RICHMOND UPON THAMES COLLEGE
RESIDENTIAL DEVELOPMENT ZONE

Proposed Residential Development

Residential Travel Plan

CLARION HOUSING GROUP

Prepared on behalf of
Clarion Housing Group

20/5453/TP02

May 2021

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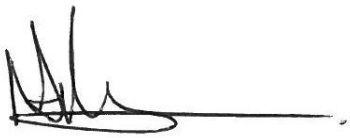
Approved by:	NDR		Date:	28/04/2021

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PLANS

APPENDICES

1 INTRODUCTION

1.1 Background

1.1.1 This Travel Plan has been prepared by RGP on behalf of Clarion Housing Group in relation to the proposed development of the 'Residential Development Zone' of the Richmond Education and Enterprise Campus (REEC) site at Richmond upon Thames College ("the site")

1.1.2 The site is located in Twickenham, within the London Borough of Richmond upon Thames as illustrates on in **Figure 1.1** below.

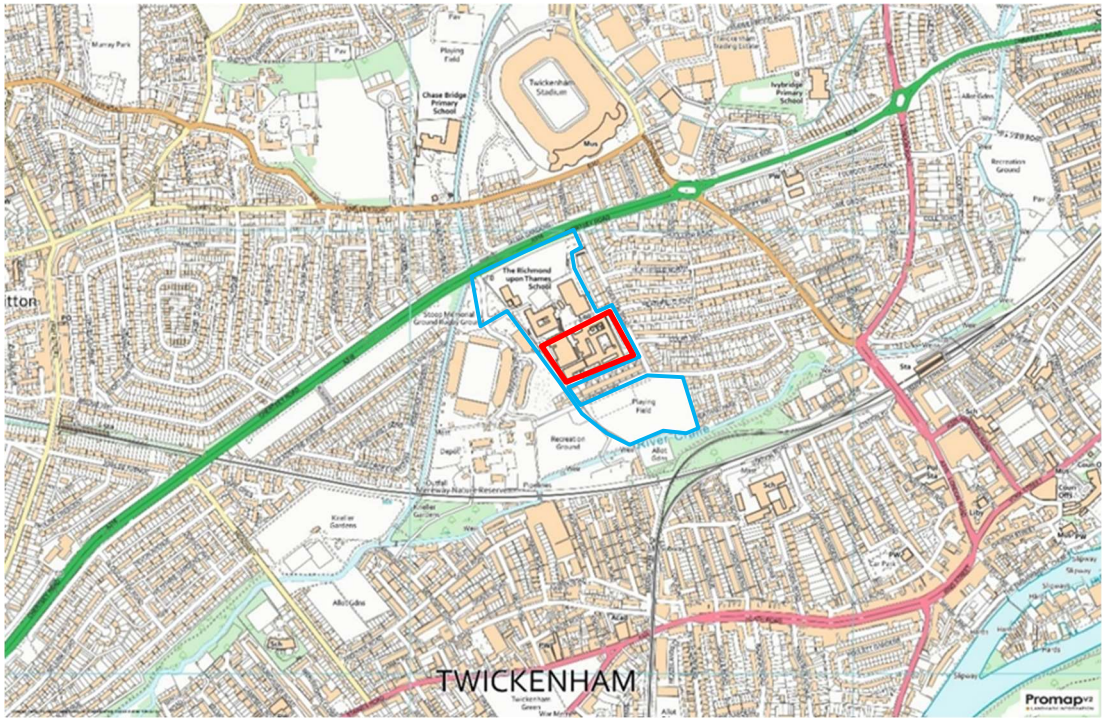


Figure 1.1 Extents of Development Site in Relation to RuTC Site

1.1.3 The development site (shown in red in Figure 1.1) forms part of the wider REEC development site (shown in blue), bound by the A316 Chertsey Road to the north and the Harlequins Stoop Stadium to the west. The site is bounded by the new College buildings and a secondary school to the north, and residential neighbours to the east and south served from Craneford Way on Egerton Road.

1.1.1 The site comprises the 'Residential Development Zone' of the wider mixed-use redevelopment of the REEC site. In August 2016, Outline planning permission 15/3038/OUT was granted for the demolition of the REEC to provide a new consolidated College campus in the north and west area of the site, enabling the remainder of the site to be redeveloped to provide a mixed-use scheme.

1.1.2 The Outline planning application was supported by a Transport Assessment prepared by *Transport Planning Practice* to demonstrate the key transport related aspects of the overall scheme. A Framework Travel Plan was also submitted (June 2015) to encourage non-car use across the site.

1.1.3 An extract of the approved Masterplan layout drawing is shown below (**Figure 1.2**), indicating the approved 'Development Zones'. The Residential Development Zone is shown at the south end of the site to the rear of the College campus, with access gained via the main access off Langhorn Drive, in a shared arrangement with the College and Twickenham Stoop Rugby Stadium.

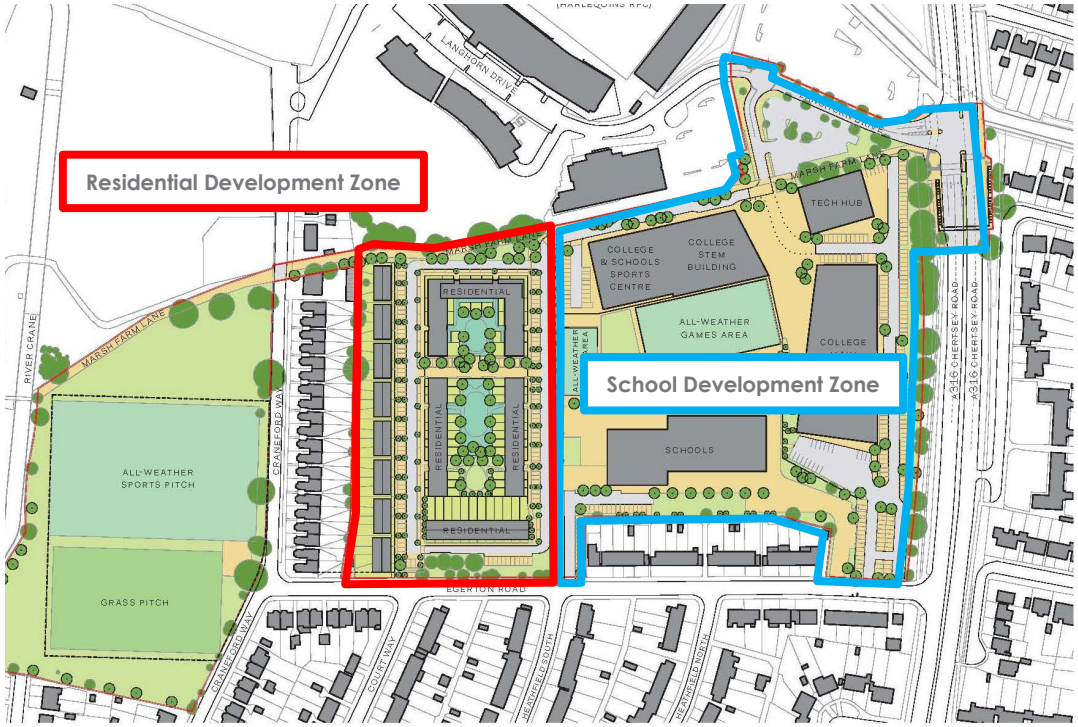


Figure 1.2 RuTC Site Development Zones

1.1.4 A Reserved Matters planning application (18/4157/RES) was approved in 2019 for the redevelopment of the 'Residential Development Zone' for the delivery of 180 homes. No further transport planning submissions were required for that application. That Reserved Matters scheme is no longer considered to be a viable option for Clarion Housing Group, who is seeking to revaluate the layout to the Residential Development Zone with a revised planning strategy as a pre-cursor to the submission of a full detailed planning application. The proposals would include a residential scheme of 212 new homes.

1.1.5 This Travel Plan therefore relates to the revised proposed to provide 212 dwelling residential development, including 30 houses and 182 flats/apartments.

1.2 Development Proposals

1.2.1 A copy of the proposed Masterplan Layout and Accommodation Schedule for the residential development is attached at **Appendix A**.

1.2.2 The revised proposals would retain the previously approved access arrangements, with all traffic to be served by the new signalised junction via Langhorn Drive. Access would continue to be provided via Egerton Road for pedestrians and cyclists only. This would be achieved through the closure of the existing vehicular access that previously served the main College staff car park, also allowing the reinstatement of on-street parking provision on Egerton Road.

1.2.3 The proposals have been developed to strike a careful balance between providing suitable levels of car parking on site for residents, whilst ensuring that residents are not car-reliant and are encouraged to utilise other modes of travel. The aspiration is to promote a 'car-lite' scheme and encourage reduced car ownership.

1.2.4 The scheme would provide 108 car parking spaces, to include 3% disabled at the outset and the potential to increase to 10%. Furthermore, 20% of the total provision would be equipped with 'active' electric vehicle charging provision and the remainder with 'passive', to be implemented, when demand warrants.

1.2.5 The proposed 212 residential units require a total provision of 388 long-stay cycle parking spaces within secure and sheltered locations. In line with the requirements of the London Cycle Design Standards, the proposals would include a range of different parking methods to suit all abilities, including a mixture of cycle stackers, 'Sheffield' type cycle stands and 'oversized' spaces for cargo bikes and tricycles, recumbent bikes, bicycles with trailers and tandem bikes, for example (1500mm space between stands and 3000mm long bays).

1.2.6 In addition to the above requirement for long-stay parking, the London Plan also confirms the requirement for short-stay parking at 1 space per 40 dwellings. The proposals therefore include 6 visitor cycle spaces (3 Sheffield cycle stands) on-street.

1.2.7 In addition, the proposals would incorporate and Brompton style bike station with secure storage, with bikes available for use by all residents.

1.3 Travel Planning Policy

1.3.1 The need to manage transport in new developments is embedded within national, regional and local policy, with the need to reduce car dependency, increase travel choices and encourage sustainable travel supported by the National Planning Policy Framework (NPPF) which states that all developments which will generate significant amounts of movement should be required to provide a Travel Plan (Paragraph 111).

1.3.2 Furthermore, Paragraph 104 of the NPPF recommends that planning policies support an appropriate mix of uses across an area, to minimise the number and length of journeys needed for employment, shopping, leisure, education and other activities.

1.3.3 The London Plan 2021, Para. 5.1.10 recognises the importance of shared use and co-location of social infrastructure in reducing the need to travel and improving accessibility, while Para. 10.4.3 suggests that the use of travel plans may help reduce the negative impact of development on the transport network and reduce potentially harmful public health benefits. Whilst the Mayor's Transport Strategy (2018) requires the use of Travel Plans to help deliver sustainable development in London and encourage people to make different choices about how they travel.

1.3.4 Policy T4 Assessing and mitigating transport impacts states 'Travel Plans … will be required having regard to Transport for London guidance.'

1.3.5 This Travel Plan has been prepared with regard to relevant guidance and best practice.

1.3.6 In addition to this TP, a Transport Assessment (TA) has been prepared by RGP, which outlines the forecast transport impact of the development proposals in detail, therefore this Travel Plan should be read in conjunction with that document.

1.3.7 This Travel Plan outlines the opportunities for sustainable travel to and from the development, detailing measures and initiatives to be implemented with the aim of reducing residents' reliance on the private car should planning permission be granted.

1.3.8 It should be acknowledged that this Travel Plan has been prepared during the COVID-19 pandemic. Whilst this has impacted on travel patterns/attitudes and the long-term effects remain unknown, it is believed that a state of normality will be returned to within the duration of this Travel Plan.

2 FRAMEWORK TRAVEL PLAN

2.1.1 The Outline planning consent 15/3038/OUT included the submission of a Framework Travel Plan to cover the entirety of the proposed uses in the REEC development.

2.1.2 A copy of the Framework Travel Plan (FTP) prepared by Transport Planning Practice is attached at **Appendix B**. The FTP included consideration of the education, business and residential uses of the site and assessed proposed Travel Plan measures for each of these uses.

2.1.3 The FTP confirms that site-specific Travel Plans will be developed as part of the detailed planning applications for the various elements of the development.

2.1.4 The main target of the Travel Plan will be to minimise car trips made to and from the development and to promote the use of alternative, sustainable travel modes.

2.1.5 The key measures specified for the residential development are as follows:

(i) Physical Design – 'hard' engineering measures including electric car charging points and cycle parking provision;

(ii) Provision of Travel Information – travel information pack provided to each household before they move into the development; community noticeboards providing travel and community information including maps and details of new travel initiatives or events; and personalised journey planning offered by TPC;

(iii) Encourage Walking – promote within travel information pack, highlight network of local walking routes and include health benefits;

(iv) Encourage Cycling – cycle parking; cycle information in travel packs and on noticeboards to include maps of key routes, local cycle shops and parking; and promote cycle training; and

(v) Encourage Public Transport Use – provide route map, timetable and fare information in travel packs as well as links to journey planners.

2.1.6 These measures and targets have been considered further within this Residential Travel Plan.

2.1.7 In terms of managing and monitoring, the FTP confirms that a TPC will be appointed to oversee the FTP for the whole development and monitoring will be undertaken in line with the iTRACE compliant methodology. Baseline travel surveys of the residential use will be undertaken within six months of occupation or when 75% of the development have been occupied (whichever comes soonest). Targets will be set following the initial survey with subsequent surveys in years 1, 3 and 5.

2.1.8 The Travel Plan for the residential element of the development will be secured through planning condition / s106 obligation and will be funded by the housing developer.

3 BASELINE CONDITIONS

3.1 Site Location

3.1.1 The Residential Development Zone ("the site") is located to the west south of the School Development Zone, as indicated on **Figure 1.2**.

3.1.2 The residential site is bound to the north by the main College and School campus, to the east by Egerton Road and residential houses and to the south by Craneford Way and residential houses. To the west, the site is bound by the Harlequins Rugby Football Stadium (Twickenham Stoop), residential apartments and a Nuffield Health Centre.

3.1.3 The site is located approximately 750 metres northwest of Twickenham Station and 500 metres south of Twickenham Stadium. **Plan 01**, attached hereto illustrates the location of the site in relation to these local facilities accessible within a convenient walking distance of the site.

3.1.4 Twickenham District Centre is located to the south of the site and offers a range of shops and amenities typically offered by a town centre. The surrounding area also benefits from good access to education (including the College), medical services and recreation that would cater for a larger portion of the travel needs of residents.

3.1.5 The site also benefits from good access to public transport nodes, including Twickenham Station, with local bus services nearby on major routes operated by Transport for London (TfL). These facilities contribute to the site's PTAL rating of 3, indicating a 'good' level of accessibility.

3.2 Local Highway Network

3.2.1 **Plan 01** illustrates the site in relation to the local highway network. The A316 Chertsey Road serves as the main access to the RuTC site as well as connecting to the strategic highway network.

3.2.2 CPZ restrictions are in force on Egerton Road and the adjacent residential streets to permit parking for residents only during the evening/night periods and at weekends. In addition, the on-street parking on Egerton Road includes pay and display parking, which would cater for the needs of short-stay visitors of the proposed development.

3.2.3 Furthermore, many of the surrounding residential roads are subject to 20mph speed limits.

3.3 Infrastructure Improvements

3.3.1 The Outline planning consent included a comprehensive scheme of highway infrastructure improvements to better local traffic conditions and provide a robust pedestrian and cycle network to cater for the increased demands of the RuTC site as a whole.

3.3.2 This included three main infrastructure improvements being brought forward as part of the overarching development, the upgrade of the A316 Chertsey Road/Langhorn Drive junction, the upgrade of the Marsh Farm Lane footpath to a widened shared cycle/footpath and the widening of the site access from the Langhorn Drive mini-roundabout.

3.4 Accessibility Credentials

3.4.1 In accordance with relevant national, regional and local transport planning policy objectives, a review of the existing transport infrastructure and services within the vicinity of the site has been undertaken.

Walking and Cycling

3.4.2 It is commonly accepted that walking and cycling can replace motorised transport for journeys of up to 2 kilometres and 5 kilometres respectively. These are considered the preferred maximum distances as outlined in the CIHT Guidelines for Providing Journeys on Foot (2000).

3.4.3 Walking and cycling play a vital role in healthy and active lifestyles and if convenient and safe links are available there is significant opportunity to reduce the need for local car trips, thus reducing the traffic volumes on the surrounding highway network.

3.4.4 The local streets surrounding the site provide high-quality routes in all directions, with well-lit footway and crossing points. The A316 Chertsey Road provides shared pedestrian/cycle footpaths along much of its length, with regular crossing points facilitated by pedestrian footbridges and signalised junctions.

3.4.5 As illustrated on **Plan 01**, the site benefits from convenient access to Twickenham District Centre (around a 9-minute walk time) with facilities extending to around 1500m with safe and convenient pedestrian connections. The District Centre is generally accessed via local residential streets including Court Way, benefitting from footways on both sides of the carriageway.

3.4.6 The site also benefits from good access to public rights of way, including a shared pedestrian/cycle path referred to as Marsh Farm Lane, which runs along the western side of the College campus, linking A316 Chertsey Road/Langhorn Drive with Craneford Way to the south. This provides a convenient north-south route that would be further improved by the ongoing works to the College Campus.

3.4.7 Immediately to the south, Marsh Farm Lane links with Craneford Way Playing Fields, with further dedicated pedestrian and cycle routes continuing south across the railway line or through 'Twickenham Junction Rough' park land which provides an off-road route to Twickenham District Centre along the River Crane (typically open 07:30am to 04:30pm).

3.4.8 The proposed development would include a network of pedestrian access routes through the site, connecting to existing and proposed infrastructure on Egerton Road and Marsh Farm Lane. In addition, the main route through the site would be formed as a shared surface that would be conducive to pedestrian and cycle activity.

3.4.9 Over short distances, especially in urban areas, cycling is often quicker than using a car and more flexible than using public transport.

3.4.10 These existing residential streets and local off-road routes also offer safe and convenient links for cycling, with Chertsey Road also providing a direct cycle route for routes further afield, including into Central London.

3.4.11 Furthermore, Brompton cycles can be hired from Twickenham station. More details to include pricing can be found here: https://www.bromptonbikehire.com/docks/3149-london:-twickenham-station.

3.4.12 It is therefore considered that there are realistic opportunities for residents to travel to / from the site by active modes (walking /cycling).

Accessibility by Bus

3.4.13 The site benefits from convenient access to local bus stops on Whitton Road both north and east of the site, as illustrated on **Figure 2.1** overleaf.

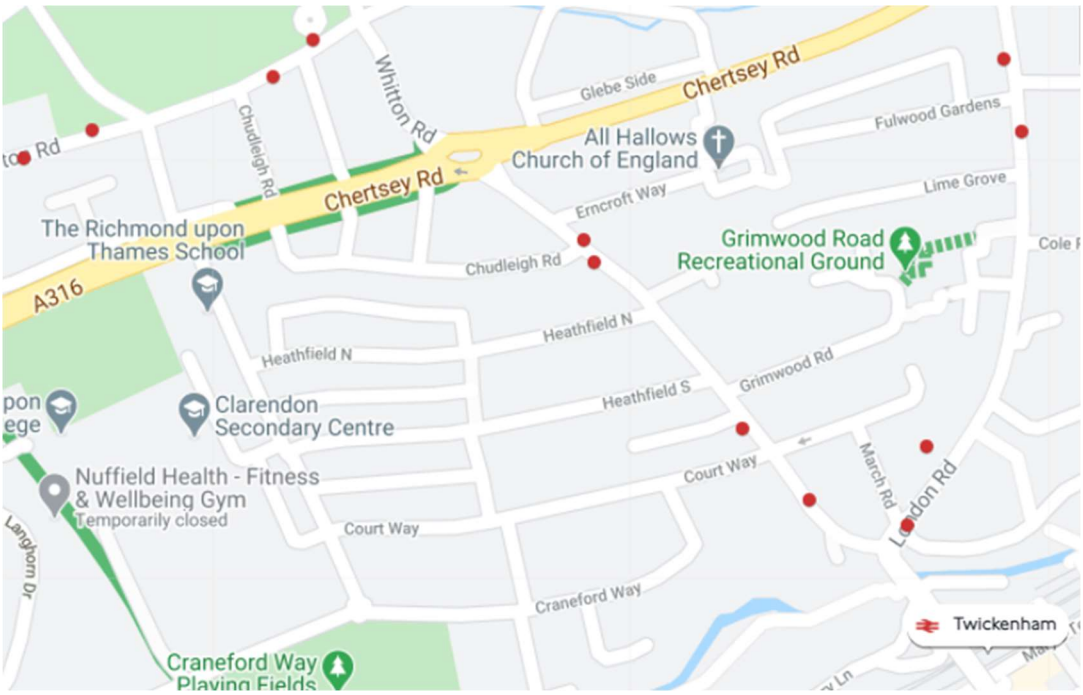


Figure 3.3 Local Bus Stops and Rail Station

3.4.14 To the east of the site, the Heatham House bus stops on Whitton Road (approximately 450 metres from the Egerton Road site access) provide access to routes 281 and 681.

3.4.15 In addition, routes 110 and 481 are accessible further north on Whitton Road (540 metre walk) via the A316 footbridge. Bus Routes 267 and H22 are also available from Twickenham Station. Whilst some of these stops fall outside the walking distances recognised by the PTAL assessment methodology, in practice all of these stops are located within a 6-8 minute walk time with safe and convenient connections.

3.4.16 **Figure 2.2** provides a summary of the key destinations accessible via these local bus services, along with typical frequencies and rail/underground connections. It is noted that the figures shown represent typical weekday frequencies, which may be higher during the peak hours.

Route	Key Destinations	Typical Weekday Frequency
110	Hampton Hill, Whitton Station, Twickenham Stadium, St Margaret's, Richmond, Kew Gardens, Kew Bridge, Gunnersbury , Ravenscourt, Hammersmith	15 minutes
267	Fullwell, Twickenham, Kew Bridge, Gunnersbury, Ravenscourt Park, Hammersmith	10-11 minutes
281	Tolworth Tower, Surbiton Station, Kingston Station, Hampston Wick Station, Fullwell Station, Twickenham Station, Hounslow Station, Hounslow Bus Station	9-13 minutes

481	Kingston ⇄, Teddington, Fulwell ⇄, Twickenham Stadium, West Middlesex Hospital	3 services per hour
681	Hounslow ⇄, Twickenham, Fulwell ⇄, Teddington	Morning and Afternoon Services
H22	Bell Corner/Hounslow Civic Centre, Whitton Station ⇄, Twickenham ⇄, West Middlesex Hospital	11-13 minutes

Figure 2.2 Summary of Local Bus Services

3.4.17 As detailed above, the site benefits from convenient access to bus services to a range of local destinations including Richmond Station, whereby further National Rail, London Underground and London Overground services can be accessed (journey time of approximately 26 minutes).

3.4.18 Further information regarding routes and timetable information can be found at www.traveline.info/ https://tfl.gov.uk/modes/buses/.

3.5 Rail Services

3.5.1 In terms of rail travel, Twickenham Rail Station is located approximately 650 metres to the south-east of the site (an 8-minute walk). The station is operated by South West Trains and is served by a number of routes providing regular services into Central London, including London Waterloo, with a typical journey time of 30 minutes. The table below summarises the key routes and destinations available from the station.

Key Destinations	Typical Weekday Frequency
Wimbledon, Raynes Park, New Malden, Kingston, Teddington, **Twickenham**, Richmond, North Sheen, Barnes, Putney, Clapham Junction, Vauxhall, London Waterloo	30 minutes
Windsor & Eton Riverside, Sunnymeads, Staines, Feltham, Whitton, **Twickenham**, Richmond, Putney, Clapham Junction, Vauxhall, London Waterloo	30 minutes
Reading, Wokingham, Bracknell, Ascot, Sunningdale, Virginia Water, Egham, Staines, **Twickenham**, Richmond, Clapham Junction, London Waterloo	2 per hour
Shepperton, Sunbury, Hampton, Fulwell, Strawberry Hill, **Twickenham**, Richmond, Putney, Clapham Junction, Vauxhall, London Waterloo	1 per day

Figure 2.3 Summary of Rail Services

3.5.2 It is also noted that these regular services offer a quick connection to Richmond station with a 4-5 minute train journey time, where London Underground and Overground

3.5.3 On the basis of the above, it is apparent that there is a range of opportunities for rail travel to / from the site. Further information including live arrival/departure times and station facilities can be found at: www.tfl.gov.uk/ / www.nationalrail.co.uk.

Car Clubs

3.5.4 Car clubs provide an alternative to using a private car. Cars are used on a pay-as-you-go basis. The cost of usage is based on how long the car is used for and the distance driven and can often work out cheaper than owing and running a car privately. Typically, cars are rented online and can be collected and returned 24 hours a day.

3.5.5 Zipcar and Enterprise vehicles are located nearby on London Road, March Road, Queen's Road, Grosvenor Road and Moor Mead Road. These could be utilised by residents rather than requiring the ownership of a private vehicle.

3.5.6 The proposals also include the provision of a further car club space on Egerton Road. This space would also be equipped with electric vehicle charging provision. To encourage usage, all residents would be provided with 2 years' free membership and driving credit.

3.5.7 It is widely recognised that car clubs are an effective means of mitigation for reduced car ownership, providing a realistic alternative for people constrained to the use of a car for a particular journey purpose.

Taxi

3.5.8 For any trips by taxi, a number of local operators serve the locale and allow pre-booking and a taxi-rank is available at Twickenham station.

3.6 PTAL Assessment

3.6.1 Public Transport Accessibility Levels (PTALs) provide a guide to the relative accessibility of an area by public transport and range between 1a (worst) and 6b (best).

3.6.2 The site is characterised as being within a PTAL zone of between 2 and 3, as illustrated by the extract from TfL's WebCAT mapping in **Figure 2.4**. A full copy of the PTAL report is attached at **Appendix C**. It is noted that the western portion of the site is not currently included within the PTAL assessment (PTAL of 0) since there is currently no access/permeability through the site. The proposed introduction of routes through the site to access the residential dwellings would allow these areas to be included within the PTAL assessment and form part of the PTAL 3.

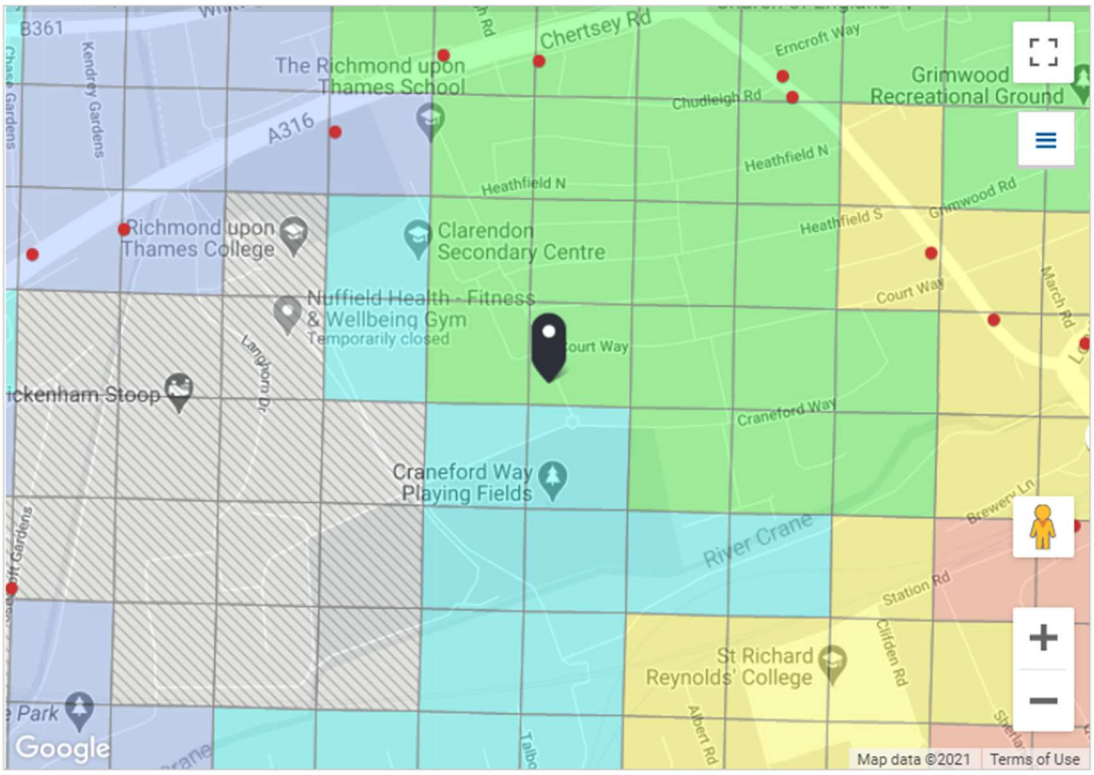


Figure 2.4 Extract from PTAL Report (WebCAT Mapping)

3.6.3 A PTAL of 3 is indicative of 'moderate' access to public transport. However, it is noteworthy that the PTAL assessment does not consider the local amenities which are accessible on foot or by cycle, whereby the daily travel needs of future residents can be catered for. The thresholds in the PTAL model work on a 640m distance to a bus stop and 960m for rail.

3.7 Summary of Baseline Conditions

3.7.1 The above review demonstrates that there are opportunities for travel by variety of modes of transport that have the potential to reduce reliance upon the private car. It is therefore considered that the proposals fully accord with the guiding principles of the NPPF, The London Plan and Richmond upon Thames Borough Council policies.

3.7.2 Although public transport use has declined as a result of COVID-19, the services are operational and therefore present a realistic option for travel. As restrictions are eased (over the life of this Travel Plan) both travel for leisure purposes and patronage of buses/trains are expected to increase.

3.7.3 The measures contained within this Travel Plan further seek to increase the awareness and use of sustainable transport modes.

4 TRIP GENERATION / TRAVEL PATTERNS

4.1 Resident Travel

4.1.1 It is necessary to collect data to establish and understand the travel habits against which the Travel Plan's progress can be measured.

4.1.2 As the residential development is not yet occupied, in lieu of baseline surveys, the likely levels of traffic to be generated by the proposed development have been estimated using TRICS outputs, as detailed within the accompanying Transport Assessment.

4.1.3 **Figure 3.1** below summarises the anticipated multi-modal trip generation.

TRAVEL MODE	DAILY (ALL RESIDENTIAL)	PERCENTAGE (%)
Private Car	430	44%
Pedestrian	252	26%
Cyclist	24	2%
Bus Passenger	114	12%
Rail/Tube Passenger	152	16%
TOTAL	*972*	*100%*

Figure 3.1 Multi-Modal Trip Generation

4.1.4 The above table confirms the mode split that can be expected in relation to the residential development and demonstrates that non-car trips are likely to amount to a good proportion of movements from and to the site given its accessible location to local amenities and public transport nodes. In total, around 56% of all trips would be made by sustainable travel modes.

4.1.5 The information obtained is considered to be a suitable starting point for formulating appropriate measures and targets, however travel surveys will be carried out at 75% occupancy / within 6 months of the site's occupation to establish the travel behaviour of residents and provide a baseline for future monitoring purposes.

4.2 Servicing & Deliveries

4.2.1 In terms of servicing and deliveries, a total of around 30 daily two-way vehicle movements (15 vehicles) are likely to be generated by the site. These would typically be from smaller Light Goods Vehicles (LGV) consisting of postal deliveries, food deliveries and maintenance/service vehicles. The proposed development would also require daily access from Ordinary Goods Vehicles, including refuse vehicles and larger rigid deliveries amounting to around 2 vehicle movements (1 vehicle) per day.

5 AIMS, OBJECTIVES AND TARGETS

5.1 Aims and Objectives

5.1.1 It is now widely accepted that it is not possible to build our way out of congestion. Instead, the approach has to be to reduce the need to travel by increasing travel choice and awareness, therefore the overall aim of this Travel Plan is:

To reduce reliance upon the private car, by effecting a change in attitude to travel by increasing awareness of sustainable travel modes and their associated benefits.

5.1.2 To achieve this aim, objectives should be provided that reflect the challenges of the site and focus the role of the Travel Plan. These objectives also support both the Mayor's Transport Strategy and the Local Authority's policy aims.

5.1.3 For the development site, the objectives are:

Objective 1: Actively encourage sustainable travel to and from the site

Objective 2: Provide infrastructure to facilitate sustainable travel / reduce the need to travel

5.2 Targets

5.2.1 To support the aim and objectives, targets have been set to focus the delivery of the Travel Plan.

5.2.2 When setting site specific targets, it is important that they are "SMART" in order that the outcomes can be quantified and an assessment of what the Travel Plan has or will achieve can be made.

Specific
Measurable
Achievable
Realistic
Time-bound

5.2.3 **Figure 4.1** overleaf presents the targets for the Travel Plan which will support the overall aim and two objectives. These should be achieved 1, 3 and 5 years following occupation / the baseline surveys and initially, they will be assessed against the data presented in **Section 3** of this report.

ACTION	TARGET DATE
Decrease the proportion of journeys made by single occupancy car by 3% / 5% / 10%	End of Year 1 / 3 / 5
Increase the proportion of trips made by active modes (walking/cycling) by 2% / 3% / 5%	End of Year 1 / 3 / 5

Figure 4.1: Targets

5.2.4 Following baseline surveys, these targets will be reviewed and amended based on the site- specific data obtained.

5.2.5 The targets stated above will be reviewed regularly and should be achieved by the target dates specified i.e. 1, 3 or 5 years. If they have been attained before the target date, they will be modified to provide further, more challenging targets, while if the surveys show that progress is not being made towards achieving the targets, the reasons why would be investigated, including a review of the current measures which would be added to or modified to ensure that the overall targets will be met.

5.2.6 Travel related concerns raised by residents and any identified barriers to sustainable travel will be ascertained by way of regular travel surveys and routine monitoring. Further bespoke measures and changes could then be introduced to address these barriers, if necessary, and ensure that the Travel Plan continues towards achieving its targets and overall aim.

5.2.7 Future targets will be established through a process of consultation with Richmond Council and Clarion Housing Group to ensure that they are appropriate in the context of the objectives, yet realistic and achievable.

6 TRAVEL PLAN MEASURES

6.1.1 An Action Plan outlining the proposed Travel Plan measures and actions identified for the site, along with responsibilities, estimated costs and implementation timescales is attached at **Appendix D**.

6.1.2 The Action Plan also pinpoints the objective that each measure will support to ensure that any initiative is targeted to achieving the overall aim for this site.

6.1.3 The Action Plan includes the following measures:

Objective 1: Promote and actively encourage sustainable travel to and from the site

- Appoint Travel Plan Coordinator (TPC)
- Nearby Facilities
- Walking / Cycling Routes
- Bicycle Purchase Scheme
- Cycle Training
- Public Transport Information
- Travel Apps
- Public Transport Discounts
- Car Sharing
- Car Clubs
- Car Club Membership
- Promote Travel Plan in Sales Literature
- Resident's Welcome Pack - see **Appendix E**
- E-newsletters

Objective 2: Provide infrastructure to facilitate sustainable travel / reduce the need to travel

- Infrastructure Improvements
- Broadband Internet Connection
- Cycle Parking / Storage
- Car Club Vehicles
- Electric Vehicle Charging Points (EVCPs)
- Travel Noticeboards

6.2 Effectiveness of Travel Plan Measures

6.2.1 The specified measures and initiatives should act to achieve the overall aim of the Travel Plan, consequently increasing the use of sustainable modes and achieving the targets set.

7 REVIEW AND APPROVAL

7.1 Implementation and Funding

7.1.1 It is anticipated that this Travel Plan will be secured through a s106 agreement / planning condition, as part of any planning approval from the Local Planning Authority,

7.1.2 Prior to the occupation of the development, a Travel Plan Coordinator (TPC) will be appointed by Clarion Housing Group to oversee the management of the Travel Plan and ensure it seeks to achieve the stated aims. It is anticipated that the TPC would fall within the role of the Site Manager, although specific tasks would become the responsibility of other staff. following instruction from the Site Manager.

7.1.3 The TPC will be responsible for the Travel Plan's management to include the implementation, review and promotion of the Travel Plan. It is anticipated that this role would take 3-5 hours per month.

7.1.4 The TPC will also be responsible for managing the agreed budget for the Travel Plan. Aside from infrastructure works which are associated with the development's construction costs, funding is required to cover initial set up, printing and marketing. This is estimated to amount to circa £500 annually and would be paid for by Clarion Housing Group.

7.1.5 This investment in resources, both in terms of appointment of a TPC and monetary, support the implementation, management and review of the Travel Plan and mitigate against any financial burden that may be imposed as a consequence of failure to meet the agreed targets.

7.1.6 It is acknowledged that a site-wide TPC will be in place for the whole development (Education, 'Tech Hub' and Residential land uses) and therefore it is recommended for the Residential TPC to make regular contact with them for the purposes of sharing information and best practice.

7.2 Monitoring

Figure 6.1: Travel Plan Timetable

7.2.1 **Figure 6.1** above, illustrates the monitoring timeline for the initial 5-year life of the Travel Plan.

7.2.2 Baseline data is to be collected by way of a questionnaire survey at 75% occupancy or 6 months following occupation (whichever occurs first). This data will form the revised baseline for inclusion in the Full Travel Plan.

7.2.3 Monitoring will then be carried out in Years 1, 3 and 5 with reports produced by the TPC and submitted to Richmond Council for approval in relation to the targets set. These reports shall demonstrate how the Travel Plan has been implemented to date and will include:

(i) Details of measures introduced and actions taken to promote the Travel Plan;

(ii) A statistical summary of the modal split of residents, disclosed by the monitoring surveys;

(iii) The progress of the Travel Plan in achieving the targets and identifying any amendments to be agreed in writing by Richmond Council in the event that targets are not achieved; and

(iv) A plan for future actions.

7.2.4 Furthermore, the following items will be monitored by the TPC annually:

(i) the demand for car (including electric vehicle) and cycle parking;

(ii) usage of the car-club vehicle on Egerton Road;

(iii) the numbers registered for car sharing; and

(iv) comments made by residents relating to transport and the Travel Plan.

