground Clearance	0.541m
Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	12.200m

Client: Williams Motor Co (Holdings) and Alliance UBS Limited

Project: Upper Brook Street Masterplan
Williams Motor Co (Holdings) / Alliance UBS Ltd

Drawing Title: Proposed Traffic Signal Junction Improvements at A34 Upper Brook Street / Booth Street East
Large Service Vehicle Swept Paths

Drawing Number: Figure TA17b
Revision: -

Date: 16/06/23
Scale: 1:250@A3

Drawn By: APB
Checked By: -

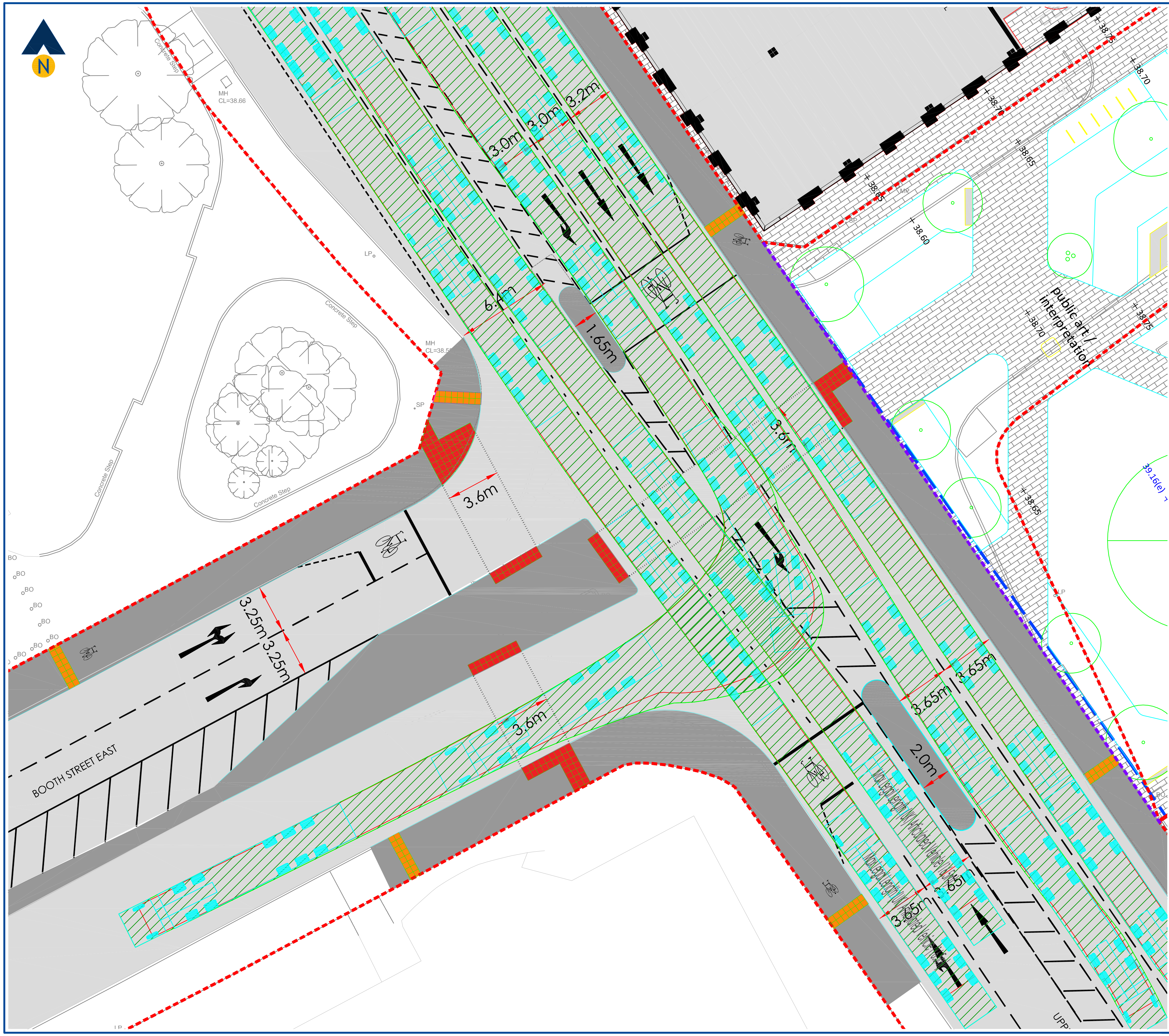
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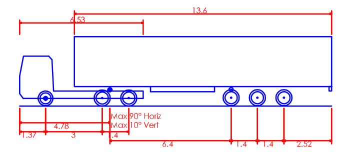
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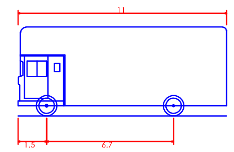
Revision:

A -



Max Legal Length (UK) Articulated Vehicle (16.5m)

Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.530m



Pantechnicon / Removals Van

Overall Length	11.000m
Overall Width	2.500m
Overall Body Height	4.730m
Min Body Ground Clearance	0.541m
Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	12.200m

Client:
Williams Motor Co (Holdings) and Alliance UBS Limited

Project:
Upper Brook Street Masterplan
Williams Motor Co (Holdings) / Alliance UBS Ltd

Drawing Title:
Proposed Traffic Signal Junction Improvements at A34 Upper Brook Street / Booth Street East
Large Service Vehicle Swept Path

Drawing Number: Figure TA17c
Revision: -

Date: 16/06/23
Scale: 1:250@A3

Drawn By: APB
Checked By: -

Status: Information

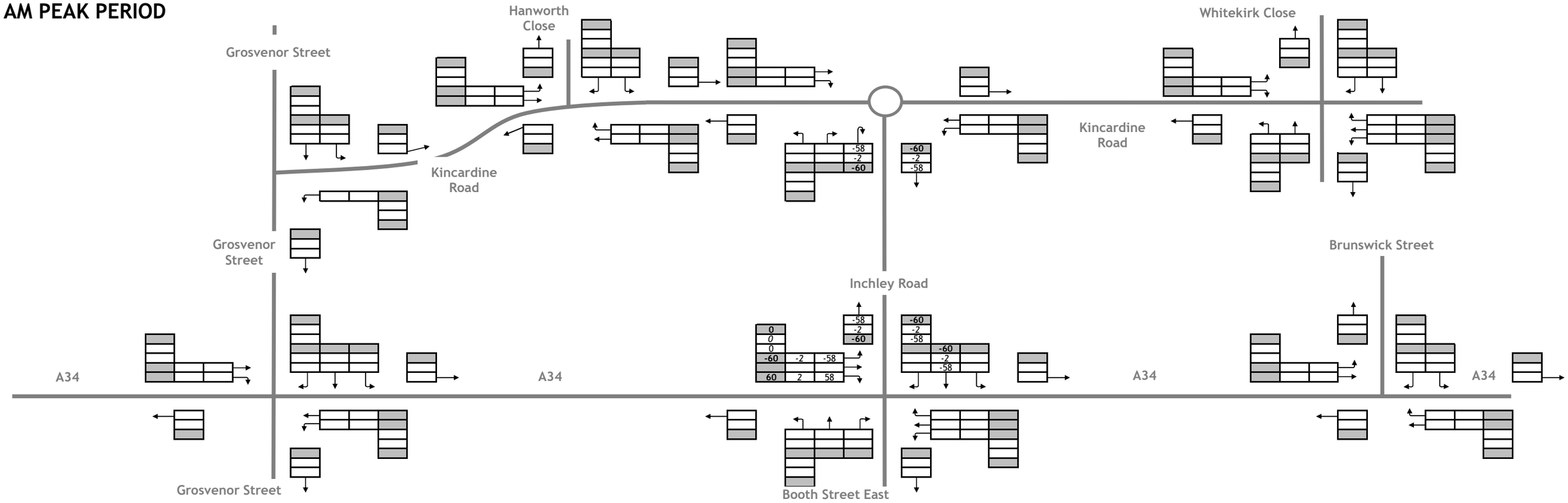
This drawing is the copyright of Focus Transport Planning Ltd. and may not be loaned, copied or reproduced in any way, or used for any offer, quote, tender or construction purposes without prior written consent of the company.

DO NOT SCALE - Follow any figured dimensions.

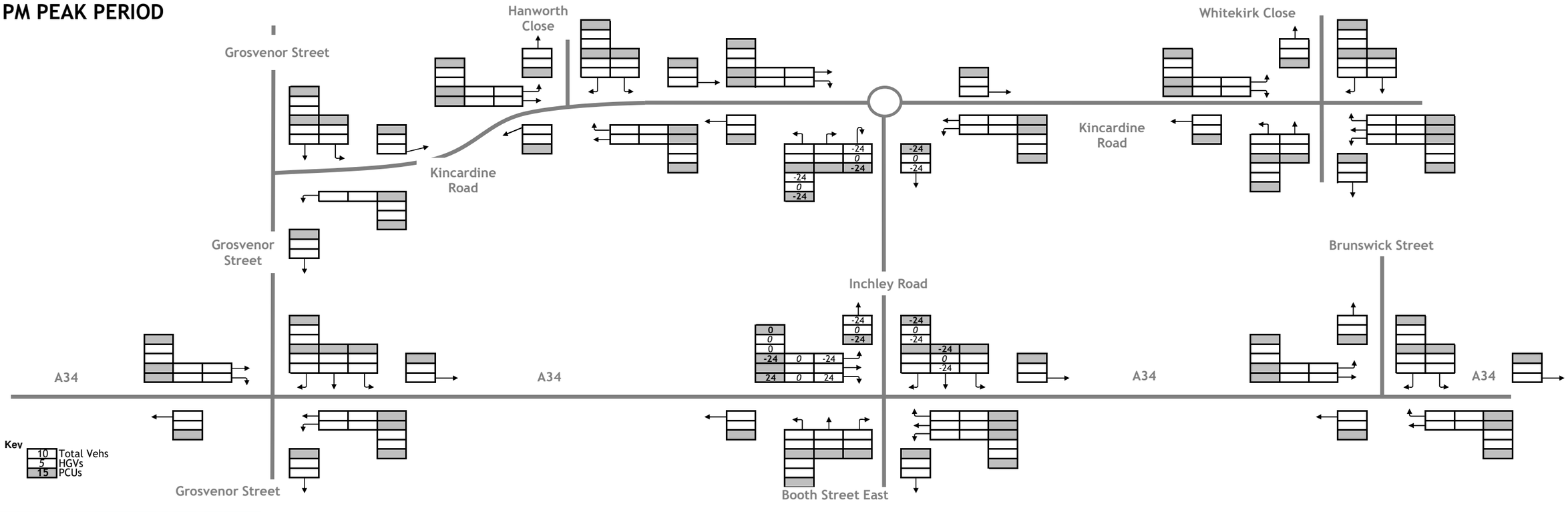
This drawing has been prepared for feasibility purposes and does not represent a construction plan. All design aspects to be confirmed at the appropriate detailed design stage.

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AM PEAK PERIOD



PM PEAK PERIOD

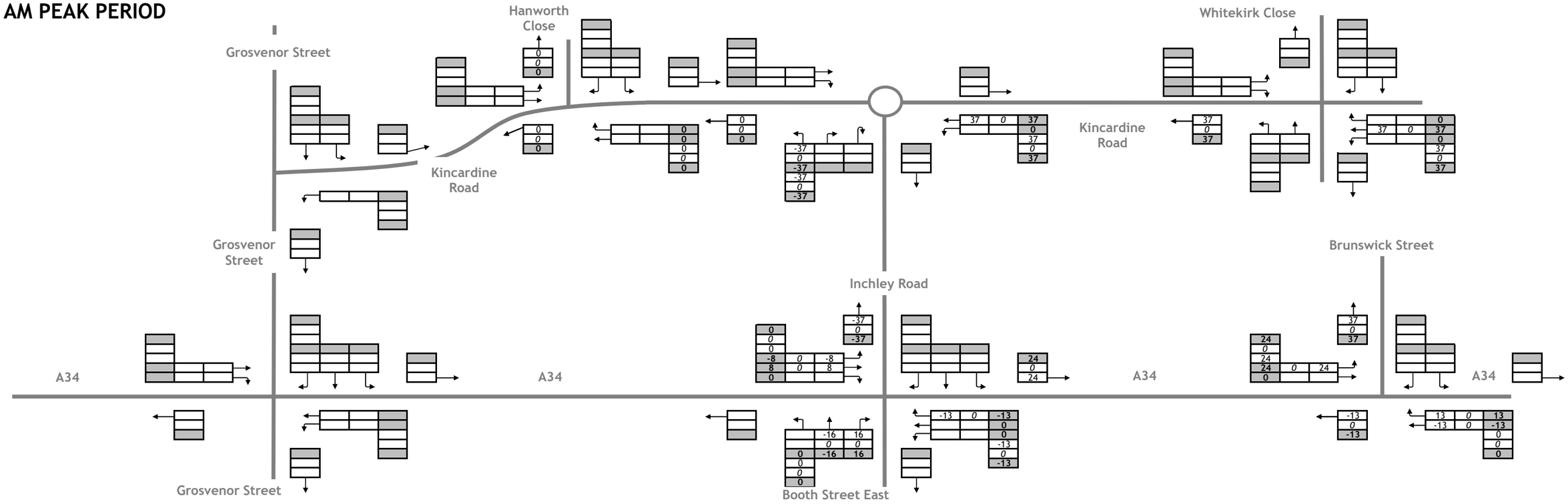


FOCUS TRANSPORT PLANNING

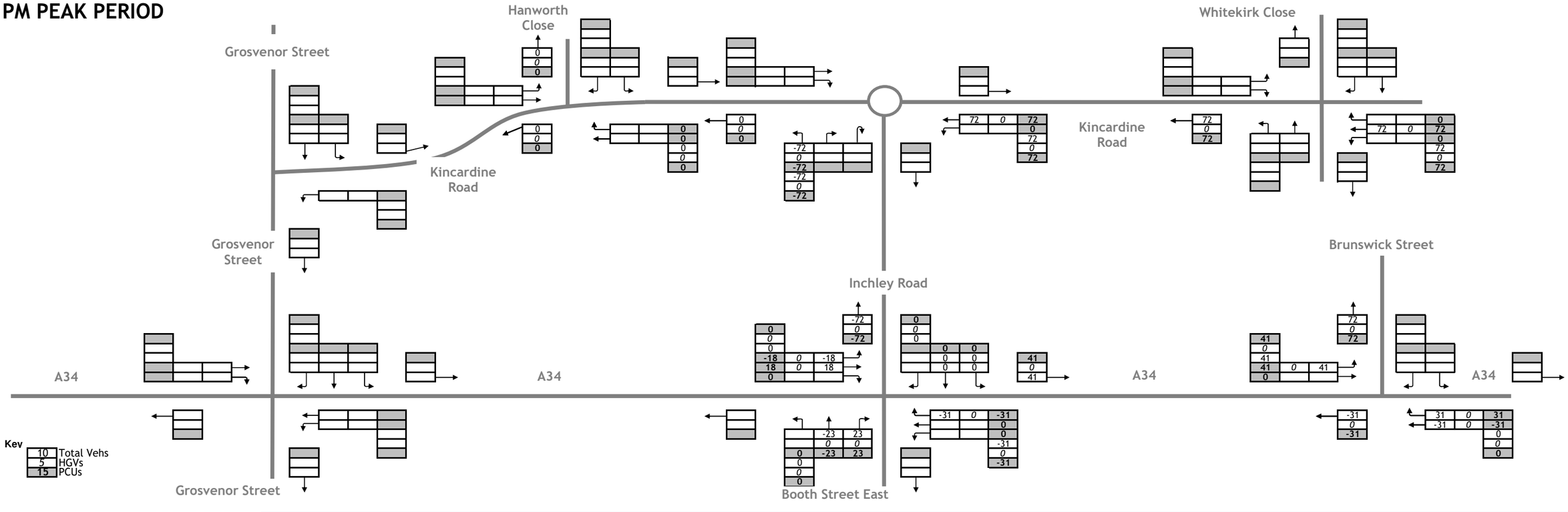
Figure TA18 **Re-assignment of Inchley Road Traffic due to Closure Upper Brook Street to Booth Street East U-turns**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD

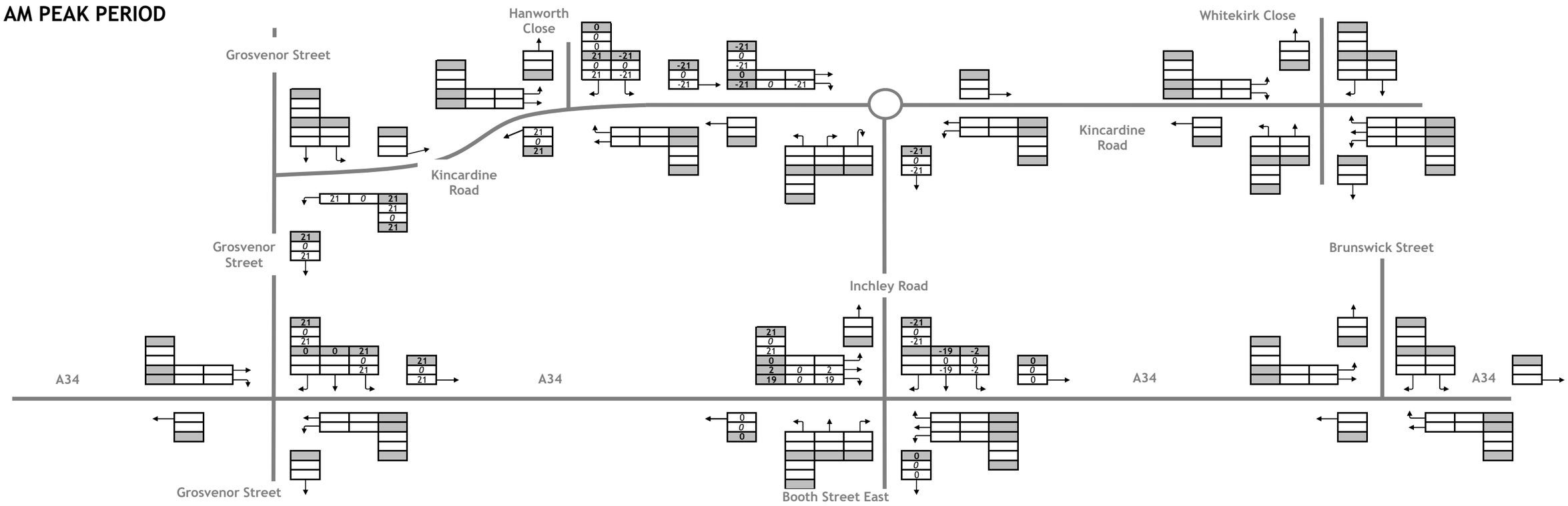


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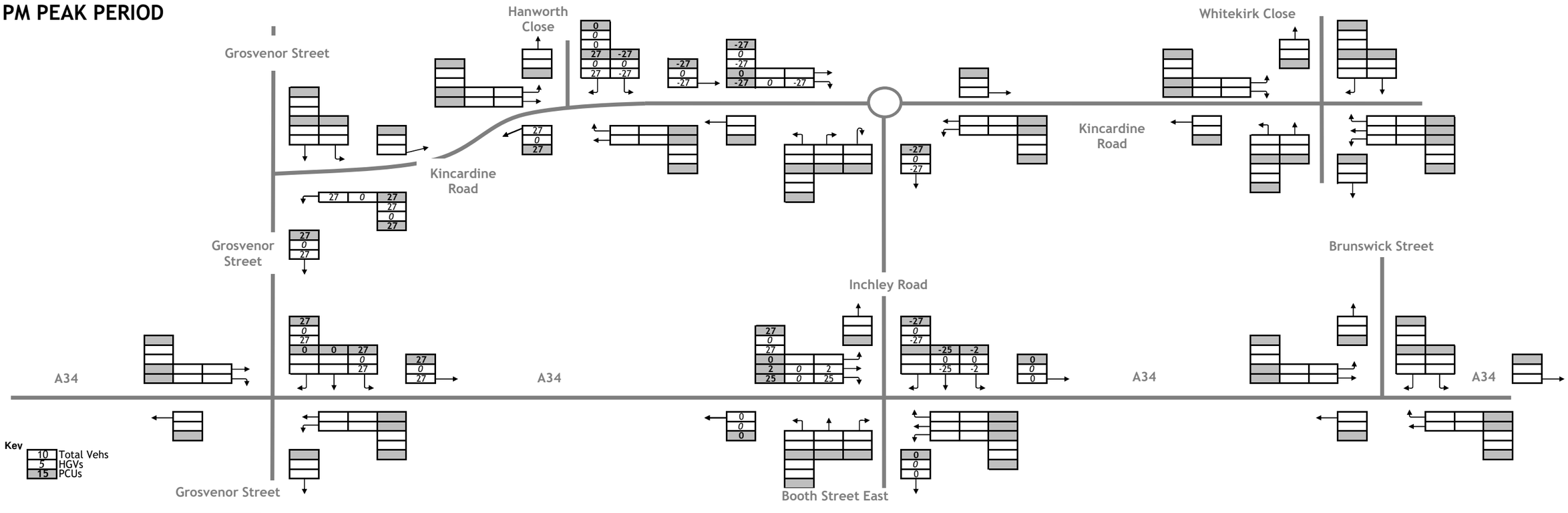
Figure TA19a **Re-Assignment of Inchley Road Traffic due to Closure Hanworth Close - Inbound Traffic**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD

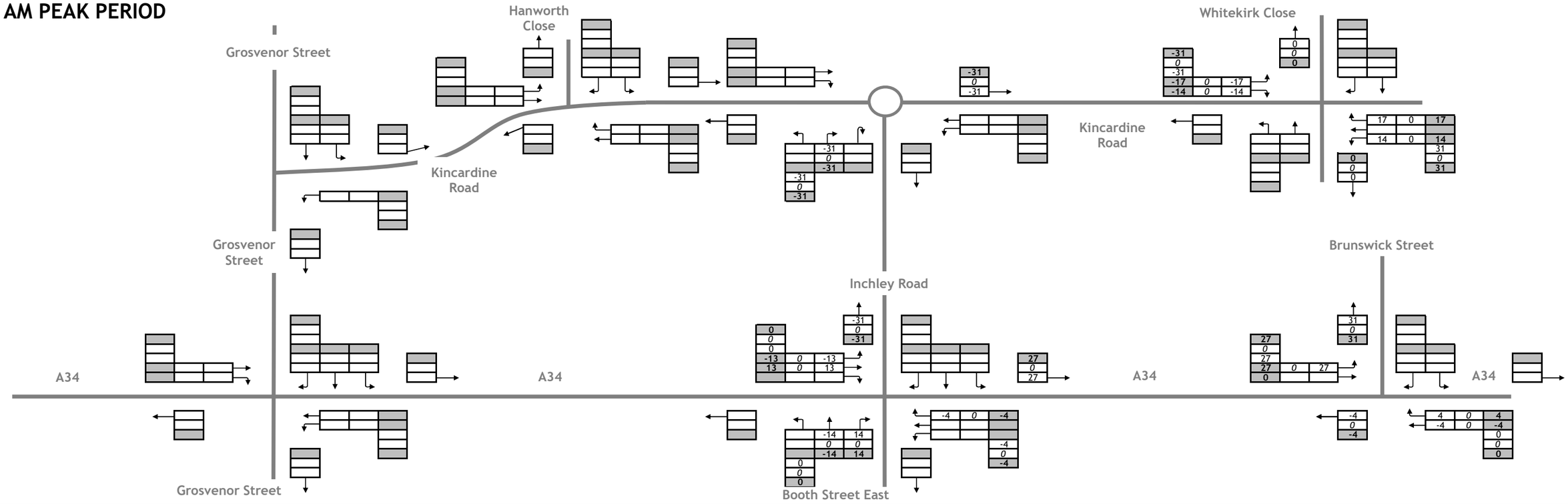


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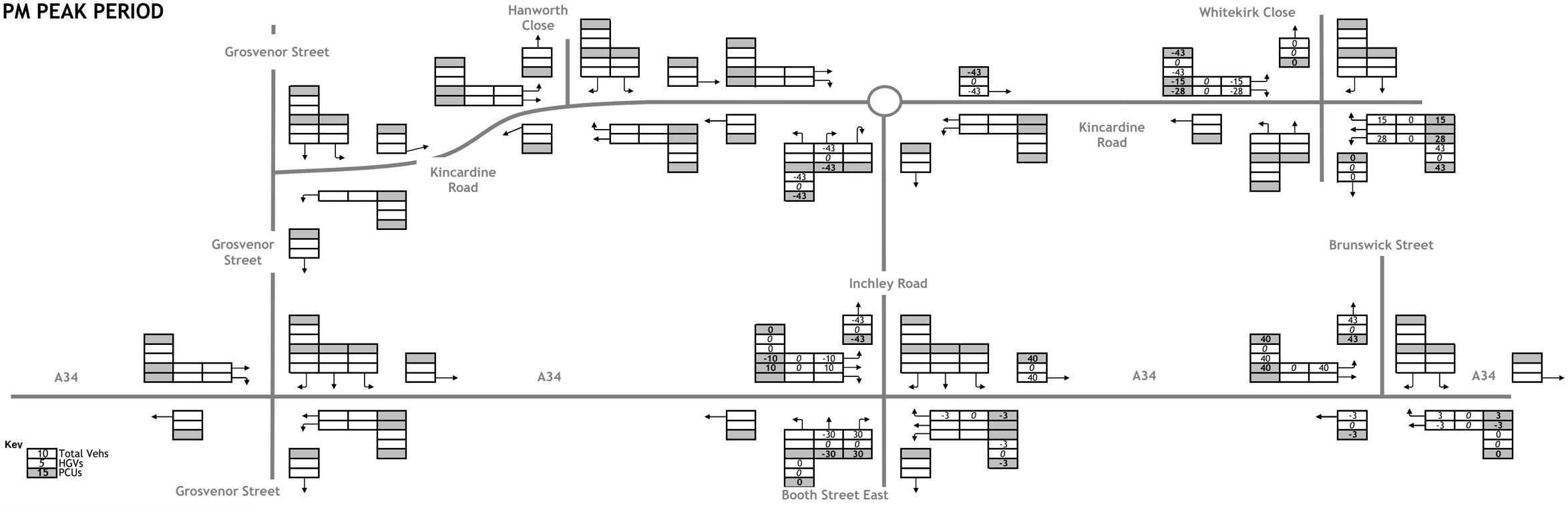
Figure TA19b **Re-assignment of Inchley Road Traffic due to Closure Hanworth Close - Outbound Traffic**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD

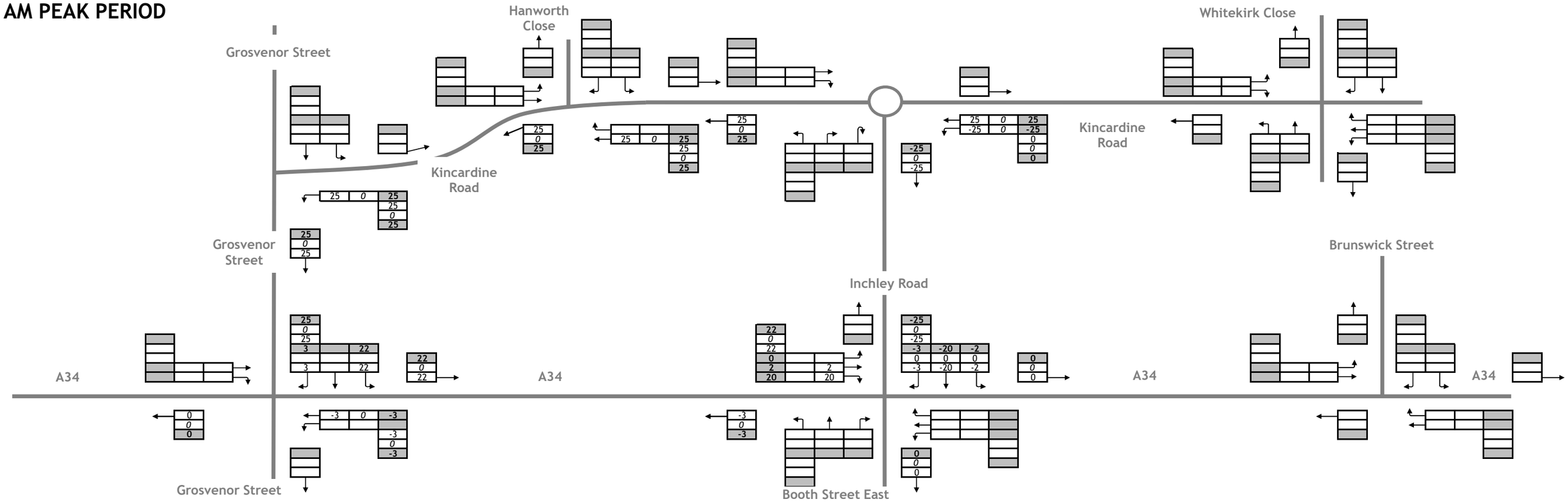


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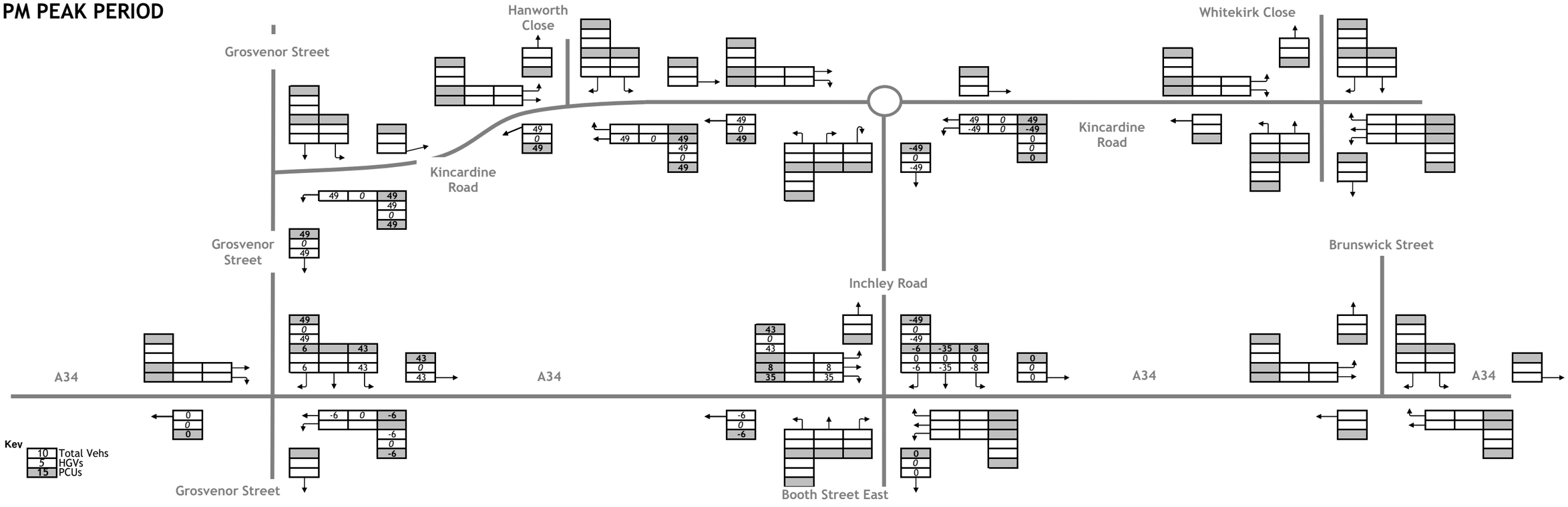
Figure TA20a **Re-assignment of Incley Road Traffic due to Closure Whitekirk Close - Inbound Traffic**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD

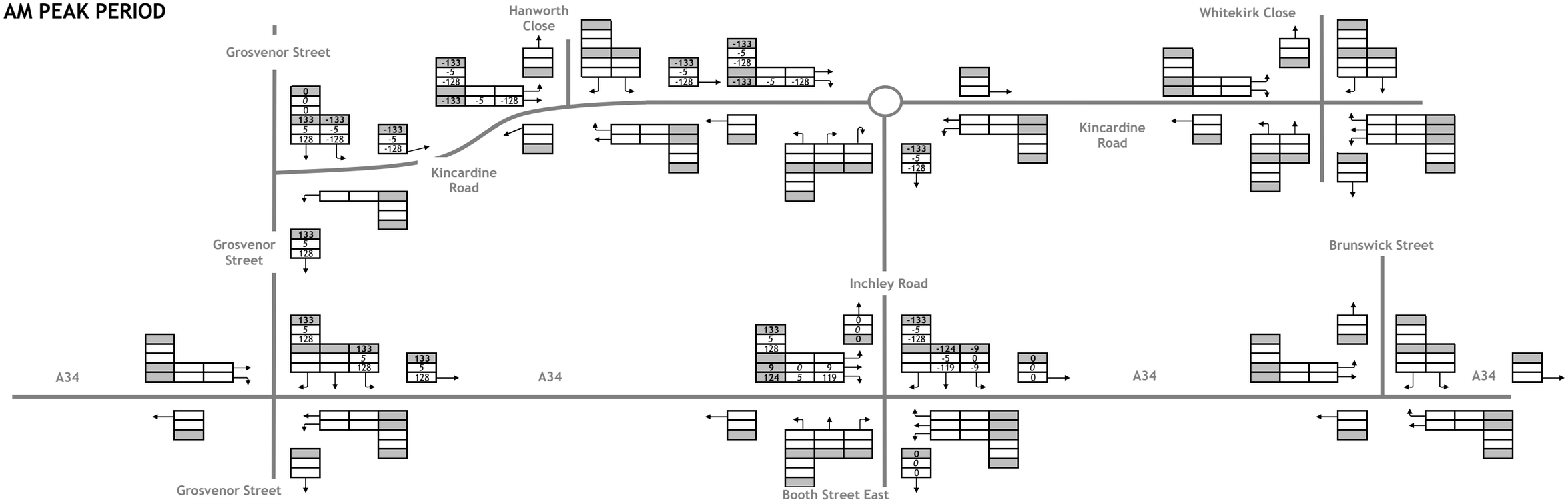


FOCUS TRANSPORT PLANNING

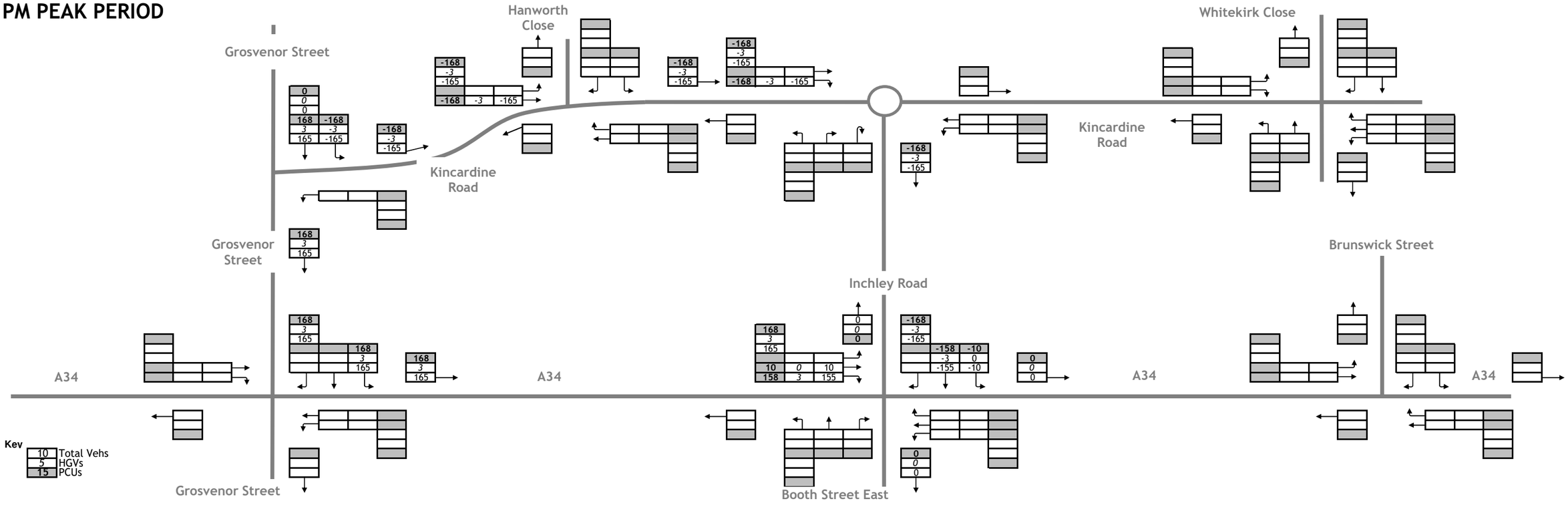
Figure TA20b **Re-assignment of Inchley Road Traffic due to Closure Whitekirk Close - Outbound Traffic**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD

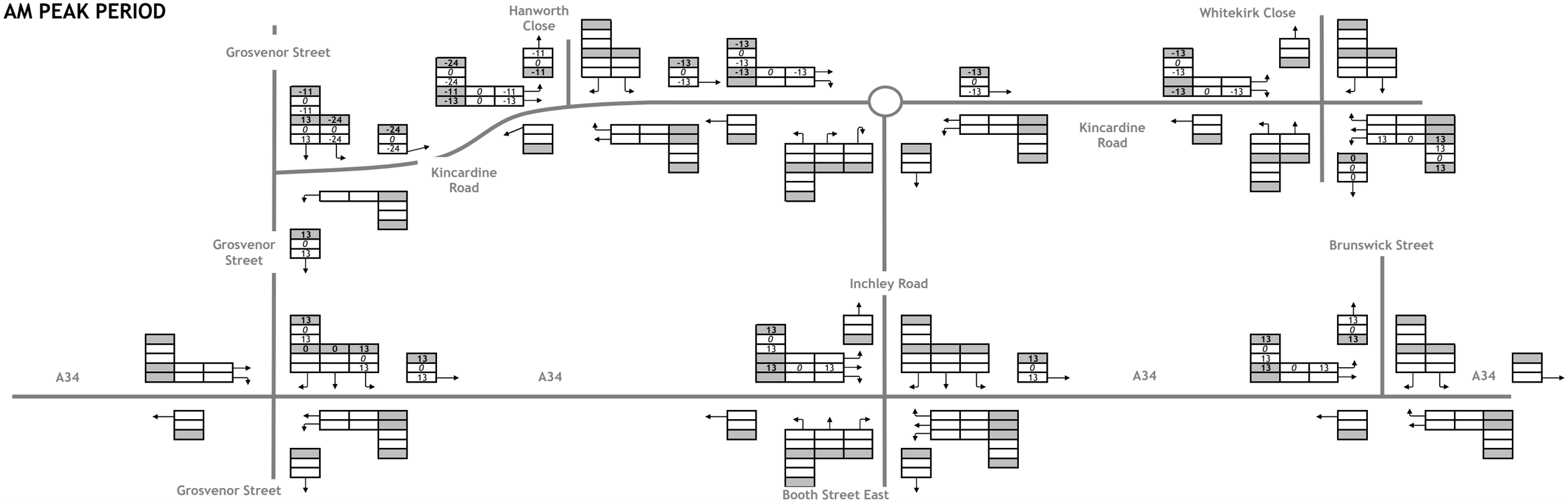


FOCUS TRANSPORT PLANNING

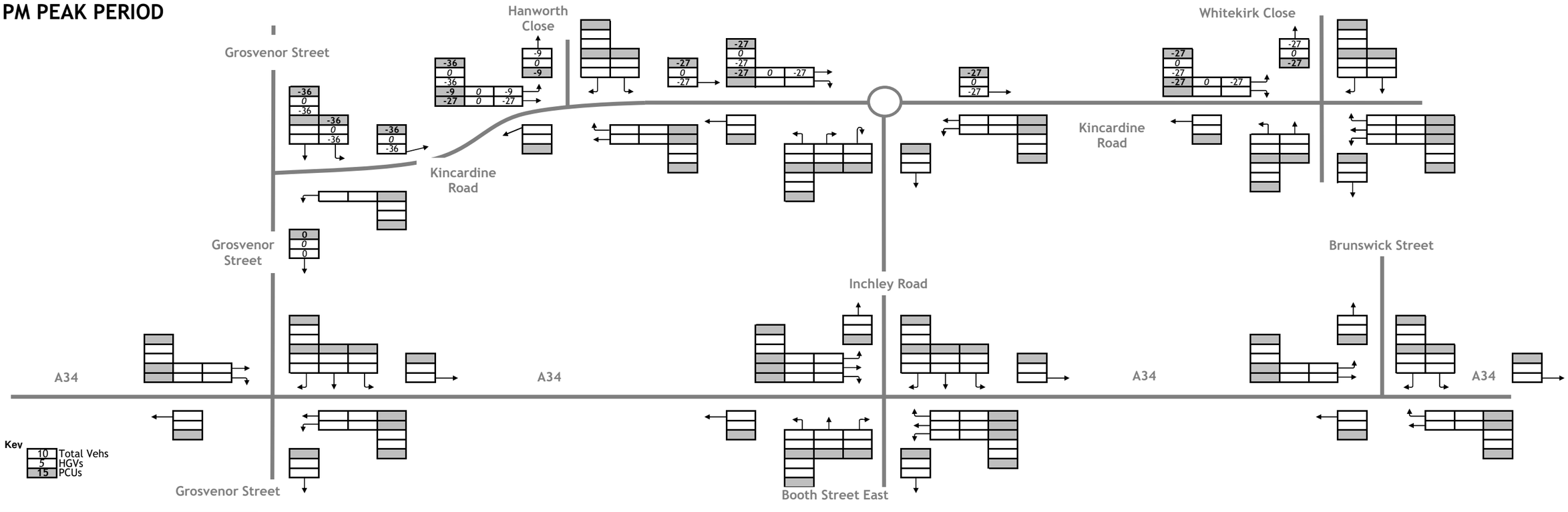
Figure TA21 **Re-assignment of Inchley Road Traffic due to Closure Grosvenor Road (W) Rat-Run Traffic**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD

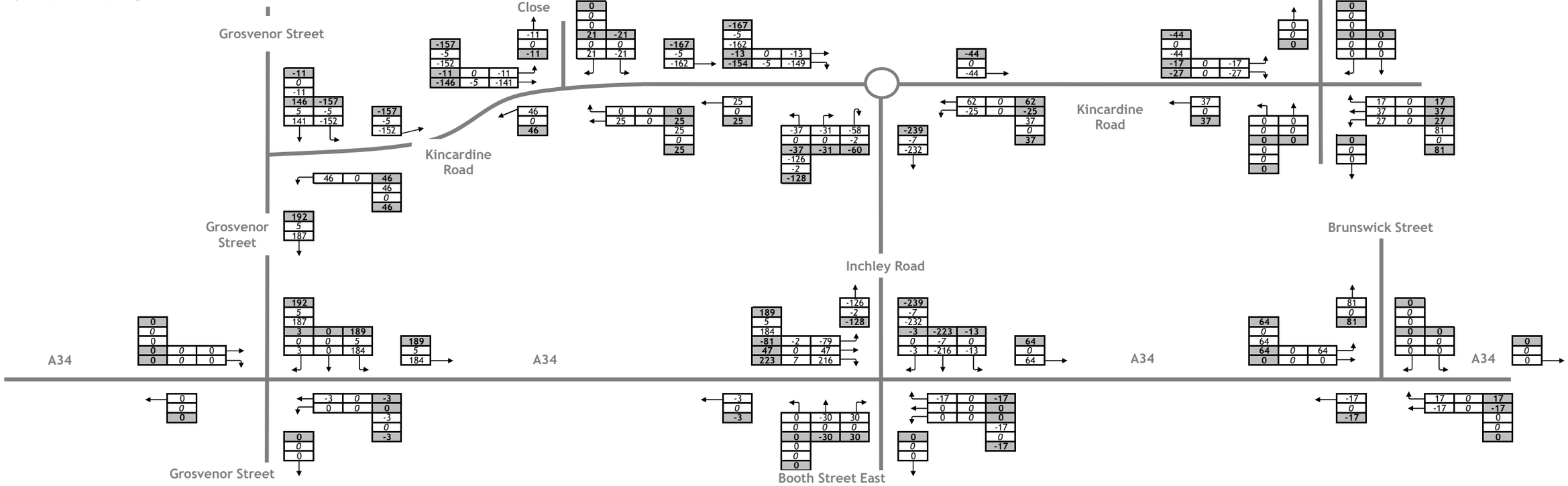


FOCUS TRANSPORT PLANNING

Figure TA22 **Re-Assignment of Kincardine Road Traffic due to Closure: Grosvenor Street (E) to Hanworth Close and Whitekirk Close**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD

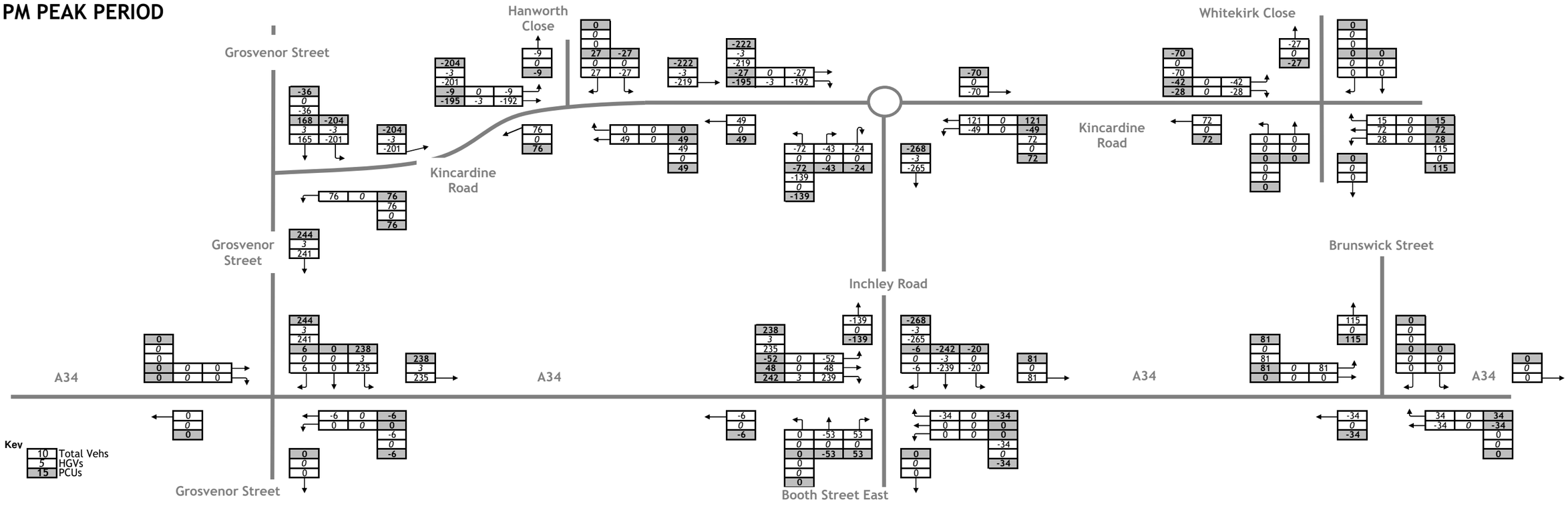
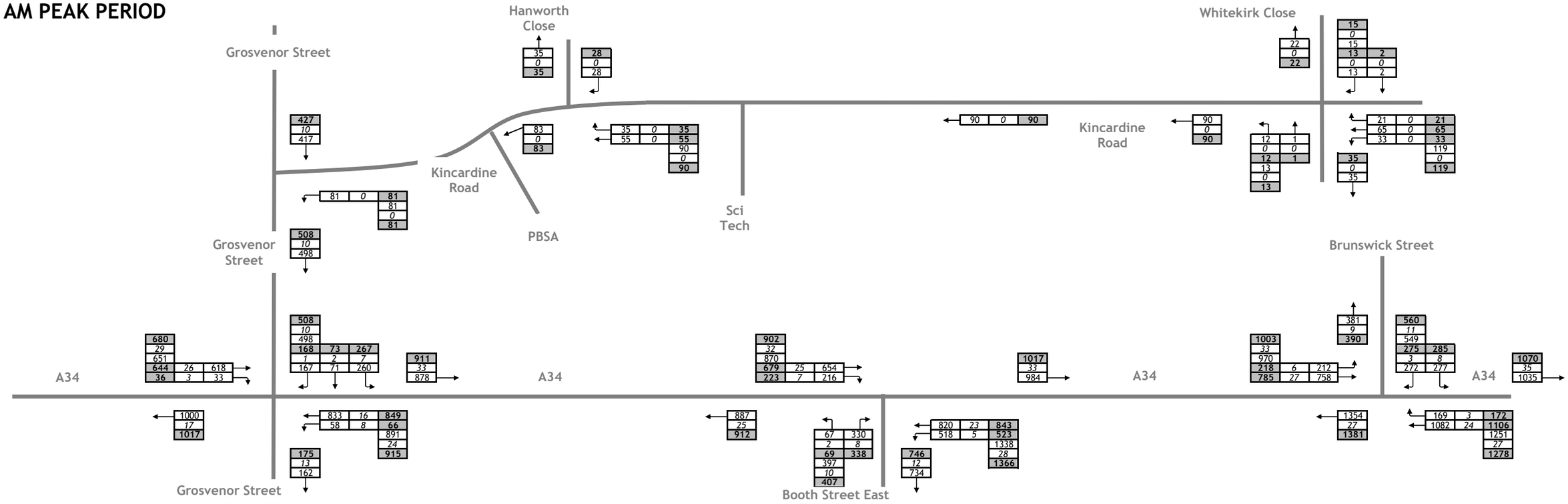


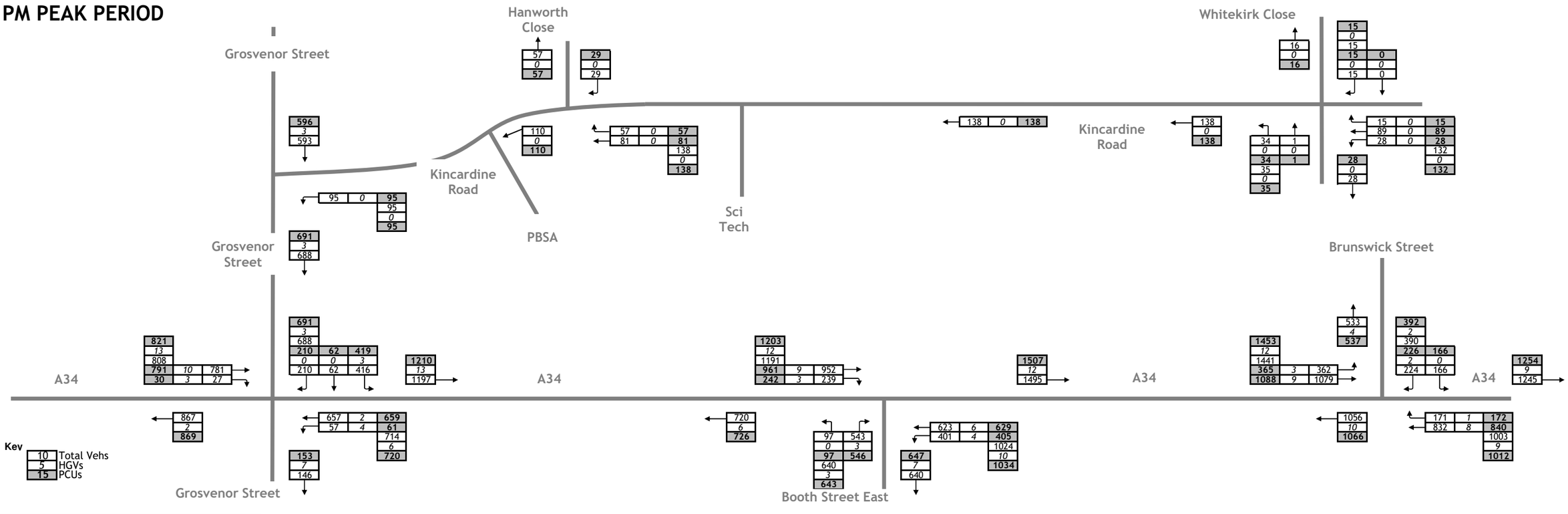
Figure TA23 **Re-assignment of Inchley Road Traffic due to Closure Total Re-assignment**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD



FOCUS TRANSPORT PLANNING

Figure TA24 **Baseline 'With Inchley Road Closure' AM & PM Peak Traffic Flows**

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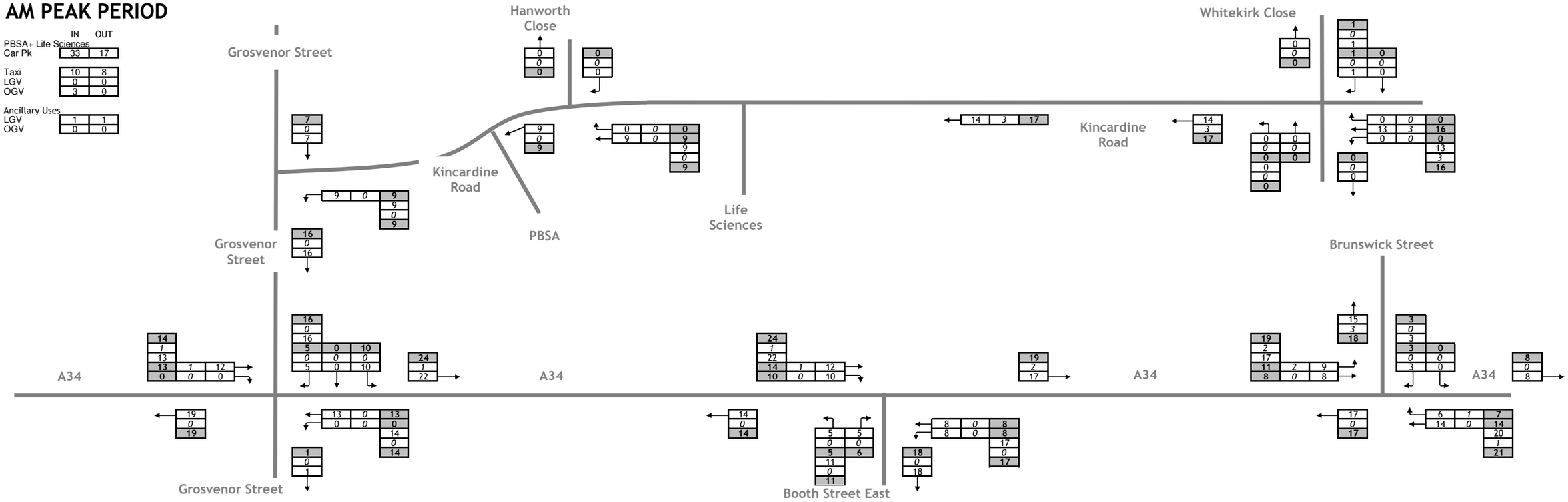
AM PEAK PERIOD

PBSA+ Life Sciences

	IN	OUT
Car Pk	33	17
Taxi	10	8
LGV	0	0
OGV	3	0

Ancillary Uses

LGV	1	1
OGV	0	0



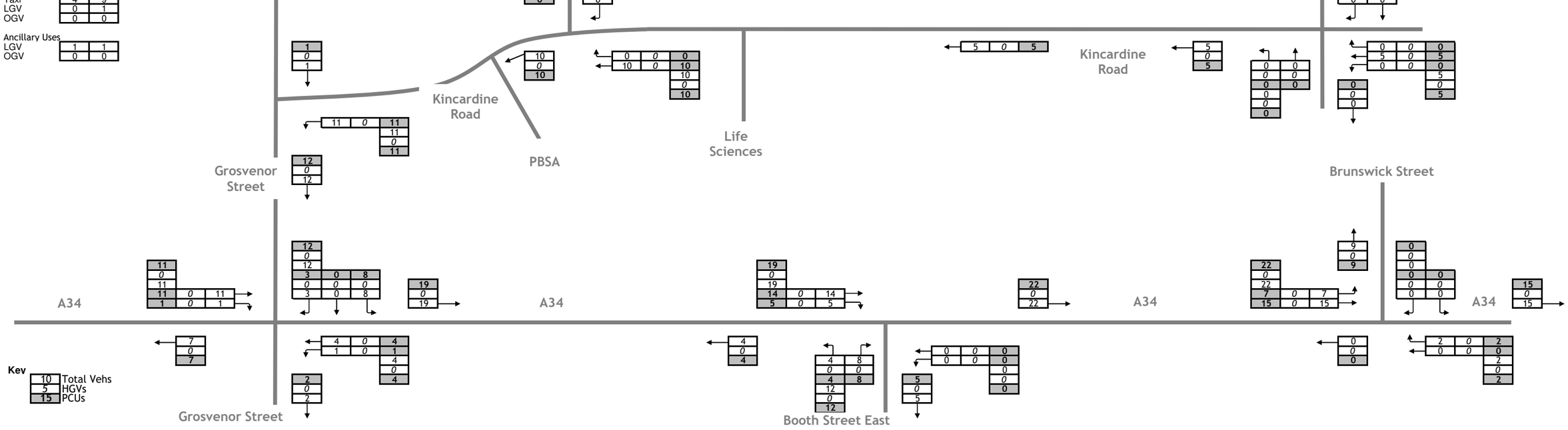
PM PEAK PERIOD

PBSA+ Life Sciences

	IN	OUT
Car Pk	0	28
Taxi	4	9
LGV	0	1
OGV	0	0

Ancillary Uses

LGV	1	1
OGV	0	0



Key

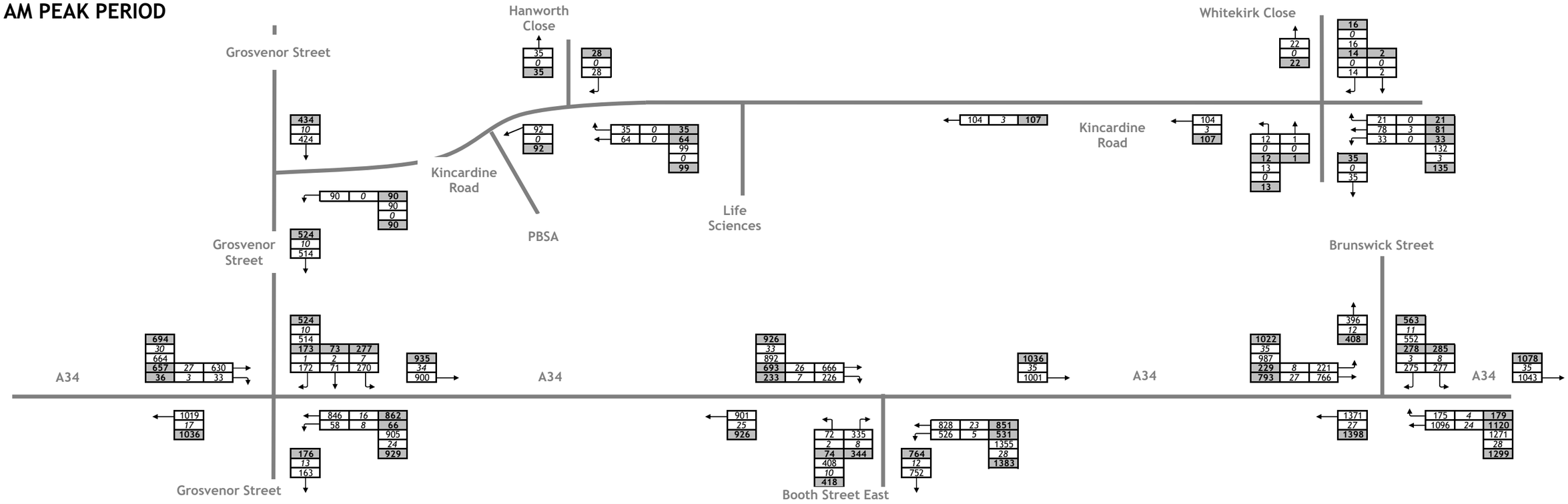
10	Total Vehs
5	HGVs
15	PCUs

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Figure TA25 **Application Scheme Combined Trip Assignment AM & PM Traffic Flows**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD

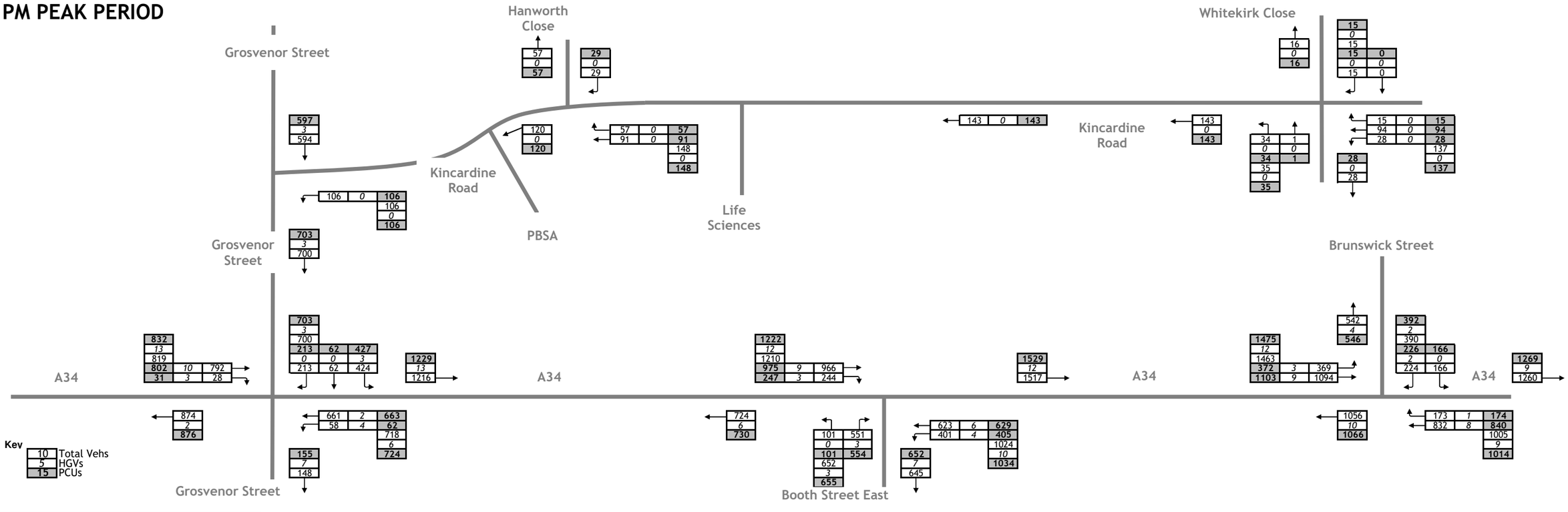
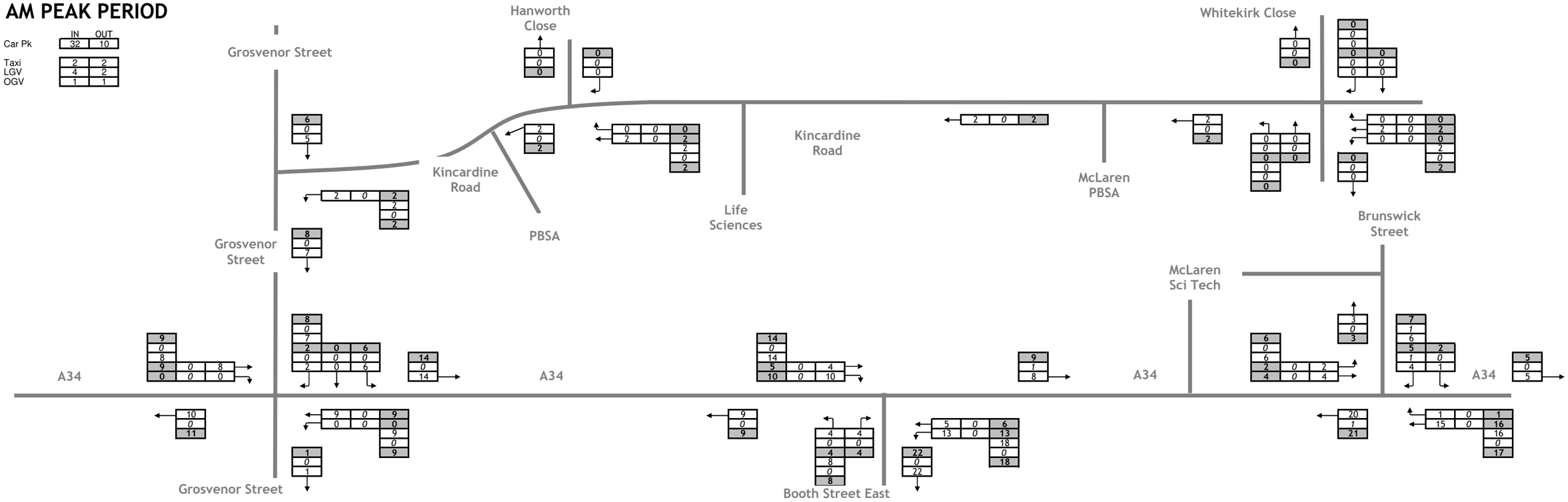


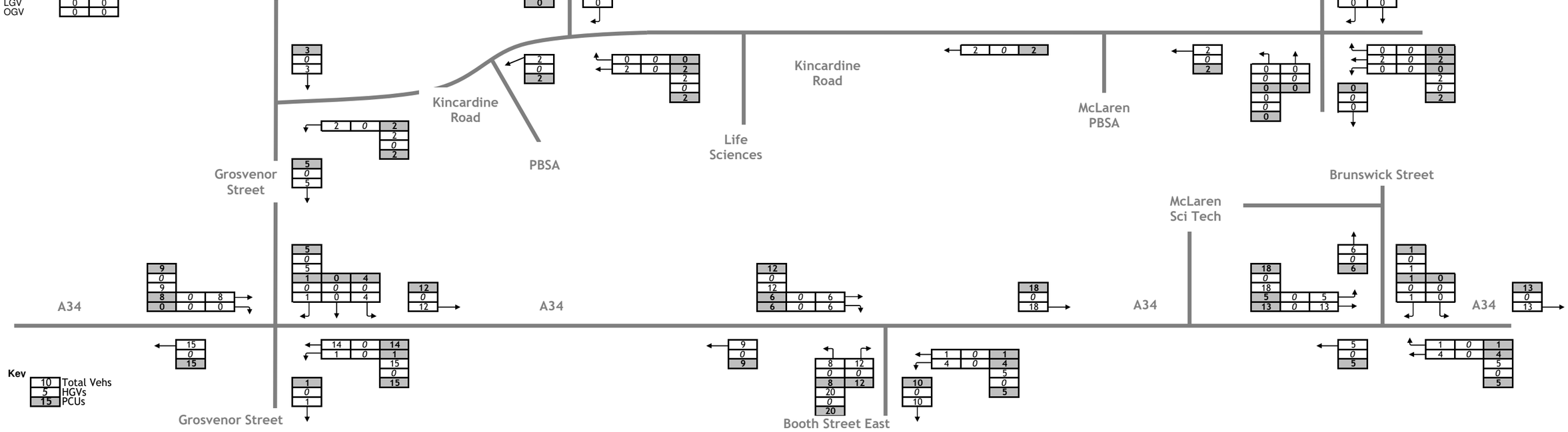
Figure TA26 **Baseline + Application Scheme 'With Development' AM & PM Traffic Flows**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD

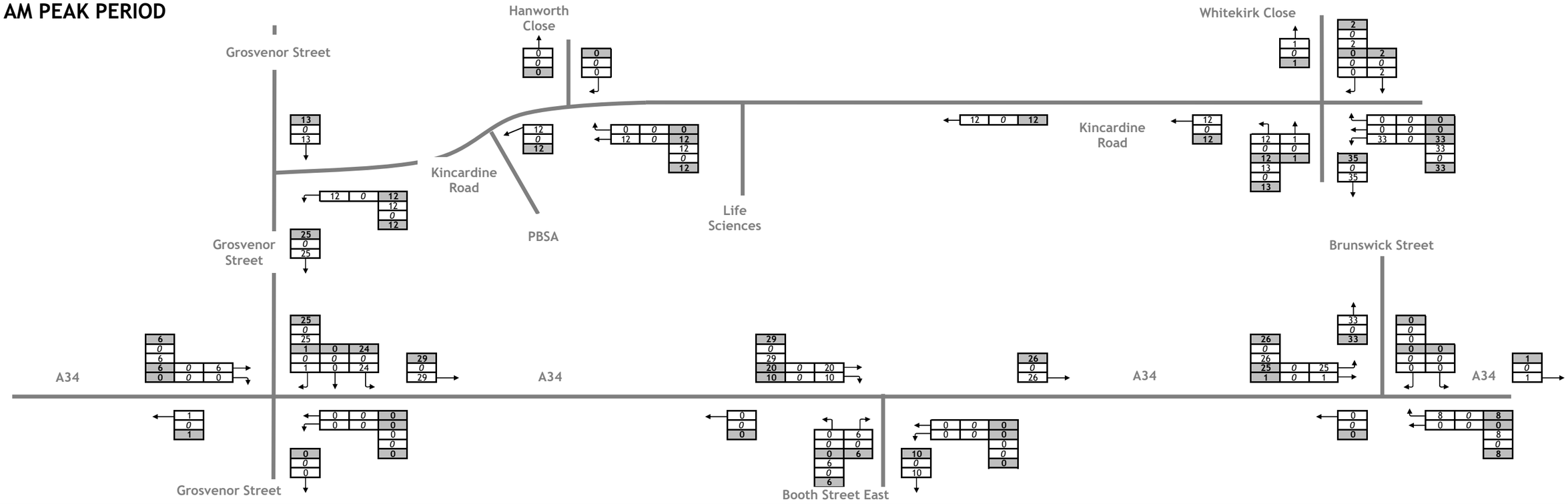


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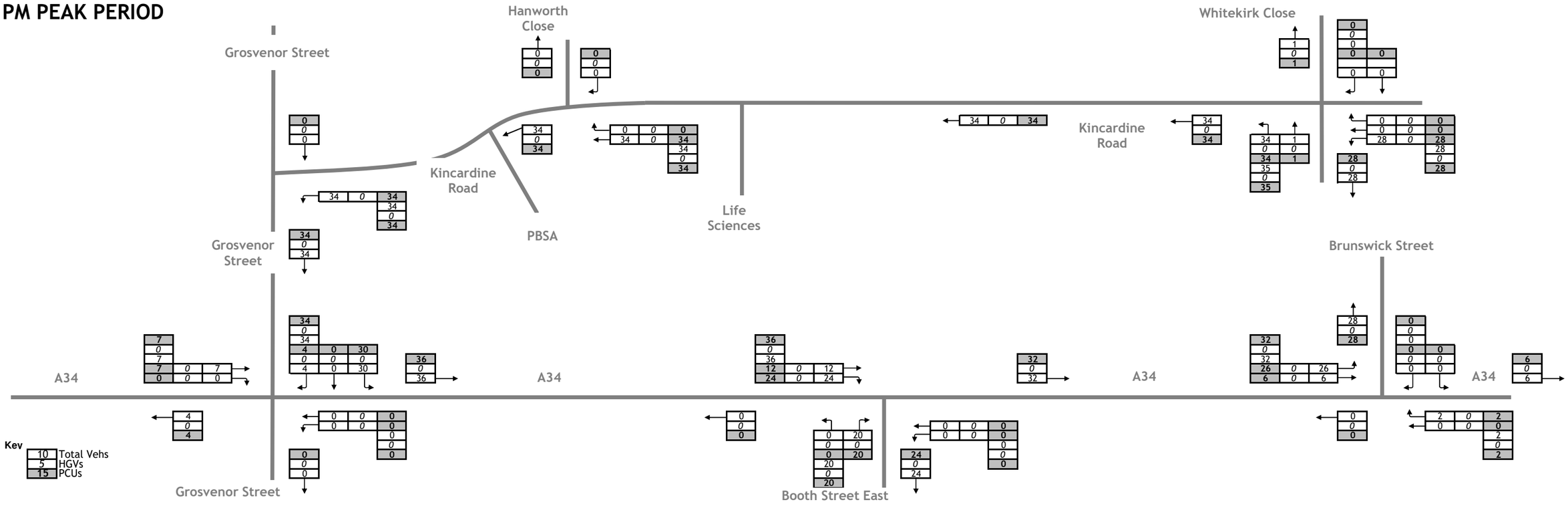
Figure TA27 **Predicted UBS South Development Traffic Movements**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD

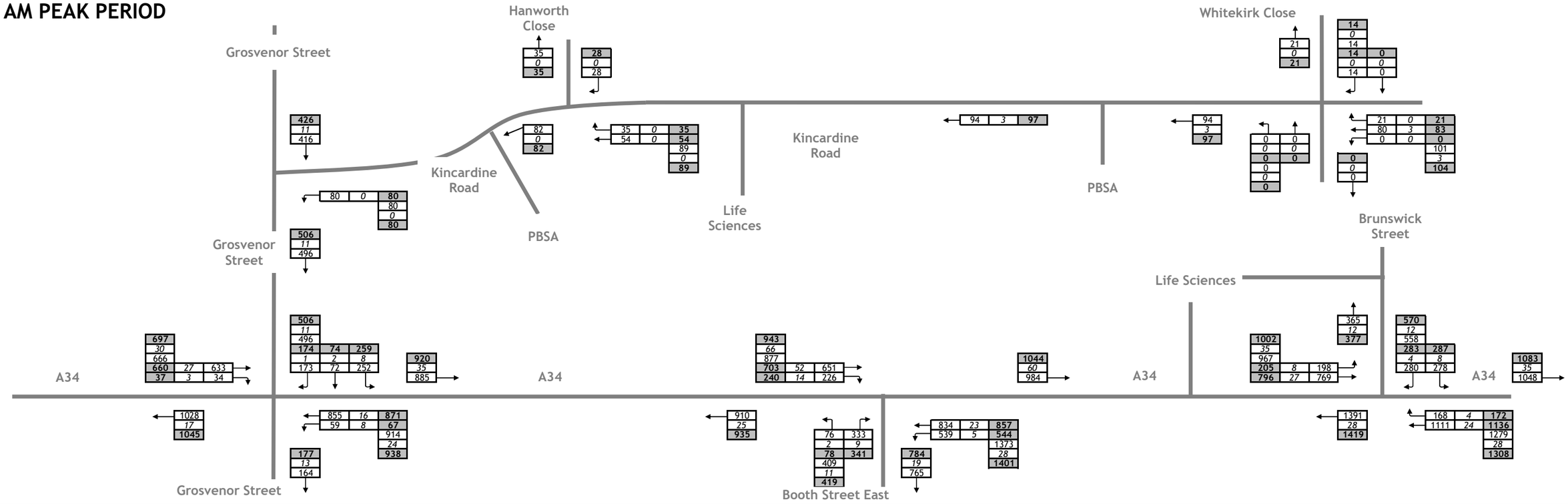


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Figure TA28 **Existing P&D Car Park Trips at UBS South Site**

J000370 Upper Brook Street Masterplan June 2023

AM PEAK PERIOD



PM PEAK PERIOD

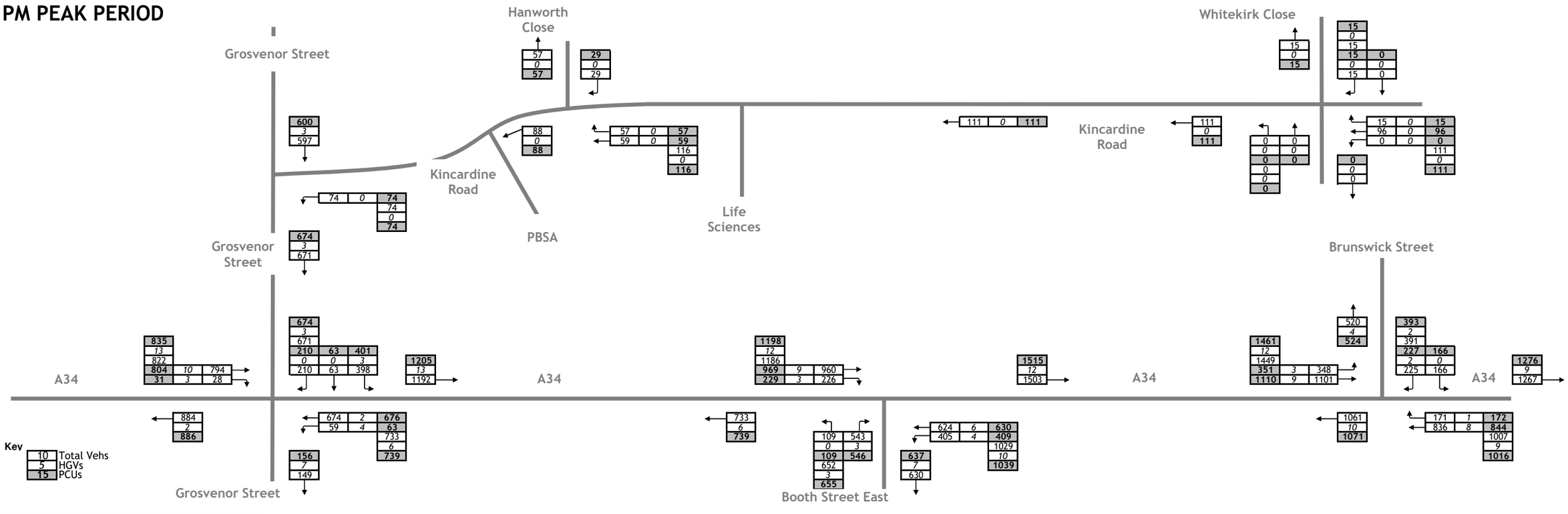
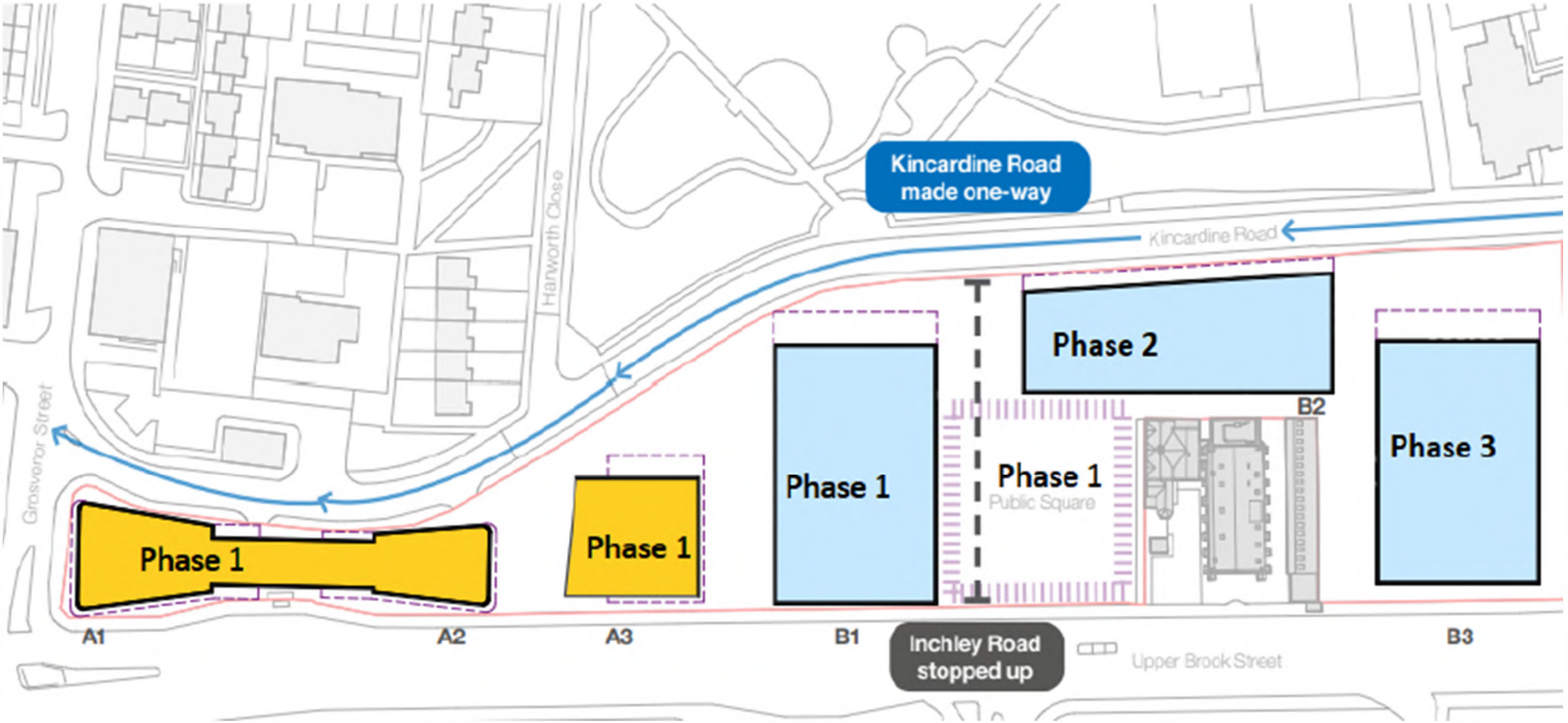


Figure TA29 **Baseline + Cumulative Development 'With Cumulative Development' AM & PM Traffic Flows**

J000370 Upper Brook Street Masterplan June 2023



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Figure TA30 **Proposed Construction Phasing Programme**

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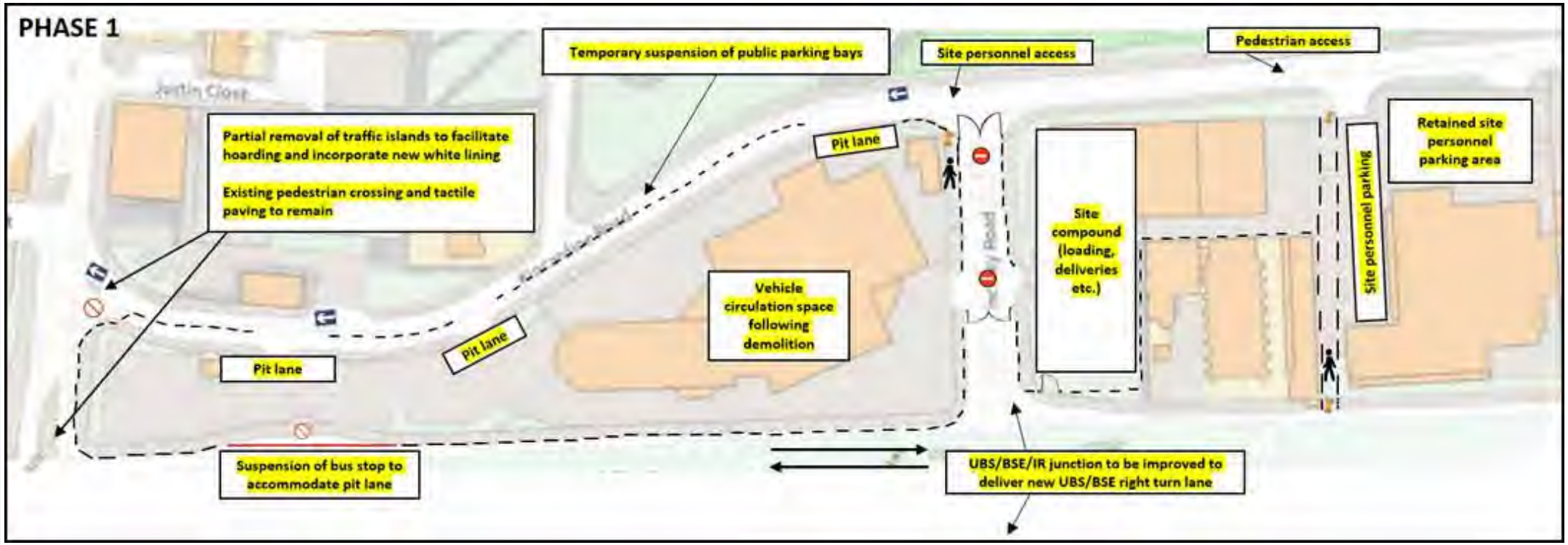
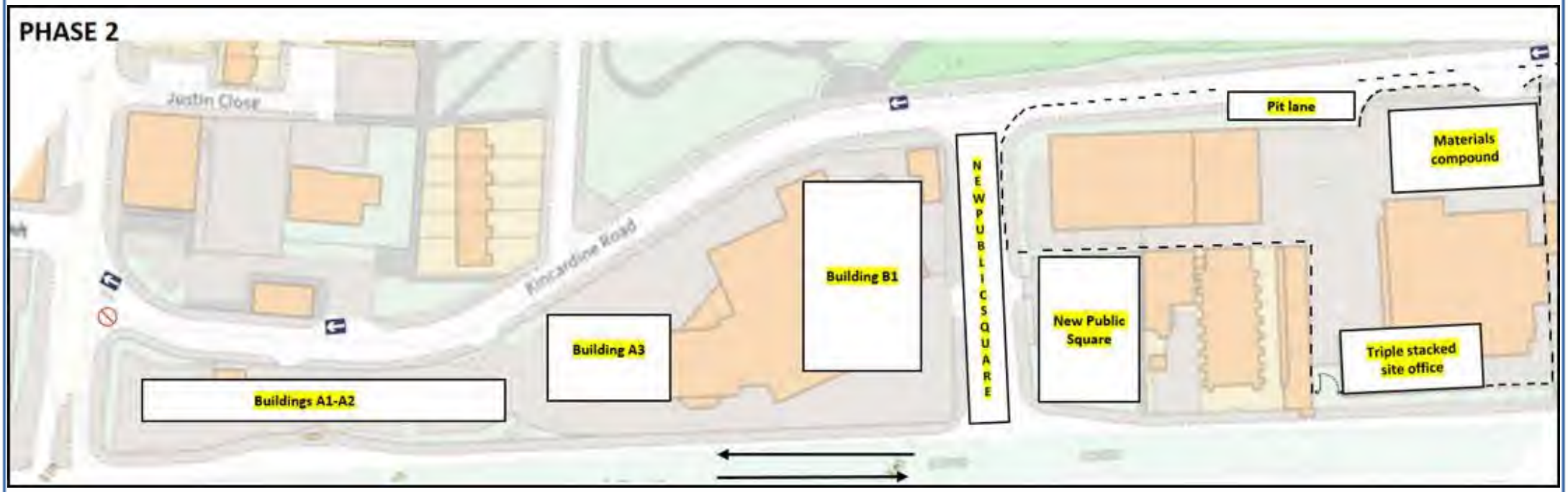


Figure TA31a **Supporting Highway Works to Deliver Proposed Construction Phasing (Phase 1)**

J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023



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Figure TA31b **Supporting Highway Works to Deliver Proposed Construction Phasing (Phase 2)**

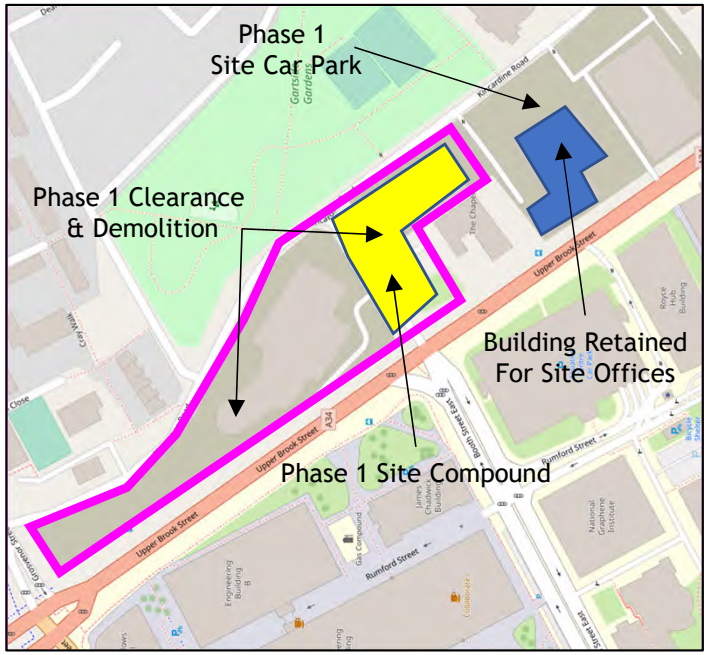
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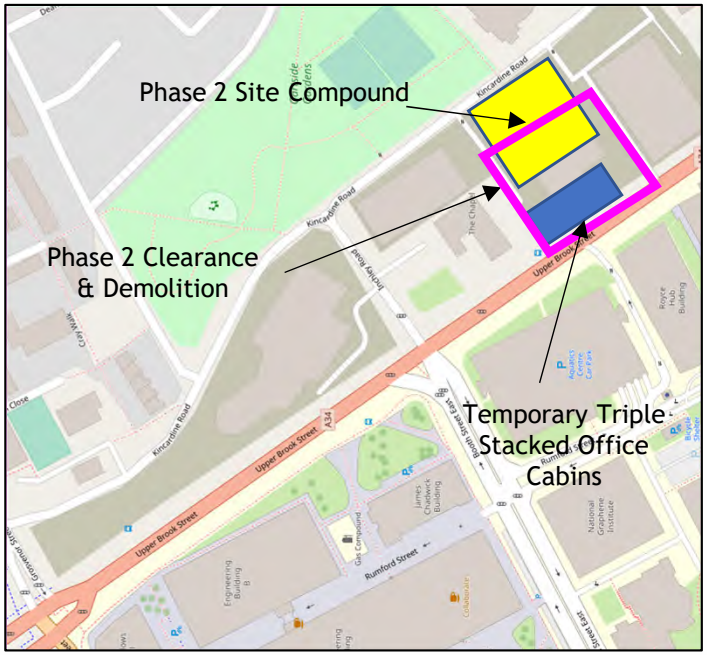
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Figure TA31c **Supporting Highway Works to Deliver Proposed Construction Phasing (Phase 3)**

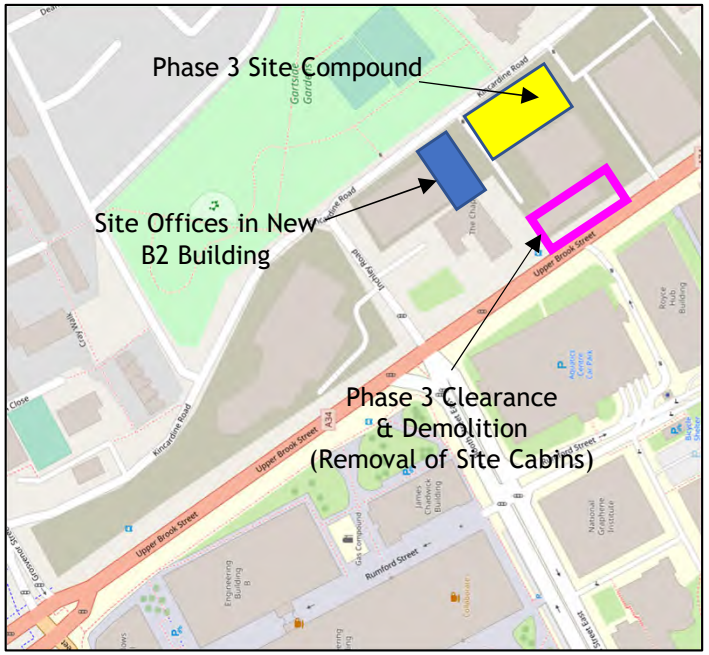
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PHASE 1



PHASE 2



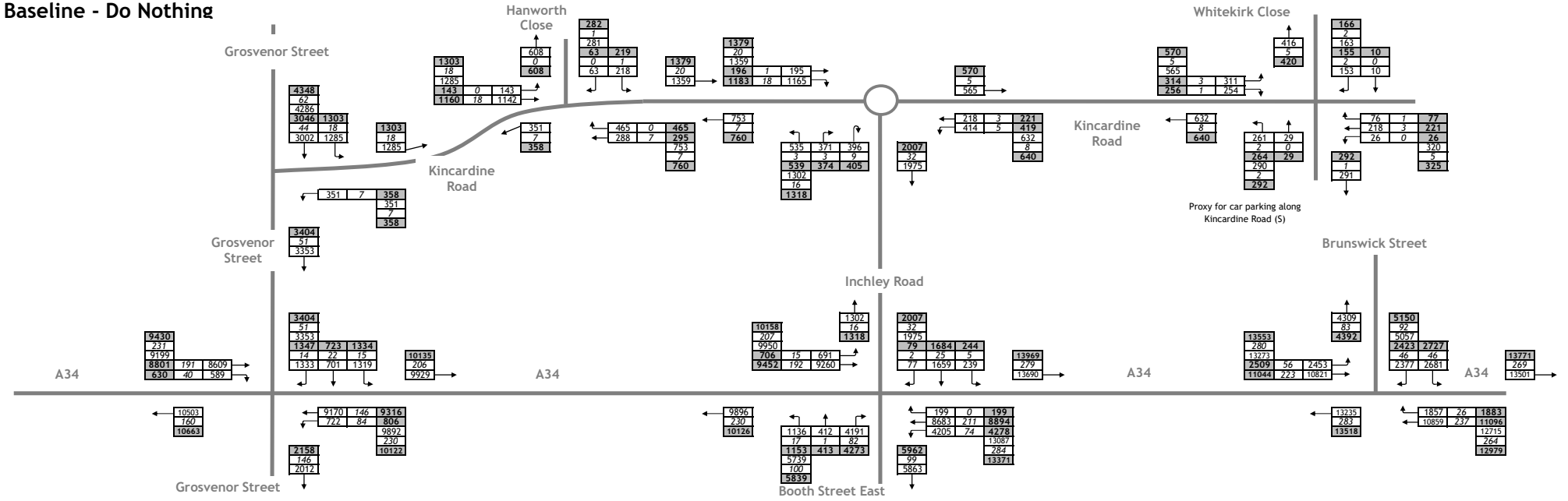
PHASE 3

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Figure TA32 **Proposed Demolition Phasing & Site Arrangements**

J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023

Baseline - Do Nothing



Construction Movements & Local Traffic Management

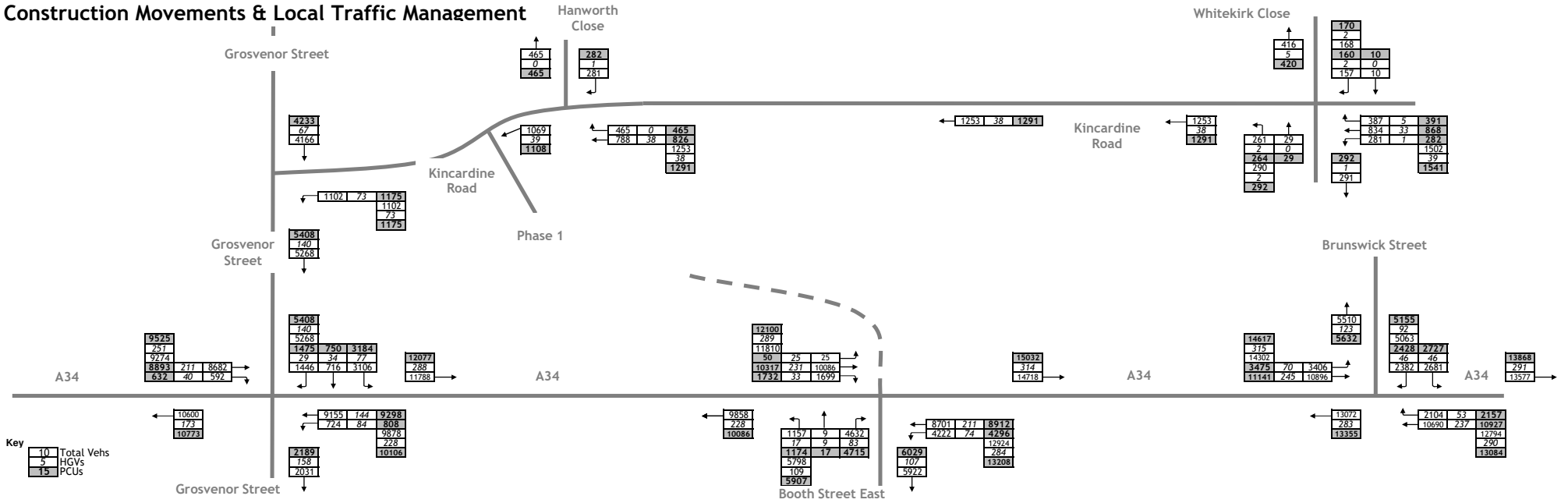


Figure TA33 **Baseline 'Do Nothing' vs 'With Peak Construction Movements (24 Hour)**

J000370 Upper Brook Street Masterplan June 2023



APPENDICES



APPENDIX TA1

Appendix TA1:

Schedule of Pre-Application Highways Discussions with MCC & TfGM Officers

- ***1st November 2022:*** **Initial Pre-Application Meeting**

  Setting out key development principles and the nature of highway improvement that could be required to allow for closure of Inchley Road and allow effective site servicing.

  Attended by MCC Highways, MCC Planning, TfGM and Development Team Representatives.

- ***9th March 2023:*** Focus TP Submit Tech Note HTN01a to MCC / TfGM

  Setting out results of November 2022 traffic survey exercise.

  Analysis of anticipated changes to local traffic flows associated with closure of Inchley Road / one-way extension of Kincardine Road.

  Preliminary junction modelling and suggested improvement layout option at Upper Brook Street / Booth Street East / Inchley Road.

- ***15th March 2023:*** Focus TP Submit Prelim Sketch Plans

  Plans illustrate one-way concept options for Kincardine Road and location of proposed servicing and disabled parking.

- **16th March 2023: Pre-App Meeting 2**

  Discussion of submitted Technical Note and Sketch Drawings.

  Attended by MCC Highways, MCC Planning, TfGM and Development Team Representatives.

- **11th April 2023: Pre-App Meeting 3**

  Conformation of one-way extension principles and identification of preliminary assessment scope / requirements and required formal documentation.

  Attended by MCC Highways, MCC Planning TfGM and Development Team Representatives.

- ***25th April 2023:*** Focus TP Submit Additional Information on Emerging Parking Strategy on Kincardine Road

  Information to MCC as requested at meeting of 11/04/23 to confirm proposed extent and location of disabled parking and retained P&D / Designated Residents Parking

- ***27 April 2023:*** Focus TP Submit Tech Note HTN03 to MCC / TfGM

  Setting out predicted trip rate and trip assignment methodology and anticipated scope of future Transport Assessment report.

- **14th May 2023: Pre-App Meeting 4**

  Discussion of detailed technical matters following MCC / TfGM review of Scoping Note 03 and detailed comments on junction modelling & assessment parameters.

  Discussion of revised junction arrangements at A34 Upper Brook Street / Booth Street East junction and incorporation improved pedestrian arrangements.

  Attended by MCC Highways, TfGM and Focus TP



APPENDIX TA2

Calculation Reference: AUDIT-506501-230421-0445

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 14 - CAR SHOW ROOMS
Category : A - CAR SHOW ROOMS
TOTAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	EX	ESSEX	1 days
	SO	SLOUGH	1 days
	WS	WEST SUSSEX	1 days
03	SOUTH WEST		
	SD	SWINDON	1 days
05	EAST MIDLANDS		
	LE	LEICESTERSHIRE	1 days
06	WEST MIDLANDS		
	WM	WEST MIDLANDS	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	WY	WEST YORKSHIRE	1 days
08	NORTH WEST		
	AC	CHESHIRE WEST & CHESTER	1 days
11	SCOTLAND		
	GC	GLASGOW CITY	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 1050 to 4660 (units: sqm)
Range Selected by User: 1000 to 9800 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/14 to 25/11/19

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	1 days
Wednesday	3 days
Thursday	1 days
Friday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	9 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town Centre	1
Suburban Area (PPS6 Out of Centre)	2
Edge of Town	4
Neighbourhood Centre (PPS6 Local Centre)	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	3
Development Zone	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	1 days - Selected
Servicing vehicles Excluded	8 days - Selected

Secondary Filtering selection:

Use Class:

Sui Generis	9 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:

All Surveys Included

Population within 1 mile:

5,001 to 10,000	1 days
10,001 to 15,000	1 days
15,001 to 20,000	1 days
20,001 to 25,000	2 days
25,001 to 50,000	4 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

50,001 to 75,000	1 days
75,001 to 100,000	2 days
125,001 to 250,000	3 days
250,001 to 500,000	2 days
500,001 or More	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	7 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	9 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	9 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 AC-14-A-01 EVANS HALSHAW FORD CHESHIRE WEST & CHESTER
STADIUM WAY
CHESTER
SEALAND IND. ESTATE
Edge of Town
Industrial Zone
Total Gross floor area: 1050 sqm
Survey date: WEDNESDAY 12/11/14 Survey Type: MANUAL

2 EX-14-A-02 KIA ESSEX
BRAINTREE ROAD
BRAINTREE

Edge of Town
Development Zone
Total Gross floor area: 1275 sqm
Survey date: FRIDAY 08/07/16 Survey Type: MANUAL

3 GC-14-A-01 LAND ROVER GLASGOW CITY
MARYHILL ROAD
GLASGOW

Neighbourhood Centre (PPS6 Local Centre)
No Sub Category
Total Gross floor area: 4660 sqm
Survey date: MONDAY 25/11/19 Survey Type: MANUAL

4 LE-14-A-05 HONDA LEICESTERSHIRE
45-49 COVENTRY ROAD
LEICESTER
NARBOROUGH
Edge of Town
Industrial Zone
Total Gross floor area: 1300 sqm
Survey date: TUESDAY 04/11/14 Survey Type: MANUAL

5 SD-14-A-01 MERCEDES BENZ SWINDON
GREAT WESTERN WAY
SWINDON

Suburban Area (PPS6 Out of Centre)
Retail Zone
Total Gross floor area: 3250 sqm
Survey date: WEDNESDAY 21/09/16 Survey Type: MANUAL

6 SO-14-A-01 JAGUAR LAND ROVER SLOUGH
LEIGH ROAD
SLOUGH
SLOUGH TRADING ESTATE
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 3772 sqm
Survey date: MONDAY 09/07/18 Survey Type: MANUAL

7 WM-14-A-05 EVANS HALSHAW WEST MIDLANDS
HAGLEY ROAD
STOURBRIDGE

Edge of Town Centre
Built-Up Zone
Total Gross floor area: 2028 sqm
Survey date: WEDNESDAY 29/11/17 Survey Type: MANUAL

8 WS-14-A-03 FORD WEST SUSSEX
BROUGHAM ROAD
WORTHING

Edge of Town
Residential Zone
Total Gross floor area: 1450 sqm
Survey date: FRIDAY 17/10/14 Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

9 WY-14-A-04 PEUGEOT WEST YORKSHIRE
LEEDS ROAD
NEAR DEWSBURY
WOODKIRK
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Gross floor area: 1122 sqm
Survey date: THURSDAY *15/09/16* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 14 - CAR SHOW ROOMS/A - CAR SHOW ROOMS
TOTAL VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	2348	0.511	8	2348	0.064	8	2348	0.575
08:00 - 09:00	9	2212	1.165	9	2212	0.382	9	2212	1.547
09:00 - 10:00	9	2212	0.754	9	2212	0.713	9	2212	1.467
10:00 - 11:00	9	2212	0.794	9	2212	0.593	9	2212	1.387
11:00 - 12:00	9	2212	0.733	9	2212	0.688	9	2212	1.421
12:00 - 13:00	9	2212	0.683	9	2212	0.743	9	2212	1.426
13:00 - 14:00	9	2212	0.703	9	2212	0.603	9	2212	1.306
14:00 - 15:00	9	2212	0.648	9	2212	0.728	9	2212	1.376
15:00 - 16:00	9	2212	0.522	9	2212	0.608	9	2212	1.130
16:00 - 17:00	9	2212	0.643	9	2212	0.859	9	2212	1.502
17:00 - 18:00	9	2212	0.347	9	2212	0.914	9	2212	1.261
18:00 - 19:00	9	2212	0.100	9	2212	0.623	9	2212	0.723
19:00 - 20:00	3	2579	0.000	3	2579	0.142	3	2579	0.142
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			7.603			7.660			15.263

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

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Parameter summary

Trip rate parameter range selected:	1050 - 4660 (units: sqm)
Survey date date range:	01/01/14 - 25/11/19
Number of weekdays (Monday-Friday):	9
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 14 - CAR SHOW ROOMS/A - CAR SHOW ROOMS
TAXIS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	2348	0.000	8	2348	0.000	8	2348	0.000
08:00 - 09:00	9	2212	0.050	9	2212	0.050	9	2212	0.100
09:00 - 10:00	9	2212	0.010	9	2212	0.010	9	2212	0.020
10:00 - 11:00	9	2212	0.020	9	2212	0.020	9	2212	0.040
11:00 - 12:00	9	2212	0.005	9	2212	0.005	9	2212	0.010
12:00 - 13:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
13:00 - 14:00	9	2212	0.015	9	2212	0.015	9	2212	0.030
14:00 - 15:00	9	2212	0.005	9	2212	0.005	9	2212	0.010
15:00 - 16:00	9	2212	0.005	9	2212	0.005	9	2212	0.010
16:00 - 17:00	9	2212	0.015	9	2212	0.015	9	2212	0.030
17:00 - 18:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
18:00 - 19:00	9	2212	0.010	9	2212	0.010	9	2212	0.020
19:00 - 20:00	3	2579	0.000	3	2579	0.000	3	2579	0.000
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.135			0.135			0.270

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 14 - CAR SHOW ROOMS/A - CAR SHOW ROOMS
OGVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	2348	0.021	8	2348	0.016	8	2348	0.037
08:00 - 09:00	9	2212	0.005	9	2212	0.005	9	2212	0.010
09:00 - 10:00	9	2212	0.005	9	2212	0.005	9	2212	0.010
10:00 - 11:00	9	2212	0.010	9	2212	0.010	9	2212	0.020
11:00 - 12:00	9	2212	0.010	9	2212	0.010	9	2212	0.020
12:00 - 13:00	9	2212	0.000	9	2212	0.005	9	2212	0.005
13:00 - 14:00	9	2212	0.010	9	2212	0.010	9	2212	0.020
14:00 - 15:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
15:00 - 16:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
16:00 - 17:00	9	2212	0.010	9	2212	0.000	9	2212	0.010
17:00 - 18:00	9	2212	0.000	9	2212	0.010	9	2212	0.010
18:00 - 19:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
19:00 - 20:00	3	2579	0.000	3	2579	0.000	3	2579	0.000
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.071			0.071			0.142

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 14 - CAR SHOW ROOMS/A - CAR SHOW ROOMS
CYCLISTS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	2348	0.048	8	2348	0.005	8	2348	0.053
08:00 - 09:00	9	2212	0.045	9	2212	0.005	9	2212	0.050
09:00 - 10:00	9	2212	0.005	9	2212	0.010	9	2212	0.015
10:00 - 11:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
11:00 - 12:00	9	2212	0.005	9	2212	0.000	9	2212	0.005
12:00 - 13:00	9	2212	0.005	9	2212	0.010	9	2212	0.015
13:00 - 14:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
14:00 - 15:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
15:00 - 16:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
16:00 - 17:00	9	2212	0.000	9	2212	0.020	9	2212	0.020
17:00 - 18:00	9	2212	0.000	9	2212	0.050	9	2212	0.050
18:00 - 19:00	9	2212	0.000	9	2212	0.015	9	2212	0.015
19:00 - 20:00	3	2579	0.000	3	2579	0.000	3	2579	0.000
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.108			0.115			0.223

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 14 - CAR SHOW ROOMS/A - CAR SHOW ROOMS
CARS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	2348	0.458	8	2348	0.048	8	2348	0.506
08:00 - 09:00	9	2212	1.055	9	2212	0.301	9	2212	1.356
09:00 - 10:00	9	2212	0.633	9	2212	0.583	9	2212	1.216
10:00 - 11:00	9	2212	0.663	9	2212	0.462	9	2212	1.125
11:00 - 12:00	9	2212	0.633	9	2212	0.613	9	2212	1.246
12:00 - 13:00	9	2212	0.633	9	2212	0.663	9	2212	1.296
13:00 - 14:00	9	2212	0.608	9	2212	0.502	9	2212	1.110
14:00 - 15:00	9	2212	0.568	9	2212	0.633	9	2212	1.201
15:00 - 16:00	9	2212	0.457	9	2212	0.543	9	2212	1.000
16:00 - 17:00	9	2212	0.548	9	2212	0.759	9	2212	1.307
17:00 - 18:00	9	2212	0.316	9	2212	0.874	9	2212	1.190
18:00 - 19:00	9	2212	0.070	9	2212	0.593	9	2212	0.663
19:00 - 20:00	3	2579	0.000	3	2579	0.142	3	2579	0.142
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			6.642			6.716			13.358

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 14 - CAR SHOW ROOMS/A - CAR SHOW ROOMS
LGVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	2348	0.027	8	2348	0.000	8	2348	0.027
08:00 - 09:00	9	2212	0.055	9	2212	0.025	9	2212	0.080
09:00 - 10:00	9	2212	0.105	9	2212	0.116	9	2212	0.221
10:00 - 11:00	9	2212	0.100	9	2212	0.100	9	2212	0.200
11:00 - 12:00	9	2212	0.085	9	2212	0.060	9	2212	0.145
12:00 - 13:00	9	2212	0.050	9	2212	0.075	9	2212	0.125
13:00 - 14:00	9	2212	0.070	9	2212	0.075	9	2212	0.145
14:00 - 15:00	9	2212	0.070	9	2212	0.090	9	2212	0.160
15:00 - 16:00	9	2212	0.060	9	2212	0.060	9	2212	0.120
16:00 - 17:00	9	2212	0.065	9	2212	0.075	9	2212	0.140
17:00 - 18:00	9	2212	0.030	9	2212	0.030	9	2212	0.060
18:00 - 19:00	9	2212	0.020	9	2212	0.015	9	2212	0.035
19:00 - 20:00	3	2579	0.000	3	2579	0.000	3	2579	0.000
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.737			0.721			1.458

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 14 - CAR SHOW ROOMS/A - CAR SHOW ROOMS
MOTOR CYCLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	2348	0.005	8	2348	0.000	8	2348	0.005
08:00 - 09:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
09:00 - 10:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
10:00 - 11:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
11:00 - 12:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
12:00 - 13:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
13:00 - 14:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
14:00 - 15:00	9	2212	0.005	9	2212	0.000	9	2212	0.005
15:00 - 16:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
16:00 - 17:00	9	2212	0.005	9	2212	0.010	9	2212	0.015
17:00 - 18:00	9	2212	0.000	9	2212	0.000	9	2212	0.000
18:00 - 19:00	9	2212	0.000	9	2212	0.005	9	2212	0.005
19:00 - 20:00	3	2579	0.000	3	2579	0.000	3	2579	0.000
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.015			0.015			0.030

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*



APPENDIX TA3



FOCUS TRANSPORT PLANNING

Appendix TA3

Core Movement Strategy for Upper Brook Street Area (From Oxford Road SRF)

J000370

Upper Brook Street Masterplan (Williams / Alliance UBS)

June 2023



APPENDIX TA4

Appendix TA4 - Baseline 'Do-Nothing' Junction Capacity Modelling Results

Key

- 0-89% DoS (within capacity conditions)
- 90-99% DoS (variable operating conditions)
- 100%+ DoS (over capacity conditions)

A34 / Grosvenor Street

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**78.3%**	-	-	**66.5%**	-
1/1 + 1/2	Grosvenor Street (E) Left Ahead & Right	316	78.3%:78.3%	6.8	447	66.5%:66.5%	6.2
2/1	A34 (S) Left & ahead	461	52.1%	7.7	400	50.7%	7.1
2/2	A34 (S) Ahead	227	23.5%	3.2	162	18.8%	2.4
2/3	A34 (S) Ahead	230	23.7%	3.2	164	18.9%	2.4
3/1	A34 (N) Ahead	291	20.8%	2.3	369	30.1%	3.9
3/2 + 3/3	A34 (N) Ahead & right	389	24.9%:24.9%	2.8	452	33.1%:33.1%	4.6
Cycle Time		80s			80s		
Stage 1, 2, 3 timings		46s, 18s,16s			42s, 15s, 23s		
Junction PRC		14.9%			35.2%		
Total delay over all lanes (pcuHr)		10.02			10.29		

A34 / Inchley Road / Booth Street East - Existing Junction

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**94.1%**	-	-	**96.3%**	-
1/1	Inchley Road - Left, Ahead & Right	239	94.1%	10.1	268	96.3%	11.9
2/1	A34(S) - Left & Ahead	523	67.5%	10.0	405	74.4%	9.4
2/2 + 2/3	A34(S) - Ahead & Right	860	46.2% :46.2%	6.9	663	49.9% : 50.1%	6.5
3/1	Booth Street East - Left	69	17.0%	1.3	97	15.4%	1.5
3/2	Booth Street East - Ahead & Right	338	76.7%	8.5	546	79.6%	12.8
4/1	A34(N) - Left & Ahead	325	37.8%	5.0	455	73.8%	10.4
4/2	A34(N) - Ahead	388	40.5%	5.9	510	75.7%	11.6
Cycle Time		80s			80s		
Stage 1, 2, 3 timings		42s, 20s, 18s (43s, 20s, 17s)			31s, 30s, 19s		
Junction PRC		-4.6%			-7.1%		
Total delay over all lanes (pcuHr)		22.92			32.74		

A34 / Brunswick Street

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**90.0%**	-	-	**76.7%**	-
1/2 + 1/1	Brunswick Street - Left & Right	560	90.0% : 90.0%	17.1	392	74.2% : 74.2%	9.8
2/1	A34(S) - Ahead	557	70.5%	11.5	437	47.9%	7.1
2/2 + 2/3	A34(S) - Ahead & Right	721	76.4% : 76.4%	12.5	575	68.0% : 76.7%	7.7
3/1	A34 (N) - Left & Ahead	430	46.7%	7.8	686	66.7%	14.0
3/2	A34 (N) - Ahead	509	49.3%	9.4	686	59.0%	12.9
Cycle Time		160s			160s		
Stage 1, 2, 1, 2, 3 timings		39s, 41s, 38s, 26s, 16s			44s, 36s, 43s, 21s, 16s		
Junction PRC		0.0%			17.4%		
Total delay over all lanes (pcuHr)		22.69			17.51		

Pedestrian stage called every second cycle, extra time given to Brunswick Street

Appendix TA4 - Baseline 'Do-Nothing' Junction Capacity Modelling Results

Kincardine Road / Hanworth Close	AM Peak			PM Peak		
	Flow (PCUs)	RFC	Queue	Flow (PCUs)	RFC	Queue
Hanworth Close (B-AC)	28	0.05	0.1	29	0.05	0.1
Kincardine Road (S) (C-AB)	65	0.07	0.1	89	0.12	0.1

Kincardine Road / Whitekirk Close / Car Park Access	AM Peak			PM Peak		
	Flow (PCUs)	RFC	Queue	Flow (PCUs)	RFC	Queue
Whitekirk Close (B-ACD)	15	0.04	0.0	15	0.04	0.0
Kincardine Road (N) (A-BCD)	44	0.05	0.1	70	0.05	0.1
Car Park Access (D-ABC)	13	0.02	0.0	35	0.06	0.1
Kincardine Road (S) (C-ABD)	38	0.01	0.0	17	0.00	0.0

Key

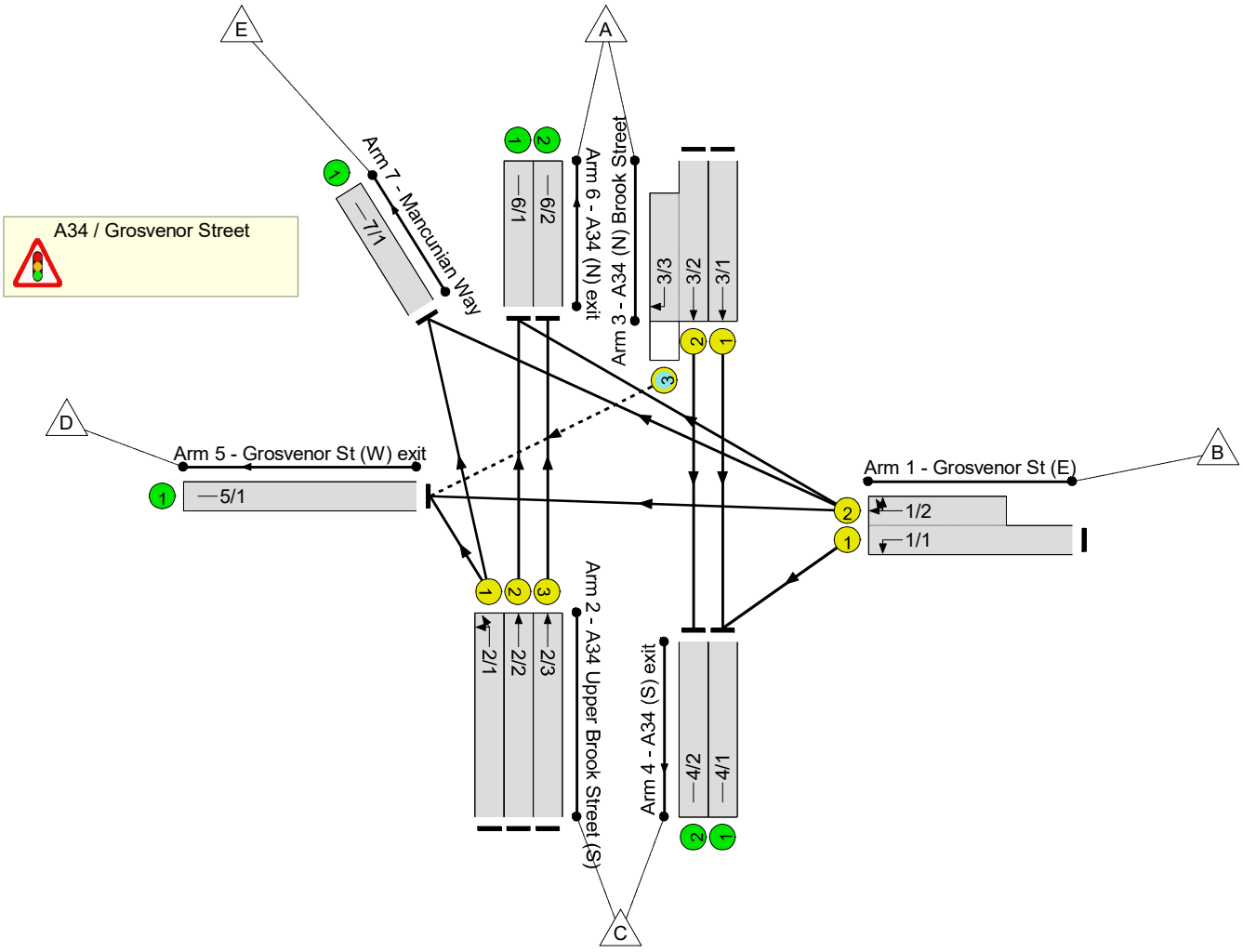
0-0.85 RFC (within capacity conditions)
0.86-0.99 RFC (variable operating conditions)
1.0+ RFC (over capacity conditions)

Full Input Data And Results

User and Project Details

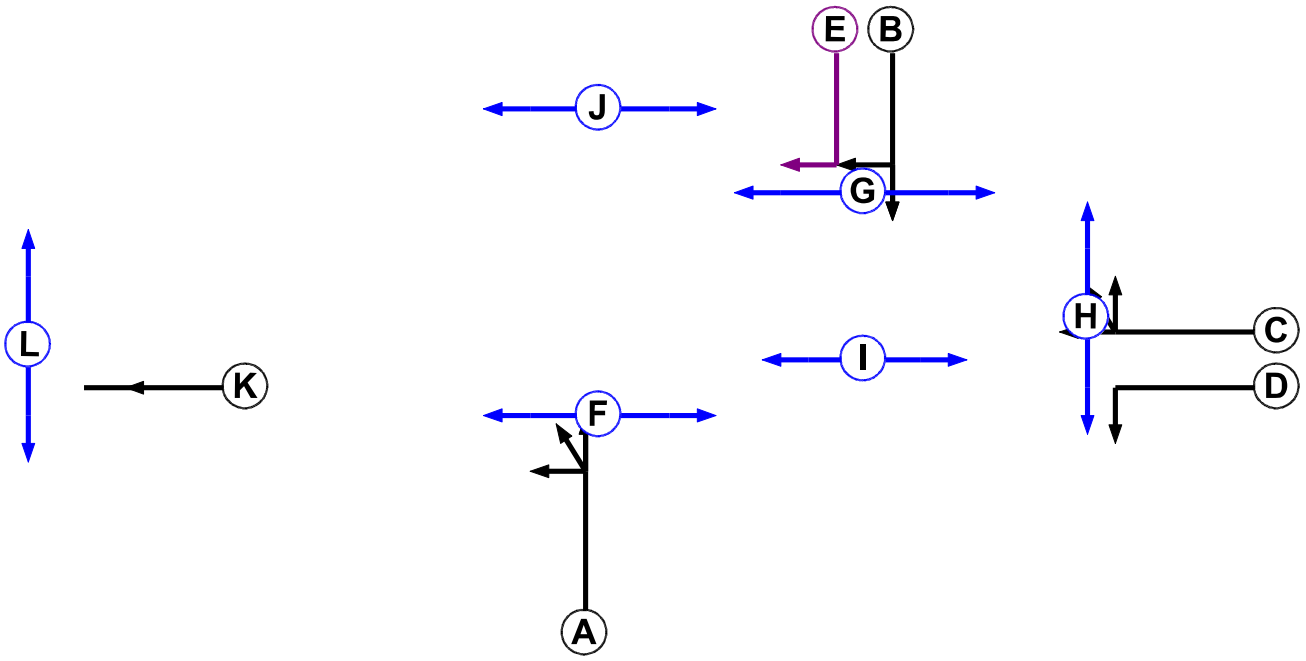
Project:	**Upper Brook Street**
Title:	**Grosvenor Road Junction**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	ManchWayA34_Grosvenor Street.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Ind. Arrow	B	-9999	3
F	Pedestrian		-9999	7
G	Pedestrian		-9999	6
H	Pedestrian		-9999	5
I	Pedestrian		-9999	5
J	Pedestrian		-9999	6
K	Traffic		-9999	7
L	Pedestrian		-9999	5

Full Input Data And Results

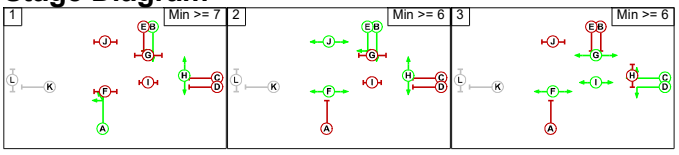
Phase Intergreens Matrix

		Starting Phase											
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K	L
	A		-	5	-	5	5	-	-	-	8	-	-
	B	-		5	6	-	-	5	-	7	-	-	-
	C	5	5		-	5	-	-	5	-	10	-	-
	D	-	4	-		-	-	-	5	-	-	-	-
	E	6	-	5	-		-	5	-	7	-	-	-
	F	10	-	-	-	-		-	-	-	-	-	-
	G	-	9	-	-	9	-		-	-	-	-	-
	H	-	-	5	5	-	-	-		-	-	-	-
	I	-	6	-	-	6	-	-	-		-	-	-
	J	9	-	9	-	-	-	-	-	-		-	-
	K	-	-	-	-	-	-	-	-	-	-		5
	L	-	-	-	-	-	-	-	-	-	-	6	

Phases in Stage

Stage No.	Phases in Stage
1	A B H
2	B E F H J
3	C D F G I

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
2	3	B	Losing	2	2
2	3	H	Losing	3	3
3	1	C	Losing	5	5
3	1	D	Losing	5	5
3	1	G	Losing	1	1
3	1	I	Losing	4	4

Full Input Data And Results

Prohibited Stage Change

	To Stage			
From Stage		1	2	3
	1		8	7
	2	10		9
	3	10	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Grosvenor Street											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
3/3 (A34 (N) Brook Street)	5/1 (Right)	1439	0	2/1	1.09	All	2.00	-	0.50	2	2.00
				2/2	1.09	All					
				2/3	1.09	All					

Full Input Data And Results

Lane Input Data

Full Input Data And Results

Junction: A34 / Grosvenor Street												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Grosvenor St (E))	U	D	2	3	60.0	Geom	-	4.17	0.00	Y	Arm 4 Left	10.00
1/2 (Grosvenor St (E))	U	C	2	3	7.1	Geom	-	4.49	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	10.00
											Arm 7 Right	10.00
2/1 (A34 Upper Brook Street (S))	U	A	2	3	33.0	Geom	-	3.40	0.00	Y	Arm 5 Left	10.00
											Arm 7 Ahead	Inf
2/2 (A34 Upper Brook Street (S))	U	A	2	3	33.0	Geom	-	3.32	0.00	N	Arm 6 Ahead	Inf
2/3 (A34 Upper Brook Street (S))	U	A	2	3	33.7	Geom	-	3.45	0.00	N	Arm 6 Ahead	Inf
3/1 (A34 (N) Brook Street)	U	B	2	3	21.7	Geom	-	3.46	0.00	Y	Arm 4 Ahead	Inf
3/2 (A34 (N) Brook Street)	U	B	2	3	21.7	Geom	-	3.46	0.00	N	Arm 4 Ahead	Inf
3/3 (A34 (N) Brook Street)	O	B E	2	3	15.8	Geom	-	3.19	0.00	N	Arm 5 Right	10.00
4/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
4/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

5/1 (Grosvenor St (W) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Mancunian Way)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Baseline AM Peak'	08:15	09:15	01:00	

Scenario 1: 'Existing Layout' (FG1: 'Baseline AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
Origin		A	B	C	D	E	Tot.
	A	0	0	644	36	0	680
	B	89	0	78	73	76	316
	C	457	0	0	66	395	918
	D	0	0	0	0	0	0
	E	0	0	0	0	0	0
	Tot.	546	0	722	175	471	1914

Full Input Data And Results

Traffic Lane Flows

Lane	Scenario 1: Existing Layout
Junction: A34 / Grosvenor Street	
1/1 (with short)	316(In) 78(Out)
1/2 (short)	238
2/1	461
2/2	227
2/3	230
3/1	291
3/2 (with short)	389(In) 353(Out)
3/3 (short)	36
4/1	369
4/2	353
5/1	175
6/1	316
6/2	230
7/1	471

Full Input Data And Results

Lane Saturation Flows

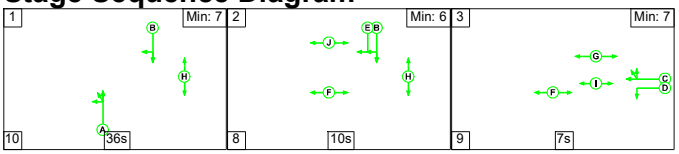
Full Input Data And Results

Junction: A34 / Grosvenor Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Grosvenor St (E))	4.17	0.00	Y	Arm 4 Left	10.00	100.0 %	1767	1767
1/2 (Grosvenor St (E))	4.49	0.00	Y	Arm 5 Ahead	Inf	30.7 %	1870	1870
				Arm 6 Right	10.00	37.4 %		
				Arm 7 Right	10.00	31.9 %		
2/1 (A34 Upper Brook Street (S))	3.40	0.00	Y	Arm 5 Left	10.00	14.3 %	1914	1914
				Arm 7 Ahead	Inf	85.7 %		
2/2 (A34 Upper Brook Street (S))	3.32	0.00	N	Arm 6 Ahead	Inf	100.0 %	2087	2087
2/3 (A34 Upper Brook Street (S))	3.45	0.00	N	Arm 6 Ahead	Inf	100.0 %	2100	2100
3/1 (A34 (N) Brook Street)	3.46	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1961	1961
3/2 (A34 (N) Brook Street)	3.46	0.00	N	Arm 4 Ahead	Inf	100.0 %	2101	2101
3/3 (A34 (N) Brook Street)	3.19	0.00	N	Arm 5 Right	10.00	100.0 %	1804	1804
4/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (Grosvenor St (W) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Mancunian Way Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 1: 'Existing Layout' (FG1: 'Baseline AM Peak', Plan 1: 'Network Control Plan 1')

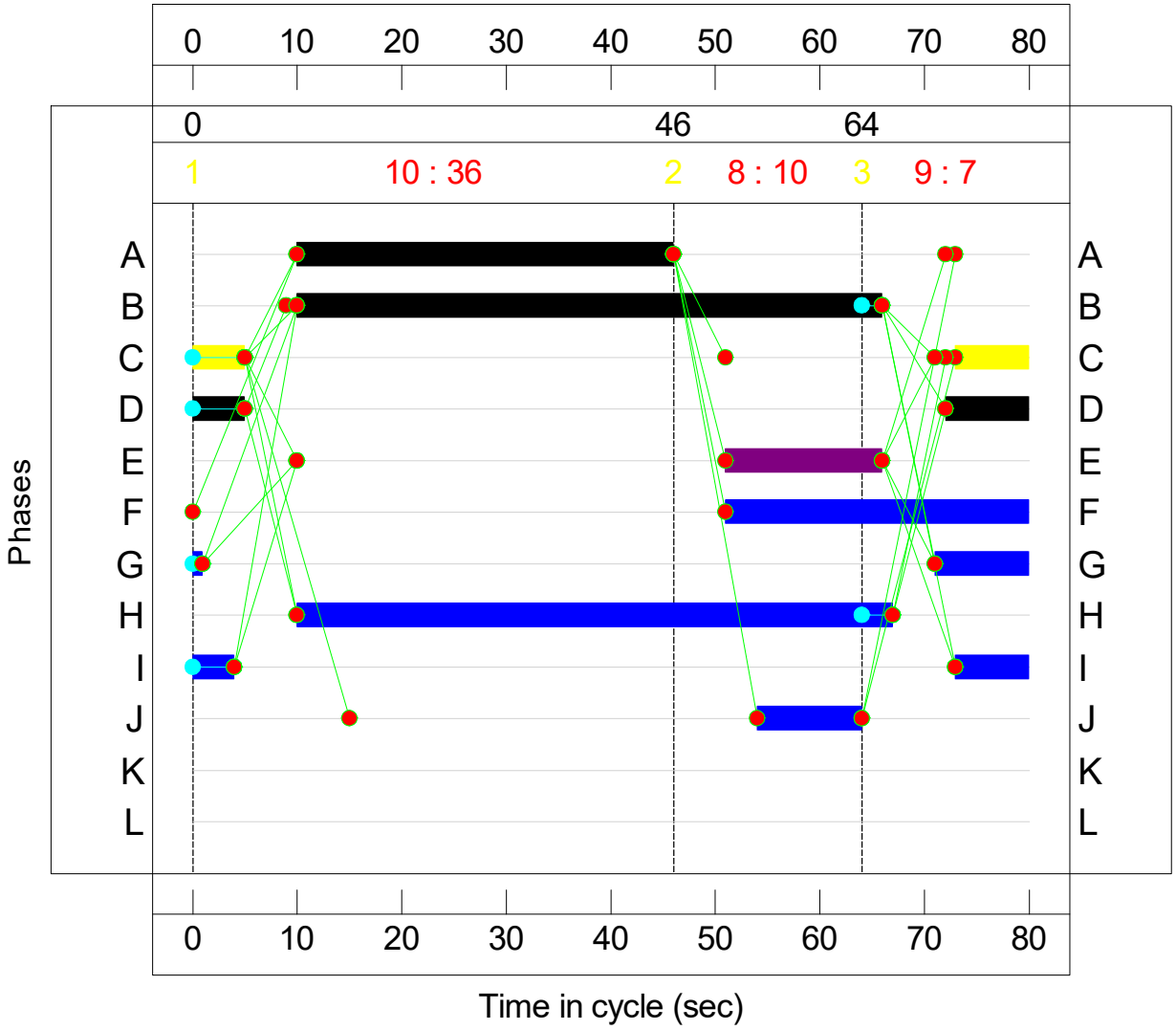
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	36	10	7
Change Point	0	46	64

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Grosvenor Road Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**78.3%**
A34 / Grosvenor Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**78.3%**
1/1+1/2	Grosvenor St (E) Left Ahead Right Right2	U	N/A	N/A	D C		1	13:12	-	316	1767:1870	100+304	78.3 : 78.3%
2/1	A34 Upper Brook Street (S) Left Ahead	U	N/A	N/A	A		1	36	-	461	1914	885	52.1%
2/2	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	36	-	227	2087	965	23.5%
2/3	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	36	-	230	2100	971	23.7%
3/1	A34 (N) Brook Street Ahead	U	N/A	N/A	B		1	56	-	291	1961	1397	20.8%
3/2+3/3	A34 (N) Brook Street Ahead Right	U+O	N/A	N/A	B	E	1	56	15	389	2101:1804	1420+145	24.9 : 24.9%
4/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	369	Inf	Inf	0.0%
4/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	353	Inf	Inf	0.0%
5/1	Grosvenor St (W) exit	U	N/A	N/A	-		-	-	-	175	Inf	Inf	0.0%
6/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	316	Inf	Inf	0.0%
6/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	230	Inf	Inf	0.0%
7/1	Mancunian Way	U	N/A	N/A	-		-	-	-	471	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Grosvenor Road Junction	**-**	**-**	**27**	**8**	**1**	**7.1**	**2.9**	**0.1**	**10.0**	**-**	**-**	**-**	**-**
A34 / Grosvenor Street	**-**	**-**	**27**	**8**	**1**	**7.1**	**2.9**	**0.1**	**10.0**	**-**	**-**	**-**	**-**
1/1+1/2	316	316	-	-	-	2.7	1.7	-	4.5	51.0	5.0	1.7	6.8
2/1	461	461	-	-	-	1.9	0.5	-	2.5	19.5	7.2	0.5	7.7
2/2	227	227	-	-	-	0.8	0.2	-	1.0	15.4	3.0	0.2	3.2
2/3	230	230	-	-	-	0.8	0.2	-	1.0	15.4	3.1	0.2	3.2
3/1	291	291	-	-	-	0.3	0.1	-	0.4	5.5	2.2	0.1	2.3
3/2+3/3	389	389	27	8	1	0.4	0.2	0.1	0.6	6.0	2.6	0.2	2.8
4/1	369	369	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	353	353	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	175	175	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	316	316	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	230	230	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	471	471	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 14.9
PRC Over All Lanes (%): 14.9

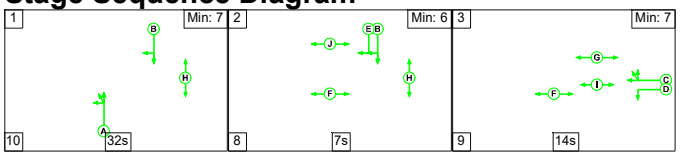
Total Delay for Signalled Lanes (pcuHr): 10.02
Total Delay Over All Lanes(pcuHr): 10.02

Cycle Time (s): 80

Full Input Data And Results

Scenario 2: 'Existing Layout' (FG2: 'Baseline PM Peak', Plan 1: 'Network Control Plan 1')

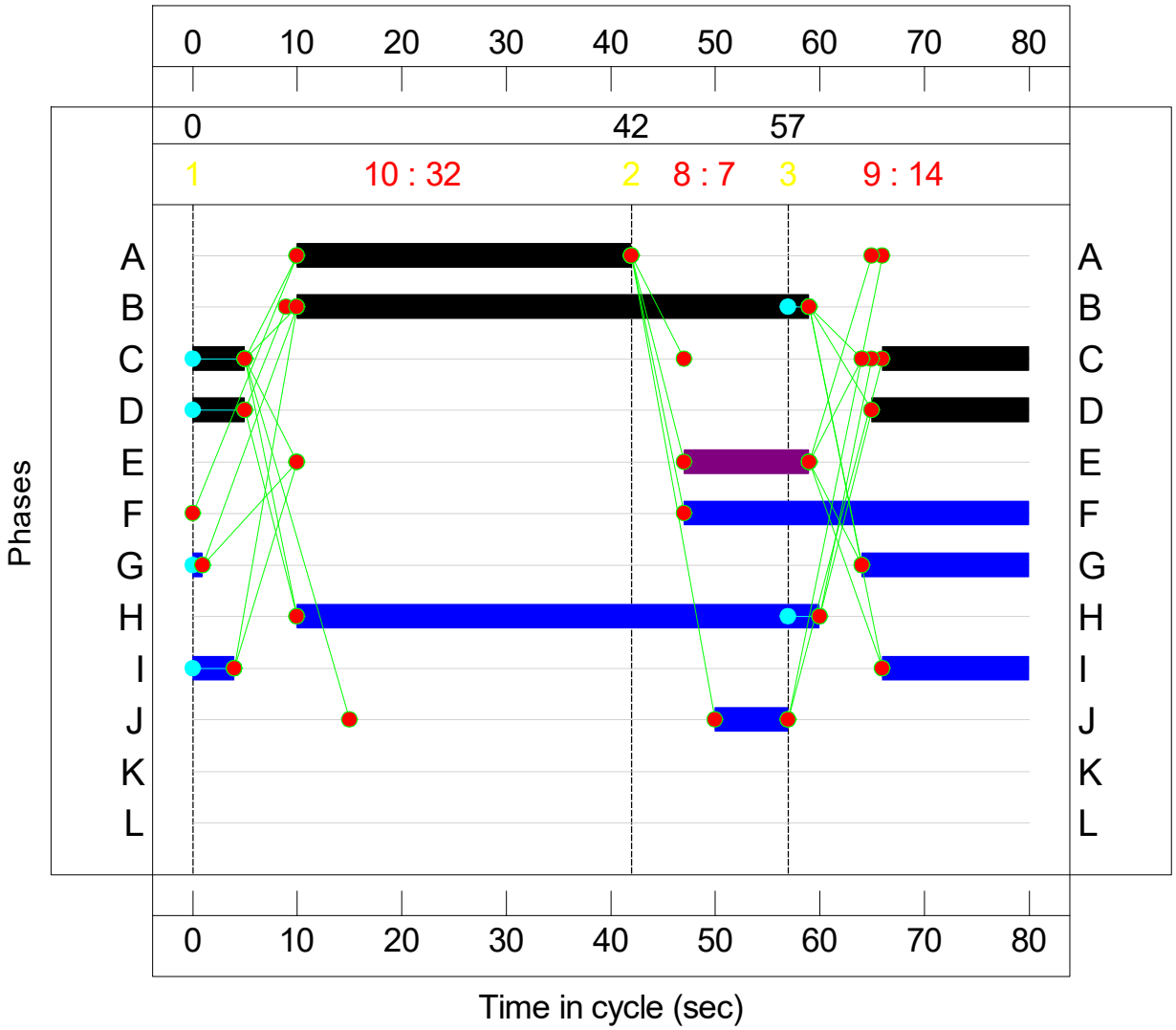
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	32	7	14
Change Point	0	42	57

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Grosvenor Road Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**66.5%**
A34 / Grosvenor Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**66.5%**
1/1+1/2	Grosvenor St (E) Left Ahead Right Right2	U	N/A	N/A	D C		1	20:19	-	447	1767:1851	272+400	66.5 : 66.5%
2/1	A34 Upper Brook Street (S) Left Ahead	U	N/A	N/A	A		1	32	-	400	1911	788	50.7%
2/2	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	32	-	162	2087	861	18.8%
2/3	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	32	-	164	2100	866	18.9%
3/1	A34 (N) Brook Street Ahead	U	N/A	N/A	B		1	49	-	369	1961	1226	30.1%
3/2+3/3	A34 (N) Brook Street Ahead Right	U+O	N/A	N/A	B	E	1	49	12	452	2101:1804	1274+91	33.1 : 33.1%
4/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	550	Inf	Inf	0.0%
4/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	422	Inf	Inf	0.0%
5/1	Grosvenor St (W) exit	U	N/A	N/A	-		-	-	-	153	Inf	Inf	0.0%
6/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	262	Inf	Inf	0.0%
6/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	164	Inf	Inf	0.0%
7/1	Mancunian Way	U	N/A	N/A	-		-	-	-	443	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Grosvenor Road Junction	**-**	**-**	**24**	**6**	**1**	**8.0**	**2.2**	**0.1**	**10.3**	**-**	**-**	**-**	**-**
A34 / Grosvenor Street	**-**	**-**	**24**	**6**	**1**	**8.0**	**2.2**	**0.1**	**10.3**	**-**	**-**	**-**	**-**
1/1+1/2	447	447	-	-	-	3.2	1.0	-	4.1	33.4	5.2	1.0	6.2
2/1	400	400	-	-	-	1.9	0.5	-	2.5	22.1	6.6	0.5	7.1
2/2	162	162	-	-	-	0.7	0.1	-	0.8	17.5	2.3	0.1	2.4
2/3	164	164	-	-	-	0.7	0.1	-	0.8	17.5	2.3	0.1	2.4
3/1	369	369	-	-	-	0.7	0.2	-	0.9	9.0	3.7	0.2	3.9
3/2+3/3	452	452	24	6	1	0.9	0.2	0.1	1.2	9.4	4.3	0.2	4.6
4/1	550	550	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	422	422	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	153	153	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	262	262	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	164	164	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	443	443	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

