- An accessible and central 'Neighbourhood Hub', created through co-location of community facilities, will form the focus of activity and be accessibly located on the main through street. A mixed use centre is proposed adjoining the main through street. The Haverhill Vision 2031 SPD sets out proposals to enhance local facilities to the north-east of Haverhill. The local centre as shown on the illustrative masterplan will contain community facilities. This centre will cater for the needs of the respective neighbours with further details provided in the Design and Access Statement.

2.6 The schools will be located on areas of the site that can accommodate school playing fields, which will complement the green infrastructure framework for the development. The location of the school as proposed is within the heart of the development will help to establish a key focal point for the development.

2.7 Design of the transport and highway proposals is considerate to the specific concerns of the local community. The access strategy has been considered to specifically limit the increase in traffic through Haverhill and integrate with the permitted NWRR. Two highway access points are proposed:

- The primary access will be a roundabout on the A143 Haverhill Road.
- A second access will be taken from Chalkstone Way.

2.8 Detailed modelling set out later in this TA shows that no third access point is necessary to serve the built proposed development (a small additional access is provided on Coupals Road to serve the Country Park only with no through route to the rest of the proposed development).

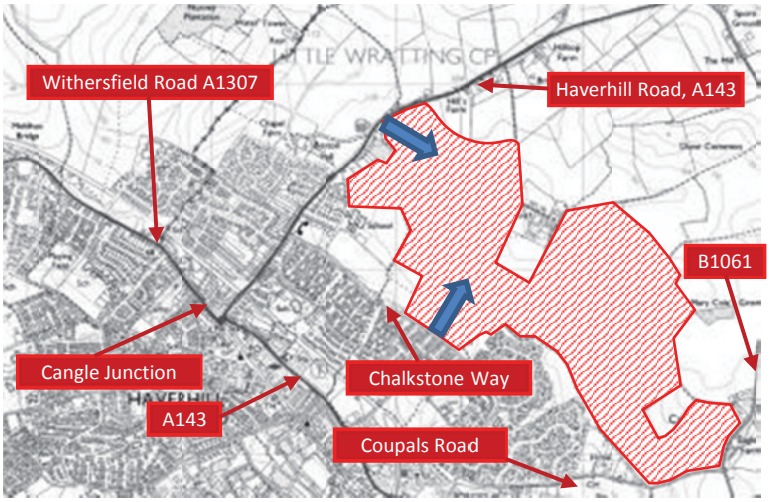


Figure 2c: Proposed Access Points to GREAT WILSEY PARK

2.9 The potential impact of the proposals for Haverhill has been fully appraised. This assessment indicates that the delivery of these proposals will not materially increase the flows through the town.

2.10 Furthermore in relation to the highway assessment, the A143 Haverhill Road, Chalkstone Way Lane and the new access have all been assessed. The results indicate that the junctions will operate satisfactorily when the development has been included.

2.11 The impact on Haverhill will be limited by discouraging the use of new highway links south of the access on the A143 Haverhill Road being used in preference to the new link road.

2.12 Consideration has also been given to the wider objectives in relation to transport in Haverhill as set out in the SPD. The objective of a 20 MPH speed limit through the centre of the proposed development, suggested in local planning policy, is supported in principle and is consistent with the highway layout proposed and in practice through the design of most streets within the development areas in accordance with such speeds.

3 National And Local Policy Background

Policy Review

3.1 This chapter reviews the following documents:

- National Planning Policy Framework (NPPF) and National Planning Practice Guidance (NPPG)
- The St Edmundsbury Core Strategy (December 2010)
- The Haverhill Vision 2031 Area Action Plan (September 2014)
- The Forest Heath and St Edmundsbury Local Plan Joint Development Management Policies Document (February 2015)
- The Suffolk Local Transport Plan 2011-2031.

National Policy

3.2 Chapter 4 of the NPPF 'Promoting Sustainable Transport' sets out the Governments expectations that development should maximise sustainable transport solutions. Paragraph 30 of the NPPF encourages solutions that support reductions in greenhouse gas emissions and reduce congestion. Local planning authorities should therefore support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport.

3.3 Paragraph 32 identifies that all developments generating significant amounts of movement should be supported by a Transport Statement or Transport Assessment. Plans and decisions should take account of whether:

- The opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure.
- Safe and suitable access to the site can be achieved for all people.
- Improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.

3.4 Paragraph 35 of the NPPF identifies that plans should protect and exploit opportunities for the use of sustainable transport modes for the movement of goods or people. Therefore developments should be 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, avoiding street clutter and where appropriate establishing home zones.
- Consider the needs of people with disabilities by all modes of transport.

3.5 A key tool to facilitate sustainable transport is the Travel Plan, as identified in Paragraph 36 of the NPPF. All developments which generate significant amounts of movement are required to provide a Travel Plan.

3.6 Paragraph 37 of the NPPF identifies that local planning policies should aim for a balance of land uses that minimise journey lengths for employment, shopping, leisure, education and other activities. Paragraph 38 notes that larger scale residential developments in particular should promote a mix of uses in order to provide opportunities to undertake day-to-day activities including work on site.

3.7 When setting local parking standards for residential and non-residential development, Paragraph 39 of the NPPF identifies that local planning authorities should take into account:

- Accessibility of the development
- The type, mix and use of development
- The availability of and opportunities for public transport
- Local car ownership levels
- An overall need to reduce the use of high-emission vehicles

3.8 Paragraph 42-006 of the NPPG states that the aims of a Travel Plan are to positively contribute to:

- Encouraging sustainable travel;
- Lessening traffic generation and its detrimental impacts;
- Reducing carbon emissions and climate impacts;
- Creating accessible, connected, inclusive communities;
- Improving health outcomes and quality of life;
- Improving road safety; and
- Reducing the need for new development to increase existing road capacity or provide new roads.

3.9 NPPG Paragraph 42-011 states that a Travel Plan should evaluate and consider:

- Benchmark travel data including trip generation databases;
- Information concerning the nature of the proposed development and the forecast level of trips by all modes of transport likely to be associated with the development;
- Relevant information about existing travel habits in the surrounding area;
- Proposals to reduce the need for travel to and from the site via all modes of transport; and
- Provision of improved public transport services.

3.10 **Manual for Streets 1 and 2 (MfS):** The UK Department for Transport (DfT) and the Department for Communities and Local Government (DCLG), with support from the Commission for Architecture and the Built Environment (CABE), commissioned WSP Group, Transport Research Laboratory (TRL), Llewelyn Davies Yeang and Phil Jones Associates to develop Manual for Streets to give guidance to a range of practitioners on effective street design.

3.11 The Manual for Streets (March 2007) guidance on the planning, design, provision and approval of new streets, and modifications to existing ones. It aims to increase quality of life through good design which creates more people-oriented streets. The detailed guidance applies mainly to residential streets although the overall design principles can be applied to all streets within urban areas.

3.12 A street is defined as "a highway with important public realm functions beyond the movement of motor traffic" – i.e. by its function rather than just the road hierarchy.

3.13 Manual for Streets has updated geometric guidelines for low trafficked residential streets, examines the effect of the environment on road user behavior, and draws on practice in other countries. This research provides the evidence base upon which the revised geometric guidelines in the Manual for Streets are based, including link widths, forward visibility, visibility splays and junction spacing.

3.14 Manual for Streets 2 - Wider Application of the Principles is the result of collaborative working between the Department for Transport and the transportation industry.

3.15 The aim of the document is to extend the advantages of good design to streets and roads outside residential areas, largely covered in MfS1. By amending the way high streets and non-trunk roads are designed, the fabric of public spaces

and the way people behave can be changed. It means embracing a new approach to design and breaking away from inflexible standards and traditional engineering solutions.

3.16 The new guide does not supersede Manual for Streets 1, rather it explains how the principles of the first document can be applied more widely.

3.17 **Design Manual for Roads & Bridges:** The DfT publish a large suite of documents known as the Design Manual for Roads and Bridges, which provides detailed standards and guidance on the provision of highway networks. The suite of documents provides a comprehensive manual which accommodates all current standards, advice notes and other published documents relating to the design, assessment and operation of trunk roads including motorways. The standards are routinely adopted by local highway authorities for their local highway network.

Local Policy

3.18 The St Edmundsbury Core Strategy (December 2010) sets out the following;

- Visions for how the future growth of Bury St Edmunds, Haverhill and the Rural Areas will be managed;
- A collection of objectives and strategic policies to help guide the sustainable distribution of new development across the borough and achieve the visions;
- Policies to guide the scale, type and location of new development;
- Broad locations for growth in Bury St Edmunds and Haverhill; and
- Information on how the detail in the Core Strategy will be implemented and monitored.

3.19 The Core Strategy provides the strategic context that will guide the preparation of subsequent Local Plan documents. It includes an outline for delivering strategic development needs, including housing, employment, leisure and retail. The Core Strategy does not include details of site specific allocations or policies for the management of new development. These are set out in separate Local Plan documents.

"By 2031 St Edmundsbury will remain a vibrant part of Suffolk and a region where the distinctive local character, unique local heritage and environmental and cultural assets are retained and enhanced for the enjoyment of all. The Borough will be a safe place to live with strong communities. Employment growth and development will produce a prosperous sustainable economy including sustainable tourism. All residents of the borough will have an equal opportunity to access services, jobs, housing and leisure facilities to maximise their potential to live and work in an environmentally sustainable manner. A hierarchy and network of town and village centres will grow and develop to provide a wide range of services in a good environment and accessible to all, appropriate to the size of settlement.

The borough will respond to the challenge of delivering growth in a manner that does not just respect the heritage and culture of St Edmundsbury but actually strives to enhance them in an environmentally sustainable way. The natural and built environment and local biodiversity of the borough will be protected and where possible enhanced to increase access to the countryside and the provision of green open space in recognition of the county ambition to become the greenest county. The challenges of climate change will be addressed to ensure that the specific threats that Suffolk faces are mitigated but that other adaptations are also made such as an increase in renewable energy and water efficiency and an active decrease in carbon emissions. All new development will respect the Breckland Special Protection Area, Special Areas of Conservation and Sites of Special Scientific Interest.

Bury St Edmunds and Haverhill will be the cultural and economic hearts of the borough with strong, sustainable links to the surrounding key services centres, villages and countryside.

…

Haverhill

- *Regeneration of the town will continue with the aim of being able to have a more attractive retail, leisure and employment offer to its residents to decrease the amount of out-commuting and to grow an organic 21st Century town based on strong community.*
- *The town centre will be a high quality environment where pedestrians and other non-car users can move around safely and comfortably.*
- *Development will be focused initially on the north-west Haverhill site and long-term development located on the north eastern edge of Haverhill.*

- *Existing surrounding settlements will be protected from coalescence and have green buffer zones developed between them and Haverhill to maintain their integrity.*
- *Haverhill will diversify its employment base, building on the bio-chemical industry and capitalising on the strong links it has with Cambridge and Stansted.*
- *To achieve the latter, long-term sustainable transport solutions will be developed to mitigate the difficulties of accessing strategic road networks along the A1307, A1017 and A143.*
- *Within the town, cycling and pedestrian links will be established.*

Outside Bury St Edmunds and Haverhill, new development will be focused primarily on those settlements where there are good levels of services and facilities, having regard to the environmental and infrastructure capacity of those settlements and the desire to safeguard existing services and employment."

3.20 The Core Strategy provides an overall spatial Vision for St. Edmundsbury Borough, as indicated below.

3.21 To achieve the overall vision, 10 strategic objectives have been identified. Those relating to transport are intended to provide a higher level of access to jobs and services for all ages in both urban and rural areas, and improve connectivity with the rest of the region.

3.22 Policy CS7 'Sustainable Transport' states that the Council will develop and promote a high quality and sustainable transport system across the borough and reduce the need for travel through spatial planning and design. All proposals for development will be required to provide for travel by a range of means of transport other than the private car in accordance with the following hierarchy:

- Walking;
- Cycling;
- Public Transport (including taxis);
- Commercial vehicles;
- Cars.

3.23 All development proposals will be required to be accessible to people of all abilities including those with mobility impairments.

3.24 New commercial development, including leisure uses and visitor attractions, which generate significant demands for travel, should be located in areas well served by a variety of transport modes. Where appropriate, development proposals that will have significant transport implications will be required to have a transport assessment and travel plan showing how car based travel to and from the site can be minimised.

3.25 Policy CS8 'Strategic Transport Improvements' states that the Council will continue to work with relevant partners, including Suffolk County Council and the Highways Agency, and developers, to secure the necessary transport infrastructure, including improvements to:

- Transport safety on the A1307 between Haverhill and the A11;
- Relieve the adverse impacts of traffic in Haverhill ;
- The public transport network ;
- Rights of Way.

3.26 Policy CS12 'Haverhill Strategic Growth' states that an Area Action Plan DPD (this is the Haverhill Vision 2031 set out below) will be prepared for Haverhill that will provide a coordinated spatial planning framework for the whole town including the release of a larger, strategic, greenfield, site. The policy specifically refers to the proposed development site stating that it will:

- Maintain the identity and segregation of Kedington and Little Wratting;

- Provide new high quality strategic public open space and recreation facilities;
- Protect by appropriate means the Scheduled Ancient Monument at Wilsey Farm;
- Provide improved public transport, foot and cycle links to the town centre and other locally significant leisure, employment and service destinations;
- Deliver additional education, community and leisure facilities to meet the needs of this development and is located in a way that can achieve positive integration with the wider area;
- Deliver around 2,500 homes of mixed tenure and size, including affordable homes; and
- Provide opportunities for B1 use class local employment.

3.27 The policy goes on to state that it is unlikely that the development at the proposed development site will commence before 2021. The actual amount of development will be determined by environmental and infrastructure capacity considerations and the preparation and adoption of detailed masterplans in which the local community and other stakeholders have been fully engaged.

3.28 The Haverhill Vision 2031 was adopted in September 2014. It includes a series of aspirations, including:

- Well-connected new development integrated into the town;
- Sustainable transport links; and
- An increased shift to non-car modes of travel.

3.29 Objective 7 states that the Vision will support and encourage all means of sustainable and safe transport, public transport improvements, and cycleway and footway improvements.

3.30 Policy HV12 'Haverhill North-West Relief Road' states that the NWRR will be provided between Wratting Road (A143) and Withersfield Road (A1307) as part of the North-West Haverhill strategic development (Policy HV3). The delivery and timing of the Relief Road will be controlled through a legal agreement attached to any planning permission for that development. Planning permission for the delivery of the North-West Haverhill strategic development in advance of the completion of the Relief Road will not be granted unless it is demonstrated that the transport impacts can be satisfactorily mitigated.

3.31 Policy HV4 'Strategic Site – North-East Haverhill' relates to the proposed development site and states that if planning application(s) to develop all or part of the site come forward in advance of the provision of the North-West Relief Road, permission will not be granted unless it is demonstrated that the transport impacts can be satisfactorily mitigated without the Relief Road.

3.32 The emerging Great Wilsey Park Masterplan Supplementary Planning Document has been produced to support Policy HV4. It provides the framework against which the planning application will be determined by the Council.

3.33 The Adopted Joint Development Management Policies Document (February 2015) includes a range of policies relevant to transport.

3.34 Policy DM45 'Transport Assessments and Travel Plans' sets out the criteria for requiring these document to accompany an planning application. It goes on to state that where a transport assessment and/or travel plan does not demonstrate that the travel impacts arising from the development will be satisfactorily mitigated or that adequate measures are in place to promote the use of more sustainable modes of transport, then planning permission will not be granted. The developer will be expected to provide the necessary funding to deliver any travel plan agreed in writing with the local planning authority. Where it is necessary to Great Wilsey Park development, developers will be required to make a financial contribution, appropriate to the scale of the development, towards the delivery of improvements to transport infrastructure or to facilitate access to more sustainable modes of transport.

3.35 Policy DM46 'Parking Standards' states that the authority will seek to reduce over-reliance on the car and to promote more sustainable forms of transport. All proposals for redevelopment, including changes of use, will be required to provide appropriately designed and sited car and cycle parking, plus make provision for emergency, delivery and service vehicles, in accordance with the adopted standards current at the time of the application. In particular it states that proposals for new mixed use sites will be expected to minimise the provision of car parking where achievable, for example by providing shared use parking, and/or car pooling as part of a Travel Plan.

3.36 **Suffolk Local Transport Plan 2011-2031:** The County Council, as the highway authority, have prepared the Suffolk Local Transport Plan 2011-2031. The local transport plan sets out Suffolk County Council's long-term transport strategy for the next 20 years. The key focus of the plan is to support Suffolk's economy as it recovers from the recession and to support future sustainable economic growth. A number of strategic transport improvements are planned for delivery in the short/medium term. This includes the Beccles Southern Relief Road and the Beccles Loop Rail Improvement.

3.37 The plan shows how transport will play its part in supporting and facilitating future sustainable economic growth by:

- Maintaining (and in the future improving) the local transport networks;
- Tackling congestion;
- Improving access to jobs and markets;
- Encouraging a shift to more sustainable travel patterns.

3.38 In Suffolk, the transport plans will support business and growth with a focus on:

- The challenge of maintaining the highway network in good condition;
- Tackling congestion in the larger towns by more efficient management of traffic, reducing the demand for car travel and promoting more sustainable means of travel;
- Improved connectivity and accessibility in rural areas;
- Seeking improvement to the A11, A12 and A14 trunk roads connecting businesses in Suffolk to each other and to their markets;
- Seeking improvement to the rail network for freight and passengers;
- Relief for the market towns suffering from high levels of through traffic
- Recognising that securing high speed broadband throughout Suffolk is very important at present in addressing accessibility and connectivity issues throughout Suffolk and supporting business growth.

3.39 Key transport issues to be addressed in Waveney are as follows:

- A14 Junctions
- Moreton Hall link road
- Bury St Edmunds – relief roads for A134, A1101 and Westley as part of new developments
- Air Quality Management Area at Great Barton (and bypass aspiration)
- Rail connections
- Haverhill to Bury St Edmunds and Cambridge bus connections
- Haverhill North West relief road
- Haverhill cycle network
- Haverhill road condition
- Rural footways

3.40 In Part 1, Chapter 3 'Transport Issues in Suffolk', the LTP states that :

"St Edmundsbury will continue to be a location for growth which could amount to at least 10,000 new homes in the next 20 years as well as a growth in jobs. The growth will be concentrated mainly in the towns of Bury St. Edmunds and Haverhill, with the remaining dwellings being across the rest of the borough. The proposed concentration of housing within Bury St Edmunds will present transport challenges if we are to avoid increased congestion within the town and on roads leading to it, including the A14. Growth throughout the rest of the borough and in neighbouring districts will also add to traffic in Bury St. Edmunds as more residents and visitors travel to the town from across the sub-region to access key services and retail. The level of growth within Haverhill will also impact upon the road network both within the town and the wider area if measures are not put in place to address increased levels of car use associated from extra car trips from them. Levels of safety and congestion on the A1307 between Haverhill and Cambridge in particular are likely to be of significant concern and we will work with St Edmundsbury and Cambridgeshire County Council to find solutions to these problems.

Economic growth within the district is also forecast to see the creation of about 13,000 new jobs, with strong demand in Bury St Edmunds and Haverhill. The location of additional employment opportunities will create additional pressure onto the road network within the district and larger towns if measures are not in place to ease the flow of traffic and to encourage the use of alternatives to single occupancy car commuting. Issues of accessibility to more remote employment locations will also need to be addressed, including links towards Cambridge and Stansted.

There are peak hour congestion issues at junctions of the A14 around Bury St Edmunds and within the town. Some junctions in Haverhill are also congested at peak times.

As with the other districts within Suffolk, the rural nature of St Edmundsbury outside of the larger towns raises areas of concern for accessibility for those people without access to cars. Bury St Edmunds and Haverhill act as service centres for the surrounding populations and it is important that development throughout the rest of the borough supports access by public transport to sites. Apart from Bury St Edmunds none of the settlements have direct access to rail services."

3.41 Key transport issues for Haverhill in itself include the following:

- Haverhill to Bury St Edmunds and Cambridge bus connections;
- Haverhill North West relief road;
- Haverhill cycle network;
- Haverhill road condition.

3.42 Part 2 states that the aim of the plan for Haverhill is to support the sustainable development of the town. Haverhill is likely to receive significant housing and employment growth. Given existing concerns about traffic levels, the challenges presented with substantial growth in Haverhill are reducing reliance on the car for the short journeys within the town and to larger urban centres such as Bury St Edmunds and Cambridge. Suffolk County Council will work with St Edmundsbury Borough Council, South Cambridgeshire District Council, and Cambridgeshire County Council in which they will work together to find solutions to traffic issues on the A1307.

3.43 Travel to work patterns for Haverhill highlight that over half of the population travel less than 2km to work i.e. within walking distance. There is also a significant proportion of residents travelling to Cambridge and Stansted Airport, which requires close working with our neighbouring authorities to implement solutions. Suffolk County Council will work with St Edmundsbury Borough Council to ensure that demand for car travel can be reduced by co-locating housing, key services and employment. They want to see better networks for walking and cycling so that these are more attractive and realistic choices. They expect that all new developments will implement robust travel plans to minimise car use, including improvement to sustainable travel infrastructure and services. They will also work with established employers at sites such as Haverhill Business Park; Haverhill Industrial Estate; and Boundary Road Industrial Estate to try to reduce car journeys.

3.44 Suffolk County Council will provide better information to people about travel including accessing information online, by mobile phones, or from variable message signs. There is a potential for urban traffic management and control in Haverhill to link traffic lights and provide priority for buses alongside real time bus information. Haverhill has a good network of walking and cycling routes but many are incomplete. Most areas of the town are within one kilometre of the centre and main employment locations.

3.45 Publicly funded infrastructure improvements will be limited at the start of this plan due to funding constraints, but we still hope to be able to fund important improvements to the walking and cycling networks. Developer funding of improvements to support the sustainability of new developments will also be essential. As the plan progresses larger-scale publicly funded schemes may be possible, but will still be judged on the benefits they offer and their deliverability.

3.46 A north west relief road is a much needed improvement. This is a requirement alongside housing development in this part of the town and will help relieve the Cangle junction of through traffic heading north towards Bury St. Edmunds.

Figure 3a: Key improvements to the Haverhill transport network

4 Existing Sustainable Travel Options

Existing Highway Network

4.1 The location of the site in relation to the local road network is indicated in Figure 4a.

Figure 4a: Site Location in relation to the local road network

4.2 The road network adjacent to the site is classified as part of the Local Road Network (LRN).

4.3 The A143 is located to the west of the site and forms an important corridor within the LRN. The A143 commences from immediately to the south of Haverhill at a roundabout with the A1017 and heads generally in an north-easterly direction passing through Bury St. Edmunds approximately 25.5km from the proposed development site, where it crosses the A14 Felixstowe-Midlands strategic route, and terminating at the A12 London-Great Yarmouth road in Great Yarmouth. The A143 is predominantly single carriageway road which is subject to national speed limit along much of the length. The section approaching Haverhill is subject to a 30mph speed limit.

4.4 The A1307 starts at the Cangle Junction (with the A143) in Haverhill Town Centre, heading north-west from the roundabout, crossing the A11 London-Norwich strategic route, approximately 16km from the proposed development site, and terminating in Cambridge City Centre.

4.5 The A1017 starts at a roundabout with the A1307 to the north-west of Haverhill, heading in a south-easterly direction and serves as a 5.6km bypass for Haverhill, intersecting the southern terminus of the A143 at a roundabout to the south-east of the town. It continues south-eastwards to terminate at a roundabout with the A131 Chelmsford-Sudbury road, just north of Braintree, approximately 23.5km from the proposed development site.

4.6 Chalkstone Way is a small local road that serves the north-eastern suburbs of Haverhill. It commences at a T-junction with the A143 Haverhill Road and skirts existing residential areas, terminating after approximately 2km at a mini-roundabout with the A143 Sturmer Road.

Existing Sustainable Facilities and Services

Pedestrians and Cyclists

4.7 At present the proposed development site does not contain any significant generators of pedestrian or cycle trips. As such, historically there has been no requirement to provide dedicated walking and cycling links into the site. There are intermittent footways within the local road network with cycle trips predominantly catered for within the highway.

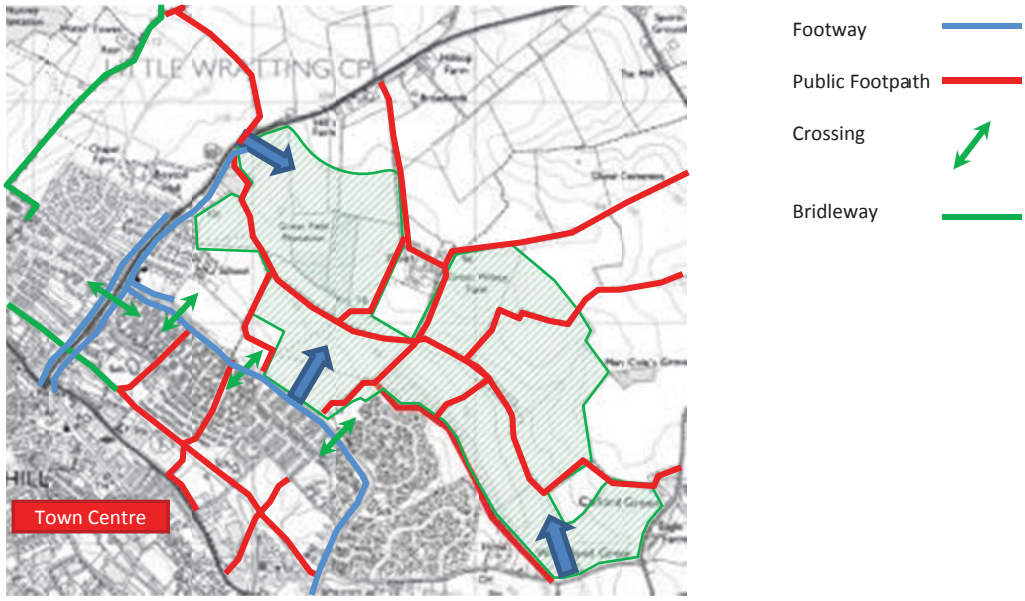


Figure 4b: NMU Connectivity from Site towards Haverhill Town Centre

4.8 There are no substantial dedicated cycling facilities.

4.9 The strongest desire line for walking and cycling is southbound towards Haverhill Town Centre. The onsite network will connect into the external walking and cycling networks that includes the PRoW network. The predominant walking and cycling desire line towards Haverhill is to be fully incorporated into the links from the development. The footways leading from the site towards the eastern and southern perimeters will also connect into the local NMU network to provide a more sustainable mode of travel towards the new Haverhill North West Relief Road.

Public Rights of Way

4.10 Public Rights of Way (PRoW) are classified as highways and as such are protected routes. The 1949 National Parks and Access to the Countryside Act placed a duty on every County Council in England and Wales to draw up and publish a definitive map and statement of PRoW in their area.

4.11 The Definitive Map is the legal record of the location and status of PRoW. The statement is a description of the PRoW shown on the definitive map.

4.12 There are four classifications of PRoW:

- Footpaths - by foot only
- Bridleways - by foot, horse or bike
- Restricted byways - by any form of transport that doesn't have a motor
- Byways open to all traffic - let you travel by any form of transport, including cars

4.13 The figure below highlights the PRoW that are closest to the site. This illustrates that there is a network of bridleways and footpaths that cross the site and connect with bridleways that penetrate other roads in the vicinity of the site.

Figure 4b: On site Public Right of Way

Public Transport – Road

4.14 Numerous public transport routes operate across Haverhill. Those that operate adjacent to the proposed site are indicated below:

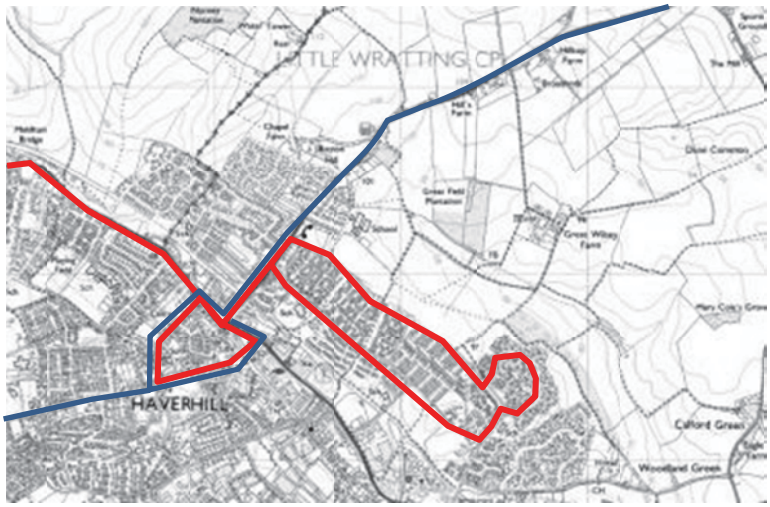


Figure 4c: Bus Routes operating close to the development

4.15 The bus services 13 and 13A are routes managed by Stagecoach and operate between Haverhill, Linton and Cambridge, Monday to Sunday. The first bus leaves Haverhill Bus Station at 05:38. The last bus reaches Haverhill Bus Station at 00:05. This service operates typically every half hour on Saturdays and every hour on Sundays.

4.16 The bus services 14, 14A, 15 and 15A are routes managed by Stephensons of Essex and operate between Haverhill, Chedburgh and Bury St Edmunds, Monday to Sunday. The first bus leaves Haverhill Bus Station at 06:15. The last bus reaches Haverhill Bus Station at 00:05. This service operates typically every hour.

4.17 In addition, a school bus service run by Stephensons of Essex – Bus Service HL025 runs between Haverhill and Poslingford from Monday to Friday. The first bus arrives at the Haverhill Bus Station at 08:37 and leaves the Haverhill Bus Station at 14:50. This service operates twice a day.

4.18 Another school bus service run by Stephensons of Essex – Bus Service HL351 runs between Haverhill and Great Bradley from Monday to Friday. The first bus arrives at the Haverhill Bus Station at 08:37 and leaves the Haverhill Bus Station at 14:50. This service operates twice a day.

4.19 The bus station provides waiting areas, toilets and is located circa 50m to the north-east of Haverhill High Street.

Public Transport – Rail

4.20 The closest main railway station is located in the centre of Cambridge, approximately 30km from the proposed site. The train station provides a range of facilities including:

- 374 space car park open 7 days of the week
- 896 cycle storage spaces
- Taxi rank in front of station
- Ticket office open 7 days of the week
- Self-service ticket office
- Manned help desk
- Cash machine
- Public Wi-fi
- Pay phones
- Post box
- Refreshments with Shops
- Toilets with baby changing facilities
- Waiting rooms

4.21 Cambridge Railway Station provides the following services:

- Four routes per hour to London Kings Cross with a journey time of circa 48 minutes.
- One route per hour to London Liverpool Street with a journey time of circa 1 hour and 10 minutes.
- One route per hour to Birmingham New Street with a journey time of circa 2 hours 37 minutes.
- One route per hour to Stansted Airport with a journey time of circa 30 minutes
- Two routes per hour to Norwich with a journey time of 1 hour and 18 minutes.

4.22 There a range of local stations that are closer to the proposed site, including Great Chesterford which is circa 28km from the proposed site. Due to the extended services and facilities provided, it is considered that Cambridge will be the key rail interchange. This train station provides a range of facilities including:

- 16 cycle storage spaces
- Ticket office open Monday - Friday
- Ticket Machine
- Public Wi-fi

4.23 Great Chesterford Railway Station provides the following services:

- Hourly to London Liverpool with a journey time of circa 1 hour and 10 minutes
- Hourly to Cambridge with a journey time of circa 16 minutes.

Accessibility

4.24 A qualitative review of the accessibility implications of the proposed development has been conducted. The existing level of access for cyclists and pedestrians between the proposed development and the surrounding transport system is described earlier in this chapter.

4.25 Various employment opportunities are located in close proximity to the site, including Maple Park Industrial Estate and Hollands Road Industrial Estate. Other key employment destinations include the Ehringshausen Way Retail and Leisure Park, Haverhill Town Centre together with further job opportunities further afield in the larger towns such as Cambridge, Braintree and Colchester. These offer a wide range of employment opportunities for the future residents.

4.26 Although two primary schools are proposed as part of the development, the nearest primary school is Westfield Community Primary School. Samuel Ward Academy offers nearby secondary education.

4.27 Existing healthcare is available at the Christmas Maltings & Clements Doctors practice in Haverhill Town Centre. A healthcare facility is also proposed as part of the development.

4.28 The site is therefore well located to make use of a wide varying of local facilities and amenities.

4.29 The distance to the key destinations, measured from the site accesses on Haverhill Road or Chalkstone Way, is indicated below together with the locations.

Employment	Approx Distance from proposed Site entrance (km)	Meet 2km Target Walk?	Approx Walk Time (mins)	Meet 5km Target Cycle?	Approx Cycle Time (mins)
1. Samuel Ward Academy – 11 to 18 years	1.1km	✓	14	✓	4
2. Westfield Community Primary School	0.8km	✓	10	✓	3
3. Haverhill Bus Station	1.5km	✓	18	✓	6
4. Haverhill Town Centre	1.8km	✓	22	✓	7
5. The Christmas Maltings & Clements Doctors practice	1.7km	✓	21	✓	7
6. Tesco Supermarket	1.6km	✓	20	✓	6
7. Ehringshausen Way Retail and Leisure Park	1.5km	✓	18	✓	6
8. Maple Park Industrial Estate	1.6km	✓	20	✓	6
9. Hollands Road Industrial Estate	2.6km		32	✓	10
10. Castle Manor Business and Enterprise College– 11 to 18 years	2.4km		30	✓	9

Figure 4d: Distance to Employment, Heathcare and Educational Destinations

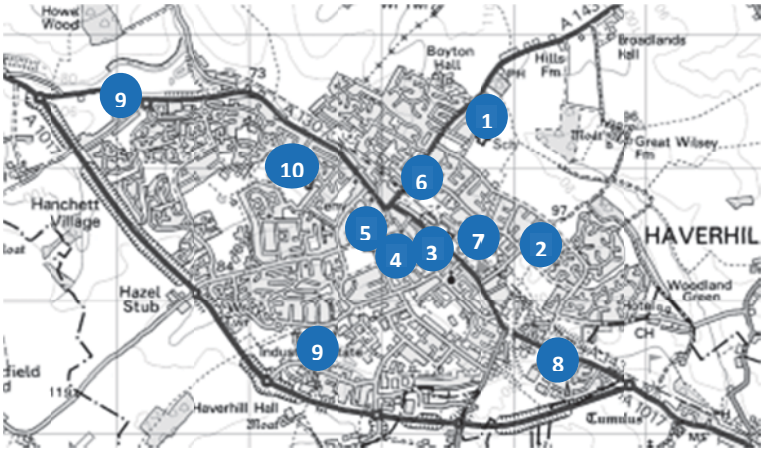


Figure 4e: Employment, Heathcare and Educational facilities

4.30 It may be concluded that the development will have very good accessibility to a wide range of local amenities that will support the new and existing community. The figure below provides a graphical representation of the 2km walking and

5km cycling isochrones, which the range of local amenities exist. The proposed development will not create any new accessibility barriers within the surrounding area. The range of facilities and services, including the provision made for education will also significantly improve as a result of the application proposals.

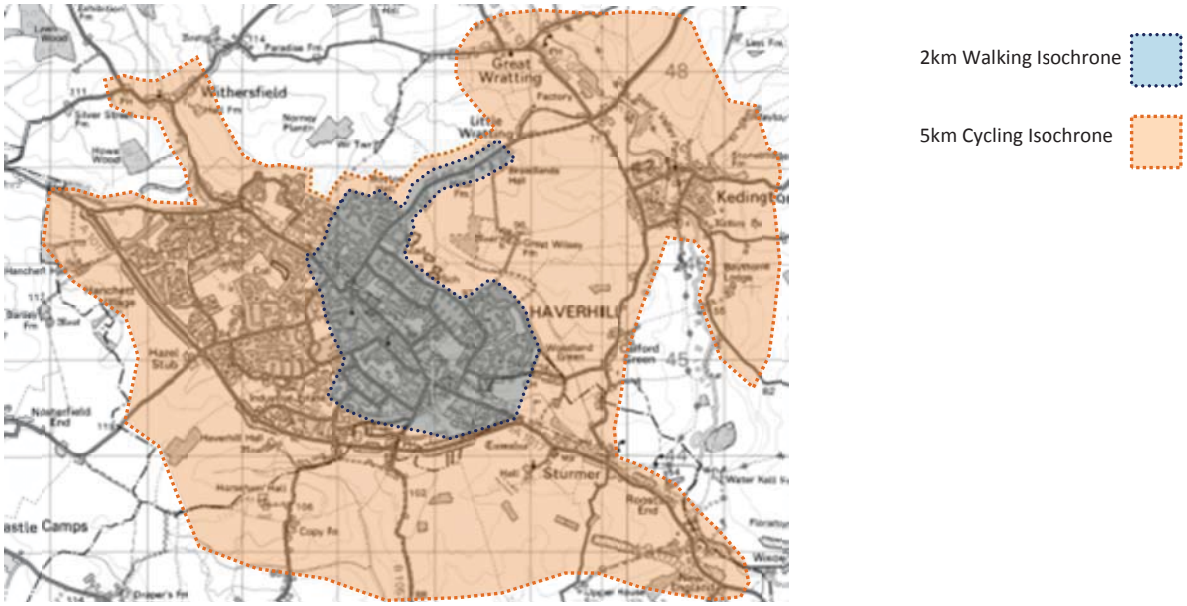
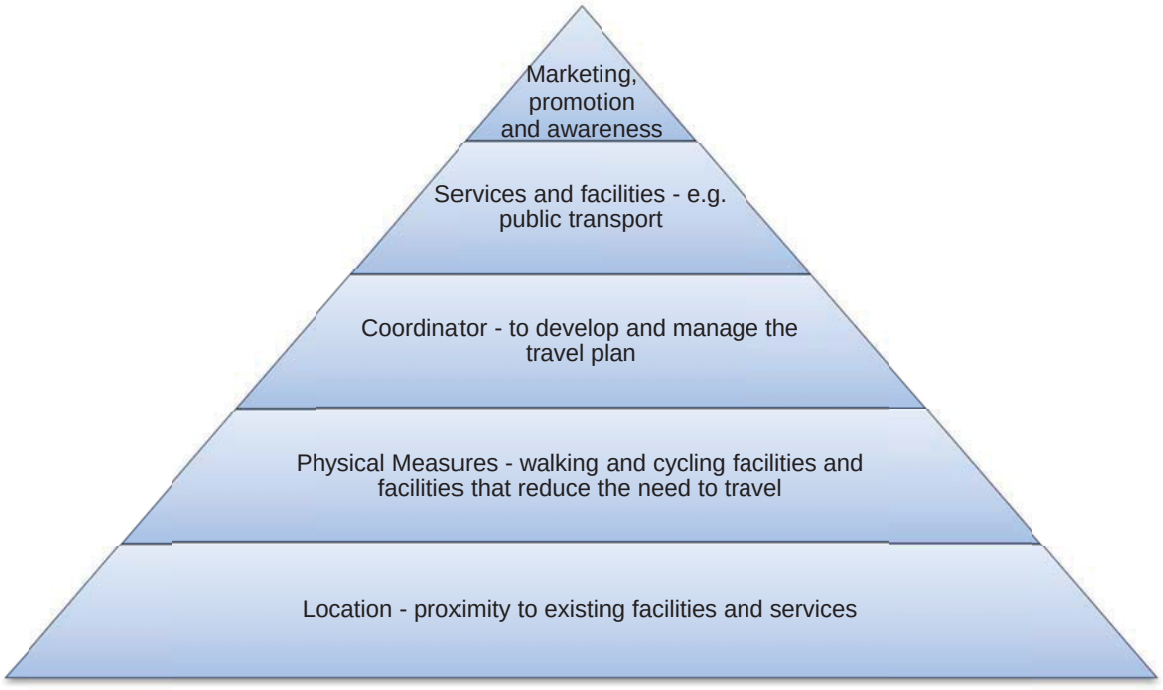


Figure 4f: Walking and Cycling Isochrones

5 Travel Plan Strategy

Travel Plan Objectives

5.1 To ensure the success of the Travel Plan it is important to establish a clear strategy. The DfT travel plan strategy referred to in the Good Practice Guidelines: Delivering Travel Plans through the planning Process demonstrates the basis of sound travel planning, as indicated below.



5.2 The aim of any travel plan is to encourage travel by sustainable modes of travel to reduce impact on the environment, in relation to the use of natural resources, reducing congestion, improving air quality through the reduction in vehicle emission and improve the health of individuals through encouraging walking and cycling.

5.3 The Travel Plan is an overarching document and to be able to determine the success it is important to identify key objectives, as listed below:

- Reduction in the car based trips
- Reduction of single occupancy Vehicles (SOV)
- Reduction in congestion and pollution through reduced car use
- Improve the modal split f trips made by walking
- Improve the modal split of trips made by cycling
- Improve the modal split of trips made by public transport

Travel Plan Targets

5.4 The TP includes travel mode share targets such that the progress of the plan can be evaluated. These targets will be based on challenging, but achievable non-car and SOV mode share targets. The targets will be based on current practices in the hinterland around, and the location of, the site. The target will take account of the local geography and existing transport provision.

5.5 It is the role of the Travel Plan to establish mode share targets for the development site. Accordingly the Census 2011 Method of Travel to Work for the Haverhill East Ward for the resident population dataset have been interrogated with this representing those who are likely to live within the proposed development. This data is presented in Figure 5a.

Mode	Percentage
Train	0.5%
Bus, minibus or coach	4.5%
Driving a car or van	64.6%
Passenger in a car or van	7.4%
Motorcycle, scooter or moped	0.7%
Taxi	0.8%
Bicycle	2.1%
On foot	16.5%
Work mainly at or from home	2.5%
Other method of travel to work	0.4%
Single Occupancy Vehicle Trip	57.2%

Figure 5a: Mode Share

5.6 The above data is on a very broad basis and includes a significant amount of urban area, such that walking and cycling are realistic options. Accordingly, the development of the mode share targets should take these objectives into consideration. These targets should be reviewed once travel statistics and mode share for the development are established.

5.7 The targets set within the TP will need to be SMART, Specific, Measurable, Achievable, Realistic, Time Bound and will need agreeing with St. Edmundsbury Borough Council (SEBC) and Suffolk County Council (SCC).

Travel Plan Management

5.8 To manage and coordinate the delivery of the Travel Plan, a Travel Plan Coordinator will be appointed. This role is critical to ensure the success of the plan and will provide a point of contact for the future residents. More details on this role are provided in subsequent sections.

Travel Plan Marketing

5.9 To ensure the maximum benefit of the TP is achieved and that future residents can decide on how to travel, it is important to raise awareness of the travel opportunities that exist through active marketing. This needs to start early to capture the minds of new residents before unsustainable travel patterns are established. A marketing plan will be established and agreed such that all residents are aware of the Objectives and Targets, together with the measures that are to be utilised.

5.10 A strategy that can be followed to assist with this is indicated below:

- **Introduce the idea of the TP:** this can be carried out through consultation groups, producing leaflets/posters to be distributed on site
- **The travel pattern survey:** this will allow site users the opportunity to comment on the plan and give any suggestions they have
- **Disseminating the results:** let everybody on site know the results of the TP survey
- **Naming the plan:** allowing the opportunity to make the plan individual to the site
- **Launch of the TP:** high profile launch, ensure all are aware of it
- **Progress:** keep everyone informed of the progress of the plan, including any new measures to be included within the plan
- **Monitoring:** the TP will need to be reviewed and monitored annually. The first review will take place one year after the first TP has been submitted and approved. The results will be fed through to the site through email drops, posters, leaflets and any focus groups that have been set up. Regular monitoring will need to be carried out on a timescale arranged by the Travel Coordinator.
- **Evaluation and Support:** Through continuous monitoring, the TP will be improved to ensure optimum performance.

5.11 Further details on the marketing activities form an integral element to the travel plan measures, as discussed in Chapter 6.

Road Based Public Transport Provision

5.12 To maximise the opportunities to travel by public transport, it is proposed to improve the current routes that operate in Haverhill. The options to deliver public transport enhancements have been discussed with SEBC and the local bus operators.

5.13 Presently, several routes operated by Stagecoach and Stephensons of Essex pass adjacent to the site boundary. It has been discussed that both of the existing routes are unsuitable for serving the proposed development.

5.14 The long term viability of any public transport route is critical if it is serve the community into the future. Therefore discussions with Stagecoach and Stephensons of Essex have established the likely level of revenue that could be generated by the development, which can be offset by the likely costs to understand the viability. As a result of this work, financial support is likely to be needed initially, but over time it is expected that patronage levels will be sufficient to safeguard the long term viability of the proposed public transport interventions.

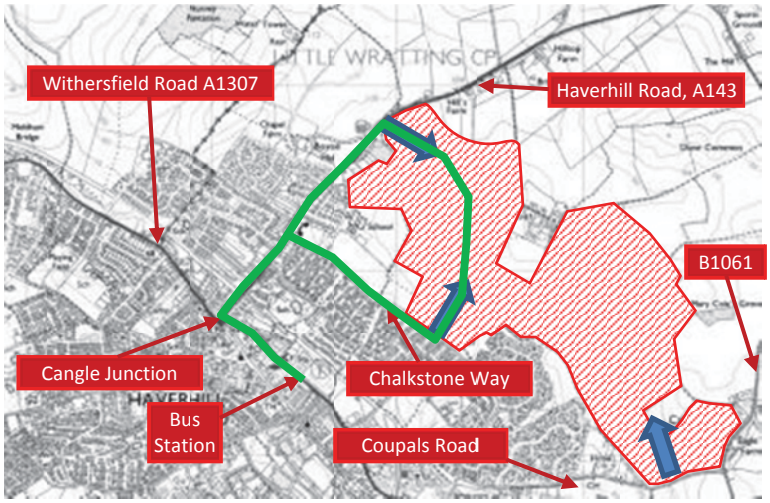


Figure 5b: Indicative Map of the Proposed Bus Route from Great Wilsey Park to Haverhill Town Centre

5.15 Initial contact was made in February 2015 to discuss possible improvements to public transport in Haverhill with the local operators. This identified that the preferred solution provides a 30 minute service from Great Wilsey Park into Haverhill town centre as indicated in Figure 5b. Passengers can then change onto routes 13/13A to get to Sainsbury's or into Cambridge. This will require one additional vehicle and the first years estimated cost for providing this service will be circa £120,000.

5.16 It is considered that the required contribution will decrease as the development is delivered, such that the public transport enhancement will be self-funding after the fifth / sixth year.

6 Travel Plan Measures and Phasing

6.1 In order to maximise the uptake of sustainable transport measures by residents at the development, sustainable transport modes will be available and will be promoted during all stages of the development process from the design, construction and initial marketing of the development through to initial occupation and then on to full occupation of the site. As the wider development progresses the marketing activities will be reviewed and modified to ensure promotional events occur to coincide with key milestones of the development such as upon opening of the rail station.

6.2 The key stages of the Travel Plan process follow the key stages of the development process as set out below:

- Before occupation of any dwellings/facilities - pre occupation
- During the period when dwellings/facilities are being occupied – during occupation
- After all dwellings/facilities have been occupied – post occupation

6.3 The measures to be implemented during each of the three phases are described in the following sections.

Pre Occupation Phase

- A fully permeable development layout for pedestrians and cyclists reflecting desire lines– pedestrian and cycle connections will be provided from the site to link into the existing infrastructure.
- On site development streets and junctions designed to the standards outlined in the Department for Transport's Manual for Streets, to limit the dominance of the car
- Careful street design to encourage walking and cycling within the site

- Shared surfaces on residential links to promote pedestrian and cycling movements, creating some areas with a 'Home Zone' style atmosphere
- Car and cycle parking provision will be in compliance with the current guidance.
- Provision of green space for social exchange and recreation
- Appointment of a Travel Plan Coordinator
- Improvement to support road based public treatment
- Development of 'Welcome Travel Packs' containing information on non-car transport modes, including public rights of way information, to be issued to each dwelling on first occupation
- Notice boards within the show house and within the work place/office to show key travel information

Occupation Phase

Welcome Packs

It is the intention to issue Welcome packs to each household on first occupation. A Welcome Pack will include the following information:

- A brief explanation of the travel plan and its objectives
- Contact details for the Travel Plan Coordinator
- Bus Maps
- Details of any resident travel user groups including bus buddy scheme
- Cycling and Walking Maps
- Details of car share database available at www.liftshare.com
- Other appropriate information

Sales and Marketing office

Any websites established by the house builders on site will be encouraged to include travel information and details of the travel plan. In addition, a further version of the Travel Plan will be produced to summarise the available modes of transports to the residents and compliment the Welcome Pack. The sales office will hold copies of the Welcome Pack and sales staff will be trained by the travel plan coordinator as and when the sales offices are established so that they understand the principles of travel planning.