7.2.5 To support this process, surveys will be undertaken in Years 1, 3 and 5 to establish the travel patterns of all site users. These will be iTRACE / TRICS compliant as detailed here: https://tfl.gov.uk/info-for/urban-planning-and-construction/travel-plans/monitoring-travel-plans. iTRACE provides a centralised software suite designed to monitor and report on the performance of Travel Plans, offering quicker, easier Travel Planning, Assessment, Auditing and Forecasting and allowing Local Authorities to share Travel Plan data. The cost for these is anticipated to be circa £3000 per survey and would be funded, in addition to the annual budget, by Clarion Housing Group.

7.2.6 To maintain the emphasis of the Travel Plan, the results of the monitoring and review process will be communicated by way of e-newsletters and the on-site Travel Plan noticeboards.

7.3 Approval

7.3.1 This Travel Plan is hereby approved for implementation at the following site:

Richmond Upon Thames College – Residential Development Zone

Signed: ..... (Rachel Rombough - RGP) Date: .....

Signed: ..... (TPC) Date: .....

PLANS

BUS TIMETABLE			
Service	**Route Summary**	**Typical Weekday Frequency**	**Hours of Operation**
Heatham House Bus Stops			
281	Tolworth Tower – Hounslow Bus Station	Mon-Fri: 9-13 minutes Sat: 9-12 minutes Sun: 10-14 minutes	Mon-Sun: 24 hour
681 (School Bus)	Broom Road/Teddington School – Hounslow Bus Station	Mon-Fri: morning and afternoon services	Mon-Fri: 07:36, 15:34
Twickenham Stadium Bus Stops			
110	School Road – Hammersmith Bus Station	Mon-Sat: 15 minutes Sun: 20 minutes	Mon-Fri: 05:58-01:01 Sat: 05:57-01:05 Sun: 05:58-00:59
481	Isleworth – Kingston Upon Thames	Mon-Sat: 3 services per hour Sun: every hour	Mon-Fri: 06:52-20-11 Sat: 07:05-20:11 Sun: 10:11-20:11
Twickenham Station Bus Stops			
267	South Road/Fullwell – Hammersmith Bus Station	Mon-Fri: 10-11 minutes Sat: 9 minutes Sun: 20 minutes	Mon-Fri: 05:06-23:46 Sat: 05:05-23:47 Sun: 05:05-23:46
H22	Bell Corner/Hounslow Civic Centre – West Middlesex Hospital	Mon-Fri: 11-13 minutes Sat: 10-12 minutes Sun: 20 minutes	Mon-Fri: 05:27-00:48 Sat: 05:35-00:48 Sun: 06:48-00:46

NATIONAL RAIL TIMETABLE (Twickenham)		
Destination	**Frequency**	**Duration**
London Waterloo	10 trains per hour	23-45 minutes
Wimbledon	2 trains per hour	27 minutes
Windsor & Eton Riverside	2 trains per hour	35 minutes
Reading	2 trains per hour	1 hour 3 minutes

LEGEND

- SITE LOCATION
- NATIONAL RAILWAY STATION
- RAILWAY TRACKS
- LOCAL BUS STOPS
- CYCLE ROUTES
- LEISURE
- RETAIL
- HEALTH CARE
- ZIPCAR CLUB
- ENTERPRISE CAR CLUB
- 1KM (13-MIN) WALK ISOCHRONE

RGP

Transport Planning and Infrastructure Design Consultants
Shackleford Suite, Mill Pool House, Mill Lane,
Godalming, Surrey, GU7 1EY
Tel: 01483 861681 Fax: 01483 861682
www.rgp.co.uk

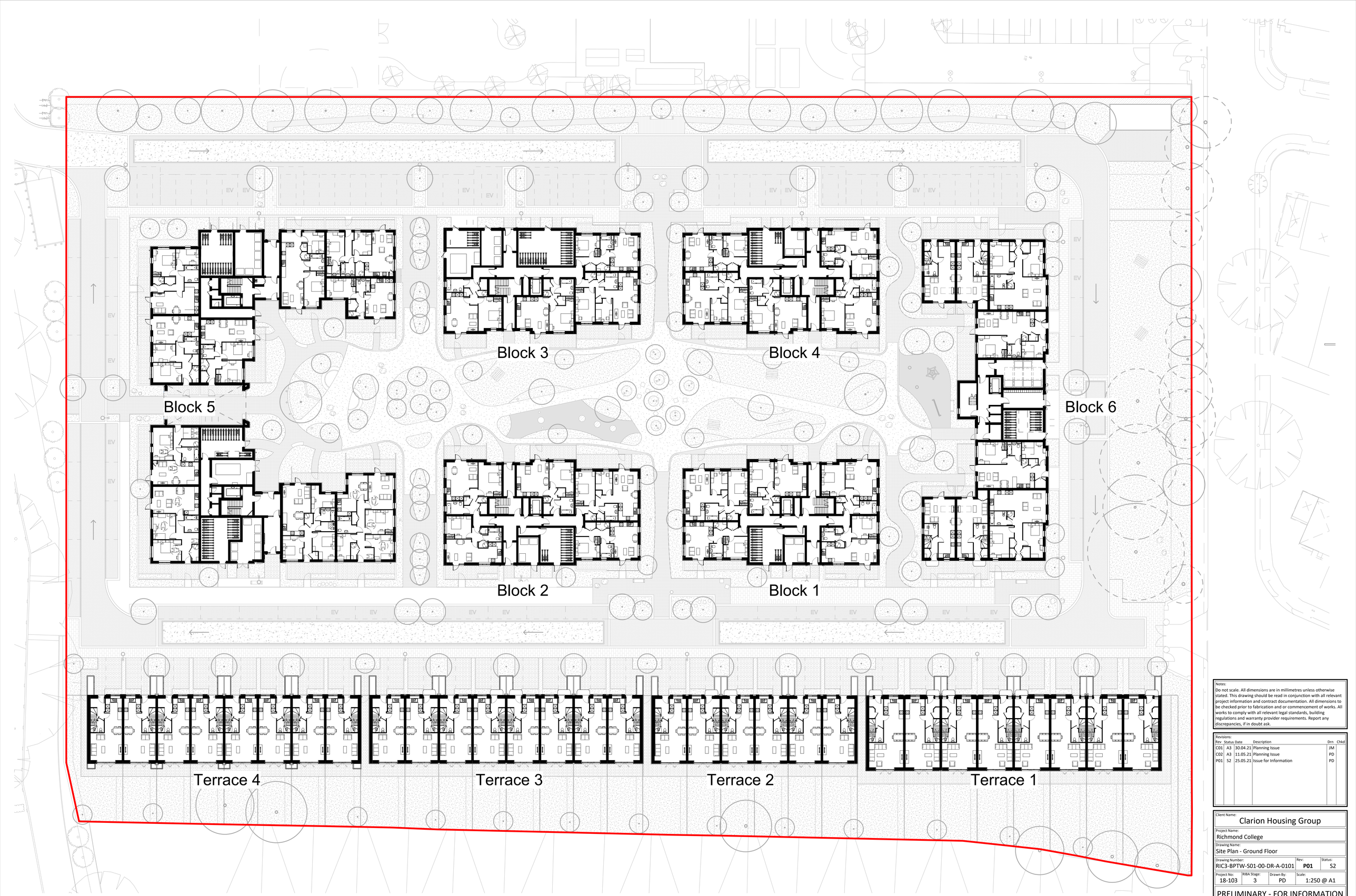
Client: Clarion Housing Group

Project: Richmond Upon Thames College Residential Development Zone

Title: Site Location and Accessibility Plan

Plan No:	Job No:	Date:	
Plan 01	5453	Feb 2021	
Drawn By:	**Checked By:**	**Rev:**	
JLM	RLR	-	A3

APPENDIX A



Notes:
Do not scale. All dimensions are in millimetres unless otherwise stated. This drawing should be read in conjunction with all relevant project information and contract documentation. All dimensions to be checked prior to fabrication and or commencement of works. All works to comply with all relevant legal standards, building regulations and warranty provider requirements. Report any discrepancies, if in doubt ask.

Revisions:

Rev	Status	Date	Description	Drn	Chkd
C01	A3	30.04.21	Planning Issue	JM	
C02	A3	11.05.21	Planning Issue	PD	
P01	S2	25.05.21	Issue for Information	PD	

Client Name: Clarion Housing Group

Project Name: Richmond College

Drawing Name: Site Plan - Ground Floor

Drawing Number:	Rev:	Status:
RIC3-BPTW-S01-00-DR-A-0101	**P01**	S2

Project No:	RIBA Stage:	Drawn By:	Scale:
18-103	3	PD	1:250 @ A1

PRELIMINARY - FOR INFORMATION

40 Norman Road,
Greenwich, London
SE10 9QX

t. 020 8293 5175
bptw.co.uk

Clarion Housing Group
Richmond College

RIC-BPTW-XX-XX-SH-A-0101-C01-A3
Accommodation Schedule

For Information
Prepared by: TZ
May-21

Accommodation Schedule

Accommodation Mix	1b/2p flat 2HR	1b/2p wch flat 2HR	2b/3p flat 3HR	2b/3p wch flat 3HR	2b/4p flat 3HR	2b/4p maisonette 3HR	2b/4p WCH flat 3HR	3b/5p WCH flat 4HR	3b/5p flat 4HR	3b/5p house 4HR	3b/5p AFF WCH fla 5HR	3b/5p AFF flat 5HR	4b/7p house 5HR	3b/6p house 5HR	3b/6p flat 4HR		total units	total hr	% units overall	% hr overall	% hr affordable		1b units	2b units	3b units
Additional units																								
Rent	7	1			12		1		1		1	5					28	89	13%	14.2%	29%		25%	46%	21%
Intermediate	26	2	4	6	26	4		2	10								80	222	38%	35.4%	71%		33%	38%	15%
Private Sale	33	6	9	3	19				2	22			8		2		104	315	49%	50.2%	n/a		32%	27%	2%
Additional units total																									
Total units	66	9	13	9	57	4	1	2	13	22	1	5	8	0	2		212		100%	100%			31%	N/A	N/A
Habitable rooms	132	18	39	27	171	12	3	8	52	88	5	25	40	0	8			628							
																		2.96	average hab room/unit						

APPENDIX B

Appendix F

TRICS data - Tech Hub

Calculation Reference: AUDIT-237601-150616-0623

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : A - OFFICE
MULTI-MODAL VEHICLES

Selected regions and areas:
02 SOUTH EAST
SC SURREY 1 days

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

Filtering Stage 2 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: 10293 to 10293 (units: sqm)
Range Selected by User: 10293 to 10293 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/07 to 18/10/11

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 1 days

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

Selected survey types:
Manual count 1 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:
Suburban Area (PPS6 Out of 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:
Residential 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.

Filtering Stage 3 selection:

Use Class:
B1 1 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Filtering Stage 3 selection (Cont.):

Population within 1 mile:
10,001 to 15,000 1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:
250,001 to 500,000 1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:
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:
Yes 1 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.

LIST OF SITES relevant to selection parameters

1 SC-02-A-17 PHARMACEUTICALS SURREY
ST GEORGE'S AVENUE
THE HEATH
WEYBRIDGE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 10293 sqm
Survey date: TUESDAY 18/10/11 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 02 - EMPLOYMENT/A - OFFICE

MULTI-MODAL 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 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	1	10293	0.029	1	10293	0.000	1	10293	0.029
07:30 - 08:00	**1**	**10293**	**0.408**	1	10293	0.029	**1**	**10293**	**0.437**
08:00 - 08:30	1	10293	0.282	1	10293	0.029	1	10293	0.311
08:30 - 09:00	1	10293	0.321	1	10293	0.019	1	10293	0.340
09:00 - 09:30	1	10293	0.359	1	10293	0.019	1	10293	0.378
09:30 - 10:00	1	10293	0.223	1	10293	0.039	1	10293	0.262
10:00 - 10:30	1	10293	0.136	1	10293	0.019	1	10293	0.155
10:30 - 11:00	1	10293	0.029	1	10293	0.039	1	10293	0.068
11:00 - 11:30	1	10293	0.029	1	10293	0.019	1	10293	0.048
11:30 - 12:00	1	10293	0.029	1	10293	0.058	1	10293	0.087
12:00 - 12:30	1	10293	0.029	1	10293	0.165	1	10293	0.194
12:30 - 13:00	1	10293	0.068	1	10293	0.087	1	10293	0.155
13:00 - 13:30	1	10293	0.136	1	10293	0.078	1	10293	0.214
13:30 - 14:00	1	10293	0.049	1	10293	0.019	1	10293	0.068
14:00 - 14:30	1	10293	0.049	1	10293	0.058	1	10293	0.107
14:30 - 15:00	1	10293	0.019	1	10293	0.087	1	10293	0.106
15:00 - 15:30	1	10293	0.029	1	10293	0.039	1	10293	0.068
15:30 - 16:00	1	10293	0.019	1	10293	0.146	1	10293	0.165
16:00 - 16:30	1	10293	0.058	1	10293	0.175	1	10293	0.233
16:30 - 17:00	1	10293	0.010	1	10293	0.214	1	10293	0.224
17:00 - 17:30	1	10293	0.019	**1**	**10293**	**0.369**	1	10293	0.388
17:30 - 18:00	1	10293	0.010	1	10293	0.262	1	10293	0.272
18:00 - 18:30	1	10293	0.000	1	10293	0.262	1	10293	0.262
18:30 - 19:00	1	10293	0.010	1	10293	0.117	1	10293	0.127
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			2.350			2.348			4.698

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 G

TRICS data - Secondary School

Calculation Reference: AUDIT-237601-150616-0646

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 04 - EDUCATION
Category : B - SECONDARY
MULTI-MODAL VEHICLES

Selected regions and areas:

01	**GREATER LONDON**		
	BN	BARNET	1 days
	HM	HAMMERSMITH AND FULHAM	1 days
	IS	ISLINGTON	1 days
02	**SOUTH EAST**		
	EX	ESSEX	1 days
	HC	HAMPSHIRE	1 days

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

Filtering Stage 2 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 pupils
Actual Range: 610 to 1200 (units:)
Range Selected by User: 610 to 1200 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/12/00 to 25/11/09

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	3 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:

Suburban Area (PPS6 Out of Centre)	4
Edge of Town	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:

Residential Zone	4
No Sub Category	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.

Filtering Stage 3 selection:

Use Class:

D1	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

15,001 to 20,000	1 days
20,001 to 25,000	1 days
25,001 to 50,000	1 days
50,001 to 100,000	2 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
100,001 to 125,000	1 days
500,001 or More	3 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	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:

Not Known	3 days
No	2 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.

LIST OF SITES relevant to selection parameters

1 **BN-04-B-01** **SECONDARY SCHOOL** **BARNET**
CHESTNUT GROVE

EAST BARNET
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 1200
Survey date: WEDNESDAY *19/10/05* *Survey Type: MANUAL*

2 **EX-04-B-01** **SECONDARY SCH.** **ESSEX**
SHEEPEN ROAD

COLCHESTER
Edge of Town
No Sub Category
Total Number of pupils: 927
Survey date: THURSDAY *29/03/01* *Survey Type: MANUAL*

3 **HC-04-B-04** **SECONDARY SCHOOL** **HAMPSHIRE**
CROYE CLOSE

ANDOVER
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 895
Survey date: THURSDAY *03/05/01* *Survey Type: MANUAL*

4 **HM-04-B-01** **SECONDARY SCHOOL** **HAMMERSMITH AND FULHAM**
KINGWOOD ROAD

FULHAM
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 610
Survey date: WEDNESDAY *04/12/02* *Survey Type: MANUAL*

5 **IS-04-B-01** **SECONDARY SCH.** **ISLINGTON**
TURLE ROAD

FINSBURY PARK
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of pupils: 850
Survey date: WEDNESDAY *25/11/09* *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 04 - EDUCATION/B - SECONDARY

MULTI-MODAL VEHICLES

Calculation factor: 1 PUPILS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	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	5	896	0.023	5	896	0.005	5	896	0.028
08:00 - 09:00	**5**	**896**	**0.090**	5	896	0.038	**5**	**896**	**0.128**
09:00 - 10:00	5	896	0.018	5	896	0.010	5	896	0.028
10:00 - 11:00	5	896	0.013	5	896	0.010	5	896	0.023
11:00 - 12:00	5	896	0.007	5	896	0.009	5	896	0.016
12:00 - 13:00	5	896	0.012	5	896	0.008	5	896	0.020
13:00 - 14:00	5	896	0.013	5	896	0.011	5	896	0.024
14:00 - 15:00	5	896	0.010	5	896	0.017	5	896	0.027
15:00 - 16:00	5	896	0.017	**5**	**896**	**0.050**	5	896	0.067
16:00 - 17:00	5	896	0.011	5	896	0.040	5	896	0.051
17:00 - 18:00	5	896	0.005	5	896	0.015	5	896	0.020
18:00 - 19:00	4	968	0.006	4	968	0.007	4	968	0.013
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			0.225			0.220			0.445

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.*

Parameter summary

Trip rate parameter range selected:	610 - 1200 (units:)
Survey date date range:	01/12/00 - 25/11/09
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	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 04 - EDUCATION/B - SECONDARY

MULTI-MODAL TOTAL PEOPLE

Calculation factor: 1 PUPILS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	Trip Rate	No. Days	Ave. PUPILS	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	5	896	0.080	5	896	0.008	5	896	0.088
08:00 - 09:00	**5**	**896**	**0.795**	5	896	0.050	5	896	0.845
09:00 - 10:00	5	896	0.106	5	896	0.025	5	896	0.131
10:00 - 11:00	5	896	0.031	5	896	0.033	5	896	0.064
11:00 - 12:00	5	896	0.023	5	896	0.026	5	896	0.049
12:00 - 13:00	5	896	0.026	5	896	0.029	5	896	0.055
13:00 - 14:00	5	896	0.070	5	896	0.071	5	896	0.141
14:00 - 15:00	5	896	0.039	5	896	0.048	5	896	0.087
15:00 - 16:00	5	896	0.090	**5**	**896**	**0.777**	**5**	**896**	**0.867**
16:00 - 17:00	5	896	0.030	5	896	0.145	5	896	0.175
17:00 - 18:00	5	896	0.012	5	896	0.046	5	896	0.058
18:00 - 19:00	4	968	0.015	4	968	0.020	4	968	0.035
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.317			1.278			2.595

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.*

Parameter summary

Trip rate parameter range selected:	610 - 1200 (units:)
Survey date date range:	01/12/00 - 25/11/09
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	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.

Appendix H

SEN 'Hands Up' survey data

Data as of March 4th 2015

March 2015	USUAL		PREFER	
Mode	Students	Staff	Students	Staff
Car	9	29	13	24
Car Share	0	4	0	4
Bus	10	7	14	7
Rail	0	2	0	2
Bicycle	1	7	9	11
Walk	10	7	12	8
Park and Walk	0	0	0	0
School transport	71	0	52	0
Grand Totals	**100**	**56**	**100**	**56**
Total no. of all students on roll/staff employed at school	100	35+		

Appendix I

TRICS data – Residential site

Calculation Reference: AUDIT-237601-150616-0632

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : K - MIXED PRIV HOUS (FLATS AND HOUSES)
MULTI-MODAL VEHICLES

Selected regions and areas:

01	**GREATER LONDON**		
	EN	ENFIELD	1 days
	HA	HARROW	1 days
02	**SOUTH EAST**		
	WS	WEST SUSSEX	1 days

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

Filtering Stage 2 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 dwellings
Actual Range:	61 to 91 (units:)
Range Selected by User:	61 to 91 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/07 to 07/11/08

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	1 days
Wednesday	1 days
Friday	1 days

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

Selected survey types:

Manual count	3 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:

Suburban Area (PPS6 Out of 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
No Sub Category	2

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.

Filtering Stage 3 selection:

Use Class:

C3	3 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

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:

125,001 to 250,000	1 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:

0.6 to 1.0	1 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	3 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.

LIST OF SITES relevant to selection parameters

1 EN-03-K-01 MIXED HOUSING ENFIELD
MOUNT PLEASANT

COCKFOSTERS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 68
Survey date: FRIDAY *07/11/08* *Survey Type: MANUAL*

2 HA-03-K-01 MIXED HOUSING HARROW
HEADSTONE LANE
HARROW
HATCH END
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 91
Survey date: TUESDAY *20/11/07* *Survey Type: MANUAL*

3 WS-03-K-02 MIXED HOUSING WEST SUSSEX
RUSSELL WAY

CRAWLEY
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Number of dwellings: 61
Survey date: WEDNESDAY *28/11/07* *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 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)

MULTI-MODAL VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	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	3	73	0.073	3	73	0.173	3	73	0.246
08:00 - 09:00	3	73	0.136	**3**	**73**	**0.182**	3	73	0.318
09:00 - 10:00	3	73	0.118	3	73	0.141	3	73	0.259
10:00 - 11:00	3	73	0.095	3	73	0.141	3	73	0.236
11:00 - 12:00	3	73	0.109	3	73	0.123	3	73	0.232
12:00 - 13:00	3	73	0.095	3	73	0.095	3	73	0.190
13:00 - 14:00	3	73	0.086	3	73	0.095	3	73	0.181
14:00 - 15:00	3	73	0.123	3	73	0.118	3	73	0.241
15:00 - 16:00	3	73	0.068	3	73	0.105	3	73	0.173
16:00 - 17:00	3	73	0.191	3	73	0.132	**3**	**73**	**0.323**
17:00 - 18:00	**3**	**73**	**0.214**	3	73	0.100	3	73	0.314
18:00 - 19:00	3	73	0.164	3	73	0.105	3	73	0.269
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.472			1.510			2.982

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.*

Parameter summary

Trip rate parameter range selected:	61 - 91 (units:)
Survey date date range:	01/01/07 - 07/11/08
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	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 03 - RESIDENTIAL/K - MIXED PRIV HOUS (FLATS AND HOUSES)

MULTI-MODAL TOTAL PEOPLE

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	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	3	73	0.145	3	73	0.327	3	73	0.472
08:00 - 09:00	3	73	0.214	**3**	**73**	**0.573**	**3**	**73**	**0.787**
09:00 - 10:00	3	73	0.227	3	73	0.291	3	73	0.518
10:00 - 11:00	3	73	0.136	3	73	0.273	3	73	0.409
11:00 - 12:00	3	73	0.182	3	73	0.205	3	73	0.387
12:00 - 13:00	3	73	0.145	3	73	0.195	3	73	0.340
13:00 - 14:00	3	73	0.159	3	73	0.195	3	73	0.354
14:00 - 15:00	3	73	0.173	3	73	0.186	3	73	0.359
15:00 - 16:00	3	73	0.177	3	73	0.164	3	73	0.341
16:00 - 17:00	3	73	0.368	3	73	0.236	3	73	0.604
17:00 - 18:00	**3**	**73**	**0.377**	3	73	0.127	3	73	0.504
18:00 - 19:00	3	73	0.359	3	73	0.177	3	73	0.536
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.662			2.949			5.611

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.*

Parameter summary

Trip rate parameter range selected:	61 - 91 (units:)
Survey date date range:	01/01/07 - 07/11/08
Number of weekdays (Monday-Friday):	3
Number of Saturdays:	0
Number of Sundays:	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.

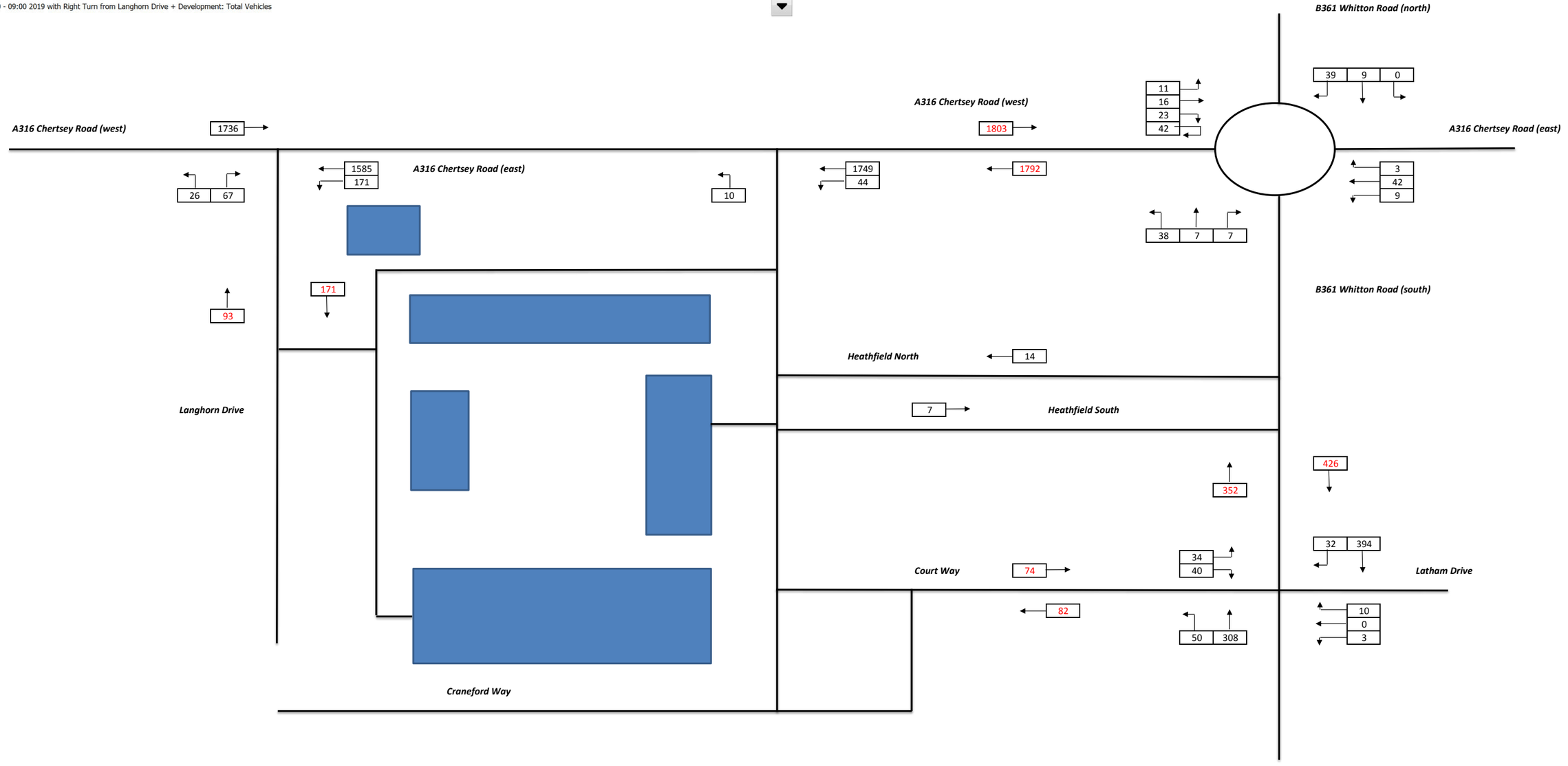
Appendix J

2019 + Development and 2034 + Development traffic flow diagrams

30713 Richmond Education and Enterprise Campus

08:00 - 09:00 2019 with Right Turn from Langhorn Drive + Development: Total Vehicles

08:00 - 09:00 2019 with Right Turn from Langhorn Drive + Development: Total Vehicles

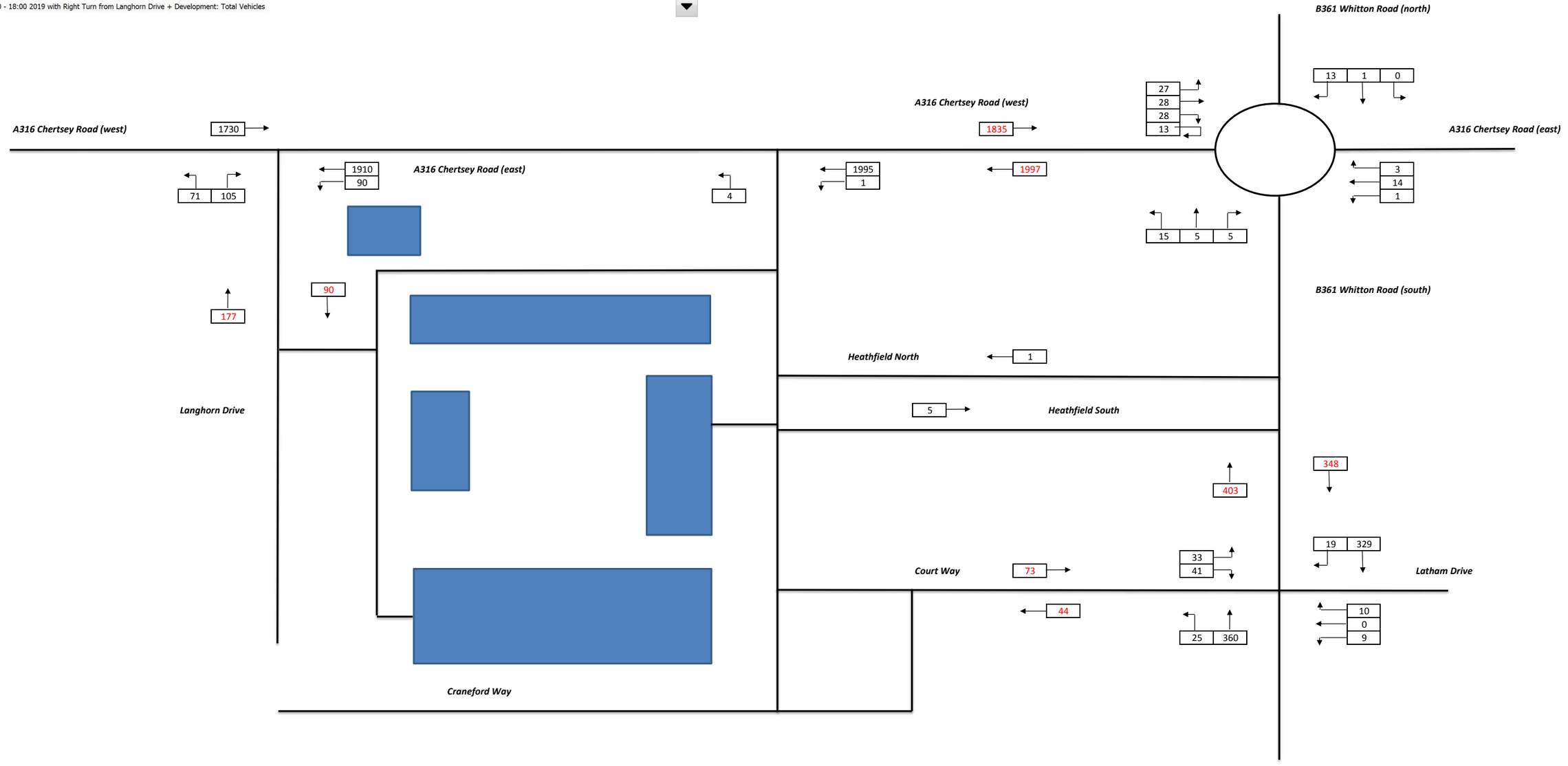


T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\Junction Assessment\Richmond Education and Enterprise Campus Flow Diagram AM Peak Hour - 2019 and 2034_Rev A

30713 Richmond Education and Enterprise Campus

17:00 - 18:00 2019 with Right Turn from Langhorn Drive + Development: Total Vehicles

17:00 - 18:00 2019 with Right Turn from Langhorn Drive + Development: Total Vehicles

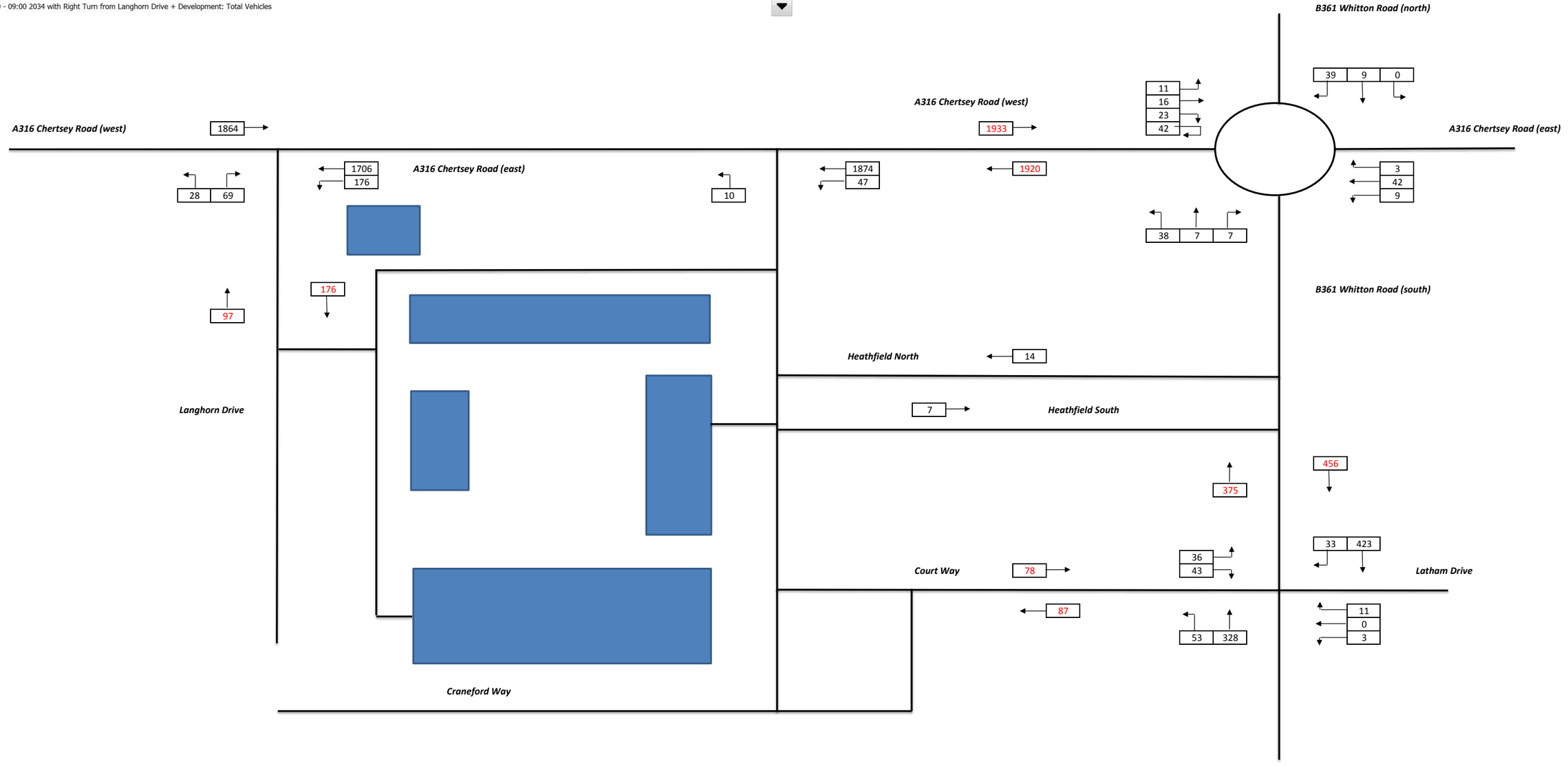


T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\Junction Assessment\Richmond Education and Enterprise Campus Flow Diagram PM Peak Hour - 2019 and 2034_A

30713 Richmond Education and Enterprise Campus

08:00 - 09:00 2034 with Right Turn from Langhorn Drive + Development: Total Vehicles

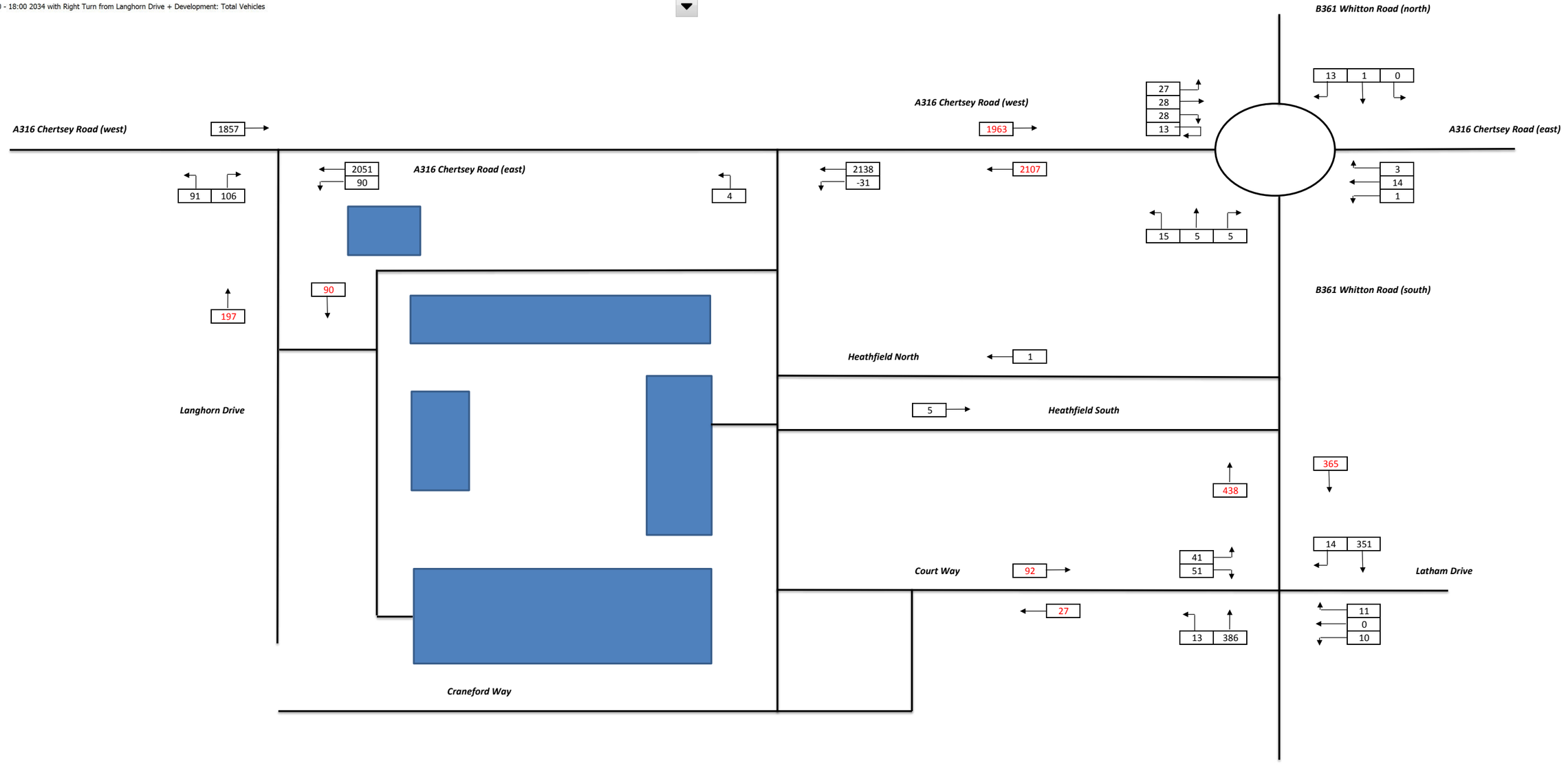
08:00 - 09:00 2034 with Right Turn from Langhorn Drive + Development: Total Vehicles