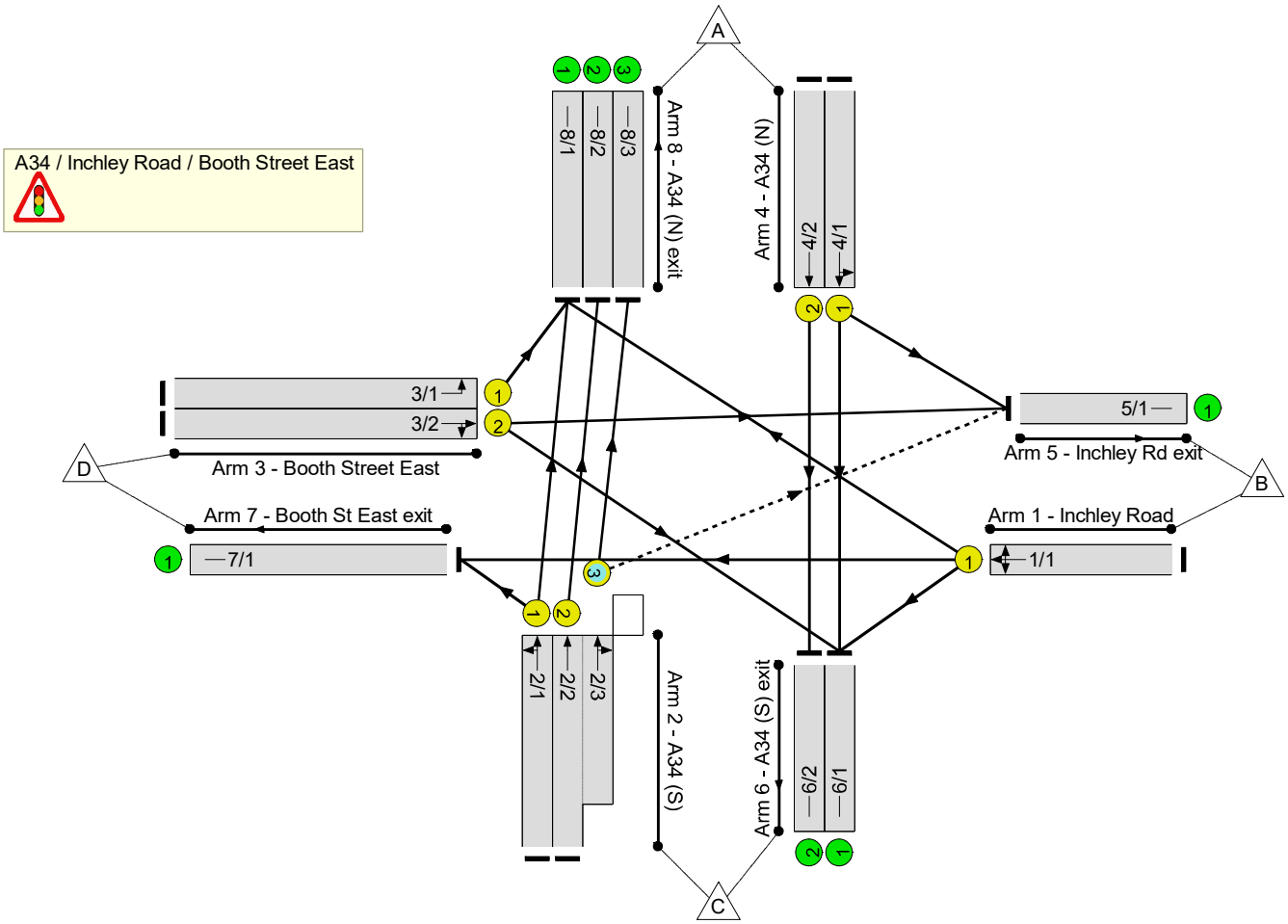
C1	PRC for Signalled Lanes (%):	35.2	Total Delay for Signalled Lanes (pcuHr):	10.29	Cycle Time (s): 80
	PRC Over All Lanes (%):	35.2	Total Delay Over All Lanes(pcuHr):	10.29	

Full Input Data And Results

User and Project Details

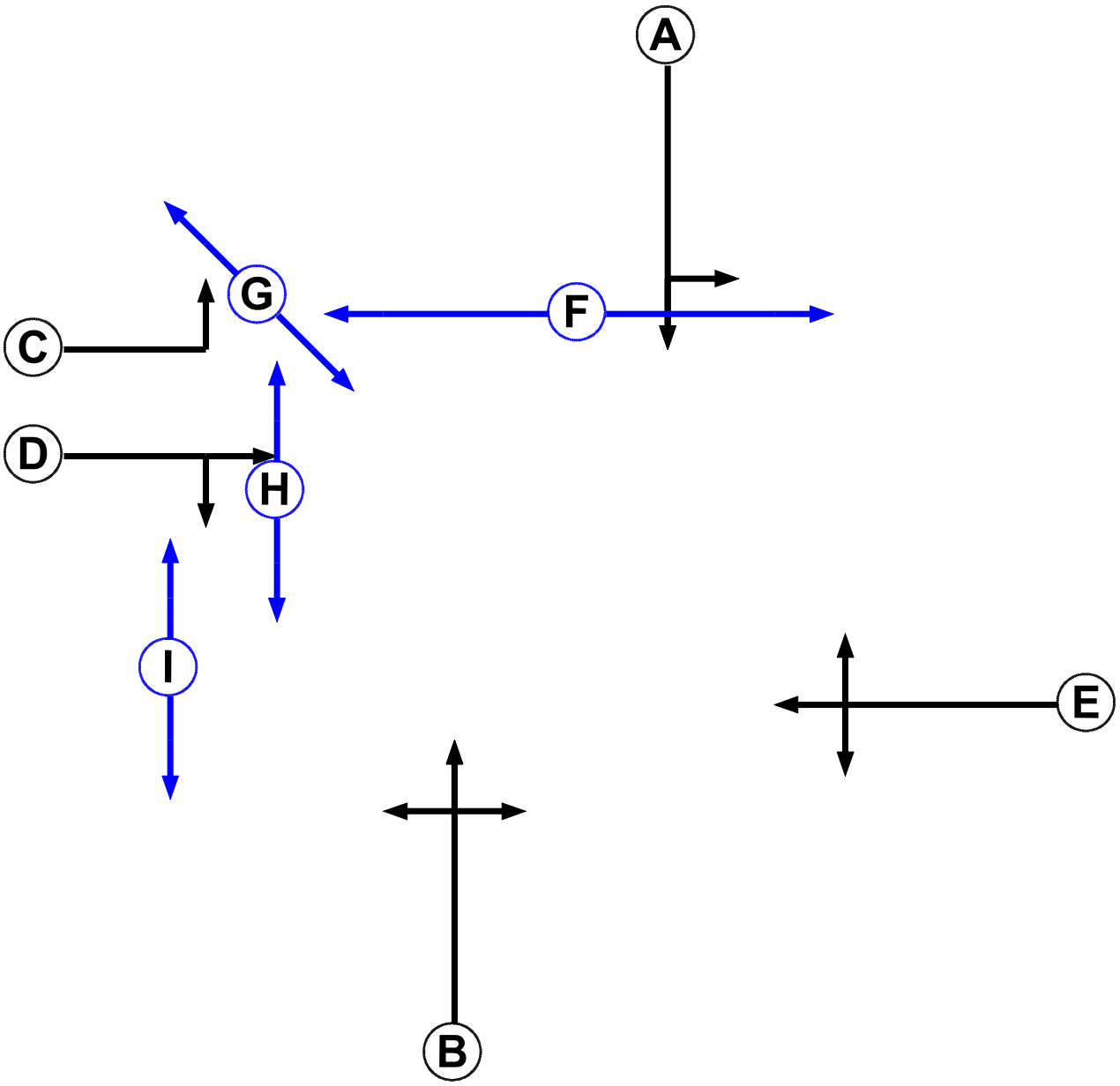
Project:	
Title:	**A334_Inchley Road_ Booth Street East**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	A34_Inchley Rd existing.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Traffic		-9999	7
F	Pedestrian		-9999	12
G	Pedestrian		-9999	5
H	Pedestrian		-9999	5
I	Pedestrian		-9999	5

Full Input Data And Results

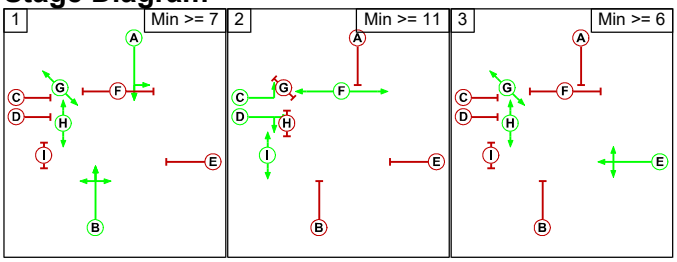
Phase Intergreens Matrix

	Starting Phase								
Terminating Phase		A	B	C	D	E	F	G	H	I
	A		-	-	5	5	5	-	-	-
	B	-		8	6	7	8	-	-	9
	C	-	4		-	4	-	5	-	-
	D	6	5	-		6	-	-	5	-
	E	6	6	8	6		9	-	-	9
	F	9	9	-	-	9		-	-	-
	G	-	-	5	-	-	-		-	-
	H	-	-	-	5	-	-	-		-
	I	-	5	-	-	5	-	-	-	

Phases in Stage

Stage No.	Phases in Stage
1	A B G H
2	C D F I
3	E G H

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
2	1	C	Losing	4	4
2	1	D	Losing	3	3
2	1	I	Losing	4	4
2	3	C	Losing	5	5
2	3	D	Losing	3	3
3	2	G	Losing	3	3
3	2	H	Losing	1	1

Full Input Data And Results

Prohibited Stage Change

	To Stage			
From Stage		1	2	3
	1		9	7
	2	9		10
	3	6	9	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Inchley Road / Booth Street East											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
2/3 (A34 (S))	5/1 (Right)	1439	0	4/1	1.09	All	2.00	2.00	0.50	2	2.00
				4/2	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: A34 / Inchley Road / Booth Street East												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Inchley Road)	U	E	2	3	60.0	Geom	-	4.34	0.00	Y	Arm 6 Left	10.00
											Arm 7 Ahead	Inf
											Arm 8 Right	20.00
2/1 (A34 (S))	U	B	2	3	49.7	Geom	-	3.12	0.00	Y	Arm 7 Left	10.00
											Arm 8 Ahead	Inf
2/2 (A34 (S))	U	B	2	3	49.7	Geom	-	3.12	0.00	N	Arm 8 Ahead	Inf
2/3 (A34 (S))	O	B	2	3	20.3	Geom	-	2.85	0.00	N	Arm 5 Right	20.00
											Arm 8 Ahead	Inf
3/1 (Booth Street East)	U	C	2	3	60.0	Geom	-	4.57	0.00	Y	Arm 8 Left	10.00
3/2 (Booth Street East)	U	D	2	3	60.0	Geom	-	3.51	0.00	N	Arm 5 Ahead	Inf
											Arm 6 Right	18.00
4/1 (A34 (N))	U	A	2	3	33.4	Geom	-	3.15	0.00	Y	Arm 5 Left	10.00
											Arm 6 Ahead	Inf
4/2 (A34 (N))	U	A	2	3	33.9	Geom	-	3.18	0.00	N	Arm 6 Ahead	Inf
5/1 (Inchley Rd exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

7/1 (Booth St East exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/2 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/3 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Baseline AM Peak'	08:15	09:15	01:00	

Scenario 1: 'Existing Layout' (FG1: 'Baseline AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	81	632	0	713
	B	3	0	13	223	239
	C	843	17	0	523	1383
	D	69	30	308	0	407
	Tot.	915	128	953	746	2742

Traffic Lane Flows

Lane	Scenario 1: Existing Layout
Junction: A34 / Inchley Road / Booth Street East	
1/1	239
2/1	523
2/2 (with short)	860(In) 433(Out)
2/3 (short)	427
3/1	69
3/2	338
4/1	325
4/2	388
5/1	128
6/1	565
6/2	388
7/1	746
8/1	72
8/2	433
8/3	410

Full Input Data And Results

Lane Saturation Flows

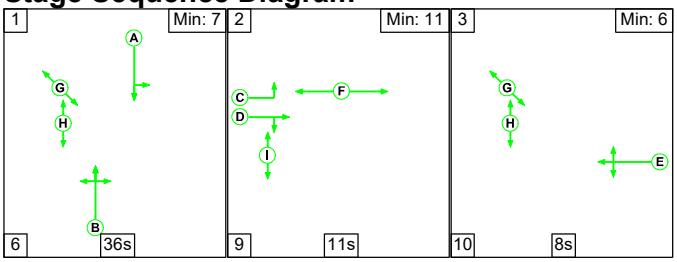
Full Input Data And Results

Junction: A34 / Inchley Road / Booth Street East								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Inchley Road)	4.34	0.00	Y	Arm 6 Left	10.00	5.4 %	2031	2031
				Arm 7 Ahead	Inf	93.3 %		
				Arm 8 Right	20.00	1.3 %		
2/1 (A34 (S))	3.12	0.00	Y	Arm 7 Left	10.00	100.0 %	1675	1675
				Arm 8 Ahead	Inf	0.0 %		
2/2 (A34 (S))	3.12	0.00	N	Arm 8 Ahead	Inf	100.0 %	2067	2067
2/3 (A34 (S))	2.85	0.00	N	Arm 5 Right	20.00	4.0 %	2034	2034
				Arm 8 Ahead	Inf	96.0 %		
3/1 (Booth Street East)	4.57	0.00	Y	Arm 8 Left	10.00	100.0 %	1802	1802
3/2 (Booth Street East)	3.51	0.00	N	Arm 5 Ahead	Inf	8.9 %	1958	1958
				Arm 6 Right	18.00	91.1 %		
4/1 (A34 (N))	3.15	0.00	Y	Arm 5 Left	10.00	24.9 %	1861	1861
				Arm 6 Ahead	Inf	75.1 %		
4/2 (A34 (N))	3.18	0.00	N	Arm 6 Ahead	Inf	100.0 %	2073	2073
5/1 (Inchley Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Booth St East exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
8/3 (A34 (N) exit Lane 3)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 1: 'Existing Layout' (FG1: 'Baseline AM Peak', Plan 1: 'Network Control Plan 1')

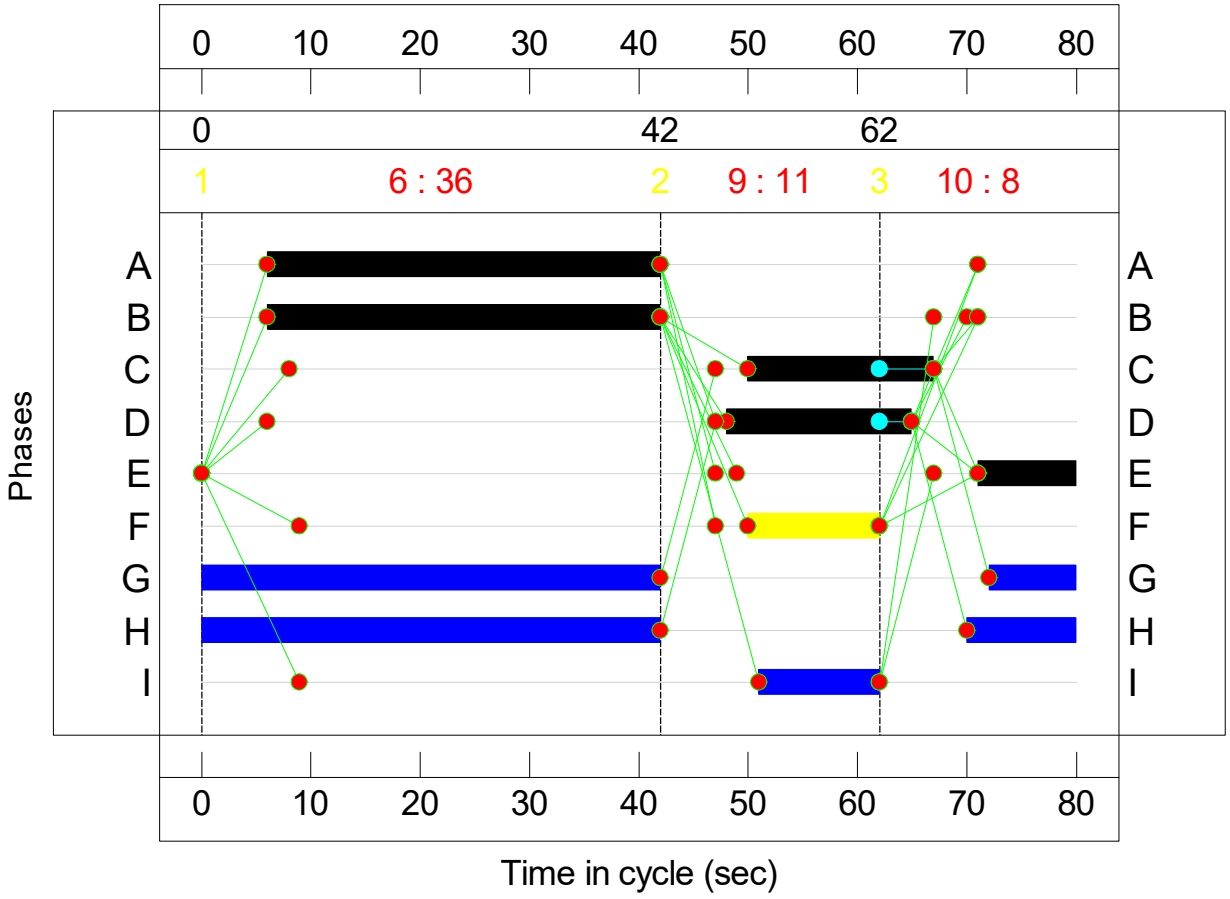
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	36	11	8
Change Point	0	42	62

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A334_Inchley Road_ Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**94.1%**
A34 / Inchley Road / Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**94.1%**
1/1	Inchley Road Left Ahead Right	U	N/A	N/A	E		1	9	-	239	2031	254	94.1%
2/1	A34 (S) Left Ahead	U	N/A	N/A	B		1	36	-	523	1675	775	67.5%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B		1	36	-	860	2067:2034	937+924	46.2 : 46.2%
3/1	Booth Street East Left	U	N/A	N/A	C		1	17	-	69	1802	405	17.0%
3/2	Booth Street East Ahead Right	U	N/A	N/A	D		1	17	-	338	1958	441	76.7%
4/1	A34 (N) Left Ahead	U	N/A	N/A	A		1	36	-	325	1861	861	37.8%
4/2	A34 (N) Ahead	U	N/A	N/A	A		1	36	-	388	2073	959	40.5%
5/1	Inchley Rd exit	U	N/A	N/A	-		-	-	-	128	Inf	Inf	0.0%
6/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	565	Inf	Inf	0.0%
6/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	388	Inf	Inf	0.0%
7/1	Booth St East exit	U	N/A	N/A	-		-	-	-	746	Inf	Inf	0.0%
8/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	72	Inf	Inf	0.0%
8/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	433	Inf	Inf	0.0%
8/3	A34 (N) exit	U	N/A	N/A	-		-	-	-	410	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A334_Inchley Road_ Booth Street East	**-**	**-**	**17**	**0**	**0**	**14.2**	**8.7**	**0.0**	**22.9**	**-**	**-**	**-**	**-**
A34 / Inchley Road / Booth Street East	**-**	**-**	**17**	**0**	**0**	**14.2**	**8.7**	**0.0**	**22.9**	**-**	**-**	**-**	**-**
1/1	239	239	-	-	-	2.3	4.9	-	7.2	107.9	5.2	4.9	10.1
2/1	523	523	-	-	-	2.4	1.0	-	3.5	23.9	9.0	1.0	10.0
2/2+2/3	860	860	17	0	0	3.5	0.4	0.0	3.9	16.5	6.5	0.4	6.9
3/1	69	69	-	-	-	0.5	0.1	-	0.6	30.4	1.2	0.1	1.3
3/2	338	338	-	-	-	2.7	1.6	-	4.3	46.1	6.9	1.6	8.5
4/1	325	325	-	-	-	1.3	0.3	-	1.6	17.4	4.7	0.3	5.0
4/2	388	388	-	-	-	1.5	0.3	-	1.9	17.4	5.6	0.3	5.9
5/1	128	128	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	565	565	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	388	388	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	746	746	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	72	72	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	433	433	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/3	410	410	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

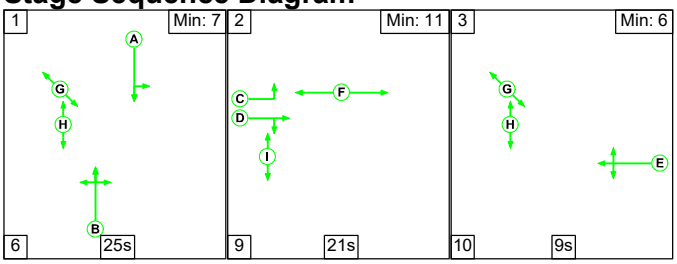
C1 PRC for Signalled Lanes (%): -4.6 Total Delay for Signalled Lanes (pcuHr): 22.92 Cycle Time (s): 80

PRC Over All Lanes (%): -4.6 Total Delay Over All Lanes(pcuHr): 22.92

Full Input Data And Results

Scenario 2: 'Existing Layout' (FG2: 'Baseline PM Peak', Plan 1: 'Network Control Plan 1')

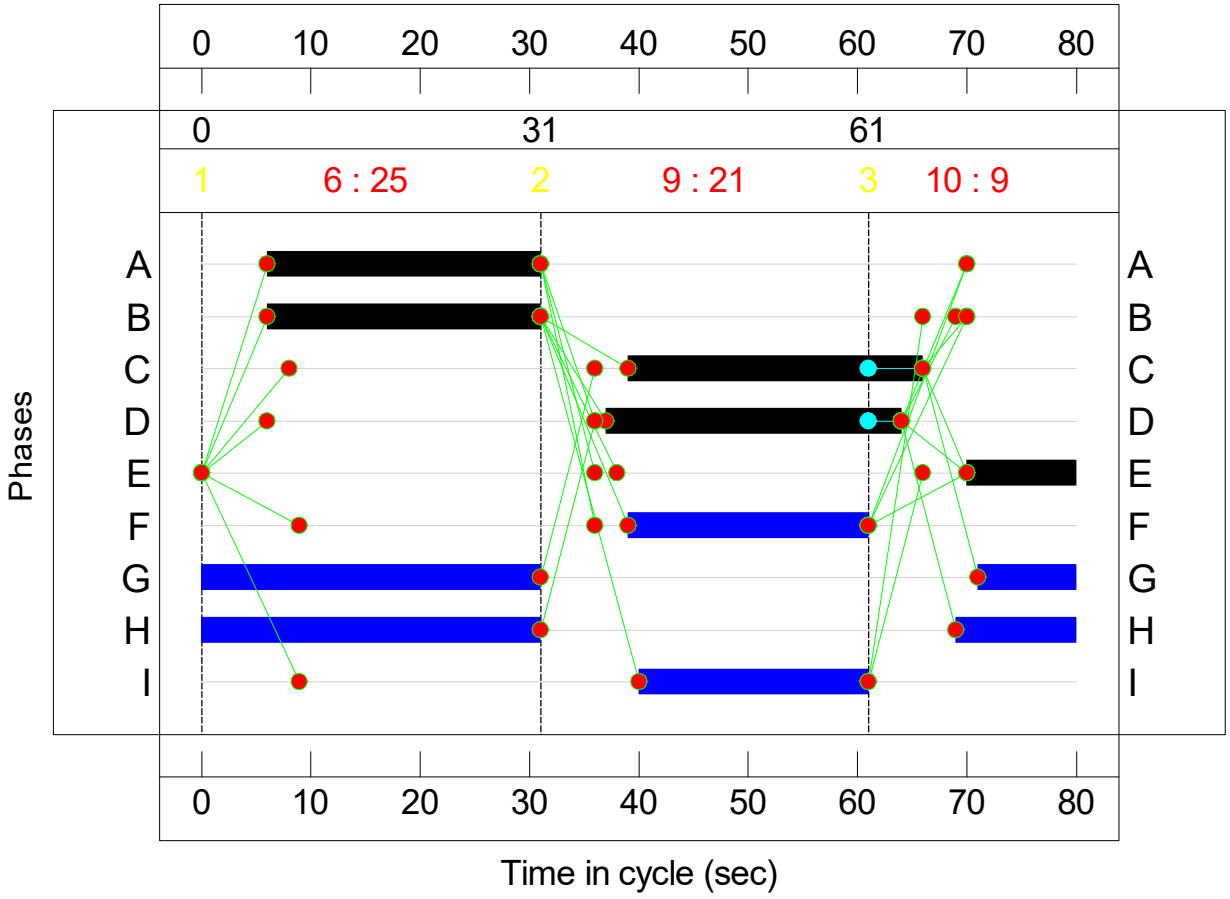
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	25	21	9
Change Point	0	31	61

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A334_Inchley Road_ Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**96.3%**
A34 / Inchley Road / Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**96.3%**
1/1	Inchley Road Left Ahead Right	U	N/A	N/A	E		1	10	-	268	2023	278	96.3%
2/1	A34 (S) Left Ahead	U	N/A	N/A	B		1	25	-	405	1675	544	74.4%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B		1	25	-	663	2067:2025	672+655	49.9 : 50.1%
3/1	Booth Street East Left	U	N/A	N/A	C		1	27	-	97	1802	631	15.4%
3/2	Booth Street East Ahead Right	U	N/A	N/A	D		1	27	-	546	1959	686	79.6%
4/1	A34 (N) Left Ahead	U	N/A	N/A	A		1	25	-	455	1898	617	73.8%
4/2	A34 (N) Ahead	U	N/A	N/A	A		1	25	-	510	2073	674	75.7%
5/1	Inchley Rd exit	U	N/A	N/A	-		-	-	-	139	Inf	Inf	0.0%
6/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	916	Inf	Inf	0.0%
6/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	510	Inf	Inf	0.0%
7/1	Booth St East exit	U	N/A	N/A	-		-	-	-	647	Inf	Inf	0.0%
8/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	103	Inf	Inf	0.0%
8/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	335	Inf	Inf	0.0%
8/3	A34 (N) exit	U	N/A	N/A	-		-	-	-	294	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A334_Inchley Road_ Booth Street East	**-**	**-**	**34**	**0**	**0**	**19.8**	**12.9**	**0.1**	**32.7**	**-**	**-**	**-**	**-**
A34 / Inchley Road / Booth Street East	**-**	**-**	**34**	**0**	**0**	**19.8**	**12.9**	**0.1**	**32.7**	**-**	**-**	**-**	**-**
1/1	268	268	-	-	-	2.6	6.0	-	8.6	115.3	5.9	6.0	11.9
2/1	405	405	-	-	-	2.7	1.4	-	4.1	36.7	8.0	1.4	9.4
2/2+2/3	663	663	34	0	0	4.0	0.5	0.1	4.6	25.2	6.0	0.5	6.5
3/1	97	97	-	-	-	0.5	0.1	-	0.6	21.2	1.5	0.1	1.5
3/2	546	546	-	-	-	3.6	1.9	-	5.5	36.0	10.9	1.9	12.8
4/1	455	455	-	-	-	3.0	1.4	-	4.4	34.9	9.0	1.4	10.4
4/2	510	510	-	-	-	3.4	1.5	-	5.0	35.0	10.1	1.5	11.6
5/1	139	139	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	916	916	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	510	510	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	647	647	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	103	103	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	335	335	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/3	294	294	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -7.1 Total Delay for Signalled Lanes (pcuHr): 32.74 Cycle Time (s): 80

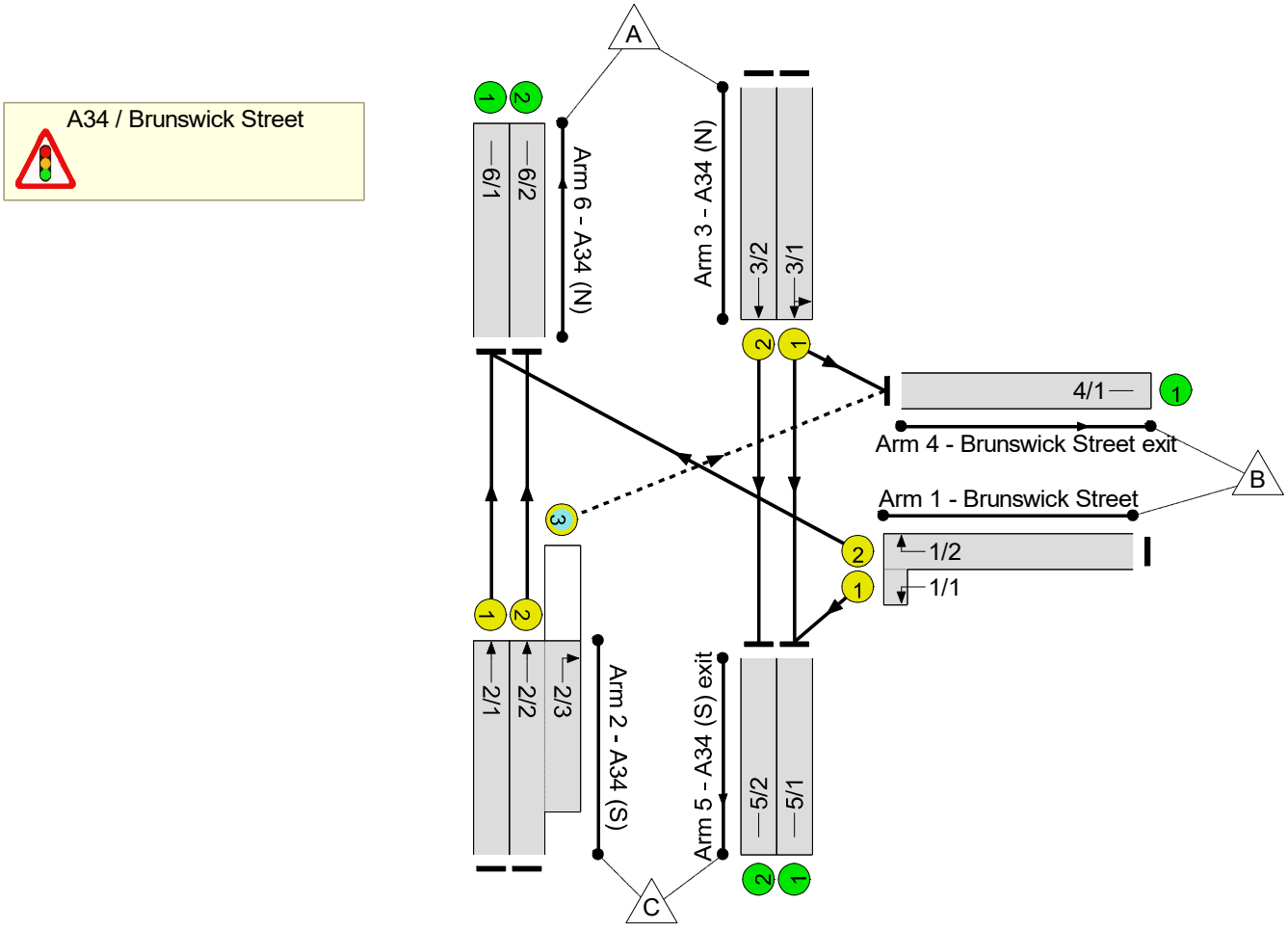
PRC Over All Lanes (%): -7.1 Total Delay Over All Lanes(pcuHr): 32.74

Full Input Data And Results

User and Project Details

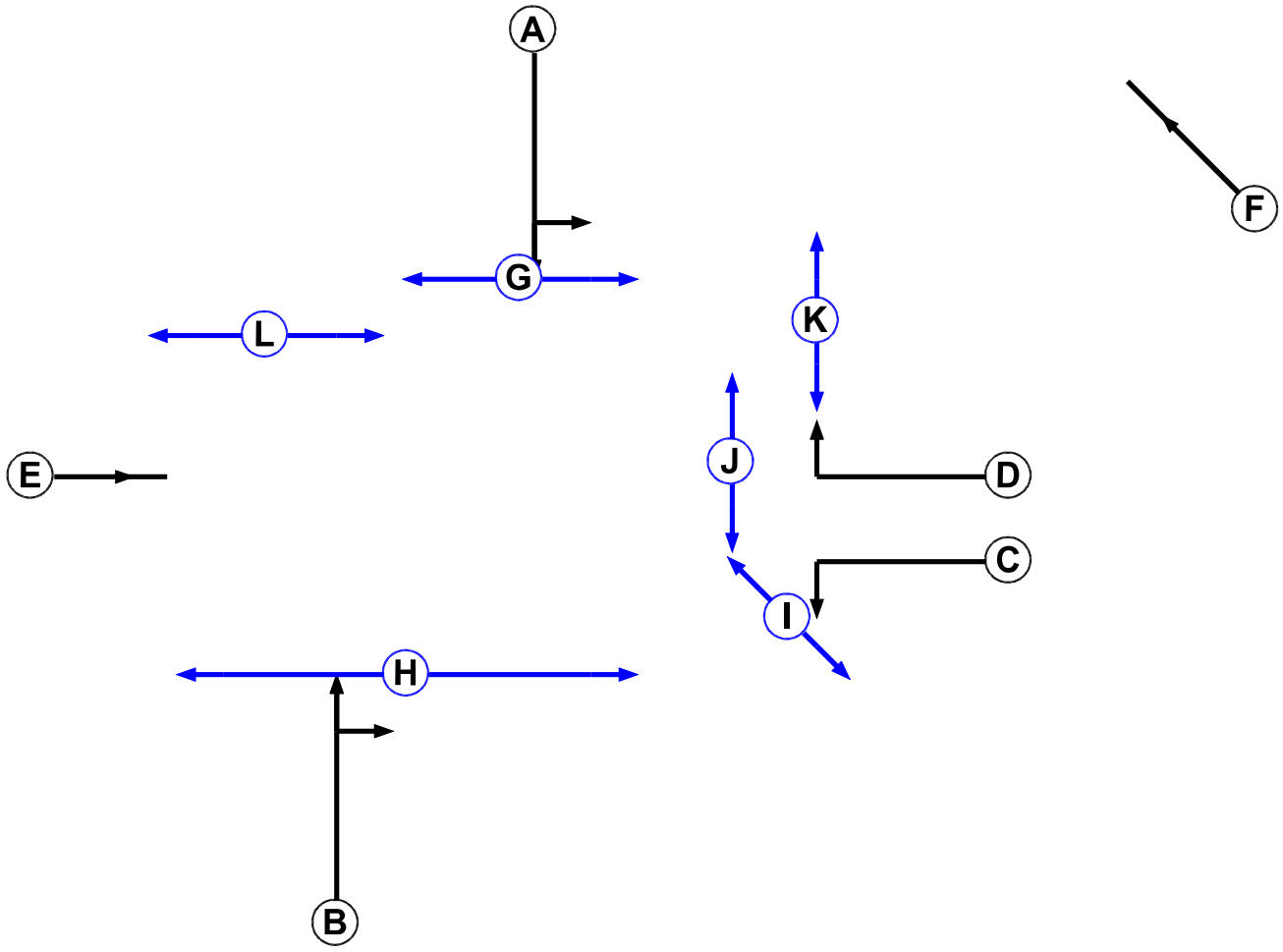
Project:	**Upper Brook Street**
Title:	**Brunswick Street**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	A34_Brunswick Street.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Traffic		-9999	7
F	Traffic		-9999	7
G	Pedestrian		-9999	6
H	Pedestrian		-9999	10
I	Pedestrian		-9999	5
J	Pedestrian		-9999	5
K	Pedestrian		-9999	5
L	Pedestrian		-9999	5

Full Input Data And Results

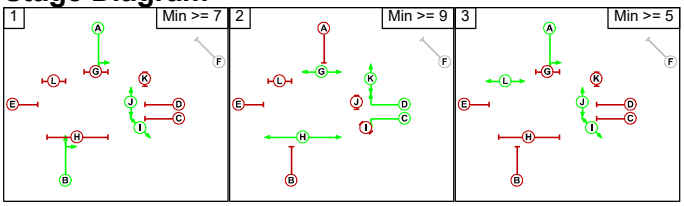
Phase Intergreens Matrix

		Starting Phase											
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K	L
	A		-	10	6	5	-	5	9	-	-	9	-
	B	-		-	6	5	-	-	5	-	-	10	8
	C	3	-		-	4	-	-	-	5	-	-	-
	D	6	6	-		6	-	-	-	-	5	-	10
	E	6	6	9	7		-	-	10	-	-	9	-
	F	-	-	-	-	-		-	-	-	-	-	-
	G	6	-	-	-	-	-		-	-	-	-	-
	H	8	8	-	-	8	-	-		-	-	-	-
	I	-	-	5	-	-	-	-	-		-	-	-
	J	-	-	-	5	-	-	-	-	-		-	-
	K	5	5	-	-	5	-	-	-	-	-		-
	L	-	5	-	5	-	-	-	-	-	-	-	

Phases in Stage

Stage No.	Phases in Stage
1	A B I J
2	C D G H K
3	A I J L

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
1	2	I	Losing	5	5
1	2	J	Losing	1	1
2	1	C	Losing	2	2
2	1	D	Losing	2	2
2	1	G	Losing	2	2
2	1	K	Losing	3	3
2	3	K	Losing	3	3
3	1	L	Losing	1	1
3	2	I	Losing	4	4
3	2	J	Losing	2	2
3	2	L	Losing	2	2

Full Input Data And Results

Prohibited Stage Change

	To Stage			
From Stage		1	2	3
	1		10	8
	2	8		10
	3	6	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Brunswick Street											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
2/3 (A34 (S))	4/1 (Right)	1439	0	3/1	1.09	All	4.00	-	0.50	4	4.00
				3/2	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: A34 / Brunswick Street												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Brunswick Street)	U	C	2	3	1.0	Geom	-	3.00	0.00	Y	Arm 5 Left	20.00
1/2 (Brunswick Street)	U	D	2	3	60.0	Geom	-	3.80	0.00	N	Arm 6 Right	10.00
2/1 (A34 (S))	U	B	2	3	36.2	Geom	-	3.30	0.00	Y	Arm 6 Ahead	Inf
2/2 (A34 (S))	U	B	2	3	36.2	Geom	-	3.03	0.00	N	Arm 6 Ahead	Inf
2/3 (A34 (S))	O	B	2	3	8.7	Geom	-	2.95	0.00	N	Arm 4 Right	10.00
3/1 (A34 (N))	U	A	2	3	49.7	Geom	-	3.49	0.00	Y	Arm 4 Left	10.00
											Arm 5 Ahead	Inf
3/2 (A34 (N))	U	A	2	3	49.7	Geom	-	3.34	0.00	N	Arm 5 Ahead	Inf
4/1 (Brunswick Street exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (N))	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (N))	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Baseline AM Peak'	08:15	09:15	01:00	

Full Input Data And Results

Scenario 1: 'Existing Layout' (FG1: 'Baseline AM Peak', Plan 1: 'Peds every second cycle')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	154	785	939
	B	275	0	285	560
	C	1123	155	0	1278
	Tot.	1398	309	1070	2777

Traffic Lane Flows

Lane	Scenario 1: Existing Layout
Junction: A34 / Brunswick Street	
1/1 (short)	285
1/2 (with short)	560(In) 275(Out)
2/1	557
2/2 (with short)	721(In) 566(Out)
2/3 (short)	155
3/1	430
3/2	509
4/1	309
5/1	561
5/2	509
6/1	832
6/2	566

Full Input Data And Results

Lane Saturation Flows

Junction: A34 / Brunswick Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Brunswick Street)	3.00	0.00	Y	Arm 5 Left	20.00	100.0 %	1781	1781
1/2 (Brunswick Street)	3.80	0.00	N	Arm 6 Right	10.00	100.0 %	1857	1857
2/1 (A34 (S))	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
2/2 (A34 (S))	3.03	0.00	N	Arm 6 Ahead	Inf	100.0 %	2058	2058
2/3 (A34 (S))	2.95	0.00	N	Arm 4 Right	10.00	100.0 %	1783	1783
3/1 (A34 (N))	3.49	0.00	Y	Arm 4 Left	10.00	35.8 %	1864	1864
				Arm 5 Ahead	Inf	64.2 %		
3/2 (A34 (N))	3.34	0.00	N	Arm 5 Ahead	Inf	100.0 %	2089	2089
4/1 (Brunswick Street exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'Existing Layout' (FG2: 'Baseline PM Peak', Plan 1: 'Peds every second cycle')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	284	1088	1372
	B	226	0	166	392
	C	874	138	0	1012
	Tot.	1100	422	1254	2776

Traffic Lane Flows

Lane	Scenario 2: Existing Layout
Junction: A34 / Brunswick Street	
1/1 (short)	166
1/2 (with short)	392(In) 226(Out)
2/1	437
2/2 (with short)	575(In) 437(Out)
2/3 (short)	138
3/1	686
3/2	686
4/1	422
5/1	568
5/2	686
6/1	663
6/2	437

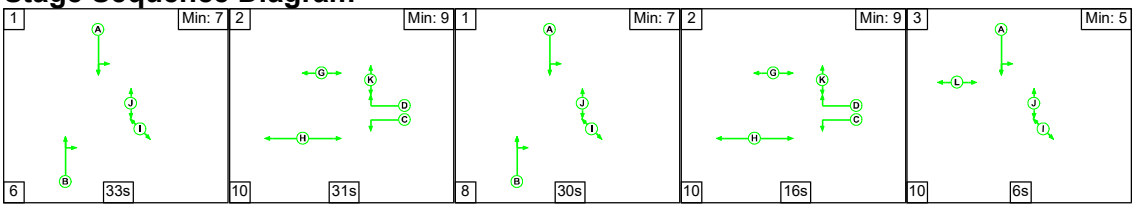
Full Input Data And Results

Lane Saturation Flows

Junction: A34 / Brunswick Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Brunswick Street)	3.00	0.00	Y	Arm 5 Left	20.00	100.0 %	1781	1781
1/2 (Brunswick Street)	3.80	0.00	N	Arm 6 Right	10.00	100.0 %	1857	1857
2/1 (A34 (S))	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
2/2 (A34 (S))	3.03	0.00	N	Arm 6 Ahead	Inf	100.0 %	2058	2058
2/3 (A34 (S))	2.95	0.00	N	Arm 4 Right	10.00	100.0 %	1783	1783
3/1 (A34 (N))	3.49	0.00	Y	Arm 4 Left	10.00	41.4 %	1849	1849
				Arm 5 Ahead	Inf	58.6 %		
3/2 (A34 (N))	3.34	0.00	N	Arm 5 Ahead	Inf	100.0 %	2089	2089
4/1 (Brunswick Street exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 1: 'Existing Layout' (FG1: 'Baseline AM Peak', Plan 1: 'Peds every second cycle')

Stage Sequence Diagram

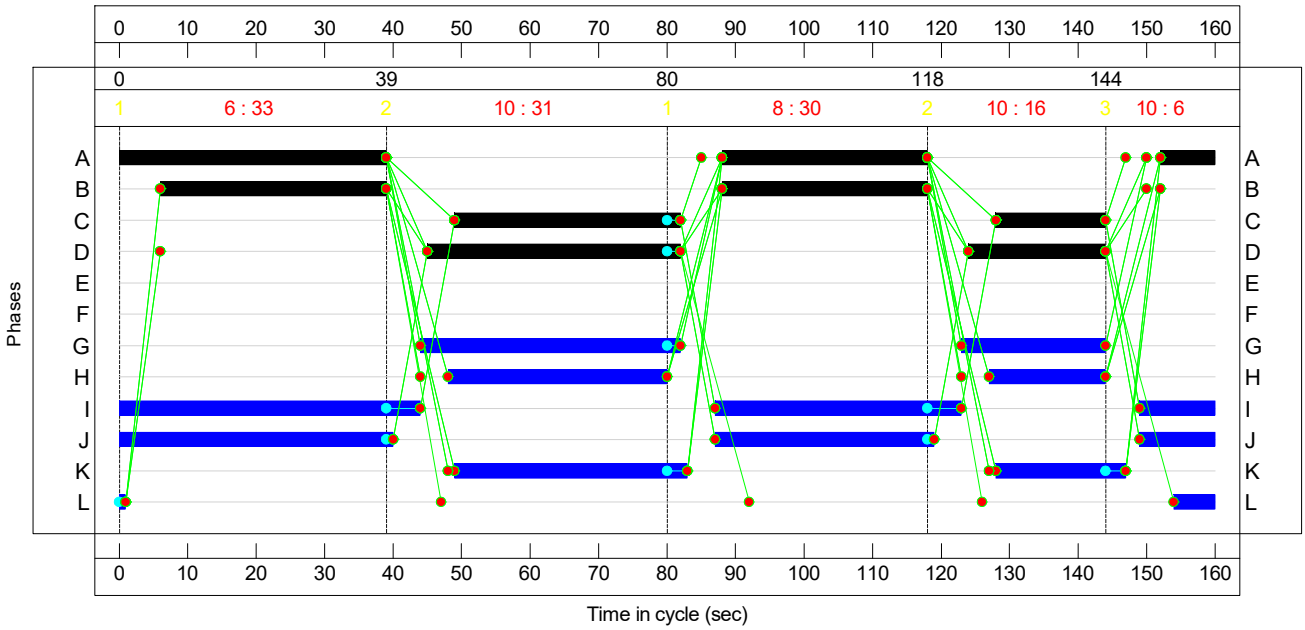


Stage Timings

Stage	1	2	1	2	3
Duration	33	31	30	16	6
Change Point	0	39	80	118	144

Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**90.0%**
A34 / Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**90.0%**
1/2+1/1	Brunswick Street Left Right	U	N/A	N/A	D C		2	57:49	-	560	1857:1781	306+317	90.0 : 90.0%
2/1	A34 (S) Ahead	U	N/A	N/A	B		2	63	-	557	1945	790	70.5%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B		2	63	-	721	2058:1783	741+203	76.4 : 76.4%
3/1	A34 (N) Left Ahead	U	N/A	N/A	A		2	77	-	430	1864	920	46.7%
3/2	A34 (N) Ahead	U	N/A	N/A	A		2	77	-	509	2089	1031	49.3%
4/1	Brunswick Street exit	U	N/A	N/A	-		-	-	-	309	Inf	Inf	0.0%
5/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	561	Inf	Inf	0.0%
5/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	509	Inf	Inf	0.0%
6/1	A34 (N)	U	N/A	N/A	-		-	-	-	832	Inf	Inf	0.0%
6/2	A34 (N)	U	N/A	N/A	-		-	-	-	566	Inf	Inf	0.0%

Full Input Data And Results

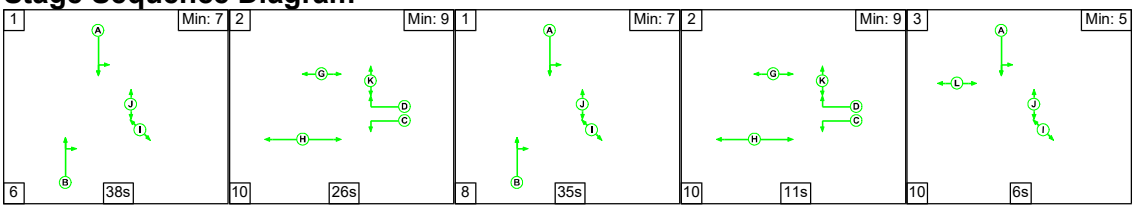
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Brunswick Street	**-**	**-**	**115**	**0**	**40**	**14.5**	**7.7**	**0.5**	**22.7**	**-**	**-**	**-**	**-**
A34 / Brunswick Street	**-**	**-**	**115**	**0**	**40**	**14.5**	**7.7**	**0.5**	**22.7**	**-**	**-**	**-**	**-**
1/2+1/1	560	560	-	-	-	4.1	4.0	-	8.0	51.6	13.1	4.0	17.1
2/1	557	557	-	-	-	3.1	1.2	-	4.2	27.4	10.4	1.2	11.5
2/2+2/3	721	721	115	0	40	3.7	1.6	0.5	5.9	29.3	10.9	1.6	12.5
3/1	430	430	-	-	-	1.6	0.4	-	2.1	17.5	7.4	0.4	7.8
3/2	509	509	-	-	-	2.0	0.5	-	2.5	17.5	8.9	0.5	9.4
4/1	309	309	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	561	561	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2	509	509	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	832	832	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	566	566	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 0.0 Total Delay for Signalled Lanes (pcuHr): 22.69 Cycle Time (s): 160
PRC Over All Lanes (%): 0.0 Total Delay Over All Lanes(pcuHr): 22.69

Full Input Data And Results

Scenario 2: 'Existing Layout' (FG2: 'Baseline PM Peak', Plan 1: 'Peds every second cycle')

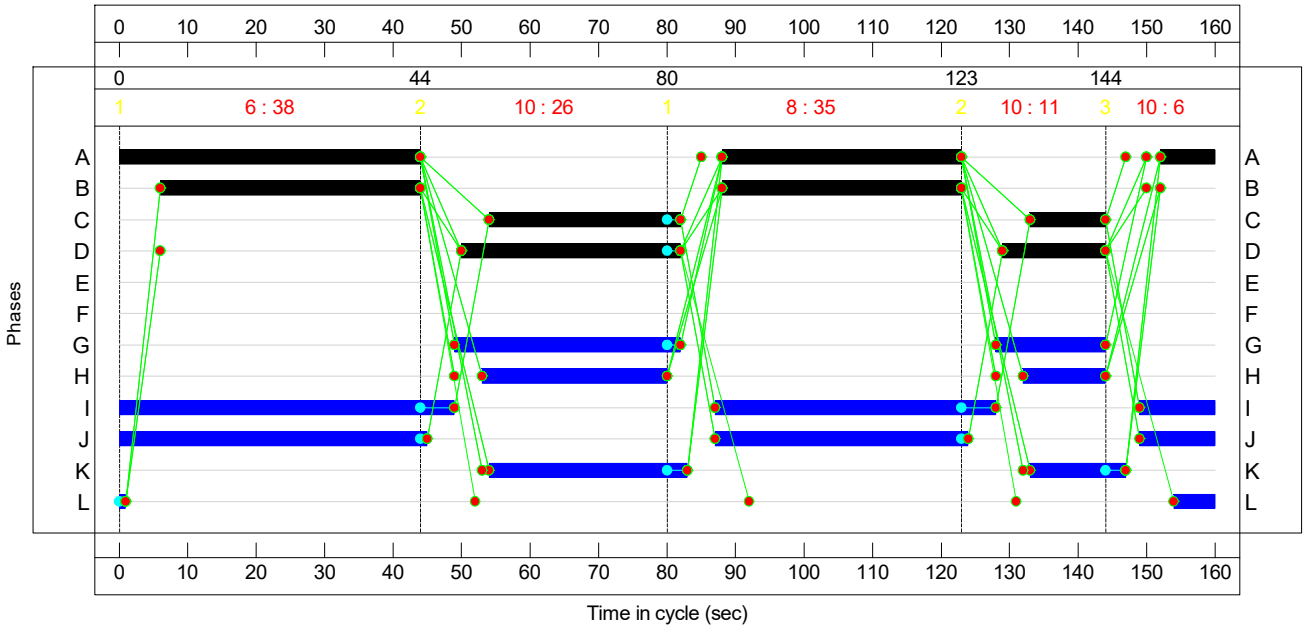
Stage Sequence Diagram



Stage Timings

Stage	1	2	1	2	3
Duration	38	26	35	11	6
Change Point	0	44	80	123	144

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**76.7%**
A34 / Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**76.7%**
1/2+1/1	Brunswick Street Left Right	U	N/A	N/A	D C		2	47:39	-	392	1857:1781	304+224	74.2 : 74.2%
2/1	A34 (S) Ahead	U	N/A	N/A	B		2	73	-	437	1945	912	47.9%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B		2	73	-	575	2058:1783	642+180	68.0 : 76.7%
3/1	A34 (N) Left Ahead	U	N/A	N/A	A		2	87	-	686	1849	1029	66.7%
3/2	A34 (N) Ahead	U	N/A	N/A	A		2	87	-	686	2089	1162	59.0%
4/1	Brunswick Street exit	U	N/A	N/A	-		-	-	-	422	Inf	Inf	0.0%
5/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	568	Inf	Inf	0.0%
5/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	686	Inf	Inf	0.0%
6/1	A34 (N)	U	N/A	N/A	-		-	-	-	663	Inf	Inf	0.0%
6/2	A34 (N)	U	N/A	N/A	-		-	-	-	437	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Brunswick Street	**-**	**-**	**0**	**0**	**138**	**11.7**	**4.7**	**1.1**	**17.5**	**-**	**-**	**-**	**-**
A34 / Brunswick Street	**-**	**-**	**0**	**0**	**138**	**11.7**	**4.7**	**1.1**	**17.5**	**-**	**-**	**-**	**-**
1/2+1/1	392	392	-	-	-	2.9	1.4	-	4.3	39.2	8.4	1.4	9.8
2/1	437	437	-	-	-	1.8	0.5	-	2.2	18.4	6.7	0.5	7.1
2/2+2/3	575	575	0	0	138	2.2	1.2	1.1	4.5	28.0	6.6	1.2	7.7
3/1	686	686	-	-	-	2.5	1.0	-	3.5	18.3	13.0	1.0	14.0
3/2	686	686	-	-	-	2.3	0.7	-	3.1	16.0	12.2	0.7	12.9
4/1	422	422	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	568	568	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2	686	686	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	663	663	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	437	437	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 17.4 Total Delay for Signalled Lanes (pcuHr): 17.51 Cycle Time (s): 160
PRC Over All Lanes (%): 17.4 Total Delay Over All Lanes(pcuHr): 17.51

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.1.7462
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Filename: Existing Hanworth Close.j9
Path: C:\Data\Projects\J000351-J000400\J000370 Upper Brook Street\Background Information\Junction Assessments\TA June 2023
Report generation date: 26/05/2023 16:34:22

»Baseline, AM
»Baseline, PM

Summary of junction performance

	AM								PM							
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
	Baseline															
Stream B-AC	D1	0.1	6.66	0.05	A	1.72	A	537 % [Stream B-AC]	D2	0.1	6.42	0.05	A	1.90	A	341 % [Stream C-AB]
Stream C-AB		0.1	6.63	0.07	A					0.1	7.10	0.12	A			

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	Kincardine Road / Hanworth Road
Site number	
Date	01/06/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	J000370
Enumerator	FTPDT-01\Office
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75			✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Baseline	AM	ONE HOUR	08:00	09:30	15	✓
D2	Baseline	PM	ONE HOUR	16:30	18:00	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Baseline, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Hanworth Close	T-Junction	Two-way		1.72	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	537	Stream B-AC

Arms

Arms

Arm	Name	Description	Arm type
A	Kincardine Road (N)		Major
B	Hanworth Close		Minor
C	Kincardine Road (S)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	7.09			44.1	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.36	27	23

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	516	0.089	0.226	0.142	0.323
B-C	661	0.097	0.244	-	-
C-B	599	0.221	0.221	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.
Streams may be combined, in which case capacity will be adjusted.
Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Baseline	AM	ONE HOUR	08:00	09:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)

A		ONE HOUR	✓	157	100.000
B		ONE HOUR	✓	28	100.000
C		ONE HOUR	✓	65	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	11	146
	B	7	0	21
	C	30	35	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	4
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.05	6.66	0.1	A	26	39
C-AB	0.07	6.63	0.1	A	34	51
C-A					26	39
A-B					10	15
A-C					134	201

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	21	5	586	0.036	21	0.0	0.0	6.369	A
C-AB	27	7	589	0.047	27	0.0	0.1	6.410	A
C-A	22	5			22				
A-B	8	2			8				
A-C	110	27			110				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	25	6	580	0.043	25	0.0	0.0	6.490	A
C-AB	33	8	587	0.056	33	0.1	0.1	6.500	A
C-A	25	6			25				
A-B	10	2			10				
A-C	131	33			131				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	31	8	571	0.054	31	0.0	0.1	6.660	A
C-AB	41	10	584	0.070	41	0.1	0.1	6.627	A
C-A	31	8			31				

A-B	12	3			12				
A-C	161	40			161				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	31	8	571	0.054	31	0.1	0.1	6.661	A
C-AB	41	10	584	0.070	41	0.1	0.1	6.630	A
C-A	31	8			31				
A-B	12	3			12				
A-C	161	40			161				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	25	6	580	0.043	25	0.1	0.0	6.494	A
C-AB	33	8	587	0.056	33	0.1	0.1	6.505	A
C-A	25	6			25				
A-B	10	2			10				
A-C	131	33			131				

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	21	5	586	0.036	21	0.0	0.0	6.373	A
C-AB	27	7	589	0.047	27	0.1	0.1	6.416	A
C-A	22	5			22				
A-B	8	2			8				
A-C	110	27			110				

Baseline, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Hanworth Close	T-Junction	Two-way		1.90	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	341	Stream C-AB

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	Baseline	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	204	100.000
B		ONE HOUR	✓	29	100.000
C		ONE HOUR	✓	89	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	9	195
	B	2	0	27
	C	32	57	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	2
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.05	6.42	0.1	A	27	40
C-AB	0.12	7.10	0.1	A	55	83

C-A					26	40
A-B					8	12
A-C					179	268

Main Results for each time segment

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	5	610	0.036	22	0.0	0.0	6.115	A
C-AB	45	11	582	0.077	44	0.0	0.1	6.692	A
C-A	22	6			22				
A-B	7	2			7				
A-C	147	37			147				

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	26	7	603	0.043	26	0.0	0.0	6.242	A
C-AB	54	13	579	0.093	54	0.1	0.1	6.858	A
C-A	26	7			26				
A-B	8	2			8				
A-C	175	44			175				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	8	592	0.054	32	0.0	0.1	6.423	A
C-AB	67	17	574	0.116	67	0.1	0.1	7.094	A
C-A	31	8			31				
A-B	10	2			10				
A-C	215	54			215				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	8	592	0.054	32	0.1	0.1	6.423	A
C-AB	67	17	574	0.116	67	0.1	0.1	7.097	A
C-A	31	8			31				
A-B	10	2			10				
A-C	215	54			215				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	26	7	603	0.043	26	0.1	0.0	6.246	A
C-AB	54	13	579	0.093	54	0.1	0.1	6.862	A
C-A	26	7			26				
A-B	8	2			8				
A-C	175	44			175				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	5	610	0.036	22	0.0	0.0	6.121	A
C-AB	45	11	582	0.077	45	0.1	0.1	6.702	A
C-A	22	6			22				
A-B	7	2			7				
A-C	147	37			147				

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.1.7462
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Filename: Existing Whitekirk Close.j9
Path: C:\Data\Projects\J000351-J000400\J000370 Upper Brook Street\Background Information\Junction Assessments\TA June 2023
Report generation date: 26/05/2023 16:52:58

»Baseline, AM
»Baseline, PM

Summary of junction performance

	AM								PM							
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
	Baseline															
Stream B-ACD	D1	0.0	8.08	0.04	A	3.57	A	900 % []	D2	0.0	8.18	0.04	A	3.71	A	874 % [Stream B-ACD]
Stream A-BCD		0.1	6.20	0.05	A					0.1	5.98	0.05	A			
Stream D-ABC		0.0	5.80	0.02	A					0.1	5.90	0.06	A			
Stream C-ABD		0.0	5.67	0.01	A					0.0	0.00	0.00	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	Kincardine Road / Whitekirk Close
Site number	
Date	01/06/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	J000370
Enumerator	FTPDT-01\Office
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75			✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Baseline	AM	ONE HOUR	08:00	09:30	15	✓
D2	Baseline	PM	ONE HOUR	16:30	18:00	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Baseline, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	Arm A - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Major arm width	Arm C - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Whitekirk Close	Crossroads	Two-way		3.57	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	900	

Arms

Arms

Arm	Name	Description	Arm type
A	Kincardine Road (N)		Major
B	Whitekirk Close		Minor
C	Kincardine Road (S)		Major
D	Car Park Access		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
A	5.79			60.0	✓	0.00
C	5.79			99.9	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	2.64	26	22
D	One lane	3.43	14	13

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
A-D	609	-	-	-	-	-	-	0.238	0.340	0.238	-	-	-
B-A	479	0.088	0.223	0.223	-	-	-	0.140	0.318	-	0.223	0.223	0.111
B-C	615	0.095	0.240	-	-	-	-	-	-	-	-	-	-
B-D, nearside lane	479	0.088	0.223	0.223	-	-	-	0.140	0.318	0.140	-	-	-
B-D, offside lane	479	0.088	0.223	0.223	-	-	-	0.140	0.318	0.140	-	-	-
C-B	632	0.247	0.247	0.353	-	-	-	-	-	-	-	-	-
D-A	659	-	-	-	-	-	-	0.258	-	0.102	-	-	-
D-B, nearside lane	510	0.149	0.149	0.338	-	-	-	0.237	0.237	0.094	-	-	-
D-B, offside lane	510	0.149	0.149	0.338	-	-	-	0.237	0.237	0.094	-	-	-
D-C	510	-	0.149	0.338	0.118	0.237	0.237	0.237	0.237	0.094	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Baseline	AM	ONE HOUR	08:00	09:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	44	100.000
B		ONE HOUR	✓	15	100.000
C		ONE HOUR	✓	38	100.000
D		ONE HOUR	✓	13	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	17	0	27
	B	13	0	0	2
	C	28	4	0	6
	D	12	1	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	0
	B	0	0	0	0
	C	0	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.04	8.08	0.0	A	14	21
A-BCD	0.05	6.20	0.1	A	25	38
A-B					15	22
A-C					0	0
D-ABC	0.02	5.80	0.0	A	12	18
C-ABD	0.01	5.67	0.0	A	4	6
C-D					5	8
C-A					26	38

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	3	467	0.024	11	0.0	0.0	7.887	A
A-BCD	21	5	610	0.034	21	0.0	0.0	6.105	A

A-B	12	3			12				
A-C	0	0			0				
D-ABC	10	2	638	0.015	10	0.0	0.0	5.732	A
C-ABD	3	0.78	638	0.005	3	0.0	0.0	5.667	A
C-D	4	1			4				
C-A	21	5			21				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	3	465	0.029	13	0.0	0.0	7.969	A
A-BCD	25	6	610	0.041	25	0.0	0.0	6.148	A
A-B	15	4			15				
A-C	0	0			0				
D-ABC	12	3	636	0.018	12	0.0	0.0	5.762	A
C-ABD	4	0.94	639	0.006	4	0.0	0.0	5.662	A
C-D	5	1			5				
C-A	25	6			25				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	17	4	462	0.036	16	0.0	0.0	8.078	A
A-BCD	31	8	611	0.050	31	0.0	0.1	6.205	A
A-B	18	4			18				
A-C	0	0			0				
D-ABC	14	4	634	0.023	14	0.0	0.0	5.805	A
C-ABD	5	1	641	0.007	5	0.0	0.0	5.654	A
C-D	7	2			7				
C-A	31	8			31				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	17	4	462	0.036	17	0.0	0.0	8.079	A
A-BCD	31	8	611	0.050	31	0.1	0.1	6.205	A
A-B	18	4			18				
A-C	0	0			0				
D-ABC	14	4	634	0.023	14	0.0	0.0	5.805	A
C-ABD	5	1	641	0.007	5	0.0	0.0	5.654	A
C-D	7	2			7				
C-A	31	8			31				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	3	465	0.029	14	0.0	0.0	7.972	A
A-BCD	25	6	610	0.041	25	0.1	0.0	6.149	A
A-B	15	4			15				
A-C	0	0			0				
D-ABC	12	3	636	0.018	12	0.0	0.0	5.763	A
C-ABD	4	0.94	639	0.006	4	0.0	0.0	5.665	A
C-D	5	1			5				
C-A	25	6			25				

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	3	467	0.024	11	0.0	0.0	7.894	A
A-BCD	21	5	610	0.034	21	0.0	0.0	6.111	A
A-B	12	3			12				
A-C	0	0			0				
D-ABC	10	2	638	0.015	10	0.0	0.0	5.733	A
C-ABD	3	0.78	638	0.005	3	0.0	0.0	5.668	A
C-D	4	1			4				
C-A	21	5			21				

Baseline, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	Arm A - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Major arm width	Arm C - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Whitekirk Close	Crossroads	Two-way		3.71	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	874	Stream B-ACD

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	Baseline	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	70	100.000
B		ONE HOUR	✓	15	100.000
C		ONE HOUR	✓	17	100.000
D		ONE HOUR	✓	35	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	42	0	28
	B	15	0	0	0
	C	17	0	0	0
	D	34	1	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	0
	B	0	0	0	0
	C	0	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.04	8.18	0.0	A	14	21
A-BCD	0.05	5.98	0.1	A	27	41
A-B					37	55
A-C					0	0
D-ABC	0.06	5.90	0.1	A	32	48
C-ABD	0.00	0.00	0.0	A	0	0
C-D					0	0
C-A					16	23

Main Results for each time segment

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	3	464	0.024	11	0.0	0.0	7.950	A
A-BCD	22	6	627	0.035	22	0.0	0.0	5.953	A
A-B	30	8			30				
A-C	0	0			0				
D-ABC	26	7	650	0.041	26	0.0	0.0	5.769	A
C-ABD	0	0	617	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	13	3			13				

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	3	461	0.029	13	0.0	0.0	8.046	A
A-BCD	27	7	630	0.043	27	0.0	0.0	5.966	A
A-B	36	9			36				
A-C	0	0			0				
D-ABC	31	8	649	0.048	31	0.0	0.1	5.827	A
C-ABD	0	0	614	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	15	4			15				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	17	4	457	0.036	16	0.0	0.0	8.176	A
A-BCD	33	8	635	0.052	33	0.0	0.1	5.982	A
A-B	44	11			44				
A-C	0	0			0				
D-ABC	39	10	648	0.059	38	0.1	0.1	5.904	A
C-ABD	0	0	609	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	19	5			19				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	17	4	457	0.036	17	0.0	0.0	8.176	A
A-BCD	33	8	635	0.052	33	0.1	0.1	5.982	A
A-B	44	11			44				
A-C	0	0			0				
D-ABC	39	10	648	0.059	39	0.1	0.1	5.904	A
C-ABD	0	0	609	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	19	5			19				

17:30 - 17:45

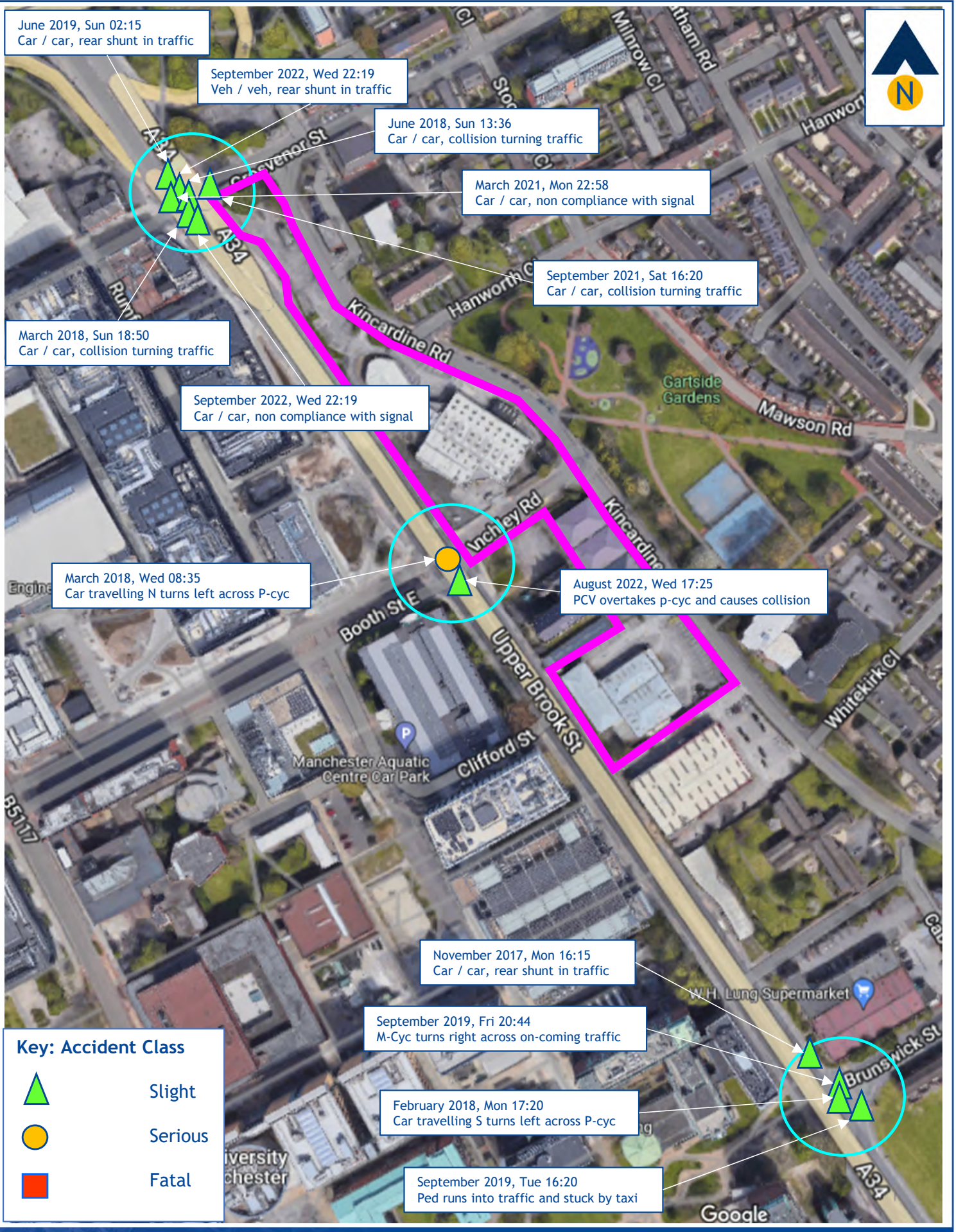
Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	3	461	0.029	14	0.0	0.0	8.049	A
A-BCD	27	7	630	0.043	27	0.1	0.0	5.969	A
A-B	36	9			36				
A-C	0	0			0				
D-ABC	31	8	649	0.048	32	0.1	0.1	5.827	A
C-ABD	0	0	614	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	15	4			15				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	3	464	0.024	11	0.0	0.0	7.956	A
A-BCD	22	6	627	0.035	22	0.0	0.0	5.958	A
A-B	30	8			30				
A-C	0	0			0				
D-ABC	26	7	650	0.041	26	0.1	0.0	5.772	A
C-ABD	0	0	617	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	13	3			13				



APPENDIX TA5



FOCUS TRANSPORT PLANNING

Appendix TA5

Summary of Recorded Core Accident Details at A3 Upper Brook Street Cluster Locations

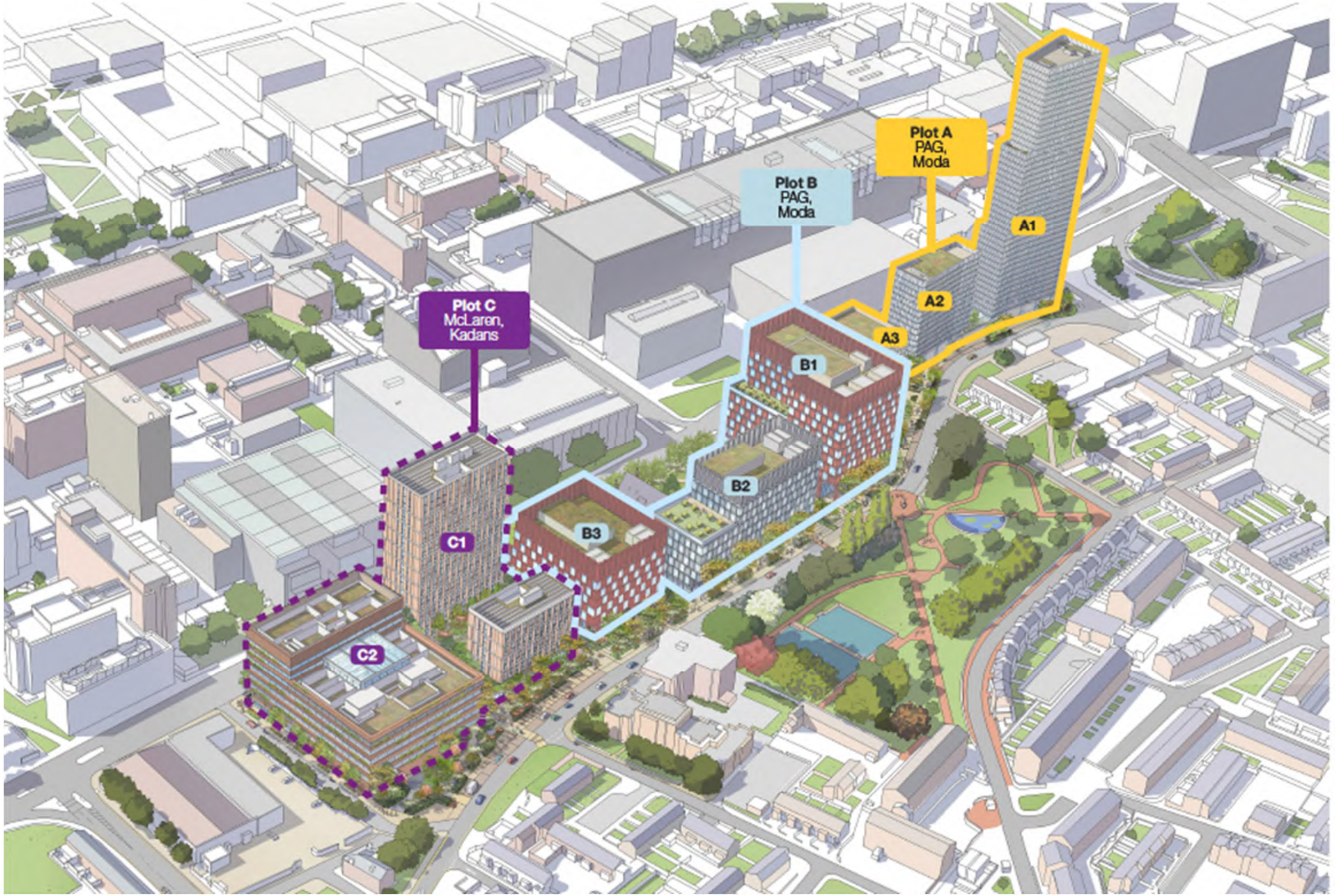
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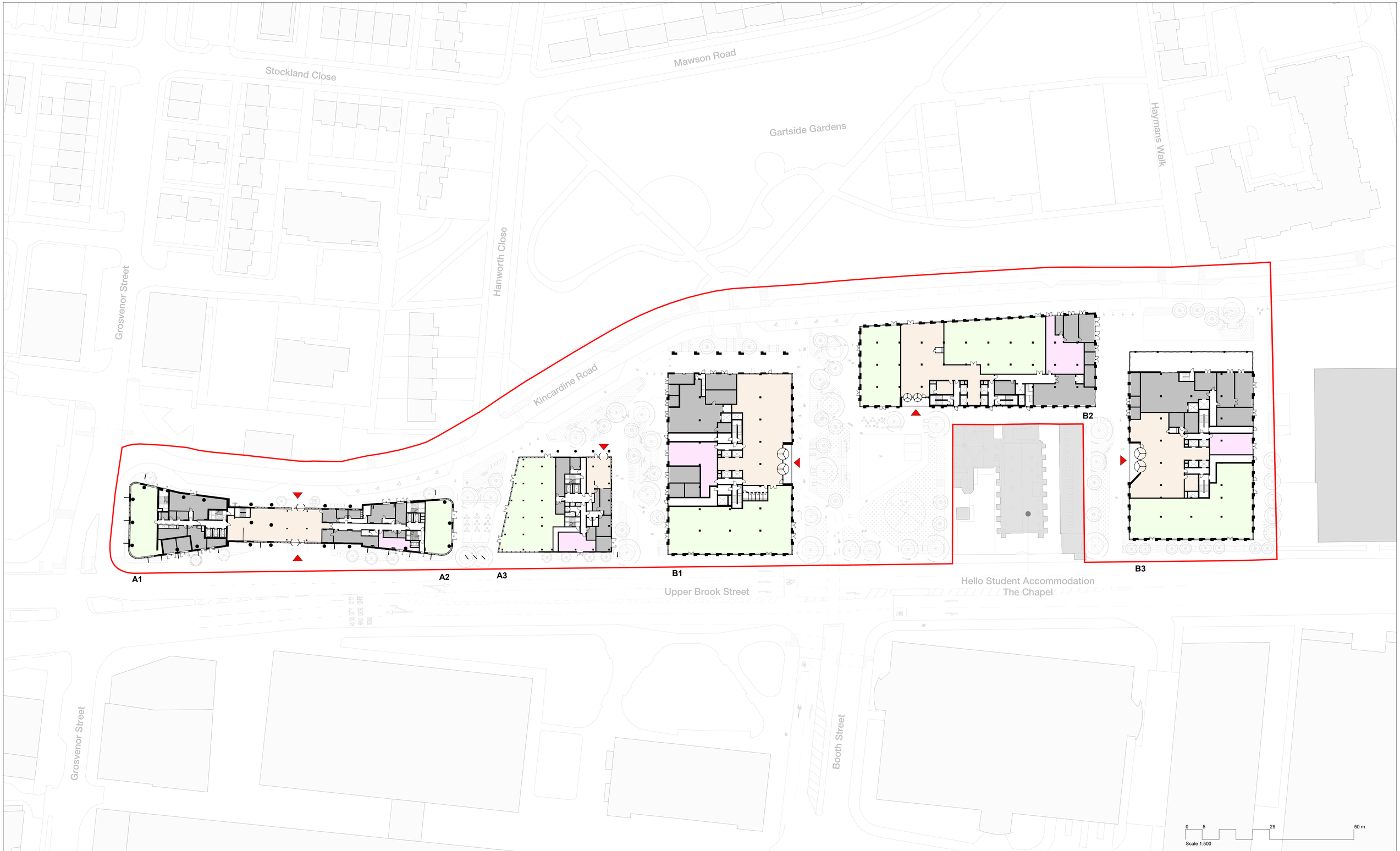
Upper Brook Street Masterplan (Williams / Alliance UBS)

June 2023



APPENDIX TA6


Plot A
PAG,
Moda
Plot B
PAG,
Moda
Plot C
McLaren,
Kadans
A1
A2
A3
B1
B2
B3
C1
C2



Rev	Description	Date
P1	Issued for Planning	23.06.23

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Key

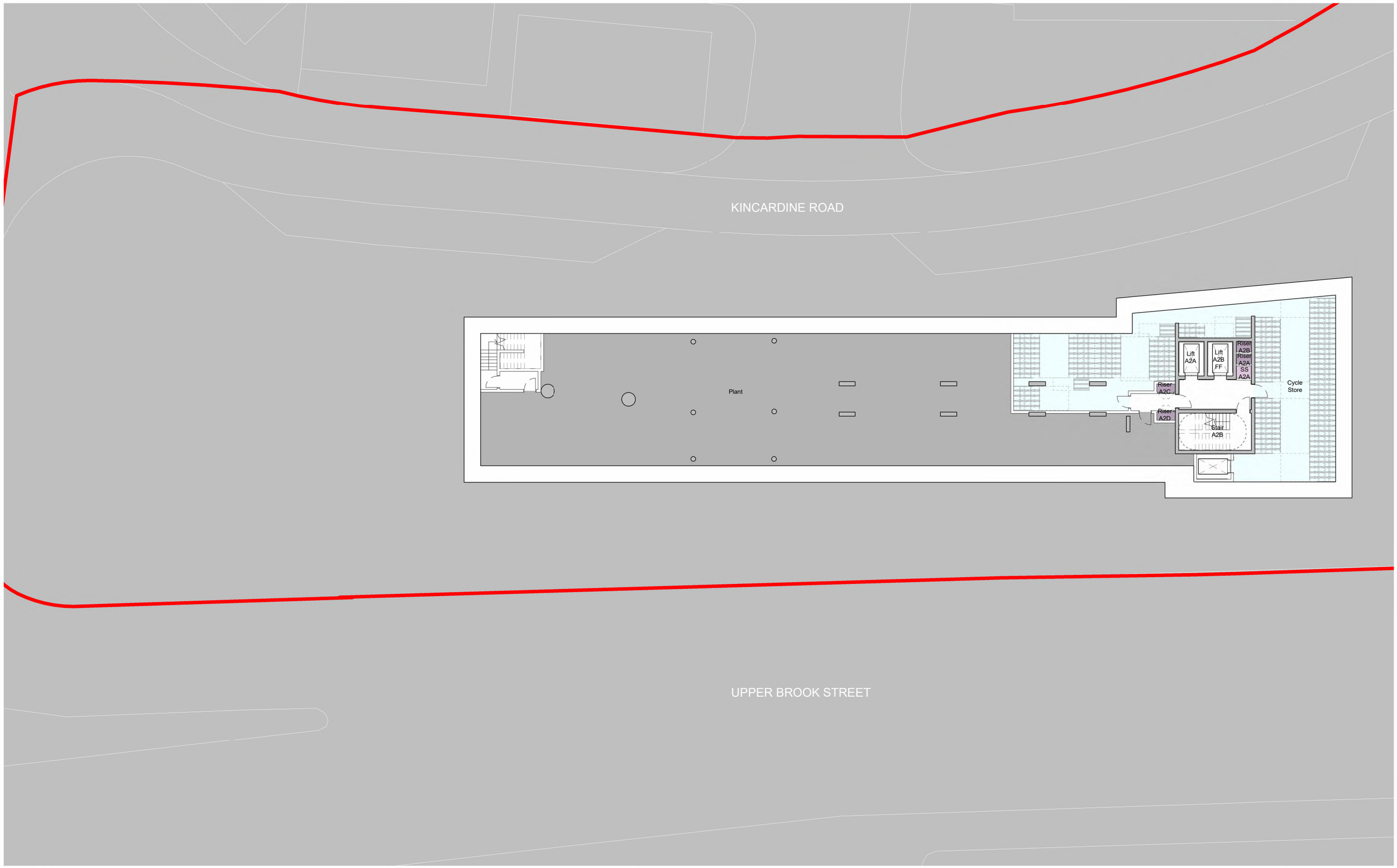
- Entrance Lobby and Amenities
- Ancillary Spaces
- Cycle Store
- Back of House
- Application Boundary
- Primary Entrance



Scale @ A1	Date	Job Number	Project
1 : 500	June 2023	220077	Upper Brook Street Manchester M1 2EH
Drawn By	**Checked By**	**Status**	
JD	LB	S2	
Drawing No.	**Rev**	**Purpose of Issue**	**Drawing**
UBS-HBA-SW-00-DR-A-081100	P1	For Planning	Proposed Illustrative Masterplan - Ground Floor Plan

26-28 Hilton Street
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NORTH

Rev	Date	Description
P01	2023-06-22	Planning Issue

0 2.5 5 7.5 10m

Project Title
Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title
A1/A2 - General Arrangement Plan
Basement

Project No
10450

Scale
1 : 250 @ A3

Status
PLANNING

SHP Drawing Code PROJ - ORIG - ZONE - ROLE - CLAS - TYPE - LOC - SEQ
10450-SHP-ZZ-A-B5D8-G200-PL-B1-001

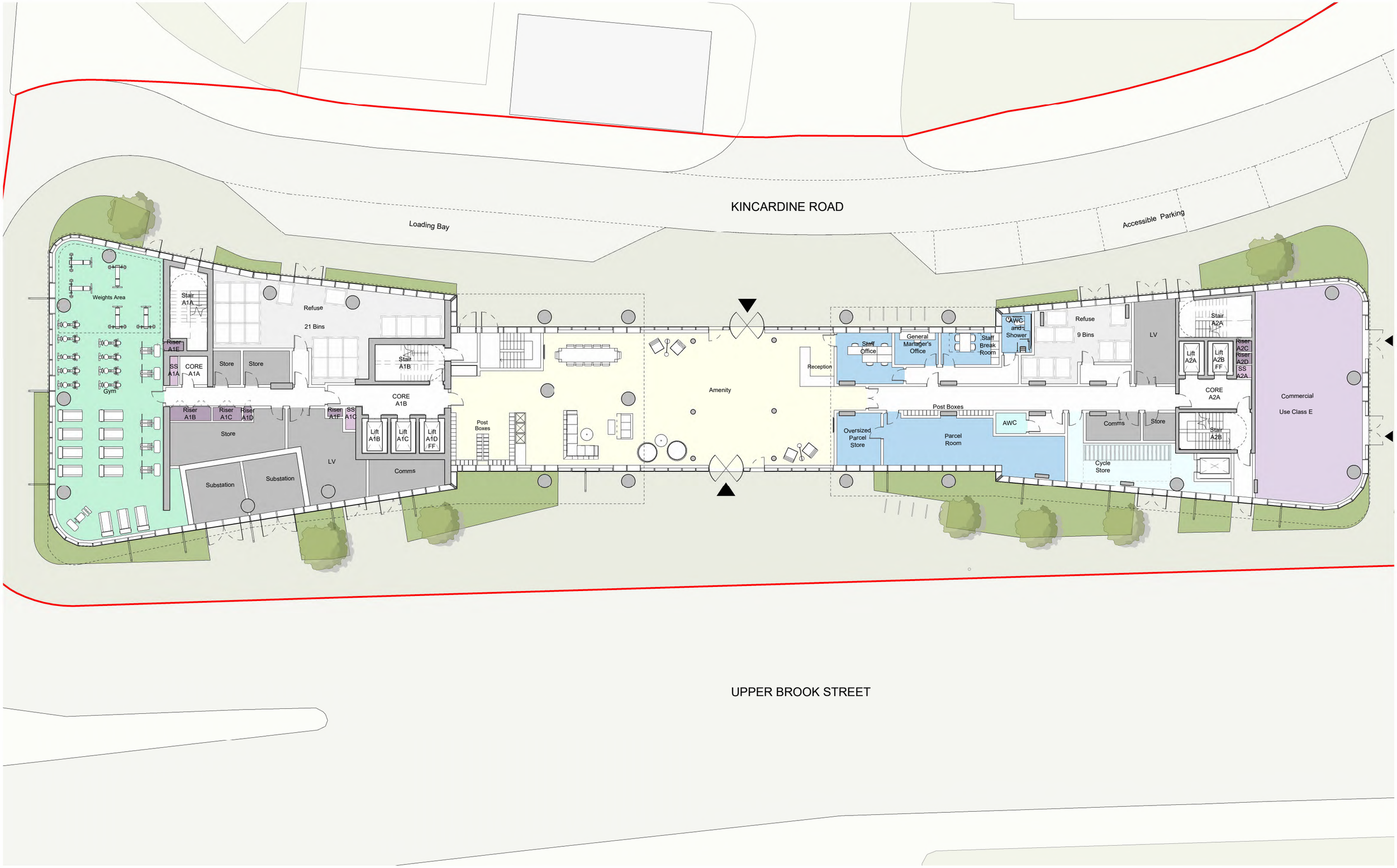
Revision
P01

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NORTH

Rev	Date	Description
P01	2023-06-22	Planning Issue

0 2.5 5 7.5 10m

Project Title: Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title: A1/A2 -General Arrangement Plan Ground Floor

Project No: 10450

Scale: 1 : 250 @ A3

Status: PLANNING

SHP Drawing Code: 10450-SHP-ZZ-A-B5D8-G200-PL-00-001

Revision: P01

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NORTH

Rev	Date	Description
P01	2023-06-22	Planning Issue

0 2.5 5 7.5 10m

Project Title
Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title
A1/A2 General Arrangement Plan
Level 01

Project No
10450

Scale
1 : 250 @ A3

Status
PLANNING

SHP Drawing Code PROJ - ORIG - ZONE - ROLE - CLAS - TYPE - LOC - SEQ
10450-SHP-ZZ-A-B5D8-G200-PL-01-001

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NORTH

Rev	Date	Description
P01	2023-06-22	Planning Issue

0 2.5 5 7.5 10m

Project Title
Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title
A3 - General Arrangement
Plan
Ground Floor

Project No
10450

Scale
1 : 250 @ A3

Status
PLANNING

SHP Drawing Code PROJ - ORIG - ZONE - ROLE - CLAS - TYPE - LOC - SEQ
10450-SHP-A3-A-B5D8-G200-PL-00-001

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NORTH

Rev	Date	Description
P01	2023-06-22	Planning Issue

0 2.5 5 7.5 10m

Project Title
Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title
A3 - General Arrangement Plan
Level 01

Project No
10450

Scale
1 : 250 @ A3

Status
PLANNING

SHP Drawing Code PROJ - ORIG - ZONE - ROLE - CLAS - TYPE - LOC - SEQ
10450-SHP-A3-A-B5D8-G200-PL-01-001

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NORTH

Rev	Date	Description
P01	2023-06-22	Planning Issue

0 2.5 5 7.5 10m

Project Title
Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title
A3 - General Arrangement Plan
Typical Levels 02-11

Project No
10450

Scale
1 : 250 @ A3

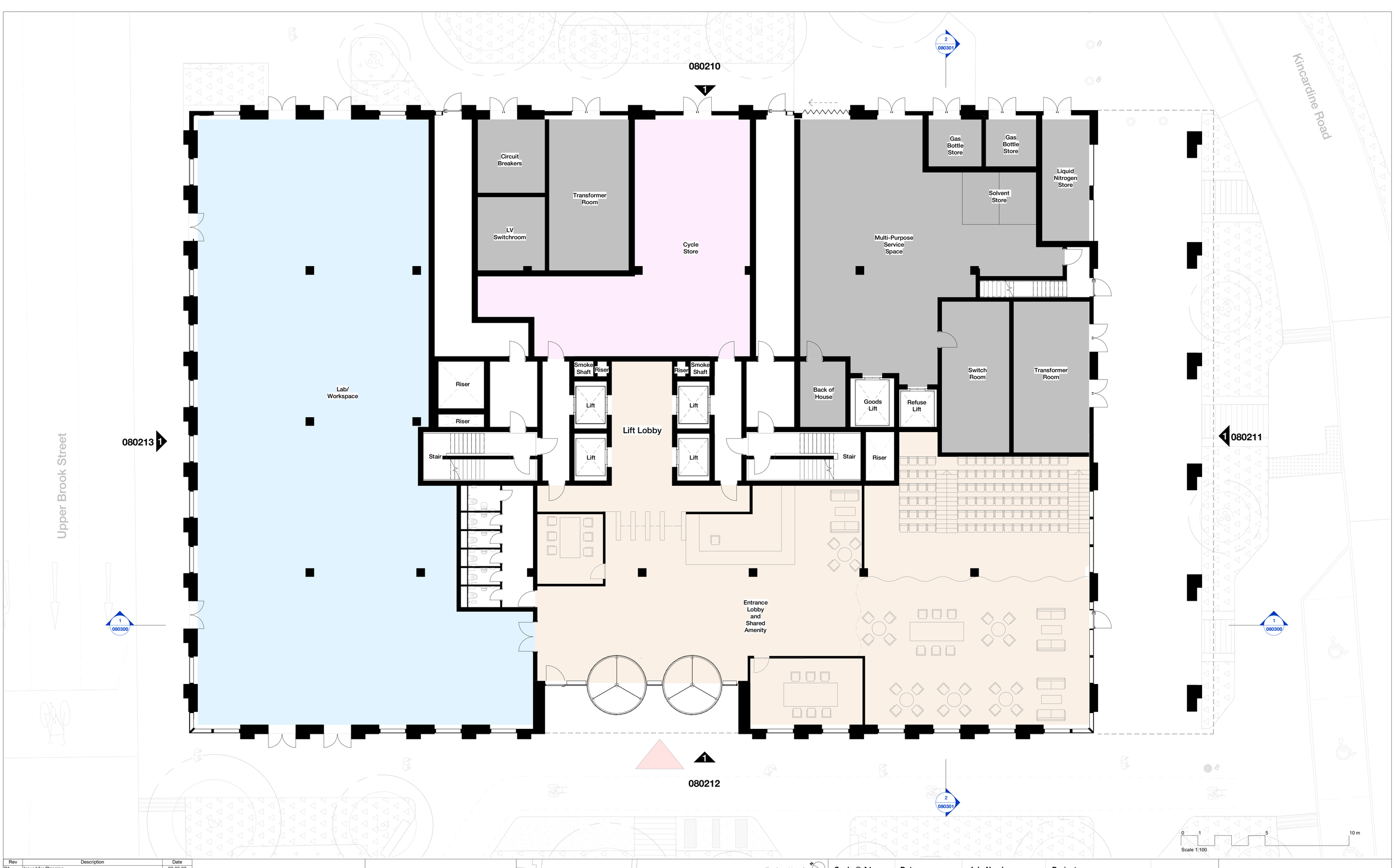
Status
PLANNING

SHP Drawing Code (PROJ - ORIG - ZONE - ROLE - CLASS - TYPE - LOC - SEQ)
10450-SHP-A3-A-B5D8-G200-PL-TY-001

Revision
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Rev	Description	Date
P1	Issued for Planning	23.06.23

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Key

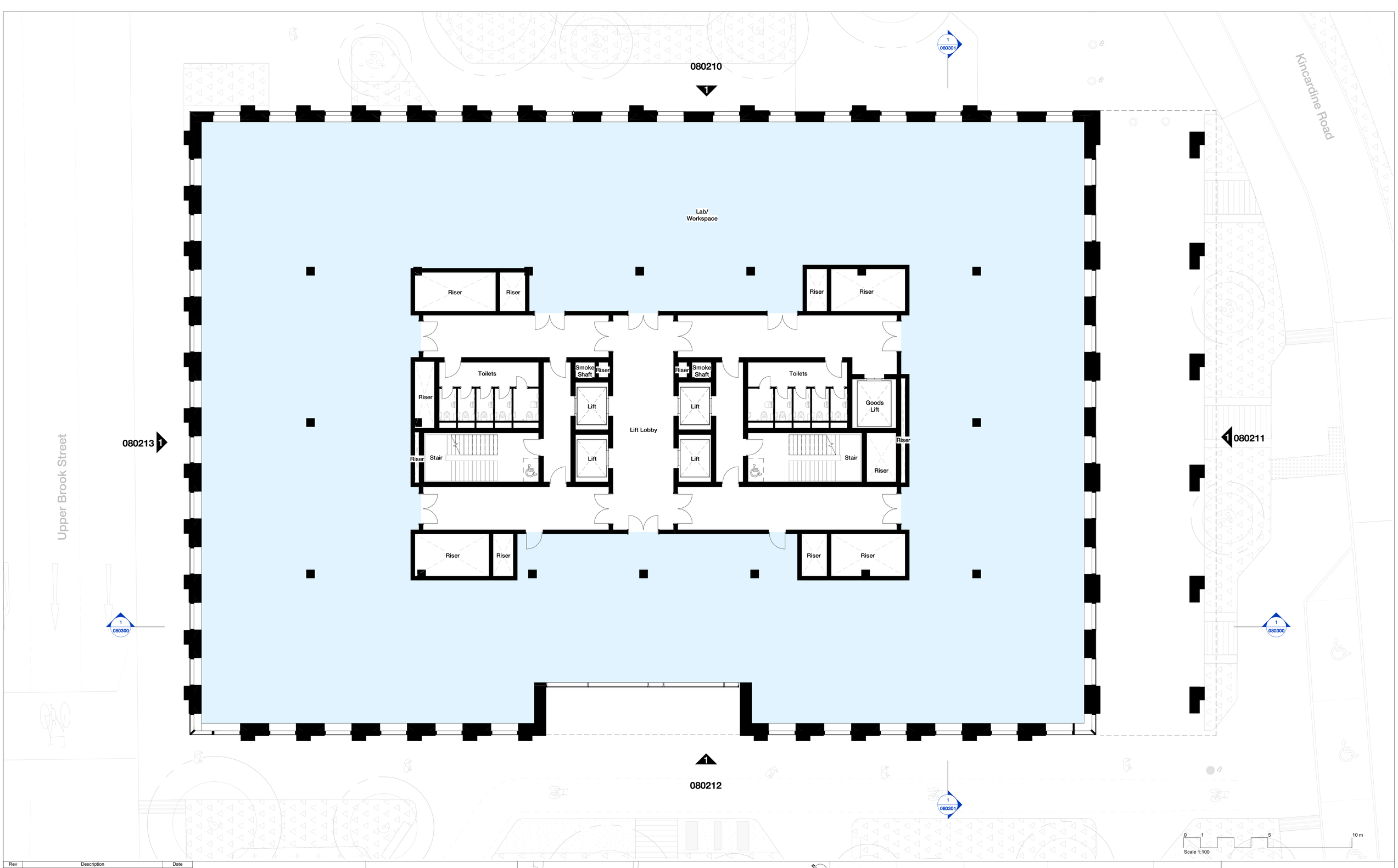
- Entrance Lobby and Amenities
- Ancillary Space
- Lab/Workspace
- Cycle Store
- Back of House
- Primary Entrance
- Application Boundary



Scale @ A1	Date	Job Number	Project
1 : 100	June 2023	220077	Upper Brook Street Manchester M1 2EH
Drawn By	**Checked By**	**Status**	
JD	LB	S2	
Drawing No.	**Rev**	**Purpose of Issue**	**Drawing**
UBS-HBA-B1-00-DR-A-080100	P1	For Planning	Proposed B1 - Ground Floor Plan

26-28 Hilton Street
Manchester M1 2EH
mail@hawkinsbrown.com
hawkinsbrown.com

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Rev	Description	Date
P1	Issued for Planning	23.06.23

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Key

- Entrance Lobby and Amenities
- Ancillary Space
- Lab/Workspace
- Cycle Store
- Back of House
- Primary Entrance
- Application Boundary



Scale @ A1 1 : 100	**Date** June 2023	**Job Number** 220077	**Project** Upper Brook Street Manchester M1 2EH
Drawn By JD	**Checked By** LB	**Status** S2	
Drawing No. UBS-HBA-B1-01-DR-A-080101	**Rev** P1	**Purpose of Issue** For Planning	**Drawing** Proposed B1 - First Floor Plan

26-28 Hilton Street
Manchester M1 2EH
mail@hawkinsbrown.com
hawkinsbrown.com

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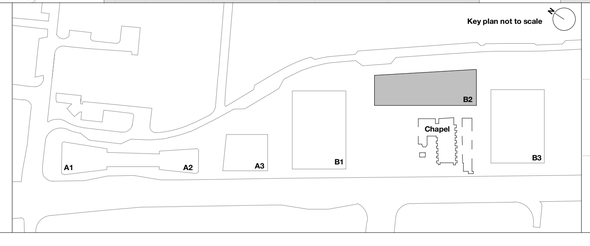


Rev	Description	Date
P1	Issued for Planning	23.06.23

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Key

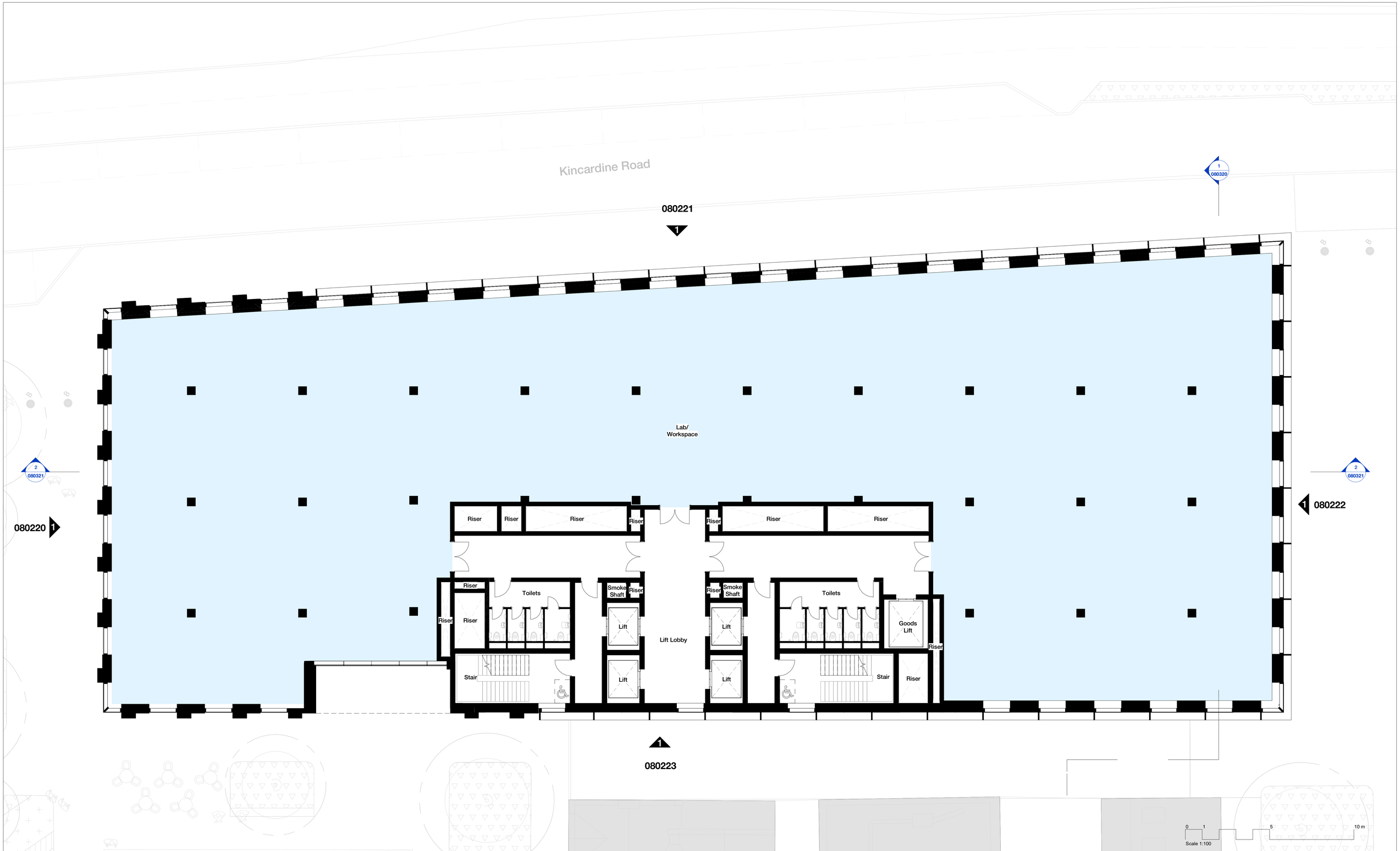
- Entrance Lobby and Amenities
- Ancillary Space
- Lab/Workspace
- Cycle Store
- Back of House
- Primary Entrance
- Application Boundary



Scale @ A1	Date	Job Number	Project
1 : 100	June 2023	220077	Upper Brook Street Manchester M1 2EH
Drawn By	**Checked By**	**Status**	
JD	LB	S2	
Drawing No.	**Rev**	**Purpose of Issue**	**Drawing**
UBS-HBA-B2-00-DR-A-080120	P1	For Planning	Proposed B2 - Ground Floor Plan

26-28 Hilton Street
Manchester M1 2EH
mail@hawkinsbrown.com
hawkinsbrown.com

Hawkins\ Brown

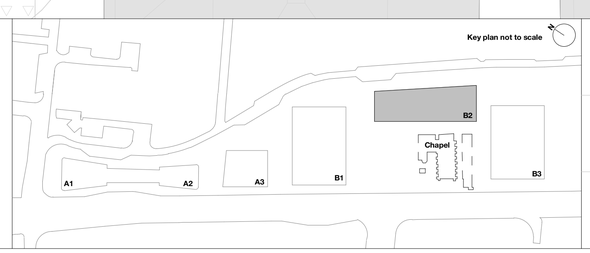


Rev	Description	Date
P1	Issued for Planning	23.06.23

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Key

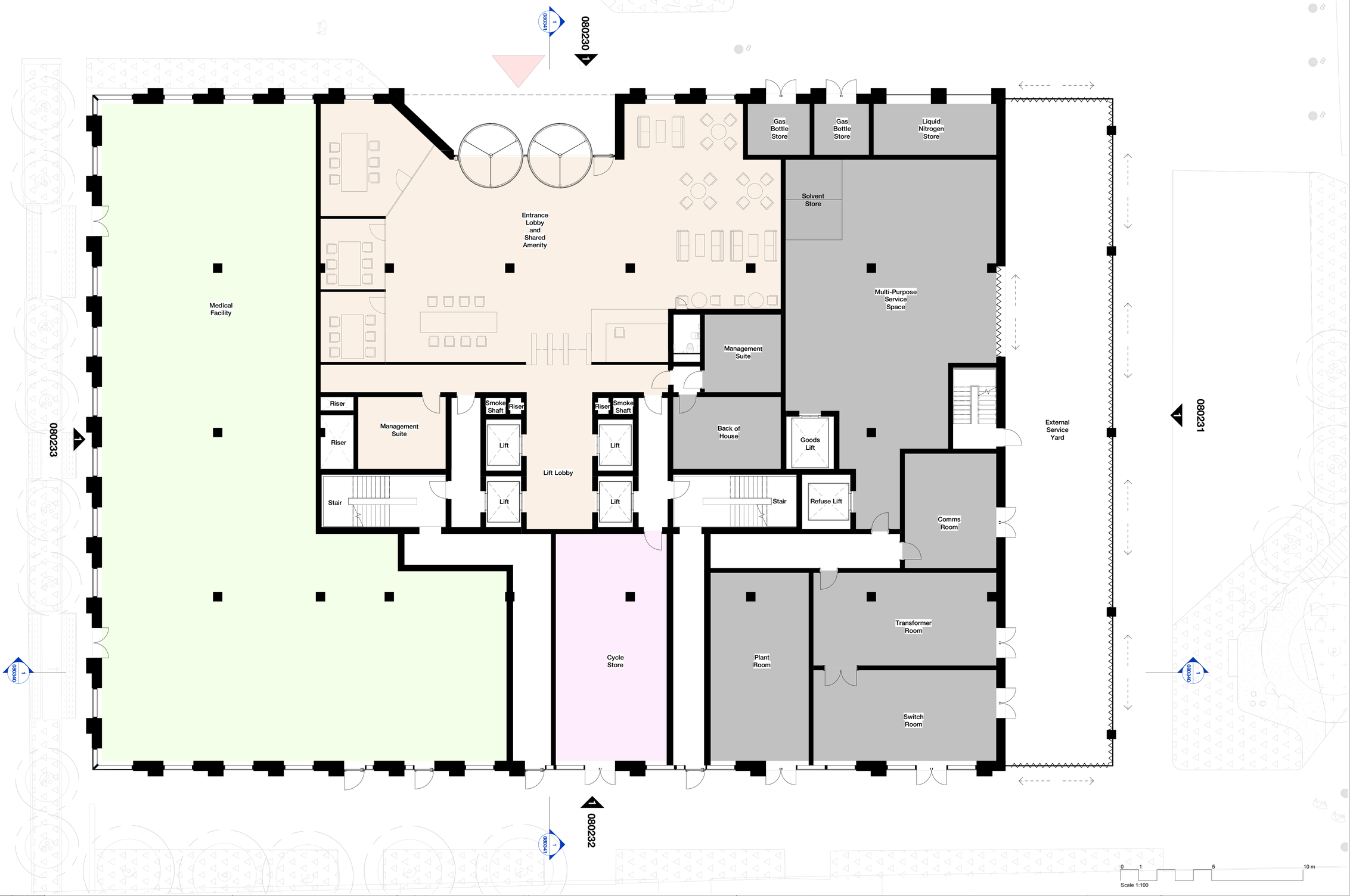
- Entrance Lobby and Amenities
- Ancillary Space
- Lab/Workspace
- Cycle Store
- Back of House
- Primary Entrance
- Application Boundary



Scale @ A1	Date	Job Number	Project
1 : 100	June 2023	220077	Upper Brook Street Manchester M1 2EH
Drawn By	**Checked By**	**Status**	
JD	LB	S2	
Drawing No.	**Rev**	**Purpose of Issue**	**Drawing**
UBS-HBA-B2-01-DR-A-080121	P1	For Planning	Proposed B2 - First Floor Plan

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Rev	Description	Date
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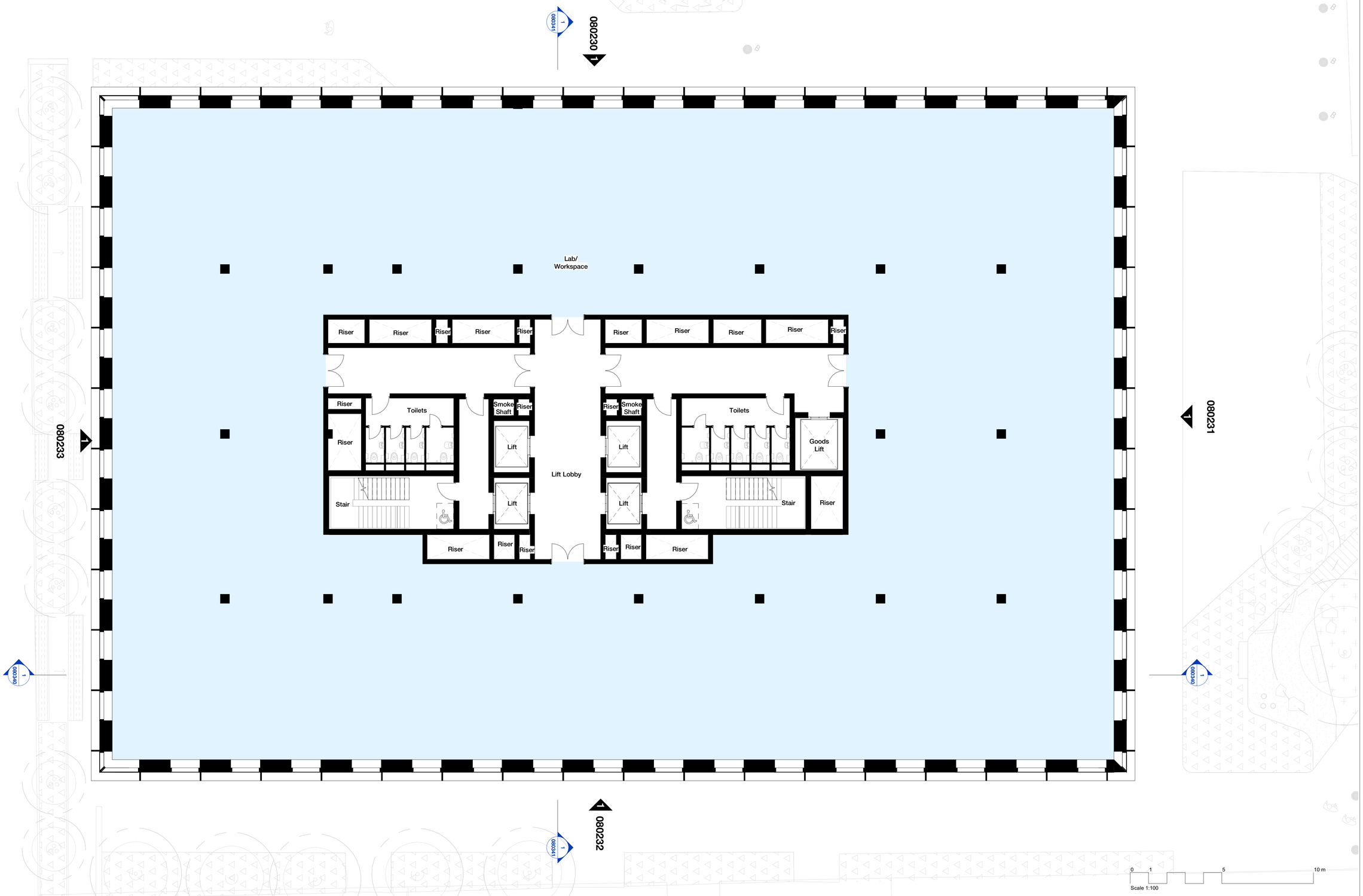
- Entrance Lobby and Amenities
- Ancillary Space
- Lab/Workspace
- Cycle Store
- Back of House
- Primary Entrance
- Application Boundary



Scale @ A1 1 : 100	**Date** June 2023	**Job Number** 220077	**Project** Upper Brook Street Manchester M1 2EH
Drawn By JD	**Checked By** LB	**Status** S2	
Drawing No. UBS-HBA-B3-00-DR-A-080140	**Rev** P1	**Purpose of Issue** For Planning	**Drawing** Proposed B3 - Ground Floor Plan

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Rev	Description	Date
P1	Issued for Planning	23.06.23

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Key

- Entrance Lobby and Amenities
- Ancillary Space
- Lab/Workspace
- Cycle Store
- Back of House
- Primary Entrance
- Application Boundary



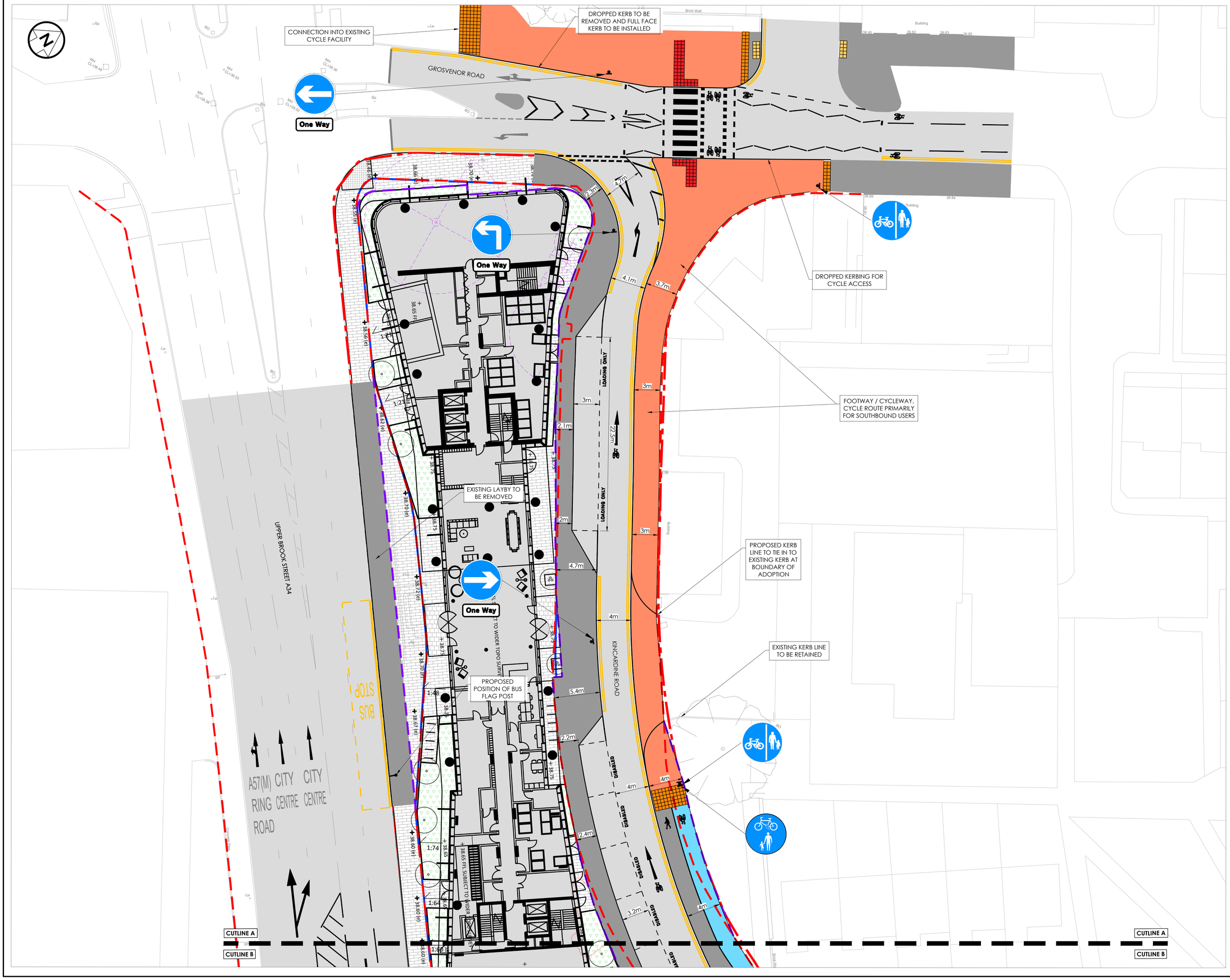
Scale @ A1	Date	Job Number	Project
1 : 100	June 2023	220077	Upper Brook Street Manchester M1 2EH
Drawn By	**Checked By**	**Status**	
JD	LB	S2	
Drawing No.	**Rev**	**Purpose of Issue**	**Drawing**
UBS-HBA-B3-01-DR-A-080141	P1	For Planning	Proposed B3 - First Floor Plan

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APPENDIX TA7



NOTES – GENERAL:

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2) ALL LEVELS ARE STATED IN METRES
3) ALL DIMENSIONS, LEVELS AND CO-ORDINATES ARE BASED UPON TOPOGRAPHICAL SURVEY DRAWING (NO. 43891MCLS-01) BY SURVEY SOLUTIONS DATED AUGUST 2022.
4) DO NOT SCALE. PLEASE REFER ANY QUERIES TO THE PROJECT MANAGER / SUPERVISOR.
5) THIS DRAWING IS TO BE READ IN COLOUR

KEY – GENERAL ARRANGEMENT

- EXISTING HIGHWAY BOUNDARY
- NEW HIGHWAY BOUNDARY
- CARRIAGEWAY
- FOOTWAY
- SHARED USE FACILITY
- CYCLE TRACK
- RAISED PLATEAU
- CONTROLLED TACTILE PAVING
- UNCONTROLLED TACTILE PAVING
- HAZARD WARNING PAVING
- GRASS VERGE
- EXISTING ROAD MARKINGS
- PROPOSED ROAD MARKINGS
- TRAFFIC SIGN
- CYCLE LANE LIGHT SEGREGATION - TRAFFIC WAND
- BUS SHELTER

REV	DRN	CHK	APP	DATE	DESCRIPTION
P02	DL	DC	ML	16/06/23	UPDATED DEVELOPMENT/LANDSCAPING

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www.wildecivil.co.uk
Tel : 0161-474-7479
Fax : 0161-474-7492

Client

PROPERTY ALLIANCE GROUP

Project

UPPER BROOK STREET
MANCHESTER
M13 9XH

Title

GENERAL ARRANGEMENT (OPTION 1)
SHEET 1 OF 4

Scale	Drawn	Date	Chkd	Approved
1:200	DL	01/06/23	DC	ML

Drawing No. 766-042-WCL-001

Revision P02

Status DRAFT

Sheet Size A1

CUTLINE A
CUTLINE B
CUTLINE C
UPPER BROOK STREET A34
Hanworth Square
HANWORTH CLOSE
KINCARDINE ROAD
AMEND AND RETAIN SPEED TABLE FEATURE
EXISTING BENCH TO BE RELOCATED
6x2m PARKING BAYS FOR RESIDENTS/GENERAL PARKING
VEHICLE CROSSING VIA 25mm UPSTAND KERB
SHARED USE AREA TO TIE IN TO RE-FORM LANDSCAPE DRAWINGS
One Way
LOADING ONLY
DISABLED
Cycle Store
Multi-Purpose Service Space
Switch Room
Transformer Room
Gas Bottle Store
Liquid Nitrogen Store
Lab and Write-up
Mech Riser
Entrance Lobby and Social Areas
3.0m 3.0m 3.2m

NOTES – GENERAL:

1) ALL DIMENSIONS ARE STATED IN MILLIMETRES UNLESS NOTED OTHERWISE.
2) ALL LEVELS ARE STATED IN METRES
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KEY – GENERAL ARRANGEMENT

- EXISTING HIGHWAY BOUNDARY
- NEW HIGHWAY BOUNDARY
- CARRIAGEWAY
- FOOTWAY
- SHARED USE FACILITY
- CYCLE TRACK
- RAISED PLATEAU
- CONTROLLED TACTILE PAVING
- UNCONTROLLED TACTILE PAVING
- HAZARD WARNING PAVING
- GRASS VERGE
- EXISTING ROAD MARKINGS
- PROPOSED ROAD MARKINGS
- TRAFFIC SIGN
- CYCLE LANE LIGHT SEGREGATION - TRAFFIC WAND
- BUS SHELTER

REV	DRN	CHK	APP	DATE	DESCRIPTION
P02	DL	DC	ML	16/06/23	UPDATED DEVELOPMENT/LANDSCAPING

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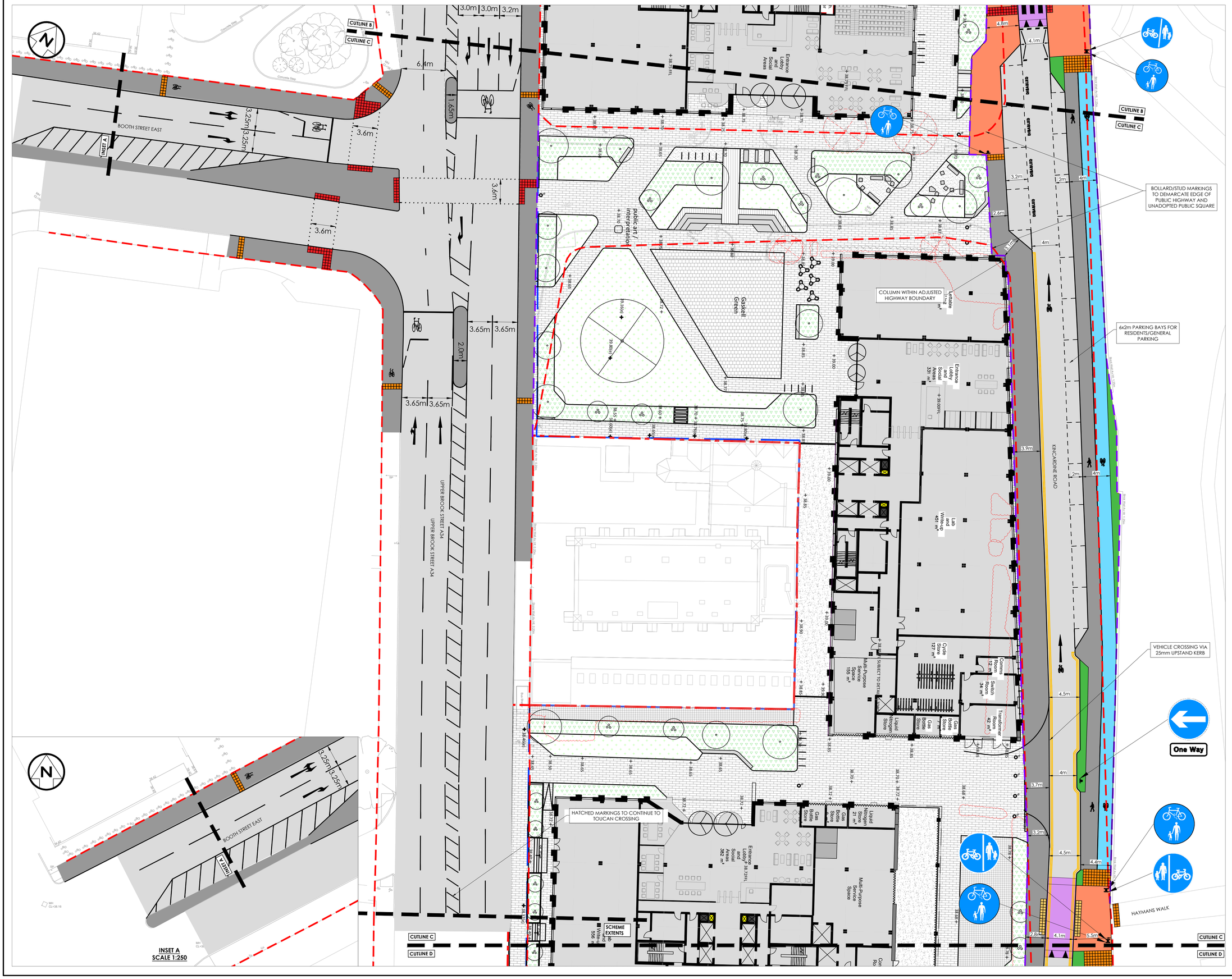
Client
PROPERTY ALLIANCE GROUP

Project
UPPER BROOK STREET
MANCHESTER
M13 9XH

Title
GENERAL ARRANGEMENT (OPTION 1)
SHEET 2 OF 4

Scale	Drawn	Date	Chkd	Approved
1:200	DL	01/06/23	DC	ML

Drawing No. 766-042-WCL-002
Revision P02
Status DRAFT
Sheet Size A1



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5) THIS DRAWING IS TO BE READ IN COLOUR

KEY – GENERAL ARRANGEMENT

- EXISTING HIGHWAY BOUNDARY
- NEW HIGHWAY BOUNDARY
- CARRIAGEWAY
- FOOTWAY
- SHARED USE FACILITY
- CYCLE TRACK
- RAISED PLATEAU
- CONTROLLED TACTILE PAVING
- UNCONTROLLED TACTILE PAVING
- HAZARD WARNING PAVING
- GRASS VERGE
- EXISTING ROAD MARKINGS
- PROPOSED ROAD MARKINGS
- TRAFFIC SIGN
- CYCLE LANE LIGHT SEGREGATION - TRAFFIC WAND
- BUS SHELTER

REV	DRN	CHK	APP	DATE	DESCRIPTION
P02	DL	DC	ML	16/06/23	UPDATED DEVELOPMENT/LANDSCAPING

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Client

PROPERTY ALLIANCE GROUP

Project

UPPER BROOK STREET
MANCHESTER
M13 9XH

Title

GENERAL ARRANGEMENT (OPTION 1)
SHEET 3 OF 4

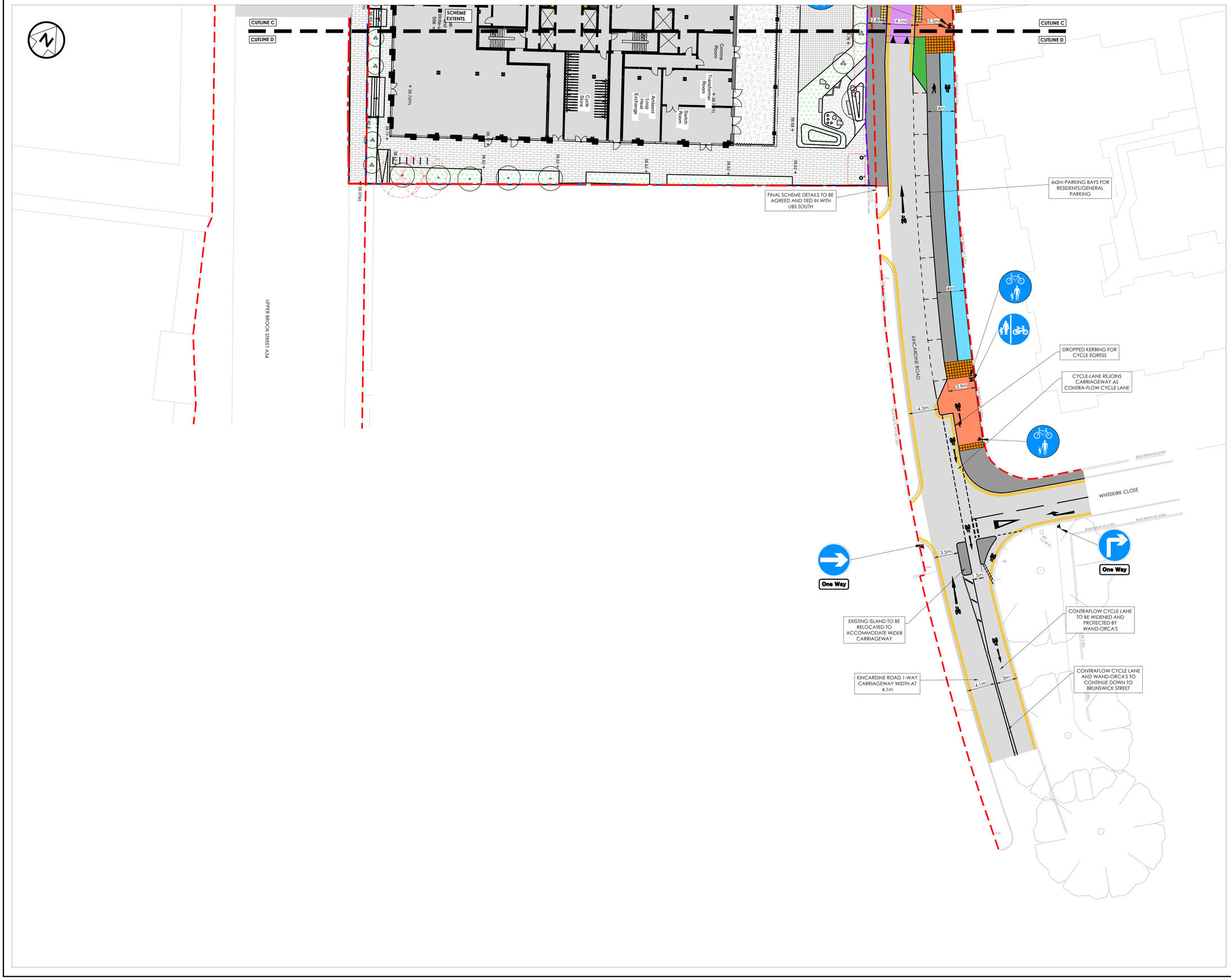
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Drawing No. 766-042-WCL-003

Revision P02

Status DRAFT

Sheet Size A1



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5) THIS DRAWING IS TO BE READ IN COLOUR

KEY – GENERAL ARRANGEMENT

- EXISTING HIGHWAY BOUNDARY
- NEW HIGHWAY BOUNDARY
- CARRIAGEWAY
- FOOTWAY
- SHARED USE FACILITY
- CYCLE TRACK
- RAISED PLATEAU
- CONTROLLED TACTILE PAVING
- UNCONTROLLED TACTILE PAVING
- HAZARD WARNING PAVING
- GRASS VERGE
- EXISTING ROAD MARKINGS
- PROPOSED ROAD MARKINGS
- TRAFFIC SIGN
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- BUS SHELTER

REV	DRN	CHK	APP	DATE	DESCRIPTION
P02	DL	DC	ML	16/06/23	UPDATED DEVELOPMENT/LANDSCAPING

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Client

PROPERTY ALLIANCE GROUP

Project

UPPER BROOK STREET
MANCHESTER
M13 9XH

Title

GENERAL ARRANGEMENT (OPTION 1)
SHEET 4 OF 4

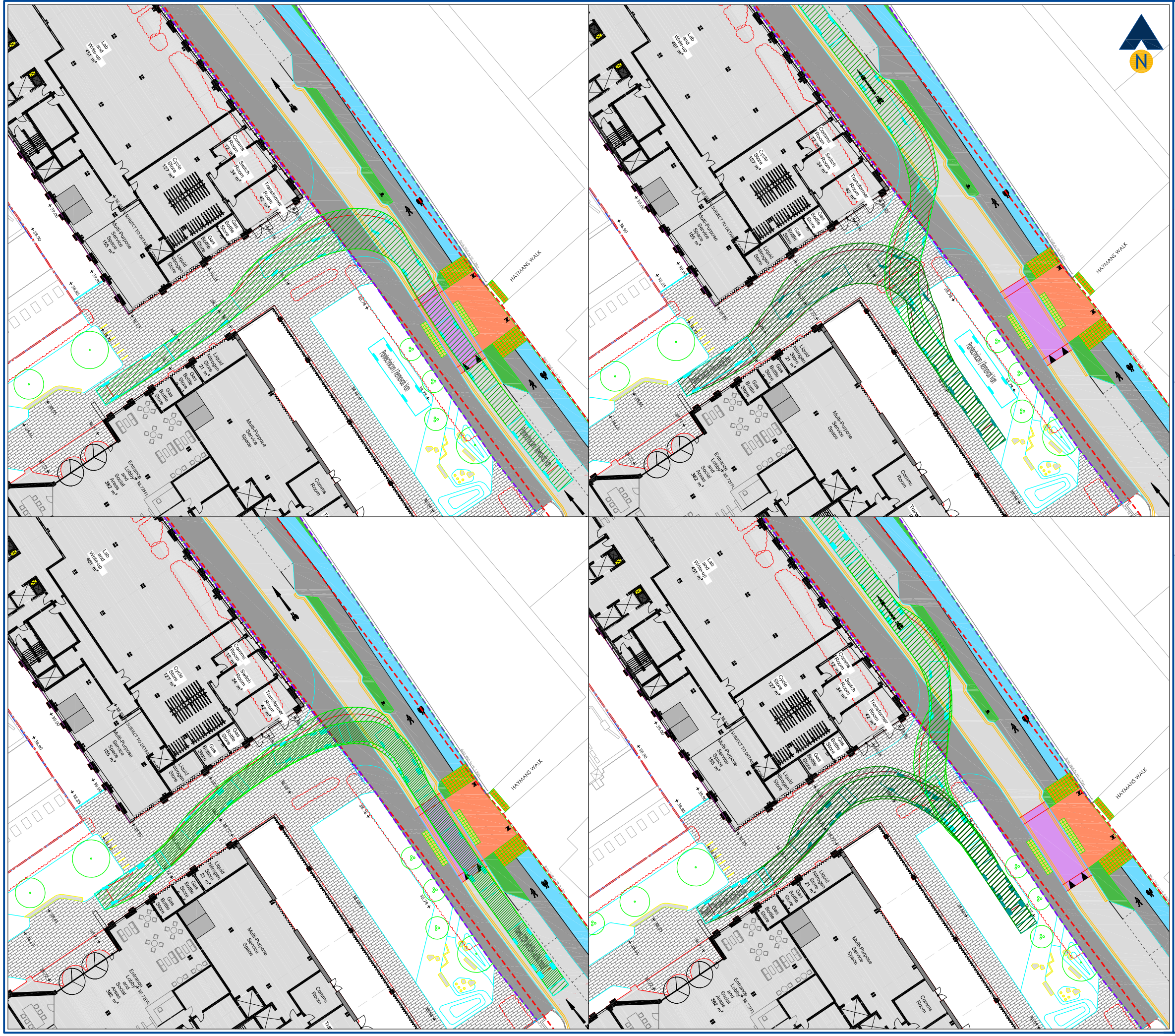
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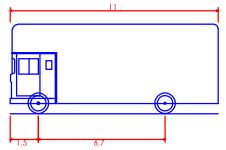
Revision P02

Status DRAFT

Sheet Size A1

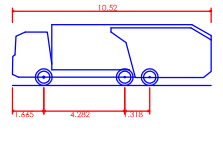


Revision:
A -



Pantechnicon / Removals Van

Overall Length	11.000m
Overall Width	2.500m
Overall Body Height	4.730m
Min Body Ground Clearance	0.541m
Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	12.200m



Phoenix 2-23W (with Elite 2 6x2ML chassis)

Overall Length	10.520m
Overall Width	2.530m
Overall Body Height	3.211m
Min Body Ground Clearance	0.416m
Track Width	2.530m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	10.250m

Client:
Williams Motor Co (Holdings) and Alliance UBS Limited

Project:
Upper Brook Street Masterplan
Williams Motor Co (Holdings) / Alliance UBS Ltd

Drawing Title:
Access to / from Life Sciences Building B2 & B3 Servicing Area
Pantechnicon / Large RCV

Drawing Number: Appendix TA7(i)
Revision: -

Date: 16/06/23
Scale: 1:500@A3

Drawn By: APB
Checked By: -

Status: Information

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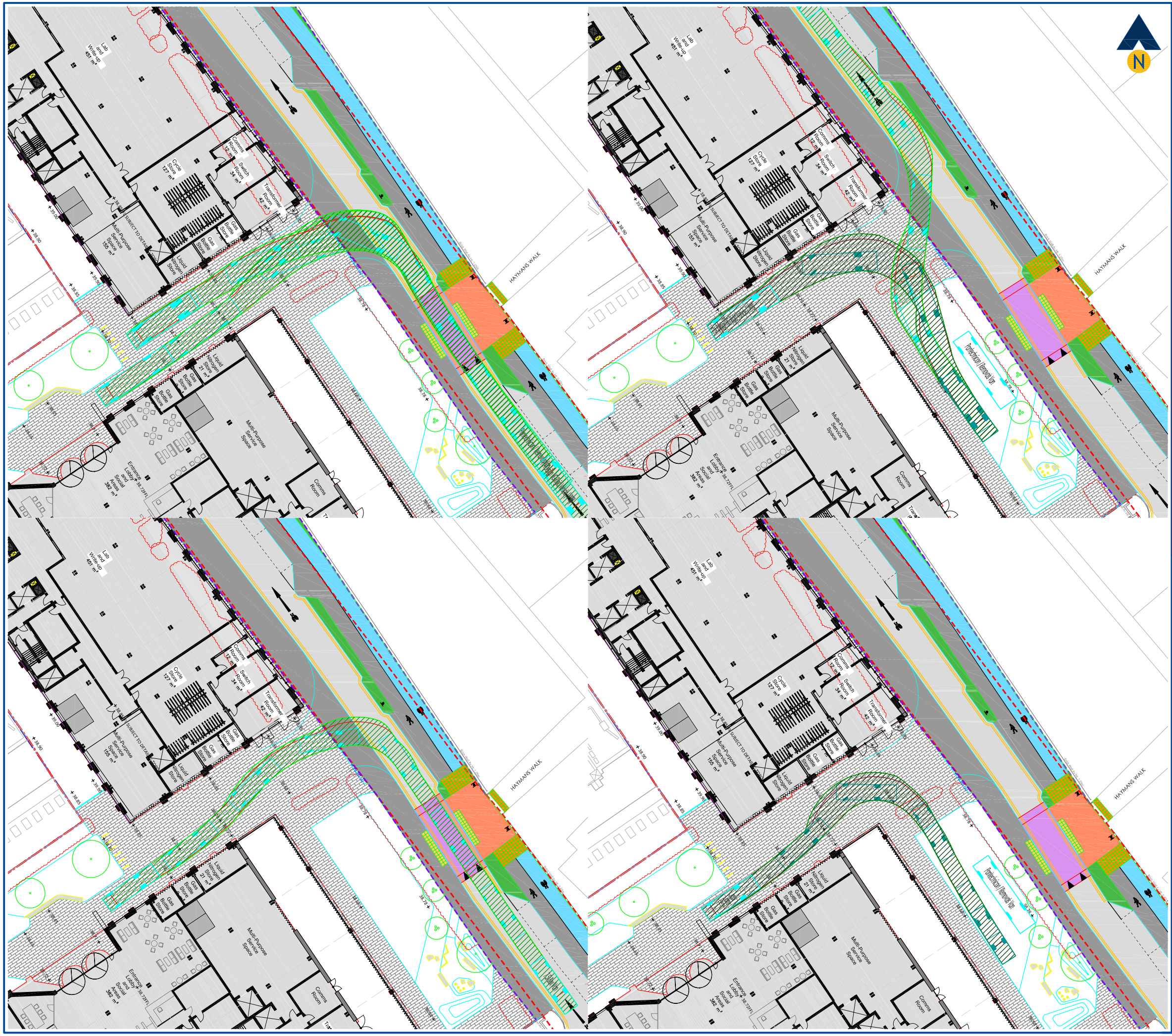
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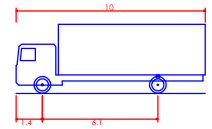
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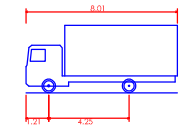


Revision:
A -
-



FTA Design HG Rigid Vehicle (1998)

Overall Length	10.000m
Overall Width	2.500m
Overall Body Height	3.445m
Min Body Ground Clearance	0.440m
Track Width	2.470m
Lock to lock time	3.00s
Kerb to Kerb Turning Radius	11.000m



7.5t Box Van

Overall Length	8.010m
Overall Width	2.100m
Overall Body Height	3.556m
Min Body Ground Clearance	0.351m
Track Width	2.064m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	7.400m

Client:
Williams Motor Co (Holdings) and Alliance UBS Limited

Project:
Upper Brook Street Masterplan
Williams Motor Co (Holdings) / Alliance UBS Ltd

Drawing Title:
Access to / from Life Sciences Building B2 & B3 Servicing Area
Rigid HGV Service Vehicle / 7.5t Box Van