Travel Induction Sessions

The Travel Plan Coordinator will arrange travel planning sessions on a six monthly basis and invite all new residents via maildrop or email, with the aim of introducing the travel plan, the objectives and targets and to encourage discussion on the sustainable travel options. Details of any arranged sessions will be posted onto the dedicated travel web-site.

Bus Buddy Scheme

The Travel Plan Coordinator will establish a bus buddy database of those people who regular travel by public transport. Details of the scheme are to be included within the Welcome Pack and on the travel website and residents will be invited to join during the travel induction sessions.

Bicycle User Group

The Travel Plan Coordinator will establish a bicycle user group, details of which are to be included within the Welcome Pack and on the travel website and residents will be invited to join. This will be held every other month and local cycle repair shops will be invited to attend to provide advice on basic cycle repair and maintenance and to highlight what equipment is available to make cycling a pleasant experience. Prize draws are to take place at the meetings to encourage support and attendance giving users a chance to win cycling equipment.

Car Share Database

The Travel Plan Coordinator will promote national car sharng schemes.

Updates to travel information

Provision of regular updated travel information by the Travel Plan Coordinator. This will include revised copies of bus timetables as and when new timetables are published which will be posted on the travel website. The TPC will ensure that any new developments on site are effectively communicated to residents. Dedicated travel planning groups will be set up by the Travel Plan Coordinator on social networking sites like www.facebook.com. This would also be used to highlight any updates to the TP and the latest news.

Smarter Choices

In recent years, there has been growing interest in a range of initiatives, which are now widely described as 'soft' transport policy measures. These seek to give better information and opportunities, aimed at helping people to choose to reduce their car use while enhancing the attractiveness of alternatives. They are fairly new as part of mainstream transport policy, mostly relatively uncontroversial, and often popular. They include:

- Workplace and school travel plans;
- Personalised travel planning, travel awareness campaigns, and public transport information and marketing;
- Car clubs and car sharing schemes;
- Teleworking, teleconferencing and home shopping.

The Travel Plan Co-ordinator will follow the advice of the DfT Smarter Choices in operating, monitoring, evaluating and supporting the Travel Plan for continuous quality management.

Promotional events

Promotional leaflets will be issued to home owners, together with updates to the travel website and social networking groups, highlight any arranged travel campaigns. Travel campaigns will be run on an annual basis per mode and events could include:

- Walk your child to school week
- Share a journey to work day
- Cycle week
- Car Club promotion week

Post Occupation Phase

6.4 To monitor the progress of the Travel survey to be carried out annually, the first to be carried out within 3 months of occupation of the 50th dwelling.

6.5 The travel survey will comprise two main elements, as described below.

Snap shot survey

This will take the form of a quick snap survey and is likely to take the form a short questionnaire that will be distributed to the residents on site. This will question the trips that are being carried out and the method of travel used. The results will be used to identify the mode split, in order to direct the marketing and promotion of the TP measures.

Detailed survey

This survey will be undertaken on the occupation of the 700th, 1,400th and 2,100st occupation. This will enable an accurate modal split to be defined. The detailed survey will include:

- Classified turning counts at the site access points
- Record of pedestrians and cyclists leaving the site
- Record of public transport users
- ATC placed on the exit to the development for one week

6.6 The TP targets will be agreed with the local authority to reduce car driver trips. The way the Travel Plan is implemented will play a vital role in the success of the Plan. The TP Coordinator and all the TP facilities and services will be available for all new property purchasers at the time of signing any purchase or letting agreement.

6.7 The TP Coordinator will ensure all the agreed measures are carried out and will monitor use, arrange surveys, keep records, review and suggest revisions to the Travel Plan and provide appropriate information to local authorities.

7 Travel Plan Coordinator

7.1 The appointment of a Travel Plan Coordinator will be central to the successful implementation and management of the TP. The person will act as the promoter of the components of the TP to secure its implementation, as well as being the key contact point for the residents and people who use the site. The TPC will actively liaise with the TPC's relating to retail, leisure, employment and schools on the site. This will include regular meetings, sharing of knowledge and coordination of promotional events to ensure a joined up, site wide approach to encouraging sustainable travel.

7.2 The key responsibilities undertaken by the Coordinator as set out below will be reviewed and amended on a regular basis:

- Leading on the delivery of the TP once approved
- Coordinating the necessary data collection required to develop the 'Welcome Travel Pack'
- Arranging the annual travel survey
- Representing the 'human face' of the TP including liaison with residents' steering group or management committee
- Personalised travel planning tailored to residents needs
- Promoting the individual measures and packages
- Promoting the use of online car share database
- Liaising with the relevant County Council Public Transport Team
- Liaising with SCC over monitoring and reviews of the TP
- Liaising with relevant bus operate companies to identify measure to assist in modal shift
- Coordination of promotion events across the site
- Provide travel plan training to sales staff
- Assessing progress towards achieving mode-shift away from car use.

7.3 More details of the TP Coordinator's responsibilities and tasks are set out below. During development construction (pre occupation), these will cover preparing marketing materials, such as the 'Welcome Travel Pack'.

7.4 During the occupation period the TP Coordinator will:

- Publicise and launch the TP
- Distribute Welcome Travel Packs
- Hold travel induction sessions for all new residents on request

7.5 After occupation the TP Coordinator will continue to:

- Provide personalised travel planning
- Promote individual plan measures

7.6 The TP Coordinator's responsibilities will be monitored by the developer in liaison with the Council and any agreed additional tasks and responsibilities will be added to the TP, which will be a continuously updated document.

Duration of TP Coordinator's Position

7.7 It is proposed that the Travel Plan Coordinator will be appointed from commencement for a period of 5 years from the first occupation of the site.

Appendix F – Traffic Flow Diagrams


1
2
3
4
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6
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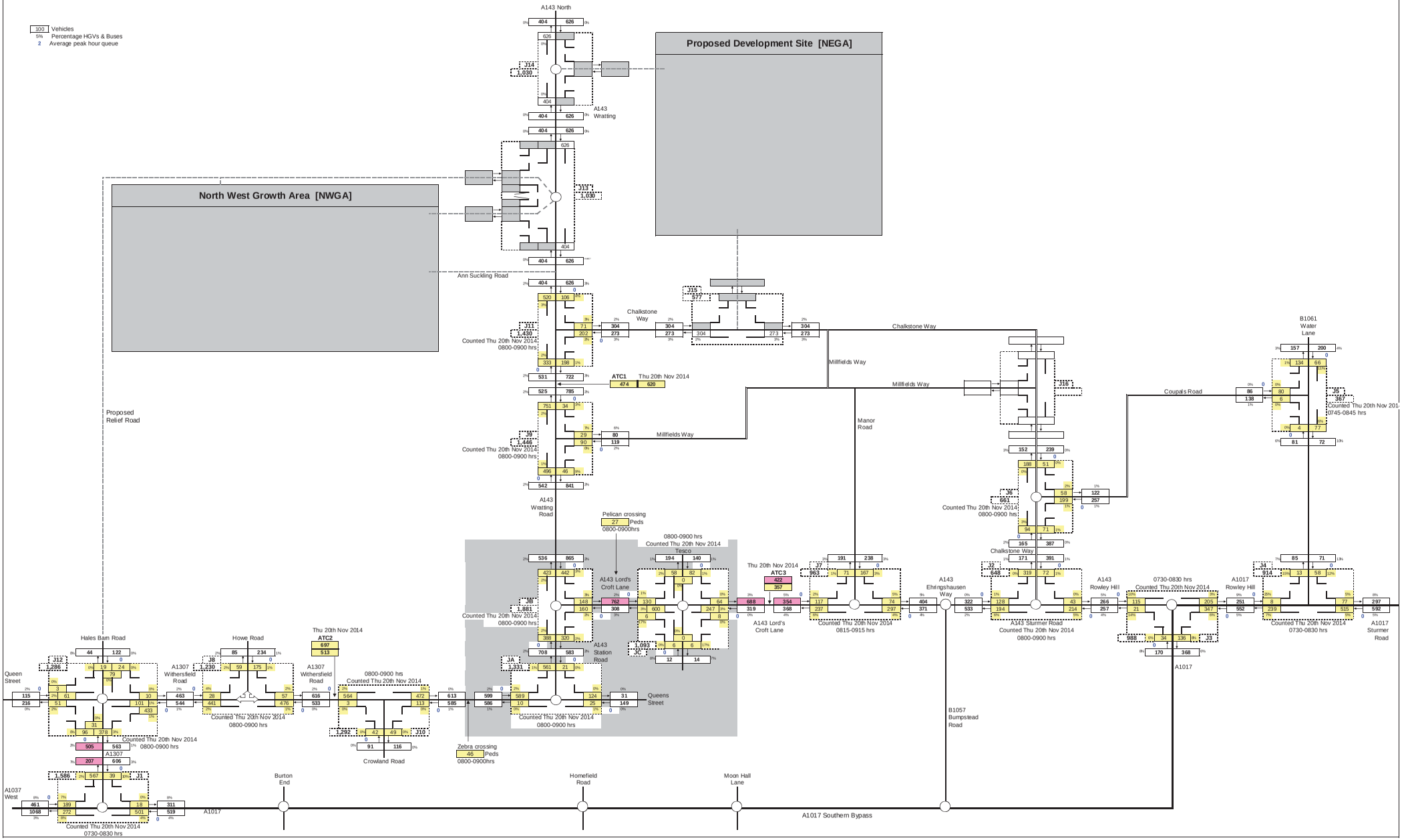
8
9
10
11
12
13
14
15
A1307
A1307
A130
Hawthorn Rd
Howe Rd
Haverhill Rd
Haycocks Rd
Park Rd
Spindle Rd
Chimswell Way
Bergamot Rd
Eastern Ave
Crowland Rd
Queensway
Chivers Rd
Camps Rd
Haverhill
Millfields Way
Chalkstone Way
Burton End
Clements Ln
A143
Manor Rd
Duddery Hill
Hamlet Rd
Roman Way
Cleves Rd
Coupals Rd
Puddle Brook
Playing Fields
Rookwood Way
Hollands Rd
Moon Hall Ln
Piperell Way
B1057
Haverhill Golf Club
B1061
Phoenix Rd
A1017
Water Ln
Sturmer
Rowley Hill

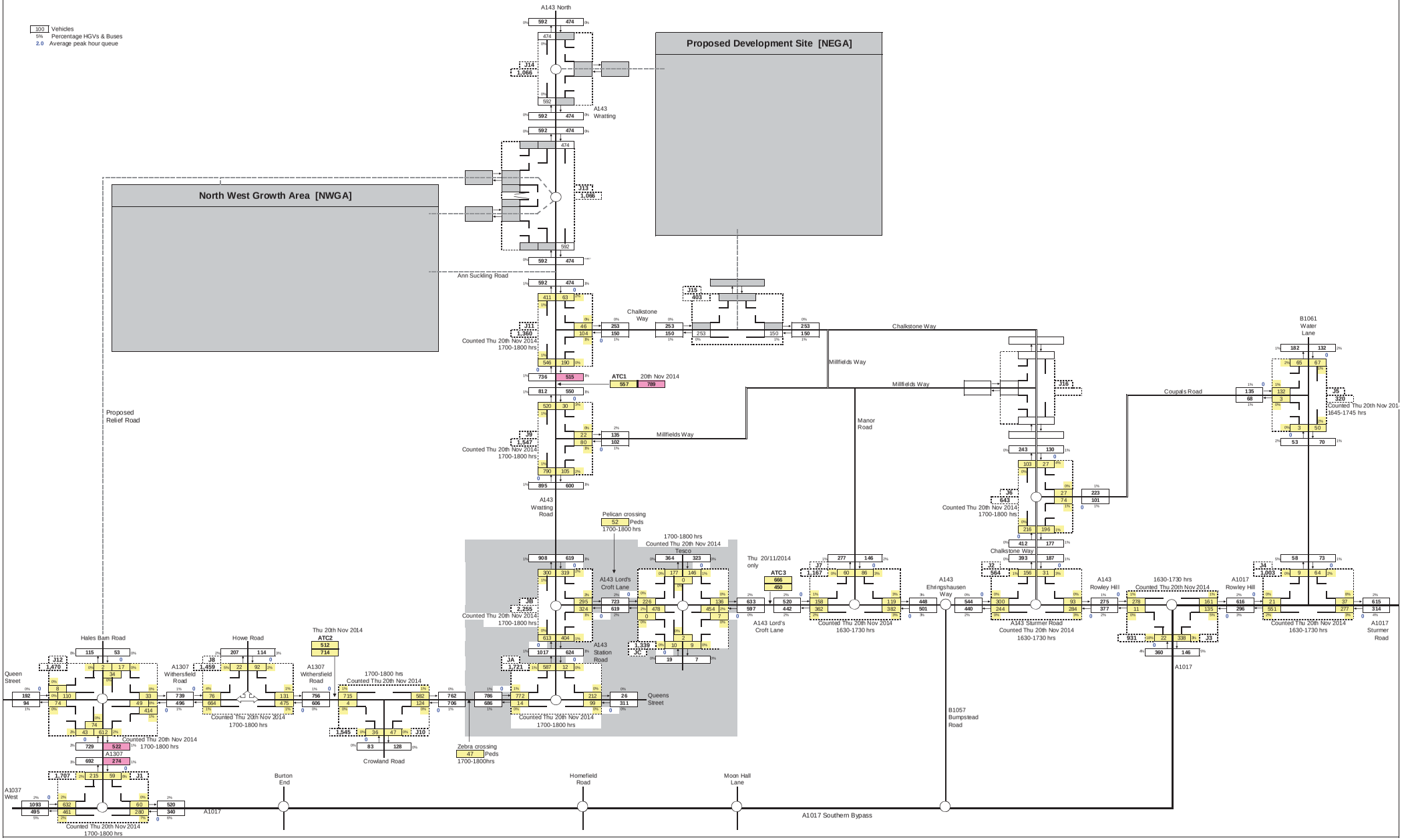
10173 Haverhill - Junction Assessments - MAX RFC

	2014		2019		2019 +Ph1		2019 +Ph1 +Impr1		2029 +Ph2		2029 +Ph2 +Impr2			
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	Improvement Phase 1	Improvement Phase 2
J1	0.494	0.799	---	0.765	0.694	0.930	---	0.763			0.838	0.725	+2M on Eb entry	2-lane Eb approach & Nb exit and +2M on Sb entry
J2	0.630	0.623	---	---	0.709	0.608	---	---	0.845	0.795	---	---	---	---
J3	0.417	0.288	---	---	0.442	0.282	---	---	0.474	0.363	---	---	---	---
J4	0.235	0.179	---	---	0.255	0.196	---	---	0.304	0.276	---	---	---	---
J5	0.256	0.201	---	---	0.267	0.230	---	---	0.301	0.275	---	---	---	---
J6	0.426	0.595	---	---	0.448	0.639	---	---	0.505	0.715	---	---	---	---
J7	0.592	0.779	---	---	0.647	0.843	---	---	0.783	**1.070**	0.657	0.837	---	+2M on both A143 entries
J8	0.536	0.621	---	---	0.743	0.805	---	---	0.530	0.523	---	---	---	---
J9	0.215	0.411	---	0.434	0.376	0.958	---	0.414	0.283	0.990	---	0.402	Right turn lane off main road for just one car	
J10	0.278	0.365	---	---	0.369	0.509	---	---	0.312	0.402	---	---	---	---
J11	0.483	0.362	0.508	---	**1.657**	0.962	0.769	0.825	**1.417**	0.916	0.558	0.815	(Priority junction modelled without pelican as cannot model that and blocking together) Roundabout needed to accommodate heavy right turn into Chalkstone Way (8M entries)	---
J12	0.422	0.594	---	---	0.707	0.843	---	---	0.787	**1.096**	0.787	0.839	---	widen Nb entry from 6.5 to 10.5M and flare from 12 to 20M (+2-lane exit)
J13	---	---	---	---	---	---	---	---	0.550	0.587	---	---	---	As drawing 10173/HL/06
J14	---	---	---	---	0.511	0.521	---	---	0.619	0.795	---	---	---	3.5M approaches and 7.0M entries
J15	---	---	---	---	0.538	0.578	---	---	0.699	0.791	---	---	Small mini-roundabout with 4M entries	---
JA JB JC	PARAMICS													

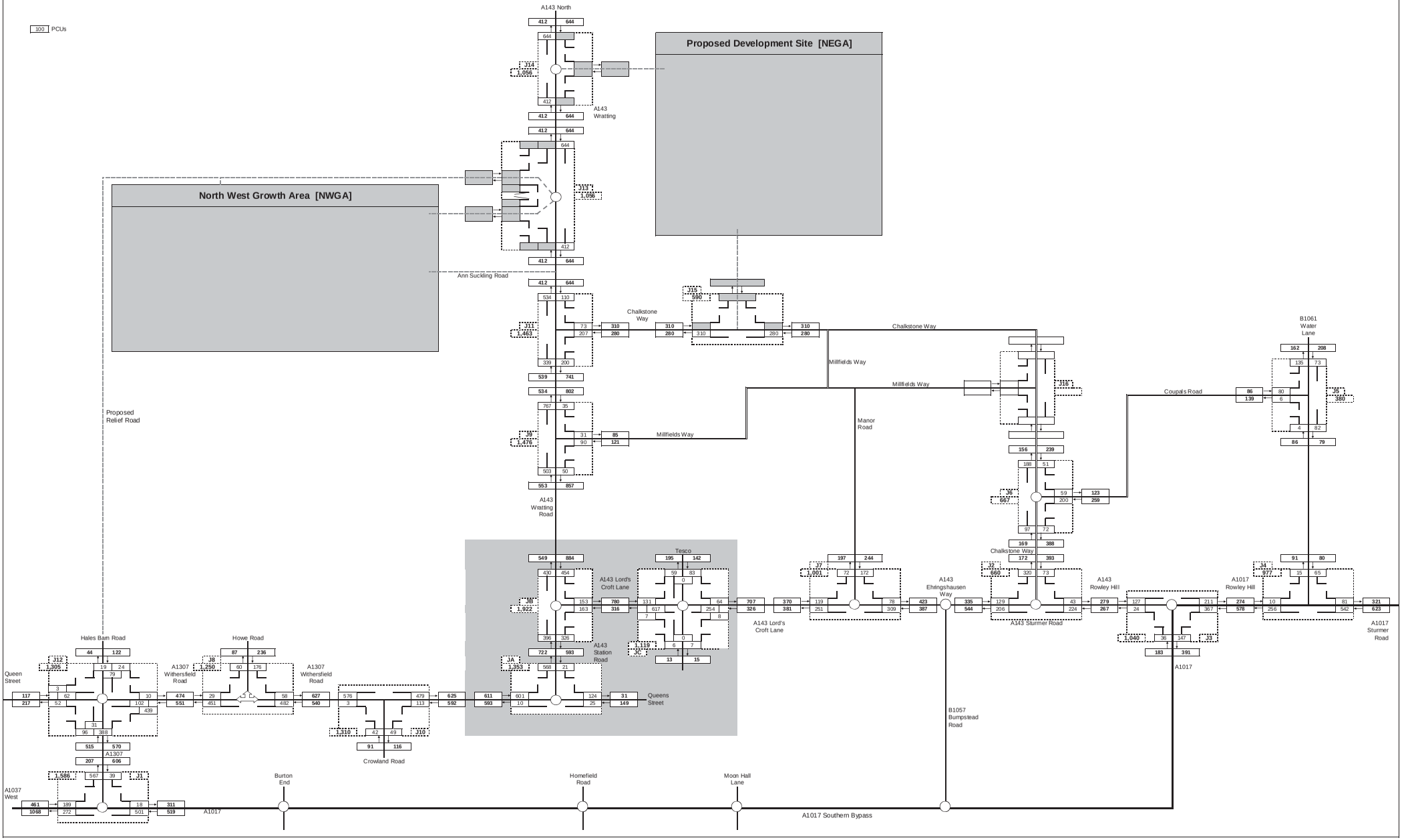
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2014 AM Peak Counted Traffic Flows [Vehicles]**	**Figure 1a**	



Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2014 PM Peak Counted Traffic Flows [Vehicles]**	**Figure 1p**	



Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2014 AM Peak Counted Traffic Flows [PCUs]**	**Figure 2a**	



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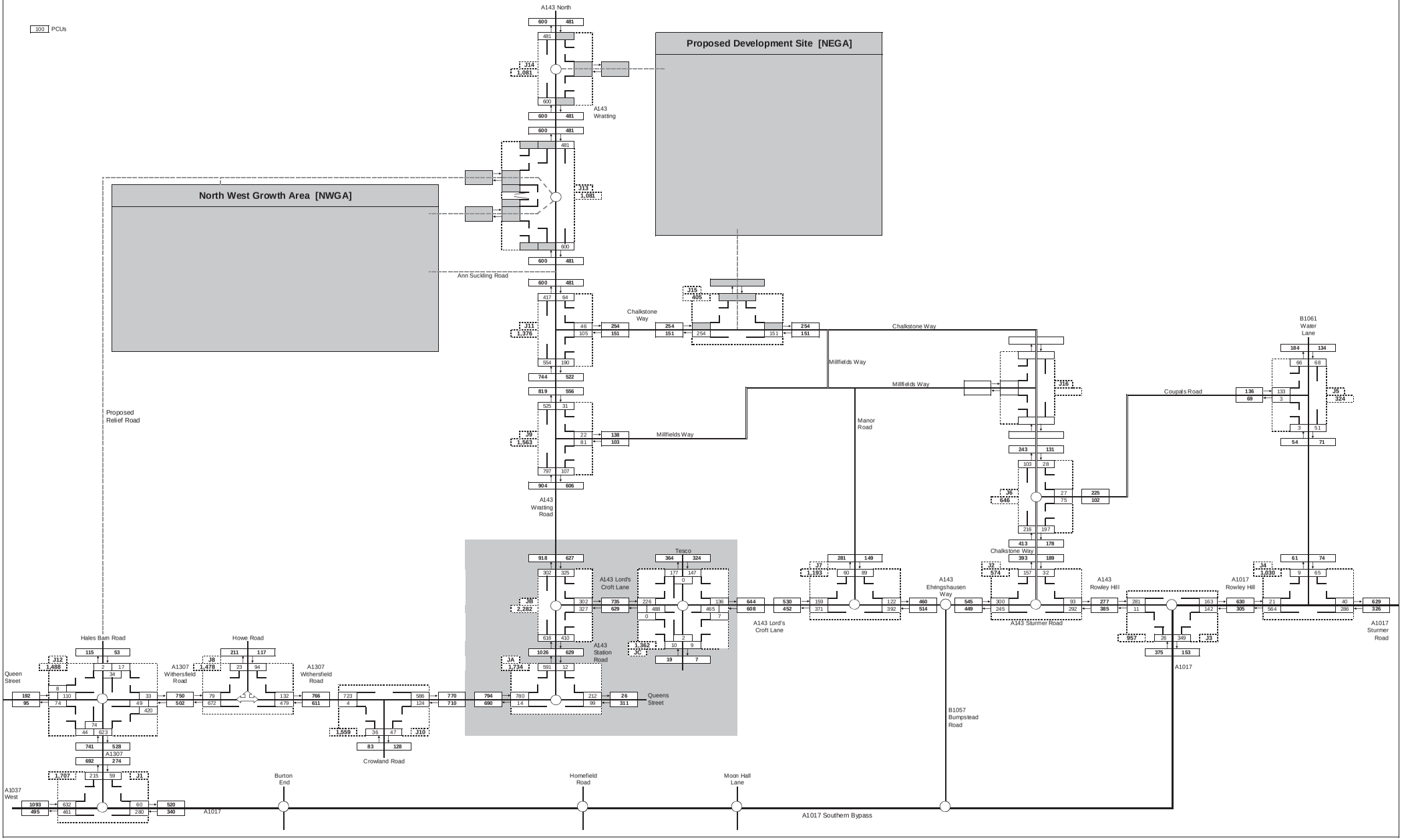
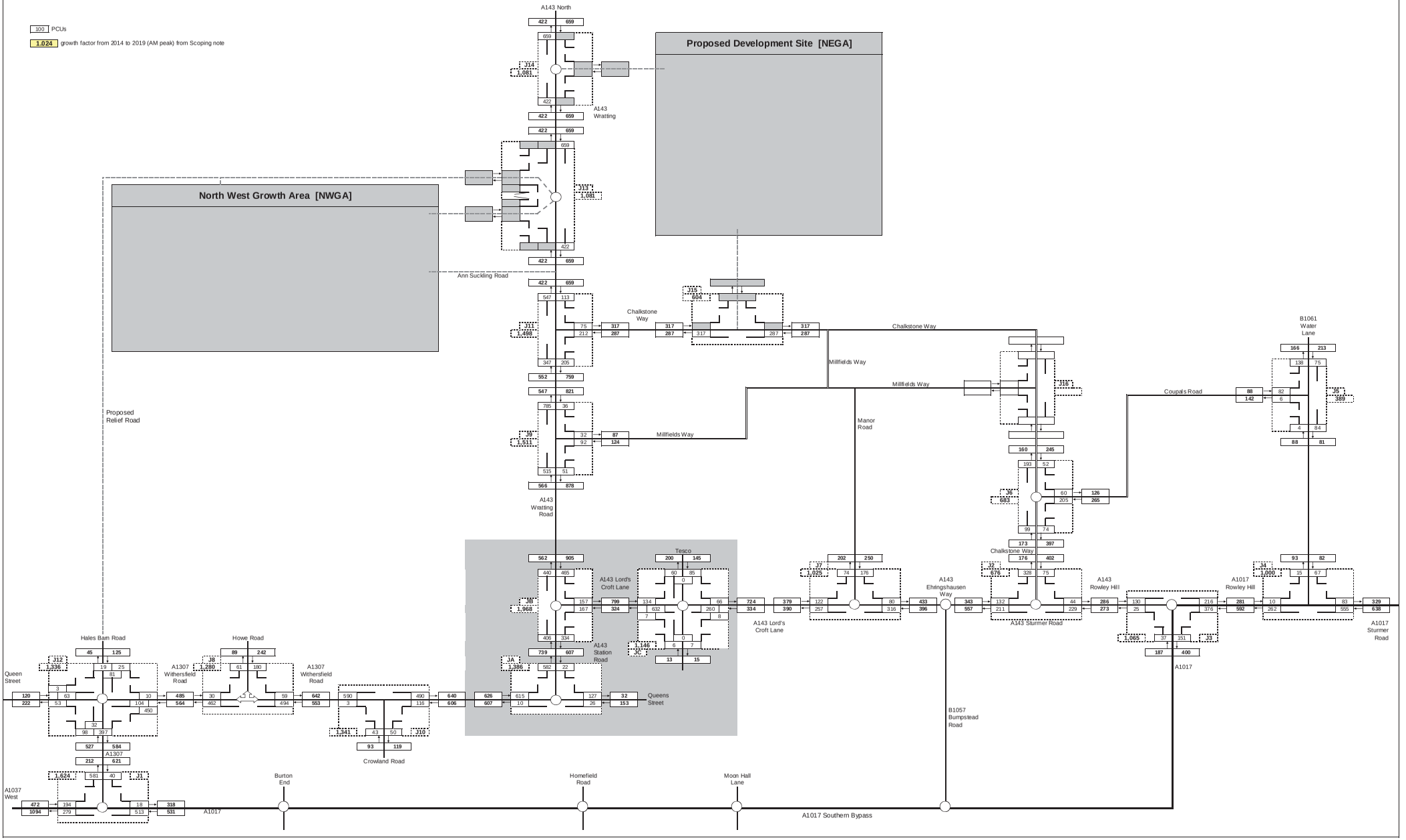
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2014 PM Peak Counted Traffic Flows [PCUs]**	**Figure 2p**	



Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2019 AM Peak Forecast Traffic Flows [PCUs]**	**Figure 3a**	



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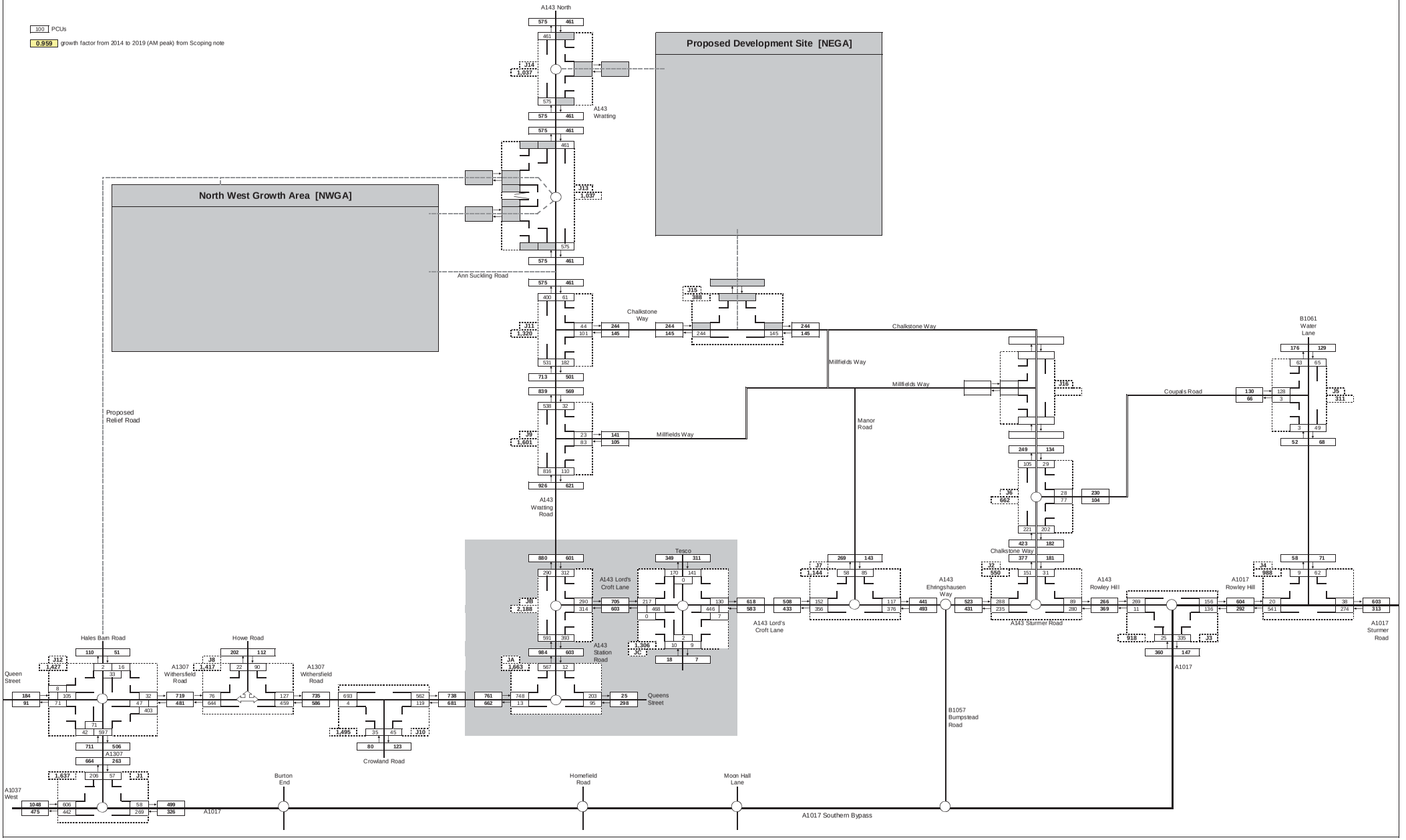
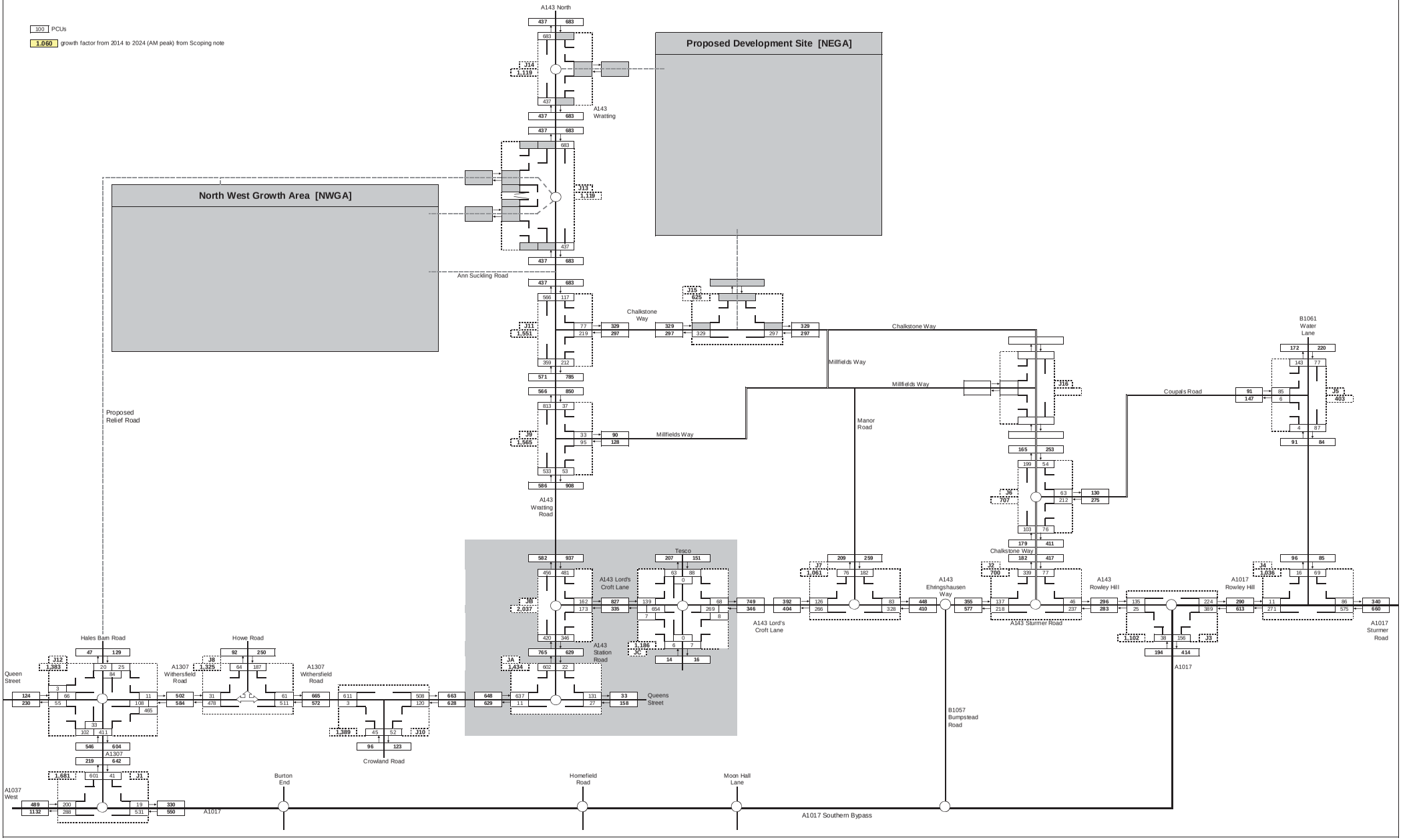
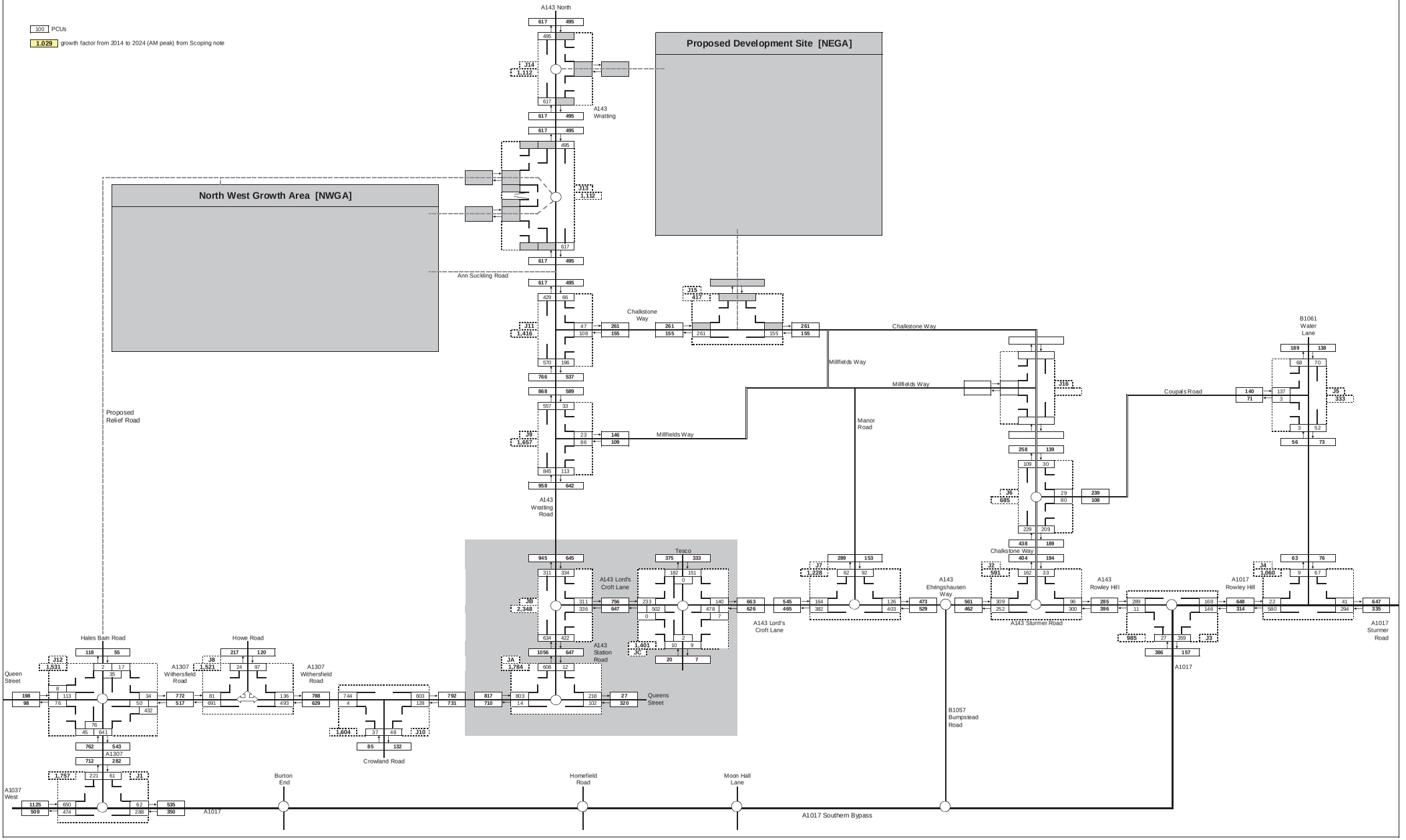
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2019 PM Peak Forecast Traffic Flows [PCUs]**	**Figure 3p**	



Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2024 AM Peak Forecast Traffic Flows [PCUs]**	**Figure 4a**	

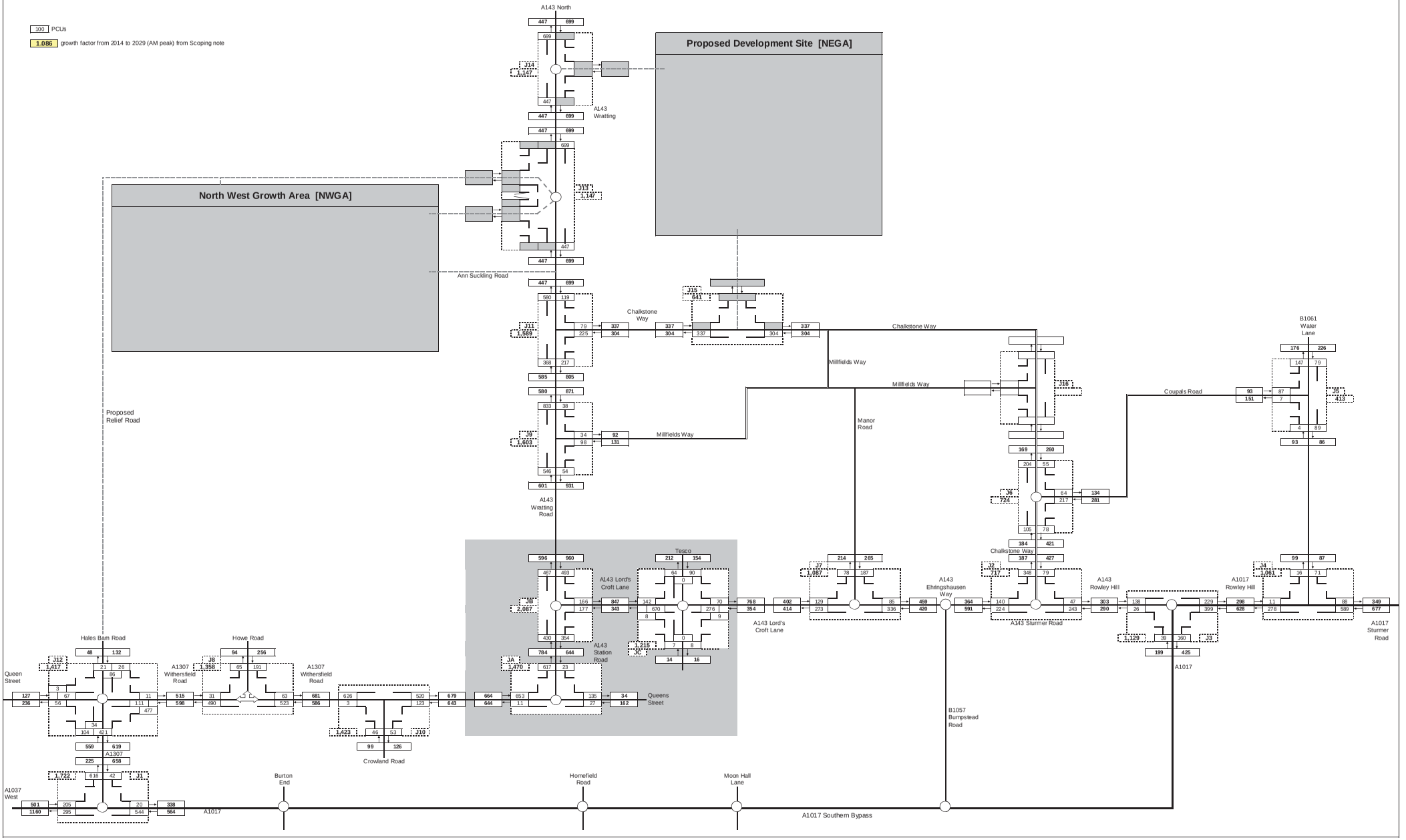


Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2024 PM Peak Forecast Traffic Flows [PCUs]**	**Figure 4p**	

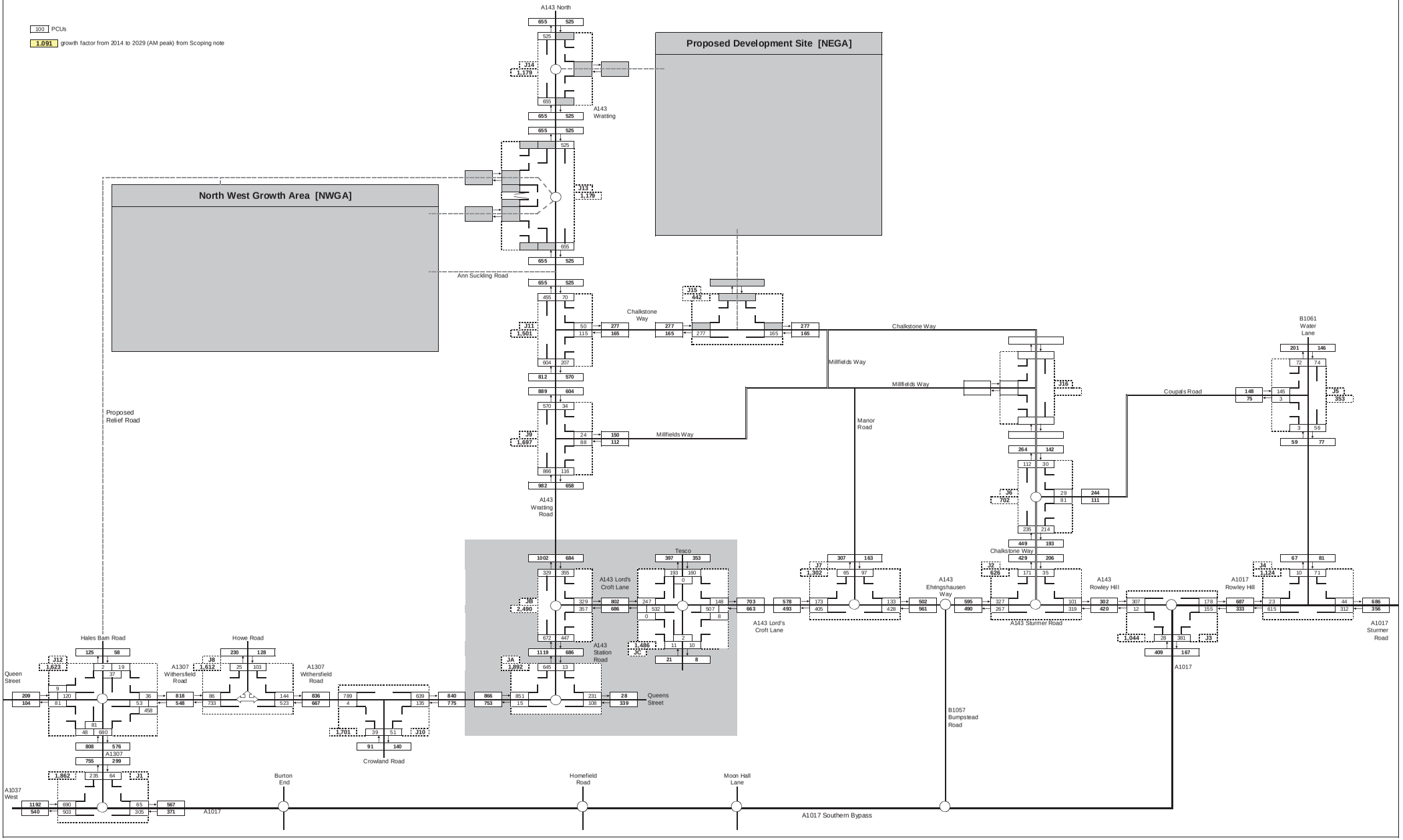


FILE="10173x07-TA Traffic Flows Rev3b~2024" SMT 19/04/2016

Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2029 AM Peak Forecast Traffic Flows [PCUs]**	**Figure 5a**	