30713 Richmond Education and Enterprise Campus

17:00 - 18:00 2034 with Right Turn from Langhorn Drive + Development: Total Vehicles

17:00 - 18:00 2034 with Right Turn from Langhorn Drive + Development: Total Vehicles



T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\Junction Assessment\Richmond Education and Enterprise Campus Flow Diagram PM Peak Hour - 2019 and 2034_A

Appendix K

2019 + Development and 2034 + Development junction capacity assessment reports

TPP
transport planning practice

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
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EMAIL: software@trl.co.uk

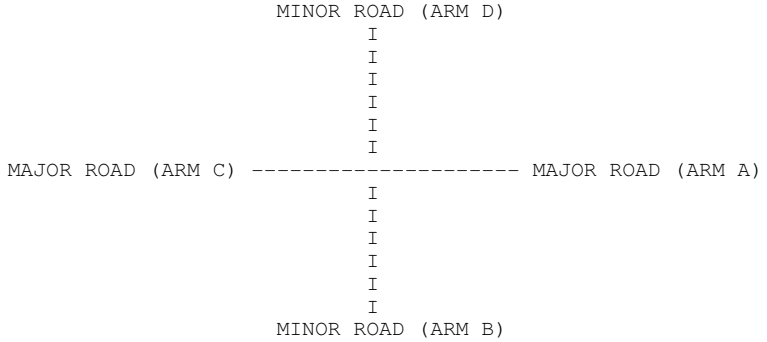
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\Whitton Road - Court Way - AM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:19:25 on Monday, 1 June 2015

RUN INFORMATION
****

RUN TITLE	: Whitton Road / Court Way AM Peak Hour
LOCATION	: Richmond College
DATE	: 28/05/15
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA



ARM A IS Whitton Road (South)
ARM B IS Court Way
ARM C IS Whitton Road (North)
ARM D IS Latham Road

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM		MINOR ROAD B		MINOR ROAD D
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.50 M.	(W)	6.50 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.	(WA-D)	2.20 M.
- VISIBILITY	(VC-B)	60.00 M.	(VA-D)	195.00 M.
- BLOCKS TRAFFIC (SPACES)		YES (1)		NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	23.0 M.	(VD-A)	19.0 M.
- VISIBILITY TO RIGHT	(VB-A)	30.0 M.	(VD-C)	22.0 M.
- LANE 1 WIDTH	(WB-C)	3.78 M.	(WD-A)	4.15 M.
- LANE 2 WIDTH	(WB-A)	0.00 M.	(WD-C)	0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

STREAM B-C

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
693.02	0.26	0.10

STREAM D-A

Intercept For STREAM D-A	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
711.22	0.27	0.11

STREAM B-A

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM D-A	Slope For Opposing STREAM D-B
538.81	0.24	0.24	0.24	0.24

Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM D-C
0.10	0.15	0.35	0.12

STREAM D-C

Intercept For STREAM D-C	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM B-C	Slope For Opposing STREAM B-D
551.52	0.25	0.25	0.25	0.25

Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM B-A
0.10	0.16	0.35	0.12

STREAM C-B

Intercept For STREAM C-B	Slope For Opposing STREAM A-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D
608.71	0.23	0.23	0.33

STREAM A-D

Intercept For STREAM A-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D
686.89	0.26	0.37	0.26

B-D Stream From Left Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D	Slope For Opposing	Slope For Opposing
0.15	0.15		

B-D Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D	Slope For Opposing	Slope For Opposing
0.15	0.15		

D-B Stream From Left Hand Lane

Intercept For STREAM D-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing	Slope For Opposing
0.16	0.16		

D-B Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing	Slope For Opposing
0.16	0.16		

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

Demand set: 2022 Dev

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2022 Dev

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
07.45 - 08.00	ARM A	0.000	0.062	0.938	0.000
		0.0	5.0	76.0	0.0
		(0.0)	(0.0)	(8.4)	(0.0)
	ARM B	0.676	0.000	0.324	0.000
		23.0	0.0	11.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.945	0.055	0.000	0.000
		86.0	5.0	0.0	0.0
		(8.6)	(0.0)	(0.0)	(0.0)
	ARM D	0.333	0.000	0.667	0.000
		1.0	0.0	2.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.00 - 08.15	ARM A	0.000	0.152	0.848	0.000
		0.0	14.0	78.0	0.0
		(0.0)	(0.0)	(2.7)	(0.0)
	ARM B	0.526	0.000	0.474	0.000
		10.0	0.0	9.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.927	0.073	0.000	0.000
		101.0	8.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.15 - 08.30	ARM A	0.000	0.124	0.876	0.000
		0.0	11.0	78.0	0.0
		(0.0)	(0.0)	(2.7)	(0.0)
	ARM B	0.556	0.000	0.444	0.000
		10.0	0.0	8.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.927	0.073	0.000	0.000
		101.0	8.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.30 - 08.45	ARM A	0.000	0.152	0.848	0.000
		0.0	14.0	78.0	0.0
		(0.0)	(0.0)	(2.7)	(0.0)
	ARM B	0.526	0.000	0.474	0.000
		10.0	0.0	9.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.927	0.073	0.000	0.000
		101.0	8.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.45 - 09.00	ARM A	0.000	0.133	0.867	0.000
		0.0	12.0	78.0	0.0
		(0.0)	(0.0)	(2.7)	(0.0)
	ARM B	0.526	0.000	0.474	0.000
		10.0	0.0	9.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.927	0.073	0.000	0.000
		101.0	8.0	0.0	0.0

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

I	I	I (4.2)I	(0.0)I	(0.0)I	(0.0)I	

	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
09.00 - 09.15					
	ARM A	0.000	0.075	0.925	0.000
		0.0	5.0	62.0	0.0
		(0.0)	(0.0)	(10.2)	(0.0)
	ARM B	0.500	0.000	0.500	0.000
		6.0	0.0	6.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.929	0.071	0.000	0.000
		91.0	7.0	0.0	0.0
		(3.5)	(0.0)	(0.0)	(0.0)
	ARM D	0.000	0.000	0.000	0.000
		0.0	0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

A PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) ENTRY	EXIT	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION (VEHS) (LEFT)	(RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
A	6.00		1.0		1.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-ACD	2.27	7.36	0.308		0.00	0.44	6.2		0.19
A-BC	5.40	27.94	0.193	1.7	0.00	0.48	7.0		0.04
A-D	0.00	0.00	0.203	1.7	0.00	0.00	0.0		
D-ABC	0.20	7.24	0.028		0.00	0.03	0.4		0.14
C-ABD	0.33	8.80	0.038		0.00	0.04	0.6		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-ACD	1.07	7.66	0.139		0.44	0.16	2.6		0.15
A-BC	6.13	26.61	0.231	3.2	0.48	0.60	8.8		0.05
A-D	0.00	0.00	0.242	3.2	0.00	0.00	0.0		
D-ABC	0.20	6.97	0.029		0.03	0.03	0.4		0.15
C-ABD	0.52	8.69	0.060		0.04	0.07	1.0		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-ACD	1.07	7.58	0.141		0.16	0.16	2.5		0.15
A-BC	6.00	22.24	0.270	9.1	0.60	0.73	10.8		0.06
A-D	0.00	0.00	0.283	9.1	0.00	0.00	0.0		
D-ABC	0.20	6.97	0.029		0.03	0.03	0.4		0.15
C-ABD	0.52	8.72	0.059		0.07	0.07	1.0		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-ACD	1.07	7.67	0.139		0.16	0.16	2.4		0.15
A-BC	6.13	26.26	0.234	3.6	0.73	0.62	9.4		0.05
A-D	0.00	0.00	0.245	3.6	0.00	0.00	0.0		
D-ABC	0.20	6.97	0.029		0.03	0.03	0.4		0.15
C-ABD	0.52	8.69	0.060		0.07	0.07	1.0		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
B-ACD	1.27	7.66	0.165		0.16	0.20	2.9		0.16
A-BC	6.00	25.66	0.234	4.3	0.62	0.62	9.2		0.05
A-D	0.00	0.00	0.246	4.3	0.00	0.00	0.0		
D-ABC	0.20	6.88	0.029		0.03	0.03	0.4		0.15
C-ABD	0.53	8.72	0.061		0.07	0.07	1.0		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
B-ACD	0.87	8.13	0.107		0.20	0.12	1.9		0.14
A-BC	4.47	27.63	0.162	2.1	0.62	0.39	6.0		0.04
A-D	0.00	0.00	0.170	2.1	0.00	0.00	0.0		
D-ABC	0.00	7.26	0.000		0.03	0.00	0.0		0.00
C-ABD	0.47	9.01	0.052		0.07	0.06	0.9		0.12

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-ACD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.4
08.15	0.2
08.30	0.2
08.45	0.2
09.00	0.2
09.15	0.1

QUEUE FOR STREAM A-BC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.2
08.15	0.3
08.30	0.3
08.45	0.3
09.00	0.3
09.15	0.2

QUEUE FOR STREAM A-D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.3
08.15	0.3
08.30	0.4
08.45	0.3
09.00	0.3
09.15	0.2

QUEUE FOR STREAM D-ABC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUE FOR STREAM C-ABD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0.1
09.15	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-ACD	114.0	76.0	18.4	0.16	18.4	0.16
A-BC	512.0	341.3	51.1	0.10	51.1	0.10
A-D	0.0	0.0	0.0	0.00	0.0	0.00
D-ABC	15.0	10.0	2.2	0.14	2.2	0.14
C-ABD	43.3	28.9	5.4	0.13	5.4	0.13
ALL	1257.0	838.0	77.1	0.06	77.2	0.06

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:19:33 on 01/06/2015]

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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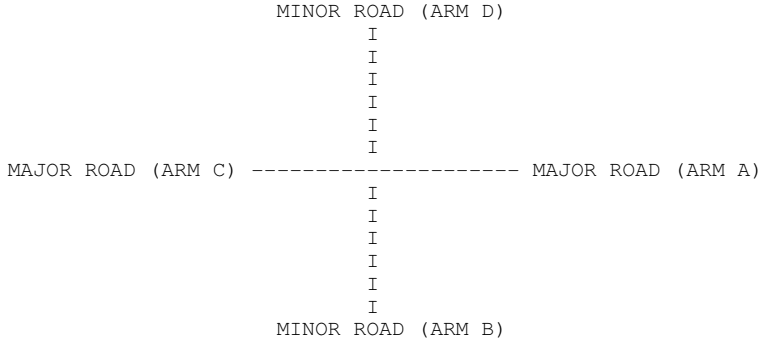
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\Whitton Road - Court Way - PM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:25:26 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: Whitton Road / Court Way PM Peak Hour
LOCATION	: Richmond College
DATE	: 24/11/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Whitton Road (South)
ARM B IS Court Way
ARM C IS Whitton Road (North)
ARM D IS Latham Road

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM		MINOR ROAD B		MINOR ROAD D	
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.50 M.	(W)	6.50 M.	
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.	(WCR)	0.00 M.	
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.	(WA-D)	2.20 M.	
- VISIBILITY	(VC-B)	60.00 M.	(VA-D)	195.00 M.	
- BLOCKS TRAFFIC (SPACES)		YES (1)		NO (0)	
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	23.0 M.	(VD-A)	19.0 M.	
- VISIBILITY TO RIGHT	(VB-A)	30.0 M.	(VD-C)	22.0 M.	
- LANE 1 WIDTH	(WB-C)	3.78 M.	(WD-A)	4.15 M.	
- LANE 2 WIDTH	(WB-A)	0.00 M.	(WD-C)	0.00 M.	

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

STREAM B-C

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
693.02	0.26	0.10

STREAM D-A

Intercept For STREAM D-A	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
711.22	0.27	0.11

STREAM B-A

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM D-A	Slope For Opposing STREAM D-B
538.81	0.24	0.24	0.24	0.24

Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM D-C
0.10	0.15	0.35	0.12

STREAM D-C

Intercept For STREAM D-C	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM B-C	Slope For Opposing STREAM B-D
551.52	0.25	0.25	0.25	0.25

Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM B-A
0.10	0.16	0.35	0.12

STREAM C-B

Intercept For STREAM C-B	Slope For Opposing STREAM A-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D
608.71	0.23	0.23	0.33

STREAM A-D

Intercept For STREAM A-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D
686.89	0.26	0.37	0.26

B-D Stream From Left Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

B-D Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

D-B Stream From Left Hand Lane

Intercept For STREAM D-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

D-B Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

Demand set: 2022 Dev

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2022 Dev

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 17.00	ARM A	0.000	0.009	0.991	0.000
		0.0	1.0	111.0	0.0
		(0.0)	(0.0)	(5.1)	(0.0)
	ARM B	0.429	0.000	0.571	0.000
		9.0	0.0	12.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.988	0.013	0.000	0.000
		79.0	1.0	0.0	0.0
		(7.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.000	0.000	1.000	0.000
		0.0	0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.00 - 17.15	ARM A	0.000	0.040	0.960	0.000
		0.0	4.0	97.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.565	0.000	0.435	0.000
		13.0	0.0	10.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.957	0.043	0.000	0.000
		89.0	4.0	0.0	0.0
		(2.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.500	0.000	0.500	0.000
		3.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.15 - 17.30	ARM A	0.000	0.020	0.980	0.000
		0.0	2.0	98.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.545	0.000	0.455	0.000
		12.0	0.0	10.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.967	0.033	0.000	0.000
		89.0	3.0	0.0	0.0
		(2.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.500	0.000	0.500	0.000
		3.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.30 - 17.45	ARM A	0.000	0.039	0.961	0.000
		0.0	4.0	98.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.565	0.000	0.435	0.000
		13.0	0.0	10.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.957	0.043	0.000	0.000
		89.0	4.0	0.0	0.0
		(2.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.500	0.000	0.500	0.000
		3.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.45 - 18.00	ARM A	0.000	0.030	0.970	0.000
		0.0	3.0	98.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.565	0.000	0.435	0.000
		13.0	0.0	10.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.967	0.033	0.000	0.000
		89.0	3.0	0.0	0.0

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

I I I (2.2)I (0.0)I (0.0)I (0.0)I

	ARM D	0.500	0.000	0.500	0.000	
		3.0	0.0	3.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	
18.00 - 18.15	ARM A	0.000	0.102	0.898	0.000	
		0.0	10.0	88.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	
	ARM B	0.625	0.000	0.375	0.000	
		10.0	0.0	6.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	
	ARM C	0.955	0.045	0.000	0.000	
		85.0	4.0	0.0	0.0	
		(2.7)	(0.0)	(0.0)	(0.0)	
	ARM D	0.000	0.000	1.000	0.000	
		0.0	0.0	2.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

A PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) ENTRY	EXIT	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION (VEHS) (LEFT)	(RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
A	6.00		1.0		1.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-ACD	1.40	7.74	0.181		0.00	0.22	3.1		0.16
A-BC	7.47	27.94	0.267	1.7	0.00	0.73	10.5		0.05
A-D	0.00	0.00	0.281	1.7	0.00	0.00	0.0		
D-ABC	0.07	6.30	0.011		0.00	0.01	0.2		0.16
C-ABD	0.07	8.34	0.008		0.00	0.01	0.1		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-ACD	1.47	7.39	0.198		0.22	0.24	3.6		0.17
A-BC	6.80	26.61	0.256	3.2	0.73	0.69	10.5		0.05
A-D	0.00	0.00	0.268	3.2	0.00	0.00	0.0		
D-ABC	0.33	7.80	0.043		0.01	0.04	0.6		0.13
C-ABD	0.26	8.51	0.031		0.01	0.03	0.5		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-ACD	1.47	7.47	0.196		0.24	0.24	3.7		0.17
A-BC	6.67	22.24	0.300	9.1	0.69	0.85	12.5		0.06
A-D	0.00	0.00	0.315	9.1	0.00	0.00	0.0		
D-ABC	0.33	7.80	0.043		0.04	0.04	0.7		0.13
C-ABD	0.20	8.54	0.023		0.03	0.02	0.4		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-ACD	1.47	7.38	0.199		0.24	0.25	3.7		0.17
A-BC	6.80	26.26	0.259	3.6	0.85	0.71	10.8		0.05
A-D	0.00	0.00	0.272	3.6	0.00	0.00	0.0		
D-ABC	0.33	7.80	0.043		0.04	0.04	0.7		0.13
C-ABD	0.26	8.51	0.031		0.02	0.03	0.5		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-ACD	1.53	7.40	0.207		0.25	0.26	3.8		0.17
A-BC	6.73	25.66	0.262	4.3	0.71	0.71	10.6		0.05
A-D	0.00	0.00	0.276	4.3	0.00	0.00	0.0		
D-ABC	0.33	7.79	0.043		0.04	0.04	0.7		0.13
C-ABD	0.20	8.53	0.023		0.03	0.02	0.4		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-ACD	1.07	7.46	0.143		0.26	0.17	2.6		0.16
A-BC	6.53	27.63	0.236	2.1	0.71	0.63	9.6		0.05
A-D	0.00	0.00	0.248	2.1	0.00	0.00	0.0		
D-ABC	0.13	6.60	0.020		0.04	0.02	0.3		0.15
C-ABD	0.27	8.63	0.031		0.02	0.03	0.5		0.12

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-ACD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.2
17.15	0.2
17.30	0.2
17.45	0.2
18.00	0.3
18.15	0.2

QUEUE FOR STREAM A-BC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.3
17.15	0.3
17.30	0.4
17.45	0.3
18.00	0.3
18.15	0.3

QUEUE FOR STREAM A-D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.4
17.15	0.4
17.30	0.5
17.45	0.4
18.00	0.4
18.15	0.3

QUEUE FOR STREAM D-ABC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUE FOR STREAM C-ABD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-ACD	126.0	84.0	20.5	0.16	20.5	0.16
A-BC	615.0	410.0	64.6	0.10	64.6	0.10
A-D	0.0	0.0	0.0	0.00	0.0	0.00
D-ABC	23.0	15.3	3.1	0.14	3.1	0.14
C-ABD	18.9	12.6	2.3	0.12	2.3	0.12
ALL	1300.0	866.7	90.5	0.07	90.5	0.07

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:25:34 on 01/06/2015]

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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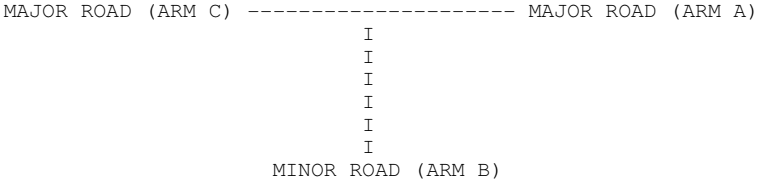
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\A316 Chertsey Road - Egerton Road - AM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:11:18 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: A316 Chertsey Road / Egerton Road - AM Peak Hour
LOCATION	: Richmond College
DATE	: 02/12/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS A316 Chertsey Road (East)
ARM B IS Egerton Road
ARM C IS A316 Chertsey Road (West)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 16.46 M.
CENTRAL RESERVE WIDTH	(WCR) 2.16 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)250.00 M.
- BLOCKS TRAFFIC (SPACES)	NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 98.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 3.66 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
732.28	0.15	0.06

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
625.86	0.15	0.06	0.09	0.21

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
718.74	0.15	0.15

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: 2022 Dev

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2022 Dev

TIME	FROM/TO	ARM A	ARM B	ARM C
07.45 - 08.00	ARM A	0.000	0.006	0.994
		0.0	3.0	538.0
		(0.0)	(0.0)	(3.5)
	ARM B	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.00 - 08.15	ARM A	0.000	0.045	0.955
		0.0	21.0	445.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	4.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.15 - 08.30	ARM A	0.000	0.028	0.972
		0.0	13.0	445.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	4.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.30 - 08.45	ARM A	0.000	0.020	0.980
		0.0	9.0	445.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	3.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.45 - 09.00	ARM A	0.000	0.007	0.993
		0.0	3.0	445.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	3.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
09.00 - 09.15	ARM A	0.000	0.008	0.992
		0.0	3.0	370.0
		(0.0)	(0.0)	(7.2)
	ARM B	0.000	0.000	1.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-AC	0.00	5.05	0.000		0.00	0.00	0.0		0.00
C-A	0.00								
C-B	0.00	5.75	0.000		0.00	0.00	0.0		0.00
A-B	0.20								
A-C	35.80								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-AC	0.27	7.59	0.035		0.00	0.04	0.5		0.14
C-A	0.00								
C-B	0.00	6.66	0.000		0.00	0.00	0.0		0.00
A-B	1.33								
A-C	28.27								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-AC	0.27	7.54	0.035		0.04	0.04	0.5		0.14
C-A	0.00								
C-B	0.00	6.66	0.000		0.00	0.00	0.0		0.00
A-B	0.84								
A-C	28.76								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-AC	0.20	7.52	0.027		0.04	0.03	0.4		0.14
C-A	0.00								
C-B	0.00	6.66	0.000		0.00	0.00	0.0		0.00
A-B	0.59								
A-C	29.01								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
B-AC	0.20	7.48	0.027		0.03	0.03	0.4		0.14
C-A	0.00								
C-B	0.00	6.66	0.000		0.00	0.00	0.0		0.00
A-B	0.20								
A-C	29.40								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
B-AC	0.07	8.10	0.008		0.03	0.01	0.1		0.12
C-A	0.00								
C-B	0.00	7.21	0.000		0.00	0.00	0.0		0.00
A-B	0.20								
A-C	24.67								

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	15.0	10.0	2.0	0.14	2.0	0.14
C-A	0.0	0.0				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	50.4	33.6				
A-C	2638.6	1759.1				
ALL	2704.0	1802.7	2.0	0.00	2.0	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

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TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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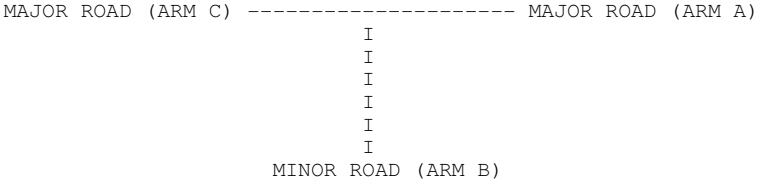
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\A316 Chertsey Road - Egerton Road - PM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:16:03 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: A316 Chertsey Road / Egerton Road - PM Peak Hour
LOCATION	: Richmond College
DATE	: 02/12/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS A316 Chertsey Road (East)
ARM B IS Egerton Road
ARM C IS A316 Chertsey Road (West)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 16.46 M.
CENTRAL RESERVE WIDTH	(WCR) 2.16 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)250.00 M.
- BLOCKS TRAFFIC (SPACES)	NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 98.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 3.66 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
732.28	0.15	0.06

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
625.86	0.15	0.06	0.09	0.21

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
718.74	0.15	0.15

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: 2022 Dev

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2022 Dev

TIME	FROM/TO	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
16.45 - 17.00	ARM A	0.000 0.0 (0.0)	0.002 1.0 (0.0)	0.998 526.0 (2.2)
	ARM B	0.000 0.0 (0.0)	0.000 0.0 (0.0)	1.000 2.0 (0.0)
	ARM C	0.000 0.0 (0.0)	0.000 0.0 (0.0)	0.000 0.0 (0.0)
17.00 - 17.15	ARM A	0.000 0.0 (0.0)	0.000 0.0 (0.0)	1.000 507.0 (2.0)
	ARM B	0.000 0.0 (0.0)	0.000 0.0 (0.0)	1.000 0.0 (0.0)
	ARM C	0.000 0.0 (0.0)	0.000 0.0 (0.0)	0.000 0.0 (0.0)
17.15 - 17.30	ARM A	0.000 0.0 (0.0)	0.002 1.0 (0.0)	0.998 507.0 (2.0)
	ARM B	0.000 0.0 (0.0)	0.000 0.0 (0.0)	0.000 0.0 (0.0)
	ARM C	0.000 0.0 (0.0)	0.000 0.0 (0.0)	0.000 0.0 (0.0)
17.30 - 17.45	ARM A	0.000 0.0 (0.0)	0.004 2.0 (0.0)	0.996 507.0 (2.0)
	ARM B	0.000 0.0 (0.0)	0.000 0.0 (0.0)	1.000 2.0 (0.0)
	ARM C	0.000 0.0 (0.0)	0.000 0.0 (0.0)	0.000 0.0 (0.0)
17.45 - 18.00	ARM A	0.000 0.0 (0.0)	0.002 1.0 (0.0)	0.998 507.0 (2.0)
	ARM B	0.000 0.0 (0.0)	0.000 0.0 (0.0)	1.000 2.0 (0.0)
	ARM C	0.000 0.0 (0.0)	0.000 0.0 (0.0)	0.000 0.0 (0.0)
18.00 - 18.15	ARM A	0.000 0.0 (0.0)	0.000 0.0 (0.0)	1.000 528.0 (1.8)
	ARM B	0.000 0.0 (0.0)	0.000 0.0 (0.0)	0.000 0.0 (0.0)
	ARM C	0.000 0.0 (0.0)	0.000 0.0 (0.0)	0.000 0.0 (0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-AC	0.13	6.66	0.020		0.00	0.02	0.3		0.15
C-A	0.00								
C-B	0.00	5.94	0.000		0.00	0.00	0.0		0.00
A-B	0.07								
A-C	35.07								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-AC	0.07	6.87	0.010		0.02	0.01	0.2		0.15
C-A	0.00								
C-B	0.00	6.13	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	33.80								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-AC	0.00	6.88	0.000		0.01	0.00	0.0		0.00
C-A	0.00								
C-B	0.00	6.13	0.000		0.00	0.00	0.0		0.00
A-B	0.07								
A-C	33.73								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-AC	0.13	6.89	0.019		0.00	0.02	0.3		0.15
C-A	0.00								
C-B	0.00	6.13	0.000		0.00	0.00	0.0		0.00
A-B	0.13								
A-C	33.67								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-AC	0.07	6.88	0.010		0.02	0.01	0.2		0.15
C-A	0.00								
C-B	0.00	6.13	0.000		0.00	0.00	0.0		0.00
A-B	0.07								
A-C	33.73								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-AC	0.00	6.66	0.000		0.01	0.00	0.0		0.00
C-A	0.00								
C-B	0.00	5.95	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	35.20								

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	6.0	4.0	0.9	0.15	0.9	0.15
C-A	0.0	0.0				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	5.0	3.3				
A-C	3078.0	2052.0				
ALL	3089.0	2059.3	0.9	0.00	0.9	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:16:11 on 01/06/2015]

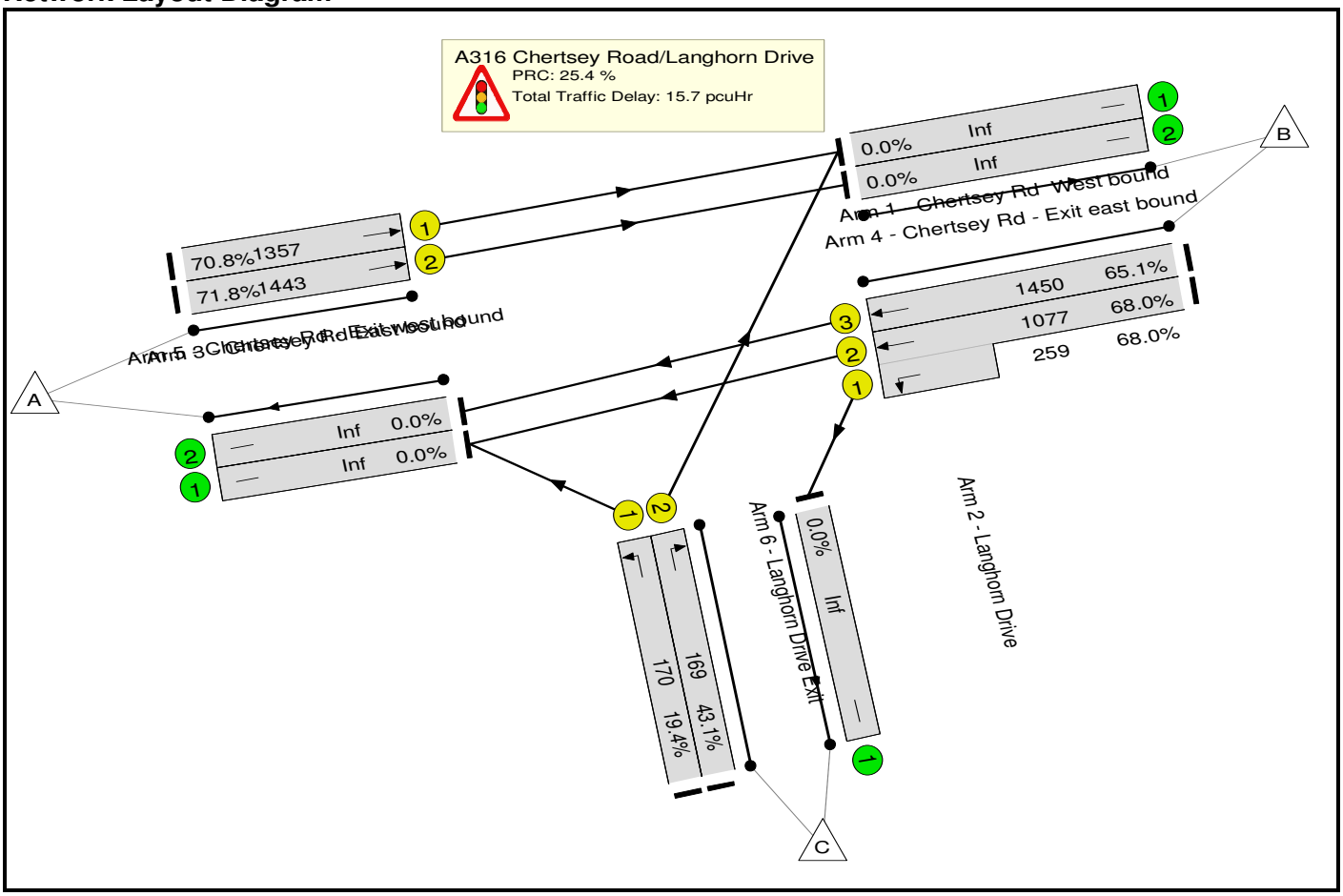
Basic Results Summary

Project and User Details

Project:	
Title:	
Location:	
File name:	Chertsey Rd-Langhorn Drive - Option 1 with left turn lane KW.lsg3x
Author:	
Company:	
Address:	
Notes:	
Linsig Version:	3, 2, 22, 0

Scenario 5: '2022 + Dev AM' (FG5: '2022 Baseline + Dev AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**71.8%**	**0**	**0**	**0**	**15.7**	**-**	**-**
A316 Chertsey Road/Langhorn Drive	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**71.8%**	**0**	**0**	**0**	**15.7**	**-**	**-**
1/2+1/1	Chertsey Rd West bound Ahead Left	U	B		1	59	-	908	1995:1613	1077+259	68.0 : 68.0%	-	-	-	3.1	12.2	12.7
1/3	Chertsey Rd West bound Ahead	U	B		1	59	-	944	2175	1450	65.1%	-	-	-	3.2	12.4	14.8
2/1	Langhorn Drive Left	U	D		1	7	-	33	1912	170	19.4%	-	-	-	0.5	51.2	0.9
2/2	Langhorn Drive Right	U	C		1	7	-	73	1905	169	43.1%	-	-	-	1.2	57.4	2.1
3/1	Chertsey Rd East bound Ahead	U	A		1	59	-	960	2035	1357	70.8%	-	-	-	3.7	14.0	16.1
3/2	Chertsey Rd East bound Ahead	U	A		1	59	-	1036	2165	1443	71.8%	-	-	-	4.0	14.0	17.7

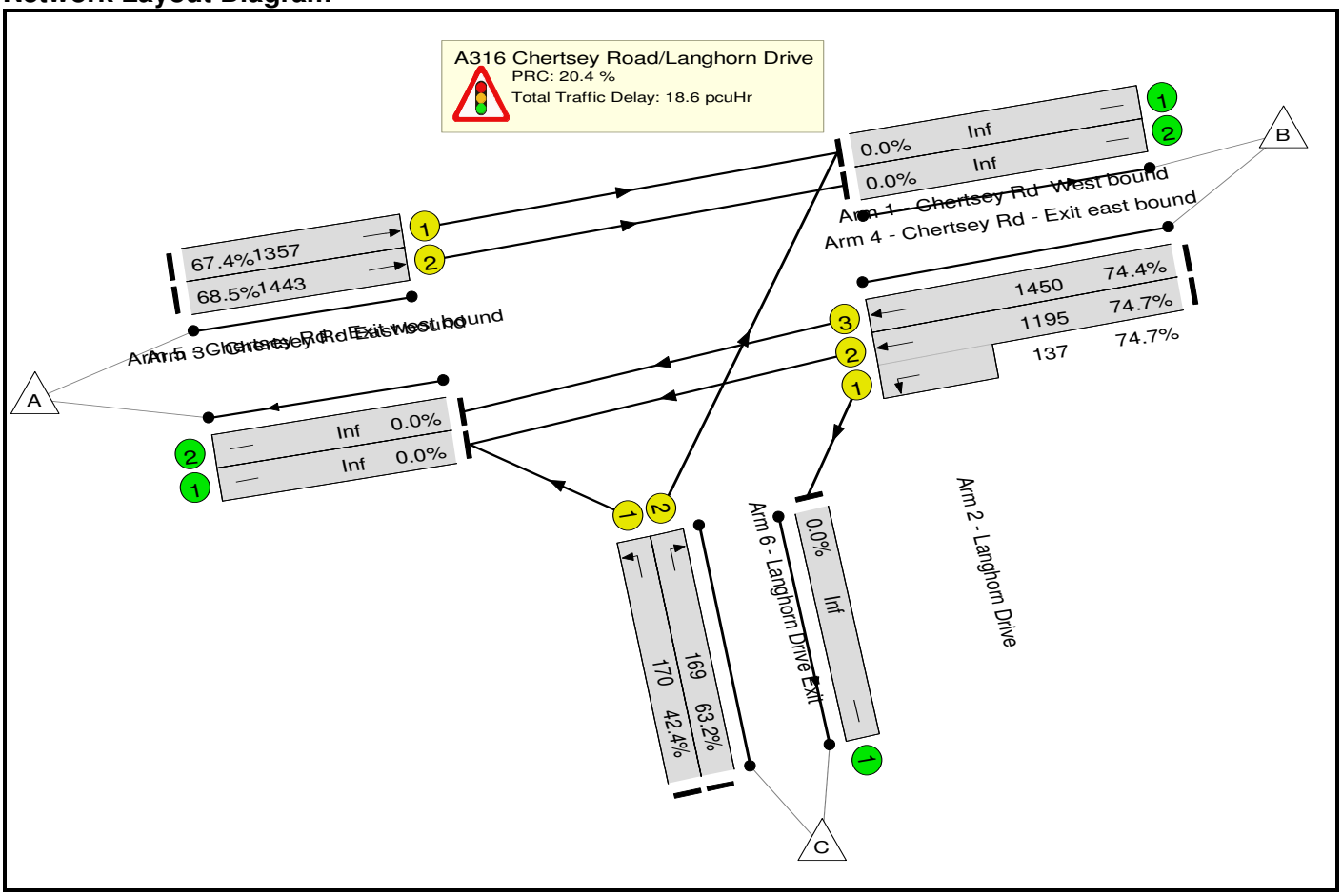
C1 PRC for Signalled Lanes (%): 25.4 Total Delay for Signalled Lanes (pcuHr): 15.71 Cycle Time (s): 90

PRC Over All Lanes (%): 25.4 Total Delay Over All Lanes(pcuHr): 15.71

Basic Results Summary

Scenario 6: '2022 + Dev PM' (FG6: '2022 Baseline + Dev PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.7%**	**0**	**0**	**0**	**18.6**	**-**	**-**
A316 Chertsey Road/Langhorn Drive	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.7%**	**0**	**0**	**0**	**18.6**	**-**	**-**
1/2+1/1	Chertsey Rd West bound Ahead Left	U	B		1	59	-	995	1995:1613	1195+137	74.7 : 74.7%	-	-	-	4.0	14.6	16.9
1/3	Chertsey Rd West bound Ahead	U	B		1	59	-	1079	2175	1450	74.4%	-	-	-	4.4	14.7	19.1
2/1	Langhorn Drive Left	U	D		1	7	-	72	1912	170	42.4%	-	-	-	1.1	57.1	2.1
2/2	Langhorn Drive Right	U	C		1	7	-	107	1905	169	63.2%	-	-	-	2.0	67.7	3.4
3/1	Chertsey Rd East bound Ahead	U	A		1	59	-	914	2035	1357	67.4%	-	-	-	3.3	13.1	14.7
3/2	Chertsey Rd East bound Ahead	U	A		1	59	-	988	2165	1443	68.5%	-	-	-	3.6	13.1	16.2