Drawing Number: Appendix TA7(ii)
Revision: -

Date: 16/06/23
Scale: 1:500@A3

Drawn By: APB
Checked By: -

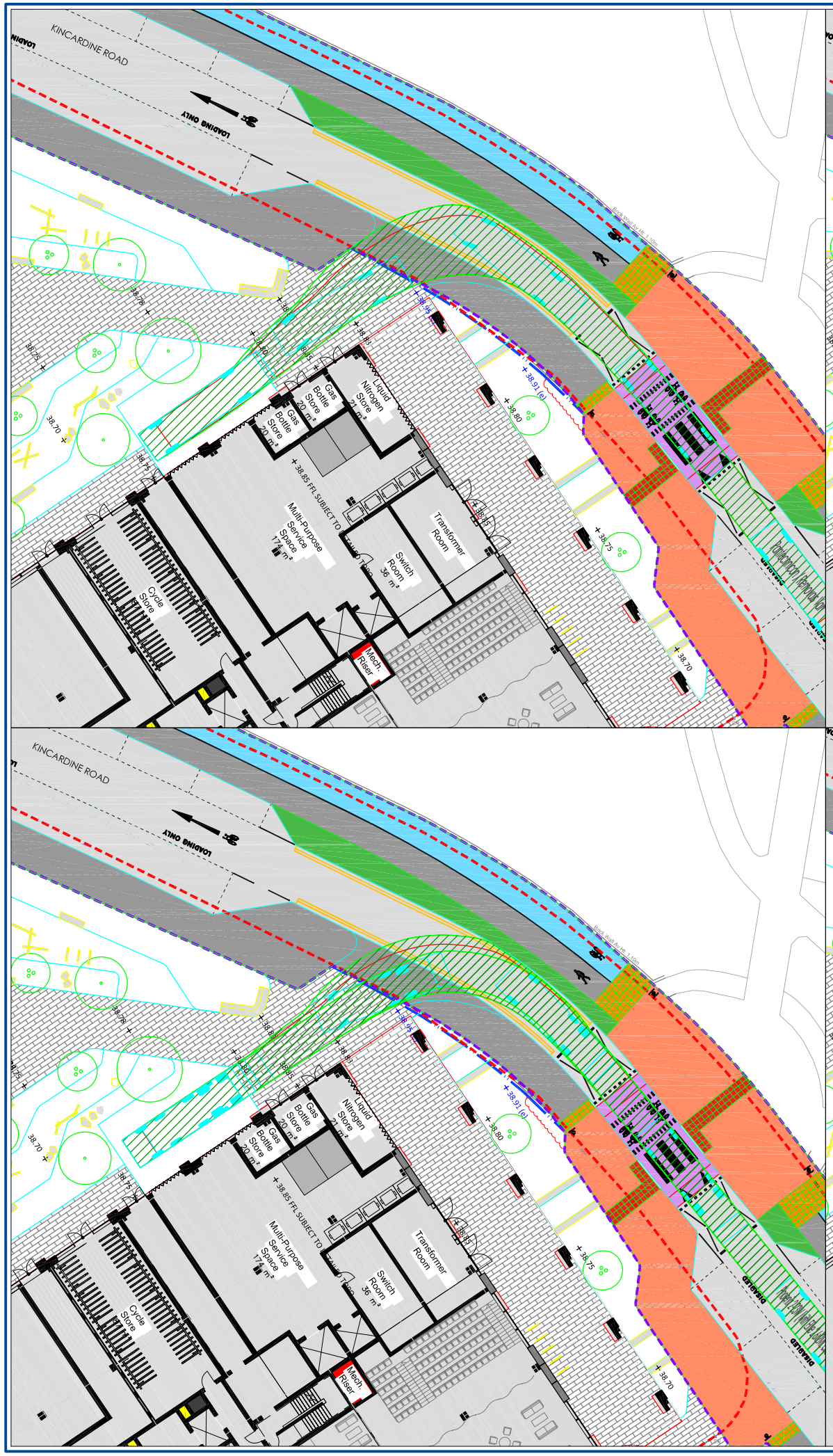
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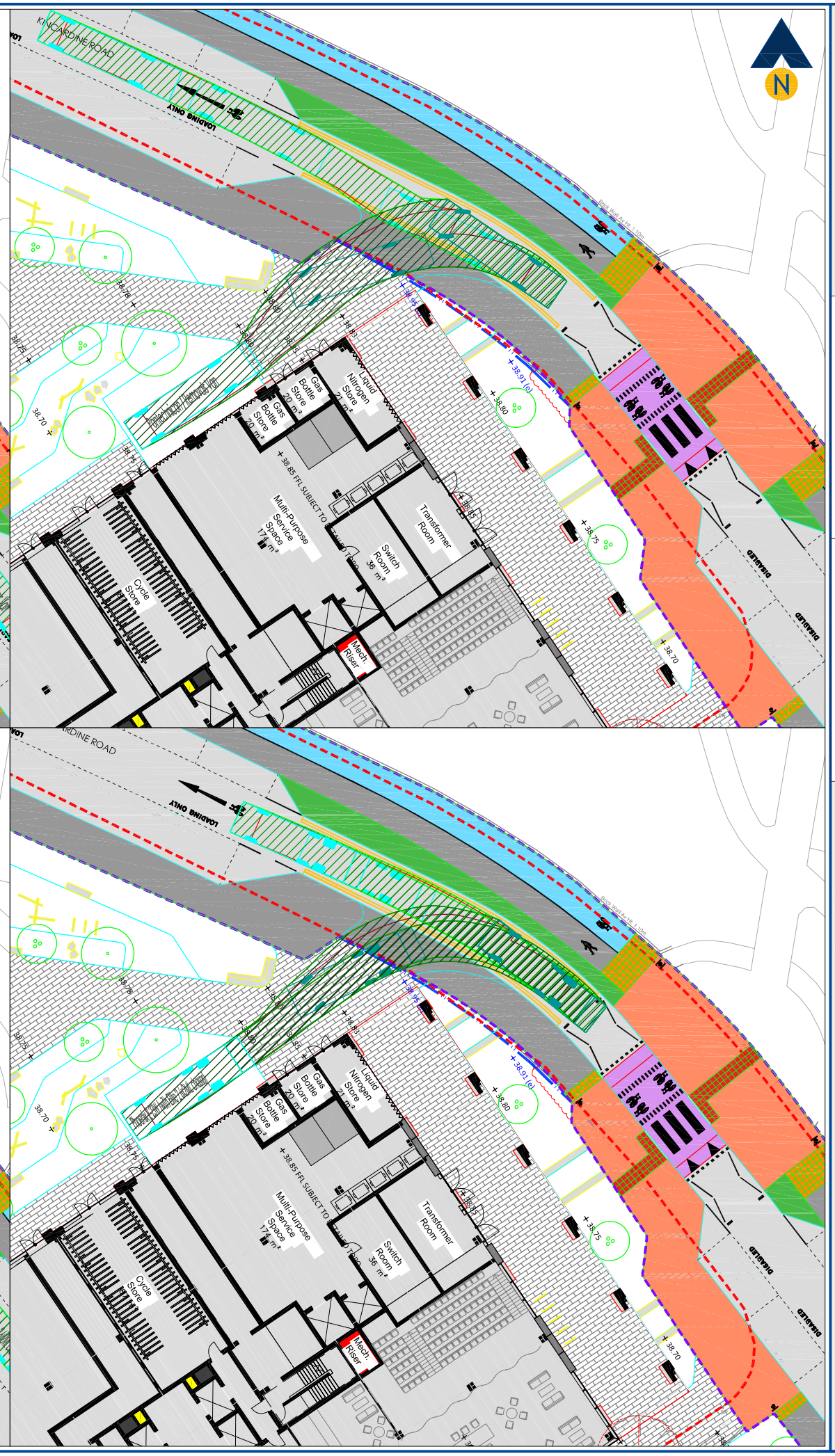
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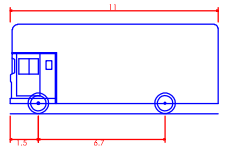
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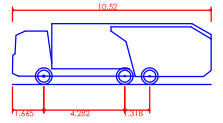
Revision:
A -

-



Pantechnicon / Removals Van

Overall Length	11.000m
Overall Width	2.500m
Overall Body Height	4.730m
Min Body Ground Clearance	0.541m
Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	12.200m



Phoenix 2-23W (with Elite 2 6x2ML chassis)

Overall Length	10.520m
Overall Width	2.530m
Overall Body Height	3.211m
Min Body Ground Clearance	0.416m
Track Width	2.530m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	10.250m

Client:
Williams Motor Co (Holdings)
and Alliance UBS Limited

Project:
Upper Brook Street Masterplan
Williams Motor Co (Holdings) / Alliance UBS Ltd

Drawing Title:
Access to / from Life Sciences
Building B1 Servicing Area
Pantechnicon / Large RCV

Drawing Number: Appendix TA7(iii)
Revision: -

Date: 16/06/23
Scale: 1:400@A3

Drawn By: APB
Checked By: -

Status:
Information

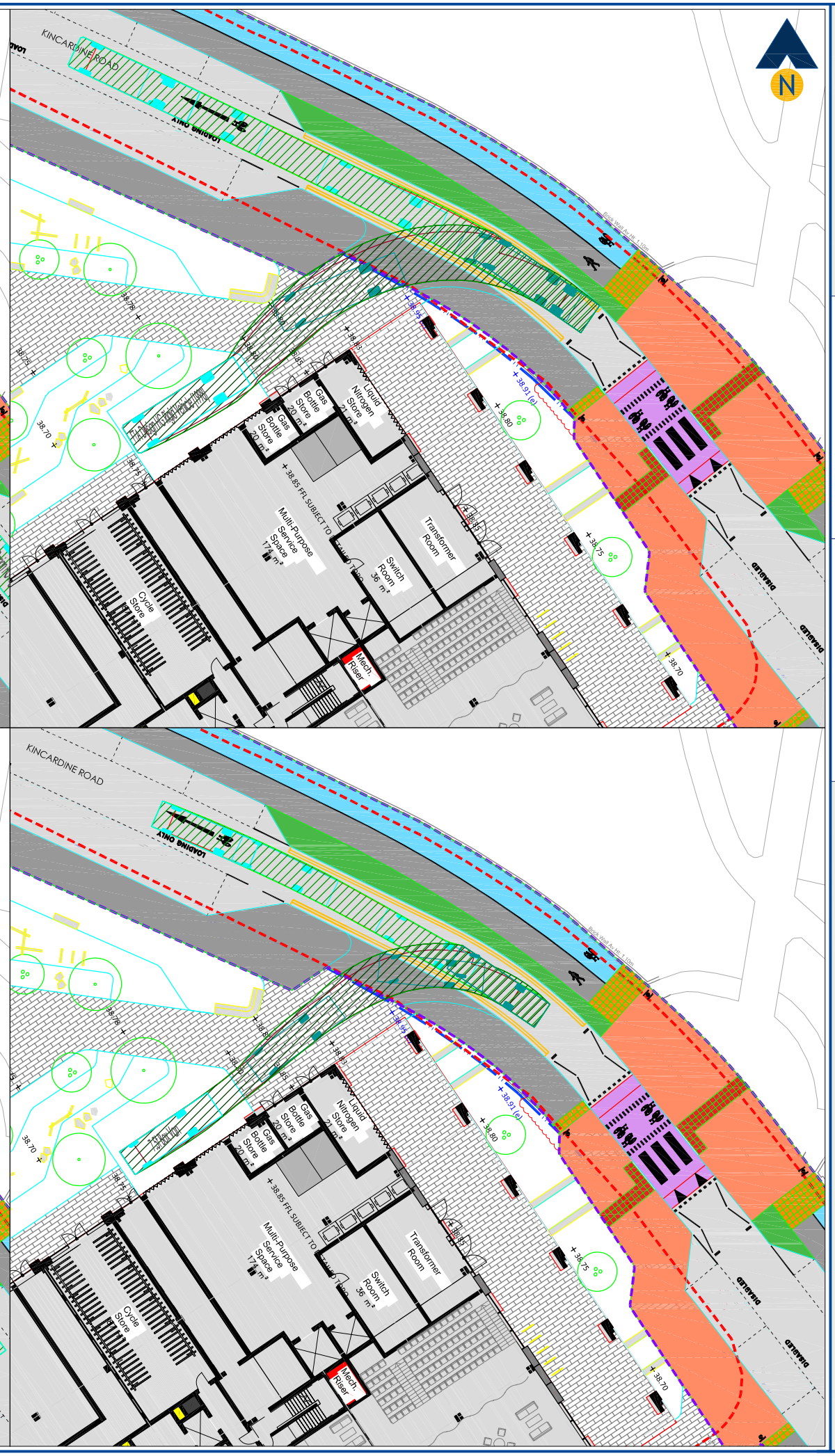
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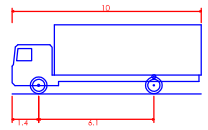
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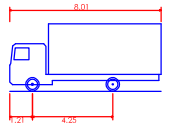


Revision:
A -
-



FTA Design HG Rigid Vehicle (1998)

Overall Length	10.000m
Overall Width	2.500m
Overall Body Height	3.645m
Min Body Ground Clearance	0.440m
Track Width	2.470m
Lock to lock time	3.00s
Kerb to Kerb Turning Radius	11.000m



7.5t Box Van

Overall Length	8.010m
Overall Width	2.100m
Overall Body Height	3.556m
Min Body Ground Clearance	0.351m
Track Width	2.064m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	7.400m

Client:
Williams Motor Co (Holdings)
and Alliance UBS Limited

Project:
Upper Brook Street Masterplan
Williams Motor Co (Holdings) / Alliance UBS Ltd

Drawing Title:
Access to / from Life Sciences
Building B1 Servicing Area
Rigid HGV Service Vehicle / 7.5t Box Van

Drawing Number: Appendix TA7(iv)
Revision: -

Date: 16/06/23
Scale: 1:400@A3

Drawn By: APB
Checked By: -

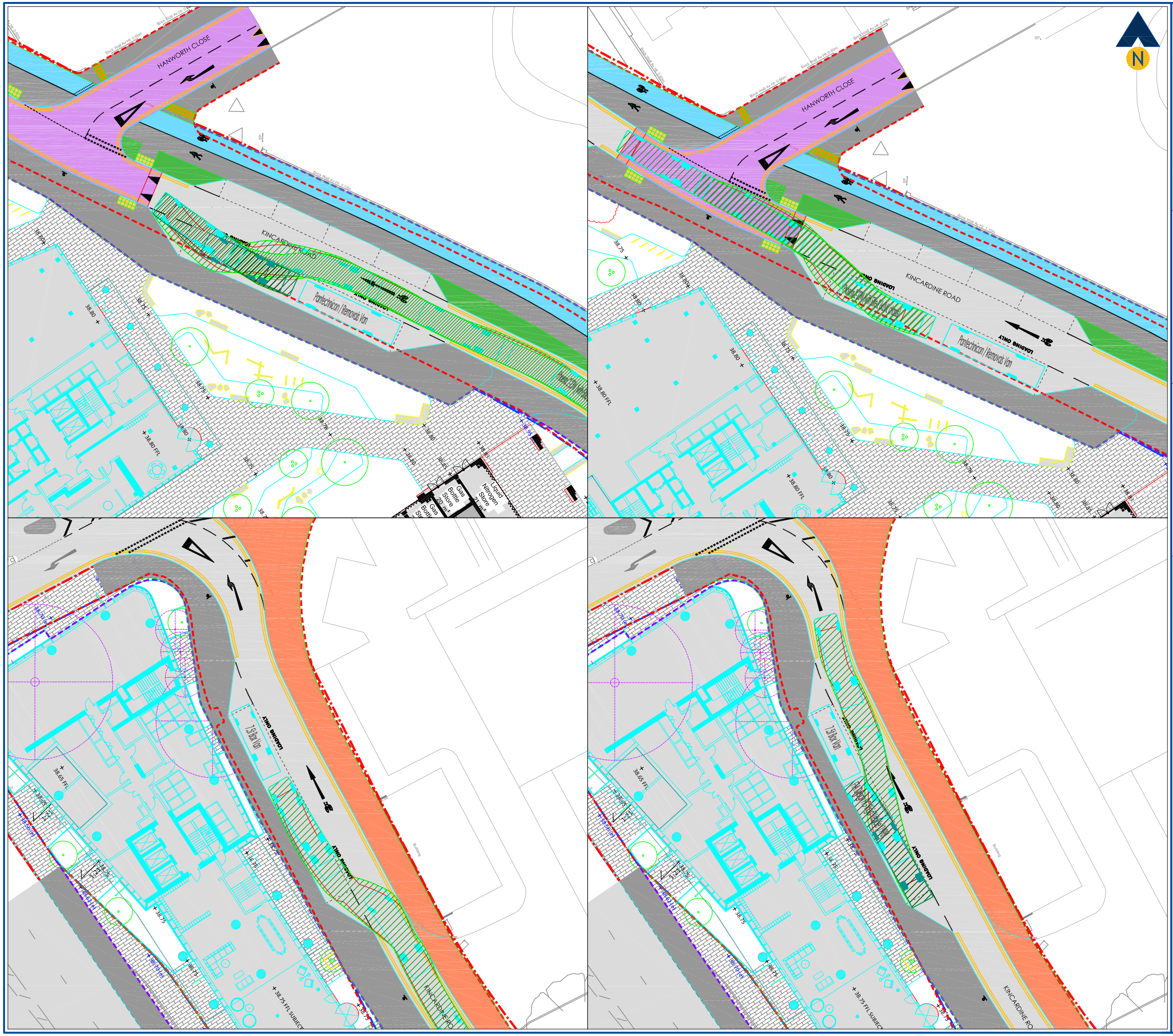
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Revision:
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Phoenix 2-23W (with Elite 2 6x2ML chassis)

Overall Length	10.520m
Overall Width	2.530m
Overall Body Height	3.211m
Min Body Ground Clearance	0.416m
Track Width	2.530m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	10.250m

FTA Design HG Rigid Vehicle (1998)

Overall Length	10.000m
Overall Width	2.500m
Overall Body Height	3.645m
Min Body Ground Clearance	0.440m
Track Width	2.470m
Lock to lock time	3.00s
Kerb to Kerb Turning Radius	11.000m

Client:
Williams Motor Co (Holdings)
and Alliance UBS Limited

Project:
Upper Brook Street Masterplan
Williams Motor Co (Holdings) / Alliance UBS Ltd

Drawing Title:
Large Vehicle Access to / from Service Lay-Bys to Kincardine Road
Large RCV & Rigid HGV Service Vehicle

Drawing Number: Appendix TA7(v)
Revision: -

Date: 16/06/23
Scale: 1:400@A3

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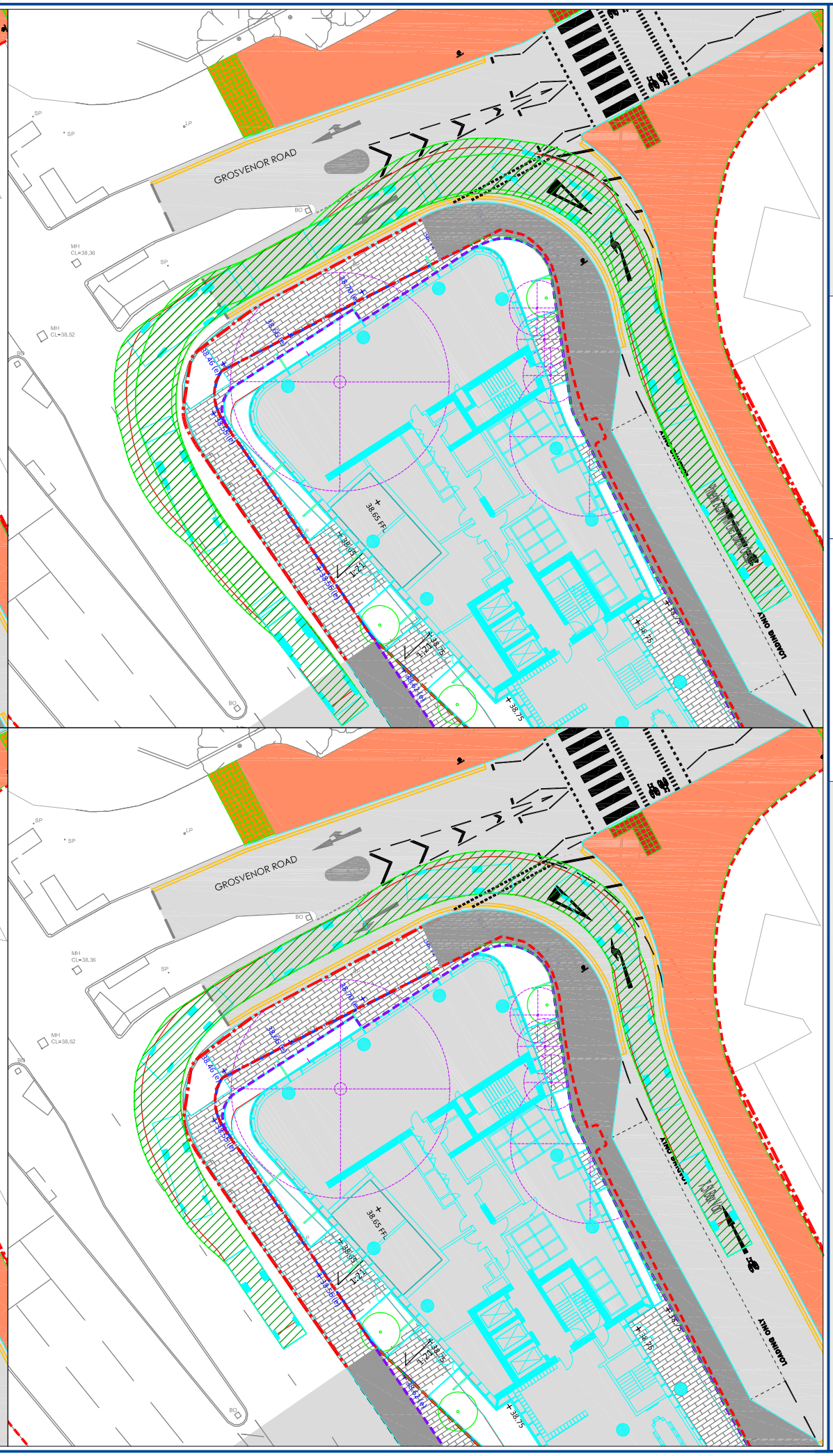
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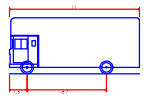
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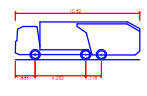




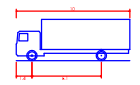
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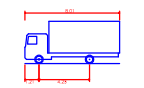
Pantechnicon / Removals Van
Overall Length 7.000m
Overall Width 2.500m
Overall Body Height 4.730m
Min Body Ground Clearance 0.361m
Track Width 2.500m
Lock to lock time 4.20s
Kerb to Kerb Turning Radius 12.200m



Phoenix 2-23M (with Elite 2 6x2ML chassis)
Overall Length 10.320m
Overall Width 2.530m
Overall Body Height 3.211m
Min Body Ground Clearance 0.416m
Track Width 2.530m
Lock to lock time 4.05s
Kerb to Kerb Turning Radius 10.230m



FTA Design HG Rigid Vehicle (1998)
Overall Length 10.000m
Overall Width 2.500m
Overall Body Height 3.440m
Min Body Ground Clearance 0.440m
Track Width 2.470m
Lock to lock time 17.00s
Kerb to Kerb Turning Radius 11.000m



7.5t Box Van
Overall Length 8.010m
Overall Width 2.100m
Overall Body Height 2.355m
Min Body Ground Clearance 0.230m
Track Width 2.224m
Lock to lock time 4.00s
Kerb to Kerb Turning Radius 7.400m

Client:
Williams Motor Co (Holdings)
and Alliance UBS Limited

Project:
Upper Brook Street Masterplan
Williams Motor Co (Holdings) / Alliance UBS Ltd

Drawing Title:
Kincardine Road to Grosvenor Street
All Service Vehicles

Drawing Number: Appendix TA7(vi)
Revision: -

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APPENDIX TA8

Upper Brook Street Masterplan Williams / Alliance UBS Limited Site Logistics Management Strategy



Upper Brook Street Masterplan

(Williams Motor Co (Holdings)/Alliance UBS Limited)

Site Logistics Management Strategy

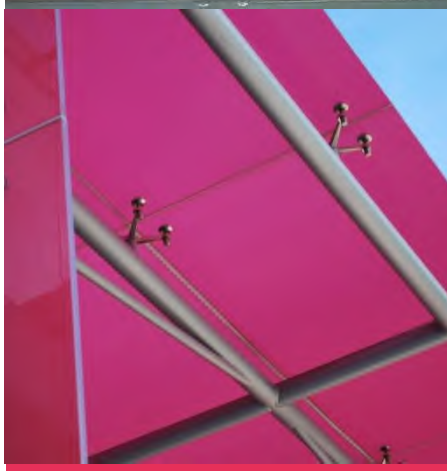
Curtins Ref: 083371-CUR-XX-XX-T-TP-00001

Revision: P04

Issue Date: 21 June 2023

Client Name: Property Alliance Group/Moda Living/Williams Motor Co (Holdings)





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Control Sheet

Rev	Description	Issued by	Checked	Date
P04	Final	AT	AT	21 June 2023

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Authorised	Signature	Date
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1.0 Introduction

1.1 Background

1.1.1 This report has been prepared by Curtins on behalf of Williams Motor Co (Holdings) and Alliance UBS Limited, to support a full planning application for a life sciences and purpose-built student accommodation (PBSA) development (hereafter referred to as the 'Proposed Development') on Phase Two of the Upper Brook Street Masterplan (hereafter referred to as the 'Site'). The proposal would bring forward development on a previously developed site which is earmarked for commercial and PBSA uses in the Oxford Road Corridor Strategic Regeneration Framework Guidance (SRFG) endorsed by MCC in 2019. This application is accompanied by a comprehensive suite of technical documents, reports and plans.

1.1.2 The Proposed Development comprises three purpose-built student accommodation blocks of circa 41, 14 and 12 floors providing accommodation for up to 1,100 students. Three commercial office blocks centred around life sciences are also proposed, however, this element is not considered within this document.

1.1.3 The full description of the Proposed Development is as follows;

"Full planning permission for the demolition of existing buildings and erection of three ground floor + 12/14/41 storey buildings to be used for Purpose Built Student Accommodation (Use Sui Generis), comprising 1,100 bedrooms in total and 506sqm of ground floor ancillary uses (café/ commercial and convenience store - Use Classes E (a)/(b)/(c)), three buildings comprising ground floor + 5/7/9 storeys for Science and Innovation uses (Use Class E (g)(i) & (ii)) and 834sq.m ground floor community uses (retail/café and medical facility (Use Classes E (a/b) and (e) and the provision of new public realm, two new public squares, new access and parking, and associated works to be on Phase Two of the Upper Brook Street Masterplan."

1.1.4 The proposed site layout is provided in Appendix A.

1.2 Purpose of This Report

1.2.1 This Site Logistics Management Strategy (SLMS) is a bespoke document which has been prepared to consider the servicing and delivery vehicle movements associated with the development proposals as well as the potential refuse and recyclable waste volumes of the proposed development, along with details of the collection arrangements. In addition, this document also considers the management procedures that will be adopted in advance of residents arrival prior to the start of term and departures at the end of term.

1.2.2 This SLMS supports the Transport Assessment (Document Reference: **J000370-TA01**) and a Framework Travel Plan (Document Reference: **J000370-TP01**) prepared by Focus Transport Planning.

1.2.3 The scope of this report is consistent with the guidance and recommendations set out in Local and National planning policy.

1.3 Structure of the Report

1.3.1 Following this introduction, **Section 2** of the report provides a comprehensive description of the site location, including use and Highway Network surroundings.

1.3.2 **Section 3** sets out the proposed management of future residents with **Section 4** detailing the proposed delivery strategy.

1.3.3 The relevant local and national waste policy is summarised in **Section 5.**

1.3.4 **Section 6** contains the waste forecasting methodology used to establish the likely refuse generation associated with the development proposals, providing details of recycling, waste management and collection procedures. The report is summarised and concluded in **Section 7.**

2.0 Site Location and Highway Layout

2.1.1 The site is located in Manchester city centre, adjacent to Upper Brook Street.

2.1.2 The site is bound by Kincardine Road to the north, Grosvenor Street to the west, Upper Brook Street to the south, and Inchley Road to the east.

2.1.3 **Figure 2.1** below shows the site in a local context relating to the local highway network:



Figure 2.1 – Site Location

(Source: OpenStreetMap, 2023)

2.2 Surrounding Highway Network

2.2.1 Inchley Road will be completely closed to vehicular traffic (in both directions). Kincardine Road is to be converted to one-way (south to north) operation from Brunswick Street to the south to Grosvenor Street to the north.

2.2.2 Vehicles egressing from Kincardine Road onto Grosvenor Street will only be able to turn left, back onto Upper Brook Street.

2.2.3 The existing mini-roundabout at the junction between Inchley Road and Kincardine Road will be removed, with land associated with Inchley Road converted into a new public square.

2.2.4 Further to these changes, there are a number of loading, drop-off and disabled parking facilities proposed along Kincardine Road between the former connection to Inchley Road and Grosvenor Street, as follows:

- A total of nine disabled spaces;
- One 25 x 3.5m loading bay;
- One 22.5 x 3.0m loading bay; and
- On-street public Pay & Display / Residents Permit parking along the northern side of Kincardine Road.

2.2.5 Further details of the proposals are included in the TA prepared by Focus Transport Planning submitted as part of the planning application.

3.0 Residents Traffic Management

3.1 Introduction

3.1.1 The application proposals comprise a comprehensive mixed-use scheme including Purpose Built Student Accommodation (PBSA) and Life Science based employment buildings.

3.1.2 This section of the SLMS considers the management of PBSA related residential traffic at the start and end of term when vehicle demand will be at its peak. The submitted Transport Assessment sets out the principles of the car free development concept being adopted and considers the typical traffic demand at all other times.

3.1.3 The application proposals have been developed with full consideration of the location and accessibility of the site to key local services and facilities by sustainable modes of travel including walking, cycling and public transport. On this basis, residents will be encouraged to travel by modes of transport other than the private car and no car parking spaces will be provided within the development itself.

3.2 Existing Parking Facilities

3.2.1 As noted previously, Focus Transport Planning has developed a highway scheme for Kincardine Road which will restrict vehicle movement to one-way only. In addition, the scheme includes dedicated loading facilities and parking provision for disabled users. The proposals also retain provision for general on-street car parking along the northern side of the carriageway.

3.2.2 On-site provision for disabled users and cycle parking provision is set out within the Transport Assessment.

3.2.3 Curtins has reviewed the existing car parking facilities within walking distance of the site and determined that the closest off-site car parking facility is the Aquatics Centre Multistorey Car Park on Booth Street East, approximately 100m south of the site.

3.2.4 The car park is operated by APCOA and provides secure off-road car parking for up to 380 vehicles with four spaces dedicated for the mobility impaired. The car park is open Monday to Sunday between 06:00 and 24:00. The current tariffs at the time of preparing this document are set out below.

Up to 15 mins	Free
Up to 2 hours	£2.50
Up to 4 hours	£4.50
Up to 9 hours	£8.00
Up to 24 hours	£12.00

3.2.5 In addition to the Aquatics Centre Multistorey Car Park, the NCP operated car park at Manchester Circle Square is located less than 200m north of the site. The car park is open 24hrs Monday to Sunday providing access to a further1,018 pay & display spaces.

3.3 Proposed Residential Management Plan

3.3.1 This Management Plan has been prepared on a worst-case basis where all residents drop-off/pick-up movements are undertaken by car. It is likely, however, that given the accessibility of the site and proximity to public transport service including bus and rail a number of future residents may arrive/depart by more sustainable means of transport.

3.3.2 The proposed application scheme, as a student residential development, will typically incur a number of vehicle movements at the beginning and end of the academic year when students move in and move out of their accommodation. As outlined in the associated Transport Assessment, throughout the remainder of the year it is not anticipated that the residential units will generate any further significant numbers of car trips given the lack of on-site car parking spaces provided and the intention to market the scheme as a “car free” development.

3.3.3 In order for drop-off/pick-up activity to be managed effectively and minimise any disruption to neighbouring premises as well as the local highway network, this Management Plan has been produced to detail arrangements for the arrival and departure of residential occupiers only.

3.3.4 Aside from on-street car parking spaces and the five spaces designated for the mobility impaired within the proposed lay-by, associated car parking is not proposed as part of the development proposals as the student accommodation provides a significant number of secure cycle parking facilities and is situated within a sustainable location with a good level of public transport and active travel opportunities available to students.

3.3.5 As noted previously, Curtins has also reviewed the existing car parking facilities within walking distance of the site and determined that the closest off-site car parking facility is the Aquatics Centre Multistorey Car Park on Booth Street East, approximately 100m south of the site that provides parking for up to 380 vehicles with a further 1,018 spaces provided at Manchester Circle Square less than 200m to the north of the site.

3.3.6 There is therefore opportunity for vehicles to park off-site if necessary.

3.4 Management of Residents

3.4.1 All residents will receive correspondence prior to occupation advising that there is no opportunity for onsite parking.

3.4.2 Details of the system of arrival and departure by car to future residents of the site will be provided at the start and end of term.

3.4.3 The arrival and departure of future residents of the site can be defined within three distinct categories:

- Student arrival at the start of the academic year;
- Student arrival and departure at the end of terms during the academic year; and
- Student departure at the end of the academic year.

3.4.4 The proposed development comprises 1,100 rooms, which will be available for occupation at the start of a new term (September) each year.

3.4.5 It is recognised that there is a need to minimise disruption to local businesses during student arrivals and to ensure minimal disruption to traffic flows along Kincardine Road and other surrounding local routes.

3.4.6 The following measures will be introduced as part of this Management Plan in order to minimise disruption to neighbouring premises:

- Resident Instructions: Prior to residents arrival, a letter will be sent advising on the most appropriate route to gain access to the site on their arrival date. The letter will also include a map of the immediate locality and identify local car parking facilities as well as local sustainable travel information for those arriving by public transport (bus/tram/train).
- Parking Capacity: When parked within the two designated loading bays along Kincardine Road, eight cars can comfortably be accommodated whilst additional space for a further nine vehicles can be accommodated within the disabled parking bays. The intention will be to utilise the two loading bays and the parking bays designated for the mobility impaired as part of the Residents Management Plan.
- Marshalling: Marshals shall be employed over the intake weekends to direct and organise traffic movements in the site's immediate vicinity. The marshals will encourage cars to unload and vacate the designated car parking spaces as soon as possible to make the best use of the local car parking in the vicinity of the site and reduce the possibility for congestion. The Marshals will issue maps and directions to local car parking for any parents / guardians that wish to spend more time in Manchester after they have unloaded their vehicle.
- Neighbour Information Letter: A letter shall be issued to all residents and businesses in the immediate vicinity of the development advising them of the arrangements put in place for resident arrivals providing contact details at the site should they have any queries or incur any difficulties during the arrivals period.

3.4.7 Any requirement for the temporary use of service areas/lay-bys during this period will be agreed with Manchester City Council in advance. This will also include engagement and coordination with the

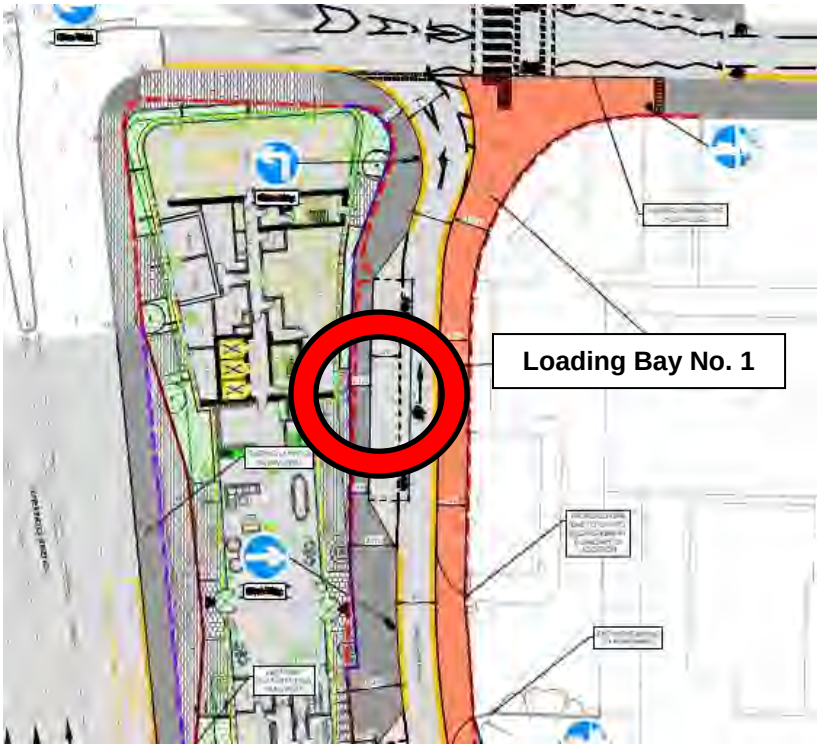
operators of the ground floor units to ensure that any disruptions are minimised and key delivery/servicing requirements will be maintained.

Resident Arrivals at the Start of the Academic Year

3.4.8 Resident arrivals are proposed to be split across two weekends with 310 residents arriving per day with arrivals spread evenly throughout each day from 09:00 – 17:00, based on each resident being allocated a 20-minute 'move in' slot. Residents will be able to book a slot in advance of arrival (with slots available for 20-minute arrivals between 09:00 – 17:00 on a Saturday and Sunday).

3.4.9 Residents will be advised of the arrival strategy well in advance of intake dates and will be provided with detailed printed information confirming the arrangements for the day, which will be as follows:

- on arrival, vehicles will park in designated loading bays clearly marked from no.1 to no. 3 (including the disabled parking bays) and report to main reception to check in and carry out any registration and key handover;
- once checked-in, on-site baggage handlers will be prepared with luggage trolleys to help unload all belongings, which will be taken to the relevant room. On-site attendants will notify each vehicle when their allotted time (approximately 20 minutes) has been reached;
- once unloaded, vehicles will be directed out of the area by supervisory staff to ensure no conflict in traffic movements.



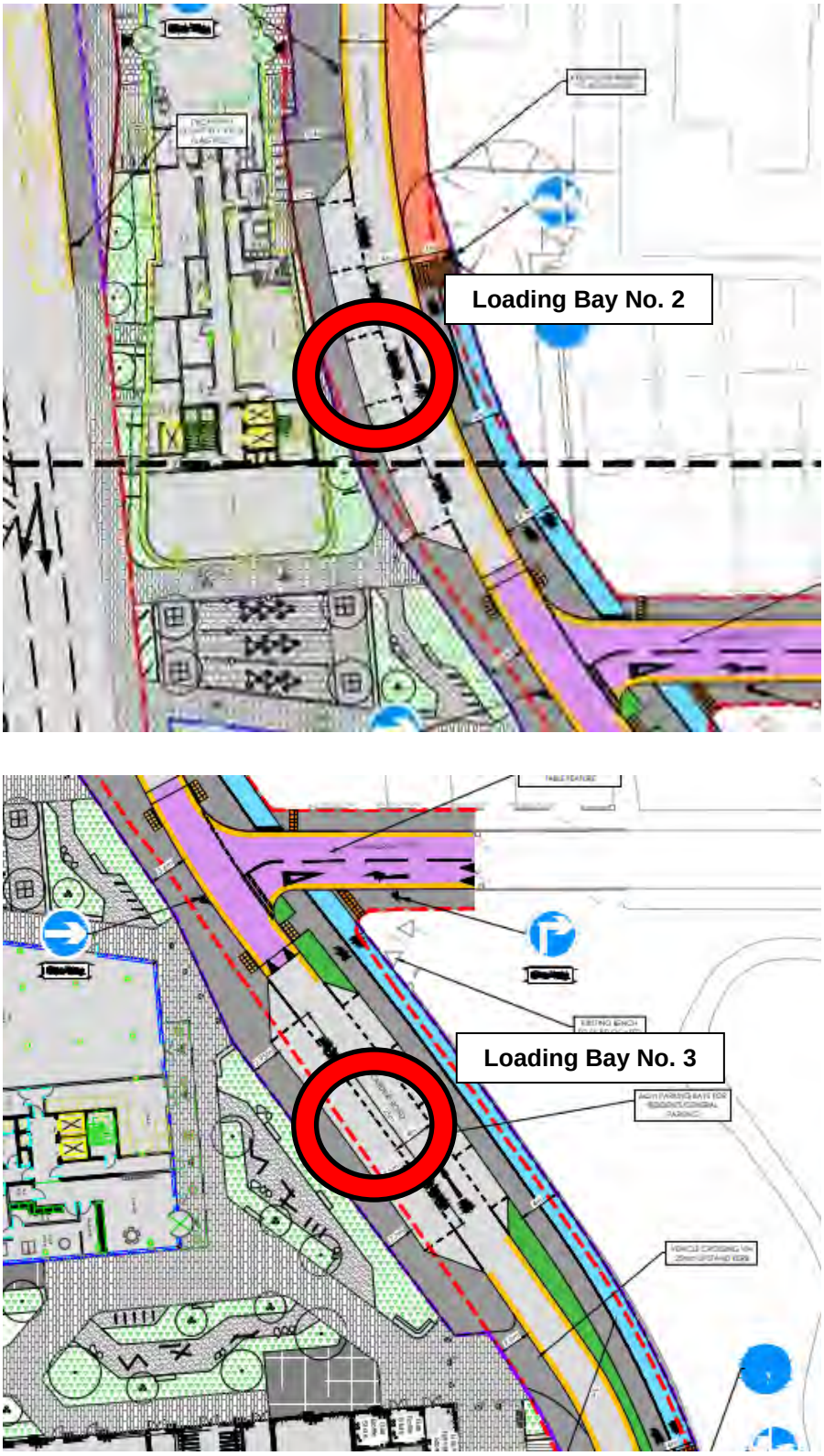


Figure 3.1 – Residents Loading/Unloading Locations

3.4.10 The vehicle capacity within each loading bay is summarised in Table 3.1.

	Capacity (no. of cars)	Capacity per hour (20 min dwell time)	Capacity per Day (09:00-17:00)
Loading Bay No.1	4	12	96
Loading Bay No. 2	5	15	120
Loading Bay No. 3	4	12	96
Total	13	39	312

Table 3.1 – Loading Bay Capacity

3.4.11 Table 3.1 demonstrates that combined capacity of each loading bay equates to 312 vehicles. On this basis, a total of four days would be required, should all 1,100 residents use a vehicle on arrival day.

3.4.12 These procedures and the use of local off-site parking at the Aquatics Centre Multistorey Car Park and Manchester Circle Square would be monitored and enforced by the on-site attendants and also mirror similar procedures which are operated successfully by comparable student residential development operators.

Resident Arrivals and Departures at the End of Terms During the Academic Year

3.4.13 Resident departures and arrivals at the end of terms during the academic year will be considerably less intensive than the arrival period at the start of the academic year.

3.4.14 On the above basis, it is unlikely that detailed traffic management will be required, although this situation will be monitored throughout the academic year and appropriate arrangements will be made should the need arise to introduce further traffic management during the student arrival and departure periods.

Resident Departures at the End of the Academic Year

3.4.15 Departures of residents occur over a period of several months and align themselves with the academic year, generally around May to July and August to September, depending on the tenancy length. As departures are spread widely across a period of many weeks, there is never a time when a mass departure occurs.

3.4.16 Clear and concise departure policies for all residents will be implemented that will ensure that pick-up vehicles arrive at the designated loading bays where belongings can be quickly loaded, and the car driven away. Because there is no check-out process to conduct, individual departures can be planned by each resident and undertaken without delay or inconvenience.

4.0 Proposed Delivery Strategy

4.1 Introduction

4.1.1 This section of the SLMS considers the management of delivery vehicles and taxi services at the proposed site during a typical day. As noted previously, the submitted Transport Assessment sets out the principles of the car free development concept being adopted and considers the typical traffic demand at all other times.

4.2 On-site Servicing

4.2.1 Two dedicated loading bays are proposed on the southern side of Kincardine Road which will be utilised by service and delivery vehicles to the three buildings being delivered as part of the planning application.

- One 25 x 3.5m loading bay;
- One 22.5 x 3.0m loading bay; and

4.2.2 These loading bays will be used by delivery and service vehicles associated with the residential, commercial and retails uses within the development. Any cycle and motorcycle courier deliveries will utilise one of the short stay cycle spaces provided within the site.

4.2.3 Vehicles would typically arrive at the loading bays in a forward gear (unless occupied) from the south/east along Kincardine Road. Vehicles would leave the area in a forward gear, continuing along Kincardine Road in a northerly direction and connect with Upper Brook Street at the Grosvenor Street/Upper Brook Street signal controlled junction.

4.2.4 The loading bays are sufficient to provide access for larger goods vehicles, such as 10m rigid type and large refuse vehicles. A swept path analysis of each loading bay is provided within the submitted Transport Assessment.

Number and Type of Deliveries

4.2.5 In order to calculate the delivery, servicing and taxi trips likely to be generated by the proposed development, trip rates have been obtained from the TRICS national database of similar student residential schemes.

4.2.6 In addition, whilst the ground floor commercial and retail uses are anticipated to be ancillary to the residential uses, the TRICS database has been interrogated in order to derive the servicing and delivery vehicle demand associated with these uses.

4.2.7 It should be noted that this exercise provides a robust analysis of the servicing/delivery demand only, reference should be made to the submitted Transport Assessment in regard to the wider multi-modal trip demand of the application proposals.

4.2.8 The following table provides an indication of the potential number of trips throughout the day for a typical development of this nature, the full TRICS outputs are included as **Appendix B** to this report:

Purpose Built Student Residential (1,100 Residents)			
Daily Generations	**Arrivals**	**Departures**	**Two-way**
OGVs	0	0	0
LGVs	11	13	24
Taxis	28	22	50
Convenience Store (389sqm)			
OGVs	1	1	2
LGVs	6	6	12
Food and Beverage (121sqm)			
LGVs	1	1	2
Servicing Vehicles	1	1	2
Combined			
OGVs	1	1	2
LGVs	18	20	38
Service Vehicles	1	1	2
Taxis	28	22	50

Table 4.1 – Servicing/Delivery Vehicle Demand

4.2.9 The assessment suggests that the proposed application scheme would generate approximately 92 two-way servicing, delivery and taxi trips per day, with the majority of trips anticipated to be generated by transit vans and 7.5t box vans. Curtins note the above table represents a typical case, forecasting the likely number of servicing trips as a result of the development as estimated from a similar development, and that there have been modal shifts such as an increase in cycle deliveries that have not been captured within the TRICS database.

4.2.10 As a significant number of city centre based parcel deliveries and take-away deliveries are undertaken by cycle/motorcycle suitable provision is provided close to the main building entrance points to secure cycle/motorcycles and allow prompt delivery.

4.2.11 Figure 4.1 presents a typical daily profile of the service vehicles and additional taxi demand at the application site.

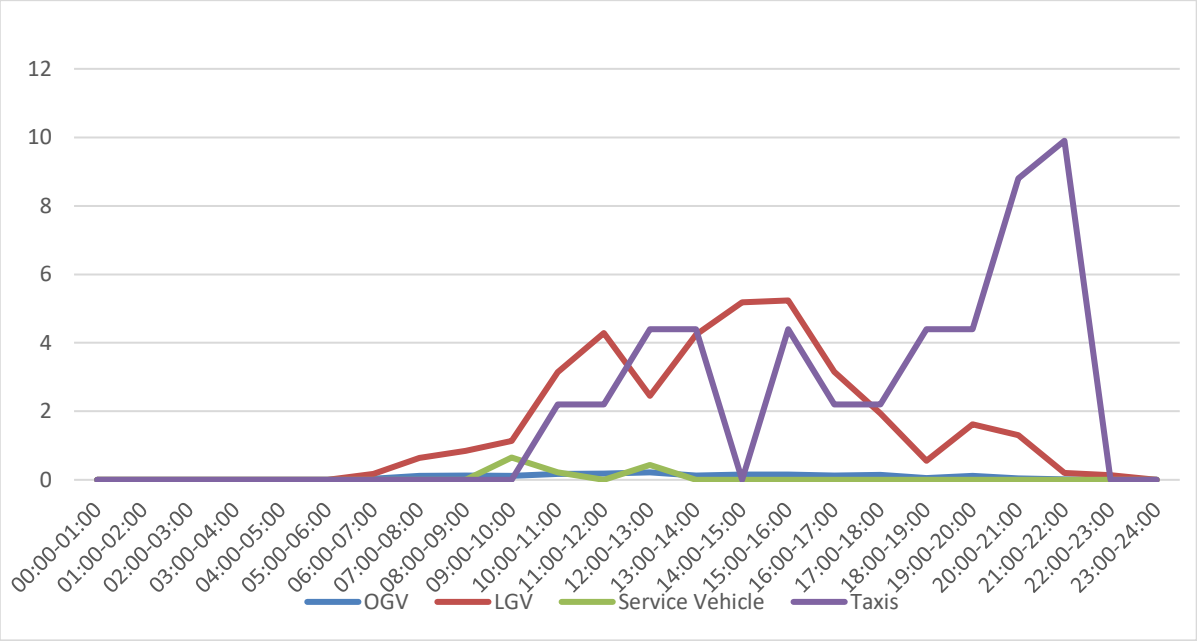


Figure 4.1 – Daily Vehicle Profile

4.2.12 Figure 4.1 confirms that vehicle demand at the site would be spread across the day, with the ability to coordinate delivery times as required.

4.2.13 Figure 4.1 also confirms that the peak taxi demand at the site has little conflict with the servicing and delivery vehicle demand.

Receiving Deliveries

4.2.14 It is envisaged that upon pulling into the loading bays, delivery staff would make their way to the main building access points (or the F&B/convenience store delivery access points).

4.2.15 The student residential operator would then receive parcels on behalf of residents wherever possible (i.e. mail and parcels could be received by reception staff, however perishable goods such as food deliveries would need to be received by the resident themselves), and these parcels would be stored in a designated area for residents to collect at a later time. This is a common approach undertaken in residential developments to minimise the number of repeat trips (i.e. preventing a missed delivery if a resident is not available to receive a parcel).

4.2.16 Deliveries that are made by bicycles or motorcycles can also secure their vehicle close to building entrance points before walking towards the residential access. It is reiterated that the estimations in **Table 4.1** above are based on a number of sites, and it is expected that there would also be cycle deliveries which would take up significantly less space than motor vehicles and dwell for significantly less time.

4.3 Management of Servicing Strategy

4.3.1 Usage demand for the designated loading bays will be managed by the site's management company, by coordinating times with delivery companies wherever possible to reduce the number of trips throughout the day and to maximise each bay's availability.

4.3.2 The following initiatives would be adopted:

- Onsite management team to manage servicing activity at the site;
- Suppliers will be encouraged to use bicycles, motorcycles, cars, and transit vans to deliver goods where possible;
- Onsite management team to work with delivery companies (i.e. Royal Mail, Hermes, Amazon, DPD etc) to minimise the number of arrivals per day and to consolidate deliveries, where possible;
- Onsite management team to ensure that delivery vehicles remain in the loading bays for as little time as required and that vehicle engines are switched off while stationary, where possible;
- A designated area would be available to receive goods from courier deliveries if a resident is not available;
- Onsite management team to seek to minimise, where possible, deliveries during the peak hours; and
- Onsite management team to make residents aware of the benefits of using off-site delivery lockers, such as Amazon Lockers and Doddle.

4.3.3 The Servicing Strategy will be reviewed on a regular basis and any comments received from residents or third parties regarding the servicing activity will be encouraged with the overall approach updated where necessary to minimise inconvenience and disruption to the surrounding public realm and highway network.

5.0 Waste Management Policy

5.1 Introduction

5.1.1 When developing refuse strategies, it is important to be cognisant of the national and local waste management policies. The following section of the report provides an overview of the policies relevant to the Proposed Development.

5.2 Waste Management Plan for England (January 2021)

5.2.1 The Waste Management Plan for England, to be read in combination with the Resources and Waste Strategy issued in 2018, sets out measures to eliminate avoidable plastic waste, tackle confusion over household recycling, and make sure that those responsible for creating polluting products pay for the costs of that pollution.

5.2.2 The Resources and Waste Strategy identifies five strategic ambitions:

- *"To work towards all plastic packaging placed on the market being recyclable, reusable or compostable by 2025;*
- *To work towards eliminating food waste to landfill by 2030;*
- *To eliminate avoidable plastic waste over the lifetime of the 25 Year Environment Plan;*
- *To double resource productivity by 2050; and*
- *To eliminate avoidable waste of all kinds by 2050."*

5.2.3 The next figure, included on the Waste Management Plan, identifies the evolution of *The Waste Hierarchy through* the years, its current status, and the goal for 2030:

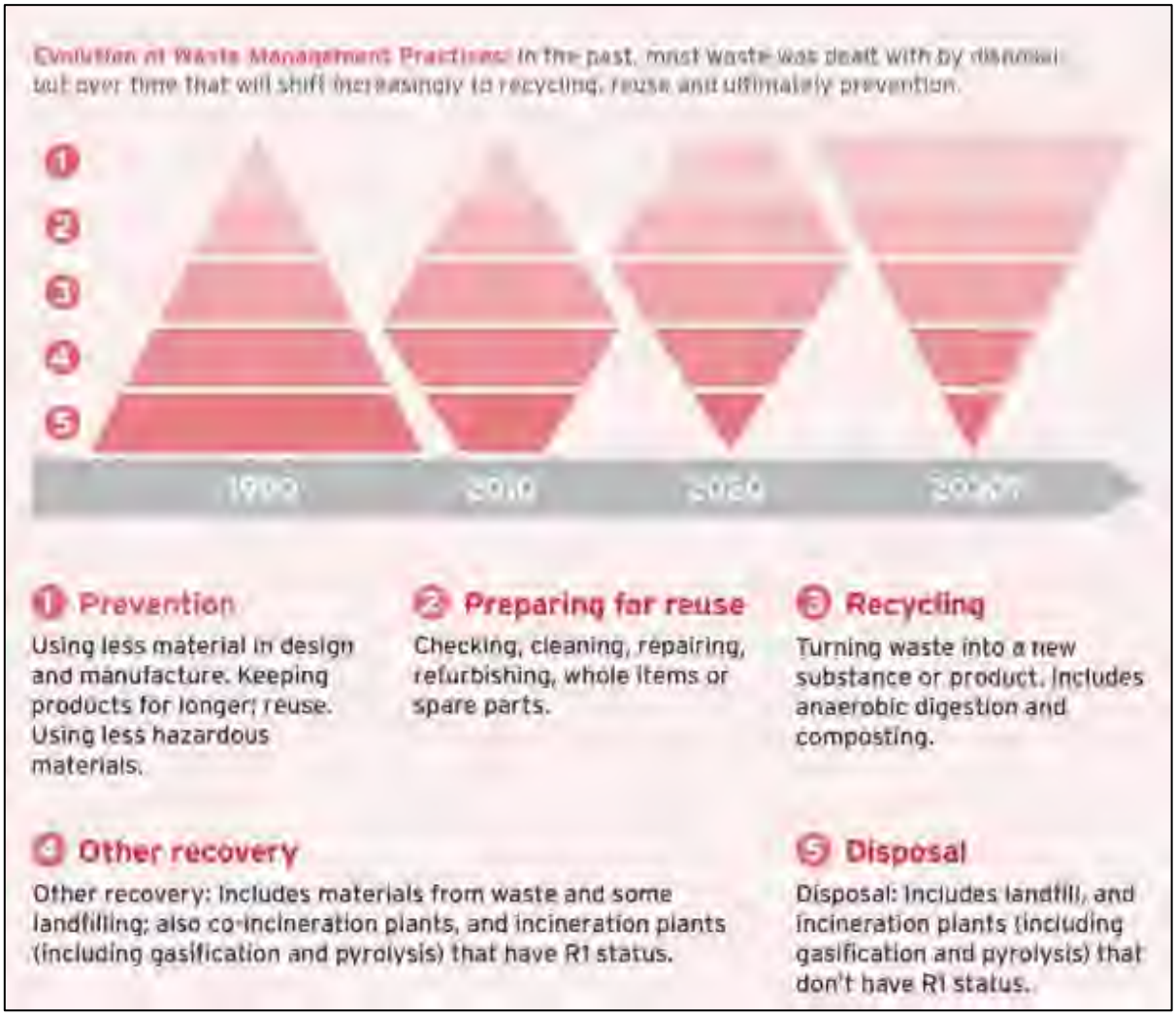


Figure 5.1 – Evolution of Waste Management Practices.
(Source: Defra)

5.2.4 The 2030 hierarchy gives top priority to preventing waste in the first place. When waste is created, it gives priority to preparing it for re-use, then recycling, then recovery, and last of all disposal (e.g.landfill).

5.2.5 This Servicing and Waste Management Strategy (SWMS) adheres to the above guidance, prioritising recycling.

5.3 Waste Management in Buildings – Code of Practice (BS 5906:2005)

5.3.1 To complement the Waste Management Plan for England, a National Code of Practice (BS 5906:2005) document has been developed and this provides guidance relating to waste forecasting for new developments.

5.3.2 This SWMS has consulted the weekly arisings included within this Code of Practice for the proposed student accommodation and commercial (supermarket) uses of the site.

5.4 Building Regulations

5.4.1 In addition to the above guidance, all new developments must comply with the requirements set out in Part H6 of the Building Regulations 2015 which states that adequate means of storing solid waste should be provided and adequate means of access should be provided for people in the building to the place of storage.

5.4.2 This SWMS proposes waste storage areas which comply with the requirements set by Building Regulations document.

5.5 Controls on Animal By-Products

5.5.1 Organic waste recycling is subject to DEFRA's Controls on Animal By-Products - Guidance on regulation (EC) 1069/2009 and accompanying implementing Regulation (EC) 142/2011, enforced in England by the Animal By-Products (Enforcement) (England) Regulations 2011.

5.5.2 The regulations predominantly relate to food waste. These regulations state that if the volume of waste is over 20kg, it must be stored and labelled in a special container and will be collected by a licensed carrier, who records all stages of the waste movement.

5.5.3 It is the occupier's responsibility to ensure that a licensed waste company is arranged, and that it complies with the regulation

5.6 Waste Storage and Collection Guidance for New Developments (GD 04 – v6.00)

5.6.1 At a more local level, Manchester City Council has prepared a Waste Storage and Collection Guidance Note which contains minimum standards to be considered for the storage and collection of waste. This guidance follows the recommendations set on the Waste Management Plan for England, strongly encouraging and promoting high levels of quality recycling.

5.6.2 The note states that all planning applications for new developments and conversions must include a Waste Management Strategy that includes:

- An estimated storage area for the waste produced by the development, including residential, office and commercial uses;
- Details of internal and external stores for both waste and recycling; and
- Location of the proposed collection point and details of the route the collection will take.

5.6.3 The waste calculations for the commercial uses (F&B) have been based on this guidance.

5.6.4 The following sections of this report provide additional information on each of the above points whilst the pro forma document, contained at the rear of the guidance note, is included as **Appendix C.**

6.0 Waste Forecasting and Strategy

6.1 Introduction

6.1.1 A key element of national and local policy is to ensure that new developments maximise recycling while minimising waste generation. It is important to ensure that developments facilitate high recycling rates by providing convenient, attractive and simple means to achieve Government's goals.

6.1.2 The proposals for the student accommodation element are for a total of 1,100 beds, divided as 649 in Block A1, 231 in Block A2, and 220 in Block A3. A total of 506m² of commercial uses are proposed at ground floor. These are divided as 121m² of F&B as worst-case for a retail unit and 385m² for small supermarket / convenience store uses.

6.1.3 The proposed site layout is provided in **Appendix A**.

6.2 Waste Forecast

6.2.1 The waste forecast for the student accommodation element has been calculated based on the recommendations set by the National Code of Practice BS 5906:2005.

6.2.2 This guidance provides a residential weekly forecast of 70l per bedroom, which in this case is used as a proxy for the student accommodation uses.

6.2.3 The same guidance has been applied to the small supermarket, which states 100l per m² of sales area. The sales area has not been determined yet, but for calculation purposes it has been assumed to be 70% of the overall area, resulting in 270m².

6.2.4 Finally, the F&B uses have been based on MCC's GD04 guidance. For calculation purposes, it has been estimated that 36 dining spaces will be provided. The guidance suggests a waste generation of 1,500l per 20 dining spaces.

6.2.5 An initial recycling percentage of 50% has been estimated for calculation purposes and for all uses. The recycling rate can be updated upon review of the actual recycling rates following occupation.

Based on these requirements, **Table 6.1** forecasts the weekly waste volume generated by the student accommodation uses of the proposed development, whilst **Table 6.2** indicates the estimated weekly waste volume for the commercial uses:

Student Accommodation Uses – Block A	
Waste Stream	Refuse Volume (649 bedrooms)
Non-recyclable Waste	22,715 l
Dry Mixed Recycling	11,358 l
Glass Recycling	9,086 l
Organic Recycling	2,272 l
Student Accommodation – Block A Total	**45,430 l**
Student Accommodation Uses – Block B	
Waste Stream	Refuse Volume (231 bedrooms)
Non-recyclable Waste	8,085 l
Dry Mixed Recycling	4,043 l
Glass Recycling	3,234 l
Organic Recycling	809 l
Student Accommodation – Block B Total	**16,170 l**
Student Accommodation Uses – Block C	
Waste Stream	Refuse Volume (220 bedrooms)
Non-recyclable Waste	7,700 l
Dry Mixed Recycling	3,850 l
Glass Recycling	3,080 l
Organic Recycling	770 l
Student Accommodation – Block C Total	**15,400 l**

Table 6.1 – Proposed Student Accommodation Uses Weekly Waste Volume Forecast.

F&B Uses	
Waste Stream	Refuse Volume (36 dining spaces)
Non-recyclable Waste	1,354l
Dry Mixed Recycling	812
Glass Recycling	339l
Organic Recycling	203
F&B Uses Total	**2,708l**
Small Supermarket Uses	
Waste Stream	Refuse Volume (270m²)
Non-recyclable Waste	6,750l
Dry Mixed Recycling	16,200l
Glass Recycling	4,050
Small Supermarket Uses Total	**27,000l**

Table 6.2 – Proposed Commercial Uses Weekly Waste Volume Forecast.

6.2.6 The recycling rate can be updated upon review of the actual recycling rates following occupation.

6.3 Collection Frequency

6.3.1 It is envisaged that the collection service will be provided by a private collector for all uses.

6.3.2 It is considered that waste will be collected two times a week for the student accommodation and F&B uses. The small supermarket is anticipated to have a higher frequency of four times a week collections.

6.4 Bin Types

6.4.1 Given the potential volumes involved for the use of the proposed student accommodation uses of the development, the most suitable containers for the general waste and recycling streams would be 1,100l Eurobins.

6.4.2 The commercial uses will likely use a combination of 1,100l Eurobins and 660l bins. However, this will be confirmed once the units are occupied, as different occupiers / waste collection companies might have a preference for differently sized bins.

6.4.3 The following **Table 6.3** summarises the required waste containers per stream for the student accommodation uses. The table has been produced following the recommendations set by the National Code of Practice BS 5906:2005, assuming the waste collection frequency summarised above in **Section 5.3**.

Student Accommodation Uses – Block A	
Waste Stream	Number of required bins (2 times a week collections)
Non-recyclable Waste	11 x 1,100l
Dry Mixed Recycling	5 x 1,100l
Glass Recycling	4 x 1,100l
Organic Recycling	1 x 1,100l
Student Accommodation – Block A Total	**21 x 1,100l**
Student Accommodation Uses – Block B	
Waste Stream	Number of required bins (2 times a week collections)
Non-recyclable Waste	4 x 1,100l
Dry Mixed Recycling	2 x 1,100l
Glass Recycling	2 x 1,100l
Organic Recycling	1 x 1,100l
Student Accommodation – Block B Total	**9 x 1,100l**
Student Accommodation Uses – Block C	
Waste Stream	Number of required bins (2 times a week collections)
Non-recyclable Waste	4 x 1,100l
Dry Mixed Recycling	2 x 1,100l
Glass Recycling	2 x 1,100l
Organic Recycling	1 x 1,100l
Student Accommodation – Block C Total	**9 x 1,100l**

Table 6.3 – Proposed Student Accommodation Required Bins.

6.4.4 The following **Table 6.4** summarises the required waste containers per stream for the commercial uses. The table has been produced following the recommendations set by the National Code of Practice BS 5906:2005 and MCC's GD04 guidance, assuming the waste collection frequency summarised above in **Section 5.3**.

F&B Uses	
Waste Stream	Number of required bins (2 times a week collections)
Non-recyclable Waste	3 x 240l
Dry Mixed Recycling	2 x 240l
Glass Recycling	1 x 240l
Organic Recycling	1 x 240l
F&B Uses Total	**7 x 240l**
Small Supermarket Uses	
Waste Stream	Number of required bins (4 times a week collections)
Non-recyclable Waste	2 x 1,100l
Dry Mixed Recycling	4 x 1,100l
Glass Recycling	1 x 1,100l
Small Supermarket Uses Total	**7 x 1,100l**

Table 6.4 – Proposed Commercial Uses Required Bins.

6.5 Waste Management Strategy – Internal Arrangements

Student Accommodation

6.5.1 The four main waste streams would be:

- General, non-recyclable waste;
- Dry Mixed Recycling (Comprising paper and cardboard, plastic and aluminium);
- Glass Recycling; and
- Organic Recycling.

6.5.2 The proposed waste storage rooms have been sized to accommodate and operate the number of bins required in the above **Table 6.3**.

6.5.3 The stores are conveniently located at ground floor level in proximity to the core of each of the blocks.

6.5.4 It is envisaged that initially at least 50% of the bins would be dedicated to recycling. This percentage could be increased at any point based on actual recycling rates.

6.5.5 The building management would be in charge of monitoring the recycling rates and promote actively high recycling rates within the residents. This could be achieved by giving information on the benefits of recycling and information on how to segregate.

6.5.6 The waste storage areas will be well lit and ventilated, including access to a water feed. The floors will comprise an easily cleaned surface and adequate drainage will be provided.

6.5.7 The building management would be responsible for keeping the waste storage facilities clean and safe. They would also be responsible for cleaning the bins on a regular basis and arranging for replacing damaged bins when necessary.

Commercial uses

6.5.8 The commercial uses will store their waste internally within their own premises.

6.5.9 Based on the final layout determined by the occupiers, which are unknown at the time of writing, it may be possible that the number of bins estimated in this report vary slightly.

6.6 Waste Management Strategy – Collections

6.6.1 **Drawing 083371-CUR-XX-00-D-TP-06001** shows the location of the waste storage rooms and the route to the collection point.

6.6.2 Refuse vehicles will collect the waste from the proposed loading bays, minimising any disruption to the public highway.

6.6.3 It is envisaged that a private contractor would be appointed to collect the waste for all uses, following the strategies described within this report.

Student Accommodation

6.6.4 For calculation purposes and as described above**,** it has been estimated that the proposed development would have a collection frequency of two times a week for all streams of the student accommodation and F&B uses and four times a week for the small supermarket.

6.6.5 However, based on the variable nature and occupancy rates of student accommodation uses, it is considered that the frequency of collections will be arranged after occupation, based on the actual waste generation volumes. The building management will be in charge of monitoring bin usage and adjusting the collection frequency accordingly.

6.6.6 The private waste operators will collect the bins from the stores and load them into the refuse vehicle.

6.6.7 Once the bins have been emptied, containers would be carried immediately back to the bin stores by the private waste operators.

Commercial Uses

6.6.8 It has been estimated that the proposed development would have a collection frequency of two times a week for the F&B uses and four times a week for the small supermarket.

6.6.9 However and as stated above, this is only an estimation for waste calculation purposes, with the final frequency to be determined once an occupier is known.

7.0 Summary and Conclusions

7.1 Summary

7.1.1 Curtins has been appointed by Moda Living to provide traffic and transport advice in relation to a planning application for a major mixed-use scheme on land adjacent to Upper Brook Street in Manchester City Centre.

7.1.2 It is understood that the proposals consist of three purpose-built student accommodation blocks of circa 41, 14 and 12 floors, providing accommodation for up to 1,100 student residents. Three commercial office blocks centred around life sciences are also proposed.

7.1.3 The proposed site layout is provided in **Appendix A**.

7.1.4 This Site Logistics Management Strategy (SLMS) is a bespoke document which has been prepared to consider the servicing and delivery vehicle movements associated with the development proposals as well as the potential refuse and recyclable waste volumes of the proposed development., along with details of the collection arrangements. in addition, this document also considers the management procedures that will be adopted in advance of residents arrival prior to the start of term and departures at the end of term.

7.1.5 The resident's arrival strategy has been developed on the assumption that all residents would require access to the site via private car to drop off belongings. Whilst this is considered a robust approach, it has been demonstrated that all residents could be accommodated within a four day period.

7.1.6 The servicing, delivery and taxi demand at the application site has been derived using standard trip generation methods.

7.1.7 The waste forecast has been calculated based on the recommendations set by the National Code of Practice BS 5906:2005 and MCC's own guidance GD04 v6.00.

7.1.8 The report concludes that the proposed development will be served by private refuse collections. The bins will be transported to the collection point from the store by the private waste operators.

7.1.9 Refuse vehicles will stop at newly proposed loading bays.

7.1.10 The proposed development is anticipated to be served by two times a week collections for all streams for the student accommodation and F&B uses, with the small supermarket to be served by four times a week collections. The collection frequency is subject to be updated following occupation, as typically the waste generated by these uses can vary significantly.

7.1.11 The proposals include a waste storage rooms at ground floor level of each of the proposed student accommodation blocks. The size of the bin stores has been determined accordingly whilst consideration to segregation and recycling has been given. The commercial uses will store their waste internally.

7.2 Conclusions

7.2.1 From an overall site logistics perspective, there are no reasons why the development proposals should not be granted planning approval.

Drawings



GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
4. FOR GENERAL NOTES REFER TO DRAWING.
5. THE CONTENT OF THIS DRAWING IS FOR INDICATIVE INFORMATION ONLY AND NOT SUITABLE FOR CONSTRUCTION PURPOSES.
6. BASED ON SIMPSON HAUGH'S LAYOUT: '10450-SHP-Z0-A-B5D8-G100-PL-00-001'

KEY:
- INDICATIVE RED LINE BOUNDARY
- WASTE STORE
- BIN ROUTE

Rev:	Description:	Date:	By:	Chkd:

curtins
Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
0161 238 2394
manchester@curtins.com
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Civils & Structures • Transport Planning • Environmental • Infrastructure • Geotechnical • Conservation & Heritage • Principal Designer
Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kendal • Leeds • Liverpool • London • Manchester • Nottingham

Status: PLANNING

Project: UPPER BROOK STREET - MANCHESTER

Drg Title: WASTE MANAGEMENT STRATEGY

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	22/06/23	JM	JM	DD
Scale: 1:250				

Project No:	Originator:	Volume:	Level:	Type:	Role:	Category / Number:	Rev:
83371	- CUR -	XX -	00 -	D	- TP -	06001	- P01

\\mafs02\Projects\083001 - 084000\083371 - Upper Brook Street Mcds\Q4-Production\4A-Models-Drawings\TP\CAD\06\

Appendix A – Development Proposals



This drawing is copyright
Do not scale off dimensions.
All dimensions to be checked on site by contractor.
Contractor to report any dimensional discrepancies, errors or omissions prior to commencing on site.

NOTE:
DO NOT SCALE OFF DRAWING REFER TO INDICATED DIMENSIONS ONLY.
DRAWING TO BE READ IN CONJUNCTION WITH SHP SPECIFICATION. INDICATIVE DETAILS TO ILLUSTRATE VISUAL INTENT ONLY. ALL TO CONTRACTORS DESIGN.
ALL DETAILS TO BE COORDINATED WITH ADJACENT TRADES AND SE AND M+E ENGINEER DETAILS.
THE CONTRACTOR IS RESPONSIBLE FOR MEETING THE SPECIFIED PERFORMANCE CRITERIA.

NORTH

Rev	Date	Description
P01	2023-06-22	Planning Issue

0 5 10 15 20m

Project Title
Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title
PBSA Site Plan
Ground Level

Project No
10450

Scale
1 : 500 @ A3

Status
PLANNING

SHP Drawing Code PROJ - ORIG - ZONE - ROLE - CLAS - TYPE - LOC - SEQ
10450-SHP-Z0-A-B5D8-G100-PL-00-001

Revision
P01

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Appendix B – TRICS Outputs

Calculation Reference: AUDIT-506501-230423-0434

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : G - STUDENT ACCOMMODATION
MULTI-MODAL TOTAL VEHICLES

Selected regions and areas:

01	GREATER LONDON		
	CN	CAMDEN	1 days
	LB	LAMBETH	1 days
03	SOUTH WEST		
	DV	DEVON	1 days
05	EAST MIDLANDS		
	DY	DERBY	1 days
06	WEST MIDLANDS		
	WM	WEST MIDLANDS	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of residents
Actual Range: 146 to 1100 (units:)
Range Selected by User: 100 to 1100 (units:)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/10 to 25/06/21

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Tuesday	2 days
Wednesday	1 days
Thursday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centre	2
Edge of Town Centre	3

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	1
Built-Up Zone	4

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	7 days - Selected
Servicing vehicles Excluded	4 days - Selected

Secondary Filtering selection:

Use Class:

C3	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:

All Surveys Included

Population within 1 mile:

1,001 to 5,000	1 days
10,001 to 15,000	1 days
25,001 to 50,000	2 days
50,001 to 100,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	1 days
250,001 to 500,000	2 days
500,001 or More	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.5 or Less	1 days
0.6 to 1.0	3 days
1.1 to 1.5	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	5 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	3 days
6a Excellent	1 days
6b (High) Excellent	1 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 CN-03-G-01 STUDENT FLATS CAMDEN
SAINT PANCRAS WAY
KING'S CROSS

Edge of Town Centre
Built-Up Zone
Total Number of residents: 571
Survey date: TUESDAY 14/11/17 Survey Type: MANUAL

2 DV-03-G-04 STUDENT ACCOMMODATION DEVON
BONHAY ROAD
EXETER

Edge of Town Centre
Residential Zone
Total Number of residents: 241
Survey date: THURSDAY 28/11/13 Survey Type: MANUAL

3 DY-03-G-02 STUDENT ACCOMMODATION DERBY
CATHEDRAL ROAD
DERBY

Town Centre
Built-Up Zone
Total Number of residents: 350
Survey date: WEDNESDAY 25/09/19 Survey Type: MANUAL

4 LB-03-G-02 STUDENT FLATS LAMBETH
WESTMINSTER BRIDGE RD
LAMBETH

Town Centre
Built-Up Zone
Total Number of residents: 1100
Survey date: TUESDAY 27/11/18 Survey Type: MANUAL

5 WM-03-G-02 STUDENT FLATS WEST MIDLANDS
RAGLAN STREET
COVENTRY

Edge of Town Centre
Built-Up Zone
Total Number of residents: 197
Survey date: THURSDAY 17/10/13 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
KI-03-G-01	Exams
KI-03-G-02	Exams

MANUALLY DESELECTED SURVEYS

Site Ref	Survey Date	Reason for Deselection
HM-03-G-02	25/06/21	Covid
IS-03-G-01	07/12/12	Limited Survey Data

TRIP RATE for Land Use 03 - RESIDENTIAL/G - STUDENT ACCOMMODATION
MULTI-MODAL TOTAL VEHICLES
Calculation factor: 1 RESIDE
BOLD print indicates peak (busiest) period
Total People to Total Vehicles ratio (all time periods and directions): 19.67

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate	No. Days	Ave. RESIDE	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00	1	241	0.000	1	241	0.000	1	241	0.000
07:00 - 08:00	5	492	0.001	5	492	0.001	5	492	0.002
08:00 - 09:00	5	492	0.002	5	492	0.001	5	492	0.003
09:00 - 10:00	5	492	0.001	5	492	0.001	5	492	0.002
10:00 - 11:00	5	492	0.004	5	492	0.004	5	492	0.008
11:00 - 12:00	5	492	0.003	5	492	0.003	5	492	0.006
12:00 - 13:00	5	492	0.002	5	492	0.004	5	492	0.006
13:00 - 14:00	5	492	0.005	5	492	0.004	5	492	0.009
14:00 - 15:00	5	492	0.003	5	492	0.004	5	492	0.007
15:00 - 16:00	5	492	0.004	5	492	0.004	5	492	0.008
16:00 - 17:00	5	492	0.003	5	492	0.003	5	492	0.006
17:00 - 18:00	5	492	0.002	5	492	0.004	5	492	0.006
18:00 - 19:00	5	492	0.002	5	492	0.002	5	492	0.004
19:00 - 20:00	5	492	0.004	5	492	0.003	5	492	0.007
20:00 - 21:00	5	492	0.005	5	492	0.006	5	492	0.011
21:00 - 22:00	2	219	0.007	2	219	0.011	2	219	0.018
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.048			0.055			0.103

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

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Parameter summary

Trip rate parameter range selected:	146 - 1100 (units:)
Survey date date range:	01/01/10 - 25/06/21
Number of weekdays (Monday-Friday):	7
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	4
Surveys manually removed from selection:	2

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Calculation Reference: AUDIT-148301-230517-0545

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 01 - RETAIL
Category : A - FOOD SUPERSTORE
TOTAL VEHICLES

Selected regions and areas:

04	EAST ANGLIA		
	CA	CAMBRIDGESHIRE	1 days
08	NORTH WEST		
	GM	GREATER MANCHESTER	1 days
10	WALES		
	CO	CONWY	1 days
	MM	MONMOUTHSHIRE	2 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 1600 to 9854 (units: sqm)
Range Selected by User: 800 to 15124 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/15 to 28/05/22

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Wednesday	1 days
Thursday	1 days
Friday	3 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centre	3
Edge of Town Centre	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Retail Zone	2
Built-Up Zone	3

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	1 days - Selected
Servicing vehicles Excluded	4 days - Selected

Secondary Filtering selection:

Use Class:

E(a)	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:

All Surveys Included

Population within 1 mile:

5,001 to 10,000	1 days
10,001 to 15,000	2 days
25,001 to 50,000	2 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	2 days
50,001 to 75,000	1 days
125,001 to 250,000	1 days
500,001 or More	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	3 days
1.1 to 1.5	1 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Petrol filling station:

PFS is present at the site and is included in the count	3 days
PFS is present at the site but is excluded from the count	0 days
There is no PFS at the site	2 days

This data displays the number of surveys within the selected set that include petrol filling station activity, and the number of surveys that do not.

Travel Plan:

No	5 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	5 days

This data displays the number of selected surveys with PTAL Ratings.

Covid-19 Restrictions	Yes	At least one survey within the selected data set was undertaken at a time of Covid-19 restrictions

LIST OF SITES relevant to selection parameters

1	CA-01-A-03	MORRISONS		CAMBRIDGESHIRE
	BACK LANE			
	CAMBOURNE			
	GREAT CAMBOURNE			
	Town Centre			
	Retail Zone			
	Total Gross floor area:		5500 sqm	
	Survey date: THURSDAY		*07/06/18*	*Survey Type: MANUAL*
2	CO-01-A-01	ASDA		CONWY
	CONWAY ROAD			
	LLANDUDNO			
	Edge of Town Centre			
	Retail Zone			
	Total Gross floor area:		9854 sqm	
	Survey date: FRIDAY		*23/03/18*	*Survey Type: MANUAL*
3	GM-01-A-28	TESCO EXPRESS		GREATER MANCHESTER
	MARKET STREET			
	MANCHESTER			
	Town Centre			
	Built-Up Zone			
	Total Gross floor area:		1600 sqm	
	Survey date: WEDNESDAY		*27/04/22*	*Survey Type: MANUAL*
4	MM-01-A-02	ASDA		MONMOUTHSHIRE
	LOWER DOCK STREET			
	NEWPORT			
	Edge of Town Centre			
	Built-Up Zone			
	Total Gross floor area:		9825 sqm	
	Survey date: FRIDAY		*27/09/19*	*Survey Type: MANUAL*
5	MM-01-A-03	ASDA		MONMOUTHSHIRE
	WOODSTOCK WAY			
	CALDICOT			
	Town Centre			
	Built-Up Zone			
	Total Gross floor area:		3518 sqm	
	Survey date: FRIDAY		*27/11/20*	*Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
TOTAL VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
06:00 - 07:00	2	5727	0.340	2	5727	0.122	2	5727	0.462
07:00 - 08:00	4	6695	1.412	4	6695	0.997	4	6695	2.409
08:00 - 09:00	5	6059	1.974	5	6059	1.383	5	6059	3.357
09:00 - 10:00	5	6059	2.677	5	6059	2.139	5	6059	4.816
10:00 - 11:00	5	6059	2.759	5	6059	2.347	5	6059	5.106
11:00 - 12:00	5	6059	2.822	5	6059	2.802	5	6059	5.624
12:00 - 13:00	5	6059	3.122	5	6059	2.799	5	6059	5.921
13:00 - 14:00	5	6059	2.832	5	6059	2.971	5	6059	5.803
14:00 - 15:00	5	6059	2.832	5	6059	3.063	5	6059	5.895
15:00 - 16:00	5	6059	2.512	5	6059	2.654	5	6059	5.166
16:00 - 17:00	5	6059	2.604	5	6059	2.911	5	6059	5.515
17:00 - 18:00	5	6059	2.611	5	6059	2.746	5	6059	5.357
18:00 - 19:00	5	6059	2.598	5	6059	2.819	5	6059	5.417
19:00 - 20:00	5	6059	1.878	5	6059	2.429	5	6059	4.307
20:00 - 21:00	5	6059	1.522	5	6059	1.911	5	6059	3.433
21:00 - 22:00	4	6199	0.488	4	6199	0.754	4	6199	1.242
22:00 - 23:00	2	5727	0.096	2	5727	0.262	2	5727	0.358
23:00 - 24:00	1	1600	0.063	1	1600	0.438	1	1600	0.500
Total Rates:			35.141			35.547			70.688

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

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Parameter summary

Trip rate parameter range selected:	1600 - 9854 (units: sqm)
Survey date date range:	01/01/15 - 28/05/22
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
TAXIS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
06:00 - 07:00	2	5727	0.009	2	5727	0.009	2	5727	0.018
07:00 - 08:00	4	6695	0.030	4	6695	0.022	4	6695	0.052
08:00 - 09:00	5	6059	0.040	5	6059	0.036	5	6059	0.076
09:00 - 10:00	5	6059	0.066	5	6059	0.069	5	6059	0.135
10:00 - 11:00	5	6059	0.079	5	6059	0.073	5	6059	0.152
11:00 - 12:00	5	6059	0.086	5	6059	0.092	5	6059	0.178
12:00 - 13:00	5	6059	0.086	5	6059	0.079	5	6059	0.165
13:00 - 14:00	5	6059	0.079	5	6059	0.069	5	6059	0.148
14:00 - 15:00	5	6059	0.102	5	6059	0.112	5	6059	0.214
15:00 - 16:00	5	6059	0.043	5	6059	0.040	5	6059	0.083
16:00 - 17:00	5	6059	0.046	5	6059	0.050	5	6059	0.096
17:00 - 18:00	5	6059	0.063	5	6059	0.069	5	6059	0.132
18:00 - 19:00	5	6059	0.069	5	6059	0.059	5	6059	0.128
19:00 - 20:00	5	6059	0.030	5	6059	0.040	5	6059	0.070
20:00 - 21:00	5	6059	0.020	5	6059	0.023	5	6059	0.043
21:00 - 22:00	4	6199	0.008	4	6199	0.012	4	6199	0.020
22:00 - 23:00	2	5727	0.017	2	5727	0.017	2	5727	0.034
23:00 - 24:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
Total Rates:			0.873			0.871			1.744

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

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TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
OGVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
06:00 - 07:00	2	5727	0.009	2	5727	0.000	2	5727	0.009
07:00 - 08:00	4	6695	0.022	4	6695	0.007	4	6695	0.029
08:00 - 09:00	5	6059	0.020	5	6059	0.013	5	6059	0.033
09:00 - 10:00	5	6059	0.013	5	6059	0.017	5	6059	0.030
10:00 - 11:00	5	6059	0.020	5	6059	0.023	5	6059	0.043
11:00 - 12:00	5	6059	0.030	5	6059	0.017	5	6059	0.047
12:00 - 13:00	5	6059	0.026	5	6059	0.030	5	6059	0.056
13:00 - 14:00	5	6059	0.013	5	6059	0.020	5	6059	0.033
14:00 - 15:00	5	6059	0.020	5	6059	0.020	5	6059	0.040
15:00 - 16:00	5	6059	0.023	5	6059	0.017	5	6059	0.040
16:00 - 17:00	5	6059	0.013	5	6059	0.020	5	6059	0.033
17:00 - 18:00	5	6059	0.013	5	6059	0.023	5	6059	0.036
18:00 - 19:00	5	6059	0.003	5	6059	0.010	5	6059	0.013
19:00 - 20:00	5	6059	0.017	5	6059	0.013	5	6059	0.030
20:00 - 21:00	5	6059	0.003	5	6059	0.007	5	6059	0.010
21:00 - 22:00	4	6199	0.000	4	6199	0.004	4	6199	0.004
22:00 - 23:00	2	5727	0.000	2	5727	0.000	2	5727	0.000
23:00 - 24:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
Total Rates:			0.245			0.241			0.486

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

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TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
PSVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
06:00 - 07:00	2	5727	0.000	2	5727	0.000	2	5727	0.000
07:00 - 08:00	4	6695	0.000	4	6695	0.000	4	6695	0.000
08:00 - 09:00	5	6059	0.000	5	6059	0.000	5	6059	0.000
09:00 - 10:00	5	6059	0.000	5	6059	0.000	5	6059	0.000
10:00 - 11:00	5	6059	0.003	5	6059	0.000	5	6059	0.003
11:00 - 12:00	5	6059	0.000	5	6059	0.003	5	6059	0.003
12:00 - 13:00	5	6059	0.003	5	6059	0.003	5	6059	0.006
13:00 - 14:00	5	6059	0.000	5	6059	0.000	5	6059	0.000
14:00 - 15:00	5	6059	0.000	5	6059	0.000	5	6059	0.000
15:00 - 16:00	5	6059	0.000	5	6059	0.000	5	6059	0.000
16:00 - 17:00	5	6059	0.000	5	6059	0.000	5	6059	0.000
17:00 - 18:00	5	6059	0.003	5	6059	0.003	5	6059	0.006
18:00 - 19:00	5	6059	0.000	5	6059	0.000	5	6059	0.000
19:00 - 20:00	5	6059	0.000	5	6059	0.000	5	6059	0.000
20:00 - 21:00	5	6059	0.000	5	6059	0.000	5	6059	0.000
21:00 - 22:00	4	6199	0.000	4	6199	0.000	4	6199	0.000
22:00 - 23:00	2	5727	0.000	2	5727	0.000	2	5727	0.000
23:00 - 24:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
Total Rates:			0.009			0.009			0.018

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

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TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
CYCLISTS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
06:00 - 07:00	2	5727	0.052	2	5727	0.035	2	5727	0.087
07:00 - 08:00	4	6695	0.063	4	6695	0.026	4	6695	0.089
08:00 - 09:00	5	6059	0.063	5	6059	0.023	5	6059	0.086
09:00 - 10:00	5	6059	0.053	5	6059	0.056	5	6059	0.109
10:00 - 11:00	5	6059	0.073	5	6059	0.043	5	6059	0.116
11:00 - 12:00	5	6059	0.073	5	6059	0.069	5	6059	0.142
12:00 - 13:00	5	6059	0.059	5	6059	0.056	5	6059	0.115
13:00 - 14:00	5	6059	0.083	5	6059	0.050	5	6059	0.133
14:00 - 15:00	5	6059	0.086	5	6059	0.096	5	6059	0.182
15:00 - 16:00	5	6059	0.063	5	6059	0.066	5	6059	0.129
16:00 - 17:00	5	6059	0.040	5	6059	0.056	5	6059	0.096
17:00 - 18:00	5	6059	0.020	5	6059	0.040	5	6059	0.060
18:00 - 19:00	5	6059	0.036	5	6059	0.066	5	6059	0.102
19:00 - 20:00	5	6059	0.020	5	6059	0.046	5	6059	0.066
20:00 - 21:00	5	6059	0.000	5	6059	0.020	5	6059	0.020
21:00 - 22:00	4	6199	0.004	4	6199	0.024	4	6199	0.028
22:00 - 23:00	2	5727	0.009	2	5727	0.026	2	5727	0.035
23:00 - 24:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
Total Rates:			0.797			0.798			1.595

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
CARS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
06:00 - 07:00	2	5727	0.279	2	5727	0.105	2	5727	0.384
07:00 - 08:00	4	6695	1.244	4	6695	0.904	4	6695	2.148
08:00 - 09:00	5	6059	1.763	5	6059	1.225	5	6059	2.988
09:00 - 10:00	5	6059	2.515	5	6059	1.964	5	6059	4.479
10:00 - 11:00	5	6059	2.525	5	6059	2.159	5	6059	4.684
11:00 - 12:00	5	6059	2.578	5	6059	2.522	5	6059	5.100
12:00 - 13:00	5	6059	2.812	5	6059	2.508	5	6059	5.320
13:00 - 14:00	5	6059	2.614	5	6059	2.736	5	6059	5.350
14:00 - 15:00	5	6059	2.601	5	6059	2.799	5	6059	5.400
15:00 - 16:00	5	6059	2.310	5	6059	2.469	5	6059	4.779
16:00 - 17:00	5	6059	2.406	5	6059	2.700	5	6059	5.106
17:00 - 18:00	5	6059	2.413	5	6059	2.512	5	6059	4.925
18:00 - 19:00	5	6059	2.436	5	6059	2.644	5	6059	5.080
19:00 - 20:00	5	6059	1.766	5	6059	2.284	5	6059	4.050
20:00 - 21:00	5	6059	1.469	5	6059	1.848	5	6059	3.317
21:00 - 22:00	4	6199	0.456	4	6199	0.698	4	6199	1.154
22:00 - 23:00	2	5727	0.070	2	5727	0.210	2	5727	0.280
23:00 - 24:00	1	1600	0.063	1	1600	0.438	1	1600	0.500
Total Rates:			32.319			32.725			65.044

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
LGVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
06:00 - 07:00	2	5727	0.035	2	5727	0.009	2	5727	0.044
07:00 - 08:00	4	6695	0.105	4	6695	0.060	4	6695	0.165
08:00 - 09:00	5	6059	0.119	5	6059	0.099	5	6059	0.218
09:00 - 10:00	5	6059	0.066	5	6059	0.059	5	6059	0.125
10:00 - 11:00	5	6059	0.112	5	6059	0.076	5	6059	0.188
11:00 - 12:00	5	6059	0.112	5	6059	0.142	5	6059	0.254
12:00 - 13:00	5	6059	0.182	5	6059	0.165	5	6059	0.347
13:00 - 14:00	5	6059	0.109	5	6059	0.132	5	6059	0.241
14:00 - 15:00	5	6059	0.086	5	6059	0.116	5	6059	0.202
15:00 - 16:00	5	6059	0.106	5	6059	0.109	5	6059	0.215
16:00 - 17:00	5	6059	0.119	5	6059	0.125	5	6059	0.244
17:00 - 18:00	5	6059	0.099	5	6059	0.116	5	6059	0.215
18:00 - 19:00	5	6059	0.063	5	6059	0.079	5	6059	0.142
19:00 - 20:00	5	6059	0.059	5	6059	0.076	5	6059	0.135
20:00 - 21:00	5	6059	0.030	5	6059	0.023	5	6059	0.053
21:00 - 22:00	4	6199	0.020	4	6199	0.032	4	6199	0.052
22:00 - 23:00	2	5727	0.009	2	5727	0.026	2	5727	0.035
23:00 - 24:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
Total Rates:			1.431			1.444			2.875

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 01 - RETAIL/A - FOOD SUPERSTORE
MOTOR CYCLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
06:00 - 07:00	2	5727	0.009	2	5727	0.000	2	5727	0.009
07:00 - 08:00	4	6695	0.011	4	6695	0.004	4	6695	0.015
08:00 - 09:00	5	6059	0.033	5	6059	0.010	5	6059	0.043
09:00 - 10:00	5	6059	0.017	5	6059	0.030	5	6059	0.047
10:00 - 11:00	5	6059	0.020	5	6059	0.017	5	6059	0.037
11:00 - 12:00	5	6059	0.017	5	6059	0.026	5	6059	0.043
12:00 - 13:00	5	6059	0.013	5	6059	0.013	5	6059	0.026
13:00 - 14:00	5	6059	0.017	5	6059	0.013	5	6059	0.030
14:00 - 15:00	5	6059	0.023	5	6059	0.017	5	6059	0.040
15:00 - 16:00	5	6059	0.030	5	6059	0.020	5	6059	0.050
16:00 - 17:00	5	6059	0.020	5	6059	0.017	5	6059	0.037
17:00 - 18:00	5	6059	0.020	5	6059	0.023	5	6059	0.043
18:00 - 19:00	5	6059	0.026	5	6059	0.026	5	6059	0.052
19:00 - 20:00	5	6059	0.007	5	6059	0.017	5	6059	0.024
20:00 - 21:00	5	6059	0.000	5	6059	0.010	5	6059	0.010
21:00 - 22:00	4	6199	0.004	4	6199	0.008	4	6199	0.012
22:00 - 23:00	2	5727	0.000	2	5727	0.009	2	5727	0.009
23:00 - 24:00	1	1600	0.000	1	1600	0.000	1	1600	0.000
Total Rates:			0.267			0.260			0.527

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

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Calculation Reference: AUDIT-148301-230420-0402

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 06 - HOTEL, FOOD & DRINK
Category : K - CAFE
TOTAL VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	WS	WEST SUSSEX	1 days
04	EAST ANGLIA		
	NF	NORFOLK	1 days
05	EAST MIDLANDS		
	LN	LINCOLNSHIRE	1 days
08	NORTH WEST		
	GM	GREATER MANCHESTER	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 82 to 200 (units: sqm)
Range Selected by User: 82 to 210 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/15 to 20/09/22

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Tuesday	3 days
Wednesday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	4 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Town Centre	3
Neighbourhood Centre (PPS6 Local Centre)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Built-Up Zone	3
High Street	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	4 days - Selected
Servicing vehicles Excluded	X days - Selected

Secondary Filtering selection:

Use Class:

E(b)	4 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:

All Surveys Included

Population within 1 mile:

15,001 to 20,000	1 days
20,001 to 25,000	2 days
25,001 to 50,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

50,001 to 75,000	1 days
125,001 to 250,000	2 days
500,001 or More	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	2 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	4 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1	GM-06-K-01 DEANSGATE MANCHESTER	CAFÉ		GREATER MANCHESTER
	Town Centre Built-Up Zone Total Gross floor area:		200 sqm	
	Survey date: TUESDAY		*19/04/22*	*Survey Type: MANUAL*
2	LN-06-K-01 RED LION SQUARE STAMFORD	CAFÉ & TEA ROOM		LINCOLNSHIRE
	Town Centre Built-Up Zone Total Gross floor area:		190 sqm	
	Survey date: TUESDAY		*12/10/21*	*Survey Type: MANUAL*
3	NF-06-K-01 SAINT GILES STREET NORWICH	CAFÉ		NORFOLK
	Town Centre Built-Up Zone Total Gross floor area:		82 sqm	
	Survey date: TUESDAY		*20/09/22*	*Survey Type: MANUAL*
4	WS-06-K-01 GORING ROAD WORTHING GORING-BY-SEA	CAFÉ		WEST SUSSEX
	Neighbourhood Centre (PPS6 Local Centre) High Street Total Gross floor area:		87 sqm	
	Survey date: WEDNESDAY		*11/05/22*	*Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 06 - HOTEL, FOOD & DRINK/K - CAFE
TOTAL VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00									
08:00 - 09:00	4	140	0.716	4	140	0.000	4	140	0.716
09:00 - 10:00	4	140	2.683	4	140	1.252	4	140	3.935
10:00 - 11:00	4	140	3.220	4	140	3.041	4	140	6.261
11:00 - 12:00	4	140	2.504	4	140	2.504	4	140	5.008
12:00 - 13:00	4	140	3.041	4	140	2.683	4	140	5.724
13:00 - 14:00	4	140	2.683	4	140	2.504	4	140	5.187
14:00 - 15:00	4	140	1.252	4	140	1.431	4	140	2.683
15:00 - 16:00	4	140	1.073	4	140	2.326	4	140	3.399
16:00 - 17:00	3	159	0.419	3	159	0.839	3	159	1.258
17:00 - 18:00	1	200	0.000	1	200	0.500	1	200	0.500
18:00 - 19:00									
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			17.591			17.080			34.671

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

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Parameter summary

Trip rate parameter range selected:	82 - 200 (units: sqm)
Survey date date range:	01/01/15 - 20/09/22
Number of weekdays (Monday-Friday):	4
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 06 - HOTEL, FOOD & DRINK/K - CAFE
TAXIS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00									
08:00 - 09:00	4	140	0.000	4	140	0.000	4	140	0.000
09:00 - 10:00	4	140	0.000	4	140	0.000	4	140	0.000
10:00 - 11:00	4	140	0.179	4	140	0.179	4	140	0.358
11:00 - 12:00	4	140	0.179	4	140	0.179	4	140	0.358
12:00 - 13:00	4	140	0.000	4	140	0.000	4	140	0.000
13:00 - 14:00	4	140	0.179	4	140	0.179	4	140	0.358
14:00 - 15:00	4	140	0.179	4	140	0.179	4	140	0.358
15:00 - 16:00	4	140	0.000	4	140	0.000	4	140	0.000
16:00 - 17:00	3	159	0.000	3	159	0.000	3	159	0.000
17:00 - 18:00	1	200	0.000	1	200	0.000	1	200	0.000
18:00 - 19:00									
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.716			0.716			1.432

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 06 - HOTEL, FOOD & DRINK/K - CAFE
CYCLISTS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00									
08:00 - 09:00	4	140	0.179	4	140	0.000	4	140	0.179
09:00 - 10:00	4	140	0.358	4	140	0.179	4	140	0.537
10:00 - 11:00	4	140	0.000	4	140	0.179	4	140	0.179
11:00 - 12:00	4	140	0.000	4	140	0.179	4	140	0.179
12:00 - 13:00	4	140	0.537	4	140	0.179	4	140	0.716
13:00 - 14:00	4	140	0.000	4	140	0.358	4	140	0.358
14:00 - 15:00	4	140	0.000	4	140	0.000	4	140	0.000
15:00 - 16:00	4	140	0.000	4	140	0.000	4	140	0.000
16:00 - 17:00	3	159	0.000	3	159	0.000	3	159	0.000
17:00 - 18:00	1	200	0.000	1	200	0.000	1	200	0.000
18:00 - 19:00									
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.074			1.074			2.148

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

TRIP RATE for Land Use 06 - HOTEL, FOOD & DRINK/K - CAFE
CARS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00									
08:00 - 09:00	4	140	0.716	4	140	0.000	4	140	0.716
09:00 - 10:00	4	140	2.326	4	140	1.073	4	140	3.399
10:00 - 11:00	4	140	3.041	4	140	2.683	4	140	5.724
11:00 - 12:00	4	140	2.326	4	140	2.326	4	140	4.652
12:00 - 13:00	4	140	3.041	4	140	2.683	4	140	5.724
13:00 - 14:00	4	140	2.504	4	140	2.326	4	140	4.830
14:00 - 15:00	4	140	1.073	4	140	1.252	4	140	2.325
15:00 - 16:00	4	140	1.073	4	140	2.326	4	140	3.399
16:00 - 17:00	3	159	0.419	3	159	0.839	3	159	1.258
17:00 - 18:00	1	200	0.000	1	200	0.500	1	200	0.500
18:00 - 19:00									
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			16.519			16.008			32.527

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

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TRIP RATE for Land Use 06 - HOTEL, FOOD & DRINK/K - CAFE
LGVS
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00									
08:00 - 09:00	4	140	0.000	4	140	0.000	4	140	0.000
09:00 - 10:00	4	140	0.358	4	140	0.179	4	140	0.537
10:00 - 11:00	4	140	0.000	4	140	0.179	4	140	0.179
11:00 - 12:00	4	140	0.000	4	140	0.000	4	140	0.000
12:00 - 13:00	4	140	0.000	4	140	0.000	4	140	0.000
13:00 - 14:00	4	140	0.000	4	140	0.000	4	140	0.000
14:00 - 15:00	4	140	0.000	4	140	0.000	4	140	0.000
15:00 - 16:00	4	140	0.000	4	140	0.000	4	140	0.000
16:00 - 17:00	3	159	0.000	3	159	0.000	3	159	0.000
17:00 - 18:00	1	200	0.000	1	200	0.000	1	200	0.000
18:00 - 19:00									
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.358			0.358			0.716

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

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TRIP RATE for Land Use 06 - HOTEL, FOOD & DRINK/K - CAFE
Servicing Vehicles
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00									
08:00 - 09:00	4	140	0.000	4	140	0.000	4	140	0.000
09:00 - 10:00	4	140	0.358	4	140	0.179	4	140	0.537
10:00 - 11:00	4	140	0.000	4	140	0.179	4	140	0.179
11:00 - 12:00	4	140	0.000	4	140	0.000	4	140	0.000
12:00 - 13:00	4	140	0.179	4	140	0.179	4	140	0.358
13:00 - 14:00	4	140	0.000	4	140	0.000	4	140	0.000
14:00 - 15:00	4	140	0.000	4	140	0.000	4	140	0.000
15:00 - 16:00	4	140	0.000	4	140	0.000	4	140	0.000
16:00 - 17:00	3	159	0.000	3	159	0.000	3	159	0.000
17:00 - 18:00	1	200	0.000	1	200	0.000	1	200	0.000
18:00 - 19:00									
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.537			0.537			1.074

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

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Appendix C – MCC Waste Pro Forma

Appendix E Proforma for Planning Applications

MANCHESTER CITY COUNCIL

Planning Application – Waste Management Strategy

Planning Application Number: TBC
Date Submitted: 22/06/23

Estimated volumes/ m^2 required by the development

Low Rise Domestic

Waste Types	Capacity Required (litres)	Number of bins required per household	Confirm what is to be provided
General refuse	140 / 240	1 x wheeled bin	
Pulpable Recycling	140 / 240	1 x wheeled bin	
Mixed Recycling	140 / 240	1 x wheeled bin	
Garden Waste	140 / 240	1 x wheeled bin	
Food Waste	23	1 x 23 litre caddy	

High Rise Apartment Developments

	Yes/No - how much space has been provided?
$0.43m^2$ has been provided per apartment for the container space. Space to manoeuvre and access containers individually has also been provided so that each container can be accessed and removed for collection individually.	

Commercial Developments

Please state number of bins you propose, showing calculations where appropriate.

General Waste - Refer to document 083371-CUR-XX-XX-T-TP-00001-P04 Pulpable Recycling - Mixed Recycling - Food Waste - Industrial Waste -

Has / will a contract be obtained with a licenced waste carrier?	☒

Mixed Use Developments

Are the stores for residential and commercial separate from each other?	☒

Internal Stores (Residential and Commercial)

Please provide details of internal stores / segregation of waste and recycling.

x

Storage Areas for Waste Containers (Residential and Commercial)

Please provide details of container stores, attaching plans if appropriate.

Residents will store the waste internally before taking it to one of the three proposed waste storage rooms, conveniently located adjacent to the cores. The employees of the commercial units will store waste internally within the retail space. It is envisaged that a private collection company would collect the waste 2 times per week for the student accommodation and commercial use (potential F&B), and 4 times a week for the commercial unit (potential small supermarket uses). The bin stores have been sized to accommodate this frequency of collection.

Ensure all bins in the store are accessible	☒
Ensure recycling facilities are as easy to access as general refuse	☒

Please confirm details of waste store ventilation and hygiene / cleaning proposals

Ventilation -	Consideration has been given to appropriately ventilate the waste storage facilities. Details have been provided in relevant documentation.
Hygiene -	Storage rooms will be constructed in permeable materials. The management company and staff of the commercial units will be responsible of cleaning the facilities.

Please provide details of who will be responsible for placing the bins at the collection point and returning them to the store / property promptly e.g. resident / management company

The management company.

Please ensure that you have attached:

Detailed plans of waste stores	☒
Location plans showing stores	☒
Location plans showing the proposed collection point and the route the collection vehicle will take	☒

Please ensure that you have completed this form in accordance with our GD04 Waste Storage and Collection Guidance for New Developments

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APPENDIX TA9

Upper Brook Street Masterplan Williams / Alliance UBS Limited INTERIM TRAVEL PLAN (PBSA)

Focus Transport Planning

J000370-TP01c
June 2023

Purpose Built Student Accommodation Development of Up to 1,100 Student Bedrooms

Upper Brook Street, Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited)

Interim Travel Plan

Prepared on behalf of:

PROPERTY ALLIANCE GROUP
MODA LIVING
WILLIAMS MOTOR CO (HOLDINGS)

FOCUS TRANSPORT PLANNING

Pentland House,
Village Way
Wilmslow, SK9 2GH
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1.2 General Travel Plan Objectives and Guidelines
1.3 Travel Plan Structure

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APPENDICES

Appendix TP1 Site Masterplan & Relevant PBSA Building Floorplans
Appendix TP2 Schedule of Travel Plan Coordinator Duties
Appendix TP3 Core Principles of Upper Brook Street PBSA Move In / Move Out Strategy
Appendix TP4 Example Travel Plan Questionnaire

1.0 INTRODUCTION

1.1 Overview and Planning Context

1.1.1 This Interim Travel Plan has been prepared by Focus Transport Planning (FTP) on behalf of Property Alliance Group/ Moda Living / Williams Motor Co (Holdings) in support of a planning application for the comprehensive re-development of land at Upper Brook Street, Manchester to deliver a mixed-use scheme comprising Purpose Built Student Accommodation (PBSA), Life Sciences based employment and ancillary retail, commercial & community uses, along with on-site landscaping and public open space. The proposals will bring forward development on a previously developed site which is earmarked for commercial and PBSA uses in the Oxford Road Corridor Strategic Regeneration Framework Document endorsed by MCC in 2019.

1.1.2 The PBSA element of the scheme envisages the delivery of 1,100 student bedspaces provided across a range of accommodation types including studio units and multi-bedroom 'cluster' settings within three main buildings. The buildings would be served by complementary cycle parking provision and include for other on-site facilities such as management suite / reception areas, resident lounges, social / study facilities, laundry facilities, shared kitchens and a gym. The buildings would be surrounded by new integrated high quality public open space and would be supported by enhanced walking & cycling links towards the nearby University of Manchester and Manchester Metropolitan University campuses, which are located within a 500m travel distance from the site (see **Figure TP1** to this report). The scheme is to be promoted as 'car free' development, with no general on-site parking available, other than a limited level of disabled / mobility impaired standard spaces. The building would also include for complementary / ancillary commercial space which is proposed to be used for a food & drink offer and an essentials style convenience store.

1.1.3 This Travel Plan sets out the measures and procedures to be adopted across the PBSA buildings at Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) to support the day-to-day operation of the proposed

development and to encourage & maximise travel to / from the site by alternative travel modes to the private car, thereby building on the core sustainable advantages of the site's location. Indeed, given that the scheme is to be promoted as an effectively 'car free' development, and cognisant of the site's location adjacent to the main University campuses and within easy walking distance of a range of 'everyday' local facilities, core daily demand for travel is expected to be almost exclusively associated with walking, cycling and public transport modes.

1.1.4 The planning application for the wider Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) development is supported by a Transport Assessment report prepared by Focus TP, alongside an additional 'Framework Travel Plan' which focusses on the operation and management of the proposed Life Sciences based employment area. The Transport Assessment report provides an appraisal of the immediate highways and transport implications of the delivery and operation of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme and includes a review of the proposed site access strategy and sustainable site design features. The Transport Assessment document ultimately concludes:

> ***"Overall, based on the above review of issues, it is concluded that the comprehensive regeneration of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site for mixed use PBSA / Life Sciences development would not result in a severe impact on the future operation of the immediate local highway network. The proposals would not result in a significant increase in development flow related traffic on local links, with key immediate junctions and sections of the A34 Upper Brook Street & Kincardine Road corridors capable of accommodating future development traffic volumes without substantive operational concerns. The development scheme would also deliver significant local highway network environmental enhancements and improved pedestrian and cycle accessibility.***
>
> ***The location and design of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) proposals would support the objective of car-free development and deliver the potential for all site users to utilise sustainable transport for a wide range of day-to-day journeys, therefore meeting the core planning sustainability objectives of promoting the use of alternative travel modes to the private car and managing the overall traffic impact associated with new development."***

1.1.5 The National Planning Policy Framework (NPPF) advises that Travel Plans should be submitted in support all major planning applications. The production and implementation of this Travel Plan for the proposed PBSA development therefore reflects core national policy and also reinforces the developer's commitment to maximising accessibility to the site and promoting effective car-free development. This Travel Plan has been targeted primarily at student residents at the PBSA buildings, but will also cover the limited number of staff working at the site and any visitor related travel.

1.1.6 At this planning application stage, it is considered most appropriate to prepare an Interim Travel Plan, which will ultimately be developed into a Full Travel Plan once the PBSA buildings are constructed and ready to be occupied. This Interim document therefore represents a framework for the development, implementation, operation and monitoring of a Travel Plan for the PBSA buildings, to build on the general sustainable principles of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme and to encourage / maximise travel to the site by sustainable travel modes.

1.2 General Travel Plan Objectives and Guidelines

1.2.1 A Travel Plan is a general term for a package of measures and initiatives aimed at encouraging sustainable travel choices. Travel Plans are tailored to the requirements of individual sites and involve the development of a set of mechanisms and targets that together enable organisations to reduce the impact of their travel and transport requirements on the local environment.

1.2.2 Travel Plans can be developed either specifically to address issues associated with individual buildings or sites, or to form part of a wider strategy involving Local Authority initiatives and other surrounding developments. This Travel Plan concentrates on those measures that can be developed specifically to support the proposed new PBSA buildings, and, given the car-free nature of the scheme, aims to ensure that all residents, staff and visitors are fully appraised of the wide range of sustainable travel options available in the vicinity of the site.

1.2.3 Alliance UBS Ltd, as developer of the PBSA buildings, will work with the final operators of the buildings to promote sustainable transport solutions where appropriate and practical under the terms set out in this Interim Travel Plan - with the operation of these initiatives anticipated to be ultimately controlled and enforced via an appropriate planning condition attached to any formal planning consent for the wider Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme.

1.2.4 It is considered that the implementation of a Travel Plan to support the PBSA development could deliver the following benefits:

Student Residents

- Improving accessibility to the development, Manchester City Centre and main University Campuses;
- Money and time savings;
- Improved health, motivation and well-being;
- Lower levels of stress;
- A better quality of life.

Developer

- Support student resident travel needs;
- Fulfil planning targets;
- Enhance company image;
- Reduce the land used for car parking spaces / promotion of the scheme as a 'car free' development;
- Improve site environment & increase opportunities for landscaping and public realm;
- Improve access for residents, staff and deliveries.

Local Community

- Less traffic and congestion;
- Minimising students that bring a car to University, thereby managing the potential for local on-street parking.
- Reduction in local level pollution / CO2 emissions.

- Enhancement of the Kincardine Road corridors and provision of new public realm and addressing existing severance issues by increasing site permeability via high-quality walk / cycle connections.

1.2.5 Travel Plans are secured through a planning and transport policy framework that extends from the national through to local level when dealing with new development proposals. Key Travel Plan policy and guidance relevant to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) is set out in the following paragraphs.

National Guidance

1.2.6 Guidance set out in National Planning Policy Guidance (NPPG), 'Travel Plans, Transport Assessments and Statements', states that a Travel Plan should "identify the specific required outcomes, targets and measures, and set out clear future monitoring and management arrangements all of which should be proportionate". NPPG also notes that "Travel Plans should, where possible, be considered in parallel to development proposals and readily integrated into the design and occupation of the new site rather than retrofitted after occupation". This guidance should be viewed in combination with the core objectives and design principles for new development, as set out in NPPF paragraph 112 which states:

> ***"Applications for development should:***
>
> ***a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;***
>
> ***b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;***
>
> ***c) create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;***
>
> ***d) allow for the efficient delivery of goods, and access by service and emergency vehicles…"***

1.2.7 For best results when preparing Travel Plans, NPPG suggests that the initial focus should be on establishing the 'outcomes' required from a Travel Plan and working from this, to develop a range of measures that can then be identified and agreed as the best way of achieving such objectives at the site. Measures are likely to include both incentives and controls, in order to encourage site users to make changes in their travel behaviour.

1.2.8 This Travel Plan therefore concentrates on those measures that can be developed to support PBSA land use and is designed to meet the core objective of effectively removing the need for general travel to / from the site by the private car and to deliver effective and practical opportunities for travel by more sustainable travel modes.

Local Guidance

1.2.9 Manchester City Council's Core Strategy (adopted July 2012) sets out a number of relevant supporting policy objectives for delivering sustainable development and sets of the hierarchy of transport users that should inform site design and accessibility (Policies T1 & T2). Policy T1 notes that the Council will support development that meets the following objectives:

- Improve choice by developing alternatives to the car.
- Promote regeneration and economic vitality by relieving traffic congestion and improving access to jobs and services, particularly for those most in need and for those without a car.
- Improve access to transport services and facilities in order to enable disabled people and people with mobility impairments to participate fully in public life.
- Improve pedestrian routes and the pedestrian environment.
- Improve and develop further Manchester's cycle network.
- Take account of the needs of road users according to a broad hierarchy consisting of, in order of priority:
  1. pedestrians and disabled people
  2. cyclists, public transport,
  3. commercial access,
  4. general off-peak traffic,

5. general peak time traffic

1.2.10 Policy T2 notes that the Council will actively manage pattens of development to ensure that new development is located close to the City's main economic drivers including the Regional Centre and the Oxford Road Universities. The policy also notes that development should be easily accessible by walking, cycling and public transport, connecting people to jobs, centres, leisure, open space and educational opportunities. Particular priority is identified to providing access to strategic employment sites, including the Oxford Road corridor and University campuses.

1.2.11 Policy T2 also notes that proportionate Traffic Impact Assessments and Travel Plans should be prepared for all major application schemes and any proposals where there are could be access or transport issues.

1.2.12 The need for, and importance of, Travel Planning is also recognised in the MCC's Guide to Development in Manchester Supplementary Planning Document (SPD), which notes:

> ***"A Travel Plan is a package of measures and actions aimed at reducing the need to travel by car by providing alternative choices and encouraging walking, cycling, and public transport use. At the planning stage consideration should be given to the proximity of the development to existing travel facilities and services, site layout, suitable density, cycling, pedestrian facilities and potential for parking restraint."***

1.3 Travel Plan Structure

1.3.1 In order to satisfy the general objectives / benefits identified within key guidance documents, three distinct areas for action have been identified to be pursued within this Travel Plan:

- 'Physical' site measures to be provided on-site;
- Tailored day-to-day 'operational' measures to encourage the take-up of sustainable travel options; and,
- Future management and monitoring of the implementation of Travel Plan initiatives.

1.3.2 In light of the national and local Travel Plan guidance outlined above, it is proposed the PBSA Travel Plan measures will be developed through a pyramid framework of measures and actions. The principles of this Travel Plan 'pyramid' approach are illustrated in **Figure TP2**, reflecting DfT guidance which notes that a Travel Plan should be built 'from the ground up', with each new layer building on the last and set within the context of the outcomes sought.

1.3.3 The remaining sections of this report therefore consider the following matters:

- Review of site location and an audit of site accessibility (Tier 1);
- Description of the proposed development (Tier 2);
- Key Action Framework for the delivery of the Travel Plan;
- Details of Plan Administration (Tier 3);
- Formulating of Travel Plan initiatives to be implemented (Tier 4);
- Monitoring and enforcement measures (Tier 5).

2.0 SITE LOCATION AND AVAILABLE SUSTAINABLE TRANSPORT CONNECTIONS

2.1 Overview

2.1.1 The location of a development site underpins all aspects of accessibility, in particular its relationship with complementary land uses and the range of practical travel mode options available to site users.

2.1.2 This section of the Travel Plan report effectively examines Tier 1 of the Travel Plan Pyramid, 'Site location and proximity to existing facilities and services' and identifies the underlying extent of site accessibility by sustainable modes of transport.

2.2 Location and Existing Site & Highway Conditions

2.2.1 The strategic location of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site is illustrated in **Figure TP1** to this report, with an aerial image of the site and immediate surrounding locality included as **Figure TP3**. These plans identify the location of the site in relation to surrounding University of Manchester & Manchester Metropolitan University campus areas, the local residential area of Brunswick and the distributor road routes of A34 Upper Brook Street & A57(M) Mancunian Way

2.2.2 The wider Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site extends to approximately 2.13(ha) and comprises an irregular shaped area of land, split into two main development parcels historically associated with a larger car dealership business (Williams). At the time of preparation of this Interim Travel Plan the site is currently characterised by car showroom related buildings and large areas of external hardstanding, previously used for the storage and display of vehicles. Vehicle access to this portion of the site is available via a number of kerbed access points from both Inchley Road and Kincardine Road. No direct vehicle access is available from Upper Brook Street or Grosvenor Street.

2.2.3 As noted above, existing primary vehicle access points to the site are via the commercial access points from the adjacent routes of Inchley Road and Kincardine Road. No direct vehicle access to the site is taken from A34 Upper Brook Street. Pedestrian access is available from all site frontage links, via both formal path connections and other informal opportunities.

2.2.4 The study area section of A34 Upper Brook Street in the vicinity of the application site is of multi-lane single carriageway character, with the route acting as one of the key southern distributor roads serving Manchester city centre. The route provides two southbound lanes over the length of the immediate study area and three northbound lanes, except for the section immediately north of the junction with Brunswick Street, which is of a two-lane layout, plus a ghost-island right turn lane serving the local route of Cottenham Street.

2.2.5 Kincardine Road runs broadly parallel to A34 Upper Brook Street and is a local 20 mph single carriageway access road connecting Grosvenor Street to the north and Brunswick Street to the south. The section of route between Brunswick Street and Whitekirk Close to the south east of the study area operates as a one-way northbound link only (with contraflow southbound cycle lane), with the remainder of the route being currently two-way in nature and open to all traffic. Kincardine Road is accessed by a number of side road connections (Arkley Street, Whitekirk Close, Inchley Road & Hanworth Close) which provide local access to the Brunswick residential zone and is characterised by on-street parking bays (combined residents parking / short-stay pay-and-display parking) to the eastern side of the route and private gated access points to parking / servicing areas to the west (associated with commercial buildings fronting Upper Brook Street, including land parcels associated with the application site). Kincardine Road is currently generally lightly trafficked and is noted to be an important local signed ‘quiet street’ cycle route, providing an alternative cycle option to the busy A34 Upper Brook Corridor.

2.2.6 It is proposed that the Kincardine Road corridor will be subject to comprehensive environmental improvements in support of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme, including the conversion of the route to one-way (northbound) control over the length of the

route between Brunswick Stret and Grosvenor Street and the extension and improvement of dedicated cycling facilities, including full length contra-flow cycling opportunities. The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) proposals will also include for the closure of Inchley Road to traffic and the conversion of this corridor to a new public square, including enhanced east-west walk / cycle linkages (see also section 3 to this report).

2.2.7 Some opportunities for local public car parking are available within the vicinity of the site, which might be suitable for occasional Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) development staff & visitor related use in future. The majority of local streets to the Upper Brook Street site are subject to managed parking controls or residents parking zones, however, some limited short-stay on-street pay & display bays are available on Kincardine Road to the south of the site. Large multi-storey Pay & Display parking is available at the following locations within a reasonable walking catchment from the PBSA site (see **Figure TP**4), with over 3,000 spaces available within a 10-minute walk:

- *NCP Circle Square* (1018 spaces, 38 disabled bays) – circa 220m to north of PBSA site boundary.
- *APCOA Aquatics Centre* (380 spaces) – circa 150m from the southern boundary of the proposed PBSA area.
- *Charles Street Multi-Storey* (808 spaces, 4 disabled bays) – circa 500m to north of PBSA site boundary.
- *Booth Street West Multi Storey, University Car Park D* (965 spaces, 17 disabled bays) – circa 800m to the west from the centre of the proposed Life Sciences development area.

2.2.8 All other local streets within the immediate catchment of the site, including the A34 Upper Brook Street & Oxford Road corridors and those streets within the main adjacent University of Manchester & Manchester Metropolitan University campuses, are subject to yellow line parking restrictions, making them effectively unavailable for parking.

2.3 Available Sustainable Transport Connections

2.3.1 The Upper Brook Street site location, on the edge of the city centre and adjacent to both main University campus areas and Oxford Road walking, cycling & public transport corridor, is considered to offer excellent opportunities for new student residential development that would meet the key sustainable development objectives outlined within national planning policy guidance. This guidance identifies the following two primary objectives when considering the location of new development:

- The need to reduce the need to travel, especially by the private car; and,
- The need to promote accessibility to a range of sustainable travel options.

2.3.2 The nature of local sustainable transport connections available within the immediate catchment of the proposed PBSA buildings and a review of general site accessibility are considered in the paragraphs below.

Bus Links

2.3.3 Nearest bus stops to the application site are located to the site's western frontage to A34 Upper Brook Street. These stops are served by the regular frequency number 50 bus route between Media City & East Didsbury, via Salford & Manchester City Centre (St Peters Square). This bus route provides a 12-minute day-time service frequency Mon-Saturday and 15-minute evening frequency. Sunday services provide a 15-minute day-time service and 20-minute evening service.

2.3.4 In addition to this available direct site frontage bus service, a wide range of other bus routes are available within a short walk of the site at stops on both the Oxford Road corridor and A6 London Road corridors. The Oxford Road stops are located circa 450m – 500m to the west of the site, via walking connections using Booth Street East or links through the main University of Manchester campus. Dedicated pedestrian crossing opportunities of A34 Upper Brook Street are available both at the junction with Booth Street East and via a Toucan crossing facility 50m to the south of site frontage.

2.3.5 The Oxford Road corridor operates as a high frequency bus corridor and offers modern high quality passenger infrastructure and is the main bus route into the city centre from South Manchester. Regular services available from Oxford Road stops closest to the Upper Brook Street site are as summarised below, with these routes providing links to a wide range of destinations across south and west Manchester, as well as cross-city connections to Middleton, Blackley and Leigh (see also **Figure TP5** to this report):

- 15: Flixton – Urmston – Stretford – Hulme - Manchester
- 18: MRI – Manchester - Blackley – Middleton - Langley
- 41: Sale – Didsbury – Manchester – Bowker Vale – Higher Blackley - Middleton
- 42: Stockport – Heaton Mersey – Didsbury – Manchester (Piccadilly Gdns)
- 42A: North Reddish – Heaton Chapel – Manchester (Piccadilly Gdns)
- 42B: Woodford – Cheadle Hulme – Cheadle – Manchester (Piccadilly Gdns)
- 43: Manchester Airport – Wythenshawe - Manchester (Piccadilly Gdns)
- 44: Bowdon – Altrincham – Didsbury - Manchester (Piccadilly Gdns)
- 53: Cheetham Hill – Crumpsall – University – Old Trafford - Pendleton
- 111: Chorlton – Moss Side – Fallowfield - Manchester (Piccadilly Gdns)
- 142: East Didsbury – Withington – Moss Side - Manchester (Piccadilly Gdns)
- 143: West Didsbury – Withington – Moss Side - Manchester (Piccadilly Gdns)
- 197: Stockport – Heaton Moor – University - Manchester (Piccadilly Gdns)
- V1: MRI – Manchester – Salford – Tyldsley - Leigh

2.3.6 Further bus connections are available to the east of the site at stops on A6 London Road at Ardwick Green. These stops are located circa 550m from the Upper Brook Street, via walking connections through the adjacent Brunswick residential area (walking route using Haymans Walk / Balsam Close / Wadeson Road / Kale Street) and safe refuge island crossing points of A6 London Road. The stops at Ardwick Green provide passenger shelters, raised bus border kerbs and information boards in both directions, with the southbound stops being served by a short section of bus only lane. Bus routes available from the Ardwick Green stops, provide high frequency connections to Stockport & south west Tameside (Hyde / Denton), viz:

- 192: Hazel Grove – Heavily – Stockport – Levenshulme – Manchester (Piccadilly Gdns)
- 201: Hattersley – Hyde – Denton – Belle Vue - Manchester (Piccadilly Gdns)
- 202: Gee Cross – Hyde – Haughton Green - Manchester (Piccadilly Gdns)
- 203: Stockport – Reddish – Debdale Park – Gorton - Manchester (Piccadilly Gdns)
- 205: Dane Bank – Denton – Debdale Park – Gorton - Manchester (Piccadilly Gdns)

2.3.7 In addition to the above scheduled services, the proposed PBSA element of the Upper Brook Street site is located within circa 650m walk of stops served by the 10-minute day-time frequency Manchester City Centre Free Bus (Line 2). This service calls at stops on Whitworth Street and provides connections to Piccadilly, Northern Quarter, Deansgate & St Peters Square. The Whitworth Street stop is also served by the Line 3 free evening bus service, providing similar frequency connections and additional links to Deansgate-Castlefield.

Rail Links

2.3.8 The proposed PBSA buildings at Upper Brook Street would also be well located to provide opportunities for walking connections to the central Manchester national rail stations of Manchester Piccadilly and Manchester Oxford Road.

2.3.9 Manchester Piccadilly is the main rail hub for Manchester, providing services to a range of destinations including, London, Birmingham, Sheffield, Leeds, Liverpool, Scotland and Wales. The station is located circa 900m walk to the north east of the northern boundary of the application site, with a number of walking routes available. It is considered that the main walking route would involve links via Upper Brook Street – Sackville Street – Granby Row – A6 London Road, which is characterised by good standard footway routes adjacent to key roads and sections of segregated off-road. The crossing of key main road routes is supported by push-button traffic signal-controlled facilities. Alternative walking connections are available through the adjacent Brunswick residential area via Grosvenor Street and footways to the main A6 London Road corridor.

2.3.10 Manchester Oxford Road station is located circa 800m to the north west of the northern boundary to the application site and is served by a range of local commuter services to south Manchester and more strategic links to Liverpool, Leeds, Sheffield, East Anglia, the North West and Scotland. The main walking route from the site to the station would be via Grosvenor Street, connecting to the walking routes along Oxford Road. These walking routes are of good quality, with push-button traffic signal-controlled crossing points available to allow safe and controlled crossing of A34 Upper Brook Street and Oxford Road.

Greater Manchester Accessibility Level (GMAL) Rating

2.3.11 The Upper Brook Street Masterplan site's excellent potential for connectivity by public transport is reflected by its Greater Manchester Accessibility Level (GMAL) rating of 8 (see **Figure TP6** to this report), placing it in the top accessibility category across the Greater Manchester region. This GMAL score highlights the highly accessible nature of the site location and the opportunities that exist to support practical car-free living and working.

Walking & Cycling

2.3.12 In addition to the above identified local public transport connections, the location of the Upper Brook Street site also provides the potential for easy access to a wide range of local shops, services and educational areas by foot or cycle. It must also be recognised that the wider Upper Brook Street Masterplan will also deliver a small range of ancillary facilities available for use by staff based at the Life Sciences buildings, with future uses anticipated to include an 'essentials' convenience store, coffee-shop / food-outlets and medical facility or pharmacy.

2.3.13 National planning guidance notes that walking is the most important mode of travel at the local scale, offering the greatest potential to replace short distance car trips of under 2km. Guidance produced by CIHT also notes that 800m represents an 'acceptable' walking distance to community facilities and shops, with 1.2km representing a 'preferred maximum'. 2km has been identified as a suitable walk distance for regular commuting trips and journeys to / from educational facilities.

2.3.14 **Figure TP7** to this report illustrates the extent of such suitable walking catchments from the site and demonstrates that 1.2km & 2km walking catchments would effectively include the full University of Manchester & Manchester Metropolitan University teaching campuses, key rail stations, the shops and services along the Oxford Road & Whitworth Street corridors and parts of Manchester city centre. As noted above, key local routes to the application site (Upper Brook Street, Oxford Road, Sackville Street and Grosvenor Street) all provide a good baseline standard of pedestrian infrastructure, being characterised by wide footways of at least 2.0m and traffic-signal 'pedestrian push-button' controlled interchanges at local main junctions. Furthermore, as noted, the Kincardine Road corridor is to be improved to deliver an active travel orientated enhanced corridor as part of the wider Upper Brook Street proposals, along with additional walk / cycle east-west links between the University of Manchester and the Brunswick residential area, delivered by excellent permeability through the Upper Brook Street regeneration scheme.

2.3.15 National Planning Guidance also notes that cycling has the potential to substitute for short car trips – particularly those journeys of less than 5km or which could form part of a longer journey by public transport. The location of the application site allows for practical cycling access to a range of local areas including all of Manchester city centre, as well as Old Trafford, Chorlton, Fallowfield, Levenshulme, Gorton, and northern suburbs such as Cheetham Hill (**Figure TP8**).

2.3.16 A plan of available local cycle infrastructure to the application site (as identified by TfGM) is illustrated in **Figure TP9**. This demonstrates that the Kincardine Road corridor is already recognised as an important local 'quiet street' cycling corridor, linking the Plymouth Grove residential areas, with the Sackville Street corridor and Manchester city centre to the north. Furthermore, the site is located close to the primary Oxford Road 'beeline' cycling corridor, which provides high quality segregated cycle infrastructure for journeys to / from Manchester city centre, the main University of Manchester & Manchester Metropolitan University campuses, along with the core student areas of Rusholme, Fallowfield, Didsbury & South Manchester. It is anticipated that the delivery of the Upper Brook Street re-development scheme will allow for further enhancement of Kincardine Road as a key cycling corridor, thereby improving wider cycle connectivity.

Summary

2.3.17 Overall, it is concluded that the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site represents an appropriate location for new student residential development, being located within easy walking distance of a range of 'everyday' local facilities such as both University campuses, shopping and leisure opportunities. The site is also located within a short walk of excellent high frequency public transport connections to and from the city centre and other University buildings, with access to these destinations also supported by practical cycle connections. Such locational characteristics should allow for the effective promotion of practical car-free student living at the site and provide a range of realistic alternative options to the car for all regular student resident journeys.

3.0 DESCRIPTION OF DEVELOPMENT

3.1 Introduction

3.1.1 This section of the Interim Travel Plan report has been prepared in line with Tier 2 of the Travel Plan Pyramid 'Sustainable site design – parking restraint, suitable density and amenity' and sets out those key site elements that will be delivered as part of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) proposals to help promote sustainable travel.

3.2 Development Proposals

3.2.1 The wider Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme site envisages the comprehensive re-development of the existing former car sales sites to deliver PBSA accommodation for 1,100 students, circa 46,643sqm Life Science based employment development space and ancillary retail and commercial facilities, set within high quality new public realm. A copy of a plan illustrating the principles of the wider Upper Brook Street Masterplan, also incorporating proposed additional Student and Life Sciences proposals to the south (to be delivered by others), is included as **Appendix TP1** to this report.

3.2.2 The PBSA element of the masterplan is proposed to be delivered over 3 main buildings (see **Appendix TP1**). These buildings will accommodate a combined student population of 1,100 students across a range of residential settings, as summarised below.

- *Building A1:* Gnd + 41 storey tower (inc roof parapet) accommodating 649 student residents
  306 * standard studio apartments;
  25 * accessible studio apartments;
  45 * large studio apartments
  9 * duplex studio apartments
  40 * 3-bedroom cluster apartment units
  36 * 4-bedroom cluster apartment units

- *Building A2:* Gnd + 14 floor building accommodating 231 student residents
  101 * standard studio apartments
  26 * 5-bedroom cluster apartment unit

- *Building A3:* Gnd + 12 floor building accommodating 220 student residents
  10 *6-bed cluster apartment units
  20 *8-bed cluster apartment units

3.2.3 The design of the buildings includes for a range of on-site facilities including the following:

- Reception areas / management suite;
- Parcel Room and Post Area;
- Amenity zones;
- Gym / workout zone;
- Laundry facilities;
- Residents lounge;
- Study / Meeting Rooms;
- Secure cycle storage areas
- Staff rooms and staff changing / showering areas.

3.2.4 Copies of relevant basement / ground floor & first floor plans illustrating the layout and location of these proposed facilities are included in **Appendix TP1** for reference.

3.2.5 In addition to these student resident specific facilities, the PBSA buildings will also include for additional lettable ground floor commercial space. It is anticipated that this space will be utilised for a local convenience store (385 sqm) and a 121sqm food / drink establishment (café / bar). These ground floor uses will provide an active frontage to the buildings and also complement the core PBSA facilities and reduce the need for student residents to travel off-site for everyday journeys.

3.3 Pedestrian & Cycle Access

3.3.1 The PBSA element to the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme has been designed to allow for good site accessibility to / from surrounding routes, with buildings providing active frontage access to both Upper Brook Street and Kincardine Road. The scheme also includes for new public realm running through the site, which alongside the closure of

Inchley Road to deliver a new public square, will ensure good site permeability and enhance east – west pedestrian and cycle movements through the site, helping to link the Brunswick residential area to the Oxford Road corridor and University zones.

3.3.2 Cycle access to the site would be supported via the provision of secure cycle stores within the PBSA buildings, as well as additional short stay visitor cycle parking to the building frontages, close to the main building pedestrian access points. It is proposed that secure parking for 275 cycles is delivered across the site, as set out below, this represents a cycle parking supply of 1 secure cycle spaces per 4 student bedrooms.

- Building A1 & A2 Basement cycle store: 220 cycles
- Building A3 Ground Floor cycle store: 55 cycles

3.3.3 It is considered that such a level of parking provision is appropriate to support PBSA development at Upper Brook Street, given the close proximity of the site to the core University of Manchester and Manchester Metropolitan University campus zones (within 500m of the site), with such journeys being typically related to pedestrian trips.

3.4 Highway Network Improvements & Parking / Servicing

3.4.1 The wider Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme is to be supported by a range of local highway network improvements including:

- Closure of Inchley Road to vehicle access and conversion to new public square, including full walk / cycle permeability.
- Conversion of full length of Kincardine Road to one-way operation and associated environmental improvements to encourage walk / cycle use of this route - including increased width footways, segregated contra-flow cycleway and traffic calming / speed table features.

- Improvement of Upper Brook Street / Booth Street East to provide new right turn lane for Upper Brook Street (N) to Booth Street East traffic movements and new high standard walk / cycle crossing facility to Upper Brook Street (S) at this junction.
- Connecting walking / cycle links to Grosvenor Street via Kincardine Road.

3.4.2 Ultimately the PBSA buildings are to be promoted as being effectively 'car free' development, with no direct general parking to be provided to support the site. New parking is to be limited to 9 new disabled standard bay parking spaces to be provided to Kincardine Road close to the PBSA buildings. These spaces have been located to deliver good disabled person accessibility to the PBSA buildings (with 5 spaces located within 50m walk of the main PBSA building entry points) and are over-sized when compared to normal parking bays, in order to assist safe driver / passenger entry / exit of vehicles.

3.4.3 The access strategy for the PBSA buildings will be delivered to comply with the Manchester City Council Local Plan Policies, the current Building Regulations and BS 8300 – Access for Disabled People. All buildings would be served by level or ramped suitable ramped access to ground floor foyer / lobby zones. Lift access will be available to all floors, with level access to the lift cores within the buildings.

3.4.4 Vehicle servicing of the PBSA buildings (deliveries, refuse collection and pick-up / drop-off movements) will be accommodated by two new dedicated service lay-bys to be provided on Kincardine Road, viz:

- *Front of buildings A1 / A2*: 22.5m * 3m loading bay;
- *Front of building A3*: 25m * 3.5m loading bay.

3.4.5 These servicing bays will be capable of accommodating a range of delivery vehicles including pantechnicon, rigid HGV, large refuse collection vehicle and vans. The sizing of these bays also directly responds to predicted levels of servicing & pick up / drop-off demand and allows for a number of car or van-based smaller service vehicles to be accommodated in each service bay at any one time.

4.0 IMPLEMENTATION OF THE TRAVEL PLAN – KEY ACTION FRAMEWORK

4.1 It is envisaged that the development of the Interim Travel Plan into a full Travel Plan and its subsequent implementation prior to first occupation of the buildings, will ultimately be delivered over a number of key stages. These stages are considered in the remaining sections of this document and cover the identification of base travel trends to the site (from the analysis of questionnaire data to be collected following first occupation of the proposed development), the implementation of Travel Plan measures / initiatives, and the monitoring of the effects of the Plan.

4.2 The identified key stages for the development of the Travel Plan are as follows:

A. Plan Administration through the selection and appointment of the Travel Plan Co-ordinator – i.e. Tier 3 of the Travel Plan Pyramid 'Implementation & development of the Travel Plan'.

B. Formulation and agreement of the final Travel Plan measures and targets to produce a Full Travel Plan – i.e. Tier 4 of the Travel Plan Pyramid 'Services and facilities'.

C. Preliminary assessment of travel behaviour of student residents & staff (to be undertaken within 3 months of initial occupation of the buildings) and monitoring of the effectiveness of the final Travel Plan, including revision, where appropriate, on a regular basis – i.e. Tier 5 of the Travel Plan Pyramid 'Marketing & promotion, awareness raising, monitoring and review'.

4.3 **Figure TP10** to this report identifies the key intermediate stages of this implementation programme.

4.4 Detailed commitments necessary to promote the successful delivery of the Travel Plan are identified and highlighted via **bold & underlined** text through the remainder of this document.

5.0 PLAN ADMINISTRATION

5.1 Introduction

5.1.1 The management and development of the Travel Plan process will be achieved through **the identification of a suitable person to undertake the PBSA Travel Plan Co-ordinator (TPC) role**. General experience in the operation of Travel Plans suggests that in order to ensure successful implementation and allocation of resources, the role of TPC should be adopted by a suitable senior member of staff of the building operator organisations. In the case of the Upper Brook Street PBSA development, it is proposed that either the PBSA site manager or individual building managers will take on the position of site TPC.

5.1.2 The TPC role will act as the focus for the development of Travel Plan measures and the day-to-day operation of the Plan. Upon launch of the Travel Plan, the TPC will act as the main contact for all Travel Plan issues and will be responsible for implementing Plan measures, involving new student residents & staff, maintaining a database of key contacts, monitoring the effects of implementation and acting on the results of the Plan review process. The range of duties and responsibilities for the TPC is set out in the sections below.

5.2 Duties and Responsibilities of the Travel Plan Co-ordinator

5.2.1 The TPC will act as the main liaison between student residents, staff and the MCC Travel Plan officer with respect to Travel Plan matters. The TPC will also act as the first point of contact for student residents and staff in all matters regarding travel and the management of physical travel facilities within the PBSA site boundary, including cycle parking and PBSA servicing traffic utilising the loading bays to the Kincardine Road site frontage.

5.2.2 The key roles and responsibilities of the TPC for the PBSA buildings site will be as follows:

- Managing the development and implementation of the Travel Plan.

- Liaising with student residents and staff regarding all on site travel issues.

- Drafting 'welcome pack' information and ensuring that all plans and contact details within this pack are contemporary.

- Co-ordinating the necessary travel survey exercises, including the initial Travel Plan questionnaire to be completed by student residents and staff within 3 months of first occupation of the development.

- Liaising with local public transport operators and the MCC Travel Plan Co-ordinator to ensure that up-to-date public transport / general sustainable travel information is freely available at the site.

- Monitoring the operation of the Travel Plan and undertaking a regular review of progress for submission to the MCC Travel Plan Co-ordinator.

5.2.3 **The TPC will be able to delegate some duties to other suitable nominated staff, as required, but will retain overall responsibility for all matters relating to the operation of the Travel Plan**. A schedule of TPC duties is provided in **Appendix TP2** to this framework. This schedule effectively represents an 'Action Plan' for the development, implementation and on-going operation of the Travel Plan.

5.3 **Key Travel Plan Administration Tasks**

5.3.1 As part of the on-going operation of the Travel Plan, the following key administrative tasks will need to be undertaken by the TPC:

- Informing the MCC Travel Plan officer of the contact details of the TPC at the inception of the Plan and updating this information should the TPC role be transferred to an alternative staff member within the lifetime of the Plan;

- Developing a 'key contacts' file of appropriate personnel at other organisations such as the Local Planning / Highway Authority, public transport operators, etc.

- Organising the update travel surveys on an annual basis for the first 5 years of travel plan operation.

- Making new student residents and employees aware of the existence of the Travel Plan at start of academic year / signing of tenancy agreements or as part of employee induction procedures.

- Maintaining a Travel Plan noticeboard or information screens at communal resident and staff areas to include up-to-date travel information, timetables, maps and details of travel initiatives such as Bike Week, Walk to Work Week, etc.

- Management of student drop-off and collection procedures at academic year start and end and liaison with other site-based businesses and the local community in order to minimise disruption.

- Investigating the potential for liaison with TPC's for the University of Manchester, Manchester Metropolitan University, and at other nearby student accommodation / residential development sites. The 'pooling' of ideas and initiatives should help ensure that the Travel Plan has maximum influence.

6.0 FORMULATION & IMPLEMENTATION OF THE FINAL TRAVEL PLAN

6.1 Introduction

6.1.1 The aim of Tiers 4 & 5 of the Travel Plan Pyramid is to set out the measures and initiatives to be implemented at a new development site in order to encourage maximum use of sustainable travel options for regular 'everyday' journeys. The following section of this document outlines those Travel Plan measures to be promoted and implemented at the PBSA buildings.

6.1.2 As noted in section 1 to this report, the Travel Plan is proposed to be delivered as part of a three-stage process:

- 'Physical' site works which will be provided at the proposed development site.
- Tailored 'operational' measures which will be introduced to improve site accessibility and encourage sustainable travel patterns.
- Monitoring of the implementation and success of Travel Plan initiatives.

6.2 'Physical' Travel Plan Measures

6.2.1 The PBSA development at Upper Brook Street will be delivered to include a number of key 'physical' transport measures. These measures relate to general transport facilities provided across the site to encourage sustainable travel movements and will include:

- **Provision of long-stay covered cycle parking for 275 cycles** within secure cycle stores across the three buildings (A1 & A2 building 220 spaces and A3 building 55 spaces, plus additional short stay cycle parking for visitors (minimum of 10 spaces) close to each main building access point. The provision of high-quality cycle infrastructure will reinforce the sustainable and accessible nature of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site and is compatible with the good cycle parking

availability at local educational facilities including the University of Manchester and Manchester Metropolitan University.

- **Promotion of the scheme as an essentially 'car free' development**. This strategy reflects the sites highly accessible location and will be supported by student resident tenancy agreements that discourage residents from operating a car when living at the site.

- **Provision of Travel Plan Noticeboards / Timetable Carousels / Information Screens** at foyers / communal areas within each PBSA building. Copies of public transport timetables, maps and cycle maps will be obtained from TfGM for inclusion on the noticeboards and available for general distribution. It is also anticipated that automatically updated key travel information could be incorporated into information screens across the site or on any intranet system.

- **Provision of suitable changing and storage facilities** to support staff and student resident use of walking and cycling modes.

- **Provision of new public realm and walking / cycling routes and associated directional signage** throughout the site and appropriate walking links to the wider higher network.

6.2.2 In addition to the above dedicated site operator delivered infrastructure it is also anticipated that the site developer will liaise with TfGM and the operators of the Beryl Bike hire scheme, to encourage the installation of a GM Bike Hire hub within the PBSA site, to allow easy cycle access for those residents and staff that may only need occasional cycle access and do not want to keep a bike on site permanently.

6.3 'Operational' Travel Plan Measures

6.3.1 In addition to the basic physical transport facilities described above, the management of student resident and staff travel through day-to-day travel initiatives will also help meet Travel Plan objectives. The package of operational

Travel Plan measures to be implemented by the site operator and managed by the site TPC to support the PBSA development will include:

Provision of Information

6.3.2 **Provision and distribution of a Welcome Pack to all residents at the Upper Brook Street PBSA buildings.** The pack should contain a summary of travel information and associated measures / incentives to assist residents in making informed decisions regarding their travel habits. Potential content should include:

- Details of check in / check out procedures (for student accommodation) and how to book time slots;
- A map identifying the location of the proposal site in the context of:
    - Local University of Manchester and Manchester Metropolitan University campuses;
    - The city centre and key local foodstore options;
    - Local bus stops / rail stations and suggested walking routes to access these facilities;
    - Location of key medical services (hospitals, health centres, dentists, pharmacies);
    - Key crossing points on the local highway network;
    - Local Enterprise Car Club parking spaces;
    - Cycle routes and location of cycle hire points.
- Details of web-links to key public transport information and examples of relevant student discount tickets / travelcards.
- Local taxi private hire phone numbers and procedures for arranging taxi pick-up / drop-off.
- Information on securing access to cycle parking areas and tips on cycle security.
- Details of how to register for the Enterprise Car Club scheme.