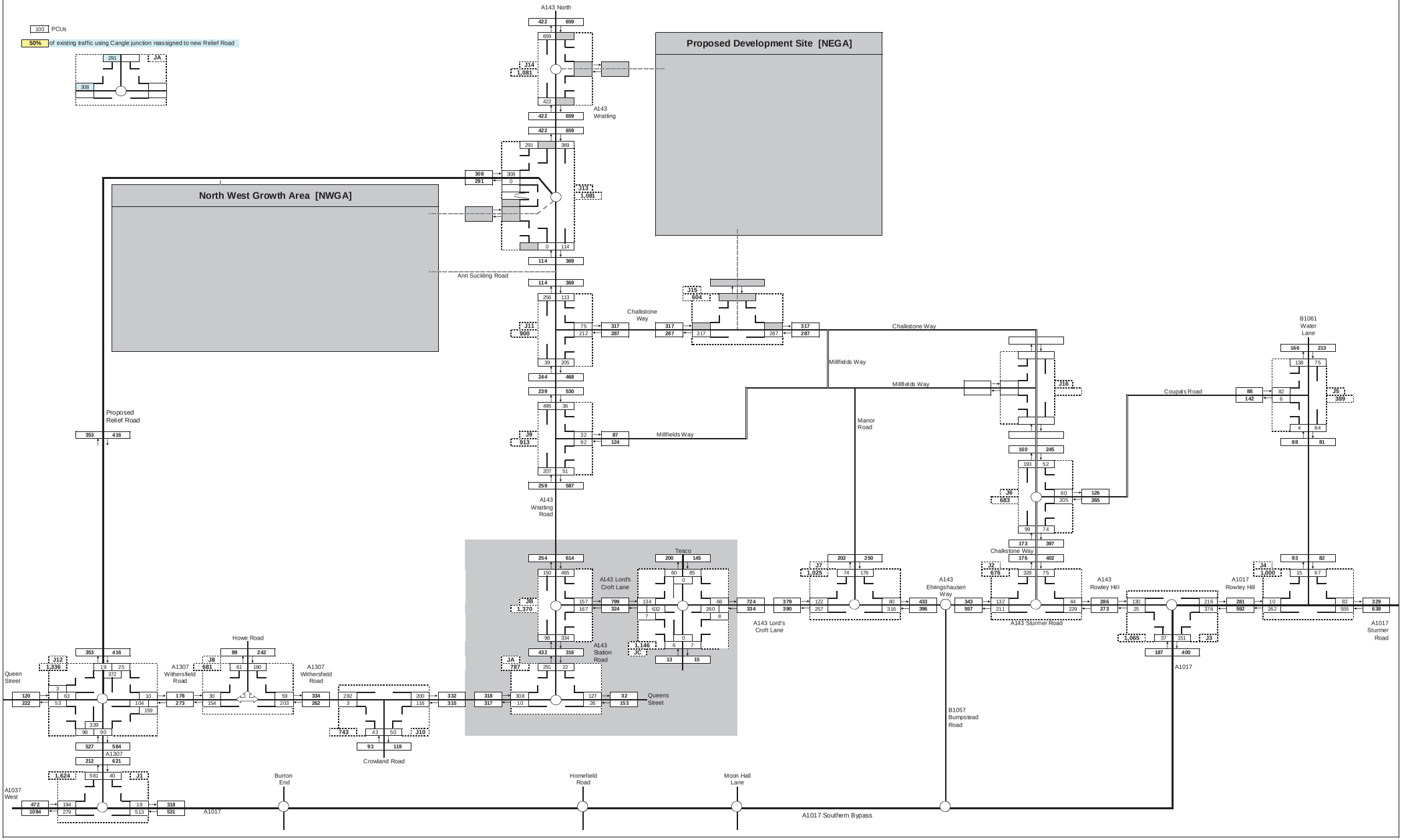


Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2029 PM Peak Forecast Traffic Flows [PCUs]**	**Figure 5p**	

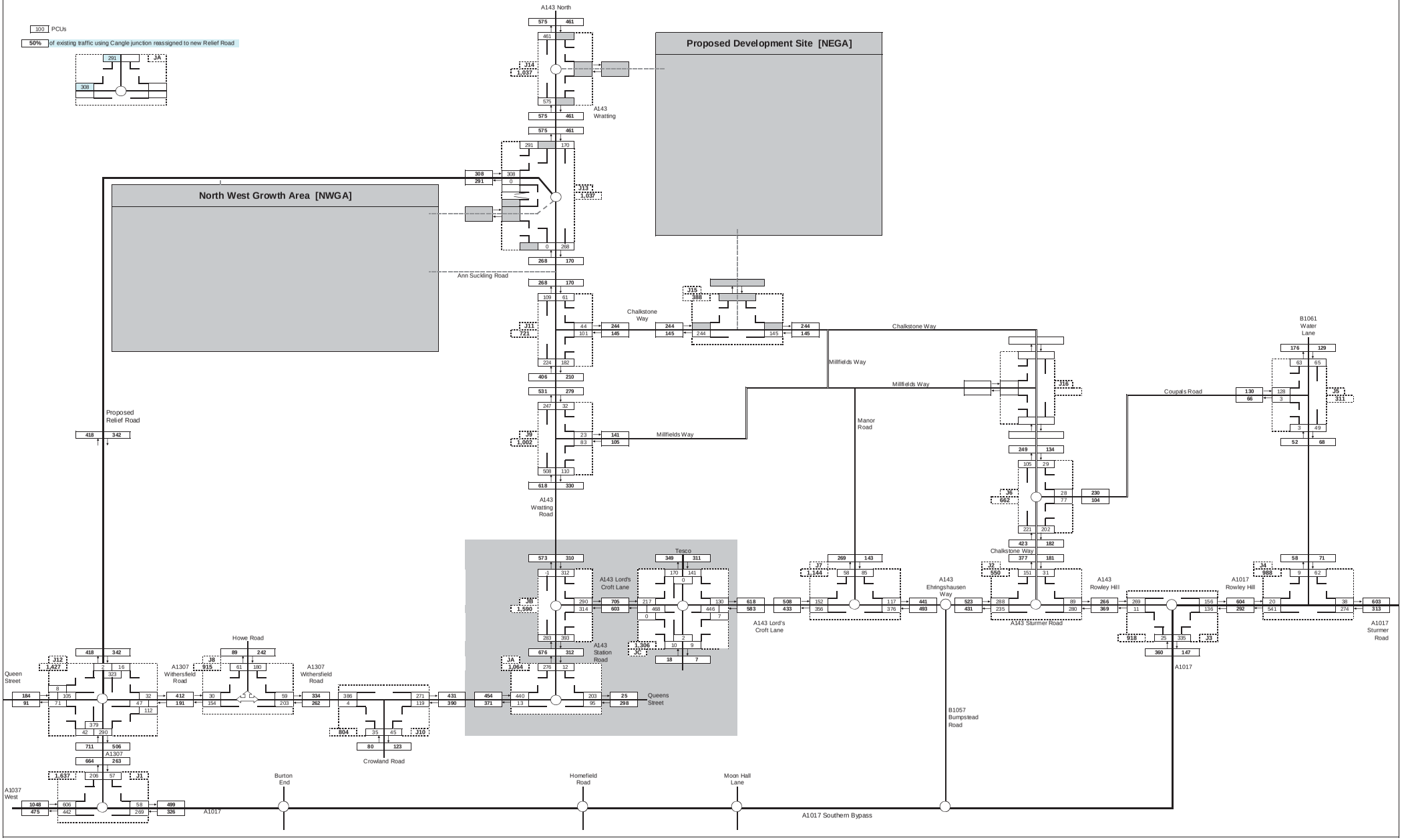


FILE="10173x07-TA Traffic Flows Rev3b~2029" SMT 19/04/2016

Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2019 AM Peak Forecast Traffic Flows With Relief Road [PCUs]**	**Figure 6a**	

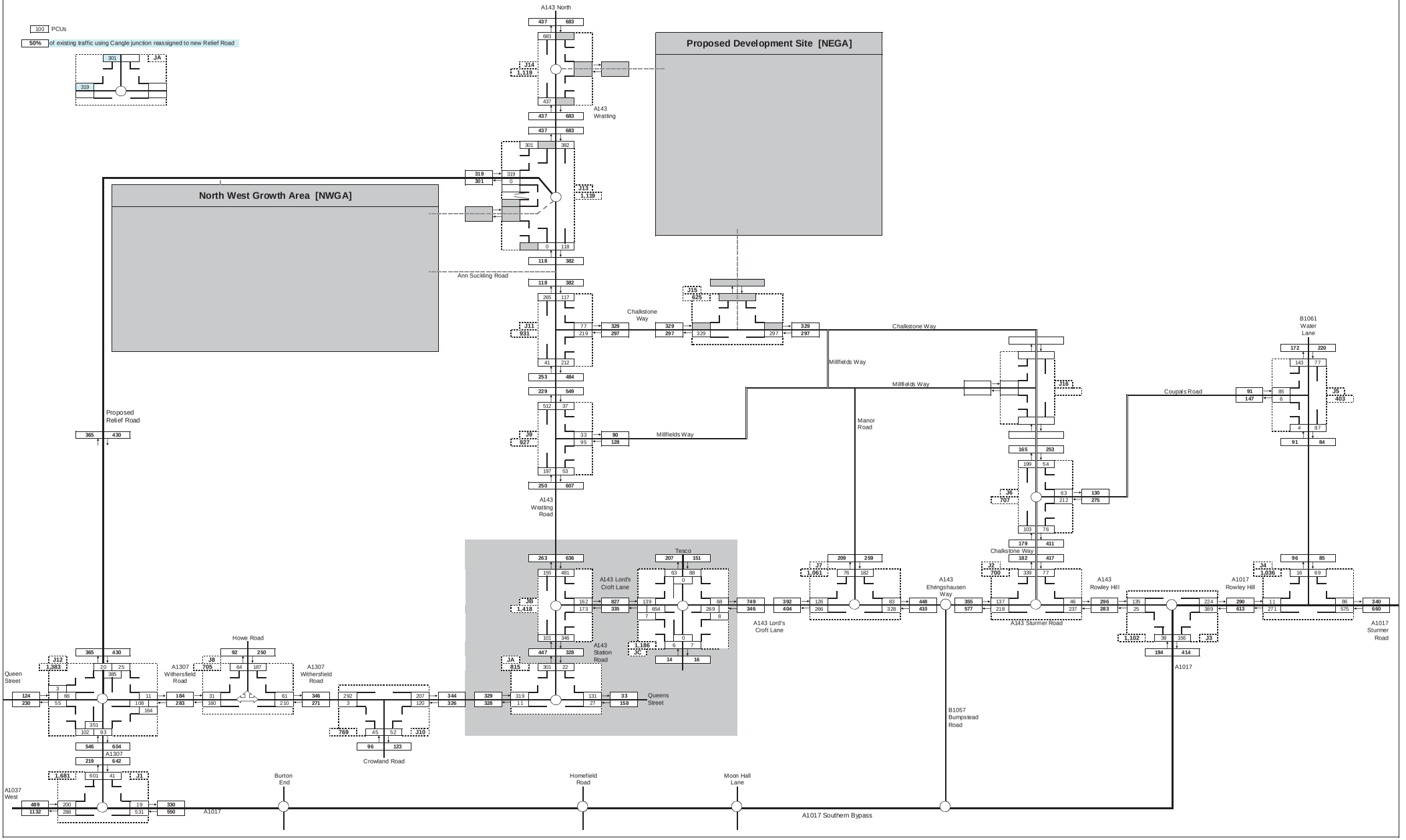


Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2019 PM Peak Forecast Traffic Flows With Relief Road [PCUs]**	**Figure 6p**	

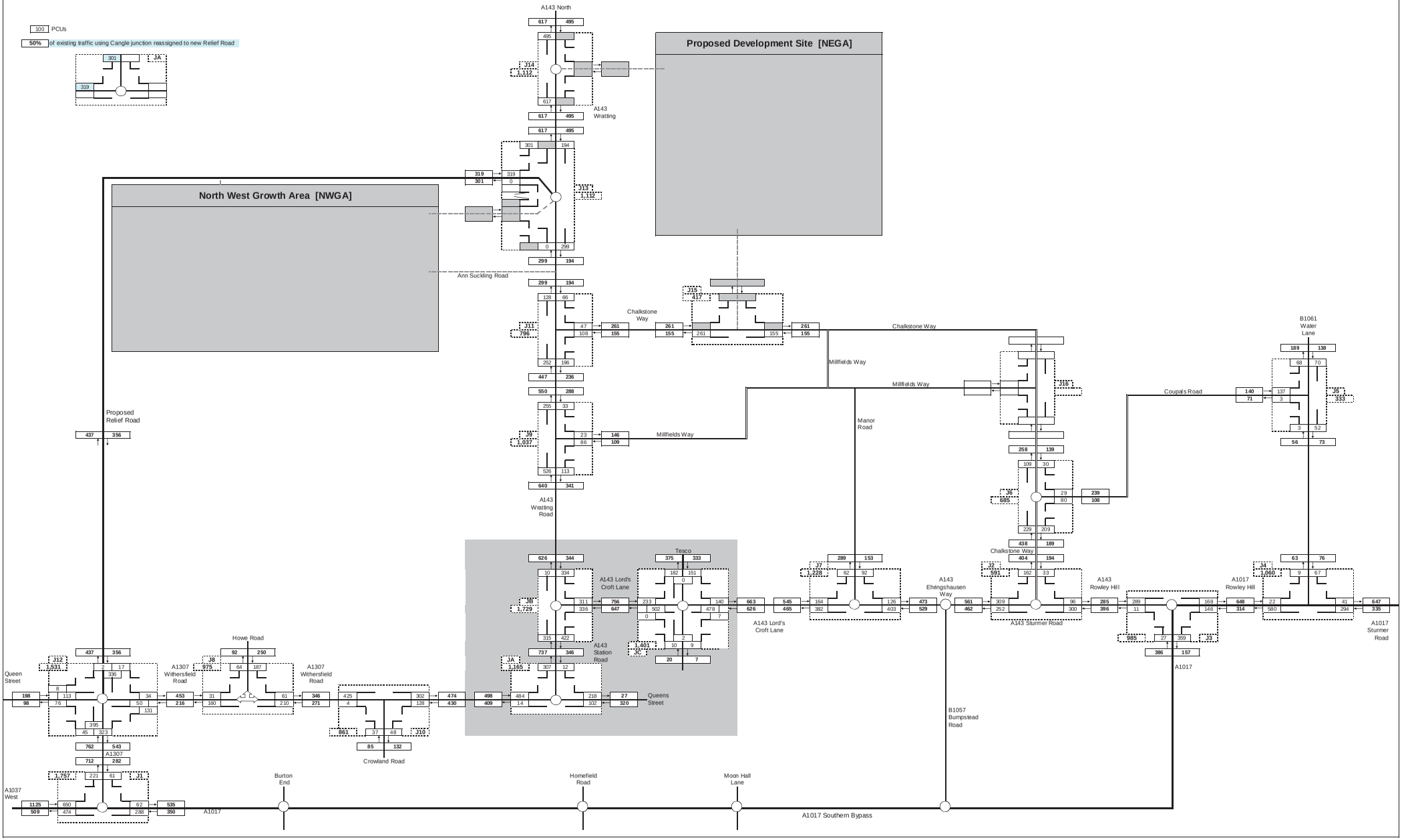


FILE="10173x07-TA Traffic Flows Rev3b~2019R" SMT 19/04/2016

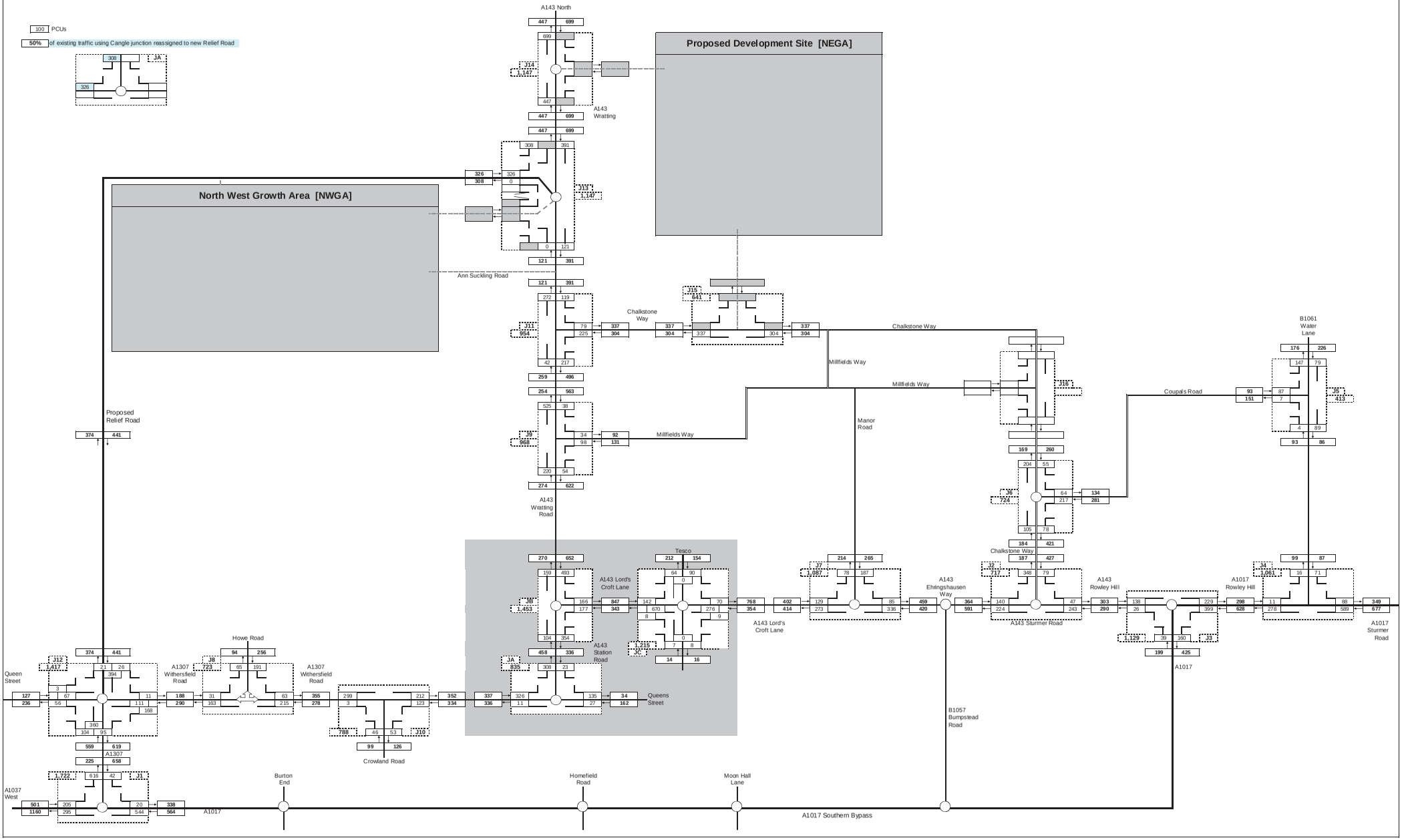
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2024 AM Peak Forecast Traffic Flows With Relief Road [PCUs]**	**Figure 7a**	



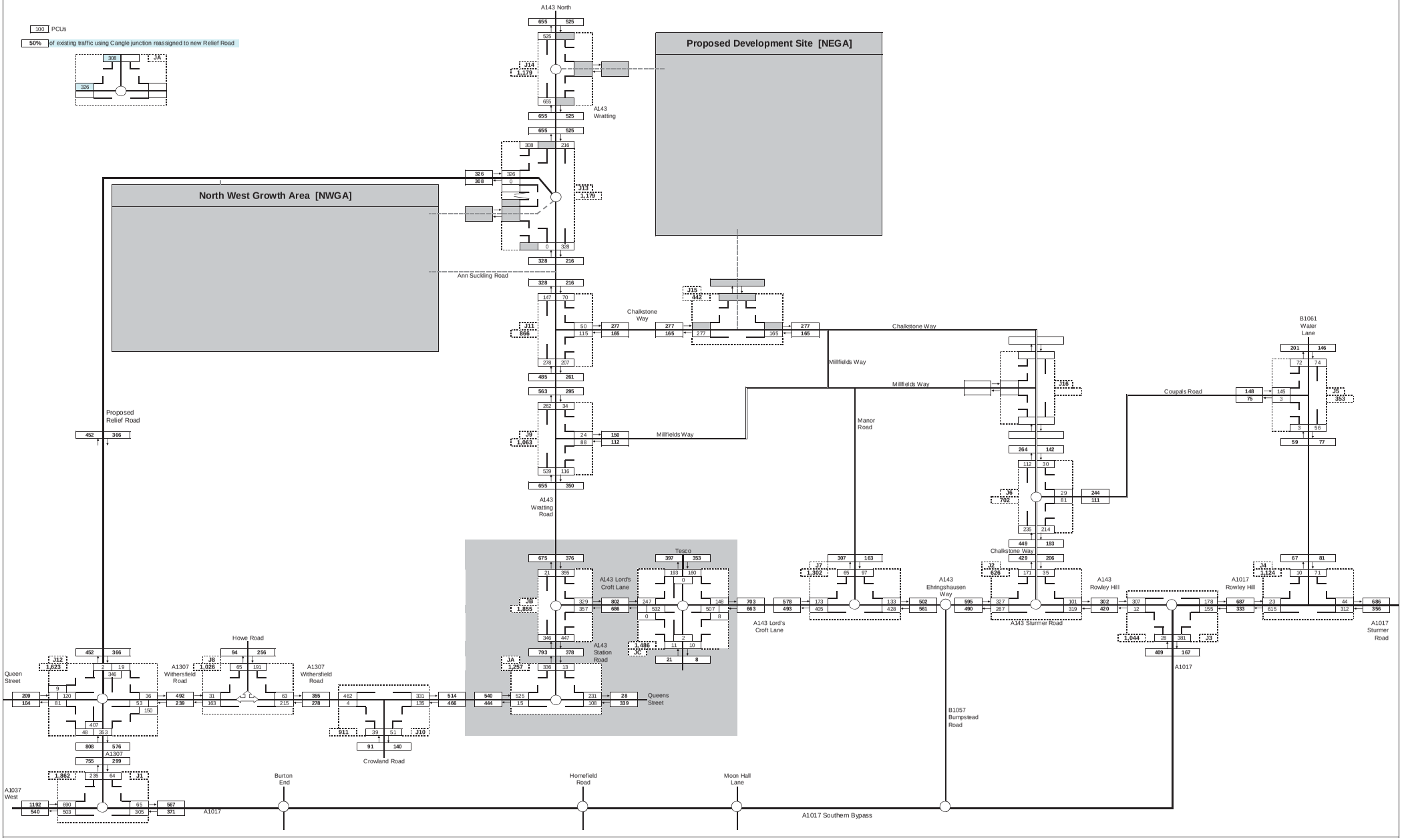
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2024 PM Peak Forecast Traffic Flows With Relief Road [PCUs]**	**Figure 7p**	



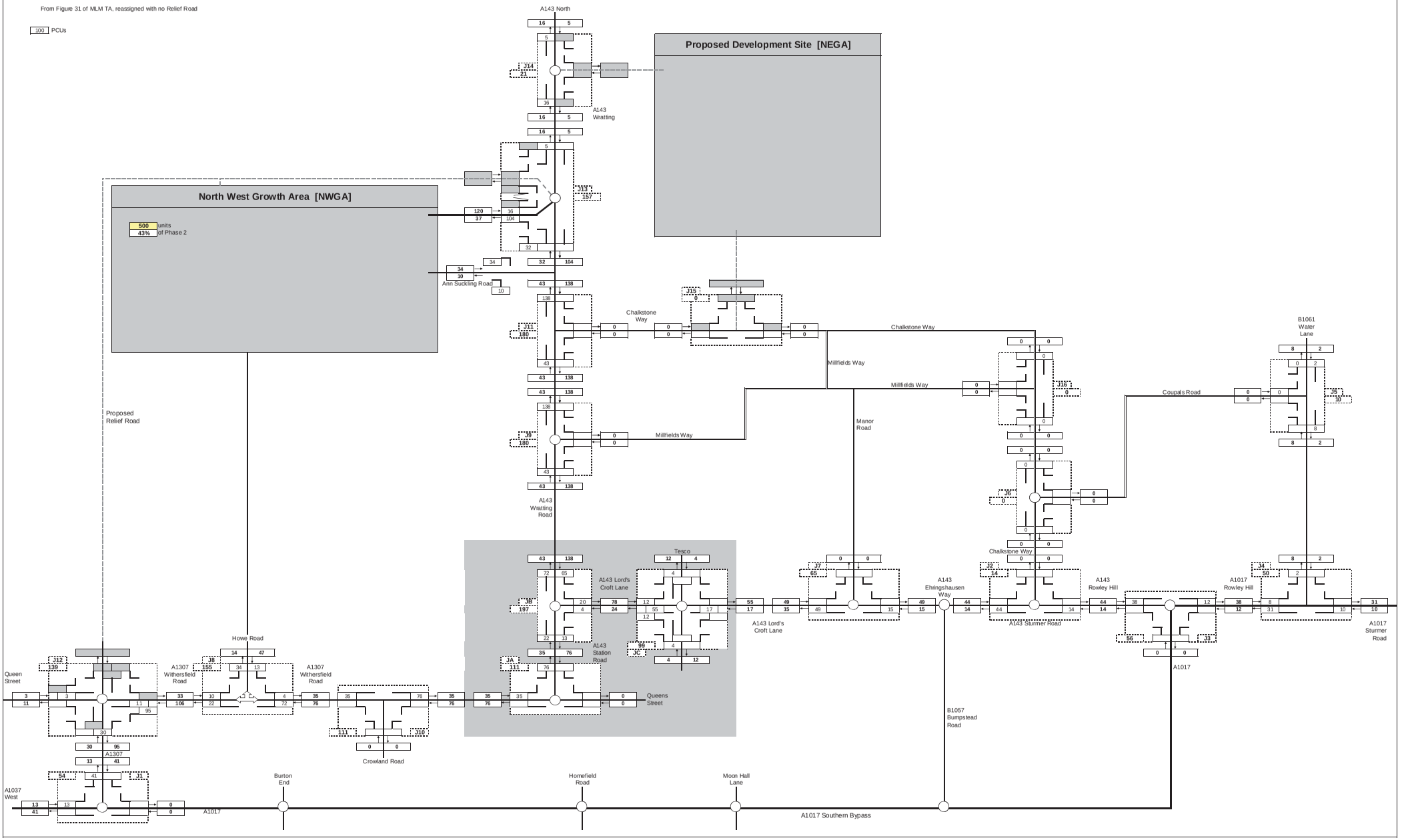
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2029 AM Peak Forecast Traffic Flows With Relief Road [PCUs]**	**Figure 8a**	



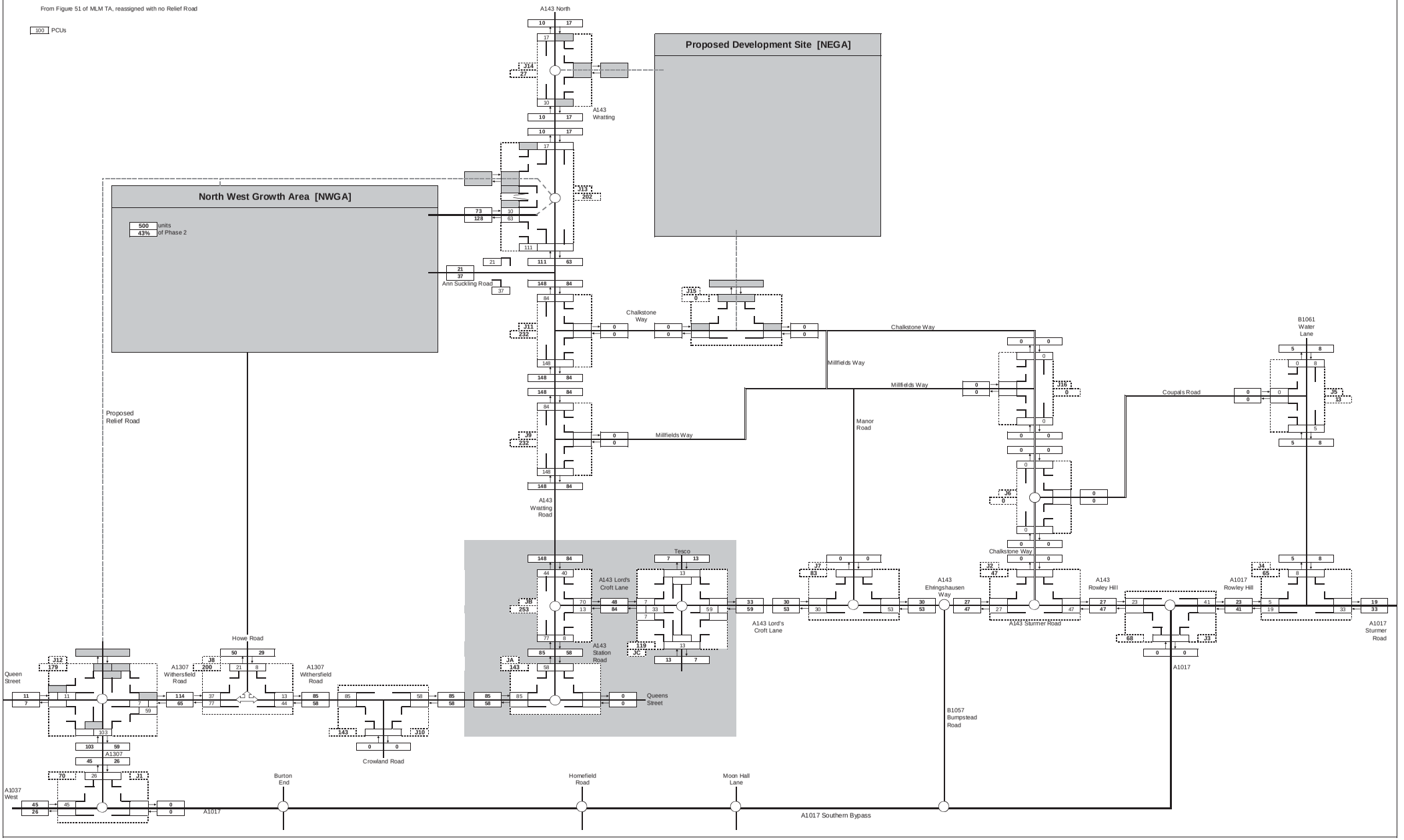
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2029 PM Peak Forecast Traffic Flows With Relief Road [PCUs]**	**Figure 8p**	



Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**AM Peak NWGA Phase 1 Traffic Flows [PCUs]**	**Figure 9a**	

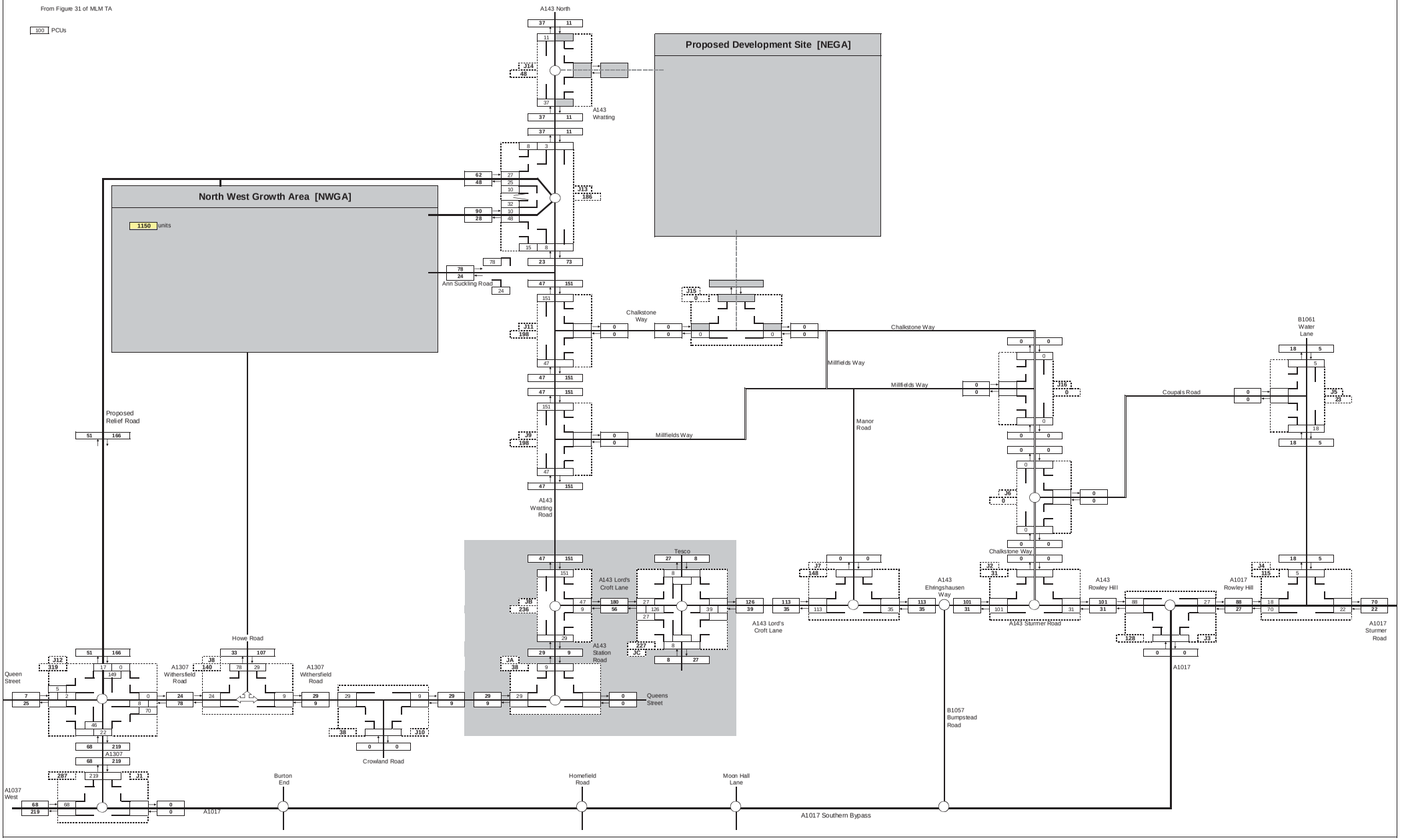


Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**PM Peak NWGA Phase 1 Traffic Flows [PCUs]**	**Figure 9p**	© Brookbanks Consulting Limited 2016

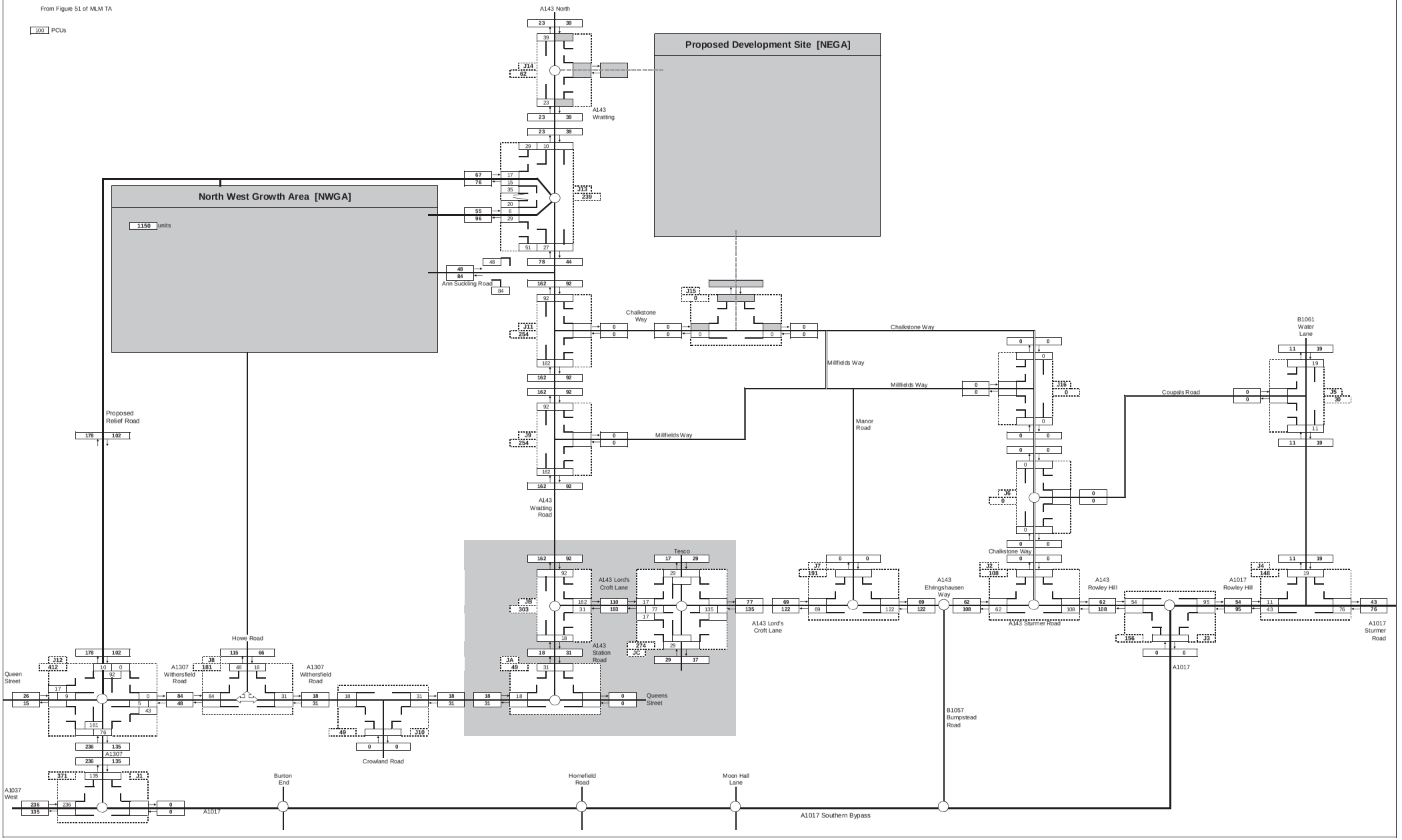


FILE="10173x07-TA Traffic Flows Rev3b~NWGA Ph1" SMT 19/04/2016

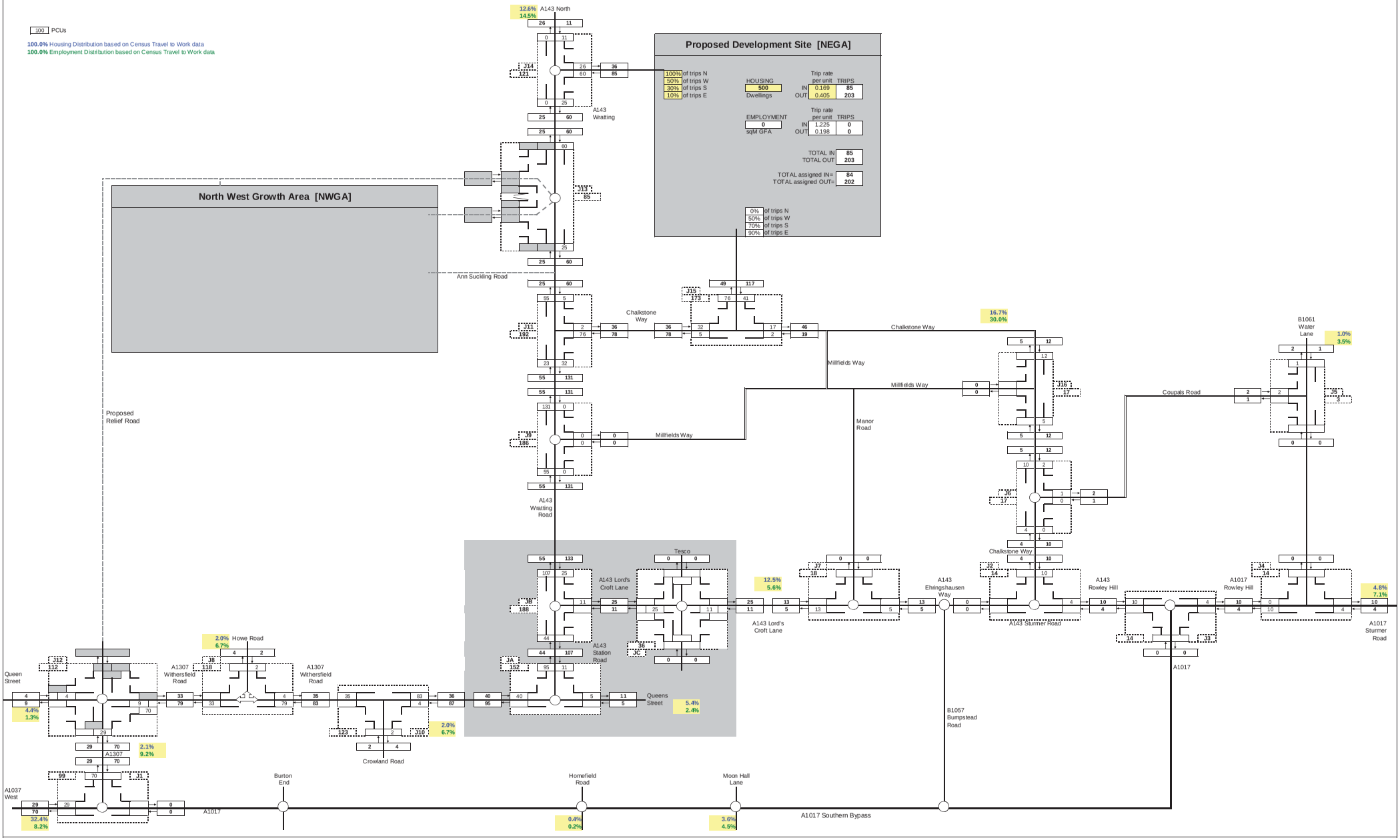
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**AM Peak NWGA Phase 2 Traffic Flows With Relief Road [PCUs]**	**Figure 10a**	



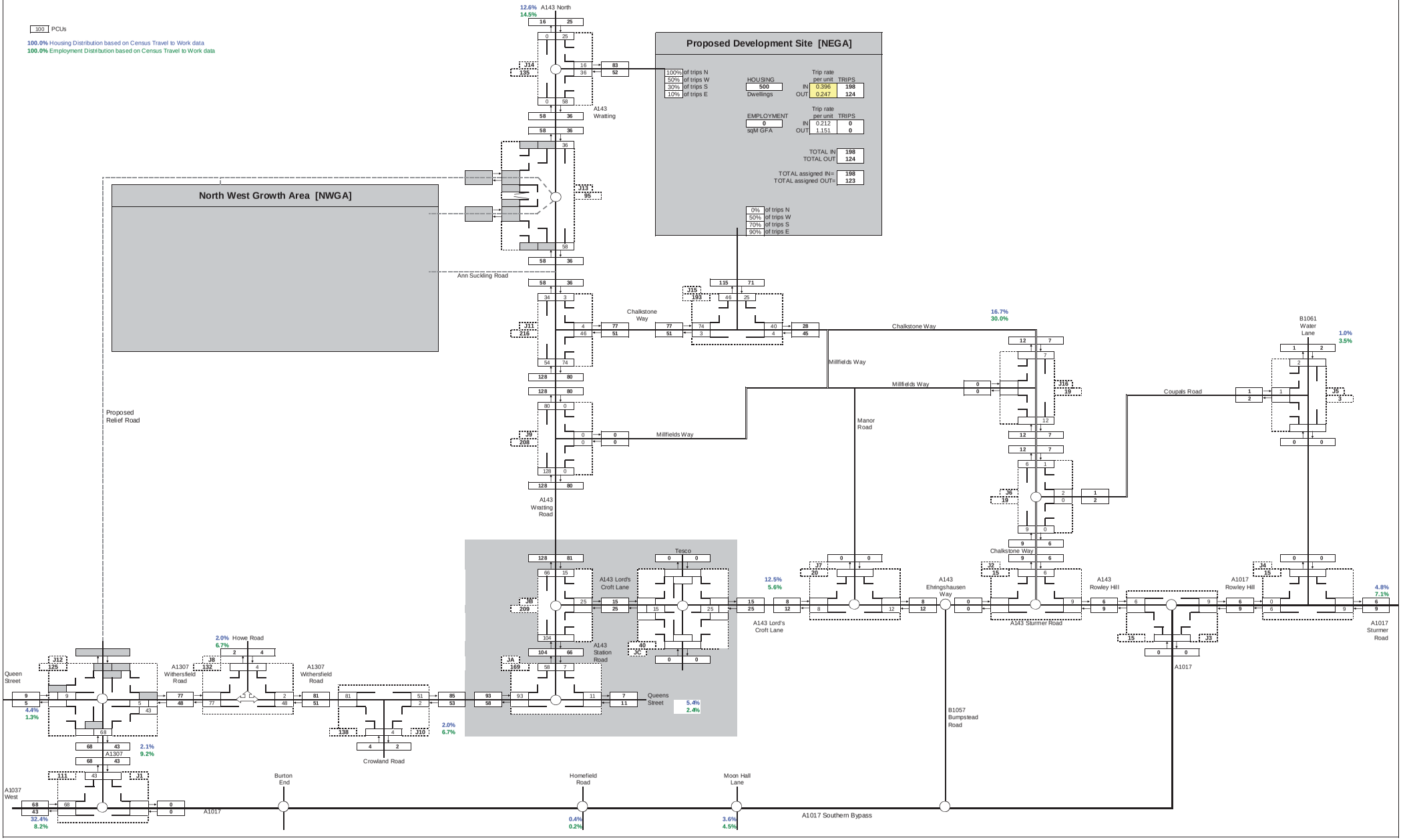
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**PM Peak NWGA Phase 2 Traffic Flows With Relief Road [PCUs]**	**Figure 10p**	



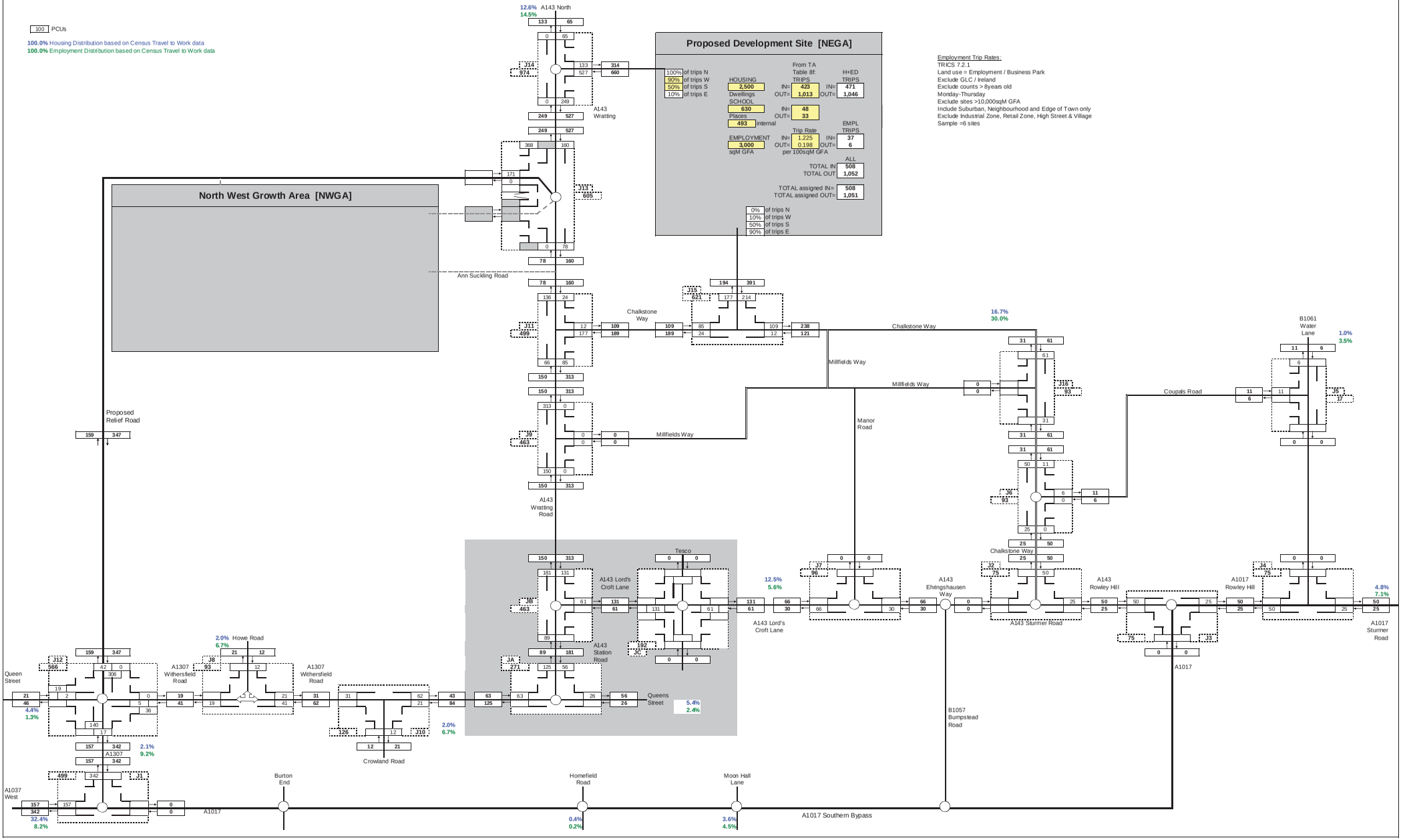
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**AM Peak NEGA Traffic Flows [PCUs]**	**Figure 11a**	