C1 PRC for Signalled Lanes (%): 20.4 Total Delay for Signalled Lanes (pcuHr): 18.55 Cycle Time (s): 90

PRC Over All Lanes (%): 20.4 Total Delay Over All Lanes(pcuHr): 18.55

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

FOR SALES AND DISTRIBUTION INFORMATION,
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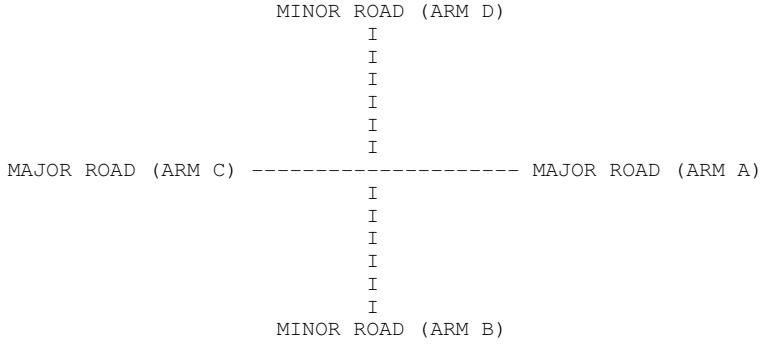
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\Whitton Road - Court Way - AM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:19:53 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: Whitton Road / Court Way AM Peak Hour
LOCATION	: Richmond College
DATE	: 28/05/15
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Whitton Road (South)
ARM B IS Court Way
ARM C IS Whitton Road (North)
ARM D IS Latham Road

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM		MINOR ROAD B		MINOR ROAD D
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.50 M.	(W)	6.50 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.	(WA-D)	2.20 M.
- VISIBILITY	(VC-B)	60.00 M.	(VA-D)	195.00 M.
- BLOCKS TRAFFIC (SPACES)		YES (1)		NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	23.0 M.	(VD-A)	19.0 M.
- VISIBILITY TO RIGHT	(VB-A)	30.0 M.	(VD-C)	22.0 M.
- LANE 1 WIDTH	(WB-C)	3.78 M.	(WD-A)	4.15 M.
- LANE 2 WIDTH	(WB-A)	0.00 M.	(WD-C)	0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

STREAM B-C

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
693.02	0.26	0.10

STREAM D-A

Intercept For STREAM D-A	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
711.22	0.27	0.11

STREAM B-A

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM D-A	Slope For Opposing STREAM D-B
538.81	0.24	0.24	0.24	0.24

Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM D-C
0.10	0.15	0.35	0.12

STREAM D-C

Intercept For STREAM D-C	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM B-C	Slope For Opposing STREAM B-D
551.52	0.25	0.25	0.25	0.25

Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM B-A
0.10	0.16	0.35	0.12

STREAM C-B

Intercept For STREAM C-B	Slope For Opposing STREAM A-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D
608.71	0.23	0.23	0.33

STREAM A-D

Intercept For STREAM A-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D
686.89	0.26	0.37	0.26

B-D Stream From Left Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D	Slope For Opposing	Slope For Opposing
	0.15	0.15		

B-D Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D	Slope For Opposing	Slope For Opposing
	0.15	0.15		

D-B Stream From Left Hand Lane

Intercept For STREAM D-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing	Slope For Opposing
	0.16	0.16		

D-B Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing	Slope For Opposing
	0.16	0.16		

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

Demand set: 2037 Dev

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2037 Dev

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
07.45 - 08.00	ARM A	0.000	0.069	0.931	0.000
		0.0	6.0	81.0	0.0
		(0.0)	(0.0)	(8.4)	(0.0)
	ARM B	0.667	0.000	0.333	0.000
		24.0	0.0	12.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.939	0.061	0.000	0.000
		92.0	6.0	0.0	0.0
		(8.6)	(0.0)	(0.0)	(0.0)
	ARM D	0.333	0.000	0.667	0.000
		1.0	0.0	2.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.00 - 08.15	ARM A	0.000	0.144	0.856	0.000
		0.0	14.0	83.0	0.0
		(0.0)	(0.0)	(2.7)	(0.0)
	ARM B	0.550	0.000	0.450	0.000
		11.0	0.0	9.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.923	0.077	0.000	0.000
		108.0	9.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.15 - 08.30	ARM A	0.000	0.126	0.874	0.000
		0.0	12.0	83.0	0.0
		(0.0)	(0.0)	(2.7)	(0.0)
	ARM B	0.526	0.000	0.474	0.000
		10.0	0.0	9.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.931	0.069	0.000	0.000
		108.0	8.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.30 - 08.45	ARM A	0.000	0.144	0.856	0.000
		0.0	14.0	83.0	0.0
		(0.0)	(0.0)	(2.7)	(0.0)
	ARM B	0.550	0.000	0.450	0.000
		11.0	0.0	9.0	0.0
		(2.6)	(0.0)	(0.0)	(0.0)
	ARM C	0.923	0.077	0.000	0.000
		108.0	9.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.45 - 09.00	ARM A	0.000	0.135	0.865	0.000
		0.0	13.0	83.0	0.0
		(0.0)	(0.0)	(2.7)	(0.0)
	ARM B	0.550	0.000	0.450	0.000
		11.0	0.0	9.0	0.0
		(2.6)	(0.0)	(0.0)	(0.0)
	ARM C	0.931	0.069	0.000	0.000
		108.0	8.0	0.0	0.0

I	I	I (4.2)I	(0.0)I	(0.0)I	(0.0)I	

	ARM D	0.250	0.000	0.750	0.000	
		1.0	0.0	3.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	
09.00 - 09.15						
	ARM A	0.000	0.070	0.930	0.000	
		0.0	5.0	66.0	0.0	
		(0.0)	(0.0)	(10.3)	(0.0)	
	ARM B	0.500	0.000	0.500	0.000	
		7.0	0.0	7.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	
	ARM C	0.933	0.067	0.000	0.000	
		97.0	7.0	0.0	0.0	
		(3.5)	(0.0)	(0.0)	(0.0)	
	ARM D	0.000	0.000	0.000	0.000	
		0.0	0.0	0.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

A PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) (ENTRY)	(EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS) (LEFT)	(RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
A	6.00		1.0		1.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-ACD	2.47	7.21	0.342		0.00	0.51	7.2		0.21
A-BC	5.80	27.94	0.208	1.7	0.00	0.52	7.6		0.05
A-D	0.00	0.00	0.218	1.7	0.00	0.00	0.0		
D-ABC	0.20	7.03	0.028		0.00	0.03	0.4		0.15
C-ABD	0.40	8.70	0.046		0.00	0.05	0.7		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-ACD	1.13	7.40	0.153		0.51	0.18	2.9		0.16
A-BC	6.53	26.61	0.246	3.2	0.52	0.65	9.5		0.05
A-D	0.00	0.00	0.258	3.2	0.00	0.00	0.0		
D-ABC	0.27	6.78	0.039		0.03	0.04	0.6		0.15
C-ABD	0.58	8.59	0.067		0.05	0.08	1.1		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-ACD	1.13	7.52	0.151		0.18	0.18	2.7		0.16
A-BC	6.40	22.24	0.288	9.1	0.65	0.80	11.8		0.06
A-D	0.00	0.00	0.302	9.1	0.00	0.00	0.0		
D-ABC	0.27	6.78	0.039		0.04	0.04	0.6		0.15
C-ABD	0.52	8.62	0.060		0.08	0.07	1.0		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-ACD	1.13	7.29	0.156		0.18	0.18	2.7		0.16
A-BC	6.53	26.26	0.249	3.6	0.80	0.67	10.3		0.05
A-D	0.00	0.00	0.261	3.6	0.00	0.00	0.0		
D-ABC	0.27	6.78	0.039		0.04	0.04	0.6		0.15
C-ABD	0.58	8.59	0.067		0.07	0.08	1.1		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
B-ACD	1.33	7.29	0.183		0.18	0.22	3.2		0.17
A-BC	6.40	25.66	0.249	4.3	0.67	0.67	10.0		0.05
A-D	0.00	0.00	0.262	4.3	0.00	0.00	0.0		
D-ABC	0.27	6.70	0.040		0.04	0.04	0.6		0.16
C-ABD	0.53	8.62	0.062		0.08	0.07	1.0		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
B-ACD	0.93	7.99	0.117		0.22	0.13	2.1		0.14
A-BC	4.73	27.63	0.171	2.1	0.67	0.42	6.4		0.04
A-D	0.00	0.00	0.180	2.1	0.00	0.00	0.0		
D-ABC	0.00	7.09	0.000		0.04	0.00	0.0		0.00
C-ABD	0.47	8.94	0.053		0.07	0.06	0.9		0.12

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-ACD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	*
08.15	0.2	
08.30	0.2	
08.45	0.2	
09.00	0.2	
09.15	0.1	

QUEUE FOR STREAM A-BC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.2
08.15	0.3
08.30	0.4
08.45	0.3
09.00	0.3
09.15	0.2

QUEUE FOR STREAM A-D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.3
08.15	0.3
08.30	0.4
08.45	0.4
09.00	0.4
09.15	0.2

QUEUE FOR STREAM D-ABC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUE FOR STREAM C-ABD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0.1
09.15	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-ACD	122.0	81.3	20.8	0.17	20.8	0.17
A-BC	546.0	364.0	55.6	0.10	55.6	0.10
A-D	0.0	0.0	0.0	0.00	0.0	0.00
D-ABC	19.0	12.7	2.9	0.15	2.9	0.15
C-ABD	46.2	30.8	5.9	0.13	5.9	0.13
ALL	1345.0	896.7	85.2	0.06	85.2	0.06

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:19:59 on 01/06/2015]

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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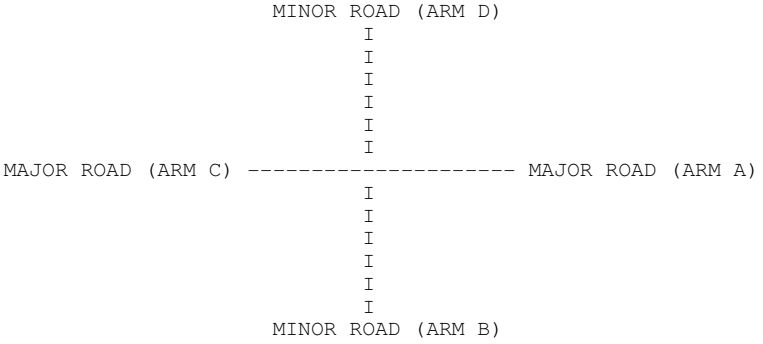
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\Whitton Road - Court Way - PM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:25:49 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: Whitton Road / Court Way PM Peak Hour
LOCATION	: Richmond College
DATE	: 24/11/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Whitton Road (South)
ARM B IS Court Way
ARM C IS Whitton Road (North)
ARM D IS Latham Road

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM		MINOR ROAD B		MINOR ROAD D	
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.50 M.	(W)	6.50 M.	
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.	(WCR)	0.00 M.	
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.	(WA-D)	2.20 M.	
- VISIBILITY	(VC-B)	60.00 M.	(VA-D)	195.00 M.	
- BLOCKS TRAFFIC (SPACES)		YES (1)		NO (0)	
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	23.0 M.	(VD-A)	19.0 M.	
- VISIBILITY TO RIGHT	(VB-A)	30.0 M.	(VD-C)	22.0 M.	
- LANE 1 WIDTH	(WB-C)	3.78 M.	(WD-A)	4.15 M.	
- LANE 2 WIDTH	(WB-A)	0.00 M.	(WD-C)	0.00 M.	

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

STREAM B-C

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
693.02	0.26	0.10

STREAM D-A

Intercept For STREAM D-A	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
711.22	0.27	0.11

STREAM B-A

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM D-A	Slope For Opposing STREAM D-B
538.81	0.24	0.24	0.24	0.24

Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM D-C
0.10	0.15	0.35	0.12

STREAM D-C

Intercept For STREAM D-C	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM B-C	Slope For Opposing STREAM B-D
551.52	0.25	0.25	0.25	0.25

Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM B-A
0.10	0.16	0.35	0.12

STREAM C-B

Intercept For STREAM C-B	Slope For Opposing STREAM A-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D
608.71	0.23	0.23	0.33

STREAM A-D

Intercept For STREAM A-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D
686.89	0.26	0.37	0.26

B-D Stream From Left Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

B-D Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

D-B Stream From Left Hand Lane

Intercept For STREAM D-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

D-B Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

Demand set: 2037 Dev

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2037 Dev

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 17.00	ARM A	0.000	0.083	0.917	0.000
		0.0	10.0	111.0	0.0
		(0.0)	(0.0)	(7.2)	(0.0)
	ARM B	0.478	0.000	0.522	0.000
		11.0	0.0	12.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.929	0.071	0.000	0.000
		79.0	6.0	0.0	0.0
		(10.1)	(0.0)	(0.0)	(0.0)
	ARM D	0.000	0.000	1.000	0.000
		0.0	0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.00 - 17.15	ARM A	0.000	0.120	0.880	0.000
		0.0	14.0	103.0	0.0
		(0.0)	(0.0)	(6.8)	(0.0)
	ARM B	0.737	0.000	0.263	0.000
		14.0	0.0	5.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.926	0.074	0.000	0.000
		88.0	7.0	0.0	0.0
		(3.4)	(0.0)	(0.0)	(0.0)
	ARM D	0.600	0.000	0.400	0.000
		3.0	0.0	2.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.15 - 17.30	ARM A	0.000	0.144	0.856	0.000
		0.0	14.0	83.0	0.0
		(0.0)	(0.0)	(1.2)	(0.0)
	ARM B	0.333	0.000	0.667	0.000
		7.0	0.0	14.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.896	0.104	0.000	0.000
		95.0	11.0	0.0	0.0
		(1.1)	(0.0)	(0.0)	(0.0)
	ARM D	0.000	0.000	1.000	0.000
		0.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.30 - 17.45	ARM A	0.000	0.100	0.900	0.000
		0.0	11.0	99.0	0.0
		(0.0)	(0.0)	(2.0)	(0.0)
	ARM B	0.522	0.000	0.478	0.000
		12.0	0.0	11.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.913	0.087	0.000	0.000
		84.0	8.0	0.0	0.0
		(1.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.500	0.000	0.500	0.000
		1.0	0.0	1.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.45 - 18.00	ARM A	0.000	0.133	0.867	0.000
		0.0	15.0	98.0	0.0
		(0.0)	(0.0)	(4.1)	(0.0)
	ARM B	0.652	0.000	0.348	0.000
		15.0	0.0	8.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.915	0.085	0.000	0.000
		86.0	8.0	0.0	0.0

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

I I I (2.3)I (0.0)I (0.0)I (0.0)I

	ARM D	0.600	0.000	0.400	0.000
		6.0	0.0	4.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
18.00 - 18.15	ARM A	0.000	0.163	0.837	0.000
		0.0	17.0	87.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM B	0.588	0.000	0.412	0.000
		10.0	0.0	7.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.924	0.076	0.000	0.000
		85.0	7.0	0.0	0.0
		(2.4)	(0.0)	(0.0)	(0.0)
	ARM D	0.000	0.000	1.000	0.000
		0.0	0.0	2.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

A PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) ENTRY	EXIT	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION (VEHS) (LEFT)	(RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
A	6.00		1.0		1.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-ACD	1.53	7.37	0.208		0.00	0.26	3.7		0.17
A-BC	8.07	27.94	0.289	1.7	0.00	0.81	11.7		0.05
A-D	0.00	0.00	0.303	1.7	0.00	0.00	0.0		
D-ABC	0.07	6.12	0.011		0.00	0.01	0.2		0.17
C-ABD	0.40	8.16	0.049		0.00	0.05	0.8		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-ACD	1.27	6.61	0.192		0.26	0.24	3.7		0.19
A-BC	7.80	26.61	0.293	3.2	0.81	0.83	12.3		0.05
A-D	0.00	0.00	0.308	3.2	0.00	0.00	0.0		
D-ABC	0.33	8.12	0.041		0.01	0.04	0.6		0.13
C-ABD	0.47	8.23	0.057		0.05	0.06	0.9		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-ACD	1.40	8.31	0.169		0.24	0.20	3.1		0.14
A-BC	6.47	22.24	0.291	9.1	0.83	0.83	12.4		0.06
A-D	0.00	0.00	0.305	9.1	0.00	0.00	0.0		
D-ABC	0.20	6.26	0.032		0.04	0.03	0.5		0.17
C-ABD	0.73	8.63	0.085		0.06	0.10	1.5		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-ACD	1.53	7.49	0.205		0.20	0.25	3.7		0.17
A-BC	7.33	26.26	0.279	3.6	0.83	0.78	11.9		0.05
A-D	0.00	0.00	0.293	3.6	0.00	0.00	0.0		
D-ABC	0.13	7.80	0.017		0.03	0.02	0.3		0.13
C-ABD	0.53	8.41	0.063		0.10	0.07	1.1		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-ACD	1.53	6.92	0.222		0.25	0.28	4.1		0.19
A-BC	7.53	25.66	0.294	4.3	0.78	0.83	12.3		0.06
A-D	0.00	0.00	0.308	4.3	0.00	0.00	0.0		
D-ABC	0.67	8.18	0.081		0.02	0.09	1.3		0.13
C-ABD	0.53	8.33	0.064		0.07	0.07	1.1		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-ACD	1.13	7.47	0.152		0.28	0.18	2.8		0.16
A-BC	6.93	27.63	0.251	2.1	0.83	0.68	10.4		0.05
A-D	0.00	0.00	0.264	2.1	0.00	0.00	0.0		
D-ABC	0.13	6.58	0.020		0.09	0.02	0.3		0.16
C-ABD	0.47	8.53	0.055		0.07	0.06	0.9		0.12

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-ACD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.3
17.15	0.2
17.30	0.2
17.45	0.3
18.00	0.3
18.15	0.2

QUEUE FOR STREAM A-BC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.4
17.15	0.4
17.30	0.4
17.45	0.4
18.00	0.4
18.15	0.3

QUEUE FOR STREAM A-D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.4
17.15	0.4
17.30	0.4
17.45	0.4
18.00	0.4
18.15	0.4

QUEUE FOR STREAM D-ABC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.1
18.15	0.0

QUEUE FOR STREAM C-ABD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.1
17.15	0.1
17.30	0.1
17.45	0.1
18.00	0.1
18.15	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-ACD	126.0	84.0	21.2	0.17	21.2	0.17
A-BC	662.0	441.3	71.0	0.11	71.0	0.11
A-D	0.0	0.0	0.0	0.00	0.0	0.00
D-ABC	23.0	15.3	3.2	0.14	3.2	0.14
C-ABD	47.0	31.3	6.2	0.13	6.2	0.13
ALL	1375.0	916.7	101.5	0.07	101.5	0.07

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:25:56 on 01/06/2015]

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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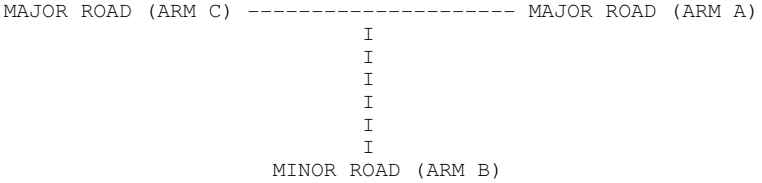
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\A316 Chertsey Road - Egerton Road - AM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:12:01 on Monday, 1 June 2015

RUN INFORMATION
****

RUN TITLE	: A316 Chertsey Road / Egerton Road - AM Peak Hour
LOCATION	: Richmond College
DATE	: 02/12/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA



ARM A IS A316 Chertsey Road (East)
ARM B IS Egerton Road
ARM C IS A316 Chertsey Road (West)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 16.46 M.
CENTRAL RESERVE WIDTH	(WCR) 2.16 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)250.00 M.
- BLOCKS TRAFFIC (SPACES)	NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 98.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 3.66 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
732.28	0.15	0.06

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
625.86	0.15	0.06	0.09	0.21

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
718.74	0.15	0.15

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: 2037 Dev

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2037 Dev

TIME	FROM/TO	ARM A	ARM B	ARM C
07.45 - 08.00	ARM A	0.000	0.005	0.995
		0.0	3.0	576.0
		(0.0)	(0.0)	(3.5)
	ARM B	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.00 - 08.15	ARM A	0.000	0.042	0.958
		0.0	21.0	476.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	4.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.15 - 08.30	ARM A	0.000	0.027	0.973
		0.0	13.0	475.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	4.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.30 - 08.45	ARM A	0.000	0.019	0.981
		0.0	9.0	475.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	3.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.45 - 09.00	ARM A	0.000	0.006	0.994
		0.0	3.0	475.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	3.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
09.00 - 09.15	ARM A	0.000	0.007	0.993
		0.0	3.0	397.0
		(0.0)	(0.0)	(7.2)
	ARM B	0.000	0.000	1.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-AC	0.00	4.67	0.000		0.00	0.00	0.0		0.00
C-A	0.00								
C-B	0.00	5.38	0.000		0.00	0.00	0.0		0.00
A-B	0.20								
A-C	38.40								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-AC	0.27	7.25	0.037		0.00	0.04	0.5		0.14
C-A	0.00								
C-B	0.00	6.36	0.000		0.00	0.00	0.0		0.00
A-B	1.34								
A-C	30.39								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-AC	0.27	7.20	0.037		0.04	0.04	0.6		0.14
C-A	0.00								
C-B	0.00	6.35	0.000		0.00	0.00	0.0		0.00
A-B	0.85								
A-C	30.89								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-AC	0.20	7.18	0.028		0.04	0.03	0.4		0.14
C-A	0.00								
C-B	0.00	6.35	0.000		0.00	0.00	0.0		0.00
A-B	0.59								
A-C	31.14								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
B-AC	0.20	7.10	0.028		0.03	0.03	0.4		0.14
C-A	0.00								
C-B	0.00	6.32	0.000		0.00	0.00	0.0		0.00
A-B	0.20								
A-C	31.73								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
B-AC	0.07	7.81	0.009		0.03	0.01	0.1		0.13
C-A	0.00								
C-B	0.00	6.95	0.000		0.00	0.00	0.0		0.00
A-B	0.20								
A-C	26.47								

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	15.0	10.0	2.1	0.14	2.1	0.14
C-A	0.0	0.0				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	50.7	33.8				
A-C	2835.3	1890.2				
ALL	2901.0	1934.0	2.1	0.00	2.1	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:12:08 on 01/06/2015]

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

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RELEASE 5.0 (JUNE 2010)

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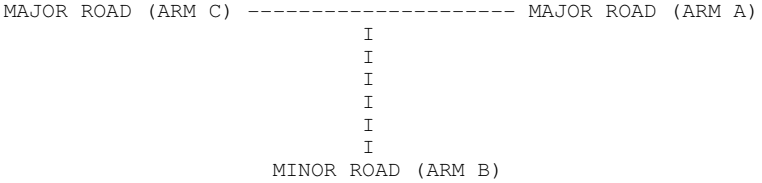
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\A316 Chertsey Road - Egerton Road - PM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:16:27 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: A316 Chertsey Road / Egerton Road - PM Peak Hour
LOCATION	: Richmond College
DATE	: 02/12/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS A316 Chertsey Road (East)
ARM B IS Egerton Road
ARM C IS A316 Chertsey Road (West)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 16.46 M.
CENTRAL RESERVE WIDTH	(WCR) 2.16 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)250.00 M.
- BLOCKS TRAFFIC (SPACES)	NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 98.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 3.66 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
732.28	0.15	0.06

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
625.86	0.15	0.06	0.09	0.21

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
718.74	0.15	0.15

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: 2037 Dev

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2037 Dev

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 17.00	ARM A	0.000	0.011	0.989
		0.0	6.0	563.0
		(0.0)	(0.0)	(2.2)
	ARM B	0.000	0.000	1.000
		0.0	0.0	4.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.00 - 17.15	ARM A	0.000	0.004	0.996
		0.0	2.0	542.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	2.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.15 - 17.30	ARM A	0.000	0.000	1.000
		0.0	0.0	543.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	2.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.30 - 17.45	ARM A	0.000	0.000	1.000
		0.0	0.0	542.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.45 - 18.00	ARM A	0.000	0.000	1.000
		0.0	0.0	542.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
18.00 - 18.15	ARM A	0.000	0.000	1.000
		0.0	0.0	565.0
		(0.0)	(0.0)	(1.8)
	ARM B	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-AC	0.27	6.25	0.043		0.00	0.04	0.6		0.17
C-A	0.00								
C-B	0.00	5.54	0.000		0.00	0.00	0.0		0.00
A-B	0.40								
A-C	37.53								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-AC	0.13	6.69	0.020		0.04	0.02	0.3		0.15
C-A	0.00								
C-B	0.00	5.96	0.000		0.00	0.00	0.0		0.00
A-B	0.13								
A-C	34.94								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-AC	0.07	6.93	0.010		0.02	0.01	0.2		0.15
C-A	0.00								
C-B	0.00	6.18	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	33.47								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-AC	0.07	6.67	0.010		0.01	0.01	0.1		0.15
C-A	0.00								
C-B	0.00	5.96	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	35.07								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-AC	0.07	6.67	0.010		0.01	0.01	0.2		0.15
C-A	0.00								
C-B	0.00	5.96	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	35.07								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-AC	0.00	6.36	0.000		0.01	0.00	0.0		0.00
C-A	0.00								
C-B	0.00	5.68	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	37.13								

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-AC	9.0	6.0	1.4	0.16	1.4	0.16
C-A	0.0	0.0				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	7.9	5.3				
A-C	3198.1	2132.0				
ALL	3215.0	2143.3	1.4	0.00	1.4	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

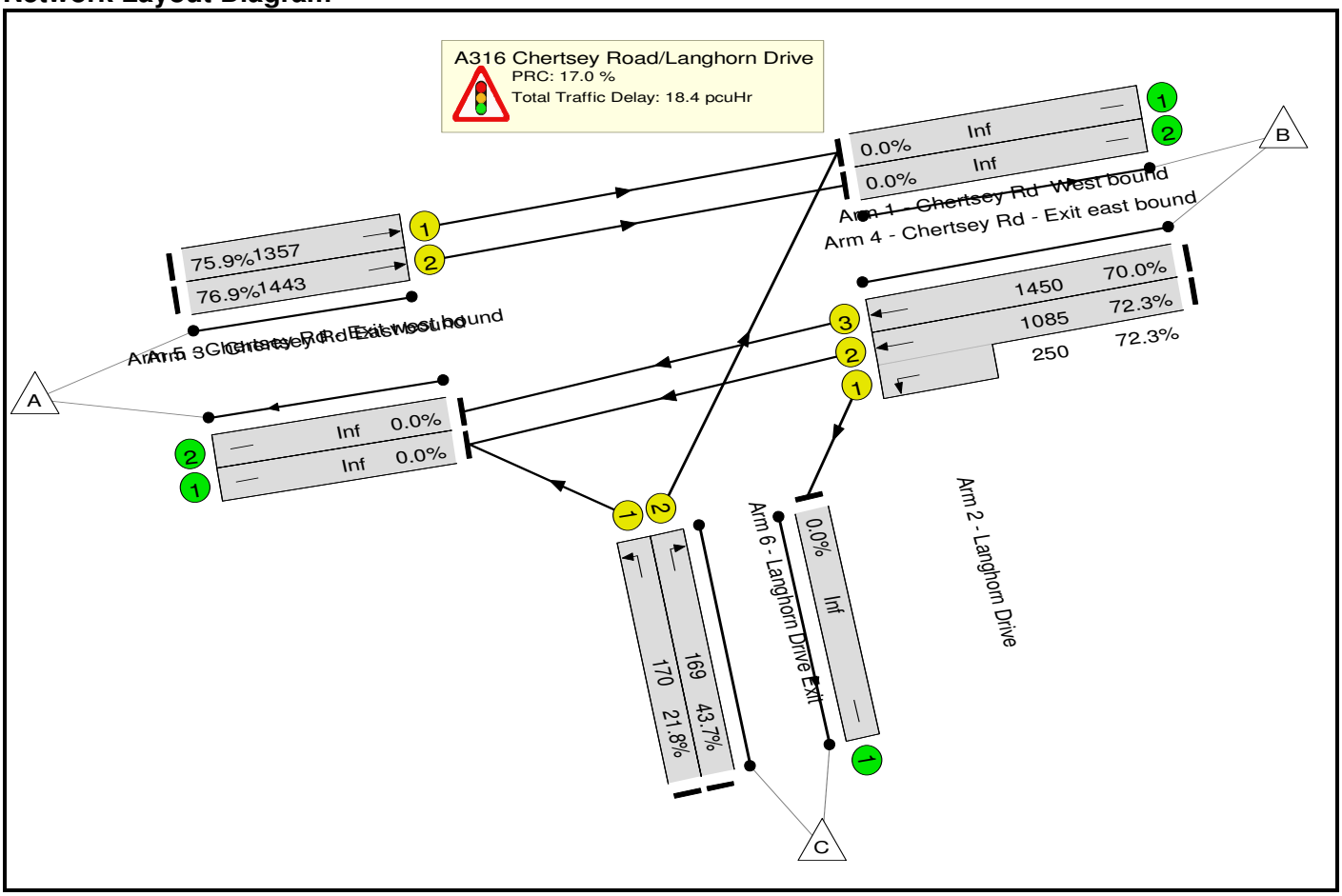
========== end of file ==========

Printed at 14:16:32 on 01/06/2015]

Basic Results Summary

Scenario 7: '2037 + Dev AM' (FG7: '2037 Baseline + Dev AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**76.9%**	**0**	**0**	**0**	**18.4**	-	-
A316 Chertsey Road/Langhorn Drive	-	-	-		-	-	-	-	-	-	**76.9%**	**0**	**0**	**0**	**18.4**	-	-
1/2+1/1	Chertsey Rd West bound Ahead Left	U	B		1	59	-	965	1995:1613	1085+250	72.3 : 72.3%	-	-	-	3.6	13.4	14.6
1/3	Chertsey Rd West bound Ahead	U	B		1	59	-	1015	2175	1450	70.0%	-	-	-	3.8	13.5	16.9
2/1	Langhorn Drive Left	U	D		1	7	-	37	1912	170	21.8%	-	-	-	0.5	51.7	1.0
2/2	Langhorn Drive Right	U	C		1	7	-	74	1905	169	43.7%	-	-	-	1.2	57.6	2.1
3/1	Chertsey Rd East bound Ahead	U	A		1	59	-	1030	2035	1357	75.9%	-	-	-	4.5	15.6	18.7
3/2	Chertsey Rd East bound Ahead	U	A		1	59	-	1110	2165	1443	76.9%	-	-	-	4.8	15.6	20.5

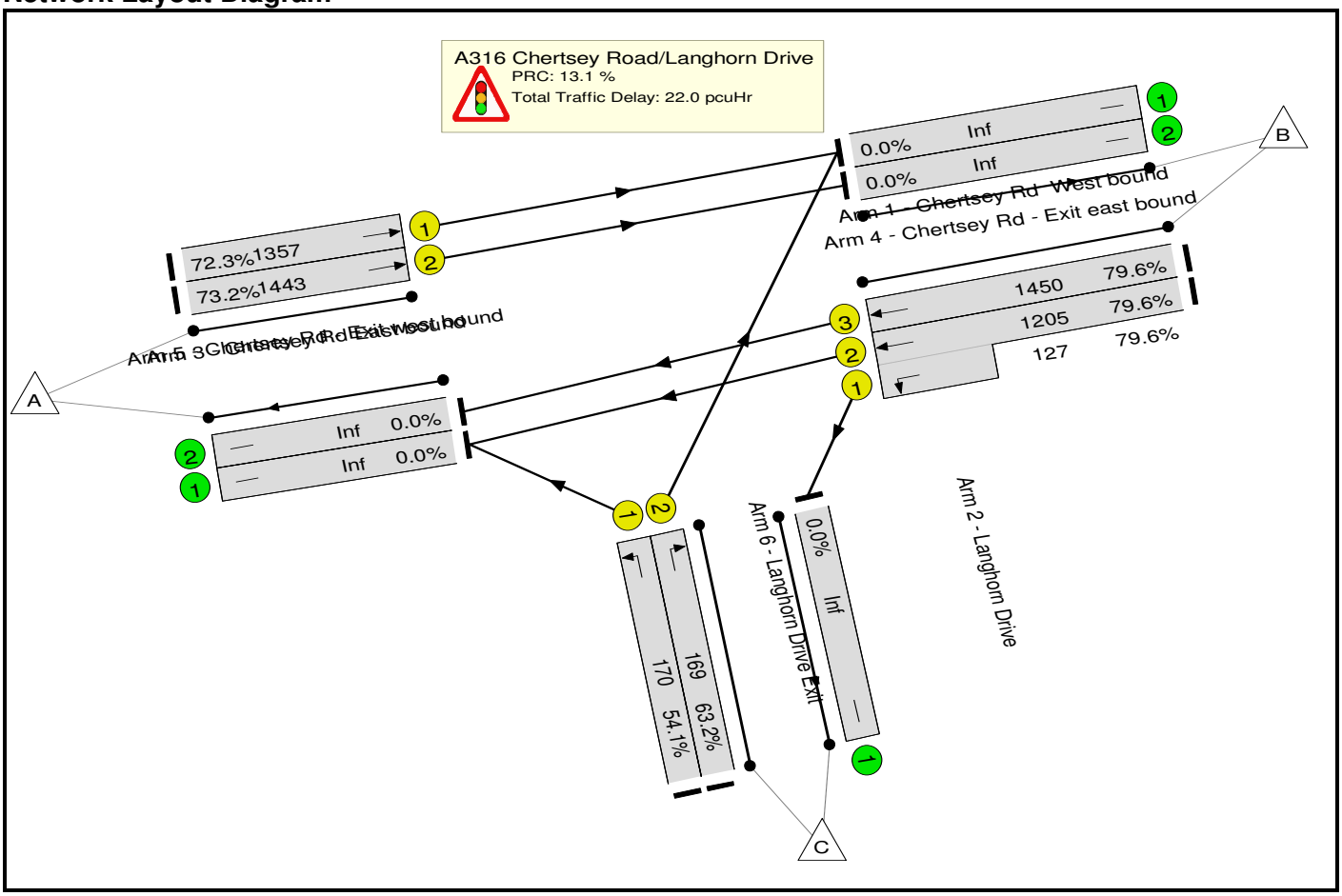
C1 PRC for Signalled Lanes (%): 17.0 Total Delay for Signalled Lanes (pcuHr): 18.37 Cycle Time (s): 90

PRC Over All Lanes (%): 17.0 Total Delay Over All Lanes(pcuHr): 18.37

Basic Results Summary

Scenario 8: '2037 + Dev PM' (FG8: '2037 Baseline + Dev PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**79.6%**	**0**	**0**	**0**	**22.0**	-	-
A316 Chertsey Road/Langhorn Drive	-	-	-		-	-	-	-	-	-	**79.6%**	**0**	**0**	**0**	**22.0**	-	-
1/2+1/1	Chertsey Rd West bound Ahead Left	U	B		1	59	-	1060	1995:1613	1205+127	79.6 : 79.6%	-	-	-	4.9	16.6	19.6
1/3	Chertsey Rd West bound Ahead	U	B		1	59	-	1154	2175	1450	79.6%	-	-	-	5.3	16.7	22.1
2/1	Langhorn Drive Left	U	D		1	7	-	92	1912	170	54.1%	-	-	-	1.6	62.0	2.8
2/2	Langhorn Drive Right	U	C		1	7	-	107	1905	169	63.2%	-	-	-	2.0	67.7	3.4
3/1	Chertsey Rd East bound Ahead	U	A		1	59	-	981	2035	1357	72.3%	-	-	-	3.9	14.4	16.8
3/2	Chertsey Rd East bound Ahead	U	A		1	59	-	1057	2165	1443	73.2%	-	-	-	4.2	14.4	18.4

C1 PRC for Signalled Lanes (%): 13.1 Total Delay for Signalled Lanes (pcuHr): 21.98 Cycle Time (s): 90

PRC Over All Lanes (%): 13.1 Total Delay Over All Lanes(pcuHr): 21.98

Appendix L

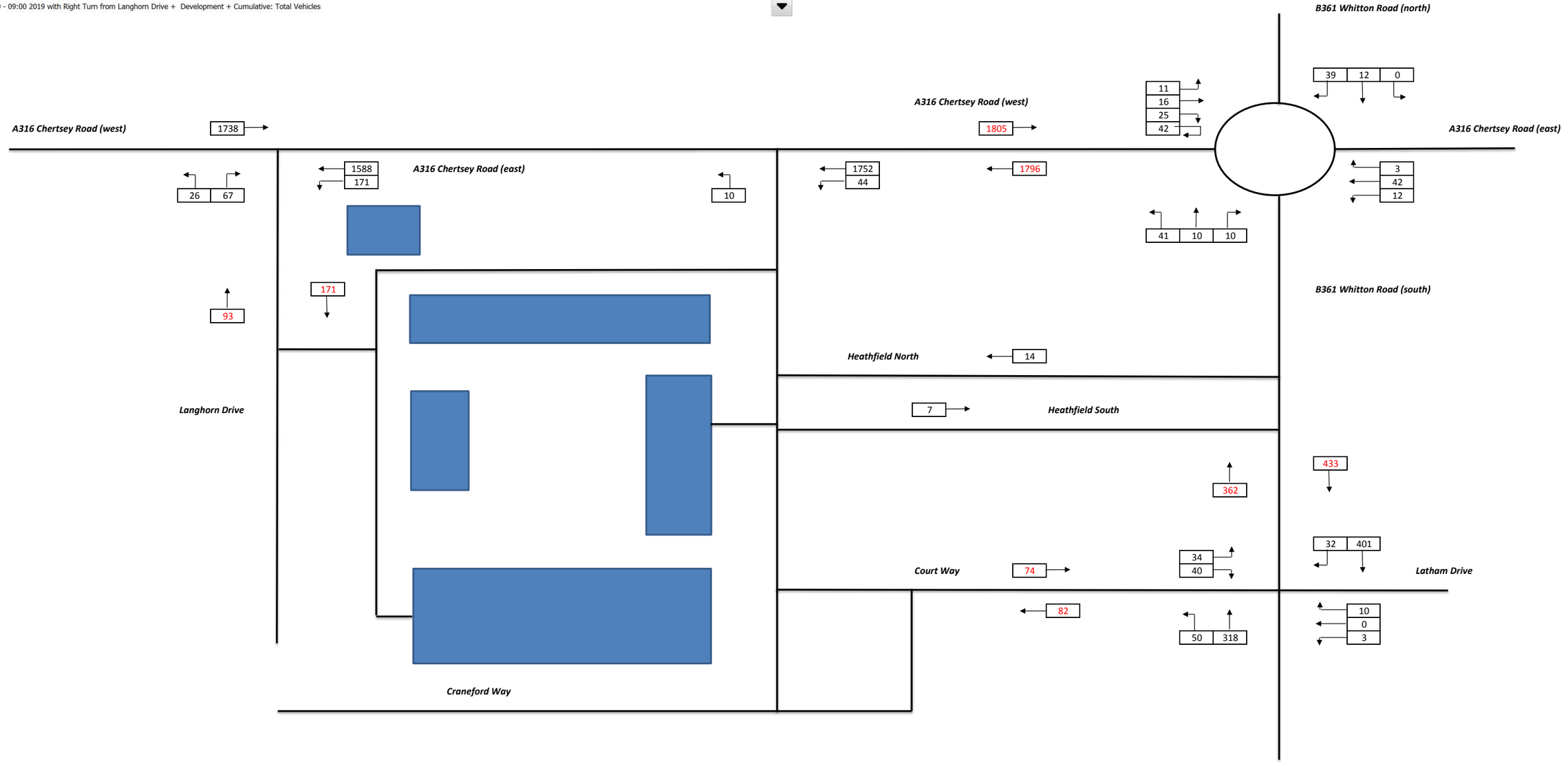
2019 + Development + Cumulative and 2034 + Development + Cumulative traffic flow