6.3.3 This welcome pack will be supplied to residents at the start of the academic year, with key information included in initial e-mail correspondence following the signing of tenancy agreements, so that student residents are already familiar with the range of travel options available to / from the site.

6.3.4 **Provision of relevant information on the immediate local area to the site, such as directions to key buildings on the University Campuses, city centre destinations, bus stops, train stations, local foodstores, banks etc.** on the Travel Plan Noticeboards.

6.3.5 **Liaison with MCC and local public transport operators to ensure up-to-date public transport information is available for display** as part of on-site Travel Plan Noticeboards / Carousels / Information Screens which will be available in communal areas.

Encouraging Walking and Cycling

6.3.6 **Promotion of suitable sustainable travel campaigns to encourage the use of walking and cycling**, via the promotion of literature and events. Example information includes bike week (https://www.cyclinguk.org/bikeweek), bikeright! initiatives (www.bikeright.co.uk/sponsors/manchester-city-council) and 'walk in to work out' active travel / fitness campaigns. A schedule of events to be pursued at the proposed development site will be defined in liaison with the MCC Travel Plan Co-ordinator as part of the delivery of the Action Plan.

6.3.7 **Provision of a puncture repair facility, track pump and basic repair tools within each of the secure cycle parking areas.** The TPC should ensure that this facility is appropriately stocked and available for use at all times.

6.3.8 **Organisation of a Bicycle User Group (BUG) across the PBSA buildings to enable cyclists to discuss issues and identify areas for enhancement of facilities on site.** The BUG will also enable student residents to share cycling tips including safe cycling routes. The TPC should also investigate opportunities for amalgamating the site BUG with any similar group at the local Universities / other student accommodation sites, which may have been developed as part of their own sustainable transport commitments (e.g. the University of Manchester UMBUG group, which has over 1200 members (http://umbug.manchester.ac.uk/).

6.3.9 **Investigate options for partnerships with local cycle repair / sales shop -** potentially via an organised voucher / discount scheme.

6.3.10 **Investigate and offer a recognised 'cycle to work' loan scheme for all employees based at the PBSA buildings that wish to purchase a new bicycle or cycle related safety equipment.**

Encouraging Public Transport Use

6.3.11 **Provision & display of Local Public Transport route maps or suitable web-links** (Manchester North & South Bus Maps / Manchester City Centre Bus Map / Metrolink System Map / Manchester City Centre Free Bus Map / North West Rail System Map), as produced by TfGM at the time of site occupation.

6.3.12 **Promotion of information relating to the relevant travel websites for access to online / real-time public transport information** such as (http://www.TfGM.com, including its online journey planner https://my.tfgm.com/#/planner/), National Rail website for on-line rail journey planner (http://www.nationalrail.co.uk) and live train departure board information for Manchester Piccadilly (https://ojp.nationalrail.co.uk/service/ldbboard/dep/MAN) & Oxford Road (https://ojp.nationalrail.co.uk/service/ldbboard/dep/MCO) stations should be made available on the Travel Plan or information screens.

6.3.13 **Promotion of student public transport ticketing options** such as the GM 'Get Me There' card or Stagecoach 'UniRider' season tickets to encourage long-term commitments to discounted public transport use.

6.3.14 Liaison with TfGM and public transport operators to ensure that all bus / train service information available on site remains valid and to bring to public transport operators' attention any issues that might be limiting the potential for student residents to access these services.

Group Taxi Bookings

6.3.15 **Encouragement of student participation in a taxi-share scheme**, to promote safety amongst users travelling within the city in the evening. To assist with the promotion of this scheme, the TPC should consider arranging a social event to assist residents in getting to know others who would be interested in such a scheme. It is envisaged that the taxi-share scheme would reduce the cost of an evening out in the city and reduce the potential for unsafe journeys on foot at night for lone and vulnerable users. The TPC could also assist this scheme through the negotiation of group discounts with local taxi firms.

Enterprise Car Club

6.3.16 The TPC will promote the benefits of the car club membership to those student residents who may need to utilise a car for occasional journeys when a public transport or active travel modes are not practical. The Enterprise Car Club allows for members to hire a car for short periods with collection from formalised pick-up / drop-off locations around the city. There are a number of car club locations within easy walk of the Upper Brook Street site, and it is anticipated that ultimately two new car club bays could be implemented on Kincardine Road in support of the wider Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme.

Other Travel Plan Initiatives

6.3.17 **Development of affiliations with other student accommodation and University Travel Plans.** Affiliations could involve the pooling of information and initiatives to maximise the influence of the Travel Plan.

6.3.18 **Student Arrival & Departure Plan** - the TPC will be responsible for the management and delivery of the start of academic year / end of academic year student move in / move out arrangements across the site PBSA buildings. Due to the large number of student residents based at the site, student move-in / move-out arrangements will need to be organised through a strictly enforced booking

system, with access to designated drop-off / pick-up areas restricted to authorised / booked vehicles and surrounding local no-wating controls enforced via PBSA staff patrols.

6.3.19 The key principles of the anticipated move in / move out booking procedures and supporting on-site management arrangements are set out in **Appendix TP3** to this report. Final detailed arrangements will be developed closer to the date of first occupation, but would need to be discussed and agreed with MCC highways at least three months prior to date of implementation, to allow for the organisation of any necessary traffic regulation orders and to agree suitable management arrangements / staffing requirements. Additional staffing will be employed on move in / move out dates to ensure strict adherence to the proposed management measures and to minimise the potential for any local congestion / disruption to local residents or businesses.

6.3.20 The PBSA building manager will implement a delivery management strategy for dealing with resident parcel deliveries and food orders (e.g. deliveroo). Such measures will support on-site building design features to support efficient delivery practice, including central post-rooms and concierge areas.

6.4 Plan Implementation

6.4.1 Alliance UBS Limited and the subsequent PBSA building operators will be required to support the Travel Plan process and agree a final package of site management measures with MCC suitable to allow the discharge of any related 'pre-occupation' planning conditions.

6.4.2 **The PBSA operator will ensure that suitable funding is available to support all Travel Plan initiatives throughout the lifetime of the development. An annual budget allocation will be made available to manage the Travel Plan, with the site TPC responsible for expenditure and budget control. This budget will be utilised for promoting, encouraging and providing incentives for increasing sustainable travel.** The funds could also be used to cover typical Travel Plan

administration tasks such as the design and production of publicity material, the production of site-specific travel information, etc.

6.4.3 Monitoring of the use of the Travel Plan operational budget will be carried out by the TPC, with details of annual spending on travel initiatives and current budget position recorded within the annual Travel Plan Progress Report to be provided to the MCC Travel Plan Co-ordinator (see section 7.3 to this report).

7.0 MONITORING PROGRESS

7.1 Introduction

7.1.1 In order to gain an understanding of the influence of the Travel Plan and to measure progress in encouraging sustainable travel patterns, monitoring of student resident and staff travel trends at the PBSA buildings will be undertaken at regular intervals. Information on travel mode choice and attitudes as to the effectiveness of travel initiatives will be regularly surveyed by the site TPC as part of a monitoring package.

7.1.2 Update surveys will be carried out by the TPC at set intervals following formal Travel Plan implementation, with results being submitted to the MCC Travel Plan Co-ordinator within two months of survey completion, as part of a Travel Plan Progress Report (see Section 7.3 to this report).

7.1.3 It is proposed that the first Travel Survey exercise is undertaken within 3 months of first occupation of the PBSA buildings by student residents, and will include resident and staff travel questionnaires and a facilities audit. Further travel surveys will be undertaken annually over the first five years of Travel Plan operation.

7.1.4 The following key parameters for site operation should be considered for inclusion within the scheduled package of monitoring tasks:

- Changes in recorded student resident / employee travel mode split (using an agreed survey questionnaire similar to the template Travel Questionnaire provided in **Appendix TP4**);
- Review of take up and condition of cycle parking facilities on site.

7.1.5 **A suitable survey budget will be set aside to fund the monitoring surveys over the initial five-year period of Plan operation.** This budget will cover the costs of core tasks / initiatives such as, copying and analysis of questionnaires and the production of a simple Travel Plan Progress Report.

7.2 Travel Plan Targets

7.2.1 As the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site is not occupied at present, it is not possible to collect baseline travel data regarding travel trends, and accordingly it is difficult to set targets at this Interim Travel Plan stage – albeit in practice, as noted above, the nature of the PBSA proposals, the car-free principles of the scheme and the close proximity of the site to key student destinations, means that future car based travel to / from the development is likely to be extremely low.

7.2.2 Nevertheless, it will be necessary to undertake a full survey of travel behaviour within the first year of occupation, from which an established baseline position can be identified. Theis initial survey will be undertaken within 3 months of first occupation of the Upper Brook Street PBSA buildings.

7.2.3 The travel survey could be undertaken via email or paper survey with a specified collection point for completed surveys on site. Targeted follow-up interviews could be undertaken by room / apartment, if necessitated by a low response rate.

7.2.4 On completion of the first survey questionnaire exercise, the TPC will report the findings to the Travel Plan Officer at MCC in order to agree Travel Plan targets going forward.

7.3 Review Procedure

7.3.1 Review of the operation of the Travel Plan will be undertaken by the TPC every year in discussion with the MCC Travel Plan officer and informed by the results of the monitoring survey programme where relevant. This review will assess the progress of the Travel Plan with respect to targets and consider the take up / effectiveness of individual measures & initiatives. This annual review may identify areas within the Travel Plan which require change or modification.

7.3.2 To assist the review process, **the TPC will prepare a brief Travel Plan Progress Report for submission to the MCC Travel Plan officer. This document will be prepared annually** and record the following:

- The results of the most recent travel surveys with respect to targets;
- The general effectiveness of current initiatives within the Travel Plan;
- Those measures within the Travel Plan which are proposed to be continued into the next year / those measures to be dropped; and,
- Details of any new travel initiatives to be provided at the PBSA buildings.

FIGURES

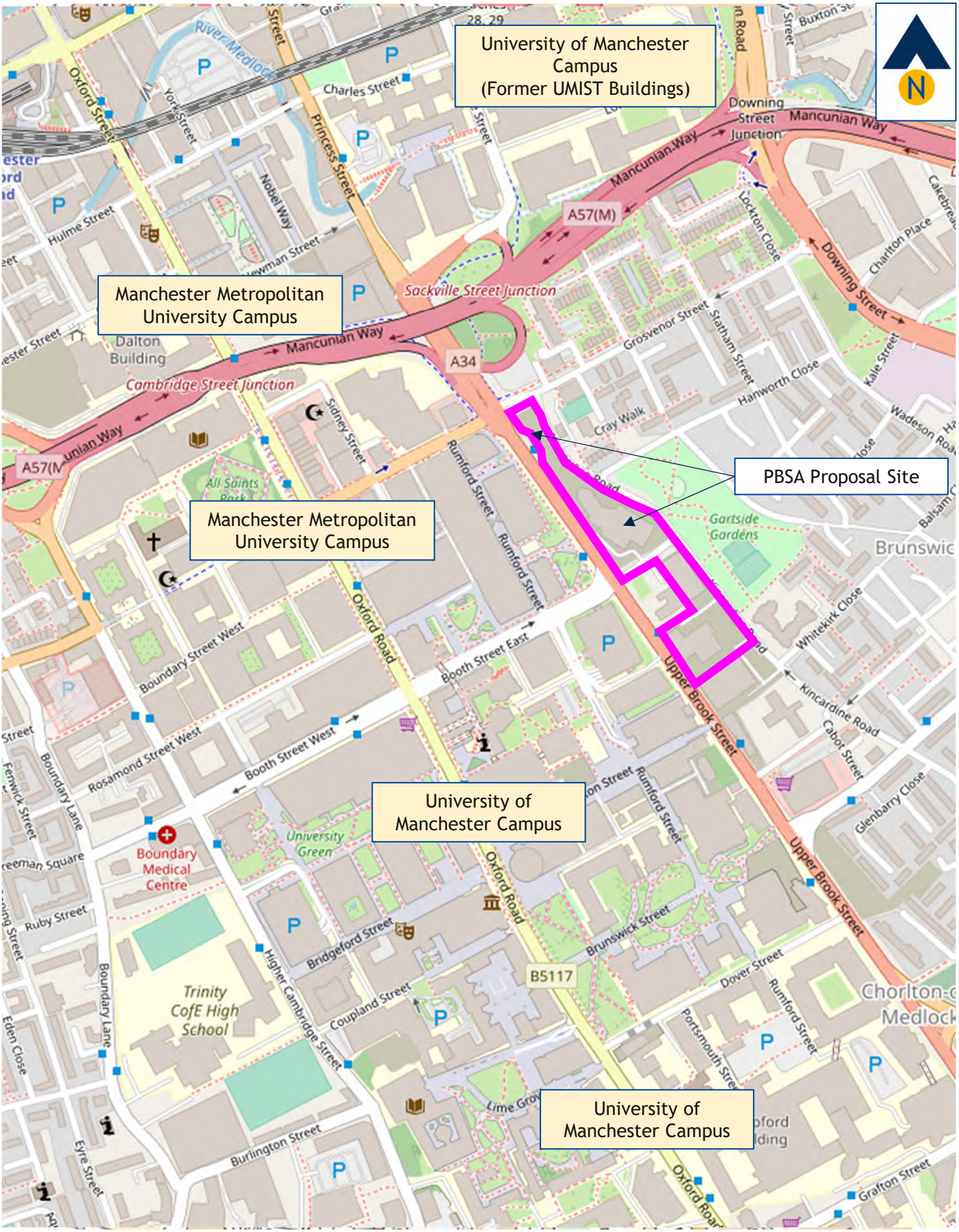
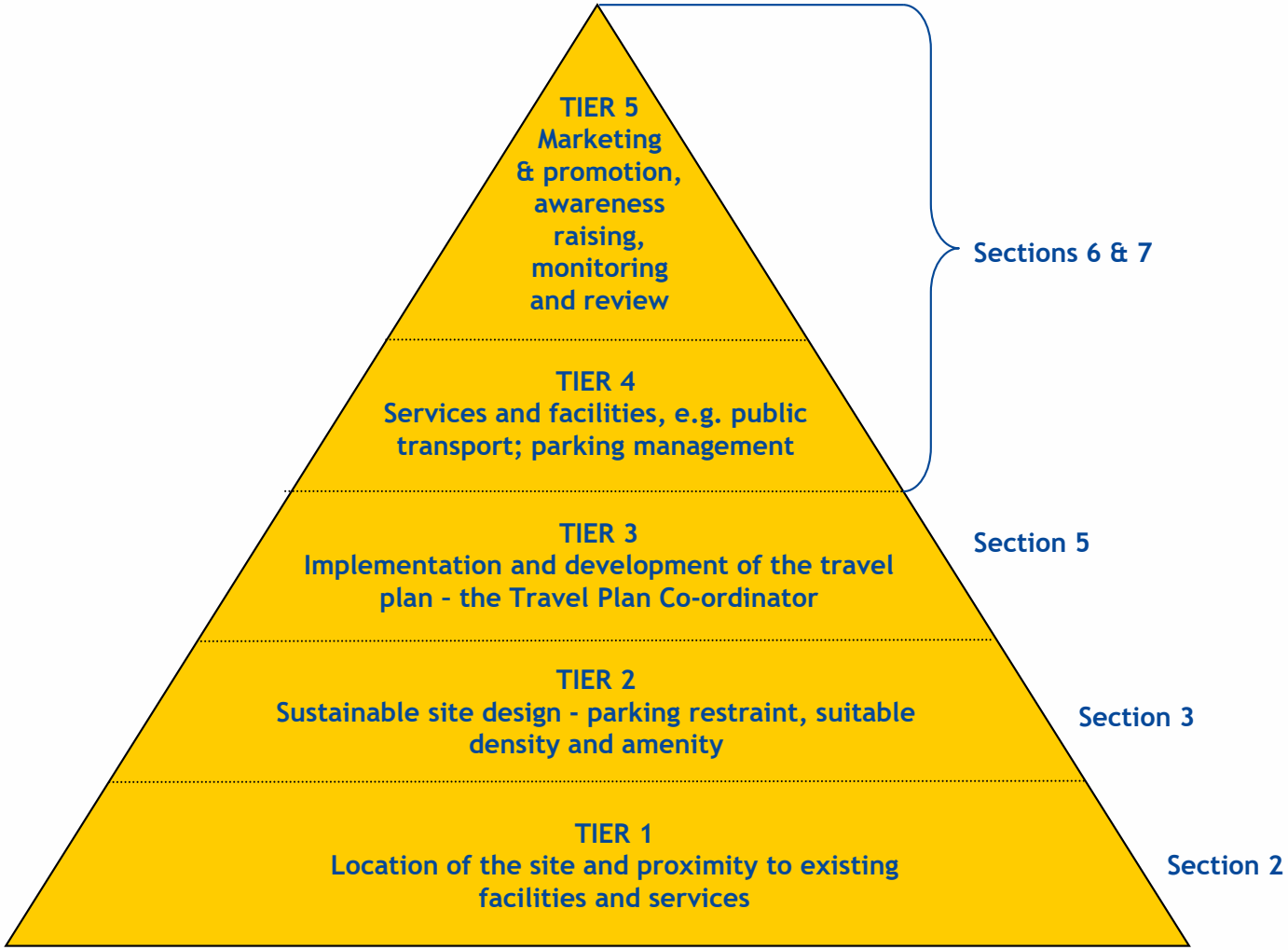


Figure TP1	**Site Location: Local Context**	
J000370	Upper Brook Street Masterplan (Williams / Alliance UBS)	June 2023



Travel Plan Pyramid *(Adapted from DfT 'Good Practice Guidelines: Delivering Travel Plans through the Planning Process', April 2009)*



FOCUS TRANSPORT PLANNING

Figure TP3 **Site Location: Immediate Context**

J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023



FOCUS TRANSPORT PLANNING

FIGURE TP4

Location & Nature of Local Parking Opportunities to the Upper Brook Street PBSA Buildings

J000370

Upper Brook Street Masterplan (Williams / Alliance UBS)

June 2023

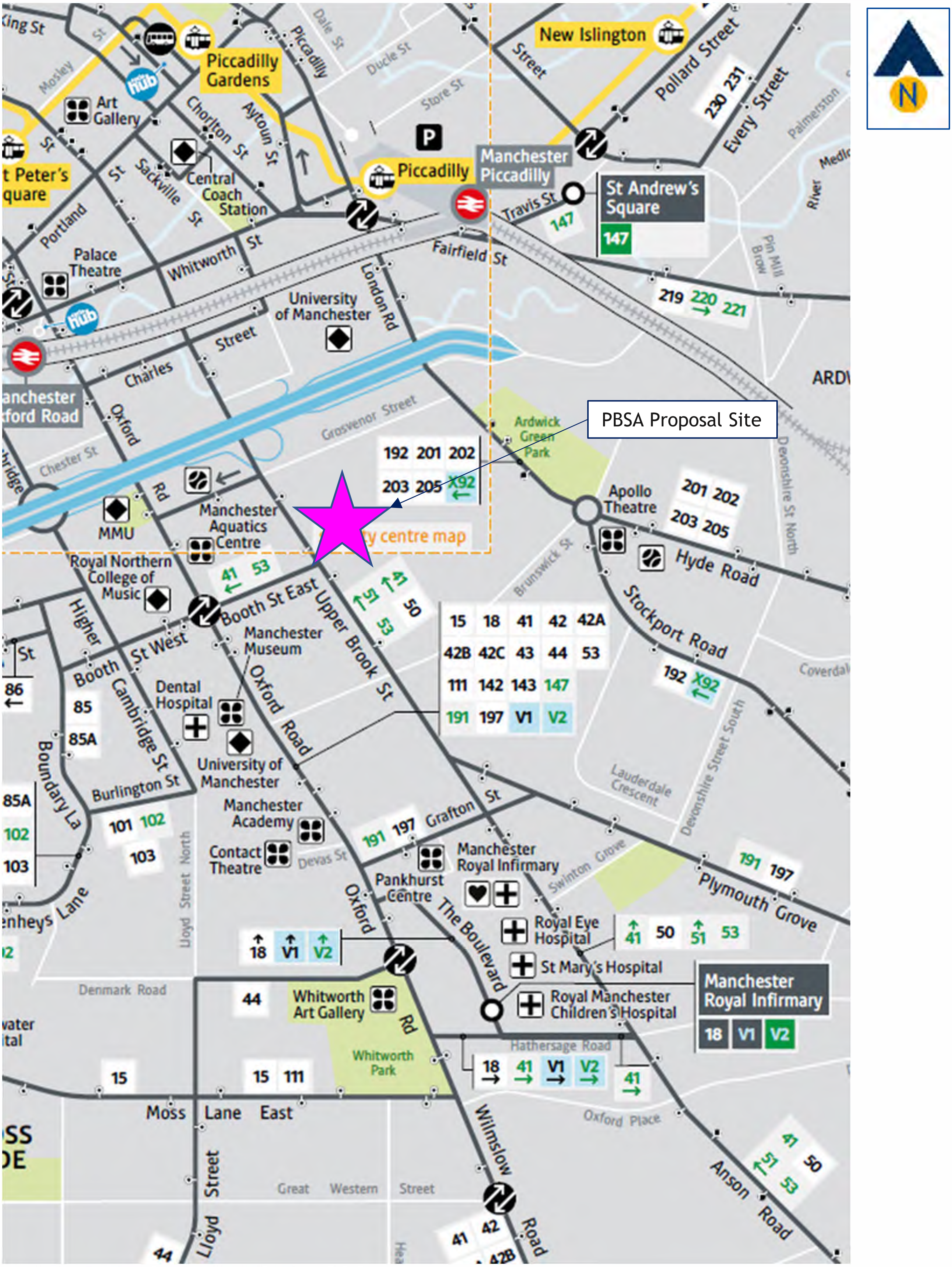


FIGURE TP5a **Local Public Transport Connections to the Upper Brook Street PBSA Buildings**

J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023

FOCUS TRANSPORT PLANNING

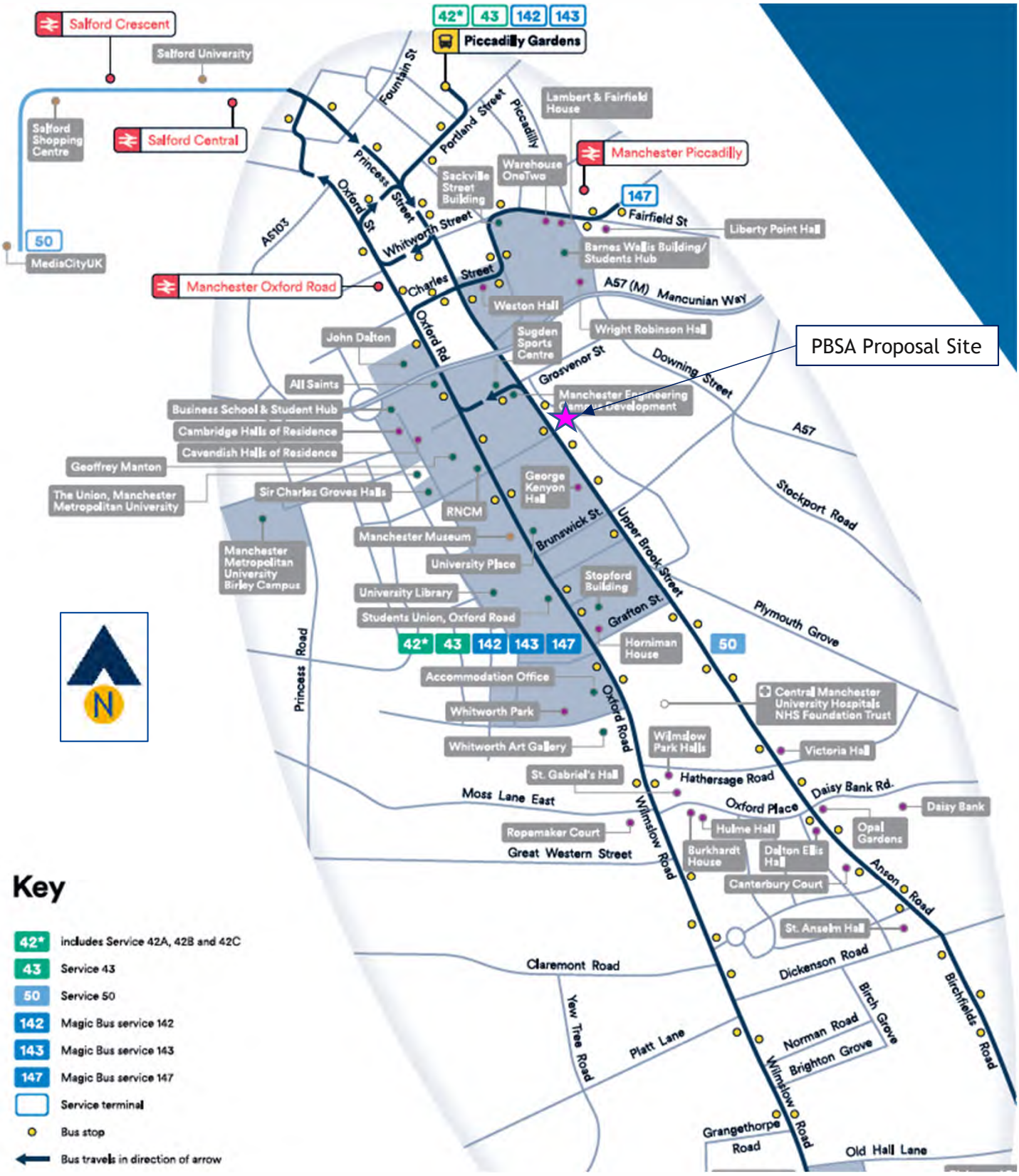
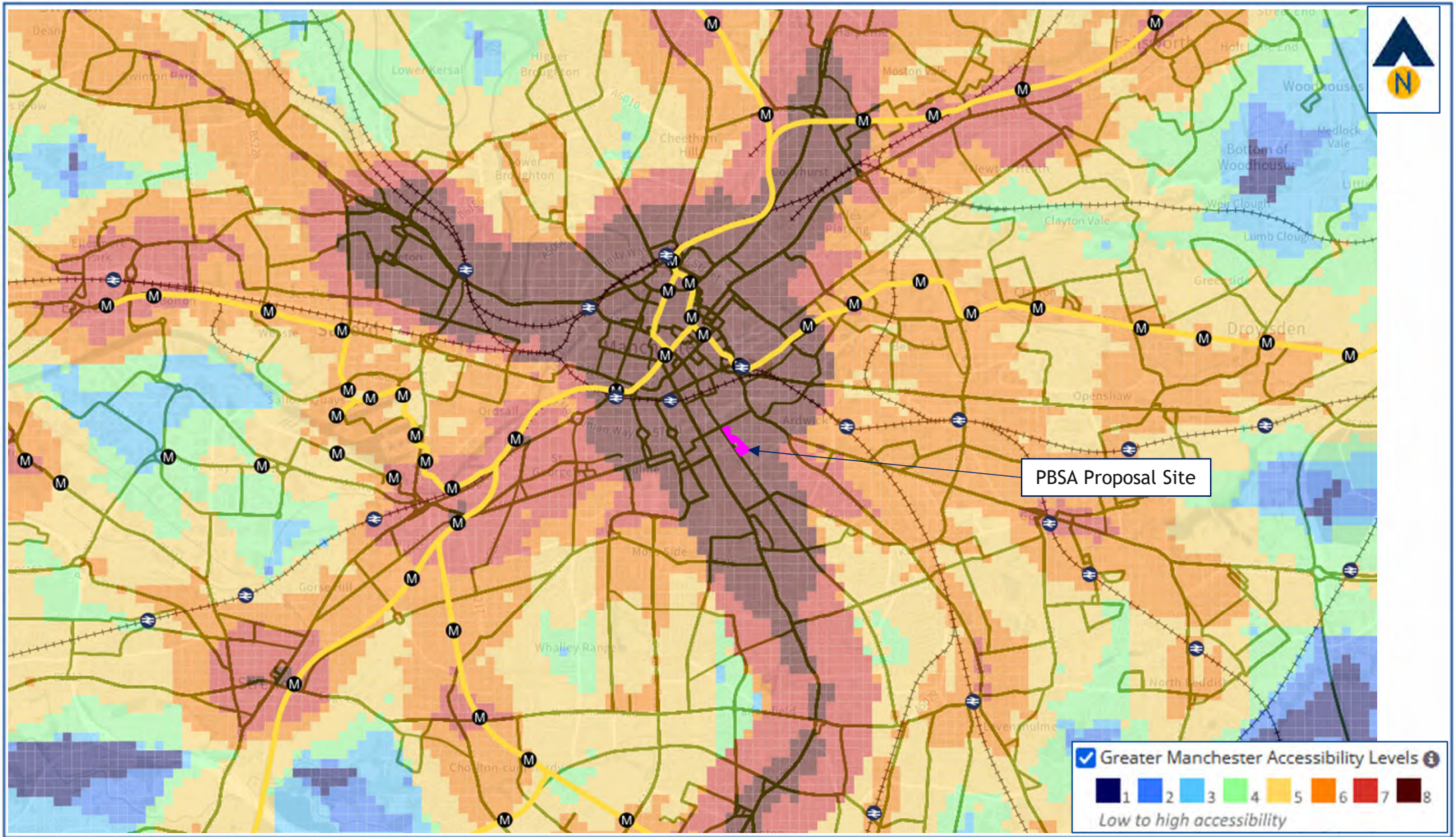


FIGURE TP5b **Local Student Bus Connections Linked By the Oxford Road Corridor**

J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023



FOCUS TRANSPORT PLANNING

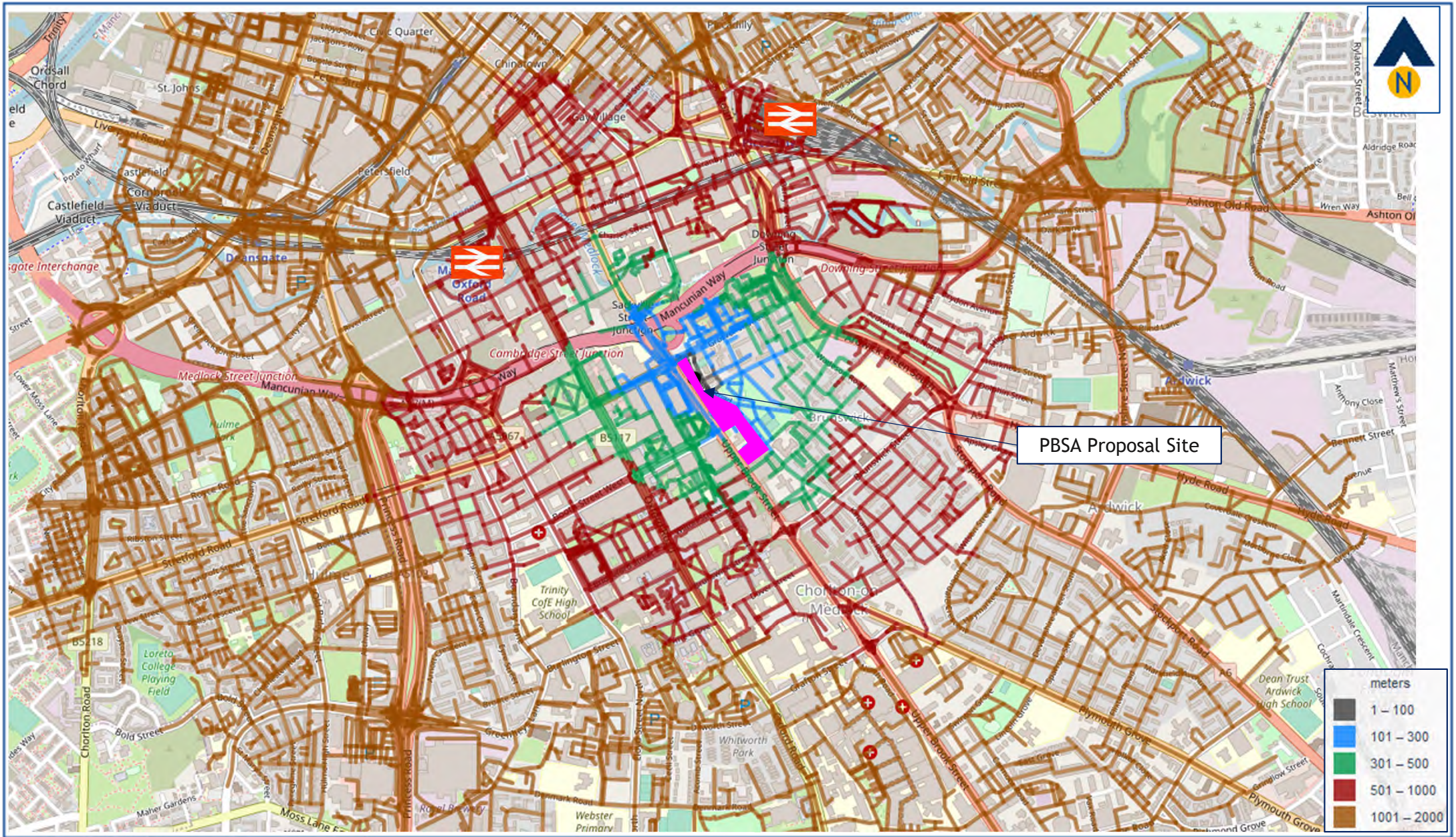
Figure TP6

Greater Manchester Accessibility Levels for Manchester City Centre and Surrounding Areas

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023



FOCUS TRANSPORT PLANNING

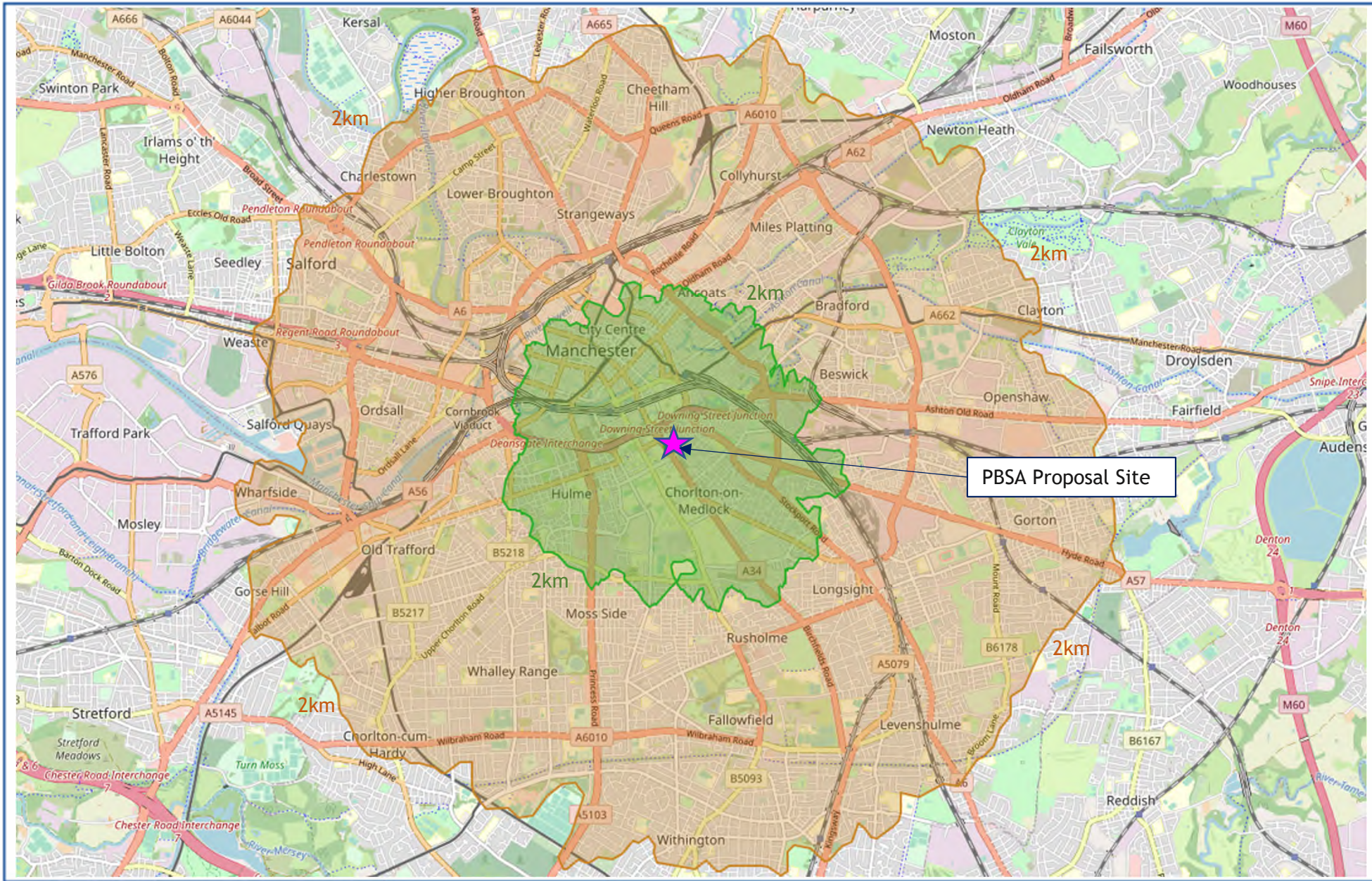
Figure TP7

2km Walk Catchment from Upper Brook Street PBSA Buildings

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023



FOCUS TRANSPORT PLANNING

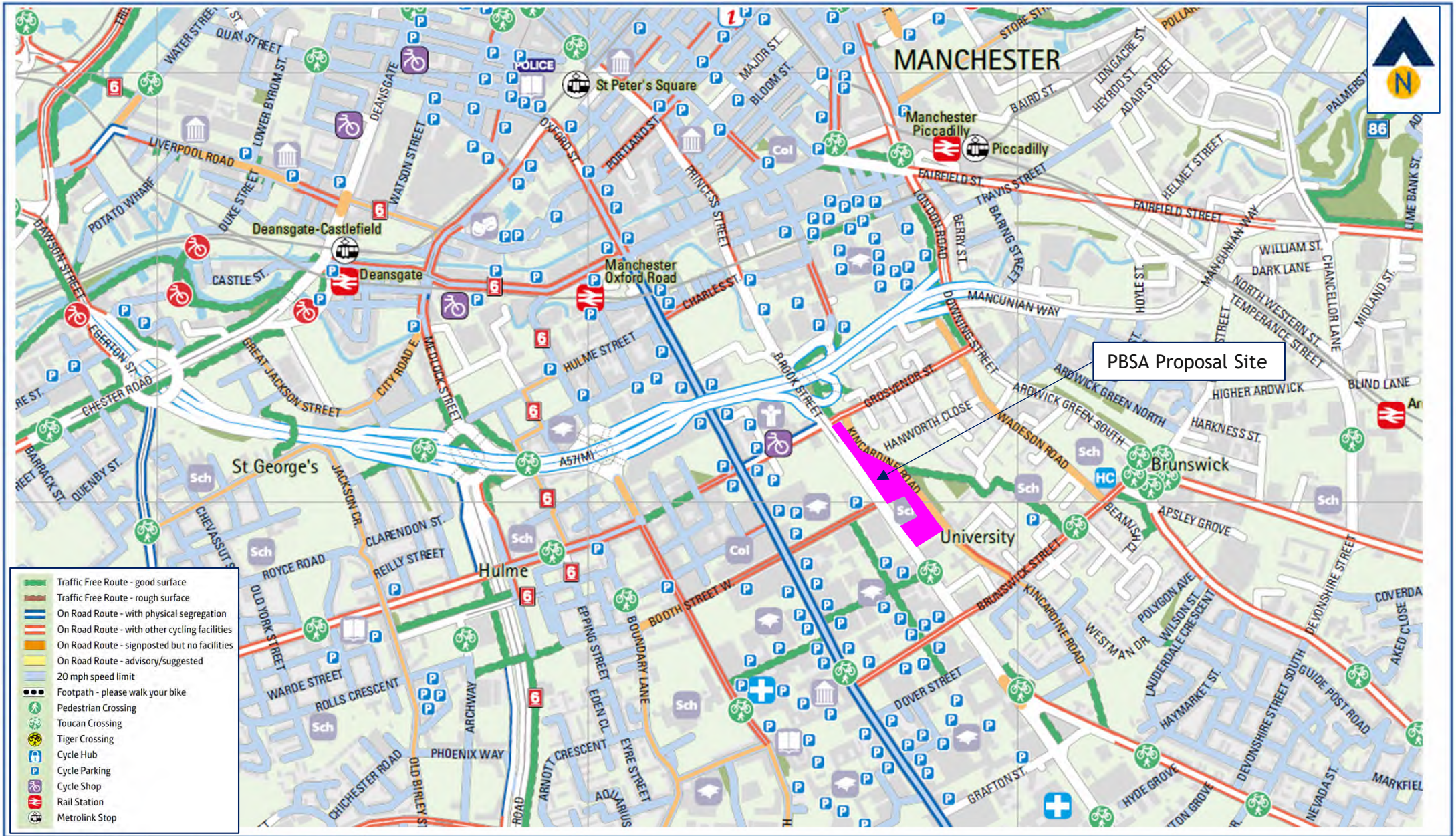
Figure TP8

2km & 5km Cycle Catchment from Upper Brook Street PBSA Buildings

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023



FOCUS TRANSPORT PLANNING

Figure TP9

Available Local Cycling Infrastructure to the Upper Brook Street PBSA Buildings

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023

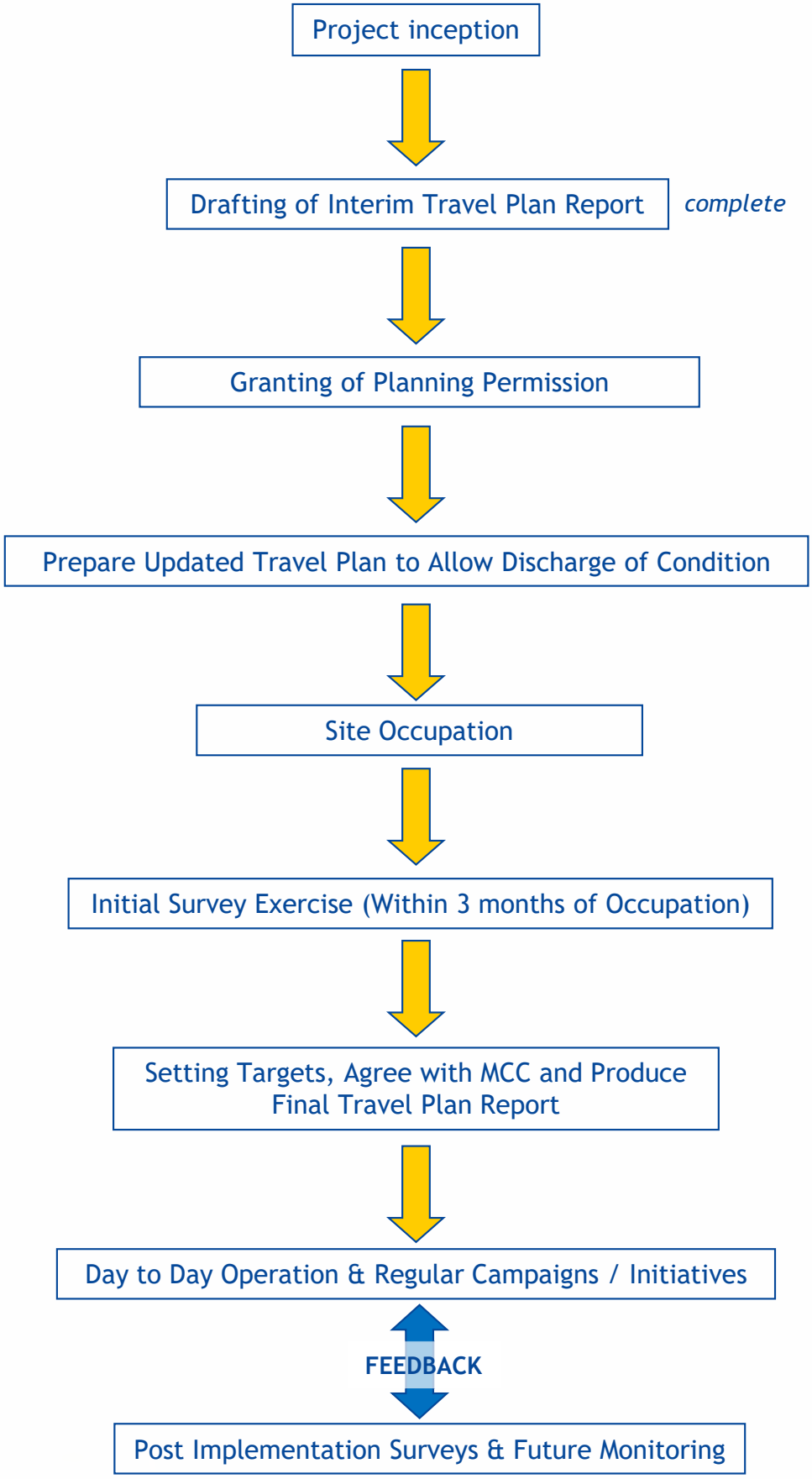


FIGURE TP10 **PBSA Travel Plan Implementation Programme**

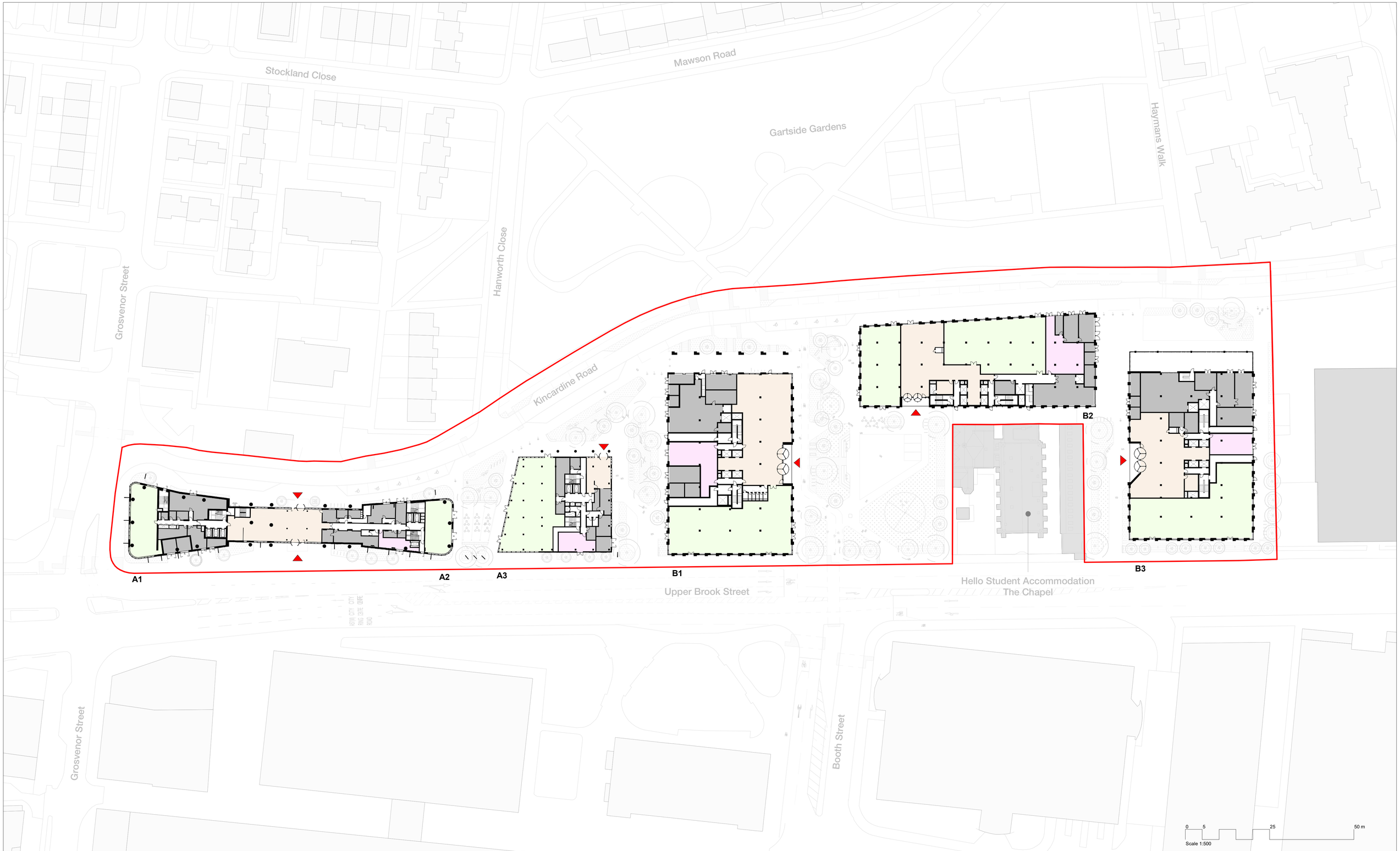
J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023



APPENDICES



APPENDIX TP1



Rev	Description	Date
P1	Issued for Planning	23.06.23

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Key

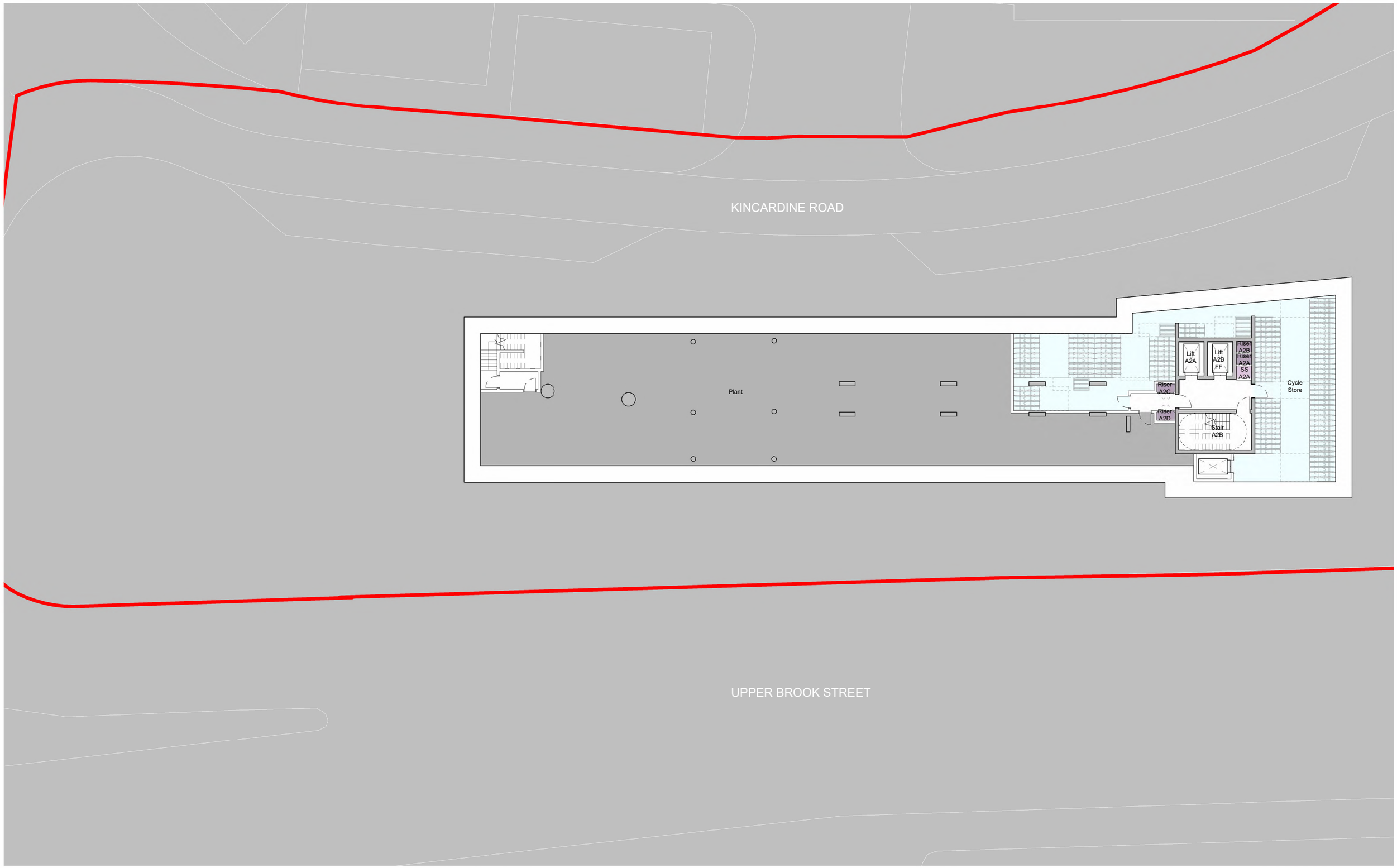
- Entrance Lobby and Amenities
- Ancillary Spaces
- Cycle Store
- Back of House
- Application Boundary
- Primary Entrance



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Drawn By	**Checked By**	**Status**	
JD	LB	S2	
Drawing No.	**Rev**	**Purpose of Issue**	**Drawing**
UBS-HBA-SW-00-DR-A-081100	P1	For Planning	Proposed Illustrative Masterplan - Ground Floor Plan

26-28 Hilton Street
Manchester M1 2EH
mail@hawkinsbrown.com
hawkinsbrown.com

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NORTH

Rev	Date	Description
P01	2023-06-22	Planning Issue

0 2.5 5 7.5 10m

Project Title
Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title
A1/A2 - General Arrangement Plan
Basement

Project No
10450

Scale
1 : 250 @ A3

Status
PLANNING

SHP Drawing Code PROJ - ORIG - ZONE - ROLE - CLAS - TYPE - LOC - SEQ
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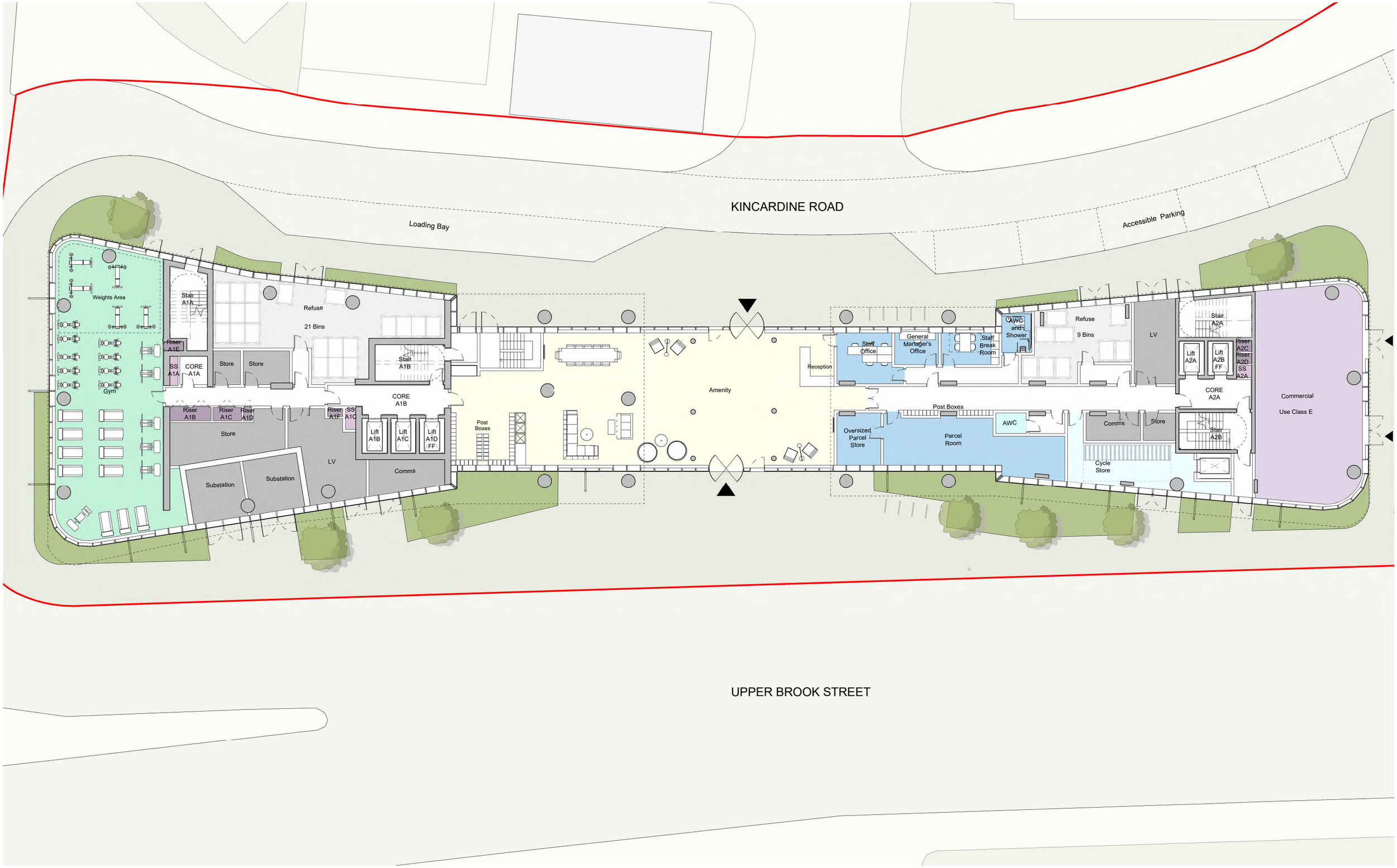
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P01

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NORTH

Rev	Date	Description
P01	2023-06-22	Planning Issue

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Project Title: Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title: A1/A2 -General Arrangement Plan Ground Floor

Project No: 10450

Scale: 1 : 250 @ A3

Status: PLANNING

SHP Drawing Code: 10450-SHP-ZZ-A-B5D8-G200-PL-00-001

Revision: P01

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Project Title
Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title
A1/A2 General Arrangement Plan
Level 01

Project No
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Status
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Project Title
Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title
A3 - General Arrangement
Plan
Ground Floor

Project No
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Project Title
Upper Brook Street Masterplan (Williams Motor Co (Holdings)/ Alliance UBS Limited), Manchester

Drawing Title
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Level 01

Project No
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Rev	Date	Description
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Drawing Title
A3 - General Arrangement Plan
Typical Levels 02-11

Project No
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APPENDIX TP2

PROPOSED STUDENT ACCOMMODATION

UPPER BROOK STREET MASTERPLAN
(WILLIAMS MOTOR CO (HOLDINGS) / ALLIANCE UBS LIMITED)

SCHEDULE OF TPC DUTIES / ACTION PLAN

SETTING UP

Task	Implementation Date	Responsible	Comments	Completed?
Appoint TPC	Minimum 9-months prior to first occupation	Site Operator		
Provide TPC contact details to MCC Travel Plan Officer	On appointment	TPC		
Set up Travel Plan working file	9-months prior to first occupation	TPC	This will also be very useful when completing annual reports	
Develop 'Move In / Move Out' Procedures and Agree with MCC Highways	Strategy completed & agreed 3-6 months prior to first occupation	TPC	Important to agree early to ensure that all measures and any required formal highway agreements are in place.	
Ensure all necessary travel infrastructure is installed correctly during construction phase	Throughout construction period	Site Developer (TPC to review)		
Delegate Travel Plan duties (where relevant)	During period prior to first occupation	TPC		
Make contact with local cycle store to investigate links / discount scheme	During period prior to first occupation	TPC		

SALES & MARKETING

Task	Implementation Date	Responsible	Comments	Completed?
Contact MCC / relevant public transport operators	6-9 months prior to first occupation	TPC	Understand what maps / timetable information is available & in what format.	
Summary travel information included in initial information pack to prospective student residents	Ready for beginning of marketing period	TPC / Sales Staff	Sales and marketing staff to be briefed on sustainable transport options	
Collate information for inclusion in Welcome Packs to be provided in student resident rooms	Begin 3-months prior to first occupation to ensure information is up to date where possible	TPC		

SITE OCCUPATION / START OF ACADEMIC YEAR

Task	Implementation Date	Responsible	Comments	Completed?
Implement Student Resident Move In Strategy	First Occupation / Start of Academic Year	Site Operator / TPC	Likely need for additional staff to operate scheme	
Provide Welcome Pack including Travel Information for Student Residents on Arrival	First Occupation / Start of Academic Year	TPC		
Prepare Travel Plan Noticeboard & Promote Health Benefits of Active Travel	1-2 weeks Prior to First Occupation / Start of Academic Year	TPC	Contact MCC Travel Plan Officer for posters and leaflets and search internet	
Undertake Initial Travel Plan Survey to Establish Baseline Conditions	Within 3-months of First Occupation	TPC	Survey both student residents & staff	
Circulate the Travel Plan objectives to all residents in the Travel Plan Welcome Pack	Upon opening	TPC		
Prepare / Update Travel Plan Noticeboard	1-2 weeks prior to opening	TPC	Contact MCC Travel Plan Officer for posters and leaflets and search internet	

ON-GOING DUTIES

Task	Implementation Date	Responsible	Comments	Completed?
Liaise with MCC Travel Plan coordinator where appropriate	As required	TPC		
Provide promotional Travel Data and health campaign information on display and keep up-to-date	Review every 3 months	TPC		
Promote and support national and local campaigns	Review annually	TPC	Particularly Walking Month and Bike to Work Week	
Check on-site cycle facilities	Formal review every 3 months	TPC / Building Managers	Contact building management if repairs / improvements required	
Organise and attend Travel Plan focus group	At least every 3 months	TPC	Liaise with other local groups for potential collaboration	
Organise and attend Bicycle User Group	At least every 3 months	TPC	Liaise with other local groups for potential collaboration	
Review and Adjust Student Move In / Move Out Arrangements as Necessary and Agree with MCC Highways	Agree procedures minimum of 3 months prior to each event.	TPB		



MONITORING

WITHIN 3 MONTHS FIRST OCCUPATION

Task	Implementation Date	Responsible	Comments	Completed?
Monitor travel patterns	3 months after opening	TPC	Use the budget available for monitoring and updating the Travel Plan	
Submit survey review report to MCC Travel Plan Officer	2 months after survey	TPC		
Undertake Travel Plan Audit and modify where appropriate	2 months after survey	TPC	Use the budget available for monitoring and updating the Travel Plan	
Update Travel Plan Noticeboard to reflect survey results	2 month after survey	TPC		

POST INITIAL SURVEY (ANUALLY FOR INITIAL 5 YEARS)

Task	Implementation Date	Responsible	Comments	Completed?
Monitor travel patterns via follow up spot questionnaires	Annually	TPC	Use the budget available for monitoring and updating the Travel Plan	
Submit survey review report to MCC Travel Plan Officer	Annually	TPC		
Undertake Travel Plan Audit and modify where appropriate	Annually	TPC	Use the budget available for monitoring and updating the Travel Plan	
Update Travel Plan Noticeboard to reflect progress towards targets and objectives	Annually	TPC		



APPENDIX TP3

3.0 Residents Traffic Management

3.1 Introduction

3.1.1 The application proposals comprise a comprehensive mixed-use scheme including Purpose Built Student Accommodation (PBSA) and Life Science based employment buildings.

3.1.2 This section of the SLMS considers the management of PBSA related residential traffic at the start and end of term when vehicle demand will be at its peak. The submitted Transport Assessment sets out the principles of the car free development concept being adopted and considers the typical traffic demand at all other times.

3.1.3 The application proposals have been developed with full consideration of the location and accessibility of the site to key local services and facilities by sustainable modes of travel including walking, cycling and public transport. On this basis, residents will be encouraged to travel by modes of transport other than the private car and no car parking spaces will be provided within the development itself.

3.2 Existing Parking Facilities

3.2.1 As noted previously, Focus Transport Planning has developed a highway scheme for Kincardine Road which will restrict vehicle movement to one-way only. In addition, the scheme includes dedicated loading facilities and parking provision for disabled users. The proposals also retain provision for general on-street car parking along the northern side of the carriageway.

3.2.2 On-site provision for disabled users and cycle parking provision is set out within the Transport Assessment.

3.2.3 Curtins has reviewed the existing car parking facilities within walking distance of the site and determined that the closest off-site car parking facility is the Aquatics Centre Multistorey Car Park on Booth Street East, approximately 100m south of the site.

3.2.4 The car park is operated by APCOA and provides secure off-road car parking for up to 380 vehicles with four spaces dedicated for the mobility impaired. The car park is open Monday to Sunday between 06:00 and 24:00. The current tariffs at the time of preparing this document are set out below.

Up to 15 mins	Free
Up to 2 hours	£2.50
Up to 4 hours	£4.50
Up to 9 hours	£8.00
Up to 24 hours	£12.00

3.2.5 In addition to the Aquatics Centre Multistorey Car Park, the NCP operated car park at Manchester Circle Square is located less than 200m north of the site. The car park is open 24hrs Monday to Sunday providing access to a further1,018 pay & display spaces.

3.3 Proposed Residential Management Plan

3.3.1 This Management Plan has been prepared on a worst-case basis where all residents drop-off/pick-up movements are undertaken by car. It is likely, however, that given the accessibility of the site and proximity to public transport service including bus and rail a number of future residents may arrive/depart by more sustainable means of transport.

3.3.2 The proposed application scheme, as a student residential development, will typically incur a number of vehicle movements at the beginning and end of the academic year when students move in and move out of their accommodation. As outlined in the associated Transport Assessment, throughout the remainder of the year it is not anticipated that the residential units will generate any further significant numbers of car trips given the lack of on-site car parking spaces provided and the intention to market the scheme as a “car free” development.

3.3.3 In order for drop-off/pick-up activity to be managed effectively and minimise any disruption to neighbouring premises as well as the local highway network, this Management Plan has been produced to detail arrangements for the arrival and departure of residential occupiers only.

3.3.4 Aside from on-street car parking spaces and the five spaces designated for the mobility impaired within the proposed lay-by, associated car parking is not proposed as part of the development proposals as the student accommodation provides a significant number of secure cycle parking facilities and is situated within a sustainable location with a good level of public transport and active travel opportunities available to students.

3.3.5 As noted previously, Curtins has also reviewed the existing car parking facilities within walking distance of the site and determined that the closest off-site car parking facility is the Aquatics Centre Multistorey Car Park on Booth Street East, approximately 100m south of the site that provides parking for up to 380 vehicles with a further 1,018 spaces provided at Manchester Circle Square less than 200m to the north of the site.

3.3.6 There is therefore opportunity for vehicles to park off-site if necessary.

3.4 Management of Residents

3.4.1 All residents will receive correspondence prior to occupation advising that there is no opportunity for onsite parking.

3.4.2 Details of the system of arrival and departure by car to future residents of the site will be provided at the start and end of term.

3.4.3 The arrival and departure of future residents of the site can be defined within three distinct categories:

- Student arrival at the start of the academic year;
- Student arrival and departure at the end of terms during the academic year; and
- Student departure at the end of the academic year.

3.4.4 The proposed development comprises 1,100 rooms, which will be available for occupation at the start of a new term (September) each year.

3.4.5 It is recognised that there is a need to minimise disruption to local businesses during student arrivals and to ensure minimal disruption to traffic flows along Kincardine Road and other surrounding local routes.

3.4.6 The following measures will be introduced as part of this Management Plan in order to minimise disruption to neighbouring premises:

- Resident Instructions: Prior to residents arrival, a letter will be sent advising on the most appropriate route to gain access to the site on their arrival date. The letter will also include a map of the immediate locality and identify local car parking facilities as well as local sustainable travel information for those arriving by public transport (bus/tram/train).
- Parking Capacity: When parked within the two designated loading bays along Kincardine Road, eight cars can comfortably be accommodated whilst additional space for a further nine vehicles can be accommodated within the disabled parking bays. The intention will be to utilise the two loading bays and the parking bays designated for the mobility impaired as part of the Residents Management Plan.
- Marshalling: Marshals shall be employed over the intake weekends to direct and organise traffic movements in the site's immediate vicinity. The marshals will encourage cars to unload and vacate the designated car parking spaces as soon as possible to make the best use of the local car parking in the vicinity of the site and reduce the possibility for congestion. The Marshals will issue maps and directions to local car parking for any parents / guardians that wish to spend more time in Manchester after they have unloaded their vehicle.
- Neighbour Information Letter: A letter shall be issued to all residents and businesses in the immediate vicinity of the development advising them of the arrangements put in place for resident arrivals providing contact details at the site should they have any queries or incur any difficulties during the arrivals period.

3.4.7 Any requirement for the temporary use of service areas/lay-bys during this period will be agreed with Manchester City Council in advance. This will also include engagement and coordination with the

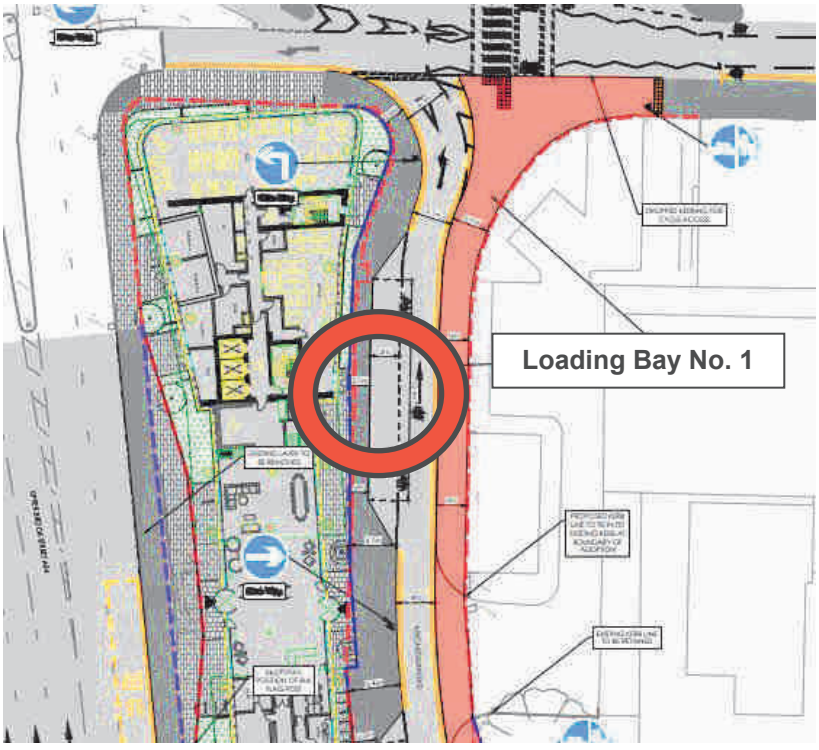
operators of the ground floor units to ensure that any disruptions are minimised and key delivery/servicing requirements will be maintained.

Resident Arrivals at the Start of the Academic Year

3.4.8 Resident arrivals are proposed to be split across two weekends with 310 residents arriving per day with arrivals spread evenly throughout each day from 09:00 – 17:00, based on each resident being allocated a 20-minute 'move in' slot. Residents will be able to book a slot in advance of arrival (with slots available for 20-minute arrivals between 09:00 – 17:00 on a Saturday and Sunday).

3.4.9 Residents will be advised of the arrival strategy well in advance of intake dates and will be provided with detailed printed information confirming the arrangements for the day, which will be as follows:

- on arrival, vehicles will park in designated loading bays clearly marked from no.1 to no. 3 (including the disabled parking bays) and report to main reception to check in and carry out any registration and key handover;
- once checked-in, on-site baggage handlers will be prepared with luggage trolleys to help unload all belongings, which will be taken to the relevant room. On-site attendants will notify each vehicle when their allotted time (approximately 20 minutes) has been reached;
- once unloaded, vehicles will be directed out of the area by supervisory staff to ensure no conflict in traffic movements.



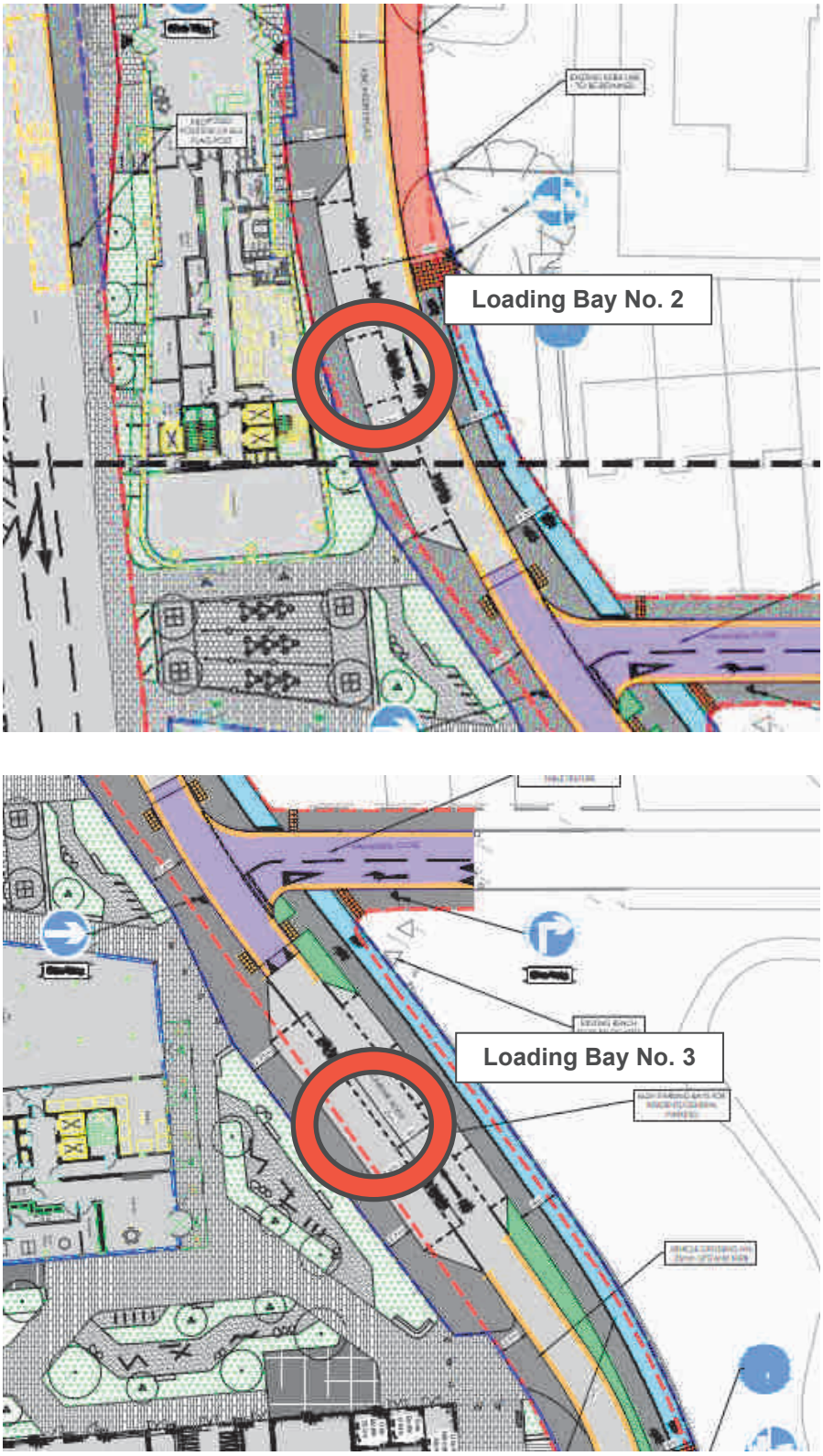


Figure 3.1 – Residents Loading/Unloading Locations

3.4.10 The vehicle capacity within each loading bay is summarised in Table 3.1.

	Capacity (no. of cars)	Capacity per hour (20 min dwell time)	Capacity per Day (09:00-17:00)
Loading Bay No.1	4	12	96
Loading Bay No. 2	5	15	120
Loading Bay No. 3	4	12	96
Total	13	39	312

Table 3.1 – Loading Bay Capacity

3.4.11 Table 3.1 demonstrates that combined capacity of each loading bay equates to 312 vehicles. On this basis, a total of four days would be required, should all 1,100 residents use a vehicle on arrival day.

3.4.12 These procedures and the use of local off-site parking at the Aquatics Centre Multistorey Car Park and Manchester Circle Square would be monitored and enforced by the on-site attendants and also mirror similar procedures which are operated successfully by comparable student residential development operators.

Resident Arrivals and Departures at the End of Terms During the Academic Year

3.4.13 Resident departures and arrivals at the end of terms during the academic year will be considerably less intensive than the arrival period at the start of the academic year.

3.4.14 On the above basis, it is unlikely that detailed traffic management will be required, although this situation will be monitored throughout the academic year and appropriate arrangements will be made should the need arise to introduce further traffic management during the student arrival and departure periods.

Resident Departures at the End of the Academic Year

3.4.15 Departures of residents occur over a period of several months and align themselves with the academic year, generally around May to July and August to September, depending on the tenancy length. As departures are spread widely across a period of many weeks, there is never a time when a mass departure occurs.

3.4.16 Clear and concise departure policies for all residents will be implemented that will ensure that pick-up vehicles arrive at the designated loading bays where belongings can be quickly loaded, and the car driven away. Because there is no check-out process to conduct, individual departures can be planned by each resident and undertaken without delay or inconvenience.



APPENDIX TP4

FOCUS TRANSPORT PLANNING

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Travel Survey

This survey is being undertaken to gain understanding of travel trends associated with the Upper Brook Street Student Residences. This information will be used to inform the continuing development and evolution of a Travel Plan to support the site. The survey should be completed only once by each resident / member of staff.

Please be assured that all information will be treated with the utmost confidentiality.

1. What is your status?

- ☐ Student Resident at Upper Brook Street
- ☐ Full time employment at Upper Brook Street
- ☐ Part time employment at Upper Brook Street

2. Do you attend University? If yes, which do you primarily attend?

- ☐ No
- ☐ Yes, University of Manchester
- ☐ Yes, Manchester Metropolitan University
- ☐ Yes, Other (specify)_____

3. If you are a Student Resident at the Upper Brook Street Site, please provide your apartment number below.

☐ Apartment Number

4. Do you have a disability that affects your travel arrangements?

☐ Yes ☐ No

5. What mode of transport do you use to travel to University / Work? *Please choose ONE option, your PRIMARY travel mode / the longest element of your journey*

- ☐ Walk
- ☐ Cycle
- ☐ Bus
- ☐ Taxi
- ☐ Car driver
- ☐ Car passenger
- ☐ Other (please specify)_____

6. What ALTERNATIVE travel mode could you use if your usual mode of transport was unavailable? *Please choose ONE option*

- ☐ Walk
- ☐ Cycle
- ☐ Bus
- ☐ Taxi
- ☐ Car driver
- ☐ Car passenger
- ☐ Could not use any other mode
- ☐ Other (please specify)_____

7. Which of these factors might tempt you to use public transport to travel to University / work? If you use public transport already, what would you like to see done? *Please choose no more than TWO options*

- ☐ More direct services
- ☐ More frequent services
- ☐ Subsidised transport or cheaper fares
- ☐ Easier access to timetable / fares information Accommodation
- ☐ Having my journey planned for me
- ☐ I would NEVER use public transport
- ☐ Other (please specify)_____

_____

8. Which of these factors might tempt you to walk to University / work? If you walk already, what would you like to see done? *Please choose no more than TWO options*

- ☐ Improved footpaths on journey
- ☐ Improved crossing points on the local network
- ☐ Better lighting on routes close to home at night
- ☐ Information on the local footpath network Accommodation
- ☐ I would NEVER walk
- ☐ Other (please specify)_____

_____

9. Which of these factors might tempt you to cycle to University / work? If you cycle already, what would you like to see done? *Please choose no more than TWO options*

- ☐ Improved cycle paths
- ☐ Improved crossing points on the local network
- ☐ More secure cycle parking
- ☐ Better lighting on routes at night time
- ☐ Provision of improved Information on the local cycle network
- ☐ Cycle skills training
- ☐ I would NEVER cycle
- ☐ Other (please specify)_____

_____

10. Do you have any comments about travel?
Please continue overleaf

_____

_____

_____

_____

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_____

Thank You



APPENDIX TA10

Upper Brook Street Masterplan Williams / Alliance UBS Limited

FRAMEWORK TRAVEL PLAN (LIFE SCIENCES)

Focus Transport Planning

J000370-TP02c
June 2023

Life Sciences Based Employment Development & Ancillary Retail & Commercial / Community Space

Upper Brook Street, Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited)

Travel Plan Framework

Prepared on behalf of:

PROPERTY ALLIANCE GROUP

WILLIAMS MOTOR CO (HOLDINGS)

FOCUS TRANSPORT PLANNING

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1.0 INTRODUCTION

1.1 Overview and Planning Context

1.1.1 This Interim Travel Plan has been prepared by Focus Transport Planning (FTP) on behalf of Property Alliance Group/ Williams Motor Co (Holdings) in support of a planning application for the comprehensive re-development of land at Upper Brook Street, Manchester to deliver a mixed-use scheme comprising Purpose Built Student Accommodation (PBSA), Life Sciences based employment and ancillary retail, commercial & community uses, along with on-site landscaping and public open space. The proposals will bring forward development on a previously developed site which is earmarked for commercial and PBSA uses in the Oxford Road Corridor Strategic Regeneration Framework Document endorsed by MCC in 2019.

1.1.2 The Life Sciences employment element of the scheme envisages the delivery of up to 46,643qm of employment & ancillary floorspace, delivered across three distinct buildings. The buildings would include for dedicated cycle parking and other on-site facilities to promote sustainable travel options and would be surrounded by new integrated high quality public open space including enhanced walking & cycling links towards the adjacent University of Manchester campus and the Oxford Road walking, cycling and public transport corridor (see **Figure TP1** & **Figure TP2** to this report). The scheme is to be delivered as 'car free' development, with no general on-site parking available, other than a limited number of disabled / mobility impaired standard spaces.

1.1.3 The planning application for the wider Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) development is supported by a Transport Assessment report prepared by Focus TP, alongside an additional 'Interim Travel Plan' which focusses on the future operation and management of the proposed PBSA buildings. The Transport Assessment report provides an appraisal of the immediate highways and transport implications of the delivery and operation of the full Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme and includes a review of the proposed site access

strategy and sustainable site design features. The Transport Assessment document ultimately concludes:

> ***"Overall, based on the above review of issues, it is concluded that the comprehensive regeneration of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site for mixed use PBSA / Life Sciences development would not result in a severe impact on the future operation of the immediate local highway network. The proposals would not result in a significant increase in development flow related traffic on local links, with key immediate junctions and sections of the A34 Upper Brook Street & Kincardine Road corridors capable of accommodating future development traffic volumes without substantive operational concerns. The development scheme would also deliver significant local highway network environmental enhancements and improved pedestrian and cycle accessibility.***
>
> ***The location and design of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) proposals would support the objective of car-free development and deliver the potential for all site users to utilise sustainable transport for a wide range of day-to-day journeys, therefore meeting the core planning sustainability objectives of promoting the use of alternative travel modes to the private car and managing the overall traffic impact associated with new development."***

1.1.4 The National Planning Policy Framework (NPPF) advises that Travel Plans should be submitted in support all major planning applications. The production and implementation of this Travel Plan for the proposed Life Sciences element of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme therefore reflects core national policy and reinforces Property Alliance Group's commitment to maximising accessibility to the site and promoting effective car-free development.

1.1.5 This document represents a framework to guide the development, implementation and operation of a Travel Plan for the proposed new Life Sciences buildings, reinforcing the sustainable development principles of the proposals and to maximise travel to the site by alternative travel modes to the private car. The Travel Plan will be adopted on a site-wide basis across the Life Sciences buildings, including the promotion of an over-arching Travel Plan Manager (TPM) role to manage travel requirements for all site tenants, covering both the core Life Sciences employment area, as well as the ancillary businesses that are anticipated to take up the ancillary commercial space within the ground floor units.

1.1.6 The Travel Plan sets out the main sustainable development infrastructure to be delivered across the buildings and those operational measures & initiatives required to be explored by businesses and organisations based at the site, in order to promote and support the principle of car-free development.

1.2 General Travel Plan Objectives & Benefits

1.2.1 A Travel Plan is a general term for a package of measures and initiatives tailored to the requirements of individual sites and aimed at promoting more sustainable travel choices and reducing reliance on the private car. It involves the development of a set of mechanisms, initiatives and targets that together enable organisations and individuals to reduce the impact of their travel and transport on the local environment.

1.2.2 Travel Plans can be developed either specifically to address issues associated with individual buildings or sites, or to form part of a wider strategy involving Local Authority initiatives and other surrounding developments. This Travel Plan concentrates on those measures that can be developed specifically to support the proposed Life Sciences employment buildings at the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site and, given the car-free nature of the scheme, aims to ensure that all staff and visitors are fully appraised of the wide range of sustainable travel options available at, or in the vicinity of, the site.

1.2.3 Property Alliance Group / Williams Motor Co (Holdings) Limited as developer of the Life Sciences buildings will promote sustainable transport solutions where appropriate and practical under the terms set out in this Framework Travel Plan, with the operation of these initiatives anticipated to be ultimately controlled and enforced via an appropriate planning condition attached to any formal planning consent for the wider Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme.

1.2.4 The implementation of effective Travel Plan initiatives to support the day-to-day operation of the Life Sciences buildings at Upper Brook Street could deliver the following benefits:

Organisation

- Support employee travel needs;
- Aid staff recruitment and retention;
- Promote a healthy and motivated workforce ;
- Fulfil planning targets;
- Enhance company image;
- Remove the need for inefficient use of land for car parking;
- Improve wider site environment;
- Increase productivity from a healthy workforce;
- Improve access for employees, visitors and deliveries;

Staff / Visitors

- Money and time savings;
- Improved health, motivation and well-being;
- Lower levels of stress;
- A better quality of life.

Local Community

- Less traffic and congestion;
- Improved public transport services;
- Reduction in local level pollution;
- Reduction in CO_2 emissions;
- Access to employment / education.

1.3 Travel Plan Policy / Guidance

1.3.1 Travel Plans are secured through a planning and transport policy framework that extends from the national through to local level when dealing with new development proposals. Key Travel Plan policy and guidance relevant to the Upper Brook Street Masterplan - North scheme is set out in the following paragraphs.

National Policy / Guidance

1.3.2 Guidance set out in National Planning Policy Guidance (NPPG), 'Travel Plans, Transport Assessments and Statements', states that a Travel Plan should "identify the specific required outcomes, targets and measures, and set out clear future

monitoring and management arrangements all of which should be proportionate". NPPG also notes that "Travel Plans should, where possible, be considered in parallel to development proposals and readily integrated into the design and occupation of the new site rather than retrofitted after occupation". This guidance should be viewed in combination with the core objectives and design principles for new development, as set out in NPPF paragraph 112 which states:

> ***"Applications for development should:***
>
> ***a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;***
>
> ***b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;***
>
> ***c) create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;***
>
> ***d) allow for the efficient delivery of goods, and access by service and emergency vehicles…"***

1.3.3 For best results when preparing Travel Plans, NPPG suggests that the initial focus should be on establishing the 'outcomes' required from a Travel Plan and working from this, to develop a range of measures that can then be identified and agreed as the best way of achieving such objectives at the site. Measures are likely to include both incentives and controls, in order to encourage site users to make changes in their travel behaviour.

1.3.4 This Travel Plan therefore concentrates on those measures that can be developed to support Life Science employment elements at the Upper Brook Street site and is designed to meet the core objective of effectively removing the need for general travel to / from the site by the private car and to deliver effective and practical opportunities for travel by more sustainable travel modes.

Local Guidance

1.3.5 Manchester City Council's Core Strategy (adopted July 2012) sets out a number of relevant supporting policy objectives for delivering sustainable development and sets of the hierarchy of transport users that should inform site design and accessibility (Policies T1 & T2). Policy T1 notes that the Council will support development that meets the following objectives:

- Improve choice by developing alternatives to the car.
- Promote regeneration and economic vitality by relieving traffic congestion and improving access to jobs and services, particularly for those most in need and for those without a car.
- Improve access to transport services and facilities in order to enable disabled people and people with mobility impairments to participate fully in public life.
- Improve pedestrian routes and the pedestrian environment.
- Improve and develop further Manchester's cycle network.
- Take account of the needs of road users according to a broad hierarchy consisting of, in order of priority:
  1. pedestrians and disabled people
  2. cyclists, public transport,
  3. commercial access,
  4. general off-peak traffic,
  5. general peak time traffic

1.3.6 Policy T2 notes that the Council will actively manage pattens of development to ensure that new development is located close to the City's main economic drivers including the Regional Centre and the Oxford Road Universities. The policy also notes that development should be easily accessible by walking, cycling and public transport, connecting people to jobs, centres, leisure, open space and educational opportunities. Particular priority is identified to providing access to strategic employment sites, including the Oxford Road corridor and University campuses.

1.3.7 Policy T2 also notes that proportionate Traffic Impact Assessments and Travel Plans should be prepared for all major application schemes and any proposals where there are could be access or transport issues.

1.3.8 The need for, and importance of, Travel Planning is also recognised in the MCC's Guide to Development in Manchester Supplementary Planning Document (SPD), which notes:

> ***"A Travel Plan is a package of measures and actions aimed at reducing the need to travel by car by providing alternative choices and encouraging walking, cycling, and public transport use. At the planning stage consideration should be given to the proximity of the development to existing travel facilities and services, site layout, suitable density, cycling, pedestrian facilities and potential for parking restraint."***

1.4 Addressing the Challenge of 'Speculative Development' and Future Multi-user Occupation

1.4.1 Future prospective users of the Life Sciences elements at Upper Brook Street have not yet been identified. The scheme therefore represents a predominantly 'speculative' development at this stage, which is ultimately anticipated to operate with a range of future tenants.

1.4.2 DfT best practice guidelines specifically recognises the challenge of preparing a Travel Plan for speculative development sites and sets out a clear two stage methodology for securing a successful plan. Such a two-stage approach is designed to ensure that:

- Base 'physical' site design measures that are currently / will be available on site prior to redevelopment site opening to provide immediate opportunities for sustainable travel.

- Additional supporting 'operational' measures will come on stream once tenants are established on the site, with initiatives tailored to each tenant in subsidiary Travel Plans.

1.4.3 This 'Framework Document' is designed to outline those base physical Travel Plan measures that can be expected to be available / will be provided to support initial site occupation and to identify a methodology by which further operational measures may be developed and ultimately implemented by site occupiers under the management of a final Travel Plan, produced post-occupation. Furthermore, dependent on the scale of floorspace taken up by individual operators, there may

be the need for individual businesses to prepare their own subsidiary Travel Plans, in order to set out in detail those organisational specific measures to be pursued, including those tailored to reflect the core principles and operating structure of individual businesses. Typically subsidiary plans would normally be prepared for larger businesses / organisations, taking on space in excess of 2,500sqm.

1.5 Opportunities for 'Opting Out'

1.5.1 Notwithstanding the above, many larger organisations in the UK already promote Travel Plans and associated initiatives for staff across their business and it is anticipated that some tenants may wish to continue to promote such company-wide initiatives. It is possible that such initiatives could exceed the package of operational measures set out within this Framework document. In such cases individual companies may prefer to 'opt out' of the Travel Plan structures set out in this framework document - providing that this is agreed with the Local Planning and Highway Authority (MCC).

1.5.2 'Opting out' will only be acceptable should an alternative Company / Organisational Travel Plan be available for review by the LPA / LHA and determined to be appropriate for implementation. Such occupiers will still be required to make their staff travel database available to the LPA / LHA and liaise and participate with the site Travel Plan Manager, to ensure that the successful implementation of Travel Plan measures can be achieved and that opportunities for the sharing of initiatives are maintained.

1.5.3 Any company wishing to 'opt out' of the site wide Travel Plan presented in this Framework Document will be required to submit an alternative plan to MCC at least two months before occupation at the Site. Alternatively, a company may adopt the site wide Travel Plan at an initial stage and then seek to 'opt out' at a later date. Again, any such 'opt out' would need to be formally agreed with MCC.

1.6 Travel Plan Structure

1.6.1 In light of the national and local Travel Plan policy / guidance outlined above, it is proposed that this Travel Plan is developed via a pyramid framework of measures and actions. The principles of this Travel Plan pyramid approach are illustrated in **Figure TP3**, with related DfT guidance noting that the process should be built 'from the ground up', with each new layer building on the last.

1.6.2 In order to satisfy the general objectives / benefits identified within key guidance documents, three distinct areas for action have been identified to be pursued within this Travel Plan:

- 'Physical' travel measures to be provided on-site by the developer;
- Tailored day-to-day 'operational' measures to encourage the take-up of sustainable travel options;
- Future management and monitoring of the implementation and take-up of Travel Plan initiatives.

1.6.3 The remaining sections of this report therefore consider the following matters, which are designed to build towards the identification of an effective Travel Plan approach for the Life Sciences buildings:

- Review of site location & accessibility audit;
- Description of the proposed development;
- Key action framework for the delivery of the Travel Plan;
- Details of plan administration;
- Assessment of travel behaviour;
- Travel Plan initiatives to be implemented;
- Monitoring and enforcement measures.

2.0 SITE LOCATION AND ACCESSIBILITY AUDIT

2.1 Overview

2.1.1 The location of a development site underpins all aspects of accessibility, in particular its relationship with complementary land uses and the range of practical travel mode options available to site users.

2.1.2 This section of the Travel Plan report effectively examines Tier 1 of the Travel Plan Pyramid – 'Site location and proximity to existing facilities and services' and identifies the extent to which the site can be considered to enjoy a good baseline level of accessibility by sustainable modes of transport.

2.2 Location and Existing Site & Highway Conditions

2.2.1 The strategic location of the Upper Brook Street Masterplan - North is illustrated in **Figure TP1** to this report, with an aerial image of the site and immediate surrounding locality included as **Figure TP2**. These plans identify the location of the site in relation to surrounding University of Manchester & Manchester Metropolitan University campus areas, the adjacent local residential area of Brunswick and the distributor road routes of A34 Upper Brook Street & A57(M) Mancunian Way

2.2.2 The wider Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site extends to approximately 2.13 hectares and comprises an irregular shaped area of land, split into two main development parcels historically associated with a car dealership business (Williams). At the time of preparation of this Framework Travel Plan, the site is characterised by former car showroom related buildings and areas of external hardstanding, previously used for the storage and display of vehicles. Vehicle access to this portion of the site is available via a formal kerbed access points from Inchley Road and Kincardine Road. No direct vehicle access is available from Upper Brook Street.

2.2.3 The study area section of A34 Upper Brook Street in the vicinity of the application site is of multi-lane single carriageway character, with the route acting as one of the key southern distributor roads serving Manchester city centre. The route provides two southbound lanes over the length of the immediate study area and three northbound lanes, except for the section immediately north of the junction with Brunswick Street, which is of a two-lane layout, plus a ghost-island right turn lane serving the local route of Cottenham Street.

2.2.4 Kincardine Road runs broadly parallel to A34 Upper Brook Street and is a local 20 mph single carriageway access road connecting Grosvenor Street to the north and Brunswick Street to the south. The section of route between Brunswick Street and Whitekirk Close to the south east of the study area operates as a one-way northbound link only (with contraflow southbound cycle lane), with the remainder of the route being currently two-way in nature and open to all traffic. Kincardine Road is accessed by a number of side road connections (Arkley Street, Whitekirk Close, Inchley Road & Hanworth Close) which provide local access to the Brunswick residential zone and is characterised by on-street parking bays (combined residents parking / short-stay pay-and-display parking) to the eastern side of the route and private gated access points to parking / servicing areas to the west (associated with commercial buildings fronting Upper Brook Street, including land parcels associated with the application site). Kincardine Road is currently generally lightly trafficked and is noted to be an important local signed ‘quiet street’ cycle route, providing an alternative cycle option to the busy A34 Upper Brook Corridor.

2.2.5 It is proposed that the Kincardine Road corridor will be subject to comprehensive environmental improvements in support of the Upper Brook Street Masterplan - North scheme, including the conversion of the route to one-way (northbound) control over the length of the route between Brunswick Stret and Grosvenor Street and the extension and improvement of dedicated cycling facilities, including full length contra-flow cycling opportunities. The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) proposals will also include for the closure of Inchley Road to traffic and the conversion of this corridor to a new public square, including enhanced east-west walk / cycle linkages (see also section 3 to this report).

2.2.6 Some opportunities for local public car parking are available within the vicinity of the site, which might be suitable for occasional Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) development staff & visitor related use in future. The majority of local streets to the Upper Brook Street site are subject to managed parking controls or residents parking zones, however, some limited short-stay on-street pay & display bays are available on Kincardine Road to the south of the site. Large multi-storey Pay & Display parking is available at the following locations within a reasonable walking catchment from the PBSA site (see **Figure TP**4), with over 3,000 spaces available within a 10-minute walk:

- *NCP Circle Square* (1018 spaces, 38 disabled bays) – circa 550m to north from the centre of the Life Sciences development area.
- *APCOA Aquatics Centre* (380 spaces) – circa 100m to the west from the centre of the proposed Life Sciences development area.
- *Charles Street Multi-Storey, University Car Park A* (808 spaces, 4 disabled bays) – circa 830m to north from the centre of the Life Sciences development area.
- *Booth Street West Multi Storey, University Car Park D* (965 spaces, 17 disabled bays) – circa 800m to the west from the centre of the proposed Life Sciences development area.

2.2.7 All other local streets within the immediate catchment of the site, including the A34 Upper Brook Street & Oxford Road corridors and those streets within the main adjacent University of Manchester & Manchester Metropolitan University campuses, are subject to yellow line parking restrictions, making them effectively unavailable for parking.

2.3 Available Sustainable Transport Connections

2.3.1 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) location, on the edge of the city centre and adjacent to both main University campus areas and Oxford Road walking, cycling & public transport corridor, is considered to offer excellent opportunities for new Life Sciences employment development, that would meet the key sustainable development objectives outlined within national planning policy guidance. This guidance

identifies the following two primary objectives when considering the location of new development:

- The need to reduce the need to travel, especially by the private car; and,
- The need to promote accessibility to a range of sustainable travel options.

2.3.2 The nature of local sustainable transport connections available within the immediate catchment of the proposed Life Sciences buildings and a review of general site accessibility are considered in the paragraphs below.

Bus Links

2.3.3 Nearest bus stops to the application site are located to the site's western frontage to A34 Upper Brook Street. These stops are served by the regular frequency number 50 bus route between Media City & East Didsbury, via Salford & Manchester City Centre (St Peters Square). This bus route provides a 12-minute day-time service frequency Mon-Saturday and 15-minute evening frequency. Sunday services provide a 15-minute day-time service and 20-minute evening service.

2.3.4 In addition to this available direct site frontage bus service, a wide range of other bus routes are available within a short walk of the site at stops on both the Oxford Road corridor and A6 London Road corridors. The Oxford Road stops are located circa 450m – 500m to the west of the site, via walking connections using Booth Street East or links through the main University of Manchester campus. Dedicated pedestrian crossing opportunities of A34 Upper Brook Street are available both at the junction with Booth Street East and via a Toucan crossing facility 50m to the south of site frontage.

2.3.5 The Oxford Road corridor operates as a high frequency bus corridor and offers modern high quality passenger infrastructure and is the main bus route into the city centre from South Manchester. Regular services available from Oxford Road stops closest to the Upper Brook Street site are as summarised below, with these routes providing links to a wide range of destinations across south and west

Manchester, as well as cross-city connections to Middleton, Blackley and Leigh (see also **Figure TP5** to this report):

- 15: Flixton – Urmston – Stretford – Hulme - Manchester
- 18: MRI – Manchester - Blackley – Middleton - Langley
- 41: Sale – Didsbury – Manchester – Bowker Vale – Higher Blackley - Middleton
- 42: Stockport – Heaton Mersey – Didsbury – Manchester (Piccadilly Gdns)
- 42A: North Reddish – Heaton Chapel – Manchester (Piccadilly Gdns)
- 42B: Woodford – Cheadle Hulme – Cheadle – Manchester (Piccadilly Gdns)
- 43: Manchester Airport – Wythenshawe - Manchester (Piccadilly Gdns)
- 44: Bowdon – Altrincham – Didsbury - Manchester (Piccadilly Gdns)
- 53: Cheetham Hill – Crumpsall – University – Old Trafford - Pendleton
- 111: Chorlton – Moss Side – Fallowfield - Manchester (Piccadilly Gdns)
- 142: East Didsbury – Withington – Moss Side - Manchester (Piccadilly Gdns)
- 143: West Didsbury – Withington – Moss Side - Manchester (Piccadilly Gdns)
- 197: Stockport – Heaton Moor – University - Manchester (Piccadilly Gdns)
- V1: MRI – Manchester – Salford – Tyldsley - Leigh

2.3.6 Further bus connections are available to the east of the site at stops on A6 London Road at Ardwick Green. These stops are located circa 550m from the Upper Brook Street, via walking connections through the adjacent Brunswick residential area (walking route using Haymans Walk / Balsam Close / Wadeson Road / Kale Street) and safe refuge island crossing points of A6 London Road. The stops at Ardwick Green provide passenger shelters, raised bus border kerbs and information boards in both directions, with the southbound stops being served by a short section of bus only lane. Bus routes available from the Ardwick Green stops, provide high frequency connections to Stockport & south west Tameside (Hyde / Denton), viz:

- 192: Hazel Grove – Heavily – Stockport – Levenshulme – Manchester (Piccadilly Gdns)
- 201: Hattersley – Hyde – Denton – Belle Vue - Manchester (Piccadilly Gdns)
- 202: Gee Cross – Hyde – Haughton Green - Manchester (Piccadilly Gdns)
- 203: Stockport – Reddish – Debdale Park – Gorton - Manchester (Piccadilly Gdns)
- 205: Dane Bank – Denton – Debdale Park – Gorton - Manchester (Piccadilly Gdns)

Rail Links

2.3.7 The proposed Life Science buildings at Upper Brook Street Masterplan - North would also be well located to provide opportunities for walking connections to the central Manchester national rail stations of Manchester Piccadilly and Manchester Oxford Road.

2.3.8 Manchester Piccadilly is the main rail hub for Manchester, providing services to a range of destinations including, London, Birmingham, Sheffield, Leeds, Liverpool, Scotland and Wales. The station is located circa 1200m walk to the north east of the northern boundary of the site, with a number of walking routes available. It is considered that the main walking route would involve links via Upper Brook Street – Sackville Street – Granby Row – A6 London Road, which is characterised by good standard footway routes adjacent to key roads and sections of segregated off-road. The crossing of key main road routes is supported by push-button traffic signal-controlled facilities. Alternative walking connections are available through the adjacent Brunswick residential area via Garside Gardens, Hanworth Close, Lockton Close and footways to the main A6 London Road corridor (circa 1000m walk distance).

2.3.9 Manchester Oxford Road station is located circa 1100m to the north west of the northern boundary to the site and is served by a range of local commuter services to south Manchester and more strategic links to Liverpool, Leeds, Sheffield, East Anglia, the North West and Scotland. The main walking route from the site to the station would be via Upper Brook Street & Grosvenor Street, connecting to the walking routes along Oxford Road. These walking connections are of good quality, with push-button traffic signal-controlled crossing points available to allow safe and controlled crossing of A34 Upper Brook Street and Oxford Road.

Greater Manchester Accessibility Level (GMAL) Rating

2.3.10 The Upper Brook Street Masterplan site's excellent potential for connectivity by public transport is reflected by its Greater Manchester Accessibility Level (GMAL) rating of 8 (see **Figure TP6** to this report), placing it in the top accessibility category across the Greater Manchester region. This GMAL score highlights the highly accessible nature of the site location and the opportunities that exist to support practical car-free living and working.

Walking & Cycling

2.3.11 In addition to the above identified local public transport connections, the location of the Upper Brook Street site also provides the potential for easy access to a wide range of local shops, services and educational areas by foot or cycle. It must also be recognised that the wider Upper Brook Street Masterplan will also deliver a small range of ancillary facilities available for use by staff based at the Life Sciences buildings, with future uses across the site anticipated to include an 'essentials' convenience store, coffee-shop / food-outlets and medical facility or pharmacy.

2.3.12 National planning guidance notes that walking is the most important mode of travel at the local scale, offering the greatest potential to replace short distance car trips of under 2km. Guidance produced by CIHT also notes that 800m represents an 'acceptable' walking distance to community facilities and shops, with 1.2km representing a 'preferred maximum'. 2km has been identified as a suitable walk distance for regular commuting trips and journeys to / from educational facilities.

2.3.13 **Figure TP7** to this report illustrates the extent of such suitable walking catchments from the Upper Brook Street frontage of the site and demonstrates that 1.2km & 2km walking catchments would effectively include the full University of Manchester & Manchester Metropolitan University campuses, key bus stops and rail stations, the shops and services along the Oxford Road & Whitworth Street corridors and parts of Manchester city centre. As noted above, key local routes to the site (Upper Brook Street, Oxford Road, Sackville Street and Grosvenor Street)

all provide a good baseline standard of pedestrian infrastructure, being characterised by wide footways of at least 2.0m and traffic-signal 'pedestrian push-button' controlled interchanges at local main junctions. Furthermore, as noted, the Kincardine Road corridor is to be improved to deliver an active travel orientated enhanced corridor as part of the wider Upper Brook Street Masterplan, along with additional walk / cycle east-west links between the University of Manchester / Oxford Road corridor and the Brunswick residential area, delivered by excellent permeability through the site.

2.3.14 National Planning Guidance also notes that cycling has the potential to substitute for short car trips – particularly those journeys of less than 5km or which could form part of a longer journey by public transport. The location of the application site allows for practical cycling access to a range of local areas including all of Manchester city centre, as well as Old Trafford, Chorlton, Fallowfield, Levenshulme, Gorton, and northern suburbs such as Cheetham Hill (**Figure TP8**).

2.3.15 A plan of available local cycle infrastructure to the application site (as identified by TfGM) is illustrated in **Figure TP9**. This demonstrates that the Kincardine Road corridor is already recognised as an important local 'quiet street' cycling corridor, linking the Plymouth Grove residential areas, with the Sackville Street corridor and Manchester city centre to the north. Furthermore, the site is located close to the primary Oxford Road 'beeline' cycling corridor, which provides high quality segregated cycle infrastructure for journeys to / from Manchester city centre, the main University of Manchester & Manchester Metropolitan University campuses, along with the core student areas of Rusholme, Fallowfield, Didsbury & South Manchester. It is anticipated that the delivery of the Upper Brook Street Masterplan - North scheme will allow for further enhancement of Kincardine Road as a key cycling corridor, thereby improving wider cycle connectivity.

Summary

2.3.16 Overall, it is concluded that the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) site represents an appropriate location for new Life Sciences based employment development, being located within a short walk

of excellent high frequency public transport connections to and from the city centre and Universities, with access to these destinations also supported by practical cycle connections. Such locational characteristics should deliver a range of realistic alternative options to the car for regular journeys and allow for the effective promotion of practical car-free employment development at the site.

3.0 REVIEW OF THE DEVELOPMENT PROPOSALS

3.1 Introduction

3.1.1 This section of the report has been prepared in reference to Tier 2 of the Travel Plan Pyramid 'Sustainable site design – parking restraint, suitable density and amenity' and sets out those key site elements that will be delivered as part of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme to help promote sustainable travel.

3.2 Development Scheme

3.2.1 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) regeneration scheme envisages the comprehensive re-development of the existing former car sales sites to deliver PBSA accommodation for 1,100 students, circa 64,643sqm GIA Life Sciences based employment development space and ancillary retail and commercial units, set within high quality new public realm. A copy of a plan illustrating the principles of the wider Upper Brook Street Masterplan, also incorporating proposed additional Student and Life Sciences proposals to the south (to be delivered by others), is included as **Appendix TP1** to this report.

3.2.2 The Life Sciences element of the masterplan is proposed to be delivered across three main buildings (see **Appendix TP1**). These buildings will provide the following schedule of employment / ancillary accommodation (GIA):

- Building B1: 20,933 sqm
- Building B2: 14,079 sqm
- Building B3: 11,631 sqm

Total: 64,643 sqm

3.2.3 The design of the buildings includes for a range of on-site facilities including the following:

- Reception areas / management suite;
- Secure cycle stores;
- Staff changing / showering areas;
- Staff café / food preparation areas.

3.2.4 Copies of relevant basement / ground floor & first floor plans illustrating the layout and location of key proposed shared facilities are included in **Appendix TP1** for reference.

3.2.5 As noted, in addition to the core Life Sciences employment facilities, the buildings will also include for additional ground floor commercial space. It is anticipated that this space will be utilised for food / drink establishment (café / bar) and other community use such as a medical based use (GP surgery or pharmacy). These ground floor uses will provide an active frontage to the buildings and also complement the core employment land use and reduce the need for staff and visitors to travel off-site during break / lunch-time periods.

3.3 Pedestrian & Cycle Access

3.3.1 The Life Sciences buildings have been designed to allow for good site accessibility to / from surrounding routes, with buildings providing active frontage access to Upper Brook Street, Kincardine Road and the proposed new public square. The masterplan scheme also includes for new public realm running through the site, which alongside the closure of Inchley Road, will deliver good site permeability and enhanced east – west pedestrian and cycle movements through the site, helping to link the Brunswick residential area to the Oxford Road corridor and University zones.

Secure Cycle Parking

3.3.2 Cycle access to the site will be supported via the provision of secure cycle stores within each of the proposed Life Science buildings,. It is proposed that secure parking for 270 cycles is delivered across the Life Sciences site (not including additional short stay cycle parking areas), as set out below, delivering an overall minimum cycle parking supply 1 secure cycle space per 10 staff members (based on a maximum staffing level across the site of 2,600 persons). In practice, however, given the influence of flexible working, shift working, illness and alternative staffing compositions in reducing this practical daily maximum staff number, it can be expected that the realistic day-to-day cycle parking to staff ratio would be much greater and in accordance with GMTS 2040 targets of 12% of future journeys to be undertaken by cycling.

- Building B1 cycle store: 110 cycles
- Building B2 cycle store: 90 cycles
- Building B3 cycle store: 70 cycles.

3.3.3 As noted above, each of the Life Sciences employment buildings would also include for showering, changing and locker / drying areas to promote cycle use and allow staff to store cycle kit and clothing whilst at work.

Short Stay Visitor Cycle Parking

3.3.4 In addition to this secure long-stay formal cycling provision, it is proposed that short-stay visitor cycle parking (sheffield stands and / or other covered cycle provision) would be located close to the main entrances of all of major buildings across the site, to allow for ad-hoc cycle trips to / from the development – typically minimum of 5 stands (10 cycle spaces) at each access point. Other ground floor ancillary development units within the site would also be required to include for secure staff cycle parking areas and short stay parking where appropriate.

3.4 Highway Network Improvements & Parking / Servicing

3.4.1 The wider Upper Brook Street Masterplan - North scheme is to be supported by a range of local highway network improvements including:

- Closure of Inchley Road to vehicle access and conversion to new public square, including full walk / cycle permeability.
- Conversion of full length of Kincardine Road to one-way operation and associated environmental improvements to encourage walk / cycle use of this route - including increased width footways, segregated contra-flow cycleway and traffic calming / speed table features.
- Improvement of Upper Brook Street / Booth Street East to provide new right turn lane for Upper Brook Street (N) to Booth Street East traffic movements and new high standard walk / cycle crossing facility to Upper Brook Street (S) at this junction.
- Connecting walking / cycle links to Grosvenor Street via Kincardine Road.

3.4.2 Ultimately the Life Sciences buildings are to be promoted as being effectively 'car free' development, with no direct general parking to be provided on site. Car parking at the site is to be limited to 9 new disabled standard bay parking spaces to be provided to the development side of Kincardine Road and shared with the proposed PBSA scheme. These spaces have been carefully located to deliver good disabled person accessibility to the Life Science buildings (4 spaces located within 50m walk of the main building entry points to buildings B1 & B2) and are specifically over-sized when compared to normal parking bays, in order to assist safe driver / passenger entry / exit of vehicles.

3.4.3 The access strategy for the Life Sciences buildings will be delivered to comply with the MCC Local Plan Policies, the current Building Regulations and BS 8300 – Access for Disabled People. All buildings would be served by level or ramped suitable ramped access to ground floor foyer / lobby zones. Lift access will be available to all floors, with level access to the lift cores within the buildings.

3.4.4 Vehicle servicing of the Life Sciences buildings (primarily deliveries & refuse collection) will be provided as follows:

- *Building B1* – Dedicated service link from Kincardine Road to the rear of the building. Access requiring drive-in / reverse-out manoeuvring and the use of a banksman for exit movements from the site.
- *Buildings B2 & B3* – Dedicated servicing zone between the buildings and accessed from Kincardine Road. Access achievable via drive-in / drive-out manoeuvring, with the potential for a service vehicle three-point-turn within the site.

3.4.5 In practice service vehicle demand associated with Life Sciences employment uses is not anticipated to be of a substantive / intensive nature and will predominately relate to 'pre-booked' deliveries, to assist efficient site operation and the good management of the servicing zones.

4.0 IMPLEMENTATION OF THE TRAVEL PLAN – KEY ACTION FRAMEWORK

4.1 Introduction

4.1.1 This section of the report outlines the method through which the Travel Plan for the Life Sciences buildings will be developed & implemented, including details of key responsibilities for both developer and future site occupiers.

4.2 Travel Plan Development

4.2.1 The development and implementation of the Travel Plan for the site is to be undertaken over three key stages. These stages are described in the remaining sections of this document and cover the role of the Site Management Company and appointed Travel Plan Manager (TPM) in overseeing both the effective delivery of the Travel Plan and the monitoring of the effects of the Plan, post occupation of the site.

4.2.2 The remainder of this Travel Plan document will therefore explore the following:

A. Plan Administration, overseen by the Site Management Company and the appointed TPM (in progress), i.e. Tier 3 of the Travel Plan pyramid 'Implementation and development of the Travel Plan';

B. Preliminary assessment of travel behaviour of site users, to be undertaken following initial occupation of the employment floorspace (refer to Section 6 for further details of assessment methodology);

C. Formulation and agreement of the site Travel Plan measures (in-progress), i.e. Tier 4 of the Travel Plan pyramid 'services and facilities';

D. Monitoring of the effectiveness of the site Travel Plan and revision where appropriate on a regular basis (to be undertaken on occupation of the site), i.e. Tier 5 of the Travel Plan pyramid 'marketing & promotion, awareness raising, monitoring and review.

4.2.3 **Figure TP10** to this report identifies the key intermediate stages with respect to the implementation programme for the Travel Plan to support the Life Sciences element of the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme.

4.2.4 Detailed commitments necessary to promote the successful delivery of the Travel Plan are identified and highlighted via **bold & underlined** text through the remainder of this document.

4.3 Developer Responsibilities

4.3.1 The developers of the Upper Brook Street Masterplan scheme, is committed to the principles of car free development and effective Travel Planning. The developer will therefore form / employ a Site Management Company, which will be responsible for implementing and monitoring of this Framework Travel Plan to support the Life Sciences development.

4.3.2 The Site Management Company will appoint a member of staff as Site Travel Plan Manager (TPM) to oversee the delivery of the Travel Plan and act as a point of contact for all travel related queries by occupiers and users of the development. Full details of the responsibilities of the Site Management Company and TPM in relation to the Travel Plan are set out in Sections 5.2 & 5.3 to this report.

4.4 Tenant Responsibilities

4.4.1 Occupiers / tenants of units of floorspace of less than 2,500sqm will not be required to produce their own individual / subsidiary Travel Plan to support site occupation, but will be encouraged and assisted in promoting the general sustainable transport principles as set out in this Framework Travel Plan.

4.4.2 Those larger organisations operating floorspace above the traditional 2,500sqm threshold will be encouraged to prepare their own individual subsidiary Travel Plan prior to occupation. Subsidiary Travel Plans will be required to accord with the guidance set out in this Framework Travel Plan, and identify user-specific / site-

specific initiatives and targets. Subsidiary Travel Plans will be developed and managed by a suitable occupier / tenant staff member who will be assigned the role of organisation Travel Plan Coordinator (TPC).

4.4.3 The TPC role will be key to the delivery of a successful individual Travel Plan and therefore a suitable person at each employment unit, such as a member of the occupier / tenant management team, should be appointed to undertake the role and be given direct support from their employer. Key roles and responsibilities of the individual organisations and TPCs are set out in Section 5.4 to this report.

- Prepare and implement a subsidiary Travel Plan for the occupier / tenant;
- Obtain a copy of the Travel Plan Pack from the Site TPM. The Pack will include information promoting local walking and cycling infrastructure, public transport services and initiatives such as car sharing, events, etc.
- Submit regular feedback to the Site TPM and MCC as necessary.
- Ensure that new occupier / tenant employees are aware of the existence of the Travel Plan.
- Undertake regular monitoring / data collection exercises in accordance with the agreed site-wide monitoring survey schedule.
- Display Travel Plan progress results on an on-site Travel Plan Noticeboard / Information Screens.

5.0 PLAN ADMINISTRATION

5.1 Overview

5.1.1 It is proposed that the delivery of the Travel Plan on behalf of the developer is overseen by the Upper Brook Street Life Sciences Site Management Company, who will be responsible for the day-to-day administration of this Framework Travel Plan. The Site Management Company will be formed / employed by the developer of the site, and will provide the main role in delivering and maintaining a successful Travel Plan throughout the lifetime of the development.

5.1.2 A description of key duties and responsibilities for the Site Management Company / TPM is provided below.

5.2 Site Management Company

5.2.1 The Site Management Company will act as the focus for the delivery of Travel Plan measures at the Life Sciences buildings & ancillary commercial areas and will be responsible for monitoring the effects of its operation.

5.2.2 The Site Management Company will implement this Travel Plan document on a site-wide basis. It is considered that such a coordinated approach to implementation across the entire Life Sciences development area will ensure that the site achieves the key sustainable transport aims of reducing single occupancy vehicle trips to / from the site. A site-wide approach should also offer benefits of economies of scale - for example, car sharing, bicycle user groups, etc. are known to have greater chances of success when they encompass a wider population.

5.3 Travel Plan Manager

5.3.1 A Travel Plan Manager (TPM) will be appointed to administer the Travel Plan at the site. The TPM role will be key to the delivery of a successful Travel Plan at the site and therefore a suitable person at the Site Management Company would be designated to undertake the required TPM duties.

5.3.2 The TPM role will be established at least three months prior to the occupation of the first employment units on site and will act as the key contact for the development of Travel Plan measures and the day-to-day operation of the Plan. Details of the TPM will be provided to the MCC and all tenant organisations subsequently taking space at the Life Sciences development.

5.3.3 Once appointed, the TPM will act as the main contact for the Travel Plan and will be responsible for implementing plan measures, involving new site users and monitoring the effects of implementation. Some of the duties and responsibilities of the TPM are set out below:

- Managing the development and implementation of the site Travel Plan.
- Maintaining on-site sustainable travel infrastructure (travel plan noticeboard, cycle parking, changing/shower facilities, etc.) and ensuring that such facilities remain fit for purpose.
- Formulating a 'key contacts' file of appropriate personnel for all businesses at the site and key personnel at relevant local transport and travel organisations such as the Local Planning & Highway Authority, TfGM, Public Transport Operators, etc.
- Organising Travel Plan Welcome Travel Packs for issue to each new on-site business / organisation to promote walking, cycling, public transport and initiatives such as car sharing.
- Creating a car share database and promoting to all site users (potentially via promoting https://liftshare.com/uk/community/sharedwheels or an alternative bespoke database).
- Promoting a Bicycle User Group (BUG) which works to look after the interests of existing cyclists and to encourage other site users to take up cycling.

- Encouraging businesses to participate in / promote the DfT Cycle to Work Loan Scheme or similar initiative to on-site businesses. This scheme allows businesses to purchase new cycles and cycle equipment for staff and reclaim the VAT on this purchase. Staff can then repay the costs of the purchase through a suitable 'salary sacrifice' agreement (applicable to employers within the overall development).

- Promoting MCC/TfGM's bicycle training opportunities to encourage site users to take up cycling (beeactive.tfgm.com/cycling/courses-and-bike-maintenance/).

- Investigating the potential for discounts on travel passes with local public transport operators and / or promote existing weekly / monthly season tickets.

- Organising Travel Plan Working Group Meetings to share initiatives with tenants located at the site.

- Liaising with TPCs of other local developments. It is considered that the 'pooling' of ideas and initiatives between local developments will ensure that the Travel Plan has maximum influence.

- Undertaking annual/biennial reviews of the Framework Travel Plan, including surveys of staff travel patterns of businesses based at the site (see section 8).

5.3.4 A schedule of Site TPM duties and tasks is provided in **Appendix TP2** to this document. This schedule effectively represents an 'Action Plan' for the development and delivery of the Travel Plan.

5.4 On-Site Tenants / Organisations

5.4.1 The tenants of each office suite / ground floor retail unit of the development will be required to adopt the principles of the site-wide Travel Plan & Prepare Subsidiary Travel Plans in the case of larger organisations. The key roles and responsibilities of site tenants will be as follows:

- Obtaining a copy of the Travel Plan Pack from the TPM. The Pack will include information promoting local walking and cycling infrastructure, public transport services and initiatives such as car sharing, etc. Tenants should liaise with the TPM on a regular basis to ensure that the Travel Plan Pack is up-to-date.

- Monitoring the operation of the Travel Plan and undertaking regular data collection exercises in accordance with the monitoring schedule proposed in Section 8 to this report. The TPMs should provide a suitable questionnaire template document;

- Providing the results of the data collection exercise to the TPM;

- Submitting regular feedback to the TPM;

- Ensuring that new employees are aware of the existence of the Travel Plan (as part of employee induction procedures) – preferably within seven days of beginning work on site;

- Attending Travel Plan Working Group meetings.

5.5 Travel Plan Working Group

5.5.1 A Travel Plan Working Group will be set up by the TPM, with all tenants invited to attend. Meetings are anticipated to act as a forum for the discussion of Travel Plan issues and assist in the administration of individual Travel Plan measures, such as a site wide car share database or methods for organising travel card discounts.

5.5.2 **Meetings will be undertaken on at least a six-monthly basis for the first two years post initial site occupation.**

6.0 ASSESSMENT OF TRAVEL BEHAVIOUR

6.1 It is important that, where possible, Travel Plans are tailored to meet the specific operational requirements of site tenants / organisations – with the principal goal being to implement realistic Travel Plan measures which can help reduce the number of single occupancy car journeys to / from the site to a minimum. This objective is best achieved through the reference to information on travel patterns at the development site which can be analysed to identify and establish baseline conditions, the propensity for future travel change and the setting of targets for sustainable trip making / managing car use and to assist in the selection / refinement of individual Travel Plan measures.

6.2 At this planning application stage of the development of the Upper Brook Street site, however, final end users are still to be identified. Suitable existing travel data is therefore unlikely to be available until occupation.

6.3 **Given the above, it is proposed that a travel survey of staff is undertaken within 6 months of initial occupation of the Life Sciences buildings or when two thirds of all employment development space is let (whichever is sooner). Additional surveys of those companies moving to the site post the initial full survey should be carried out within 3 months of the date of tenant occupation.**

6.4 **Travel surveys should be carried out on the basis of a detailed questionnaire provided to tenants by the TPM.** An example staff travel survey, which could be used as a template, is attached as **Appendix TP3.** The final form of the questionnaire should be agreed with MCC prior to any survey exercise being undertaken. Further travel surveys should be undertaken annually for the first 5 years of operation of the plan in accordance with the Travel Plan monitoring schedule (see Section 8).

6.5 **The travel surveys will be organised by the TPM (in conjunction with the tenants) who will include all information collected within a subsequent Travel Database for the site.** All data collected will be subject to the regulations of the

GDPR Data Protection Act. Full staff postcodes will not be stored within the database for security reasons, with only the first four digits being utilised.

7.0 FORMULATION AND AGREEMENT OF THE TRAVEL PLAN

7.1 Introduction

7.1.1 The aims of Tiers 4 & 5 of the Travel Plan pyramid are to establish the measures and initiatives to be implemented on site to reduce the level of dependency on the private car and to determine how their operation / effectiveness can be promoted and monitored.

7.1.2 The following section of this Travel Plan document outlines those physical and operational measures to be implemented at the site.

7.1.3 **The measures proposed within this document represent a package of initiatives that will be progressed for implementation by the TPM to support initial occupation of the site. Many of these measures will subsequently be tailored to reflect site user requirements following occupation of the development, as informed by regular monitoring of site employees.**

7.1.4 The Travel Plan is proposed to be delivered as part of a three-stage process:

- *Physical site works* - which would be provided by the site developer as part of the delivery of the scheme;
- *Tailored operational Travel Plan measures* - which would be introduced / promoted site-wide to improve accessibility / encourage sustainable travel patterns amongst site users;
- *Monitoring of the implementation and success of Travel Plan initiatives.*

7.2 Physical Travel Plan Measures

7.2.1 The Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme includes for a number of key 'physical' transport measures that will be provided on site prior to occupation by the end users as part of each development unit. These measures relate to general transport facilities that will be common across all development units and are as follows:

- Provision of suitable levels of secure cycle parking within each building, in line with final consented scheme plans (see section 3.3 to this report). This cycle parking area to include for a puncture repair facility, track pump and basic cycle repair tools maintained by the building manager or Site TPM.

- Provision of additional short stay visitor cycle parking in public realm areas close to the main pedestrian entrance points to the Life Sciences buildings.

- Provision of changing / shower areas and lockers within each building to support staff access by walking, cycling and public transport modes.

- Provision of basic food preparation areas within each Life Sciences employment suite, to minimise the need for staff to travel off site during main break periods.

7.2.2 Each business will also be encouraged to provide their own Travel Plan noticeboard / information screens within communal staff areas to include up-to-date public transport information, details of key travel initiatives, healthy living information, etc.

7.2.3 It is the responsibility of the TPM to ensure that sustainable transport facilities within the curtilage of the development site are properly maintained and remain fit for purpose.

7.2.4 In addition to these key building related issues, it is also proposed that the Upper Brook Street Masterplan (Williams Motor Co (Holdings) / Alliance UBS Limited) scheme will deliver & support the following travel infrastructure:

- New public realm and walking / cycling routes within the site and associated directional signage.
- Local walking and cycle enhancements to Kincardine Road and new connecting facilities to Grosvenor Street, Gartside Gardens and Booth Street West.
- New GM Bee Network cycle hire docking stations within the site to encourage additional cycle movements.
- Two car club bays on Kincardine Road.

7.3 Operational Travel Plan Measures

7.3.1 The following paragraphs outline those 'operational' measures to be considered and promoted, where appropriate, by the Site TPM and those organisations taking space at the Life Sciences buildings. For ease of reference, measures have been grouped under the following key sub-headings:

- Improving Information and Raising Awareness;
- Encouraging Increased use of Public Transport;
- Encouraging Increased use of Walking and Cycling;
- Encouraging Efficient Car Use;
- Opportunities to Reduce the Need to Travel.

Improving Information and Raising Awareness

7.3.2 **Information discussed under each heading of this section should be promoted via a Travel Plan Pack to be offered by the Site TPM to all site tenants / organisation when taking on floorspace within the Life Sciences buildings.** The pack should be collated by the Site TPM and provided to each new business on site for circulation amongst all employees and visitors. It is recommended that the pack is displayed within communal areas, such as lobby or staff break out zones. It is anticipated that this pack will be a useful tool in the promotion of the Travel Plan and encouraging the use of sustainable transport options and would comprise:

- Short introductory note to accompany the Travel Plan Pack to explain why the Travel Plan has been produced, its objectives and details of key contacts, including the Site TPM;
- Details of journey planning tools, such as (https://tfgm.com/plan-a-journey or www.traveline.info);
- Greater Manchester cycle map, details of local cycle training opportunities & Bee Network Cycle Hire;
- Details of the site car share database scheme / promotion of the Enterprise Car Club service for short-term ad-hoc access to hire cars;

- Demonstration of site accessibility and available local sustainable connections to local shops and services within promotional information supporting the development of the site, e.g. websites, development PR material, etc;
- Details of relevant TfGM initiatives and public transport timetables / ticketing;
- Promotion of key travel events.

7.3.3 **Information within the Travel Plan Pack should be regularly checked and updated by the Site TPM.**

Encouraging Increased use of Public Transport

7.3.4 Public transport services using local stops can potentially be made more attractive to staff at the site through the provision of increased information, highlighting cheaper / convenient ticketing arrangements and promoting opportunities for improved connections.

7.3.5 It is the responsibility of the Site TPM to ensure that the Travel Plan pack contains appropriate levels of information to encourage use of local public transport services and issue to each tenant for circulation amongst all staff and visitors. Details of key information services such as the TfGM website for access to online public transport information (www.TfGM.com), online bus journey planners (e.g. www.traveline.info, National Rail website for on-line rail journey planner (www.nationalrail.co.uk) and live train departure board information for Manchester Piccadilly (https://ojp.nationalrail.co.uk/service/ldbboard/dep/MAN) & Oxford Road (https://ojp.nationalrail.co.uk/service/ldbboard/dep/MCO) stations should be made available on the Travel Plan or information screens.

7.3.6 **Provision of further information to site users regarding the Traveline phone service (0871 200 2233) for up to date 'real time' travel information and advice.**

7.3.7 **Provision of Local Public Transport route maps (Manchester North & South Bus Maps / Manchester City Centre Bus Map / Metrolink System Map / Metroshuttle**

Map / North West Rail System Map) for the Manchester City Centre area (as produced by TfGM at the time of site occupation).

7.3.8 **The Site TPM will liaise with local public transport operators and TfGM to ensure that all public transport information provided on-site is up to date.**

7.3.9 **The Site TPM will also liaise with local public transport operators, TfGM and other TPCs within the local area to investigate opportunities for publicising opportunities for more convenient arrangements for the purchase / renewal of season tickets or mobile phone-based ticketing arrangements.**

Encouraging Increased use of Walking and Cycling

7.3.10 **Provision of information / maps about the local footpath network and local shops, facilities and services located within a suitable walking catchment of the site, to be includes as part of the Travel Plan pack.**

7.3.11 **Provision of information regarding the health benefits of walking and cycling within the Travel Plan pack**, such as details of the 'Walking the Way to Health' initiatives and direction to key information sources such as www.sustrans.org.uk, www.bikeright.co.uk, etc.

7.3.12 **Encourage businesses and organisations based at the site to participate in an interest free cycle loan system to staff via the 'DfT Cycle to Work Loan Scheme'. This scheme allows for businesses to purchase new cycles and cycle equipment for staff and reclaim the VAT on this purchase. Staff can then effectively repay the costs of the purchase through a suitable 'salary sacrifice' agreement (see Appendix TP4 for details of how to set up a scheme).**

7.3.13 **The Site TPM should seek to identify the potential for the negotiation of discounts on cycle related purchases with local cycle shops for staff based at the site.**

7.3.14 **Promotion of events** such as National Bike Week where commuters are encouraged to leave their cars at home and try cycling.

7.3.15 **Provision of details of the Bee Network 'Beryl Bike' Cycle Hire Scheme.** Currently being rolled out across Manchester, Salford and Trafford, the scheme will provide new stations of pedal and e-bikes to hire on a pay-as-you-ride basis. Pedal bikes cost 50p to unlock and 5p per minute to ride. E-bikes cost £1 to unlock and 10p per minute to ride. Further details available at https://beeactive.tfgm.com/cycle-hire/, including link to the Beryl (scheme operator) app, which provides the locations of nearest stations. TfGM will be approached to consider installing new hire bike docking stations within the wider Upper Brook Street Masterplan area, to promote easy staff, visitor and student resident access to cycling.

7.3.16 **Provision of details of local cycle training courses operated by TfGM and partners, to site users** (see **Appendix TP5**).

7.3.17 **Provision of information concerning the health benefits of cycling.** The TPM should also direct site users to other key cycling information sources such as https://beeactive.tfgm.com/cycling/, www.sustrans.org.uk, www.loveyourbike.org, etc.

7.3.18 **Investigate the potential for creation of a Bicycle User Group (BUG).** BUGs work to look after the interests of existing cyclists and to encourage other employees to take up cycling.

7.3.19 **Provision of incentives to encourage staff to cycle to work at the site, such as providing a free breakfast for those who cycle to / from the site during National Bike Week and sponsored equipment (such as fluorescent bibs / clip lights / reflectors, etc).**

Encouraging Efficient Car Use

7.3.20 **Promotion of the city centre Enterprise Car Club scheme and the details of car pick / up drop off locations within a local walking distance of the development site.** There are a number of car club locations within easy walk of the Upper Brook Street site, and it is anticipated that ultimately two new car club bays could be implemented on Kincardine Road in support of the wider Upper Brook Street Masterplan.

Opportunities to Reduce the Need to Travel

7.3.21 Improvements in technology will allow for some tasks to be undertaken without the need to travel to the workplace or physically attend meetings. In addition, modern working practices often allow for flexible working practices to avoid the need for staff to travel during peak 'rush hour' periods. Some of these advancements could be employed by occupiers at the site. Clearly the Site TPM can only have limited influence in encouraging the use of such measures, as individual site tenants will have different operating regimes. Nevertheless, the Site TPM will encourage tenants at the site to consider key target areas such as those set out below:

- Reducing the overall need to travel for business purposes;
- Reducing overall business mileage required per person;
- Encouraging more sustainable business travel by providing options to use alternative travel modes to the private car and promoting initiatives such as cycle mileage rates / organisational membership of Beryl-Bike or Enterprise Car Club schemes, etc.

Supporting the Principle of Car-Free Development

7.3.22 To give staff confidence to embrace the car-free principles of the development and to re-assure them that travel choices will be supported, the Site TPM will encourage site tenants to offer a free emergency taxi ride home to staff if required to work late at short notice or in the case of a family emergency situation.

Experience suggests that such schemes are rarely called on in practice, but they give staff the comfort that full support is available from their employer should they ever need it.

7.4 Plan Implementation

7.4.1 The development of the Travel Plan and the Site TPM role at the redevelopment site will be funded and operated by the Site Management Company.

7.4.2 Measures identified within sections 7.2 and 7.3 to this report should be available at the date of first occupation of the site where possible.

7.4.3 A suitable Travel Plan operating budget will be set aside to assist the delivery of the Travel Plan over the initial five-year period, post initial site occupation. This budget will be utilised for promoting, encouraging and providing incentives for increasing sustainable travel at the site. The funds could also be used for covering typical travel plan administration tasks such as the design and production of publicity material, maintenance of on-site sustainable travel infrastructure (Travel Plan noticeboard / information screens, cycle storage areas), personalised travel planning and the production of site-specific travel information / welcome packs.

7.4.4 Monitoring of the use of the Travel Plan operational budget will be carried out by the site TPM, with details of annual spending on travel initiatives and current budget position recorded within the Travel Plan Progress Report provided to MCC (see section 8.3 to this report).

8.0 IDENTIFYING TARGETS AND MONITORING PROGRESS

8.1 Introduction

8.1.1 In order to gain an understanding of the influence / impact of the Travel Plan and to measure the Plan's progress in encouraging sustainable travel patterns, monitoring of staff travel trends at the site will be undertaken at regular intervals, with a view to the site meeting appropriate voluntary Travel Plan targets. Section 1 to this report identifies that the key objectives of any Travel Plan at the site would be to minimise the need for car journeys associated with the day-to-day operation of the Life Sciences buildings and to encourage increased use of a wide range of more sustainable travel modes. Targets for the Travel Plan at the site should therefore be designed to be 'SMART', i.e.

- **S**pecific;
- **M**easurable;
- **A**chievable;
- **R**elevant; and
- **T**ime-bound.

8.2 Travel Plan Targets

8.2.1 As baseline travel trends for the development are not currently available, but the development is to be promoted as primarily 'car free' in nature, it is difficult to set initial targets at this pre-planning stage. Ultimately car use is expected to be low, but there will be opportunities, particularly immediately prior to and after business occupation, to target travel patterns and demonstrate the sustainable alternatives to car travel.

8.2.2 Information on mode choice, staff / visitor use of local car parking opportunities, etc. will need to be regularly collected by the TPM as part of programmed data collection exercises. Initial travel surveys at the site should be carried out within six months of initial occupation at the site or when two thirds of all employment

development space is let (whichever is sooner). The remaining units will be surveyed post occupation by new business, as part of subsequent scheduled survey exercises (see section 8.3 below).

8.2.3 Following the completion of the first Travel Survey exercise, it is proposed that appropriate targets are discussed and agreed with MCC, based upon the recorded site-specific baseline data.

8.2.4 Progress towards targets will be monitored via regular update surveys (see section 8.3), with short term targets acting as a guide to the progress of Travel Plan initiatives.

8.3 Monitoring

8.3.1 Update surveys will be carried out by the Site TPM at set intervals after initial occupation, with results being submitted to MCC within six weeks of survey completion, as part of the Travel Plan progress reporting.

8.3.2 It is proposed that Travel Surveys are undertaken based on the schedule set out below:

- Initial survey within six months post initial occupation or when the site is two-thirds occupied (whichever sooner).
- Comprehensive follow-up survey, one-year post date of initial survey.
- Annual surveys for first five years of Travel Plan operation and then every two years from that point forward.

8.3.3 The following key parameters for site operation should be included within the monitoring survey exercise:

- Changes in recorded staff travel mode split across the site (using an agreed short survey questionnaire);
- Location of any Life Sciences building related car parking (staff & visitors, where possible).

- Any Travel Plan feedback from on-site businesses.

8.3.4 The Site TPM will maintain a monitoring table of progress towards agreed Travel Plan targets based on the results of the regular monitoring surveys.

8.4 Review Procedure

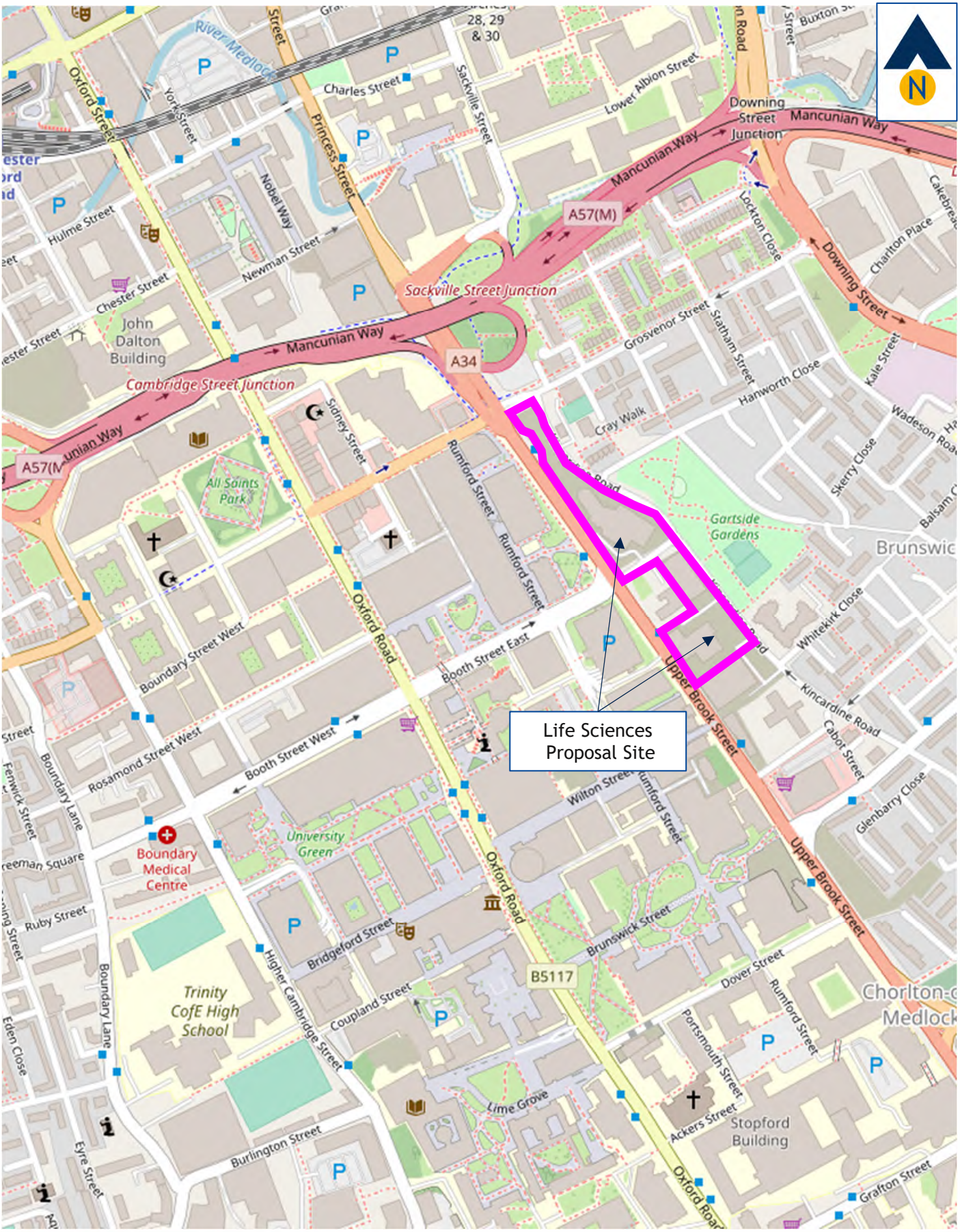
8.4.1 Regular review of the Framework Travel Plan will be undertaken by the Site TPM in discussion with MCC, based on the results of the scheduled monitoring programme. This review will assess the progress of the Travel Plan with respect to targets and consider the take up / effectiveness of individual measures. This review may identify areas within the Travel Plan which may require changes or modification.

8.4.2 It may be necessary to review Travel Plan targets based on performance records, feedback from staff, changes in local transport provision and the experience of the TPM re: take up of Travel Plan.