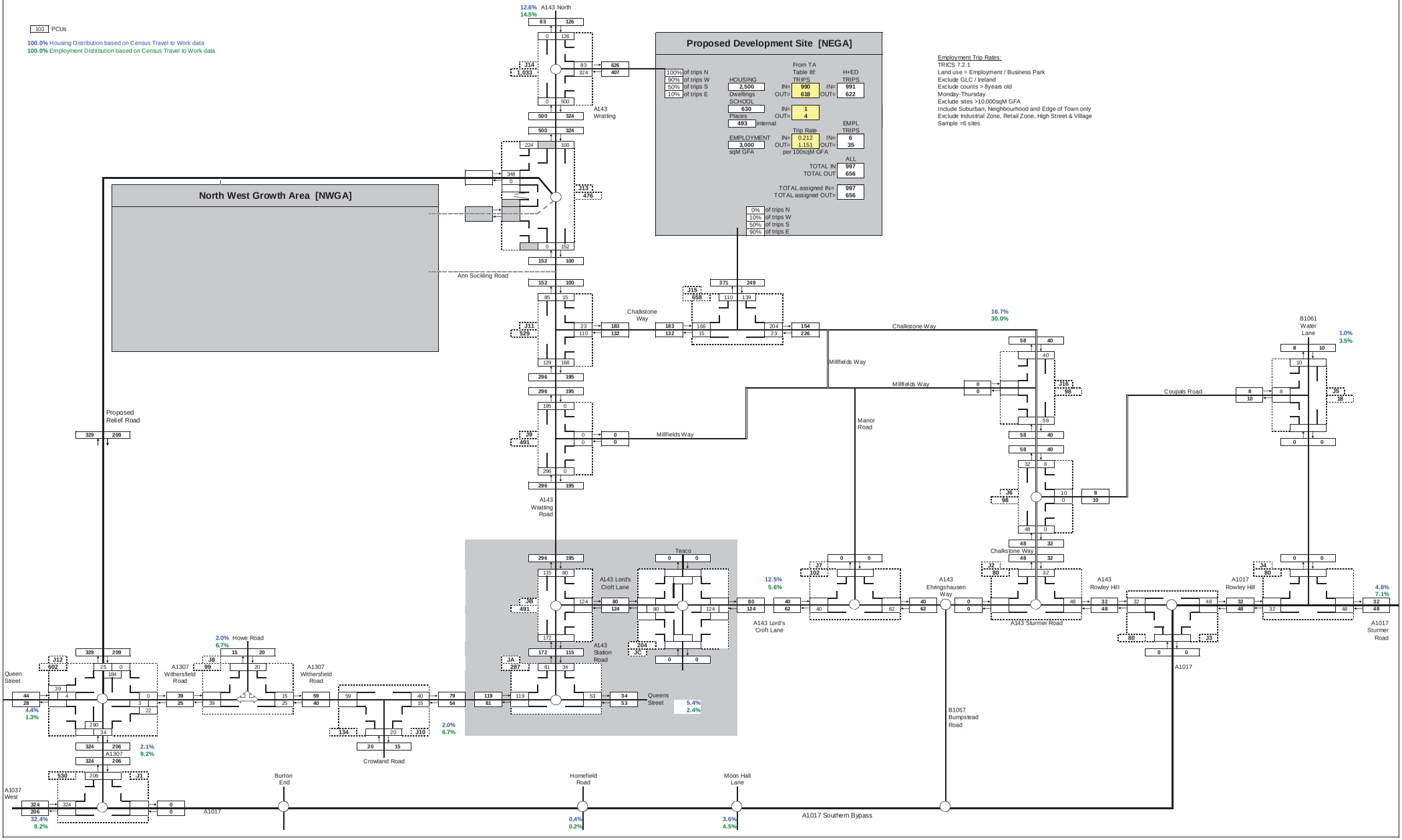
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**PM Peak NEGA Traffic Flows [PCUs]**	**Figure 11p**	



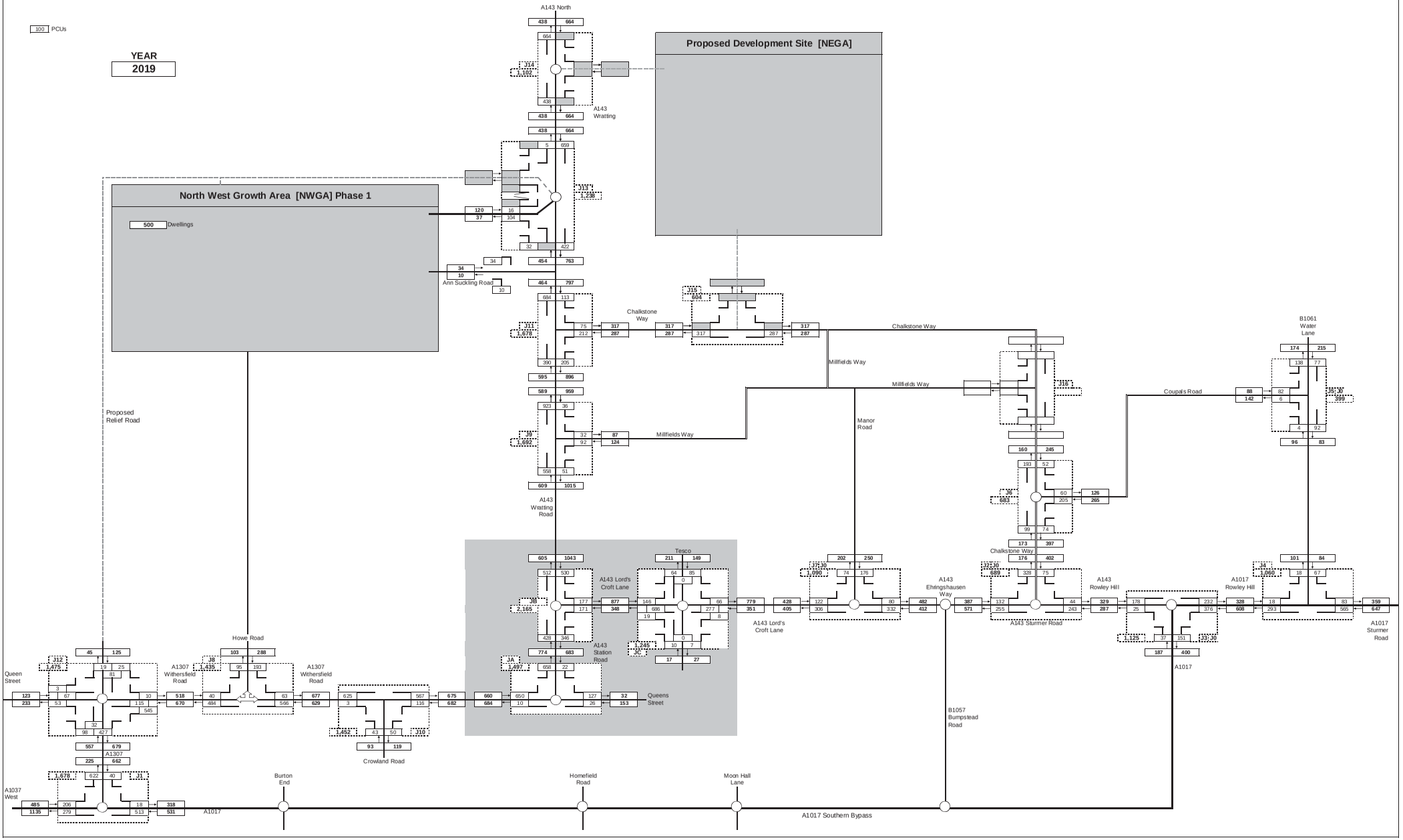
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**AM Peak NEGA Traffic Flows With Relief Road [PCUs]**	**Figure 12a**	



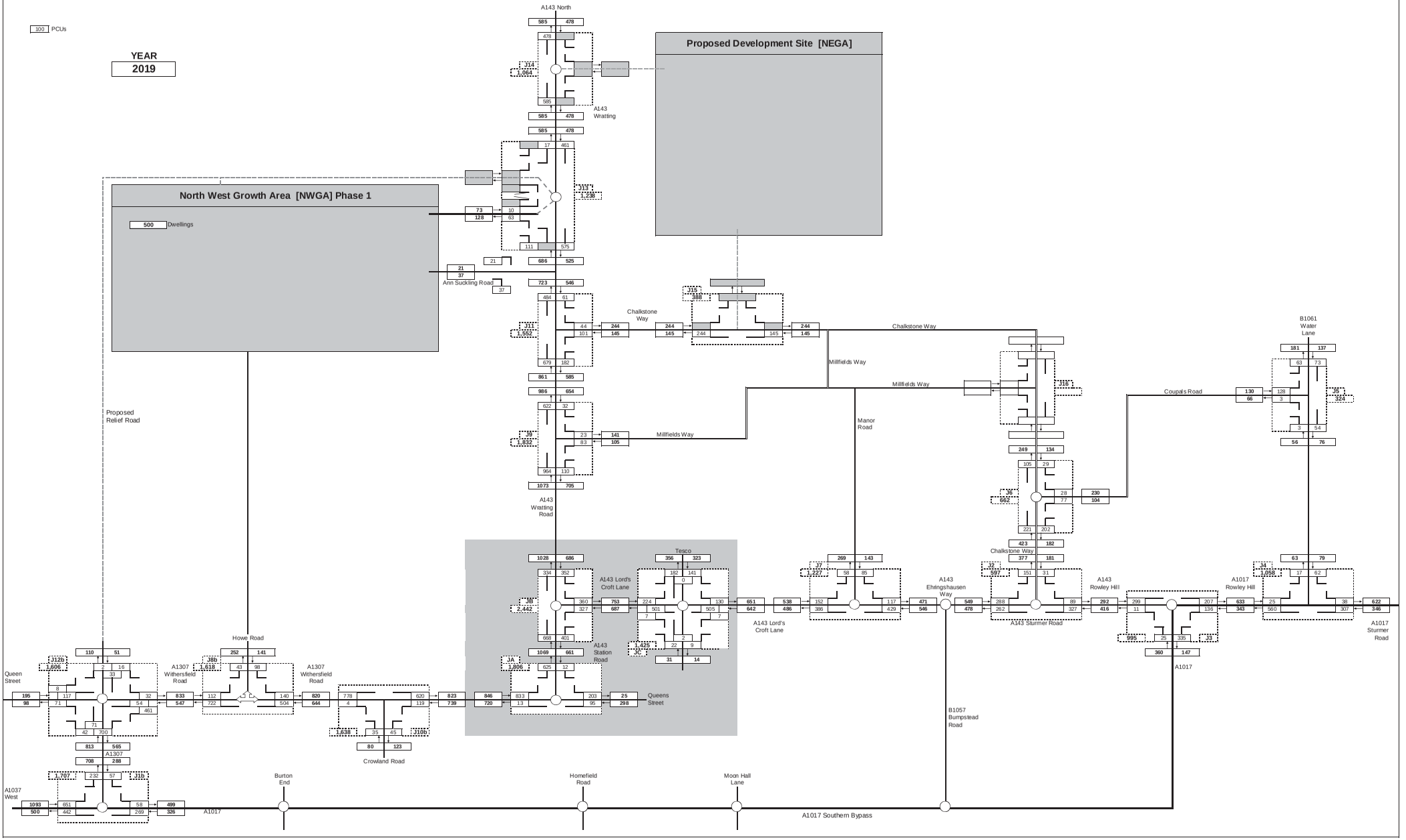
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**PM Peak NEGA Traffic Flows With Relief Road [PCUs]**	**Figure 12p**	



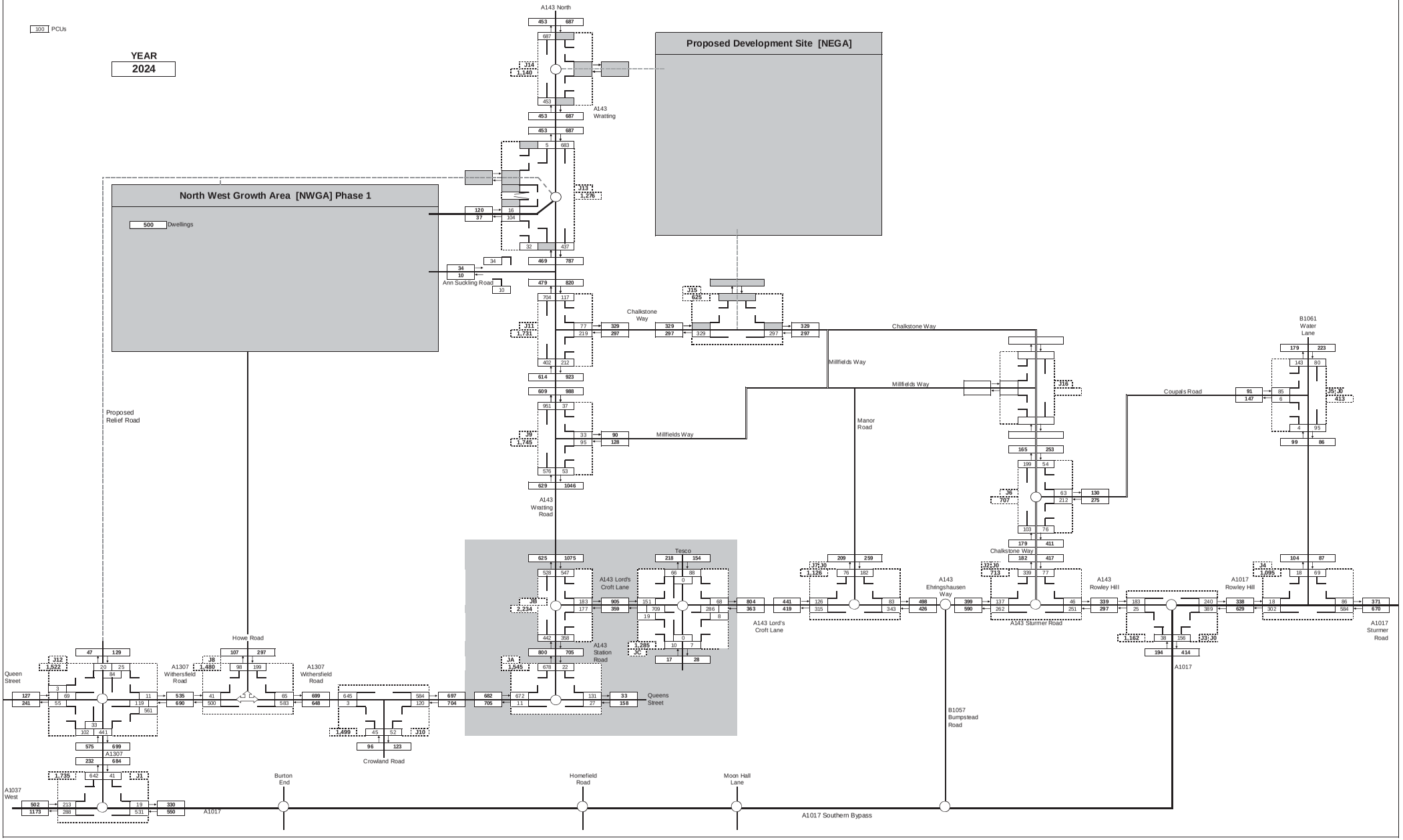
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2019 AM Peak Future Year Traffic Flows with NW Phase 1 Development but no Relief Road [PCUs]**	**Figure 13a**	



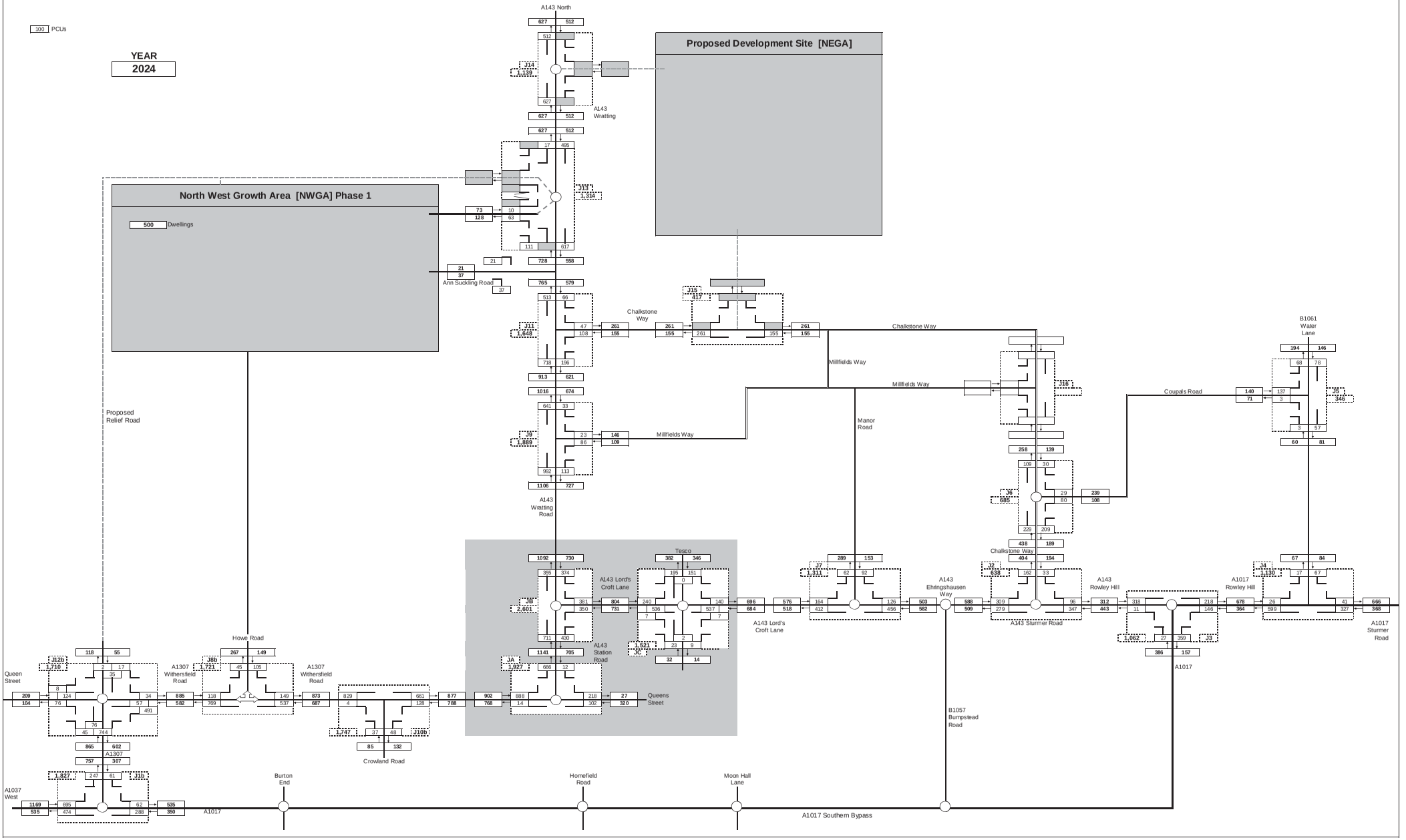
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2019 PM Peak Future Year Traffic Flows with NW Phase 1 Development but no Relief Road [PCUs]**	**Figure 13p**	



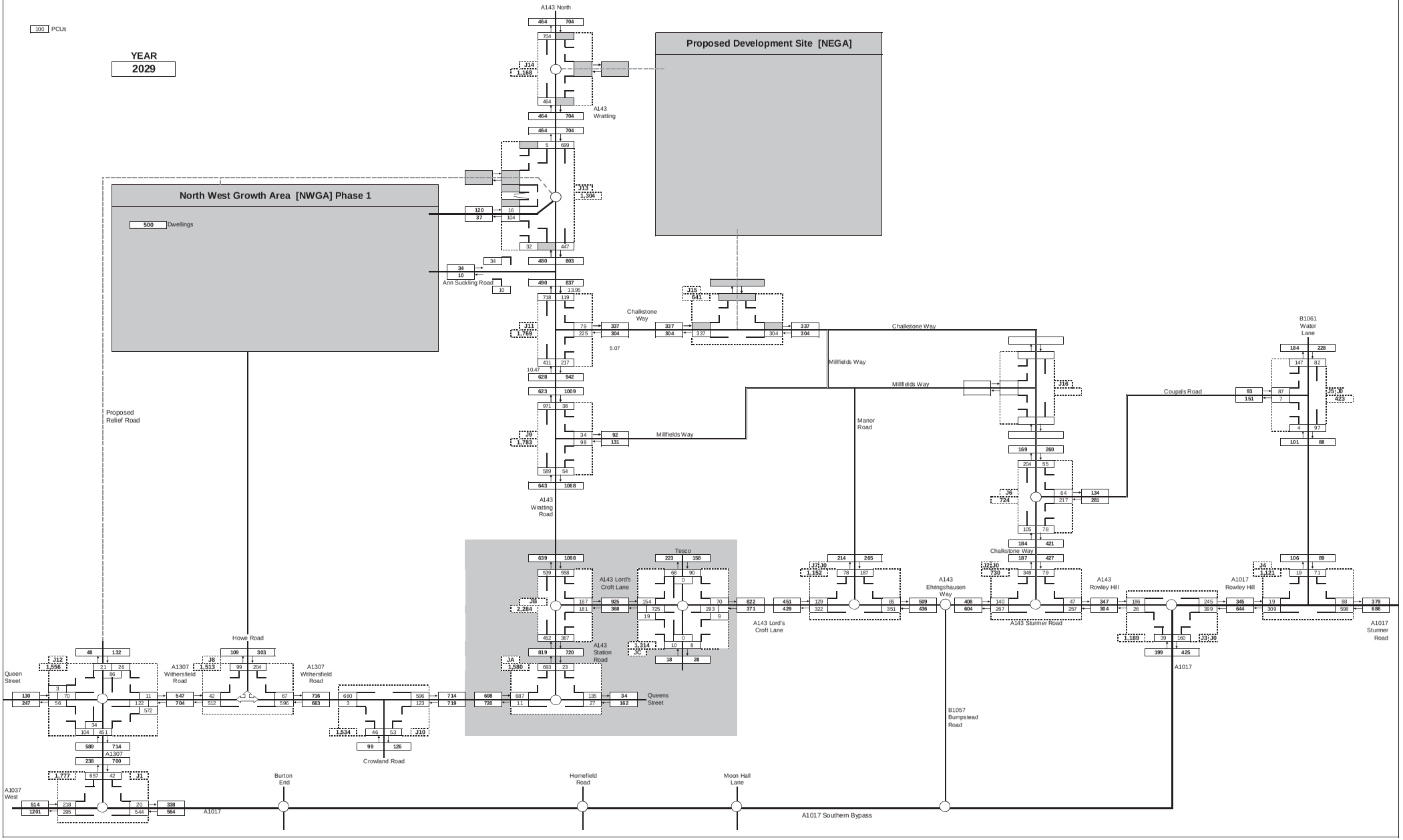
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2024 AM Peak Future Year Traffic Flows with NW Phase 1 Development but no Relief Road [PCUs]**	**Figure 15a**	



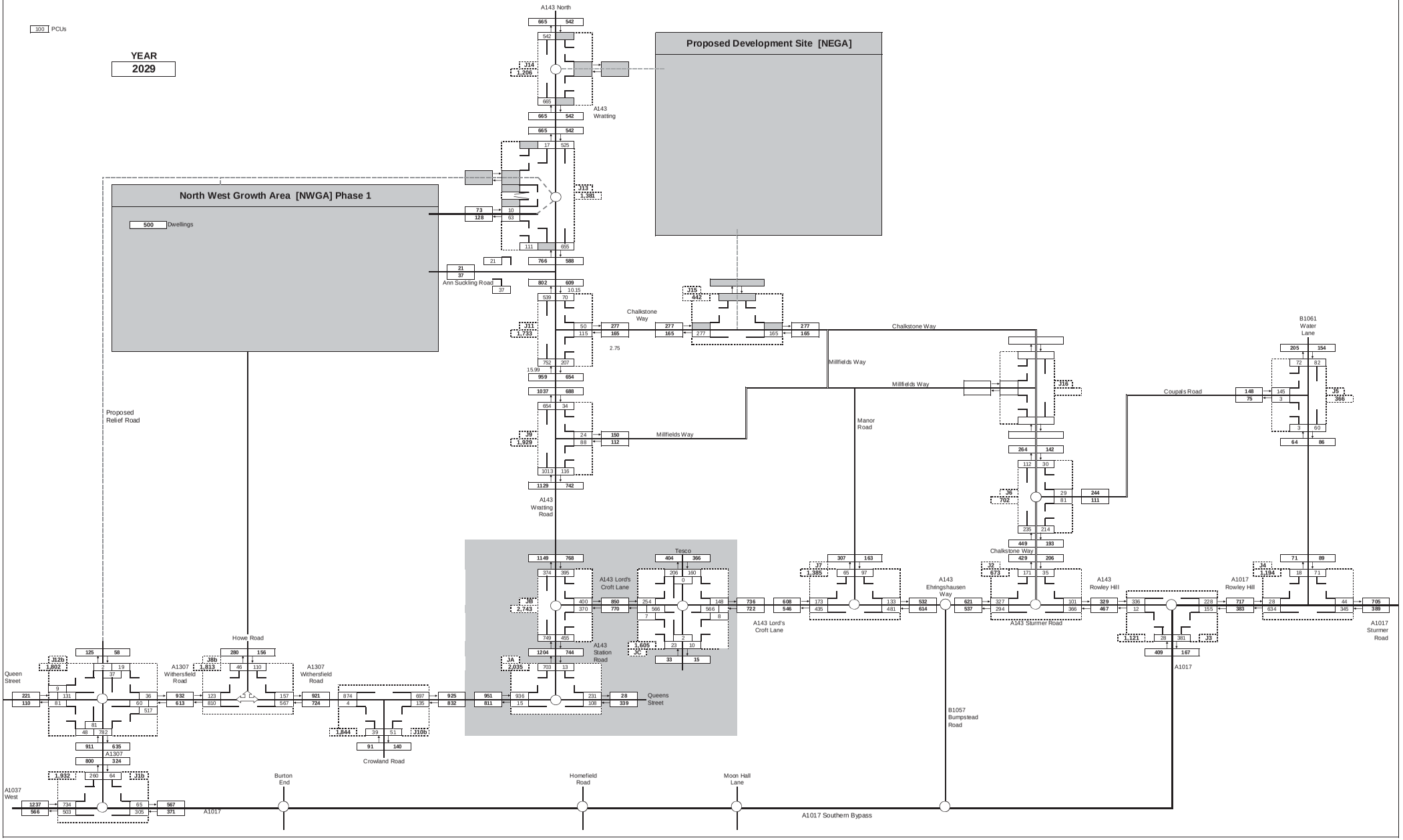
Client:	Hallam Land Management & Commercial Estates Group	Prepared by: S.M.T.	Brookbanks Consulting
Job:	10173 Land at Haverhill	19/04/2016	
Title:	2024 PM Peak Future Year Traffic Flows with NW Phase 1 Development but no Relief Road [PCUs]	Figure 15p	



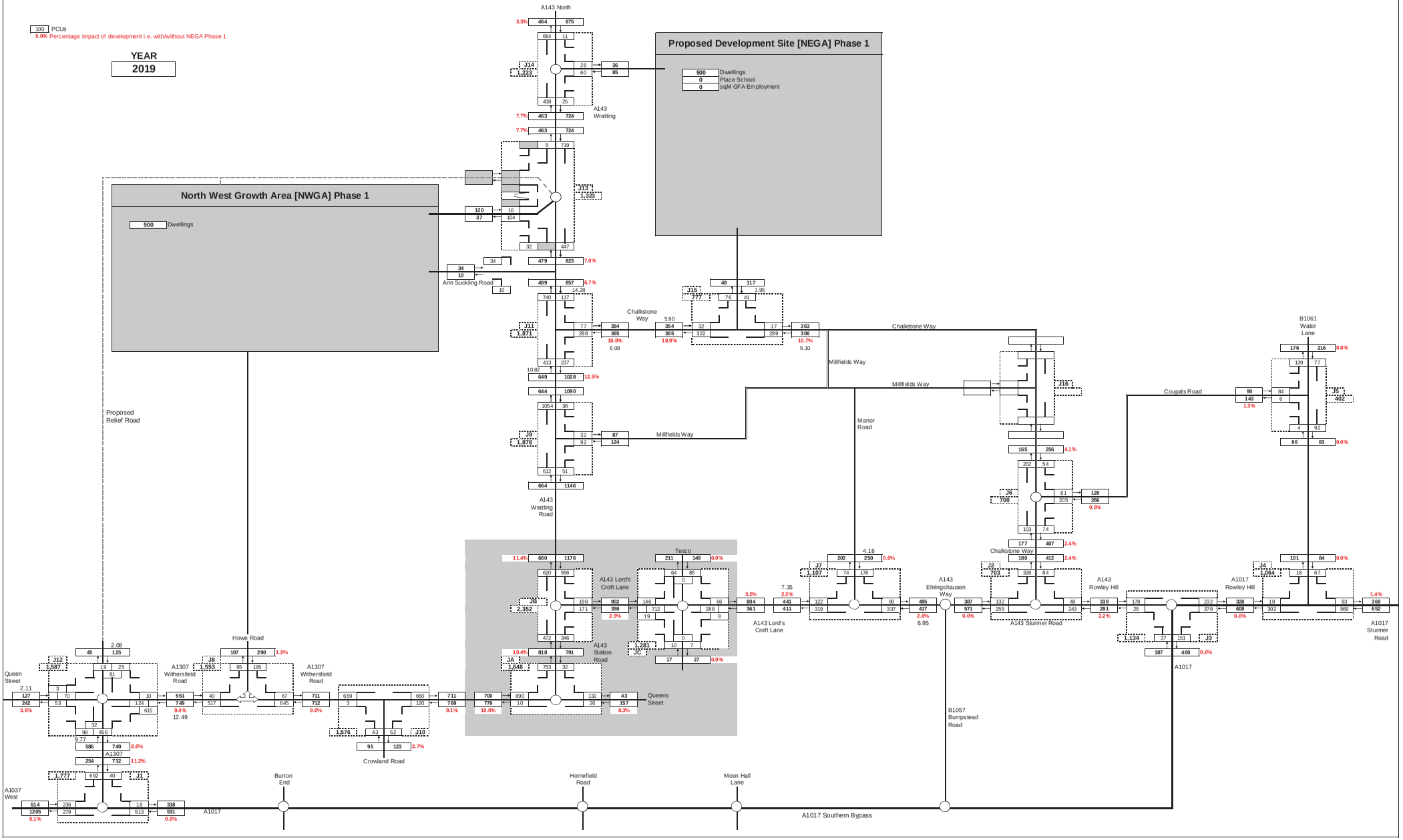
Client:	Hallam Land Management & Commercial Estates Group	Prepared by: S.M.T.	Brookbanks Consulting
Job:	10173 Land at Haverhill	19/04/2016	
Title:	2029 AM Peak Future Year Traffic Flows with NW Phase 1 Development but no Relief Road [PCUs]	Figure 17a	



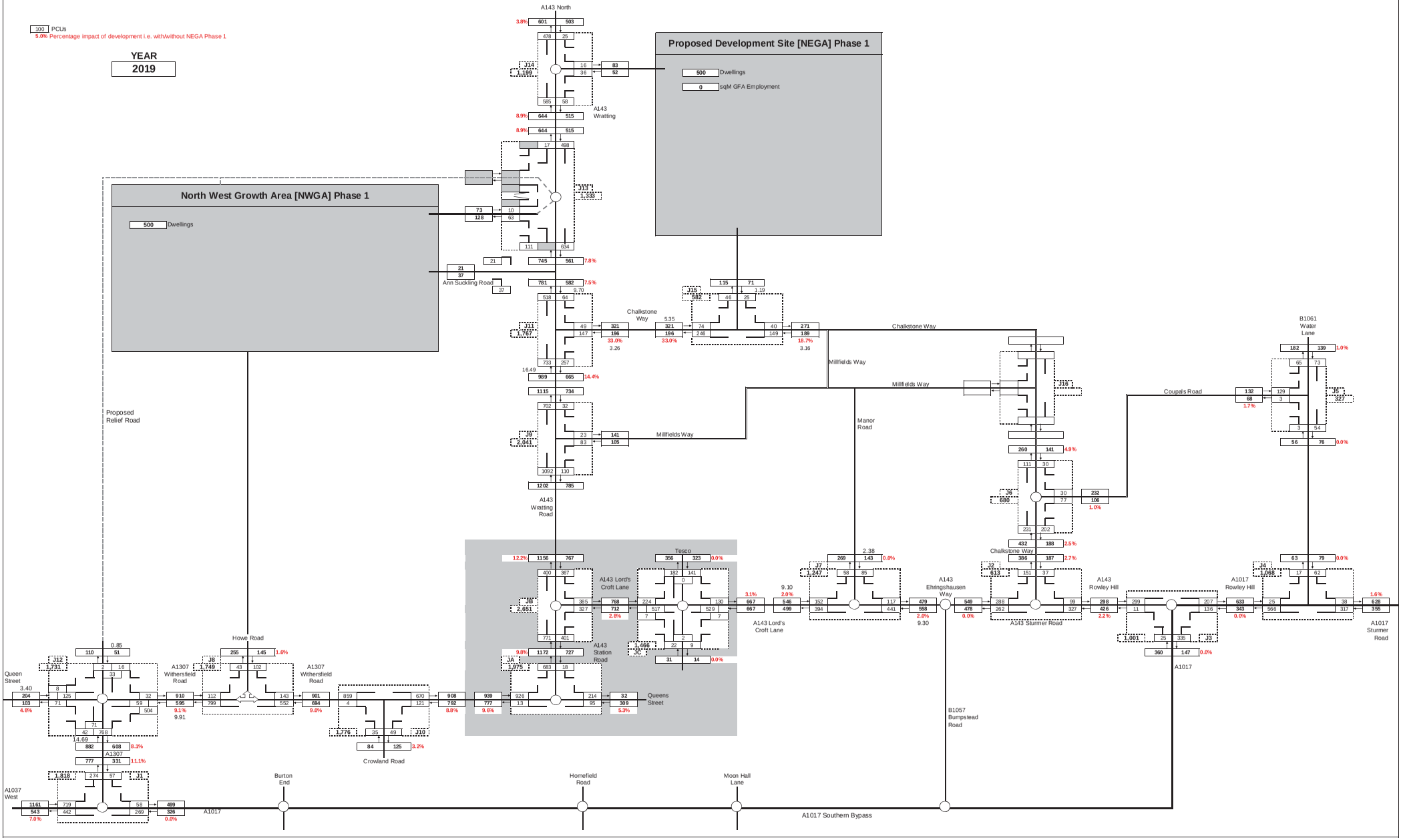
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2029 PM Peak Future Year Traffic Flows with NW Phase 1 Development but no Relief Road [PCUs]**	**Figure 17p**	



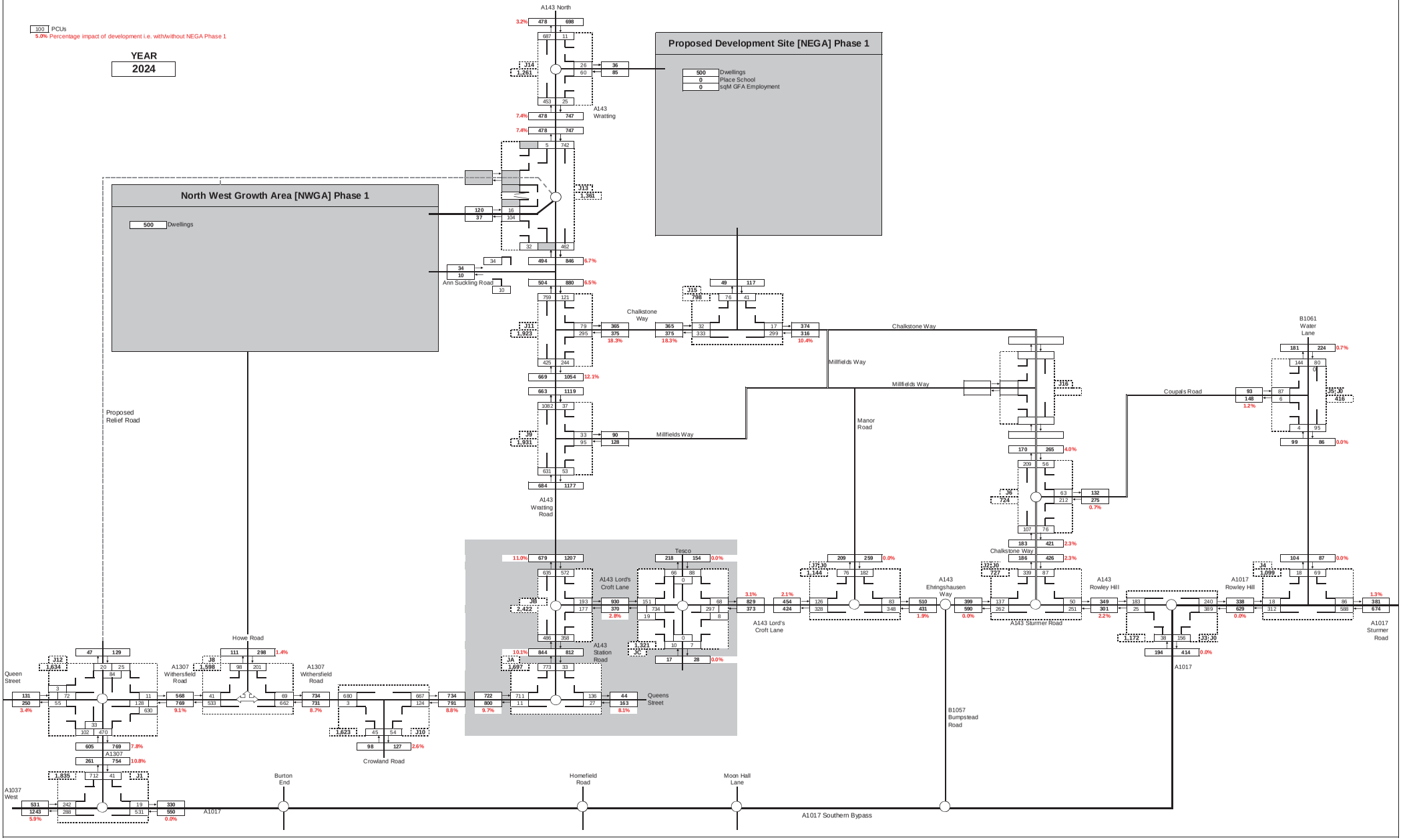
Client:	Hallam Land Management & Commercial Estates Group	Prepared by: S.M.T.	Brookbanks Consulting
Job:	10173 Land at Haverhill	19/04/2016	
Title:	2019 AM Peak Future Year Traffic Flows with NW+NE Phase 1 Developments but no Relief Road [PCUs]	Figure 14a	



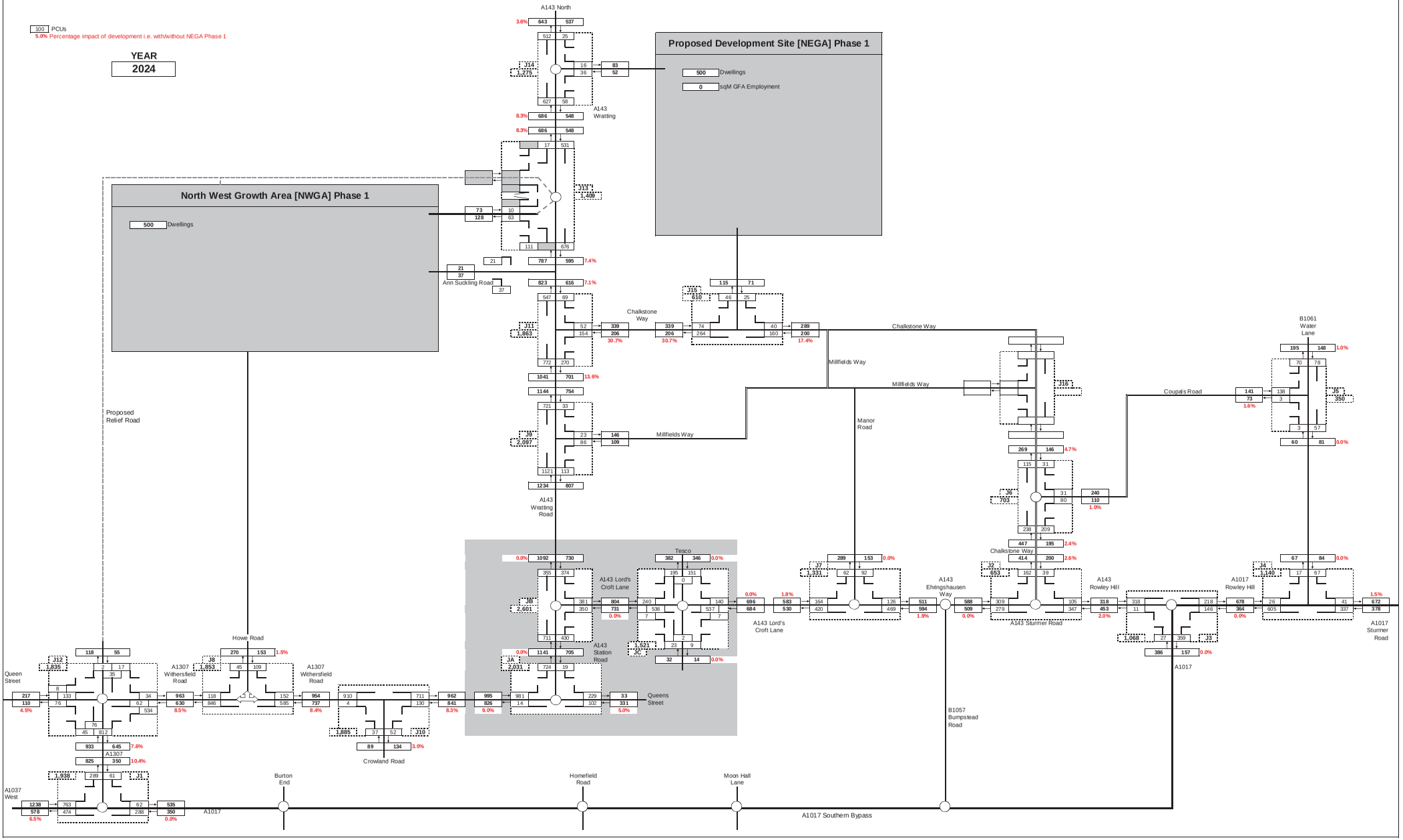
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2019 PM Peak Future Year Traffic Flows with NW+NE Phase 1 Developments but no Relief Road [PCUs]**	**Figure 14p**	



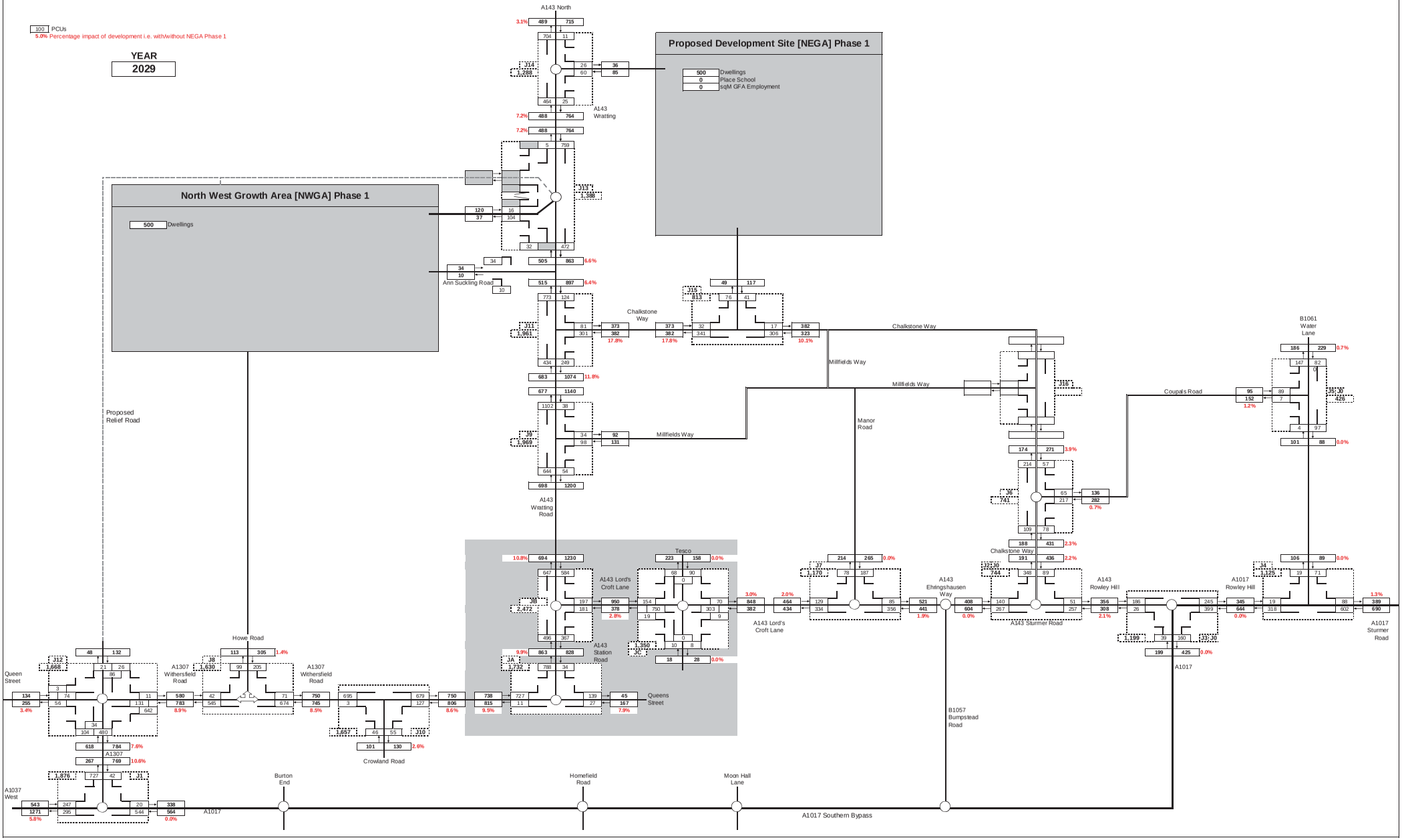
Client:	Hallam Land Management & Commercial Estates Group	Prepared by: S.M.T.	Brookbanks Consulting
Job:	10173 Land at Haverhill	19/04/2016	
Title:	2024 AM Peak Future Year Traffic Flows with NW+NE Phase 1 Developments but no Relief Road [PCUs]	Figure 16a	