TPP
transport planning practice

30713 Richmond Education and Enterprise Campus

08:00 - 09:00 2019 with Right Turn from Langhorn Drive + Development + Cumulative: Total Vehicles

08:00 - 09:00 2019 with Right Turn from Langhorn Drive + Development + Cumulative: Total Vehicles

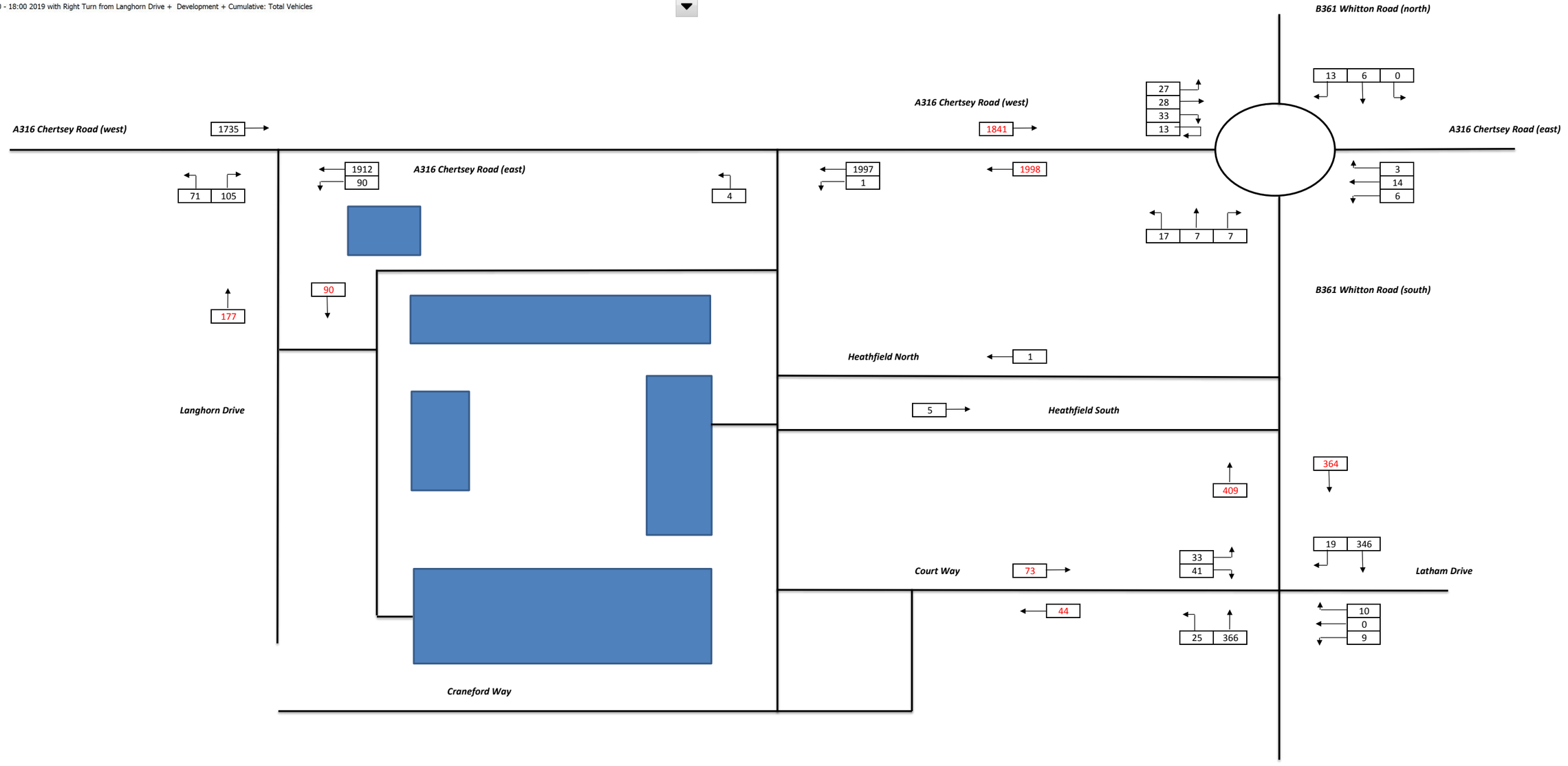


T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\Junction Assessment\Richmond Education and Enterprise Campus Flow Diagram AM Peak Hour - 2019 and 2034_Rev A

30713 Richmond Education and Enterprise Campus

17:00 - 18:00 2019 with Right Turn from Langhorn Drive + Development + Cumulative: Total Vehicles

17:00 - 18:00 2019 with Right Turn from Langhorn Drive + Development + Cumulative: Total Vehicles

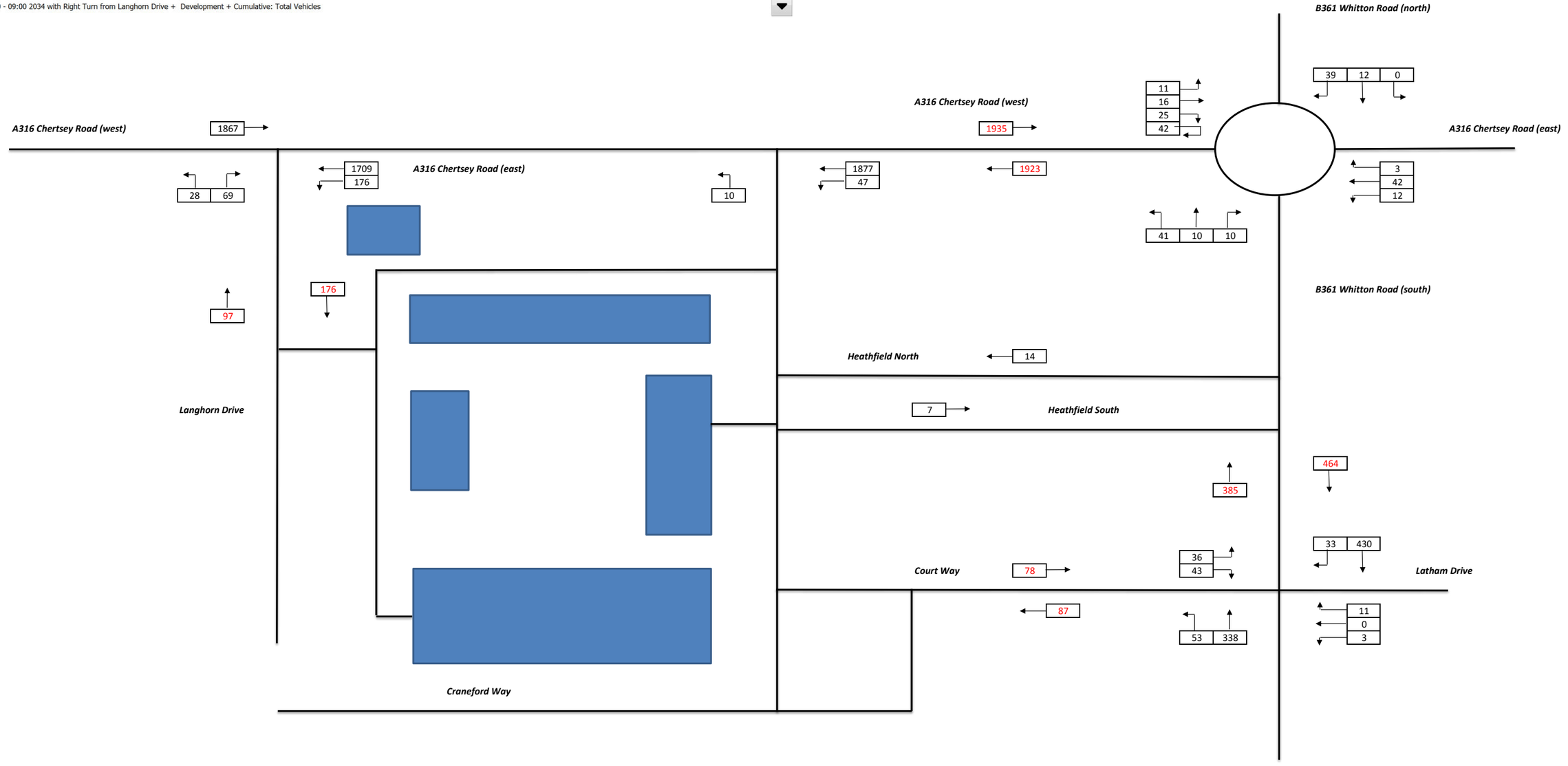


T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\Junction Assessment\Richmond Education and Enterprise Campus Flow Diagram PM Peak Hour - 2019 and 2034_A

30713 Richmond Education and Enterprise Campus

08:00 - 09:00 2034 with Right Turn from Langhorn Drive + Development + Cumulative: Total Vehicles

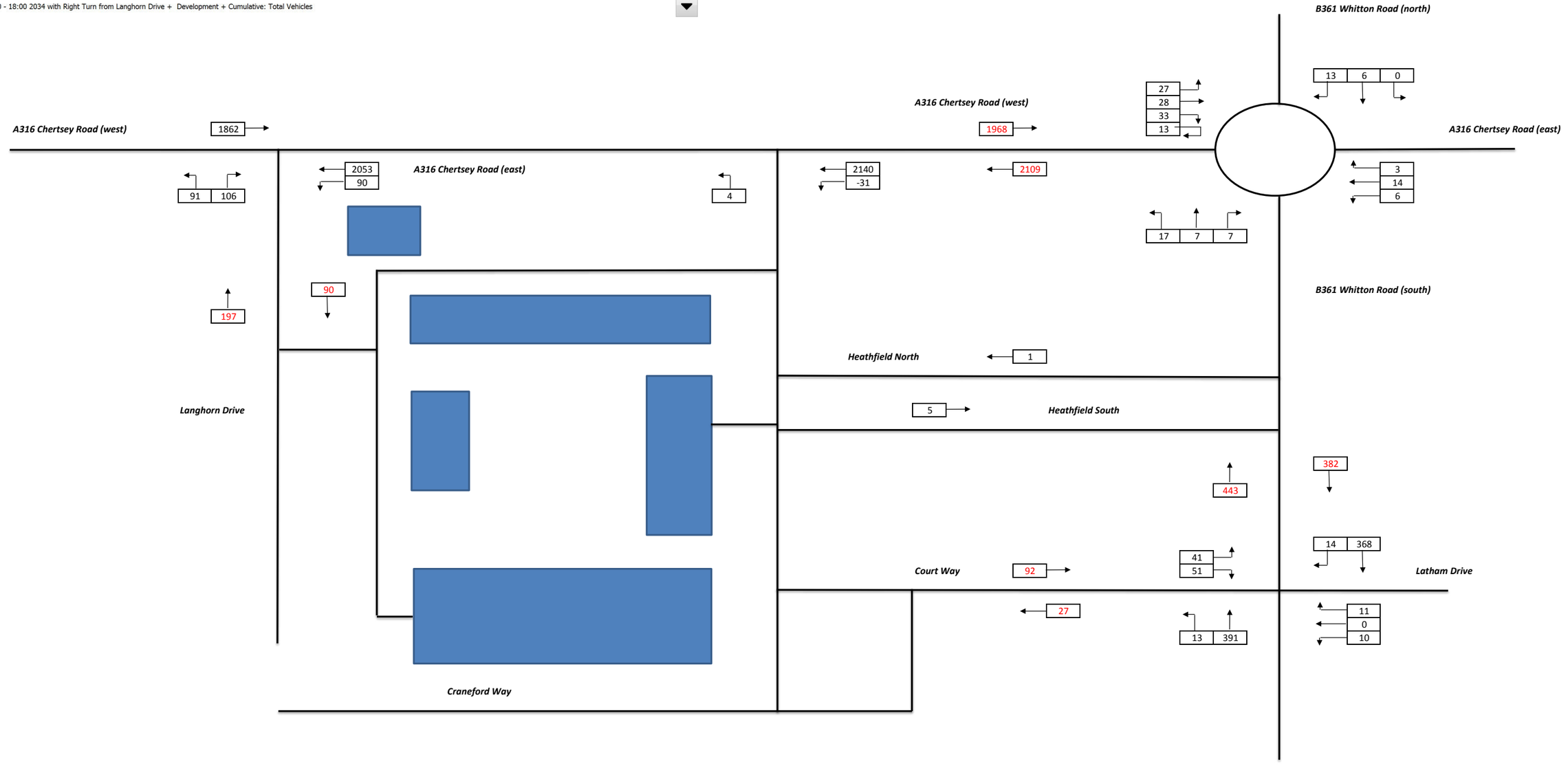
08:00 - 09:00 2034 with Right Turn from Langhorn Drive + Development + Cumulative: Total Vehicles



30713 Richmond Education and Enterprise Campus

17:00 - 18:00 2034 with Right Turn from Langhorn Drive + Development + Cumulative: Total Vehicles

17:00 - 18:00 2034 with Right Turn from Langhorn Drive + Development + Cumulative: Total Vehicles



T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\Junction Assessment\Richmond Education and Enterprise Campus Flow Diagram PM Peak Hour - 2019 and 2034_A

Appendix M

2019 + Development + Cumulative and 2034 + Development + Cumulative junction capacity assessment reports

TPP
transport planning practice

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
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EMAIL: software@trl.co.uk

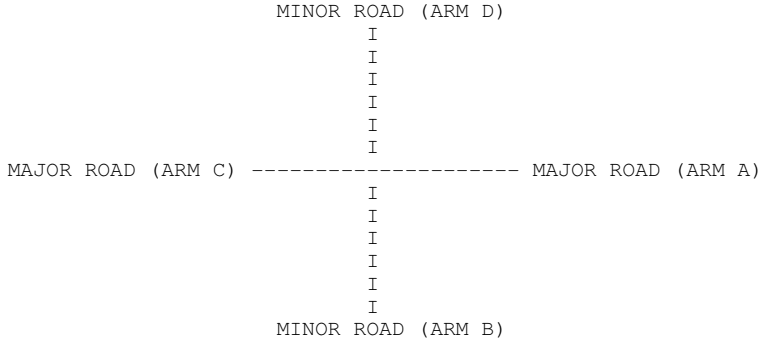
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\Whitton Road - Court Way - AM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:20:16 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: Whitton Road / Court Way AM Peak Hour
LOCATION	: Richmond College
DATE	: 28/05/15
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Whitton Road (South)
ARM B IS Court Way
ARM C IS Whitton Road (North)
ARM D IS Latham Road

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM		MINOR ROAD B		MINOR ROAD D
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.50 M.	(W)	6.50 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.	(WA-D)	2.20 M.
- VISIBILITY	(VC-B)	60.00 M.	(VA-D)	195.00 M.
- BLOCKS TRAFFIC (SPACES)		YES (1)		NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	23.0 M.	(VD-A)	19.0 M.
- VISIBILITY TO RIGHT	(VB-A)	30.0 M.	(VD-C)	22.0 M.
- LANE 1 WIDTH	(WB-C)	3.78 M.	(WD-A)	4.15 M.
- LANE 2 WIDTH	(WB-A)	0.00 M.	(WD-C)	0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

STREAM B-C

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
693.02	0.26	0.10

STREAM D-A

Intercept For STREAM D-A	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
711.22	0.27	0.11

STREAM B-A

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM D-A	Slope For Opposing STREAM D-B
538.81	0.24	0.24	0.24	0.24

Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM D-C
0.10	0.15	0.35	0.12

STREAM D-C

Intercept For STREAM D-C	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM B-C	Slope For Opposing STREAM B-D
551.52	0.25	0.25	0.25	0.25

Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM B-A
0.10	0.16	0.35	0.12

STREAM C-B

Intercept For STREAM C-B	Slope For Opposing STREAM A-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D
608.71	0.23	0.23	0.33

STREAM A-D

Intercept For STREAM A-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D
686.89	0.26	0.37	0.26

B-D Stream From Left Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

B-D Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

D-B Stream From Left Hand Lane

Intercept For STREAM D-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

D-B Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

Demand set: 2022 Cumulative+Dev

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2022 Cumulative+Dev

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
07.45 - 08.00	ARM A	0.000	0.060	0.940	0.000
		0.0	5.0	78.0	0.0
		(0.0)	(0.0)	(8.1)	(0.0)
	ARM B	0.676	0.000	0.324	0.000
		23.0	0.0	11.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.946	0.054	0.000	0.000
		87.0	5.0	0.0	0.0
		(8.7)	(0.0)	(0.0)	(0.0)
	ARM D	0.333	0.000	0.667	0.000
		1.0	0.0	2.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.00 - 08.15	ARM A	0.000	0.147	0.853	0.000
		0.0	14.0	81.0	0.0
		(0.0)	(0.0)	(2.8)	(0.0)
	ARM B	0.526	0.000	0.474	0.000
		10.0	0.0	9.0	0.0
		(2.6)	(0.0)	(0.0)	(0.0)
	ARM C	0.928	0.072	0.000	0.000
		103.0	8.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.15 - 08.30	ARM A	0.000	0.120	0.880	0.000
		0.0	11.0	81.0	0.0
		(0.0)	(0.0)	(2.8)	(0.0)
	ARM B	0.556	0.000	0.444	0.000
		10.0	0.0	8.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.928	0.072	0.000	0.000
		103.0	8.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.30 - 08.45	ARM A	0.000	0.147	0.853	0.000
		0.0	14.0	81.0	0.0
		(0.0)	(0.0)	(2.8)	(0.0)
	ARM B	0.526	0.000	0.474	0.000
		10.0	0.0	9.0	0.0
		(2.6)	(0.0)	(0.0)	(0.0)
	ARM C	0.928	0.072	0.000	0.000
		103.0	8.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.45 - 09.00	ARM A	0.000	0.140	0.860	0.000
		0.0	13.0	80.0	0.0
		(0.0)	(0.0)	(2.8)	(0.0)
	ARM B	0.526	0.000	0.474	0.000
		10.0	0.0	9.0	0.0
		(2.6)	(0.0)	(0.0)	(0.0)
	ARM C	0.928	0.072	0.000	0.000
		103.0	8.0	0.0	0.0

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

I	I	I (4.2)I	(0.0)I	(0.0)I	(0.0)I	

	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
09.00 - 09.15					
	ARM A	0.000	0.072	0.928	0.000
		0.0	5.0	64.0	0.0
		(0.0)	(0.0)	(10.6)	(0.0)
	ARM B	0.500	0.000	0.500	0.000
		6.0	0.0	6.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.931	0.069	0.000	0.000
		94.0	7.0	0.0	0.0
		(3.9)	(0.0)	(0.0)	(0.0)
	ARM D	0.000	0.000	0.000	0.000
		0.0	0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

A PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) ENTRY	EXIT	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION (VEHS) (LEFT)	(RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
A	6.00		1.0		1.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-ACD	2.27	7.31	0.310		0.00	0.44	6.2		0.20
A-BC	5.53	27.94	0.198	1.7	0.00	0.49	7.2		0.04
A-D	0.00	0.00	0.208	1.7	0.00	0.00	0.0		
D-ABC	0.20	7.21	0.028		0.00	0.03	0.4		0.14
C-ABD	0.33	8.77	0.038		0.00	0.04	0.6		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-ACD	1.07	7.49	0.142		0.44	0.17	2.6		0.16
A-BC	6.27	26.61	0.236	3.2	0.49	0.61	9.0		0.05
A-D	0.00	0.00	0.247	3.2	0.00	0.00	0.0		
D-ABC	0.20	6.91	0.029		0.03	0.03	0.4		0.15
C-ABD	0.52	8.66	0.060		0.04	0.07	1.0		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-ACD	1.07	7.52	0.142		0.17	0.17	2.5		0.16
A-BC	6.13	22.24	0.276	9.1	0.61	0.76	11.1		0.06
A-D	0.00	0.00	0.290	9.1	0.00	0.00	0.0		
D-ABC	0.20	6.91	0.029		0.03	0.03	0.4		0.15
C-ABD	0.52	8.69	0.060		0.07	0.07	1.0		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-ACD	1.07	7.49	0.142		0.17	0.17	2.5		0.16
A-BC	6.27	26.26	0.239	3.6	0.76	0.63	9.7		0.05
A-D	0.00	0.00	0.251	3.6	0.00	0.00	0.0		
D-ABC	0.20	6.91	0.029		0.03	0.03	0.4		0.15
C-ABD	0.52	8.65	0.060		0.07	0.07	1.0		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
B-ACD	1.27	7.48	0.169		0.17	0.20	3.0		0.16
A-BC	6.20	25.66	0.242	4.3	0.63	0.64	9.5		0.05
A-D	0.00	0.00	0.254	4.3	0.00	0.00	0.0		
D-ABC	0.20	6.83	0.029		0.03	0.03	0.4		0.15
C-ABD	0.53	8.67	0.062		0.07	0.07	1.0		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
B-ACD	0.87	8.06	0.108		0.20	0.12	1.9		0.14
A-BC	4.60	27.63	0.167	2.1	0.64	0.40	6.2		0.04
A-D	0.00	0.00	0.175	2.1	0.00	0.00	0.0		
D-ABC	0.00	7.18	0.000		0.03	0.00	0.0		0.00
C-ABD	0.47	8.97	0.052		0.07	0.06	0.9		0.12

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-ACD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.4
08.15	0.2
08.30	0.2
08.45	0.2
09.00	0.2
09.15	0.1

QUEUE FOR STREAM A-BC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.2
08.15	0.3
08.30	0.4
08.45	0.3
09.00	0.3
09.15	0.2

QUEUE FOR STREAM A-D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.3
08.15	0.3
08.30	0.4
08.45	0.3
09.00	0.3
09.15	0.2

QUEUE FOR STREAM D-ABC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUE FOR STREAM C-ABD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0.1
09.15	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-ACD	114.0	76.0	18.7	0.16	18.7	0.16
A-BC	525.0	350.0	52.7	0.10	52.7	0.10
A-D	0.0	0.0	0.0	0.00	0.0	0.00
D-ABC	15.0	10.0	2.2	0.15	2.2	0.15
C-ABD	43.4	28.9	5.5	0.13	5.5	0.13
ALL	1282.0	854.7	79.1	0.06	79.1	0.06

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:20:21 on 01/06/2015]

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

FOR SALES AND DISTRIBUTION INFORMATION,
PROGRAM ADVICE AND MAINTENANCE CONTACT:
TRL SOFTWARE SALES
TEL: CROWTHORNE (01344) 770758, FAX: 770356
EMAIL: software@trl.co.uk

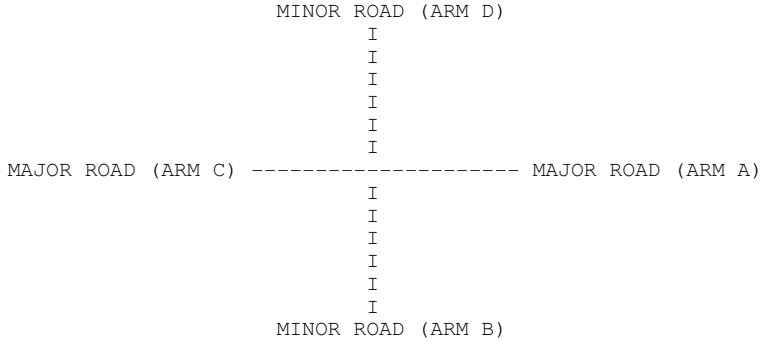
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\Whitton Road - Court Way - PM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:26:20 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: Whitton Road / Court Way PM Peak Hour
LOCATION	: Richmond College
DATE	: 24/11/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Whitton Road (South)
ARM B IS Court Way
ARM C IS Whitton Road (North)
ARM D IS Latham Road

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM		MINOR ROAD B		MINOR ROAD D	
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.50 M.	(W)	6.50 M.	
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.	(WCR)	0.00 M.	
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.	(WA-D)	2.20 M.	
- VISIBILITY	(VC-B)	60.00 M.	(VA-D)	195.00 M.	
- BLOCKS TRAFFIC (SPACES)		YES (1)		NO (0)	
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	23.0 M.	(VD-A)	19.0 M.	
- VISIBILITY TO RIGHT	(VB-A)	30.0 M.	(VD-C)	22.0 M.	
- LANE 1 WIDTH	(WB-C)	3.78 M.	(WD-A)	4.15 M.	
- LANE 2 WIDTH	(WB-A)	0.00 M.	(WD-C)	0.00 M.	

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

STREAM B-C

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
693.02	0.26	0.10

STREAM D-A

Intercept For STREAM D-A	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
711.22	0.27	0.11

STREAM B-A

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM D-A	Slope For Opposing STREAM D-B
538.81	0.24	0.24	0.24	0.24

Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM D-C
0.10	0.15	0.35	0.12

STREAM D-C

Intercept For STREAM D-C	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM B-C	Slope For Opposing STREAM B-D
551.52	0.25	0.25	0.25	0.25

Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM B-A
0.10	0.16	0.35	0.12

STREAM C-B

Intercept For STREAM C-B	Slope For Opposing STREAM A-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D
608.71	0.23	0.23	0.33

STREAM A-D

Intercept For STREAM A-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D
686.89	0.26	0.37	0.26

B-D Stream From Left Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

B-D Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

D-B Stream From Left Hand Lane

Intercept For STREAM D-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

D-B Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

Demand set: 2022 Cumulative+Dev

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2022 Cumulative+Dev

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 17.00	ARM A	0.000	0.036	0.964	0.000
		0.0	4.0	107.0	0.0
		(0.0)	(0.0)	(4.9)	(0.0)
	ARM B	0.438	0.000	0.563	0.000
		7.0	0.0	9.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.975	0.025	0.000	0.000
		77.0	2.0	0.0	0.0
		(6.8)	(0.0)	(0.0)	(0.0)
	ARM D	0.000	0.000	1.000	0.000
		0.0	0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.00 - 17.15	ARM A	0.000	0.070	0.930	0.000
		0.0	7.0	93.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.533	0.000	0.467	0.000
		8.0	0.0	7.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.946	0.054	0.000	0.000
		88.0	5.0	0.0	0.0
		(2.1)	(0.0)	(0.0)	(0.0)
	ARM D	0.400	0.000	0.600	0.000
		2.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.15 - 17.30	ARM A	0.000	0.070	0.930	0.000
		0.0	7.0	93.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.556	0.000	0.444	0.000
		10.0	0.0	8.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.946	0.054	0.000	0.000
		88.0	5.0	0.0	0.0
		(2.1)	(0.0)	(0.0)	(0.0)
	ARM D	0.600	0.000	0.400	0.000
		3.0	0.0	2.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.30 - 17.45	ARM A	0.000	0.070	0.930	0.000
		0.0	7.0	93.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.571	0.000	0.429	0.000
		12.0	0.0	9.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.946	0.054	0.000	0.000
		88.0	5.0	0.0	0.0
		(2.1)	(0.0)	(0.0)	(0.0)
	ARM D	0.400	0.000	0.600	0.000
		2.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.45 - 18.00	ARM A	0.000	0.061	0.939	0.000
		0.0	6.0	93.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.571	0.000	0.429	0.000
		12.0	0.0	9.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.946	0.054	0.000	0.000
		88.0	5.0	0.0	0.0

I	I	I (2.1)I	(0.0)I	(0.0)I	(0.0)I	

	ARM D	0.400	0.000	0.600	0.000	
		2.0	0.0	3.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	
18.00 - 18.15	ARM A	0.000	0.115	0.885	0.000	
		0.0	11.0	85.0	0.0	
		(0.0)	(0.0)	(3.2)	(0.0)	
	ARM B	0.615	0.000	0.385	0.000	
		8.0	0.0	5.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	
	ARM C	0.943	0.057	0.000	0.000	
		82.0	5.0	0.0	0.0	
		(0.6)	(0.0)	(0.0)	(0.0)	
	ARM D	0.000	0.000	1.000	0.000	
		0.0	0.0	2.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

A PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) ENTRY	EXIT	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION (VEHS) (LEFT)	(RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
A	6.00		1.0		1.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-ACD	1.07	7.78	0.137		0.00	0.16	2.3		0.15
A-BC	7.33	27.94	0.263	1.7	0.00	0.71	10.3		0.05
A-D	0.00	0.00	0.276	1.7	0.00	0.00	0.0		
D-ABC	0.07	6.43	0.010		0.00	0.01	0.1		0.16
C-ABD	0.13	8.37	0.016		0.00	0.02	0.2		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-ACD	1.33	7.55	0.177		0.16	0.21	3.1		0.16
A-BC	6.67	26.61	0.251	3.2	0.71	0.68	10.2		0.05
A-D	0.00	0.00	0.263	3.2	0.00	0.00	0.0		
D-ABC	0.33	7.51	0.044		0.01	0.05	0.7		0.14
C-ABD	0.33	8.54	0.039		0.02	0.04	0.6		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-ACD	1.33	7.47	0.178		0.21	0.22	3.2		0.16
A-BC	6.67	22.24	0.300	9.1	0.68	0.85	12.4		0.06
A-D	0.00	0.00	0.315	9.1	0.00	0.00	0.0		
D-ABC	0.33	8.25	0.040		0.05	0.04	0.6		0.13
C-ABD	0.33	8.54	0.039		0.04	0.04	0.6		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-ACD	1.33	7.43	0.180		0.22	0.22	3.2		0.16
A-BC	6.67	26.26	0.254	3.6	0.85	0.69	10.6		0.05
A-D	0.00	0.00	0.267	3.6	0.00	0.00	0.0		
D-ABC	0.33	7.53	0.044		0.04	0.05	0.7		0.14
C-ABD	0.33	8.54	0.039		0.04	0.04	0.6		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-ACD	1.40	7.44	0.188		0.22	0.23	3.4		0.17
A-BC	6.60	25.66	0.257	4.3	0.69	0.69	10.4		0.05
A-D	0.00	0.00	0.270	4.3	0.00	0.00	0.0		
D-ABC	0.33	7.51	0.044		0.05	0.05	0.7		0.14
C-ABD	0.33	8.56	0.039		0.04	0.04	0.6		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-ACD	0.93	7.51	0.124		0.23	0.14	2.2		0.15
A-BC	6.40	27.63	0.232	2.1	0.69	0.61	9.3		0.05
A-D	0.00	0.00	0.243	2.1	0.00	0.00	0.0		
D-ABC	0.13	6.70	0.020		0.05	0.02	0.3		0.15
C-ABD	0.33	8.62	0.038		0.04	0.04	0.6		0.12

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-ACD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.2
17.15	0.2
17.30	0.2
17.45	0.2
18.00	0.2
18.15	0.1

QUEUE FOR STREAM A-BC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.3
17.15	0.3
17.30	0.4
17.45	0.3
18.00	0.3
18.15	0.3

QUEUE FOR STREAM A-D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.4
17.15	0.4
17.30	0.5
17.45	0.4
18.00	0.4
18.15	0.3

QUEUE FOR STREAM D-ABC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUE FOR STREAM C-ABD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-ACD	111.0	74.0	17.4	0.16	17.4	0.16
A-BC	605.0	403.3	63.2	0.10	63.2	0.10
A-D	0.0	0.0	0.0	0.00	0.0	0.00
D-ABC	23.0	15.3	3.2	0.14	3.2	0.14
C-ABD	26.7	17.8	3.3	0.12	3.3	0.12
ALL	1272.0	848.0	87.1	0.07	87.1	0.07

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:26:28 on 01/06/2015]

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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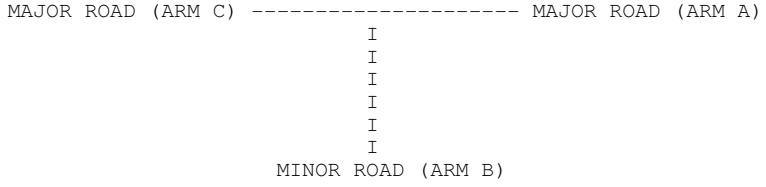
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\A316 Chertsey Road - Egerton Road - AM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:12:33 on Monday, 1 June 2015

RUN INFORMATION
****

RUN TITLE	: A316 Chertsey Road / Egerton Road - AM Peak Hour
LOCATION	: Richmond College
DATE	: 02/12/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA



ARM A IS A316 Chertsey Road (East)
ARM B IS Egerton Road
ARM C IS A316 Chertsey Road (West)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 16.46 M.
CENTRAL RESERVE WIDTH	(WCR) 2.16 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)250.00 M.
- BLOCKS TRAFFIC (SPACES)	NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 98.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 3.66 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
732.28	0.15	0.06

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
625.86	0.15	0.06	0.09	0.21

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
718.74	0.15	0.15

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: 2022 Cumulative+Dev

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2022 Cumulative+Dev

TIME	FROM/TO	ARM A	ARM B	ARM C
07.45 - 08.00				
	ARM A	0.000	0.006	0.994
		0.0	3.0	539.0
		(0.0)	(0.0)	(3.5)
	ARM B	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.00 - 08.15				
	ARM A	0.000	0.045	0.955
		0.0	21.0	445.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	4.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.15 - 08.30				
	ARM A	0.000	0.028	0.972
		0.0	13.0	445.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	4.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.30 - 08.45				
	ARM A	0.000	0.020	0.980
		0.0	9.0	445.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	3.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.45 - 09.00				
	ARM A	0.000	0.007	0.993
		0.0	3.0	445.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	3.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
09.00 - 09.15				
	ARM A	0.000	0.005	0.995
		0.0	2.0	371.0
		(0.0)	(0.0)	(7.2)
	ARM B	0.000	0.000	1.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-AC	0.00	5.04	0.000		0.00	0.00	0.0		0.00
C-A	0.00								
C-B	0.00	5.74	0.000		0.00	0.00	0.0		0.00
A-B	0.20								
A-C	35.87								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-AC	0.27	7.58	0.035		0.00	0.04	0.5		0.14
C-A	0.00								
C-B	0.00	6.65	0.000		0.00	0.00	0.0		0.00
A-B	1.34								
A-C	28.33								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-AC	0.27	7.53	0.035		0.04	0.04	0.5		0.14
C-A	0.00								
C-B	0.00	6.65	0.000		0.00	0.00	0.0		0.00
A-B	0.84								
A-C	28.82								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-AC	0.20	7.51	0.027		0.04	0.03	0.4		0.14
C-A	0.00								
C-B	0.00	6.65	0.000		0.00	0.00	0.0		0.00
A-B	0.59								
A-C	29.08								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
B-AC	0.20	7.44	0.027		0.03	0.03	0.4		0.14
C-A	0.00								
C-B	0.00	6.62	0.000		0.00	0.00	0.0		0.00
A-B	0.20								
A-C	29.67								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
B-AC	0.07	8.09	0.008		0.03	0.01	0.1		0.12
C-A	0.00								
C-B	0.00	7.20	0.000		0.00	0.00	0.0		0.00
A-B	0.13								
A-C	24.80								

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	15.0	10.0	2.0	0.14	2.0	0.14
C-A	0.0	0.0				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	49.5	33.0				
A-C	2648.5	1765.7				
ALL	2713.0	1808.7	2.0	0.00	2.0	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:12:39 on 01/06/2015]

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

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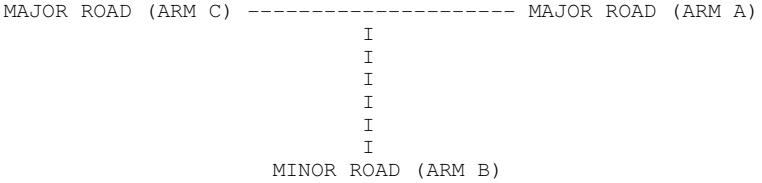
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\A316 Chertsey Road - Egerton Road - PM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:16:52 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: A316 Chertsey Road / Egerton Road - PM Peak Hour
LOCATION	: Richmond College
DATE	: 02/12/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS A316 Chertsey Road (East)
ARM B IS Egerton Road
ARM C IS A316 Chertsey Road (West)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 16.46 M.
CENTRAL RESERVE WIDTH	(WCR) 2.16 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)250.00 M.
- BLOCKS TRAFFIC (SPACES)	NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 98.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 3.66 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
732.28	0.15	0.06