8.4.3 **To assist the review process, the Site TPM will prepare a brief Travel Plan Progress Report for submission to MCC.** This document should be prepared following each site exercise and should record the following:

- The results of the most recent travel surveys with respect to targets;
- The general effectiveness of current initiatives within the Travel Plan;
- Those measures within the Travel Plan which are proposed to be continued / those measures to be withdrawn;
- Details of any new Travel Plan initiatives to be provided at the Life Sciences buildings.

FIGURES



FOCUS TRANSPORT PLANNING

Figure TP1 **Site Location: Local Context**

J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023

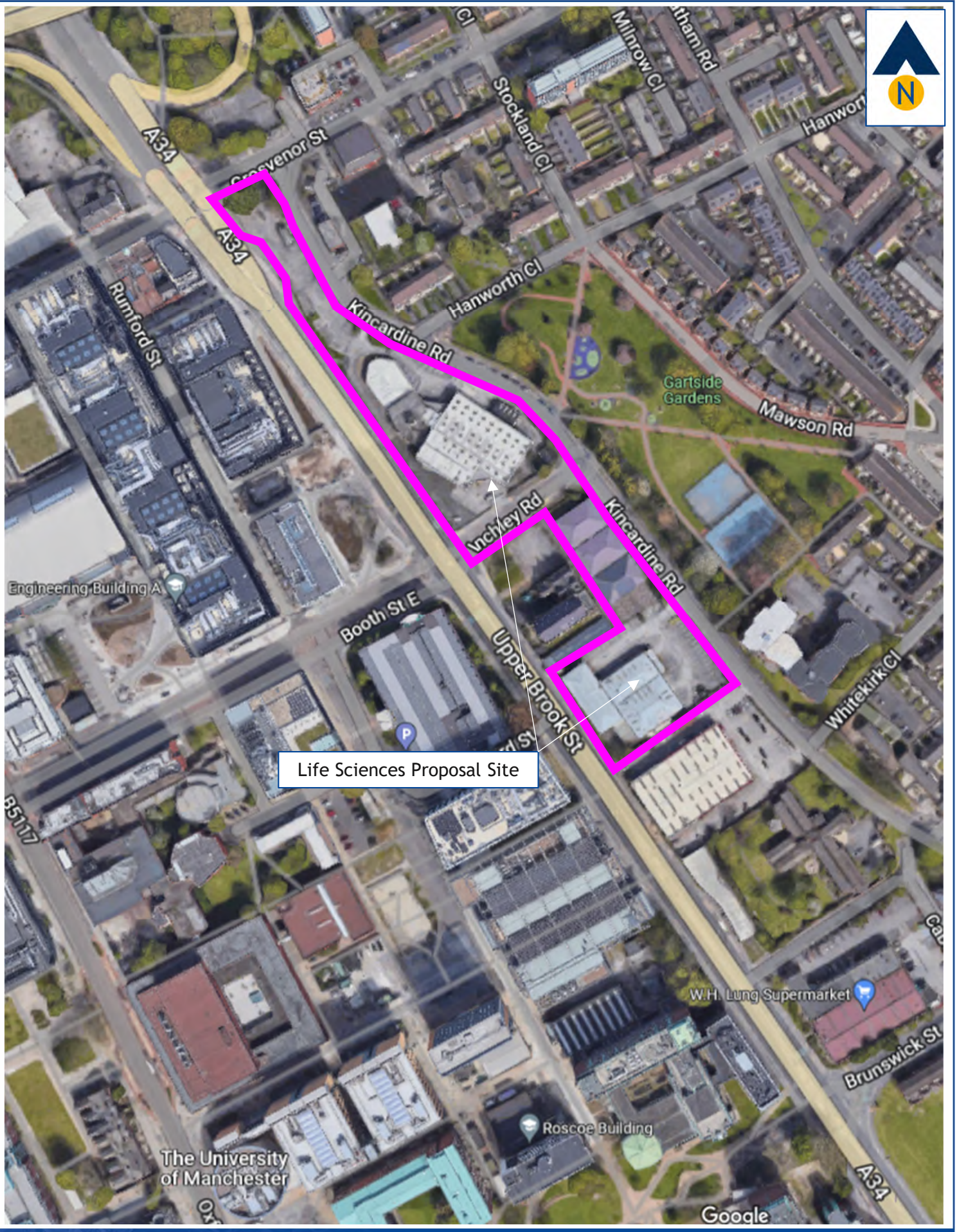
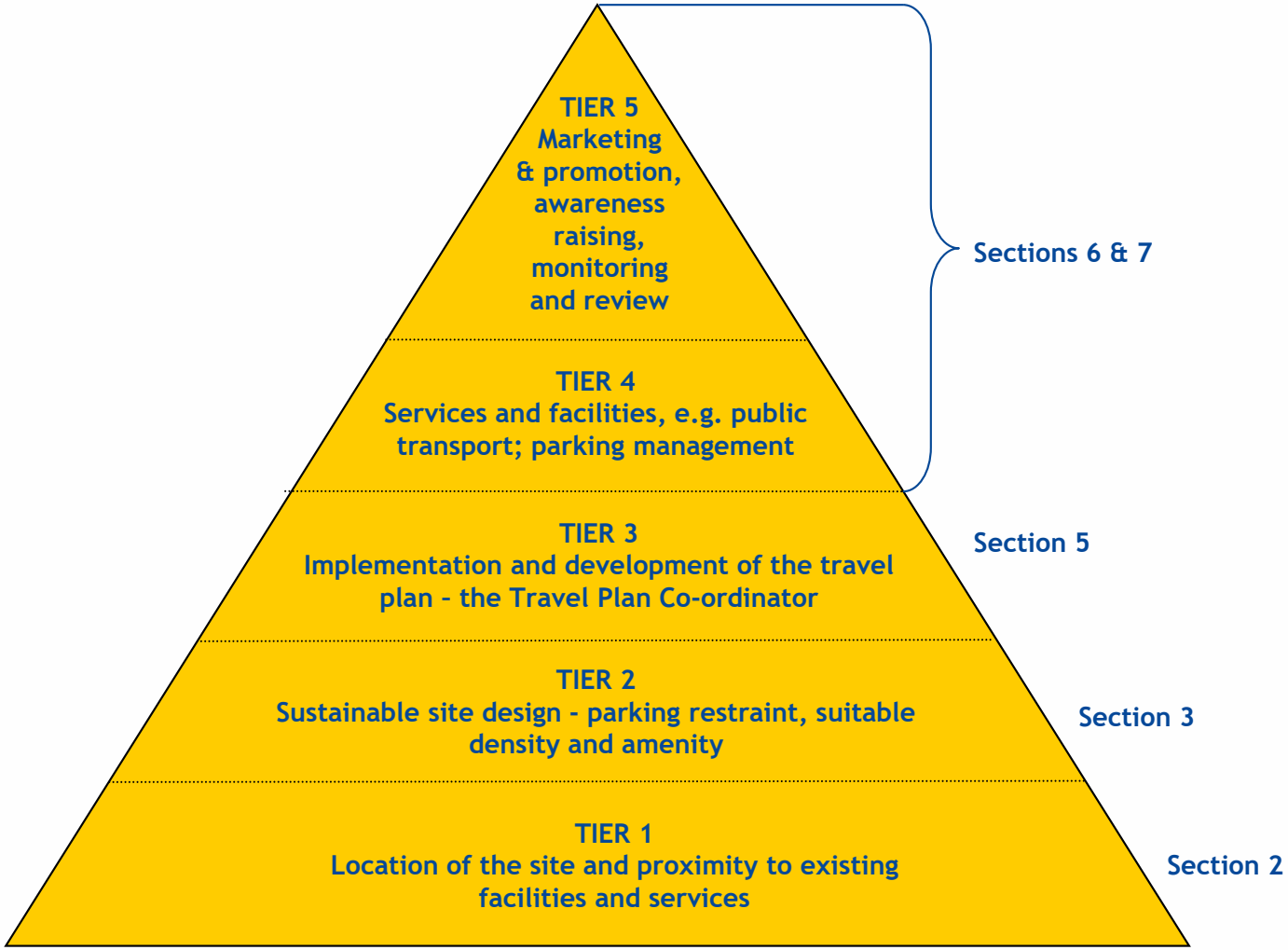


Figure TP2	**Site Location: Immediate Context**	
J000370	Upper Brook Street Masterplan (Williams / Alliance UBS)	June 2023



Travel Plan Pyramid *(Adapted from DfT 'Good Practice Guidelines: Delivering Travel Plans through the Planning Process', April 2009)*



FOCUS TRANSPORT PLANNING

FIGURE TP4

Location & Nature of Local Parking Opportunities to the Upper Brook Street Life Sciences Buildings

J000370

Upper Brook Street Masterplan (Williams / Alliance UBS)

June 2023

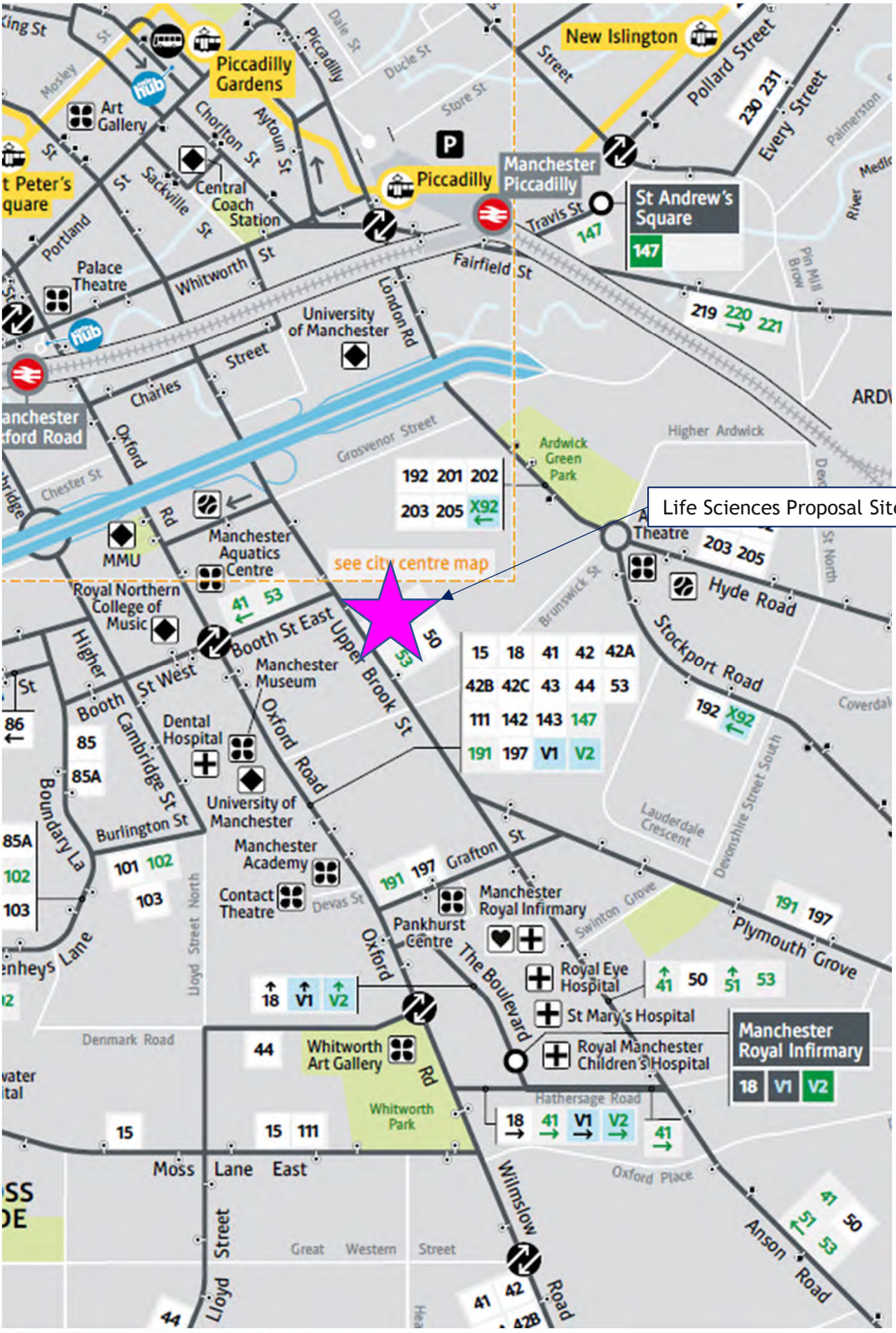
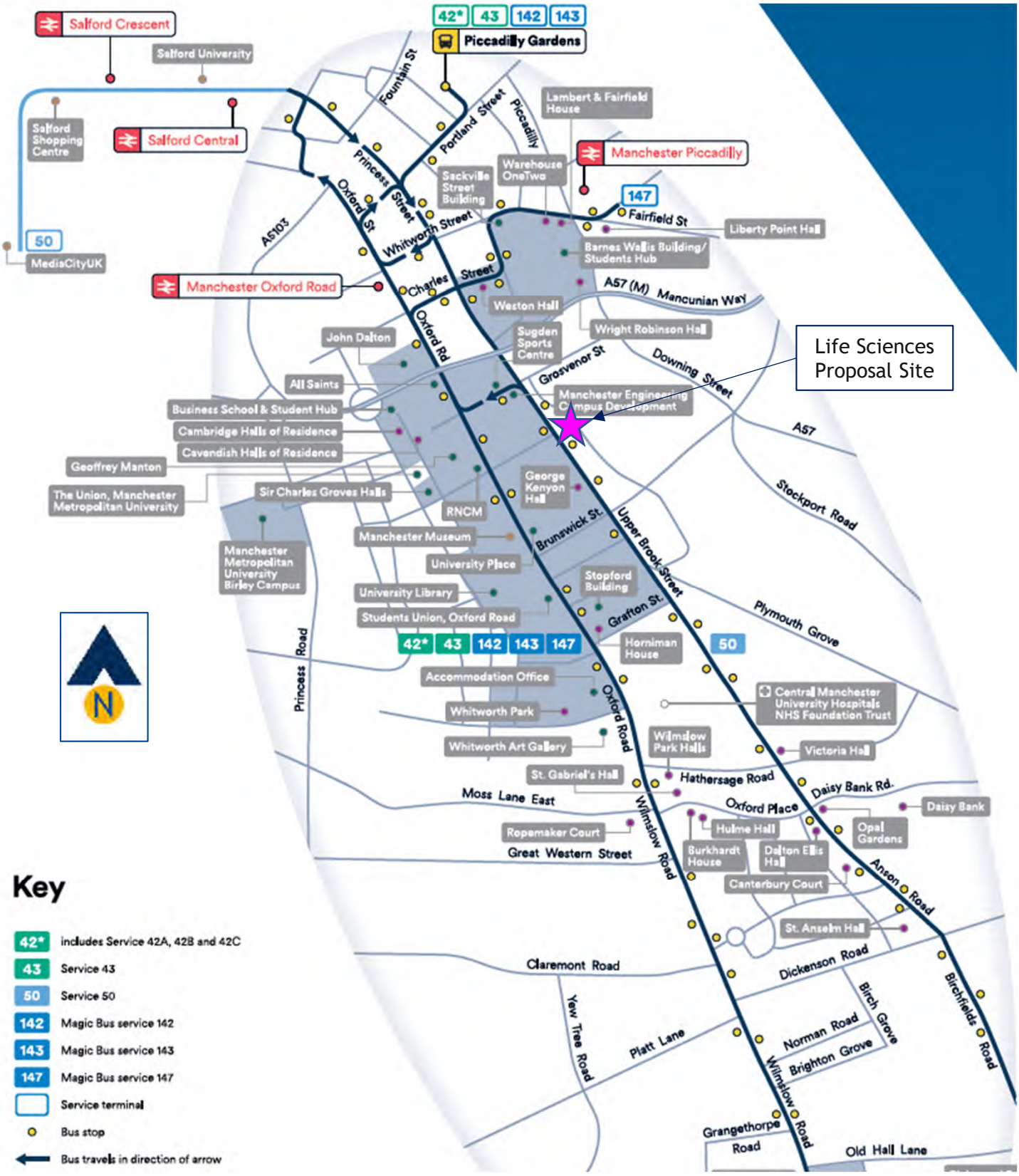


FIGURE TP5a **Local Public Transport Connections to the Upper Brook Street Life Sciences Buildings**

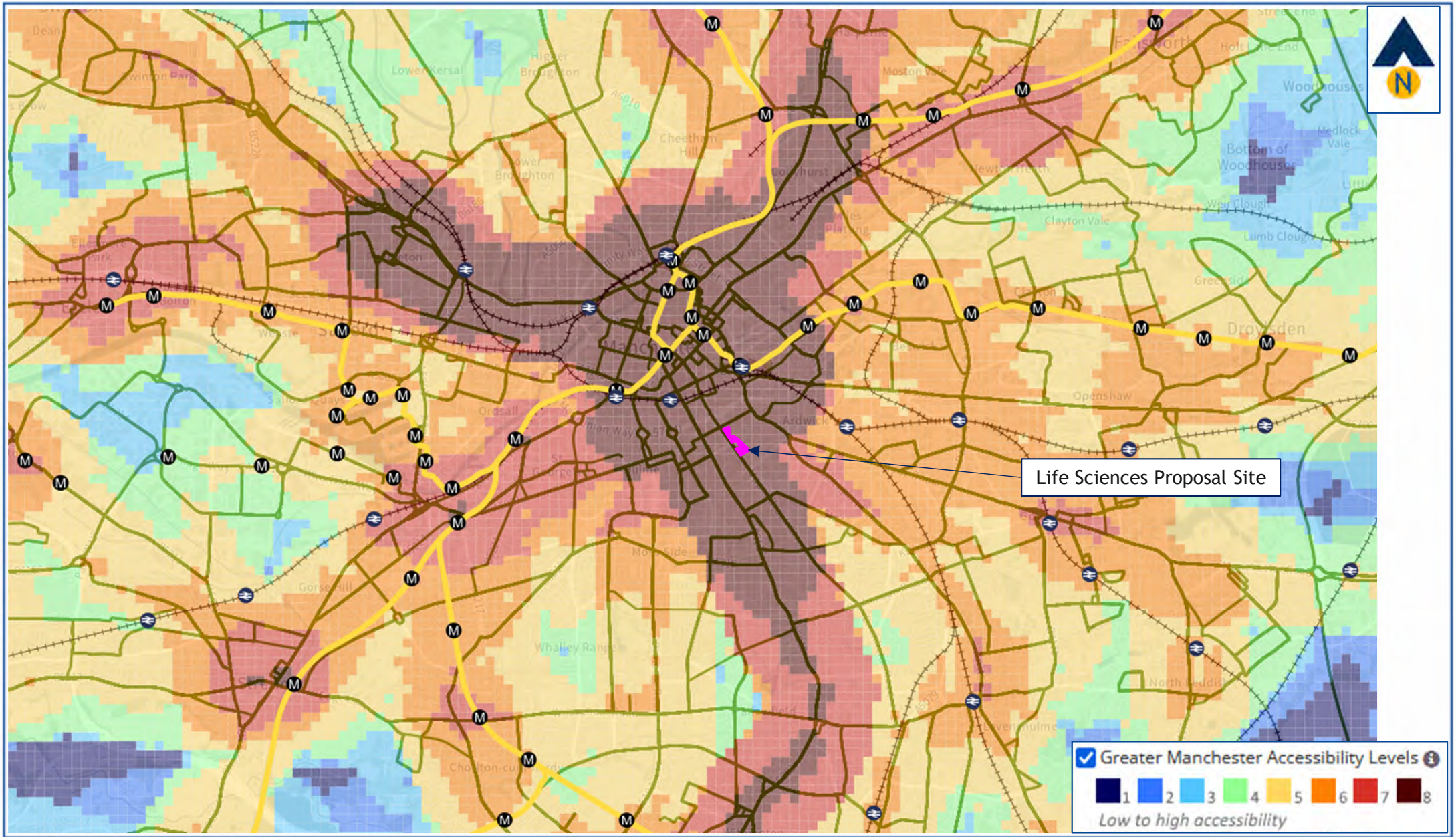
J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023



FOCUS TRANSPORT PLANNING

FIGURE TP5b **Local Student Bus Connections Linked By the Oxford Road Corridor**

J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023



FOCUS TRANSPORT PLANNING

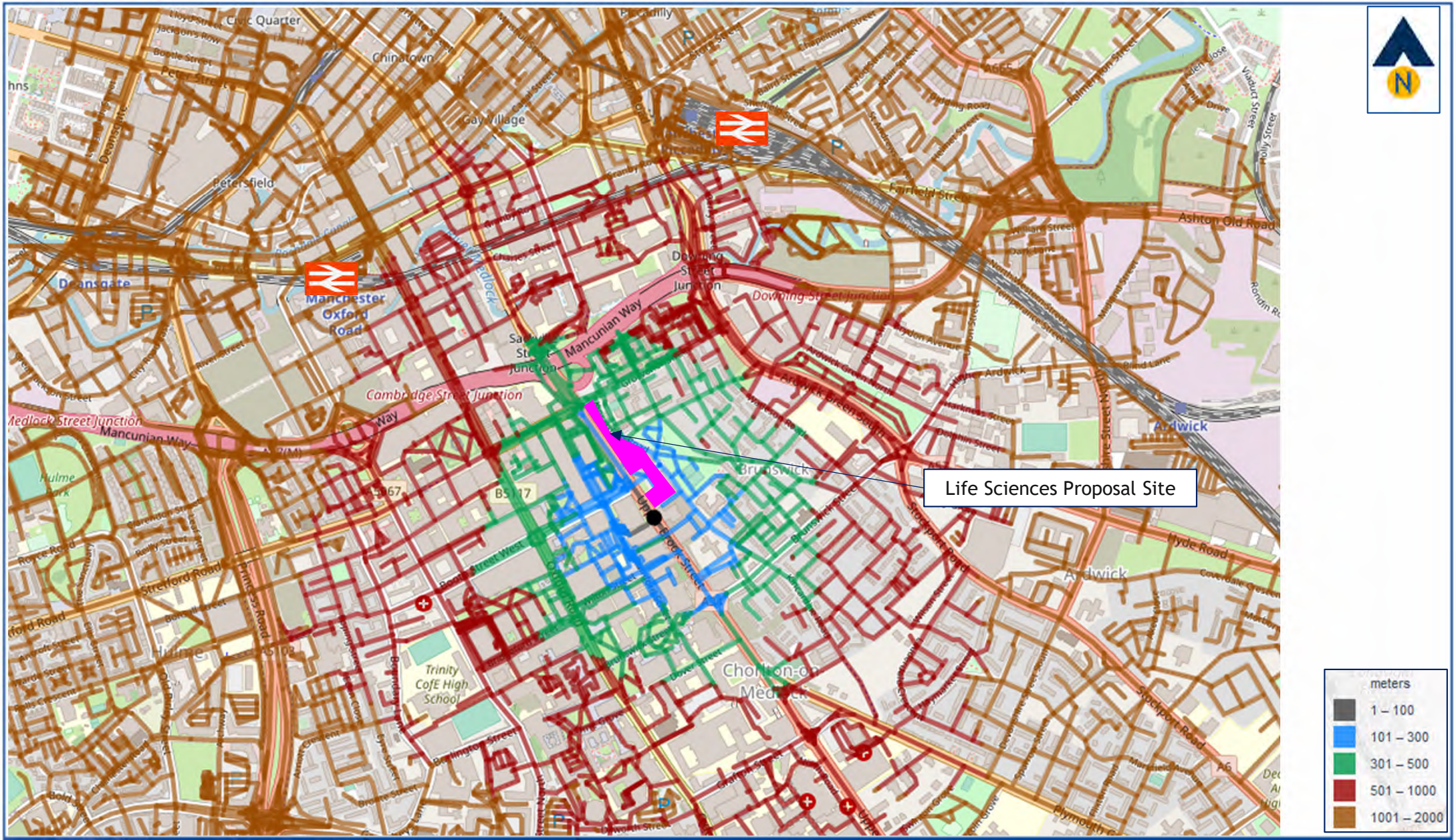
Figure TP6

Greater Manchester Accessibility Levels for Manchester City Centre and Surrounding Areas

Upper Brook Street Masterplan
(Williams / Alliance UBS)

J000370

June 2023



FOCUS TRANSPORT PLANNING

Figure TP7

2km Walk Catchment from Upper Brook Street Life Sciences Buildings

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023

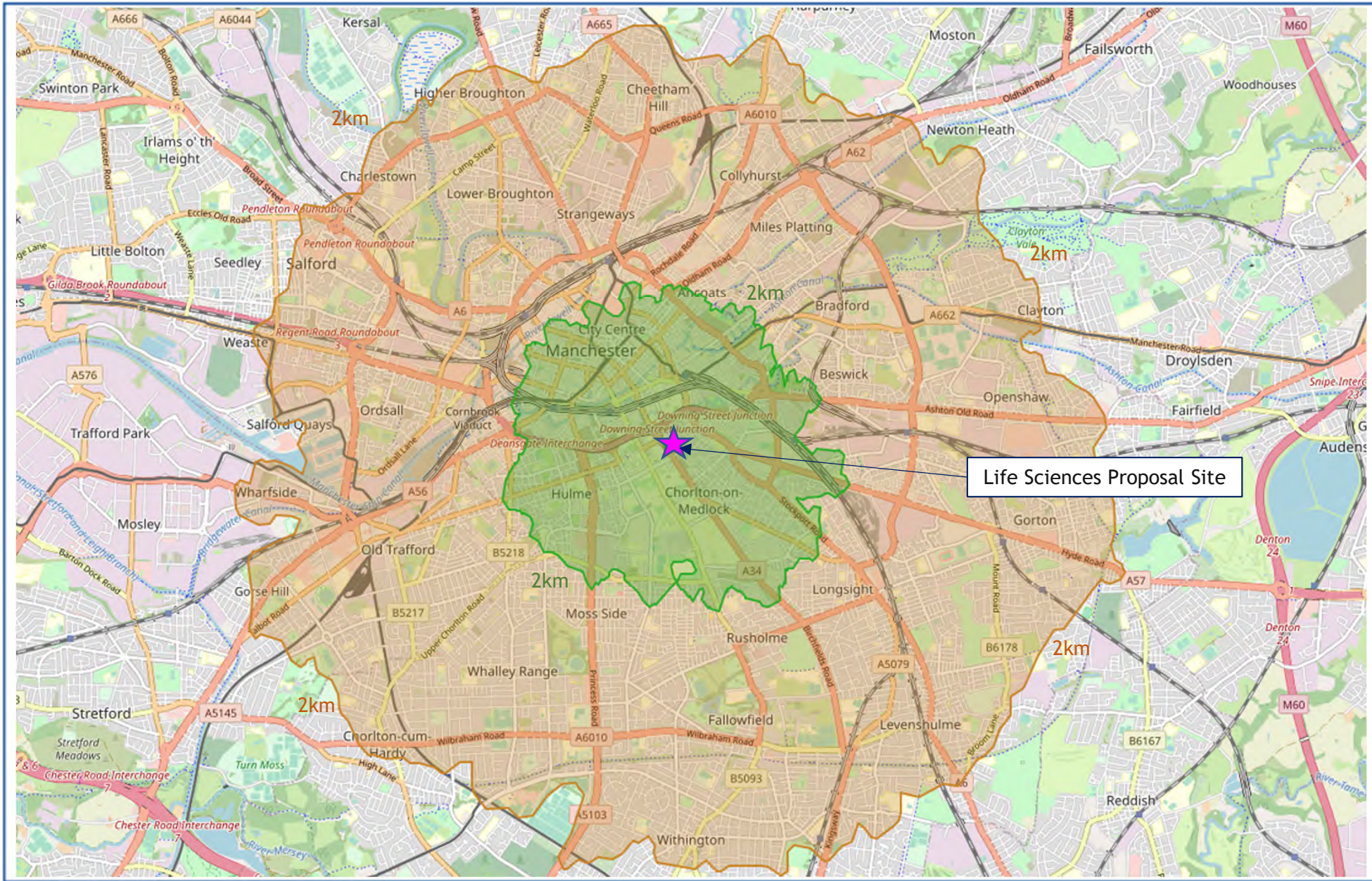


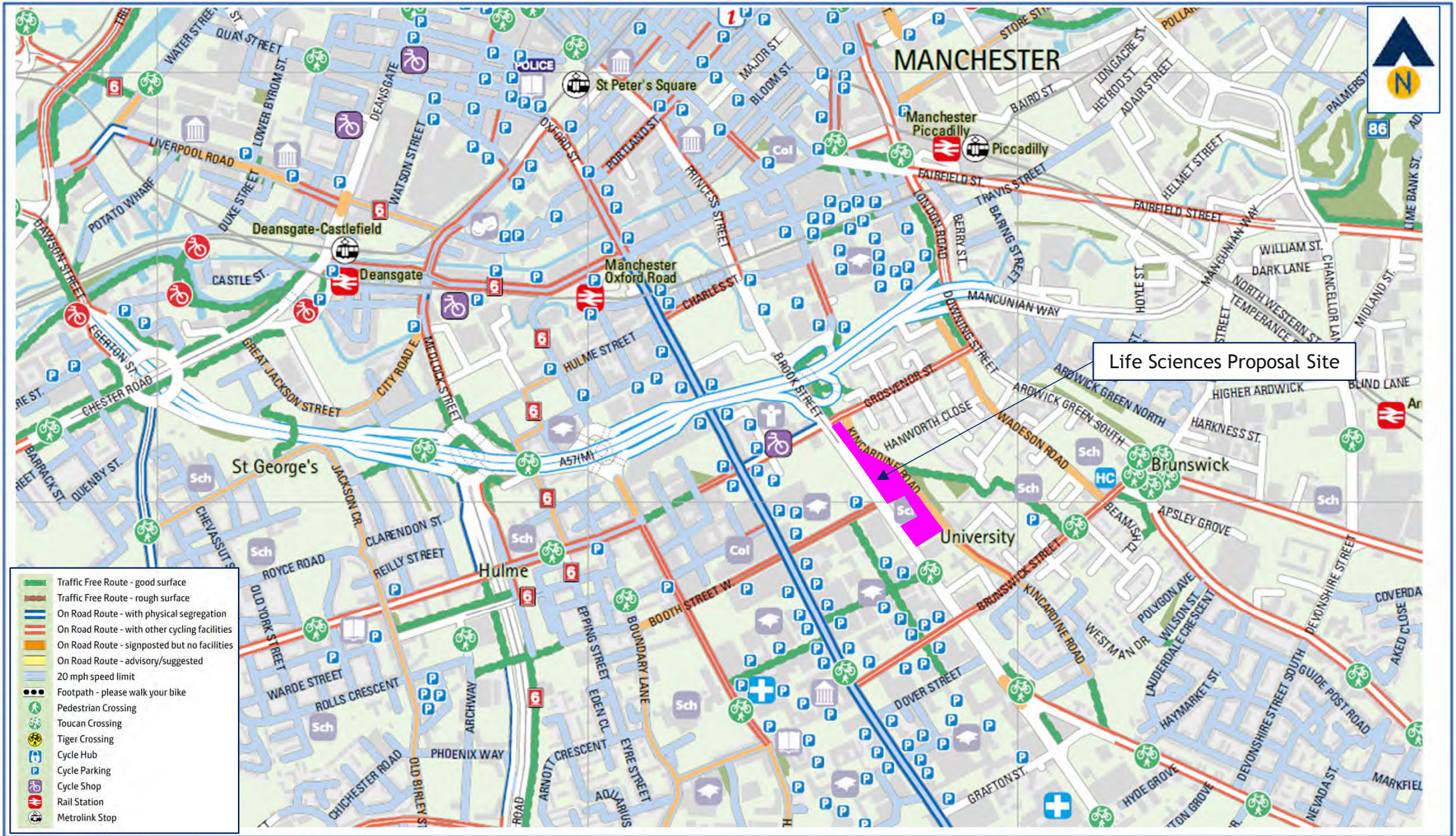
Figure TP8

2km & 5km Cycle Catchment from Upper Brook Street Life Sciences Buildings

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023



FOCUS TRANSPORT PLANNING

Figure TP9

Available Local Cycling Infrastructure to the Upper Brook Street Life Sciences Buildings

J000370

Upper Brook Street Masterplan
(Williams / Alliance UBS)

June 2023

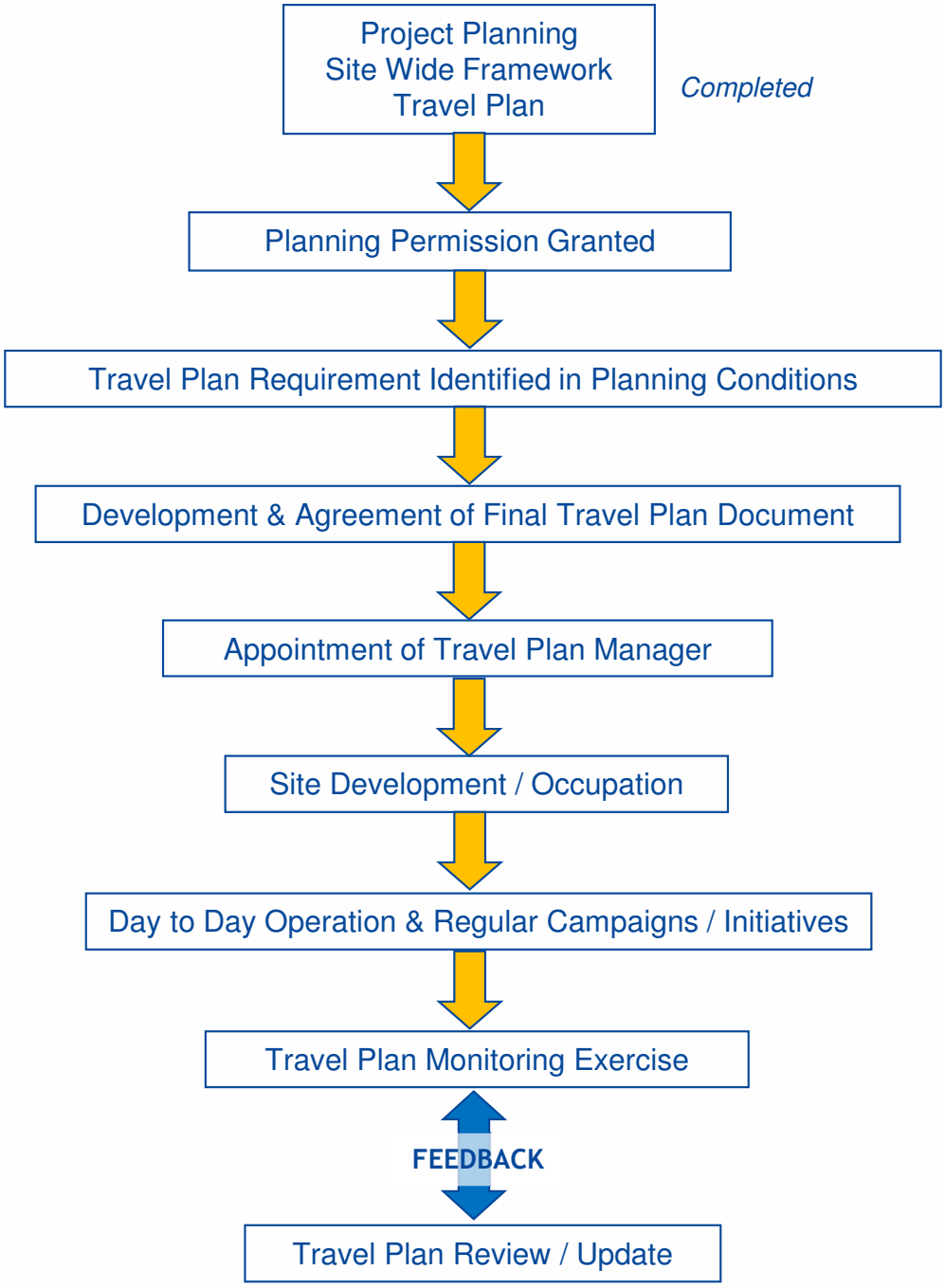


FIGURE TP10 **Life Sciences Buildings Travel Plan Implementation Programme**

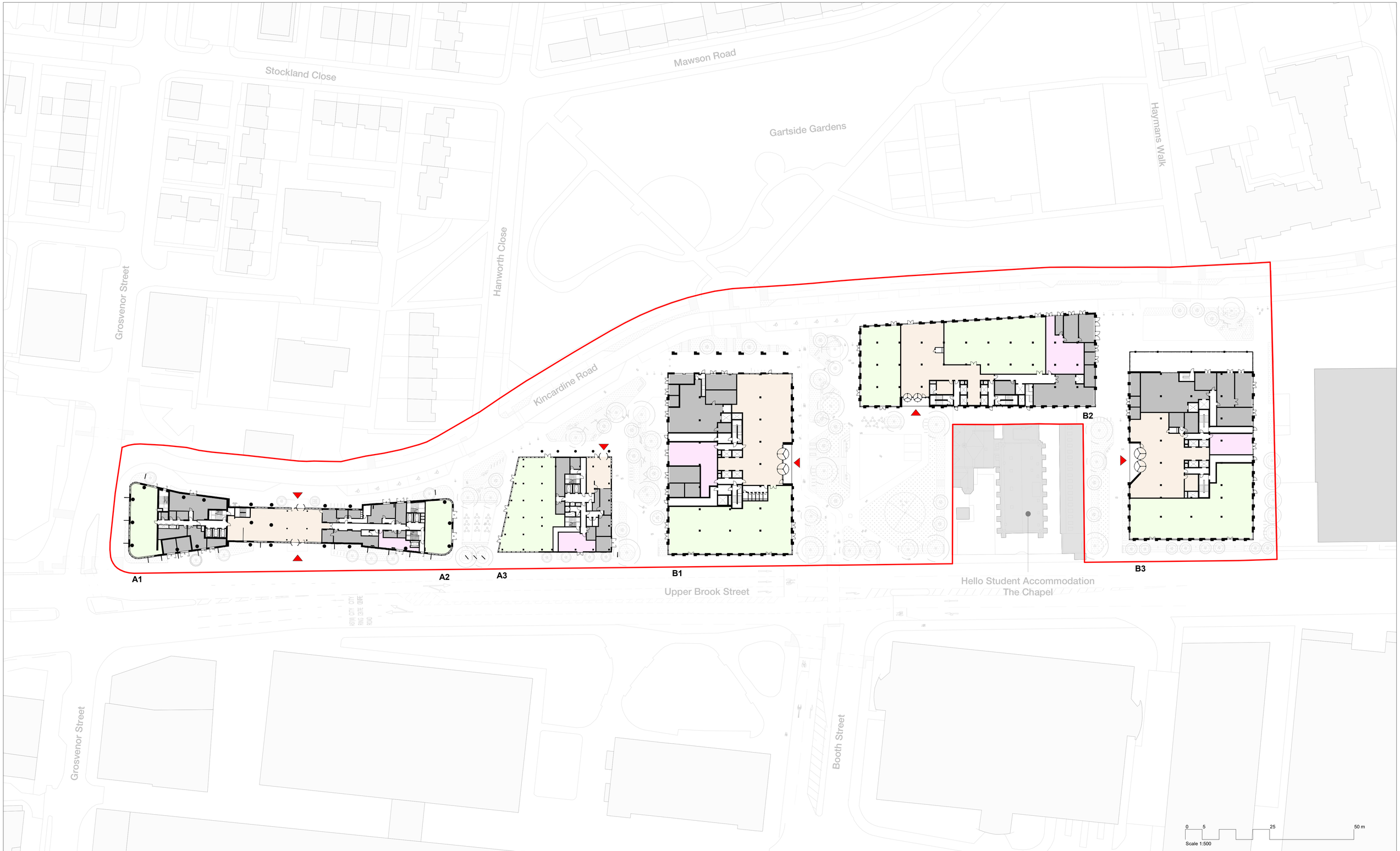
J000370 Upper Brook Street Masterplan (Williams / Alliance UBS) June 2023



APPENDICES



APPENDIX TP1



Rev	Description	Date
P1	Issued for Planning	23.06.23

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Key

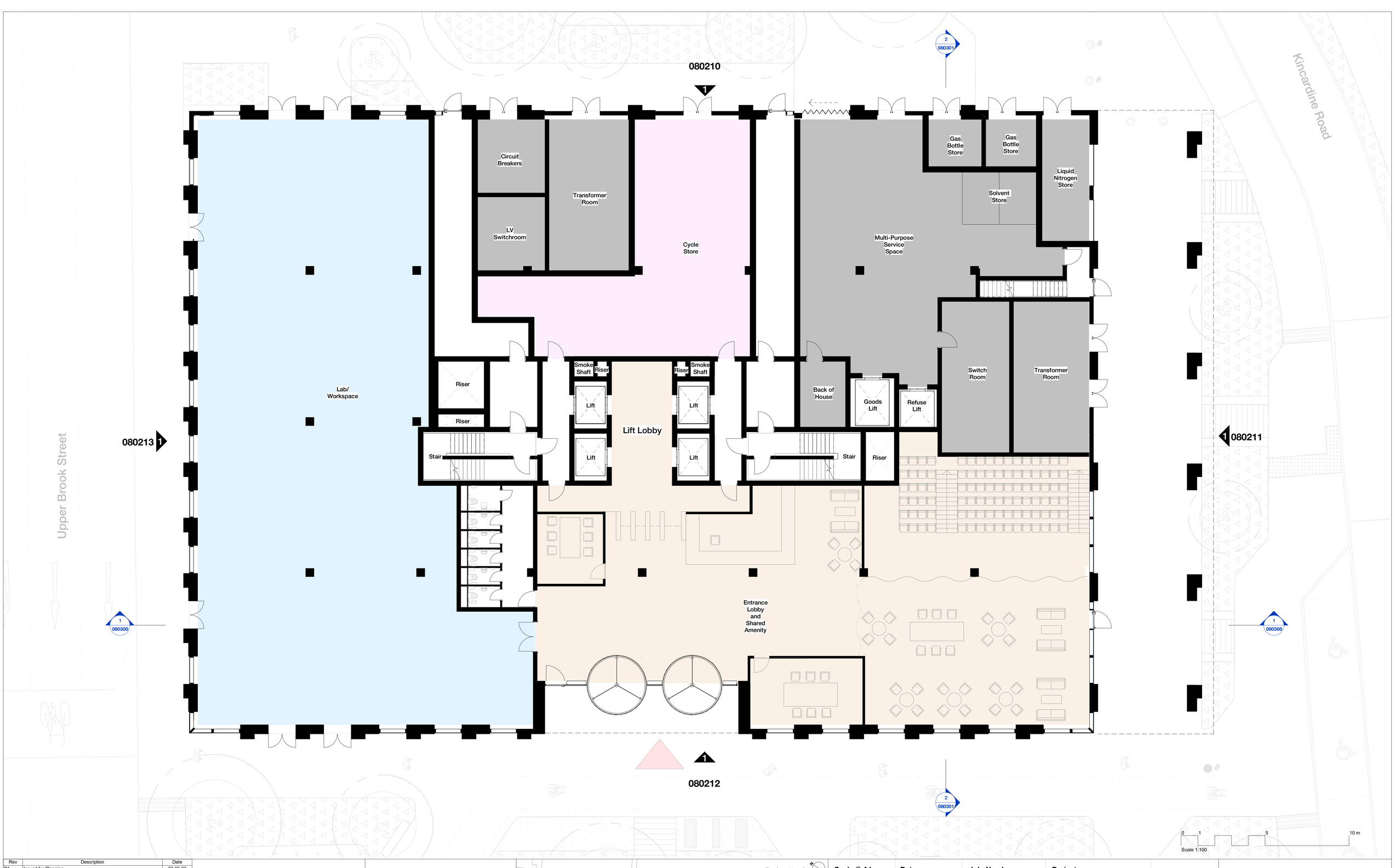
- Entrance Lobby and Amenities
- Ancillary Spaces
- Cycle Store
- Back of House
- Application Boundary
- Primary Entrance



Scale @ A1	Date	Job Number	Project
1 : 500	June 2023	220077	Upper Brook Street Manchester M1 2EH
Drawn By	**Checked By**	**Status**	
JD	LB	S2	
Drawing No.	**Rev**	**Purpose of Issue**	**Drawing**
UBS-HBA-SW-00-DR-A-081100	P1	For Planning	Proposed Illustrative Masterplan - Ground Floor Plan

26-28 Hilton Street
Manchester M1 2EH
mail@hawkinsbrown.com
hawkinsbrown.com

Hawkins\
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Rev	Description	Date
P1	Issued for Planning	23.06.23

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Key

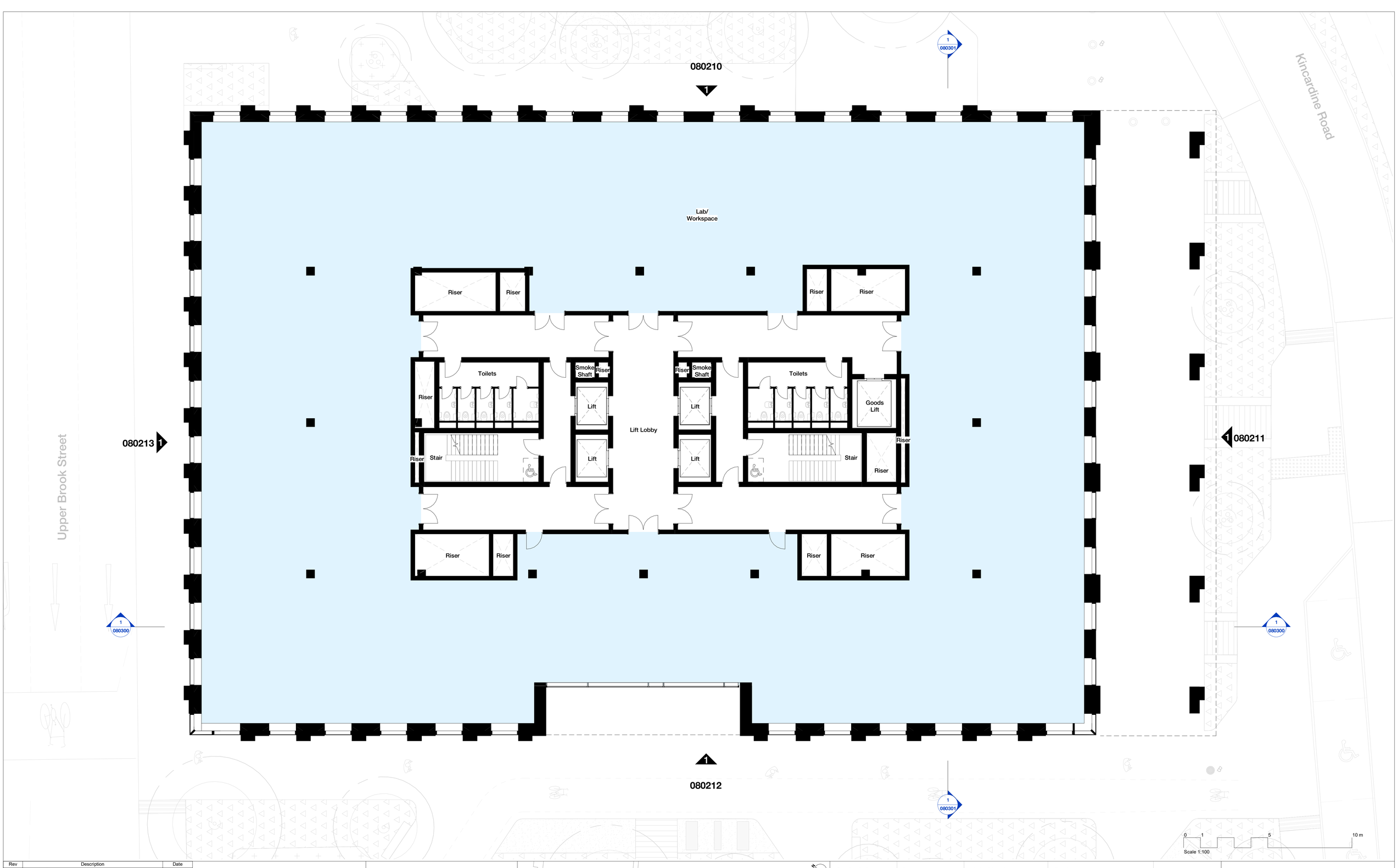
- Entrance Lobby and Amenities
- Ancillary Space
- Lab/Workspace
- Cycle Store
- Back of House
- Primary Entrance
- Application Boundary



Scale @ A1	Date	Job Number	Project
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Drawn By	**Checked By**	**Status**	
JD	LB	S2	
Drawing No.	**Rev**	**Purpose of Issue**	**Drawing**
UBS-HBA-B1-00-DR-A-080100	P1	For Planning	Proposed B1 - Ground Floor Plan

26-28 Hilton Street
Manchester M1 2EH
mail@hawkinsbrown.com
hawkinsbrown.com

Hawkins\
Brown



Rev	Description	Date
P1	Issued for Planning	23.06.23

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Key

- Entrance Lobby and Amenities
- Ancillary Space
- Lab/Workspace
- Cycle Store
- Back of House
- Primary Entrance
- Application Boundary



Scale @ A1 1 : 100	**Date** June 2023	**Job Number** 220077	**Project** Upper Brook Street Manchester M1 2EH
Drawn By JD	**Checked By** LB	**Status** S2	
Drawing No. UBS-HBA-B1-01-DR-A-080101	**Rev** P1	**Purpose of Issue** For Planning	**Drawing** Proposed B1 - First Floor Plan

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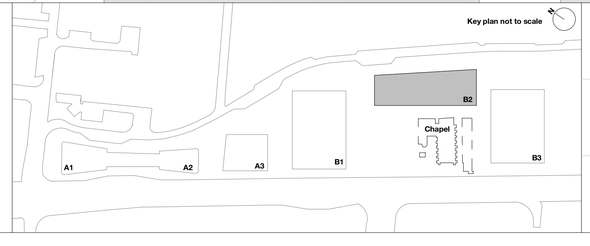


Rev	Description	Date
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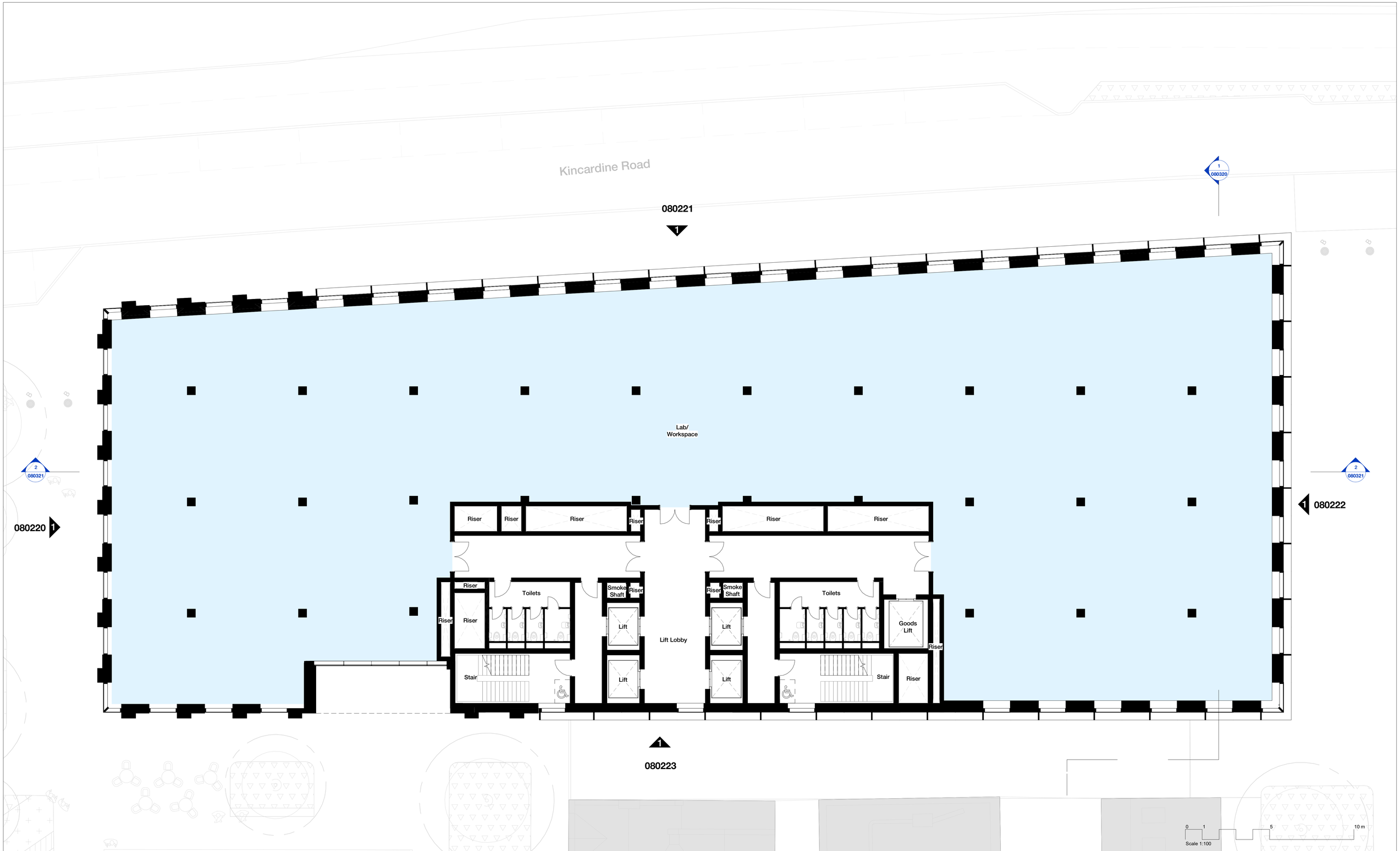
- Entrance Lobby and Amenities
- Ancillary Space
- Lab/Workspace
- Cycle Store
- Back of House
- Primary Entrance
- Application Boundary



Scale @ A1	Date	Job Number	Project
1 : 100	June 2023	220077	Upper Brook Street Manchester M1 2EH
Drawn By	**Checked By**	**Status**	
JD	LB	S2	
Drawing No.	**Rev**	**Purpose of Issue**	**Drawing**
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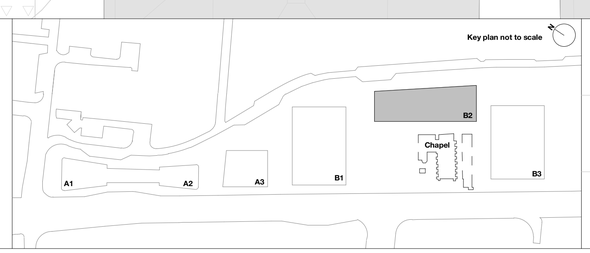


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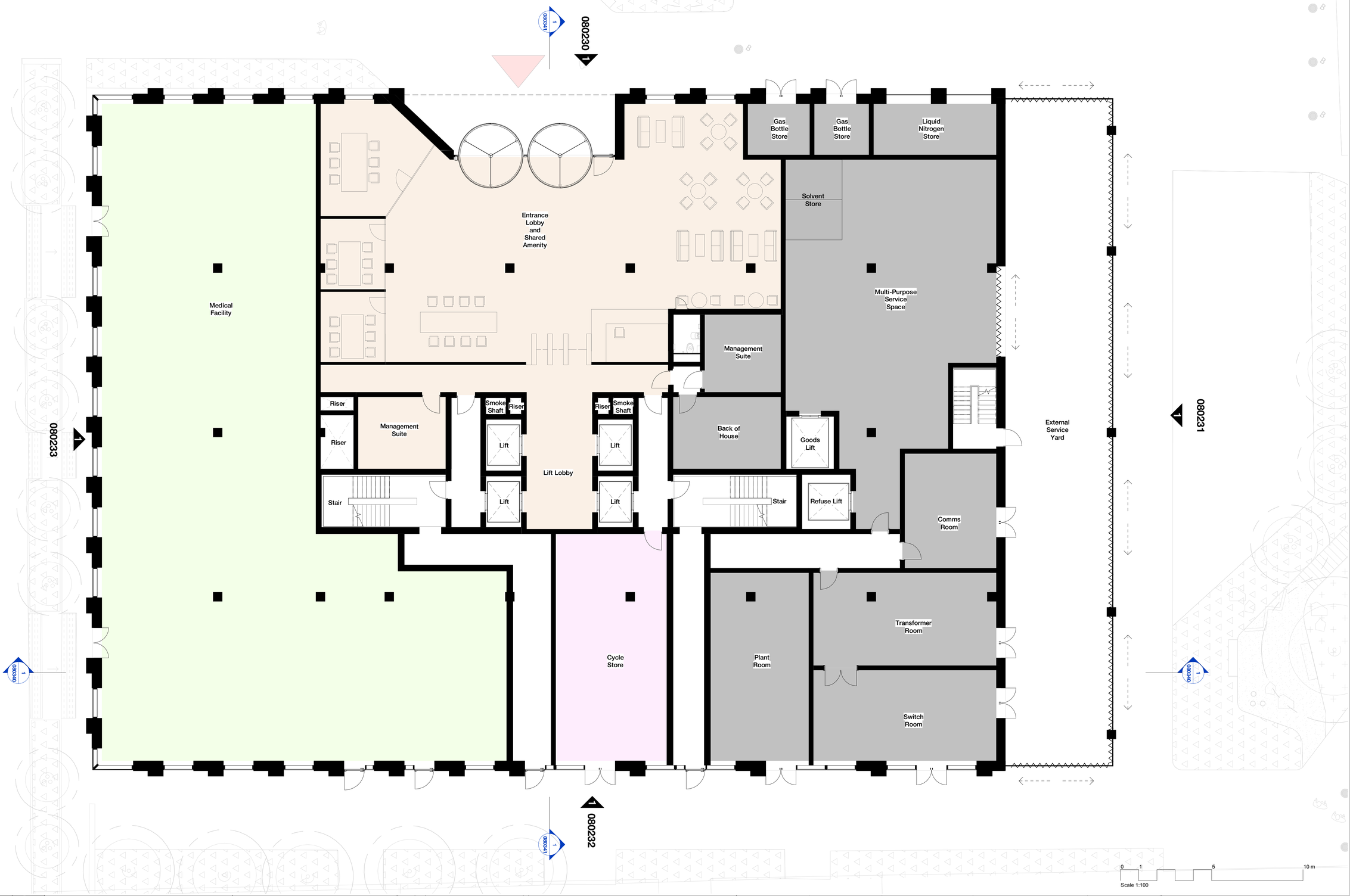
- Entrance Lobby and Amenities
- Ancillary Space
- Lab/Workspace
- Cycle Store
- Back of House
- Primary Entrance
- Application Boundary



Scale @ A1	Date	Job Number	Project
1 : 100	June 2023	220077	Upper Brook Street Manchester M1 2EH
Drawn By	**Checked By**	**Status**	
JD	LB	S2	
Drawing No.	**Rev**	**Purpose of Issue**	**Drawing**
UBS-HBA-B2-01-DR-A-080121	P1	For Planning	Proposed B2 - First Floor Plan

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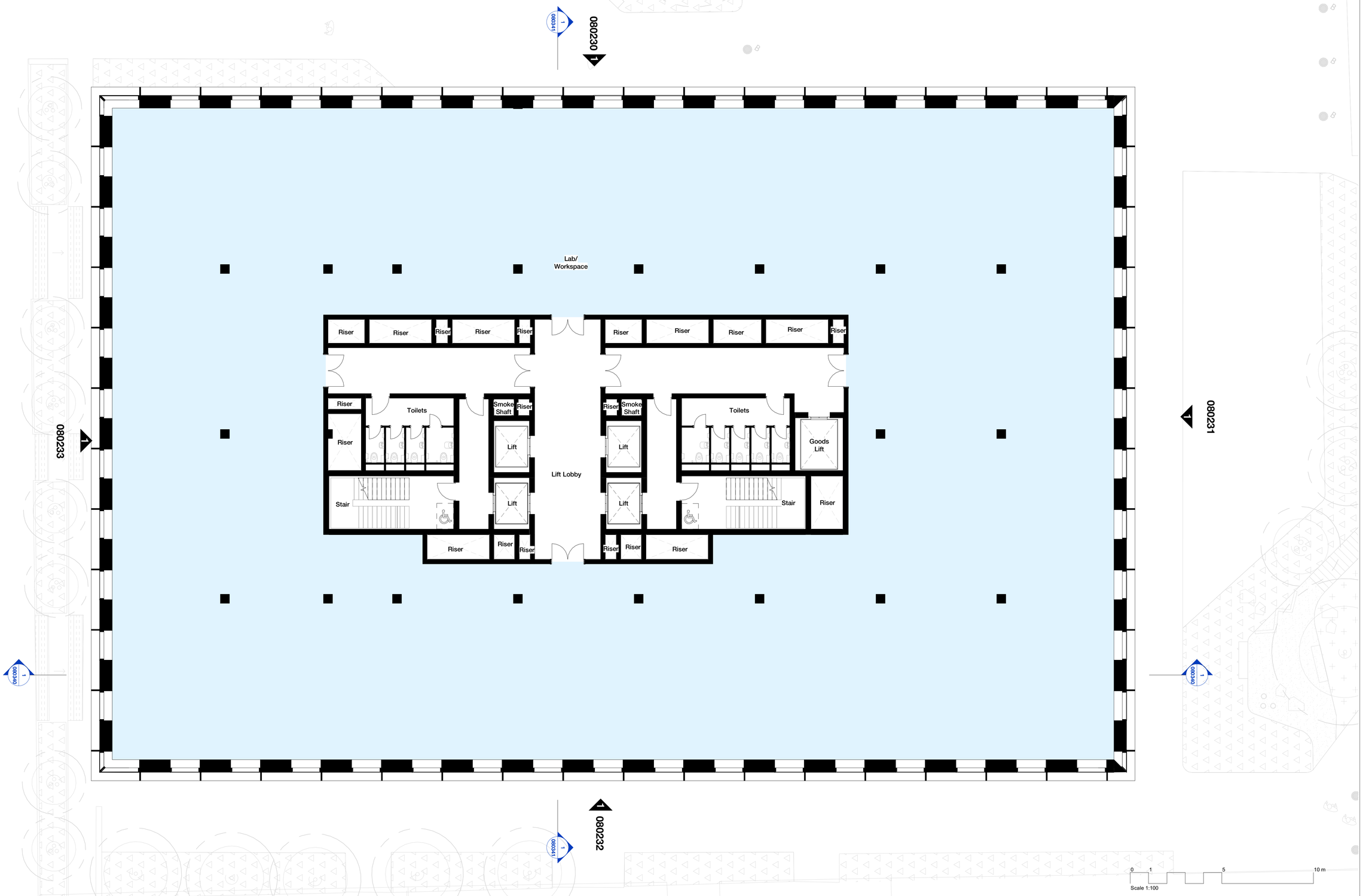
- Entrance Lobby and Amenities
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- Back of House
- Primary Entrance
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- Cycle Store
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APPENDIX TP2

UPPER BROOK STREET MASTERPLAN
(WILLIAMS MOTOR CO (HOLDINGS) / ALLIANCE UBS LIMITED)

TRAVEL PLAN - LIFE SCIENCES BUILDINGS

SCHEDULE OF SITE TPM DUTIES / ACTION PLAN

Setting Up

Task	Implementation Date	Completed?
Deliver internal & external cycle parking areas	As on-site development proceeds	
Appoint Site TPM	3 Months Prior to 1st Occupation	
Set up Travel Plan Working File	3 Months Prior to 1st Occupation	

Initial Site Travel Plan Launch

Task	Implementation Date	Completed?
Contact MCC / public transport operators and obtain up-to-date timetables and literature and investigate opportunities for staff season ticket promotions	3 months prior to first occupation on site	
Contact MCC / TfGM to obtain copies of Cycle Map or generate bespoke Cycle Map for Development	3 months prior to first occupation on site	
Review cycle provision on-site to ensure completion and fit for purpose	4 weeks prior to first occupation on site	
Research opportunities for cycle training	4 weeks prior to first occupation on site	
Research good practice on 'Bicycle User Group' schemes & develop suitable initiative for the site	4 weeks prior to first occupation on site	
Investigate Enterprise Car Club membership opportunities for individuals and organisations	4 weeks prior to first occupation on site	
Collate new business welcome packs (to include all relevant information outlined above)	4 weeks prior to first occupation on site	
Remind relevant large organisations need to prepare Subsidiary Travel Plans	At confirmation of new business tenancy agreement at site	

On-going TPM Duties (Over Life Time of Plan)

Task	Implementation Date	Completed?
Provide promotional travel data and health campaign information on display and keep up dated	Formal review every 3 months	
Ensure on-site cycle facilities are maintained and fit for purpose	Formal review every 3 months	
Promote and support national campaigns as appropriate	Review annually	
Offer welcome packs (to include all relevant information outlined above) to all new businesses at the site	Confirmation of new business tenancy agreement at site	

UPPER BROOK STREET MASTERPLAN
(WILLIAMS MOTOR CO (HOLDINGS) / ALLIANCE UBS LIMITED)

TRAVEL PLAN - LIFE SCIENCES BUILDINGS

Monitoring Schedule

Initial Travel Survey

Task	Implementation Date	Completed?
Undertake survey of site users	6 months post initial occupation or when the site employment floorspace is two-thirds fully occupied (whichever sooner)	
Prepare survey review / performance report	2 months post completion of initial questionnaire exercise	
Undertake Travel Plan Audit and modify where appropriate	Following survey	

Further Monitoring: Development Completion (On-going)

Task	Implementation Date	Completed?
Undertake survey of staff / tenants	Every year for first five years and every two years thereafter	
Prepare survey review / performance report	1 month post completion of questionnaire exercise	
Undertake Travel Plan Audit and modify where appropriate	Following survey	



APPENDIX TP3

UPPER BROOK STREET MASTERPLAN
(WILLIAMS MOTOR CO (HOLDINGS) / ALLIANCE UBS LIMITED)

LIFE SCEINCES BUILDINGS: TRAVEL PLAN QUESTIONNAIRE

This travel survey is being undertaken amongst all employees to gain an understanding of existing travel patterns and travel attitudes for journeys to / from the Life Sciences buildings at Upper Brook Street. This information will be used to help inform the continuing development of the Travel Plan for the site which to seeks to promote a better travel experience and support the principles of car-free development.

The survey should be completed during the week commencing [??DATE??] and should only be completed **ONCE** by **EACH** member of staff. Please complete the survey based on your general travel habits on the basis of a typical journey. Once completed please return your survey form in the pre-paid envelope.

The information that you provide will be treated with the utmost confidentiality.

1. **What is your home postcode?**

   ……

2. **Are you:**
   - O Male
   - O Female

3. **Do you have a disability which affects your travel arrangements?**
   - O Yes
   - O No

4. **What mode of transport do you primarily use to travel to / from Upper Brook Street?**
   - O Walk
   - O Cycle
   - O Bus
   - O Train
   - O Tram
   - O Car (Driver)
   - O Car (Passenger)
   - O Motorbike

5. **If you travelled by car, where did you park?**
   - O Aquatics Multi-Storey
   - O Circle Square Multi-Storey
   - O University Car Park A (Charles Street)
   - O University Car Park D (Booth Street West)
   - O On-Street Pay & Display Bay
   - O Enterprise Car Club Journey
   - O Other

6. **What alternative travel mode could you use, if your current mode of transport was unavailable?**
   - O Walk
   - O Cycle
   - O Bus
   - O Train
   - O Tram
   - O Car (Driver)
   - O Car (Passenger)
   - O Motorbike
   - O Could not travel by any other mode

7. **Which of these factors might tempt you to use public transport to travel to work? If you use public transport already, what would you like to see done?**

   Please choose no more than TWO options
   - O More direct service connecting to where I live
   - O More frequent services
   - O Discount tickets / passes available at work
   - O Easier access to timetable / fares information at work
   - O Having my journey planned for me
   - O Free taxi home if asked to work late / family emergency
   - O I would NEVER use public transport to travel to work

8. **Which of these factors might tempt you to walk / cycle to work? If you walk / cycle already, what would you like to see done?**

   Please choose no more than TWO options
   - O Improved footpaths / cycle paths on journey to work
   - O Secure cycle parking at work
   - O Better lighting on routes close to work at night time
   - O Changing facilities / showers at work
   - O Information on the local footpath / cycle network at work
   - O Free taxi home if asked to work late / family emergency
   - O Interest free cycle loan provided by work
   - O I would NEVER walk / cycle to work

9. **Do you have any comments or ideas that you would like to tell us about your travel to work journey?**

   ……

   ……

   ……..

Thank you for completing this survey.



APPENDIX TP4

Department for Transport

Cycle to Work Scheme
Guidance for Employers

Moving Britain Ahead



June 2019

The Department for Transport has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the Department's website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact the Department.

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1. Introduction

Why Cycle to Work?

1.1 The Government's ambition that cycling and walking are the natural choices for shorter journeys, or as part of a longer journey, was clearly set out in the Cycling and Walking Investment Strategy published in 2017[1]. If we can increase levels of active travel, such as cycling, the benefits are substantial. For individuals, it means cheaper travel and better health. For businesses, it means increased productivity and increased footfall in shops. And for society as a whole it means lower congestion, better air quality, and vibrant, attractive places and communities.

1.2 The health benefits of cycling are well understood. Illness as an outcome of physical inactivity costs the NHS up to £1 billion per annum, with further indirect costs calculated at £8.2 billion[2].

1.3 We want to make sure that Cycle to Work schemes continue to attract new cyclists and are as inclusive as possible so that people travelling to work have the opportunity to realise the benefits that cycling affords. The scheme has involved over 40,000 employers across the country, and has contributed to help more than 1.6 million commuters to cycle to work.[3]

[1] https://www.gov.uk/government/publications/cycling-and-walking-investment-strategy
[2] NICE Report (2013)
[3] Source: Cycle to Work Alliance 2019

What this guidance does

1.4 This document offers guidance to employers on Cycle to Work schemes. These are employee benefit schemes that enable employees to hire cycles for active travel and/or cyclist's safety equipment from the employer, or from a third party, in return for a deduction from their earnings known as salary sacrifice. For a definition of cycles for active travel and safety equipment see Annex A. If the scheme meets the relevant criteria it can provide financial benefits to both employers and employees.

1.5 This guidance updates and clarifies the guidance last published in 2011 by the Department for Transport. It may also be of help to scheme providers.

1.6 **The guidance reflects the tax and legal position at the time of publication**. Employers and scheme providers should check the current position (see Annex B for technical details). This guidance has been developed by the Department for Transport, HM Treasury, HM Revenue and Customs (HMRC) and the Financial Conduct Authority (FCA).

2. Options for Cycling to Work

Overview

2.1 This document primarily concerns Cycle to Work schemes using the salary sacrifice process. It sets out how such schemes typically operate, and what is needed to ensure that the tax and National Insurance benefits can apply. It also sets out whether the associated hire agreement may be regulated or exempt.

2.2 There are also other ways in which you, as an employer, can encourage cycling to work and for active travel. Some of these other options are described briefly below.

2.3 Of course, any scheme will only reap the full benefits of cycling if there are suitable facilities to support those who choose to cycle to work. These include secure, safe and accessible cycle parking at their place of work and good quality shower, changing and locker amenities for staff who want them.

Loan Schemes

2.4 One alternative option is to provide a loan to an employee to purchase a cycle for active travel and/or safety equipment. This is similar to offering an advance of salary to employees for purchasing rail season tickets.

2.5 Loan schemes, including on an interest-free basis, may be subject to regulation by the FCA. Whether a loan scheme meets the criteria to be exempt from regulation will depend upon the nature and duration of the loan. If in doubt, you should consider seeking legal advice. If the loan is not exempt, you will need FCA authorisation[4].

Pooled Schemes

2.6 Another alternative is the workplace pool cycle model. This is a tried and tested option for supporting staff in their commuting and for inter-site and business trip travel which is not currently being well served by public transport. At its simplest, you can purchase a suitable fleet of cycles for active travel and make them available to employees either on a one-to-one or a pool basis. Work place schemes should focus on attracting people who currently travel on less sustainable and less active modes, such as their cars, between local meetings or work sites. Cycles for active travel should be easily accessible both in terms of position, close to where they are needed and are securely stored and maintained.

[4] Article 60B of the Financial Services and Markets Act 2000 (Regulated Activities) Order 2001, SI 2001/544.

3. How a salary sacrifice scheme works

Overview

3.1 Salary sacrifice is where your employee agrees to give up part of their pre-tax salary in exchange for a benefit from their employer, in this case, the hire of a cycle for active travel and/or safety equipment. See figure 1 below.



Figure 1 Flow diagram of how salary sacrifice works (Image courtesy of the Cycle to Work Alliance)

3.2 There will also be a separate hire agreement, which may or may not be regulated by the FCA. This will typically be between the employee and the employer, who has either purchased the equipment or leased it from a third party (such as a retailer or a specialist leasing firm). The employee pays for the hire via the salary sacrifice arrangement with the employer.

3.3 In some cases, the hire agreement may be between the employee and a third party, such as a scheme provider, who hires the goods to the employee and is remunerated by the employer from the salary sacrifice proceeds.

4. The salary sacrifice scheme

Overview

4.1 A Cycle to Work scheme can benefit both the employer and the employee.

4.2 If the scheme meets the relevant criteria it can benefit from a tax exemption introduced under Section 244 of the Income Tax (Earnings and Pensions) Act 2003. Since a portion of the salary is foregone, the employee pays less tax and National Insurance Contributions (NICs), and the employer is able to save on employer NICs at 13.8% and Apprenticeship Levy at 0.5% (where applicable) on the amount sacrificed.

4.3 The tables below give examples of how much can be saved by employees:

Examples of hire value	Year 1	Year 2	Total
£500	£80	£80	£160
£750	£120	£120	£240
£1,000	£160	£160	£320

Table 1 Example of Basic Rate Taxpayer Employee Saving at 32% (20% Income Tax and 12% NIC) over two-year term

Examples of hire value	Year 1	Year 2	Total
£500	£105	£105	£210
£750	£157.50	£157.50	£315
£1,000	£210	£210	£420

Table 2 Example of Higher Rate Taxpayer Employee Saving at 42% (40% Income Tax and 2% NIC) over two-year term

If the employee buys the cycle and equipment at the end of the hire period under a separate agreement made at that time, then there are further savings to be made - see B.26 for further details and Annex C for valuing cycles at the scheme end.

4.4 The table below gives examples of how much can be saved by employers:

Examples of hire value	Employers' NIC Saving (13.8%)
£500	£69
£750	£103.50
£1,000	£138

Table 3 Example of how much can be saved by employers

4.5 The salary sacrifice arrangement is typically for at least 12 months. This is irrespective of the length of the associated hire agreement.

4.6 The following conditions must also be met:

- An employee must not, at any point during the hire period, own the cycle;
- At least 50% of the cycle's use must be for 'qualifying journeys', i.e. commuting to work purposes;
- The offer of the use of hired cycles must be made available across the whole workforce, with no groups of employees being excluded. This does not necessarily have to be through a salary sacrifice arrangement in each case.

4.7 For tax and National Insurance purposes there is no limit on the value of the cycle and safety equipment you can provide to an employee.

4.8 Further technical guidance to support you on how a salary sacrifice scheme works can be found at Annex B to this guidance. In addition, you can find out how to set up a salary sacrifice arrangement and understand the effects on tax and NICs here https://www.gov.uk/guidance/salary-sacrifice-and-the-effects-on-paye

Eligibility

4.9 Any employer, of any size, across the public, private and voluntary sectors can run a Cycle to Work scheme. However, the tax and NI benefits apply only to staff who are treated as employees for tax purposes.

4.10 If your employee is under 18 you may not want to enter into a hire agreement with them because of the law relating to contracts with minors, or you may want to consider requiring an adult to act as a guarantor[5]. Alternatively, you can make a cycle for active travel available to them without a salary sacrifice.

4.11 The scheme does not include people who are self-employed. Specialist tax advice is available to self-employed people who wish to use cycles and equipment for business purposes. There is also some general guidance here: https://www.gov.uk/expenses-if-youre-self-employed

[5] The agreement would need to comply with CCA requirements – there are additional provisions where security is provided in relation to a regulated credit or hire agreement, for example by a guarantor.

Equipment included

4.12 Only cycles for active travel and cyclist's safety equipment can be hired under the Cycle to Work Scheme. Cycles are defined as being 'a bicycle, a tricycle, or a cycle having four or more wheels, not being in any case a motor vehicle' (Section 192(1) of the Road Traffic Act 1988 (c.52)). An Electrically Assisted Pedal Cycle (EAPC) can be included under the scheme – see Annex A for more detail.

4.13 Providing cyclist's safety equipment is optional and whilst this equipment is not defined in legislation a suggested list of equipment is at Annex A. It is the employer's responsibility to ensure safety equipment is compliant with the scheme.

4.14 You can hire two cycles to one employee if, for example, a cycle is used at either end of a train journey between home and place of work. However, both cycles should be used for commuting. As above, this is subject to the £1,000 limit if the employer is relying on the FSMA Order exemption, rather than being FCA authorised.

Inclusivity and adapted cycles

4.15 For some people with disabilities, cycling is easier than walking. Depending on the person, the right cycle for active travel may be an Electronically Assisted Pedal Cycle (EAPC), a cycle with adaptations or a non-standard cycle, e.g. tricycle, hand-cycle, cargo-cycle (with or without electronic assist). The relevant conditions in relation to the Cycle to Work scheme will apply as set out in paragraphs 5.1 to 5.7 and if using a scheme provider as set out in section 6.

5. Consumer hire agreement, authorisation and exemption

Overview

5.1 Where a cycle and/or safety equipment is made available to an employee under a salary sacrifice arrangement there will be a consumer hire agreement in place which will typically be between the employee and the employer, or it could be with a third party, such as a scheme provider.

5.2 This is likely to be a regulated consumer hire agreement under the Consumer Credit Act 1974 (CCA). The owner of the goods will need to comply with all relevant CCA requirements and other consumer protection legislation, including on unfair contract terms. In particular, pre-contractual information must be provided, in the manner required by the CCA[6], and the hire agreement must comply with form and content requirements.[7] There are also post-contractual CCA requirements. If the hire agreement lasts for more than 18 months, the employee will have a statutory right to terminate under section 101 of the CCA.

5.3 In addition, the owner under the consumer hire agreement may need Financial Conduct Authority (FCA) authorisation.[8] Details on how to apply can be found on the FCA website here: https://www.fca.org.uk/firms/authorisation

5.4 There is an exemption from needing authorisation where the owner is the employer and the total value of the goods being hired does not exceed £1,000.[9] The agreement must be under a relevant employee benefit scheme.[10] This exemption is provided under the Financial Services and Markets Act 2000 (Exemption) Order 2001 (referred to here as the FSMA Order).

5.5 This exemption does not apply if the total value of the goods hired under the agreement exceeds £1,000. This is irrespective of the value of the salary sacrifice arrangement. The exemption also does not apply if the employer is authorised by the FCA for another separate regulated activity[11], or if the agreement is with a third party (such as a scheme provider), in which case FCA authorisation is needed. Schemes where the total value of goods hired exceeds £1,000 are acceptable provided the requisite FCA authorisation is obtained.

5.6 Even if the FSMA Order exemption applies, and your company does not need FCA authorisation, the consumer hire agreement must still comply with requirements set out in the CCA.

---

[6] Section 55 CCA and the Consumer Credit (Disclosure of Information) Regulations 2004.
[7] Section 60 CCA and the Consumer Credit (Agreements) Regulations 1983.
[8] Article 60N of the Financial Services and Markets Act 2000 (Regulated Activities) Order 2001, SI 2001/544.
[9] Paragraph 53 of the Schedule Financial Services and Markets Act 2000 (Exemption) Order 2001, SI 2001/1201 – see http://www.legislation.gov.uk/ukdsi/2013/9780111100493/article/14/data.xht?wrap=true
[10] A scheme operated by an employer which is designed to allow employees to take advantage of the relevant tax exemption and under which cycles or cyclist's safety equipment are made available in the manner described in any guidance issued by the Secretary of State.
[11] Section 38 of the Financial Services and Markets Act 2000.

5.7 The diagrams below set out scenarios where the employer hires cycles for active travel and equipment directly to employees:

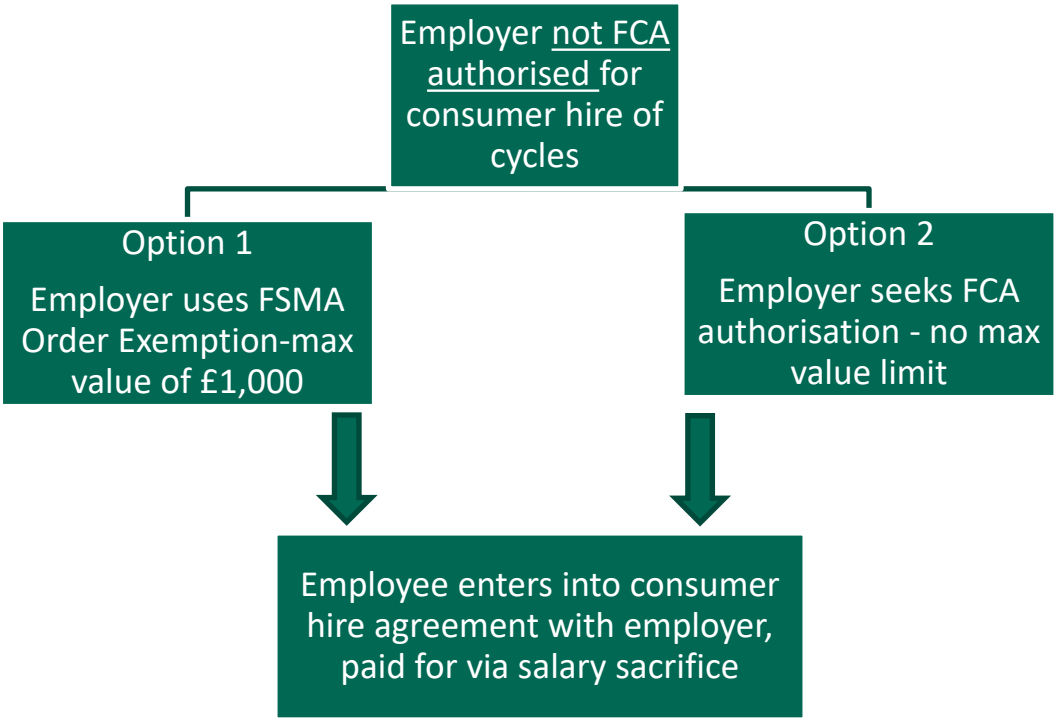


Diagram 1 Employer not FCA authorised for consumer hire of cycles

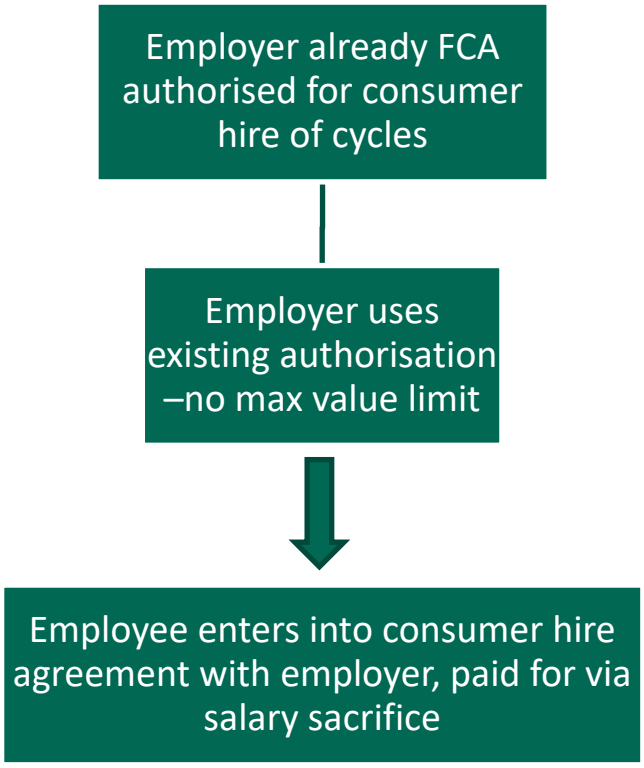


Diagram 2 Employer already FCA authorised for consumer hire of cycles

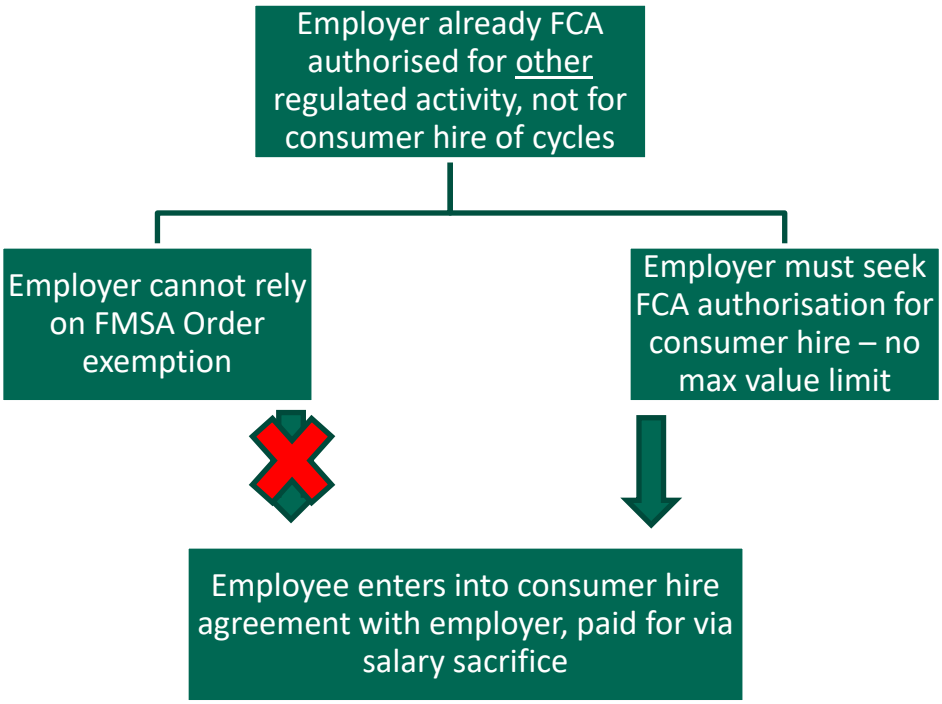


Diagram 3 Employer already FCA authorised for other regulated activity, not for consumer hire of cycles

6. Cycle to Work scheme providers

Overview

6.1 You can set up and run your own salary sacrifice scheme, or there are Cycle to Work scheme providers who can run a scheme for you. Scheme providers will normally:

- Ensure the scheme is fully compliant with legislation;
- Administer the scheme for you, reducing complexity;
- Advise you on salary sacrifice arrangements;
- Help you promote the scheme to your employees.

6.2 Using this arrangement typically means that your employee enters into a consumer hire agreement directly with the scheme provider. The scheme provider will need authorisation by the Financial Conduct Authority (FCA).

6.3 Depending upon the circumstances, you (the employer) may be acting as a credit broker, and so may need FCA authorisation for credit broking.[12] There is relevant guidance in PERG 2.3 in the FCA's Perimeter Guidance Manual – https://www.handbook.fca.org.uk/handbook

6.4 Alternatively, you could act as an appointed representative of the scheme provider. An appointed representative is a firm or individual that carries on regulated activities under the supervision of another firm that the FCA directly authorises (in this case, the scheme provider). The scheme provider, as principal, must however, take responsibility for your activities as the appointed representative. There must be a written contract, documenting the arrangement, and the principal must ensure the appointed representative complies with all applicable FCA rules.

6.5 Details on what it means to be an appointed representative can be found here https://www.fca.org.uk/firms/appointed-representatives-principals

6.6 If in doubt about this or any other regulatory issues, you should consider seeking legal advice on your position. If you act as a credit broker without being authorised this is likely to be a criminal offence. In addition, the hire agreement is likely to be unenforceable by the scheme provider and the employee would be entitled to a refund of hire charges (unless the scheme provider applies to the court to enforce the agreement and to be allowed to retain sums already paid).

6.7 The diagram below sets out a scenario where a third-party scheme provider hires cycles and equipment to employees:

[12] Article 36A of the Financial Services and Markets Act 2000 (Regulated Activities) Order 2001.



Diagram 4 Third party already FCA authorised for consumer hire of cycles

7. Frequently Asked Questions

Q.1 Can an employee put their own funds towards costs?

No, employees are not allowed to use their own funds towards the cost of goods being hired under a consumer hire agreement. This, however, does not preclude the employee from separately buying additional equipment.

Q.2 Can employers hire a cycle and equipment worth more than £1,000 to employees?

Yes. Cycle to Work schemes where the total value of goods hired by the employer to the employee exceeds £1,000 are acceptable provided the requisite Financial Conduct Authority (FCA) authorisation is obtained. This is irrespective of the value of the salary sacrifice arrangement.

Q.3 Do HMRC need to authorise the scheme?

Cycle to Work schemes do not need approval from HMRC. HMRC provide general information for employers regarding salary sacrifice. See link here: https://www.gov.uk/guidance/salary-sacrifice-and-the-effects-on-paye

Q.4 Can an employee keep the cycle at the end of the hire period?

At the end of the hire period an employee may have three options:

- Option 1: extend the hire agreement;
- Option 2: return the cycle and equipment;
- Option 3: buy the cycle and equipment under a separate agreement entered into at the time (see Annex C for valuing cycles at scheme end).

There must be no option, whether express or implied, as part of, or alongside the initial hire agreement for the employee to purchase the cycle or equipment at the end of the hire agreement. If there is, this is likely to make it a hire-purchase agreement (rather than a hire agreement) where different regulatory requirements apply and it would no longer be eligible for the tax exemption. Therefore, your employee scheme rules should not refer to ownership as an option, and any decision to sell the cycle or equipment to the employee should be entirely discretionary at the time. It is important therefore that the employee is not given any expectation at the outset that they may be entitled to buy the cycle outright.

Q.5 Should cycles be insured?

Whilst the cycle remains the property of the employer (or third-party provider) throughout the hire term, the employee is responsible for its appropriate care, maintenance and security. Therefore, it is recommended that employees take out separate insurance, or check if the cycle is covered under their home contents insurance policy (in which case they should tell the insurer who owns the cycle). Salary sacrifice payments should continue irrespective of any insurance claim.

Q.6 Is it only cycles that can be hired?

Only cycles for active travel and cyclist's safety equipment can be hired under the Cycle to Work Scheme. An Electrically Assisted Pedal Cycle (EAPC) can be included under the scheme – see Annex A.

Annex A: What Equipment is included in a salary sacrifice scheme?

A.1 Eligible equipment includes cycles for active travel and cyclists' safety equipment.

A.2 A "cycle" is 'a bicycle, a tricycle, or a cycle having four or more wheels, not being in any case a motor vehicle' (Section 192(1) of the Road Traffic Act 1988 (c.52)). An Electrically Assisted Pedal Cycle (EAPC) can be included under the scheme. For further information on requirements for using EAPCs see: https://www.gov.uk/electric-bike-rules

A.3 Cyclists' safety equipment is not defined in legislation, although this could include:

- Cycle helmets which conform to European standard BSEN1078
- Bells and bulb horns
- Lights, including dynamo packs
- Mirrors and mudguards to ensure riders' visibility is not impaired
- Cycle clips and dress guards
- Panniers, luggage carriers and straps to allow luggage to be safely carried
- Child safety seats
- Locks and chains to ensure the cycle can be safely secured
- Pumps, puncture repair kits, cycle tool kits and tyre sealant to allow for minor repairs
- Replacement parts to keep a cycle roadworthy
- Adaptations for disability/mobility issues.
- Reflective clothing or reflective cycle equipment, e.g. spoke reflectors

Annex B: Technical guidance for a salary sacrifice scheme

Scope of Cycle to Work scheme

B.1 For more technical information on general availability, go to:

- The general rules on availability
- The definition of 'excluded employees'
- The definition of making bicycles available

National Minimum Wage and National Living Wage

B.2 All employees must be paid the National Minimum or National Living Wage. Your employee must not sacrifice salary to a level below this minimum (however the scheme should generally be available to all colleagues).

B.3 If a salary sacrifice agreement would put their salary below this threshold, you can:

- offer the employee a lower value package and/or a longer than usual hire period;
- hire a cycle to the employee without a salary sacrifice arrangement.

Time periods for schemes

B.4 Typically, such schemes run for 12 months or 18 months. This is irrespective of the length of the hire period, which can be shorter or longer. If the hire agreement lasts for more than 18 months, the employee has a statutory right to terminate under the Consumer Credit Act 1974. There may also be an initial cooling-off period. Where an employment is less than 12 months, an employee can participate in the scheme as long as they are in the scheme for the duration of their employment. See HMRC advice for further details on time periods https://www.gov.uk/hmrc-internal-manuals/employment-income-manual/eim21665.

B.5 If the employee leaves their employment for any reason during the period of the salary sacrifice arrangement, you may require them to pay compensation, to cover the costs that you have not recovered under the arrangement.

Employer's National Insurance Contributions

B.6 If your employee uses a salary sacrifice arrangement, you will save Secondary Class 1 National Insurance Contributions (NICs) (at 13.8%) on the salary sacrificed.

Benefit entitlement - impact on employers to consider

B.7 The benefits offered through a salary sacrifice arrangement are often exempt from tax, which provides the employee with a financial advantage, and the employer also does not have to pay employer NICs on the salary foregone.

B.8 The tax advantages of a salary sacrifice arrangement will only apply where the Cycle to Work scheme requirements are met, mainly that the cycle is:

- owned by the employer and/or a third party, and
- mostly used for commuting or business travel.

B.9 If a scheme is structured such that either of the two conditions are not met, then the cycle will be considered to be a Benefit in Kind, and employers will be responsible for reporting the taxable Benefit to HMRC.

B.10 There are two ways to report a Benefit in Kind to HMRC. Employers can register for payrolling services before the start of the tax year (6 April), and use the simple online services to pay tax and NICs on the benefit. This prevents the need to submit a P11D return. Further information can be found at https://www.gov.uk/guidance/paying-your-employees-expenses-and-benefits-through-your-payroll

B.11 Alternatively, at the end of the tax year employers will need to submit a P11D form to HMRC for each employee they have provided with expenses or benefits. Further information can be found at https://www.gov.uk/government/publications/paye-end-of-year-expenses-and-benefits-p11d

Benefit entitlement – impact on employees to consider

B.12 If a salary sacrifice arrangement is used, this can affect your employee's entitlement to some state benefits. This is because both the gross pay of the employee is reduced, and the NICs they pay is reduced. The entitlement to some benefits is based on how much the employee earns, and some on NICs they have paid.

B.13 Therefore, a salary sacrifice arrangement may affect an employee's current or future entitlement to a range of benefits. Although the likelihood is that any effect will be small, you need to clearly tell your employees what the sacrifice will mean in practical terms - in particular the effect, or potential effect, on:

- any pension scheme being contributed to (in particular this may be important if an employee is nearing retirement and has a final salary pension scheme);
- entitlement to contribution-based benefits like the State Pension;
- entitlement to earnings-related benefits like Maternity Allowance;
- entitlement to work-related payments like Statutory Sick Pay.

B.14 Salary sacrifice may also impact your employee's entitlement to holiday pay and bonuses, which depends on your contract with your employee.

B.15 For more information on the potential impact on benefit entitlement go to https://www.gov.uk/guidance/salary-sacrifice-and-the-effects-on-paye

Corporation Tax and Capital Allowances

During the Agreement

B.16 If you purchase cycles outright and cyclist's safety equipment to hire out to your employees, this will be capital expenditure and you can claim capital allowances in the normal manner.

B.17 For many businesses, expenditure on cycles and cyclist's safety equipment will qualify for the Annual Investment Allowance (AIA). The AIA allows businesses to write off 100 per cent of qualifying capital expenditure currently up to £200,000 each year against the business's taxable profits.

B.18 More information on claiming capital allowances is available here: https://www.gov.uk/capital-allowances

B.19 Where the AIA is not available, or your total capital expenditure on plant and machinery exceeds the annual limit, expenditure on cycles and cyclist's safety equipment can be added to the main capital allowances pool and qualify for writing-down allowances at 18 per cent per annum.

B.20 For example:

- Cost of cycle in year 1 = £500
- Amount on which capital allowance due in year 1 is £500 x 18% = £90
- Amount on which capital allowance due in year 2 is £410 x 18% = £73.80
- And so on.

B.21 As long as you own the assets, you can continue to claim capital allowances regardless of how long it is used in the Cycle to Work scheme.

B.22 If you lease cycles and cyclist's safety equipment, the leasing costs will be a deductible expense against profits. Your auditor or tax advisor will be able to determine the specific accounting treatment

End of the agreement

B.23 Where you have claimed capital allowances on the original capital expenditure any sums received for the sale of the cycle or cyclist's safety equipment must be brought into account as disposal proceeds in the main capital allowances pool.

Withdrawing from a scheme

B.24 The consequences for withdrawing from a Cycle to Work scheme will depend upon the terms of the salary sacrifice arrangement and the associated hire agreement.

B.25 You should clearly communicate the terms of the arrangements to employees prior to their entering into a Cycle to Work scheme.

End of hire agreements

B.26 Provided that there is not a built in automatic transfer of ownership at the end of the hire period, you may choose to give your employee the option to purchase the equipment under a separate agreement following the expiry of the hire agreement. If so, you will need to value the equipment for tax purposes. You can either use the simplified approach set out here: https://www.gov.uk/hmrc-internal-manuals/employment-income-manual/eim21667a Annex C also sets out the value of cycles at scheme end or you can choose to work out the market value and charge the employee that amount. Any payment must be out of post-tax pay.

B.27 If you give your employee the cycle without them paying for it, then this is a taxable benefit in kind, and should be reported on form P11D.

B.28 Alternatively, you may wish to allow your employee to keep using the cycle and equipment after the initial hire period has ended, without transferring ownership, by extending the duration of the hire agreement or by entering into a new hire agreement. As long as the conditions of the tax exemption are still met, no tax charge will arise.

VAT

B.29 If the cycle has been specifically adapted for a disabled person, no VAT is charged on the purchase. There is therefore no input tax on the purchase or hire, and no output tax on the salary sacrificed amount or end of period transfer.

During the Hire Agreement

B.30 When you purchase or hire equipment, VAT will be charged on the cost (but not for cycle helmets which are zero rated).

B.31 If you do not use salary sacrifice arrangements, this is input tax and is subject to the usual rules on VAT recovery.

B.32 If you use a salary sacrifice arrangement, then this is still input tax, but the salary sacrifice constitutes consideration for the equipment and, hence, output tax will be due on the amount of salary forgone.

End of Agreement Purchase

B.33 If at the end of hire period your employee is given, as part of a separate agreement, an option to purchase the equipment and they choose to do so, then any charge made will be liable to VAT.

B.34 Output VAT will also be payable on the purchase price by the employee on the supply by the hiring company or to you as owner of the equipment.

Annex C: Valuing cycles at the scheme end

Age of cycle	Acceptable disposal value as a percentage of original price (including VAT) Original price of the cycle less than £500	Acceptable disposal value as a percentage of original price (including VAT) Original price £500+
1 year	18%	25%
18 months	16%	21%
2 years	13%	17%
3 years	8%	12%
4 years	3%	7%
5 years	Negligible	2%
6 years & over	Negligible	Negligible

Table 1 Valuing cycles at the scheme end

C.1 For fuller guidance on transfer of ownership, you may wish to refer to EIM 21667, EIM 21667a and EIM 21650 in the Employment Income Manual, available here: https://www.gov.uk/hmrc-internal-manuals/employment-income-manual/eim21601

Annex D: Further contacts for advice

D.1 For further advice on how to implement a Cycle to Work scheme please contact:

- Department for Transport: general-enquiries@forms.dft.gov.uk
- HMRC for specific details on how tax applies in schemes: https://www.gov.uk/contact-hmrc
- General information for employers regarding salary sacrifice is available at: www.gov.uk/guidance/salary-sacrifice-and-the-effects-on-paye



APPENDIX TP5



RIDING COURSES

From complete beginners to experienced cyclists, we've got a course for everyone – even professional drivers who want to get more cycle-aware. Learn to ride, build your road confidence, and learn how to ride safely as a family.

Other course types

Bike maintenance courses | Safe Urban driving for LGV and PCV's

LEARN TO RIDE

Free beginner's cycle training

This course is for you if you're new to cycling or haven't ridden for many years. You might not even have a bike. Run by a qualified instructor, the course will give you the confidence to take the first step into cycling, at your own pace, starting from getting on your bike. You'll be in a small group with other beginners in a quiet outdoor area and there's no pressure, come to as many sessions as it takes. You'll learn to get on and off your bike, how to start and stop, steer and change speed and how to check your bike before you ride.

Sessions are open to those over the age of 12 when accompanied by an adult or 16 when unaccompanied.

We provide a bike, but you can bring your own if you prefer and wear whatever you feel comfortable to cycle in. Sessions are held across Greater Manchester and last two hours.

Book your place





ROAD RIDER READY

Free road cycling training

This is for you if you can ride off the road but want to learn the skills needed to ride alongside traffic and with other road users. Sessions are open to those over the age of 12 when accompanied by an adult or 16 when unaccompanied.

Run by a qualified instructor, you'll be in a small group with people of similar ability. You'll start in a traffic-free area, before putting your new skills into practice on quiet roads.

You'll learn how make short road journeys safely and gain the confidence to ride in traffic.

We provide a bike but you can bring your own if you prefer and wear whatever you feel comfortable to cycle in. Sessions are held across Greater Manchester. Each session lasts two hours.

Book your place

ONE TO ONE SESSIONS

Building confidence for riding alongside traffic

This is for you if you already cycle but would like to build more confidence riding alongside traffic.

Sessions are open to those over the age of 12 when accompanied by an adult or 16 when unaccompanied.

You'll learn how to plan a route, communicate with other road-users, take the safest position on the road and anticipate others' behaviour to ride confidently in busy traffic. If you're still a novice rider, you'll learn bike-control and skills in a quiet area first.

With one-to-one coaching from an expert instructor, you'll get personal support to learn the skills to get out on the road. We will meet you at a place of your choice, during the day or evening, and put you through real-life road riding situations.

You'll need to bring your own bike and wear whatever you feel comfortable cycling in. Wherever you choose within Greater Manchester. Each session lasts two hours.

Register your interest

FAMILY CONFIDENCE TRAINING

Learn how to ride safely as a group

Our bespoke family training provides guidance on how to safely cycle as a group on the road. Whether you're new to cycling or just in need of some practice, we'll teach you how adults should lead journeys and how children should follow.

Sessions are open to all ages, but children must be able to cycle and control their bikes. If you're interested in a course, simply register and one of our instructors will be in touch. The session will then be designed to suit you, including taking place at a time and location of your choice.

All participants will need their own roadworthy bike and can wear whatever they feel comfortable cycling in. The sessions are delivered close to your home, or a place which is convenient. Each session lasts two hours.

Register your interest



MAINTENANCE COURSES

Learn how to fix your bike, from brakes and punctures to more advanced repairs. Keep your bike in shape and keep riding.

BASIC MAINTENANCE

A hands-on session to give you the skills to keep your bike in check.

This training is for you if you would like to learn how to look after you bike and carry out simple maintenance.

You will learn:

- About the parts of your bike and what they do
- What to check before you ride
- How to adjust the saddle, handlebars, brakes and gears
- How to mend punctures

Led by a bike maintenance expert, you'll be in a small group with other beginners in a friendly, supportive atmosphere. It's a hands-on session which will give you the confidence and skills to keep your bike on the move.

It's best to bring your own bike to work on, but we can lend you one if necessary.

The sessions last two hours and are held across Greater Manchester. The basic maintenance course is provided at the subsidised cost of £5.

Book your place

INTERMEDIATE MAINTENANCE

Want to up your bike maintenance game?

Please note that at the moment we are only running a limited programme and these sessions are not currently available.

This course is for you if you have a basic knowledge of bike maintenance, but want to extend your skills to take on more complex tasks and save money on repairs.

The intermediate maintenance course is provided at the subsidised cost of £25.

You will learn how to:

- Adjust your brakes
- Adjust and index gears
- Inspect and replace cables
- Check and maintain your chain
- Carry out routine servicing

Led by a cycle maintenance expert, you'll be in a small group with others of similar experience in a friendly, supportive atmosphere. It's an intensive hands-on session which will give you the confidence and skills to keep your bike in top condition.

It's best to bring your own bike to work on, but we can lend you one if necessary.

The sessions last six hours and are held across Greater Manchester.

Book your place

COURSES FOR DRIVERS

SAFE URBAN DRIVING FOR LGV AND PCV DRIVERS

For professional drivers who want to be more aware of people on bikes

Please note that at the moment we are only running a limited programme and these sessions are not currently available .

This course is for you if you're a professional driver who wants to understand, and be more aware of, cyclists.

Through a mixture of conventional training, and by riding a bike out on the road, you will learn: Awareness of risks to vulnerable road users How to assess dangerous situations and avoid accidents How to use your mirrors and avoid blind spots Highway code rules About the best lighting and reflective material

This full-day session, run by qualified instructors, gives you the skills and awareness to be safe in traffic, around bikes and other vulnerable road-users, and to experience the road from a cyclist's point-of-view.

The course is accredited by the Joint Approvals Unit for Periodic Training (JAUPT) and the Fleet Operator Recognition Scheme (FORS), and can contribute to your Driver Certificate of Professional Competence (CPC).

We provide a bike but you can bring your own if you prefer and wear clothes you'll be comfortable cycling in. The training sessions are a full day long and take place in Openshaw, Manchester.

Book your place

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BUYING, BORROWING & RENTING BIKES

If you don't have access to a bike, TfGM can help you get started.

Access to bikes



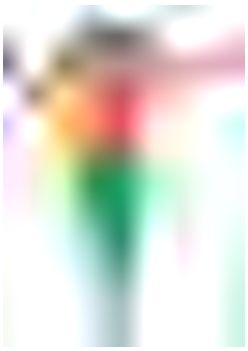


STAY IN THE LOOP

Sign up to receive our cycling and walking newsletter

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APPENDIX TA11

PBSA Sites (Per Person)

Time Range	Total People			Pedestrians			Cyclists			Public Transport			Cars			Taxis			Motor Cycles			OGV			LGVs			Vehicle Occupants		
	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
00:00-01:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
01:00-02:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
02:00-03:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
03:00-04:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
04:00-05:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
05:00-06:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
06:00-07:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
07:00-08:00	0.010	0.019	0.029	0.004	0.007	0.011	0.000	0.000	0.000	0.005	0.011	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
08:00-09:00	0.013	0.123	0.136	0.005	0.071	0.076	0.001	0.001	0.002	0.005	0.050	0.055	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
09:00-10:00	0.014	0.072	0.086	0.004	0.036	0.040	0.000	0.000	0.000	0.008	0.035	0.043	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
10:00-11:00	0.031	0.087	0.118	0.013	0.047	0.060	0.000	0.000	0.000	0.014	0.035	0.049	0.002	0.002	0.004	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.01	0.01
11:00-12:00	0.043	0.065	0.108	0.019	0.035	0.054	0.002	0.003	0.005	0.018	0.023	0.041	0.001	0.000	0.001	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.01
12:00-13:00	0.053	0.067	0.120	0.028	0.035	0.063	0.000	0.001	0.001	0.022	0.029	0.051	0.000	0.002	0.002	0.002	0.002	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
13:00-14:00	0.069	0.074	0.143	0.037	0.041	0.078	0.001	0.001	0.002	0.024	0.028	0.052	0.001	0.000	0.001	0.002	0.002	0.004	0.001	0.001	0.002	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.01
14:00-15:00	0.067	0.071	0.138	0.037	0.041	0.078	0.001	0.001	0.002	0.025	0.024	0.049	0.001	0.001	0.002	0.000	0.000	0.000	0.001	0.001	0.002	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.01	0.01
15:00-16:00	0.097	0.060	0.157	0.058	0.035	0.093	0.001	0.001	0.002	0.031	0.020	0.051	0.000	0.001	0.001	0.002	0.002	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.01	0.01
16:00-17:00	0.096	0.042	0.138	0.061	0.026	0.087	0.001	0.000	0.001	0.031	0.014	0.045	0.001	0.002	0.003	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.01
17:00-18:00	0.108	0.063	0.171	0.066	0.041	0.107	0.001	0.001	0.002	0.039	0.018	0.057	0.000	0.002	0.002	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.01
18:00-19:00	0.107	0.060	0.167	0.070	0.039	0.109	0.003	0.002	0.005	0.031	0.018	0.049	0.000	0.000	0.000	0.002	0.002	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
19:00-20:00	0.065	0.037	0.102	0.031	0.023	0.054	0.000	0.000	0.000	0.029	0.012	0.041	0.001	0.001	0.002	0.002	0.002	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.01
20:00-21:00	0.090	0.043	0.133	0.047	0.028	0.075	0.000	0.001	0.001	0.036	0.011	0.047	0.001	0.001	0.002	0.004	0.004	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.01	0.00	0.01
21:00-22:00	0.048	0.037	0.085	0.039	0.030	0.069	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.009	0.007	0.002	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.01	0.01	0.02
22:00-23:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
23:00-24:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
AM Peak (08:30-09:30)	**0.014**	**0.098**	**0.111**	**0.005**	**0.054**	**0.058**	**0.001**	**0.001**	**0.001**	**0.007**	**0.043**	**0.049**	**0.001**	**0.001**	**0.002**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.002**	**0.001**	**0.002**
PM Peak (17:00-18:00)	**0.108**	**0.063**	**0.171**	**0.066**	**0.041**	**0.107**	**0.001**	**0.001**	**0.002**	**0.039**	**0.018**	**0.057**	**0.000**	**0.002**	**0.002**	**0.001**	**0.001**	**0.002**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.001**	**0.001**	**0.002**	**0.003**	**0.005**
12hr (07:00-19:00)	**0.708**	**0.803**	**1.511**	**0.402**	**0.454**	**0.856**	**0.011**	**0.011**	**0.022**	**0.253**	**0.305**	**0.558**	**0.008**	**0.011**	**0.019**	**0.012**	**0.012**	**0.024**	**0.002**	**0.002**	**0.004**	**0.000**	**0.000**	**0.000**	**0.009**	**0.011**	**0.020**	**0.035**	**0.034**	**0.069**

AM Peak (08:30-09:30) Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	0.014	0.098	0.111	100.0%	100.0%	100.0%
Pedestrians	0.005	0.054	0.058	33.3%	54.9%	52.3%
Cyclists	0.001	0.001	0.001	3.7%	0.5%	0.9%
Public Transport	0.007	0.043	0.049	48.1%	43.6%	44.1%
Car	0.001	0.001	0.002	7.4%	0.5%	1.4%
Taxi	0.000	0.000	0.000	0.0%	0.0%	0.0%
Motorcycle	0.000	0.000	0.000	0.0%	0.0%	0.0%
other	0.001	0.001	0.002	7.4%	0.5%	1.4%

Vehicle Demand (AM Peak)

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	0.001	0.001	0.002	100.0%	100.0%	100.0%
Motorcycle	0.000	0.000	0.000	0.0%	0.0%	0.0%
Taxi	0.000	0.000	0.000	0.0%	0.0%	0.0%
OGV	0.000	0.000	0.000	0.0%	0.0%	0.0%
LGV	0.000	0.000	0.000	0.0%	0.0%	0.0%
Total	0.001	0.001	0.002	100.0%	100.0%	100.0%

PM Peak (17:00-18:00) Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	0.108	0.063	0.171	100.0%	100.0%	100.0%
Pedestrians	0.066	0.041	0.107	61.1%	65.1%	62.6%
Cyclists	0.001	0.001	0.002	0.9%	1.6%	1.2%
Public Transport	0.039	0.018	0.057	36.1%	28.6%	33.3%
Car	0.000	0.002	0.002	0.0%	3.2%	1.2%
Taxi	0.001	0.001	0.002	0.9%	1.6%	1.2%
Motorcycle	0.000	0.000	0.000	0.0%	0.0%	0.0%
other	0.001	0.000	0.001	0.9%	0.0%	0.6%

Vehicle Demand (PM Peak)

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	0.000	0.002	0.002	0.0%	50.0%	40.0%
Motorcycle	0.000	0.000	0.000	0.0%	0.0%	0.0%
Taxi	0.001	0.001	0.002	100.0%	25.0%	40.0%
OGV	0.000	0.000	0.000	0.0%	0.0%	0.0%
LGV	0.000	0.001	0.001	0.0%	25.0%	20.0%
Total	0.001	0.004	0.005	100.0%	100.0%	100.0%

12hr (07:00-19:00) Core Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	0.708	0.803	1.511	100.0%	100.0%	100.0%
Pedestrians	0.402	0.454	0.856	56.8%	56.5%	56.7%
Cyclists	0.011	0.011	0.022	1.6%	1.4%	1.5%
Public Transport	0.253	0.305	0.558	35.7%	38.0%	36.9%
Car	0.008	0.011	0.019	1.1%	1.4%	1.3%
Taxi	0.012	0.012	0.024	1.7%	1.5%	1.6%
Motorcycle	0.002	0.002	0.004	0.3%	0.2%	0.3%
other	0.020	0.008	0.028	2.8%	1.0%	1.9%

Vehicle Demand (12 Hour)

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	0.008	0.011	0.019	25.8%	30.6%	28.4%
Motorcycle	0.002	0.002	0.004	6.5%	5.6%	6.0%
Taxi	0.012	0.012	0.024	38.7%	33.3%	35.8%
OGV	0.000	0.000	0.000	0.0%	0.0%	0.0%
LGV	0.009	0.011	0.020	29.0%	30.6%	29.9%
Total	0.031	0.036	0.067	100.0%	100.0%	100.0%

PBSA Trip Demand 1100 Students

Time Range	Total People			Pedestrians			Cyclists			Public Transport			Cars			Taxis			Motor Cycles			OGV			LGVs			Vehicle Occupants		
	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
00:00-01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00-02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00-03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00-04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00-05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00-06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00-07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00-08:00	11	21	32	4	8	12	0	0	0	6	12	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
08:00-09:00	14	135	150	6	78	84	1	1	2	6	55	61	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3
09:00-10:00	15	79	95	4	40	44	0	0	0	9	39	47	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
10:00-11:00	34	96	130	14	52	66	0	0	0	15	39	54	2	2	4	1	1	2	0	0	0	0	0	0	1	1	2	4	6	10
11:00-12:00	47	72	119	21	39	59	2	3	6	20	25	45	1	0	1	1	1	2	0	0	0	0	0	0	1	2	3	4	4	9
12:00-13:00	58	74	132	31	39	69	0	1	1	24	32	56	0	2	2	2	2	4	0	0	0	0	0	0	0	1	1	2	2	4
13:00-14:00	76	81	157	41	45	86	1	1	2	26	31	57	1	0	1	2	2	4	1	1	2	0	0	0	2	1	3	7	4	11
14:00-15:00	74	78	152	41	45	86	1	1	2	28	26	54	1	1	2	0	0	0	1	1	2	0	0	0	2	2	4	3	7	10
15:00-16:00	107	66	173	64	39	102	1	1	2	34	22	56	0	1	1	2	2	4	0	0	0	0	0	0	2	2	4	7	4	11
16:00-17:00	106	46	152	67	29	96	1	0	1	34	15	50	1	2	3	1	1	2	0	0	0	0	0	0	1	1	2	2	3	6
17:00-18:00	119	69	188	73	45	118	1	1	2	43	20	63	0	2	2	1	1	2	0	0	0	0	0	0	0	1	1	2	3	6
18:00-19:00	118	66	184	77	43	120	3	2	6	34	20	54	0	0	0	2	2	4	0	0	0	0	0	0	0	0	0	2	1	3
19:00-20:00	72	41	112	34	25	59	0	0	0	32	13	45	1	1	2	2	2	4	0	0	0	0	0	0	1	0	1	4	2	7
20:00-21:00	99	47	146	52	31	83	0	1	1	40	12	52	1	1	2	4	4	9	0	0	0	0	0	0	0	1	1	8	3	11
21:00-22:00	53	41	94	43	33	76	0	0	0	0	0	0	0	10	10	8	2	10	0	0	0	0	0	0	0	0	0	10	8	18
22:00-23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00-24:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak (08:30-09:30)	**15**	**107**	**122**	**5**	**59**	**64**	**1**	**1**	**1**	**7**	**47**	**54**	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**2**
PM Peak (17:00-18:00)	**119**	**69**	**188**	**73**	**45**	**118**	**1**	**1**	**2**	**43**	**20**	**63**	**0**	**2**	**2**	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**2**	**3**	**6**
12hr (07:00-19:00)	**779**	**883**	**1662**	**442**	**499**	**942**	**12**	**12**	**24**	**278**	**336**	**614**	**9**	**12**	**21**	**13**	**13**	**26**	**2**	**2**	**4**	**0**	**0**	**0**	**10**	**12**	**22**	**39**	**37**	**76**

AM Peak (08:30-09:30) Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	15	107	122	100.0%	100.0%	100.0%
Pedestrians	5	59	64	33.3%	54.9%	52.3%
Cyclists	1	1	1	3.7%	0.5%	0.9%
Public Transport	7	47	54	48.1%	43.6%	44.1%
Car	1	1	2	7.4%	0.5%	1.4%
Taxi	0	0	0	0.0%	0.0%	0.0%
Motorcycle	0	0	0	0.0%	0.0%	0.0%
other	1	1	2	7.4%	0.5%	1.4%

Vehicle Demand (AM Peak)

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	1	1	2	100.0%	100.0%	100.0%
Motorcycle	0	0	0	0.0%	0.0%	0.0%
Taxi	0	0	0	0.0%	0.0%	0.0%
OGV	0	0	0	0.0%	0.0%	0.0%
LGV	0	0	0	0.0%	0.0%	0.0%
Total	1	1	2	100.0%	100.0%	100.0%

On Foot	**12**	**106**	**118**

PM Peak (17:00-18:00) Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	119	69	188	100.0%	100.0%	100.0%
Pedestrians	73	45	118	61.1%	65.1%	62.6%
Cyclists	1	1	2	0.9%	1.6%	1.2%
Public Transport	43	20	63	36.1%	28.6%	33.3%
Car	0	2	2	0.0%	3.2%	1.2%
Taxi	1	1	2	0.9%	1.6%	1.2%
Motorcycle	0	0	0	0.0%	0.0%	0.0%
other	1	0	1	0.9%	0.0%	0.6%

Vehicle Demand (PM Peak)

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	0	2	2	0.0%	50.0%	40.0%
Motorcycle	0	0	0	0.0%	0.0%	0.0%
Taxi	1	1	2	100.0%	25.0%	40.0%
OGV	0	0	0	0.0%	0.0%	0.0%
LGV	0	1	1	0.0%	25.0%	20.0%
Total	1	4	6	100.0%	100.0%	100.0%

On Foot	**116**	**65**	**180**

12hr (07:00-19:00) Core Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	779	883	1662	100.0%	100.0%	100.0%
Pedestrians	442	499	942	56.8%	56.5%	56.7%
Cyclists	12	12	24	1.6%	1.4%	1.5%
Public Transport	278	336	614	35.7%	38.0%	36.9%
Car	9	12	21	1.1%	1.4%	1.3%
Taxi	13	13	26	1.7%	1.5%	1.6%
Motorcycle	2	2	4	0.3%	0.2%	0.3%
other	22	9	31	2.8%	1.0%	1.9%

Vehicle Demand (12 Hour)

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	9	12	21	25.8%	30.6%	28.4%
Motorcycle	2	2	4	6.5%	5.6%	6.0%
Taxi	13	13	26	38.7%	33.3%	35.8%
OGV	0	0	0	0.0%	0.0%	0.0%
LGV	10	12	22	29.0%	30.6%	29.9%
Total	34	40	74	100.0%	100.0%	100.0%

On Foot	**721**	**835**	**1555**



APPENDIX TA12

Life Sciences Trip Rates (Per Person)

Time Range	Total People			Pedestrians			Cyclists			Public Transport			Cars			Taxis			Motor Cycles			OGV			LGVs			Vehicle Occupants		
	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
00:00-00:30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
00:30-01:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
01:00-01:30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
01:30-02:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
02:00-02:30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
02:30-03:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
03:00-03:30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
03:30-04:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
04:00-04:30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
04:30-05:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
05:00-05:30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
05:30-06:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
06:00-06:30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
06:30-07:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
07:00-07:30	0.026	0.003	0.029	0.003	0.002	0.005	0.002	0.000	0.002	0.017	0.001	0.018	0.003	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
07:30-08:00	0.066	0.012	0.078	0.012	0.006	0.018	0.003	0.000	0.003	0.044	0.001	0.045	0.004	0.003	0.007	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.01	0.00	0.01
08:00-08:30	0.125	0.013	0.138	0.018	0.008	0.026	0.009	0.000	0.009	0.085	0.002	0.087	0.007	0.001	0.008	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.01	0.00	0.02
08:30-09:00	0.181	0.016	0.197	0.019	0.009	0.028	0.012	0.000	0.012	0.136	0.003	0.139	0.008	0.002	0.010	0.003	0.002	0.005	0.001	0.000	0.001	0.000	0.000	0.000	0.00	0.00	0.00	0.01	0.00	0.02
09:00-09:30	0.145	0.021	0.166	0.018	0.011	0.029	0.011	0.001	0.012	0.110	0.004	0.114	0.003	0.004	0.007	0.001	0.001	0.002	0.000	0.000	0.000	0.001	0.000	0.001	0.00	0.00	0.00	0.01	0.01	0.01
09:30-10:00	0.068	0.020	0.088	0.017	0.013	0.030	0.004	0.000	0.004	0.043	0.005	0.048	0.002	0.000	0.002	0.001	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.00	0.00	0.00	0.01	0.00	0.01
10:00-10:30	0.048	0.032	0.080	0.017	0.020	0.037	0.003	0.001	0.004	0.027	0.007	0.034	0.001	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.01
10:30-11:00	0.042	0.031	0.073	0.020	0.021	0.041	0.001	0.000	0.001	0.016	0.007	0.023	0.002	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.01	0.00	0.01
11:00-11:30	0.026	0.029	0.055	0.010	0.012	0.022	0.001	0.000	0.001	0.012	0.013	0.025	0.002	0.002	0.004	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.01
11:30-12:00	0.028	0.030	0.058	0.017	0.017	0.034	0.000	0.000	0.000	0.009	0.011	0.020	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
12:00-12:30	0.026	0.042	0.068	0.015	0.025	0.040	0.001	0.001	0.002	0.008	0.013	0.021	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.01
12:30-13:00	0.045	0.068	0.113	0.029	0.039	0.068	0.001	0.002	0.003	0.013	0.026	0.039	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
13:00-13:30	0.054	0.052	0.106	0.035	0.029	0.064	0.001	0.001	0.002	0.015	0.020	0.035	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
13:30-14:00	0.041	0.038	0.079	0.025	0.024	0.049	0.000	0.001	0.001	0.012	0.011	0.023	0.001	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.01
14:00-14:30	0.023	0.018	0.041	0.016	0.008	0.024	0.000	0.000	0.000	0.006	0.005	0.011	0.001	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
14:30-15:00	0.021	0.026	0.047	0.012	0.007	0.019	0.001	0.000	0.001	0.008	0.016	0.024	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
15:00-15:30	0.017	0.031	0.048	0.006	0.008	0.014	0.001	0.001	0.002	0.008	0.020	0.028	0.002	0.001	0.003	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.01
15:30-16:00	0.010	0.034	0.044	0.005	0.006	0.011	0.000	0.001	0.001	0.003	0.022	0.025	0.000	0.003	0.003	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.01	0.01
16:00-16:30	0.016	0.041	0.057	0.005	0.004	0.009	0.000	0.001	0.001	0.009	0.031	0.040	0.000	0.003	0.003	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.01	0.01
16:30-17:00	0.014	0.062	0.076	0.005	0.008	0.013	0.000	0.003	0.003	0.007	0.045	0.052	0.001	0.004	0.005	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.01	0.01
17:00-17:30	0.012	0.118	0.130	0.003	0.011	0.014	0.000	0.007	0.007	0.007	0.093	0.100	0.000	0.005	0.005	0.000	0.001	0.001	0.000	0.001	0.001	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.01	0.01
17:30-18:00	0.006	0.147	0.153	0.002	0.011	0.013	0.000	0.012	0.012	0.003	0.116	0.119	0.000	0.003	0.003	0.001	0.002	0.003	0.000	0.001	0.001	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.01	0.01
18:00-18:30	0.005	0.100	0.105	0.001	0.008	0.009	0.000	0.011	0.011	0.003	0.076	0.079	0.000	0.003	0.003	0.001	0.001	0.002	0.000	0.001	0.001	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.01	0.01
18:30-19:00	0.005	0.049	0.054	0.002	0.004	0.006	0.000	0.006	0.006	0.002	0.037	0.039	0.001	0.001	0.002	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
19:00-19:30	0.000	0.012	0.012	0.000	0.002	0.002	0.000	0.002	0.002	0.000	0.009	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
19:30-20:00	0.000	0.012	0.012	0.000	0.003	0.003	0.000	0.000	0.000	0.000	0.008	0.008	0.000	0.000	0.000	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
20:00-20:30	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.003	0.000	0.000	0.000	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
20:30-21:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
21:00-21:30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
21:30-22:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
22:00-22:30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
22:30-23:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
23:00-23:30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
23:30-24:00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
AM Peak (08:30-09:30)	**0.326**	**0.037**	**0.363**	**0.037**	**0.020**	**0.057**	**0.023**	**0.001**	**0.024**	**0.246**	**0.007**	**0.253**	**0.011**	**0.006**	**0.017**	**0.004**	**0.003**	**0.007**	**0.001**	**0.000**	**0.001**	**0.001**	**0.000**	**0.001**	**0.000**	**0.000**	**0.000**	**0.020**	**0.008**	**0.028**
PM Peak (17:00-18:00)	**0.018**	**0.265**	**0.283**	**0.005**	**0.022**	**0.027**	**0.000**	**0.019**	**0.019**	**0.010**	**0.209**	**0.219**	**0.000**	**0.008**	**0.008**	**0.001**	**0.003**	**0.004**	**0.000**	**0.002**	**0.002**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.002**	**0.014**	**0.016**
12hr (07:00-19:00)	**1.050**	**1.033**	**2.083**	**0.312**	**0.311**	**0.623**	**0.051**	**0.049**	**0.100**	**0.603**	**0.585**	**1.188**	**0.043**	**0.047**	**0.090**	**0.012**	**0.014**	**0.026**	**0.002**	**0.003**	**0.005**	**0.001**	**0.000**	**0.001**	**0.006**	**0.005**	**0.011**	**0.083**	**0.081**	**0.164**

AM Peak (08:30-09:30) Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	0.326	0.037	0.363	100.0%	100.0%	100.0%
Pedestrians	0.037	0.020	0.057	11.3%	54.1%	15.7%
Cyclists	0.023	0.001	0.024	7.1%	2.7%	6.6%
Public Transport	0.246	0.007	0.253	75.5%	18.9%	69.7%
Car	0.011	0.006	0.017	3.4%	16.2%	4.7%
Taxi	0.004	0.003	0.007	1.2%	8.1%	1.9%
Motorcycle	0.001	0.000	0.001	0.3%	0.0%	0.3%
other	0.004	0.000	0.004	1.2%	0.0%	1.1%

Vehicle Demand (AM Peak)

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	0.011	0.006	0.017	64.7%	66.7%	65.4%
Motorcycle	0.001	0.000	0.001	5.9%	0.0%	3.8%
Taxi	0.004	0.003	0.007	23.5%	33.3%	26.9%
OGV	0.001	0.000	0.001	5.9%	0.0%	3.8%
LGV	0.000	0.000	0.000	0.0%	0.0%	0.0%
Total	0.017	0.009	0.026	100.0%	100.0%	100.0%

PM Peak (17:00-18:00) Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	0.018	0.265	0.283	100.0%	100.0%	100.0%
Pedestrians	0.005	0.022	0.027	27.8%	8.3%	9.5%
Cyclists	0.000	0.019	0.019	0.0%	7.2%	6.7%
Public Transport	0.010	0.209	0.219	55.6%	78.9%	77.4%
Car	0.000	0.008	0.008	0.0%	3.0%	2.8%
Taxi	0.001	0.003	0.004	5.6%	1.1%	1.4%
Motorcycle	0.000	0.002	0.002	0.0%	0.8%	0.7%
other	0.002	0.002	0.004	11.1%	0.8%	1.4%

Vehicle Demand (PM Peak)

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	0.000	0.008	0.008	0.0%	61.5%	57.1%
Motorcycle	0.000	0.002	0.002	0.0%	15.4%	14.3%
Taxi	0.001	0.003	0.004	100.0%	23.1%	28.6%
OGV	0.000	0.000	0.000	0.0%	0.0%	0.0%
LGV	0.000	0.000	0.000	0.0%	0.0%	0.0%
Total	0.001	0.013	0.014	100.0%	100.0%	100.0%

12hr (07:00-19:00) Core Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	1.050	1.033	2.083	100.0%	100.0%	100.0%
Pedestrians	0.312	0.311	0.623	29.7%	30.1%	29.9%
Cyclists	0.051	0.049	0.100	4.9%	4.7%	4.8%
Public Transport	0.603	0.585	1.188	57.4%	56.6%	57.0%
Car	0.043	0.047	0.090	4.1%	4.5%	4.3%
Taxi	0.012	0.014	0.026	1.1%	1.4%	1.2%
Motorcycle	0.002	0.003	0.005	0.2%	0.3%	0.2%
other	0.027	0.024	0.051	2.6%	2.3%	2.4%

Vehicle Demand (AM Peak)

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	0.043	0.047	0.090	67.2%	68.1%	67.7%
Motorcycle	0.002	0.003	0.005	3.1%	4.3%	3.8%
Taxi	0.012	0.014	0.026	18.8%	20.3%	19.5%
OGV	0.001	0.000	0.001	1.6%	0.0%	0.8%
LGV	0.006	0.005	0.011	9.4%	7.2%	8.3%
Total	0.064	0.069	0.133	100.0%	100.0%	100.0%

Life Sciences Trip Demand 2600 Persons

Time Range	Total People			Pedestrians			Cyclists			Public Transport			Cars			Taxis			Motor Cycles			OGV			LGVs			Vehicle Occupants		
	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
00:00-00:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:30-01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00-01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30-02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00-02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30-03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00-03:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30-04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00-04:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30-05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00-05:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30-06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00-06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30-07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00-07:30	68	8	75	8	5	13	5	0	5	44	3	47	8	0	8	0	0	0	0	0	0	0	0	0	0	0	0	10	0	10
07:30-08:00	172	31	203	31	16	47	8	0	8	114	3	117	10	8	18	3	3	5	0	0	0	0	0	0	3	3	5	18	10	29
08:00-08:30	325	34	359	47	21	68	23	0	23	221	5	226	18	3	21	3	0	3	0	0	0	0	0	0	3	0	3	34	8	42
08:30-09:00	471	42	512	49	23	73	31	0	31	354	8	361	21	5	26	8	5	13	3	0	3	0	0	0	0	0	0	36	8	44
09:00-09:30	377	55	432	47	29	75	29	3	31	286	10	296	8	10	18	3	3	5	0	0	0	3	0	3	0	0	0	16	13	29
09:30-10:00	177	52	229	44	34	78	10	0	10	112	13	125	5	0	5	3	0	3	3	0	3	0	0	0	3	3	5	13	3	16
10:00-10:30	125	83	208	44	52	96	8	3	10	70	18	88	3	5	8	0	0	0	0	0	0	0	0	0	0	0	0	5	8	13
10:30-11:00	109	81	190	52	55	107	3	0	3	42	18	60	5	3	8	0	0	0	0	0	0	0	0	0	3	3	5	13	8	21
11:00-11:30	68	75	143	26	31	57	3	0	3	31	34	65	5	5	10	3	3	5	0	0	0	0	0	0	0	0	0	10	10	21
11:30-12:00	73	78	151	44	44	88	0	0	0	23	29	52	3	3	5	0	0	0	0	0	0	0	0	0	0	0	0	5	3	8
12:00-12:30	68	109	177	39	65	104	3	3	5	21	34	55	3	3	5	0	0	0	0	0	0	0	0	0	3	3	5	5	8	13
12:30-13:00	117	177	294	75	101	177	3	5	8	34	68	101	3	3	5	0	0	0	0	0	0	0	0	0	0	0	0	5	3	8
13:00-13:30	140	135	276	91	75	166	3	3	5	39	52	91	3	3	5	0	0	0	0	0	0	0	0	0	0	0	0	5	5	10
13:30-14:00	107	99	205	65	62	127	0	3	3	31	29	60	3	5	8	0	0	0	0	0	0	0	0	0	3	0	3	8	5	13
14:00-14:30	60	47	107	42	21	62	0	0	0	16	13	29	3	5	8	0	0	0	0	0	0	0	0	0	0	0	0	3	8	10
14:30-15:00	55	68	122	31	18	49	3	0	3	21	42	62	3	3	5	0	0	0	0	0	0	0	0	0	0	3	3	3	8	10
15:00-15:30	44	81	125	16	21	36	3	3	5	21	52	73	5	3	8	0	3	3	0	0	0	0	0	0	0	0	0	5	8	13
15:30-16:00	26	88	114	13	16	29	0	3	3	8	57	65	0	8	8	0	3	3	0	0	0	0	0	0	0	0	0	3	13	16
16:00-16:30	42	107	148	13	10	23	0	3	3	23	81	104	0	8	8	3	3	5	0	0	0	0	0	0	0	0	0	3	13	16
16:30-17:00	36	161	198	13	21	34	0	8	8	18	117	135	3	10	13	0	3	3	0	0	0	0	0	0	0	0	0	5	13	18
17:00-17:30	31	307	338	8	29	36	0	18	18	18	242	260	0	13	13	0	3	3	0	3	3	0	0	0	0	0	0	3	18	21
17:30-18:00	16	382	398	5	29	34	0	31	31	8	302	309	0	8	8	3	5	8	0	3	3	0	0	0	0	0	0	3	18	21
18:00-18:30	13	260	273	3	21	23	0	29	29	8	198	205	0	8	8	3	3	5	0	3	3	0	0	0	0	0	0	3	13	16
18:30-19:00	13	127	140	5	10	16	0	16	16	5	96	101	3	3	5	3	3	5	0	0	0	0	0	0	0	0	0	3	8	10
19:00-19:30	0	31	31	0	5	5	0	5	5	0	23	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:30-20:00	0	31	31	0	8	8	0	0	0	0	21	21	0	0	0	3	3	5	0	0	0	0	0	0	0	0	0	0	5	5
20:00-20:30	0	10	10	0	0	0	0	0	0	0	8	8	0	0	0	3	3	5	0	0	0	0	0	0	0	0	0	0	3	3
20:30-21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00-21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:30-22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00-22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:30-23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00-23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:30-24:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM Peak (08:30-09:30)	**848**	**96**	**944**	**96**	**52**	**148**	**60**	**3**	**62**	**640**	**18**	**658**	**29**	**16**	**44**	**10**	**8**	**18**	**3**	**0**	**3**	**3**	**0**	**3**	**0**	**0**	**0**	**52**	**21**	**73**
PM Peak (17:00-18:00)	**47**	**689**	**736**	**13**	**57**	**70**	**0**	**49**	**49**	**26**	**543**	**569**	**0**	**21**	**21**	**3**	**8**	**10**	**0**	**5**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**36**	**42**
12hr (07:00-19:00)	**2730**	**2686**	**5416**	**811**	**809**	**1620**	**133**	**127**	**260**	**1568**	**1521**	**3089**	**112**	**122**	**234**	**31**	**36**	**68**	**5**	**8**	**13**	**3**	**0**	**3**	**16**	**13**	**29**	**216**	**211**	**426**

AM Peak (08:30-09:30) Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	848	96	944	100.0%	100.0%	100.0%
Pedestrians	96	52	148	11.3%	54.1%	15.7%
Cyclists	60	3	62	7.1%	2.7%	6.6%
Public Transport	640	18	658	75.5%	18.9%	69.7%
Car	29	16	44	3.4%	16.2%	4.7%
Taxi	10	8	18	1.2%	8.1%	1.9%
Motorcycle	3	0	3	0.3%	0.0%	0.3%
other	10	0	10	1.2%	0.0%	1.1%

Vehicle Demand (AM Peak)

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	29	16	44	64.7%	66.7%	65.4%
Motorcycle	3	0	3	5.9%	0.0%	3.8%
Taxi	10	8	18	23.5%	33.3%	26.9%
OGV	3	0	3	5.9%	0.0%	3.8%
LGV	0	0	0	0.0%	0.0%	0.0%
Total	44	23	68	100.0%	100.0%	100.0%

On Foot	**736**	**70**	**806**

PM Peak (17:00-18:00) Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	47	689	736	100.0%	100.0%	100.0%
Pedestrians	13	57	70	27.8%	8.3%	9.5%
Cyclists	0	49	49	0.0%	7.2%	6.7%
Public Transport	26	543	569	55.6%	78.9%	77.4%
Car	0	21	21	0.0%	3.0%	2.8%
Taxi	3	8	10	5.6%	1.1%	1.4%
Motorcycle	0	5	5	0.0%	0.8%	0.7%
other	5	5	10	11.1%	0.8%	1.4%

Vehicle Demand (PM Peak)

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	0	21	21	0.0%	61.5%	57.1%
Motorcycle	0	5	5	0.0%	15.4%	14.3%
Taxi	3	8	10	100.0%	23.1%	28.6%
OGV	0	0	0	0.0%	0.0%	0.0%
LGV	0	0	0	0.0%	0.0%	0.0%
Total	3	34	36	100.0%	100.0%	100.0%

On Foot	**39**	**601**	**640**

12hr (07:00-19:00) Core Mode Split

	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Total People	2730	2686	5416	100.0%	100.0%	100.0%
Pedestrians	811	809	1620	29.7%	30.1%	29.9%
Cyclists	133	127	260	4.9%	4.7%	4.8%
Public Transport	1568	1521	3089	57.4%	56.6%	57.0%
Car	112	122	234	4.1%	4.5%	4.3%
Taxi	31	36	68	1.1%	1.4%	1.2%
Motorcycle	5	8	13	0.2%	0.3%	0.2%
other	70	62	133	2.6%	2.3%	2.4%

Vehicle Demand (12 Hour)

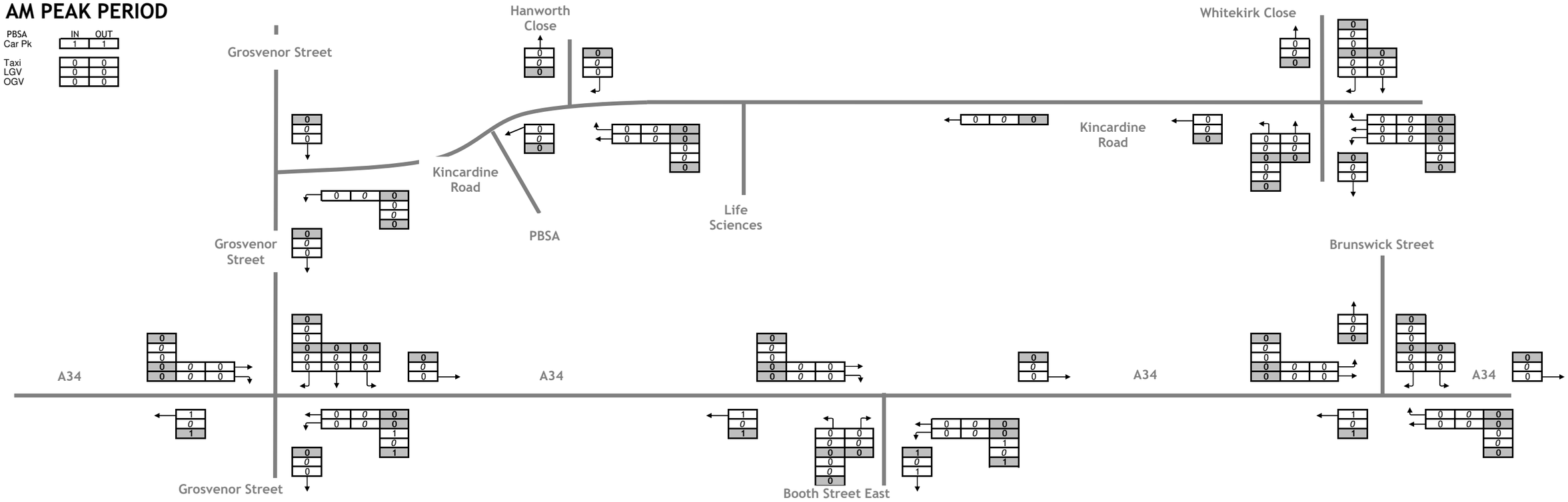
	Arrivals	Departures	Two-way	Arrivals	Departures	Two-way
Car	112	122	234	67.2%	68.1%	67.7%
Motorcycle	5	8	13	3.1%	4.3%	3.8%
Taxi	31	36	68	18.8%	20.3%	19.5%
OGV	3	0	3	1.6%	0.0%	0.8%
LGV	16	13	29	9.4%	7.2%	8.3%
Total	166	179	346	100.0%	100.0%	100.0%