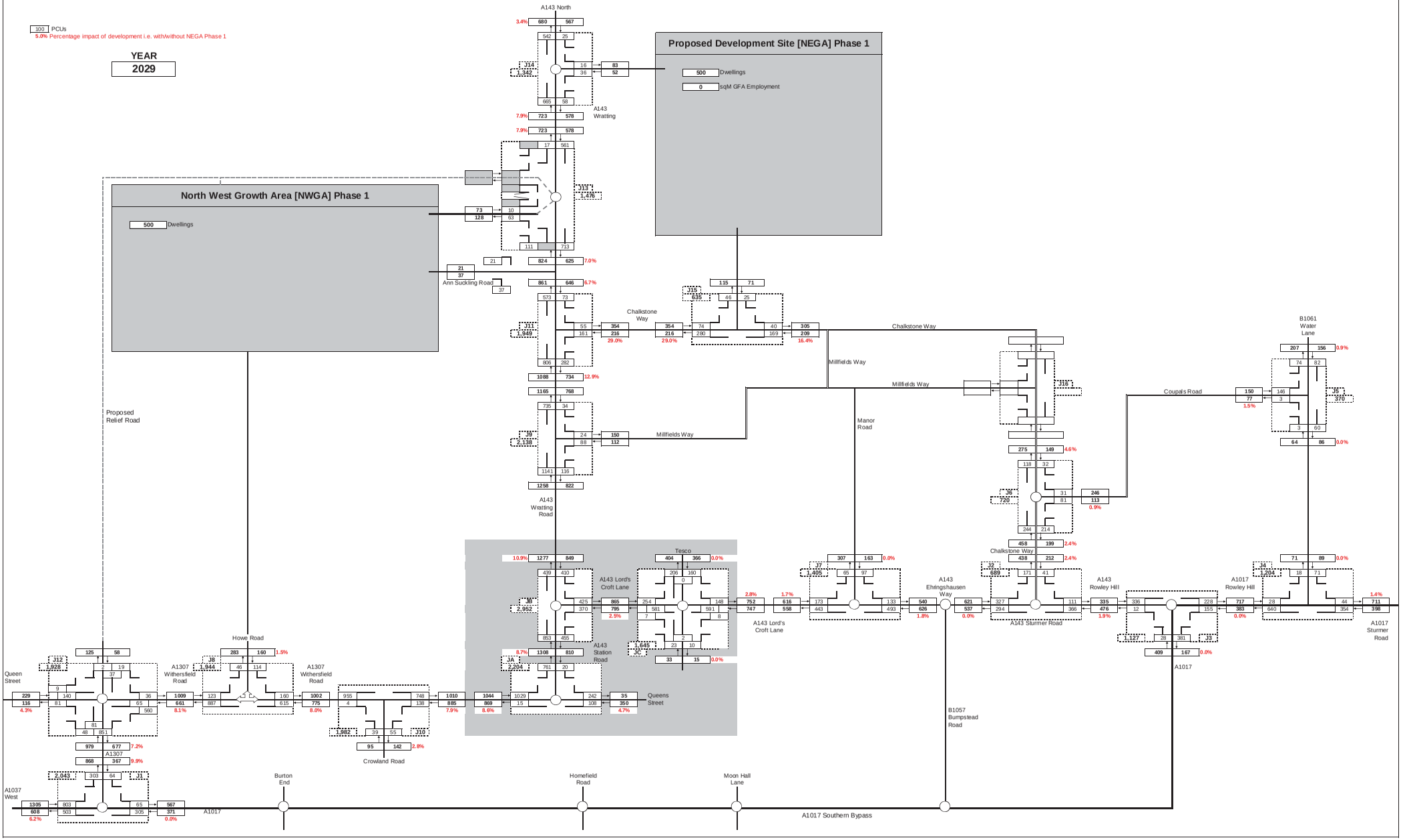
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2024 PM Peak Future Year Traffic Flows with NW+NE Phase 1 Developments but no Relief Road [PCUs]**	**Figure 16p**	



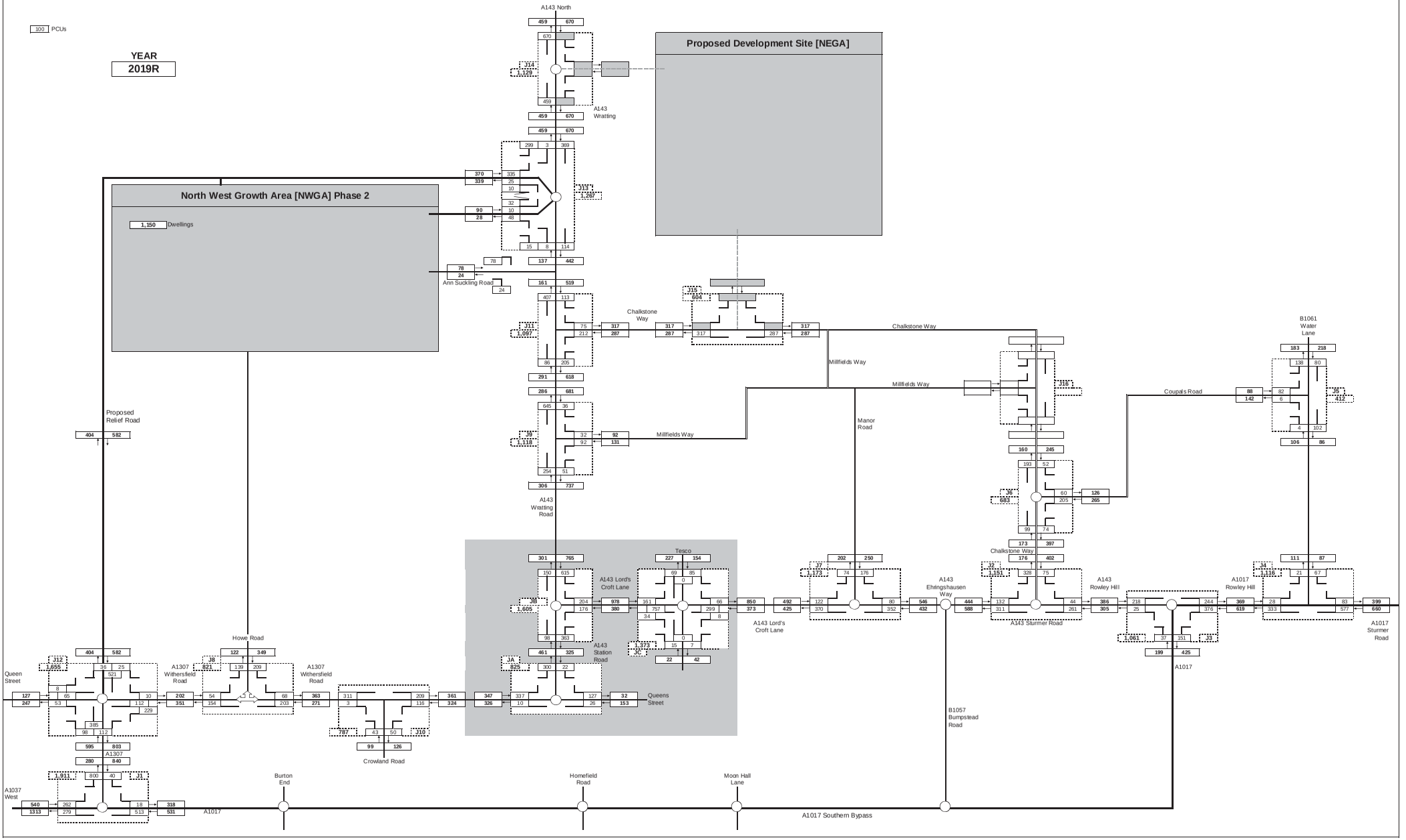
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2029 AM Peak Future Year Traffic Flows with NW+NE Phase 1 Developments but no Relief Road [PCUs]**	**Figure 18a**	



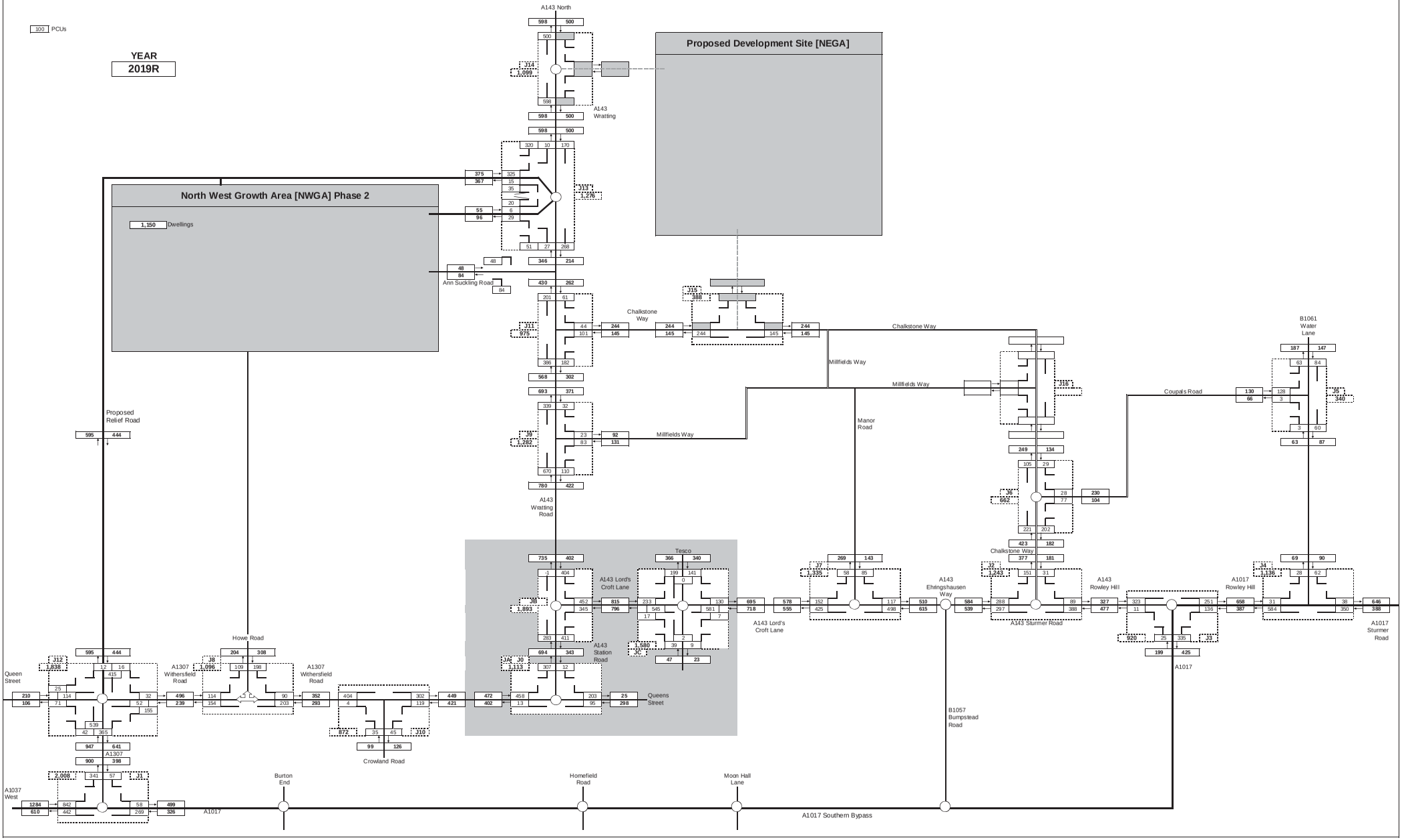
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2029 PM Peak Future Year Traffic Flows with NW+NE Phase 1 Developments but no Relief Road [PCUs]**	**Figure 18p**	



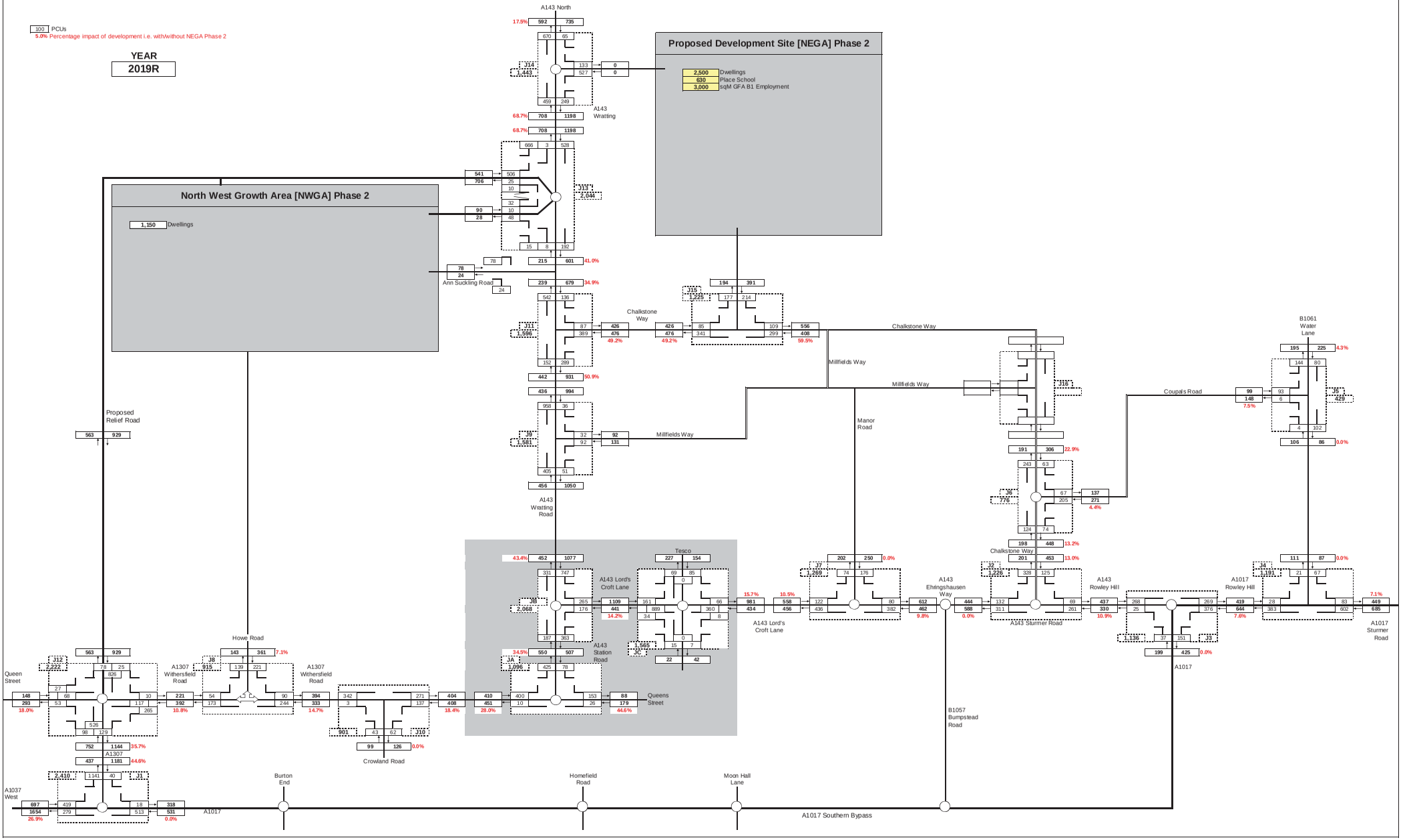
Client:	Hallam Land Management & Commercial Estates Group	Prepared by: S.M.T.	Brookbanks Consulting
Job:	10173 Land at Haverhill	19/04/2016	
Title:	2019 AM Peak Future Year Traffic Flows with NW Phase 2 Development and Relief Road [PCUs]	Figure 19a	



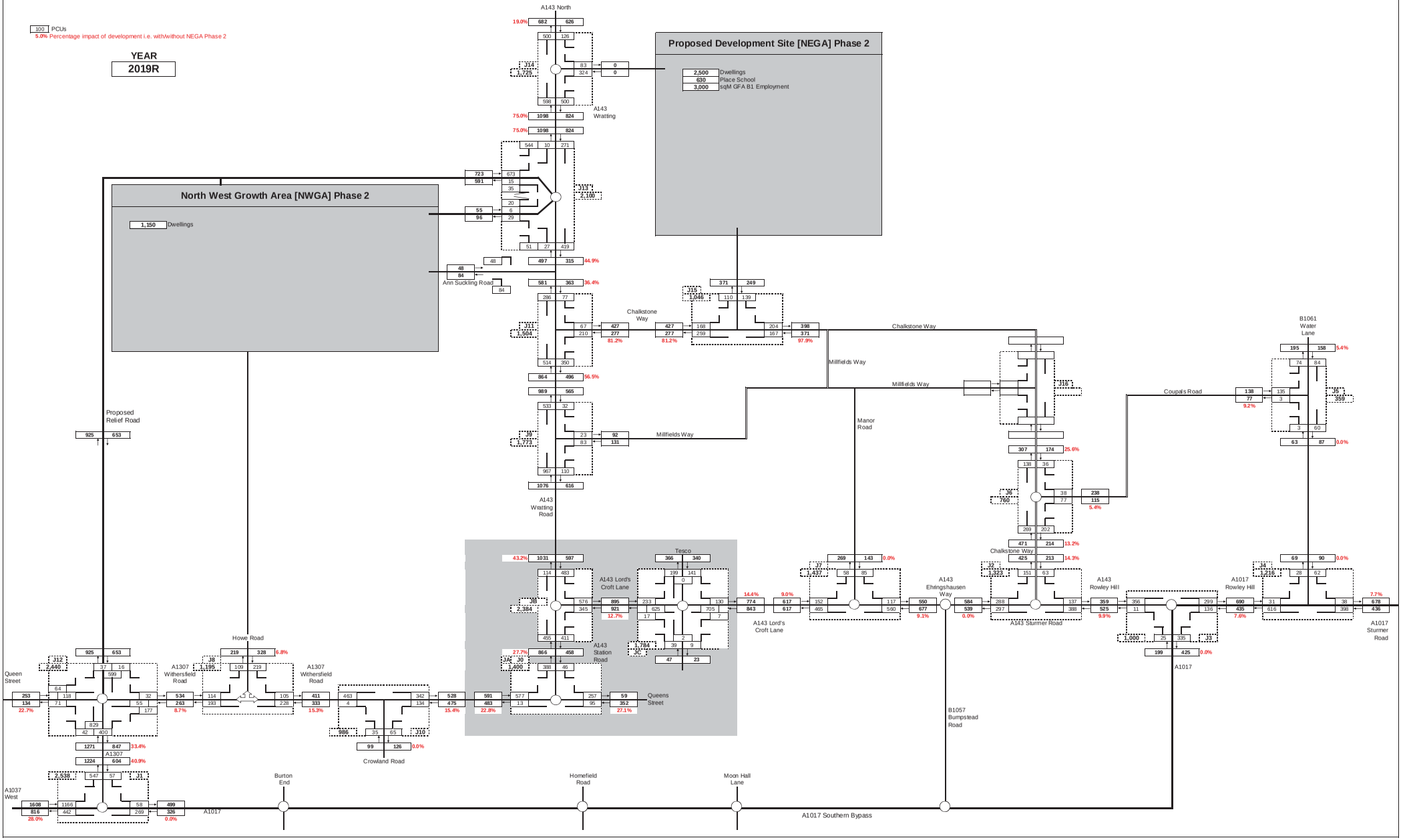
Client:	Hallam Land Management & Commercial Estates Group	Prepared by: S.M.T.	Brookbanks Consulting
Job:	10173 Land at Haverhill	12/03/2015	
Title:	2019 PM Peak Future Year Traffic Flows with NW Phase 2 Development and Relief Road [PCUs]	Figure 14p	



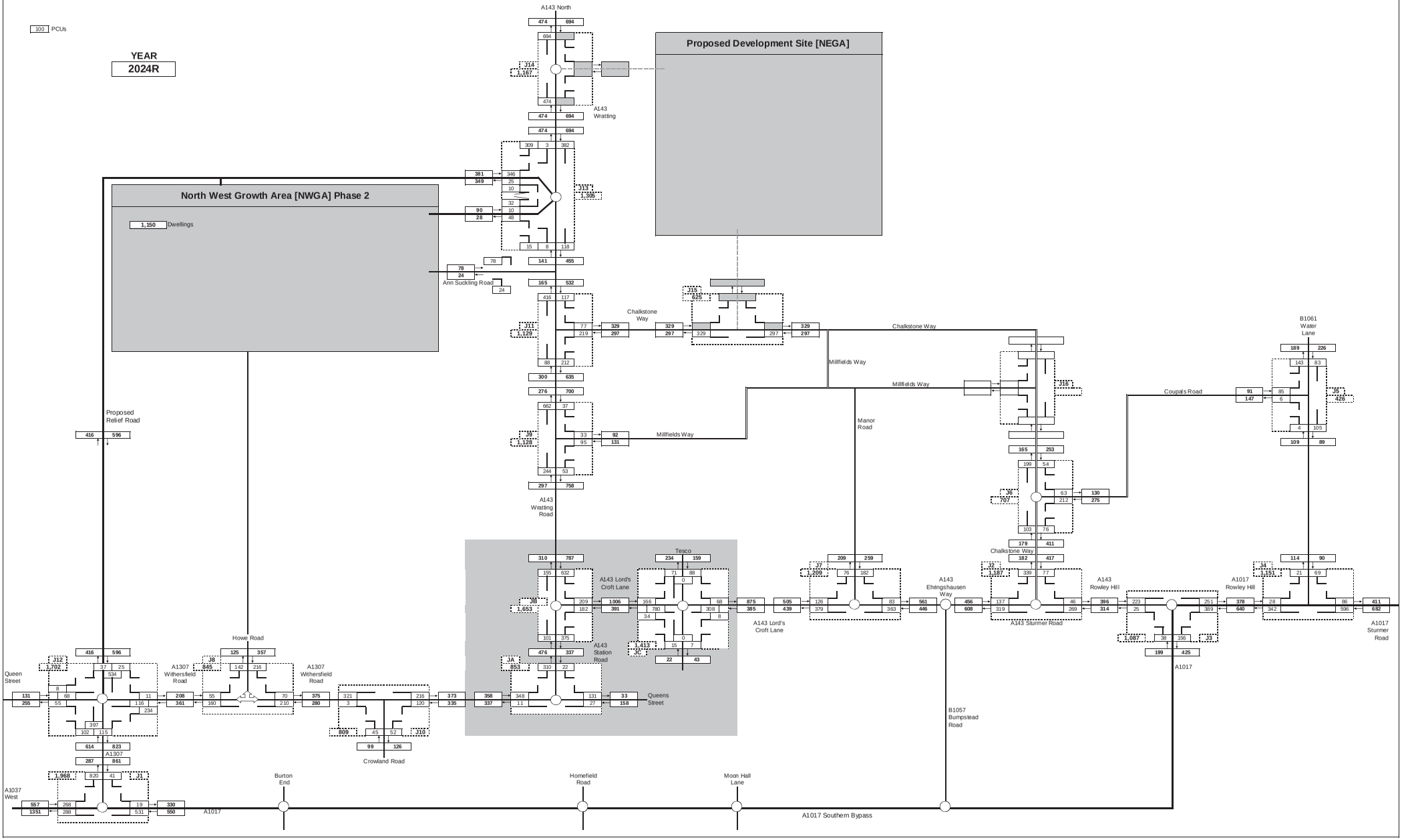
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2019 AM Peak Future Year Traffic Flows with NW+NE Phase 2 Developments and Relief Road [PCUs]**	**Figure 20a**	



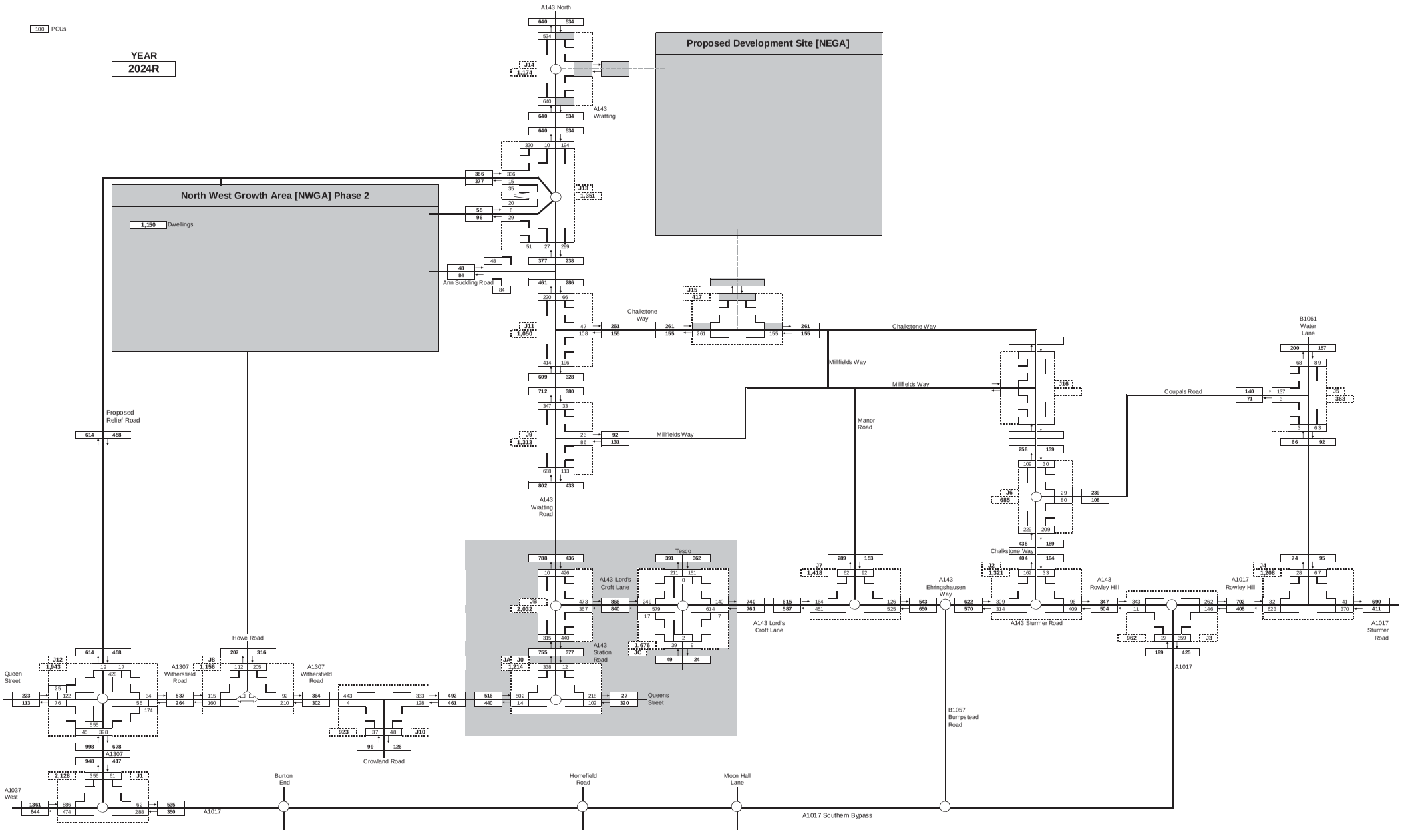
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	12/03/2015	
Title:	**2019 PM Peak Future Year Traffic Flows with Relief Road [PCUs]**	**Figure 14p**	



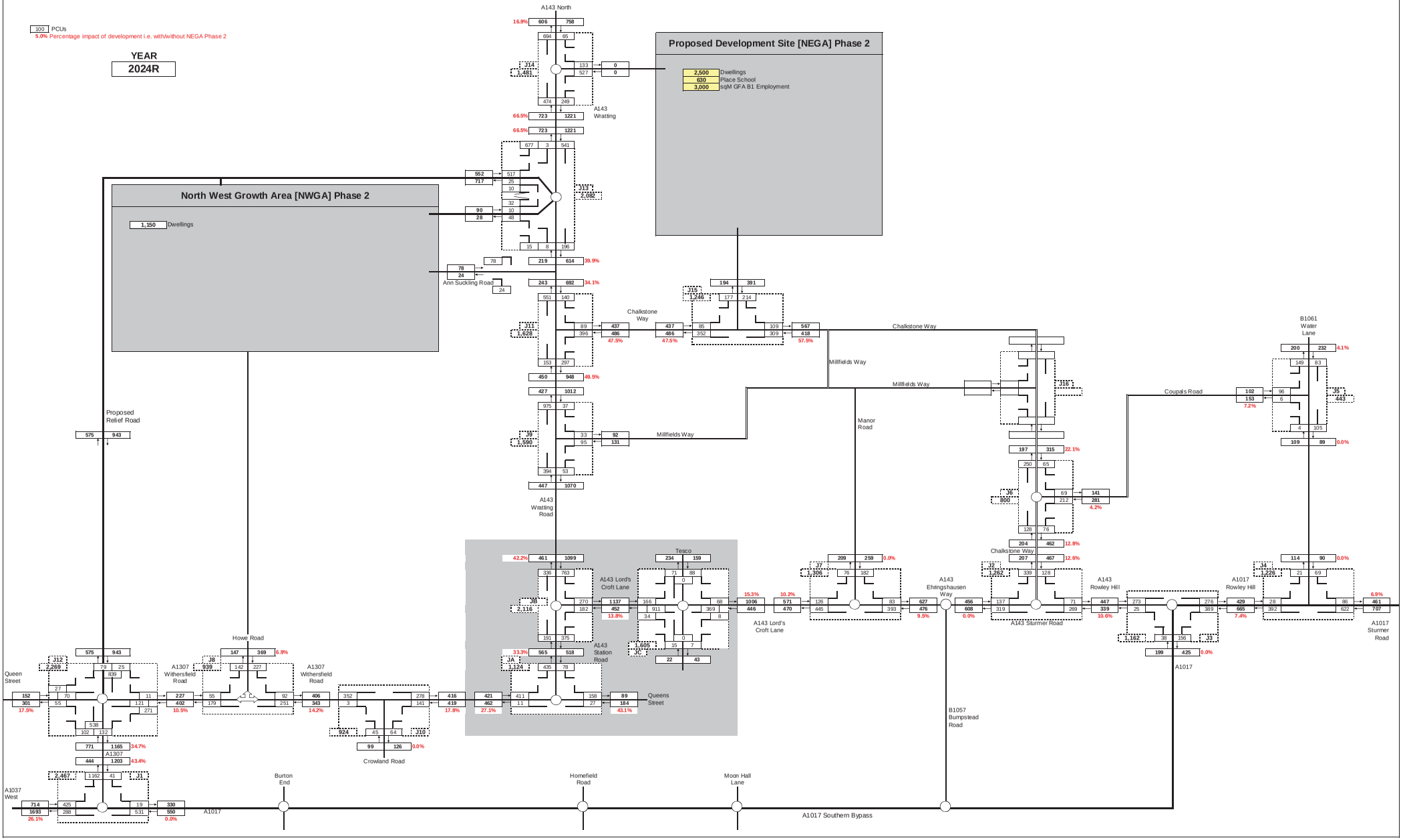
Client:	Hallam Land Management & Commercial Estates Group	Prepared by: S.M.T.	Brookbanks Consulting
Job:	10173 Land at Haverhill	19/04/2016	
Title:	2024 AM Peak Future Year Traffic Flows with NW Phase 2 Development and Relief Road [PCUs]	Figure 21a	



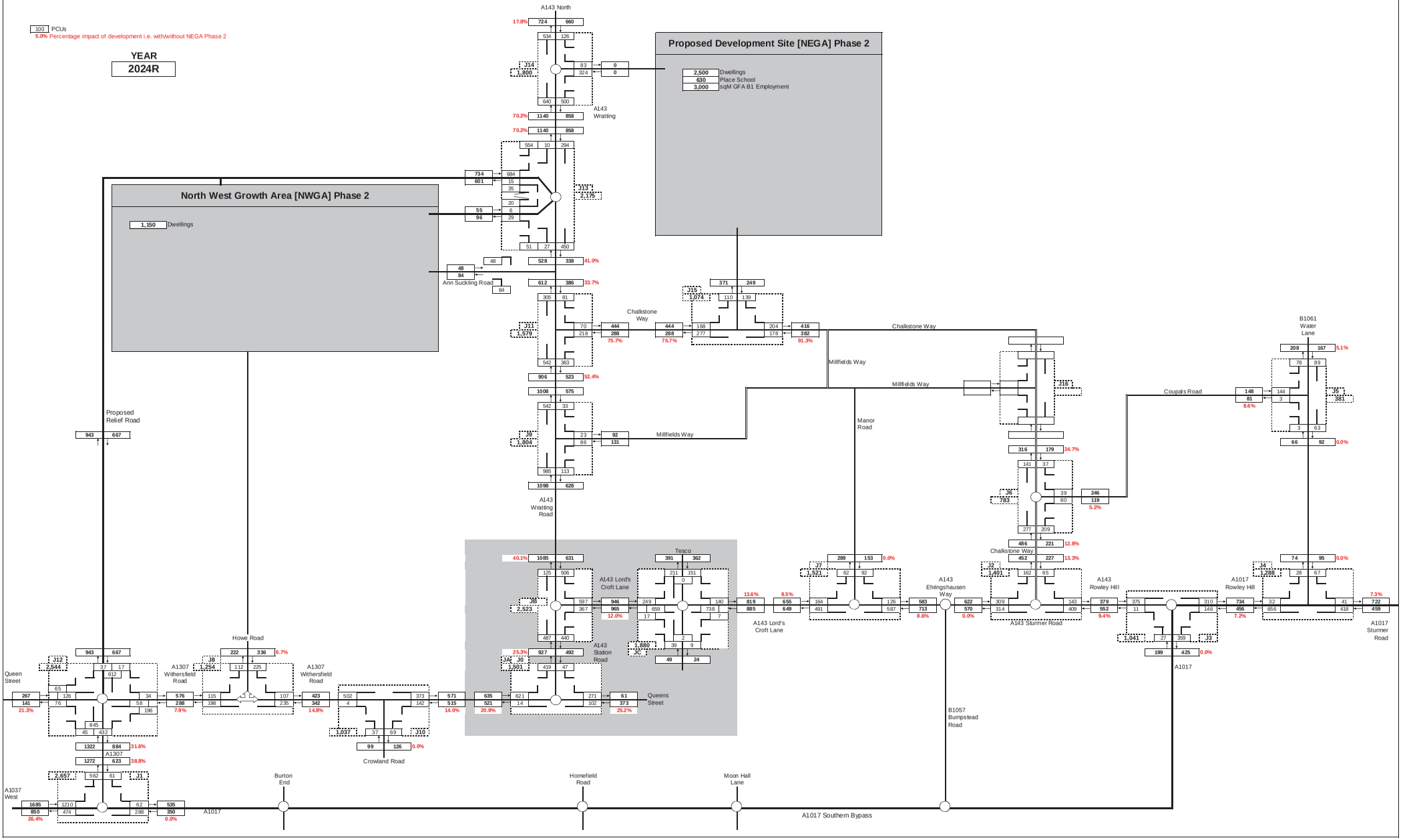
Client:	Hallam Land Management & Commercial Estates Group	Prepared by: S.M.T.	Brookbanks Consulting
Job:	10173 Land at Haverhill	12/03/2015	
Title:	2024 PM Peak Future Year Traffic Flows with NW Phase 2 Development and Relief Road [PCUs]	Figure 14p	



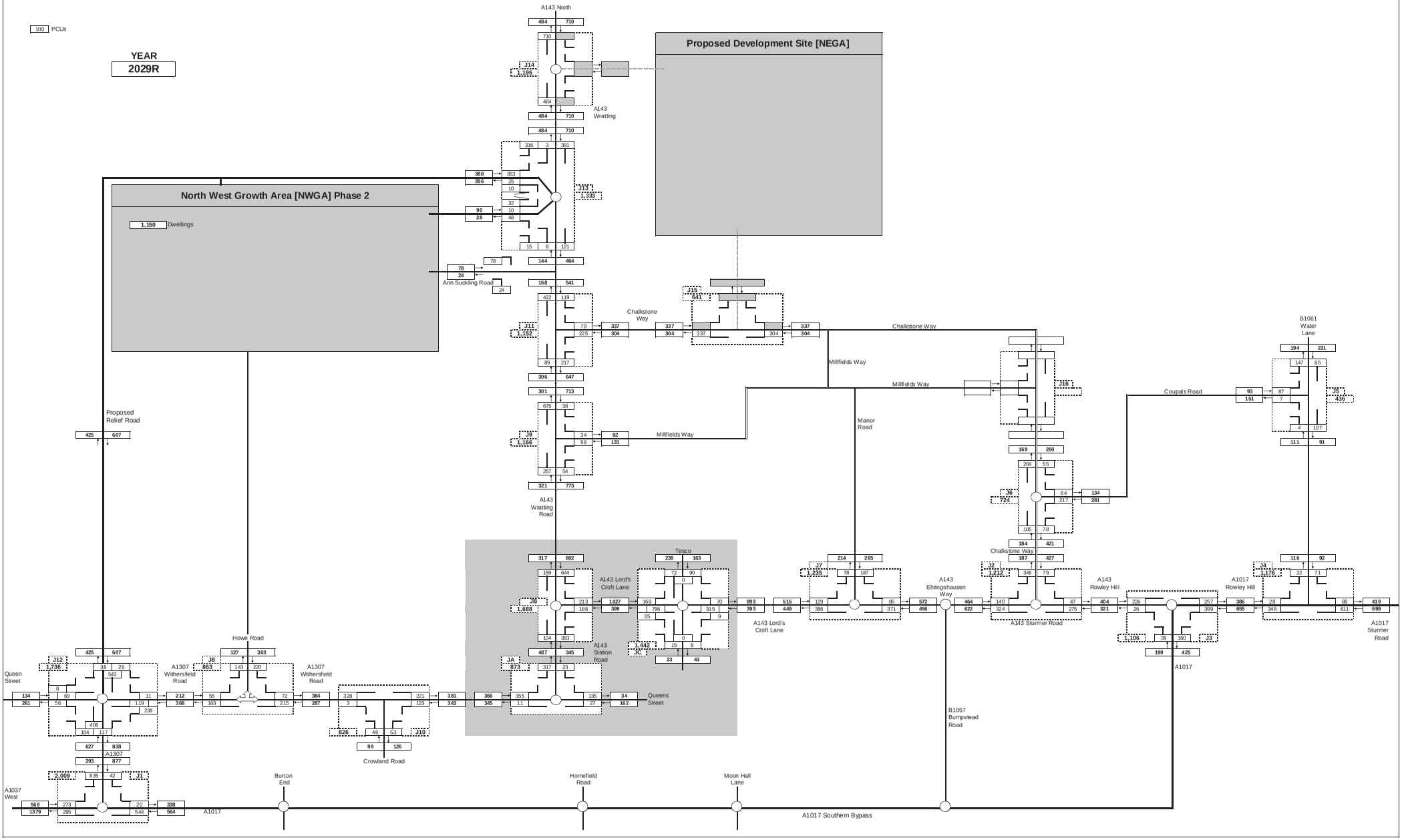
Client:	Hallam Land Management & Commercial Estates Group	Prepared by: S.M.T.	Brookbanks Consulting
Job:	10173 Land at Haverhill	19/04/2016	
Title:	2024 AM Peak Future Year Traffic Flows with NW+NE Phase 2 Developments and Relief Road [PCUs]	Figure 22a	



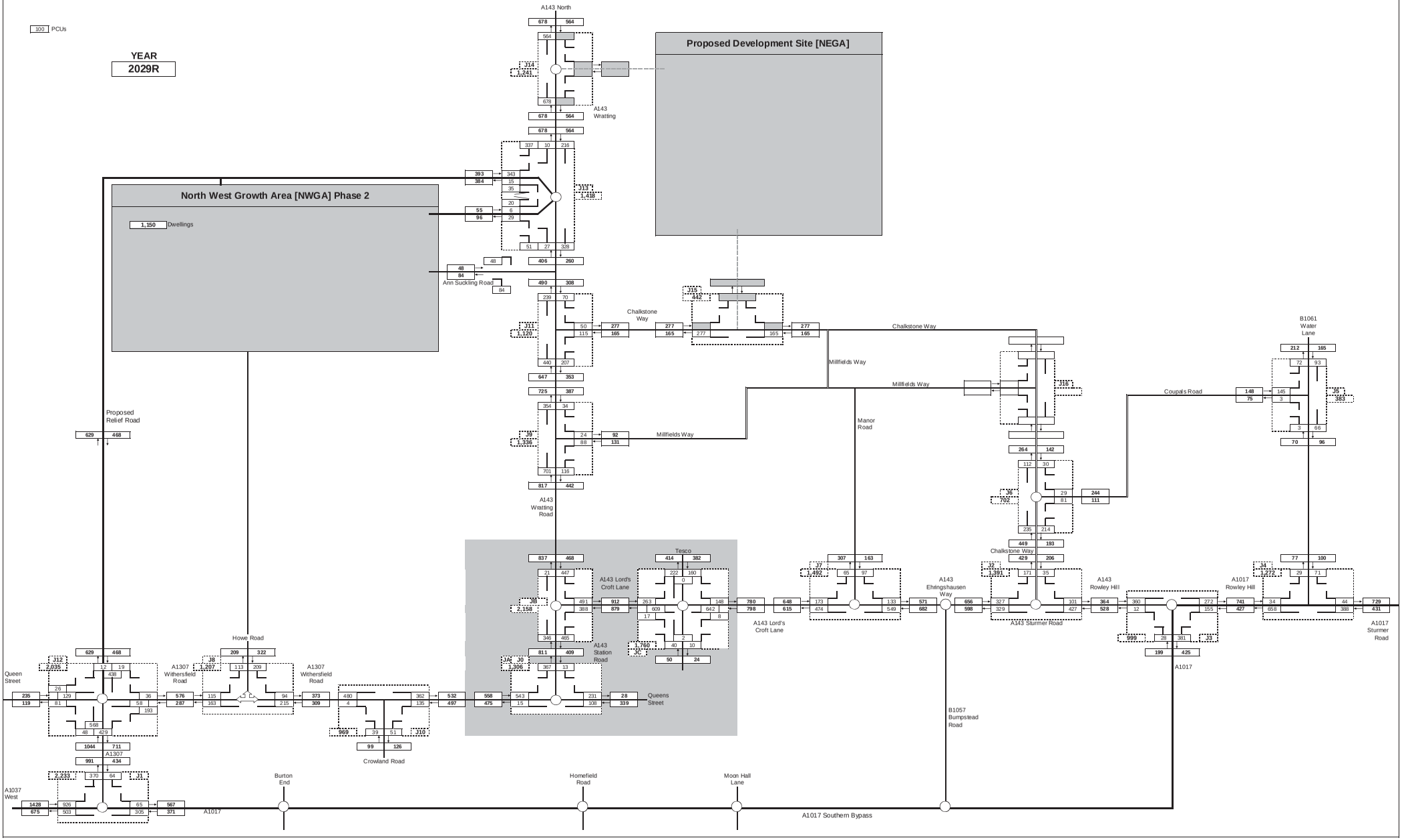
Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	12/03/2015	
Title:	**2024 PM Peak Future Year Traffic Flows with Relief Road [PCUs]**	**Figure 14p**	



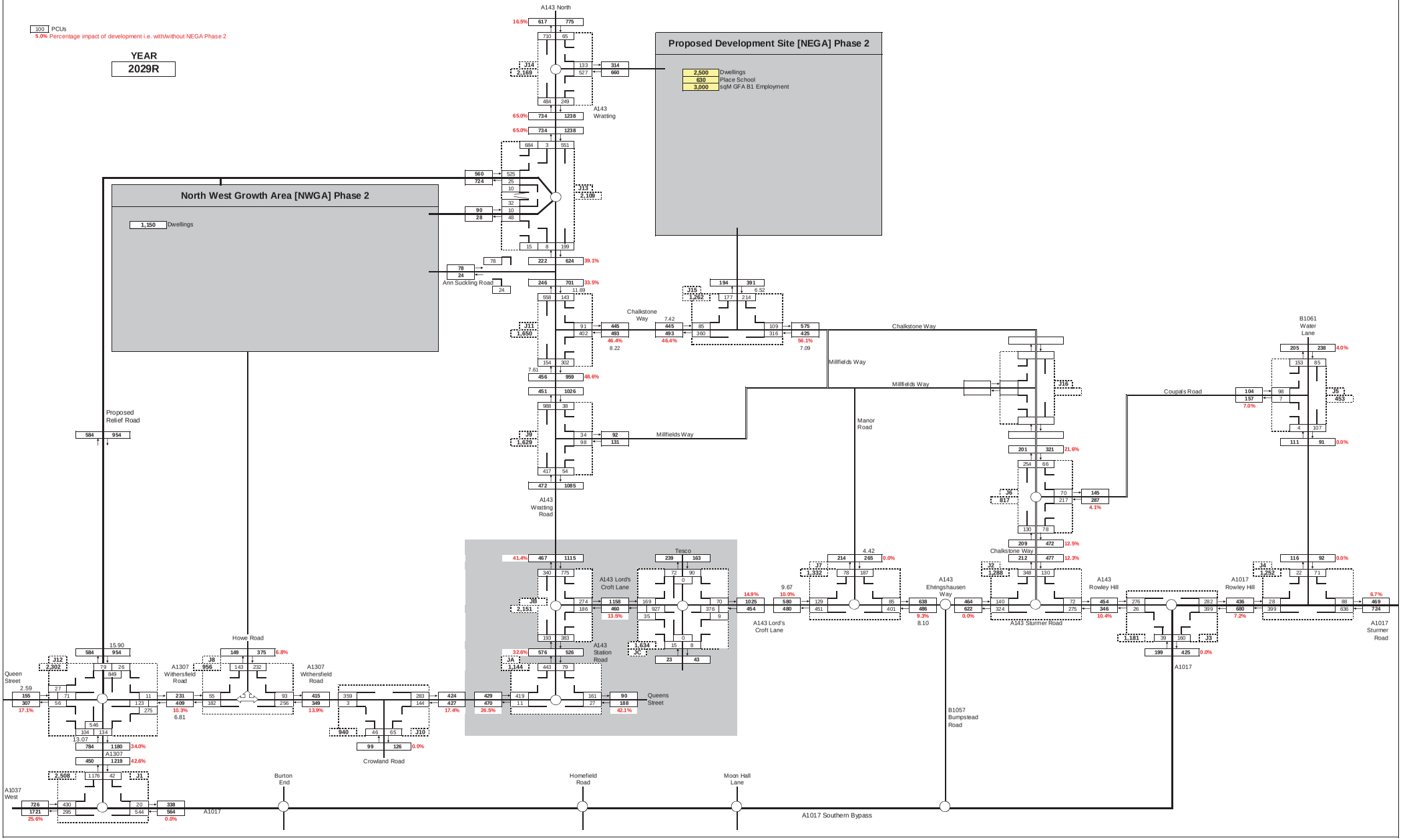
Client:	Hallam Land Management & Commercial Estates Group	Prepared by: S.M.T.	Brookbanks Consulting
Job:	10173 Land at Haverhill	19/04/2016	
Title:	2029 AM Peak Future Year Traffic Flows with NW Phase 2 Development and Relief Road [PCUs]	Figure 23a	