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
625.86	0.15	0.06	0.09	0.21

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
718.74	0.15	0.15

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: 2022 Cumulative+Dev

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2022 Cumulative+Dev

TIME	FROM/TO	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
16.45 - 17.00	ARM A	0.000	0.002	0.998
		0.0	1.0	527.0
		(0.0)	(0.0)	(2.2)
	ARM B	0.000	0.000	1.000
		0.0	0.0	2.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.00 - 17.15	ARM A	0.000	0.000	1.000
		0.0	0.0	507.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.15 - 17.30	ARM A	0.000	0.002	0.998
		0.0	1.0	507.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.30 - 17.45	ARM A	0.000	0.004	0.996
		0.0	2.0	507.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	2.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.45 - 18.00	ARM A	0.000	0.002	0.998
		0.0	1.0	507.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
18.00 - 18.15	ARM A	0.000	0.000	1.000
		0.0	0.0	528.0
		(0.0)	(0.0)	(1.8)
	ARM B	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-AC	0.13	6.65	0.020		0.00	0.02	0.3		0.15
C-A	0.00								
C-B	0.00	5.93	0.000		0.00	0.00	0.0		0.00
A-B	0.07								
A-C	35.13								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-AC	0.07	6.86	0.010		0.02	0.01	0.2		0.15
C-A	0.00								
C-B	0.00	6.12	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	33.87								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-AC	0.00	6.87	0.000		0.01	0.00	0.0		0.00
C-A	0.00								
C-B	0.00	6.12	0.000		0.00	0.00	0.0		0.00
A-B	0.07								
A-C	33.80								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-AC	0.13	6.88	0.019		0.00	0.02	0.3		0.15
C-A	0.00								
C-B	0.00	6.12	0.000		0.00	0.00	0.0		0.00
A-B	0.13								
A-C	33.73								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-AC	0.07	6.87	0.010		0.02	0.01	0.2		0.15
C-A	0.00								
C-B	0.00	6.12	0.000		0.00	0.00	0.0		0.00
A-B	0.07								
A-C	33.80								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-AC	0.00	6.65	0.000		0.01	0.00	0.0		0.00
C-A	0.00								
C-B	0.00	5.94	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	35.27								

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	6.0	4.0	0.9	0.15	0.9	0.15
C-A	0.0	0.0				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	5.0	3.3				
A-C	3084.0	2056.0				
ALL	3095.0	2063.3	0.9	0.00	0.9	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

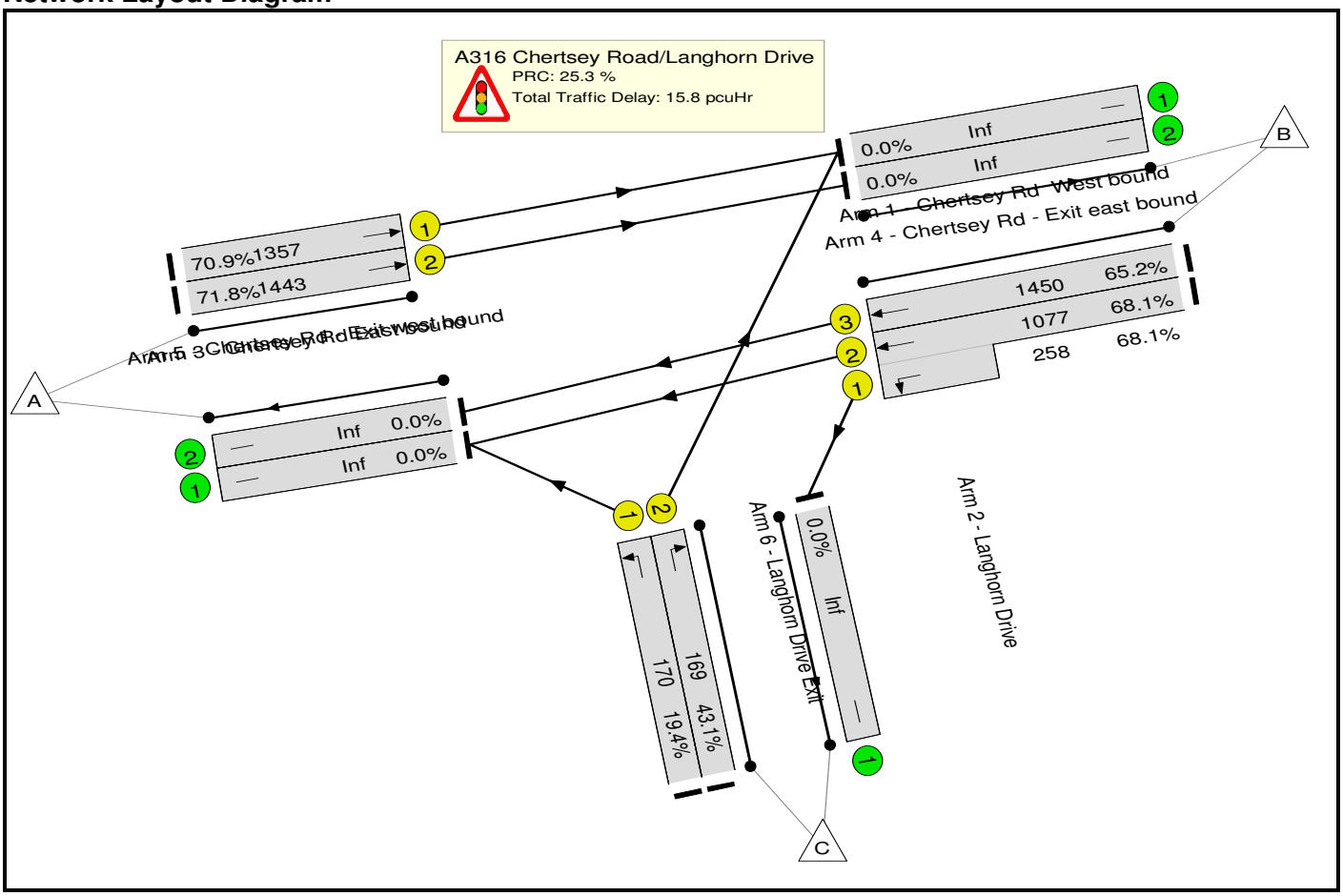
========== end of file ==========

Printed at 14:16:58 on 01/06/2015]

Basic Results Summary

Scenario 9: '2022 + Dev + Cumulative' (FG9: '2022 Baseline + Dev + Cumulative AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**71.8%**	**0**	**0**	**0**	**15.8**	-	-
A316 Chertsey Road/Langhorn Drive	-	-	-		-	-	-	-	-	-	**71.8%**	**0**	**0**	**0**	**15.8**	-	-
1/2+1/1	Chertsey Rd West bound Ahead Left	U	B		1	59	-	910	1995:1613	1077+258	68.1 : 68.1%	-	-	-	3.1	12.3	12.7
1/3	Chertsey Rd West bound Ahead	U	B		1	59	-	946	2175	1450	65.2%	-	-	-	3.3	12.4	14.9
2/1	Langhorn Drive Left	U	D		1	7	-	33	1912	170	19.4%	-	-	-	0.5	51.2	0.9
2/2	Langhorn Drive Right	U	C		1	7	-	73	1905	169	43.1%	-	-	-	1.2	57.4	2.1
3/1	Chertsey Rd East bound Ahead	U	A		1	59	-	962	2035	1357	70.9%	-	-	-	3.7	14.0	16.2
3/2	Chertsey Rd East bound Ahead	U	A		1	59	-	1037	2165	1443	71.8%	-	-	-	4.0	14.0	17.7

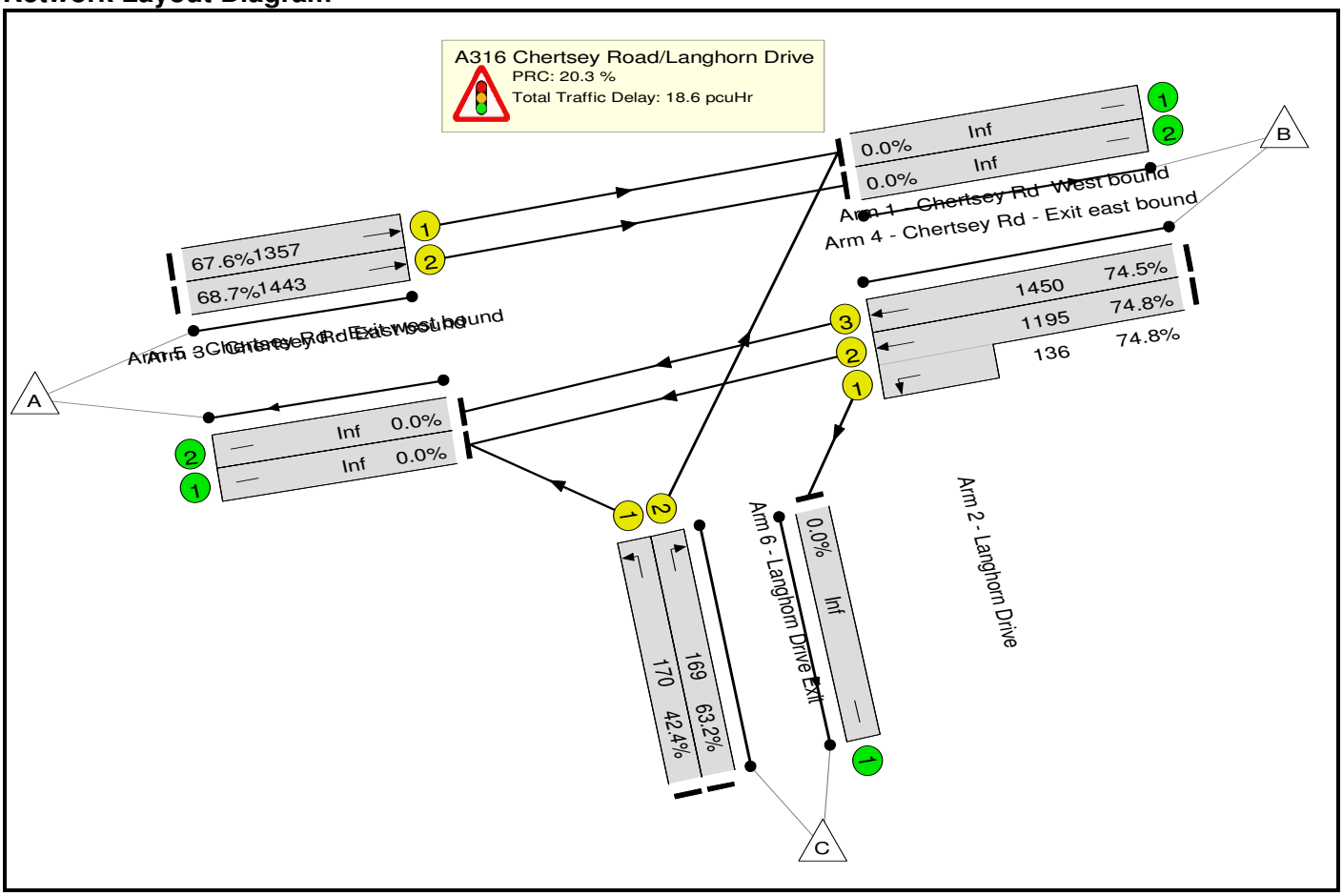
C1 PRC for Signalled Lanes (%): 25.3 Total Delay for Signalled Lanes (pcuHr): 15.77 Cycle Time (s): 90

PRC Over All Lanes (%): 25.3 Total Delay Over All Lanes(pcuHr): 15.77

Basic Results Summary

Scenario 10: '2022 + Dev + Cumulative' (FG10: '2022 Baseline + Dev + Cumulative PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**74.8%**	**0**	**0**	**0**	**18.6**	-	-
A316 Chertsey Road/Langhorn Drive	-	-	-		-	-	-	-	-	-	**74.8%**	**0**	**0**	**0**	**18.6**	-	-
1/2+1/1	Chertsey Rd West bound Ahead Left	U	B		1	59	-	996	1995:1613	1195+136	74.8 : 74.8%	-	-	-	4.1	14.7	16.9
1/3	Chertsey Rd West bound Ahead	U	B		1	59	-	1080	2175	1450	74.5%	-	-	-	4.4	14.8	19.1
2/1	Langhorn Drive Left	U	D		1	7	-	72	1912	170	42.4%	-	-	-	1.1	57.1	2.1
2/2	Langhorn Drive Right	U	C		1	7	-	107	1905	169	63.2%	-	-	-	2.0	67.7	3.4
3/1	Chertsey Rd East bound Ahead	U	A		1	59	-	917	2035	1357	67.6%	-	-	-	3.4	13.2	14.8
3/2	Chertsey Rd East bound Ahead	U	A		1	59	-	991	2165	1443	68.7%	-	-	-	3.6	13.2	16.2

C1 PRC for Signalled Lanes (%): 20.3 Total Delay for Signalled Lanes (pcuHr): 18.63 Cycle Time (s): 90

PRC Over All Lanes (%): 20.3 Total Delay Over All Lanes(pcuHr): 18.63

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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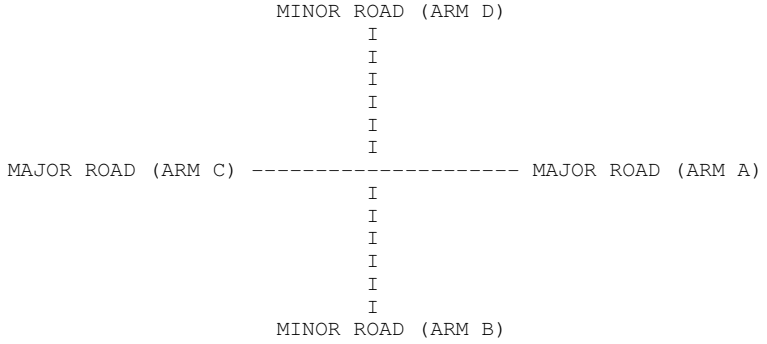
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\Whitton Road - Court Way - AM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:20:42 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: Whitton Road / Court Way AM Peak Hour
LOCATION	: Richmond College
DATE	: 28/05/15
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Whitton Road (South)
ARM B IS Court Way
ARM C IS Whitton Road (North)
ARM D IS Latham Road

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM		MINOR ROAD B		MINOR ROAD D
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.50 M.	(W)	6.50 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.	(WA-D)	2.20 M.
- VISIBILITY	(VC-B)	60.00 M.	(VA-D)	195.00 M.
- BLOCKS TRAFFIC (SPACES)		YES (1)		NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	23.0 M.	(VD-A)	19.0 M.
- VISIBILITY TO RIGHT	(VB-A)	30.0 M.	(VD-C)	22.0 M.
- LANE 1 WIDTH	(WB-C)	3.78 M.	(WD-A)	4.15 M.
- LANE 2 WIDTH	(WB-A)	0.00 M.	(WD-C)	0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

STREAM B-C

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
693.02	0.26	0.10

STREAM D-A

Intercept For STREAM D-A	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
711.22	0.27	0.11

STREAM B-A

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM D-A	Slope For Opposing STREAM D-B
538.81	0.24	0.24	0.24	0.24

Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM D-C
0.10	0.15	0.35	0.12

STREAM D-C

Intercept For STREAM D-C	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM B-C	Slope For Opposing STREAM B-D
551.52	0.25	0.25	0.25	0.25

Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM B-A
0.10	0.16	0.35	0.12

STREAM C-B

Intercept For STREAM C-B	Slope For Opposing STREAM A-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D
608.71	0.23	0.23	0.33

STREAM A-D

Intercept For STREAM A-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D
686.89	0.26	0.37	0.26

B-D Stream From Left Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

B-D Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

D-B Stream From Left Hand Lane

Intercept For STREAM D-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

D-B Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

Demand set: 2037 Cumulative+Dev

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2037 Cumulative+Dev

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
07.45 - 08.00	ARM A	0.000	0.067	0.933	0.000
		0.0	6.0	83.0	0.0
		(0.0)	(0.0)	(8.2)	(0.0)
	ARM B	0.667	0.000	0.333	0.000
		24.0	0.0	12.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.939	0.061	0.000	0.000
		93.0	6.0	0.0	0.0
		(8.7)	(0.0)	(0.0)	(0.0)
	ARM D	0.333	0.000	0.667	0.000
		1.0	0.0	2.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.00 - 08.15	ARM A	0.000	0.140	0.860	0.000
		0.0	14.0	86.0	0.0
		(0.0)	(0.0)	(2.8)	(0.0)
	ARM B	0.550	0.000	0.450	0.000
		11.0	0.0	9.0	0.0
		(2.6)	(0.0)	(0.0)	(0.0)
	ARM C	0.924	0.076	0.000	0.000
		110.0	9.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.15 - 08.30	ARM A	0.000	0.122	0.878	0.000
		0.0	12.0	86.0	0.0
		(0.0)	(0.0)	(2.8)	(0.0)
	ARM B	0.526	0.000	0.474	0.000
		10.0	0.0	9.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.932	0.068	0.000	0.000
		110.0	8.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.30 - 08.45	ARM A	0.000	0.140	0.860	0.000
		0.0	14.0	86.0	0.0
		(0.0)	(0.0)	(2.8)	(0.0)
	ARM B	0.550	0.000	0.450	0.000
		11.0	0.0	9.0	0.0
		(2.6)	(0.0)	(0.0)	(0.0)
	ARM C	0.924	0.076	0.000	0.000
		110.0	9.0	0.0	0.0
		(4.2)	(0.0)	(0.0)	(0.0)
	ARM D	0.250	0.000	0.750	0.000
		1.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
08.45 - 09.00	ARM A	0.000	0.131	0.869	0.000
		0.0	13.0	86.0	0.0
		(0.0)	(0.0)	(2.8)	(0.0)
	ARM B	0.550	0.000	0.450	0.000
		11.0	0.0	9.0	0.0
		(2.6)	(0.0)	(0.0)	(0.0)
	ARM C	0.932	0.068	0.000	0.000
		110.0	8.0	0.0	0.0

I	I	I (4.2)I	(0.0)I	(0.0)I	(0.0)I	

	ARM D	0.250	0.000	0.750	0.000	
		1.0	0.0	3.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	
09.00 - 09.15	ARM A	0.000	0.068	0.932	0.000	
		0.0	5.0	69.0	0.0	
		(0.0)	(0.0)	(10.6)	(0.0)	
	ARM B	0.500	0.000	0.500	0.000	
		7.0	0.0	7.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	
	ARM C	0.935	0.065	0.000	0.000	
		100.0	7.0	0.0	0.0	
		(3.9)	(0.0)	(0.0)	(0.0)	
	ARM D	0.000	0.000	0.000	0.000	
		0.0	0.0	0.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

A PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) ENTRY	EXIT	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION (VEHS) (LEFT)	(RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
A	6.00		1.0		1.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-ACD	2.47	7.17	0.344		0.00	0.51	7.2		0.21
A-BC	5.93	27.94	0.212	1.7	0.00	0.54	7.8		0.05
A-D	0.00	0.00	0.223	1.7	0.00	0.00	0.0		
D-ABC	0.20	7.00	0.029		0.00	0.03	0.4		0.15
C-ABD	0.40	8.67	0.046		0.00	0.05	0.7		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-ACD	1.13	7.23	0.157		0.51	0.19	3.0		0.17
A-BC	6.67	26.61	0.251	3.2	0.54	0.67	9.8		0.05
A-D	0.00	0.00	0.263	3.2	0.00	0.00	0.0		
D-ABC	0.27	6.72	0.040		0.03	0.04	0.6		0.15
C-ABD	0.58	8.56	0.068		0.05	0.08	1.1		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-ACD	1.13	7.46	0.152		0.19	0.18	2.7		0.16
A-BC	6.53	22.24	0.294	9.1	0.67	0.83	12.1		0.06
A-D	0.00	0.00	0.308	9.1	0.00	0.00	0.0		
D-ABC	0.27	6.72	0.040		0.04	0.04	0.6		0.16
C-ABD	0.52	8.59	0.061		0.08	0.07	1.0		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-ACD	1.13	7.23	0.157		0.18	0.18	2.7		0.16
A-BC	6.67	26.26	0.254	3.6	0.83	0.69	10.5		0.05
A-D	0.00	0.00	0.267	3.6	0.00	0.00	0.0		
D-ABC	0.27	6.72	0.040		0.04	0.04	0.6		0.16
C-ABD	0.58	8.56	0.068		0.07	0.08	1.1		0.13

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
B-ACD	1.33	7.22	0.185		0.18	0.22	3.3		0.17
A-BC	6.60	25.66	0.257	4.3	0.69	0.69	10.4		0.05
A-D	0.00	0.00	0.270	4.3	0.00	0.00	0.0		
D-ABC	0.27	6.63	0.040		0.04	0.04	0.6		0.16
C-ABD	0.53	8.58	0.062		0.08	0.07	1.1		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
B-ACD	0.93	7.90	0.118		0.22	0.14	2.1		0.14
A-BC	4.93	27.63	0.179	2.1	0.69	0.44	6.8		0.04
A-D	0.00	0.00	0.188	2.1	0.00	0.00	0.0		
D-ABC	0.00	6.99	0.000		0.04	0.00	0.0		0.00
C-ABD	0.47	8.88	0.053		0.07	0.06	0.9		0.12

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-ACD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	*
08.15	0.2	
08.30	0.2	
08.45	0.2	
09.00	0.2	
09.15	0.1	

QUEUE FOR STREAM A-BC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.3
08.15	0.3
08.30	0.4
08.45	0.3
09.00	0.3
09.15	0.2

QUEUE FOR STREAM A-D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.3
08.15	0.4
08.30	0.4
08.45	0.4
09.00	0.4
09.15	0.2

QUEUE FOR STREAM D-ABC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUE FOR STREAM C-ABD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0.1
09.15	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-ACD	122.0	81.3	21.1	0.17	21.1	0.17
A-BC	560.0	373.3	57.4	0.10	57.4	0.10
A-D	0.0	0.0	0.0	0.00	0.0	0.00
D-ABC	19.0	12.7	2.9	0.15	2.9	0.15
C-ABD	46.3	30.8	6.0	0.13	6.0	0.13
ALL	1371.0	914.0	87.3	0.06	87.3	0.06

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:20:47 on 01/06/2015]

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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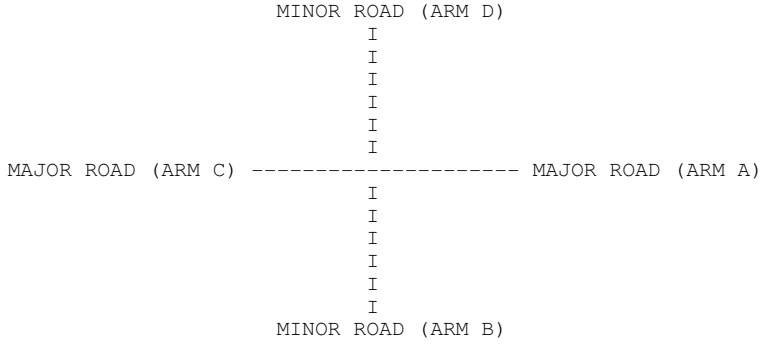
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\Whitton Road - Court Way - PM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:26:46 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: Whitton Road / Court Way PM Peak Hour
LOCATION	: Richmond College
DATE	: 24/11/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Whitton Road (South)
ARM B IS Court Way
ARM C IS Whitton Road (North)
ARM D IS Latham Road

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM		MINOR ROAD B		MINOR ROAD D	
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.50 M.	(W)	6.50 M.	
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.	(WCR)	0.00 M.	
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.	(WA-D)	2.20 M.	
- VISIBILITY	(VC-B)	60.00 M.	(VA-D)	195.00 M.	
- BLOCKS TRAFFIC (SPACES)		YES (1)		NO (0)	
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	23.0 M.	(VD-A)	19.0 M.	
- VISIBILITY TO RIGHT	(VB-A)	30.0 M.	(VD-C)	22.0 M.	
- LANE 1 WIDTH	(WB-C)	3.78 M.	(WD-A)	4.15 M.	
- LANE 2 WIDTH	(WB-A)	0.00 M.	(WD-C)	0.00 M.	

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

STREAM B-C

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
693.02	0.26	0.10

STREAM D-A

Intercept For STREAM D-A	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D
711.22	0.27	0.11

STREAM B-A

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM D-A	Slope For Opposing STREAM D-B
538.81	0.24	0.24	0.24	0.24

Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM D-C
0.10	0.15	0.35	0.12

STREAM D-C

Intercept For STREAM D-C	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM B-C	Slope For Opposing STREAM B-D
551.52	0.25	0.25	0.25	0.25

Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM B-A
0.10	0.16	0.35	0.12

STREAM C-B

Intercept For STREAM C-B	Slope For Opposing STREAM A-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D
608.71	0.23	0.23	0.33

STREAM A-D

Intercept For STREAM A-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D
686.89	0.26	0.37	0.26

B-D Stream From Left Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

B-D Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-D	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-B
538.81	0.24	0.24	0.10	0.35

	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-D		
	0.15	0.15		

D-B Stream From Left Hand Lane

Intercept For STREAM D-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

D-B Stream From Right Hand Lane

Intercept For STREAM B-D	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B	Slope For Opposing STREAM C-D	Slope For Opposing STREAM A-D
551.52	0.25	0.25	0.10	0.35

	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B		
	0.16	0.16		

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100

Demand set: 2037 Cumulative+Dev

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2037 Cumulative+Dev

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 17.00	ARM A	0.000	0.088	0.912	0.000
		0.0	11.0	114.0	0.0
		(0.0)	(0.0)	(4.9)	(0.0)
	ARM B	0.429	0.000	0.571	0.000
		9.0	0.0	12.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.988	0.012	0.000	0.000
		82.0	1.0	0.0	0.0
		(6.9)	(0.0)	(0.0)	(0.0)
	ARM D	0.000	0.000	1.000	0.000
		0.0	0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.00 - 17.15	ARM A	0.000	0.124	0.876	0.000
		0.0	14.0	99.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.565	0.000	0.435	0.000
		13.0	0.0	10.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.959	0.041	0.000	0.000
		93.0	4.0	0.0	0.0
		(2.1)	(0.0)	(0.0)	(0.0)
	ARM D	0.500	0.000	0.500	0.000
		3.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.15 - 17.30	ARM A	0.000	0.020	0.980	0.000
		0.0	2.0	99.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.545	0.000	0.455	0.000
		12.0	0.0	10.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.969	0.031	0.000	0.000
		93.0	3.0	0.0	0.0
		(2.1)	(0.0)	(0.0)	(0.0)
	ARM D	0.500	0.000	0.500	0.000
		3.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.30 - 17.45	ARM A	0.000	0.039	0.961	0.000
		0.0	4.0	99.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.565	0.000	0.435	0.000
		13.0	0.0	10.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.959	0.041	0.000	0.000
		93.0	4.0	0.0	0.0
		(2.1)	(0.0)	(0.0)	(0.0)
	ARM D	0.500	0.000	0.500	0.000
		3.0	0.0	3.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
17.45 - 18.00	ARM A	0.000	0.029	0.971	0.000
		0.0	3.0	99.0	0.0
		(0.0)	(0.0)	(3.7)	(0.0)
	ARM B	0.435	0.000	0.565	0.000
		10.0	0.0	13.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.969	0.031	0.000	0.000
		93.0	3.0	0.0	0.0

I	I	I (2.1)I	(0.0)I	(0.0)I	(0.0)I	

	ARM D	0.500	0.000	0.500	0.000	
		3.0	0.0	3.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	
18.00 - 18.15	ARM A	0.000	0.099	0.901	0.000	
		0.0	10.0	91.0	0.0	
		(0.0)	(0.0)	(0.6)	(0.0)	
	ARM B	0.625	0.000	0.375	0.000	
		10.0	0.0	6.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	
	ARM C	0.956	0.044	0.000	0.000	
		87.0	4.0	0.0	0.0	
		(3.1)	(0.0)	(0.0)	(0.0)	
	ARM D	0.000	0.000	1.000	0.000	
		0.0	0.0	2.0	0.0	
		(0.0)	(0.0)	(0.0)	(0.0)	

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

A PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) (ENTRY)	(EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS) (LEFT)	(RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
A	6.00		1.0		1.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-ACD	1.40	7.76	0.180		0.00	0.22	3.1		0.16
A-BC	7.67	27.94	0.274	1.7	0.00	0.75	10.9		0.05
A-D	0.00	0.00	0.288	1.7	0.00	0.00	0.0		
D-ABC	0.07	6.30	0.011		0.00	0.01	0.2		0.16
C-ABD	0.07	8.30	0.008		0.00	0.01	0.1		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-ACD	1.47	7.44	0.197		0.22	0.24	3.6		0.17
A-BC	6.87	26.61	0.258	3.2	0.75	0.70	10.7		0.05
A-D	0.00	0.00	0.271	3.2	0.00	0.00	0.0		
D-ABC	0.33	7.79	0.043		0.01	0.04	0.6		0.13
C-ABD	0.26	8.50	0.031		0.01	0.03	0.5		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-ACD	1.47	7.42	0.198		0.24	0.24	3.7		0.17
A-BC	6.73	22.24	0.303	9.1	0.70	0.86	12.6		0.06
A-D	0.00	0.00	0.318	9.1	0.00	0.00	0.0		
D-ABC	0.33	7.72	0.043		0.04	0.04	0.7		0.14
C-ABD	0.20	8.52	0.023		0.03	0.02	0.4		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-ACD	1.47	7.33	0.200		0.24	0.25	3.7		0.17
A-BC	6.87	26.26	0.261	3.6	0.86	0.72	11.0		0.05
A-D	0.00	0.00	0.275	3.6	0.00	0.00	0.0		
D-ABC	0.33	7.72	0.043		0.04	0.04	0.7		0.14
C-ABD	0.26	8.49	0.031		0.02	0.03	0.5		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-ACD	1.53	7.78	0.197		0.25	0.25	3.7		0.16
A-BC	6.80	25.66	0.265	4.3	0.72	0.72	10.8		0.05
A-D	0.00	0.00	0.278	4.3	0.00	0.00	0.0		
D-ABC	0.33	7.67	0.043		0.04	0.05	0.7		0.14
C-ABD	0.20	8.51	0.024		0.03	0.02	0.4		0.12

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-ACD	1.07	7.37	0.145		0.25	0.17	2.7		0.16
A-BC	6.73	27.63	0.244	2.1	0.72	0.65	9.9		0.05
A-D	0.00	0.00	0.256	2.1	0.00	0.00	0.0		
D-ABC	0.13	6.50	0.021		0.05	0.02	0.3		0.16
C-ABD	0.27	8.57	0.031		0.02	0.03	0.5		0.12

WARNING NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR

QUEUE FOR STREAM B-ACD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.2
17.15	0.2
17.30	0.2
17.45	0.2
18.00	0.2
18.15	0.2

QUEUE FOR STREAM A-BC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.4
17.15	0.3
17.30	0.4
17.45	0.3
18.00	0.3
18.15	0.3

QUEUE FOR STREAM A-D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.4
17.15	0.4
17.30	0.5
17.45	0.4
18.00	0.4
18.15	0.3

QUEUE FOR STREAM D-ABC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUE FOR STREAM C-ABD

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-ACD	126.0	84.0	20.4	0.16	20.4	0.16
A-BC	625.0	416.7	65.9	0.11	65.9	0.11
A-D	0.0	0.0	0.0	0.00	0.0	0.00
D-ABC	23.0	15.3	3.1	0.14	3.1	0.14
C-ABD	19.0	12.7	2.3	0.12	2.3	0.12
ALL	1334.0	889.3	91.8	0.07	91.8	0.07

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:26:51 on 01/06/2015]

TRL LIMITED

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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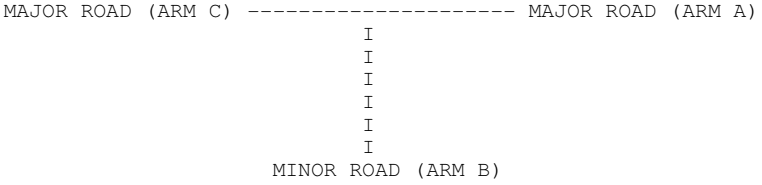
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\A316 Chertsey Road - Egerton Road - AM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:08:41 on Monday, 1 June 2015

RUN INFORMATION
****

RUN TITLE	: A316 Chertsey Road / Egerton Road - AM Peak Hour
LOCATION	: Richmond College
DATE	: 02/12/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA



ARM A IS A316 Chertsey Road (East)
ARM B IS Egerton Road
ARM C IS A316 Chertsey Road (West)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 16.46 M.
CENTRAL RESERVE WIDTH	(WCR) 2.16 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)250.00 M.
- BLOCKS TRAFFIC (SPACES)	NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 98.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 3.66 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
732.28	0.15	0.06

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
625.86	0.15	0.06	0.09	0.21

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
718.74	0.15	0.15

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: 2037 Cumulative+Dev

TIME PERIOD BEGINS 07.45 AND ENDS 09.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2037 Cumulative+Dev

TIME	FROM/TO	ARM A	ARM B	ARM C
07.45 - 08.00				
	ARM A	0.000	0.005	0.995
		0.0	3.0	577.0
		(0.0)	(0.0)	(3.5)
	ARM B	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.00 - 08.15				
	ARM A	0.000	0.042	0.958
		0.0	21.0	476.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	4.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.15 - 08.30				
	ARM A	0.000	0.027	0.973
		0.0	13.0	476.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	4.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.30 - 08.45				
	ARM A	0.000	0.019	0.981
		0.0	9.0	476.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	3.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
08.45 - 09.00				
	ARM A	0.000	0.006	0.994
		0.0	3.0	476.0
		(0.0)	(0.0)	(3.7)
	ARM B	0.000	0.000	1.000
		0.0	0.0	3.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
09.00 - 09.15				
	ARM A	0.000	0.004	0.996
		0.0	3.0	698.0
		(0.0)	(0.0)	(7.2)
	ARM B	0.000	0.000	1.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-AC	0.00	4.69	0.000		0.00	0.00	0.0		0.00
C-A	0.00								
C-B	0.00	5.40	0.000		0.00	0.00	0.0		0.00
A-B	0.20								
A-C	38.27								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-AC	0.27	7.24	0.037		0.00	0.04	0.5		0.14
C-A	0.00								
C-B	0.00	6.35	0.000		0.00	0.00	0.0		0.00
A-B	1.34								
A-C	30.46								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-AC	0.27	7.19	0.037		0.04	0.04	0.6		0.14
C-A	0.00								
C-B	0.00	6.35	0.000		0.00	0.00	0.0		0.00
A-B	0.85								
A-C	30.95								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-AC	0.20	7.16	0.028		0.04	0.03	0.4		0.14
C-A	0.00								
C-B	0.00	6.34	0.000		0.00	0.00	0.0		0.00
A-B	0.59								
A-C	31.21								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
B-AC	0.20	7.09	0.028		0.03	0.03	0.4		0.15
C-A	0.00								
C-B	0.00	6.31	0.000		0.00	0.00	0.0		0.00
A-B	0.20								
A-C	31.80								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
B-AC	0.07	7.79	0.009		0.03	0.01	0.1		0.13
C-A	0.00								
C-B	0.00	6.94	0.000		0.00	0.00	0.0		0.00
A-B	0.11								
A-C	26.62								

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	15.0	10.0	2.1	0.14	2.1	0.14
C-A	0.0	0.0				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	49.4	32.9				
A-C	2839.6	1893.1				
ALL	2904.0	1936.0	2.1	0.00	2.1	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 14:09:13 on 01/06/2015]

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

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EMAIL: software@trl.co.uk

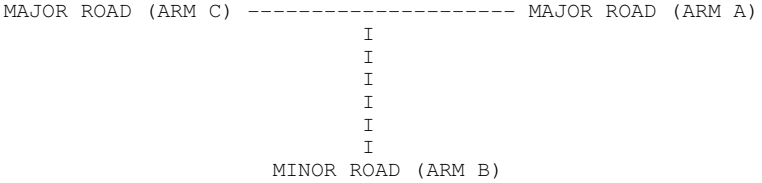
Run with file:-
"T:\30000_projects\30713 Richmond Education and Enterprise Campus\Calculations\Revised Scheme\
Junction Assessment\PICADY\A316 Chertsey Road - Egerton Road - PM Peak Hour - revised scheme.vpi"
(drive-on-the-left) at 14:17:21 on Monday, 1 June 2015

RUN INFORMATION

RUN TITLE	: A316 Chertsey Road / Egerton Road - PM Peak Hour
LOCATION	: Richmond College
DATE	: 02/12/14
CLIENT	: Cascade Consulting
ENUMERATOR	: Chris Pringle [TPP079]
JOB NUMBER	: 30713
STATUS	: Preliminary
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS A316 Chertsey Road (East)
ARM B IS Egerton Road
ARM C IS A316 Chertsey Road (West)

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 16.46 M.
CENTRAL RESERVE WIDTH	(WCR) 2.16 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)250.00 M.
- BLOCKS TRAFFIC (SPACES)	NO (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 98.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 3.66 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
732.28	0.15	0.06

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
625.86	0.15	0.06	0.09	0.21

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
718.74	0.15	0.15

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: 2037 Cumulative+Dev

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.
DEMAND FLOW PROFILES ARE INPUT DIRECTLY

Demand set: 2037 Cumulative+Dev

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 17.00	ARM A	0.000	0.011	0.989
		0.0	6.0	564.0
		(0.0)	(0.0)	(2.2)
	ARM B	0.000	0.000	1.000
		0.0	0.0	4.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.00 - 17.15	ARM A	0.000	0.004	0.996
		0.0	2.0	543.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	2.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.15 - 17.30	ARM A	0.000	0.000	1.000
		0.0	0.0	543.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	2.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.30 - 17.45	ARM A	0.000	0.000	1.000
		0.0	0.0	543.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
17.45 - 18.00	ARM A	0.000	0.000	1.000
		0.0	0.0	543.0
		(0.0)	(0.0)	(2.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
18.00 - 18.15	ARM A	0.000	0.000	1.000
		0.0	0.0	566.0
		(0.0)	(0.0)	(1.8)
	ARM B	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.000	0.000	0.000
		0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS
TURNING COUNTS
(PERCENTAGE OF H.V.S)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE TURNING PROPORTIONS USED VARY BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES BETWEEN TIME SEGMENTS
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-AC	0.27	6.24	0.043		0.00	0.04	0.6		0.17
C-A	0.00								
C-B	0.00	5.53	0.000		0.00	0.00	0.0		0.00
A-B	0.40								
A-C	37.60								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-AC	0.13	6.69	0.020		0.04	0.02	0.3		0.15
C-A	0.00								
C-B	0.00	5.96	0.000		0.00	0.00	0.0		0.00
A-B	0.13								
A-C	34.94								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-AC	0.13	6.67	0.020		0.02	0.02	0.3		0.15
C-A	0.00								
C-B	0.00	5.96	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	35.07								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-AC	0.07	6.67	0.010		0.02	0.01	0.2		0.15
C-A	0.00								
C-B	0.00	5.96	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	35.07								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-AC	0.07	6.66	0.010		0.01	0.01	0.2		0.15
C-A	0.00								
C-B	0.00	5.95	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	35.13								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-AC	0.00	6.35	0.000		0.01	0.00	0.0		0.00
C-A	0.00								
C-B	0.00	5.67	0.000		0.00	0.00	0.0		0.00
A-B	0.00								
A-C	37.20								