On Foot	**2379**	**2330**	**4709**

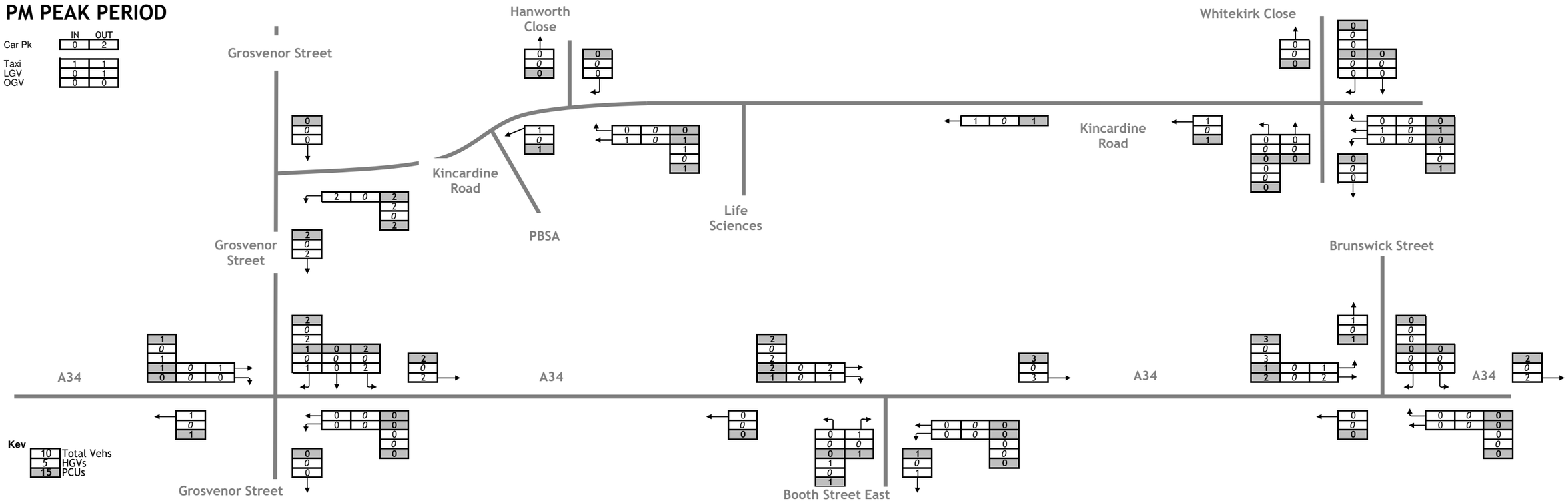


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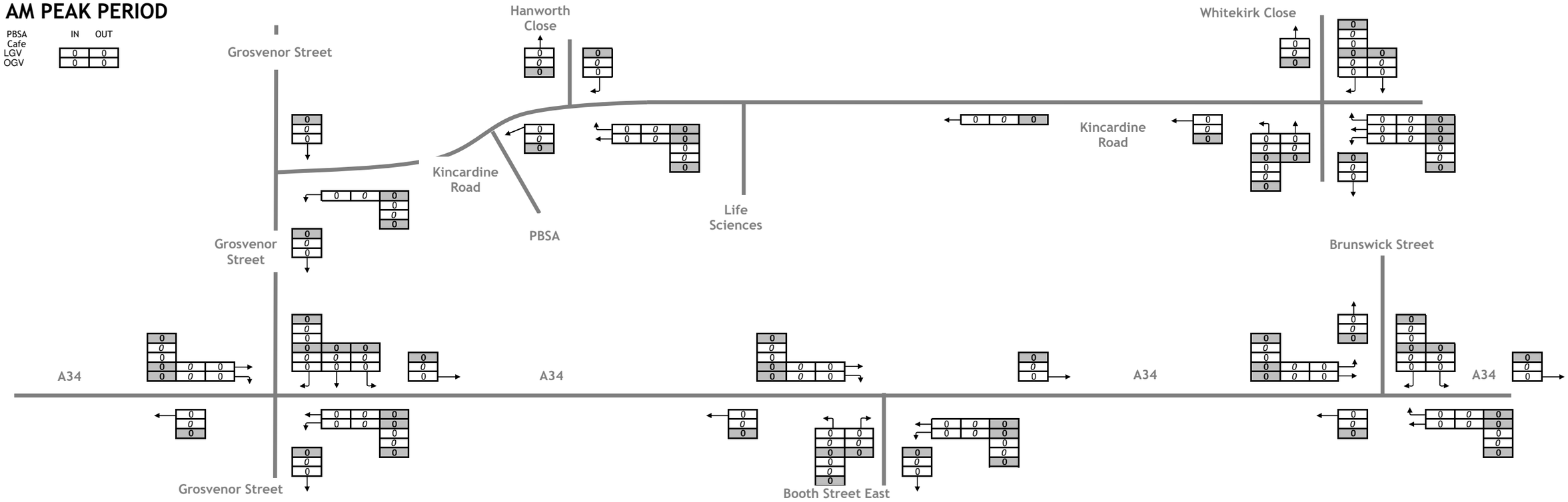
AM PEAK PERIOD



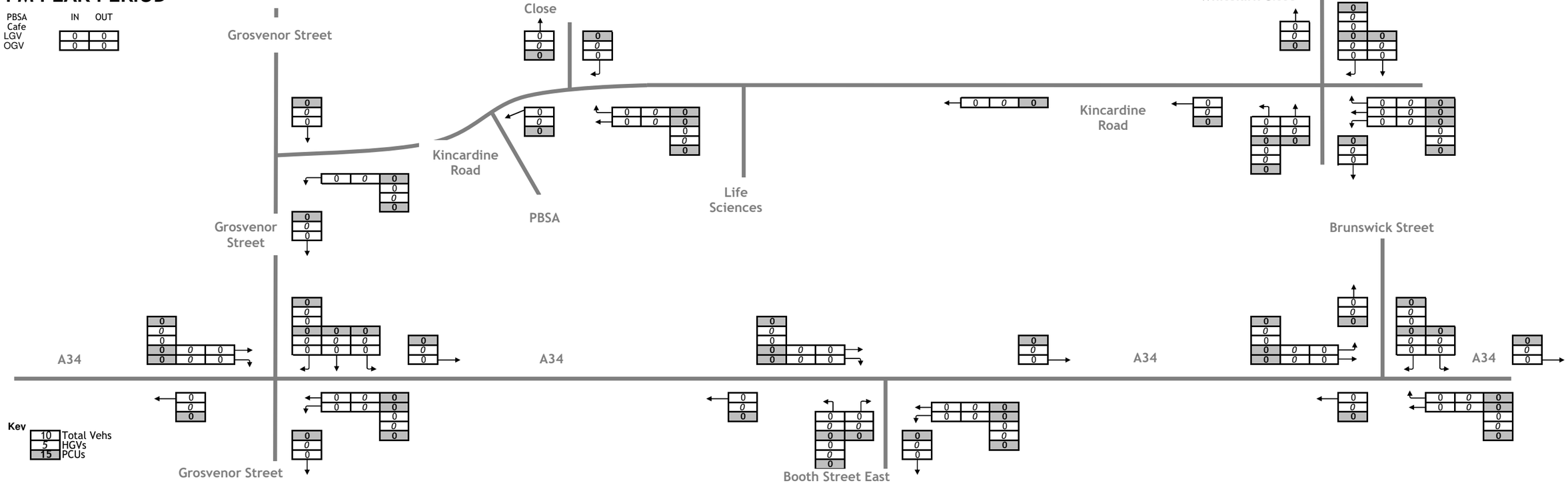
PM PEAK PERIOD



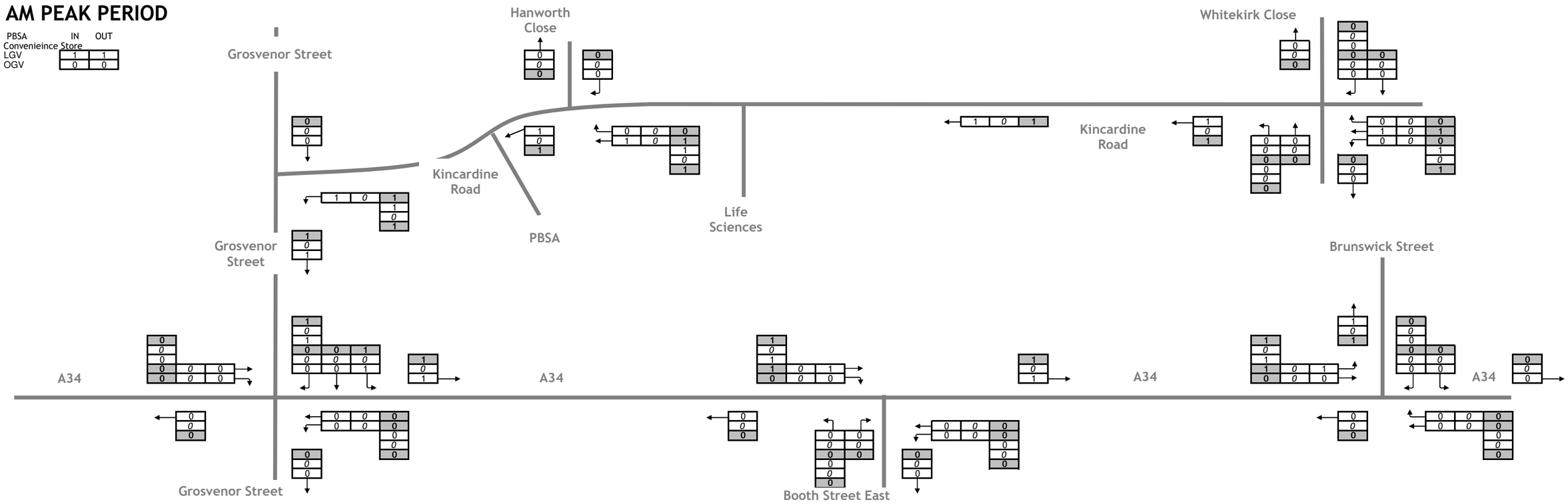
AM PEAK PERIOD



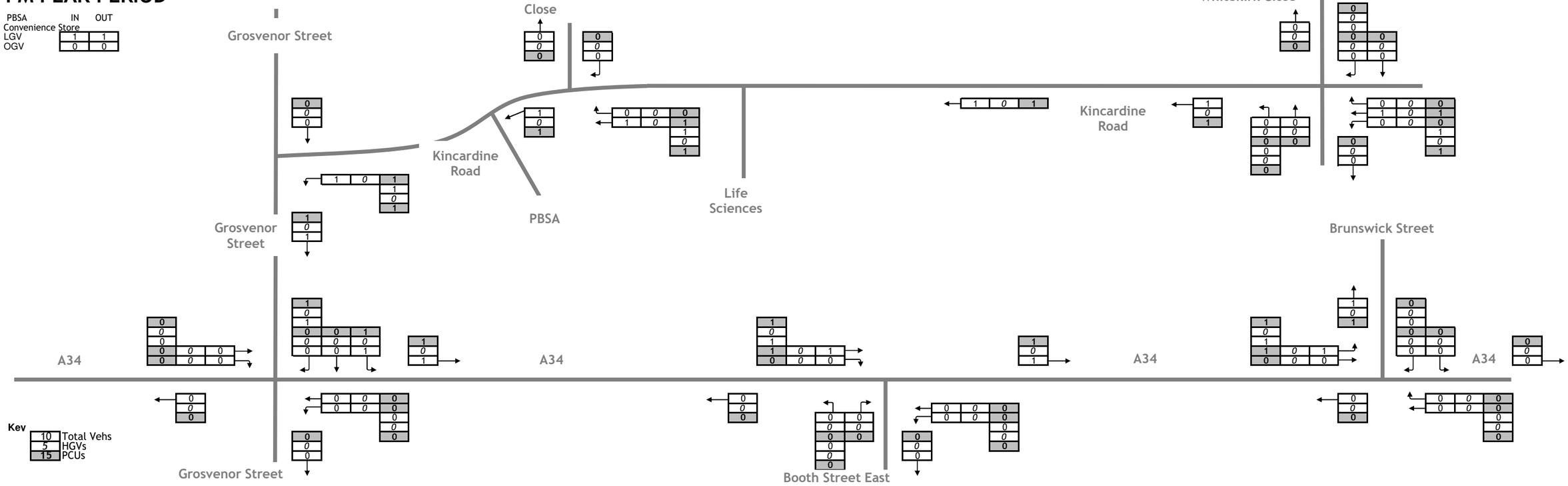
PM PEAK PERIOD



AM PEAK PERIOD

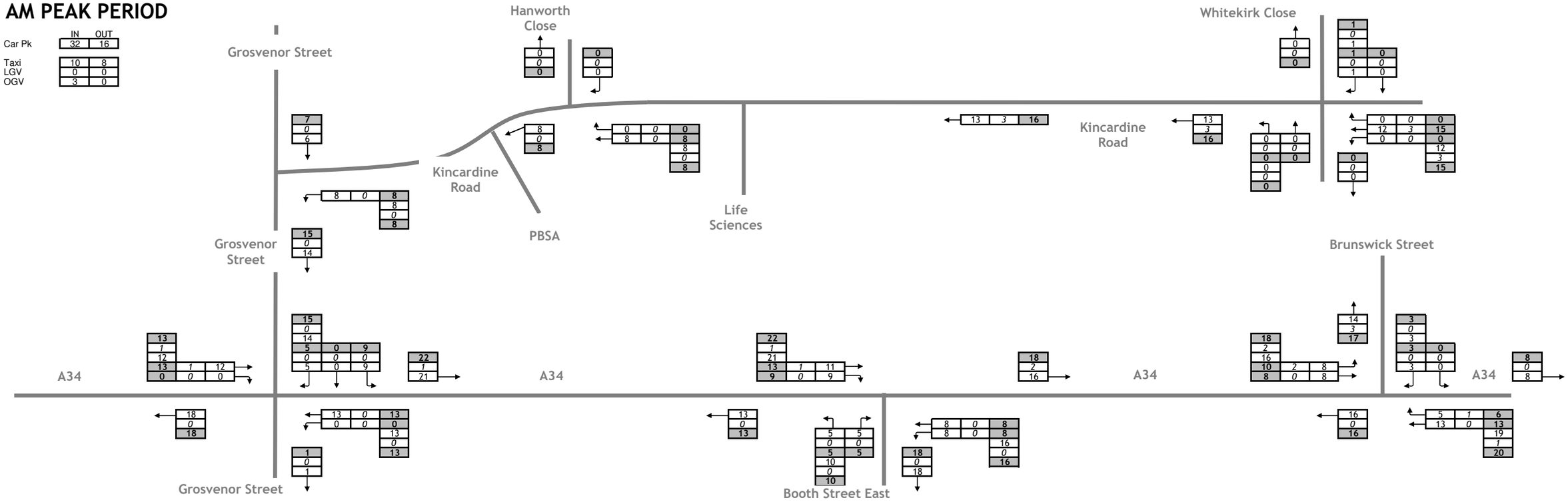


PM PEAK PERIOD



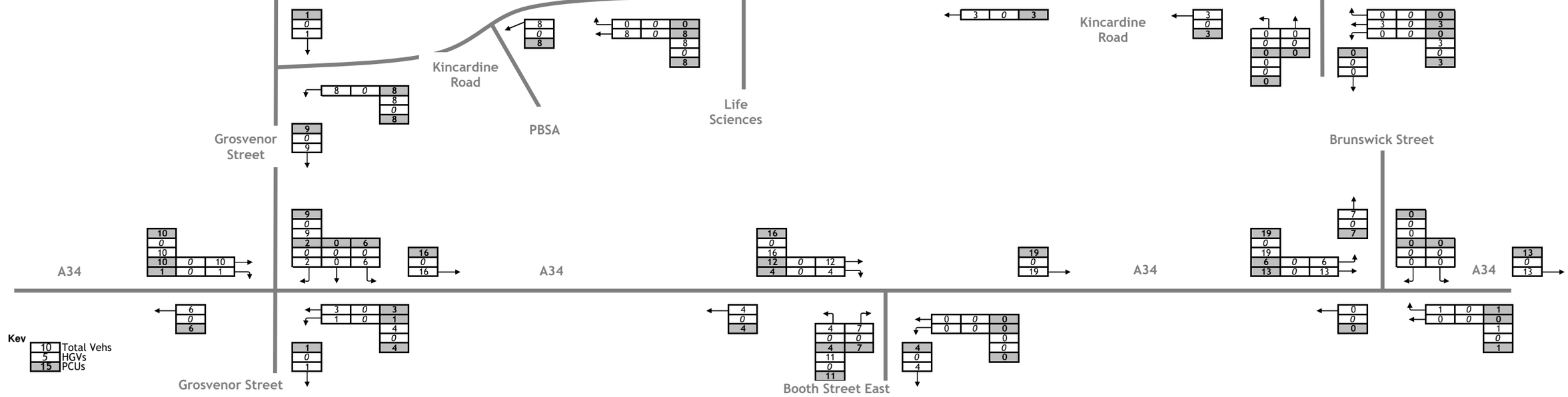
AM PEAK PERIOD

	IN	OUT
Car Pk	32	16
Taxi	10	8
LGV	0	0
OGV	3	0

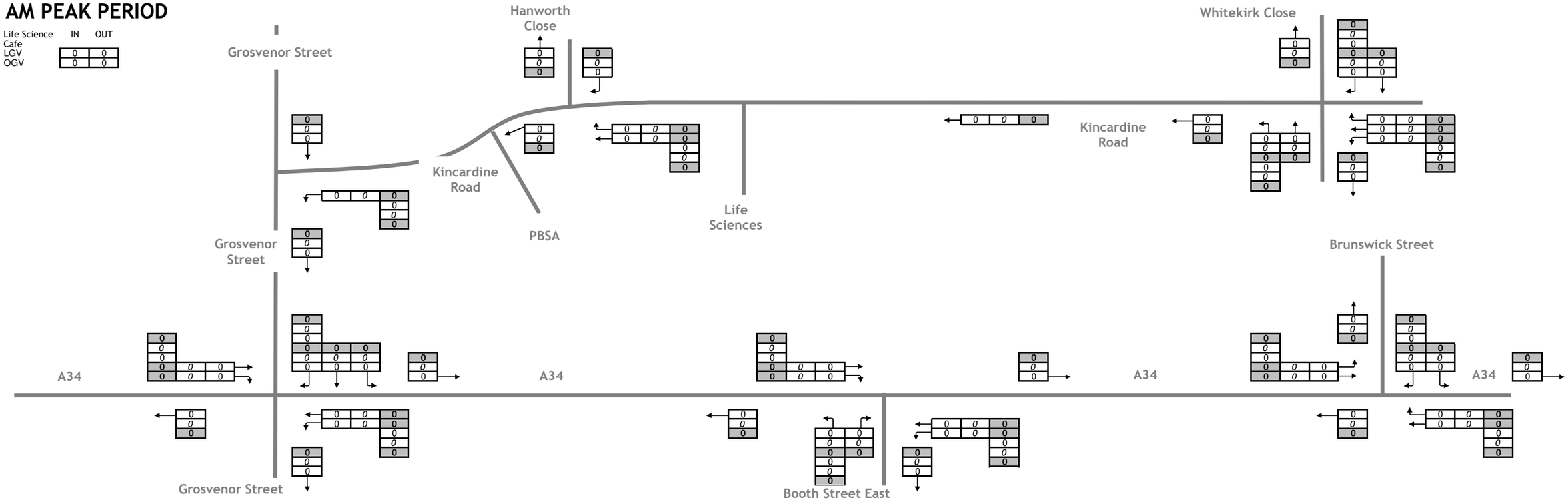


PM PEAK PERIOD

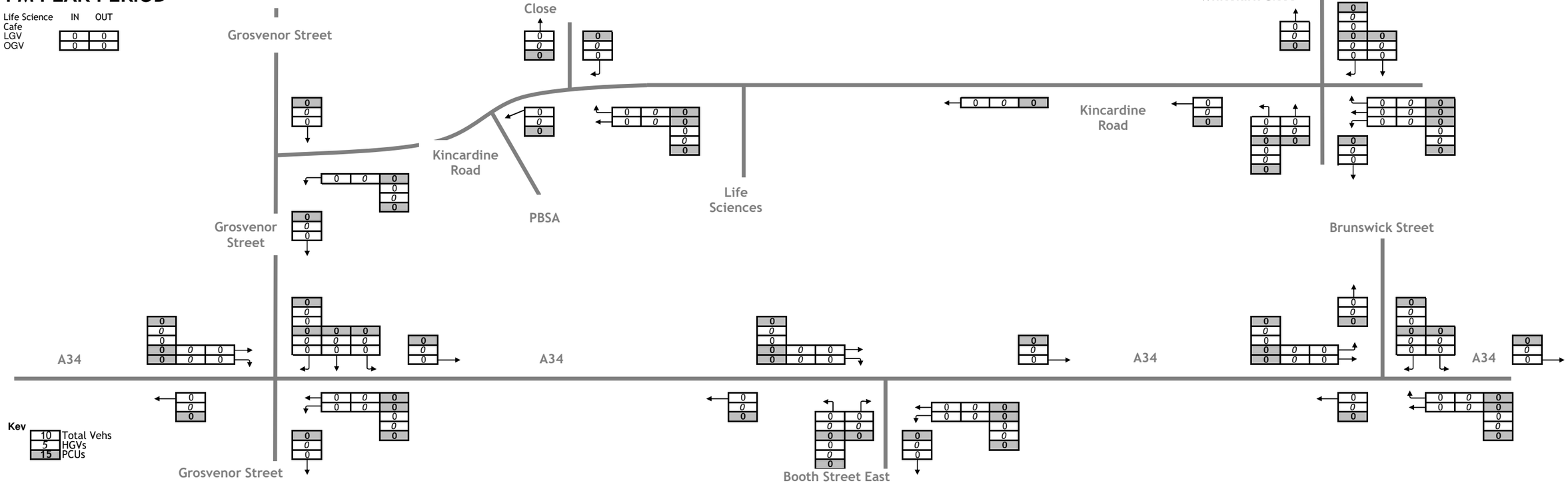
	IN	OUT
Car Pk	0	26
Taxi	3	8
LGV	0	0
OGV	0	0



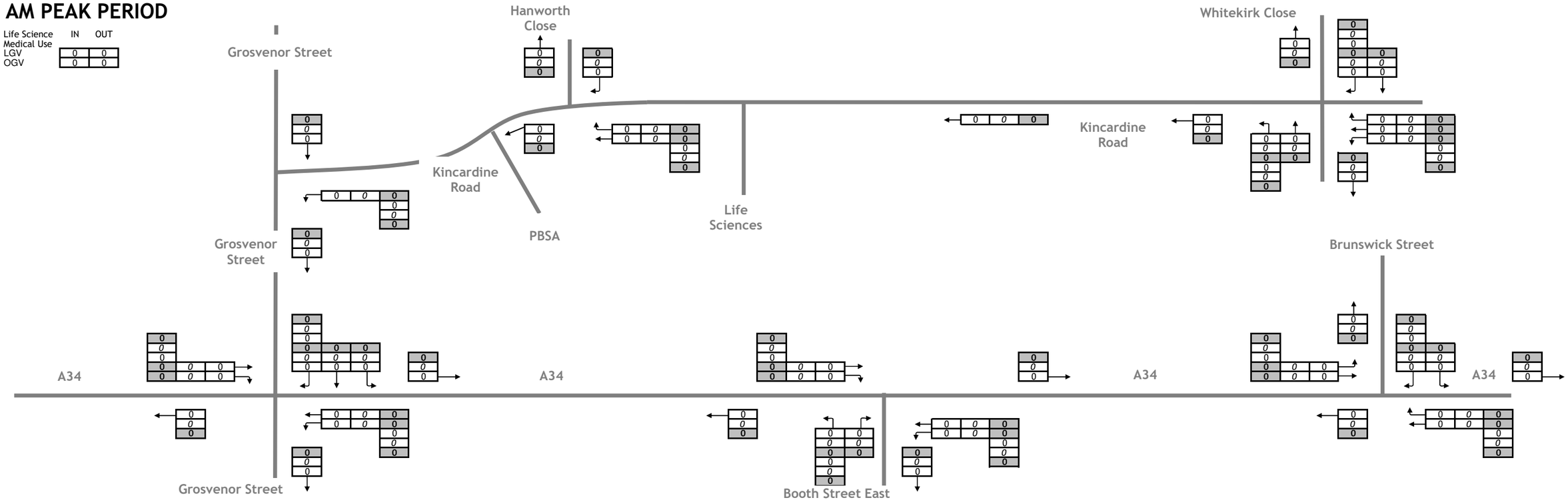
AM PEAK PERIOD



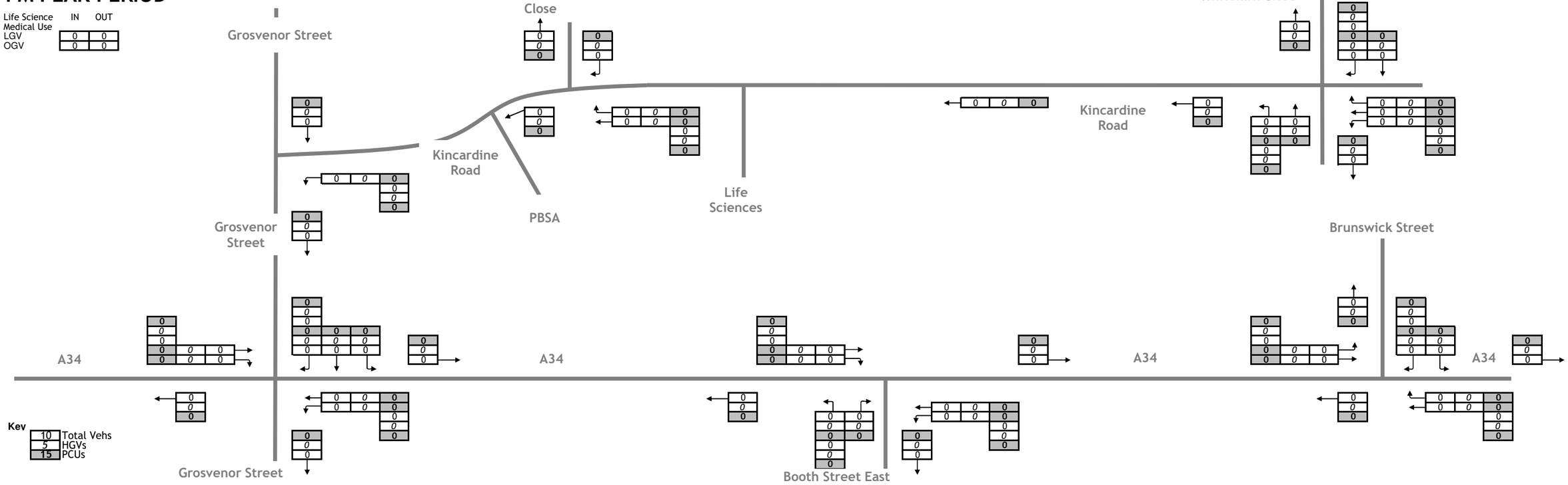
PM PEAK PERIOD



AM PEAK PERIOD



PM PEAK PERIOD





APPENDIX TA14

Appendix TA14 - Baseline + Application Scheme 'With Development' Junction Capacity Modelling Results

Key

- 0-89% DoS (within capacity conditions)
- 90-99% DoS (variable operating conditions)
- 100%+ DoS (over capacity conditions)

A34 / Grosvenor Street

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**63.1%**	-	-	**75.6%**	-
1/1 + 1/2	Grosvenor Street (E) Left Ahead & Right	523	63.1%:63.1%	5.9	702	75.6%:75.6%	9.4
2/1	A34 (S) Left & ahead	466	62.8%	9.1	400	72.8%	9.3
2/2	A34 (S) Ahead	230	28.4%	3.7	161	26.8%	2.9
2/3	A34 (S) Ahead	232	28.5%	3.7	164	27.2%	3.0
3/1	A34 (N) Ahead	302	26.2%	3.4	375	39.2%	5.5
3/2 + 3/3	A34 (N) Ahead & right	390	29.9%:29.9%	4.0	458	42.4%:42.4%	6.4
Cycle Time		80s			80s		
Stage 1, 2, 3 timings		40s, 14s,26s			32s, 14s, 34s		
Junction PRC		42.6%			19.0%		
Total delay over all lanes (pcuHr)		12.24			15.45		

A34 / Booth Street East - Proposed Junction

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**93.7%**	-	-	**91.7%**	-
2/1	A34(S) - Left & Ahead	637	92.9%	18.8	475	90.6%	14.3
2/2	A34(S) - Ahead	745	93.7%	21.9	559	91.7%	16.6
3/1	Booth Street East - Left & Right	198	90.1%	7.7	311	82.9%	8.8
3/2	Booth Street East - Right	219	91.3%	8.6	344	84.3%	9.8
4/1	A34(N) - Ahead	328	34.8%	4.7	467	60.3%	8.9
4/2	A34(N) - Ahead	363	36.2%	5.2	508	61.8%	9.7
4/3	A34(N) - Right	233	93.2%	7.5	247	83.2%	6.0
Cycle Time		80s			80s		
Stage 1, 2 ,3 timings		38s, 9s, 14s, 19s			31s,9s, 21s 19s		
Junction PRC		-4.1%			-1.9%		
Total delay over all lanes (pcuHr)		41.55			38.27		

A34 / Brunswick Street

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**82.1%**	-	-	**96.7%**	-
1/2 + 1/1	Brunswick Street - Left & Right	563	81.5% : 81.5%	13.0	392	83.2% : 83.2%	9.9
2/1	A34(S) - Ahead	561	76.9%	13.3	651	66.1%	12.9
2/2 + 2/3	A34(S) - Ahead & Right	737	82.1% : 82.1%	15.0	363	96.7% : 96.7%	9.4
3/1	A34 (N) - Left & Ahead	463	55.5%	8.5	671	63.0%	11.1
3/2	A34 (N) - Ahead	557	58.4%	10.3	804	65.5%	13.5
Cycle Time		160s			160s		
Stage 1, 2, 1, 2, 3 timings		31s, 39s, 41s, 34s, 15s			39s, 28s, 54s, 24s, 15s		
Junction PRC		9.6%			-7.4%		
Total delay over all lanes (pcuHr)		23.84			24.82		

Pedestrian stage called every second cycle, extra time given to Brunswick Street

Appendix TA14 - Baseline + Application Scheme 'With Development' Junction Capacity Modelling Results

Kincardine Road / Hanworth Close	AM Peak			PM Peak		
	Flow (PCUs)	RFC	Queue	Flow (PCUs)	RFC	Queue
Hanworth Close (B-AC)	28	0.06	0.1	29	0.07	0.1
Kincardine Road (S) (C-AB)	99	0.07	0.1	148	0.11	0.1

Kincardine Road / Whitekirk Close / Car Park Access	AM Peak			PM Peak		
	Flow (PCUs)	RFC	Queue	Flow (PCUs)	RFC	Queue
Whitekirk Close (B-ACD)	16	0.04	0.0	15	0.04	0.0
Kincardine Road (N) (A-BCD)	0	0.00	0.0	0	0.00	0.0
Car Park Access (D-ABC)	13	0.02	0.0	35	0.06	0.1
Kincardine Road (S) (C-ABD)	132	0.04	0.1	137	0.03	0.0

Key

0-0.85 RFC (within capacity conditions)
0.86-0.99 RFC (variable operating conditions)
1.0+ RFC (over capacity conditions)

Appendix TA14 - Comparison of 'Do-Nothing' v 'With Development' Modelling Results

JUNCTION PRC

	AM Peak		PM Peak	
Junction PRC	**Baseline**	**Do Something**	**Baseline**	**Do Something**
A34 Upper Brook Street / Grosvenor Street	14.9%	42.6%	35.2%	19.0%
A34 UBS / Inchley Road / Booth Street East	-4.6%	-4.1%	-7.1%	-1.9%
A34 Upper Brook Street / Brunswick Street	0.0%	9.6%	17.4%	-7.4%

JUNCTION DELAY

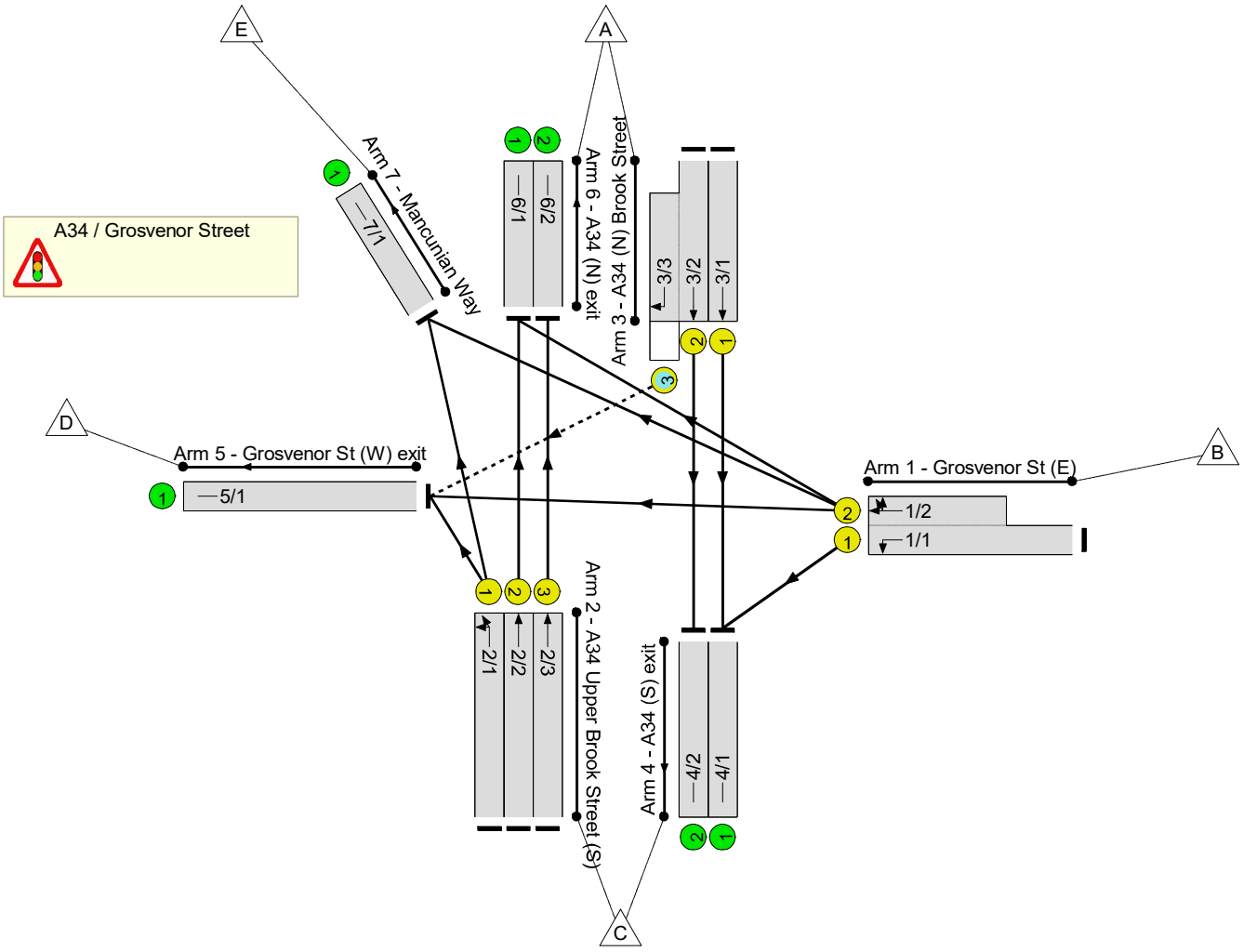
	AM Peak		PM Peak	
Total Delay Over All Lanes (pcuHr)	**Baseline**	**Do Something**	**Baseline**	**Do Something**
A34 Upper Brook Street / Grosvenor Street	10.20	12.24	10.29	15.45
A34 UBS / Inchley Road / Booth Street East	22.92	41.55	32.74	38.27
A34 Upper Brook Street / Brunswick Street	22.69	23.84	17.51	24.82

Full Input Data And Results

User and Project Details

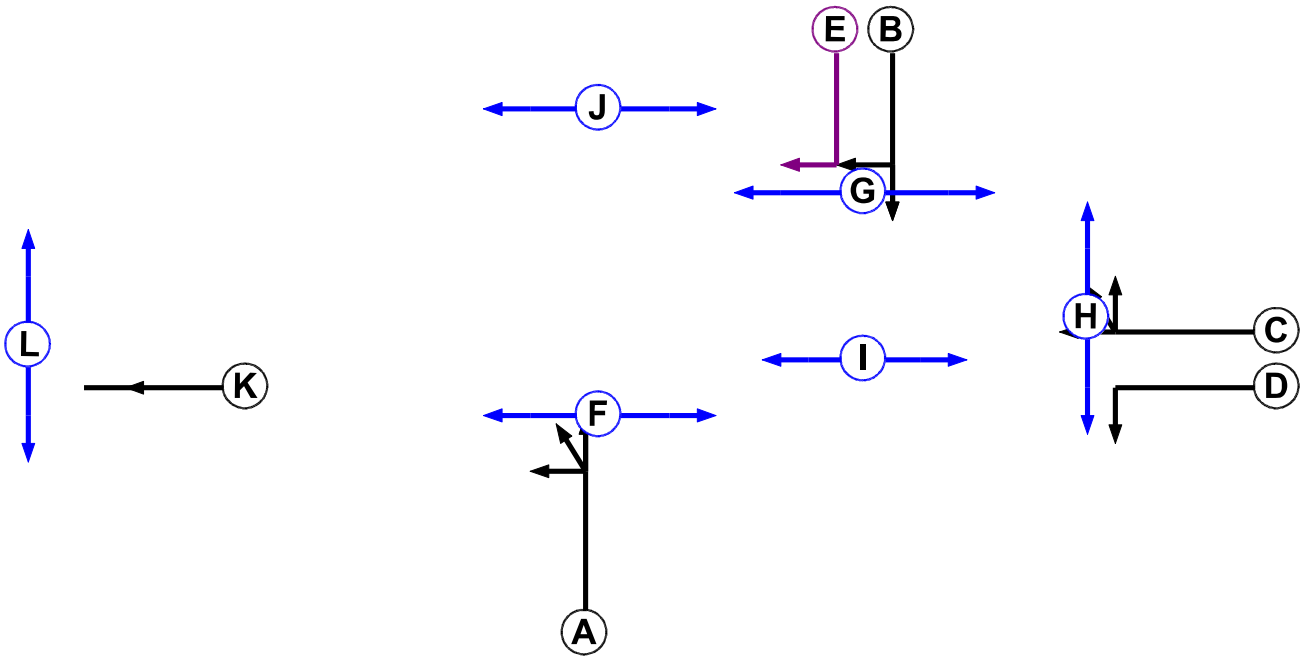
Project:	**Upper Brook Street**
Title:	**Grosvenor Road Junction**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	ManchWayA34_Grosvenor Street.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Ind. Arrow	B	-9999	3
F	Pedestrian		-9999	7
G	Pedestrian		-9999	6
H	Pedestrian		-9999	5
I	Pedestrian		-9999	5
J	Pedestrian		-9999	6
K	Traffic		-9999	7
L	Pedestrian		-9999	5

Full Input Data And Results

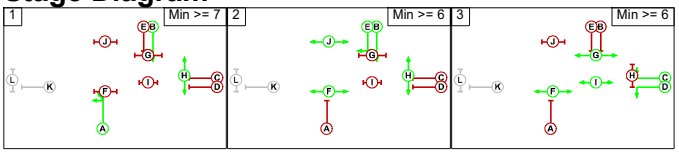
Phase Intergreens Matrix

		Starting Phase											
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K	L
	A		-	5	-	5	5	-	-	-	8	-	-
	B	-		5	6	-	-	5	-	7	-	-	-
	C	5	5		-	5	-	-	5	-	10	-	-
	D	-	4	-		-	-	-	5	-	-	-	-
	E	6	-	5	-		-	5	-	7	-	-	-
	F	10	-	-	-	-		-	-	-	-	-	-
	G	-	9	-	-	9	-		-	-	-	-	-
	H	-	-	5	5	-	-	-		-	-	-	-
	I	-	6	-	-	6	-	-	-		-	-	-
	J	9	-	9	-	-	-	-	-	-		-	-
	K	-	-	-	-	-	-	-	-	-	-		5
	L	-	-	-	-	-	-	-	-	-	-	6	

Phases in Stage

Stage No.	Phases in Stage
1	A B H
2	B E F H J
3	C D F G I

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
2	3	B	Losing	2	2
2	3	H	Losing	3	3
3	1	C	Losing	5	5
3	1	D	Losing	5	5
3	1	G	Losing	1	1
3	1	I	Losing	4	4

Full Input Data And Results

Prohibited Stage Change

	To Stage			
From Stage		1	2	3
	1		8	7
	2	10		9
	3	10	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Grosvenor Street											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
3/3 (A34 (N) Brook Street)	5/1 (Right)	1439	0	2/1	1.09	All	2.00	-	0.50	2	2.00
				2/2	1.09	All					
				2/3	1.09	All					

Full Input Data And Results

Lane Input Data

Full Input Data And Results

Junction: A34 / Grosvenor Street												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Grosvenor St (E))	U	D	2	3	60.0	Geom	-	4.17	0.00	Y	Arm 4 Left	10.00
1/2 (Grosvenor St (E))	U	C	2	3	7.1	Geom	-	4.49	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	10.00
											Arm 7 Right	10.00
2/1 (A34 Upper Brook Street (S))	U	A	2	3	33.0	Geom	-	3.40	0.00	Y	Arm 5 Left	10.00
											Arm 7 Ahead	Inf
2/2 (A34 Upper Brook Street (S))	U	A	2	3	33.0	Geom	-	3.32	0.00	N	Arm 6 Ahead	Inf
2/3 (A34 Upper Brook Street (S))	U	A	2	3	33.7	Geom	-	3.45	0.00	N	Arm 6 Ahead	Inf
3/1 (A34 (N) Brook Street)	U	B	2	3	21.7	Geom	-	3.46	0.00	Y	Arm 4 Ahead	Inf
3/2 (A34 (N) Brook Street)	U	B	2	3	21.7	Geom	-	3.46	0.00	N	Arm 4 Ahead	Inf
3/3 (A34 (N) Brook Street)	O	B E	2	3	15.8	Geom	-	3.19	0.00	N	Arm 5 Right	10.00
4/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
4/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

5/1 (Grosvenor St (W) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Mancunian Way)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Baseline AM Peak'	08:15	09:15	01:00	

Scenario 3: 'Application Scheme' (FG3: 'Do Something (Application Scheme) AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
Origin		A	B	C	D	E	Tot.
	A	0	0	656	36	0	692
	B	93	0	277	73	80	523
	C	462	0	0	66	400	928
	D	0	0	0	0	0	0
	E	0	0	0	0	0	0
	Tot.	555	0	933	175	480	2143

Traffic Lane Flows

Lane	Scenario 3: Application Scheme
Junction: A34 / Grosvenor Street	
1/1 (with short)	523(In) 277(Out)
1/2 (short)	246
2/1	466
2/2	230
2/3	232
3/1	302
3/2 (with short)	390(In) 354(Out)
3/3 (short)	36
4/1	579
4/2	354
5/1	175
6/1	323
6/2	232
7/1	480

Full Input Data And Results

Lane Saturation Flows

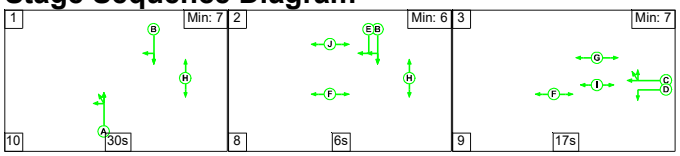
Full Input Data And Results

Junction: A34 / Grosvenor Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Grosvenor St (E))	4.17	0.00	Y	Arm 4 Left	10.00	100.0 %	1767	1767
1/2 (Grosvenor St (E))	4.49	0.00	Y	Arm 5 Ahead	Inf	29.7 %	1867	1867
				Arm 6 Right	10.00	37.8 %		
				Arm 7 Right	10.00	32.5 %		
2/1 (A34 Upper Brook Street (S))	3.40	0.00	Y	Arm 5 Left	10.00	14.2 %	1914	1914
				Arm 7 Ahead	Inf	85.8 %		
2/2 (A34 Upper Brook Street (S))	3.32	0.00	N	Arm 6 Ahead	Inf	100.0 %	2087	2087
2/3 (A34 Upper Brook Street (S))	3.45	0.00	N	Arm 6 Ahead	Inf	100.0 %	2100	2100
3/1 (A34 (N) Brook Street)	3.46	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1961	1961
3/2 (A34 (N) Brook Street)	3.46	0.00	N	Arm 4 Ahead	Inf	100.0 %	2101	2101
3/3 (A34 (N) Brook Street)	3.19	0.00	N	Arm 5 Right	10.00	100.0 %	1804	1804
4/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (Grosvenor St (W) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Mancunian Way Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 3: 'Application Scheme' (FG3: 'Do Something (Application Scheme) AM Peak', Plan 1: 'Network Control Plan 1')

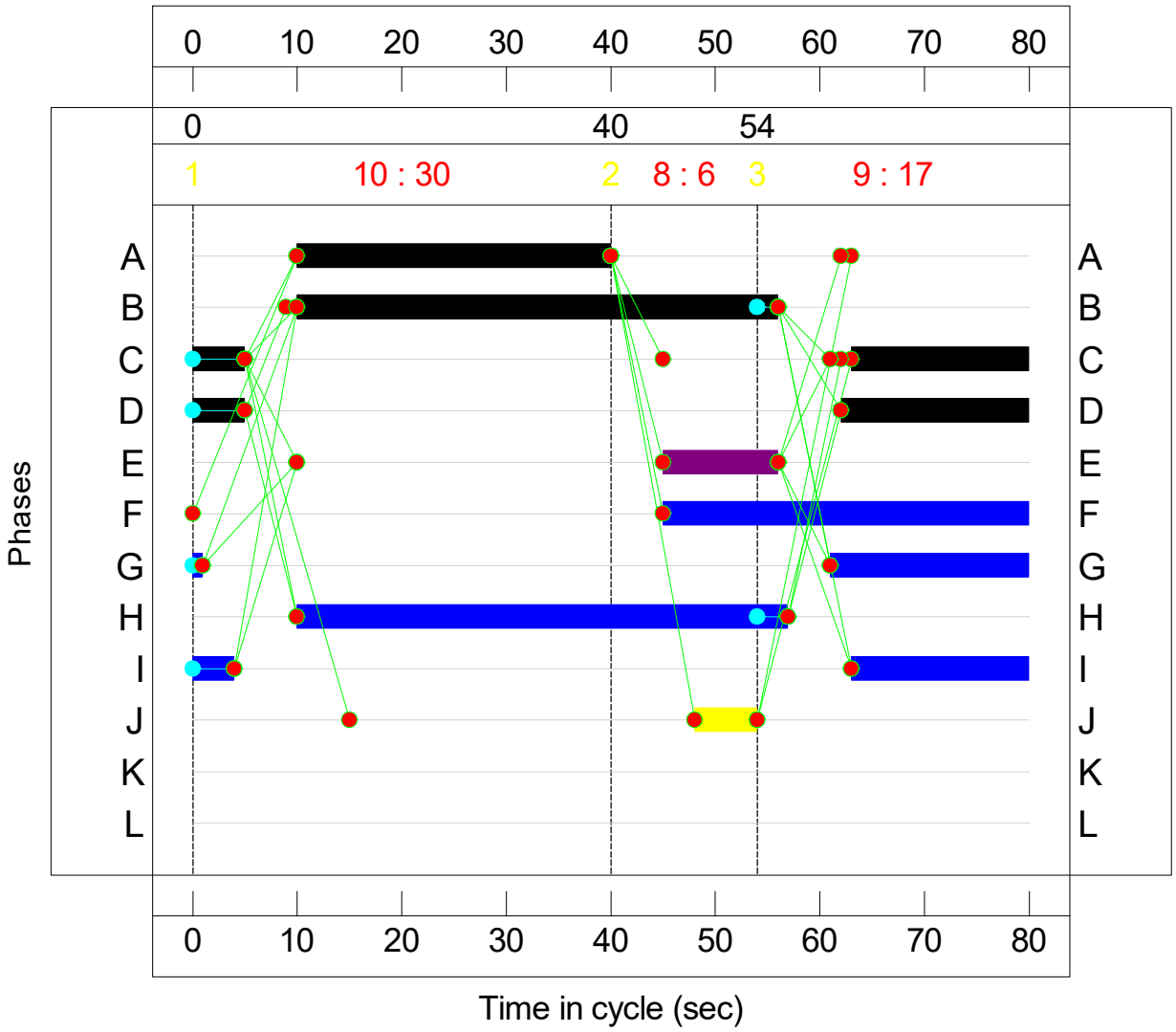
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	30	6	17
Change Point	0	40	54

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Grosvenor Road Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**63.1%**
A34 / Grosvenor Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**63.1%**
1/1+1/2	Grosvenor St (E) Left Ahead Right Right2	U	N/A	N/A	D C		1	23:22	-	523	1767:1867	439+390	63.1 : 63.1%
2/1	A34 Upper Brook Street (S) Left Ahead	U	N/A	N/A	A		1	30	-	466	1914	742	62.8%
2/2	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	30	-	230	2087	809	28.4%
2/3	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	30	-	232	2100	814	28.5%
3/1	A34 (N) Brook Street Ahead	U	N/A	N/A	B		1	46	-	302	1961	1152	26.2%
3/2+3/3	A34 (N) Brook Street Ahead Right	U+O	N/A	N/A	B	E	1	46	11	390	2101:1804	1186+121	29.9 : 29.9%
4/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	579	Inf	Inf	0.0%
4/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	354	Inf	Inf	0.0%
5/1	Grosvenor St (W) exit	U	N/A	N/A	-		-	-	-	175	Inf	Inf	0.0%
6/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	323	Inf	Inf	0.0%
6/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	232	Inf	Inf	0.0%
7/1	Mancunian Way	U	N/A	N/A	-		-	-	-	480	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Grosvenor Road Junction	**-**	**-**	**29**	**6**	**1**	**9.7**	**2.5**	**0.1**	**12.2**	**-**	**-**	**-**	**-**
A34 / Grosvenor Street	**-**	**-**	**29**	**6**	**1**	**9.7**	**2.5**	**0.1**	**12.2**	**-**	**-**	**-**	**-**
1/1+1/2	523	523	-	-	-	3.4	0.9	-	4.2	29.2	5.1	0.9	5.9
2/1	466	466	-	-	-	2.6	0.8	-	3.4	26.3	8.3	0.8	9.1
2/2	230	230	-	-	-	1.1	0.2	-	1.3	20.0	3.5	0.2	3.7
2/3	232	232	-	-	-	1.1	0.2	-	1.3	20.0	3.5	0.2	3.7
3/1	302	302	-	-	-	0.7	0.2	-	0.9	10.2	3.3	0.2	3.4
3/2+3/3	390	390	29	6	1	0.9	0.2	0.1	1.2	10.9	3.8	0.2	4.0
4/1	579	579	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	354	354	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	175	175	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	323	323	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	232	232	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	480	480	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 42.6
PRC Over All Lanes (%): 42.6

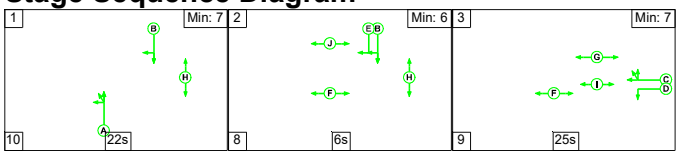
Total Delay for Signalled Lanes (pcuHr): 12.24
Total Delay Over All Lanes(pcuHr): 12.24

Cycle Time (s): 80

Full Input Data And Results

Scenario 4: 'Application Scheme' (FG4: 'Do Something (Application Scheme) PM Peak', Plan 1: 'Network Control Plan 1')

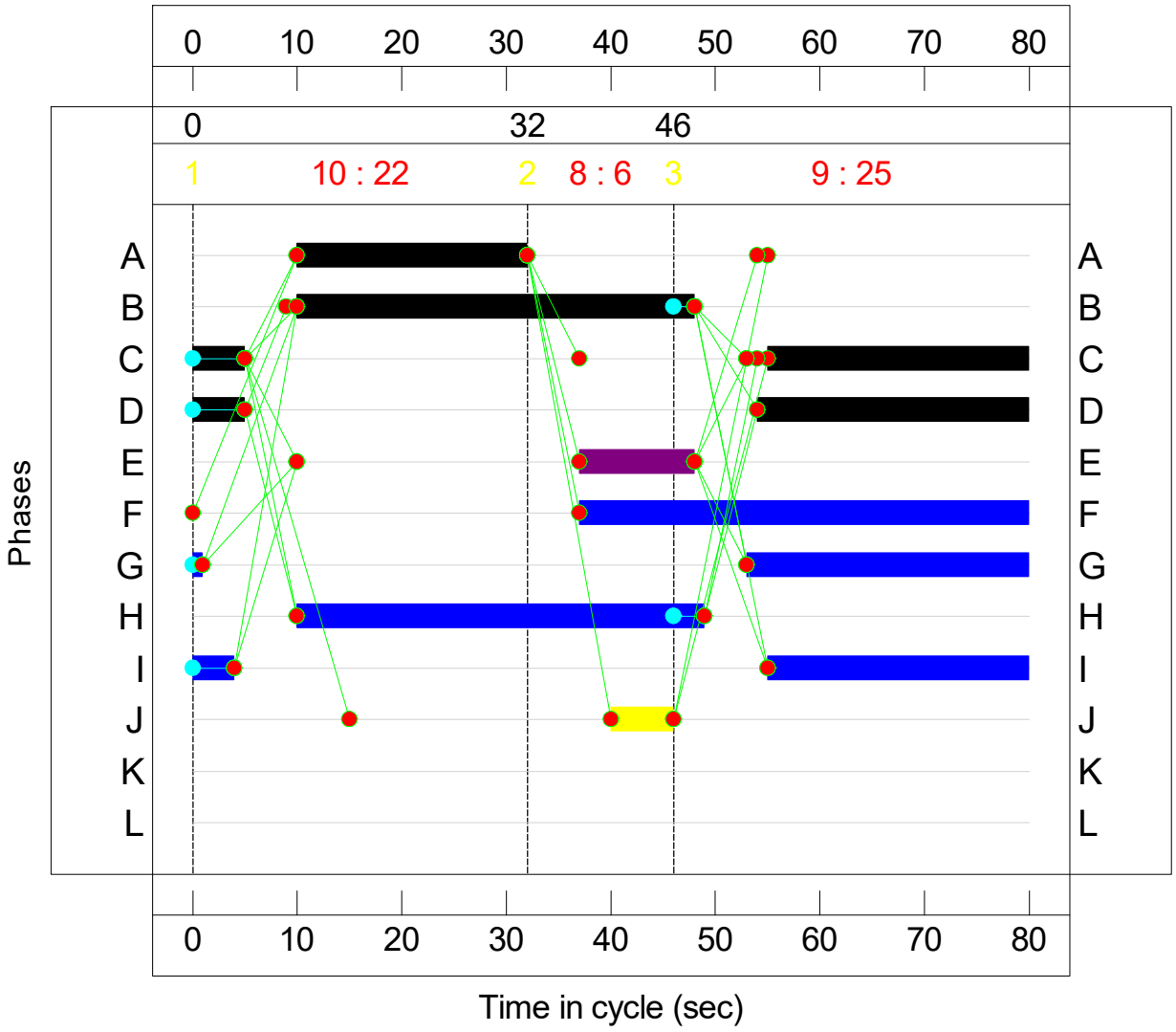
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	22	6	25
Change Point	0	32	46

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Grosvenor Road Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**75.6%**
A34 / Grosvenor Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**75.6%**
1/1+1/2	Grosvenor St (E) Left Ahead Right Right2	U	N/A	N/A	D C		1	31:30	-	702	1767:1849	565+364	75.6 : 75.6%
2/1	A34 Upper Brook Street (S) Left Ahead	U	N/A	N/A	A		1	22	-	400	1911	549	72.8%
2/2	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	22	-	161	2087	600	26.8%
2/3	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	22	-	164	2100	604	27.2%
3/1	A34 (N) Brook Street Ahead	U	N/A	N/A	B		1	38	-	375	1961	956	39.2%
3/2+3/3	A34 (N) Brook Street Ahead Right	U+O	N/A	N/A	B	E	1	38	11	458	2101:1804	1007+73	42.4 : 42.4%
4/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	802	Inf	Inf	0.0%
4/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	427	Inf	Inf	0.0%
5/1	Grosvenor St (W) exit	U	N/A	N/A	-		-	-	-	155	Inf	Inf	0.0%
6/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	265	Inf	Inf	0.0%
6/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	164	Inf	Inf	0.0%
7/1	Mancunian Way	U	N/A	N/A	-		-	-	-	447	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Grosvenor Road Junction	**-**	**-**	**25**	**5**	**1**	**11.5**	**3.9**	**0.1**	**15.4**	**-**	**-**	**-**	**-**
A34 / Grosvenor Street	**-**	**-**	**25**	**5**	**1**	**11.5**	**3.9**	**0.1**	**15.4**	**-**	**-**	**-**	**-**
1/1+1/2	702	702	-	-	-	3.6	1.5	-	5.1	26.3	7.9	1.5	9.4
2/1	400	400	-	-	-	2.9	1.3	-	4.2	37.5	8.0	1.3	9.3
2/2	161	161	-	-	-	1.0	0.2	-	1.2	26.1	2.7	0.2	2.9
2/3	164	164	-	-	-	1.0	0.2	-	1.2	26.1	2.8	0.2	3.0
3/1	375	375	-	-	-	1.4	0.3	-	1.7	16.1	5.2	0.3	5.5
3/2+3/3	458	458	25	5	1	1.7	0.4	0.1	2.1	16.6	6.0	0.4	6.4
4/1	802	802	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	427	427	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	155	155	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	265	265	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	164	164	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	447	447	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 19.0
PRC Over All Lanes (%): 19.0

Total Delay for Signalled Lanes (pcuHr): 15.45
Total Delay Over All Lanes(pcuHr): 15.45

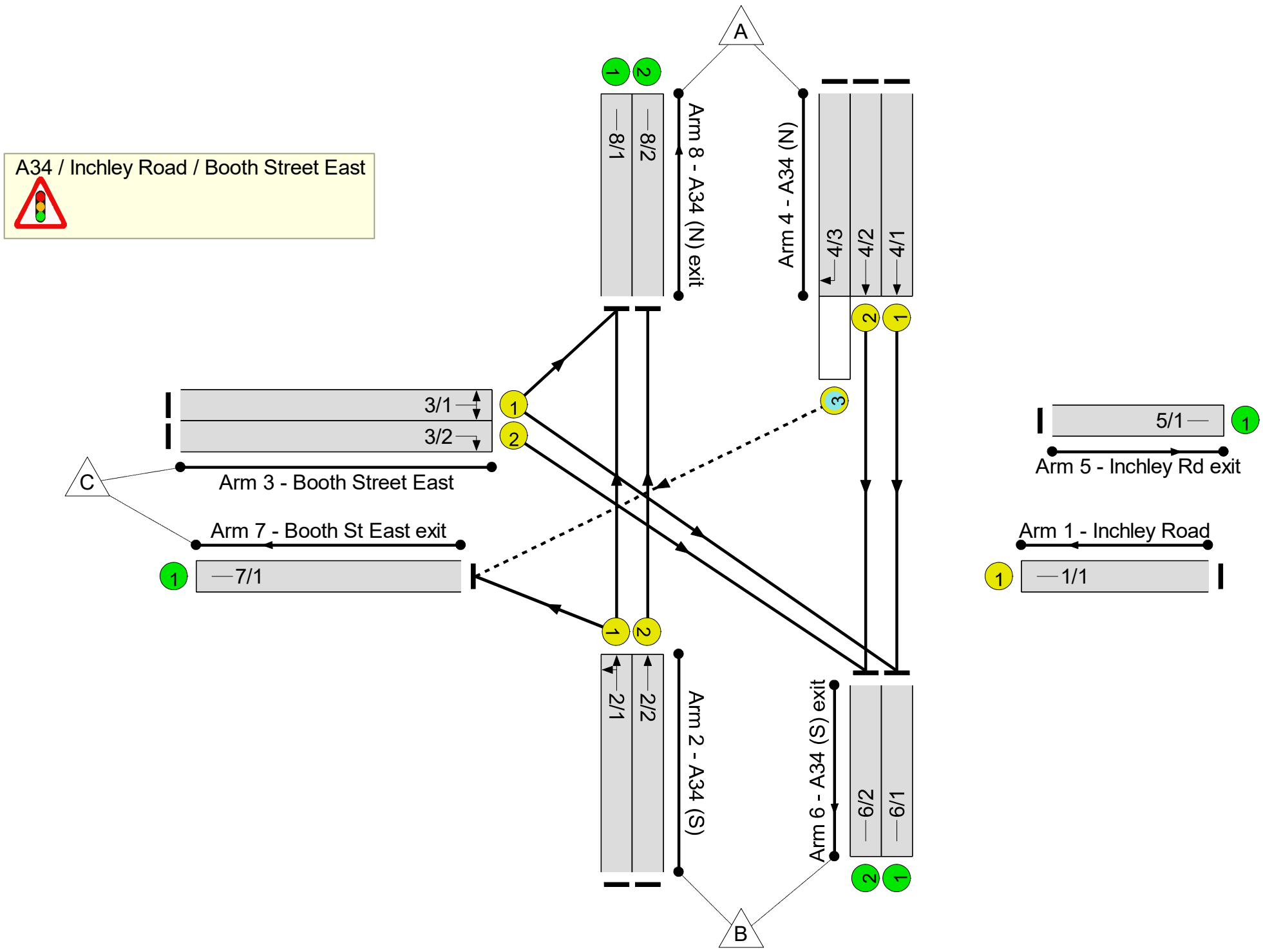
Cycle Time (s): 80

Full Input Data And Results

User and Project Details

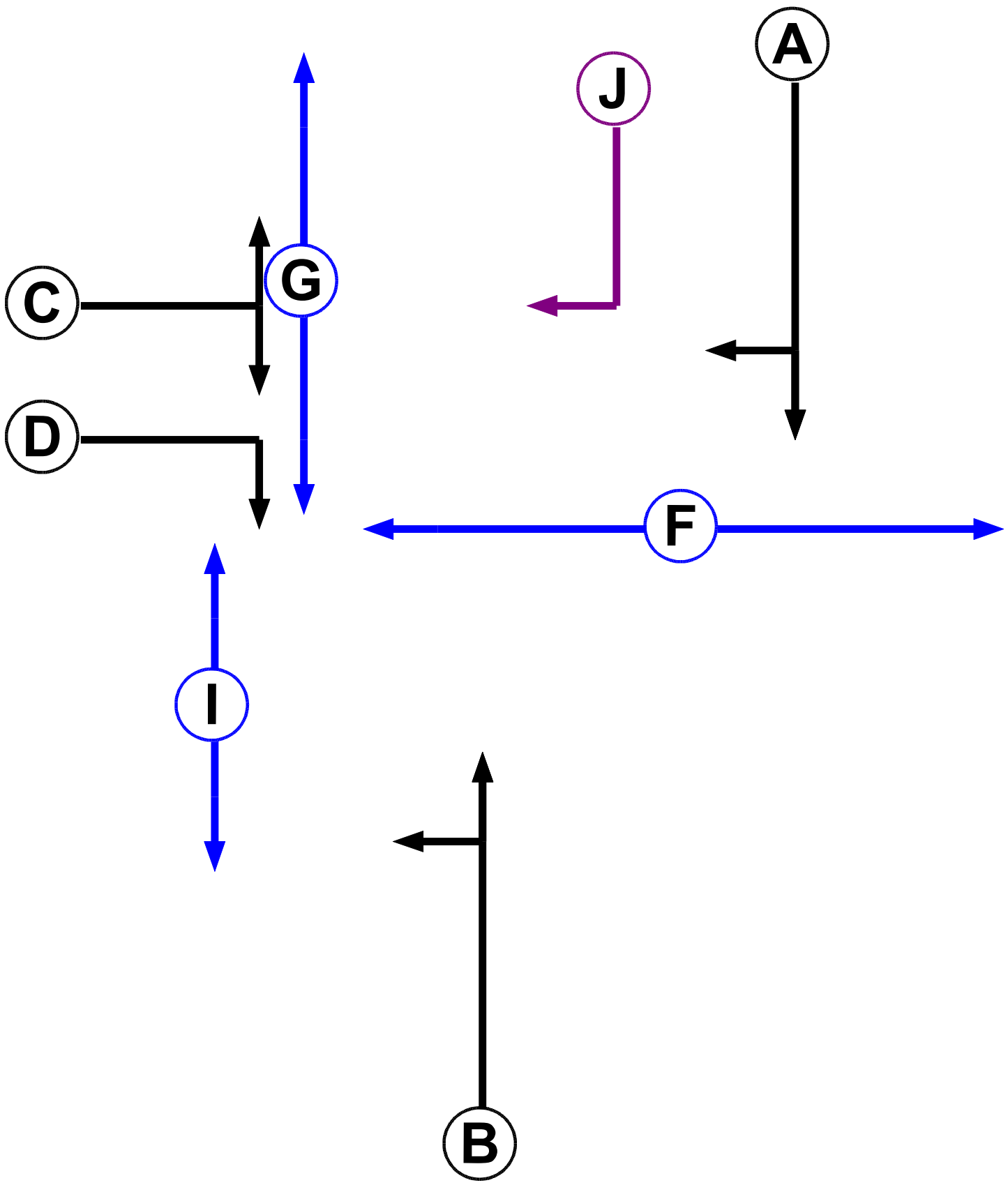
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Title:	**A34_ Booth Street East**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	Proposed A34_Booth St East.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Traffic		-9999	7
F	Pedestrian		-9999	12
G	Pedestrian		-9999	6
H	Pedestrian		-9999	5
I	Pedestrian		-9999	5
J	Ind. Arrow	A	-9999	4

Full Input Data And Results

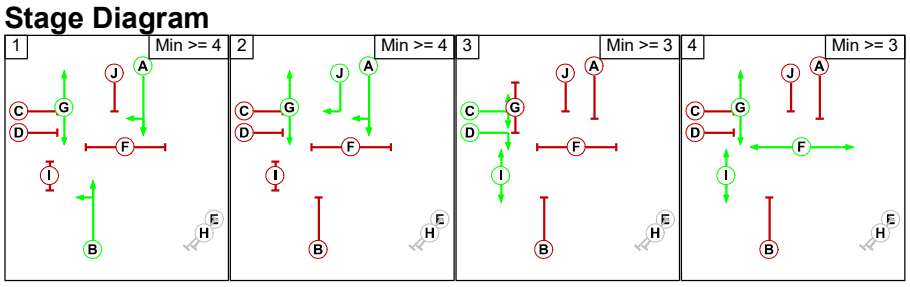
Phase Intergreens Matrix

	Starting Phase										
Terminating Phase		A	B	C	D	E	F	G	H	I	J
	A		-	5	5	-	-	-	-	-	-
	B	-		-	-	-	-	-	-	7	5
	C	-	-		-	-	7	5	-	-	-
	D	-	-	-		-	7	5	-	-	-
	E	-	-	-	-		-	-	-	-	-
	F	9	9	-	-	-		-	-	-	-
	G	-	-	-	-	-	-		-	-	-
	H	-	-	-	-	-	-	-		-	-
	I	-	-	-	-	-	-	-	-		-
	J	-	-	5	5	-	-	-	-	9	

Phases in Stage

Stage No.	Phases in Stage
1	A B G
2	A G J
3	C D I
4	F G I

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

	To Stage				
From Stage		1	2	3	4
	1		5	7	7
	2	2		9	9
	3	5	X		7
	4	9	X	2	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Inchley Road / Booth Street East											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
4/3 (A34 (N))	7/1 (Right)	1439	0	2/1	1.09	All	4.00	-	0.50	4	4.00
				2/2	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: A34 / Inchley Road / Booth Street East												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Inchley Road)	U	E	2	3	60.0	Geom	-	4.34	0.00	Y		
2/1 (A34 (S))	U	B	2	3	49.7	Geom	-	3.65	0.00	Y	Arm 7 Left	15.00
											Arm 8 Ahead	Inf
2/2 (A34 (S))	U	B	2	3	49.7	Geom	-	3.65	0.00	N	Arm 8 Ahead	Inf
3/1 (Booth Street East)	U	C	2	3	8.3	Geom	-	3.25	0.00	Y	Arm 6 Right	20.00
											Arm 8 Left	10.00
3/2 (Booth Street East)	U	D	2	3	8.3	Geom	-	3.25	0.00	N	Arm 6 Right	18.00
4/1 (A34 (N))	U	A	2	3	33.4	Geom	-	3.20	0.00	Y	Arm 6 Ahead	Inf
4/2 (A34 (N))	U	A	2	3	33.9	Geom	-	3.00	0.00	N	Arm 6 Ahead	Inf
4/3 (A34 (N))	O	A J	2	3	8.7	Geom	-	3.00	0.00	N	Arm 7 Right	15.00
5/1 (Inchley Rd exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Booth St East exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/2 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Application Scheme AM Peak'	08:15	09:15	01:00	

Scenario 1: 'Proposed Layout' (FG1: 'Application Scheme AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	691	233	924
	B	851	0	531	1382
	C	74	343	0	417
	Tot.	925	1034	764	2723

Traffic Lane Flows

Lane	Scenario 1: Proposed Layout
Junction: A34 / Inchley Road / Booth Street East	
1/1	0
2/1	637
2/2	745
3/1	198
3/2	219
4/1	328
4/2	363
4/3	233
5/1	0
6/1	452
6/2	582
7/1	764
8/1	180
8/2	745

Lane Saturation Flows

Junction: A34 / Inchley Road / Booth Street East

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Inchley Road)	4.34	0.00	Y				2049	2049
2/1 (A34 (S))	3.65	0.00	Y	Arm 7 Left	15.00	83.4 %	1828	1828
				Arm 8 Ahead	Inf	16.6 %		
2/2 (A34 (S))	3.65	0.00	N	Arm 8 Ahead	Inf	100.0 %	2120	2120
3/1 (Booth Street East)	3.25	0.00	Y	Arm 6 Right	20.00	62.6 %	1759	1759
				Arm 8 Left	10.00	37.4 %		
3/2 (Booth Street East)	3.25	0.00	N	Arm 6 Right	18.00	100.0 %	1920	1920
4/1 (A34 (N))	3.20	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1935	1935
4/2 (A34 (N))	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
4/3 (A34 (N))	3.00	0.00	N	Arm 7 Right	15.00	100.0 %	1868	1868
5/1 (Inchley Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Booth St East exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'Proposed Layout' (FG2: 'Application Scheme PM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	975	247	1222
	B	629	0	405	1034
	C	101	554	0	655
	Tot.	730	1529	652	2911

Traffic Lane Flows

Lane	Scenario 2: Proposed Layout
Junction: A34 / Inchley Road / Booth Street East	
1/1	0
2/1	475
2/2	559
3/1	311
3/2	344
4/1	467
4/2	508
4/3	247
5/1	0
6/1	677
6/2	852
7/1	652
8/1	171
8/2	559

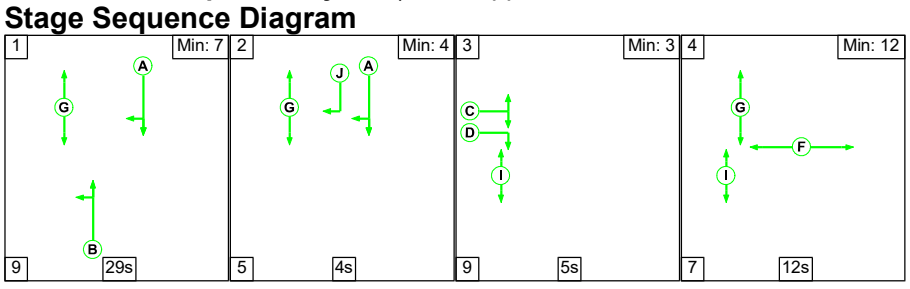
Lane Saturation Flows

Junction: A34 / Inchley Road / Booth Street East

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Inchley Road)	4.34	0.00	Y				2049	2049
2/1 (A34 (S))	3.65	0.00	Y	Arm 7 Left	15.00	85.3 %	1824	1824
				Arm 8 Ahead	Inf	14.7 %		
2/2 (A34 (S))	3.65	0.00	N	Arm 8 Ahead	Inf	100.0 %	2120	2120
3/1 (Booth Street East)	3.25	0.00	Y	Arm 6 Right	20.00	67.5 %	1765	1765
				Arm 8 Left	10.00	32.5 %		
3/2 (Booth Street East)	3.25	0.00	N	Arm 6 Right	18.00	100.0 %	1920	1920
4/1 (A34 (N))	3.20	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1935	1935
4/2 (A34 (N))	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
4/3 (A34 (N))	3.00	0.00	N	Arm 7 Right	15.00	100.0 %	1868	1868
5/1 (Inchley Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Booth St East exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 1: 'Proposed Layout' (FG1: 'Application Scheme AM Peak', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

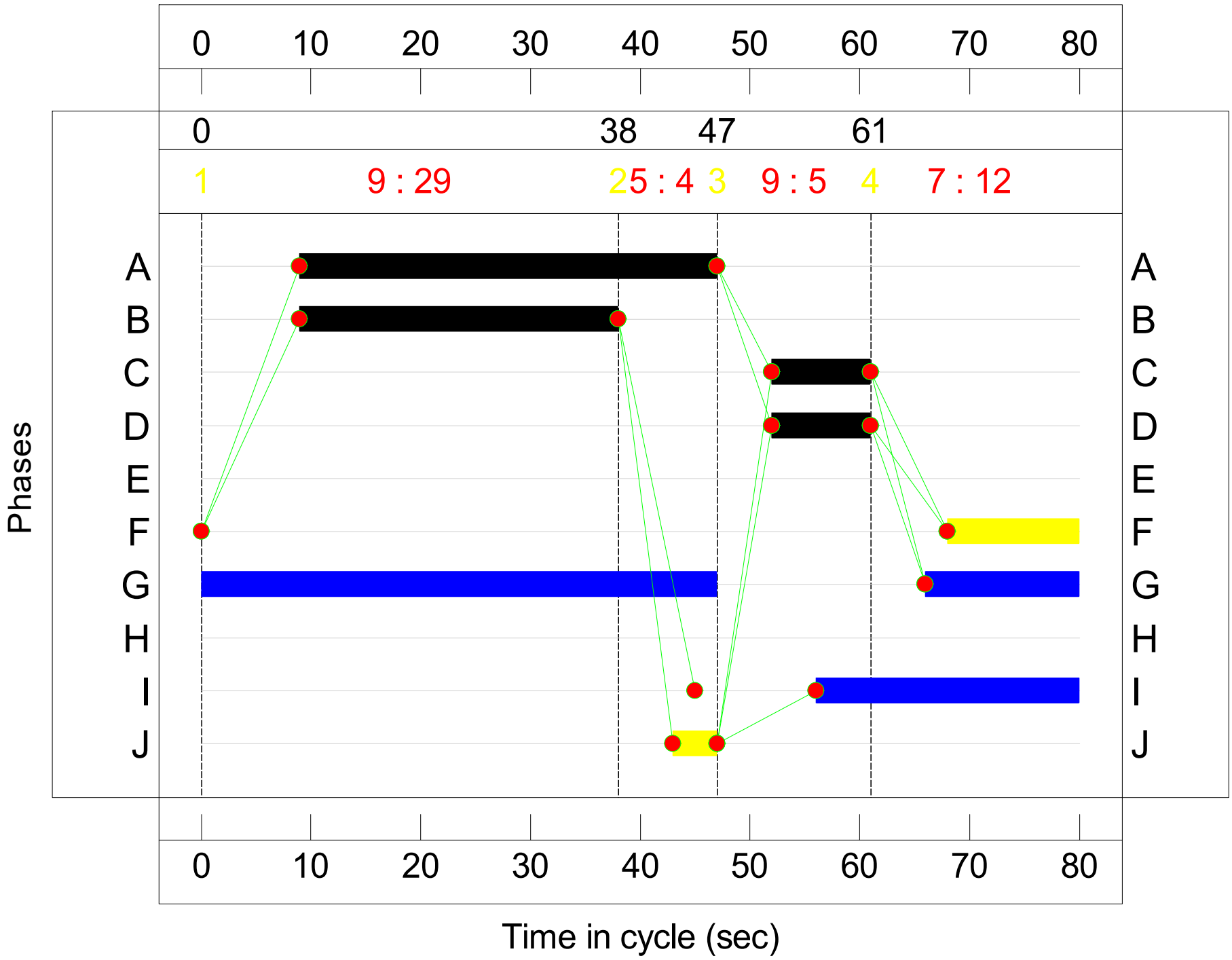


Full Input Data And Results

Stage Timings

Stage	1	2	3	4
Duration	29	4	5	12
Change Point	0	38	47	61

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A34_ Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**93.7%**
A34 / Inchley Road / Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**93.7%**
1/1	Inchley Road	U	N/A	N/A	E		0	0	-	0	2049	0	0.0%
2/1	A34 (S) Left Ahead	U	N/A	N/A	B		1	29	-	637	1828	686	92.9%
2/2	A34 (S) Ahead	U	N/A	N/A	B		1	29	-	745	2120	795	93.7%
3/1	Booth Street East Right Left	U	N/A	N/A	C		1	9	-	198	1759	220	90.1%
3/2	Booth Street East Right	U	N/A	N/A	D		1	9	-	219	1920	240	91.3%
4/1	A34 (N) Ahead	U	N/A	N/A	A		1	38	-	328	1935	943	34.8%
4/2	A34 (N) Ahead	U	N/A	N/A	A		1	38	-	363	2055	1002	36.2%
4/3	A34 (N) Right	O	N/A	N/A	A	J	1	38	4	233	1868	250	93.2%
5/1	Inchley Rd exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
6/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	452	Inf	Inf	0.0%
6/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	582	Inf	Inf	0.0%
7/1	Booth St East exit	U	N/A	N/A	-		-	-	-	764	Inf	Inf	0.0%
8/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	180	Inf	Inf	0.0%
8/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	745	Inf	Inf	0.0%

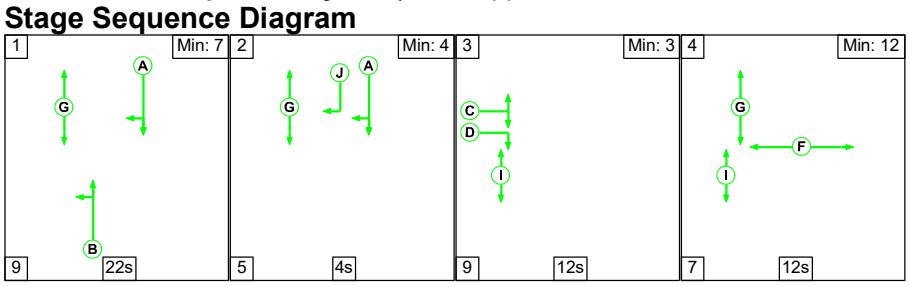
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A34_ Booth Street East	-	-	**0**	**163**	**70**	**16.6**	**23.7**	**1.3**	**41.6**	-	-	-	-
A34 / Inchley Road / Booth Street East	-	-	**0**	**163**	**70**	**16.6**	**23.7**	**1.3**	**41.6**	-	-	-	-
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/1	637	637	-	-	-	4.2	5.4	-	9.6	54.4	13.4	5.4	18.8
2/2	745	745	-	-	-	5.0	6.0	-	11.0	53.1	15.9	6.0	21.9
3/1	198	198	-	-	-	1.9	3.4	-	5.3	97.1	4.3	3.4	7.7
3/2	219	219	-	-	-	2.1	3.8	-	5.9	97.4	4.8	3.8	8.6
4/1	328	328	-	-	-	1.2	0.3	-	1.4	15.6	4.5	0.3	4.7
4/2	363	363	-	-	-	1.3	0.3	-	1.6	15.6	4.9	0.3	5.2
4/3	233	233	0	163	70	0.9	4.5	1.3	6.7	103.3	3.0	4.5	7.5
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	452	452	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	582	582	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	764	764	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	180	180	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	745	745	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -4.1 Total Delay for Signalled Lanes (pcuHr): 41.55 Cycle Time (s): 80
PRC Over All Lanes (%): -4.1 Total Delay Over All Lanes(pcuHr): 41.55

Full Input Data And Results

Scenario 2: 'Proposed Layout' (FG2: 'Application Scheme PM Peak', Plan 1: 'Network Control Plan 1')

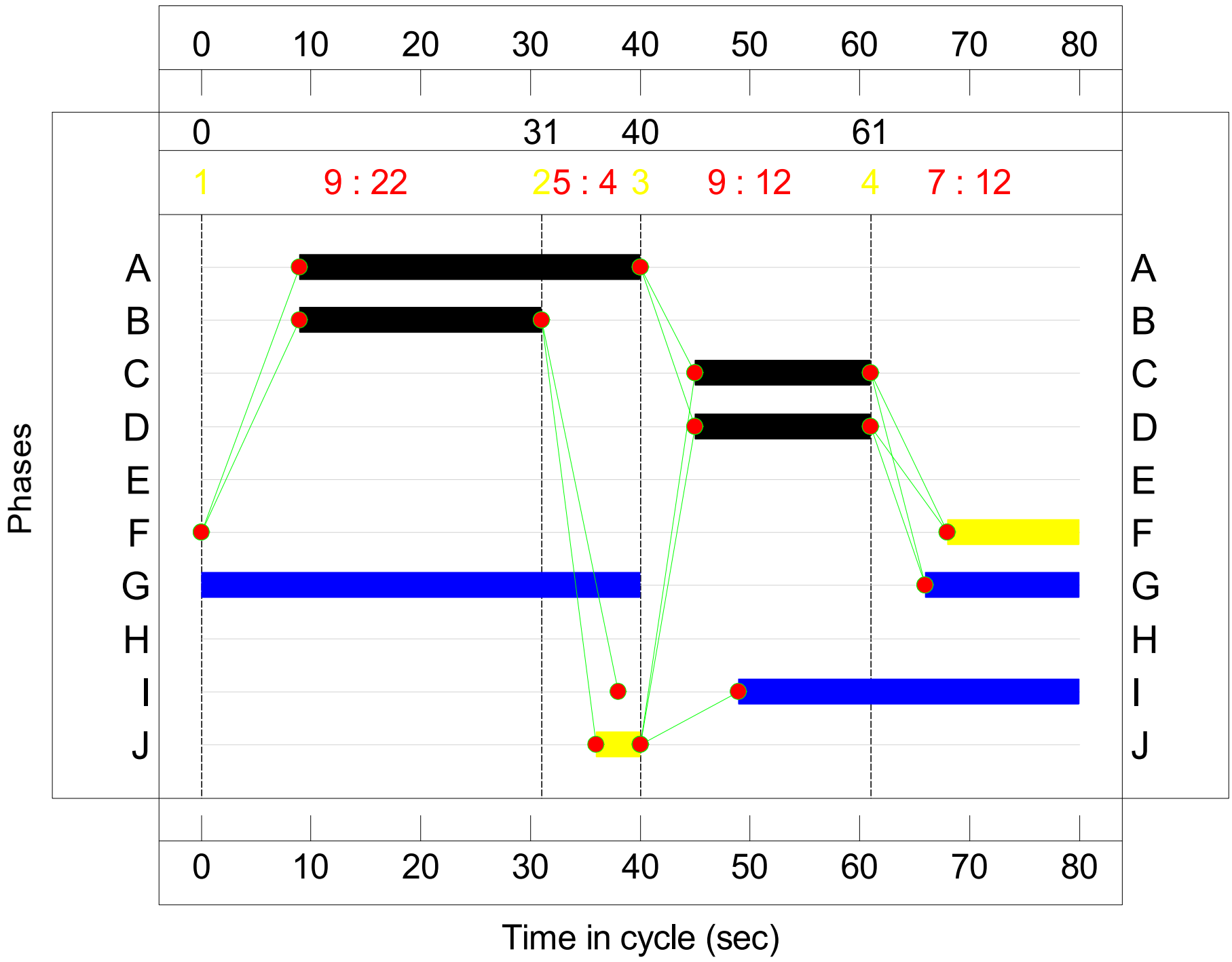
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	22	4	12	12
Change Point	0	31	40	61

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A34_ Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**91.7%**
A34 / Inchley Road / Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**91.7%**
1/1	Inchley Road	U	N/A	N/A	E		0	0	-	0	2049	0	0.0%
2/1	A34 (S) Left Ahead	U	N/A	N/A	B		1	22	-	475	1824	524	90.6%
2/2	A34 (S) Ahead	U	N/A	N/A	B		1	22	-	559	2120	610	91.7%
3/1	Booth Street East Right Left	U	N/A	N/A	C		1	16	-	311	1765	375	82.9%
3/2	Booth Street East Right	U	N/A	N/A	D		1	16	-	344	1920	408	84.3%
4/1	A34 (N) Ahead	U	N/A	N/A	A		1	31	-	467	1935	774	60.3%
4/2	A34 (N) Ahead	U	N/A	N/A	A		1	31	-	508	2055	822	61.8%
4/3	A34 (N) Right	O	N/A	N/A	A	J	1	31	4	247	1868	297	83.2%
5/1	Inchley Rd exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
6/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	677	Inf	Inf	0.0%
6/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	852	Inf	Inf	0.0%
7/1	Booth St East exit	U	N/A	N/A	-		-	-	-	652	Inf	Inf	0.0%
8/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	171	Inf	Inf	0.0%
8/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	559	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A34_ Booth Street East	-	-	**8**	**163**	**76**	**19.8**	**17.4**	**1.1**	**38.3**	-	-	-	-
A34 / Inchley Road / Booth Street East	-	-	**8**	**163**	**76**	**19.8**	**17.4**	**1.1**	**38.3**	-	-	-	-
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/1	475	475	-	-	-	3.6	4.1	-	7.7	58.7	10.2	4.1	14.3
2/2	559	559	-	-	-	4.3	4.7	-	9.0	57.7	12.0	4.7	16.6
3/1	311	311	-	-	-	2.6	2.3	-	4.9	56.4	6.6	2.3	8.8
3/2	344	344	-	-	-	2.9	2.5	-	5.4	56.3	7.3	2.5	9.8
4/1	467	467	-	-	-	2.5	0.8	-	3.2	24.8	8.2	0.8	8.9
4/2	508	508	-	-	-	2.7	0.8	-	3.5	24.8	8.9	0.8	9.7
4/3	247	247	8	163	76	1.3	2.3	1.1	4.6	67.1	3.8	2.3	6.0
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	677	677	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	852	852	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	652	652	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	171	171	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	559	559	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

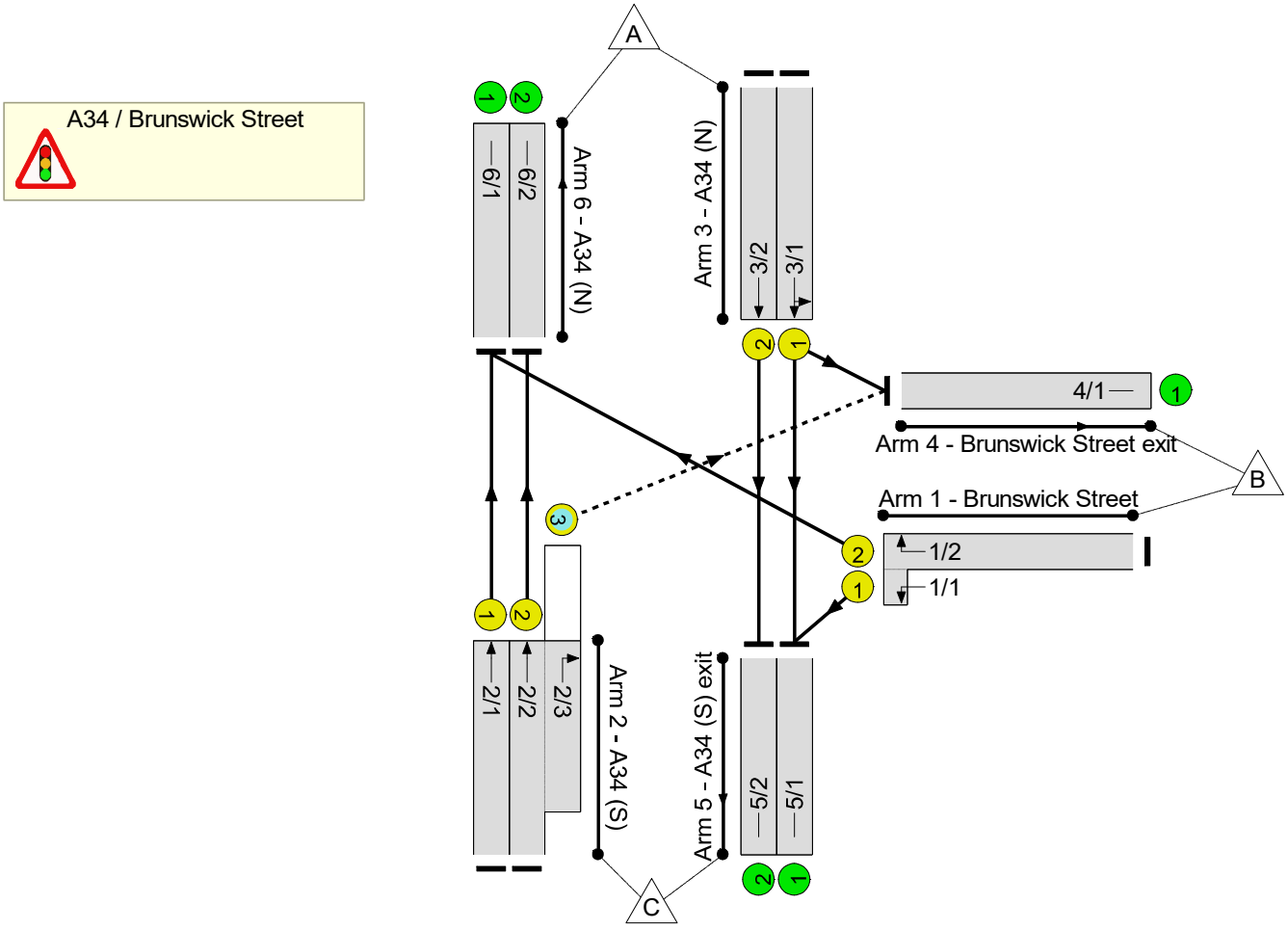
C1 PRC for Signalled Lanes (%): -1.9 Total Delay for Signalled Lanes (pcuHr): 38.27 Cycle Time (s): 80
PRC Over All Lanes (%): -1.9 Total Delay Over All Lanes(pcuHr): 38.27

Full Input Data And Results

User and Project Details

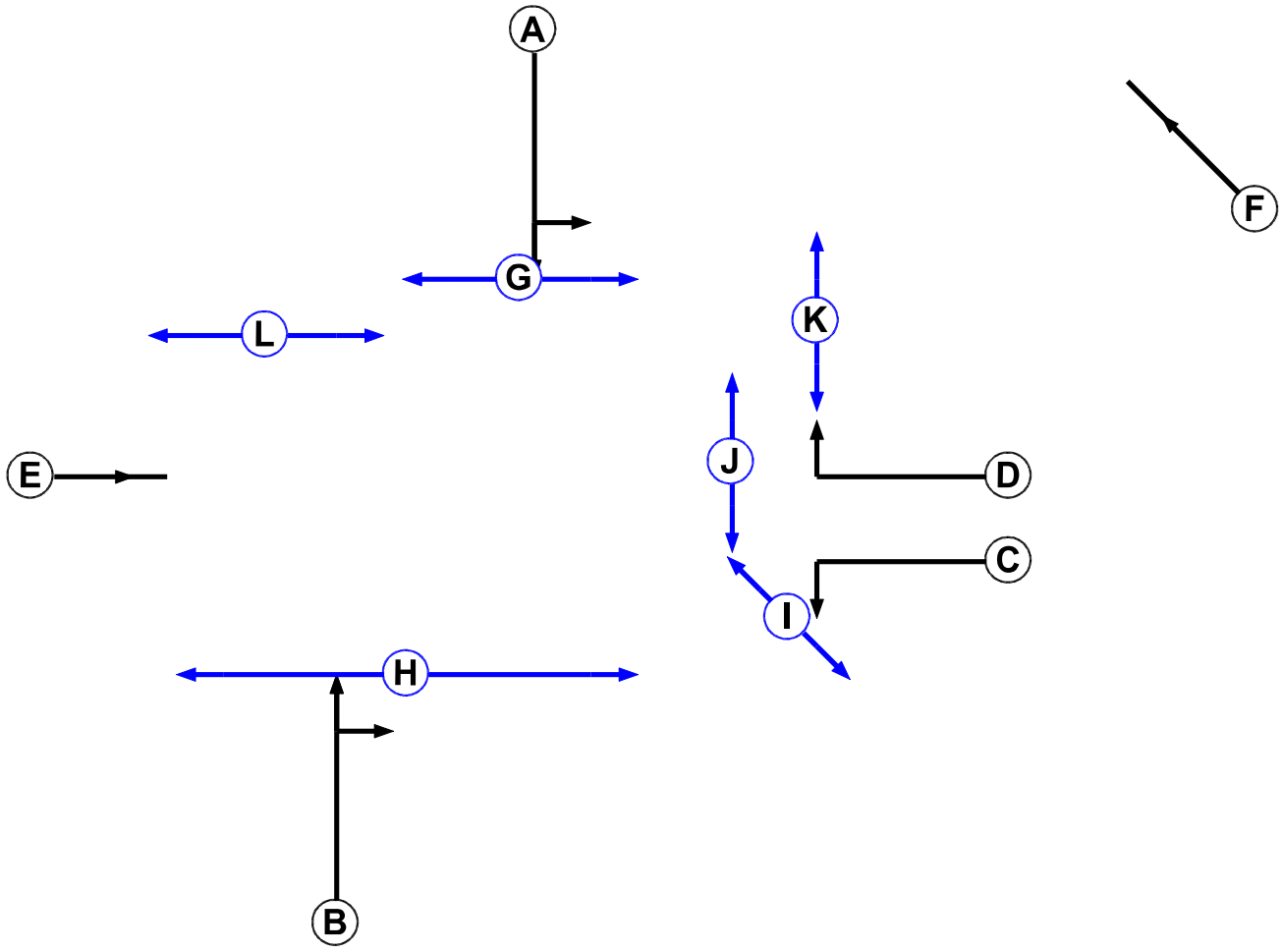
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Title:	**Brunswick Street**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	A34_Brunswick Street.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Traffic		-9999	7
F	Traffic		-9999	7
G	Pedestrian		-9999	6
H	Pedestrian		-9999	10
I	Pedestrian		-9999	5
J	Pedestrian		-9999	5
K	Pedestrian		-9999	5
L	Pedestrian		-9999	5

Full Input Data And Results

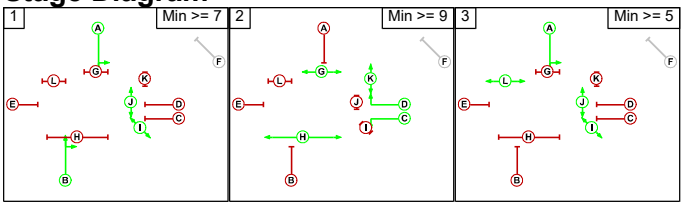
Phase Intergreens Matrix

		Starting Phase											
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K	L
	A		-	10	6	5	-	5	9	-	-	9	-
	B	-		-	6	5	-	-	5	-	-	10	8
	C	3	-		-	4	-	-	-	5	-	-	-
	D	6	6	-		6	-	-	-	-	5	-	10
	E	6	6	9	7		-	-	10	-	-	9	-
	F	-	-	-	-	-		-	-	-	-	-	-
	G	6	-	-	-	-	-		-	-	-	-	-
	H	8	8	-	-	8	-	-		-	-	-	-
	I	-	-	5	-	-	-	-	-		-	-	-
	J	-	-	-	5	-	-	-	-	-		-	-
	K	5	5	-	-	5	-	-	-	-	-		-
	L	-	5	-	5	-	-	-	-	-	-	-	

Phases in Stage

Stage No.	Phases in Stage
1	A B I J
2	C D G H K
3	A I J L

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
1	2	I	Losing	5	5
1	2	J	Losing	1	1
2	1	C	Losing	2	2
2	1	D	Losing	2	2
2	1	G	Losing	2	2
2	1	K	Losing	3	3
2	3	K	Losing	3	3
3	1	L	Losing	1	1
3	2	I	Losing	4	4
3	2	J	Losing	2	2
3	2	L	Losing	2	2

Full Input Data And Results

Prohibited Stage Change

	To Stage			
From Stage		1	2	3
	1		10	8
	2	8		10
	3	6	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Brunswick Street											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
2/3 (A34 (S))	4/1 (Right)	1439	0	3/1	1.09	All	4.00	-	0.50	4	4.00
				3/2	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: A34 / Brunswick Street												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Brunswick Street)	U	C	2	3	1.0	Geom	-	3.00	0.00	Y	Arm 5 Left	20.00
1/2 (Brunswick Street)	U	D	2	3	60.0	Geom	-	3.80	0.00	N	Arm 6 Right	10.00
2/1 (A34 (S))	U	B	2	3	36.2	Geom	-	3.30	0.00	Y	Arm 6 Ahead	Inf
2/2 (A34 (S))	U	B	2	3	36.2	Geom	-	3.03	0.00	N	Arm 6 Ahead	Inf
2/3 (A34 (S))	O	B	2	3	8.7	Geom	-	2.95	0.00	N	Arm 4 Right	10.00
3/1 (A34 (N))	U	A	2	3	49.7	Geom	-	3.49	0.00	Y	Arm 4 Left	10.00
											Arm 5 Ahead	Inf
3/2 (A34 (N))	U	A	2	3	49.7	Geom	-	3.34	0.00	N	Arm 5 Ahead	Inf
4/1 (Brunswick Street exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (N))	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (N))	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
3: 'Do Something (Application Scheme) AM Peak'	08:15	09:15	01:00	

Full Input Data And Results

Scenario 3: 'Existing Layout' (FG3: 'Do Something (Application Scheme) AM Peak', Plan 1: 'Peds every second cycle')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	227	793	1020
	B	278	0	285	563
	C	1120	178	0	1298
	Tot.	1398	405	1078	2881

Traffic Lane Flows

Lane	Scenario 3: Existing Layout
Junction: A34 / Brunswick Street	
1/1 (short)	285
1/2 (with short)	563(In) 278(Out)
2/1	561
2/2 (with short)	737(In) 559(Out)
2/3 (short)	178
3/1	463
3/2	557
4/1	405
5/1	521
5/2	557
6/1	839
6/2	559

Full Input Data And Results

Lane Saturation Flows

Junction: A34 / Brunswick Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Brunswick Street)	3.00	0.00	Y	Arm 5 Left	20.00	100.0 %	1781	1781
1/2 (Brunswick Street)	3.80	0.00	N	Arm 6 Right	10.00	100.0 %	1857	1857
2/1 (A34 (S))	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
2/2 (A34 (S))	3.03	0.00	N	Arm 6 Ahead	Inf	100.0 %	2058	2058
2/3 (A34 (S))	2.95	0.00	N	Arm 4 Right	10.00	100.0 %	1783	1783
3/1 (A34 (N))	3.49	0.00	Y	Arm 4 Left	10.00	49.0 %	1829	1829
				Arm 5 Ahead	Inf	51.0 %		
3/2 (A34 (N))	3.34	0.00	N	Arm 5 Ahead	Inf	100.0 %	2089	2089
4/1 (Brunswick Street exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'Existing Layout' (FG4: 'Do Something (Application Scheme) PM Peak', Plan 1: 'Peds every second cycle')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	372	1103	1475
	B	226	0	166	392
	C	840	174	0	1014
	Tot.	1066	546	1269	2881

Traffic Lane Flows

Lane	Scenario 4: Existing Layout
Junction: A34 / Brunswick Street	
1/1 (short)	166
1/2 (with short)	392(In) 226(Out)
2/1	651
2/2 (with short)	363(In) 189(Out)
2/3 (short)	174
3/1	671
3/2	804
4/1	546
5/1	465
5/2	804
6/1	877
6/2	189

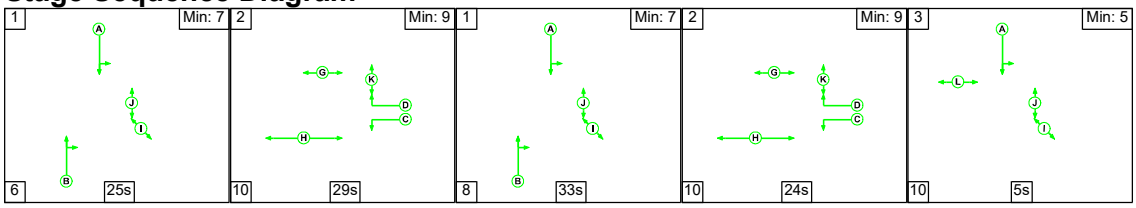
Full Input Data And Results

Lane Saturation Flows

Junction: A34 / Brunswick Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Brunswick Street)	3.00	0.00	Y	Arm 5 Left	20.00	100.0 %	1781	1781
1/2 (Brunswick Street)	3.80	0.00	N	Arm 6 Right	10.00	100.0 %	1857	1857
2/1 (A34 (S))	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
2/2 (A34 (S))	3.03	0.00	N	Arm 6 Ahead	Inf	100.0 %	2058	2058
2/3 (A34 (S))	2.95	0.00	N	Arm 4 Right	10.00	100.0 %	1783	1783
3/1 (A34 (N))	3.49	0.00	Y	Arm 4 Left	10.00	55.4 %	1813	1813
				Arm 5 Ahead	Inf	44.6 %		
3/2 (A34 (N))	3.34	0.00	N	Arm 5 Ahead	Inf	100.0 %	2089	2089
4/1 (Brunswick Street exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 3: 'Existing Layout' (FG3: 'Do Something (Application Scheme) AM Peak', Plan 1: 'Peds every second cycle')

Stage Sequence Diagram

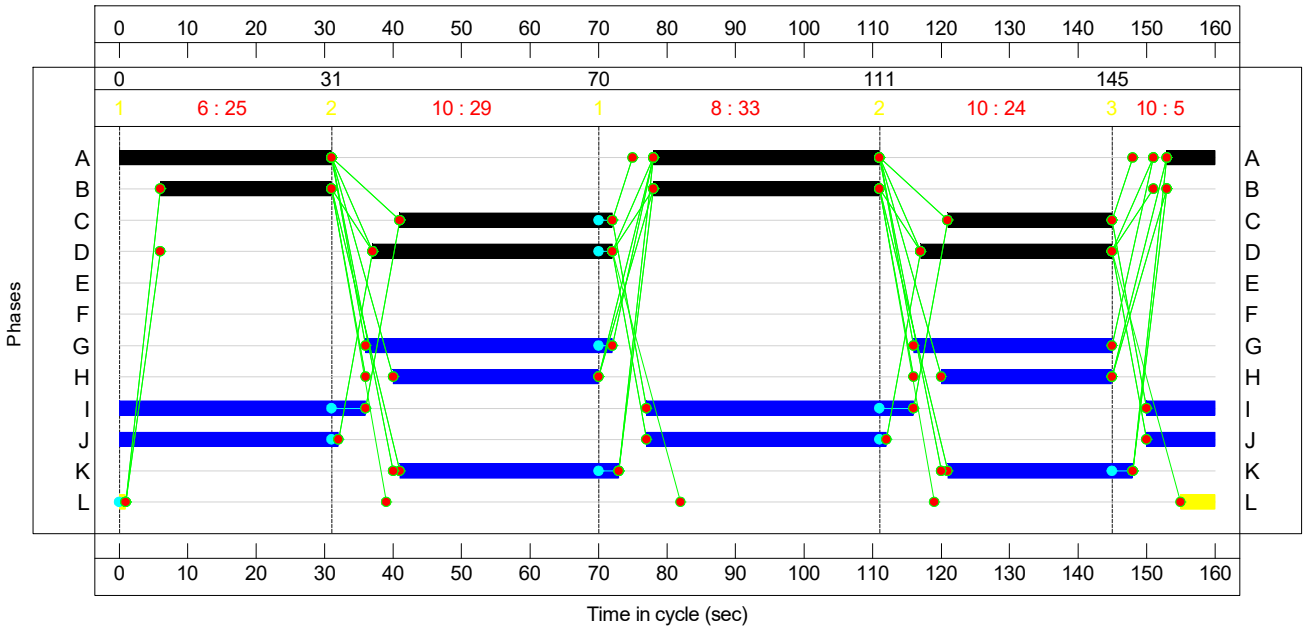


Stage Timings

Stage	1	2	1	2	3
Duration	25	29	33	24	5
Change Point	0	31	70	111	145

Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**82.1%**
A34 / Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**82.1%**
1/2+1/1	Brunswick Street Left Right	U	N/A	N/A	D C		2	63:55	-	563	1857:1781	341+350	81.5 : 81.5%
2/1	A34 (S) Ahead	U	N/A	N/A	B		2	58	-	561	1945	729	76.9%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B		2	58	-	737	2058:1783	681+217	82.1 : 82.1%
3/1	A34 (N) Left Ahead	U	N/A	N/A	A		2	71	-	463	1829	834	55.5%
3/2	A34 (N) Ahead	U	N/A	N/A	A		2	71	-	557	2089	953	58.4%
4/1	Brunswick Street exit	U	N/A	N/A	-		-	-	-	405	Inf	Inf	0.0%
5/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	521	Inf	Inf	0.0%
5/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	557	Inf	Inf	0.0%
6/1	A34 (N)	U	N/A	N/A	-		-	-	-	839	Inf	Inf	0.0%
6/2	A34 (N)	U	N/A	N/A	-		-	-	-	559	Inf	Inf	0.0%

Full Input Data And Results

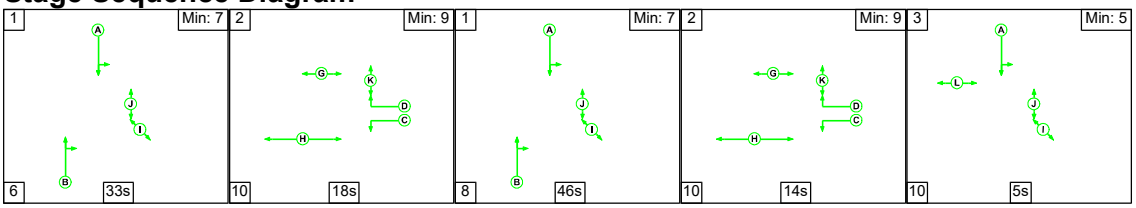
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Brunswick Street	**-**	**-**	**84**	**0**	**94**	**15.7**	**7.3**	**0.8**	**23.8**	**-**	**-**	**-**	**-**
A34 / Brunswick Street	**-**	**-**	**84**	**0**	**94**	**15.7**	**7.3**	**0.8**	**23.8**	**-**	**-**	**-**	**-**
1/2+1/1	563	563	-	-	-	3.5	2.1	-	5.6	35.8	10.9	2.1	13.0
2/1	561	561	-	-	-	3.4	1.6	-	5.1	32.6	11.7	1.6	13.3
2/2+2/3	737	737	84	0	94	4.3	2.2	0.8	7.3	35.6	12.8	2.2	15.0
3/1	463	463	-	-	-	2.0	0.6	-	2.7	20.7	7.8	0.6	8.5
3/2	557	557	-	-	-	2.5	0.7	-	3.2	20.7	9.6	0.7	10.3
4/1	405	405	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	521	521	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2	557	557	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	839	839	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	559	559	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 9.6 Total Delay for Signalled Lanes (pcuHr): 23.84 Cycle Time (s): 160
PRC Over All Lanes (%): 9.6 Total Delay Over All Lanes(pcuHr): 23.84

Full Input Data And Results

Scenario 4: 'Existing Layout' (FG4: 'Do Something (Application Scheme) PM Peak', Plan 1: 'Peds every second cycle')

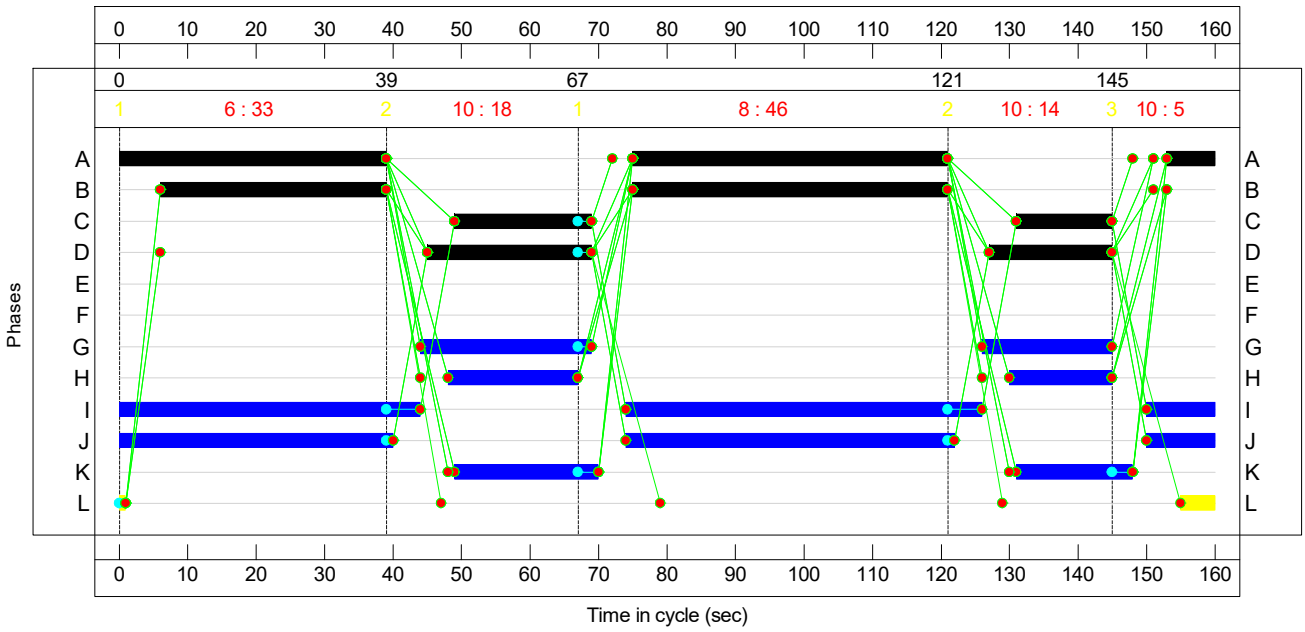
Stage Sequence Diagram



Stage Timings

Stage	1	2	1	2	3
Duration	33	18	46	14	5
Change Point	0	39	67	121	145

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**96.7%**
A34 / Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**96.7%**
1/2+1/1	Brunswick Street Left Right	U	N/A	N/A	D C		2	42:34	-	392	1857:1781	272+200	83.2 : 83.2%
2/1	A34 (S) Ahead	U	N/A	N/A	B		2	79	-	651	1945	985	66.1%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B		2	79	-	363	2058:1783	196+180	96.7 : 96.7%
3/1	A34 (N) Left Ahead	U	N/A	N/A	A		2	92	-	671	1813	1065	63.0%
3/2	A34 (N) Ahead	U	N/A	N/A	A		2	92	-	804	2089	1227	65.5%
4/1	Brunswick Street exit	U	N/A	N/A	-		-	-	-	546	Inf	Inf	0.0%
5/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	465	Inf	Inf	0.0%
5/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	804	Inf	Inf	0.0%
6/1	A34 (N)	U	N/A	N/A	-		-	-	-	877	Inf	Inf	0.0%
6/2	A34 (N)	U	N/A	N/A	-		-	-	-	189	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Brunswick Street	**-**	**-**	**0**	**0**	**174**	**11.3**	**12.0**	**1.5**	**24.8**	**-**	**-**	**-**	**-**
A34 / Brunswick Street	**-**	**-**	**0**	**0**	**174**	**11.3**	**12.0**	**1.5**	**24.8**	**-**	**-**	**-**	**-**
1/2+1/1	392	392	-	-	-	3.0	2.3	-	5.4	49.3	7.5	2.3	9.9
2/1	651	651	-	-	-	2.7	1.0	-	3.7	20.2	11.9	1.0	12.9
2/2+2/3	363	363	0	0	174	1.1	6.9	1.5	9.5	94.2	2.5	6.9	9.4
3/1	671	671	-	-	-	2.0	0.8	-	2.9	15.4	10.3	0.8	11.1
3/2	804	804	-	-	-	2.5	0.9	-	3.4	15.3	12.5	0.9	13.5
4/1	546	546	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	465	465	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2	804	804	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	877	877	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	189	189	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -7.4 Total Delay for Signalled Lanes (pcuHr): 24.82 Cycle Time (s): 160
PRC Over All Lanes (%): -7.4 Total Delay Over All Lanes(pcuHr): 24.82

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.1.7462
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Filename: Hanworth Close Proposed.j9
Path: C:\Data\Projects\J000351-J000400\J000370 Upper Brook Street\Background Information\Junction Assessments\TA June 2023
Report generation date: 26/05/2023 18:04:53

»Do Something - Application Scheme, AM
»Do Something - Application Scheme, PM

Summary of junction performance

	AM								PM							
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
	Do Something - Application Scheme															
Stream B-AC	D1	0.1	7.89	0.06	A	3.56	A	682 % [Stream B-AC]	D2	0.1	8.11	0.07	A	3.58	A	473 % [Stream C-AB]
Stream C-AB		0.1	5.97	0.07	A					0.1	6.08	0.11	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	Upper Brook Street
Location	Kincardine Road / Hanworth Close
Site number	
Date	01/06/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	J000370
Enumerator	FTPDT-01\Office
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75			✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Do Something - Application Scheme	AM	ONE HOUR	08:00	09:30	15	✓
D2	Do Something - Application Scheme	PM	ONE HOUR	16:30	18:00	15	✓
D3	Sensitivity Test - Cumulative Scheme	AM	ONE HOUR	08:00	09:30	15	

D4	Sensitivity Test - Cumulative Scheme	PM	ONE HOUR	16:30	18:00	15	

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Do Something - Application Scheme, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Hanworth Close	T-Junction	One-way from C to A		3.56	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	682	Stream B-AC

Arms

Arms

Arm	Name	Description	Arm type
A	Kincardine Road (N)		Major
B	Hanworth Close		Minor
C	Kincardine Road (S)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	4.00			44.1	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.24	16	29

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	509	0.085	0.214	0.135	0.305
B-C	657	0.092	0.233	-	-
C-B	599	0.212	0.212	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.
Streams may be combined, in which case capacity will be adjusted.
Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Do Something - Application Scheme	AM	ONE HOUR	08:00	09:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	0	100.000
B		ONE HOUR	✓	28	100.000
C		ONE HOUR	✓	99	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	0	0
	B	28	0	0
	C	64	35	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.06	7.89	0.1	A	26	39
C-AB	0.07	5.97	0.1	A	35	53
C-A					55	83
A-B					0	0
A-C					0	0

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	21	5	494	0.043	21	0.0	0.0	7.606	A
C-AB	29	7	632	0.045	28	0.0	0.1	5.966	A
C-A	46	12			46				
A-B	0	0			0				
A-C	0	0			0				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	25	6	491	0.051	25	0.0	0.1	7.723	A
C-AB	35	9	638	0.054	35	0.1	0.1	5.966	A
C-A	54	14			54				
A-B	0	0			0				
A-C	0	0			0				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	31	8	487	0.063	31	0.1	0.1	7.884	A
C-AB	43	11	646	0.067	43	0.1	0.1	5.967	A

C-A	66	16			66				
A-B	0	0			0				
A-C	0	0			0				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	31	8	487	0.063	31	0.1	0.1	7.885	A
C-AB	43	11	647	0.067	43	0.1	0.1	5.970	A
C-A	66	16			66				
A-B	0	0			0				
A-C	0	0			0				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	25	6	491	0.051	25	0.1	0.1	7.727	A
C-AB	35	9	638	0.054	35	0.1	0.1	5.968	A
C-A	54	14			54				
A-B	0	0			0				
A-C	0	0			0				

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	21	5	494	0.043	21	0.1	0.0	7.611	A
C-AB	29	7	632	0.045	29	0.1	0.1	5.972	A
C-A	46	11			46				
A-B	0	0			0				
A-C	0	0			0				

Do Something - Application Scheme, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Hanworth Close	T-Junction	One-way from C to A		3.58	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	473	Stream C-AB

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	Do Something - Application Scheme	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	0	100.000
B		ONE HOUR	✓	29	100.000
C		ONE HOUR	✓	148	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	0	0
	B	29	0	0
	C	91	57	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)

B-AC	0.07	8.11	0.1	A	27	40
C-AB	0.11	6.08	0.1	A	60	90
C-A					76	113
A-B					0	0
A-C					0	0

Main Results for each time segment

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	5	486	0.045	22	0.0	0.0	7.741	A
C-AB	48	12	645	0.074	48	0.0	0.1	6.023	A
C-A	63	16			63				
A-B	0	0			0				
A-C	0	0			0				

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	26	7	482	0.054	26	0.0	0.1	7.897	A
C-AB	59	15	654	0.090	59	0.1	0.1	6.045	A
C-A	74	19			74				
A-B	0	0			0				
A-C	0	0			0				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	8	476	0.067	32	0.1	0.1	8.106	A
C-AB	74	18	666	0.111	74	0.1	0.1	6.076	A
C-A	89	22			89				
A-B	0	0			0				
A-C	0	0			0				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	8	476	0.067	32	0.1	0.1	8.109	A
C-AB	74	18	666	0.111	74	0.1	0.1	6.077	A
C-A	89	22			89				
A-B	0	0			0				
A-C	0	0			0				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	26	7	482	0.054	26	0.1	0.1	7.901	A
C-AB	59	15	654	0.090	59	0.1	0.1	6.051	A
C-A	74	19			74				
A-B	0	0			0				
A-C	0	0			0				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	5	486	0.045	22	0.1	0.0	7.753	A
C-AB	48	12	645	0.074	48	0.1	0.1	6.030	A
C-A	63	16			63				
A-B	0	0			0				
A-C	0	0			0				

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.1.7462
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Filename: Whitekirk Close Proposed.j9
Path: C:\Data\Projects\J000351-J000400\J000370 Upper Brook Street\Background Information\Junction Assessments\TA June 2023
Report generation date: 27/05/2023 13:55:05

»Do Something - Application Scheme, AM
»Do Something - Application Scheme, PM

Summary of junction performance

	AM								PM							
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
	Do Something - Application Scheme															
Stream B-ACD	D1	0.0	7.96	0.04	A	2.10	A	811 % [Stream C-ABD]	D2	0.0	8.04	0.04	A	2.30	A	743 % [Stream D-ABC]
Stream A-BCD		0.0	0.00	0.00	A					0.0	0.00	0.00	A			
Stream D-ABC		0.0	5.94	0.02	A					0.1	6.12	0.06	A			
Stream C-ABD		0.1	5.41	0.04	A					0.0	5.31	0.03	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	Kincardine Road / Whitekirk Close
Site number	
Date	01/06/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	J000370
Enumerator	FTPDT-01\Office
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75			✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Do Something - Application Scheme	AM	ONE HOUR	08:00	09:30	15	✓
D2	Do Something - Application Scheme	PM	ONE HOUR	16:30	18:00	15	✓
D3	Sensitivity Test - Cumulative Scheme	AM	ONE HOUR	08:00	09:30	15	

D4	Sensitivity Test - Cumulative Scheme	PM	ONE HOUR	16:30	18:00	15	

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Do Something - Application Scheme, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Whitekirk Close	Crossroads	One-way from C to A		2.10	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	811	Stream C-ABD

Arms

Arms

Arm	Name	Description	Arm type
A	Kincardine Road (N)		Major
B	Whitekirk Close		Minor
C	Kincardine Road (S)		Major
D	Car Park Access		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
A	4.00				✓	
C	4.00			99.9	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	2.85	26	25
D	One lane	3.43	12	13

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
A-D	574	-	-	-	-	-	-	0.203	0.290	0.203	-	-	-
B-A	491	0.082	0.206	0.206	-	-	-	0.130	0.295	-	0.206	0.206	0.103
B-C	630	0.088	0.223	-	-	-	-	-	-	-	-	-	-
B-D, nearside lane	491	0.082	0.206	0.206	-	-	-	0.130	0.295	0.130	-	-	-
B-D, offside lane	491	0.082	0.206	0.206	-	-	-	0.130	0.295	0.130	-	-	-
C-B	632	0.224	0.224	0.319	-	-	-	-	-	-	-	-	-
D-A	659	-	-	-	-	-	-	0.233	-	0.092	-	-	-
D-B, nearside lane	509	0.135	0.135	0.306	-	-	-	0.214	0.214	0.085	-	-	-
D-B, offside lane	509	0.135	0.135	0.306	-	-	-	0.214	0.214	0.085	-	-	-
D-C	509	-	0.135	0.306	0.107	0.214	0.214	0.214	0.214	0.085	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.
Streams may be combined, in which case capacity will be adjusted.
Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

		Time Period	Traffic profile	Start time	Finish time	Time segment length	Run

ID	Scenario name	name	type	(HH:mm)	(HH:mm)	(min)	automatically
D1	Do Something - Application Scheme	AM	ONE HOUR	08:00	09:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	0	100.000
B		ONE HOUR	✓	16	100.000
C		ONE HOUR	✓	132	100.000
D		ONE HOUR	✓	13	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	0	0	0
	B	14	0	0	2
	C	78	21	0	33
	D	12	1	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	0
	B	0	0	0	0
	C	4	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.04	7.96	0.0	A	15	22
A-BCD	0.00	0.00	0.0	A	0	0
A-B					0	0
A-C					0	0
D-ABC	0.02	5.94	0.0	A	12	18
C-ABD	0.04	5.41	0.1	A	23	34
C-D					29	44
C-A					69	104

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	12	3	476	0.025	12	0.0	0.0	7.749	A
A-BCD	0	0	552	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	10	2	628	0.016	10	0.0	0.0	5.819	A
C-ABD	18	5	686	0.026	18	0.0	0.0	5.406	A
C-D	24	6			24				
C-A	57	14			57				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	14	4	474	0.030	14	0.0	0.0	7.840	A
A-BCD	0	0	548	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	12	3	625	0.019	12	0.0	0.0	5.867	A
C-ABD	22	6	697	0.032	22	0.0	0.0	5.355	A
C-D	29	7			29				
C-A	68	17			68				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	18	4	470	0.038	18	0.0	0.0	7.964	A
A-BCD	0	0	542	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	14	4	621	0.023	14	0.0	0.0	5.935	A
C-ABD	28	7	711	0.039	28	0.0	0.1	5.291	A
C-D	35	9			35				
C-A	82	21			82				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	18	4	470	0.038	18	0.0	0.0	7.964	A
A-BCD	0	0	542	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	14	4	621	0.023	14	0.0	0.0	5.935	A
C-ABD	28	7	711	0.039	28	0.1	0.1	5.296	A
C-D	35	9			35				
C-A	82	21			82				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	14	4	473	0.030	14	0.0	0.0	7.842	A
A-BCD	0	0	548	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	12	3	625	0.019	12	0.0	0.0	5.870	A
C-ABD	22	6	697	0.032	22	0.1	0.0	5.361	A
C-D	29	7			29				
C-A	68	17			68				

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	12	3	476	0.025	12	0.0	0.0	7.754	A
A-BCD	0	0	552	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	10	2	628	0.016	10	0.0	0.0	5.822	A
C-ABD	18	5	686	0.026	18	0.0	0.0	5.411	A
C-D	24	6			24				
C-A	57	14			57				

Do Something - Application Scheme, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Whitekirk Close	Crossroads	One-way from C to A		2.30	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	743	Stream D-ABC

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	Do Something - Application Scheme	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	0	100.000
B		ONE HOUR	✓	15	100.000
C		ONE HOUR	✓	137	100.000
D		ONE HOUR	✓	35	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	0	0	0
	B	15	0	0	0
	C	94	15	0	28
	D	34	1	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	0
	B	0	0	0	0
	C	0	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.04	8.04	0.0	A	14	21
A-BCD	0.00	0.00	0.0	A	0	0
A-B					0	0
A-C					0	0
D-ABC	0.06	6.12	0.1	A	32	48
C-ABD	0.03	5.31	0.0	A	16	25
C-D					25	38
C-A					84	126

Main Results for each time segment

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	3	473	0.024	11	0.0	0.0	7.796	A
A-BCD	0	0	552	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	26	7	635	0.041	26	0.0	0.0	5.909	A
C-ABD	13	3	691	0.019	13	0.0	0.0	5.305	A
C-D	21	5			21				
C-A	69	17			69				

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	3	469	0.029	13	0.0	0.0	7.897	A
A-BCD	0	0	548	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	31	8	632	0.050	31	0.0	0.1	5.997	A
C-ABD	16	4	703	0.023	16	0.0	0.0	5.239	A
C-D	25	6			25				
C-A	83	21			83				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	17	4	464	0.036	16	0.0	0.0	8.035	A
A-BCD	0	0	542	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	39	10	627	0.061	38	0.1	0.1	6.120	A
C-ABD	20	5	719	0.028	20	0.0	0.0	5.152	A
C-D	30	7			30				
C-A	101	25			101				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	17	4	464	0.036	17	0.0	0.0	8.036	A
A-BCD	0	0	542	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	39	10	627	0.061	39	0.1	0.1	6.120	A
C-ABD	20	5	719	0.028	20	0.0	0.0	5.154	A
C-D	30	7			30				
C-A	101	25			101				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	3	469	0.029	14	0.0	0.0	7.898	A

A-BCD	0	0	548	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	31	8	632	0.050	32	0.1	0.1	6.000	A
C-ABD	16	4	703	0.023	16	0.0	0.0	5.242	A
C-D	25	6			25				
C-A	83	21			83				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	3	473	0.024	11	0.0	0.0	7.801	A
A-BCD	0	0	552	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	26	7	635	0.041	26	0.1	0.0	5.912	A
C-ABD	13	3	691	0.019	13	0.0	0.0	5.308	A
C-D	21	5			21				
C-A	69	17			69				



APPENDIX TA15

Appendix TA15 - Baseline + Application Scheme 'With Development' Junction Capacity Modelling Results (90 second cycle time option)

Key

- 0-89% DoS (within capacity conditions)
- 90-99% DoS (variable operating conditions)
- 100%+ DoS (over capacity conditions)

A34 / Grosvenor Street

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**62.5%**	-	-	**72.7%**	-
1/1 + 1/2	Grosvenor Street (E) Left Ahead & Right	523	62.5%:62.5%	6.4	702	72.7%:72.7%	10.2
2/1	A34 (S) Left & ahead	466	60.9%	10.0	400	72.5%	10.2
2/2	A34 (S) Ahead	230	27.6%	4.0	161	26.7%	3.3
2/3	A34 (S) Ahead	232	27.6%	4.1	164	27.0%	3.3
3/1	A34 (N) Ahead	303	26.7%	3.9	377	41.2%	6.5
3/2 + 3/3	A34 (N) Ahead & right	389	30.5%:30.5%	4.6	456	44.3%:44.3%	7.5
Cycle Time		90s			90s		
Stage 1, 2, 3 timings		45s, 14s,31s			35s, 14s, 41s		
Junction PRC		44.1%			23.7%		
Total delay over all lanes (pcuHr)		13.00			16.55		

A34 / Booth Street East - Proposed Junction

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**88.8%**	-	-	**83.0%**	-
2/1	A34(S) - Left & Ahead	629	86.1%	17.3	467	79.5%	12.5
2/2	A34(S) - Ahead	753	88.8%	21.0	567	83.0%	15.4
3/1	Booth Street East - Left & Right	199	84.8%	7.3	312	75.8%	8.7
3/2	Booth Street East - Right	218	85.2%	7.8	343	76.6%	9.6
4/1	A34(N) - Ahead	328	32.5%	4.9	467	57.2%	9.5
4/2	A34(N) - Ahead	363	33.8%	5.5	508	58.5%	10.4
4/3	A34(N) - Right	233	88.3%	6.3	247	75.7%	7.3
Cycle Time		90s			90s		
Stage 1, 2 ,3 timings		44s, 11s, 16s, 19s			37s,9s, 25s 19s		
Junction PRC		1.4%			8.4%		
Total delay over all lanes (pcuHr)		34.06			32.15		

A34 / Brunswick Street

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**78.3%**	-	-	**75.3%**	-
1/2 + 1/1	Brunswick Street - Left & Right	563	77.5% : 77.5%	13.1	392	74.3% : 74.3%	10.0
2/1	A34(S) - Ahead	561	71.1%	13.7	651	64.8%	15.6
2/2 + 2/3	A34(S) - Ahead & Right	737	78.3% : 78.3%	15.4	363	72.7% : 72.7%	4.4
3/1	A34 (N) - Left & Ahead	463	59.2%	10.8	671	72.4%	15.1
3/2	A34 (N) - Ahead	557	62.3%	13.2	804	75.3%	18.5
Cycle Time		180s			180s		
Stage 1, 2, 1, 2, 3 timings		28s, 9s,43s, 48s, 37s, 15s			35s, 14s ,26s, 54s, 34s, 15s		
Junction PRC		14.9%			19.5%		
Total delay over all lanes (pcuHr)		24.37			22.32		

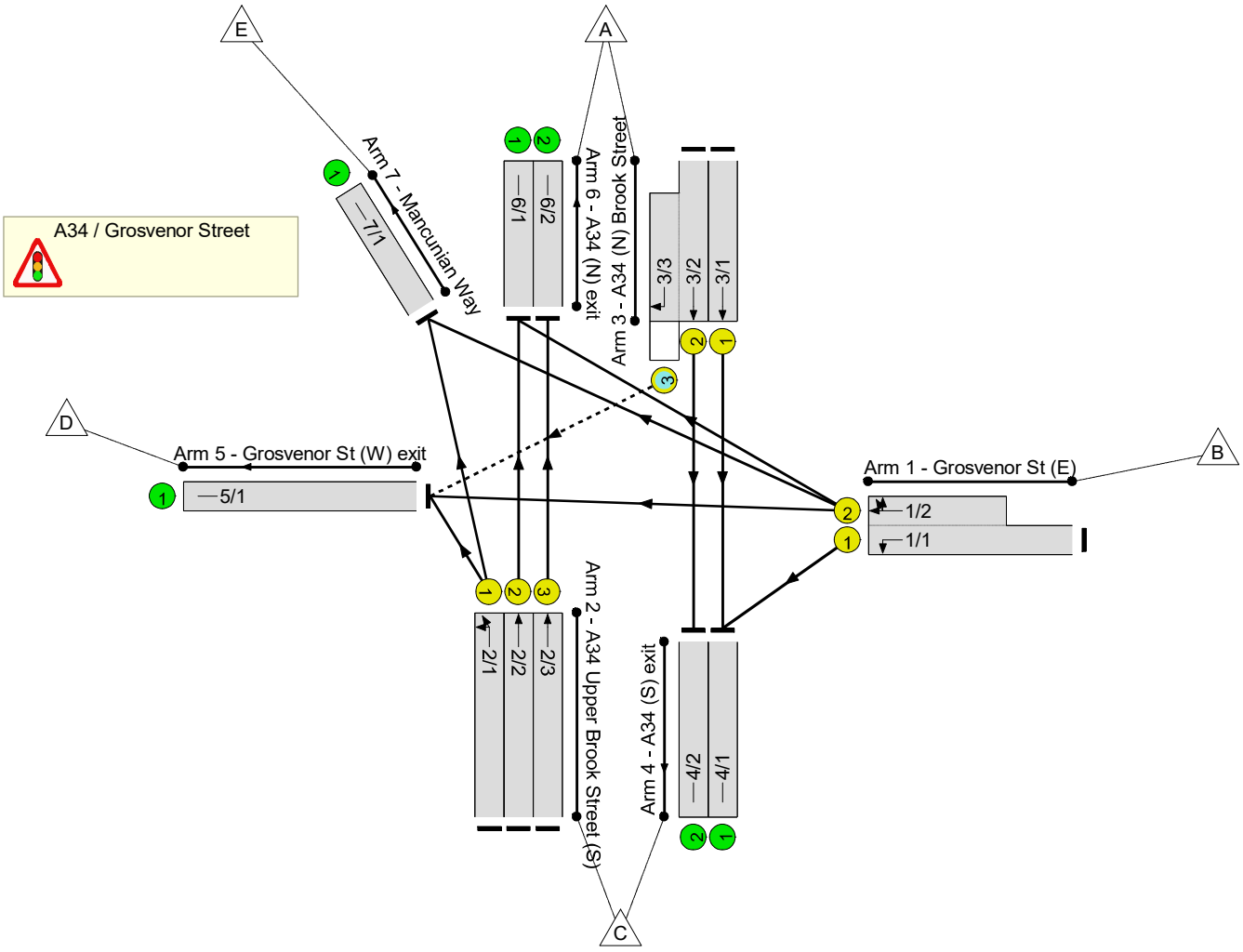
Pedestrian stage called every second cycle, extra time given to Brunswick Street

Full Input Data And Results

User and Project Details

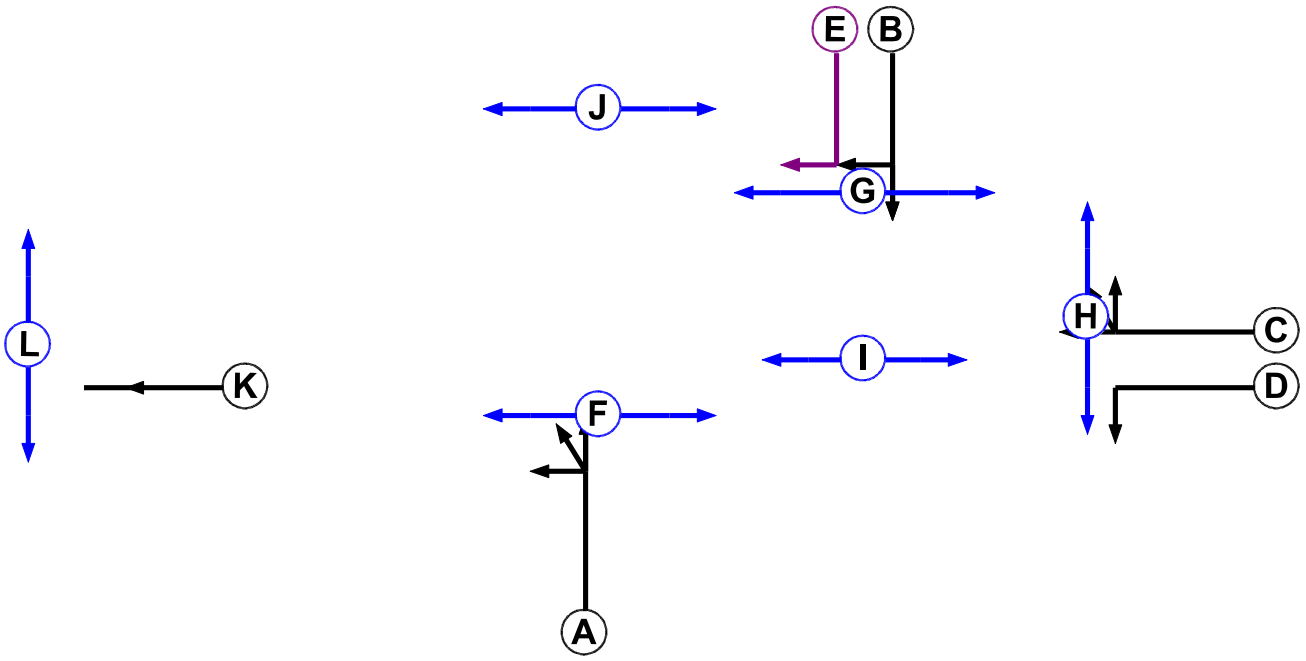
Project:	**Upper Brook Street**
Title:	**Grosvenor Road Junction**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	90s ManchWayA34_Grosvenor Street.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Ind. Arrow	B	-9999	3
F	Pedestrian		-9999	7
G	Pedestrian		-9999	6
H	Pedestrian		-9999	5
I	Pedestrian		-9999	5
J	Pedestrian		-9999	6
K	Traffic		-9999	7
L	Pedestrian		-9999	5

Full Input Data And Results

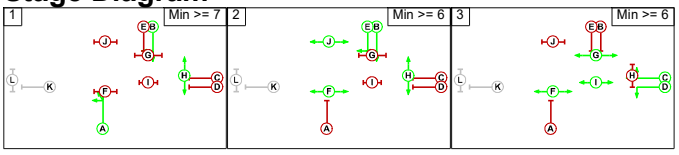
Phase Intergreens Matrix

		Starting Phase											
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K	L
	A		-	5	-	5	5	-	-	-	8	-	-
	B	-		5	6	-	-	5	-	7	-	-	-
	C	5	5		-	5	-	-	5	-	10	-	-
	D	-	4	-		-	-	-	5	-	-	-	-
	E	6	-	5	-		-	5	-	7	-	-	-
	F	10	-	-	-	-		-	-	-	-	-	-
	G	-	9	-	-	9	-		-	-	-	-	-
	H	-	-	5	5	-	-	-		-	-	-	-
	I	-	6	-	-	6	-	-	-		-	-	-
	J	9	-	9	-	-	-	-	-	-		-	-
	K	-	-	-	-	-	-	-	-	-	-		5
	L	-	-	-	-	-	-	-	-	-	-	6	

Phases in Stage

Stage No.	Phases in Stage
1	A B H
2	B E F H J
3	C D F G I

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
2	3	B	Losing	2	2
2	3	H	Losing	3	3
3	1	C	Losing	5	5
3	1	D	Losing	5	5
3	1	G	Losing	1	1
3	1	I	Losing	4	4

Full Input Data And Results

Prohibited Stage Change

	To Stage			
From Stage		1	2	3
	1		8	7
	2	10		9
	3	10	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Grosvenor Street											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
3/3 (A34 (N) Brook Street)	5/1 (Right)	1439	0	2/1	1.09	All	2.00	-	0.50	2	2.00
				2/2	1.09	All					
				2/3	1.09	All					

Full Input Data And Results

Lane Input Data

Full Input Data And Results

Junction: A34 / Grosvenor Street												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Grosvenor St (E))	U	D	2	3	60.0	Geom	-	4.17	0.00	Y	Arm 4 Left	10.00
1/2 (Grosvenor St (E))	U	C	2	3	7.1	Geom	-	4.49	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	10.00
											Arm 7 Right	10.00
2/1 (A34 Upper Brook Street (S))	U	A	2	3	33.0	Geom	-	3.40	0.00	Y	Arm 5 Left	10.00
											Arm 7 Ahead	Inf
2/2 (A34 Upper Brook Street (S))	U	A	2	3	33.0	Geom	-	3.32	0.00	N	Arm 6 Ahead	Inf
2/3 (A34 Upper Brook Street (S))	U	A	2	3	33.7	Geom	-	3.45	0.00	N	Arm 6 Ahead	Inf
3/1 (A34 (N) Brook Street)	U	B	2	3	21.7	Geom	-	3.46	0.00	Y	Arm 4 Ahead	Inf
3/2 (A34 (N) Brook Street)	U	B	2	3	21.7	Geom	-	3.46	0.00	N	Arm 4 Ahead	Inf
3/3 (A34 (N) Brook Street)	O	B E	2	3	15.8	Geom	-	3.19	0.00	N	Arm 5 Right	10.00
4/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
4/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

5/1 (Grosvenor St (W) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Mancunian Way)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
3: 'Do Something (Application Scheme) AM Peak'	08:15	09:15	01:00	

Scenario 3: 'Application Scheme' (FG3: 'Do Something (Application Scheme) AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
Origin		A	B	C	D	E	Tot.
	A	0	0	656	36	0	692
	B	93	0	277	73	80	523
	C	462	0	0	66	400	928
	D	0	0	0	0	0	0
	E	0	0	0	0	0	0
	Tot.	555	0	933	175	480	2143

Traffic Lane Flows

Lane	Scenario 3: Application Scheme
Junction: A34 / Grosvenor Street	
1/1 (with short)	523(In) 277(Out)
1/2 (short)	246
2/1	466
2/2	230
2/3	232
3/1	303
3/2 (with short)	389(In) 353(Out)
3/3 (short)	36
4/1	580
4/2	353
5/1	175
6/1	323
6/2	232
7/1	480

Full Input Data And Results

Lane Saturation Flows

Full Input Data And Results

Junction: A34 / Grosvenor Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Grosvenor St (E))	4.17	0.00	Y	Arm 4 Left	10.00	100.0 %	1767	1767
1/2 (Grosvenor St (E))	4.49	0.00	Y	Arm 5 Ahead	Inf	29.7 %	1867	1867
				Arm 6 Right	10.00	37.8 %		
				Arm 7 Right	10.00	32.5 %		
2/1 (A34 Upper Brook Street (S))	3.40	0.00	Y	Arm 5 Left	10.00	14.2 %	1914	1914
				Arm 7 Ahead	Inf	85.8 %		
2/2 (A34 Upper Brook Street (S))	3.32	0.00	N	Arm 6 Ahead	Inf	100.0 %	2087	2087
2/3 (A34 Upper Brook Street (S))	3.45	0.00	N	Arm 6 Ahead	Inf	100.0 %	2100	2100
3/1 (A34 (N) Brook Street)	3.46	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1961	1961
3/2 (A34 (N) Brook Street)	3.46	0.00	N	Arm 4 Ahead	Inf	100.0 %	2101	2101
3/3 (A34 (N) Brook Street)	3.19	0.00	N	Arm 5 Right	10.00	100.0 %	1804	1804
4/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (Grosvenor St (W) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Mancunian Way Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 4: 'Application Scheme' (FG4: 'Do Something (Application Scheme) PM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
Origin		A	B	C	D	E	Tot.
	A	0	0	802	31	0	833
	B	104	0	427	62	109	702
	C	325	0	0	62	338	725
	D	0	0	0	0	0	0
	E	0	0	0	0	0	0
	Tot.	429	0	1229	155	447	2260

Traffic Lane Flows

Lane	Scenario 4: Application Scheme
Junction: A34 / Grosvenor Street	
1/1 (with short)	702(In) 427(Out)
1/2 (short)	275
2/1	400
2/2	161
2/3	164
3/1	377
3/2 (with short)	456(In) 425(Out)
3/3 (short)	31
4/1	804
4/2	425
5/1	155
6/1	265
6/2	164
7/1	447