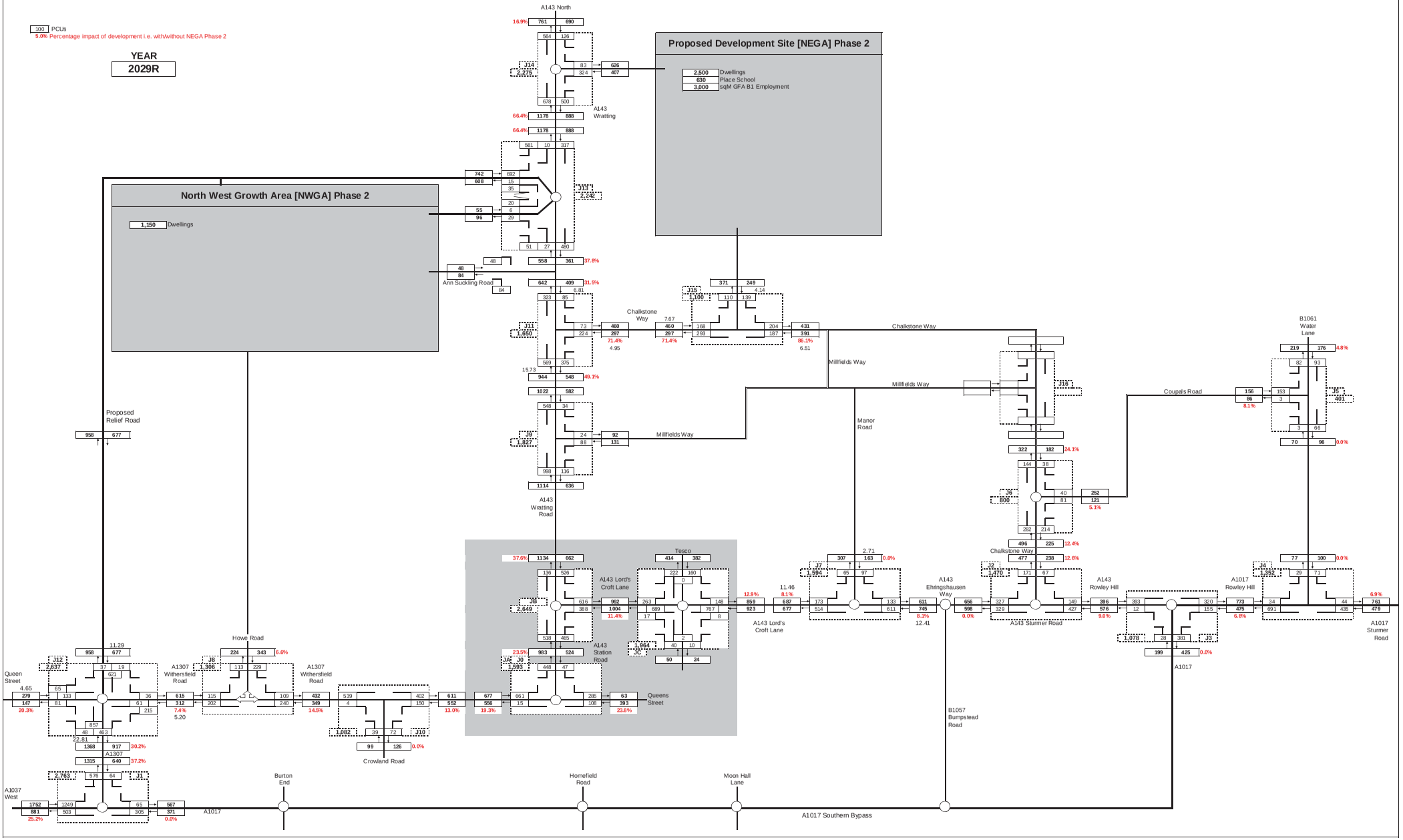
Client:	Hallam Land Management & Commercial Estates Group	Prepared by: S.M.T.	Brookbanks Consulting
Job:	10173 Land at Haverhill	12/03/2015	
Title:	2029 PM Peak Future Year Traffic Flows with NW Phase 2 Development and Relief Road [PCUs]	Figure 14p	



Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	19/04/2016	
Title:	**2029 AM Peak Future Year Traffic Flows with NW+NE Phase 2 Developments and Relief Road [PCUs]**	**Figure 24a**	



Client:	**Hallam Land Management & Commercial Estates Group**	Prepared by: S.M.T.	Brookbanks Consulting
Job:	**10173 Land at Haverhill**	12/03/2015	
Title:	**2029 PM Peak Future Year Traffic Flows with Relief Road [PCUs]**	**Figure 14p**	



Appendix G – Junction Assessment Outputs

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011
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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J1 A1307 jw A1017\10173a - J1 A1017 jw A1307 - Rev3 2019 AM +NW1+NE1.vai"
(drive-on-the-left) at 14:41:50 on Wednesday, 8 April 2015

.FILE PROPERTIES

RUN TITLE	J1 A1017 jw A1307 - 2019 +NW1+NE1 Rev3 AM
LOCATION	Haverhill
DATE	08/04/15
CLIENT	Hallam
ENUMERATOR	sue.tadman [BCL25]
JOB NUMBER	10173
STATUS	Preliminary
DESCRIPTION	

.INPUT DATA

ARM A - A1307 East
ARM B - A1017 South
ARM C - A1017 North

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	8.00	12.00	15.00	40.00	30.0	0.604	25.548
B	3.60	6.00	10.00	25.00	40.00	25.0	0.619	25.714
C	3.60	8.30	6.00	30.00	40.00	25.0	0.622	25.788

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS (TO RISE)	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS (FALLING)	RATE OF FLOW (VEH/MIN) BEFORE (PEAK)	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
A	15.00	45.00	75.00	9.61	14.42	9.61
B	15.00	45.00	75.00	6.64	9.96	6.64
C	15.00	45.00	75.00	6.57	9.86	6.57

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.052	0.948
		0.0	40.0	729.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.034	0.000	0.966
		18.0	0.0	513.0

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

```
 I                  I         I (  0.0)I (  0.0)I (  0.0)I
 I                  I         I         I         I         I
 I                  I  ARM  C I  0.470 I  0.530 I  0.000 I
 I                  I         I  247.0 I  279.0 I    0.0 I
 I                  I         I (  0.0)I (  0.0)I (  0.0)I
 I                  I         I         I         I         I
 ------------------------------------------------------------
```

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

```
.-------------------------------------------------------------------------------------------
---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 07.45-08.00                                                        I
                                I
 I ARM A       9.65     23.44   0.412   - -       -    0.0    0.7       10.1
         -              0.072     I
 I ARM B       6.66     20.08   0.332   - -       -    0.0    0.5        7.2
         -              0.074     I
 I ARM C       6.60     25.65   0.257   - -       -    0.0    0.3        5.1
         -              0.052     I
 I                                                                    I
                                I
-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 08.00-08.15                                                        I
                                I
 I ARM A      11.52     23.03   0.500   - -       -    0.7    1.0       14.4
         -              0.087     I
 I ARM B       7.96     18.97   0.419   - -       -    0.5    0.7       10.4
         -              0.090     I
 I ARM C       7.88     25.62   0.308   - -       -    0.3    0.4        6.5
         -              0.056     I
 I                                                                    I
                                I
-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
```



```
 I 08.15-08.30                                                        I
                                I
 I ARM A      14.11     22.46   0.628   - -       -    1.0    1.7       23.7
         -              0.118     I
 I ARM B       9.74     17.46   0.558   - -       -    0.7    1.2       17.8
         -              0.128     I
 I ARM C       9.65     25.58   0.377   - -       -    0.4    0.6        8.9
         -              0.063     I
 I                                                                    I
                                I
-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 08.30-08.45                                                        I
                                I
 I ARM A      14.11     22.46   0.628   - -       -    1.7    1.7       25.0
         -              0.120     I
 I ARM B       9.74     17.44   0.559   - -       -    1.2    1.3       18.7
         -              0.130     I
 I ARM C       9.65     25.58   0.377   - -       -    0.6    0.6        9.0
         -              0.063     I
 I                                                                    I
                                I
-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 08.45-09.00                                                        I
                                I
 I ARM A      11.52     23.02   0.500   - -       -    1.7    1.0       15.7
         -              0.088     I
 I ARM B       7.96     18.93   0.420   - -       -    1.3    0.7       11.3
         -              0.092     I
 I ARM C       7.88     25.62   0.308   - -       -    0.6    0.4        6.8
         -              0.056     I
 I                                                                    I
                                I
-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
```

```
                                  -
 I 09.00-09.15                                                                  
                                  I                                             
 I ARM A       9.65     23.43   0.412   - -       -    1.0    0.7       10.8    
         -                0.073     I                                          
 I ARM B       6.66     20.04   0.332   - -       -    0.7    0.5        7.7    
         -                0.075     I                                          
 I ARM C       6.60     25.65   0.257   - -       -    0.4    0.3        5.3    
         -                0.052     I                                          
 I                                                                              
                                  I                                             
--------------------------------------------------------------------------------
---------------------------------
```

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.7	*
08.15	1.0	*
08.30	1.7	**
08.45	1.7	**
09.00	1.0	*
09.15	0.7	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	
08.15	0.7	*
08.30	1.2	*
08.45	1.3	*
09.00	0.7	*
09.15	0.5	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.3	
08.15	0.4	
08.30	0.6	*
08.45	0.6	*
09.00	0.4	
09.15	0.3	

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

A	1058.5	705.6	99.8	0.09	99.9	0.09		
B	730.9	487.3	73.2	0.10	73.2	0.10		
C	724.0	482.7	41.6	0.06	41.6	0.06		
ALL	2513.4	1675.6	214.6	0.09	214.7	0.09		

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

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Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J1 A1307 jw A1017\10173a - J1 A1017 jw A1307 - Rev3 2019 PM +NW1+NE1.vai"
(drive-on-the-left) at 14:42:20 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J1 A1017 jw A1307 - 2019 +NW1+NE1 Rev3 PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - A1307 East
ARM B - A1017 South
ARM C - A1017 North

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	8.00	12.00	15.00	40.00	30.0	0.604	25.548
B	3.60	6.00	10.00	25.00	40.00	25.0	0.619	25.714
C	3.60	8.30	6.00	30.00	40.00	25.0	0.622	25.788

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
A	15.00	45.00	75.00	4.43	6.64	4.43
B	15.00	45.00	75.00	4.09	6.13	4.09
C	15.00	45.00	75.00	15.01	22.52	15.01

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
		TURNING PROPORTIONS		
		TURNING COUNTS		
		(PERCENTAGE OF H.V.S)		
16.45 - 18.15	ARM A	0.000	0.161	0.839
		0.0	57.0	297.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.177	0.000	0.823
		58.0	0.0	269.0

```
 I                  I         I (  0.0)I (  0.0)I (  0.0)I
 I                  I         I         I         I         I
 I                  I  ARM  C I  0.632 I  0.368 I  0.000 I
 I                  I         I  759.0 I  442.0 I    0.0 I
 I                  I         I (  0.0)I (  0.0)I (  0.0)I
 I                  I         I         I         I         I
 ------------------------------------------------------------
```

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

```
.-------------------------------------------------------------------------------------------
---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 16.45-17.00                                                        I
                                I
 I ARM A       4.44     22.22   0.200   - -       -    0.0    0.2        3.7
         -              0.056     I
 I ARM B       4.10     23.42   0.175   - -       -    0.0    0.2        3.1
         -              0.052     I
 I ARM C      15.07     25.34   0.595   - -       -    0.0    1.4       20.7
         -              0.096     I
 I                              I
                                I

-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 17.00-17.15                                                        I
                                I
 I ARM A       5.30     21.56   0.246   - -       -    0.2    0.3        4.8
         -              0.061     I
 I ARM B       4.90     22.96   0.213   - -       -    0.2    0.3        4.0
         -              0.055     I
 I ARM C      17.99     25.25   0.713   - -       -    1.4    2.4       34.1
         -              0.135     I
 I                              I
                                I

-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
```



```
 I 17.15-17.30                                                        I
                                I
 I ARM A       6.50     20.71   0.314   - -       -    0.3    0.5        6.7
         -              0.070     I
 I ARM B       6.00     22.35   0.269   - -       -    0.3    0.4        5.4
         -              0.061     I
 I ARM C      22.04     25.13   0.877   - -       -    2.4    6.2       80.0
         -              0.280     I
 I                              I
                                I

-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 17.30-17.45                                                        I
                                I
 I ARM A       6.50     20.66   0.314   - -       -    0.5    0.5        6.8
         -              0.071     I
 I ARM B       6.00     22.34   0.269   - -       -    0.4    0.4        5.5
         -              0.061     I
 I ARM C      22.04     25.13   0.877   - -       -    6.2    6.6       96.6
         -              0.314     I
 I                              I
                                I

-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 17.45-18.00                                                        I
                                I
 I ARM A       5.30     21.49   0.247   - -       -    0.5    0.3        5.0
         -              0.062     I
 I ARM B       4.90     22.96   0.213   - -       -    0.4    0.3        4.2
         -              0.055     I
 I ARM C      17.99     25.25   0.713   - -       -    6.6    2.6       42.3
         -              0.149     I
 I                              I
                                I

-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
```

```
                                  -
 I 18.00-18.15                                                                  
                                  I                                             
 I ARM A       4.44     22.18   0.200   - -       -    0.3    0.3        3.8    
         -              0.056     I                                            
 I ARM B       4.10     23.41   0.175   - -       -    0.3    0.2        3.2    
         -              0.052     I                                            
 I ARM C      15.07     25.34   0.595   - -       -    2.6    1.5       23.3    
         -              0.099     I                                            
 I                                                                              
                                  I                                             

--------------------------------------------------------------------------------
---------------------------------
```

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.2	
17.15	0.3	
17.30	0.5	
17.45	0.5	
18.00	0.3	
18.15	0.3	

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.2	
17.15	0.3	
17.30	0.4	
17.45	0.4	
18.00	0.3	
18.15	0.2	

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.4	*
17.15	2.4	**
17.30	6.2	******
17.45	6.6	*******
18.00	2.6	***
18.15	1.5	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *			* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)		(MIN)	(MIN/VEH)
A	487.3	324.8	30.8	0.06		30.8	0.06
B	450.1	300.1	25.4	0.06		25.4	0.06
C	1653.1	1102.1	297.0	0.18		297.0	0.18
ALL	2590.4	1727.0	353.2	0.14		353.3	0.14

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
program advice and maintenance, contact:

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Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J1 A1307 jw A1017\
10173a - J1 A1017 jw A1307 - Rev3 2029R AM +NW2+NE2 +Impr1.vai"
(drive-on-the-left) at 14:43:17 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J1 A1017 jw A1307 - 2029R +NW2+NE2 +Impr1 Rev3 AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - A1307 East
ARM B - A1017 South
ARM C - A1017 North

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	8.00	12.00	15.00	40.00	30.0	0.604	25.548
B	3.60	6.00	10.00	25.00	40.00	25.0	0.619	25.714
C	3.60	9.30	10.00	30.00	40.00	25.0	0.664	29.328

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS (TO RISE)	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS (FALLING)	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
A	15.00	45.00	75.00	15.23	22.84	15.23
B	15.00	45.00	75.00	7.05	10.58	7.05
C	15.00	45.00	75.00	9.06	13.59	9.06

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
07.45 - 09.15		TURNING PROPORTIONS		
		TURNING COUNTS		
		(PERCENTAGE OF H.V.S)		
	ARM A	0.000	0.034	0.966
		0.0	42.0	1176.0
		(0.0)%	(0.0)%	(0.0)%
	ARM B	0.035	0.000	0.965
		20.0	0.0	544.0

```
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I  ARM  C I  0.593 I  0.407 I  0.000 I
 I                   I         I  430.0 I  295.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 ------------------------------------------------------------
```

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
I 07.45-08.00							
I ARM A	15.28	23.32	0.655	- -	-	0.0	1.9	26.2
I ARM B	7.08	16.66	0.425	- -	-	0.0	0.7	10.5
I ARM C	9.10	29.16	0.312	- -	-	0.0	0.5	6.6
I							

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
I 08.00-08.15							
I ARM A	18.25	22.88	0.798	- -	-	1.9	3.7	50.5
I ARM B	8.45	14.89	0.568	- -	-	0.7	1.3	18.3
I ARM C	10.86	29.13	0.373	- -	-	0.5	0.6	8.7
I							

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
I 08.15-08.30							
I ARM A	22.35	22.28	1.003	- -	-	3.7	18.8	191.9
I ARM B	10.35	12.96	0.798	- -	-	1.3	3.6	46.5
I ARM C	13.30	29.09	0.457	- -	-	0.6	0.8	12.3
I							

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
I 08.30-08.45							
I ARM A	22.35	22.28	1.003	- -	-	18.8	26.8	344.9
I ARM B	10.35	12.68	0.816	- -	-	3.6	4.1	58.1
I ARM C	13.30	29.08	0.457	- -	-	0.8	0.8	12.6
I							

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
I 08.45-09.00							
I ARM A	18.25	22.88	0.798	- -	-	26.8	4.3	134.2
I ARM B	8.45	13.92	0.607	- -	-	4.1	1.6	26.2
I ARM C	10.86	29.12	0.373	- -	-	0.8	0.6	9.1
I							

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)

```
                                  -
 I 09.00-09.15                                                                  
                                  I
 I ARM A      15.28     23.31   0.656   - -       -    4.3    1.9       31.2
         -              0.130     I
 I ARM B       7.08     16.49   0.429   - -       -    1.6    0.8       11.9
         -              0.107     I
 I ARM C       9.10     29.16   0.312   - -       -    0.6    0.5        6.9
         -              0.050     I
 I                                                                              
                                  I
```

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.9	**
08.15	3.7	****
08.30	18.8	******************
08.45	26.8	**************************
09.00	4.3	****
09.15	1.9	**

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.7	*
08.15	1.3	*
08.30	3.6	****
08.45	4.1	****
09.00	1.6	**
09.15	0.8	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	
08.15	0.6	*
08.30	0.8	*
08.45	0.8	*
09.00	0.6	*
09.15	0.5	

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

A	1676.5	1117.7	778.9	0.46	779.0	0.46	
B	776.3	517.5	171.5	0.22	171.6	0.22	
C	997.9	665.3	56.3	0.06	56.3	0.06	
ALL	3450.7	2300.5	1006.7	0.29	1006.8	0.29	

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
program advice and maintenance, contact:

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Fax: +44 (0) 1344 770356
Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J1 A1307 jw A1017\
10173a - J1 A1017 jw A1307 - Rev3 2029R PM +NW2+NE2 +Impr1.vai"
(drive-on-the-left) at 14:44:20 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J1 A1017 jw A1307 - 2029R +NW2+NE2 +Impr1 Rev3 PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - A1307 East
ARM B - A1017 South
ARM C - A1017 North

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	8.00	12.00	15.00	40.00	30.0	0.604	25.548
B	3.60	6.00	10.00	25.00	40.00	25.0	0.619	25.714
C	3.60	9.30	10.00	30.00	40.00	25.0	0.664	29.328

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
A	15.00	45.00	75.00	8.00	12.00	8.00
B	15.00	45.00	75.00	4.63	6.94	4.63
C	15.00	45.00	75.00	21.90	32.85	21.90

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
16.45 - 18.15		TURNING PROPORTIONS		
		TURNING COUNTS		
		(PERCENTAGE OF H.V.S)		
	ARM A	0.000	0.100	0.900
		0.0	64.0	576.0
		(0.0)I	(0.0)I	(0.0)I
	ARM B	0.176	0.000	0.824
		65.0	0.0	305.0

```
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I  ARM  C I  0.713 I  0.287 I  0.000 I
 I                   I         I 1249.0 I  503.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
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. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

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---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                                                      -
 I 16.45-17.00                                                        I
 I ARM A       8.03     21.77   0.369   - -       -    0.0    0.6        8.4
         -              0.072     I
 I ARM B       4.64     21.26   0.218   - -       -    0.0    0.3        4.1
         -              0.060     I
 I ARM C      21.98     28.79   0.764   - -       -    0.0    3.1       42.7
         -              0.139     I
 I                                                                    I
                                                                      I

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.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                                                      -
 I 17.00-17.15                                                        I
 I ARM A       9.59     21.06   0.455   - -       -    0.6    0.8       12.1
         -              0.087     I
 I ARM B       5.54     20.38   0.272   - -       -    0.3    0.4        5.5
         -              0.067     I
 I ARM C      26.25     28.68   0.915   - -       -    3.1    8.6      107.0
         -              0.321     I
 I                                                                    I
                                                                      I

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----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
```



```
 I 17.15-17.30                                                        I
 I ARM A      11.74     20.64   0.569   - -       -    0.8    1.3       18.7
         -              0.112     I
 I ARM B       6.79     19.19   0.354   - -       -    0.4    0.5        8.0
         -              0.081     I
 I ARM C      32.15     28.54   1.127   - -       -    8.6   65.9      569.8
         -              1.468     I
 I                                                                    I
                                                                      I

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.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                                                      -
 I 17.30-17.45                                                        I
 I ARM A      11.74     20.61   0.570   - -       -    1.3    1.3       19.6
         -              0.113     I
 I ARM B       6.79     19.18   0.354   - -       -    0.5    0.5        8.2
         -              0.081     I
 I ARM C      32.15     28.54   1.127   - -       -   65.9  120.5     1398.3
         -              3.372     I
 I                                                                    I
                                                                      I

-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                                                      -
 I 17.45-18.00                                                        I
 I ARM A       9.59     20.62   0.465   - -       -    1.3    0.9       13.6
         -              0.091     I
 I ARM B       5.54     20.36   0.272   - -       -    0.5    0.4        5.8
         -              0.068     I
 I ARM C      26.25     28.68   0.915   - -       -  120.5   87.6     1560.6
         -              3.669     I
 I                                                                    I
                                                                      I

-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -
```

```
                                  -
 I 18.00-18.15                    I
                                  I
 I ARM A       8.03     20.77   0.387   - -       -    0.9    0.6        9.8
         -              0.079     I
 I ARM B       4.64     21.23   0.219   - -       -    0.4    0.3        4.3
         -              0.060     I
 I ARM C      21.98     28.79   0.764   - -       -   87.6    3.8      599.7
         -              1.483     I
 I
                                  I

--------------------------------------------------------------------------------
---------------------------------

.QUEUE AT ARM A
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00           0.6  *
    17.15           0.8  *
    17.30           1.3  *
    17.45           1.3  *
    18.00           0.9  *
    18.15           0.6  *


.QUEUE AT ARM B
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00           0.3
    17.15           0.4
    17.30           0.5  *
    17.45           0.5  *
    18.00           0.4
    18.15           0.3


.QUEUE AT ARM C
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00           3.1  ***
    17.15           8.6  *********
    17.30          65.9
**************************************************************
    17.45         120.5
********************************************************************************
**********
    18.00          87.6
********************************************************************************
********
    18.15           3.8  ****

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
                 -------------------------------------------

 ------------------------------------------------------------------------------
```



```
T75
 I  ARM  I   TOTAL DEMAND  I     * QUEUEING *    I  * INCLUSIVE QUEUEING *  I
 I       I                 I      * DELAY *      I         * DELAY *        I
 I       I-------------------------------------------------------------------I
 I       I  (VEH)  (VEH/H) I  (MIN)    (MIN/VEH) I    (MIN)      (MIN/VEH)  I
 ---------------------------------------------------------------------------
 I   A   I  880.9 I  587.3 I    82.3 I    0.09   I      82.3  I     0.09    I
 I   B   I  509.3 I  339.5 I    35.7 I    0.07   I      35.7  I     0.07    I
 I   C   I 2411.5 I 1607.7 I  4278.1 I    1.77   I    4278.3  I     1.77    I
 ---------------------------------------------------------------------------
 I  ALL  I 3801.7 I 2534.5 I  4396.1 I    1.16   I    4396.3  I     1.16    I
 ---------------------------------------------------------------------------
 * 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 JOB
```

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
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Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J1 A1307 jw A1017\
10173a - J1 A1017 jw A1307 - Rev3 2029R AM +NW2+NE2 +Impr2.vai"
(drive-on-the-left) at 14:43:49 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J1 A1017 jw A1307 - 2029R +NW2+NE2 +Impr2 Rev3 AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - A1307 East
ARM B - A1017 South
ARM C - A1017 North

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	11.00	15.00	15.00	60.00	30.0	0.566	29.586
B	3.60	6.00	10.00	25.00	60.00	25.0	0.537	25.714
C	7.00	9.00	15.00	30.00	60.00	25.0	0.727	43.857

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF FLOW STARTS	MINUTES FROM START TO TOP OF PEAK	WHEN FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
	TO RISE	IS REACHED	FALLING			
A	15.00	45.00	75.00	15.23	22.84	15.23
B	15.00	45.00	75.00	7.05	10.58	7.05
C	15.00	45.00	75.00	9.06	13.59	9.06

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
07.45 - 09.15		TURNING PROPORTIONS		
		TURNING COUNTS (PERCENTAGE OF H.V.S)		
	ARM A	0.000	0.034	0.966
		0.0	42.0	1176.0
		(0.0)%	(0.0)%	(0.0)%
	ARM B	0.035	0.000	0.965
		20.0	0.0	544.0

```
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I  ARM  C I  0.593 I  0.407 I  0.000 I
 I                   I         I  430.0 I  295.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 ------------------------------------------------------------
```

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

```
.-------------------------------------------------------------------------------------------
---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 07.45-08.00                                                        I
                                I
 I ARM A      15.28     27.50   0.556   - -       -    0.0    1.2       17.8
         -              0.081     I
 I ARM B       7.08     17.83   0.397   - -       -    0.0    0.7        9.4
         -              0.092     I
 I ARM C       9.10     43.68   0.208   - -       -    0.0    0.3        3.9
         -              0.029     I
 I                                                                    I
                                I
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 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 08.00-08.15                                                        I
                                I
 I ARM A      18.25     27.09   0.674   - -       -    1.2    2.0       28.9
         -              0.112     I
 I ARM B       8.45     16.28   0.519   - -       -    0.7    1.1       15.3
         -              0.127     I
 I ARM C      10.86     43.64   0.249   - -       -    0.3    0.3        4.9
         -              0.031     I
 I                                                                    I
                                I
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 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
```



```
 I 08.15-08.30                                                        I
                                I
 I ARM A      22.35     26.52   0.843   - -       -    2.0    4.9       65.3
         -              0.220     I
 I ARM B      10.35     14.23   0.727   - -       -    1.1    2.5       34.4
         -              0.246     I
 I ARM C      13.30     43.59   0.305   - -       -    0.3    0.4        6.5
         -              0.033     I
 I                                                                    I
                                I
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---------------------------------- 
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 08.30-08.45                                                        I
                                I
 I ARM A      22.35     26.52   0.843   - -       -    4.9    5.1       75.4
         -              0.237     I
 I ARM B      10.35     14.13   0.732   - -       -    2.5    2.6       38.9
         -              0.262     I
 I ARM C      13.30     43.59   0.305   - -       -    0.4    0.4        6.6
         -              0.033     I
 I                                                                    I
                                I
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---------------------------------- 
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 08.45-09.00                                                        I
                                I
 I ARM A      18.25     27.08   0.674   - -       -    5.1    2.1       34.0
         -              0.118     I
 I ARM B       8.45     16.15   0.523   - -       -    2.6    1.1       17.8
         -              0.133     I
 I ARM C      10.86     43.64   0.249   - -       -    0.4    0.3        5.0
         -              0.031     I
 I                                                                    I
                                I
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---------------------------------- 
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -
```

```
                                  -
 I 09.00-09.15                                                                  
                                  I
 I ARM A      15.28     27.49   0.556   - -       -    2.1    1.3       19.7
         -              0.083     I
 I ARM B       7.08     17.76   0.398   - -       -    1.1    0.7       10.4
         -              0.094     I
 I ARM C       9.10     43.67   0.208   - -       -    0.3    0.3        4.0
         -              0.029     I
 I
                                  I
```

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.2	*
08.15	2.0	**
08.30	4.9	*****
08.45	5.1	*****
09.00	2.1	**
09.15	1.3	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.7	*
08.15	1.1	*
08.30	2.5	***
08.45	2.6	***
09.00	1.1	*
09.15	0.7	*

.QUEUE AT ARM C

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	0.3
09.15	0.3

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

A	1676.5	1117.7	241.2	0.14	241.2	0.14	
B	776.3	517.5	126.1	0.16	126.1	0.16	
C	997.9	665.3	30.9	0.03	30.9	0.03	
ALL	3450.7	2300.5	398.2	0.12	398.2	0.12	

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J1 A1307 jw A1017\
10173a - J1 A1017 jw A1307 - Rev3 2029R PM +NW2+NE2 +Impr2.vai"
(drive-on-the-left) at 14:44:49 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J1 A1017 jw A1307 - 2029R +NW2+NE2 +Impr2 Rev3 PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - A1307 East
ARM B - A1017 South
ARM C - A1017 North

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	11.00	15.00	15.00	60.00	30.0	0.566	29.586
B	3.60	6.00	10.00	25.00	60.00	25.0	0.537	25.714
C	7.00	9.00	15.00	30.00	60.00	25.0	0.727	43.857

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK	NUMBER OF MINUTES FROM START WHEN FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE TO RISE	RATE OF FLOW (VEH/MIN) AT TOP IS REACHED	RATE OF FLOW (VEH/MIN) AFTER FALLING
A	15.00	45.00	75.00	8.00	12.00	8.00
B	15.00	45.00	75.00	4.63	6.94	4.63
C	15.00	45.00	75.00	21.90	32.85	21.90

DEMAND SET TITLE: as above

T33

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

TIME	FROM/T	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.100	0.900
		0.0	64.0	576.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.176	0.000	0.824
		65.0	0.0	305.0

```
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I  ARM  C I  0.713 I  0.287 I  0.000 I
 I                   I         I 1249.0 I  503.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
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. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

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---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -                                     -
 I 16.45-17.00                                                        I
                                I                                     I
 I ARM A       8.03     26.03   0.309   - -       -    0.0    0.4        6.5
         -               0.055     I                                  I
 I ARM B       4.64     21.85   0.212   - -       -    0.0    0.3        3.9
         -               0.058     I                                  I
 I ARM C      21.98     43.27   0.508   - -       -    0.0    1.0       15.0
         -               0.047     I                                  I
 I                              I                                     I
                                I                                     I
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.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -                                     -
 I 17.00-17.15                                                        I
                                I                                     I
 I ARM A       9.59     25.33   0.379   - -       -    0.4    0.6        8.9
         -               0.063     I                                  I
 I ARM B       5.54     21.09   0.263   - -       -    0.3    0.4        5.2
         -               0.064     I                                  I
 I ARM C      26.25     43.15   0.608   - -       -    1.0    1.5       22.5
         -               0.059     I                                  I
 I                              I                                     I
                                I                                     I
-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
```



```
 I 17.15-17.30                                                        I
                                I                                     I
 I ARM A      11.74     24.38   0.482   - -       -    0.6    0.9       13.4
         -               0.079     I                                  I
 I ARM B       6.79     20.05   0.339   - -       -    0.4    0.5        7.5
         -               0.075     I                                  I
 I ARM C      32.15     42.99   0.748   - -       -    1.5    2.9       41.3
         -               0.091     I                                  I
 I                              I                                     I
                                I                                     I
-------------------------------------------------------------------------------------------
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.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -                                     -
 I 17.30-17.45                                                        I
                                I                                     I
 I ARM A      11.74     24.36   0.482   - -       -    0.9    0.9       13.9
         -               0.079     I                                  I
 I ARM B       6.79     20.04   0.339   - -       -    0.5    0.5        7.6
         -               0.075     I                                  I
 I ARM C      32.15     42.99   0.748   - -       -    2.9    2.9       43.8
         -               0.092     I                                  I
 I                              I                                     I
                                I                                     I
-------------------------------------------------------------------------------------------
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.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -                                     -
 I 17.45-18.00                                                        I
                                I                                     I
 I ARM A       9.59     25.31   0.379   - -       -    0.9    0.6        9.4
         -               0.064     I                                  I
 I ARM B       5.54     21.07   0.263   - -       -    0.5    0.4        5.5
         -               0.064     I                                  I
 I ARM C      26.25     43.15   0.608   - -       -    2.9    1.6       24.3
         -               0.060     I                                  I
 I                              I                                     I
                                I                                     I
-------------------------------------------------------------------------------------------
----------------------------------
.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
```

```
                                  -
 I 18.00-18.15                    I
                                  I
 I ARM A       8.03     26.01   0.309   - -       -    0.6    0.4        6.9
         -                0.056     I
 I ARM B       4.64     21.83   0.213   - -       -    0.4    0.3        4.1
         -                0.058     I
 I ARM C      21.98     43.26   0.508   - -       -    1.6    1.0       15.9
         -                0.047     I
 I                                  I
```

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.4	
17.15	0.6	*
17.30	0.9	*
17.45	0.9	*
18.00	0.6	*
18.15	0.4	

.QUEUE AT ARM B

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

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.0	*
17.15	1.5	**
17.30	2.9	***
17.45	2.9	***
18.00	1.6	**
18.15	1.0	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	880.9	587.3	59.0	0.07	59.0	0.07
B	509.3	339.5	33.9	0.07	33.9	0.07
C	2411.5	1607.7	162.8	0.07	162.8	0.07
ALL	3801.7	2534.5	255.7	0.07	255.7	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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011
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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J2 A143 Sturner Road jw Chalkstone way\
10173a - J2 A143 jw Chalkstone Way - Rev3 2019 +NW1+NE1 AM.vai"
(drive-on-the-left) at 14:11:30 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J2 A143 jw Chalkstone Way - Rev3 2019 +NW1+NE1 AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Chalkstone Way
ARM B - A143 Rowley Hill
ARM C - A143 Ehringhausen Way

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

T5

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	4.50	3.00	3.00	8.50	6.00	0.00	0.533	13.460
B	3.20	4.00	2.00	3.20	13.00	14.00	0.00	0.560	14.321
C	3.20	6.00	5.00	3.20	11.00	8.00	0.00	0.566	17.016

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS
T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
ARM A	15.00	45.00	75.00	5.15	7.73	5.15
ARM B	15.00	45.00	75.00	3.64	5.46	3.64
ARM C	15.00	45.00	75.00	4.84	7.26	4.84

DEMAND SET TITLE: as above

T33

TIME	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) FROM/T	ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.204	0.796
		0.0	84.0	328.0

	I (0.0)I (0.0)I (0.0)I		
ARM B I	0.165 I	0.000 I	0.835 I
	48.0 I	0.0 I	243.0 I
	I (0.0)I (0.0)I (0.0)I		
ARM C I	0.341 I	0.659 I	0.000 I
	132.0 I	255.0 I	0.0 I
	I (0.0)I (0.0)I (0.0)I		

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME
		AVERAGE DELAY PER ARRIVING (MIN)					
07.45-08.00							
ARM A	5.17	11.76	0.439	- -	-	0.0	0.8	11.0
	-	0.149						
ARM B	3.65	12.04	0.303	- -	-	0.0	0.4	6.2
	-	0.118						
ARM C	4.86	16.68	0.291	- -	-	0.0	0.4	5.9
	-	0.084						
08.00-08.15							
ARM A	6.17	11.42	0.540	- -	-	0.8	1.1	16.4
	-	0.189						
ARM B	4.36	11.58	0.377	- -	-	0.4	0.6	8.7
	-	0.138						
ARM C	5.80	16.61	0.349	- -	-	0.4	0.5	7.8
	-	0.092						

I SEGMENT)	(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
	VEHICLE (MIN)				
08.15-08.30					
ARM A	7.56	10.97	0.689	- -	-	1.1	2.1	28.9
	-	0.282						
ARM B	5.34	10.98	0.486	- -	-	0.6	0.9	13.3
	-	0.176						
ARM C	7.10	16.52	0.430	- -	-	0.5	0.7	10.9
	-	0.106						
08.30-08.45							
ARM A	7.56	10.96	0.690	- -	-	2.1	2.2	32.0
	-	0.293						
ARM B	5.34	10.95	0.488	- -	-	0.9	0.9	14.0
	-	0.178						
ARM C	7.10	16.52	0.430	- -	-	0.7	0.7	11.2
	-	0.106						
08.45-09.00							
ARM A	6.17	11.42	0.541	- -	-	2.2	1.2	19.2
	-	0.196						
ARM B	4.36	11.54	0.378	- -	-	0.9	0.6	9.6
	-	0.140						
ARM C	5.80	16.61	0.349	- -	-	0.7	0.5	8.3
	-	0.093						

TIME SEGMENT		PER ARRIVING VEHICLE (MIN)	(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME (MIN)
09.00-09.15							
ARM A	5.17	11.75	0.440	- -	1.2	0.8	12.5
		0.153					
ARM B	3.65	12.00	0.304	- -	0.6	0.4	6.8
		0.120					
ARM C	4.86	16.67	0.291	- -	0.5	0.4	6.3
		0.085					

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.8	*
08.15	1.1	*
08.30	2.1	**
08.45	2.2	**
09.00	1.2	*
09.15	0.8	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.6	*
08.30	0.9	*
08.45	0.9	*
09.00	0.6	*
09.15	0.4	

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.5	*
08.30	0.7	*
08.45	0.7	*
09.00	0.5	*
09.15	0.4	

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	567.1	378.1	119.9	0.21	120.0	0.21
B	400.5	267.0	58.6	0.15	58.6	0.15
C	532.7	355.1	50.5	0.09	50.5	0.09
ALL	1500.3	1000.2	229.0	0.15	229.1	0.15

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
program advice and maintenance, contact:

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Crowthorne House
Nine Mile Ride
Wokingham, Berks.
RG40 3GA,UK

Tel: +44 (0) 1344 770758
Fax: +44 (0) 1344 770356
Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J2 A143 Sturner Road jw Chalkstone way\
10173a - J2 A143 jw Chalkstone Way - Rev3 2019 +NW1+NE1 PM.vai"
(drive-on-the-left) at 14:12:10 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J2 A143 jw Chalkstone Way - Rev3 2019 +NW1+NE1 PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Chalkstone Way
ARM B - A143 Rowley Hill
ARM C - A143 Ehringhausen Way

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

T5

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	4.50	3.00	3.00	8.50	6.00	0.00	0.533	13.460
B	3.20	4.00	2.00	3.20	13.00	14.00	0.00	0.560	14.321
C	3.20	6.00	5.00	3.20	11.00	8.00	0.00	0.566	17.016

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS
T13

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
ARM A	15.00	45.00	75.00	2.35	3.52	2.35
ARM B	15.00	45.00	75.00	5.32	7.99	5.32
ARM C	15.00	45.00	75.00	6.88	10.31	6.88

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
16.45 - 18.15				
	ARM A	0.000	0.197	0.803
		0.0	37.0	151.0

		(0.0)	(0.0)	(0.0)
ARM B	0.232	0.000	0.768	
	99.0	0.0	327.0	
		(0.0)	(0.0)	(0.0)
ARM C	0.524	0.476	0.000	
	288.0	262.0	0.0	
		(0.0)	(0.0)	(0.0)

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
16.45-17.00								
	ARM A	2.36	11.72	0.201	- -	-	0.0	0.2	3.6
		-	0.106						
	ARM B	5.35	13.27	0.403	- -	-	0.0	0.7	9.5
		-	0.125						
	ARM C	6.90	16.32	0.423	- -	-	0.0	0.7	10.4
		-	0.105						
17.00-17.15								
	ARM A	2.82	11.37	0.248	- -	-	0.2	0.3	4.8
		-	0.117						
	ARM B	6.38	13.06	0.489	- -	-	0.7	0.9	13.6
		-	0.149						
	ARM C	8.24	16.18	0.509	- -	-	0.7	1.0	14.8
		-	0.125						

TIME SEGMENT		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
17.15-17.30								
	ARM A	3.45	10.91	0.316	- -	-	0.3	0.5	6.7
		-	0.134						
	ARM B	7.82	12.77	0.612	- -	-	0.9	1.5	21.6
		-	0.198						
	ARM C	10.09	15.99	0.631	- -	-	1.0	1.7	23.6
		-	0.167						
17.30-17.45								
	ARM A	3.45	10.90	0.317	- -	-	0.5	0.5	6.9
		-	0.134						
	ARM B	7.82	12.77	0.612	- -	-	1.5	1.6	23.1
		-	0.201						
	ARM C	10.09	15.99	0.631	- -	-	1.7	1.7	25.2
		-	0.169						
17.45-18.00								
	ARM A	2.82	11.36	0.248	- -	-	0.5	0.3	5.1
		-	0.117						
	ARM B	6.38	13.05	0.489	- -	-	1.6	1.0	15.3
		-	0.152						
	ARM C	8.24	16.17	0.510	- -	-	1.7	1.1	16.5
		-	0.128						

SEGMENT)		PER ARRIVING VEHICLE (MIN)	(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
I 18.00-18.15							
I ARM A	2.36	11.70	0.202	- -	-	0.3	0.3	3.9
	-	0.107						
I ARM B	5.35	13.26	0.403	- -	-	1.0	0.7	10.6
	-	0.127						
I ARM C	6.90	16.31	0.423	- -	-	1.1	0.7	11.5
	-	0.107						

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.2	
17.15	0.3	
17.30	0.5	
17.45	0.5	
18.00	0.3	
18.15	0.3	

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.7	*
17.15	0.9	*
17.30	1.5	**
17.45	1.6	**
18.00	1.0	*
18.15	0.7	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.7	*
17.15	1.0	*
17.30	1.7	**
17.45	1.7	**
18.00	1.1	*
18.15	0.7	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	258.8	172.5	31.0	0.12	31.0	0.12
B	586.4	390.9	93.8	0.16	93.8	0.16
C	757.0	504.7	102.0	0.13	102.0	0.13
ALL	1602.2	1068.1	226.8	0.14	226.8	0.14

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END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

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Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J2 A143 Sturner Road jw Chalkstone way\
10173a - J2 A143 jw Chalkstone Way - Rev3 2029R +NW2+NE2 AM.vai"
(drive-on-the-left) at 14:12:59 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J2 A143 jw Chalkstone Way - Rev3 2029R +NW2+NE2 AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Chalkstone Way
ARM B - A143 Rowley Hill
ARM C - A143 Ehringhausen Way

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

T5

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	4.50	3.00	3.00	8.50	6.00	0.00	0.533	13.460
ARM B	3.20	4.00	2.00	3.20	13.00	14.00	0.00	0.560	14.321
ARM C	3.20	6.00	5.00	3.20	11.00	8.00	0.00	0.566	17.016

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS
T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above
T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
ARM A	15.00	45.00	75.00	5.97	8.96	5.97
ARM B	15.00	45.00	75.00	4.34	6.51	4.34
ARM C	15.00	45.00	75.00	5.80	8.70	5.80

DEMAND SET TITLE: as above
T33

TIME	FROM/T	TURNING PROPORTIONS TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.272	0.728
		0.0	130.0	348.0

	I (0.0)I (0.0)I (0.0)I		
ARM B	I 0.207 I 0.000 I 0.793 I		
	I 72.0 I 0.0 I 275.0 I		
	I (0.0)I (0.0)I (0.0)I		
ARM C	I 0.302 I 0.698 I 0.000 I		
	I 140.0 I 324.0 I 0.0 I		
	I (0.0)I (0.0)I (0.0)I		

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME
	AVERAGE DELAY PER ARRIVING (MIN)						
07.45-08.00							
ARM A	6.00	11.30	0.531	- -	-	0.0	1.1	15.4
	-	0.184						
ARM B	4.35	11.90	0.366	- -	-	0.0	0.6	8.2
	-	0.131						
ARM C	5.82	16.51	0.353	- -	-	0.0	0.5	7.8
	-	0.093						
08.00-08.15							
ARM A	7.16	10.88	0.659	- -	-	1.1	1.8	25.6
	-	0.262						
ARM B	5.20	11.42	0.455	- -	-	0.6	0.8	11.8
	-	0.160						
ARM C	6.95	16.41	0.424	- -	-	0.5	0.7	10.6
	-	0.105						

SEGMENT)		VEHICLE (MIN)	(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
08.15-08.30							
ARM A	8.77	10.30	0.852	- -	-	1.8	4.7	58.3
	-	0.532						
ARM B	6.37	10.82	0.588	- -	-	0.8	1.4	19.5
	-	0.220						
ARM C	8.51	16.27	0.523	- -	-	0.7	1.1	15.6
	-	0.128						
08.30-08.45							
ARM A	8.77	10.29	0.853	- -	-	4.7	5.1	73.8
	-	0.622						
ARM B	6.37	10.76	0.592	- -	-	1.4	1.4	21.1
	-	0.227						
ARM C	8.51	16.27	0.523	- -	-	1.1	1.1	16.3
	-	0.129						
08.45-09.00							
ARM A	7.16	10.86	0.659	- -	-	5.1	2.0	34.7
	-	0.301						
ARM B	5.20	11.32	0.459	- -	-	1.4	0.9	13.6
	-	0.165						
ARM C	6.95	16.40	0.424	- -	-	1.1	0.7	11.5
	-	0.106						

I SEGMENT)	PER ARRIVING VEHICLE	I (RFC) (MIN)	(PEDS/MIN) I	(VEHS)	(VEHS)	TIME
I 09.00-09.15						
I ARM A	6.00	11.29	0.531	- -	-	2.0	1.2	18.5
	-	0.193						
I ARM B	4.35	11.85	0.367	- -	-	0.9	0.6	9.1
	-	0.134						
I ARM C	5.82	16.50	0.353	- -	-	0.7	0.6	8.5
	-	0.094						

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.1	*
08.15	1.8	**
08.30	4.7	*****
08.45	5.1	*****
09.00	2.0	**
09.15	1.2	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.6	*
08.15	0.8	*
08.30	1.4	*
08.45	1.4	*
09.00	0.9	*
09.15	0.6	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	*
08.15	0.7	*
08.30	1.1	*
08.45	1.1	*
09.00	0.7	*
09.15	0.6	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	657.9	438.6	226.5	0.34	226.5	0.34
B	477.6	318.4	83.4	0.17	83.4	0.17
C	638.7	425.8	70.3	0.11	70.3	0.11
ALL	1774.2	1182.8	380.1	0.21	380.2	0.21

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

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Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J2 A143 Sturner Road jw Chalkstone way\
10173a - J2 A143 jw Chalkstone Way - Rev3 2029R +NW2+NE2 PM.vai"
(drive-on-the-left) at 14:13:42 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J2 A143 jw Chalkstone Way - Rev3 2029R +NW2+NE2 PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Chalkstone Way
ARM B - A143 Rowley Hill
ARM C - A143 Ehringhausen Way

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

T5

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	4.50	3.00	3.00	8.50	6.00	0.00	0.533	13.460
B	3.20	4.00	2.00	3.20	13.00	14.00	0.00	0.560	14.321
C	3.20	6.00	5.00	3.20	11.00	8.00	0.00	0.566	17.016

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS
T13

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
ARM A	15.00	45.00	75.00	2.97	4.46	2.97
ARM B	15.00	45.00	75.00	7.20	10.80	7.20
ARM C	15.00	45.00	75.00	8.20	12.30	8.20

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
16.45 - 18.15				
	ARM A	0.000	0.282	0.718
		0.0	67.0	171.0

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

```
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I  ARM  B I  0.259 I  0.000 I  0.741 I
 I                   I         I  149.0 I    0.0 I  427.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I  ARM  C I  0.498 I  0.502 I  0.000 I
 I                   I         I  327.0 I  329.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 ------------------------------------------------------------
```

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

```
.-------------------------------------------------------------------------------
---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                  PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 16.45-17.00                     I
 I ARM A       2.99     11.28   0.265   - -       -    0.0    0.4        5.1
         -              0.120     I
 I ARM B       7.23     13.13   0.551   - -       -    0.0    1.2       16.8
         -              0.165     I
 I ARM C       8.23     15.97   0.515   - -       -    0.0    1.0       14.9
         -              0.127     I
 I                                 I
                                   I
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---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                  PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 17.00-17.15                     I
 I ARM A       3.57     10.84   0.329   - -       -    0.4    0.5        7.0
         -              0.137     I
 I ARM B       8.63     12.89   0.670   - -       -    1.2    1.9       27.2
         -              0.230     I
 I ARM C       9.83     15.76   0.624   - -       -    1.0    1.6       23.0
         -              0.166     I
 I                                 I
                                   I
-------------------------------------------------------------------------------
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.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                  PER ARRIVING  I
```



```
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 17.15-17.30                     I
 I ARM A       4.37     10.27   0.425   - -       -    0.5    0.7       10.5
         -              0.168     I
 I ARM B      10.57     12.57   0.841   - -       -    1.9    4.5       57.8
         -              0.429     I
 I ARM C      12.04     15.49   0.777   - -       -    1.6    3.2       43.7
         -              0.272     I
 I                                 I
                                   I
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---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                  PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 17.30-17.45                     I
 I ARM A       4.37     10.24   0.426   - -       -    0.7    0.7       11.0
         -              0.170     I
 I ARM B      10.57     12.56   0.841   - -       -    4.5    4.8       70.5
         -              0.483     I
 I ARM C      12.04     15.47   0.778   - -       -    3.2    3.4       49.6
         -              0.288     I
 I                                 I
                                   I
-------------------------------------------------------------------------------
---------------------------------
.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                  PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 17.45-18.00                     I
 I ARM A       3.57     10.80   0.330   - -       -    0.7    0.5        7.8
         -              0.139     I
 I ARM B       8.63     12.88   0.670   - -       -    4.8    2.1       35.4
         -              0.255     I
 I ARM C       9.83     15.73   0.625   - -       -    3.4    1.7       27.5
         -              0.176     I
 I                                 I
                                   I
-------------------------------------------------------------------------------
---------------------------------
.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
```