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-AC	10.0	6.7	1.6	0.16	1.6	0.16
C-A	0.0	0.0				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	7.9	5.3				
A-C	3225.1	2150.0				
ALL	3243.0	2162.0	1.6	0.00	1.6	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

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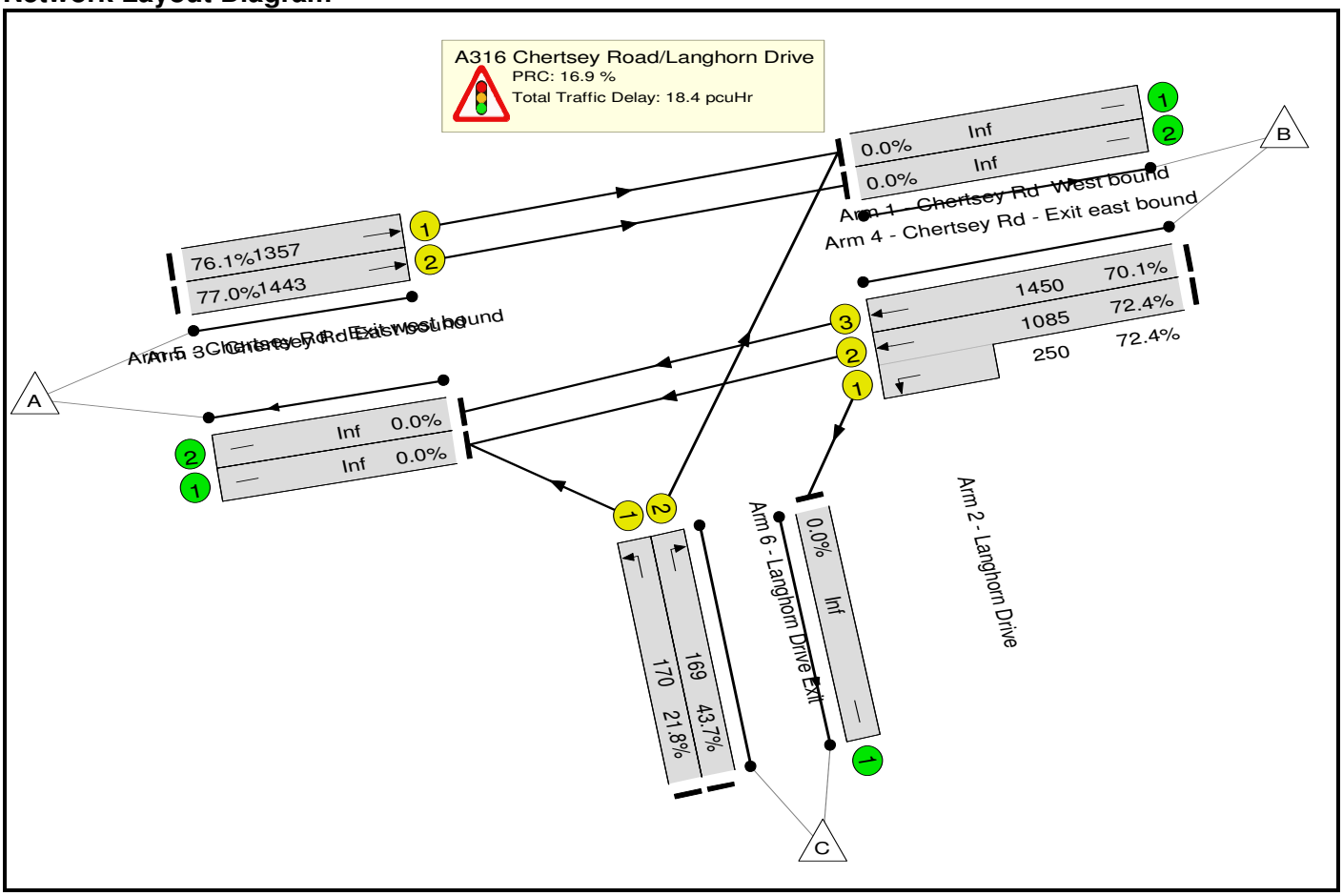
Basic Results Summary

Scenario 11: '2037 + Dev + Cumulative' (FG11: '2037 Baseline + Dev + Cumulative AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**77.0%**	**0**	**0**	**0**	**18.4**	-	-
A316 Chertsey Road/Langhorn Drive	-	-	-		-	-	-	-	-	-	**77.0%**	**0**	**0**	**0**	**18.4**	-	-
1/2+1/1	Chertsey Rd West bound Ahead Left	U	B		1	59	-	967	1995:1613	1085+250	72.4 : 72.4%	-	-	-	3.6	13.4	14.6
1/3	Chertsey Rd West bound Ahead	U	B		1	59	-	1017	2175	1450	70.1%	-	-	-	3.8	13.5	17.0
2/1	Langhorn Drive Left	U	D		1	7	-	37	1912	170	21.8%	-	-	-	0.5	51.7	1.0
2/2	Langhorn Drive Right	U	C		1	7	-	74	1905	169	43.7%	-	-	-	1.2	57.6	2.1
3/1	Chertsey Rd East bound Ahead	U	A		1	59	-	1032	2035	1357	76.1%	-	-	-	4.5	15.6	18.8
3/2	Chertsey Rd East bound Ahead	U	A		1	59	-	1111	2165	1443	77.0%	-	-	-	4.8	15.6	20.5

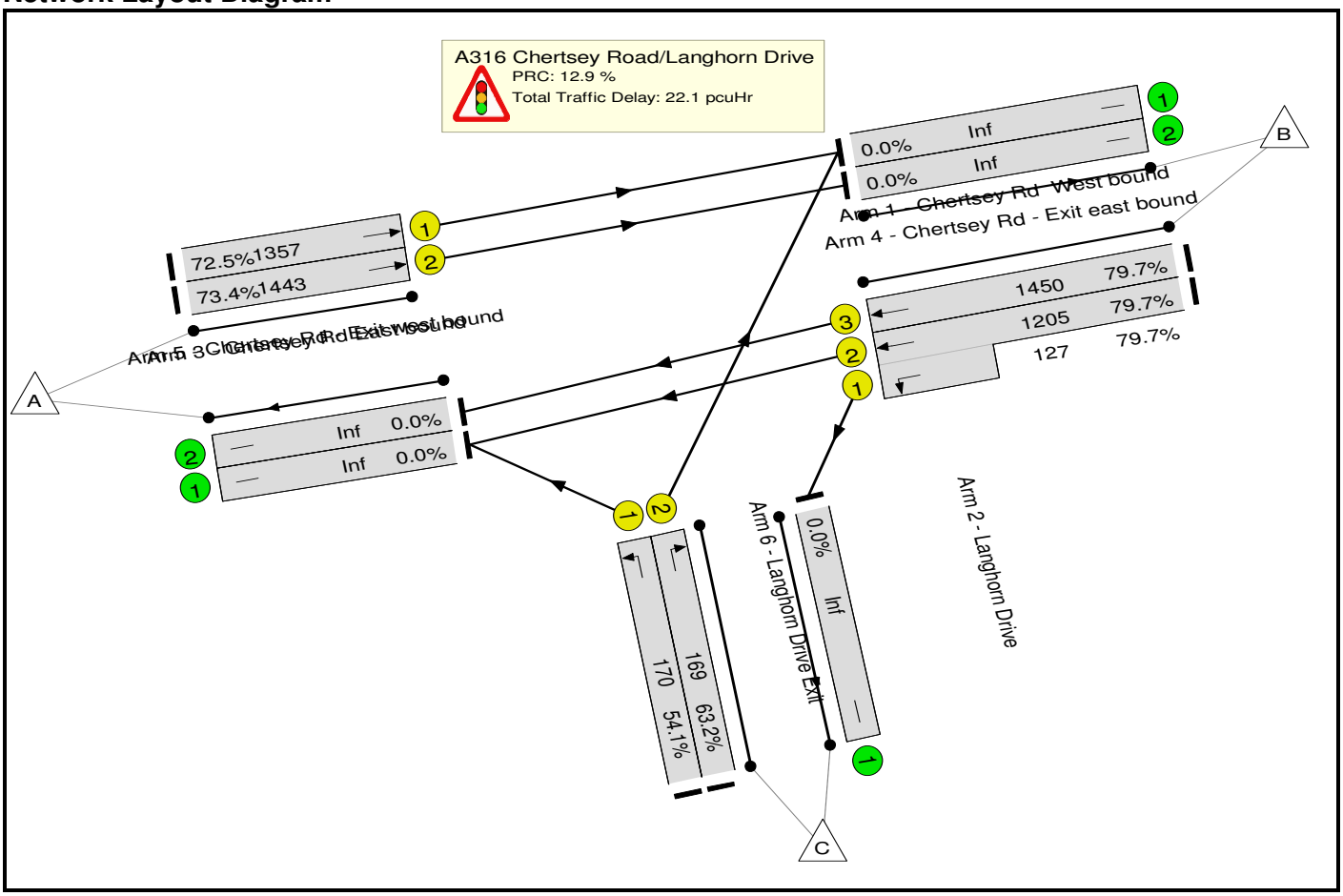
C1 PRC for Signalled Lanes (%): 16.9 Total Delay for Signalled Lanes (pcuHr): 18.45 Cycle Time (s): 90

PRC Over All Lanes (%): 16.9 Total Delay Over All Lanes(pcuHr): 18.45

Basic Results Summary

Scenario 12: '2037 + Dev + Cumulative' (FG12: '2037 Baseline + Dev + Cumulative PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network	-	-	-		-	-	-	-	-	-	**79.7%**	**0**	**0**	**0**	**22.1**	-	-
A316 Chertsey Road/Langhorn Drive	-	-	-		-	-	-	-	-	-	**79.7%**	**0**	**0**	**0**	**22.1**	-	-
1/2+1/1	Chertsey Rd West bound Ahead Left	U	B		1	59	-	1061	1995:1613	1205+127	79.7 : 79.7%	-	-	-	4.9	16.6	19.7
1/3	Chertsey Rd West bound Ahead	U	B		1	59	-	1155	2175	1450	79.7%	-	-	-	5.4	16.7	22.1
2/1	Langhorn Drive Left	U	D		1	7	-	92	1912	170	54.1%	-	-	-	1.6	62.0	2.8
2/2	Langhorn Drive Right	U	C		1	7	-	107	1905	169	63.2%	-	-	-	2.0	67.7	3.4
3/1	Chertsey Rd East bound Ahead	U	A		1	59	-	984	2035	1357	72.5%	-	-	-	4.0	14.5	17.2
3/2	Chertsey Rd East bound Ahead	U	A		1	59	-	1060	2165	1443	73.4%	-	-	-	4.3	14.5	18.5

C1 PRC for Signalled Lanes (%): 12.9 Total Delay for Signalled Lanes (pcuHr): 22.07 Cycle Time (s): 90

PRC Over All Lanes (%): 12.9 Total Delay Over All Lanes(pcuHr): 22.07

Appendix N

Framework Travel Plan

TPP
transport planning practice

Richmond upon Thames College

Richmond Education and Enterprise Campus
Framework Travel Plan

June 2015

TPP
transport planning practice

Contents

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1. INTRODUCTION

1.1 Transport Planning Practice were appointed to prepare a Framework Travel Plan (FTP) for the proposed redevelopment of Richmond upon Thames College (RuTC).

1.2 The existing site consists of Richmond upon Thames College with associated playing fields, vehicle and cycle parking. The site located to the north west of Twickenham town centre, it is bounded by Chertsey Road immediately to the north, Egerton Road to the east, residential dwellings on Craneford Way to the south and Marsh Farm Lane (footpath) to the west.

1.3 This FTP will consider the following uses associated with the proposals including non-residential education (D1), residential (C3) and business (B1) as well as assessing proposed Travel Plan measures required for each of the three uses.

1.4 The purpose of this FTP is to set out a strategy for minimising residents, students and employees dependence on travel by private car and to maximise the use of public transport, walking and cycling. Objectives include promoting sustainable modes of travel, which reflects current Government policy objectives in respect of this site.

1.5 It is envisaged that detailed site specific Travel Plans will be developed as part of the detailed applications for the various elements of the development. These would then be undertaken at a time when the end users requirements would be better understood.

1.6 The contact details of the author of this FTP are as follows:

Henry Binnian
Transport Planning Practice
Email: henry.binnian@tppweb.co.uk Tel: 020 7608 0008

Proposal

1.7 The proposal is to redevelop RuTC to create Richmond Education and Enterprise Campus. The proposals will re-provide Richmond College in a new development, introduce a new Secondary School and a Special Educational Needs School. Additionally a new media 'Tech Hub' and Residential dwellings will be built. Further to this there will be an upgrade of the sports fields and sport centre facilities associated with the education uses at the development. Table 1.0 presents the land use breakdown of the proposed site.

Table 1.0: Land use breakdown, car and cycle provision

Land use	No. of units/m^2 GEA	Car parking	Cycle parking
Tech Hub (B1 use)	Up to 1,700m^2	10	Cycle parking will be provided in accordance with the London Plan (March 2015)
Residential	180 dwellings	In line with London Plan	
Sport Centre	Up to 3,900 m^2	-	
Richmond College	Up to 16,000 m^2	150	
Secondary School	Up to 7,000 m^2	40	
Special Educational Needs School	Up to 4,000 m^2	30	

1.8 The remaining chapters within this report are outlined below:

- **Section 2: Policy background –** summarises the current policy related to Travel Plans.
- **Section 3**: **Site assessment –** describes the accessibility of the site by a range of different transport modes.
- **Section 4: Travel survey** – sets out how the baseline surveys could be carried out.
- **Section 5: Travel Plan objectives and targets** – sets out the objectives and aims of the document and targets against which the FTP will be assessed.
- **Section 6: Proposed School Travel Plan measures –** gives details of the measures that will be implemented as part of the FTP to help deliver sustainable patterns of travel for students, staff and visitors.
- **Section 7: Proposed Commercial Travel Plan measures –** gives details of the measures that will be implemented as part of the FTP to help deliver sustainable patterns of travel for commercial occupiers.
- **Section 8: Proposed Residential Travel Plan measures –** gives details of the measures that will be implemented as part of the FTP to help deliver sustainable patterns of travel for residential occupiers.
- **Section 9: Travel Plan management and monitoring –** explains how the TP will be managed and monitored. An action plan is also provided.
- **Section 10: Travel Plan securing, enforcement and funding** – sets out how the Travel Plan will be secured, enforced and funded.

2. POLICY CONTEXT

2.1 This chapter provides a summary of the relevant transport policy against which the proposals are assessed.

National policy

National Planning Policy Framework

2.2 The National Planning Policy Framework (NPPF) was published on the 27th March 2012 and supersedes all previous national planning policy documents. It focuses on a presumption in favour of sustainable development. One of the core planning principles relates to actively managing patterns of growth to make the fullest possible use of public transport, walking and cycling and focusing significant developments in locations which are or can be made sustainable.

2.3 The NPPF recognises that the transport system should be balanced in favour of sustainable transport modes so that people are given a real choice about how they travel.

2.4 The NPPF states that developments should be located and designed where practical to:

- Accommodate the efficient delivery of goods and supplies.
- Give priority to pedestrian and cycle movements, and have access to high quality public transport facilities.
- Create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians.
- Incorporate facilities for charging plug-in and other ultra-low emission vehicles.
- Consider the needs of people with disabilities by all modes of transport.

2.5 It goes on to state that a key tool to facilitate this will be a Travel Plan. All developments which generate significant amount of movement should be required to provide a Travel Plan.

2.6 In respect of parking standards, the NPPF states that local planning authorities should take into account the following:

- Accessibility of the development.
- Type, mix and use of development.
- Availability of and opportunities for public transport.
- Local car ownership levels.
- Overall need to reduce the use of high-emission vehicles.

Regional policy

Further Alterations to the London Plan (FALP) (March 2015)

2.7 The London Plan Spatial Development Strategy for Greater London 2011 sets out the spatial development strategy for London, and provides the London wide context within which individual Boroughs set their local planning policies. A key objective of the London Plan is to improve London's accessibility, which, amongst other issues, includes tackling traffic congestion. An issue that assists closer integration between transport and spatial development is encouraging patterns and forms of development that reduce the need to travel, especially by car.

2.8 With regard to parking strategy, The Mayor of London, in conjunction with the Boroughs, seeks to ensure that on-site parking at new developments is kept to a minimum. Maximum parking standards are set, which can be reduced in areas of good public transport accessibility, and, in the most accessible locations, can lead to car–free developments.

2.9 The London Plan also recognises the importance of site accessibility and location as inherent within the objective of making the most sustainable and efficient use of space by encouraging development intensification in areas that have good public transport accessibility. The Plan also provides further guidance and sets out an approach to determining appropriate maximum parking standards within a policy context. The approach set out in Policy 6.13 seeks to regulate parking in order to minimise additional car travel, reduce trip lengths and encourage use of other more sustainable means of travel.

2.10 The London Plan recognises that improving conditions for cycling makes this sustainable mode an increasingly viable alternative to the private car, and requires cycle parking facilities within all new developments.

2.11 Travel Plans can help to deliver many of the transport objectives set out within the London Plan's Policy 6.1 'Strategic Approach' which include reducing the need to travel, reducing car use and supporting measures that encourage shift to more sustainable modes and technology. The use of Travel Plans can help reduce emissions by promoting alternatives to the car.

2.12 The London Plan encourages and supports the use of Travel Plans for development proposals. Policy 6.3 'Assessing Transport Capacity' states that Travel Plans should be provided for applications above the thresholds set out in TfL guidance.

2.13 Policies 6.9 and 6.10 aim to increase cycling and walking in London, in particular, to achieve a 5% modal share by 2026 for cycling. Proposed developments should therefore provide secure and accessible cycle parking facilities and ensure there is a high quality pedestrian environment and street space. Table 2.1 sets out the FALP cycle parking minimum standards for the land uses associated with this development.

Table 2.1: Cycle parking Standards

Land Use	Cycle parking standards	
	Long-stay	**Short-stay**
B1 Tech hub	1 space per 250 m^2	1 space per 1000 m^2
Residential C3	1 space per studio a nd 1 bedroom unit 2 spaces per all other dwellings	1 space per 40 units
Schools D1	1 space per 8 staff & 1 per 8 students	1 space per 100 students

The Mayor's Transport Strategy (2010)

2.14 The Mayor's Transport Strategy recognises that through setting appropriate parking standards, encourage smarter travel planning and making public transport more attractive, the Mayor will encourage the use of public transport, walking, cycling and car sharing.

Local Policy

2.15 The Local Plan (formerly known as the Local Development Framework) sets out the priorities for the development of the borough and will be used for making decisions on planning applications.

LBRuT Core Strategy (2009)

2.16 This document sets out the Strategic Planning Framework for the Borough over the next 15 years, it considers other plans and strategies and is the delivery mechanism for the spatial elements of the community. This document outlines the council's transport objectives and policies.

2.17 The following transport policies in CP5 – Sustainable Travel that are associated with this development are stated below:

2.18 Policy 5.C – Cycling and Walking

- Prioritise the needs of pedestrians and cyclists in the design of new developments including links to existing networks and requiring the provision of adequate cycle parking.

2.19 Policy 5.F – Car Parking and Travel

- Provide car share facilities and car clubs in appropriate new developments and encourage the use of low emission vehicles in order to reduce congestion and pollution.

2.20 Policy 5.G – Sustainable Travel

- Encourage major employers and schools to develop Green Travel Plans and require these where appropriate with planning applications.

- The council and its partners will welcome the development of green Travel Plans for all types of developments. All Travel Plans should be produced in line with TfL Guidance on Workplace and Travel Planning and Residential Travel Planning.

Development Management Plan (2011)

2.21 The Development Management Plan (DMP) includes the detailed policies which will be used when new developments are considered. The DMP takes forward the strategic objectives in the Core Strategy and is consistent with National and Regional Policies.

2.22 5.4 Transport and Parking – this chapter takes forward CP5 in the Core Strategy as well as complementing LBRuT Implementation Plan. The relevant policies are stated below:

2.23 Policy DM TP 1 – Higher trip generating developments will only be permitted in areas which are, or at the time of implementation are, easily accessible by transport other than the private car, and well located with respect to local services.

2.24 Policy DM TP 2 – The impact of new developments on the transport network will be assessed against other plan policies and transport standards. All planning applications for major developments should be accompanied by a Transport Assessment. Matters to be included are set out in DfT/ TfL guidance.

2.25 Policy DM TP 3 – New developments will be expected to create or improve links with the local and wider transport networks, including links to cycle and pedestrian networks. All new developments must be designed to improve accessibility including:

- Maximise permeability, with safe, convenient accessible and appropriate road, cycle and pedestrian routes within and in the immediate vicinity of the scheme, as well as accessible walking and cycling links to the wider transport network including to public transport node and key land uses, taking account the need to connect people to jobs, to town centres and to schools.

2.26 Policy DM TP 6 – New developments and schemes improve the safety and security of the pedestrian environment where appropriate.

2.27 Policy DM TP 7 – To maintain and improve conditions for cyclists, the council will ensure that new developments do not adversely impact on the cycling network or cyclists and provide appropriate cycle access and sufficient, secure cycle parking facilities.

2.28 Policy DM TP 8 – Vehicle and cycle parking standards are set out in table 2.1. Developers may provide fewer car parking spaces if they can show that there would be no adverse impact on amenity, street scene, road safety or emergency access. In general it is expected that in low PTAL areas (1-4) the standards should be met, but in higher PTAL areas (5-6) provision at a lower level may be appropriate in exceptional circumstances. Additionally electronic charging points are welcomed where there is demand.

Table 2.1: Parking Standards

Land Use	Vehicle Parking Space Required (All floor space referred to is gross)		Cycle parking standard
	Controlled parking zones	**The remainder of the Borough**	
Schools D1	1 space per 2 staff, Arrangements must also be made for adequate setting down areas and visitor parking spaces. Adequate facilities for the setting down of coaches shall also be considered	1 space per 2 staff	5 spaces per classroom depending on the nature of the school
Residential C3	1-2 bedrooms 1 spaces	1-2 bedrooms 1 spaces	1 space
	3 bedrooms For 1 unit, 2 spaces; for two or more units 1 allocated space plus sufficient unallocated spaces to provide a total of 1.5 spaces overall per unit.	3 bedrooms For 1 unit, 2 spaces; for two or more units 1 allocated space plus sufficient unallocated spaces to provide a total of 1.5 spaces overall per unit.	1 space
	4+ bedrooms 2 spaces	4+ bedrooms 2 spaces (negotiable)	2 spaces
B1	1 space per 300sqm Plus 1 lorry parking space per 250sqm (minimum 1 per unit)	Within 400m of a rail station, 1 space per 200sqm. Elsewhere 1 per 100sqm plus 1 lorry parking space per 2500sqm (minimum 1 per unit)	1 per 200 sqm

Planning Brief Richmond upon Thames College (December 2008)

2.29 There are a number of key access and movement principles which the redevelopment will be based on. As stated in the document, these are:

- The primary access for vehicular traffic to the college should continue to be off the A316.

- The majority of pedestrian visitors should arrive from the eastern boundary (via Twickenham Station), secondary access for pedestrians and cyclists should be provided around the site as visitors arrive from all directions.

- Any residential development on the site should be accessed off Egerton Road to separate college and residential traffic (subject to size of residential development).

2.30 Car parking provision within the redevelopment scheme is an important consideration. Car parking should be provided on site and integrated into the design of the campus and sports facilities.

2.31 A Travel Plan will be prepared and implemented to promote sustainable forms of transport and measures to reduce car travel to the site for students, staff and visitors.

Twickenham Area Action Plan (July 2013)

2.32 The Twickenham Area Action Plan places great focus on improving walking routes to create an accessible pedestrian environment. In turn this will encourage residents to make greater use of facilities within the town centre and so reduce their need to travel.

2.33 New developments should provide sufficient parking to avoid adverse impact on on-street parking, in line with the parking standards set out in the Development Management Plan DM TP8.

2.34 Any new developments should have adequate, convenient and safe servicing arrangements in line with the Council's SPD on Transport Standards. Further, servicing hours will be controlled where necessary for safety or amenity reasons.

3. SITE ASSESSMENT

Site location and land use

3.1 It is proposed to demolish the existing Richmond upon Thames College and re-develop the site to provide Richmond Education and Enterprise Campus, which will consist of a replacement College, Secondary School, Special Educational Needs School, Tech Hub, sports centre and playing fields, and associated vehicle and cycle parking. In addition there will be a Residential development on part of the existing college site.

3.2 The site located to the north west of Twickenham town centre, it is bounded by Chertsey Road immediately to the north, Egerton Road to the east, residential dwellings on Craneford Way to the south and Marsh Farm Lane (footpath) and Harlequin's Stoop Stadium to the west. The site is located approximately 750m north-west of Twickenham Station and 500m south of Twickenham Stadium within the London Borough of Richmond upon Thames.

Site access

3.3 The primary vehicular access will be taken from Langhorn Drive. Cars will access the staff and visitor car park via the existing College site access from the mini-roundabout junction with Langhorn Drive. This entrance will provide access to the replacement College, Tech Hub, Residential units and the sports centre. Vehicular access to the special needs school and Secondary School will be taken from Egerton Road. There will be pedestrian and cycle access via Craneford Way, Egerton Road and Langhorn Drive. Access to the playing fields will be taken from Craneford Way via Court Way.

Local area

3.4 Twickenham town centre is located 800m to the south of the site as the crow flies and offers a range of shops and amenities typically offered by a small town centre. The nearest doctors surgery is The Green Surgery located approximately 950m south of the site, which is a 10 - 12 minute walk based on a walking speed of approximately 80m-100m per minute and which can be accessed via Marsh Farm Lane. The land use of the local area comprises of predominately residential properties.

Public transport

Public transport accessibility level (PTAL)

3.5 The PTAL value for the site ranges from 1b on the western side of the site to 2 on the eastern side. This shows that it has a poor level of public transport accessibility. The PTAL calculation has been carried out using the TfL website http://www.webptals.org.uk/.

Bus

3.6 The site is served by four bus routes which include the 267, 281, 481 and the 681. The bus routes can be accessed by a number of bus stops which surround the site. Below is a list of the nearest bus stops surrounding the site including the most direct route and distance to the bus stops from the College pedestrian entrances on Egerton Road and the bus routes they are served by:

- Stops 'C' and 'N' on Whitton Road are reached via Egerton Road, Chertsey Road and Chudleigh Road; are 490m away; and are served by 281, 481 and 681.
- Stops 'L' and 'S' on Whitton Road are reached via Egerton Road and Court Way; are 507m away; and are served by 281 and 681.
- Stops 'B' and 'P' on Whitton Road are reached via Egerton Road, Chertsey Road and Tayben Avenue; are 537m away; and are served by 281, 481 and 681.
- Stops 'M' and 'R' on Whitton Road are reached via Egerton Road and Heathfield North; are 545m away; and are served by 281 and 681.
- Stops 'B' and 'C' on London Road are reached via Egerton Road, Court Way and Whitton Road; are 460m away; and are served by 267, 481 and 681.

3.7 Table 3.2 below shows a summary of the bus services serving the site.

Table 3.2: Summary of existing bus services

Bus Route	Direction (towards)	Monday – Friday			Sat	Sun
		AM	Inter peak	PM		
267	Hammersmith Bus Station	7	6	6	5	4
	Fulwell Rail Station	5	6	6	5	4
281	Hounslow Bus Station	8	8	8	8	5
	Tolworth (Ewell Road)	8	8	7	7	5
481	West Middlesex University Hospital	1	1	1	1	0
	Kingston (Cromwell Road Bus Station)	1	1	1	1	0
Total		30	30	29	27	18

3.8 The above table shows that the site is served by 30 buses in the morning peak and inter-peak hour and 29 buses in the evening peak hour in both directions. On weekends, the frequency is reduced to 27 buses per hour on Saturday and 18 buses per hour on Sunday.

Rail

3.9 Twickenham National Rail Station is located to the south east from the site (a 7 to 9 minute walk). The station and all trains serving it are operated by South West Trains. The station provides key links to Richmond, Waterloo, Reading, Kingston and Hounslow. Table 3.3 shows the directional frequency in the peak hours.

Table 3.3: Twickenham Station rail service frequencies

National Rail	Westbound		Eastbound	
	AM Peak	PM Peak	AM Peak	PM Peak
Twickenham	11	10	11	8

Walking

3.10 The surrounding footways are generally satisfactory, being a minimum of 2.0m in width, with dropped kerbs, tactile paving and street lighting. On the A316 Chertsey Road, there is a crash barrier on the central reservation preventing pedestrians from crossing the road. There is a signal controlled pedestrian crossing on Chertsey Road approximately 100m east of the site and a pedestrian footbridge directly north of the site. Many of the residential roads have traffic calming by means of speed cushions located at regular intervals, and there is a fire access gate across Egerton Road which reduces traffic on the residential roads to access only.

3.11 The cycle/footpath of Marsh Farm Lane runs along the western boundary of the site between the junction of the A316 Chertsey Road/ Langhorn Drive and Craneford Way. From Craneford Way, the cycle/footpath runs through the Craneford Way playing fields, across the railway line via a footbridge and onto Marsh Farm Road.

3.12 Marsh Farm Lane footpath is proposed to be upgraded and widened to allow cyclists and pedestrians to use the route at the same time. A new east-west shared cycle / footway is to connect London Road and Twickenham Station to Marsh Farm Lane, passing through land the former sorting office site and land known as the Twickenham Rough.

3.13 The bus routes on Whitton Road (section north of the A316) can be accessed via the footbridge or signalised pedestrian crossing on Chertsey Road. The route has dropped kerbs, tactile paving and street lighting. The footways leading to Twickenham Station, either via Court Way, Heathfield North or Heathfield South and Whitton Road and London Road have similar characteristics with a zebra crossing on Whitton Road and signal controlled pedestrian crossings at the junction of Whitton Road / London Road and on London Road. The cycle / footway on both sides of the A316 are to be upgraded by TfL with work due to be complete in 2016.

Cycling

3.14 Transport for London's 2013 Local Cycling Guide 9 advises on a number of routes recommended by cyclists within the vicinity of the site and cycle routes that have signing or road markings. The site is well connected by cycle routes providing links to locations including; Twickenham Station, Richmond, Isleworth and Teddington. Chertsey Road has off-road shared cycle/ footway routes adjacent to it providing segregation from cyclists and motorists.

Parking

Car

3.15 The different land uses of the development mean that parking spaces are distributed throughout the site. The car parking provision meets the standards set out in the local and regional policy. Students will not be allowed to park in the school parking spaces which are for the use of staff and visitors only. Table 3.4 presents the breakdown of car parking spaces allocated to each use.

Table 3.4: Summary of proposed car parking spaces

Land Use		Parking spaces
School	Richmond College	150
	Secondary School	40
	Special Needs School	30
Residential		Based on London Plan standards
Tech hub		10
Total		**420**

Cycle

3.16 Cycle parking will be allocated to each use in accordance with the London Plan (March 2015) minimum standards.

3.17 The Tech Hub will be provided with a minimum of one cycle space per 200m^2 of GEA which meets local policy standards. Residential cycle parking will be provided to meet the local parking standards as set out in table 3.5.

Table 3.5: Residential cycle parking standards

Unit Type	Studio and 1 bedroom unit	2 + Bedroom units	Visitor
Cycle parking	1 space per unit	2 spaces per unit	1 space per 40 units

Car clubs

3.18 Zipcar, one of the world's leading car club companies has four car club parking bays within the vicinity of Twickenham Station, one on London Road, March Road, Station Road and Grosvenor Road. All four car club bays are within a 7 to 12 minute walk from the site. More information can be found at http://www.zipcar.co.uk/.

Local highway network

3.19 The A316 Chertsey Road, which is part of Transport for London's Road Network (TLRN), is a dual carriageway and runs in a northeast-southwest direction along the northern boundary of the site. The road links the site to central London to the east and the M3 Motorway and wider national strategic road network to the west and has a speed limit of 40mph near the site. Locally, the road is intersected by the B538 Hospital Bridge Road to the west and the B361 Whitton Road to the east with semi signalised roundabout junctions.

3.20 The A316 Chertsey Road, has shared cycle/footways along both sides of the carriageways. There is a signal controlled pedestrian crossing over the A316 near Chudleigh Road and a pedestrian footbridge near Talma Gardens and Langhorn Drive. There are two other pedestrian bridges over the A316 further to the west.

3.21 The site is accessed from two locations off of the A316 Chertsey Road. The first is from Egerton Road into the student car park and the second is from Langhorn Drive which provides access to the northern part of the site and some of the staff parking areas. The A316 Chertsey Road / Langhorn Drive will be upgraded from a

simple priority left in – left out junction, to a fully signal controlled left in – left and right out junction. A dedicated pedestrian crossing phase will be provided in the signal phasing across the A316 Chertsey Road and a pedestrian crossing assisted by traffic signal phasing will be provided across Langhorn Drive. As a result of the right turn facility being provided at the junction, the vehicular link between Langhorn Drive and Craneford Way will be removed. The access road between the mini-roundabout and the site will be widened to 6.0m to enable all purpose vehicle access.

3.22 Egerton Road has footways on both sides of the carriageway, street lighting and has a 30mph speed limit. There is a vehicle restriction immediately south of the student car park access which is controlled with a fire gate. The vehicle restriction is in place to prevent rat-running by vehicles travelling from Whitton Road to Chertsey Road (westbound), thereby avoiding the semi signal controlled roundabout. Langhorn Drive, which has a speed limit of 20mph provides access into the site for pedestrians and cyclists via the Marsh Farm Lane cycle/footpath which has street lighting. Marsh Farm Lane runs south to Craneford Way.

3.23 The B361 Whitton Road, which has a speed limit of 30mph, runs in a northwest-southeast direction to the east of the residential area of Heatham and is connected to the site via the residential roads of roads of Court Way, Heathfield North and Heathfield South. Adjacent to the Court Way/Whitton Road junction is a zebra crossing. Heathfield North is one-way in a westerly direction and Heathfield South is one-way in an easterly direction. Each of these residential roads provides access to Egerton Road which in turn provides access to Craneford Way.

3.24 The residential roads of Court Way, Heathfield North, Heathfield South, Egerton Road and Craneford Way are accessed via simple priority junctions and have a speed limit of 20mph. Each road has street lighting, footways on both sides of the carriageway, except for Craneford Way which has a footway on its northern side of the carriageway only.

3.25 The site is accessed from two locations from Egerton Road. The first is via the Main College access and the second is via the secondary College access, both of which provide access to the main staff car parking areas. The site is also accessed from Craneford Way, which provides access to the rear of the College (western side) where the servicing area is located.

3.26 To the south, the B361 Whitton Road joins the A310 London Road via signal controlled junction which has pedestrian signal phases. The A310 London Road provides access to Twickenham station and Twickenham town centre via the A305 King Street. There is a signalised pedestrian crossing over the A310 London Road directly opposite Twickenham station.

Delivery and servicing

3.27 Deliveries and servicing vehicles associated with the Tech Hub and the three schools will access the site via Langhorn Drive and egress the site via either Langhorn Drive or Egerton Road back on to the A316 Chertsey Road. Deliveries associated with the Residential units will take place on the residential roads within the site.

4. TRAVEL SURVEY

4.1 As the proposed development has not been built it is not possible to establish the travel patterns of the future occupants for each land use, aside from the preliminary assessment set out within the Transport Assessment.

4.2 Upon occupation of the various elements of the development baseline surveys will be undertaken within agreed time periods or in the case of the Residential site, once 75% of units or office space has been occupied.

4.3 The surveys are likely to include vehicle counts at access points. In addition to this there will be travel questionnaire surveys. Due to multiple land uses on site, there will be three types of travel surveys to capture the different travel patterns associated with each category of use i.e. residential, educational, and commercial uses. This allows the surveys to target residents, staff and students as there travel method and modes are likely to not be similar.

Commercial use travel survey (Tech Hub)

4.4 An online survey tool, such as Survey Monkey, could be used to distribute the travel survey questionnaires to all employees occupied in the development, as it is more than likely the majority of employees will have access to a computer and have an email account. This method of data collection allows a quick and economic way of distributing, collecting and analysing the travel surveys. The results of the surveys can then be sent to LBRuT for review. A basic paper survey could be handed out to visitors and delivery drivers for completion before they leave the site to establish their mode and travel patterns.

Educational use travel survey

4.5 A baseline travel survey will be undertaken within three months of opening. The survey will gather initial information about travel characteristics and perceived travel choices. From this baseline travel survey, the future targets of the Travel Plan going forward can be set.

4.6 As the site is education use, the surveys will be carried out by performing a 'Hands Up' survey using the methodology set out in Transport for London's "A Guide to Conducting Hand up Surveys" (December 2008) prepared by WSP.

4.7 After the initial baseline survey, the travel survey will be repeated regularly (as agreed with Richmond Council) to monitor as to whether targets have been achieved and to set new targets going forward.

4.8 The results of the travel survey will be uploaded to STAR (School Travel Accredited and Recognised). STAR is a strategic framework that encourages and rewards schools to adopt safer and active travel behaviour. The STAR Accreditation Scheme recognises and rewards schools at one of three levels with travel plans that not only promote safe and active travel but achieve it as well.