Full Input Data And Results

Lane Saturation Flows

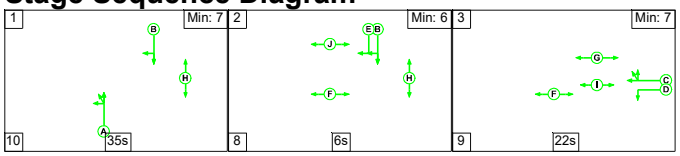
Full Input Data And Results

Junction: A34 / Grosvenor Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Grosvenor St (E))	4.17	0.00	Y	Arm 4 Left	10.00	100.0 %	1767	1767
1/2 (Grosvenor St (E))	4.49	0.00	Y	Arm 5 Ahead	Inf	22.5 %	1849	1849
				Arm 6 Right	10.00	37.8 %		
				Arm 7 Right	10.00	39.6 %		
2/1 (A34 Upper Brook Street (S))	3.40	0.00	Y	Arm 5 Left	10.00	15.5 %	1911	1911
				Arm 7 Ahead	Inf	84.5 %		
2/2 (A34 Upper Brook Street (S))	3.32	0.00	N	Arm 6 Ahead	Inf	100.0 %	2087	2087
2/3 (A34 Upper Brook Street (S))	3.45	0.00	N	Arm 6 Ahead	Inf	100.0 %	2100	2100
3/1 (A34 (N) Brook Street)	3.46	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1961	1961
3/2 (A34 (N) Brook Street)	3.46	0.00	N	Arm 4 Ahead	Inf	100.0 %	2101	2101
3/3 (A34 (N) Brook Street)	3.19	0.00	N	Arm 5 Right	10.00	100.0 %	1804	1804
4/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (Grosvenor St (W) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Mancunian Way Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 3: 'Application Scheme' (FG3: 'Do Something (Application Scheme) AM Peak', Plan 1: 'Network Control Plan 1')

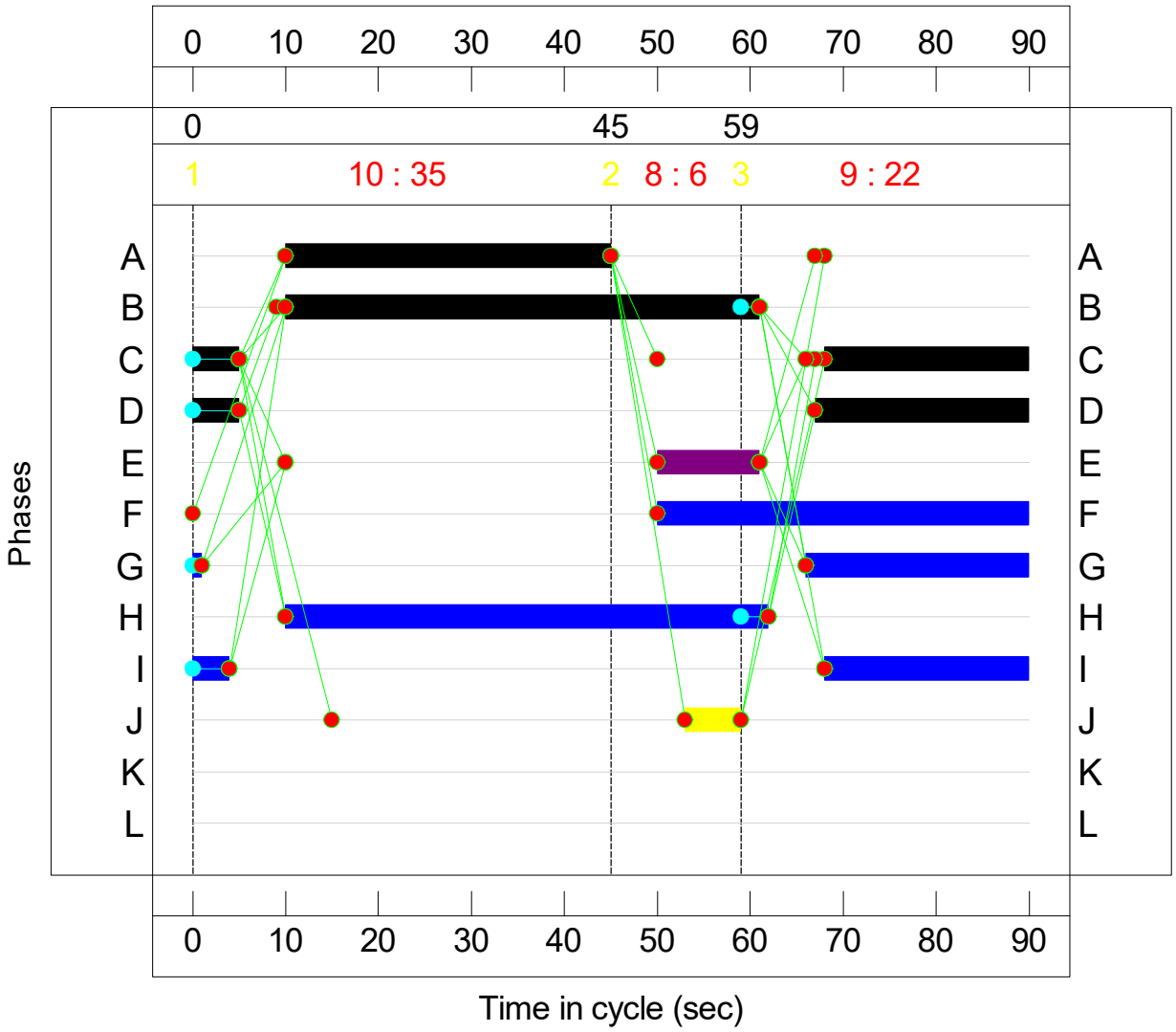
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	35	6	22
Change Point	0	45	59

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Grosvenor Road Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**62.5%**
A34 / Grosvenor Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**62.5%**
1/1+1/2	Grosvenor St (E) Left Ahead Right Right2	U	N/A	N/A	D C		1	28:27	-	523	1767:1867	443+394	62.5 : 62.5%
2/1	A34 Upper Brook Street (S) Left Ahead	U	N/A	N/A	A		1	35	-	466	1914	766	60.9%
2/2	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	35	-	230	2087	835	27.6%
2/3	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	35	-	232	2100	840	27.6%
3/1	A34 (N) Brook Street Ahead	U	N/A	N/A	B		1	51	-	303	1961	1133	26.7%
3/2+3/3	A34 (N) Brook Street Ahead Right	U+O	N/A	N/A	B	E	1	51	11	389	2101:1804	1158+118	30.5 : 30.5%
4/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	580	Inf	Inf	0.0%
4/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	353	Inf	Inf	0.0%
5/1	Grosvenor St (W) exit	U	N/A	N/A	-		-	-	-	175	Inf	Inf	0.0%
6/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	323	Inf	Inf	0.0%
6/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	232	Inf	Inf	0.0%
7/1	Mancunian Way	U	N/A	N/A	-		-	-	-	480	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Grosvenor Road Junction	**-**	**-**	**30**	**6**	**1**	**10.5**	**2.4**	**0.1**	**13.0**	**-**	**-**	**-**	**-**
A34 / Grosvenor Street	**-**	**-**	**30**	**6**	**1**	**10.5**	**2.4**	**0.1**	**13.0**	**-**	**-**	**-**	**-**
1/1+1/2	523	523	-	-	-	3.6	0.8	-	4.4	30.3	5.5	0.8	6.4
2/1	466	466	-	-	-	2.8	0.8	-	3.5	27.4	9.2	0.8	10.0
2/2	230	230	-	-	-	1.2	0.2	-	1.4	21.2	3.8	0.2	4.0
2/3	232	232	-	-	-	1.2	0.2	-	1.4	21.2	3.9	0.2	4.1
3/1	303	303	-	-	-	0.8	0.2	-	1.0	11.7	3.7	0.2	3.9
3/2+3/3	389	389	30	6	1	1.0	0.2	0.1	1.4	12.5	4.4	0.2	4.6
4/1	580	580	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	353	353	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	175	175	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	323	323	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	232	232	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	480	480	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 44.1
PRC Over All Lanes (%): 44.1

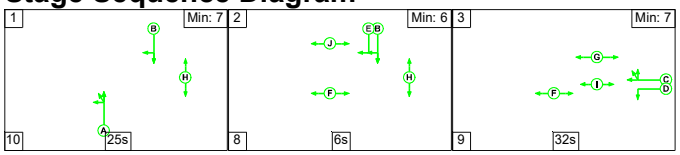
Total Delay for Signalled Lanes (pcuHr): 13.00
Total Delay Over All Lanes(pcuHr): 13.00

Cycle Time (s): 90

Full Input Data And Results

Scenario 4: 'Application Scheme' (FG4: 'Do Something (Application Scheme) PM Peak', Plan 1: 'Network Control Plan 1')

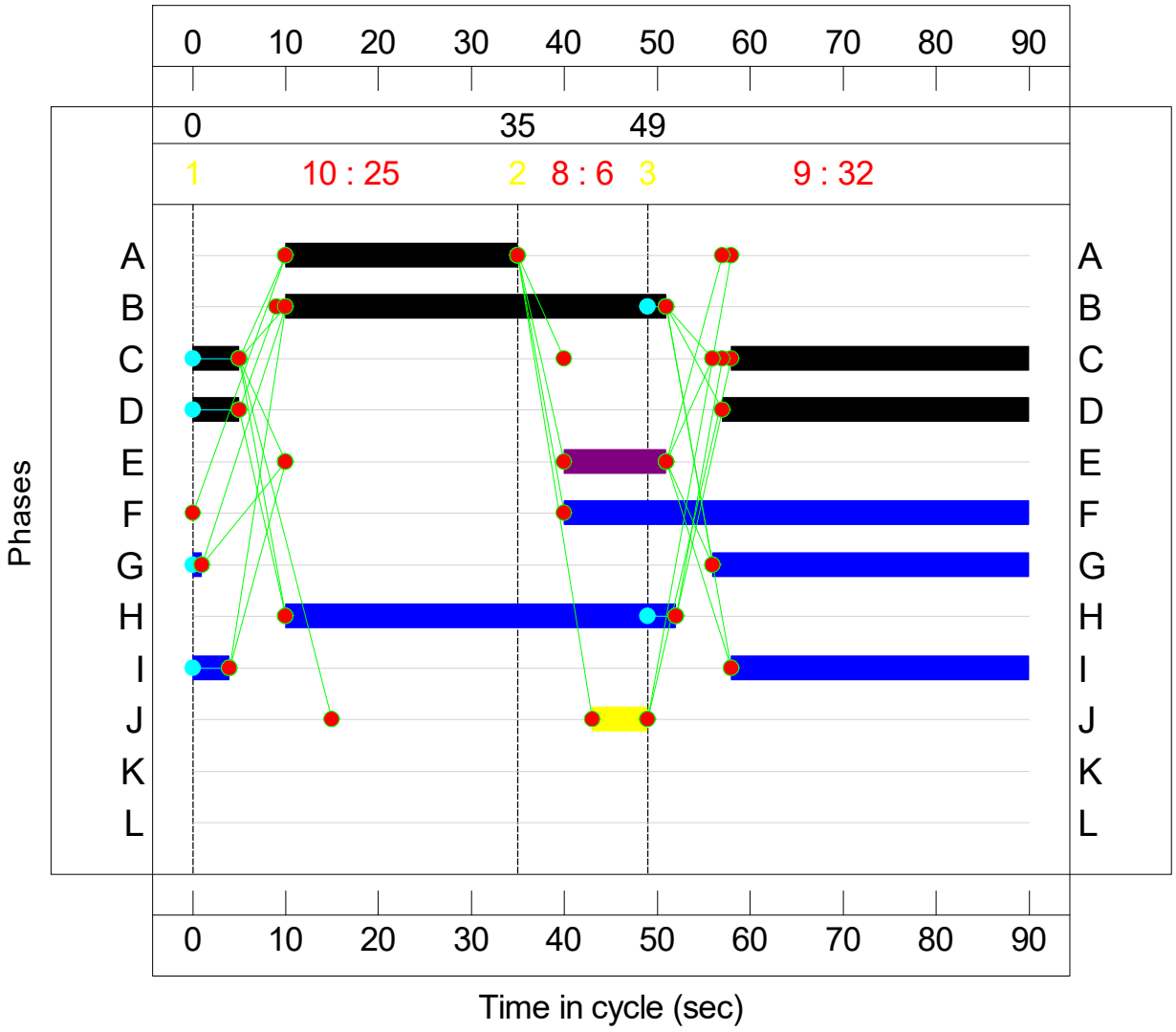
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	25	6	32
Change Point	0	35	49

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Grosvenor Road Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**72.7%**
A34 / Grosvenor Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**72.7%**
1/1+1/2	Grosvenor St (E) Left Ahead Right Right2	U	N/A	N/A	D C		1	38:37	-	702	1767:1849	587+378	72.7 : 72.7%
2/1	A34 Upper Brook Street (S) Left Ahead	U	N/A	N/A	A		1	25	-	400	1911	552	72.5%
2/2	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	25	-	161	2087	603	26.7%
2/3	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	25	-	164	2100	607	27.0%
3/1	A34 (N) Brook Street Ahead	U	N/A	N/A	B		1	41	-	377	1961	915	41.2%
3/2+3/3	A34 (N) Brook Street Ahead Right	U+O	N/A	N/A	B	E	1	41	11	456	2101:1804	959+70	44.3 : 44.3%
4/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	804	Inf	Inf	0.0%
4/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	425	Inf	Inf	0.0%
5/1	Grosvenor St (W) exit	U	N/A	N/A	-		-	-	-	155	Inf	Inf	0.0%
6/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	265	Inf	Inf	0.0%
6/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	164	Inf	Inf	0.0%
7/1	Mancunian Way	U	N/A	N/A	-		-	-	-	447	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Grosvenor Road Junction	**-**	**-**	**25**	**5**	**1**	**12.7**	**3.7**	**0.1**	**16.6**	**-**	**-**	**-**	**-**
A34 / Grosvenor Street	**-**	**-**	**25**	**5**	**1**	**12.7**	**3.7**	**0.1**	**16.6**	**-**	**-**	**-**	**-**
1/1+1/2	702	702	-	-	-	3.6	1.3	-	5.0	25.4	8.9	1.3	10.2
2/1	400	400	-	-	-	3.2	1.3	-	4.5	40.4	8.9	1.3	10.2
2/2	161	161	-	-	-	1.1	0.2	-	1.3	28.7	3.1	0.2	3.3
2/3	164	164	-	-	-	1.1	0.2	-	1.3	28.8	3.1	0.2	3.3
3/1	377	377	-	-	-	1.7	0.3	-	2.0	19.2	6.2	0.3	6.5
3/2+3/3	456	456	25	5	1	2.0	0.4	0.1	2.5	19.8	7.1	0.4	7.5
4/1	804	804	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	425	425	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	155	155	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	265	265	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	164	164	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	447	447	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

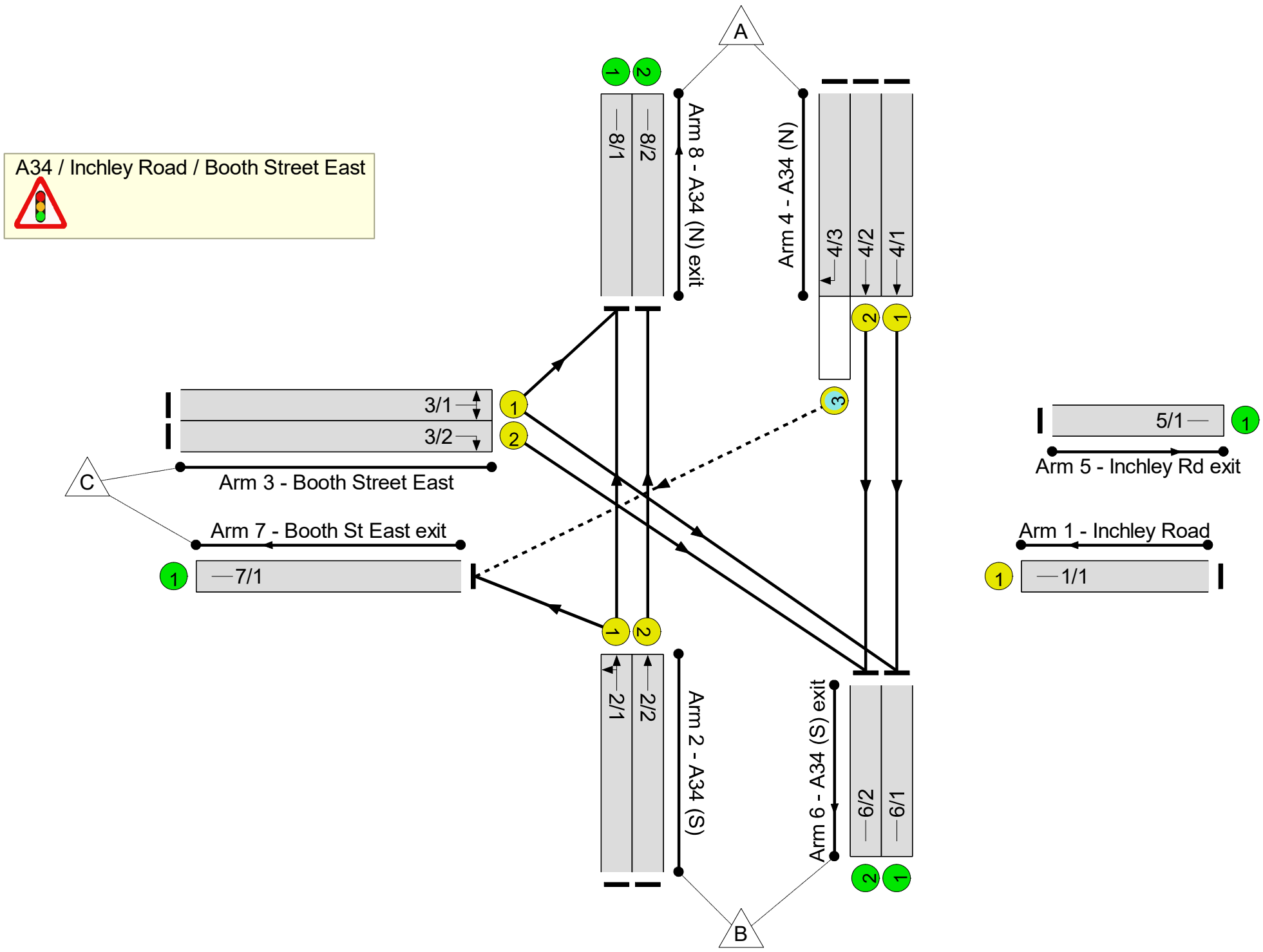
C1	PRC for Signalled Lanes (%):	23.7	Total Delay for Signalled Lanes (pcuHr):	16.55	Cycle Time (s): 90
	PRC Over All Lanes (%):	23.7	Total Delay Over All Lanes(pcuHr):	16.55	

Full Input Data And Results

User and Project Details

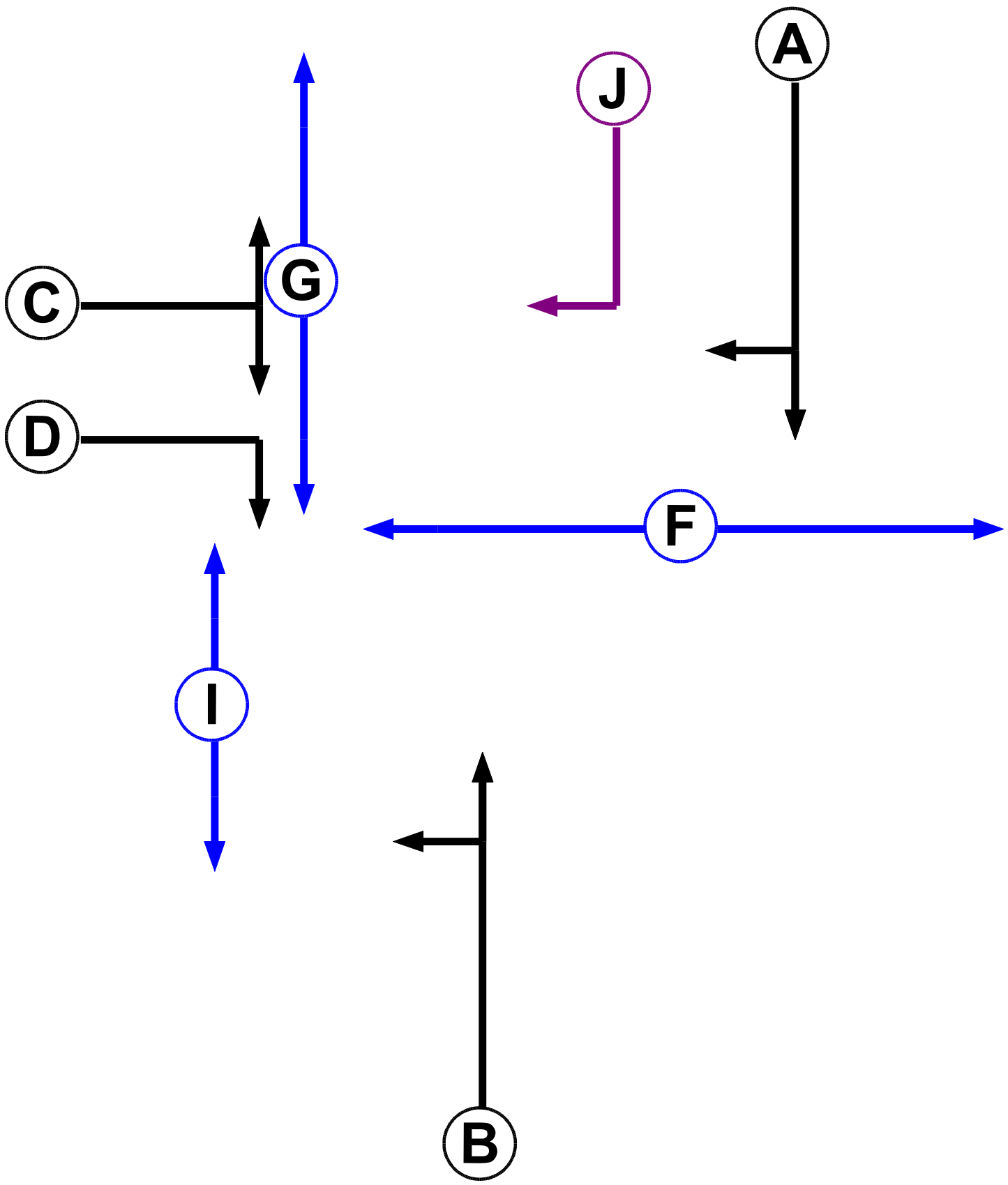
Project:	
Title:	**A34_ Booth Street East**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	90s Proposed A34_Booth St East.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Traffic		-9999	7
F	Pedestrian		-9999	12
G	Pedestrian		-9999	6
H	Pedestrian		-9999	5
I	Pedestrian		-9999	5
J	Ind. Arrow	A	-9999	4

Full Input Data And Results

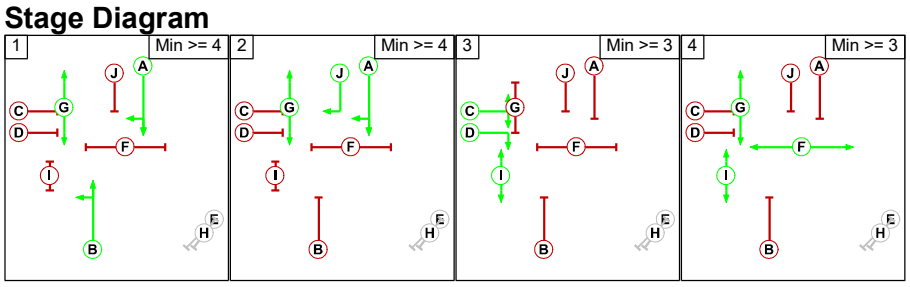
Phase Intergreens Matrix

	Starting Phase										
Terminating Phase		A	B	C	D	E	F	G	H	I	J
	A		-	5	5	-	-	-	-	-	-
	B	-		-	-	-	-	-	-	7	5
	C	-	-		-	-	7	5	-	-	-
	D	-	-	-		-	7	5	-	-	-
	E	-	-	-	-		-	-	-	-	-
	F	9	9	-	-	-		-	-	-	-
	G	-	-	-	-	-	-		-	-	-
	H	-	-	-	-	-	-	-		-	-
	I	-	-	-	-	-	-	-	-		-
	J	-	-	5	5	-	-	-	-	9	

Phases in Stage

Stage No.	Phases in Stage
1	A B G
2	A G J
3	C D I
4	F G I

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

	To Stage				
From Stage		1	2	3	4
	1		5	7	7
	2	2		9	9
	3	5	X		7
	4	9	X	2	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Inchley Road / Booth Street East											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
4/3 (A34 (N))	7/1 (Right)	1439	0	2/1	1.09	All	4.00	-	0.50	4	4.00
				2/2	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: A34 / Inchley Road / Booth Street East												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Inchley Road)	U	E	2	3	60.0	Geom	-	4.34	0.00	Y		
2/1 (A34 (S))	U	B	2	3	49.7	Geom	-	3.65	0.00	Y	Arm 7 Left	15.00
											Arm 8 Ahead	Inf
2/2 (A34 (S))	U	B	2	3	49.7	Geom	-	3.65	0.00	N	Arm 8 Ahead	Inf
3/1 (Booth Street East)	U	C	2	3	8.3	Geom	-	3.25	0.00	Y	Arm 6 Right	20.00
											Arm 8 Left	10.00
3/2 (Booth Street East)	U	D	2	3	8.3	Geom	-	3.25	0.00	N	Arm 6 Right	18.00
4/1 (A34 (N))	U	A	2	3	33.4	Geom	-	3.20	0.00	Y	Arm 6 Ahead	Inf
4/2 (A34 (N))	U	A	2	3	33.9	Geom	-	3.00	0.00	N	Arm 6 Ahead	Inf
4/3 (A34 (N))	O	A J	2	3	8.7	Geom	-	3.00	0.00	N	Arm 7 Right	15.00
5/1 (Inchley Rd exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Booth St East exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/2 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Application Scheme AM Peak'	08:15	09:15	01:00	

Scenario 1: 'Proposed Layout' (FG1: 'Application Scheme AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	691	233	924
	B	851	0	531	1382
	C	74	343	0	417
	Tot.	925	1034	764	2723

Traffic Lane Flows

Lane	Scenario 1: Proposed Layout
Junction: A34 / Inchley Road / Booth Street East	
1/1	0
2/1	629
2/2	753
3/1	199
3/2	218
4/1	328
4/2	363
4/3	233
5/1	0
6/1	453
6/2	581
7/1	764
8/1	172
8/2	753

Lane Saturation Flows

Junction: A34 / Inchley Road / Booth Street East								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Inchley Road)	4.34	0.00	Y				2049	2049
2/1 (A34 (S))	3.65	0.00	Y	Arm 7 Left	15.00	84.4 %	1826	1826
				Arm 8 Ahead	Inf	15.6 %		
2/2 (A34 (S))	3.65	0.00	N	Arm 8 Ahead	Inf	100.0 %	2120	2120
3/1 (Booth Street East)	3.25	0.00	Y	Arm 6 Right	20.00	62.8 %	1759	1759
				Arm 8 Left	10.00	37.2 %		
3/2 (Booth Street East)	3.25	0.00	N	Arm 6 Right	18.00	100.0 %	1920	1920
4/1 (A34 (N))	3.20	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1935	1935
4/2 (A34 (N))	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
4/3 (A34 (N))	3.00	0.00	N	Arm 7 Right	15.00	100.0 %	1868	1868
5/1 (Inchley Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Booth St East exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 2: 'Proposed Layout' (FG2: 'Application Scheme PM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	975	247	1222
	B	629	0	405	1034
	C	101	554	0	655
	Tot.	730	1529	652	2911

Traffic Lane Flows

Lane	Scenario 2: Proposed Layout
Junction: A34 / Inchley Road / Booth Street East	
1/1	0
2/1	467
2/2	567
3/1	312
3/2	343
4/1	467
4/2	508
4/3	247
5/1	0
6/1	678
6/2	851
7/1	652
8/1	163
8/2	567

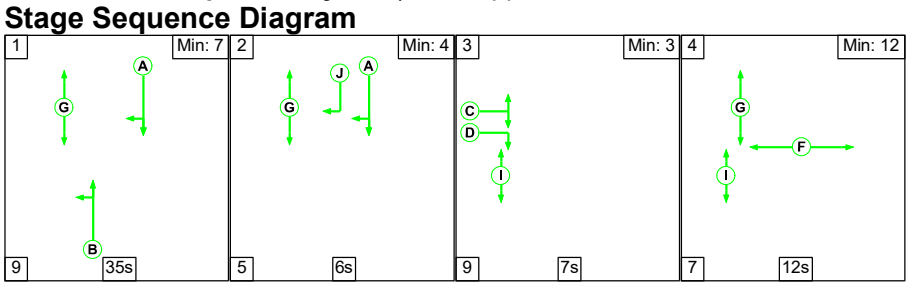
Lane Saturation Flows

Junction: A34 / Inchley Road / Booth Street East

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Inchley Road)	4.34	0.00	Y				2049	2049
2/1 (A34 (S))	3.65	0.00	Y	Arm 7 Left	15.00	86.7 %	1822	1822
				Arm 8 Ahead	Inf	13.3 %		
2/2 (A34 (S))	3.65	0.00	N	Arm 8 Ahead	Inf	100.0 %	2120	2120
3/1 (Booth Street East)	3.25	0.00	Y	Arm 6 Right	20.00	67.6 %	1765	1765
				Arm 8 Left	10.00	32.4 %		
3/2 (Booth Street East)	3.25	0.00	N	Arm 6 Right	18.00	100.0 %	1920	1920
4/1 (A34 (N))	3.20	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1935	1935
4/2 (A34 (N))	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
4/3 (A34 (N))	3.00	0.00	N	Arm 7 Right	15.00	100.0 %	1868	1868
5/1 (Inchley Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Booth St East exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 1: 'Proposed Layout' (FG1: 'Application Scheme AM Peak', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

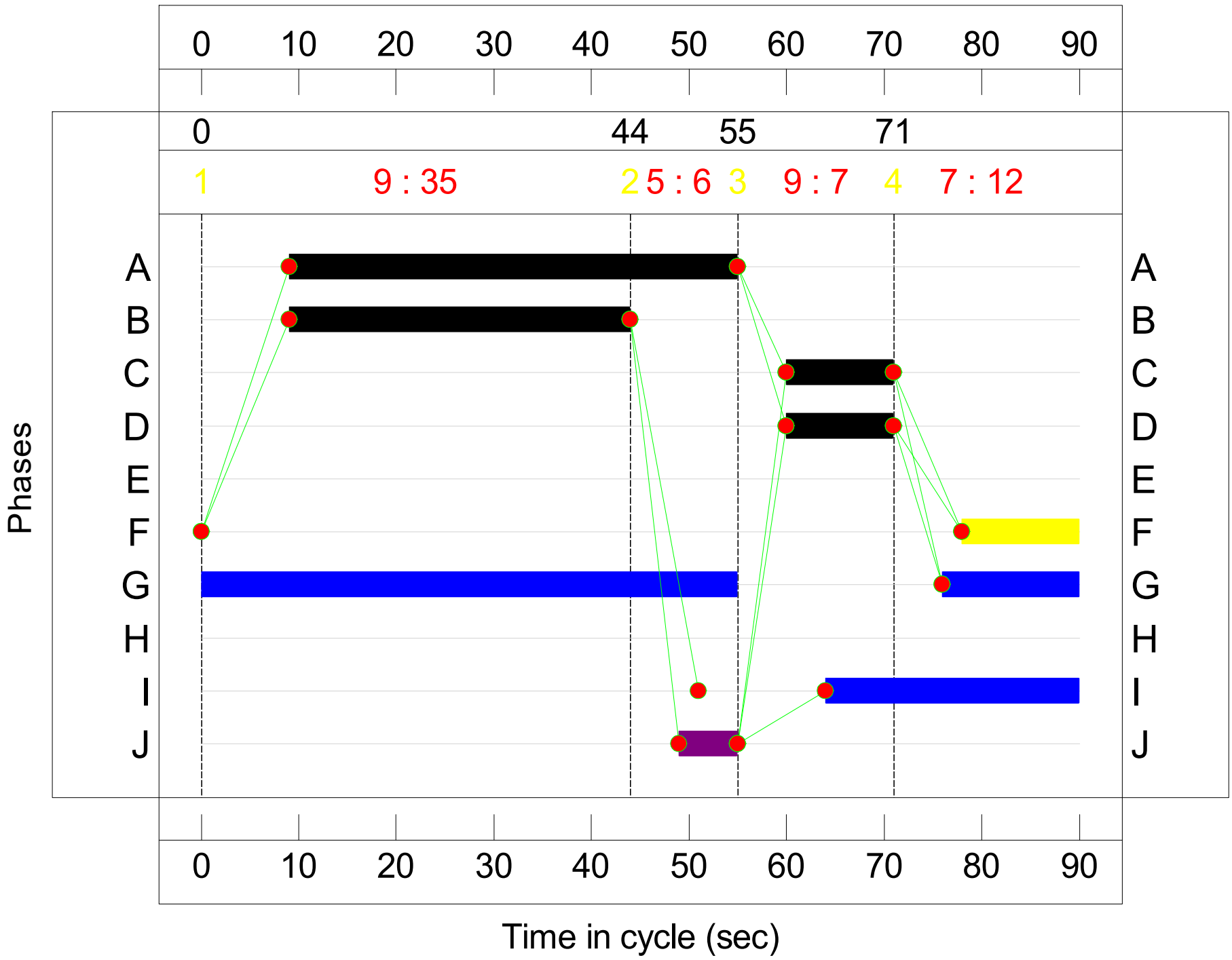


Full Input Data And Results

Stage Timings

Stage	1	2	3	4
Duration	35	6	7	12
Change Point	0	44	55	71

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A34_ Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**88.8%**
A34 / Inchley Road / Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**88.8%**
1/1	Inchley Road	U	N/A	N/A	E		0	0	-	0	2049	0	0.0%
2/1	A34 (S) Left Ahead	U	N/A	N/A	B		1	35	-	629	1826	730	86.1%
2/2	A34 (S) Ahead	U	N/A	N/A	B		1	35	-	753	2120	848	88.8%
3/1	Booth Street East Right Left	U	N/A	N/A	C		1	11	-	199	1759	235	84.8%
3/2	Booth Street East Right	U	N/A	N/A	D		1	11	-	218	1920	256	85.2%
4/1	A34 (N) Ahead	U	N/A	N/A	A		1	46	-	328	1935	1010	32.5%
4/2	A34 (N) Ahead	U	N/A	N/A	A		1	46	-	363	2055	1073	33.8%
4/3	A34 (N) Right	O	N/A	N/A	A	J	1	46	6	233	1868	264	88.3%
5/1	Inchley Rd exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
6/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	453	Inf	Inf	0.0%
6/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	581	Inf	Inf	0.0%
7/1	Booth St East exit	U	N/A	N/A	-		-	-	-	764	Inf	Inf	0.0%
8/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	172	Inf	Inf	0.0%
8/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	753	Inf	Inf	0.0%

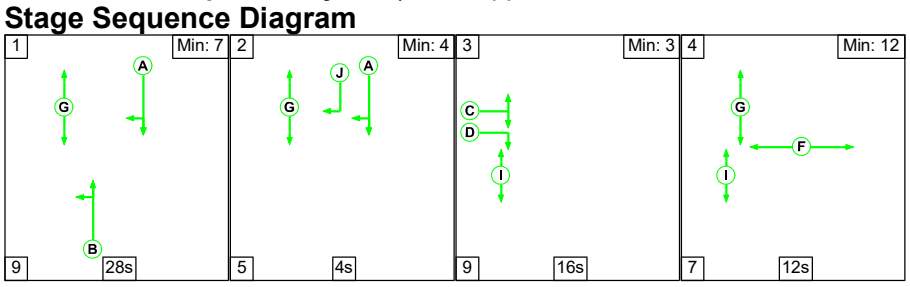
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A34_ Booth Street East	-	-	**0**	**181**	**52**	**17.4**	**15.2**	**1.5**	**34.1**	-	-	-	-
A34 / Inchley Road / Booth Street East	-	-	**0**	**181**	**52**	**17.4**	**15.2**	**1.5**	**34.1**	-	-	-	-
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/1	629	629	-	-	-	4.3	2.9	-	7.3	41.5	14.3	2.9	17.3
2/2	753	753	-	-	-	5.3	3.7	-	8.9	42.7	17.4	3.7	21.0
3/1	199	199	-	-	-	2.1	2.5	-	4.6	82.6	4.8	2.5	7.3
3/2	218	218	-	-	-	2.3	2.5	-	4.8	79.9	5.3	2.5	7.8
4/1	328	328	-	-	-	1.1	0.2	-	1.4	15.0	4.6	0.2	4.9
4/2	363	363	-	-	-	1.3	0.3	-	1.5	15.0	5.2	0.3	5.5
4/3	233	233	0	181	52	1.0	3.1	1.5	5.6	86.3	3.2	3.1	6.3
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	453	453	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	581	581	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	764	764	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	172	172	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	753	753	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 1.4 Total Delay for Signalled Lanes (pcuHr): 34.06 Cycle Time (s): 90
PRC Over All Lanes (%): 1.4 Total Delay Over All Lanes(pcuHr): 34.06

Full Input Data And Results

Scenario 2: 'Proposed Layout' (FG2: 'Application Scheme PM Peak', Plan 1: 'Network Control Plan 1')

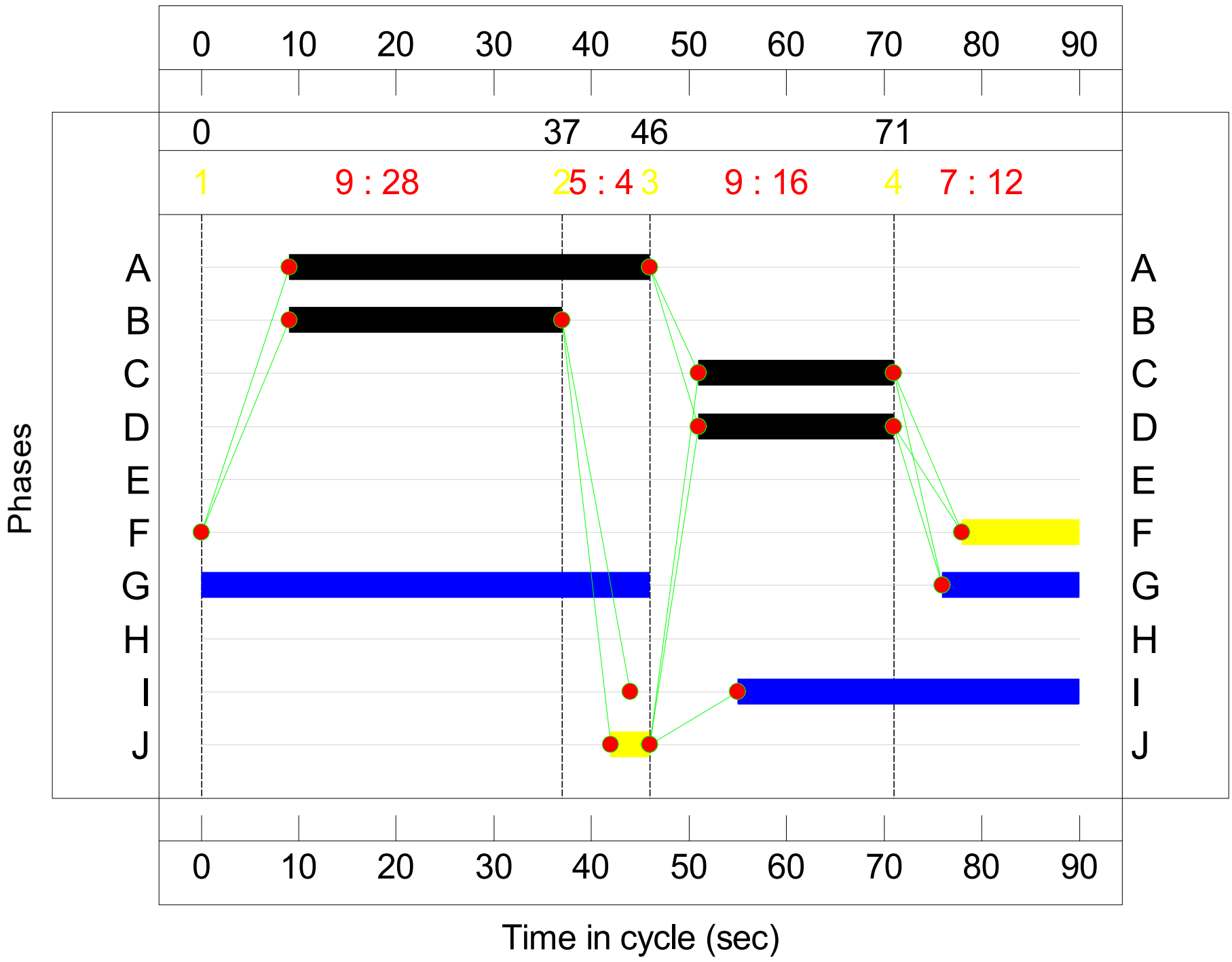
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	28	4	16	12
Change Point	0	37	46	71

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A34_ Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**83.0%**
A34 / Inchley Road / Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**83.0%**
1/1	Inchley Road	U	N/A	N/A	E		0	0	-	0	2049	0	0.0%
2/1	A34 (S) Left Ahead	U	N/A	N/A	B		1	28	-	467	1822	587	79.5%
2/2	A34 (S) Ahead	U	N/A	N/A	B		1	28	-	567	2120	683	83.0%
3/1	Booth Street East Right Left	U	N/A	N/A	C		1	20	-	312	1765	412	75.8%
3/2	Booth Street East Right	U	N/A	N/A	D		1	20	-	343	1920	448	76.6%
4/1	A34 (N) Ahead	U	N/A	N/A	A		1	37	-	467	1935	817	57.2%
4/2	A34 (N) Ahead	U	N/A	N/A	A		1	37	-	508	2055	868	58.5%
4/3	A34 (N) Right	O	N/A	N/A	A	J	1	37	4	247	1868	326	75.7%
5/1	Inchley Rd exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
6/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	678	Inf	Inf	0.0%
6/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	851	Inf	Inf	0.0%
7/1	Booth St East exit	U	N/A	N/A	-		-	-	-	652	Inf	Inf	0.0%
8/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	163	Inf	Inf	0.0%
8/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	567	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A34_ Booth Street East	-	-	**21**	**145**	**81**	**20.7**	**10.2**	**1.2**	**32.2**	-	-	-	-
A34 / Inchley Road / Booth Street East	-	-	**21**	**145**	**81**	**20.7**	**10.2**	**1.2**	**32.2**	-	-	-	-
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/1	467	467	-	-	-	3.6	1.9	-	5.5	42.3	10.6	1.9	12.5
2/2	567	567	-	-	-	4.4	2.3	-	6.8	43.1	13.1	2.3	15.4
3/1	312	312	-	-	-	2.8	1.5	-	4.3	49.6	7.2	1.5	8.7
3/2	343	343	-	-	-	3.1	1.6	-	4.7	48.8	8.0	1.6	9.6
4/1	467	467	-	-	-	2.6	0.7	-	3.2	24.9	8.8	0.7	9.5
4/2	508	508	-	-	-	2.8	0.7	-	3.5	24.9	9.7	0.7	10.4
4/3	247	247	21	145	81	1.4	1.5	1.2	4.2	60.7	5.8	1.5	7.3
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	678	678	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	851	851	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	652	652	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	163	163	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	567	567	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

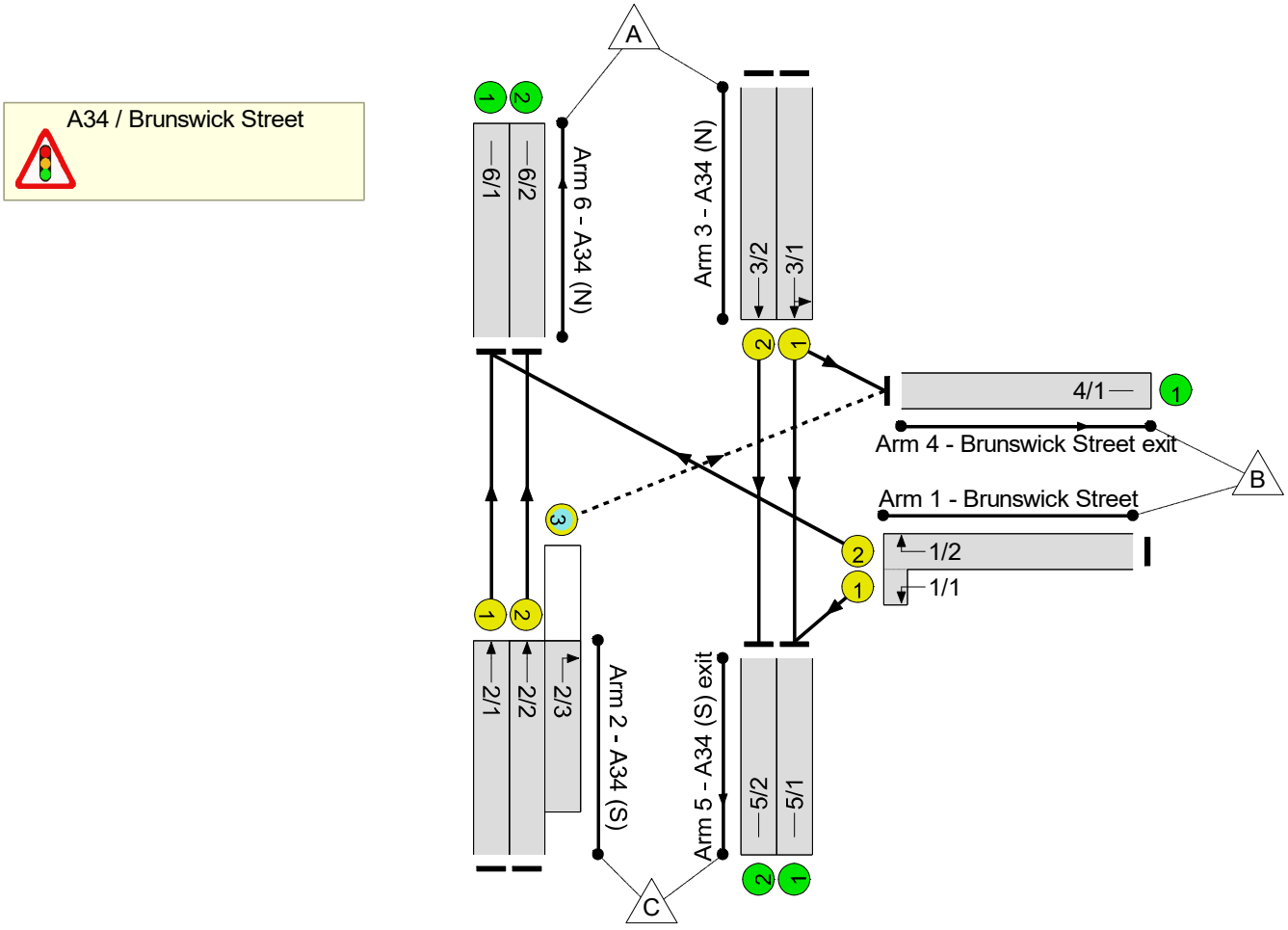
C1 PRC for Signalled Lanes (%): 8.4 Total Delay for Signalled Lanes (pcuHr): 32.15 Cycle Time (s): 90
PRC Over All Lanes (%): 8.4 Total Delay Over All Lanes(pcuHr): 32.15

Full Input Data And Results

User and Project Details

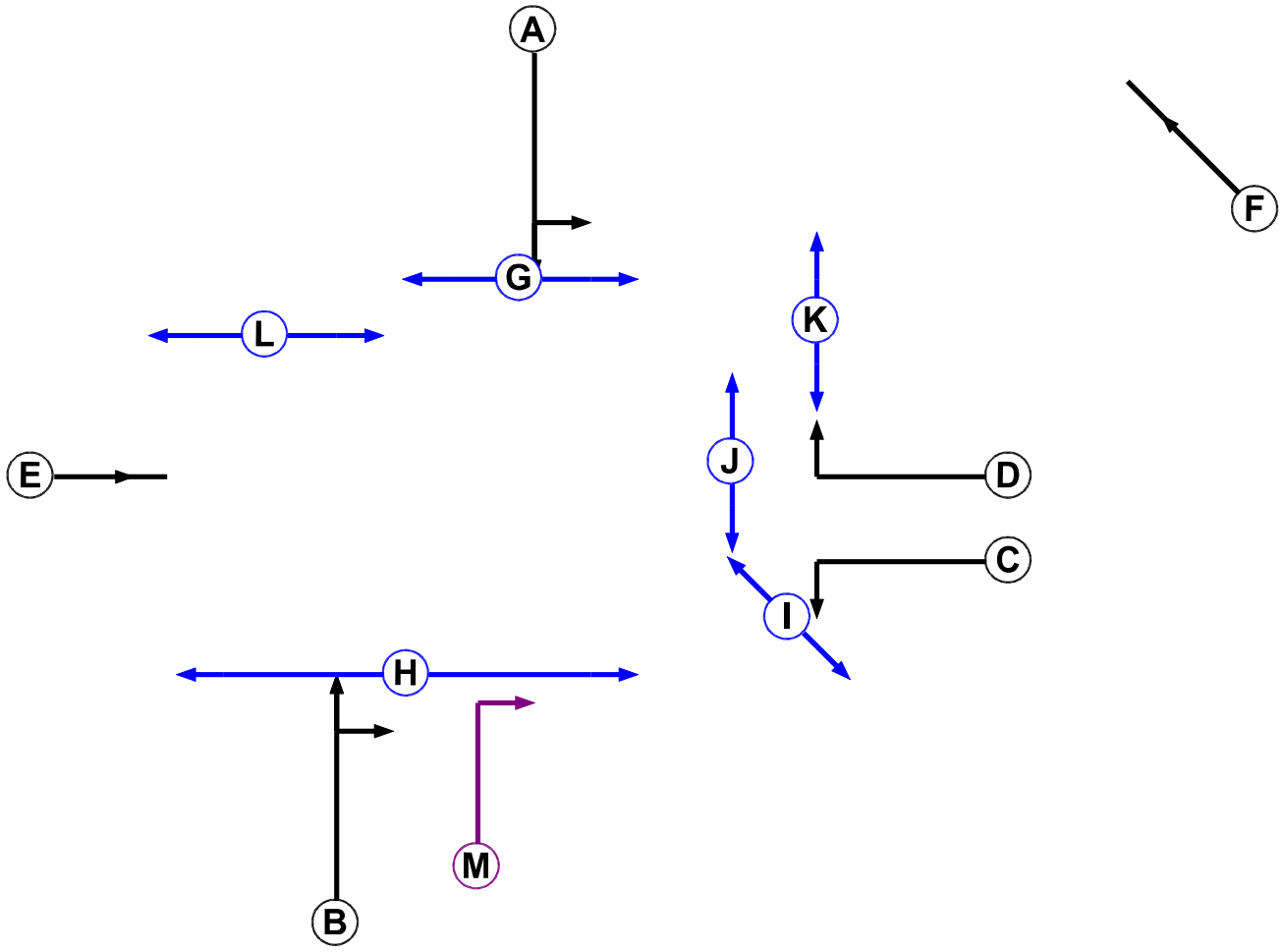
Project:	**Upper Brook Street**
Title:	**Brunswick Street**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	A34_Brunswick Street IGA.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Traffic		-9999	7
F	Traffic		-9999	7
G	Pedestrian		-9999	6
H	Pedestrian		-9999	10
I	Pedestrian		-9999	5
J	Pedestrian		-9999	5
K	Pedestrian		-9999	5
L	Pedestrian		-9999	5
M	Ind. Arrow	B	-9999	4

Full Input Data And Results

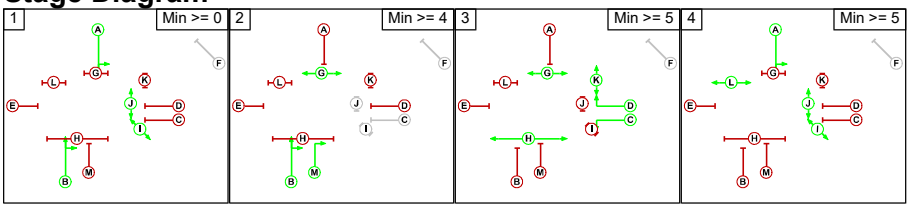
Phase Intergreens Matrix

	Starting Phase													
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K	L	M
	A		-	10	6	5	-	5	9	-	-	9	-	5
	B	-		-	6	5	-	-	5	-	-	10	8	-
	C	3	-		-	4	-	-	-	5	-	-	-	-
	D	6	6	-		6	-	-	-	-	5	-	10	-
	E	6	6	9	7		-	-	10	-	-	9	-	-
	F	-	-	-	-	-		-	-	-	-	-	-	-
	G	6	-	-	-	-	-		-	-	-	-	-	-
	H	8	8	-	-	8	-	-		-	-	-	-	-
	I	-	-	5	-	-	-	-	-		-	-	-	-
	J	-	-	-	5	-	-	-	-	-		-	-	-
	K	5	5	-	-	5	-	-	-	-	-		-	-
	L	-	5	-	5	-	-	-	-	-	-	-		-
	M	-	-	-	6	-	-	-	-	-	-	10	-	

Phases in Stage

Stage No.	Phases in Stage
1	A B I J
2	B G M
3	C D G H K
4	A I J L

Stage Diagram



Full Input Data And Results

Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
1	3	I	Losing	5	5
1	3	J	Losing	1	1
3	1	C	Losing	2	2
3	1	D	Losing	2	2
3	1	G	Losing	2	2
3	1	K	Losing	3	3
3	4	K	Losing	3	3
4	1	L	Losing	1	1
4	3	I	Losing	4	4
4	3	J	Losing	2	2
4	3	L	Losing	2	2

Prohibited Stage Change

	To Stage				
From Stage		1	2	3	4
	1		5	10	8
	2	6		10	8
	3	8	X		10
	4	6	5	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Brunswick Street											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
2/3 (A34 (S))	4/1 (Right)	1439	0	3/1	1.09	All	4.00	-	0.50	4	4.00
				3/2	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: A34 / Brunswick Street												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Brunswick Street)	U	C	2	3	1.0	Geom	-	3.00	0.00	Y	Arm 5 Left	20.00
1/2 (Brunswick Street)	U	D	2	3	60.0	Geom	-	3.80	0.00	N	Arm 6 Right	10.00
2/1 (A34 (S))	U	B	2	3	36.2	Geom	-	3.30	0.00	Y	Arm 6 Ahead	Inf
2/2 (A34 (S))	U	B	2	3	36.2	Geom	-	3.03	0.00	N	Arm 6 Ahead	Inf
2/3 (A34 (S))	O	B M	2	3	8.7	Geom	-	2.95	0.00	N	Arm 4 Right	10.00
3/1 (A34 (N))	U	A	2	3	49.7	Geom	-	3.49	0.00	Y	Arm 4 Left	10.00
											Arm 5 Ahead	Inf
3/2 (A34 (N))	U	A	2	3	49.7	Geom	-	3.34	0.00	N	Arm 5 Ahead	Inf
4/1 (Brunswick Street exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (N))	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (N))	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
3: 'Do Something (Application Scheme) AM Peak'	08:15	09:15	01:00	

Full Input Data And Results

Scenario 3: 'Existing Layout' (FG3: 'Do Something (Application Scheme) AM Peak', Plan 1: 'Peds every second cycle')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	227	793	1020
	B	278	0	285	563
	C	1120	178	0	1298
	Tot.	1398	405	1078	2881

Traffic Lane Flows

Lane	Scenario 3: Existing Layout
Junction: A34 / Brunswick Street	
1/1 (short)	285
1/2 (with short)	563(In) 278(Out)
2/1	561
2/2 (with short)	737(In) 559(Out)
2/3 (short)	178
3/1	463
3/2	557
4/1	405
5/1	521
5/2	557
6/1	839
6/2	559

Full Input Data And Results

Lane Saturation Flows

Junction: A34 / Brunswick Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Brunswick Street)	3.00	0.00	Y	Arm 5 Left	20.00	100.0 %	1781	1781
1/2 (Brunswick Street)	3.80	0.00	N	Arm 6 Right	10.00	100.0 %	1857	1857
2/1 (A34 (S))	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
2/2 (A34 (S))	3.03	0.00	N	Arm 6 Ahead	Inf	100.0 %	2058	2058
2/3 (A34 (S))	2.95	0.00	N	Arm 4 Right	10.00	100.0 %	1783	1783
3/1 (A34 (N))	3.49	0.00	Y	Arm 4 Left	10.00	49.0 %	1829	1829
				Arm 5 Ahead	Inf	51.0 %		
3/2 (A34 (N))	3.34	0.00	N	Arm 5 Ahead	Inf	100.0 %	2089	2089
4/1 (Brunswick Street exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'Existing Layout' (FG4: 'Do Something (Application Scheme) PM Peak', Plan 1: 'Peds every second cycle')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	372	1103	1475
	B	226	0	166	392
	C	840	174	0	1014
	Tot.	1066	546	1269	2881

Traffic Lane Flows

Lane	Scenario 4: Existing Layout
Junction: A34 / Brunswick Street	
1/1 (short)	166
1/2 (with short)	392(In) 226(Out)
2/1	651
2/2 (with short)	363(In) 189(Out)
2/3 (short)	174
3/1	671
3/2	804
4/1	546
5/1	465
5/2	804
6/1	877
6/2	189

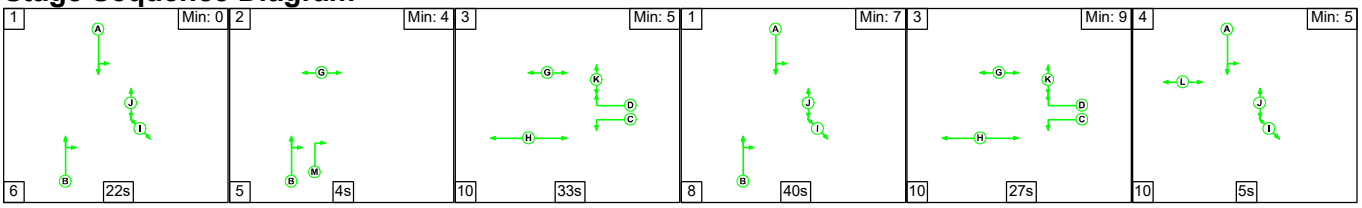
Full Input Data And Results

Lane Saturation Flows

Junction: A34 / Brunswick Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Brunswick Street)	3.00	0.00	Y	Arm 5 Left	20.00	100.0 %	1781	1781
1/2 (Brunswick Street)	3.80	0.00	N	Arm 6 Right	10.00	100.0 %	1857	1857
2/1 (A34 (S))	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
2/2 (A34 (S))	3.03	0.00	N	Arm 6 Ahead	Inf	100.0 %	2058	2058
2/3 (A34 (S))	2.95	0.00	N	Arm 4 Right	10.00	100.0 %	1783	1783
3/1 (A34 (N))	3.49	0.00	Y	Arm 4 Left	10.00	55.4 %	1813	1813
				Arm 5 Ahead	Inf	44.6 %		
3/2 (A34 (N))	3.34	0.00	N	Arm 5 Ahead	Inf	100.0 %	2089	2089
4/1 (Brunswick Street exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 3: 'Existing Layout' (FG3: 'Do Something (Application Scheme) AM Peak', Plan 1: 'Peds every second cycle')

Stage Sequence Diagram

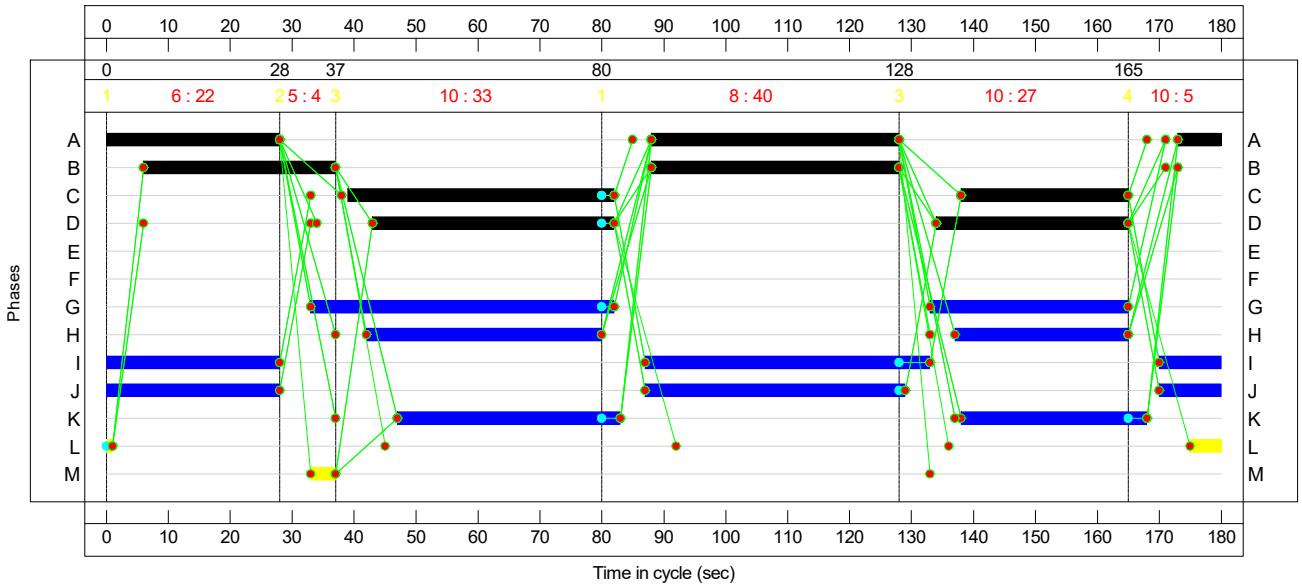


Stage Timings

Stage	1	2	3	1	3	4
Duration	22	4	33	40	27	5
Change Point	0	28	37	80	128	165

Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**78.3%**
A34 / Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**78.3%**
1/2+1/1	Brunswick Street Left Right	U	N/A	N/A	D C		2	70	-	563	1857:1781	359+368	77.5 : 77.5%
2/1	A34 (S) Ahead	U	N/A	N/A	B		2	71	-	561	1945	789	71.1%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B	M	2	71	4	737	2058:1783	714+227	78.3 : 78.3%
3/1	A34 (N) Left Ahead	U	N/A	N/A	A		2	75	-	463	1829	782	59.2%
3/2	A34 (N) Ahead	U	N/A	N/A	A		2	75	-	557	2089	894	62.3%
4/1	Brunswick Street exit	U	N/A	N/A	-		-	-	-	405	Inf	Inf	0.0%
5/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	521	Inf	Inf	0.0%
5/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	557	Inf	Inf	0.0%
6/1	A34 (N)	U	N/A	N/A	-		-	-	-	839	Inf	Inf	0.0%
6/2	A34 (N)	U	N/A	N/A	-		-	-	-	559	Inf	Inf	0.0%

Full Input Data And Results

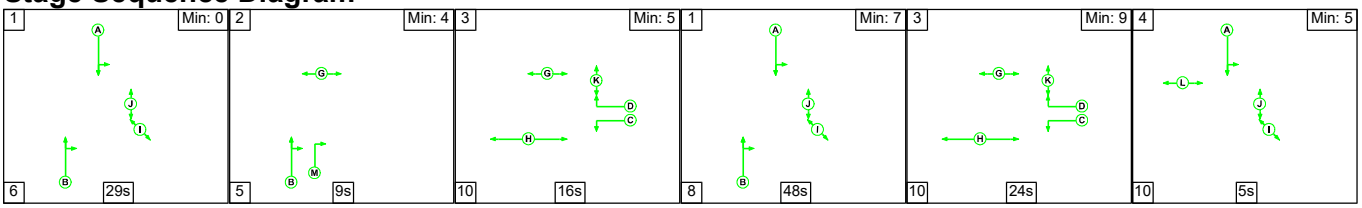
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Brunswick Street	**-**	**-**	**71**	**48**	**59**	**17.3**	**6.2**	**0.9**	**24.4**	**-**	**-**	**-**	**-**
A34 / Brunswick Street	**-**	**-**	**71**	**48**	**59**	**17.3**	**6.2**	**0.9**	**24.4**	**-**	**-**	**-**	**-**
1/2+1/1	563	563	-	-	-	3.7	1.7	-	5.3	34.2	11.4	1.7	13.1
2/1	561	561	-	-	-	3.5	1.2	-	4.7	30.3	12.5	1.2	13.7
2/2+2/3	737	737	71	48	59	4.4	1.8	0.9	7.0	34.2	13.6	1.8	15.4
3/1	463	463	-	-	-	2.6	0.7	-	3.3	25.8	10.0	0.7	10.8
3/2	557	557	-	-	-	3.2	0.8	-	4.0	25.8	12.4	0.8	13.2
4/1	405	405	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	521	521	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2	557	557	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	839	839	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	559	559	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 14.9 Total Delay for Signalled Lanes (pcuHr): 24.37 Cycle Time (s): 180
PRC Over All Lanes (%): 14.9 Total Delay Over All Lanes(pcuHr): 24.37

Full Input Data And Results

Scenario 4: 'Existing Layout' (FG4: 'Do Something (Application Scheme) PM Peak', Plan 1: 'Peds every second cycle')

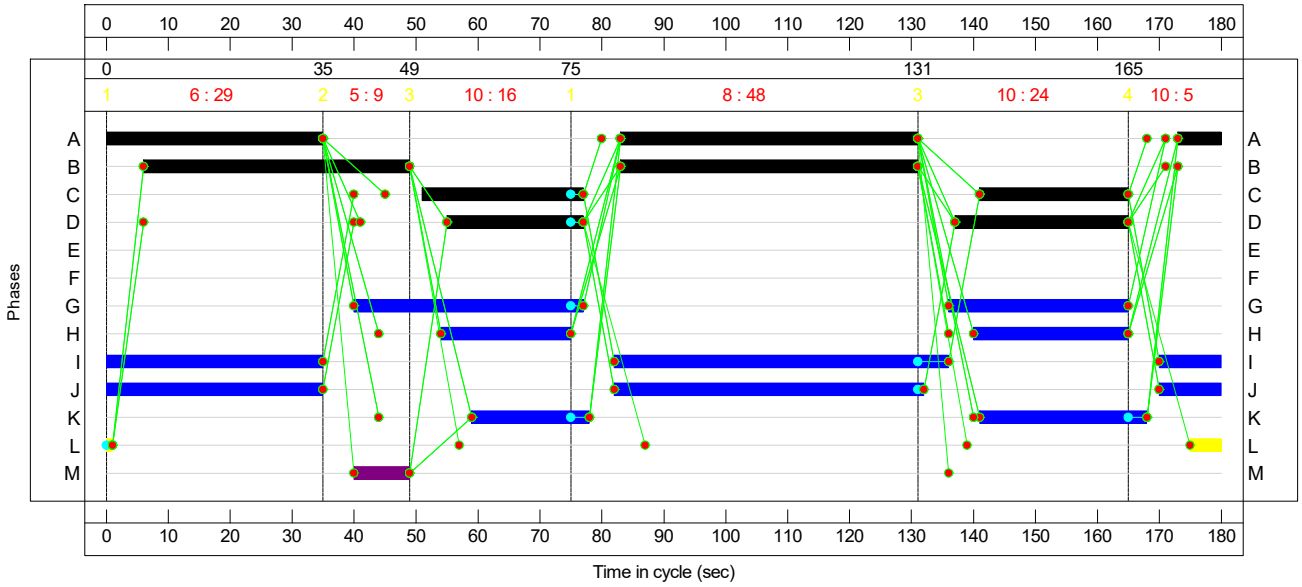
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	1	3	4
Duration	29	9	16	48	24	5
Change Point	0	35	49	75	131	165

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**75.3%**
A34 / Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**75.3%**
1/2+1/1	Brunswick Street Left Right	U	N/A	N/A	D C		2	50	-	392	1857:1781	304+224	74.3 : 74.3%
2/1	A34 (S) Ahead	U	N/A	N/A	B		2	91	-	651	1945	1005	64.8%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B	M	2	91	9	363	2058:1783	260+239	72.7 : 72.7%
3/1	A34 (N) Left Ahead	U	N/A	N/A	A		2	90	-	671	1813	927	72.4%
3/2	A34 (N) Ahead	U	N/A	N/A	A		2	90	-	804	2089	1068	75.3%
4/1	Brunswick Street exit	U	N/A	N/A	-		-	-	-	546	Inf	Inf	0.0%
5/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	465	Inf	Inf	0.0%
5/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	804	Inf	Inf	0.0%
6/1	A34 (N)	U	N/A	N/A	-		-	-	-	877	Inf	Inf	0.0%
6/2	A34 (N)	U	N/A	N/A	-		-	-	-	189	Inf	Inf	0.0%

Full Input Data And Results

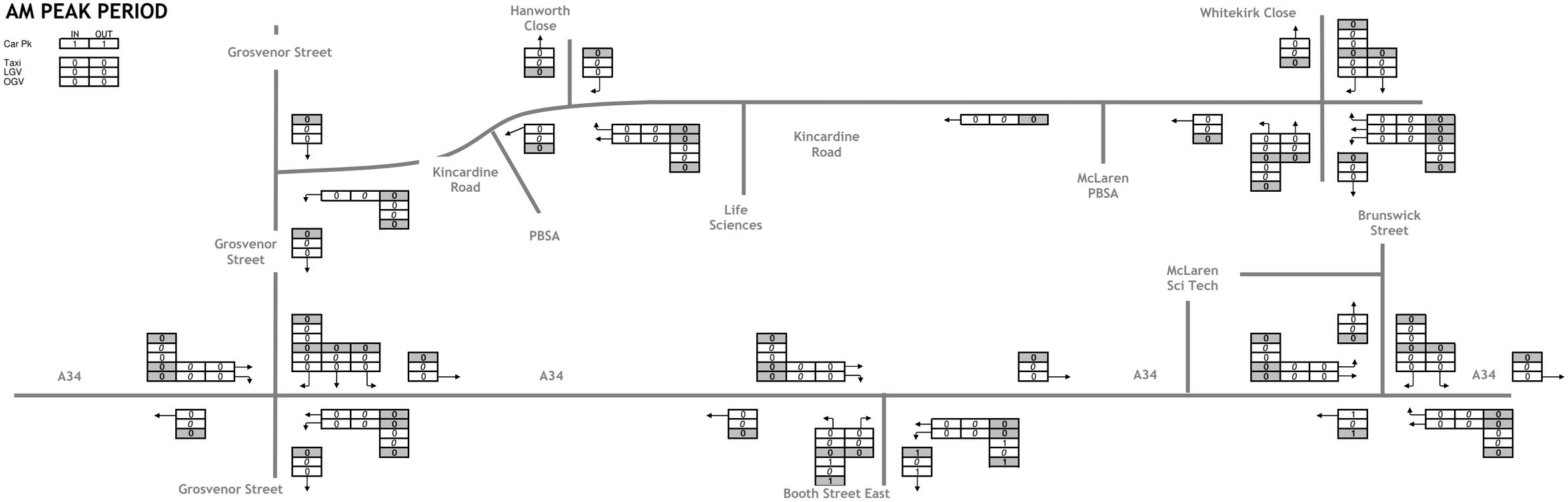
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Brunswick Street	**-**	**-**	**0**	**91**	**83**	**14.5**	**6.4**	**1.3**	**22.3**	**-**	**-**	**-**	**-**
A34 / Brunswick Street	**-**	**-**	**0**	**91**	**83**	**14.5**	**6.4**	**1.3**	**22.3**	**-**	**-**	**-**	**-**
1/2+1/1	392	392	-	-	-	3.1	1.4	-	4.6	41.8	8.6	1.4	10.0
2/1	651	651	-	-	-	3.0	0.9	-	3.9	21.8	14.6	0.9	15.6
2/2+2/3	363	363	0	91	83	1.2	1.3	1.3	3.9	38.7	3.1	1.3	4.4
3/1	671	671	-	-	-	3.2	1.3	-	4.5	24.1	13.8	1.3	15.1
3/2	804	804	-	-	-	3.9	1.5	-	5.4	24.3	17.0	1.5	18.5
4/1	546	546	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	465	465	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2	804	804	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	877	877	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	189	189	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 19.5 Total Delay for Signalled Lanes (pcuHr): 22.32 Cycle Time (s): 180
PRC Over All Lanes (%): 19.5 Total Delay Over All Lanes(pcuHr): 22.32

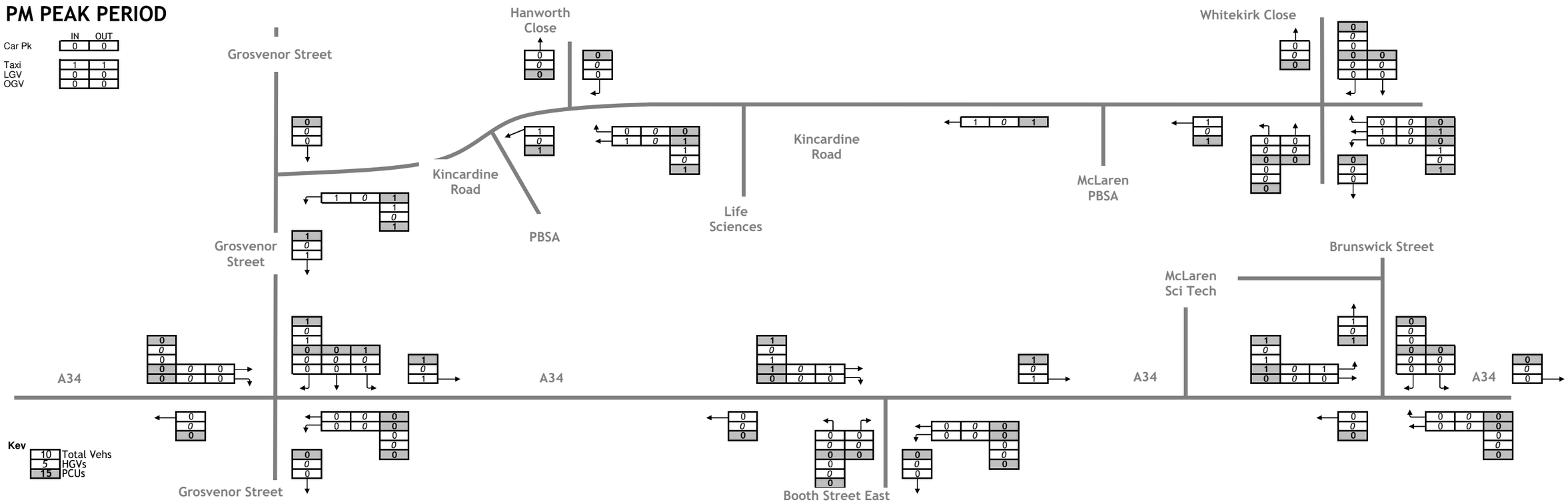


APPENDIX TA16

AM PEAK PERIOD



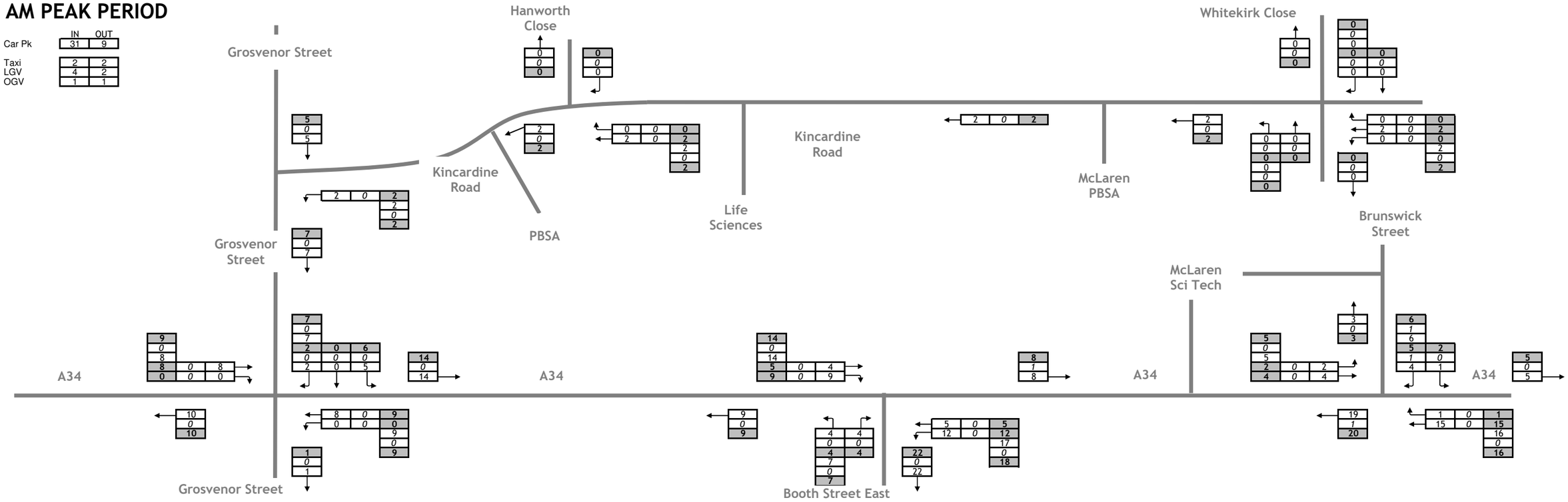
PM PEAK PERIOD



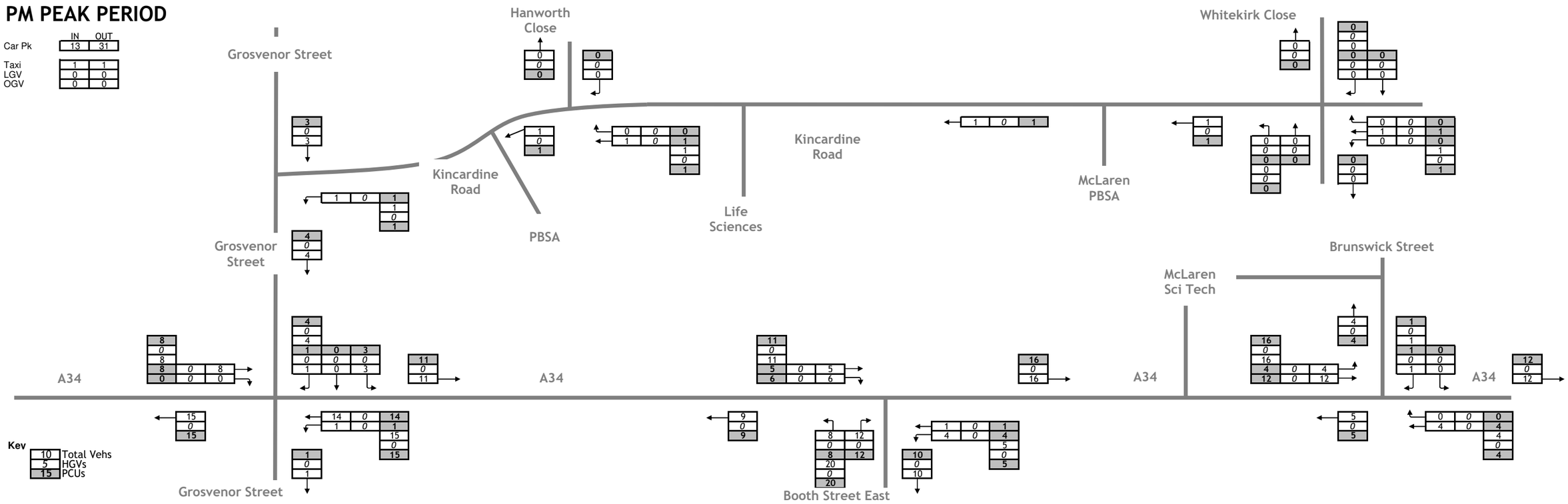
FOCUS TRANSPORT PLANNING

Appendix TA16(i)	**Total PBSA Trip Generation - (Taxis, Deliveries & Off-Site Car Parks)**	
J000370	Upper Brook Street Masterplan	June 2023

AM PEAK PERIOD



PM PEAK PERIOD



FOCUS TRANSPORT PLANNING

Appendix TA16(ii) **Total Life Sciences Building Trip Generation - (Taxis, Deliveries & Off-Site Car Parks)**

J000370 Upper Brook Street Masterplan June 2023



APPENDIX TA17

Appendix TA17 - Baseline + Cumulative Development at Upper Brook Street 'With Cumulative Development' Junction Capacity Modelling Results

Key

- 0-89% DoS (within capacity conditions)
- 90-99% DoS (variable operating conditions)
- 100%+ DoS (over capacity conditions)

A34 / Grosvenor Street

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**61.5%**	-	-	**73.4%**	-
1/1 + 1/2	Grosvenor Street (E) Left Ahead & Right	507	61.2%:61.2%	5.5	674	73.4%:73.4%	8.4
2/1	A34 (S) Left & ahead	471	61.5%	9.0	408	71.2%	9.3
2/2	A34 (S) Ahead	232	27.8%	3.7	164	26.2%	2.9
2/3	A34 (S) Ahead	235	28.0%	3.7	164	26.5%	3.0
3/1	A34 (N) Ahead	302	25.7%	3.3	376	38.3%	5.4
3/2 + 3/3	A34 (N) Ahead & right	393	29.5%:29.5%	4.0	459	41.5%:41.5%	6.3
Cycle Time		80s			80s		
Stage 1, 2, 3 timings		41s, 14s,25s			33s, 14s, 33s		
Junction PRC		46.3%			22.6%		
Total delay over all lanes (pcuHr)		11.89			14.90		

A34 / Booth Street East - Proposed Junction

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**96.0%**	-	-	**92.0%**	-
2/1	A34(S) - Left & Ahead	645	94.2%	20.0	478	91.2%	14.6
2/2	A34(S) - Ahead	755	95.0%	23.1	561	92.0%	16.8
3/1	Booth Street East - Left & Right	199	90.6%	7.9	311	83.1%	8.9
3/2	Booth Street East - Right	220	91.7%	8.8	344	84.3%	9.8
4/1	A34(N) - Ahead	332	35.2%	4.8	464	59.9%	8.9
4/2	A34(N) - Ahead	368	36.7%	5.3	505	61.4%	9.6
4/3	A34(N) - Right	240	96.0%	8.8	229	77.2%	5.0
Cycle Time		80s			80s		
Stage 1, 2 ,3 timings		38s, 9s, 14s, 19s			31s,9s, 21s 19s		
Junction PRC		-6.6%			-2.3%		
Total delay over all lanes (pcuHr)		45.10			37.80		

A34 / Brunswick Street

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**82.8%**	-	-	**95.6%**	-
1/2 + 1/1	Brunswick Street - Left & Right	569	82.3% : 82.3%	12.9	393	83.4% : 83.4%	9.9
2/1	A34(S) - Ahead	568	77.9%	13.4	670	68.0%	13.7
2/2 + 2/3	A34(S) - Ahead & Right	738	82.8% : 82.8%	14.9	346	95.6% : 95.6%	8.5
3/1	A34 (N) - Left & Ahead	455	54.2%	8.4	666	62.3%	10.6
3/2	A34 (N) - Ahead	545	57.2%	10.2	794	64.8%	12.8
Cycle Time		160s			160s		
Stage 1, 2, 1, 2, 3 timings		29s, 40s, 43s, 33s, 15s			39s, 27s, 54s, 25s, 15s		
Junction PRC		8.7%			-6.2%		
Total delay over all lanes (pcuHr)		24.01			24.08		

Pedestrian stage called every second cycle, extra time given to Brunswick Street

Appendix TA17 - Baseline + Cumulative Development at Upper Brook Street 'With Cumulative Development' Junction Capacity Modelling Results

Kincardine Road / Hanworth Close	AM Peak			PM Peak		
	Flow (PCUs)	RFC	Queue	Flow (PCUs)	RFC	Queue
Hanworth Close (B-AC)	28	0.06	0.1	29	0.07	0.1
Kincardine Road (S) (C-AB)	89	0.07	0.1	116	0.11	0.1

Kincardine Road / Whitekirk Close / Car Park Access	AM Peak			PM Peak		
	Flow (PCUs)	RFC	Queue	Flow (PCUs)	RFC	Queue
Whitekirk Close (B-ACD)	14	0.03	0.0	15	0.03	0.0
Kincardine Road (N) (A-BCD)	0	0.00	0.0	0	0.00	0.0
Car Park Access (D-ABC)	0	0.00	0.0	0	0.00	0.0
Kincardine Road (S) (C-ABD)	101	0.04	0.0	111	0.03	0.0

Key

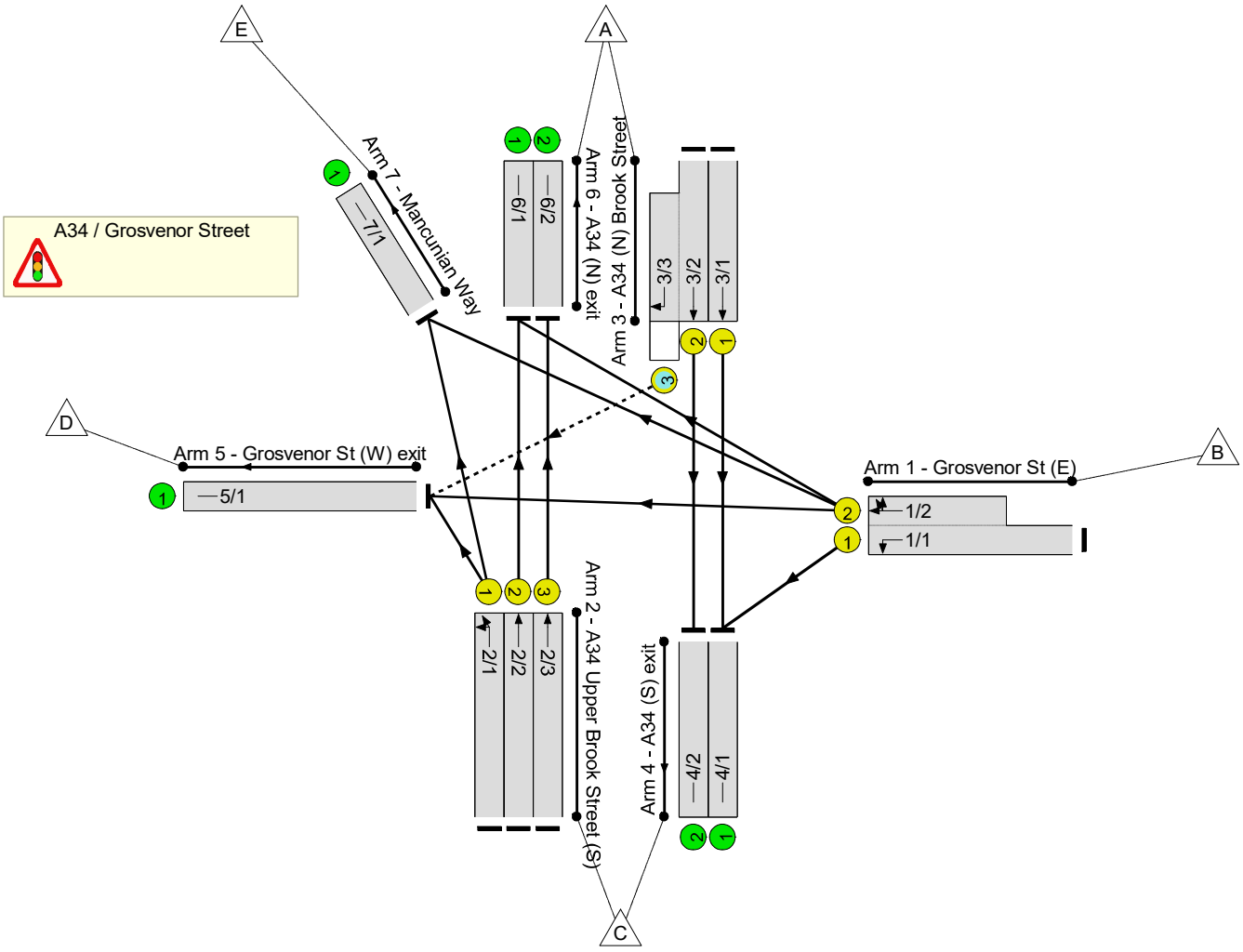
0-0.85 RFC (within capacity conditions)
0.86-0.99 RFC (variable operating conditions)
1.0+ RFC (over capacity conditions)

Full Input Data And Results

User and Project Details

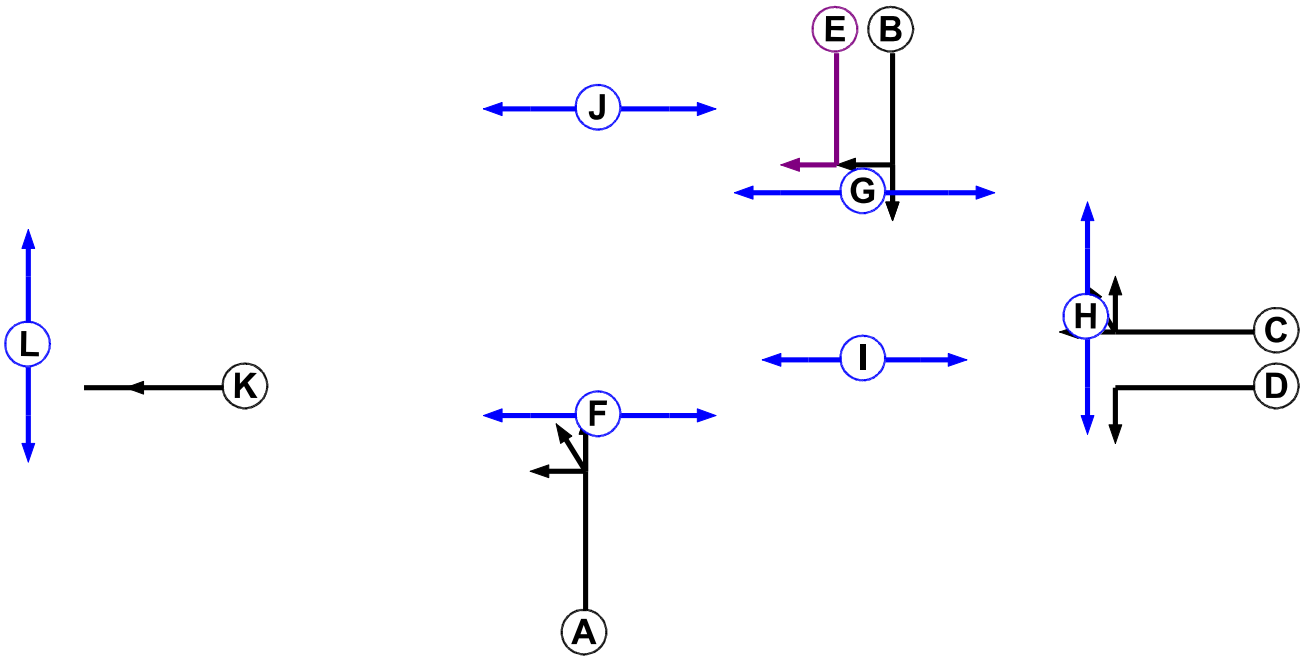
Project:	**Upper Brook Street**
Title:	**Grosvenor Road Junction**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	ManchWayA34_Grosvenor Street.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Ind. Arrow	B	-9999	3
F	Pedestrian		-9999	7
G	Pedestrian		-9999	6
H	Pedestrian		-9999	5
I	Pedestrian		-9999	5
J	Pedestrian		-9999	6
K	Traffic		-9999	7
L	Pedestrian		-9999	5

Full Input Data And Results

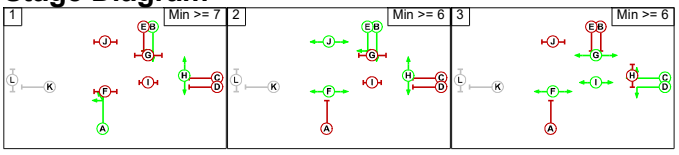
Phase Intergreens Matrix

		Starting Phase											
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K	L
	A		-	5	-	5	5	-	-	-	8	-	-
	B	-		5	6	-	-	5	-	7	-	-	-
	C	5	5		-	5	-	-	5	-	10	-	-
	D	-	4	-		-	-	-	5	-	-	-	-
	E	6	-	5	-		-	5	-	7	-	-	-
	F	10	-	-	-	-		-	-	-	-	-	-
	G	-	9	-	-	9	-		-	-	-	-	-
	H	-	-	5	5	-	-	-		-	-	-	-
	I	-	6	-	-	6	-	-	-		-	-	-
	J	9	-	9	-	-	-	-	-	-		-	-
	K	-	-	-	-	-	-	-	-	-	-		5
	L	-	-	-	-	-	-	-	-	-	-	6	

Phases in Stage

Stage No.	Phases in Stage
1	A B H
2	B E F H J
3	C D F G I

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
2	3	B	Losing	2	2
2	3	H	Losing	3	3
3	1	C	Losing	5	5
3	1	D	Losing	5	5
3	1	G	Losing	1	1
3	1	I	Losing	4	4

Full Input Data And Results

Prohibited Stage Change

	To Stage			
From Stage		1	2	3
	1		8	7
	2	10		9
	3	10	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Grosvenor Street											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
3/3 (A34 (N) Brook Street)	5/1 (Right)	1439	0	2/1	1.09	All	2.00	-	0.50	2	2.00
				2/2	1.09	All					
				2/3	1.09	All					

Full Input Data And Results

Lane Input Data

Full Input Data And Results

Junction: A34 / Grosvenor Street												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Grosvenor St (E))	U	D	2	3	60.0	Geom	-	4.17	0.00	Y	Arm 4 Left	10.00
1/2 (Grosvenor St (E))	U	C	2	3	7.1	Geom	-	4.49	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	10.00
											Arm 7 Right	10.00
2/1 (A34 Upper Brook Street (S))	U	A	2	3	33.0	Geom	-	3.40	0.00	Y	Arm 5 Left	10.00
											Arm 7 Ahead	Inf
2/2 (A34 Upper Brook Street (S))	U	A	2	3	33.0	Geom	-	3.32	0.00	N	Arm 6 Ahead	Inf
2/3 (A34 Upper Brook Street (S))	U	A	2	3	33.7	Geom	-	3.45	0.00	N	Arm 6 Ahead	Inf
3/1 (A34 (N) Brook Street)	U	B	2	3	21.7	Geom	-	3.46	0.00	Y	Arm 4 Ahead	Inf
3/2 (A34 (N) Brook Street)	U	B	2	3	21.7	Geom	-	3.46	0.00	N	Arm 4 Ahead	Inf
3/3 (A34 (N) Brook Street)	O	B E	2	3	15.8	Geom	-	3.19	0.00	N	Arm 5 Right	10.00
4/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
4/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

5/1 (Grosvenor St (W) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Mancunian Way)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Baseline AM Peak'	08:15	09:15	01:00	

Scenario 5: 'Cumulative Scheme' (FG5: 'Sensitivity Test (Cumulative) AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
Origin		A	B	C	D	E	Tot.
	A	0	0	658	37	0	695
	B	94	0	259	74	80	507
	C	467	0	0	67	404	938
	D	0	0	0	0	0	0
	E	0	0	0	0	0	0
	Tot.	561	0	917	178	484	2140

Traffic Lane Flows

Lane	Scenario 5: Cumulative Scheme
Junction: A34 / Grosvenor Street	
1/1 (with short)	507(In) 259(Out)
1/2 (short)	248
2/1	471
2/2	232
2/3	235
3/1	302
3/2 (with short)	393(In) 356(Out)
3/3 (short)	37
4/1	561
4/2	356
5/1	178
6/1	326
6/2	235
7/1	484

Full Input Data And Results

Lane Saturation Flows

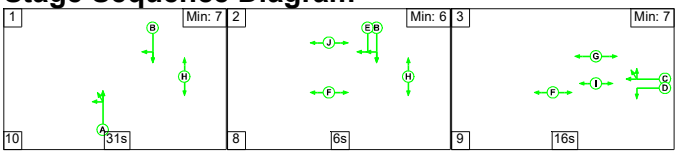
Full Input Data And Results

Junction: A34 / Grosvenor Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Grosvenor St (E))	4.17	0.00	Y	Arm 4 Left	10.00	100.0 %	1767	1767
1/2 (Grosvenor St (E))	4.49	0.00	Y	Arm 5 Ahead	Inf	29.8 %	1868	1868
				Arm 6 Right	10.00	37.9 %		
				Arm 7 Right	10.00	32.3 %		
2/1 (A34 Upper Brook Street (S))	3.40	0.00	Y	Arm 5 Left	10.00	14.2 %	1914	1914
				Arm 7 Ahead	Inf	85.8 %		
2/2 (A34 Upper Brook Street (S))	3.32	0.00	N	Arm 6 Ahead	Inf	100.0 %	2087	2087
2/3 (A34 Upper Brook Street (S))	3.45	0.00	N	Arm 6 Ahead	Inf	100.0 %	2100	2100
3/1 (A34 (N) Brook Street)	3.46	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1961	1961
3/2 (A34 (N) Brook Street)	3.46	0.00	N	Arm 4 Ahead	Inf	100.0 %	2101	2101
3/3 (A34 (N) Brook Street)	3.19	0.00	N	Arm 5 Right	10.00	100.0 %	1804	1804
4/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (Grosvenor St (W) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Mancunian Way Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 5: 'Cumulative Scheme' (FG5: 'Sensitivity Test (Cumulative) AM Peak', Plan 1: 'Network Control Plan 1')

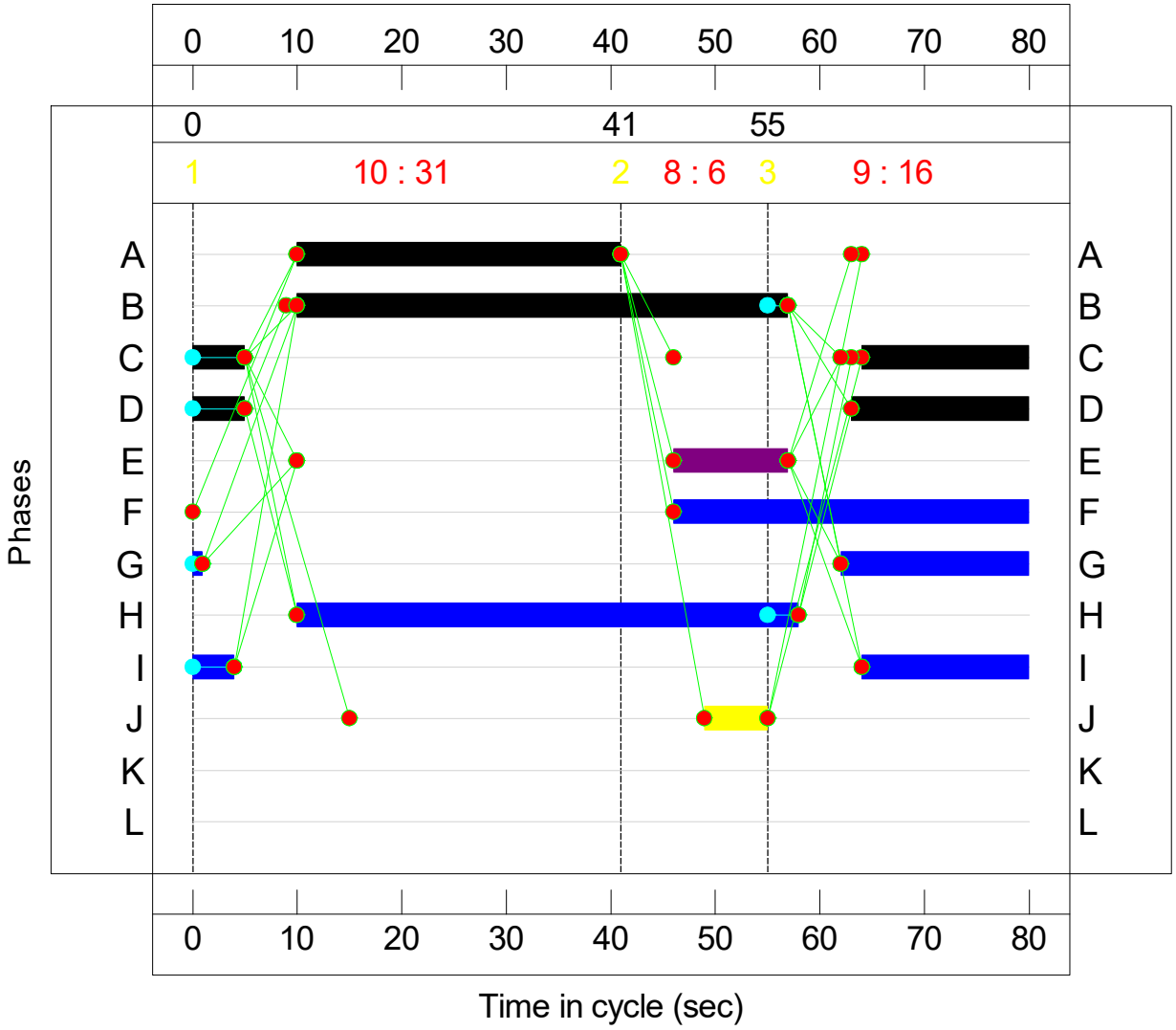
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	31	6	16
Change Point	0	41	55

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Grosvenor Road Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**61.5%**
A34 / Grosvenor Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**61.5%**
1/1+1/2	Grosvenor St (E) Left Ahead Right Right2	U	N/A	N/A	D C		1	22:21	-	507	1767:1868	423+405	61.2 : 61.2%
2/1	A34 Upper Brook Street (S) Left Ahead	U	N/A	N/A	A		1	31	-	471	1914	766	61.5%
2/2	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	31	-	232	2087	835	27.8%
2/3	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	31	-	235	2100	840	28.0%
3/1	A34 (N) Brook Street Ahead	U	N/A	N/A	B		1	47	-	302	1961	1177	25.7%
3/2+3/3	A34 (N) Brook Street Ahead Right	U+O	N/A	N/A	B	E	1	47	11	393	2101:1804	1208+126	29.5 : 29.5%
4/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	561	Inf	Inf	0.0%
4/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	356	Inf	Inf	0.0%
5/1	Grosvenor St (W) exit	U	N/A	N/A	-		-	-	-	178	Inf	Inf	0.0%
6/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	326	Inf	Inf	0.0%
6/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	235	Inf	Inf	0.0%
7/1	Mancunian Way	U	N/A	N/A	-		-	-	-	484	Inf	Inf	0.0%

Full Input Data And Results

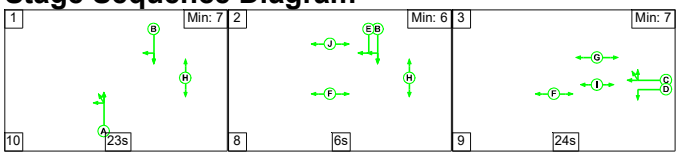
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Grosvenor Road Junction	**-**	**-**	**30**	**6**	**1**	**9.5**	**2.3**	**0.1**	**11.9**	**-**	**-**	**-**	**-**
A34 / Grosvenor Street	**-**	**-**	**30**	**6**	**1**	**9.5**	**2.3**	**0.1**	**11.9**	**-**	**-**	**-**	**-**
1/1+1/2	507	507	-	-	-	3.4	0.8	-	4.2	29.6	4.7	0.8	5.5
2/1	471	471	-	-	-	2.5	0.8	-	3.3	25.2	8.2	0.8	9.0
2/2	232	232	-	-	-	1.0	0.2	-	1.2	19.2	3.5	0.2	3.7
2/3	235	235	-	-	-	1.1	0.2	-	1.3	19.2	3.5	0.2	3.7
3/1	302	302	-	-	-	0.6	0.2	-	0.8	9.6	3.1	0.2	3.3
3/2+3/3	393	393	30	6	1	0.8	0.2	0.1	1.1	10.4	3.8	0.2	4.0
4/1	561	561	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	356	356	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	178	178	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	326	326	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	235	235	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	484	484	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1	PRC for Signalled Lanes (%):	46.3	Total Delay for Signalled Lanes (pcuHr):	11.89	Cycle Time (s):	80
	PRC Over All Lanes (%):	46.3	Total Delay Over All Lanes(pcuHr):	11.89		

Full Input Data And Results

Scenario 6: 'Cumulative Scheme' (FG6: 'Sensitivity Test (Cumulative) PM Peak', Plan 1: 'Network Control Plan 1')

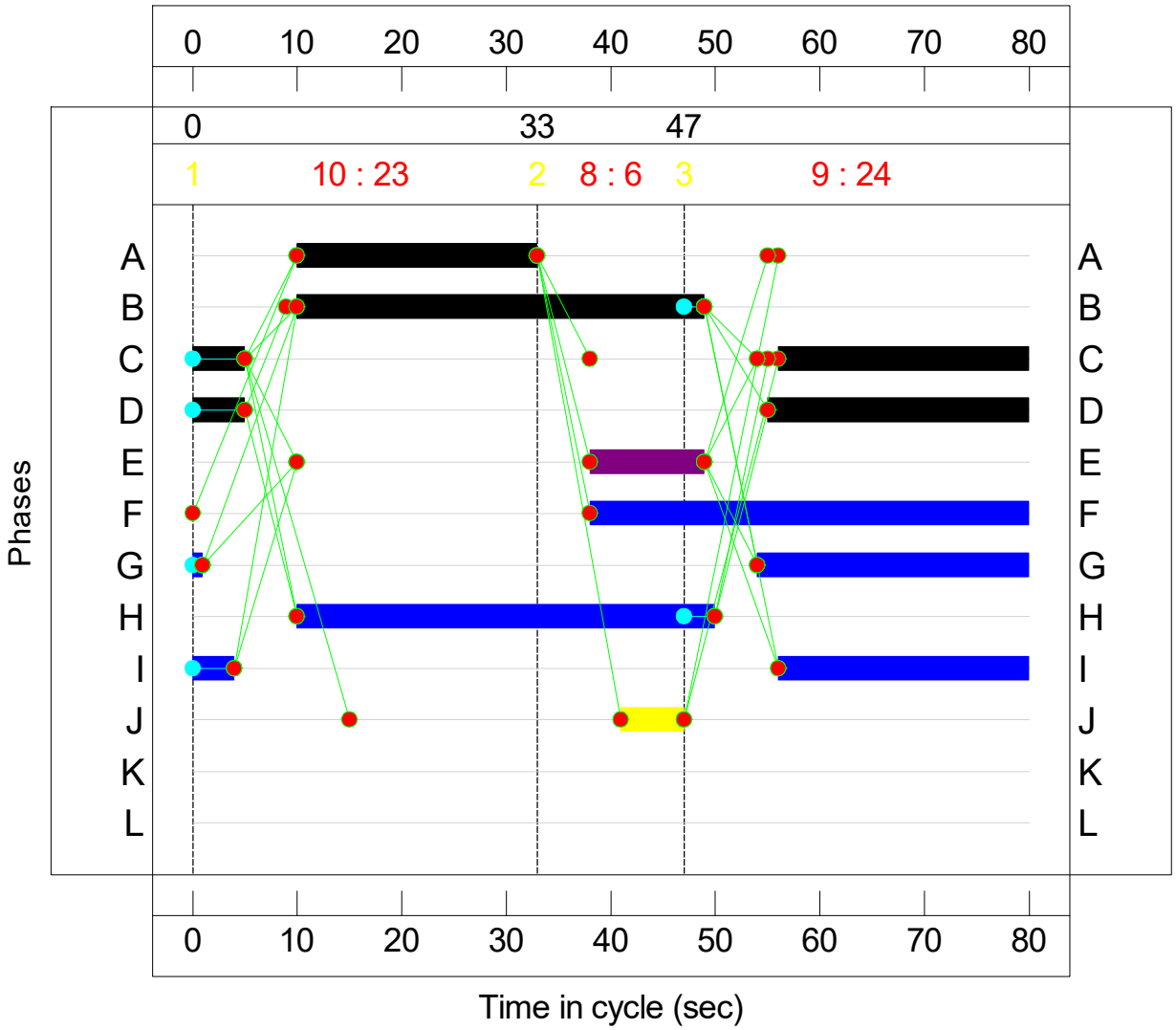
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	23	6	24
Change Point	0	33	47

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Grosvenor Road Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**73.4%**
A34 / Grosvenor Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**73.4%**
1/1+1/2	Grosvenor St (E) Left Ahead Right Right2	U	N/A	N/A	D C		1	30:29	-	674	1767:1851	546+372	73.4 : 73.4%
2/1	A34 Upper Brook Street (S) Left Ahead	U	N/A	N/A	A		1	23	-	408	1911	573	71.2%
2/2	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	23	-	164	2087	626	26.2%
2/3	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	23	-	167	2100	630	26.5%
3/1	A34 (N) Brook Street Ahead	U	N/A	N/A	B		1	39	-	376	1961	980	38.3%
3/2+3/3	A34 (N) Brook Street Ahead Right	U+O	N/A	N/A	B	E	1	39	11	459	2101:1804	1031+75	41.5 : 41.5%
4/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	777	Inf	Inf	0.0%
4/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	428	Inf	Inf	0.0%
5/1	Grosvenor St (W) exit	U	N/A	N/A	-		-	-	-	157	Inf	Inf	0.0%
6/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	267	Inf	Inf	0.0%
6/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	167	Inf	Inf	0.0%
7/1	Mancunian Way	U	N/A	N/A	-		-	-	-	452	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Grosvenor Road Junction	**-**	**-**	**25**	**5**	**1**	**11.2**	**3.6**	**0.1**	**14.9**	**-**	**-**	**-**	**-**
A34 / Grosvenor Street	**-**	**-**	**25**	**5**	**1**	**11.2**	**3.6**	**0.1**	**14.9**	**-**	**-**	**-**	**-**
1/1+1/2	674	674	-	-	-	3.6	1.4	-	4.9	26.3	7.0	1.4	8.4
2/1	408	408	-	-	-	2.8	1.2	-	4.0	35.7	8.0	1.2	9.3
2/2	164	164	-	-	-	1.0	0.2	-	1.1	25.2	2.7	0.2	2.9
2/3	167	167	-	-	-	1.0	0.2	-	1.2	25.2	2.8	0.2	3.0
3/1	376	376	-	-	-	1.3	0.3	-	1.6	15.4	5.1	0.3	5.4
3/2+3/3	459	459	25	5	1	1.6	0.4	0.1	2.0	15.9	5.9	0.4	6.3
4/1	777	777	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	428	428	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	157	157	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	267	267	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	167	167	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	452	452	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 22.6
PRC Over All Lanes (%): 22.6

Total Delay for Signalled Lanes (pcuHr): 14.90
Total Delay Over All Lanes(pcuHr): 14.90

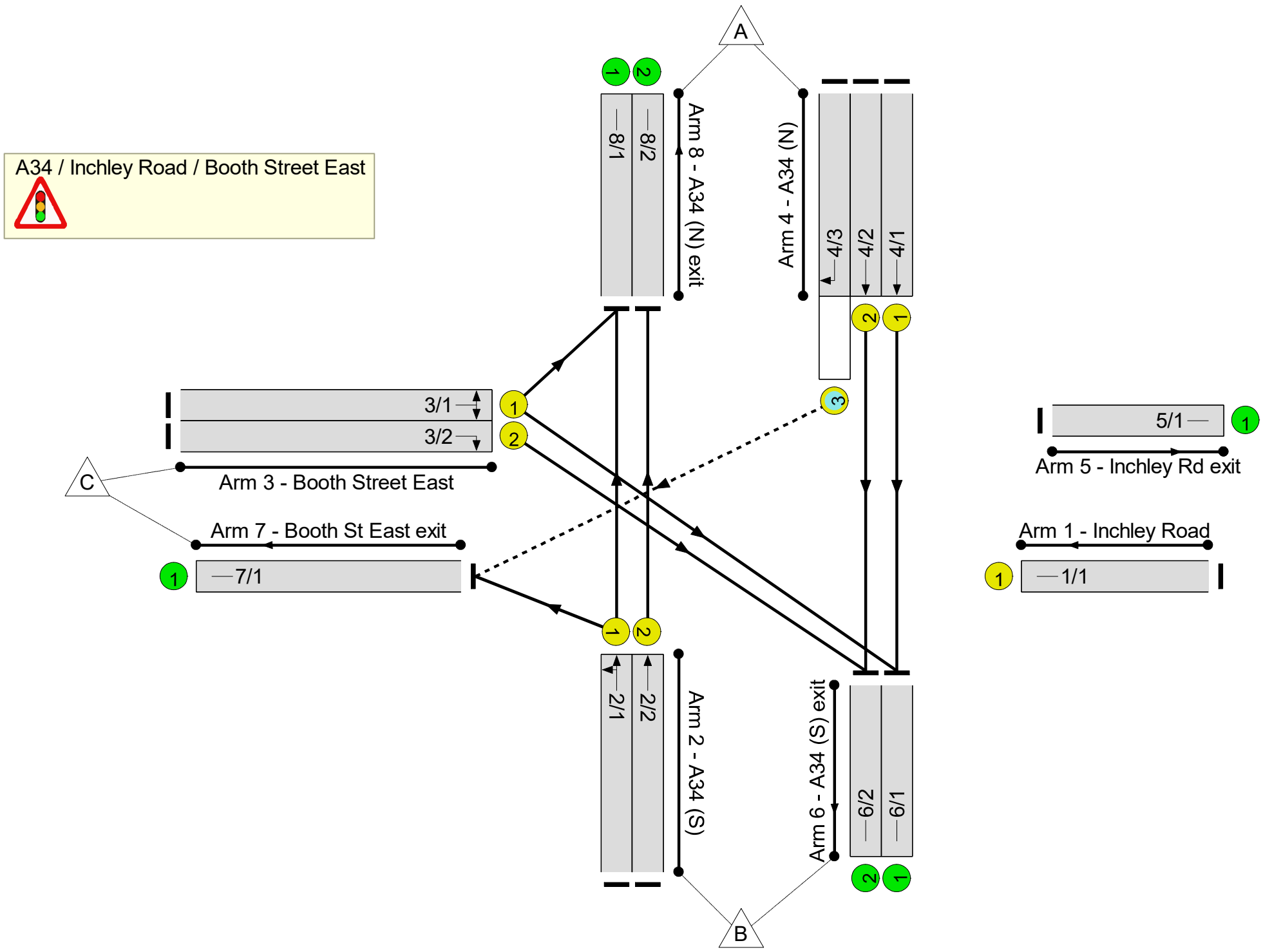
Cycle Time (s): 80

Full Input Data And Results

User and Project Details

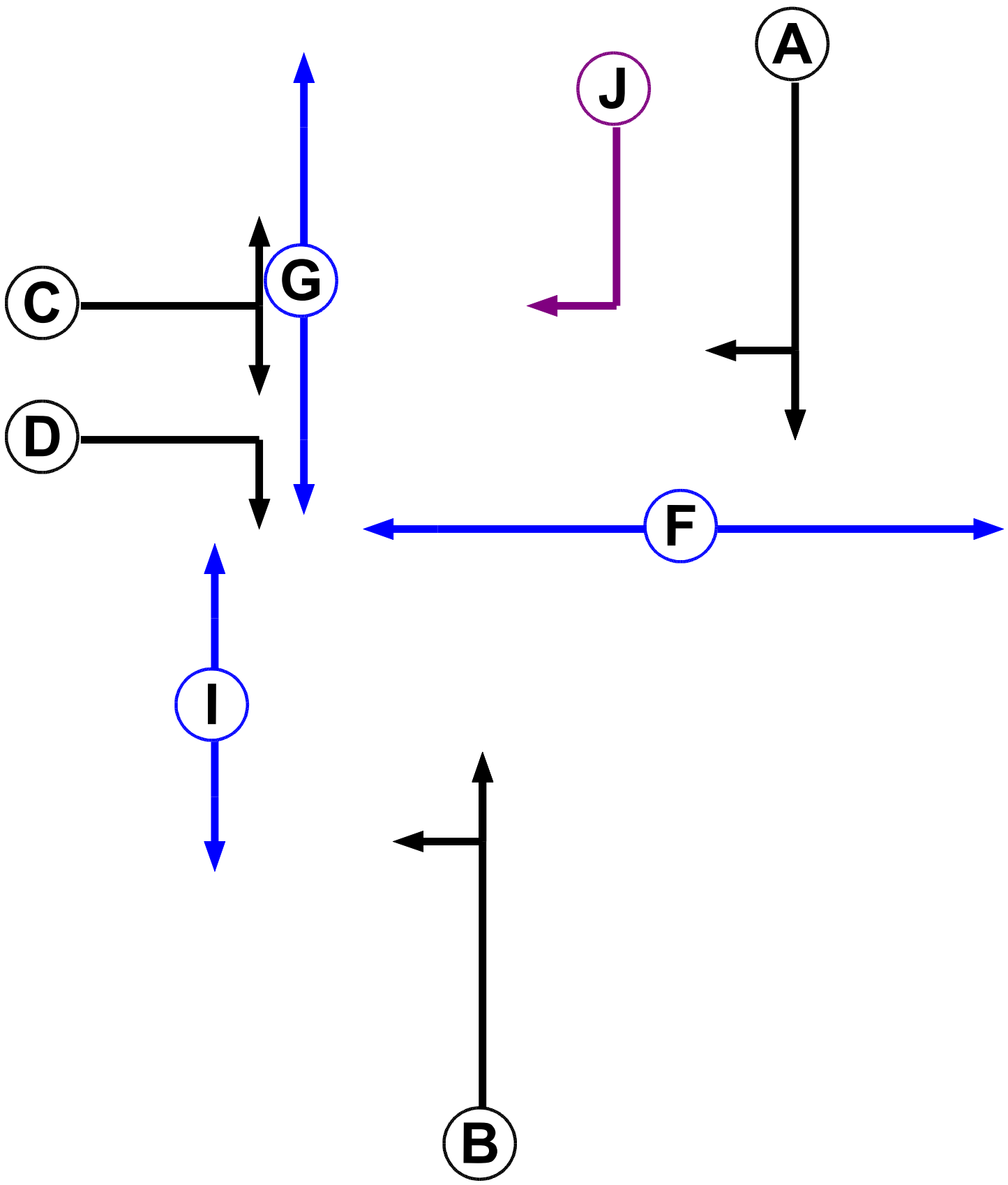
Project:	
Title:	**A34_ Booth Street East**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	Proposed A34_Booth St East.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Traffic		-9999	7
F	Pedestrian		-9999	12
G	Pedestrian		-9999	6
H	Pedestrian		-9999	5
I	Pedestrian		-9999	5
J	Ind. Arrow	A	-9999	4

Full Input Data And Results

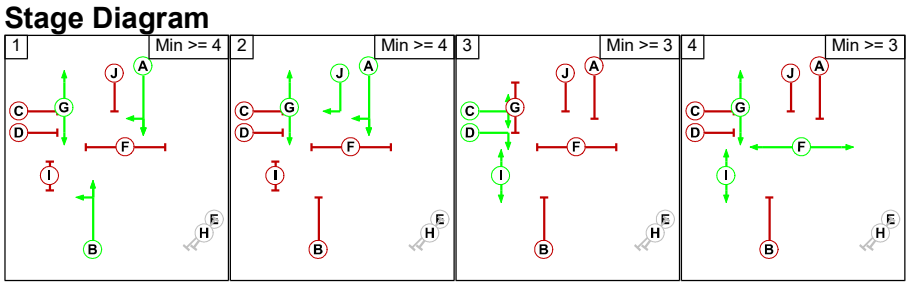
Phase Intergreens Matrix

	Starting Phase										
Terminating Phase		A	B	C	D	E	F	G	H	I	J
	A		-	5	5	-	-	-	-	-	-
	B	-		-	-	-	-	-	-	7	5
	C	-	-		-	-	7	5	-	-	-
	D	-	-	-		-	7	5	-	-	-
	E	-	-	-	-		-	-	-	-	-
	F	9	9	-	-	-		-	-	-	-
	G	-	-	-	-	-	-		-	-	-
	H	-	-	-	-	-	-	-		-	-
	I	-	-	-	-	-	-	-	-		-
	J	-	-	5	5	-	-	-	-	9	

Phases in Stage

Stage No.	Phases in Stage
1	A B G
2	A G J
3	C D I
4	F G I

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

	To Stage				
From Stage		1	2	3	4
	1		5	7	7
	2	2		9	9
	3	5	X		7
	4	9	X	2	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Inchley Road / Booth Street East											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
4/3 (A34 (N))	7/1 (Right)	1439	0	2/1	1.09	All	4.00	-	0.50	4	4.00
				2/2	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: A34 / Inchley Road / Booth Street East												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Inchley Road)	U	E	2	3	60.0	Geom	-	4.34	0.00	Y		
2/1 (A34 (S))	U	B	2	3	49.7	Geom	-	3.65	0.00	Y	Arm 7 Left	15.00
											Arm 8 Ahead	Inf
2/2 (A34 (S))	U	B	2	3	49.7	Geom	-	3.65	0.00	N	Arm 8 Ahead	Inf
3/1 (Booth Street East)	U	C	2	3	8.3	Geom	-	3.25	0.00	Y	Arm 6 Right	20.00
											Arm 8 Left	10.00
3/2 (Booth Street East)	U	D	2	3	8.3	Geom	-	3.25	0.00	N	Arm 6 Right	18.00
4/1 (A34 (N))	U	A	2	3	33.4	Geom	-	3.20	0.00	Y	Arm 6 Ahead	Inf
4/2 (A34 (N))	U	A	2	3	33.9	Geom	-	3.00	0.00	N	Arm 6 Ahead	Inf
4/3 (A34 (N))	O	A J	2	3	8.7	Geom	-	3.00	0.00	N	Arm 7 Right	15.00
5/1 (Inchley Rd exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Booth St East exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/2 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Application Scheme AM Peak'	08:15	09:15	01:00	

Scenario 3: 'Proposed Layout' (FG3: 'Cumulative Scheme AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	700	240	940
	B	856	0	544	1400
	C	78	341	0	419
	Tot.	934	1041	784	2759

Traffic Lane Flows

Lane	Scenario 3: Proposed Layout
Junction: A34 / Inchley Road / Booth Street East	
1/1	0
2/1	645
2/2	755
3/1	199
3/2	220
4/1	332
4/2	368
4/3	240
5/1	0
6/1	453
6/2	588
7/1	784
8/1	179
8/2	755

Lane Saturation Flows

Junction: A34 / Inchley Road / Booth Street East

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Inchley Road)	4.34	0.00	Y				2049	2049
2/1 (A34 (S))	3.65	0.00	Y	Arm 7 Left	15.00	84.3 %	1826	1826
				Arm 8 Ahead	Inf	15.7 %		
2/2 (A34 (S))	3.65	0.00	N	Arm 8 Ahead	Inf	100.0 %	2120	2120
3/1 (Booth Street East)	3.25	0.00	Y	Arm 6 Right	20.00	60.8 %	1757	1757
				Arm 8 Left	10.00	39.2 %		
3/2 (Booth Street East)	3.25	0.00	N	Arm 6 Right	18.00	100.0 %	1920	1920
4/1 (A34 (N))	3.20	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1935	1935
4/2 (A34 (N))	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
4/3 (A34 (N))	3.00	0.00	N	Arm 7 Right	15.00	100.0 %	1868	1868
5/1 (Inchley Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Booth St East exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'Proposed Layout' (FG4: 'Cumulative Scheme PM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	969	229	1198
	B	630	0	409	1039
	C	109	546	0	655
	Tot.	739	1515	638	2892

Traffic Lane Flows

Lane	Scenario 4: Proposed Layout
Junction: A34 / Inchley Road / Booth Street East	
1/1	0
2/1	478
2/2	561
3/1	311
3/2	344
4/1	464
4/2	505
4/3	229
5/1	0
6/1	666
6/2	849
7/1	638
8/1	178
8/2	561

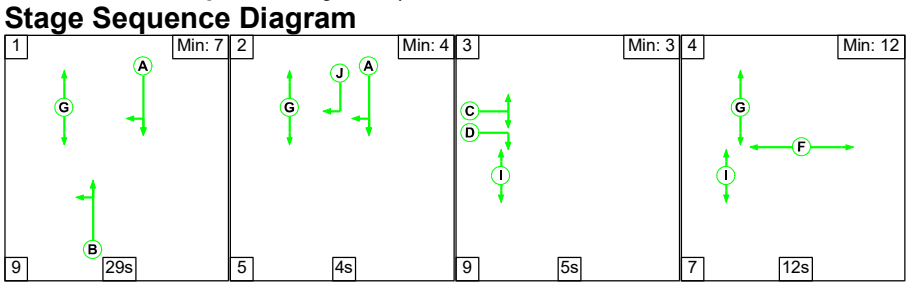
Lane Saturation Flows

Junction: A34 / Inchley Road / Booth Street East

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Inchley Road)	4.34	0.00	Y				2049	2049
2/1 (A34 (S))	3.65	0.00	Y	Arm 7 Left	15.00	85.6 %	1824	1824
				Arm 8 Ahead	Inf	14.4 %		
2/2 (A34 (S))	3.65	0.00	N	Arm 8 Ahead	Inf	100.0 %	2120	2120
3/1 (Booth Street East)	3.25	0.00	Y	Arm 6 Right	20.00	65.0 %	1762	1762
				Arm 8 Left	10.00	35.0 %		
3/2 (Booth Street East)	3.25	0.00	N	Arm 6 Right	18.00	100.0 %	1920	1920
4/1 (A34 (N))	3.20	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1935	1935
4/2 (A34 (N))	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
4/3 (A34 (N))	3.00	0.00	N	Arm 7 Right	15.00	100.0 %	1868	1868
5/1 (Inchley Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Booth St East exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 3: 'Proposed Layout' (FG3: 'Cumulative Scheme AM Peak', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

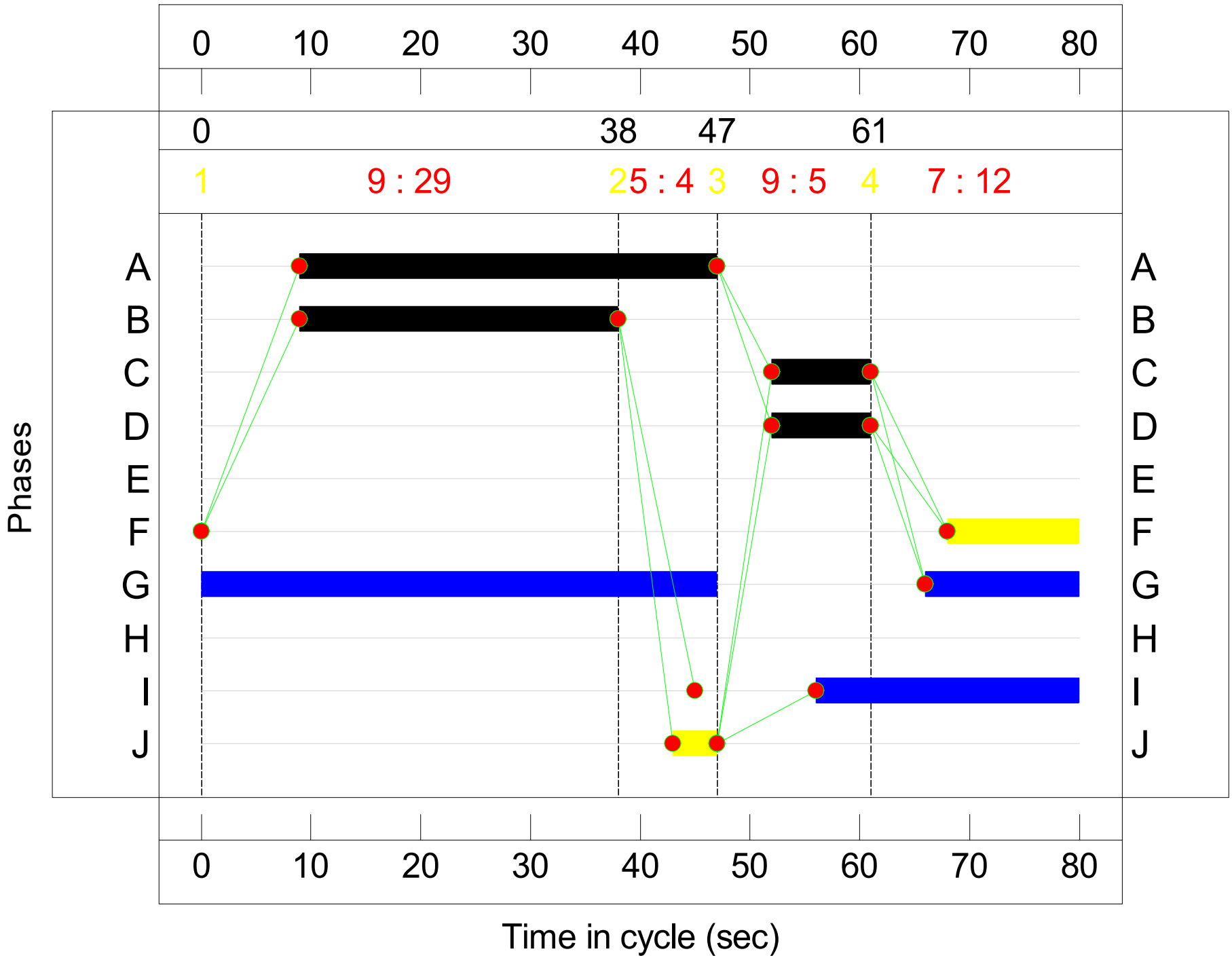


Full Input Data And Results

Stage Timings

Stage	1	2	3	4
Duration	29	4	5	12
Change Point	0	38	47	61

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A34_ Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**96.0%**
A34 / Inchley Road / Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**96.0%**
1/1	Inchley Road	U	N/A	N/A	E		0	0	-	0	2049	0	0.0%
2/1	A34 (S) Left Ahead	U	N/A	N/A	B		1	29	-	645	1826	685	94.2%
2/2	A34 (S) Ahead	U	N/A	N/A	B		1	29	-	755	2120	795	95.0%
3/1	Booth Street East Right Left	U	N/A	N/A	C		1	9	-	199	1757	220	90.6%
3/2	Booth Street East Right	U	N/A	N/A	D		1	9	-	220	1920	240	91.7%
4/1	A34 (N) Ahead	U	N/A	N/A	A		1	38	-	332	1935	943	35.2%
4/2	A34 (N) Ahead	U	N/A	N/A	A		1	38	-	368	2055	1002	36.7%
4/3	A34 (N) Right	O	N/A	N/A	A	J	1	38	4	240	1868	250	96.0%
5/1	Inchley Rd exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
6/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	453	Inf	Inf	0.0%
6/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	588	Inf	Inf	0.0%
7/1	Booth St East exit	U	N/A	N/A	-		-	-	-	784	Inf	Inf	0.0%
8/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	179	Inf	Inf	0.0%
8/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	755	Inf	Inf	0.0%

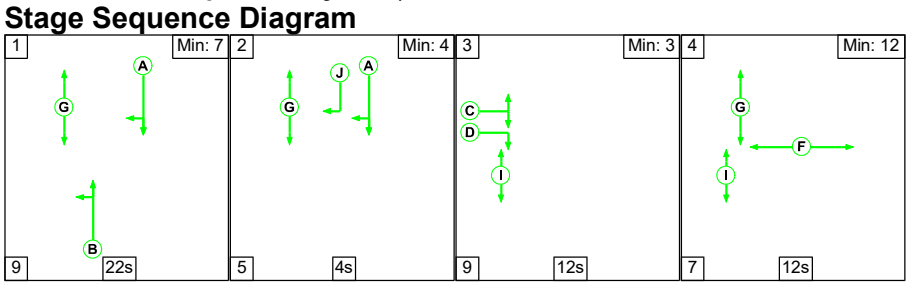
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A34_ Booth Street East	-	-	**0**	**163**	**77**	**16.9**	**26.9**	**1.3**	**45.1**	-	-	-	-
A34 / Inchley Road / Booth Street East	-	-	**0**	**163**	**77**	**16.9**	**26.9**	**1.3**	**45.1**	-	-	-	-
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/1	645	645	-	-	-	4.3	6.2	-	10.5	58.7	13.8	6.2	20.0
2/2	755	755	-	-	-	5.1	7.0	-	12.1	57.6	16.1	7.0	23.1
3/1	199	199	-	-	-	1.9	3.6	-	5.5	99.3	4.3	3.6	7.9
3/2	220	220	-	-	-	2.1	3.9	-	6.1	99.1	4.8	3.9	8.8
4/1	332	332	-	-	-	1.2	0.3	-	1.4	15.6	4.5	0.3	4.8
4/2	368	368	-	-	-	1.3	0.3	-	1.6	15.6	5.0	0.3	5.3
4/3	240	240	0	163	77	0.9	5.6	1.3	7.9	118.7	3.1	5.6	8.8
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	453	453	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	588	588	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	784	784	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	179	179	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	755	755	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -6.6 Total Delay for Signalled Lanes (pcuHr): 45.10 Cycle Time (s): 80
PRC Over All Lanes (%): -6.6 Total Delay Over All Lanes(pcuHr): 45.10

Full Input Data And Results

Scenario 4: 'Proposed Layout' (FG4: 'Cumulative Scheme PM Peak', Plan 1: 'Network Control Plan 1')

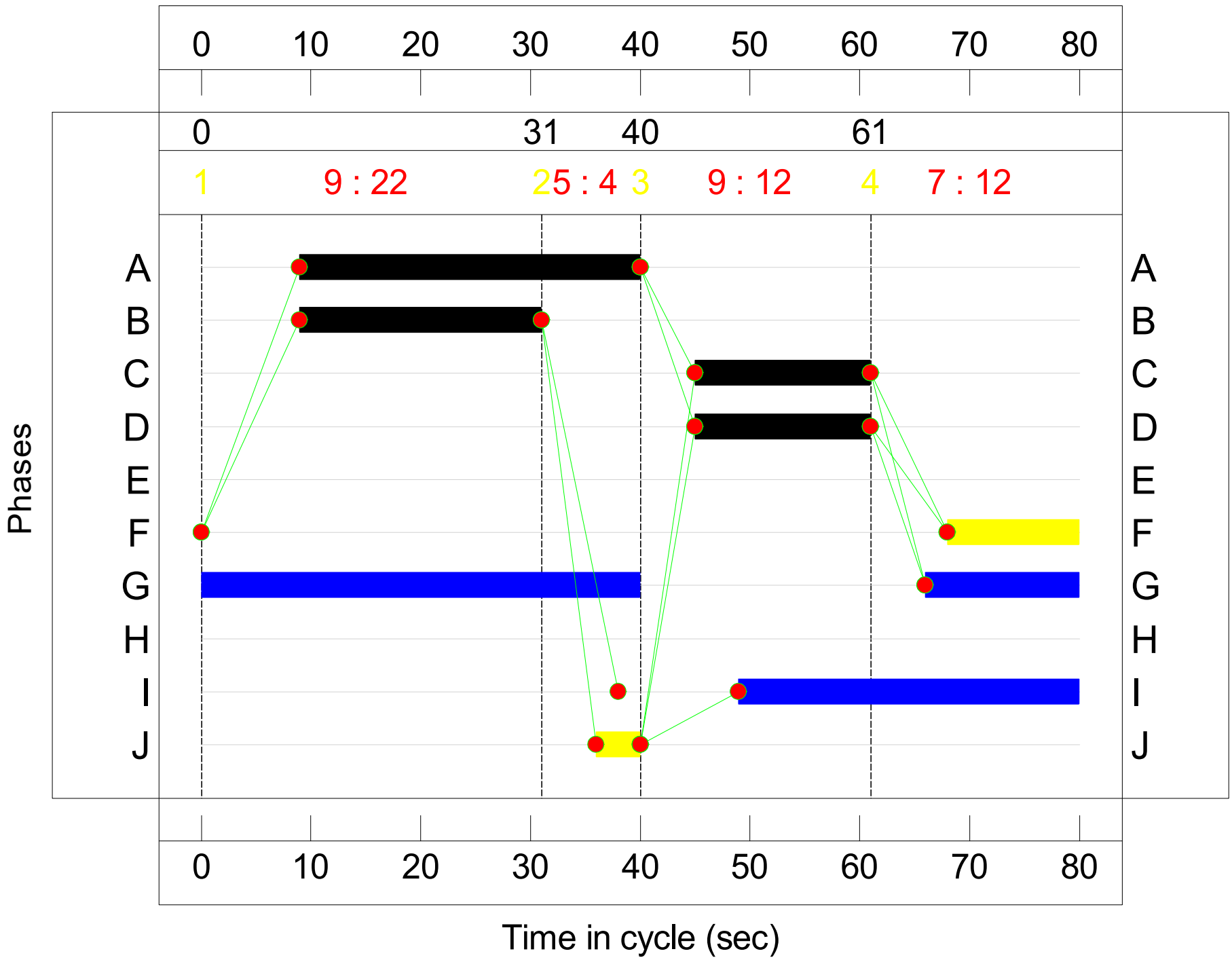
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	22	4	12	12
Change Point	0	31	40	61

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A34_ Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**92.0%**
A34 / Inchley Road / Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**92.0%**
1/1	Inchley Road	U	N/A	N/A	E		0	0	-	0	2049	0	0.0%
2/1	A34 (S) Left Ahead	U	N/A	N/A	B		1	22	-	478	1824	524	91.2%
2/2	A34 (S) Ahead	U	N/A	N/A	B		1	22	-	561	2120	610	92.0%
3/1	Booth Street East Right Left	U	N/A	N/A	C		1	16	-	311	1762	374	83.1%
3/2	Booth Street East Right	U	N/A	N/A	D		1	16	-	344	1920	408	84.3%
4/1	A34 (N) Ahead	U	N/A	N/A	A		1	31	-	464	1935	774	59.9%
4/2	A34 (N) Ahead	U	N/A	N/A	A		1	31	-	505	2055	822	61.4%
4/3	A34 (N) Right	O	N/A	N/A	A	J	1	31	4	229	1868	297	77.2%
5/1	Inchley Rd exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
6/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	666	Inf	Inf	0.0%
6/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	849	Inf	Inf	0.0%
7/1	Booth St East exit	U	N/A	N/A	-		-	-	-	638	Inf	Inf	0.0%
8/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	178	Inf	Inf	0.0%
8/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	561	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A34_ Booth Street East	-	-	**8**	**163**	**58**	**19.7**	**17.1**	**1.0**	**37.8**	-	-	-	-
A34 / Inchley Road / Booth Street East	-	-	**8**	**163**	**58**	**19.7**	**17.1**	**1.0**	**37.8**	-	-	-	-
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/1	478	478	-	-	-	3.7	4.3	-	8.0	60.2	10.2	4.3	14.6
2/2	561	561	-	-	-	4.3	4.8	-	9.1	58.6	12.0	4.8	16.8
3/1	311	311	-	-	-	2.6	2.3	-	4.9	56.6	6.6	2.3	8.9
3/2	344	344	-	-	-	2.9	2.5	-	5.4	56.3	7.3	2.5	9.8
4/1	464	464	-	-	-	2.4	0.7	-	3.2	24.7	8.1	0.7	8.9
4/2	505	505	-	-	-	2.7	0.8	-	3.5	24.7	8.8	0.8	9.6
4/3	229	229	8	163	58	1.1	1.6	1.0	3.7	58.9	3.4	1.6	5.0
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	666	666	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	849	849	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	638	638	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	178	178	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	561	561	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

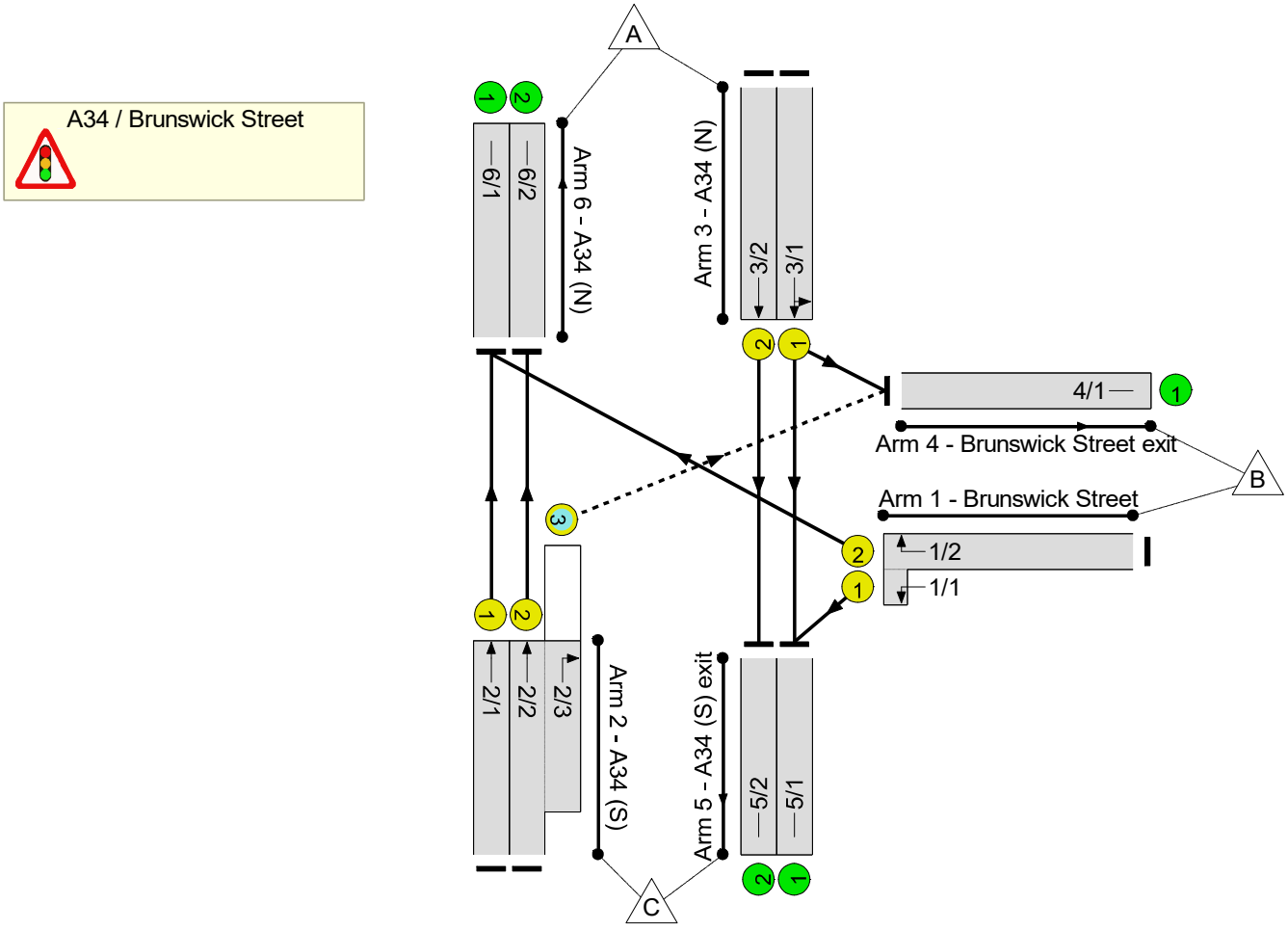
C1 PRC for Signalled Lanes (%): -2.3 Total Delay for Signalled Lanes (pcuHr): 37.80 Cycle Time (s): 80
PRC Over All Lanes (%): -2.3 Total Delay Over All Lanes(pcuHr): 37.80