I SEGMENT)	PER ARRIVING VEHICLE (MIN) I	I (RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
I 18.00-18.15		I				
I ARM A	2.99	11.25	0.266	- -	-	0.5	0.4	5.6
	-	0.121	I					
I ARM B	7.23	13.11	0.551	- -	-	2.1	1.3	19.9
	-	0.173	I					
I ARM C	8.23	15.95	0.516	- -	-	1.7	1.1	17.0
	-	0.131	I					
I			I					

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.4	
17.15	0.5	
17.30	0.7	*
17.45	0.7	*
18.00	0.5	
18.15	0.4	

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.2	*
17.15	1.9	**
17.30	4.5	*****
17.45	4.8	*****
18.00	2.1	**
18.15	1.3	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.0	*
17.15	1.6	**
17.30	3.2	***
17.45	3.4	***
18.00	1.7	**
18.15	1.1	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

I ARM	I TOTAL DEMAND	I * QUEUEING * DELAY *	I * INCLUSIVE QUEUEING * DELAY *
I	I (VEH)	I (VEH/H) I (MIN) (MIN/VEH) I (MIN) (MIN/VEH) I
I A	I 327.6	I 218.4 I 47.0 I 0.14 I 47.0 I 0.14 I
I B	I 792.8	I 528.5 I 227.6 I 0.29 I 227.7 I 0.29 I
I C	I 902.9	I 602.0 I 175.6 I 0.19 I 175.6 I 0.19 I
I ALL	I 2023.3	I 1348.9 I 450.2 I 0.22 I 450.3 I 0.22 I

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J3 A1017 jw A143 Rowley Hill\
10173a - J3 A1017 jw A143 Rowley Hill - Rev3 2019 +NW1+NE1 AM.vai"
(drive-on-the-left) at 14:06:53 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J3 A1017 jw A143 Rowley Hill - Rev3 2019AM +NW1+NE1
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - A143 Rowley Hill
ARM B - A1017 Rowley Hill
ARM C - A1017 South

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	8.00	12.00	15.00	40.00	30.0	0.604	25.548
B	3.60	6.00	10.00	25.00	40.00	25.0	0.619	25.714
C	3.60	8.30	6.00	30.00	40.00	25.0	0.622	25.788

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
A	15.00	45.00	75.00	2.54	3.81	2.54
B	15.00	45.00	75.00	7.60	11.40	7.60
C	15.00	45.00	75.00	2.35	3.52	2.35

DEMAND SET TITLE: as above

T33

TIME	FROM/T	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.877	0.123
		0.0	178.0	25.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.382	0.000	0.618
		232.0	0.0	376.0

		I (0.0)I (0.0)I (0.0)I	
		I I I I	
	I ARM C I	0.197 I 0.803 I 0.000 I	
		I 37.0 I 151.0 I 0.0 I	
		I (0.0)I (0.0)I (0.0)I	
		I I I I	

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING
I 07.45-08.00									
I ARM A	2.55	24.41	0.104	- -	-	0.0	0.1	1.7	
	-	0.046							
I ARM B	7.63	25.52	0.299	- -	-	0.0	0.4	6.2	
	-	0.056							
I ARM C	2.36	23.99	0.098	- -	-	0.0	0.1	1.6	
	-	0.046							
I									

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING
I 08.00-08.15									
I ARM A	3.04	24.18	0.126	- -	-	0.1	0.1	2.1	
	-	0.047							
I ARM B	9.11	25.48	0.357	- -	-	0.4	0.6	8.2	
	-	0.061							
I ARM C	2.82	23.63	0.119	- -	-	0.1	0.1	2.0	
	-	0.048							
I									

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING
I 08.15-08.30									
I ARM A	3.73	23.88	0.156	- -	-	0.1	0.2	2.7	
	-	0.050							
I ARM B	11.16	25.43	0.439	- -	-	0.6	0.8	11.4	
	-	0.070							
I ARM C	3.45	23.15	0.149	- -	-	0.1	0.2	2.6	
	-	0.051							
I									

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING
I 08.30-08.45									
I ARM A	3.73	23.88	0.156	- -	-	0.2	0.2	2.8	
	-	0.050							
I ARM B	11.16	25.43	0.439	- -	-	0.8	0.8	11.7	
	-	0.070							
I ARM C	3.45	23.14	0.149	- -	-	0.2	0.2	2.6	
	-	0.051							
I									

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING
I 08.45-09.00									
I ARM A	3.04	24.18	0.126	- -	-	0.2	0.1	2.2	
	-	0.047							
I ARM B	9.11	25.48	0.357	- -	-	0.8	0.6	8.6	
	-	0.061							
I ARM C	2.82	23.62	0.119	- -	-	0.2	0.1	2.1	
	-	0.048							
I									

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING

```
 I 09.00-09.15                    -
                                  I
 I ARM A       2.55     24.40   0.104   - -       -    0.1    0.1        1.8
         -              0.046     I
 I ARM B       7.63     25.52   0.299   - -       -    0.6    0.4        6.5
         -              0.056     I
 I ARM C       2.36     23.98   0.098   - -       -    0.1    0.1        1.7
         -              0.046     I
 I
                                  I
```

.QUEUE AT ARM A

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

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.6	*
08.30	0.8	*
08.45	0.8	*
09.00	0.6	*
09.15	0.4	

.QUEUE AT ARM C

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

A	279.4	186.3	13.3	0.05	13.3	0.05
B	836.9	557.9	52.5	0.06	52.5	0.06
C	258.8	172.5	12.5	0.05	12.5	0.05
ALL	1375.0	916.7	78.3	0.06	78.3	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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011
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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J3 A1017 jw A143 Rowley Hill\
10173a - J3 A1017 jw A143 Rowley Hill - Rev3 2019 +NW1+NE1 PM.vai"
(drive-on-the-left) at 14:06:57 on Wednesday, 8 April 2015

.FILE PROPERTIES

RUN TITLE: J3 A1017 jw A143 Rowley Hill - Rev3 2019PM +NW1+NE1
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA

ARM A - A143 Rowley Hill
ARM B - A1017 Rowley Hill
ARM C - A1017 South

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	8.00	12.00	15.00	40.00	30.0	0.604	25.548
B	3.60	6.00	10.00	25.00	40.00	25.0	0.619	25.714
C	3.60	8.30	6.00	30.00	40.00	25.0	0.622	25.788

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE TO RISE	AT TOP IS REACHED	AFTER FALLING	PEAK	OF PEAK	PEAK
A	15.00	45.00	75.00	3.88	5.81	3.88			
B	15.00	45.00	75.00	4.29	6.43	4.29			
C	15.00	45.00	75.00	4.50	6.75	4.50			

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.965	0.035
		0.0	299.0	11.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.603	0.000	0.397
		207.0	0.0	136.0

```
I                   I         I (  0.0)I (  0.0)I (  0.0)I
I                   I         I         I         I         I
I                   I  ARM  C I  0.069 I  0.931 I  0.000 I
I                   I         I   25.0 I  335.0 I    0.0 I
I                   I         I (  0.0)I (  0.0)I (  0.0)I
I                   I         I         I         I         I
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. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

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---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 16.45-17.00                                                        I
                                I
 I ARM A       3.89     23.01   0.169   - -       -    0.0    0.2        3.0
         -              0.052     I
 I ARM B       4.30     25.63   0.168   - -       -    0.0    0.2        3.0
         -              0.047     I
 I ARM C       4.52     24.17   0.187   - -       -    0.0    0.2        3.4
         -              0.051     I
 I                                                                    I
                                I

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----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 17.00-17.15                                                        I
                                I
 I ARM A       4.64     22.51   0.206   - -       -    0.2    0.3        3.8
         -              0.056     I
 I ARM B       5.14     25.61   0.201   - -       -    0.2    0.3        3.7
         -              0.049     I
 I ARM C       5.39     23.86   0.226   - -       -    0.2    0.3        4.3
         -              0.054     I
 I                                                                    I
                                I

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----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
```



```
 I 17.15-17.30                                                        I
                                I
 I ARM A       5.69     21.84   0.260   - -       -    0.3    0.4        5.2
         -              0.062     I
 I ARM B       6.29     25.59   0.246   - -       -    0.3    0.3        4.8
         -              0.052     I
 I ARM C       6.61     23.43   0.282   - -       -    0.3    0.4        5.8
         -              0.059     I
 I                                                                    I
                                I

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----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 17.30-17.45                                                        I
                                I
 I ARM A       5.69     21.84   0.260   - -       -    0.4    0.4        5.3
         -              0.062     I
 I ARM B       6.29     25.59   0.246   - -       -    0.3    0.3        4.9
         -              0.052     I
 I ARM C       6.61     23.43   0.282   - -       -    0.4    0.4        5.9
         -              0.059     I
 I                                                                    I
                                I

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----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 17.45-18.00                                                        I
                                I
 I ARM A       4.64     22.50   0.206   - -       -    0.4    0.3        4.0
         -              0.056     I
 I ARM B       5.14     25.61   0.201   - -       -    0.3    0.3        3.8
         -              0.049     I
 I ARM C       5.39     23.85   0.226   - -       -    0.4    0.3        4.5
         -              0.054     I
 I                                                                    I
                                I

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----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
```

```
 I 18.00-18.15                          -
                                        I
 I ARM A       3.89     23.00   0.169   - -       -    0.3    0.2        3.1
         -              0.052    I
 I ARM B       4.30     25.63   0.168   - -       -    0.3    0.2        3.1
         -              0.047    I
 I ARM C       4.52     24.17   0.187   - -       -    0.3    0.2        3.5
         -              0.051    I
 I
                                I
```

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.2
17.15	0.3
17.30	0.4
17.45	0.4
18.00	0.3
18.15	0.2

.QUEUE AT ARM B

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

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.2
17.15	0.3
17.30	0.4
17.45	0.4
18.00	0.3
18.15	0.2

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	426.7	284.5	24.3	0.06	24.3	0.06
B	472.1	314.7	23.3	0.05	23.3	0.05
C	495.5	330.3	27.3	0.06	27.3	0.06
ALL	1394.3	929.5	74.9	0.05	74.9	0.05

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
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Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J3 A1017 jw A143 Rowley Hill\
10173a - J3 A1017 jw A143 Rowley Hill - Rev3 2029R +NW2+NE2 AM.vai"
(drive-on-the-left) at 14:07:33 on Wednesday, 8 April 2015

.FILE PROPERTIES

RUN TITLE: J3 A1017 jw A143 Rowley Hill - Rev3 2029R +NW2+NE2 AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA

ARM A - A143 Rowley Hill
ARM B - A1017 Rowley Hill
ARM C - A1017 South

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	8.00	12.00	15.00	40.00	30.0	0.604	25.548
B	3.60	6.00	10.00	25.00	40.00	25.0	0.619	25.714
C	3.60	8.30	6.00	30.00	40.00	25.0	0.622	25.788

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS (TO RISE)	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS (FALLING)	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
A	15.00	45.00	75.00	3.78	5.66	3.78
B	15.00	45.00	75.00	8.51	12.77	8.51
C	15.00	45.00	75.00	2.49	3.73	2.49

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.914	0.086
		0.0	276.0	26.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.414	0.000	0.586
		282.0	0.0	399.0

```
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I  ARM  C I  0.196 I  0.804 I  0.000 I
 I                   I         I   39.0 I  160.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 ------------------------------------------------------------
```

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	I
I 07.45-08.00								I
I ARM A	3.79	24.34	0.156	- -	-	0.0	0.2	2.7
-		0.049	I					
I ARM B	8.54	25.51	0.335	- -	-	0.0	0.5	7.3
-		0.059	I					
I ARM C	2.50	23.60	0.106	- -	-	0.0	0.1	1.7
-		0.047	I					
I								
			I					

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	I
I 08.00-08.15								I
I ARM A	4.52	24.10	0.188	- -	-	0.2	0.2	3.4
-		0.051	I					
I ARM B	10.20	25.47	0.401	- -	-	0.5	0.7	9.8
-		0.065	I					
I ARM C	2.98	23.16	0.129	- -	-	0.1	0.1	2.2
-		0.050	I					
I								
			I					

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	I
I 08.15-08.30								I
I ARM A	5.54	23.78	0.233	- -	-	0.2	0.3	4.5
-		0.055	I					
I ARM B	12.50	25.42	0.492	- -	-	0.7	1.0	14.0
-		0.077	I					
I ARM C	3.65	22.58	0.162	- -	-	0.1	0.2	2.8
-		0.053	I					
I								
			I					

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	I
I 08.30-08.45								I
I ARM A	5.54	23.78	0.233	- -	-	0.3	0.3	4.5
-		0.055	I					
I ARM B	12.50	25.42	0.492	- -	-	1.0	1.0	14.4
-		0.077	I					
I ARM C	3.65	22.57	0.162	- -	-	0.2	0.2	2.9
-		0.053	I					
I								
			I					

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	I
I 08.45-09.00								I
I ARM A	4.52	24.10	0.188	- -	-	0.3	0.2	3.5
-		0.051	I					
I ARM B	10.20	25.47	0.401	- -	-	1.0	0.7	10.3
-		0.066	I					
I ARM C	2.98	23.16	0.129	- -	-	0.2	0.1	2.3
-		0.050	I					
I								
			I					

```
 I 09.00-09.15                    -
                                  I
 I ARM A       3.79     24.34   0.156   - -       -    0.2    0.2        2.8
         -              0.049     I
 I ARM B       8.54     25.51   0.335   - -       -    0.7    0.5        7.7
         -              0.059     I
 I ARM C       2.50     23.59   0.106   - -       -    0.1    0.1        1.8
         -              0.047     I
 I
                                  I
```

.QUEUE AT ARM A

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

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	*
08.15	0.7	*
08.30	1.0	*
08.45	1.0	*
09.00	0.7	*
09.15	0.5	*

.QUEUE AT ARM C

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	415.7	277.1	21.5	0.05	21.5	0.05
B	937.3	624.9	63.6	0.07	63.6	0.07
C	273.9	182.6	13.7	0.05	13.7	0.05
ALL	1626.9	1084.6	98.7	0.06	98.7	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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
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Fax: +44 (0) 1344 770356
Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J3 A1017 jw A143 Rowley Hill\
10173a - J3 A1017 jw A143 Rowley Hill - Rev3 2029R +NW2+NE2 PM.vai"
(drive-on-the-left) at 14:07:59 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J3 A1017 jw A143 Rowley Hill - Rev3 2029R +NW2+NE2 PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - A143 Rowley Hill
ARM B - A1017 Rowley Hill
ARM C - A1017 South

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	8.00	12.00	15.00	40.00	30.0	0.604	25.548
B	3.60	6.00	10.00	25.00	40.00	25.0	0.619	25.714
C	3.60	8.30	6.00	30.00	40.00	25.0	0.622	25.788

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO TOP OF PEAK	NUMBER OF MINUTES FROM START WHEN FLOW STOPS TO IS REACHED	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
	TO RISE	FALLING			
A	15.00	45.00	75.00	5.06	7.59	5.06
B	15.00	45.00	75.00	5.94	8.91	5.94
C	15.00	45.00	75.00	5.11	7.67	5.11

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
		TURNING PROPORTIONS		
		TURNING COUNTS		
		(PERCENTAGE OF H.V.S)		
16.45 - 18.15	ARM A	0.000	0.970	0.030
		0.0	393.0	12.0
		(0.0)I	(0.0)I	(0.0)I
	ARM B	0.674	0.000	0.326
		320.0	0.0	155.0

```
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I  ARM  C I  0.068 I  0.932 I  0.000 I
 I                   I         I   28.0 I  381.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
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. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

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---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 16.45-17.00                                                        I
                                I
 I ARM A       5.08     22.67   0.224   - -       -    0.0    0.3        4.2
         -               0.057     I
 I ARM B       5.96     25.62   0.233   - -       -    0.0    0.3        4.4
         -               0.051     I
 I ARM C       5.13     23.30   0.220   - -       -    0.0    0.3        4.1
         -               0.055     I
 I                              I
                                I

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----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 17.00-17.15                                                        I
                                I
 I ARM A       6.07     22.11   0.275   - -       -    0.3    0.4        5.6
         -               0.062     I
 I ARM B       7.12     25.60   0.278   - -       -    0.3    0.4        5.7
         -               0.054     I
 I ARM C       6.13     22.81   0.269   - -       -    0.3    0.4        5.4
         -               0.060     I
 I                              I
                                I

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----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
```



```
 I 17.15-17.30                                                        I
                                I
 I ARM A       7.43     21.33   0.348   - -       -    0.4    0.5        7.8
         -               0.072     I
 I ARM B       8.72     25.58   0.341   - -       -    0.4    0.5        7.6
         -               0.059     I
 I ARM C       7.51     22.14   0.339   - -       -    0.4    0.5        7.5
         -               0.068     I
 I                              I
                                I

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.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 17.30-17.45                                                        I
                                I
 I ARM A       7.43     21.33   0.348   - -       -    0.5    0.5        8.0
         -               0.072     I
 I ARM B       8.72     25.58   0.341   - -       -    0.5    0.5        7.7
         -               0.059     I
 I ARM C       7.51     22.14   0.339   - -       -    0.5    0.5        7.7
         -               0.068     I
 I                              I
                                I

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.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
                                -
 I 17.45-18.00                                                        I
                                I
 I ARM A       6.07     22.10   0.275   - -       -    0.5    0.4        5.8
         -               0.062     I
 I ARM B       7.12     25.60   0.278   - -       -    0.5    0.4        5.9
         -               0.054     I
 I ARM C       6.13     22.80   0.269   - -       -    0.5    0.4        5.6
         -               0.060     I
 I                              I
                                I

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.-------------------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                                                    -
```

```
                                  -
 I 18.00-18.15                                                                  
                                  I
 I ARM A       5.08     22.66   0.224   - -       -    0.4    0.3        4.4
         -              0.057     I
 I ARM B       5.96     25.62   0.233   - -       -    0.4    0.3        4.6
         -              0.051     I
 I ARM C       5.13     23.29   0.220   - -       -    0.4    0.3        4.3
         -              0.055     I
 I
                                  I

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---------------------------------

.QUEUE AT ARM A
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00          0.3
    17.15          0.4
    17.30          0.5  *
    17.45          0.5  *
    18.00          0.4
    18.15          0.3


.QUEUE AT ARM B
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00          0.3
    17.15          0.4
    17.30          0.5  *
    17.45          0.5  *
    18.00          0.4
    18.15          0.3


.QUEUE AT ARM C
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00          0.3
    17.15          0.4
    17.30          0.5  *
    17.45          0.5  *
    18.00          0.4
    18.15          0.3

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
                 ----------------------------------------

 ------------------------------------------------------------------------------
T75
 I  ARM  I   TOTAL DEMAND  I     * QUEUEING *    I  * INCLUSIVE QUEUEING *  I
 I       I                 I      * DELAY *      I         * DELAY *        I
 I       I-------------------------------------------------------------------I
 I       I  (VEH)  (VEH/H) I  (MIN)    (MIN/VEH) I    (MIN)      (MIN/VEH)  I
```



```
 ------------------------------------------------------------------------------
 I   A   I  557.5 I  371.6 I    35.8 I    0.06   I      35.8  I     0.06    I
 I   B   I  653.8 I  435.9 I    35.9 I    0.05   I      35.9  I     0.05    I
 I   C   I  563.0 I  375.3 I    34.6 I    0.06   I      34.6  I     0.06    I
 ------------------------------------------------------------------------------
 I  ALL  I 1774.2 I 1182.8 I   106.4 I    0.06   I     106.4  I     0.06    I
 ------------------------------------------------------------------------------
 * 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 JOB
```

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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TRL SOFTWARE SALES
TEL: CROWTHORNE (01344) 770758, FAX: 770356
EMAIL: software@trl.co.uk

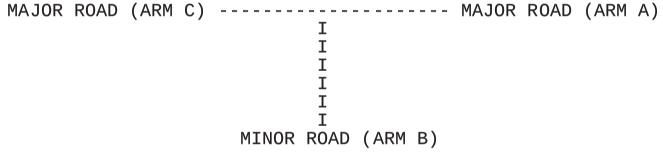
Run with file:-
"P:\10173\Traffic\Junctions - Rev3\J4 A1017 jw B1061 Water Lane\
10173 J4 A1017 jw B1061 Water Lane - Rev3 2019+NW1+NE1 AM.vpi"
(drive-on-the-left) at 15:06:38 on Wednesday, 8 April 2015

.RUN INFORMATION

RUN TITLE	: 10173 J4 A1017 jw B1061 Water Lane - Rev3 2019+NW1+NE1 AM
LOCATION	: Haverhill
DATE	: 08/04/15
CLIENT	: Hallam
ENUMERATOR	: sue.tadman [BCL25]
JOB NUMBER	: 10173
STATUS	: Preliminary
DESCRIPTION	:

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS A1017 Rowley Hill
ARM B IS Water Lane
ARM C IS A1017 Sturmer 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		
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	7.00
CENTRAL RESERVE WIDTH	(WCR)	0.00
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20
- VISIBILITY	(VC-B)	100.00
- BLOCKS TRAFFIC (SPACES)		YES (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	30.0
- VISIBILITY TO RIGHT	(VB-A)	25.0
- LANE 1 WIDTH	(WB-C)	3.00
- LANE 2 WIDTH	(WB-A)	0.00

.SLOPES AND INTERCEPT

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

Intercept For STREAM B-C	Slope For STREAM A-C	Slope For Opposing STREAM A-B
639.67	0.24	0.09

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
499.60	0.22	0.09	0.14	0.31

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
631.87	0.23	0.23

(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: as above

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 SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
A	15.00	45.00	75.00	4.00	6.00	4.00
B	15.00	45.00	75.00	1.06	1.59	1.06
C	15.00	45.00	75.00	8.15	12.22	8.15

.Demand set: as above

TIME	FROM/TO ARM	TURNING PROPORTIONS TURNING COUNTS (PERCENTAGE OF H.V.S) A	B	C
07.45 - 09.15	ARM A	0.000	0.056	0.944
		0.0	18.0	302.0
		(0.0)I	(0.0)I	(0.0)
	ARM B	0.212	0.000	0.788
		18.0	0.0	67.0
		(0.0)I	(0.0)I	(0.0)

	A	B	C
ARM C	0.873	0.127	0.000
	569.0	83.0	0.0
	(0.0)I	(0.0)I	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
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 SEGMENT	ARM	DEMAND FLOW (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
07.45-08.00								
	B-AC	1.07	8.67	0.123		0.00	0.14	2.0
			0.13					
	C-AB	2.02	14.40	0.141		0.00	0.30	4.4
			0.08					
	C-A	6.16						
	A-B	0.23						
	A-C	3.79						
08.00-08.15								
	B-AC	1.27	8.38	0.152		0.14	0.18	2.6
			0.14					
	C-AB	2.81	15.24	0.184		0.30	0.43	6.5
			0.08					
	C-A	6.96						
	A-B	0.27						
	A-C	4.52						

TIME SEGMENT	ARM	DEMAND FLOW (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)

```
    (VEH.MIN/      PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 08.15-08.30                           I
 I   B-AC      1.56      7.95    0.196                 0.18   0.24        3.5
                      0.16      I
 I   C-AB      4.13     16.35    0.253                 0.43   0.69       10.3
                      0.08      I
 I   C-A       7.83                                                          
                                 I
 I   A-B       0.33                                                          
                                 I
 I   A-C       5.54                                                          
                                 I
 I                                                                           
                                 I
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 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 08.30-08.45                           I
 I   B-AC      1.56      7.95    0.196                 0.24   0.24        3.6
                      0.16      I
 I   C-AB      4.14     16.36    0.253                 0.69   0.69       10.5
                      0.08      I
 I   C-A       7.82                                                          
                                 I
 I   A-B       0.33                                                          
                                 I
 I   A-C       5.54                                                          
                                 I
 I                                                                           
                                 I
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-----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 08.45-09.00                           I
 I   B-AC      1.27      8.38    0.152                 0.24   0.18        2.8
                      0.14      I
 I   C-AB      2.82     15.25    0.185                 0.69   0.45        6.8
                      0.08      I
 I   C-A       6.95                                                          
                                 I
 I   A-B       0.27                                                          
                                 I
 I   A-C       4.52                                                          
                                 I
 I                                                                           
                                 I
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 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 09.00-09.15                           I
 I   B-AC      1.07      8.67    0.123                 0.18   0.14        2.2
                      0.13      I
 I   C-AB      2.04     14.41    0.141                 0.45   0.31        4.7
                      0.08      I
 I   C-A       6.14                                                          
                                 I
 I   A-B       0.23                                                          
                                 I
 I   A-C       3.79                                                          
                                 I
 I                                                                           
                                 I
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*WARNING* NO MARGINAL ANALYSIS OF CAPACITIES AS MAJOR ROAD BLOCKING MAY OCCUR
.
 QUEUE FOR STREAM    B-AC
 ------------------------
  TIME          NO. OF
  SEGMENT       VEHICLES
  ENDING        IN QUEUE
   08.00           0.1
   08.15           0.2
   08.30           0.2
   08.45           0.2
   09.00           0.2
   09.15           0.1
.
 QUEUE FOR STREAM    C-AB
 ------------------------
  TIME          NO. OF
  SEGMENT       VEHICLES
  ENDING        IN QUEUE
   08.00           0.3
   08.15           0.4
   08.30           0.7    *
   08.45           0.7    *
   09.00           0.4
   09.15           0.3
.
                QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
                ---------------------------------------------

-------------------------------------------------------------------------------
I STREAM I   TOTAL DEMAND  I   * QUEUEING *      I * INCLUSIVE QUEUEING * I
I        I                 I    * DELAY *        I       * DELAY *        I
I        I-----------------------------------------------------------------I
I        I  (VEH)  (VEH/H) I  (MIN)    (MIN/VEH) I    (MIN)     (MIN/VEH) I
-------------------------------------------------------------------------------
I  B-AC  I  117.0 I   78.0 I    16.7 I    0.14   I      16.7  I    0.14   I
I  C-AB  I  269.4 I  179.6 I    43.2 I    0.16   I      43.2  I    0.16   I
I  C-A   I  628.1 I  418.7 I         I           I            I           I
I  A-B   I   24.8 I   16.5 I         I           I            I           I
I  A-C   I  415.7 I  277.1 I         I           I            I           I
-------------------------------------------------------------------------------
I  ALL   I 1454.9 I  969.9 I    59.9 I    0.04   I      59.9  I    0.04   I
-------------------------------------------------------------------------------
```

* 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*******

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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EMAIL: software@trl.co.uk

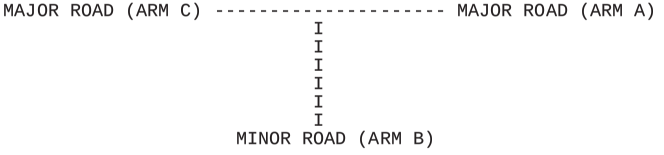
Run with file:-
"P:\10173\Traffic\Junctions - Rev3\J4 A1017 jw B1061 Water Lane\
 10173 J4 A1017 jw B1061 Water Lane - Rev3 2019+NW1+NE1 PM.vpi"
(drive-on-the-left) at 15:07:17 on Wednesday, 8 April 2015

.RUN INFORMATION
 ****

RUN TITLE	: 10173 J4 A1017 jw B1061 Water Lane - Rev3 2019+NW1+NE1 AM
LOCATION	: Haverhill
DATE	: 08/04/15
CLIENT	: Hallam
ENUMERATOR	: sue.tadman [BCL25]
JOB NUMBER	: 10173
STATUS	: Preliminary
DESCRIPTION	:

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
  ****

  INPUT DATA



ARM A IS A1017 Rowley Hill
ARM B IS Water Lane
ARM C IS A1017 Sturmer 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
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH (W) M.	7.00
CENTRAL RESERVE WIDTH (WCR) M.	0.00
MAJOR ROAD RIGHT TURN - WIDTH (WC-B) M.	2.20
- VISIBILITY (VC-B) M.	100.00
- BLOCKS TRAFFIC (SPACES) (0)	YES
MINOR ROAD - VISIBILITY TO LEFT (VB-C) M.	30.0
- VISIBILITY TO RIGHT (VB-A) M.	25.0
- LANE 1 WIDTH (WB-C) M.	3.00
- LANE 2 WIDTH (WB-A) M.	0.00

.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
639.67	0.24	0.09

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A
499.60	0.22	0.09	0.14
0.31			

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
631.87	0.23	0.23

(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: as above

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 SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
A	15.00	45.00	75.00	7.39	11.08	7.39
B	15.00	45.00	75.00	0.99	1.48	0.99
C	15.00	45.00	75.00	4.44	6.66	4.44

.Demand set: as above

TIME	TURNING PROPORTIONS (PERCENTAGE OF H.V.S) FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.042	0.958
		0.0	25.0	566.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.215	0.000	0.785
		17.0	0.0	62.0
		(0.0)	(0.0)	(0.0)

```
 I                   I         I        I        I        I
 I                   I ARM  C  I  0.893 I  0.107 I  0.000 I
 I                   I         I  317.0 I   38.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I        I        I        I
 ------------------------------------------------------------
 TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 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
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 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 16.45-17.00
                                I
 I   B-AC      0.99      8.11    0.122                0.00   0.14        2.0
                       0.14     I
 I   C-AB      0.71     11.56    0.061                0.00   0.10        1.5
                       0.09     I
 I   C-A       3.74
                                I
 I   A-B       0.31
                                I
 I   A-C       7.10
                                I
 I
                                I
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-----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.00-17.15
                                I
 I   B-AC      1.18      7.72    0.153                0.14   0.18        2.6
                       0.15     I
 I   C-AB      0.95     11.86    0.080                0.10   0.15        2.2
                       0.09     I
 I   C-A       4.37
                                I
 I   A-B       0.37
                                I
 I   A-C       8.48
                                I
 I
                                I
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-----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
```



```
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.15-17.30
                                I
 I   B-AC      1.45      7.17    0.202                0.18   0.25        3.6
                       0.17     I
 I   C-AB      1.32     12.24    0.108                0.15   0.23        3.5
                       0.09     I
 I   C-A       5.19
                                I
 I   A-B       0.46
                                I
 I   A-C      10.39
                                I
 I
                                I
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-----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.30-17.45
                                I
 I   B-AC      1.45      7.17    0.202                0.25   0.25        3.8
                       0.17     I
 I   C-AB      1.32     12.24    0.108                0.23   0.23        3.5
                       0.09     I
 I   C-A       5.19
                                I
 I   A-B       0.46
                                I
 I   A-C      10.39
                                I
 I
                                I
.-------------------------------------------------------------------------------
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.-------------------------------------------------------------------------------
-----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.45-18.00
                                I
 I   B-AC      1.18      7.72    0.153                0.25   0.18        2.8
                       0.15     I
 I   C-AB      0.95     11.86    0.080                0.23   0.15        2.3
                       0.09     I
 I   C-A       4.37
                                I
 I   A-B       0.37
                                I
 I   A-C       8.48
                                I
 I
                                I
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I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ PER ARRIVING	AVERAGE DELAY I
I 18.00-18.15									I
I B-AC	0.99	8.11	0.122		0.18	0.14	2.2	0.14	I
I C-AB	0.71	11.57	0.062		0.15	0.10	1.6	0.09	I
I C-A	3.74								I
I A-B	0.31								I
I A-C	7.10								I
I									I

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

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.1
17.15	0.2
17.30	0.2
17.45	0.3
18.00	0.2
18.15	0.1

QUEUE FOR STREAM C-AB

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

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I STREAM I	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *		I
I	(VEH)	(VEH/H) I	(MIN)	(MIN/VEH) I	(MIN)	(MIN/VEH) I	
I B-AC I	108.7	72.5 I	17.0	0.16 I	17.0	0.16 I	
I C-AB I	89.4	59.6 I	14.6	0.16 I	14.6	0.16 I	
I C-A I	399.2	266.1 I		I		I	
I A-B I	34.4	22.9 I		I		I	
I A-C I	779.1	519.4 I		I		I	
I ALL I	1410.8	940.6 I	31.6	0.02 I	31.6	0.02 I	

* 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*******

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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EMAIL: software@trl.co.uk

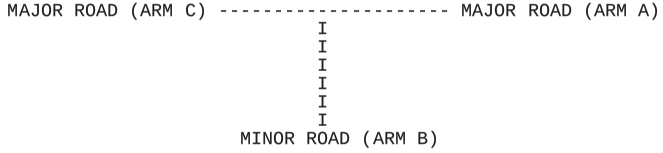
Run with file:-
"P:\10173\Traffic\Junctions - Rev3\J4 A1017 jw B1061 Water Lane\
10173 J4 A1017 jw B1061 Water Lane - Rev3 2029R+NW2+NE2 AM.vpi"
(drive-on-the-left) at 15:08:35 on Wednesday, 8 April 2015

.RUN INFORMATION

RUN TITLE	: 10173 J4 A1017 jw B1061 Water Lane - Rev3 2029R+NW2+NE2 PM
LOCATION	: Haverhill
DATE	: 08/04/15
CLIENT	: Hallam
ENUMERATOR	: sue.tadman [BCL25]
JOB NUMBER	: 10173
STATUS	: Preliminary
DESCRIPTION	:

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS A1017 Rowley Hill
ARM B IS Water Lane
ARM C IS A1017 Sturmer 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
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 7.00	
CENTRAL RESERVE WIDTH	(WCR) 0.00	
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20	
- VISIBILITY	(VC-B)100.00	
- BLOCKS TRAFFIC (SPACES)	YES (0)	
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 30.0	
- VISIBILITY TO RIGHT	(VB-A) 25.0	
- LANE 1 WIDTH	(WB-C) 3.00	
- LANE 2 WIDTH	(WB-A) 0.00	

.SLOPES AND INTERCEPT

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

Intercept For STREAM B-C	Slope For STREAM A-C	Slope For Opposing STREAM A-B
639.67	0.24	0.09

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
499.60	0.22	0.09	0.14	0.31

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
631.87	0.23	0.23

(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: as above

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 SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
A	15.00	45.00	75.00	5.34	8.01	5.34
B	15.00	45.00	75.00	1.16	1.74	1.16
C	15.00	45.00	75.00	9.05	13.58	9.05

.Demand set: as above

TIME	FROM/TO ARM	TURNING PROPORTIONS (PERCENTAGE OF H.V.S) TURNING COUNTS A	B	C
07.45 - 09.15	ARM A	0.000	0.066	0.934
		0.0	28.0	399.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.237	0.000	0.763
		22.0	0.0	71.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.878	0.122	0.000
		636.0	88.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
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 SEGMENT		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
07.45-08.00								
	B-AC	1.17	8.19	0.142		0.00	0.16	2.4
			0.14					
	C-AB	2.34	14.71	0.159		0.00	0.36	5.4
			0.08					
	C-A	6.74						
	A-B	0.35						
	A-C	5.01						

GEOMETRIC DELAY 0.14 AVERAGE DELAY (VEH.MIN/ PER ARRIVING 0.08

TIME SEGMENT		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
08.00-08.15								
	B-AC	1.39	7.81	0.179		0.16	0.21	3.1
			0.16					
	C-AB	3.33	15.66	0.213		0.36	0.55	8.2
			0.08					
	C-A	7.52						
	A-B	0.42						
	A-C	5.98						

GEOMETRIC DELAY 0.16 AVERAGE DELAY (VEH.MIN/ PER ARRIVING 0.08

TIME SEGMENT		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)

I SEGMENT)	(VEH.MIN/ TIME SEGMENT)	PER ARRIVING VEHICLE (MIN)	I (RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
I 08.15-08.30			I				
I	B-AC	1.71	7.24	0.236	0.21	0.30	4.4
		0.18	I				
I	C-AB	5.14	16.95	0.303	0.55	0.93	14.0
		0.08	I				
I	C-A	8.15					
			I				
I	A-B	0.51					
			I				
I	A-C	7.32					
			I				
I							
			I				

I GEOMETRIC DELAY	TIME AVERAGE DELAY I	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW	START QUEUE	END QUEUE	DELAY (VEH.MIN/
	(VEH.MIN/	PER ARRIVING	I					
I SEGMENT)	TIME SEGMENT)	VEHICLE	(MIN) I	(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
I 08.30-08.45				I				
I	B-AC	1.71	7.24	0.236	0.30	0.31	4.6	
		0.18		I				
I	C-AB	5.15	16.97	0.304	0.93	0.94	14.3	
		0.09		I				
I	C-A	8.13						
				I				
I	A-B	0.51						
				I				
I	A-C	7.32						
				I				
I								
				I				

I GEOMETRIC DELAY	TIME AVERAGE DELAY I	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW	START QUEUE	END QUEUE	DELAY (VEH.MIN/
	(VEH.MIN/	PER ARRIVING	I					
I SEGMENT)	TIME SEGMENT)	VEHICLE	(MIN) I	(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
I 08.45-09.00				I				
I	B-AC	1.39	7.80	0.179	0.31	0.22	3.4	
		0.16		I				
I	C-AB	3.35	15.68	0.213	0.94	0.57	8.6	
		0.08		I				
I	C-A	7.50						
				I				
I	A-B	0.42						
				I				
I	A-C	5.98						
				I				
I								
				I				

I GEOMETRIC DELAY	TIME AVERAGE DELAY I	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW	START QUEUE	END QUEUE	DELAY (VEH.MIN/
	(VEH.MIN/	PER ARRIVING	I					
I SEGMENT)	TIME SEGMENT)	VEHICLE	(MIN) I	(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
I 09.00-09.15				I				
I	B-AC	1.17	8.19	0.142	0.22	0.17	2.6	
		0.14		I				
I	C-AB	2.36	14.73	0.160	0.57	0.38	5.7	
		0.08		I				
I	C-A	6.73						
				I				
I	A-B	0.35						
				I				
I	A-C	5.01						
				I				
I								
				I				

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

QUEUE FOR STREAM B-AC

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

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.5	*
08.30	0.9	*
08.45	0.9	*
09.00	0.6	*
09.15	0.4	

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I STREAM	I TOTAL DEMAND		I * QUEUEING * DELAY *		I * INCLUSIVE QUEUEING * DELAY *	
	I (VEH)	(VEH/H) I	(MIN)	(MIN/VEH) I	(MIN)	(MIN/VEH) I
I B-AC	I 128.0	I 85.3 I	20.5	I 0.16 I	20.5	I 0.16 I
I C-AB	I 325.0	I 216.7 I	56.1	I 0.17 I	56.2	I 0.17 I
I C-A	I 671.5	I 447.7 I		I		I
I A-B	I 38.5	I 25.7 I		I		I
I A-C	I 549.2	I 366.1 I		I		I
I ALL	I 1712.3	I 1141.5 I	76.6	I 0.04 I	76.6	I 0.04 I

* 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*******

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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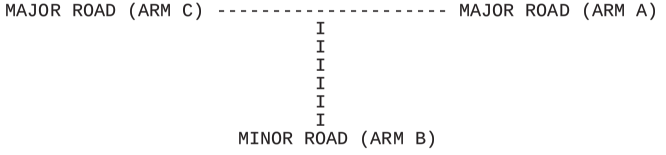
Run with file:-
"P:\10173\Traffic\Junctions - Rev3\J4 A1017 jw B1061 Water Lane\
 10173 J4 A1017 jw B1061 Water Lane - Rev3 2029R+NW2+NE2 PM.vpi"
(drive-on-the-left) at 15:09:02 on Wednesday, 8 April 2015

.RUN INFORMATION
 ****

RUN TITLE	: 10173 J4 A1017 jw B1061 Water Lane - Rev3 2029R+NW2+NE2 PM
LOCATION	: Haverhill
DATE	: 08/04/15
CLIENT	: Hallam
ENUMERATOR	: sue.tadman [BCL25]
JOB NUMBER	: 10173
STATUS	: Preliminary
DESCRIPTION	:

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
  ****

  INPUT DATA



ARM A IS A1017 Rowley Hill
ARM B IS Water Lane
ARM C IS A1017 Sturmer 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
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH (W)	7.00
CENTRAL RESERVE WIDTH (WCR)	0.00
MAJOR ROAD RIGHT TURN - WIDTH (WC-B)	2.20
- VISIBILITY (VC-B)	100.00
- BLOCKS TRAFFIC (SPACES)	YES (0)
MINOR ROAD - VISIBILITY TO LEFT (VB-C)	30.0
- VISIBILITY TO RIGHT (VB-A)	25.0
- LANE 1 WIDTH (WB-C)	3.00
- LANE 2 WIDTH (WB-A)	0.00

.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
639.67	0.24	0.09

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A
499.60	0.22	0.09	0.14
0.31			

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
631.87	0.23	0.23

(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: as above

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 SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	9.06	13.59	9.06
ARM B	15.00	45.00	75.00	1.25	1.88	1.25
ARM C	15.00	45.00	75.00	5.99	8.98	5.99

.Demand set: as above

TIME	FROM/TO	TURNING PROPORTIONS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.047	0.953
		0.0	34.0	691.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.290	0.000	0.710
		29.0	0.0	71.0
		(0.0)	(0.0)	(0.0)

```
 I                   I        I        I        I        I
 I                   I ARM  C  I  0.908 I  0.092 I  0.000 I
 I                   I         I  435.0 I   44.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I        I        I        I
 ------------------------------------------------------------
 TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 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
.-------------------------------------------------------------------------------
-----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 16.45-17.00
                                I
 I   B-AC      1.25      7.35    0.171                0.00   0.20        2.9
                       0.16     I
 I   C-AB      0.98      12.31   0.080                0.00   0.15        2.2
                       0.09     I
 I   C-A       5.03
                                I
 I   A-B       0.43
                                I
 I   A-C       8.67
                                I
 I
                                I
.-------------------------------------------------------------------------------
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.-------------------------------------------------------------------------------
-----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.00-17.15
                                I
 I   B-AC      1.50      6.84    0.219                0.20   0.28        4.0
                       0.19     I
 I   C-AB      1.33      12.73   0.105                0.15   0.22        3.4
                       0.09     I
 I   C-A       5.84
                                I
 I   A-B       0.51
                                I
 I   A-C      10.35
                                I
 I
                                I
.-------------------------------------------------------------------------------
-----------------------------------

.-------------------------------------------------------------------------------
-----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
```



```
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.15-17.30
                                I
 I   B-AC      1.84      6.10    0.301                0.28   0.42        6.0
                       0.23     I
 I   C-AB      1.95      13.35   0.146                0.22   0.38        5.8
                       0.09     I
 I   C-A       6.84
                                I
 I   A-B       0.62
                                I
 I   A-C      12.68
                                I
 I
                                I
.-------------------------------------------------------------------------------
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.-------------------------------------------------------------------------------
-----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.30-17.45
                                I
 I   B-AC      1.84      6.10    0.301                0.42   0.43        6.4
                       0.23     I
 I   C-AB      1.96      13.35   0.147                0.38   0.39        5.9
                       0.09     I
 I   C-A       6.83
                                I
 I   A-B       0.62
                                I
 I   A-C      12.68
                                I
 I
                                I
.-------------------------------------------------------------------------------
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.-------------------------------------------------------------------------------
-----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.45-18.00
                                I
 I   B-AC      1.50      6.83    0.219                0.43   0.29        4.4
                       0.19     I
 I   C-AB      1.34      12.74   0.105                0.39   0.23        3.5
                       0.09     I
 I   C-A       5.84
                                I
 I   A-B       0.51
                                I
 I   A-C      10.35
                                I
 I
                                I
.-------------------------------------------------------------------------------
```

I TIME SEGMENT)	DEMAND TIME SEGMENT)	CAPACITY VEHICLE	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME (MIN)	GEOMETRIC DELAY (VEH.MIN/ VEHICLE	AVERAGE DELAY PER ARRIVING I
I 18.00-18.15									I
I B-AC	1.25	7.35	0.171		0.29	0.21	3.2	0.16	I
I C-AB	0.99	12.32	0.080		0.23	0.15	2.3	0.09	I
I C-A	5.02								I
I A-B	0.43								I
I A-C	8.67								I
I									I

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

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.2
17.15	0.3
17.30	0.4
17.45	0.4
18.00	0.3
18.15	0.2

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.1
17.15	0.2
17.30	0.4
17.45	0.4
18.00	0.2
18.15	0.2

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I STREAM I	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *		I
I	I (VEH)	I (VEH/H) I	(MIN)	(MIN/VEH) I	(MIN)	(MIN/VEH) I	
I B-AC	I 137.6	I 91.8 I	27.0 I	0.20 I	27.0 I	0.20 I	
I C-AB	I 128.3	I 85.6 I	23.0 I	0.18 I	23.0 I	0.18 I	
I C-A	I 531.0	I 354.0 I	I	I	I	I	
I A-B	I 46.8	I 31.2 I	I	I	I	I	
I A-C	I 951.1	I 634.1 I	I	I	I	I	
I ALL	I 1794.9	I 1196.6 I	50.0 I	0.03 I	50.0 I	0.03 I	

* 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*******

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

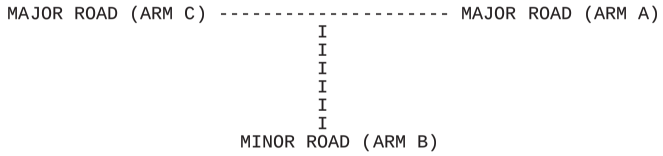
Run with file:-
"P:\10173\Traffic\Junctions - Rev3\J5 B1061 Water Lane jw Coupals Road\10173 J5 B1061 Water Lane jw Coupals Road - Rev3 2019+NW1+NE1 AM.vpi"
(drive-on-the-left) at 15:03:16 on Wednesday, 8 April 2015

.RUN INFORMATION

RUN TITLE	: 10173 J4 B1061 Water Lane jw Coupals Road - Rev3 2019+NW1+NE1 AM
LOCATION	: Haverhill
DATE	: 08/04/15
CLIENT	: Hallam
ENUMERATOR	: sue.tadman [BCL25]
JOB NUMBER	: 10173
STATUS	: Preliminary
DESCRIPTION	:

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS B1061 Water Lane (S)
ARM B IS Coupals Road
ARM C IS B1061 Water Lane (N)

.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

.GEOMETRIC DATA

DATA ITEM		
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.50
CENTRAL RESERVE WIDTH	(WCR)	0.00
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20
- VISIBILITY	(VC-B)	100.00
- BLOCKS TRAFFIC (SPACES)		YES (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	100.0
- VISIBILITY TO RIGHT	(VB-A)	50.0
- LANE 1 WIDTH	(WB-C)	3.00
- LANE 2 WIDTH	(WB-A)	0.00

.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
655.41	0.25	0.10

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
535.05	0.24	0.10	0.15	0.34

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
631.87	0.24	0.24

(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: as above

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 SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
A	15.00	45.00	75.00	1.20	1.80	1.20
B	15.00	45.00	75.00	1.13	1.69	1.13
C	15.00	45.00	75.00	2.70	4.05	2.70

.Demand set: as above

TIME	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) FROM/TO	ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.042	0.958
		0.0	4.0	92.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.067	0.000	0.933
		6.0	0.0	84.0

	0.0)	0.0)	0.0)
ARM C	0.356	0.644	0.000
	77.0	139.0	0.0
	0.0)	0.0)	0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
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 SEGMENT		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ PER ARRIVING VEHICLE (MIN)
07.45-08.00								
	B-AC	1.13	10.39	0.109		0.00	0.12	1.8
			0.11					
	C-AB	1.91	10.88	0.176		0.00	0.23	3.4
			0.11					
	C-A	0.80						
	A-B	0.05						
	A-C	1.15						
08.00-08.15								
	B-AC	1.35	10.32	0.131		0.12	0.15	2.2
			0.11					
	C-AB	2.33	10.95	0.212		0.23	0.29	4.4
			0.12					
	C-A	0.91						
	A-B	0.06						
	A-C	1.38						

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ PER ARRIVING VEHICLE (MIN)

I	(VEH/MIN)	(VEH/MIN)	CAPACITY	FLOW	QUEUE	QUEUE	(VEH.MIN/
(VEH.MIN/	PER ARRIVING	I					
I			(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
SEGMENT)	TIME SEGMENT)		VEHICLE (MIN)	I			
I 08.15-08.30							
			I				
I B-AC	1.65	10.21	0.162		0.15	0.19	2.8
		0.12	I				
I C-AB	2.93	11.05	0.265		0.29	0.40	6.0
		0.12	I				
I C-A	1.04						
			I				
I A-B	0.07						
			I				
I A-C	1.69						
			I				
I							
			I				

I TIME	DEMAND	CAPACITY	DEMAND/	PEDESTRIAN	START	END	DELAY
GEOMETRIC DELAY	AVERAGE DELAY	I					
I	(VEH/MIN)	(VEH/MIN)	CAPACITY	FLOW	QUEUE	QUEUE	(VEH.MIN/
(VEH.MIN/	PER ARRIVING	I					
I			(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
SEGMENT)	TIME SEGMENT)		VEHICLE (MIN)	I			
I 08.30-08.45							
			I				
I B-AC	1.65	10.21	0.162		0.19	0.19	2.9
		0.12	I				
I C-AB	2.93	11.05	0.265		0.40	0.40	6.0
		0.12	I				
I C-A	1.04						
			I				
I A-B	0.07						
			I				
I A-C	1.69						
			I				
I							
			I				

I TIME	DEMAND	CAPACITY	DEMAND/	PEDESTRIAN	START	END	DELAY
GEOMETRIC DELAY	AVERAGE DELAY	I					
I	(VEH/MIN)	(VEH/MIN)	CAPACITY	FLOW	QUEUE	QUEUE	(VEH.MIN/
(VEH.MIN/	PER ARRIVING	I					
I			(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
SEGMENT)	TIME SEGMENT)		VEHICLE (MIN)	I			
I 08.45-09.00							
			I				
I B-AC	1.35	10.32	0.131		0.19	0.15	2.3
		0.11	I				
I C-AB	2.33	10.95	0.213		0.40	0.30	4.5
		0.12	I				
I C-A	0.91						
			I				
I A-B	0.06						
			I				
I A-C	1.38						
			I				
I							
			I				

I	(VEH/MIN)	(VEH/MIN)	CAPACITY	FLOW	QUEUE	QUEUE	(VEH.MIN/
(VEH.MIN/	PER ARRIVING	I					
I			(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
SEGMENT)	TIME SEGMENT)		VEHICLE (MIN)	I			
I 09.00-09.15							
			I				
I B-AC	1.13	10.39	0.109		0.15	0.12	1.9
		0.11	I				
I C-AB	1.91	10.88	0.176		0.30	0.23	3.5
		0.11	I				
I C-A	0.80						
			I				
I A-B	0.05						
			I				
I A-C	1.15						
			I				
I							
			I				

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

QUEUE FOR STREAM B-AC

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

QUEUE FOR STREAM C-AB

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

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I STREAM I	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
I	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
I B-AC	123.9	82.6	13.8	0.11	13.8	0.11
I C-AB	215.0	143.3	27.8	0.13	27.8	0.13
I C-A	82.3	54.9				
I A-B	5.5	3.7				
I A-C	126.6	84.4				
I ALL	553.3	368.9	41.6	0.08	41.6	0.08

---

* 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*******

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

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

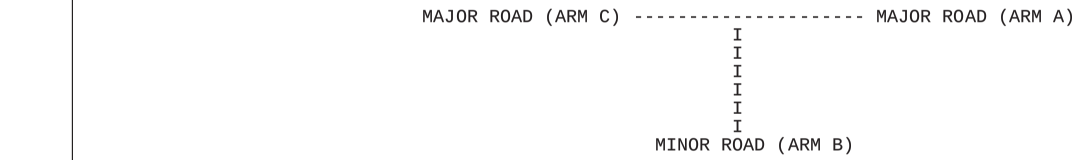
Run with file:-
"P:\10173\Traffic\Junctions - Rev3\J5 B1061 Water Lane jw Coupals Road\
10173 J5 B1061 Water Lane jw Coupals Road - Rev3 2019+NW1+NE1 PM.vpi"
(drive-on-the-left) at 15:03:36 on Wednesday, 8 April 2015

.RUN INFORMATION
 ****

RUN TITLE	: 10173 J4 B1061 Water Lane jw Coupals Road - Rev3 2019+NW1+NE1 PM
LOCATION	: Haverhill
DATE	: 08/04/15
CLIENT	: Hallam
ENUMERATOR	: sue.tadman [BCL25]
JOB NUMBER	: 10173
STATUS	: Preliminary
DESCRIPTION	:

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
 ****

 INPUT DATA



ARM A IS B1061 Water Lane (S)
ARM B IS Coupals Road
ARM C IS B1061 Water Lane (N)

.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

.GEOMETRIC DATA

DATA ITEM		MINOR ROAD
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	6.50
CENTRAL RESERVE WIDTH	(WCR)	0.00
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20
- VISIBILITY	(VC-B)	100.00
- BLOCKS TRAFFIC (SPACES)		YES (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	100.0
- VISIBILITY TO RIGHT	(VB-A)	50.0
- LANE 1 WIDTH	(WB-C)	3.00
- LANE 2 WIDTH	(WB-A)	0.00

.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
655.41	0.25	0.10

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
535.05	0.24	0.10	0.15	0.34

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
631.87	0.24	0.24

(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: as above

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 SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
A	15.00	45.00	75.00	0.71	1.07	0.71
B	15.00	45.00	75.00	1.65	2.47	1.65
C	15.00	45.00	75.00	1.73	2.59	1.73

.Demand set: as above

TIME	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.053	0.947
		0.0	3.0	54.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.023	0.000	0.977
		3.0	0.0	129.0