Residential use travel survey

4.9 A baseline travel survey will be undertaken once 75% of units are occupied or six months after first occupation and the FTP will be updated accordingly.

4.10 A questionnaires could be distributed to residents asking them about their travel patterns in order to determine a full modal split. The questionnaire based survey will aim to achieve a minimum response rate of 30% from residents. To seek to achieve this, an advanced warning letter will be issued to residents explaining the need for the surveys as part of the Travel Plan. A reminder postcard could be issued to encourage residents to complete the questionnaires. The first survey will be used to establish the baseline modal split.

5. TRAVEL PLAN OBJECTIVES AND TARGETS

5.1 This section outlines the overarching objectives and the proposed targets.

Aims and Objectives

5.2 This Framework Travel Plan sets out a holistic package of measures aimed at encouraging environmentally sustainable travel choices. The objective is to bring together a co-ordinated approach to encourage the use of non-car transport modes and further encourage walking and cycling modes.

5.3 The implementation of this Framework Travel Plan supports national, regional and local planning legislation which emphasises the importance of sustainable travel. The main objectives of this Framework Travel Plan are set out below in the context of DfT and TfL guidance on Travel Plans:

1. Encourage residents, staff, students and commercial occupiers to make well-informed and sustainable decisions about the way they travel to and from the development;

2. Ensure that residents, staff, students and commercial occupiers are aware of the range of travel choices available to them and address needs for access to a full range of facilities and services – for health, leisure, recreation and shopping;

3. Promote healthy lifestyles and sustainable, vibrant local communities by promoting the health benefits of walking and cycling, and raising awareness on the impacts of transport modes on the environment;

4. Reduce traffic generated by the development by discouraging private car and taxi use; and

5. To promote sustainable practices for the delivery of goods.

Targets

5.4 Targets are used to measure the success of the TP and should be SMART targets. Smart Targets are: Specific, Measurable, Achievable, Realistic and Time-bound.

5.5 The main target of the Travel Plan will be to minimise car trips made to and from the development and to promote the use of alternative, sustainable travel modes. Additional targets could also include:

- Increasing the mode share of cycling to work/ college by 5% within two years of completion of the development.

- Increasing the mode share of employees/students walking to work/school by 10% within one year of the baseline survey being undertaken.

- 80% of residents/employees of the development to be aware of the Travel Plan within three months of full occupation.

- There will be no more than one return residential vehicle trip per day per unit.

6. PROPOSED SCHOOL TRAVEL PLAN MEASURES

6.1 A Travel Plan Co-ordinator (TPC) will be appointed who will be responsible for implementing, managing and promoting the FTP to the schools. This FTP will form the basis from which each school based within the development can prepare their own full Travel Plan's. The measures set out in this FTP could be used by the schools.

6.2 Measures set out below contribute to increasing the use of sustainable transport by the users of the site.

Walking & Cycling

6.3 Walking and cycling to the site will be encouraged through schemes such as walk/cycle to school/work week. Such schemes often show students and staff how feasible it is to access the site by walking and cycling when they may have not thought possible. Further encouragement could be provided by the provision of maps showing safe walking and cycling routes to the site and presentations in classes highlighting the health benefits of walking and cycling.

6.4 In accordance to the London Plan FALP (March 2015). To encourage cycling, staff cycle training will be available to encourage safer cycling to the site. LBRuT provides free cycle proficiency training levels 1 and 2 to school years 5 and 6 respectively.

Public Transport

6.5 The schools could offer all staff season ticket loans for public transport use. Students are eligible to receive public transport ticket discount from TfL. More information can be found at http://www.tfl.gov.uk/tickets/default.aspx

Car Travel

6.6 In line with the development plans there will be no allocated on-site parking spaces for students. A total of 220 parking spaces will be provided for staff and visitors of the three schools. The level of visitor and staff parking meets LBRuT maximum parking standards. The proposed provision of parking is lower than what is currently in place relative to staff levels.

Car Clubs

6.7 Car clubs provide a useful alternative to owning a private car. Although the site is education use, a car club car may be beneficial to users of the site who may need the occasional use of a car for work related reasons.

6.8 Zipcar, one of the world's leading car club companies has four car club parking bays within the vicinity of Twickenham Station, one on London Road, March Road, Station Road and Grosvenor Road. More information can be found at http://www.zipcar.co.uk/.

Reducing the Need to Travel

6.9 Teaching staff are usually required to be present on working days, however providing staff with the option to home-working, teleconferencing and flexi working provides flexibility allowing some staff members to reduce their need to travel. This practice should be extended to the proposed site.

6.10 The site will also have a cafeteria and eating facilities for staff and students, further reducing the need to travel away from the site throughout the day.

Management of Deliveries

6.11 To remove the risk of conflict between the students and the servicing vehicles, access will not be permitted between school start and finish times.

6.12 The school websites could have information for suppliers providing details of the site whereabouts, the location of servicing bays and the time periods they can access the development. A link to the a map showing the Transport for London Road Network will also be available to encourage suppliers to use the capital's strategic road network rather than local roads.

7. PROPOSED TECH HUB TRAVEL PLAN MEASURES

Marketing and promotion

7.1 A TPC will be appointed who will be responsible for implementing, managing and promoting the FTP to commercial occupier (intended to be Haymarket Publishing) of the site. This FTP will form the basis from which the company based within the proposed Tech Hub can prepare their own full Travel Plan's. The measures set out in this FTP could be used by future Tech Hub occupiers.

7.2 The TPC will advise the commercial occupiers of the Tech Hub on implementing a range of marketing measures to ensure that all building users are aware of their role in achieving the aims of the FTP and to help to encourage new employees to use sustainable travel alternatives. The following are examples of such measures:

- ***Website:*** Providing information on the location of the nearest transport links, including local buses and rail stations, cycling routes and Car Club bays on the company website. Information on the purpose of the FTP would also be provided along with the strategies and measures implemented. This would encourage visitors, new members of staff (and potentially interviewees seeking employment) to use sustainable modes of transport.

- ***Intranet:*** In addition to the company website, travel information could also be provided on the occupier's intranet which would be accessible by staff. This would provide more targeted information, such as cycle facilities and promotional events.

- ***Notice boards***: Provision of notice boards in the entrance foyers, clearly displaying the information to staff and visitors. This would provide travel information and updates on improvements and any proposed measures. The notice boards would keep employees and visitors up-to-date with changes in the travel options available which would keep them travelling by sustainable modes and to encourage others to use such modes either for the first time or on a more regular basis.

- ***Forum meetings***: Holding bi-yearly Travel Plan forum meetings or staff meetings within the development to discuss transport matters and any suggested improvements that could be put forward to the TPC. These meetings could be more regular during the early stages of occupation to

help identify the perceived barriers to travelling by certain modes and ways to overcome such barriers at the outset. First forum meeting will be organised by the TPC.

Information packs

7.3 A Travel Information Pack could be prepared by the commercial occupiers in collaboration with the TPC, who will advise them with regards to the sustainable transport modes available. The provision of such information is essential in fostering sustainable travel habits early, before employees settle into unsustainable habits when a sustainable alternative may be more suitable.

7.4 The Travel Information Packs are expected to include the following:

- an explanation of the FTP, its purpose, aims and objectives;
- contact details for the site management team;
- information on the local amenities and services including the location of the nearest car club (Zipcar) bays;
- information on the health benefits of walking and a map showing the accessible areas on foot within typical journey times;
- TfL cycle network maps relevant to Richmond upon Thames including a map of the nearby cycle ways and information on the cycle tools in TfL journey planner;
- information on cycle training available to people working in LBRuT.
- information on travel planning website services such as TfL and DfT journey planners, to raise awareness of transport options, and alternatives in case of delays or cancellations; and
- train and bus service maps and timetables, including late night travel advice, to highlight the services available.

Initiatives to reduce car use and the need to travel

7.5 The provision of a secure cycle parking together with changing rooms and shower facilities will encourage employees to cycle to work rather than commute by car.

7.6 Further methods to reduce the need to travel include conference calling, this lets employees attend meetings in their own office mitigating the need to travel.

Employees who are provided with remote login services have more flexibility allowing them to work from home or other locations removing the need to travel.

Measures to encourage cycling

7.7 Cycling forms an important part of the Mayor's Transport Strategy for London, particularly as the road network and public transport network become more congested and the challenge to provide additional capacity becomes more difficult. It is often the fastest mode of travel in congested networks and offers opportunities for exercise and the associated health benefits. It has the potential to form an important role with regards to short local trips as well as longer trips to employment and leisure locations within central London and the surrounding areas.

7.8 As part of the Travel Information Pack, information could be provided to employees showing the areas within cycling distance of Richmond Education and Enterprise Campus. This will complement the London Cycle Network Maps that will also be provided in the information pack. Occupiers will also be made aware by the TPC of the additional cycle tools available using the TfL journey planner software.

7.9 The TPC will also advise the occupiers on the following measures that could encourage cycling by the staff:

- ***Route maps***: Provision of cycle route maps to staff so that they are aware of the opportunities available to them.

- ***Cycle training***: Provision of information on cycle safety training or refresher courses offered by the Council and privately, for less confident cyclists to encourage them to take up cycling within 12 months of first occupancy. The aim of the courses will be for new cyclists to gain confidence to use London's busy roads as well as advising on good cycling techniques, so encouraging staff to take up cycling.

- ***Bikes4Work scheme***: Provision of interest free loans to purchase a bicycle free of tax to their staff.

- ***Bicycle Users Group***: Setting up a bicycle users group for employees to provide a useful forum to bring together cyclists within the development so that they can share best practice and information, and organise

promotional events. This forum could also encourage experienced cyclists to become a 'buddy' for new or less confident cyclists.

- ***Promotional events:*** Promotion and organising events to encourage staff to cycle to work. These could include service and repair sessions, free breakfasts for cyclists and promoting National Bike Week.

Promotion of public transport

7.10 The TPC will inform the occupiers regarding the following initiatives that could be considered to assist building users to use the public transport network:

- ***Route maps***: Making public transport information, including bus route maps and timetables, available to all staff to highlight the services available. In particular, this would assist in informing staff of the most efficient way to travel to meetings and other business-related journeys.

- ***Travel Planning Service***: Organising personalised staff travel planning sessions to provide information, such as those provided by TfL and DfT online journey planners to raise awareness of transport options, and alternatives in case of delays or cancellations.

- ***Interest-free season ticket loans***: Provision of interest-free season ticket loans to staff. This would reduce the financial burden of travelling by public transport.

Promotion of sustainable practices for deliveries

7.11 The baseline survey will collect information on the delivery patterns and the TPC will advise the occupiers about the following measures that could be implemented to make the servicing operations more sustainable:

- ***Consolidating deliveries***: Discussing the feasibility of consolidating deliveries which would involve combining and reducing the number of vehicle trips with the delivery operators.

- ***Green vehicles***: Use of hybrid, electric and other low carbon emission vehicles that are less harmful to the environment. Encouraging the use of delivery and collection companies which use green vehicles.

- ***Time restrictions***: Restricting deliveries taking place during the peak traffic hours to help reduce congestion on local roads.

8. PROPOSED RESIDENTIAL TRAVEL PLAN MEASURES

8.1 This chapter sets out measures which could be implemented to bring together a co-ordinated approach to encourage Travel Plan residents use to sustainable modes of transport.

Physical Design

8.2 'Hard' engineering measures will be incorporated into the design of the development which will influence travel patterns, and will have a significant impact upon reducing dependence upon the private car from the outset. It should be noted that appropriate hard engineering measures will be provided during the construction and landscaping within the development prior to occupation and will be funded by the developer.

8.3 *Electric car charging points* – Electric car charging points will be available within the development car park. A minimum provision of 20% of car parking bays will be fitted with electric vehicle charging points (EVCP). A further 20% of spaces will have a passive EVCP provisions enabling further electric car charging facilities to be provided readily following a request from residents in the future.

8.4 Cycle parking provision - The proposed development will provide secure cycle parking which will meet the London Plan (March 2015) minimum standards.

Provision of Travel Information

8.5 Informing future residents of the range of travel choices available to them and the Travel Plan measures which will be implemented at the development will be key to the success of the Travel Plan. The ways in which travel information would be provided are set out below. Electronic versions of the travel information could also be made available.

8.6 Travel Information Pack - containing travel information would be provided to each household and commercial occupier before they move into the development. Providing this information in advance ensures that residents become aware of the various modes of transport and existing services that are available to them at the earliest opportunity.

8.7 The packs are expected to include the following:

- an explanation of the Travel Plan, its purpose, aims and objectives;
- contact details for the estate management team;
- information on the local amenities and services including the location of the nearest car club bay;
- information on the health benefits of walking and a map showing the accessible areas on foot within typical journey times;
- TfL cycle network maps relevant to Richmond including the map of the nearby cycle superhighway and information on the cycle tools in TfL journey planner;
- information on cycle training available to people living or working in LBRuT.
- information on travel planning website services such as TfL and DfT journey planners, to raise awareness of transport options, and alternatives in case of delays or cancellations; and
- train and bus service maps and timetables, including late night travel advice, to highlight the services available.

8.8 Community noticeboards - providing travel and community information to residents within the site would be placed in convenient locations. Maps of the immediate local area will be displayed on the communal notice boards identifying locations of cycle parking, car club bays and public transport service access points. The noticeboards will also be used to inform residents of any new travel initiatives or events organised by the TPCs.

8.9 Personalised Journey Planner - To further inform residents of the travel options available, the TPC could discuss travel requirements with residents and provide information on possible routes for residents travelling to work, schools and other key facilities. The personalised journey planning service would also extend to the cover the specific journey planning requirements of mobility impaired persons residing within the site.

Initiatives to encourage walking

8.10 To further encourage walking as a main mode of transport for local trips, the following measures could be implemented by the TPCs:

- *Promotional material* **-** Walking will be promoted within the Travel Packs which will be issued to residents. This could include the health benefits of walking and highlight the network of walking routes in the local area.

Initiatives to encourage cycling

8.11 The proposed development will include cycle parking facilities and cycle information will be provided to residents within their Travel Packs. The Travel Plan measures to encourage cycling could include:

- *Cycle parking* **-** The proposed development will provide secure cycle parking which will meet the London Plan (March 2015) minimum standards, this provision will include spaces for visitors.

- *Cycle maps and routes* - Cycle information, including cycle maps showing key routes and other facilities such as local cycle parking locations and cycle shops, would be provided to residents in their Travel Packs and also on the community noticeboards.

- *Cycle training* – LBRuT offer cycle training to anyone who works, studies or live in the borough. The training is one to one and costs £10 for a 90 minute sessions. This will help new cyclists to gain confidence and develop skills. This helps them to understand and cycle the safest and most convenient route. The cycle training would be promoted by the SMT / TPCs.

Initiatives to encourage the use of public transport

8.12 The site is accessible by public transport and has a PTAL of 1b/2. Future residents will be made aware of the full range of buses, national rail and LUL services available to them through the following measures:

- *Promotional material* - Public transport information, such as route maps, timetables and fares, would be included in the Travel Packs.

- *Journey planners* – Links to the TfL and National Rail journey planners will be promoted within the Travel Packs.

9. MANAGEMENT, MONITORING AND ACTION PLAN

Travel Plan Co-ordinator

9.1 A Travel Plan Co-ordinator (TPC) will be appointed to oversee the FTP for the whole development and to liaise with key staff at each of the occupiers of the development i.e. College, Secondary School, Special Needs School, Residential and 'Tech Hub', who will be responsible for implementing, managing and promoting Travel Plans in their organisations/residents.

9.2 The responsibilities of the TPC's would include the following:

- Implement the various marketing and promotional measures and campaigns as set out in the full Travel Plan.
- Liaise with the occupiers to ensure they are aware of the objectives and initiatives of the full Travel Plan.
- Produce up-to-date information on walking, cycling and public transport.
- Undertake manual ad-hoc inspections to monitor the use of car and cycle parking.
- Coordinate the travel surveys and monitor reports prepared by the various occupiers of the development.
- Produce a Travel Plan summary reports for the development at intervals agreed with Richmond Council.

Monitoring

9.3 The monitoring of the TP will be undertaken in line with the iTRACE compliant methodology. Therefore, a workplace, school and residential iTRACE travel survey will be undertaken within six months of occupation or when 75% of the developments have been occupied (whichever comes soonest). This will ascertain the baseline travel patterns and help set travel mode split targets. The actual targets will be set following the result of the initial survey.

9.4 The surveys will be commissioned by TPC and will take place in years 1, 3 and 5 after the initial baseline survey. The TPC will examine the survey results against the Travel Plan targets and produce a monitoring report which will be submitted to LBRuT for input into iTRACE.

Action plan

9.5 This section includes a check list of the proposed measures detailing who will be responsible for ensuring that the actions identified in previous sections are delivered. The Action Plan is included in Table 9.1. The proposed measures have been linked to the overall objectives of the FTP. This action plan has been design for the overall proposed development, the action plans in the Travel Plans produced for each of the uses will be more detailed.

Table 9.1: Action Plan

Objective	Measures/Actions	When	By Whom
Raise awareness of sustainable modes of travel available	Appoint named Travel Plan Co-ordinator.	Prior to first occupation	Developer
	Provide Information Packs.	Upon occupation	TPC
	Provide Information Packs.	Upon occupation	TPC
To ensure Travel Plan is monitored and targets are being met.	Ensure baseline surveys are undertaken by the occupiers of the various elements of the development	Within agreed periods following occupation or when 75% of units are occupied	TPC
	Ensure TRAVL compliant survey and monitoring reports are prepared	Years 1, 3 and 5 following the baseline surveys of each occupier	TPC

10. SECURING, ENFORCEMENT AND FUNDING

Enforcement

10.1 The Travel Plan for each element of the development will be reviewed after five years at which point if targets have not been achieved, possible amendments will be agreed between LBRuT, the TPC and the operator of the College/Secondary School/Special Educational Needs School/Tech Hub or Residential development.

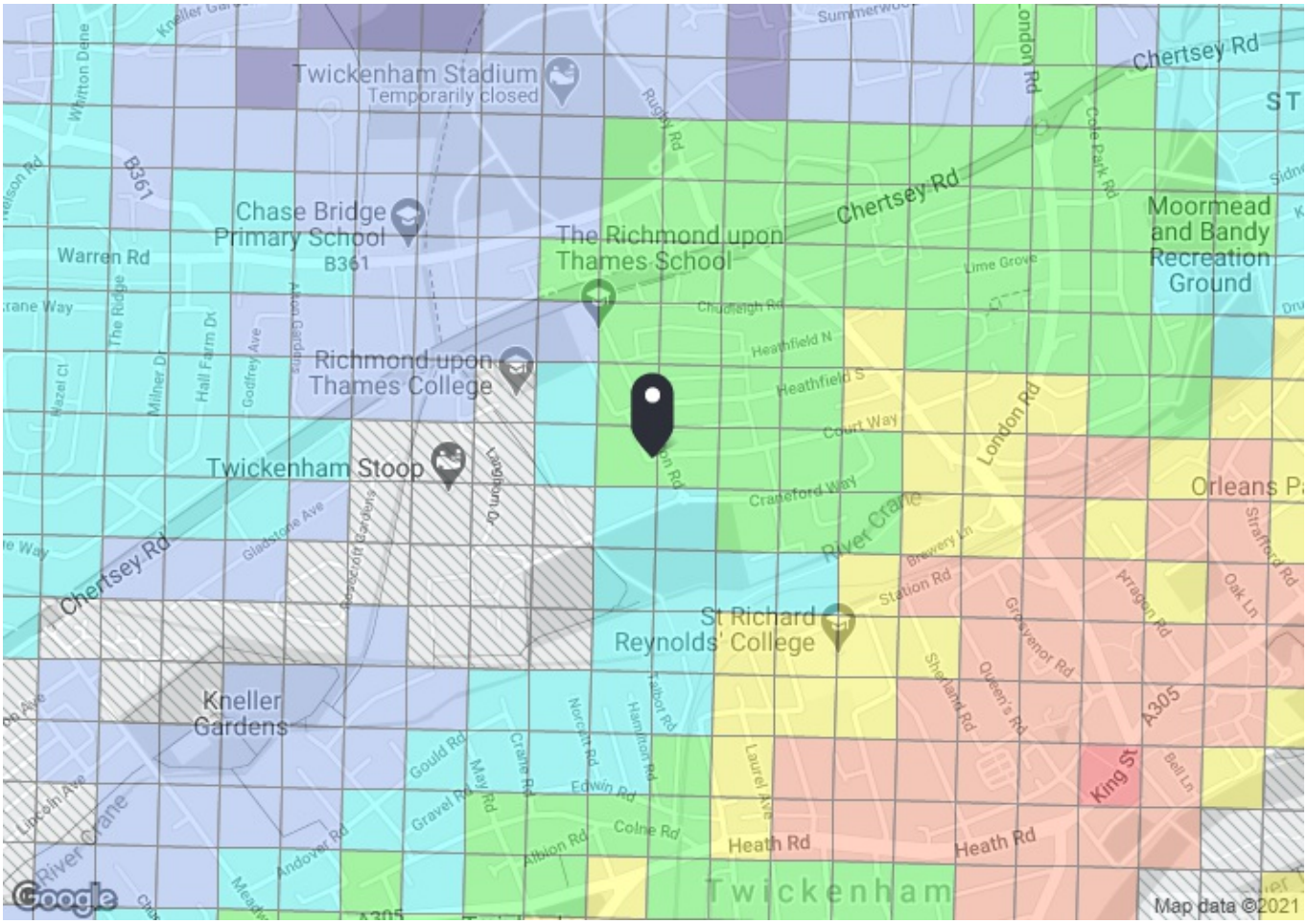
Funding and securing the Travel Plan

10.2 The Travel Plan for each element of the development will be secured through planning conditions / s.106 obligations arising from the detailed and outline planning applications for the separate elements of the development proposals.

10.3 The Travel Plan measures will be funded by the operators of the various elements of the development / the developer of Residential site.

APPENDIX C

TRANSPORT FOR LONDON



PTAL output for Base Year
3

1 Egerton Rd, Twickenham TW2 7SH, UK
Easting: 515491, Northing: 173737

Grid Cell: 47591

Report generated: 04/03/2021

Map key - PTAL

0 (Worst)	1a
1b	2
3	4
5	6a
6b (Best)	

Map layers

PTAL (cell size: 100m)

Calculation Parameters

Day of Week	M-F
Time Period	AM Peak
Walk Speed	4.8 kph
Bus Node Max. Walk Access Time (mins)	8
Bus Reliability Factor	2.0
LU Station Max. Walk Access Time (mins)	12
LU Reliability Factor	0.75
National Rail Station Max. Walk Access Time (mins)	12
National Rail Reliability Factor	0.75

Calculation data

Mode	Stop	Route	Distance (metres)	Frequency(vph)	Walk Time (mins)	SWT (mins)	TAT (mins)	EDF	Weight	AI
Bus	WHITTON ROAD TAYBEN AVE	481	532.78	1	6.66	32	38.66	0.78	0.5	0.39
Bus	WHITTON ROAD TAYBEN AVE	281	532.78	7.5	6.66	6	12.66	2.37	1	2.37
Rail	Twickenham	'RICHMND-GUILDFD 2N13'	732.66	0.33	9.16	91.66	100.82	0.3	0.5	0.15
Rail	Twickenham	'ALDRSHT-WATRLMN 1N90'	732.66	1	9.16	30.75	39.91	0.75	0.5	0.38
Rail	Twickenham	'RDNG4AB-WATRLMN 2C10'	732.66	0.67	9.16	45.53	54.68	0.55	0.5	0.27
Rail	Twickenham	'WATRLMN-RDNG4AB 2C13'	732.66	0.67	9.16	45.53	54.68	0.55	0.5	0.27
Rail	Twickenham	'RDNG4AB-WATRLMN 2C14'	732.66	0.33	9.16	91.66	100.82	0.3	0.5	0.15
Rail	Twickenham	'RDNG4AB-WATRLMN 2C16'	732.66	0.33	9.16	91.66	100.82	0.3	0.5	0.15
Rail	Twickenham	'WATRLMN-RDNG4AB 2C17'	732.66	1.33	9.16	23.31	32.46	0.92	0.5	0.46
Rail	Twickenham	'RDNG4AB-WATRLMN 2C18'	732.66	0.67	9.16	45.53	54.68	0.55	0.5	0.27
Rail	Twickenham	'WATRLMN-RDNG4AB 2C85'	732.66	0.33	9.16	91.66	100.82	0.3	0.5	0.15
Rail	Twickenham	'WATRLMN-RDNG4AB 2C87'	732.66	0.33	9.16	91.66	100.82	0.3	0.5	0.15
Rail	Twickenham	'RDNG4AB-WATRLMN 2C90'	732.66	0.33	9.16	91.66	100.82	0.3	0.5	0.15
Rail	Twickenham	'SHEPRTN-WATRLMN 2H92'	732.66	1	9.16	30.75	39.91	0.75	0.5	0.38
Rail	Twickenham	'WDON-WATRLMN 2K03'	732.66	0.33	9.16	91.66	100.82	0.3	0.5	0.15
Rail	Twickenham	'WATRLMN-WATRLMN 2K09'	732.66	2	9.16	15.75	24.91	1.2	1	1.2
Rail	Twickenham	'WATRLMN-WATRLMN 2O09'	732.66	2	9.16	15.75	24.91	1.2	0.5	0.6
Rail	Twickenham	'TWCKNHM-WATRLMN 2O92'	732.66	0.67	9.16	45.53	54.68	0.55	0.5	0.27
Rail	Twickenham	'TWCKNHM-WATRLMN 2R03'	732.66	0.33	9.16	91.66	100.82	0.3	0.5	0.15
Rail	Twickenham	'WATRLMN-WATRLMN 2R09'	732.66	2	9.16	15.75	24.91	1.2	0.5	0.6
Rail	Twickenham	'WSORAER-WATRLMN 2U10'	732.66	2	9.16	15.75	24.91	1.2	0.5	0.6
Rail	Twickenham	'WATRLMN-WSORAER 2U13'	732.66	2	9.16	15.75	24.91	1.2	0.5	0.6
Rail	Twickenham	'HOUNSLW-WATRLMN 2V05'	732.66	0.33	9.16	91.66	100.82	0.3	0.5	0.15
									Total Grid Cell AI:	**10.01**

APPENDIX D

Action Plan - Richmond Upon Thames College Residential Zone

OBJECTIVE	MEASURE	DETAILS	RESPONSIBILITY	ESTIMATED COST / BUDGET	OUTCOME / IMPLEMENTATION TIMESCALES
Objective 1: Promote and actively encourage sustainable travel to and from the site	**Travel Plan Coordinator (TPC)**	TPC to be appointed prior to occupation and trained to ensure they are fully aware of their responsibilities.	Clarion Housing Group	3-5 hours per month. Staffing budget	To be appointed prior to occupation.
	Nearby Facilities	Make site users aware of the services local to the site that can be walked/cycled to, to avoid unnecessary trips further afield.	TPC	Part of TPC role (4 hours a year) £60 annually	Prior to occupation and then ongoing for the 5 years of the plan.
	Walking / Cycling Routes	Promote local walking and cycling routes, journey planners such as walkit.com and provide maps.	TPC	Part of TPC role (4 hours a year) £60 annually	Prior to occupation and then quarterly review for the 5 years of the plan.
	Bicycle Purchase Scheme	Promote the Try Before you Bike scheme: https://www.peddlemywheels.com/try-before-you-bike	TPC to promote	Part of TPC role to promote (3 hours a year) £45 annually	Promote the scheme as part of the Resident's Welcome Pack.
	Cycle Training	Offer cycle training to residents. Free 90-minute 1-to-1 training sessions can be booked here: https://www.richmond.gov.uk/services/roads_and_transport/road_safety/cycling_training/book_cycling_training	TPC	Part of TPC role (3 hours a year) £45 annually	Promote as part of the Resident's Welcome Pack.
	Public Transport Information	Publicise public transport routes, timetables and fare information (travelcard / contactless payment) to all residents.	TPC	Part of TPC role (4 hours a year) £60 annually	Prior to occupation and then quarterly review for the 5 years of the plan.
	Travel Apps	Promote Travel Apps which allow for mobile handset planning of public transport trips and awareness of network issues and problems.	TPC	Part of TPC role (4 hours a year) £60 annually	Prior to occupation and then quarterly review for the 5 years of the plan.
	Public Transport Discounts	Discuss the potential for discounted travel for residents/staff with local bus and train operators.	TPC	Part of TPC role (3 hours a year) £45 annually	Following occupation. Repeat annually.
	Car Sharing	The car share database (https://liftshare.com/uk/community/london-liftshare) will be promoted to all residents.	TPC	Part of TPC role (4 hours a year) £60 annually	Prior to occupation and then quarterly review for the 5 years of the plan.
	Car Clubs	A number of Zipcar vehicles are available in the vicinity of the site and can be hired on an adhoc basis. These will be promoted to reduce the need for private car trips.	TPC	Part of TPC role (4 hours a year) £60 annually	Prior to occupation and then quarterly review for the 5 years of the plan.
	Car Club Membership	Residents will be provided with 2 years' membership to a local car club and driving credits.	TPC	To be agreed with the car club operator.	Membership provided for 2 years.
	Promote Travel Plan in Sales Literature	Display and make promotional travel material available as part of the sales pack and show home for the site, so that prospective residents are aware of the Travel Plan prior to property purchase.	Clarion Housing Group / TPC	Marketing budget	Earliest stage - prior to sale of dwellings.
	Resident's Welcome Packs	Travel information will be communicated via a Resident's Welcome Pack. See example at **Appendix D**.	TPC	Estimated printing costs of £1 per pack, with preparation costs of £500	Prepare and distribute prior to occupation.
	E-Newsletters	Send e-newsletters to residents on pertinent topics (i.e. cycle events, financial savings, ways to get fit and healthy, routes to key amenities).	TPC	Part of TPC role (10 hours a year) £150 annually	Send 6-monthly for the life of the Travel Plan.
Objective 2: Provide infrastructure to facilitate sustainable travel / reduce the need to travel	**Infrastructure Improvements**	Communicate details of the proposed infrastructure improvements.	Clarion Housing Group	Included within s278 costs	As part of the construction phase / Council implemented.
	Broadband Internet Connection	All dwellings would be equipped with a super-fast broadband connection to support home working and internet shopping.	Construction Company	Construction budget	To be installed as part of the construction.
	Cycle Parking / Storage	Covered and secure cycle parking will be provided on-site in accordance with the London Plan and London Cycle Design Standards.	Construction Company	Construction budget Minimum circa £30 per Sheffield style cycle rack. Plus c. £120 installation cost per rack.	To be established as part of the construction phase.
	Car Club Vehicles	A car club vehicle will be provided on Egerton Road, through liaison with an operator such as Zipcar, Enterprise Car Club etc.	Clarion Housing Group / TPC	Circa £15,000 (per vehicle - includes back of house operation)	Review prior to occupation and regularly thereafter.
	Electric Vehicle Charging Points (EVCPs)	20% of total parking provision will be equipped with 'active' electric vehicle charging points with the remainder having 'passive' infrastructure, to be implemented when demands warrants.	Construction Company	£0-2.5k for equipment and installation of EVCPs	To be installed as part of the construction phase.

	Travel Noticeboards	Travel Noticeboards will be established in prominent places on-site. Walking and cycling maps/routes, bus and rail timetable information will be displayed.	Construction Company / TPC to populate	Noticeboard costs - variable	Prior to opening and reviewed quarterly.
Monitoring	**Travel Surveys**	Collection of baseline data relating to the modes of travel used by site users 6 months following occupation or at 75% occupation, repeating in Years 1, 3 and 5. This includes residents' travel questionnaires, travel diaries, parking surveys, cycle parking use and car club use, as appropriate.	TPC	c. £2000-£4000 per annum	To be completed for baseline and then repeated in Years 1, 3 and 5.
	Interim Monitoring	'Snapshot surveys' and review of car and cycle parking usage.	TPC	Part of TPC role (4 hours a year) £60 annually	To be completed during Years 2 and 4 after occupation.
	Target Review	Set targets following the baseline surveys and then review in Years 1, 3 and 5 to establish whether the targets are being met. Revise measures/targets accordingly.	TPC	Responsibility of TPC to arrange	Targets to be set following baseline surveys and reviewed in Years 1, 3 & 5.
	Update Report	Produce a Full Travel Plan for the site following the baseline surveys, then prepare an Update/Progress Report to summarise the travel surveys/target review in Years 1, 3 and 5, identifying if any significant amendments are required to the content of the Travel Plan, from that originally agreed Issue report to relevant Council Officers.	TPC	Responsibility of TPC to arrange	Full Travel Plan to be prepared and issued in Year 1 and Progress Reports produced in Years 3 & 5 within 3 months of Travel Surveys.
	Additional / Remedial Measures	Further promotion of above initiatives and possible introduction of new initiatives (cycle maintenance, travel plan event, press release) if targets are not met.	TPC / Site Operator	TBC	Annually for 5 years following Biennial and Snapshot Travel Surveys being completed.

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APPENDIX E

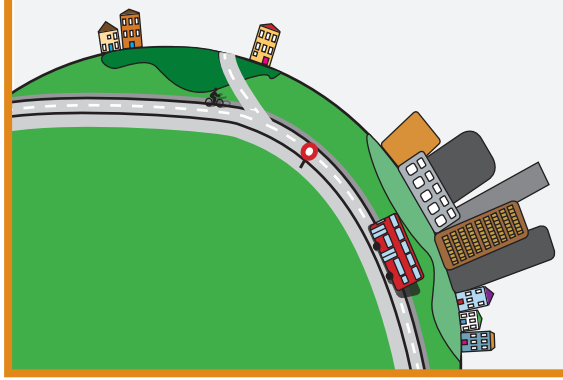
WELCOME TO

This is a travel leaflet providing you with information on your local travel options, including:

A regular brisk 30 minute walk reduces a risk of stroke by up to 27%

Regular walking reduces the risk of type 2 Diabetes by 60% and certain Cancers by 20%

Cycling improves joint mobility and decreases stress levels. Just 30 minutes of cycling can burn around 330 calories



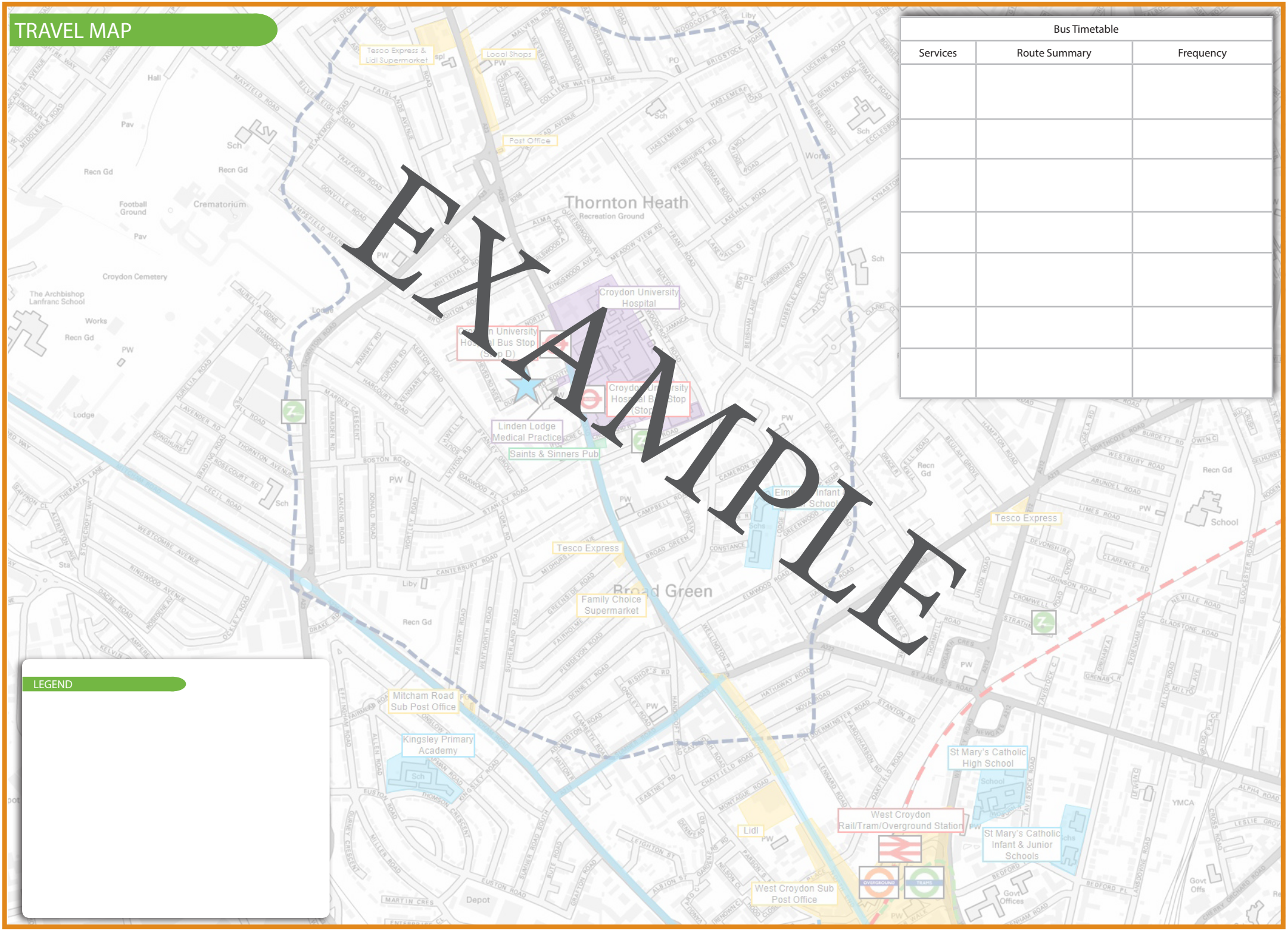
WALKING & CYCLING

BUS

RAIL

CAR SHARING

TRAVEL MAP



EXAMPLE

Bus Timetable		
Services	Route Summary	Frequency

LEGEND