Full Input Data And Results

User and Project Details

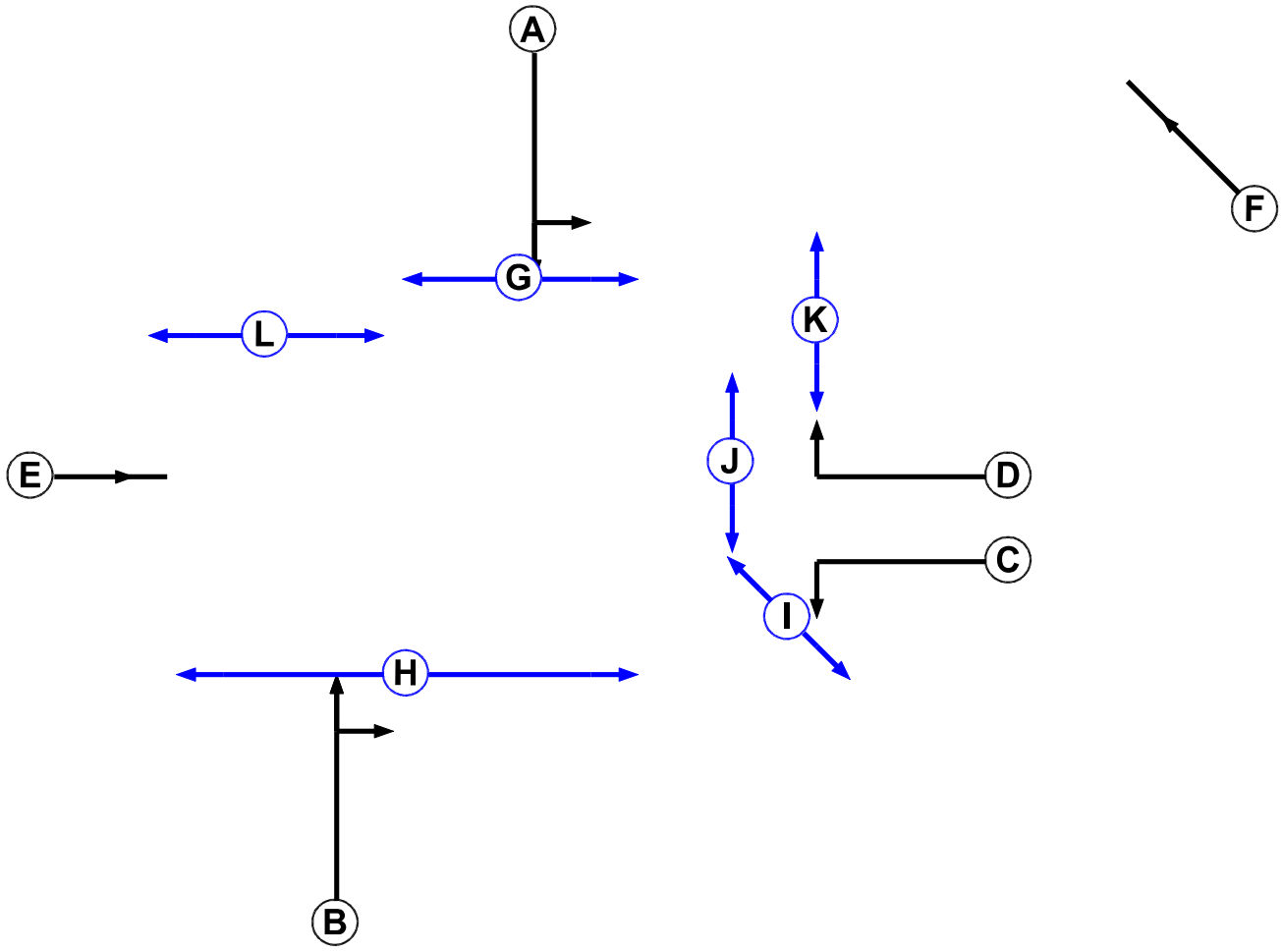
Project:	**Upper Brook Street**
Title:	**Brunswick Street**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	A34_Brunswick Street.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Traffic		-9999	7
F	Traffic		-9999	7
G	Pedestrian		-9999	6
H	Pedestrian		-9999	10
I	Pedestrian		-9999	5
J	Pedestrian		-9999	5
K	Pedestrian		-9999	5
L	Pedestrian		-9999	5

Full Input Data And Results

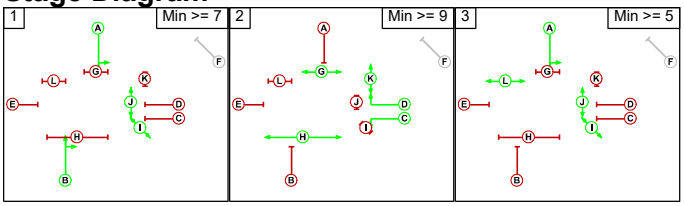
Phase Intergreens Matrix

		Starting Phase											
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K	L
	A		-	10	6	5	-	5	9	-	-	9	-
	B	-		-	6	5	-	-	5	-	-	10	8
	C	3	-		-	4	-	-	-	5	-	-	-
	D	6	6	-		6	-	-	-	-	5	-	10
	E	6	6	9	7		-	-	10	-	-	9	-
	F	-	-	-	-	-		-	-	-	-	-	-
	G	6	-	-	-	-	-		-	-	-	-	-
	H	8	8	-	-	8	-	-		-	-	-	-
	I	-	-	5	-	-	-	-	-		-	-	-
	J	-	-	-	5	-	-	-	-	-		-	-
	K	5	5	-	-	5	-	-	-	-	-		-
	L	-	5	-	5	-	-	-	-	-	-	-	

Phases in Stage

Stage No.	Phases in Stage
1	A B I J
2	C D G H K
3	A I J L

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
1	2	I	Losing	5	5
1	2	J	Losing	1	1
2	1	C	Losing	2	2
2	1	D	Losing	2	2
2	1	G	Losing	2	2
2	1	K	Losing	3	3
2	3	K	Losing	3	3
3	1	L	Losing	1	1
3	2	I	Losing	4	4
3	2	J	Losing	2	2
3	2	L	Losing	2	2

Full Input Data And Results

Prohibited Stage Change

	To Stage			
From Stage		1	2	3
	1		10	8
	2	8		10
	3	6	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Brunswick Street											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
2/3 (A34 (S))	4/1 (Right)	1439	0	3/1	1.09	All	4.00	-	0.50	4	4.00
				3/2	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: A34 / Brunswick Street												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Brunswick Street)	U	C	2	3	1.0	Geom	-	3.00	0.00	Y	Arm 5 Left	20.00
1/2 (Brunswick Street)	U	D	2	3	60.0	Geom	-	3.80	0.00	N	Arm 6 Right	10.00
2/1 (A34 (S))	U	B	2	3	36.2	Geom	-	3.30	0.00	Y	Arm 6 Ahead	Inf
2/2 (A34 (S))	U	B	2	3	36.2	Geom	-	3.03	0.00	N	Arm 6 Ahead	Inf
2/3 (A34 (S))	O	B	2	3	8.7	Geom	-	2.95	0.00	N	Arm 4 Right	10.00
3/1 (A34 (N))	U	A	2	3	49.7	Geom	-	3.49	0.00	Y	Arm 4 Left	10.00
											Arm 5 Ahead	Inf
3/2 (A34 (N))	U	A	2	3	49.7	Geom	-	3.34	0.00	N	Arm 5 Ahead	Inf
4/1 (Brunswick Street exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (N))	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (N))	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
5: 'Sensitivity Test (Cumulative) AM Peak'	08:15	09:15	01:00	

Full Input Data And Results

Scenario 5: 'Existing Layout' (FG5: 'Sensitivity Test (Cumulative) AM Peak', Plan 1: 'Peds every second cycle')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	204	796	1000
	B	283	0	286	569
	C	1135	171	0	1306
	Tot.	1418	375	1082	2875

Traffic Lane Flows

Lane	Scenario 5: Existing Layout
Junction: A34 / Brunswick Street	
1/1 (short)	286
1/2 (with short)	569(In) 283(Out)
2/1	568
2/2 (with short)	738(In) 567(Out)
2/3 (short)	171
3/1	455
3/2	545
4/1	375
5/1	537
5/2	545
6/1	851
6/2	567

Full Input Data And Results

Lane Saturation Flows

Junction: A34 / Brunswick Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Brunswick Street)	3.00	0.00	Y	Arm 5 Left	20.00	100.0 %	1781	1781
1/2 (Brunswick Street)	3.80	0.00	N	Arm 6 Right	10.00	100.0 %	1857	1857
2/1 (A34 (S))	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
2/2 (A34 (S))	3.03	0.00	N	Arm 6 Ahead	Inf	100.0 %	2058	2058
2/3 (A34 (S))	2.95	0.00	N	Arm 4 Right	10.00	100.0 %	1783	1783
3/1 (A34 (N))	3.49	0.00	Y	Arm 4 Left	10.00	44.8 %	1840	1840
				Arm 5 Ahead	Inf	55.2 %		
3/2 (A34 (N))	3.34	0.00	N	Arm 5 Ahead	Inf	100.0 %	2089	2089
4/1 (Brunswick Street exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 6: 'Existing Layout' (FG6: 'Sensitivity Test (Cumulative) PM Peak', Plan 1: 'Peds every second cycle')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	351	1110	1461
	B	227	0	166	393
	C	844	172	0	1016
	Tot.	1071	523	1276	2870

Traffic Lane Flows

Lane	Scenario 6: Existing Layout
Junction: A34 / Brunswick Street	
1/1 (short)	166
1/2 (with short)	393(In) 227(Out)
2/1	670
2/2 (with short)	346(In) 174(Out)
2/3 (short)	172
3/1	666
3/2	795
4/1	523
5/1	481
5/2	795
6/1	897
6/2	174

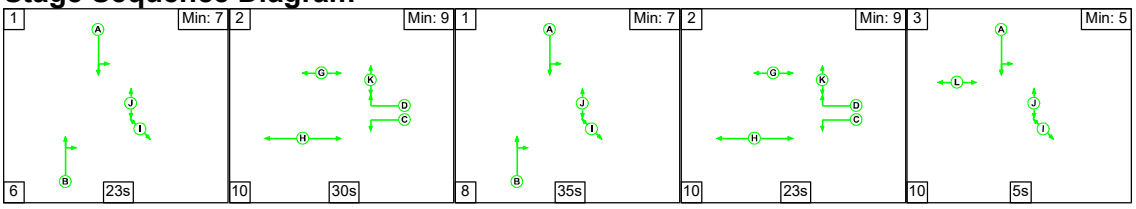
Full Input Data And Results

Lane Saturation Flows

Junction: A34 / Brunswick Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Brunswick Street)	3.00	0.00	Y	Arm 5 Left	20.00	100.0 %	1781	1781
1/2 (Brunswick Street)	3.80	0.00	N	Arm 6 Right	10.00	100.0 %	1857	1857
2/1 (A34 (S))	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
2/2 (A34 (S))	3.03	0.00	N	Arm 6 Ahead	Inf	100.0 %	2058	2058
2/3 (A34 (S))	2.95	0.00	N	Arm 4 Right	10.00	100.0 %	1783	1783
3/1 (A34 (N))	3.49	0.00	Y	Arm 4 Left	10.00	52.7 %	1820	1820
				Arm 5 Ahead	Inf	47.3 %		
3/2 (A34 (N))	3.34	0.00	N	Arm 5 Ahead	Inf	100.0 %	2089	2089
4/1 (Brunswick Street exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 5: 'Existing Layout' (FG5: 'Sensitivity Test (Cumulative) AM Peak', Plan 1: 'Peds every second cycle')

Stage Sequence Diagram

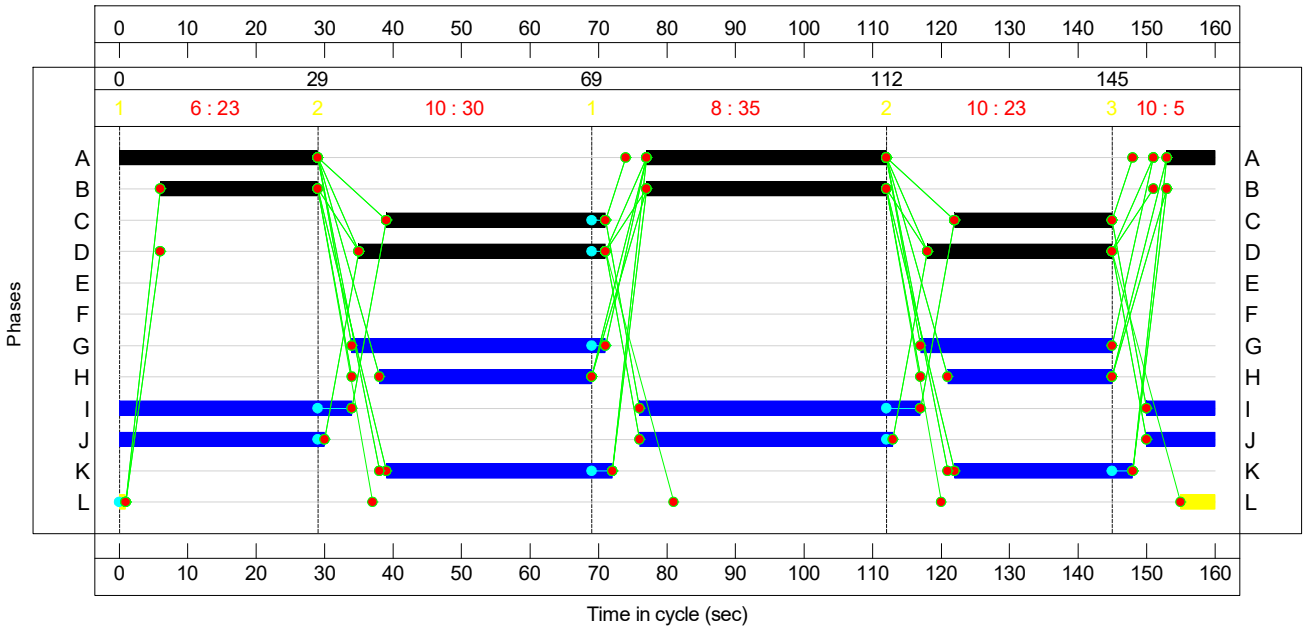


Stage Timings

Stage	1	2	1	2	3
Duration	23	30	35	23	5
Change Point	0	29	69	112	145

Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**82.8%**
A34 / Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**82.8%**
1/2+1/1	Brunswick Street Left Right	U	N/A	N/A	D C		2	63:55	-	569	1857:1781	344+348	82.3 : 82.3%
2/1	A34 (S) Ahead	U	N/A	N/A	B		2	58	-	568	1945	729	77.9%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B		2	58	-	738	2058:1783	685+207	82.8 : 82.8%
3/1	A34 (N) Left Ahead	U	N/A	N/A	A		2	71	-	455	1840	839	54.2%
3/2	A34 (N) Ahead	U	N/A	N/A	A		2	71	-	545	2089	953	57.2%
4/1	Brunswick Street exit	U	N/A	N/A	-		-	-	-	375	Inf	Inf	0.0%
5/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	537	Inf	Inf	0.0%
5/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	545	Inf	Inf	0.0%
6/1	A34 (N)	U	N/A	N/A	-		-	-	-	851	Inf	Inf	0.0%
6/2	A34 (N)	U	N/A	N/A	-		-	-	-	567	Inf	Inf	0.0%

Full Input Data And Results

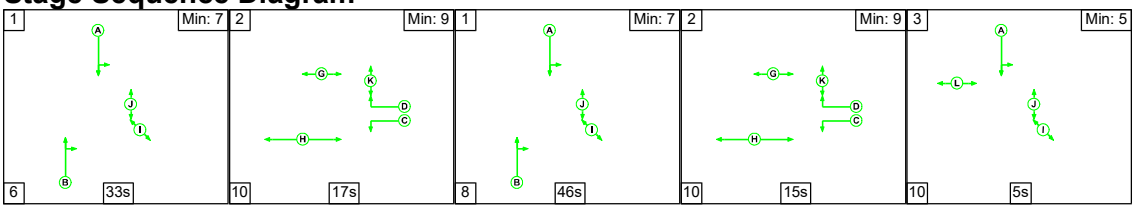
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Brunswick Street	**-**	**-**	**89**	**0**	**82**	**15.7**	**7.6**	**0.7**	**24.0**	**-**	**-**	**-**	**-**
A34 / Brunswick Street	**-**	**-**	**89**	**0**	**82**	**15.7**	**7.6**	**0.7**	**24.0**	**-**	**-**	**-**	**-**
1/2+1/1	569	569	-	-	-	3.5	2.2	-	5.7	36.4	10.7	2.2	12.9
2/1	568	568	-	-	-	3.5	1.7	-	5.2	33.1	11.7	1.7	13.4
2/2+2/3	738	738	89	0	82	4.3	2.3	0.7	7.3	35.8	12.5	2.3	14.9
3/1	455	455	-	-	-	2.0	0.6	-	2.6	20.5	7.8	0.6	8.4
3/2	545	545	-	-	-	2.4	0.7	-	3.1	20.5	9.5	0.7	10.2
4/1	375	375	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	537	537	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2	545	545	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	851	851	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	567	567	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 8.7 Total Delay for Signalled Lanes (pcuHr): 24.01 Cycle Time (s): 160
PRC Over All Lanes (%): 8.7 Total Delay Over All Lanes(pcuHr): 24.01

Full Input Data And Results

Scenario 6: 'Existing Layout' (FG6: 'Sensitivity Test (Cumulative) PM Peak', Plan 1: 'Peds every second cycle')

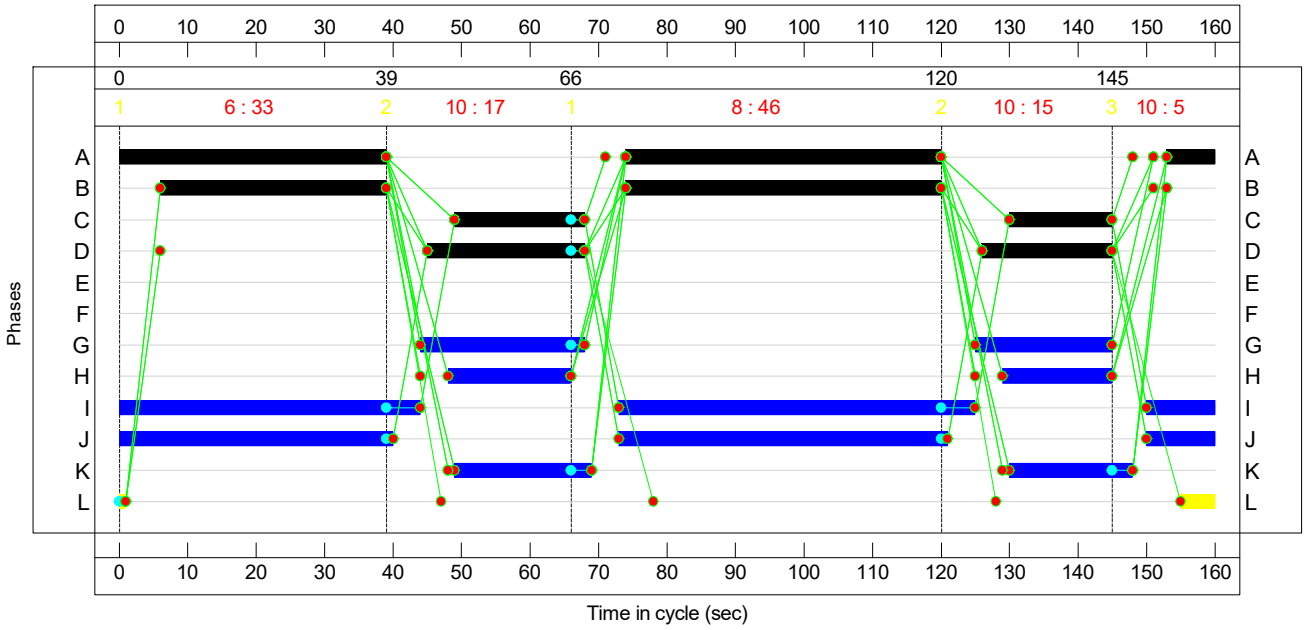
Stage Sequence Diagram



Stage Timings

Stage	1	2	1	2	3
Duration	33	17	46	15	5
Change Point	0	39	66	120	145

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**95.6%**
A34 / Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**95.6%**
1/2+1/1	Brunswick Street Left Right	U	N/A	N/A	D C		2	42:34	-	393	1857:1781	272+199	83.4 : 83.4%
2/1	A34 (S) Ahead	U	N/A	N/A	B		2	79	-	670	1945	985	68.0%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B		2	79	-	346	2058:1783	182+180	95.6 : 95.6%
3/1	A34 (N) Left Ahead	U	N/A	N/A	A		2	92	-	666	1820	1069	62.3%
3/2	A34 (N) Ahead	U	N/A	N/A	A		2	92	-	795	2089	1227	64.8%
4/1	Brunswick Street exit	U	N/A	N/A	-		-	-	-	523	Inf	Inf	0.0%
5/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	481	Inf	Inf	0.0%
5/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	795	Inf	Inf	0.0%
6/1	A34 (N)	U	N/A	N/A	-		-	-	-	897	Inf	Inf	0.0%
6/2	A34 (N)	U	N/A	N/A	-		-	-	-	174	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Brunswick Street	**-**	**-**	**0**	**0**	**172**	**11.3**	**11.3**	**1.5**	**24.1**	**-**	**-**	**-**	**-**
A34 / Brunswick Street	**-**	**-**	**0**	**0**	**172**	**11.3**	**11.3**	**1.5**	**24.1**	**-**	**-**	**-**	**-**
1/2+1/1	393	393	-	-	-	3.0	2.4	-	5.4	49.5	7.6	2.4	9.9
2/1	670	670	-	-	-	2.8	1.1	-	3.9	20.8	12.7	1.1	13.7
2/2+2/3	346	346	0	0	172	1.1	6.1	1.5	8.6	89.9	2.4	6.1	8.5
3/1	666	666	-	-	-	2.0	0.8	-	2.8	15.2	9.8	0.8	10.6
3/2	795	795	-	-	-	2.4	0.9	-	3.3	15.1	11.9	0.9	12.8
4/1	523	523	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	481	481	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2	795	795	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	897	897	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	174	174	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): -6.2
PRC Over All Lanes (%): -6.2

Total Delay for Signalled Lanes (pcuHr): 24.08
Total Delay Over All Lanes(pcuHr): 24.08

Cycle Time (s): 160

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.1.7462
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Filename: Hanworth Close Proposed.j9
Path: C:\Data\Projects\J000351-J000400\J000370 Upper Brook Street\Background Information\Junction Assessments\TA June 2023
Report generation date: 26/05/2023 18:05:47

»Sensitivity Test - Cumulative Scheme, AM
»Sensitivity Test - Cumulative Scheme , PM

Summary of junction performance

	AM								PM							
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
	Sensitivity Test - Cumulative Scheme															
Stream B-AC	D3	0.1	7.86	0.06	A	3.84	A	705 % [Stream B-AC]	D4	0.1	8.02	0.07	A	4.31	A	543 % [Stream C-AB]
Stream C-AB		0.1	6.03	0.07	A					0.1	6.28	0.11	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	Upper Brook Street
Location	Kincardine Road / Hanworth Close
Site number	
Date	01/06/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	J000370
Enumerator	FTPDT-01\Office
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75			✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Do Something - Application Scheme	AM	ONE HOUR	08:00	09:30	15	
D2	Do Something - Application Scheme	PM	ONE HOUR	16:30	18:00	15	
D3	Sensitivity Test - Cumulative Scheme	AM	ONE HOUR	08:00	09:30	15	✓

D4	Sensitivity Test - Cumulative Scheme	PM	ONE HOUR	16:30	18:00	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Sensitivity Test - Cumulative Scheme, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Hanworth Close	T-Junction	One-way from C to A		3.84	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	705	Stream B-AC

Arms

Arms

Arm	Name	Description	Arm type
A	Kincardine Road (N)		Major
B	Hanworth Close		Minor
C	Kincardine Road (S)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	4.00			44.1	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.24	16	29

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	509	0.085	0.214	0.135	0.305
B-C	657	0.092	0.233	-	-
C-B	599	0.212	0.212	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.
Streams may be combined, in which case capacity will be adjusted.
Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	Sensitivity Test - Cumulative Scheme	AM	ONE HOUR	08:00	09:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	0	100.000
B		ONE HOUR	✓	28	100.000
C		ONE HOUR	✓	89	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	0	0
	B	28	0	0
	C	54	35	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.06	7.86	0.1	A	26	39
C-AB	0.07	6.03	0.1	A	35	52
C-A					47	70
A-B					0	0
A-C					0	0

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	21	5	495	0.043	21	0.0	0.0	7.589	A
C-AB	28	7	627	0.045	28	0.0	0.1	6.012	A
C-A	39	10			39				
A-B	0	0			0				
A-C	0	0			0				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	25	6	492	0.051	25	0.0	0.1	7.703	A
C-AB	34	9	632	0.054	34	0.1	0.1	6.021	A
C-A	46	11			46				
A-B	0	0			0				
A-C	0	0			0				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	31	8	489	0.063	31	0.1	0.1	7.858	A
C-AB	43	11	639	0.067	42	0.1	0.1	6.033	A

C-A	55	14			55				
A-B	0	0			0				
A-C	0	0			0				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	31	8	489	0.063	31	0.1	0.1	7.860	A
C-AB	43	11	639	0.067	43	0.1	0.1	6.033	A
C-A	55	14			55				
A-B	0	0			0				
A-C	0	0			0				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	25	6	492	0.051	25	0.1	0.1	7.705	A
C-AB	34	9	632	0.054	34	0.1	0.1	6.023	A
C-A	46	11			46				
A-B	0	0			0				
A-C	0	0			0				

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	21	5	495	0.043	21	0.1	0.0	7.598	A
C-AB	28	7	627	0.045	28	0.1	0.1	6.018	A
C-A	39	10			39				
A-B	0	0			0				
A-C	0	0			0				

Sensitivity Test - Cumulative Scheme , PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Hanworth Close	T-Junction	One-way from C to A		4.31	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	543	Stream C-AB

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	Sensitivity Test - Cumulative Scheme	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	0	100.000
B		ONE HOUR	✓	29	100.000
C		ONE HOUR	✓	116	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	0	0
	B	29	0	0
	C	59	57	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	0	0	0
	B	0	0	0
	C	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)

B-AC	0.07	8.02	0.1	A	27	40
C-AB	0.11	6.28	0.1	A	57	86
C-A					49	74
A-B					0	0
A-C					0	0

Main Results for each time segment

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	5	490	0.045	22	0.0	0.0	7.687	A
C-AB	46	12	629	0.073	46	0.0	0.1	6.170	A
C-A	41	10			41				
A-B	0	0			0				
A-C	0	0			0				

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	26	7	486	0.054	26	0.0	0.1	7.830	A
C-AB	56	14	635	0.088	56	0.1	0.1	6.217	A
C-A	48	12			48				
A-B	0	0			0				
A-C	0	0			0				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	8	481	0.066	32	0.1	0.1	8.021	A
C-AB	70	17	643	0.109	70	0.1	0.1	6.282	A
C-A	58	14			58				
A-B	0	0			0				
A-C	0	0			0				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	32	8	481	0.066	32	0.1	0.1	8.023	A
C-AB	70	17	643	0.109	70	0.1	0.1	6.283	A
C-A	58	14			58				
A-B	0	0			0				
A-C	0	0			0				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	26	7	486	0.054	26	0.1	0.1	7.835	A
C-AB	56	14	635	0.088	56	0.1	0.1	6.223	A
C-A	48	12			48				
A-B	0	0			0				
A-C	0	0			0				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	22	5	489	0.045	22	0.1	0.0	7.699	A
C-AB	46	12	629	0.073	46	0.1	0.1	6.179	A
C-A	41	10			41				
A-B	0	0			0				
A-C	0	0			0				

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.1.7462
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Filename: Whitekirk Close Proposed.j9
Path: C:\Data\Projects\J000351-J000400\J000370 Upper Brook Street\Background Information\Junction Assessments\TA June 2023
Report generation date: 27/05/2023 13:55:54

»Sensitivity Test - Cumulative Scheme, AM
»Sensitivity Test - Cumulative Scheme, PM

Summary of junction performance

	AM								PM							
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
	Sensitivity Test - Cumulative Scheme															
Stream B-ACD	D3	0.0	7.87	0.03	A	2.10	A	900 % []	D4	0.0	7.90	0.03	A	1.68	A	900 % []
Stream A-BCD		0.0	0.00	0.00	A					0.0	0.00	0.00	A			
Stream D-ABC		0.0	0.00	0.00	A					0.0	0.00	0.00	A			
Stream C-ABD		0.0	5.53	0.04	A					0.0	5.41	0.03	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	Kincardine Road / Whitekirk Close
Site number	
Date	01/06/2023
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	J000370
Enumerator	FTPDT-01\Office
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75			✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	Do Something - Application Scheme	AM	ONE HOUR	08:00	09:30	15	
D2	Do Something - Application Scheme	PM	ONE HOUR	16:30	18:00	15	
D3	Sensitivity Test - Cumulative Scheme	AM	ONE HOUR	08:00	09:30	15	✓

D4	Sensitivity Test - Cumulative Scheme	PM	ONE HOUR	16:30	18:00	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Sensitivity Test - Cumulative Scheme, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Whitekirk Close	Crossroads	One-way from C to A		2.10	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	900	

Arms

Arms

Arm	Name	Description	Arm type
A	Kincardine Road (N)		Major
B	Whitekirk Close		Minor
C	Kincardine Road (S)		Major
D	Car Park Access		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
A	4.00				✓	
C	4.00			99.9	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	2.85	26	25
D	One lane	3.43	12	13

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
A-D	574	-	-	-	-	-	-	0.203	0.290	0.203	-	-	-
B-A	491	0.082	0.206	0.206	-	-	-	0.130	0.295	-	0.206	0.206	0.103
B-C	630	0.088	0.223	-	-	-	-	-	-	-	-	-	-
B-D, nearside lane	491	0.082	0.206	0.206	-	-	-	0.130	0.295	0.130	-	-	-
B-D, offside lane	491	0.082	0.206	0.206	-	-	-	0.130	0.295	0.130	-	-	-
C-B	632	0.224	0.224	0.319	-	-	-	-	-	-	-	-	-
D-A	659	-	-	-	-	-	-	0.233	-	0.092	-	-	-
D-B, nearside lane	509	0.135	0.135	0.306	-	-	-	0.214	0.214	0.085	-	-	-
D-B, offside lane	509	0.135	0.135	0.306	-	-	-	0.214	0.214	0.085	-	-	-
D-C	509	-	0.135	0.306	0.107	0.214	0.214	0.214	0.214	0.085	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

		Time Period	Traffic profile	Start time	Finish time	Time segment length	Run

ID	Scenario name	name	type	(HH:mm)	(HH:mm)	(min)	automatically
D3	Sensitivity Test - Cumulative Scheme	AM	ONE HOUR	08:00	09:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	0	100.000
B		ONE HOUR	✓	14	100.000
C		ONE HOUR	✓	101	100.000
D		ONE HOUR	✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	0	0	0
	B	14	0	0	0
	C	80	21	0	0
	D	0	0	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	0
	B	0	0	0	0
	C	4	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.03	7.87	0.0	A	13	19
A-BCD	0.00	0.00	0.0	A	0	0
A-B					0	0
A-C					0	0
D-ABC	0.00	0.00	0.0	A	0	0
C-ABD	0.04	5.53	0.0	A	22	33
C-D					0	0
C-A					71	106

Main Results for each time segment

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	3	478	0.022	10	0.0	0.0	7.694	A
A-BCD	0	0	557	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	523	0.000	0	0.0	0.0	0.000	A
C-ABD	17	4	671	0.026	17	0.0	0.0	5.526	A
C-D	0	0			0				
C-A	59	15			59				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	3	476	0.026	13	0.0	0.0	7.770	A
A-BCD	0	0	554	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	520	0.000	0	0.0	0.0	0.000	A
C-ABD	21	5	679	0.031	21	0.0	0.0	5.496	A
C-D	0	0			0				
C-A	70	17			70				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	15	4	473	0.033	15	0.0	0.0	7.875	A
A-BCD	0	0	549	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	516	0.000	0	0.0	0.0	0.000	A
C-ABD	27	7	689	0.039	26	0.0	0.0	5.457	A
C-D	0	0			0				
C-A	85	21			85				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	15	4	473	0.033	15	0.0	0.0	7.875	A
A-BCD	0	0	549	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	516	0.000	0	0.0	0.0	0.000	A
C-ABD	27	7	689	0.039	27	0.0	0.0	5.462	A
C-D	0	0			0				
C-A	85	21			85				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	3	476	0.026	13	0.0	0.0	7.771	A
A-BCD	0	0	554	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	520	0.000	0	0.0	0.0	0.000	A
C-ABD	21	5	679	0.031	21	0.0	0.0	5.501	A
C-D	0	0			0				
C-A	70	17			70				

09:15 - 09:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	3	478	0.022	11	0.0	0.0	7.698	A
A-BCD	0	0	557	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	523	0.000	0	0.0	0.0	0.000	A
C-ABD	17	4	671	0.026	17	0.0	0.0	5.531	A
C-D	0	0			0				
C-A	59	15			59				

Sensitivity Test - Cumulative Scheme, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs. If HV% at the junction is genuinely zero, please ignore this warning.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Kincardine Road / Whitekirk Close	Crossroads	One-way from C to A		1.68	A

Junction Network Options

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold
Left	Normal/unknown	900	

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	Sensitivity Test - Cumulative Scheme	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	0	100.000
B		ONE HOUR	✓	15	100.000
C		ONE HOUR	✓	111	100.000
D		ONE HOUR	✓	0	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	0	0	0
	B	15	0	0	0
	C	96	15	0	0
	D	0	0	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	0
	B	0	0	0	0
	C	0	0	0	0
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.03	7.90	0.0	A	14	21
A-BCD	0.00	0.00	0.0	A	0	0
A-B					0	0
A-C					0	0
D-ABC	0.00	0.00	0.0	A	0	0
C-ABD	0.03	5.41	0.0	A	16	24
C-D					0	0
C-A					86	129

Main Results for each time segment

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	3	478	0.024	11	0.0	0.0	7.707	A
A-BCD	0	0	556	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	522	0.000	0	0.0	0.0	0.000	A
C-ABD	13	3	679	0.019	13	0.0	0.0	5.404	A
C-D	0	0			0				
C-A	71	18			71				

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	3	476	0.028	13	0.0	0.0	7.789	A
A-BCD	0	0	553	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	518	0.000	0	0.0	0.0	0.000	A
C-ABD	15	4	688	0.022	15	0.0	0.0	5.353	A
C-D	0	0			0				
C-A	84	21			84				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	17	4	472	0.035	16	0.0	0.0	7.899	A
A-BCD	0	0	548	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	513	0.000	0	0.0	0.0	0.000	A
C-ABD	19	5	700	0.028	19	0.0	0.0	5.286	A
C-D	0	0			0				
C-A	103	26			103				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	17	4	472	0.035	17	0.0	0.0	7.899	A
A-BCD	0	0	548	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	513	0.000	0	0.0	0.0	0.000	A
C-ABD	19	5	700	0.028	19	0.0	0.0	5.288	A
C-D	0	0			0				
C-A	103	26			103				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	3	476	0.028	14	0.0	0.0	7.792	A

A-BCD	0	0	552	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	518	0.000	0	0.0	0.0	0.000	A
C-ABD	15	4	688	0.022	15	0.0	0.0	5.354	A
C-D	0	0			0				
C-A	84	21			84				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	3	478	0.024	11	0.0	0.0	7.714	A
A-BCD	0	0	556	0.000	0	0.0	0.0	0.000	A
A-B	0	0			0				
A-C	0	0			0				
D-ABC	0	0	522	0.000	0	0.0	0.0	0.000	A
C-ABD	13	3	679	0.019	13	0.0	0.0	5.406	A
C-D	0	0			0				
C-A	71	18			71				



APPENDIX TA18

Appendix TA18 - Baseline + Cumulative Development at Upper Brook Street 'With Cumulative Development' Junction Capacity Modelling Results (90second cycle time option)

Key

- 0-89% DoS (within capacity conditions)
- 90-99% DoS (variable operating conditions)
- 100%+ DoS (over capacity conditions)

A34 / Grosvenor Street

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**60.6%**	-	-	**71.2%**	-
1/1 + 1/2	Grosvenor Street (E) Left Ahead & Right	507	60.6%:60.6%	5.9	674	70.5%:70.5%	9.0
2/1	A34 (S) Left & ahead	471	59.9%	9.9	408	71.2%	10.3
2/2	A34 (S) Ahead	232	27.0%	4.0	164	26.2%	3.3
2/3	A34 (S) Ahead	235	27.2%	4.0	167	26.5%	3.3
3/1	A34 (N) Ahead	303	26.2%	3.8	377	40.2%	6.4
3/2 + 3/3	A34 (N) Ahead & right	392	30.1%:30.1%	4.6	458	43.5%:43.5%	7.3
Cycle Time		90s			90S		
Stage 1, 2, 3 timings		46s, 14s,30s			36s, 14s, 40s		
Junction PRC		48.6%			26.5%		
Total delay over all lanes (pcuHr)		12.66			16.04		

A34 / Booth Street East - Proposed Junction

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**91.0%**	-	-	**83.4%**	-
2/1	A34(S) - Left & Ahead	637	87.3%	17.7	469	79.9%	12.6
2/2	A34(S) - Ahead	763	90.0%	21.9	570	83.4%	15.6
3/1	Booth Street East - Left & Right	200	85.4%	7.4	312	75.9%	8.7
3/2	Booth Street East - Right	219	85.5%	7.9	343	76.6%	9.6
4/1	A34(N) - Ahead	332	32.9%	4.9	464	56.8%	9.4
4/2	A34(N) - Ahead	368	34.3%	5.6	505	58.2%	10.2
4/3	A34(N) - Right	240	91.0%	7.1	229	70.3%	4.9
Cycle Time		90s			90s		
Stage 1, 2 ,3 timings		44s, 11s, 16s, 19s			37s, 9s, 25s 19s		
Junction PRC		-1.1%			7.9%		
Total delay over all lanes (pcuHr)		35.93			31.70		

A34 / Brunswick Street

	Lane Description	AM Peak			PM Peak		
		Flow	Deg of Sat	MMQ	Flow	Deg of Sat	MMQ
		-	**78.9%**	-	-	**74.5%**	-
1/2 + 1/1	Brunswick Street - Left & Right	569	78.3% : 78.3%	13.1	393	74.4% : 74.4%	9.9
2/1	A34(S) - Ahead	568	72.0%	14.1	670	66.7%	15.9
2/2 + 2/3	A34(S) - Ahead & Right	738	78.9% : 78.9%	16.0	346	71.9% : 71.9%	4.0
3/1	A34 (N) - Left & Ahead	455	57.8%	10.4	666	71.6%	15.1
3/2	A34 (N) - Ahead	545	61.0%	12.6	795	74.5%	18.4
Cycle Time		180s			180s		
Stage 1, 2, 1, 2, 3 timings		27s, 9s,42s, 49s, 38s, 15s			34s, 14s ,27s, 57s, 33s, 15s		
Junction PRC		14.1%			20.9%		
Total delay over all lanes (pcuHr)		24.38			22.18		

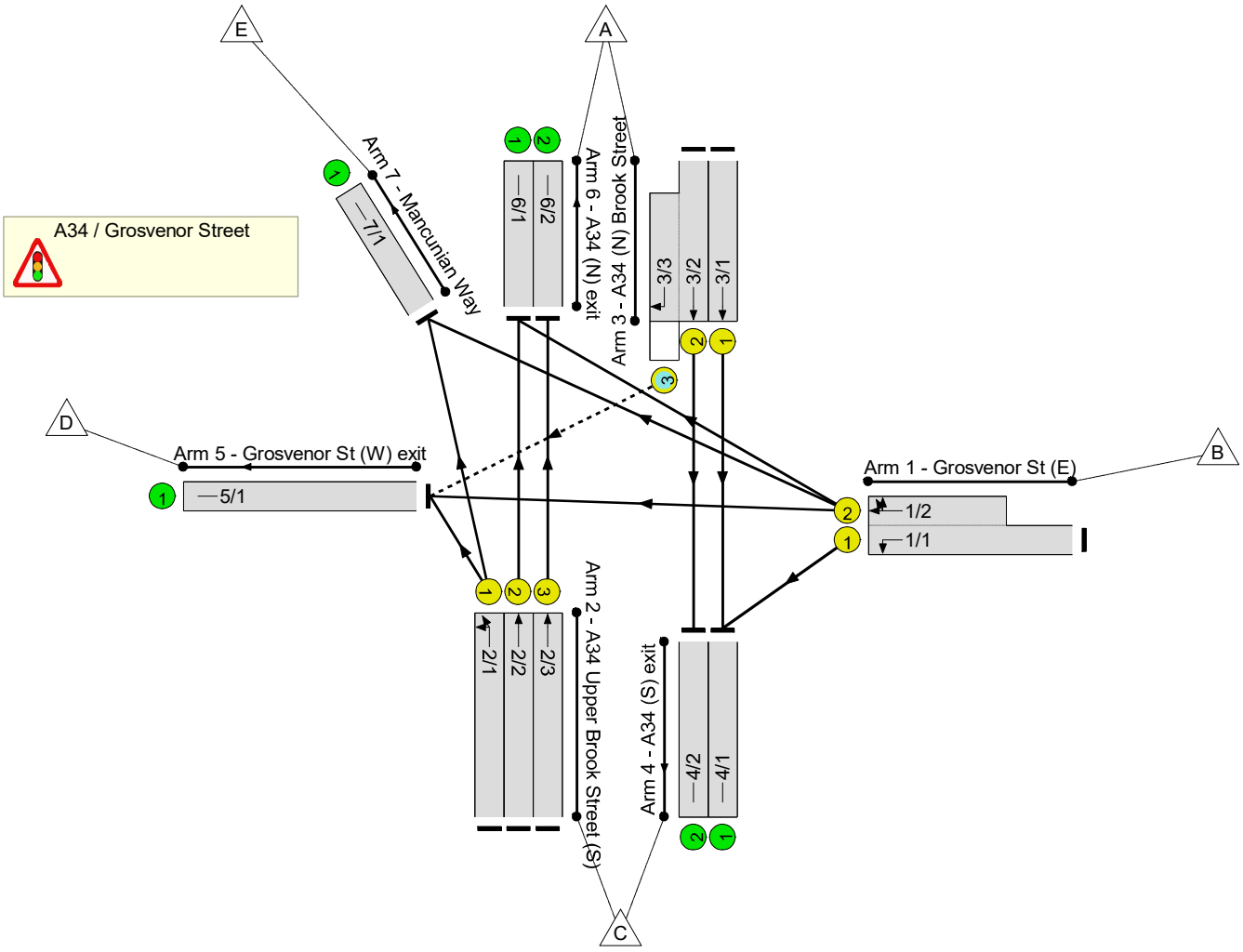
Pedestrian stage called every second cycle, extra time given to Brunswick Street

Full Input Data And Results

User and Project Details

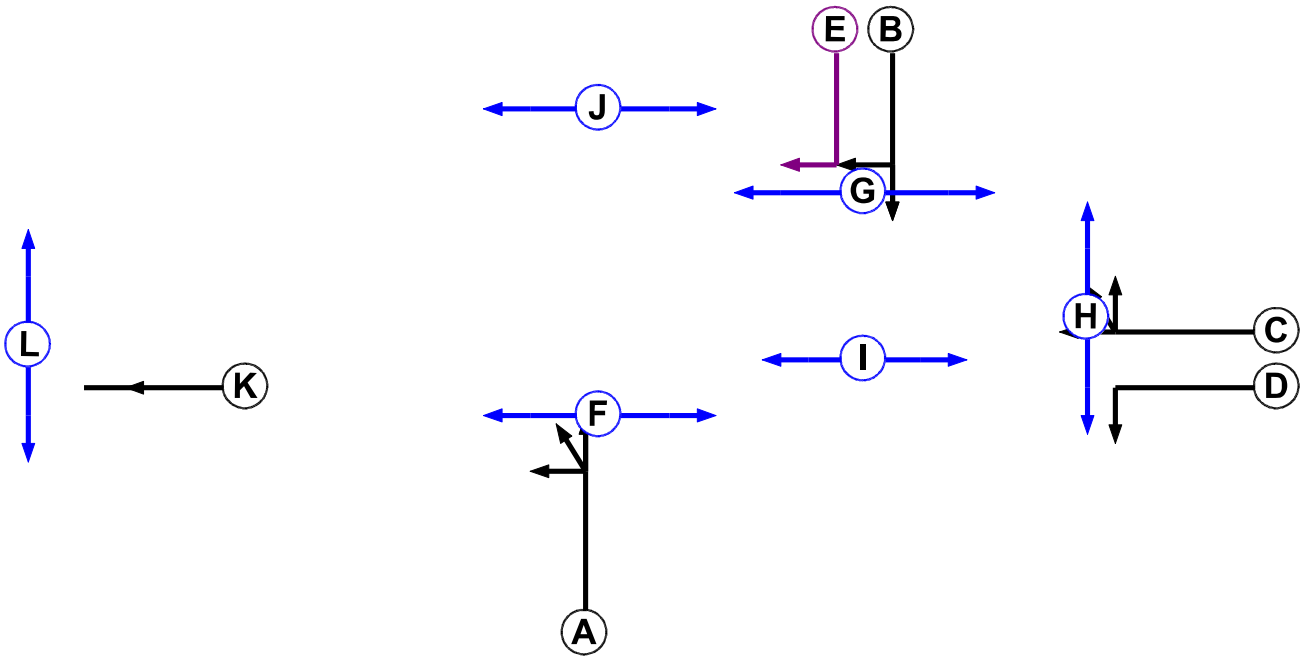
Project:	**Upper Brook Street**
Title:	**Grosvenor Road Junction**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	90s ManchWayA34_Grosvenor Street.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Ind. Arrow	B	-9999	3
F	Pedestrian		-9999	7
G	Pedestrian		-9999	6
H	Pedestrian		-9999	5
I	Pedestrian		-9999	5
J	Pedestrian		-9999	6
K	Traffic		-9999	7
L	Pedestrian		-9999	5

Full Input Data And Results

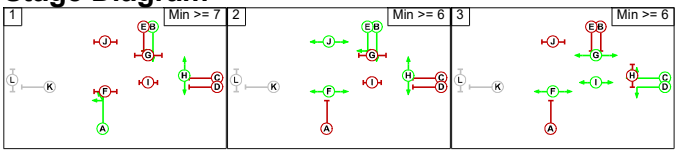
Phase Intergreens Matrix

		Starting Phase											
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K	L
	A		-	5	-	5	5	-	-	-	8	-	-
	B	-		5	6	-	-	5	-	7	-	-	-
	C	5	5		-	5	-	-	5	-	10	-	-
	D	-	4	-		-	-	-	5	-	-	-	-
	E	6	-	5	-		-	5	-	7	-	-	-
	F	10	-	-	-	-		-	-	-	-	-	-
	G	-	9	-	-	9	-		-	-	-	-	-
	H	-	-	5	5	-	-	-		-	-	-	-
	I	-	6	-	-	6	-	-	-		-	-	-
	J	9	-	9	-	-	-	-	-	-		-	-
	K	-	-	-	-	-	-	-	-	-	-		5
	L	-	-	-	-	-	-	-	-	-	-	6	

Phases in Stage

Stage No.	Phases in Stage
1	A B H
2	B E F H J
3	C D F G I

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
2	3	B	Losing	2	2
2	3	H	Losing	3	3
3	1	C	Losing	5	5
3	1	D	Losing	5	5
3	1	G	Losing	1	1
3	1	I	Losing	4	4

Full Input Data And Results

Prohibited Stage Change

	To Stage			
From Stage		1	2	3
	1		8	7
	2	10		9
	3	10	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Grosvenor Street											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
3/3 (A34 (N) Brook Street)	5/1 (Right)	1439	0	2/1	1.09	All	2.00	-	0.50	2	2.00
				2/2	1.09	All					
				2/3	1.09	All					

Full Input Data And Results

Lane Input Data

Full Input Data And Results

Junction: A34 / Grosvenor Street												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Grosvenor St (E))	U	D	2	3	60.0	Geom	-	4.17	0.00	Y	Arm 4 Left	10.00
1/2 (Grosvenor St (E))	U	C	2	3	7.1	Geom	-	4.49	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	10.00
											Arm 7 Right	10.00
2/1 (A34 Upper Brook Street (S))	U	A	2	3	33.0	Geom	-	3.40	0.00	Y	Arm 5 Left	10.00
											Arm 7 Ahead	Inf
2/2 (A34 Upper Brook Street (S))	U	A	2	3	33.0	Geom	-	3.32	0.00	N	Arm 6 Ahead	Inf
2/3 (A34 Upper Brook Street (S))	U	A	2	3	33.7	Geom	-	3.45	0.00	N	Arm 6 Ahead	Inf
3/1 (A34 (N) Brook Street)	U	B	2	3	21.7	Geom	-	3.46	0.00	Y	Arm 4 Ahead	Inf
3/2 (A34 (N) Brook Street)	U	B	2	3	21.7	Geom	-	3.46	0.00	N	Arm 4 Ahead	Inf
3/3 (A34 (N) Brook Street)	O	B E	2	3	15.8	Geom	-	3.19	0.00	N	Arm 5 Right	10.00
4/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
4/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

5/1 (Grosvenor St (W) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Mancunian Way)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'Baseline AM Peak'	08:15	09:15	01:00	

Scenario 5: 'Cumulative Scheme' (FG5: 'Sensitivity Test (Cumulative) AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination						
Origin		A	B	C	D	E	Tot.
	A	0	0	658	37	0	695
	B	94	0	259	74	80	507
	C	467	0	0	67	404	938
	D	0	0	0	0	0	0
	E	0	0	0	0	0	0
	Tot.	561	0	917	178	484	2140

Traffic Lane Flows

Lane	Scenario 5: Cumulative Scheme
Junction: A34 / Grosvenor Street	
1/1 (with short)	507(In) 259(Out)
1/2 (short)	248
2/1	471
2/2	232
2/3	235
3/1	303
3/2 (with short)	392(In) 355(Out)
3/3 (short)	37
4/1	562
4/2	355
5/1	178
6/1	326
6/2	235
7/1	484

Full Input Data And Results

Lane Saturation Flows

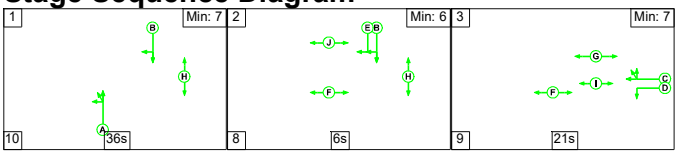
Full Input Data And Results

Junction: A34 / Grosvenor Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Grosvenor St (E))	4.17	0.00	Y	Arm 4 Left	10.00	100.0 %	1767	1767
1/2 (Grosvenor St (E))	4.49	0.00	Y	Arm 5 Ahead	Inf	29.8 %	1868	1868
				Arm 6 Right	10.00	37.9 %		
				Arm 7 Right	10.00	32.3 %		
2/1 (A34 Upper Brook Street (S))	3.40	0.00	Y	Arm 5 Left	10.00	14.2 %	1914	1914
				Arm 7 Ahead	Inf	85.8 %		
2/2 (A34 Upper Brook Street (S))	3.32	0.00	N	Arm 6 Ahead	Inf	100.0 %	2087	2087
2/3 (A34 Upper Brook Street (S))	3.45	0.00	N	Arm 6 Ahead	Inf	100.0 %	2100	2100
3/1 (A34 (N) Brook Street)	3.46	0.00	Y	Arm 4 Ahead	Inf	100.0 %	1961	1961
3/2 (A34 (N) Brook Street)	3.46	0.00	N	Arm 4 Ahead	Inf	100.0 %	2101	2101
3/3 (A34 (N) Brook Street)	3.19	0.00	N	Arm 5 Right	10.00	100.0 %	1804	1804
4/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
4/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
5/1 (Grosvenor St (W) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Mancunian Way Lane 1)	Infinite Saturation Flow						Inf	Inf

Full Input Data And Results

Scenario 5: 'Cumulative Scheme' (FG5: 'Sensitivity Test (Cumulative) AM Peak', Plan 1: 'Network Control Plan 1')

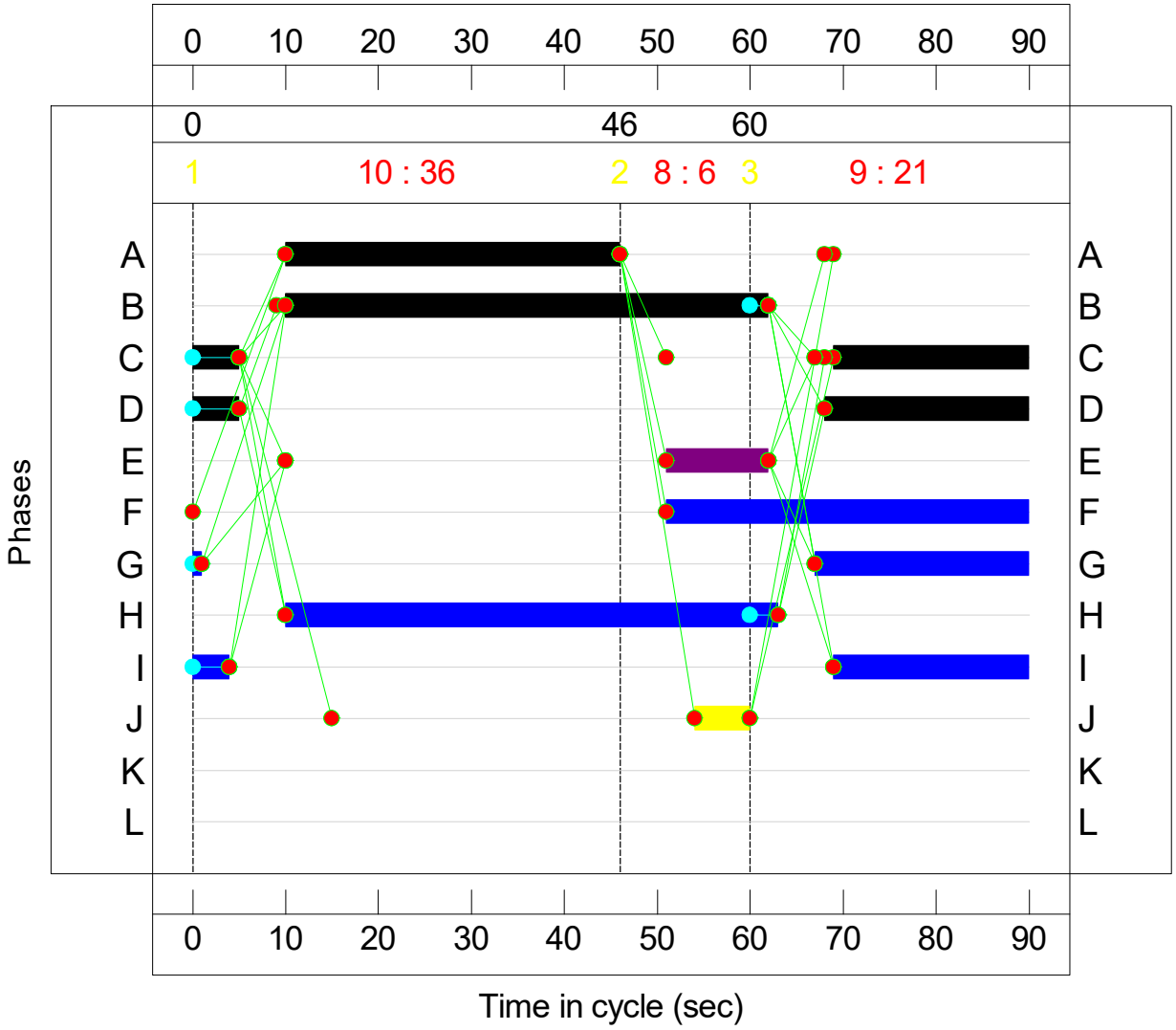
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	36	6	21
Change Point	0	46	60

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Grosvenor Road Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**60.6%**
A34 / Grosvenor Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**60.6%**
1/1+1/2	Grosvenor St (E) Left Ahead Right Right2	U	N/A	N/A	D C		1	27:26	-	507	1767:1868	428+409	60.6 : 60.6%
2/1	A34 Upper Brook Street (S) Left Ahead	U	N/A	N/A	A		1	36	-	471	1914	787	59.9%
2/2	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	36	-	232	2087	858	27.0%
2/3	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	36	-	235	2100	863	27.2%
3/1	A34 (N) Brook Street Ahead	U	N/A	N/A	B		1	52	-	303	1961	1155	26.2%
3/2+3/3	A34 (N) Brook Street Ahead Right	U+O	N/A	N/A	B	E	1	52	11	392	2101:1804	1178+123	30.1 : 30.1%
4/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	562	Inf	Inf	0.0%
4/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	355	Inf	Inf	0.0%
5/1	Grosvenor St (W) exit	U	N/A	N/A	-		-	-	-	178	Inf	Inf	0.0%
6/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	326	Inf	Inf	0.0%
6/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	235	Inf	Inf	0.0%
7/1	Mancunian Way	U	N/A	N/A	-		-	-	-	484	Inf	Inf	0.0%

Full Input Data And Results

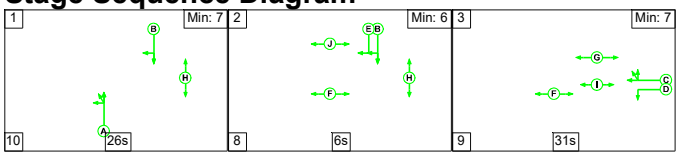
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Grosvenor Road Junction	**-**	**-**	**30**	**6**	**1**	**10.3**	**2.3**	**0.1**	**12.7**	**-**	**-**	**-**	**-**
A34 / Grosvenor Street	**-**	**-**	**30**	**6**	**1**	**10.3**	**2.3**	**0.1**	**12.7**	**-**	**-**	**-**	**-**
1/1+1/2	507	507	-	-	-	3.6	0.8	-	4.3	30.7	5.2	0.8	5.9
2/1	471	471	-	-	-	2.7	0.7	-	3.5	26.4	9.2	0.7	9.9
2/2	232	232	-	-	-	1.1	0.2	-	1.3	20.4	3.8	0.2	4.0
2/3	235	235	-	-	-	1.1	0.2	-	1.3	20.4	3.9	0.2	4.0
3/1	303	303	-	-	-	0.8	0.2	-	0.9	11.1	3.6	0.2	3.8
3/2+3/3	392	392	30	6	1	1.0	0.2	0.1	1.3	12.0	4.3	0.2	4.6
4/1	562	562	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	355	355	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	178	178	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	326	326	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	235	235	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	484	484	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1	PRC for Signalled Lanes (%):	48.6	Total Delay for Signalled Lanes (pcuHr):	12.66	Cycle Time (s): 90
	PRC Over All Lanes (%):	48.6	Total Delay Over All Lanes(pcuHr):	12.66	

Full Input Data And Results

Scenario 6: 'Cumulative Scheme' (FG6: 'Sensitivity Test (Cumulative) PM Peak', Plan 1: 'Network Control Plan 1')

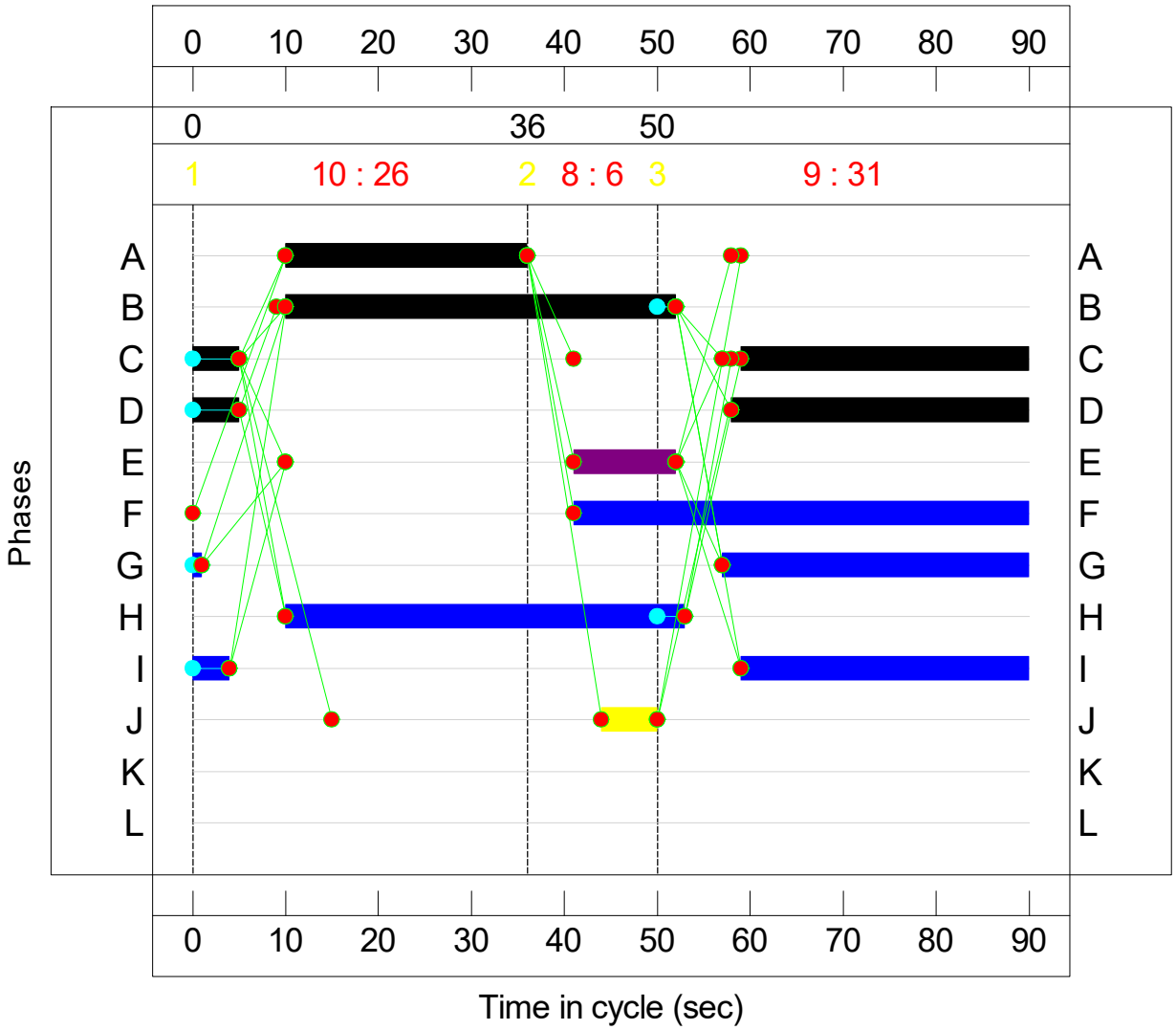
Stage Sequence Diagram



Stage Timings

Stage	1	2	3
Duration	26	6	31
Change Point	0	36	50

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Grosvenor Road Junction	-	-	**N/A**	-	-		-	-	-	-	-	-	**71.2%**
A34 / Grosvenor Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**71.2%**
1/1+1/2	Grosvenor St (E) Left Ahead Right Right2	U	N/A	N/A	D C		1	37:36	-	674	1767:1851	569+387	70.5 : 70.5%
2/1	A34 Upper Brook Street (S) Left Ahead	U	N/A	N/A	A		1	26	-	408	1911	573	71.2%
2/2	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	26	-	164	2087	626	26.2%
2/3	A34 Upper Brook Street (S) Ahead	U	N/A	N/A	A		1	26	-	167	2100	630	26.5%
3/1	A34 (N) Brook Street Ahead	U	N/A	N/A	B		1	42	-	377	1961	937	40.2%
3/2+3/3	A34 (N) Brook Street Ahead Right	U+O	N/A	N/A	B	E	1	42	11	458	2101:1804	981+71	43.5 : 43.5%
4/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	778	Inf	Inf	0.0%
4/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	427	Inf	Inf	0.0%
5/1	Grosvenor St (W) exit	U	N/A	N/A	-		-	-	-	157	Inf	Inf	0.0%
6/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	267	Inf	Inf	0.0%
6/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	167	Inf	Inf	0.0%
7/1	Mancunian Way	U	N/A	N/A	-		-	-	-	452	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Grosvenor Road Junction	**-**	**-**	**25**	**5**	**1**	**12.5**	**3.5**	**0.1**	**16.0**	**-**	**-**	**-**	**-**
A34 / Grosvenor Street	**-**	**-**	**25**	**5**	**1**	**12.5**	**3.5**	**0.1**	**16.0**	**-**	**-**	**-**	**-**
1/1+1/2	674	674	-	-	-	3.6	1.2	-	4.7	25.3	7.8	1.2	9.0
2/1	408	408	-	-	-	3.2	1.2	-	4.4	38.8	9.1	1.2	10.3
2/2	164	164	-	-	-	1.1	0.2	-	1.3	27.8	3.1	0.2	3.3
2/3	167	167	-	-	-	1.1	0.2	-	1.3	27.9	3.2	0.2	3.3
3/1	377	377	-	-	-	1.6	0.3	-	1.9	18.4	6.1	0.3	6.4
3/2+3/3	458	458	25	5	1	1.9	0.4	0.1	2.4	19.0	6.9	0.4	7.3
4/1	778	778	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
4/2	427	427	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	157	157	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	267	267	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	167	167	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	452	452	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 26.5
PRC Over All Lanes (%): 26.5

Total Delay for Signalled Lanes (pcuHr): 16.04
Total Delay Over All Lanes(pcuHr): 16.04

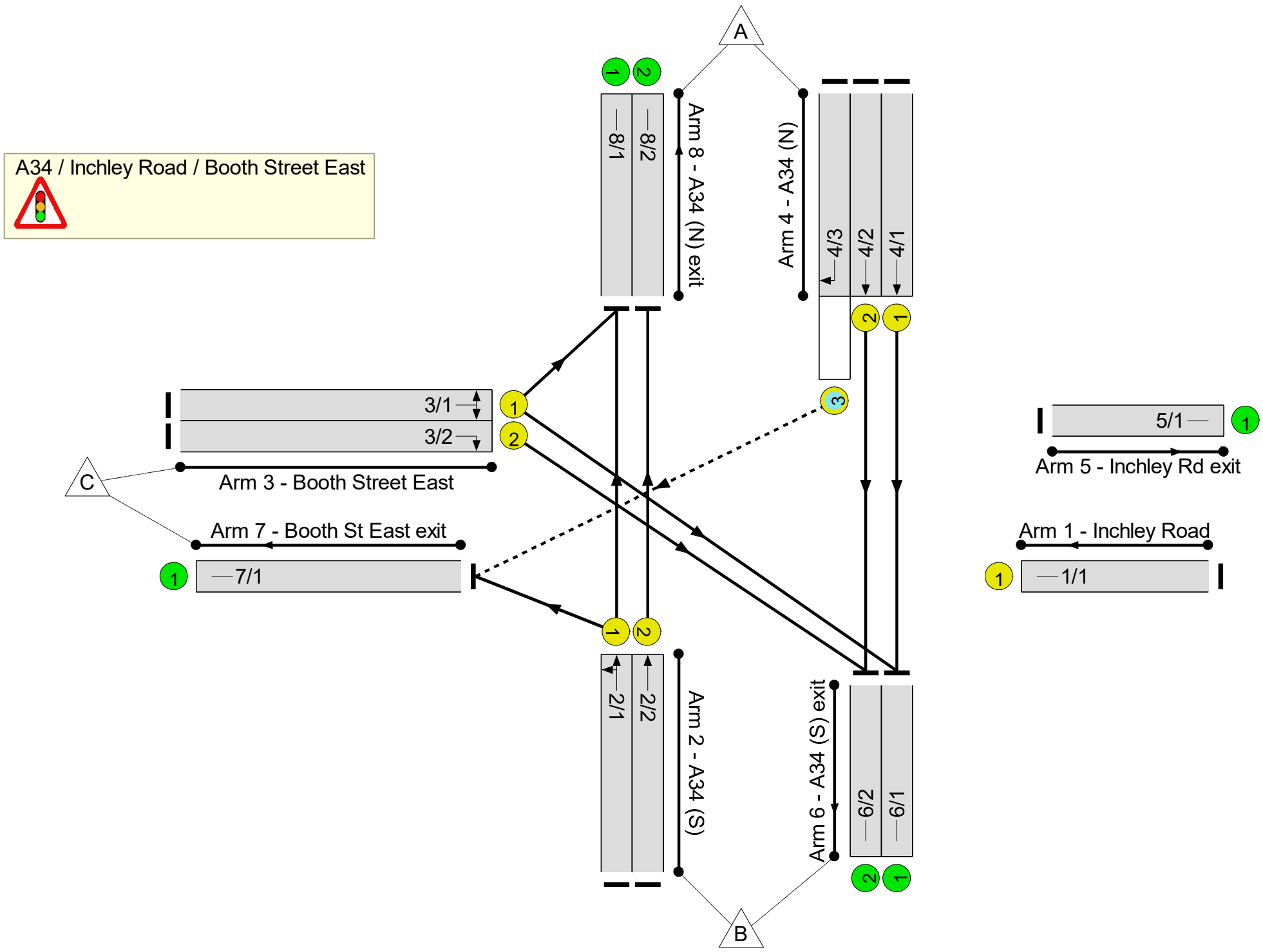
Cycle Time (s): 90

Full Input Data And Results

User and Project Details

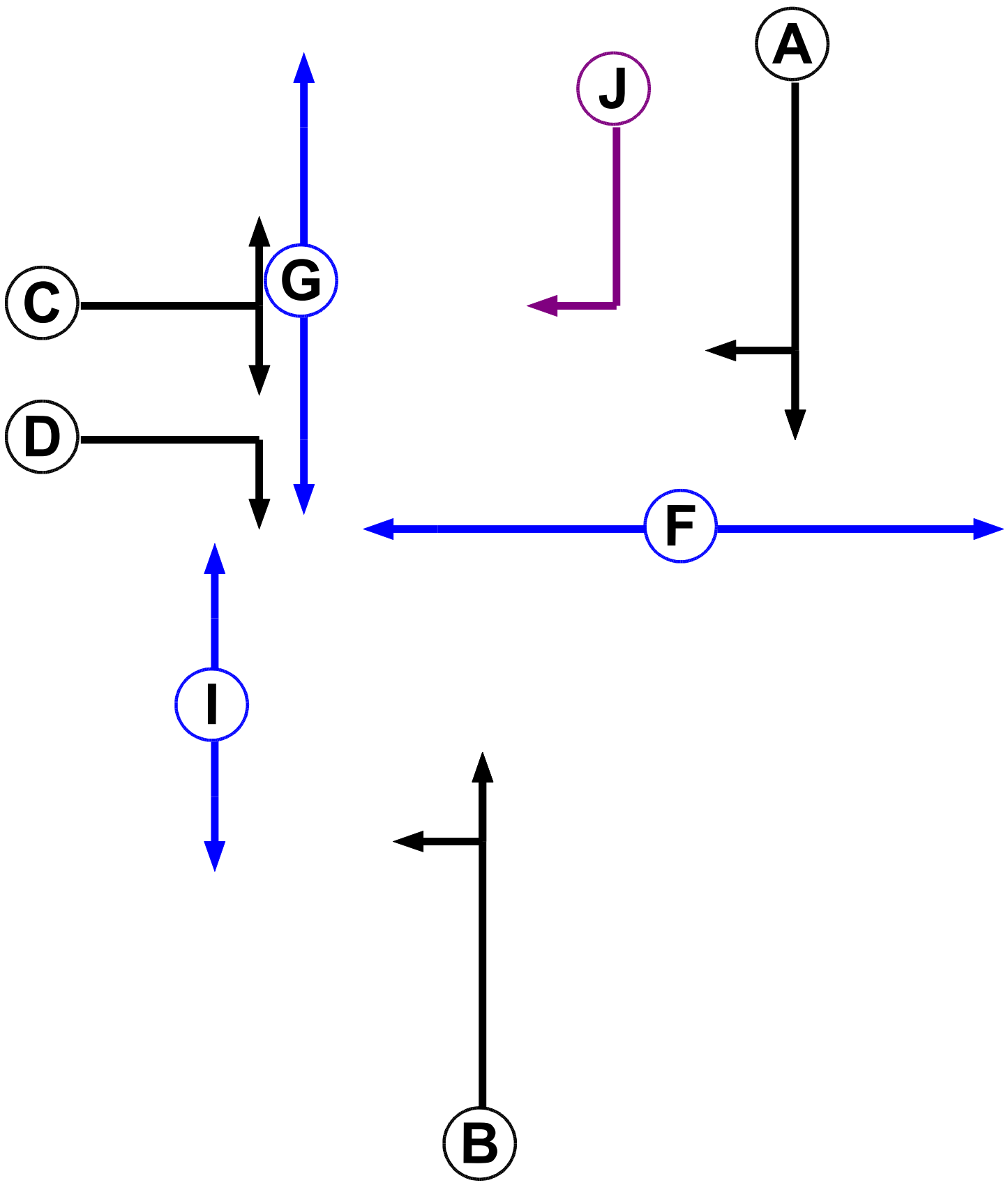
Project:	
Title:	**A34_ Booth Street East**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	90s Proposed A34_Booth St East.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Traffic		-9999	7
F	Pedestrian		-9999	12
G	Pedestrian		-9999	6
H	Pedestrian		-9999	5
I	Pedestrian		-9999	5
J	Ind. Arrow	A	-9999	4

Full Input Data And Results

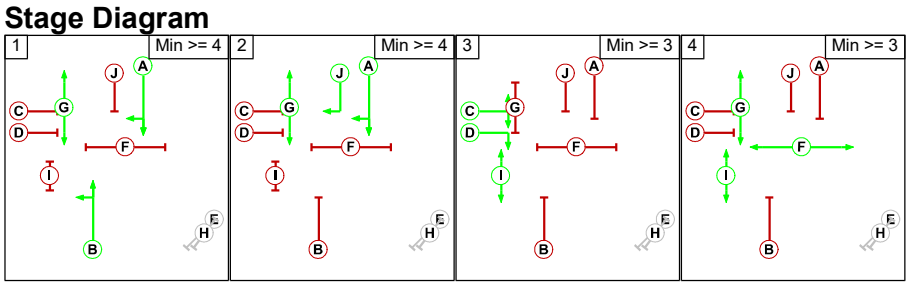
Phase Intergreens Matrix

	Starting Phase										
Terminating Phase		A	B	C	D	E	F	G	H	I	J
	A		-	5	5	-	-	-	-	-	-
	B	-		-	-	-	-	-	-	7	5
	C	-	-		-	-	7	5	-	-	-
	D	-	-	-		-	7	5	-	-	-
	E	-	-	-	-		-	-	-	-	-
	F	9	9	-	-	-		-	-	-	-
	G	-	-	-	-	-	-		-	-	-
	H	-	-	-	-	-	-	-		-	-
	I	-	-	-	-	-	-	-	-		-
	J	-	-	5	5	-	-	-	-	9	

Phases in Stage

Stage No.	Phases in Stage
1	A B G
2	A G J
3	C D I
4	F G I

Stage Diagram



Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

Prohibited Stage Change

	To Stage				
From Stage		1	2	3	4
	1		5	7	7
	2	2		9	9
	3	5	X		7
	4	9	X	2	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Inchley Road / Booth Street East											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
4/3 (A34 (N))	7/1 (Right)	1439	0	2/1	1.09	All	4.00	-	0.50	4	4.00
				2/2	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: A34 / Inchley Road / Booth Street East												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Inchley Road)	U	E	2	3	60.0	Geom	-	4.34	0.00	Y		
2/1 (A34 (S))	U	B	2	3	49.7	Geom	-	3.65	0.00	Y	Arm 7 Left	15.00
											Arm 8 Ahead	Inf
2/2 (A34 (S))	U	B	2	3	49.7	Geom	-	3.65	0.00	N	Arm 8 Ahead	Inf
3/1 (Booth Street East)	U	C	2	3	8.3	Geom	-	3.25	0.00	Y	Arm 6 Right	20.00
											Arm 8 Left	10.00
3/2 (Booth Street East)	U	D	2	3	8.3	Geom	-	3.25	0.00	N	Arm 6 Right	18.00
4/1 (A34 (N))	U	A	2	3	33.4	Geom	-	3.20	0.00	Y	Arm 6 Ahead	Inf
4/2 (A34 (N))	U	A	2	3	33.9	Geom	-	3.00	0.00	N	Arm 6 Ahead	Inf
4/3 (A34 (N))	O	A J	2	3	8.7	Geom	-	3.00	0.00	N	Arm 7 Right	15.00
5/1 (Inchley Rd exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (Booth St East exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/2 (A34 (N) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
3: 'Cumulative Scheme AM Peak'	08:15	09:15	01:00	

Scenario 3: 'Proposed Layout' (FG3: 'Cumulative Scheme AM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	700	240	940
	B	856	0	544	1400
	C	78	341	0	419
	Tot.	934	1041	784	2759

Traffic Lane Flows

Lane	Scenario 3: Proposed Layout
Junction: A34 / Inchley Road / Booth Street East	
1/1	0
2/1	637
2/2	763
3/1	200
3/2	219
4/1	332
4/2	368
4/3	240
5/1	0
6/1	454
6/2	587
7/1	784
8/1	171
8/2	763

Lane Saturation Flows

Junction: A34 / Inchley Road / Booth Street East

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Inchley Road)	4.34	0.00	Y				2049	2049
2/1 (A34 (S))	3.65	0.00	Y	Arm 7 Left	15.00	85.4 %	1824	1824
				Arm 8 Ahead	Inf	14.6 %		
2/2 (A34 (S))	3.65	0.00	N	Arm 8 Ahead	Inf	100.0 %	2120	2120
3/1 (Booth Street East)	3.25	0.00	Y	Arm 6 Right	20.00	61.0 %	1757	1757
				Arm 8 Left	10.00	39.0 %		
3/2 (Booth Street East)	3.25	0.00	N	Arm 6 Right	18.00	100.0 %	1920	1920
4/1 (A34 (N))	3.20	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1935	1935
4/2 (A34 (N))	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
4/3 (A34 (N))	3.00	0.00	N	Arm 7 Right	15.00	100.0 %	1868	1868
5/1 (Inchley Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Booth St East exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 4: 'Proposed Layout' (FG4: 'Cumulative Scheme PM Peak', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	969	229	1198
	B	630	0	409	1039
	C	109	546	0	655
	Tot.	739	1515	638	2892

Traffic Lane Flows

Lane	Scenario 4: Proposed Layout
Junction: A34 / Inchley Road / Booth Street East	
1/1	0
2/1	469
2/2	570
3/1	312
3/2	343
4/1	464
4/2	505
4/3	229
5/1	0
6/1	667
6/2	848
7/1	638
8/1	169
8/2	570

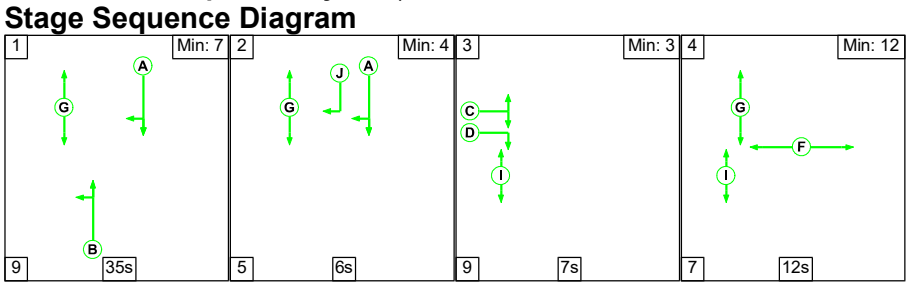
Lane Saturation Flows

Junction: A34 / Inchley Road / Booth Street East

Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (Inchley Road)	4.34	0.00	Y				2049	2049
2/1 (A34 (S))	3.65	0.00	Y	Arm 7 Left	15.00	87.2 %	1821	1821
				Arm 8 Ahead	Inf	12.8 %		
2/2 (A34 (S))	3.65	0.00	N	Arm 8 Ahead	Inf	100.0 %	2120	2120
3/1 (Booth Street East)	3.25	0.00	Y	Arm 6 Right	20.00	65.1 %	1762	1762
				Arm 8 Left	10.00	34.9 %		
3/2 (Booth Street East)	3.25	0.00	N	Arm 6 Right	18.00	100.0 %	1920	1920
4/1 (A34 (N))	3.20	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1935	1935
4/2 (A34 (N))	3.00	0.00	N	Arm 6 Ahead	Inf	100.0 %	2055	2055
4/3 (A34 (N))	3.00	0.00	N	Arm 7 Right	15.00	100.0 %	1868	1868
5/1 (Inchley Rd exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
7/1 (Booth St East exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (A34 (N) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
8/2 (A34 (N) exit Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 3: 'Proposed Layout' (FG3: 'Cumulative Scheme AM Peak', Plan 1: 'Network Control Plan 1')

Stage Sequence Diagram

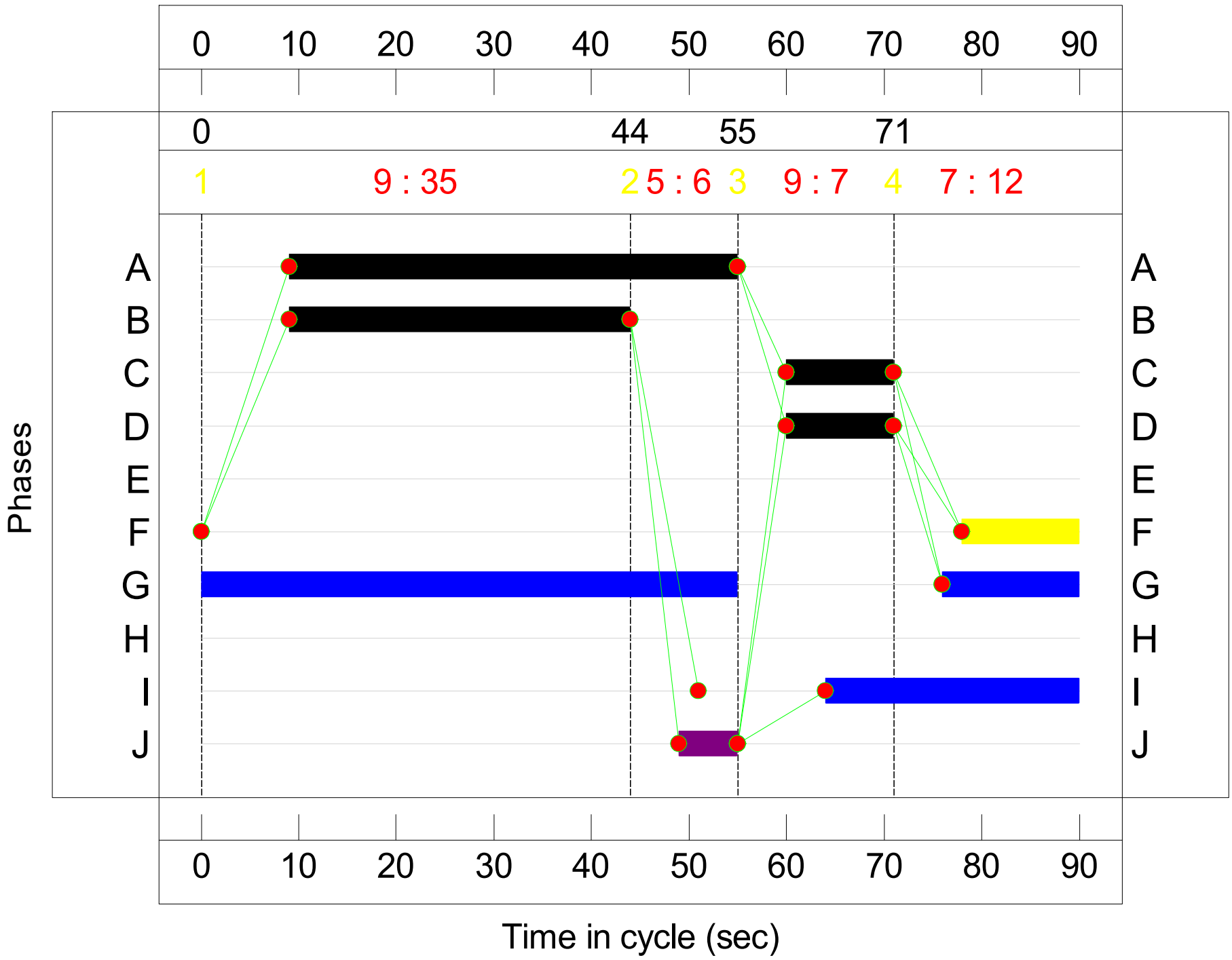


Full Input Data And Results

Stage Timings

Stage	1	2	3	4
Duration	35	6	7	12
Change Point	0	44	55	71

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A34_ Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**91.0%**
A34 / Inchley Road / Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**91.0%**
1/1	Inchley Road	U	N/A	N/A	E		0	0	-	0	2049	0	0.0%
2/1	A34 (S) Left Ahead	U	N/A	N/A	B		1	35	-	637	1824	730	87.3%
2/2	A34 (S) Ahead	U	N/A	N/A	B		1	35	-	763	2120	848	90.0%
3/1	Booth Street East Right Left	U	N/A	N/A	C		1	11	-	200	1757	234	85.4%
3/2	Booth Street East Right	U	N/A	N/A	D		1	11	-	219	1920	256	85.5%
4/1	A34 (N) Ahead	U	N/A	N/A	A		1	46	-	332	1935	1010	32.9%
4/2	A34 (N) Ahead	U	N/A	N/A	A		1	46	-	368	2055	1073	34.3%
4/3	A34 (N) Right	O	N/A	N/A	A	J	1	46	6	240	1868	264	91.0%
5/1	Inchley Rd exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
6/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	454	Inf	Inf	0.0%
6/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	587	Inf	Inf	0.0%
7/1	Booth St East exit	U	N/A	N/A	-		-	-	-	784	Inf	Inf	0.0%
8/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	171	Inf	Inf	0.0%
8/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	763	Inf	Inf	0.0%

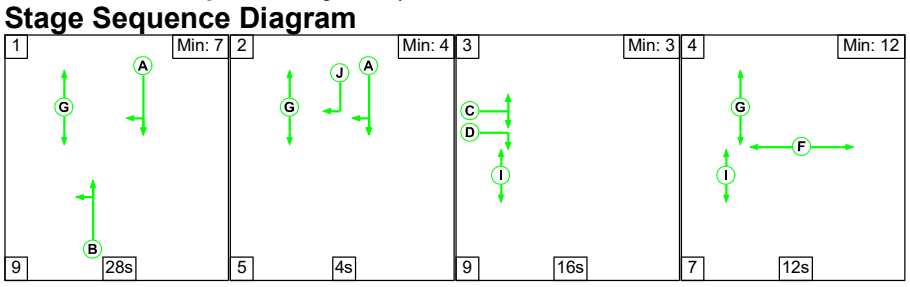
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A34_ Booth Street East	-	-	**0**	**181**	**59**	**17.7**	**16.8**	**1.5**	**35.9**	-	-	-	-
A34 / Inchley Road / Booth Street East	-	-	**0**	**181**	**59**	**17.7**	**16.8**	**1.5**	**35.9**	-	-	-	-
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/1	637	637	-	-	-	4.4	3.2	-	7.6	43.1	14.5	3.2	17.7
2/2	763	763	-	-	-	5.4	4.1	-	9.5	44.6	17.8	4.1	21.9
3/1	200	200	-	-	-	2.1	2.5	-	4.7	83.9	4.9	2.5	7.4
3/2	219	219	-	-	-	2.3	2.6	-	4.9	80.8	5.4	2.6	7.9
4/1	332	332	-	-	-	1.1	0.2	-	1.4	15.1	4.7	0.2	4.9
4/2	368	368	-	-	-	1.3	0.3	-	1.5	15.1	5.3	0.3	5.6
4/3	240	240	0	181	59	1.1	3.8	1.5	6.3	95.2	3.3	3.8	7.1
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	454	454	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	587	587	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	784	784	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	171	171	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	763	763	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): -1.1 Total Delay for Signalled Lanes (pcuHr): 35.93 Cycle Time (s): 90
PRC Over All Lanes (%): -1.1 Total Delay Over All Lanes(pcuHr): 35.93

Full Input Data And Results

Scenario 4: 'Proposed Layout' (FG4: 'Cumulative Scheme PM Peak', Plan 1: 'Network Control Plan 1')

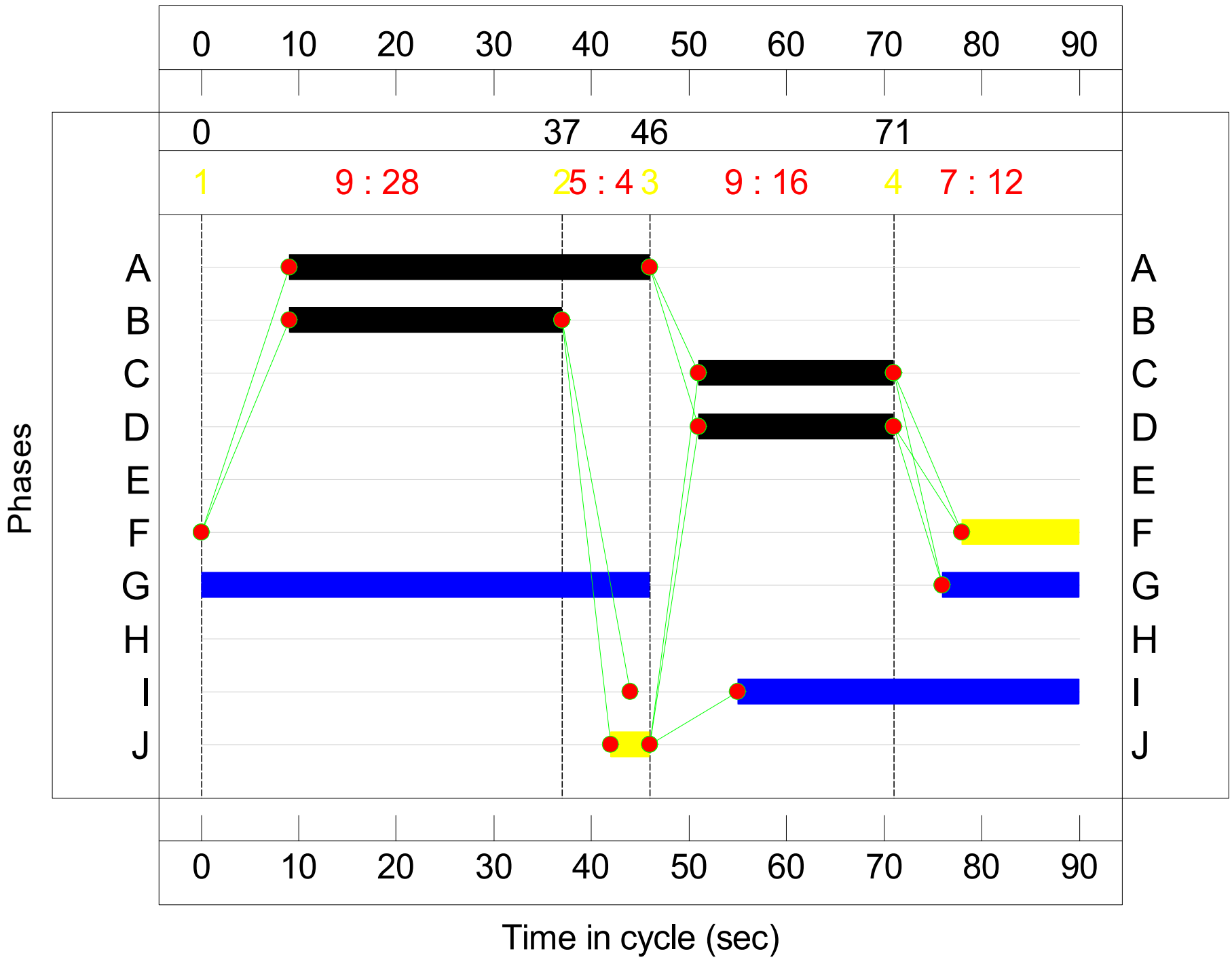
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	4
Duration	28	4	16	12
Change Point	0	37	46	71

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: A34_ Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**83.4%**
A34 / Inchley Road / Booth Street East	-	-	**N/A**	-	-		-	-	-	-	-	-	**83.4%**
1/1	Inchley Road	U	N/A	N/A	E		0	0	-	0	2049	0	0.0%
2/1	A34 (S) Left Ahead	U	N/A	N/A	B		1	28	-	469	1821	587	79.9%
2/2	A34 (S) Ahead	U	N/A	N/A	B		1	28	-	570	2120	683	83.4%
3/1	Booth Street East Right Left	U	N/A	N/A	C		1	20	-	312	1762	411	75.9%
3/2	Booth Street East Right	U	N/A	N/A	D		1	20	-	343	1920	448	76.6%
4/1	A34 (N) Ahead	U	N/A	N/A	A		1	37	-	464	1935	817	56.8%
4/2	A34 (N) Ahead	U	N/A	N/A	A		1	37	-	505	2055	868	58.2%
4/3	A34 (N) Right	O	N/A	N/A	A	J	1	37	4	229	1868	326	70.3%
5/1	Inchley Rd exit	U	N/A	N/A	-		-	-	-	0	Inf	Inf	0.0%
6/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	667	Inf	Inf	0.0%
6/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	848	Inf	Inf	0.0%
7/1	Booth St East exit	U	N/A	N/A	-		-	-	-	638	Inf	Inf	0.0%
8/1	A34 (N) exit	U	N/A	N/A	-		-	-	-	169	Inf	Inf	0.0%
8/2	A34 (N) exit	U	N/A	N/A	-		-	-	-	570	Inf	Inf	0.0%

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: A34_ Booth Street East	-	-	**20**	**145**	**63**	**20.5**	**10.0**	**1.2**	**31.7**	-	-	-	-
A34 / Inchley Road / Booth Street East	-	-	**20**	**145**	**63**	**20.5**	**10.0**	**1.2**	**31.7**	-	-	-	-
1/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
2/1	469	469	-	-	-	3.6	1.9	-	5.6	42.6	10.7	1.9	12.6
2/2	570	570	-	-	-	4.5	2.4	-	6.9	43.5	13.1	2.4	15.6
3/1	312	312	-	-	-	2.8	1.5	-	4.3	49.8	7.2	1.5	8.7
3/2	343	343	-	-	-	3.1	1.6	-	4.7	48.8	8.0	1.6	9.6
4/1	464	464	-	-	-	2.5	0.7	-	3.2	24.8	8.8	0.7	9.4
4/2	505	505	-	-	-	2.8	0.7	-	3.5	24.9	9.5	0.7	10.2
4/3	229	229	20	145	63	1.2	1.2	1.2	3.6	56.5	3.8	1.2	4.9
5/1	0	0	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	667	667	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	848	848	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	638	638	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	169	169	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	570	570	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

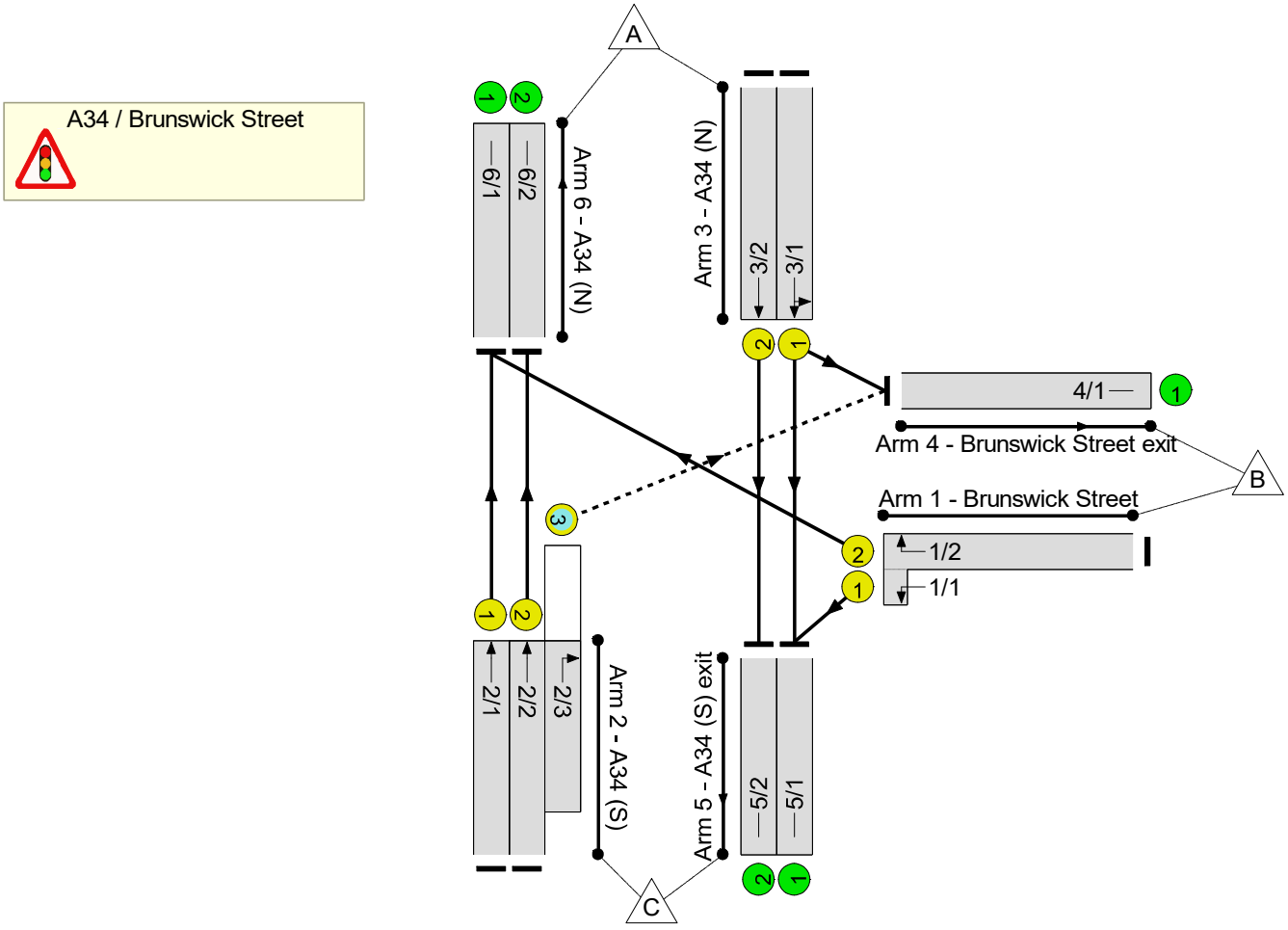
C1 PRC for Signalled Lanes (%): 7.9 Total Delay for Signalled Lanes (pcuHr): 31.70 Cycle Time (s): 90
PRC Over All Lanes (%): 7.9 Total Delay Over All Lanes(pcuHr): 31.70

Full Input Data And Results

User and Project Details

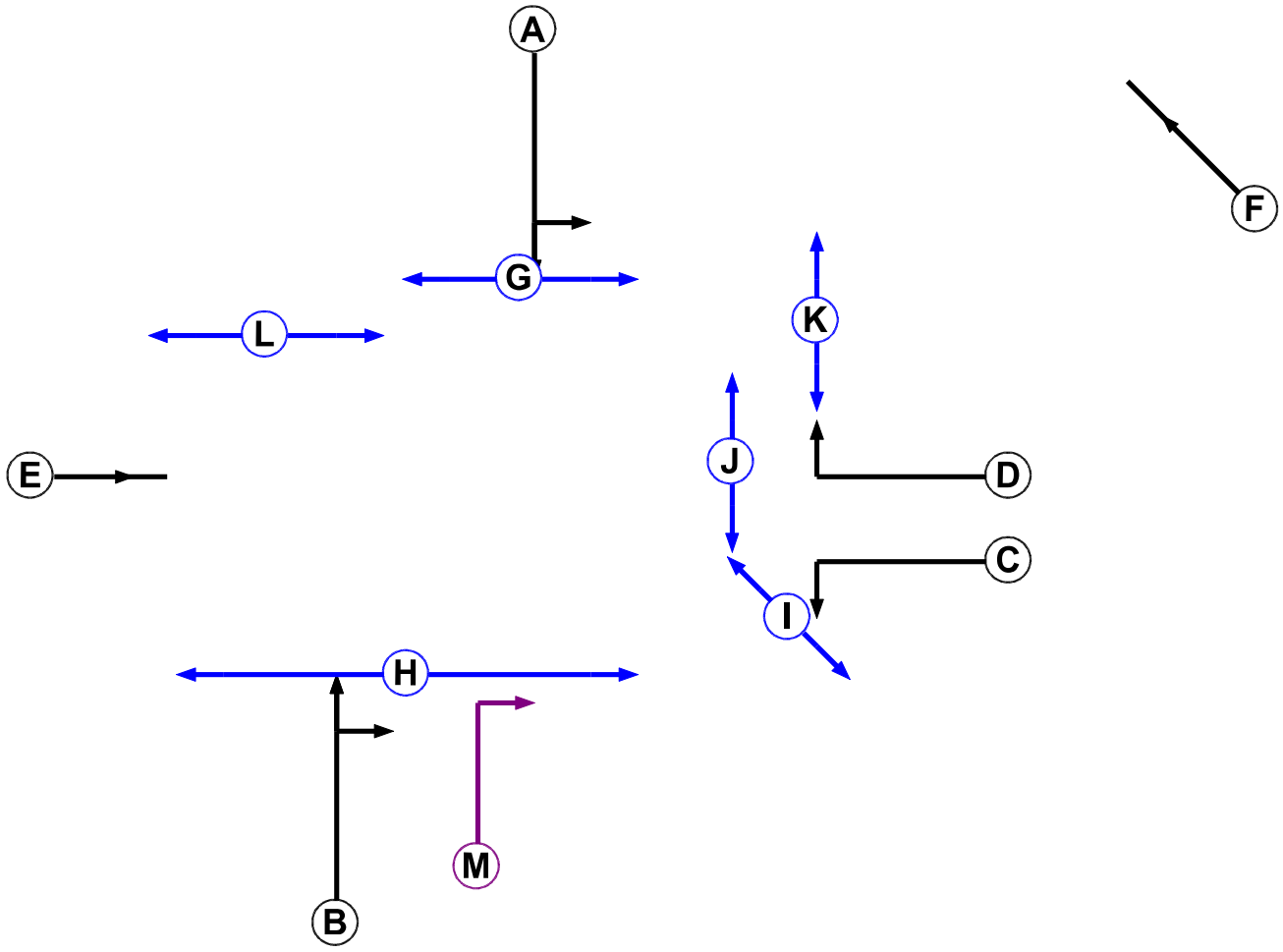
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Title:	**Brunswick Street**
Location:	
Date Completed:	June 2023
Additional detail:	
File name:	A34_Brunswick Street IGA.lsg3x
Author:	
Company:	
Address:	

Network Layout Diagram



Full Input Data And Results

Phase Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		-9999	7
B	Traffic		-9999	7
C	Traffic		-9999	7
D	Traffic		-9999	7
E	Traffic		-9999	7
F	Traffic		-9999	7
G	Pedestrian		-9999	6
H	Pedestrian		-9999	10
I	Pedestrian		-9999	5
J	Pedestrian		-9999	5
K	Pedestrian		-9999	5
L	Pedestrian		-9999	5
M	Ind. Arrow	B	-9999	4

Full Input Data And Results

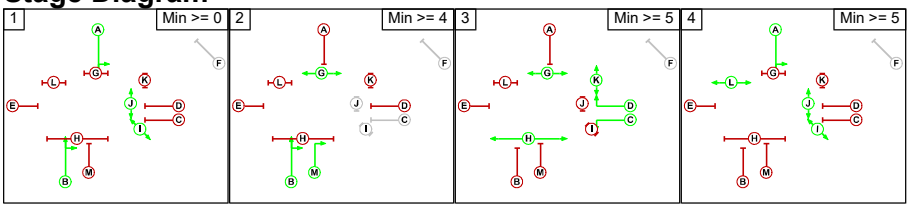
Phase Intergreens Matrix

	Starting Phase													
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K	L	M
	A		-	10	6	5	-	5	9	-	-	9	-	5
	B	-		-	6	5	-	-	5	-	-	10	8	-
	C	3	-		-	4	-	-	-	5	-	-	-	-
	D	6	6	-		6	-	-	-	-	5	-	10	-
	E	6	6	9	7		-	-	10	-	-	9	-	-
	F	-	-	-	-	-		-	-	-	-	-	-	-
	G	6	-	-	-	-	-		-	-	-	-	-	-
	H	8	8	-	-	8	-	-		-	-	-	-	-
	I	-	-	5	-	-	-	-	-		-	-	-	-
	J	-	-	-	5	-	-	-	-	-		-	-	-
	K	5	5	-	-	5	-	-	-	-	-		-	-
	L	-	5	-	5	-	-	-	-	-	-	-		-
	M	-	-	-	6	-	-	-	-	-	-	10	-	

Phases in Stage

Stage No.	Phases in Stage
1	A B I J
2	B G M
3	C D G H K
4	A I J L

Stage Diagram



Full Input Data And Results

Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
1	3	I	Losing	5	5
1	3	J	Losing	1	1
3	1	C	Losing	2	2
3	1	D	Losing	2	2
3	1	G	Losing	2	2
3	1	K	Losing	3	3
3	4	K	Losing	3	3
4	1	L	Losing	1	1
4	3	I	Losing	4	4
4	3	J	Losing	2	2
4	3	L	Losing	2	2

Prohibited Stage Change

	To Stage				
From Stage		1	2	3	4
	1		5	10	8
	2	6		10	8
	3	8	X		10
	4	6	5	10	

Full Input Data And Results

Give-Way Lane Input Data

Junction: A34 / Brunswick Street											
Lane	**Movement**	**Max Flow when Giving Way (PCU/Hr)**	**Min Flow when Giving Way (PCU/Hr)**	**Opposing Lane**	**Opp. Lane Coeff.**	**Opp. Mvmnts.**	**Right Turn Storage (PCU)**	**Non-Blocking Storage (PCU)**	**RTF**	**Right Turn Move up (s)**	**Max Turns in Intergreen (PCU)**
2/3 (A34 (S))	4/1 (Right)	1439	0	3/1	1.09	All	4.00	-	0.50	4	4.00
				3/2	1.09	All					

Full Input Data And Results

Lane Input Data

Junction: A34 / Brunswick Street												
Lane	**Lane Type**	**Phases**	**Start Disp.**	**End Disp.**	**Physical Length (PCU)**	**Sat Flow Type**	**Def User Saturation Flow (PCU/Hr)**	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Turns**	**Turning Radius (m)**
1/1 (Brunswick Street)	U	C	2	3	1.0	Geom	-	3.00	0.00	Y	Arm 5 Left	20.00
1/2 (Brunswick Street)	U	D	2	3	60.0	Geom	-	3.80	0.00	N	Arm 6 Right	10.00
2/1 (A34 (S))	U	B	2	3	36.2	Geom	-	3.30	0.00	Y	Arm 6 Ahead	Inf
2/2 (A34 (S))	U	B	2	3	36.2	Geom	-	3.03	0.00	N	Arm 6 Ahead	Inf
2/3 (A34 (S))	O	B M	2	3	8.7	Geom	-	2.95	0.00	N	Arm 4 Right	10.00
3/1 (A34 (N))	U	A	2	3	49.7	Geom	-	3.49	0.00	Y	Arm 4 Left	10.00
											Arm 5 Ahead	Inf
3/2 (A34 (N))	U	A	2	3	49.7	Geom	-	3.34	0.00	N	Arm 5 Ahead	Inf
4/1 (Brunswick Street exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
5/2 (A34 (S) exit)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (A34 (N))	U		2	3	60.0	Inf	-	-	-	-	-	-
6/2 (A34 (N))	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
5: 'Sensitivity Test (Cumulative) AM Peak'	08:15	09:15	01:00	

Full Input Data And Results

Scenario 5: 'Existing Layout' (FG5: 'Sensitivity Test (Cumulative) AM Peak', Plan 1: 'Peds every second cycle')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	204	796	1000
	B	283	0	286	569
	C	1135	171	0	1306
	Tot.	1418	375	1082	2875

Traffic Lane Flows

Lane	Scenario 5: Existing Layout
Junction: A34 / Brunswick Street	
1/1 (short)	286
1/2 (with short)	569(In) 283(Out)
2/1	568
2/2 (with short)	738(In) 567(Out)
2/3 (short)	171
3/1	455
3/2	545
4/1	375
5/1	537
5/2	545
6/1	851
6/2	567

Full Input Data And Results

Lane Saturation Flows

Junction: A34 / Brunswick Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Brunswick Street)	3.00	0.00	Y	Arm 5 Left	20.00	100.0 %	1781	1781
1/2 (Brunswick Street)	3.80	0.00	N	Arm 6 Right	10.00	100.0 %	1857	1857
2/1 (A34 (S))	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
2/2 (A34 (S))	3.03	0.00	N	Arm 6 Ahead	Inf	100.0 %	2058	2058
2/3 (A34 (S))	2.95	0.00	N	Arm 4 Right	10.00	100.0 %	1783	1783
3/1 (A34 (N))	3.49	0.00	Y	Arm 4 Left	10.00	44.8 %	1840	1840
				Arm 5 Ahead	Inf	55.2 %		
3/2 (A34 (N))	3.34	0.00	N	Arm 5 Ahead	Inf	100.0 %	2089	2089
4/1 (Brunswick Street exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 6: 'Existing Layout' (FG6: 'Sensitivity Test (Cumulative) PM Peak', Plan 1: 'Peds every second cycle')

Traffic Flows, Desired

Desired Flow :

	Destination				
Origin		A	B	C	Tot.
	A	0	351	1110	1461
	B	227	0	166	393
	C	844	172	0	1016
	Tot.	1071	523	1276	2870

Traffic Lane Flows

Lane	Scenario 6: Existing Layout
Junction: A34 / Brunswick Street	
1/1 (short)	166
1/2 (with short)	393(In) 227(Out)
2/1	670
2/2 (with short)	346(In) 174(Out)
2/3 (short)	172
3/1	666
3/2	795
4/1	523
5/1	481
5/2	795
6/1	897
6/2	174

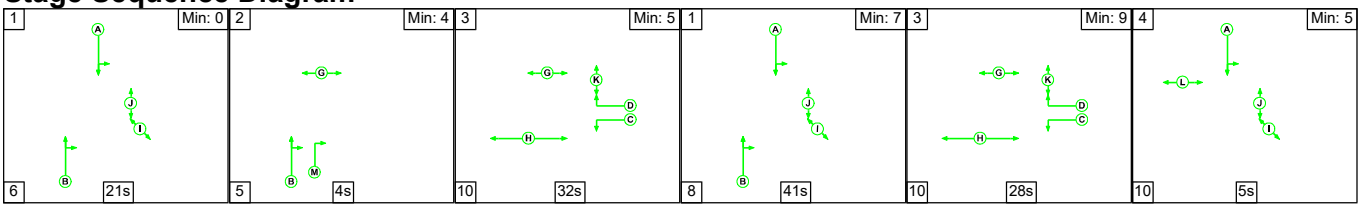
Full Input Data And Results

Lane Saturation Flows

Junction: A34 / Brunswick Street								
Lane	**Lane Width (m)**	**Gradient**	**Nearside Lane**	**Allowed Turns**	**Turning Radius (m)**	**Turning Prop.**	**Sat Flow (PCU/Hr)**	**Flared Sat Flow (PCU/Hr)**
1/1 (Brunswick Street)	3.00	0.00	Y	Arm 5 Left	20.00	100.0 %	1781	1781
1/2 (Brunswick Street)	3.80	0.00	N	Arm 6 Right	10.00	100.0 %	1857	1857
2/1 (A34 (S))	3.30	0.00	Y	Arm 6 Ahead	Inf	100.0 %	1945	1945
2/2 (A34 (S))	3.03	0.00	N	Arm 6 Ahead	Inf	100.0 %	2058	2058
2/3 (A34 (S))	2.95	0.00	N	Arm 4 Right	10.00	100.0 %	1783	1783
3/1 (A34 (N))	3.49	0.00	Y	Arm 4 Left	10.00	52.7 %	1820	1820
				Arm 5 Ahead	Inf	47.3 %		
3/2 (A34 (N))	3.34	0.00	N	Arm 5 Ahead	Inf	100.0 %	2089	2089
4/1 (Brunswick Street exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (A34 (S) exit Lane 1)	Infinite Saturation Flow						Inf	Inf
5/2 (A34 (S) exit Lane 2)	Infinite Saturation Flow						Inf	Inf
6/1 (A34 (N) Lane 1)	Infinite Saturation Flow						Inf	Inf
6/2 (A34 (N) Lane 2)	Infinite Saturation Flow						Inf	Inf

Scenario 5: 'Existing Layout' (FG5: 'Sensitivity Test (Cumulative) AM Peak', Plan 1: 'Peds every second cycle')

Stage Sequence Diagram

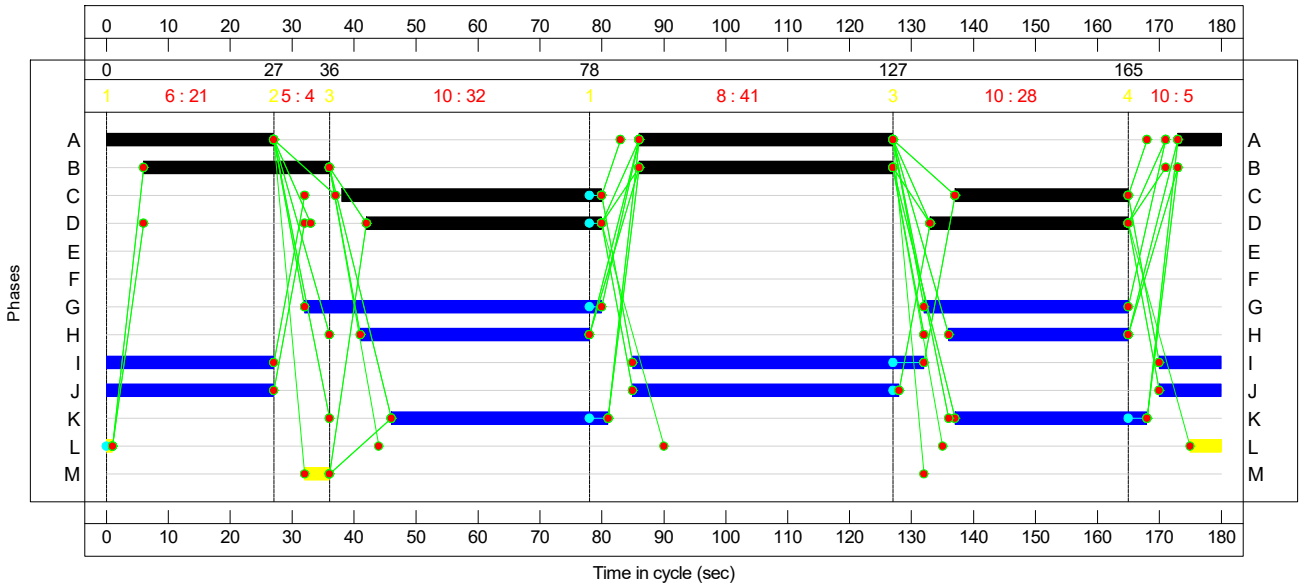


Stage Timings

Stage	1	2	3	1	3	4
Duration	21	4	32	41	28	5
Change Point	0	27	36	78	127	165

Full Input Data And Results

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**78.9%**
A34 / Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**78.9%**
1/2+1/1	Brunswick Street Left Right	U	N/A	N/A	D C		2	70	-	569	1857:1781	361+365	78.3 : 78.3%
2/1	A34 (S) Ahead	U	N/A	N/A	B		2	71	-	568	1945	789	72.0%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B	M	2	71	4	738	2058:1783	719+217	78.9 : 78.9%
3/1	A34 (N) Left Ahead	U	N/A	N/A	A		2	75	-	455	1840	787	57.8%
3/2	A34 (N) Ahead	U	N/A	N/A	A		2	75	-	545	2089	894	61.0%
4/1	Brunswick Street exit	U	N/A	N/A	-		-	-	-	375	Inf	Inf	0.0%
5/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	537	Inf	Inf	0.0%
5/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	545	Inf	Inf	0.0%
6/1	A34 (N)	U	N/A	N/A	-		-	-	-	851	Inf	Inf	0.0%
6/2	A34 (N)	U	N/A	N/A	-		-	-	-	567	Inf	Inf	0.0%

Full Input Data And Results

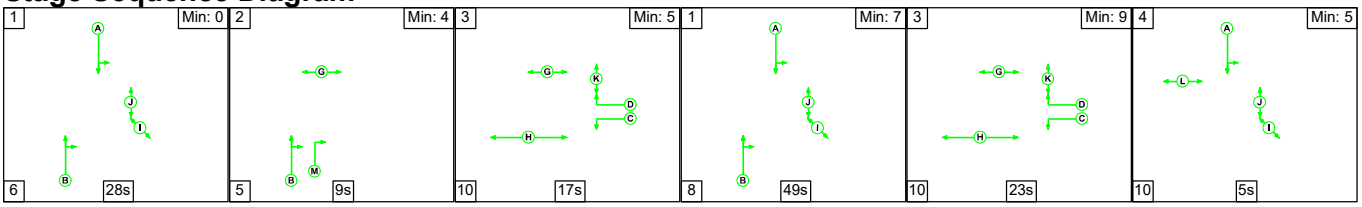
Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Brunswick Street	**-**	**-**	**78**	**44**	**50**	**17.3**	**6.3**	**0.8**	**24.4**	**-**	**-**	**-**	**-**
A34 / Brunswick Street	**-**	**-**	**78**	**44**	**50**	**17.3**	**6.3**	**0.8**	**24.4**	**-**	**-**	**-**	**-**
1/2+1/1	569	569	-	-	-	3.7	1.8	-	5.5	34.7	11.3	1.8	13.1
2/1	568	568	-	-	-	3.6	1.3	-	4.8	30.7	12.8	1.3	14.1
2/2+2/3	738	738	78	44	50	4.4	1.8	0.8	7.0	34.2	14.2	1.8	16.0
3/1	455	455	-	-	-	2.5	0.7	-	3.2	25.3	9.7	0.7	10.4
3/2	545	545	-	-	-	3.1	0.8	-	3.8	25.4	11.8	0.8	12.6
4/1	375	375	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	537	537	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2	545	545	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	851	851	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	567	567	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1 PRC for Signalled Lanes (%): 14.1 Total Delay for Signalled Lanes (pcuHr): 24.38 Cycle Time (s): 180
PRC Over All Lanes (%): 14.1 Total Delay Over All Lanes(pcuHr): 24.38

Full Input Data And Results

Scenario 6: 'Existing Layout' (FG6: 'Sensitivity Test (Cumulative) PM Peak', Plan 1: 'Peds every second cycle')

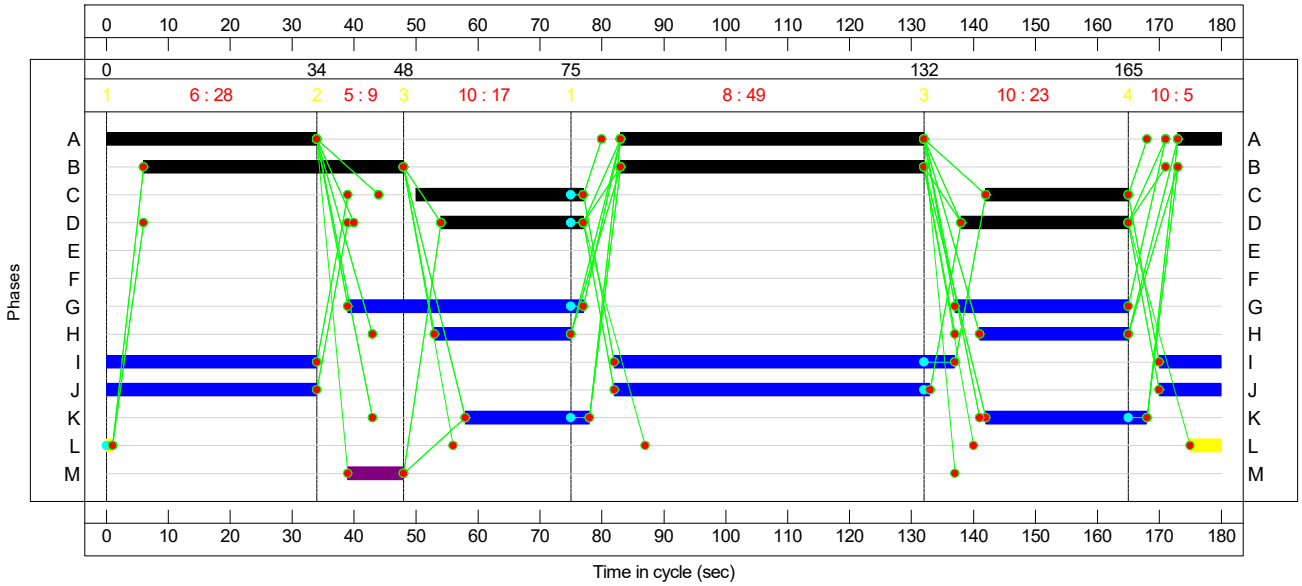
Stage Sequence Diagram



Stage Timings

Stage	1	2	3	1	3	4
Duration	28	9	17	49	23	5
Change Point	0	34	48	75	132	165

Signal Timings Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network: Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**74.5%**
A34 / Brunswick Street	-	-	**N/A**	-	-		-	-	-	-	-	-	**74.5%**
1/2+1/1	Brunswick Street Left Right	U	N/A	N/A	D C		2	50	-	393	1857:1781	305+223	74.4 : 74.4%
2/1	A34 (S) Ahead	U	N/A	N/A	B		2	91	-	670	1945	1005	66.7%
2/2+2/3	A34 (S) Right Ahead	U+O	N/A	N/A	B	M	2	91	9	346	2058:1783	242+239	71.9 : 71.9%
3/1	A34 (N) Left Ahead	U	N/A	N/A	A		2	90	-	666	1820	930	71.6%
3/2	A34 (N) Ahead	U	N/A	N/A	A		2	90	-	795	2089	1068	74.5%
4/1	Brunswick Street exit	U	N/A	N/A	-		-	-	-	523	Inf	Inf	0.0%
5/1	A34 (S) exit	U	N/A	N/A	-		-	-	-	481	Inf	Inf	0.0%
5/2	A34 (S) exit	U	N/A	N/A	-		-	-	-	795	Inf	Inf	0.0%
6/1	A34 (N)	U	N/A	N/A	-		-	-	-	897	Inf	Inf	0.0%
6/2	A34 (N)	U	N/A	N/A	-		-	-	-	174	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network: Brunswick Street	**-**	**-**	**0**	**88**	**84**	**14.5**	**6.4**	**1.3**	**22.2**	**-**	**-**	**-**	**-**
A34 / Brunswick Street	**-**	**-**	**0**	**88**	**84**	**14.5**	**6.4**	**1.3**	**22.2**	**-**	**-**	**-**	**-**
1/2+1/1	393	393	-	-	-	3.1	1.4	-	4.6	41.9	8.4	1.4	9.9
2/1	670	670	-	-	-	3.1	1.0	-	4.1	22.1	14.9	1.0	15.9
2/2+2/3	346	346	0	88	84	1.2	1.3	1.3	3.8	39.2	2.8	1.3	4.0
3/1	666	666	-	-	-	3.2	1.2	-	4.4	23.9	13.9	1.2	15.1
3/2	795	795	-	-	-	3.9	1.4	-	5.3	24.0	17.0	1.4	18.4
4/1	523	523	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/1	481	481	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2	795	795	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	897	897	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	174	174	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0

C1

PRC for Signalled Lanes (%): 20.9
PRC Over All Lanes (%): 20.9

Total Delay for Signalled Lanes (pcuHr): 22.18
Total Delay Over All Lanes(pcuHr): 22.18

Cycle Time (s): 180



APPENDIX TA19

Estimate of Phase 1 'Peak' Construction Staff Traffic Levels

Maximum Construction Staff Demand:	250	Operatives	40	Management / Office Staff
Construction Staff Car User Demand	40.2%	Operatives	80%	Management Staff
Typical Construction Staff Car Occupancy	1.24	Operatives per vehicle	1	Management Staff Per Vehicle
Construction Operative Trip Demand (Parking)	81	Operative Staff Vehicles Parking per Day	32	Operative Staff Vehicles Parking per Day
Construction Working Hours:	**07:30 - 18:00**	(Core Hours 07:30-16:00)	**08:00 - 17:00**	(Core Hours 07:30-16:00)

Anticipated Construction Staff & Visitor Arrival / Departure Profile

Hour Begin	Operatives Arr	Operatives Dep	Operatives Total	Manage Arr	Manage Dep	Manage Total	Vist / Other Arr	Vist / Other Dep	Vist / Other Total
06:00	2	0	**2**	2	0	**2**	0	0	**0**
07:00	61	0	**61**	16	0	**16**	0	0	**0**
08:00	18	0	**18**	14	0	**14**	3	0	**3**
09:00	0	0	**0**	0	0	**0**	3	3	**7**
10:00	0	0	**0**	0	0	**0**	3	3	**7**
11:00	0	0	**0**	0	0	**0**	3	3	**7**
12:00	0	0	**0**	0	0	**0**	3	3	**7**
13:00	0	0	**0**	0	0	**0**	3	3	**7**
14:00	0	0	**0**	0	0	**0**	3	3	**7**
15:00	0	4	**4**	0	0	**0**	3	3	**7**
16:00	0	49	**49**	0	5	**5**	0	3	**3**
17:00	0	24	**24**	0	19	**19**	0	0	**0**
18:00	0	4	**4**	0	8	**8**	0	0	**0**
12hr 07:00-19:00	79	81	**160**	30	32	**62**	27	27	**54**

Hour Begin	Total Arr	Total Dep	Total 2-Way
06:00	4	0	**4**
07:00	77	0	**77**
08:00	36	0	**36**
09:00	3	3	**7**
10:00	3	3	**7**
11:00	3	3	**7**
12:00	3	3	**7**
13:00	3	3	**7**
14:00	3	3	**7**
15:00	3	7	**11**
16:00	0	57	**57**
17:00	0	44	**44**
18:00	0	12	**12**
12hr 07:00-19:00	137	140	**277**

Anticipated Construction HGV Demand Profile

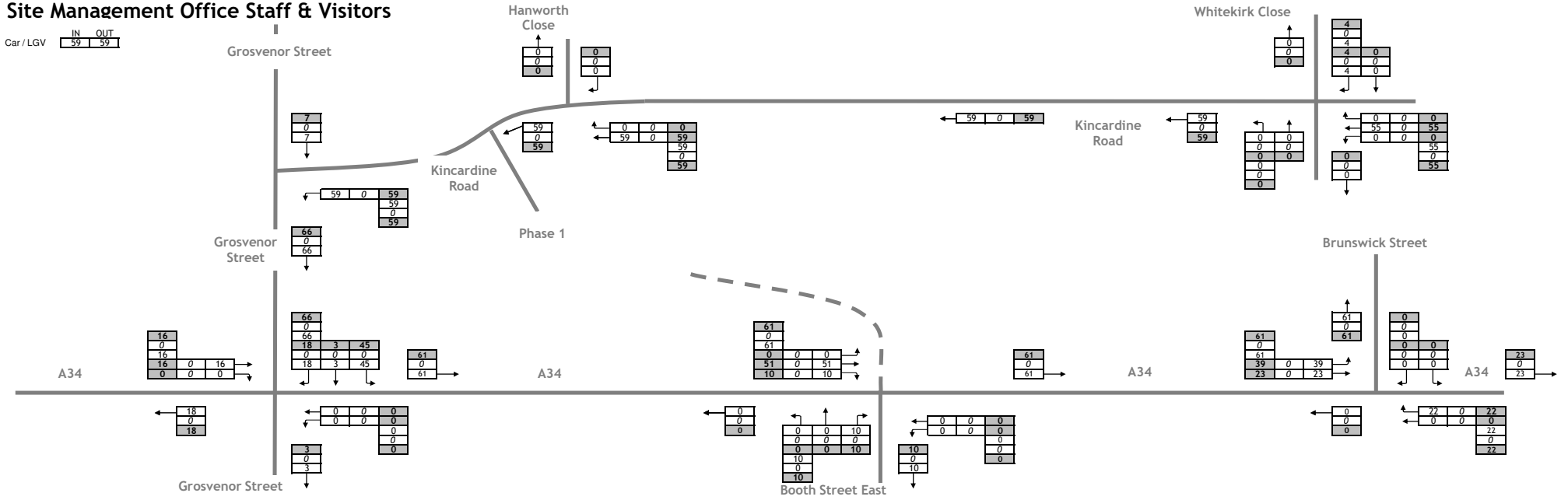
Maximum Phase 1 HGV Demand	Arrival	60
	Departure	60

Hour Begin	Arrival	Departure	Total	Assumption
06:00	0	0	**0**	
07:00	5	5	**9**	7.5% Arrivals, 7.5% Departures
08:00	8	8	**15**	12.5% Arrivals, 12.5% Departures
09:00	8	8	**15**	12.5% Arrivals, 12.5% Departures
10:00	8	8	**15**	12.5% Arrivals, 12.5% Departures
11:00	8	8	**15**	12.5% Arrivals, 12.5% Departures
12:00	8	8	**15**	12.5% Arrivals, 12.5% Departures
13:00	6	6	**12**	10% Arrivals, 10% Departures
14:00	6	6	**12**	10% Arrivals, 10% Departures
15:00	3	3	**6**	5% Arrivals, 5% Departures
16:00	2	2	**3**	2.5% Arrivals, 2.5% Departures
17:00	2	2	**3**	2.5% Arrivals, 2.5% Departures
18:00	0	0	**0**	
12hr 07:00-19:00	60	60	**120**	

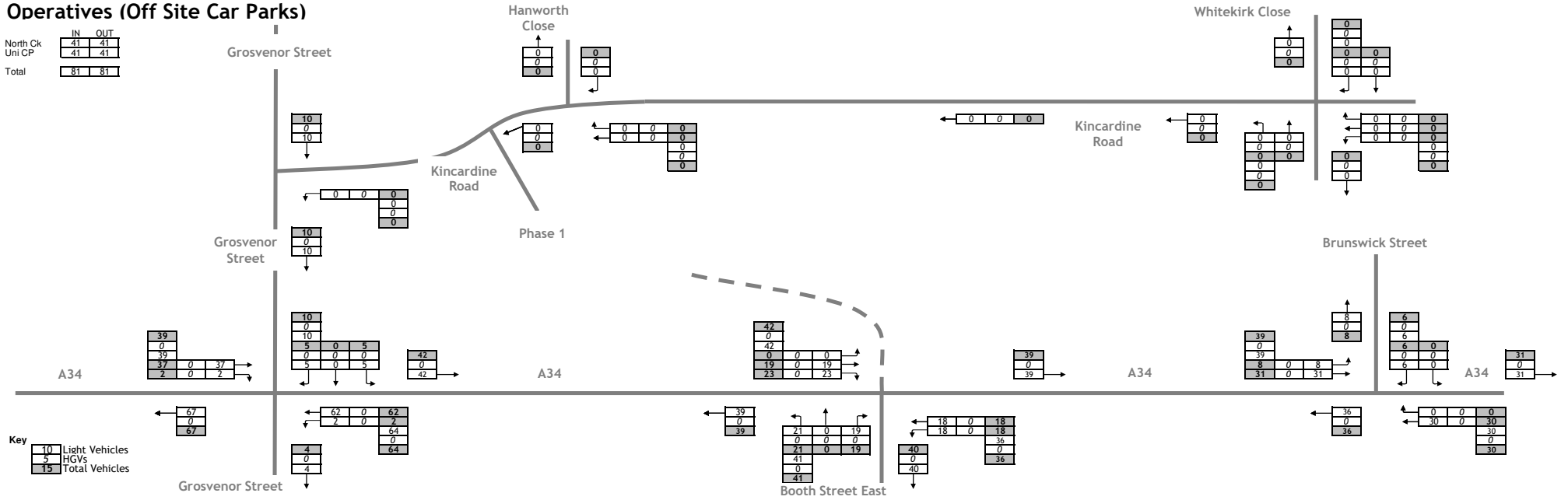


APPENDIX TA20

Site Management Office Staff & Visitors

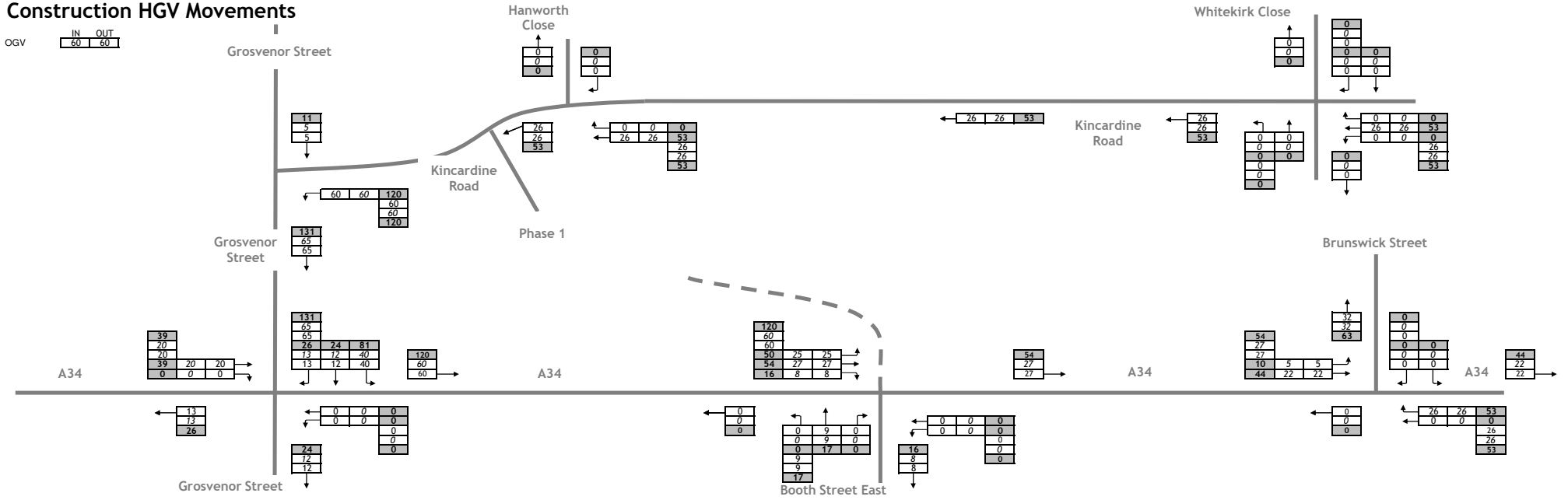


Operatives (Off Site Car Parks)

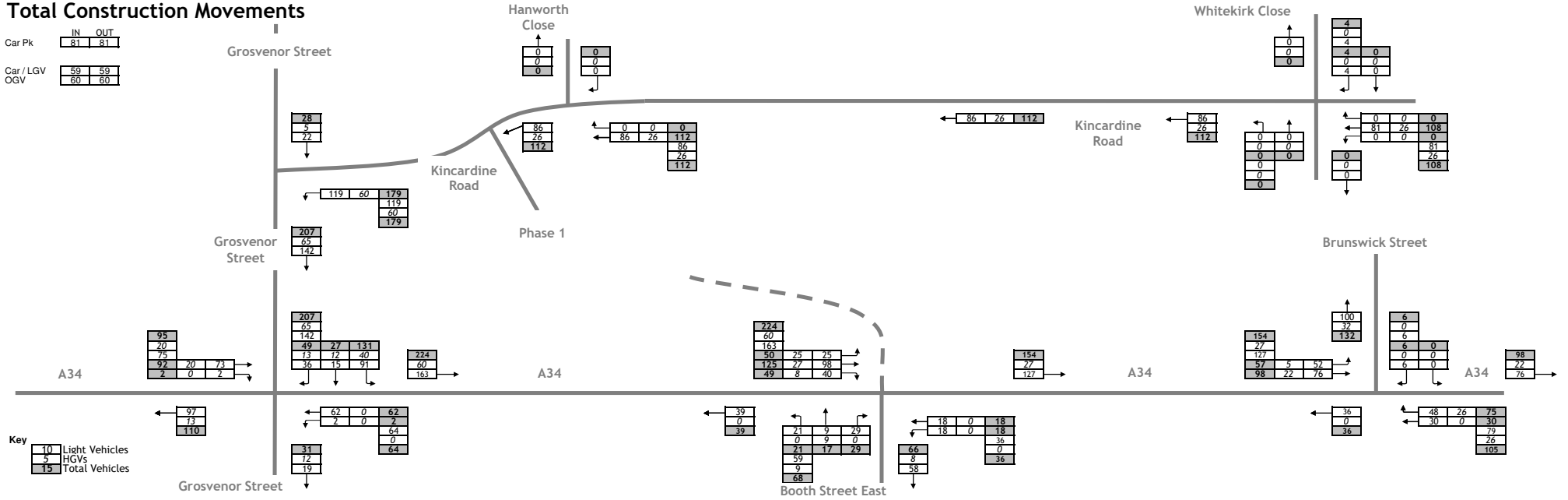


Appendix TA20(i)	**Construction Phase 1: Staff / Visitor Trips to Site Management Office and Car Parks (24 Hour)**	
J000370	Upper Brook Street Masterplan	June 2023

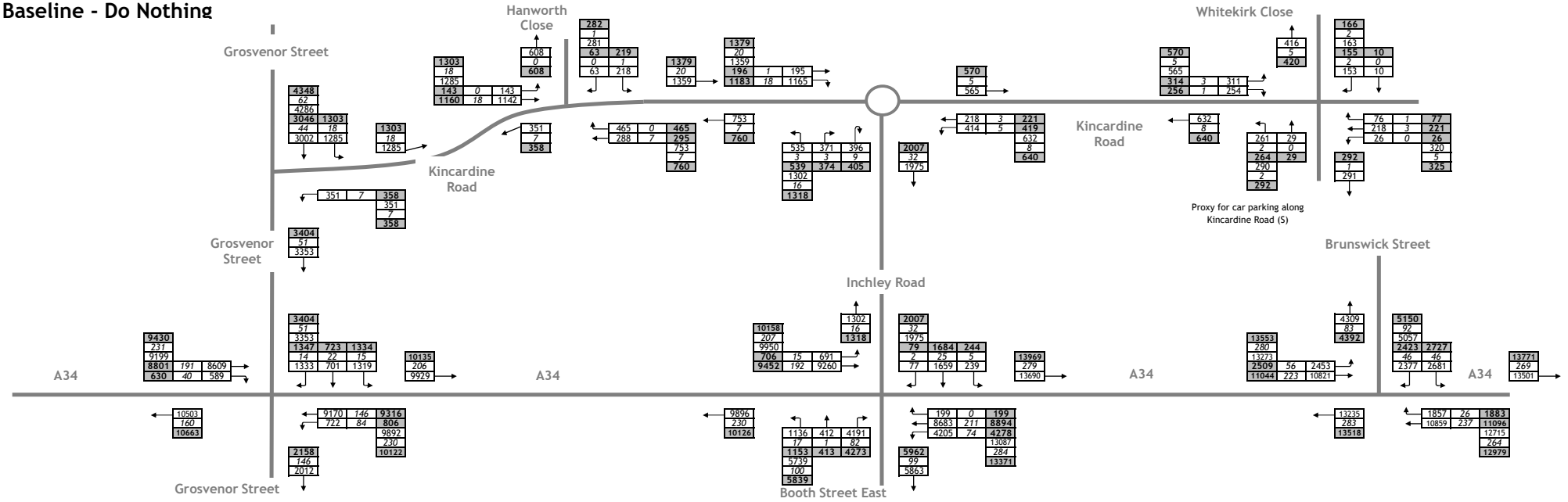
Construction HGV Movements



Total Construction Movements



Baseline - Do Nothing



Construction Movements & Local Traffic Management