```
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I ARM  C  I  0.529 I  0.471 I  0.000 I
 I                   I         I   73.0 I   65.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 ------------------------------------------------------------
 TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 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
.-------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 16.45-17.00
                                I
 I   B-AC      1.66     10.68    0.155                0.00   0.18        2.6
                       0.11      I
 I   C-AB      0.89     10.96    0.081                0.00   0.10        1.4
                       0.10      I
 I   C-A       0.84
                                I
 I   A-B       0.04
                                I
 I   A-C       0.68
                                I
 I
                                I
.-------------------------------------------------------------------------------
----------------------------------

.-------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.00-17.15
                                I
 I   B-AC      1.98     10.64    0.186                0.18   0.23        3.3
                       0.12      I
 I   C-AB      1.08     11.04    0.098                0.10   0.12        1.8
                       0.10      I
 I   C-A       0.99
                                I
 I   A-B       0.04
                                I
 I   A-C       0.81
                                I
 I
                                I
.-------------------------------------------------------------------------------
----------------------------------

.-------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
```



```
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.15-17.30
                                I
 I   B-AC      2.42     10.59    0.229                0.23   0.29        4.3
                       0.12      I
 I   C-AB      1.35     11.16    0.121                0.12   0.16        2.4
                       0.10      I
 I   C-A       1.18
                                I
 I   A-B       0.06
                                I
 I   A-C       0.99
                                I
 I
                                I
.-------------------------------------------------------------------------------
----------------------------------

.-------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.30-17.45
                                I
 I   B-AC      2.42     10.59    0.229                0.29   0.29        4.4
                       0.12      I
 I   C-AB      1.35     11.16    0.121                0.16   0.16        2.4
                       0.10      I
 I   C-A       1.18
                                I
 I   A-B       0.06
                                I
 I   A-C       0.99
                                I
 I
                                I
.-------------------------------------------------------------------------------
----------------------------------

.-------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.45-18.00
                                I
 I   B-AC      1.98     10.64    0.186                0.29   0.23        3.5
                       0.12      I
 I   C-AB      1.08     11.04    0.098                0.16   0.12        1.8
                       0.10      I
 I   C-A       0.99
                                I
 I   A-B       0.04
                                I
 I   A-C       0.81
                                I
 I
                                I
```

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY I PER ARRIVING I
I 18.00-18.15			I						
I B-AC	1.66	10.68	0.155		0.23	0.19	2.8		
			0.11	I					
I C-AB	0.89	10.96	0.081		0.12	0.10	1.5		
			0.10	I					
I C-A	0.84			I					
I A-B	0.04			I					
I A-C	0.68			I					
I				I					

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

QUEUE FOR STREAM B-AC

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

QUEUE FOR STREAM C-AB

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

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I STREAM I	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
I	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
I B-AC	181.7	121.1	21.0	0.12	21.0	0.12
I C-AB	99.7	66.5	11.3	0.11	11.3	0.11
I C-A	90.2	60.2				
I A-B	4.1	2.8				
I A-C	74.3	49.6				
I ALL	450.1	300.1	32.4	0.07	32.4	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*******

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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EMAIL: software@trl.co.uk

Run with file:-
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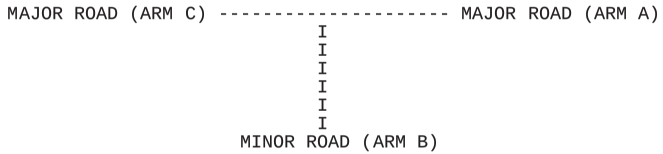
(drive-on-the-left) at 15:04:47 on Wednesday, 8 April 2015

.RUN INFORMATION

RUN TITLE	: 10173 J4 B1061 Water Lane jw Coupals Road - Rev3 2029R+NW2+NE2 AM
LOCATION	: Haverhill
DATE	: 08/04/15
CLIENT	: Hallam
ENUMERATOR	: sue.tadman [BCL25]
JOB NUMBER	: 10173
STATUS	: Preliminary
DESCRIPTION	:

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS B1061 Water Lane (S)
ARM B IS Coupals Road
ARM C IS B1061 Water Lane (N)

.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

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH (W)	6.50 M.
CENTRAL RESERVE WIDTH (WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH (WC-B)	2.20 M.
- VISIBILITY (VC-B)	100.00 M.
- BLOCKS TRAFFIC (SPACES)	YES (0)
MINOR ROAD - VISIBILITY TO LEFT (VB-C)	100.0 M.
- VISIBILITY TO RIGHT (VB-A)	50.0 M.
- LANE 1 WIDTH (WB-C)	3.00 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 STREAM A-C	Slope For Opposing STREAM A-B
655.41	0.25	0.10

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
535.05	0.24	0.10	0.15	0.34

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
631.87	0.24	0.24

(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: as above

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 SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
A	15.00	45.00	75.00	1.39	2.08	1.39
B	15.00	45.00	75.00	1.31	1.97	1.31
C	15.00	45.00	75.00	2.97	4.46	2.97

.Demand set: as above

TIME	FROM/TO ARM	A	B	C
07.45 - 09.15	TURNING PROPORTIONS			
	A	0.000	0.036	0.964
		0.0	4.0	107.0
		0.0	0.0	0.0
	B	0.067	0.000	0.933
		7.0	0.0	98.0
	TURNING COUNTS (PERCENTAGE OF H.V.S)			
	A	0.0	0.0	0.0
	B	0.0	0.0	0.0
	C	0.0	0.0	0.0

	A	B	C
ARM C	0.357	0.643	0.000
	85.0	153.0	0.0
	0.0	0.0	0.0

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
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 SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
07.45-08.00							
B-AC	1.32	10.34	0.127		0.00	0.14	2.1
		0.11					
C-AB	2.13	10.90	0.195		0.00	0.26	3.9
		0.11					
C-A	0.86						
A-B	0.05						
A-C	1.34						

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
08.00-08.15							
B-AC	1.57	10.25	0.153		0.14	0.18	2.6
		0.12					
C-AB	2.59	10.98	0.236		0.26	0.34	5.1
		0.12					
C-A	0.98						
A-B	0.06						
A-C	1.60						

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)

I SEGMENT)	(VEH/MIN) (VEH.MIN/ TIME SEGMENT)	PER ARRIVING VEHICLE (MIN)	I (RFC)	(PEDS/MIN)	(VEHS)	QUEUE (VEHS)	QUEUE TIME	(VEH.MIN/ I
I 08.15-08.30			I					
I B-AC	1.93	10.13	0.190		0.18	0.23	3.4	
		0.12	I					
I C-AB	3.27	11.08	0.295		0.34	0.46	7.0	
		0.13	I					
I C-A	1.10		I					
I A-B	0.07		I					
I A-C	1.96		I					
I			I					

I TIME SEGMENT)	DEMAND (VEH/MIN) (VEH.MIN/ TIME SEGMENT)	CAPACITY PER ARRIVING VEHICLE (MIN)	DEMAND/ I (RFC)	PEDESTRIAN (PEDS/MIN)	START (VEHS)	END QUEUE (VEHS)	DELAY QUEUE TIME	GEOMETRIC DELAY AVERAGE DELAY (VEH.MIN/ I
I 08.30-08.45			I					
I B-AC	1.93	10.13	0.190		0.23	0.23	3.5	
		0.12	I					
I C-AB	3.27	11.08	0.295		0.46	0.47	7.0	
		0.13	I					
I C-A	1.10		I					
I A-B	0.07		I					
I A-C	1.96		I					
I			I					

I TIME SEGMENT)	DEMAND (VEH/MIN) (VEH.MIN/ TIME SEGMENT)	CAPACITY PER ARRIVING VEHICLE (MIN)	DEMAND/ I (RFC)	PEDESTRIAN (PEDS/MIN)	START (VEHS)	END QUEUE (VEHS)	DELAY QUEUE TIME	GEOMETRIC DELAY AVERAGE DELAY (VEH.MIN/ I
I 08.45-09.00			I					
I B-AC	1.57	10.25	0.154		0.23	0.18	2.8	
		0.12	I					
I C-AB	2.59	10.98	0.236		0.47	0.35	5.2	
		0.12	I					
I C-A	0.97		I					
I A-B	0.06		I					
I A-C	1.60		I					
I			I					

I SEGMENT)	(VEH/MIN) (VEH.MIN/ TIME SEGMENT)	PER ARRIVING VEHICLE (MIN)	I (RFC)	(PEDS/MIN)	(VEHS)	QUEUE (VEHS)	QUEUE TIME	(VEH.MIN/ I
I 09.00-09.15			I					
I B-AC	1.32	10.33	0.127		0.18	0.15	2.3	
		0.11	I					
I C-AB	2.13	10.90	0.195		0.35	0.27	4.0	
		0.11	I					
I C-A	0.86		I					
I A-B	0.05		I					
I A-C	1.34		I					
I			I					

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

QUEUE FOR STREAM B-AC

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

QUEUE FOR STREAM C-AB

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.3
08.15	0.3
08.30	0.5
08.45	0.5
09.00	0.3
09.15	0.3

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I STREAM I	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
I	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
I B-AC	144.5	96.3	16.7	0.12	16.7	0.12
I C-AB	239.6	159.8	32.2	0.13	32.2	0.13
I C-A	87.9	58.6				
I A-B	5.5	3.7				
I A-C	147.3	98.2				
I ALL	624.9	416.6	48.9	0.08	48.9	0.08

---

* 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*******

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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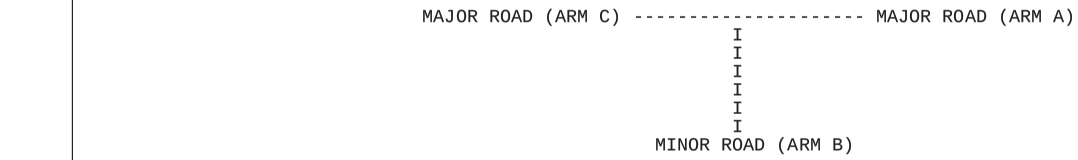
Run with file:-
"P:\10173\Traffic\Junctions - Rev3\J5 B1061 Water Lane jw Coupals Road\
 10173 J5 B1061 Water Lane jw Coupals Road - Rev3 2029R+NW2+NE2 PM.vpi"
(drive-on-the-left) at 15:04:41 on Wednesday, 8 April 2015

.RUN INFORMATION
 ****

RUN TITLE   : 10173 J4 B1061 Water Lane jw Coupals Road - Rev3
2029R+NW2+NE2 PM
LOCATION   : Haverhill
DATE   : 08/04/15
CLIENT   : Hallam
ENUMERATOR   : sue.tadman [BCL25]
JOB NUMBER   : 10173
STATUS   : Preliminary
DESCRIPTION   :

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
 ****

 INPUT DATA



ARM A IS B1061 Water Lane (S)
ARM B IS Coupals Road
ARM C IS B1061 Water Lane (N)

.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

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH (W)	6.50
CENTRAL RESERVE WIDTH (WCR)	0.00
MAJOR ROAD RIGHT TURN - WIDTH (WC-B)	2.20
- VISIBILITY (VC-B)	100.00
- BLOCKS TRAFFIC (SPACES)	YES (0)
MINOR ROAD - VISIBILITY TO LEFT (VB-C)	100.0
- VISIBILITY TO RIGHT (VB-A)	50.0
- LANE 1 WIDTH (WB-C)	3.00
- LANE 2 WIDTH (WB-A)	0.00

.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
655.41	0.25	0.10

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
535.05	0.24	0.10	0.15	0.34

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
631.87	0.24	0.24

(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: as above

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 SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
A	15.00	45.00	75.00	0.86	1.29	0.86
B	15.00	45.00	75.00	1.95	2.93	1.95
C	15.00	45.00	75.00	2.19	3.28	2.19

.Demand set: as above

TIME	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.043	0.957
		0.0	3.0	66.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.019	0.000	0.981
		3.0	0.0	153.0

```
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I ARM  C  I  0.531 I  0.469 I  0.000 I
 I                   I         I   93.0 I   82.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 ------------------------------------------------------------
 TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
 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
.-------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                                (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 16.45-17.00
                                  I
 I   B-AC      1.96     10.65    0.184                0.00   0.22        3.2
                       0.11      I
 I   C-AB      1.15     11.09    0.104                0.00   0.13        1.9
                       0.10      I
 I   C-A       1.05
                                  I
 I   A-B       0.04
                                  I
 I   A-C       0.83
                                  I
 I
                                  I
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.-------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                                (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.00-17.15
                                  I
 I   B-AC      2.34     10.61    0.220                0.22   0.28        4.1
                       0.12      I
 I   C-AB      1.40     11.20    0.125                0.13   0.16        2.5
                       0.10      I
 I   C-A       1.22
                                  I
 I   A-B       0.04
                                  I
 I   A-C       0.99
                                  I
 I
                                  I
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----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
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 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                                (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.15-17.30
                                  I
 I   B-AC      2.86     10.55    0.271                0.28   0.37        5.4
                       0.13      I
 I   C-AB      1.77     11.35    0.156                0.16   0.21        3.2
                       0.10      I
 I   C-A       1.44
                                  I
 I   A-B       0.06
                                  I
 I   A-C       1.21
                                  I
 I
                                  I
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.-------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                                (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.30-17.45
                                  I
 I   B-AC      2.86     10.55    0.271                0.37   0.37        5.5
                       0.13      I
 I   C-AB      1.77     11.35    0.156                0.21   0.21        3.2
                       0.10      I
 I   C-A       1.44
                                  I
 I   A-B       0.06
                                  I
 I   A-C       1.21
                                  I
 I
                                  I
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.-------------------------------------------------------------------------------
----------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                                (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 I 17.45-18.00
                                  I
 I   B-AC      2.34     10.61    0.220                0.37   0.29        4.4
                       0.12      I
 I   C-AB      1.40     11.20    0.125                0.21   0.17        2.5
                       0.10      I
 I   C-A       1.22
                                  I
 I   A-B       0.04
                                  I
 I   A-C       0.99
                                  I
 I
                                  I
```

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ PER ARRIVING TIME SEGMENT)	AVERAGE DELAY I
I 18.00-18.15									
I B-AC	1.96	10.65	0.184		0.29	0.23	3.5	0.12	I
I C-AB	1.15	11.09	0.104		0.17	0.13	2.0	0.10	I
I C-A	1.05								I
I A-B	0.04								I
I A-C	0.83								I
I									I

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

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.00	0.2
17.15	0.3
17.30	0.4
17.45	0.4
18.00	0.3
18.15	0.2

QUEUE FOR STREAM C-AB

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

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I STREAM I	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
I	(VEH)	(VEH/H) I	(MIN)	(MIN/VEH) I	(MIN)	(MIN/VEH) I
I B-AC	214.7	143.1 I	26.1	0.12 I	26.1	0.12 I
I C-AB	129.5	86.3 I	15.3	0.12 I	15.3	0.12 I
I C-A	111.4	74.3 I		I		I
I A-B	4.1	2.8 I		I		I
I A-C	90.8	60.6 I		I		I
I ALL	550.6	367.0 I	41.4	0.08 I	41.4	0.08 I

* 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*******

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J6 Chalkstone Way jw Coupals Road\
10173a - J6 Chalkstone Way jw Coupals Road - Rev3 2019+NW1+NE1 AM.vai"
(drive-on-the-left) at 12:47:00 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J7 Chalkstone Way jw Coupals Road - Rev3 2019+NW1+NE1 AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Chalkstone Way (N)
ARM B - Coupals Road
ARM C - Chalkstone Way (S)

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

---------- T5

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
A	3.20	3.20	0.00	3.20	10.00	6.00	0.00	0.515	12.941
B	3.20	3.20	0.00	3.20	10.00	6.00	0.00	0.515	12.941
C	3.20	3.20	0.00	3.20	10.00	10.00	0.00	0.518	13.000

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS
---------- T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
A	15.00	45.00	75.00	3.20	4.80	3.20
B	15.00	45.00	75.00	3.33	4.99	3.33
C	15.00	45.00	75.00	2.21	3.32	2.21

DEMAND SET TITLE: as above
---------- T33

TIME	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S)	FROM/T	ARM A	ARM B	ARM C
07.45 - 09.15		ARM A	0.000	0.211	0.789
			0.0	54.0	202.0

```
 I                    I         I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I         I         I         I
 I                    I  ARM  B I  0.229 I  0.000 I  0.771 I
 I                    I         I   61.0 I    0.0 I  205.0 I
 I                    I         I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I         I         I         I
 I                    I  ARM  C I  0.582 I  0.418 I  0.000 I
 I                    I         I  103.0 I   74.0 I    0.0 I
 I                    I         I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I         I         I         I
 ------------------------------------------------------------
```

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

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.-------------------------------------------------------------------------------
---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                    PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 07.45-08.00                     I
 I ARM A       3.21     12.47   0.258   - -       -    0.0    0.3        5.0
         -              0.108     I
 I ARM B       3.34     11.65   0.287   - -       -    0.0    0.4        5.7
         -              0.120     I
 I ARM C       2.22     12.61   0.176   - -       -    0.0    0.2        3.1
         -              0.096     I
 I                                 I
                                   I
-------------------------------------------------------------------------------
---------------------------------
.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                    PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 08.00-08.15                     I
 I ARM A       3.84     12.37   0.310   - -       -    0.3    0.4        6.5
         -              0.117     I
 I ARM B       3.99     11.39   0.350   - -       -    0.4    0.5        7.7
         -              0.135     I
 I ARM C       2.65     12.53   0.212   - -       -    0.2    0.3        3.9
         -              0.101     I
 I                                 I
                                   I
-------------------------------------------------------------------------------
---------------------------------
.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                    PER ARRIVING  I
```



```
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 08.15-08.30                     I
 I ARM A       4.70     12.24   0.384   - -       -    0.4    0.6        8.9
         -              0.132     I
 I ARM B       4.88     11.04   0.442   - -       -    0.5    0.8       11.2
         -              0.161     I
 I ARM C       3.25     12.42   0.261   - -       -    0.3    0.4        5.1
         -              0.109     I
 I                                 I
                                   I
-------------------------------------------------------------------------------
---------------------------------
.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                    PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 08.30-08.45                     I
 I ARM A       4.70     12.24   0.384   - -       -    0.6    0.6        9.2
         -              0.133     I
 I ARM B       4.88     11.03   0.442   - -       -    0.8    0.8       11.7
         -              0.163     I
 I ARM C       3.25     12.42   0.261   - -       -    0.4    0.4        5.3
         -              0.109     I
 I                                 I
                                   I
-------------------------------------------------------------------------------
---------------------------------
.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                    PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 08.45-09.00                     I
 I ARM A       3.84     12.37   0.310   - -       -    0.6    0.5        7.0
         -              0.117     I
 I ARM B       3.99     11.38   0.350   - -       -    0.8    0.5        8.5
         -              0.136     I
 I ARM C       2.65     12.53   0.212   - -       -    0.4    0.3        4.2
         -              0.101     I
 I                                 I
                                   I
-------------------------------------------------------------------------------
---------------------------------
.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
```

SEGMENT)	PER ARRIVING VEHICLE	(RFC) (MIN)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
I 09.00-09.15						
I ARM A	3.21	12.46	0.258	- -	-	0.5	0.4	5.4
	-	0.108						
I ARM B	3.34	11.63	0.287	- -	-	0.5	0.4	6.3
	-	0.121						
I ARM C	2.22	12.60	0.176	- -	-	0.3	0.2	3.3
	-	0.096						

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.3	
08.15	0.4	
08.30	0.6	*
08.45	0.6	*
09.00	0.5	
09.15	0.4	

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.5	*
08.30	0.8	*
08.45	0.8	*
09.00	0.5	*
09.15	0.4	

.QUEUE AT ARM C

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	352.4	234.9	42.1	0.12	42.1	0.12
B	366.1	244.1	51.2	0.14	51.2	0.14
C	243.6	162.4	24.9	0.10	24.9	0.10
ALL	962.1	641.4	118.1	0.12	118.1	0.12

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J6 Chalkstone Way jw Coupals Road\
10173a - J6 Chalkstone Way jw Coupals Road - Rev3 2019+NW1+NE1 PM.vai"
(drive-on-the-left) at 12:56:29 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J7 Chalkstone Way jw Coupals Road - Rev3 2019+NW1+NE1 PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Chalkstone Way (N)
ARM B - Coupals Road
ARM C - Chalkstone Way (S)

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

T5

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.20	3.20	0.00	3.20	10.00	6.00	0.00	0.515	12.941
ARM B	3.20	3.20	0.00	3.20	10.00	6.00	0.00	0.515	12.941
ARM C	3.20	3.20	0.00	3.20	10.00	10.00	0.00	0.518	13.000

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS
T13

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF FLOW STARTS	MINUTES FROM START WHEN TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE TO RISE	AT PEAK	AFTER IS REACHED	FALLING	BEFORE PEAK	AT PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	1.76	2.64	1.76				
ARM B	15.00	45.00	75.00	1.34	2.01	1.34				
ARM C	15.00	45.00	75.00	5.41	8.12	5.41				

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.213	0.787
		0.0	30.0	111.0

		(0.0)	(0.0)	(0.0)
ARM B		0.280	0.000	0.720
		30.0	0.0	77.0
		(0.0)	(0.0)	(0.0)
ARM C		0.533	0.467	0.000
		231.0	202.0	0.0
		(0.0)	(0.0)	(0.0)

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN))
16.45-17.00							
ARM A	1.77	11.65	0.152	- -	0.0	0.2	2.6
	-	0.101		-			
ARM B	1.34	12.23	0.110	- -	0.0	0.1	1.8
	-	0.092		-			
ARM C	5.43	12.81	0.424	- -	0.0	0.7	10.4
	-	0.134		-			
17.00-17.15							
ARM A	2.11	11.39	0.186	- -	0.2	0.2	3.3
	-	0.108		-			
ARM B	1.60	12.09	0.133	- -	0.1	0.2	2.2
	-	0.095		-			
ARM C	6.49	12.77	0.508	- -	0.7	1.0	14.6
	-	0.158		-			

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN))
17.15-17.30							
ARM A	2.59	11.04	0.234	- -	0.2	0.3	4.4
	-	0.118		-			
ARM B	1.96	11.89	0.165	- -	0.2	0.2	2.9
	-	0.101		-			
ARM C	7.95	12.72	0.625	- -	1.0	1.6	22.7
	-	0.206		-			
17.30-17.45							
ARM A	2.59	11.03	0.234	- -	0.3	0.3	4.6
	-	0.118		-			
ARM B	1.96	11.89	0.165	- -	0.2	0.2	2.9
	-	0.101		-			
ARM C	7.95	12.72	0.625	- -	1.6	1.6	24.4
	-	0.209		-			
17.45-18.00							
ARM A	2.11	11.37	0.186	- -	0.3	0.2	3.5
	-	0.108		-			
ARM B	1.60	12.08	0.133	- -	0.2	0.2	2.4
	-	0.096		-			
ARM C	6.49	12.77	0.508	- -	1.6	1.1	16.6
	-	0.161		-			

SEGMENT)		PER ARRIVING VEHICLE (MIN)	(RFC)	(PEDS/MIN)		(VEHS)	(VEHS)	TIME
I 18.00-18.15								
I ARM A	1.77	11.63	0.152	- -	-	0.2	0.2	2.8
	-	0.101						
I ARM B	1.34	12.22	0.110	- -	-	0.2	0.1	1.9
	-	0.092						
I ARM C	5.43	12.81	0.424	- -	-	1.1	0.7	11.6
	-	0.136						

.QUEUE AT ARM A

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

.QUEUE AT ARM B

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

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.7	*
17.15	1.0	*
17.30	1.6	**
17.45	1.6	**
18.00	1.1	*
18.15	0.7	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	194.1	129.4	21.2	0.11	21.2	0.11
B	147.3	98.2	14.1	0.10	14.1	0.10
C	596.0	397.3	100.3	0.17	100.3	0.17
ALL	937.3	624.9	135.6	0.14	135.7	0.14

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011
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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J6 Chalkstone Way jw Coupals Road\
10173a - J6 Chalkstone Way jw Coupals Road - Rev3 2029+NW2+NE2 AM.vai"
(drive-on-the-left) at 12:57:14 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J7 Chalkstone Way jw Coupals Road - Rev3 2029R+NW2+NE2 AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Chalkstone Way (N)
ARM B - Coupals Road
ARM C - Chalkstone Way (S)

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.20	3.20	0.00	3.20	10.00	6.00	0.00	0.515	12.941
ARM B	3.20	3.20	0.00	3.20	10.00	6.00	0.00	0.515	12.941
ARM C	3.20	3.20	0.00	3.20	10.00	10.00	0.00	0.518	13.000

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS
.---------- T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
ARM A	15.00	45.00	75.00	4.00	6.00	4.00
ARM B	15.00	45.00	75.00	3.59	5.38	3.59
ARM C	15.00	45.00	75.00	2.60	3.90	2.60

DEMAND SET TITLE: as above
.---------- T33

TIME	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) FROM/T	ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.206	0.794
		0.0	66.0	254.0

		(0.0)	(0.0)	(0.0)
ARM B	0.244	0.000	0.756	
	70.0	0.0	217.0	
		(0.0)	(0.0)	(0.0)
ARM C	0.625	0.375	0.000	
	130.0	78.0	0.0	
		(0.0)	(0.0)	(0.0)

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN))
07.45-08.00							
ARM A	4.02	12.44	0.323	- -	0.0	0.5	6.8
	-	0.118		-			
ARM B	3.60	11.31	0.318	- -	0.0	0.5	6.6
	-	0.129		-			
ARM C	2.61	12.55	0.208	- -	0.0	0.3	3.8
	-	0.100		-			
08.00-08.15							
ARM A	4.79	12.34	0.389	- -	0.5	0.6	9.1
	-	0.132		-			
ARM B	4.30	10.99	0.391	- -	0.5	0.6	9.2
	-	0.149		-			
ARM C	3.12	12.46	0.250	- -	0.3	0.3	4.9
	-	0.107		-			

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN))
08.15-08.30							
ARM A	5.87	12.21	0.481	- -	0.6	0.9	13.1
	-	0.157		-			
ARM B	5.27	10.55	0.499	- -	0.6	1.0	13.9
	-	0.187		-			
ARM C	3.82	12.34	0.309	- -	0.3	0.4	6.5
	-	0.117		-			
08.30-08.45							
ARM A	5.87	12.20	0.481	- -	0.9	0.9	13.7
	-	0.158		-			
ARM B	5.27	10.54	0.500	- -	1.0	1.0	14.7
	-	0.190		-			
ARM C	3.82	12.34	0.309	- -	0.4	0.4	6.7
	-	0.117		-			
08.45-09.00							
ARM A	4.79	12.34	0.389	- -	0.9	0.6	10.0
	-	0.133		-			
ARM B	4.30	10.98	0.392	- -	1.0	0.7	10.2
	-	0.151		-			
ARM C	3.12	12.45	0.250	- -	0.4	0.3	5.2
	-	0.107		-			

```
                    PER ARRIVING  I
 I                                 (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                    VEHICLE (MIN) I
 -                                                -
 I 09.00-09.15                                    I
 I ARM A       4.02     12.44   0.323   - -       -    0.6    0.5        7.4
         -              0.119     I
 I ARM B       3.60     11.30   0.319   - -       -    0.7    0.5        7.3
         -              0.130     I
 I ARM C       2.61     12.54   0.208   - -       -    0.3    0.3        4.1
         -              0.101     I
 I                                 I
```

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	
08.15	0.6	*
08.30	0.9	*
08.45	0.9	*
09.00	0.6	*
09.15	0.5	

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	
08.15	0.6	*
08.30	1.0	*
08.45	1.0	*
09.00	0.7	*
09.15	0.5	

.QUEUE AT ARM C

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	0.3
09.15	0.3

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	440.5	293.6	60.2	0.14	60.2	0.14
B	395.0	263.4	62.0	0.16	62.0	0.16
C	286.3	190.9	31.0	0.11	31.0	0.11
ALL	1121.8	747.9	153.2	0.14	153.2	0.14

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

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Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J6 Chalkstone Way jw Coupals Road\
10173a - J6 Chalkstone Way jw Coupals Road - Rev3 2029+NW2+NE2 PM.vai"
(drive-on-the-left) at 12:57:39 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J7 Chalkstone Way jw Coupals Road - Rev3 2029R+NW2+NE2 PM
LOCATION: Haverhill
DATE: 29/01/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Chalkstone Way (N)
ARM B - Coupals Road
ARM C - Chalkstone Way (S)

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

T5

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.20	3.20	0.00	3.20	10.00	6.00	0.00	0.515	12.941
ARM B	3.20	3.20	0.00	3.20	10.00	6.00	0.00	0.515	12.941
ARM C	3.20	3.20	0.00	3.20	10.00	10.00	0.00	0.518	13.000

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS
T13

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above
T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
ARM A	15.00	45.00	75.00	2.28	3.41	2.28
ARM B	15.00	45.00	75.00	1.51	2.27	1.51
ARM C	15.00	45.00	75.00	6.20	9.30	6.20

DEMAND SET TITLE: as above
T33

TIME	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) FROM/T	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.209	0.791
		0.0	38.0	144.0

```
 I                    I         I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I         I         I         I
 I                    I  ARM  B I  0.331 I  0.000 I  0.669 I
 I                    I         I   40.0 I    0.0 I   81.0 I
 I                    I         I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I         I         I         I
 I                    I  ARM  C I  0.569 I  0.431 I  0.000 I
 I                    I         I  282.0 I  214.0 I    0.0 I
 I                    I         I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I         I         I         I
 ------------------------------------------------------------
```

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

```
.-------------------------------------------------------------------------------
---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                    PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 16.45-17.00                     I
 I ARM A       2.28     11.57   0.197   - -       -    0.0    0.2        3.5
         -              0.107     I
 I ARM B       1.52     12.02   0.126   - -       -    0.0    0.1        2.1
         -              0.095     I
 I ARM C       6.22     12.74   0.488   - -       -    0.0    0.9       13.3
         -              0.150     I
 I                                 I

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.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                    PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 17.00-17.15                     I
 I ARM A       2.73     11.30   0.241   - -       -    0.2    0.3        4.6
         -              0.116     I
 I ARM B       1.81     11.83   0.153   - -       -    0.1    0.2        2.6
         -              0.100     I
 I ARM C       7.43     12.69   0.586   - -       -    0.9    1.4       19.6
         -              0.188     I
 I                                 I

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.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                    PER ARRIVING  I
```



```
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 17.15-17.30                     I
 I ARM A       3.34     10.94   0.305   - -       -    0.3    0.4        6.3
         -              0.131     I
 I ARM B       2.22     11.58   0.192   - -       -    0.2    0.2        3.5
         -              0.107     I
 I ARM C       9.10     12.62   0.721   - -       -    1.4    2.4       33.5
         -              0.273     I
 I                                 I

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.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                    PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 17.30-17.45                     I
 I ARM A       3.34     10.92   0.306   - -       -    0.4    0.4        6.5
         -              0.132     I
 I ARM B       2.22     11.58   0.192   - -       -    0.2    0.2        3.5
         -              0.107     I
 I ARM C       9.10     12.62   0.721   - -       -    2.4    2.5       37.2
         -              0.282     I
 I                                 I

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.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                    PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 17.45-18.00                     I
 I ARM A       2.73     11.28   0.242   - -       -    0.4    0.3        5.0
         -              0.117     I
 I ARM B       1.81     11.83   0.153   - -       -    0.2    0.2        2.8
         -              0.100     I
 I ARM C       7.43     12.69   0.586   - -       -    2.5    1.5       23.2
         -              0.195     I
 I                                 I

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.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                    AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
```

```
                    PER ARRIVING  I
 I                                 (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                    VEHICLE (MIN) I
 -                                                -

 I 18.00-18.15                                    I
 I ARM A       2.28     11.55   0.198   - -       -    0.3    0.2        3.8
         -              0.108     I
 I ARM B       1.52     12.01   0.126   - -       -    0.2    0.1        2.2
         -              0.095     I
 I ARM C       6.22     12.74   0.489   - -       -    1.5    1.0       15.3
         -              0.155     I
 I                                 I
```

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.2	
17.15	0.3	
17.30	0.4	
17.45	0.4	
18.00	0.3	
18.15	0.2	

.QUEUE AT ARM B

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

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.9	*
17.15	1.4	*
17.30	2.4	**
17.45	2.5	***
18.00	1.5	*
18.15	1.0	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND	* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	250.5	167.0	29.8	0.12	29.8	0.12
B	166.5	111.0	16.7	0.10	16.7	0.10
C	682.7	455.1	142.0	0.21	142.0	0.21
ALL	1099.8	733.2	188.6	0.17	188.6	0.17

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011
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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J7 A143 Lords Croft Lane jw Manor Road\
10173a - J7 A143 jw Manor Road - Rev3 2019+NW1+NE1 [flat] AM.vai"
(drive-on-the-left) at 14:17:19 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J7 A143 jw Manor Road - Rev3 2019+NW1+NE1 [flat] AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Manor Road
ARM B - A143 Ehringhausen Way
ARM C - A143 Lord Croft's lane

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

---------- T5

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	3.20	0.50	3.00	11.00	6.00	0.00	0.509	11.917
ARM B	3.00	3.00	0.00	3.00	12.50	12.00	0.00	0.515	12.674
ARM C	3.00	4.00	5.00	3.00	10.00	6.00	0.00	0.535	14.285

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS
---------- T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
ARM A	15.00	45.00	75.00	3.13	4.69	3.13
ARM B	15.00	45.00	75.00	5.21	7.82	5.21
ARM C	15.00	45.00	75.00	5.51	8.27	5.51

DEMAND SET TITLE: as above
---------- T33

TIME	TURNING PROPORTIONS / TURNING COUNTS / (PERCENTAGE OF H.V.S) FROM/T	ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.704	0.296
		0.0	176.0	74.0

```
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I  ARM  B I  0.192 I  0.000 I  0.808 I
 I                   I         I   80.0 I    0.0 I  337.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
 I                   I  ARM  C I  0.277 I  0.723 I  0.000 I
 I                   I         I  122.0 I  319.0 I    0.0 I
 I                   I         I (  0.0)I (  0.0)I (  0.0)I
 I                   I         I         I         I         I
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```

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

```
.-------------------------------------------------------------------------------
---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                  PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 07.45-08.00                     I
 I ARM A       3.14      9.90   0.317   - -       -    0.0    0.5        6.5
         -              0.147     I
 I ARM B       5.23     12.20   0.429   - -       -    0.0    0.7       10.5
         -              0.142     I
 I ARM C       5.53     13.75   0.402   - -       -    0.0    0.7        9.5
         -              0.120     I
 I                                 I

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---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                  PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 08.00-08.15                     I
 I ARM A       3.75      9.49   0.395   - -       -    0.5    0.6        9.3
         -              0.174     I
 I ARM B       6.25     12.11   0.516   - -       -    0.7    1.0       15.0
         -              0.169     I
 I ARM C       6.61     13.65   0.484   - -       -    0.7    0.9       13.4
         -              0.141     I
 I                                 I

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---------------------------------
.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                  PER ARRIVING  I
```



```
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 08.15-08.30                     I
 I ARM A       4.59      8.95   0.513   - -       -    0.6    1.0       14.5
         -              0.226     I
 I ARM B       7.65     11.98   0.639   - -       -    1.0    1.7       23.9
         -              0.226     I
 I ARM C       8.09     13.50   0.599   - -       -    0.9    1.5       20.7
         -              0.182     I
 I                                 I

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.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                  PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 08.30-08.45                     I
 I ARM A       4.59      8.94   0.513   - -       -    1.0    1.0       15.5
         -              0.229     I
 I ARM B       7.65     11.98   0.639   - -       -    1.7    1.7       25.8
         -              0.231     I
 I ARM C       8.09     13.50   0.599   - -       -    1.5    1.5       22.0
         -              0.185     I
 I                                 I

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---------------------------------
.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
                  PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)                   VEHICLE (MIN) I
 -                                 -
 I 08.45-09.00                     I
 I ARM A       3.75      9.47   0.395   - -       -    1.0    0.7       10.5
         -              0.176     I
 I ARM B       6.25     12.10   0.516   - -       -    1.7    1.1       17.2
         -              0.173     I
 I ARM C       6.61     13.64   0.484   - -       -    1.5    1.0       15.0
         -              0.144     I
 I                                 I

-------------------------------------------------------------------------------
---------------------------------
.-------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
                  AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
```

SEGMENT)	PER ARRIVING VEHICLE	(RFC) (MIN)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME
I 09.00-09.15						
I ARM A	3.14	9.87	0.318	- -	-	0.7	0.5	7.3
	-	0.149						
I ARM B	5.23	12.19	0.429	- -	-	1.1	0.8	11.9
	-	0.145						
I ARM C	5.53	13.75	0.403	- -	-	1.0	0.7	10.6
	-	0.122						

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	
08.15	0.6	*
08.30	1.0	*
08.45	1.0	*
09.00	0.7	*
09.15	0.5	

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.7	*
08.15	1.0	*
08.30	1.7	**
08.45	1.7	**
09.00	1.1	*
09.15	0.8	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.7	*
08.15	0.9	*
08.30	1.5	*
08.45	1.5	*
09.00	1.0	*
09.15	0.7	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND	* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH) (VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	344.1 229.4	63.6	0.18	63.6	0.18
B	574.0 382.6	104.4	0.18	104.4	0.18
C	607.0 404.7	91.1	0.15	91.1	0.15
ALL	1525.1 1016.7	259.0	0.17	259.1	0.17

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011
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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J7 A143 Lords Croft Lane jw Manor Road\
10173a - J7 A143 jw Manor Road - Rev3 2019+NW1+NE1 [flat] PM.vai"
(drive-on-the-left) at 14:17:42 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J7 A143 jw Manor Road - Rev3 2019+NW1+NE1 [flat] PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Manor Road
ARM B - A143 Ehringhausen Way
ARM C - A143 Lord Croft's lane

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

T5

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	3.20	0.50	3.00	11.00	6.00	0.00	0.509	11.917
ARM B	3.00	3.00	0.00	3.00	12.50	12.00	0.00	0.515	12.674
ARM C	3.00	4.00	5.00	3.00	10.00	6.00	0.00	0.535	14.285

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(17.00)AND ENDS(18.00)
.LENGTH OF TIME PERIOD -(60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: as above

DEMAND SET TITLE: as above

T33

TIME	FROM/T	TURNING PROPORTIONS / TURNING COUNTS / (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
17.00 - 18.00	ARM A	0.000	0.594	0.406
		0.0	85.0	58.0
		(0.0)%	(0.0)%	(0.0)%
	ARM B	0.210	0.000	0.790
		117.0	0.0	441.0
		(0.0)%	(0.0)%	(0.0)%
	ARM C	0.278	0.722	0.000
		152.0	394.0	0.0
		(0.0)%	(0.0)%	(0.0)%

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	ARM	DEMAND FLOW (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY RATIO	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15	ARM A	2.38	8.63	0.276	- -	0.0	0.4	5.4
	ARM B	9.30	12.18	0.763	- -	0.0	3.0	38.5
	ARM C	9.10	13.26	0.686	- -	0.0	2.1	28.2
17.15-17.30	ARM A	2.38	8.58	0.277	- -	0.4	0.4	5.7
	ARM B	9.30	12.18	0.764	- -	3.0	3.1	45.5
	ARM C	9.10	13.24	0.687	- -	2.1	2.1	31.8
17.30-17.45	ARM A	2.38	8.58	0.278	- -	0.4	0.4	5.7
	ARM B	9.30	12.18	0.764	- -	3.1	3.1	46.7
	ARM C	9.10	13.24	0.687	- -	2.1	2.2	32.3

TIME SEGMENT	ARM	DEMAND FLOW (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY RATIO	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00	ARM A	2.38	8.58	0.278	- -	0.4	0.4	5.7
	ARM B	9.30	12.18	0.764	- -	3.1	3.2	47.2
	ARM C	9.10	13.24	0.687	- -	2.2	2.2	32.5

.QUEUE AT ARM A

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

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	3.0	***
17.30	3.1	***
17.45	3.1	***
18.00	3.2	***

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	2.1	**
17.30	2.1	**
17.45	2.2	**
18.00	2.2	**

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	142.8	142.8	22.5	0.16	22.5	0.16
B	558.0	558.0	177.8	0.32	178.2	0.32
C	546.0	546.0	124.7	0.23	124.9	0.23
ALL	1246.8	1246.8	325.0	0.26	325.6	0.26

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
program advice and maintenance, contact:

TRL Limited
Crowthorne House
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RG40 3GA,UK

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Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J7 A143 Lords Croft Lane jw Manor Road\
10173a - J7 A143 jw Manor Road - Rev3 2029R+NW2+NE2 [flat] AM.vai"
(drive-on-the-left) at 14:18:20 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J7 A143 jw Manor Road - Rev3 2029R+NW2+NE2 [flat] AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Manor Road
ARM B - A143 Ehringhausen Way
ARM C - A143 Lord Croft's lane

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	3.20	0.50	3.00	11.00	6.00	0.00	0.509	11.917
ARM B	3.00	3.00	0.00	3.00	12.50	12.00	0.00	0.515	12.674
ARM C	3.00	4.00	5.00	3.00	10.00	6.00	0.00	0.535	14.285

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(08.00)AND ENDS(09.00)
.LENGTH OF TIME PERIOD -(60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: as above

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
08.00 - 09.00				
	ARM A	0.000	0.706	0.294
		0.0	187.0	78.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.175	0.000	0.825
		85.0	0.0	401.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.222	0.778	0.000
		129.0	451.0	0.0
		(0.0)	(0.0)	(0.0)

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

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	AVERAGE DELAY PER ARRIVING (RFC) VEHICLE (MIN)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME
08.00-08.15								
ARM A	4.42	8.15	0.542	0.258	- -	0.0	1.1	15.7
ARM B	8.10	12.02	0.674	0.240	- -	0.0	2.0	26.7
ARM C	9.67	13.54	0.714	0.240	- -	0.0	2.4	31.7
08.15-08.30								
ARM A	4.42	8.09	0.546	0.271	- -	1.1	1.2	17.4
ARM B	8.10	12.01	0.675	0.256	- -	2.0	2.0	30.0
ARM C	9.67	13.53	0.715	0.258	- -	2.4	2.4	36.1
08.30-08.45								
ARM A	4.42	8.09	0.546	0.272	- -	1.2	1.2	17.7
ARM B	8.10	12.01	0.675	0.256	- -	2.0	2.0	30.5
ARM C	9.67	13.53	0.715	0.258	- -	2.4	2.5	36.7

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
08.45-09.00							
ARM A	4.42	8.09	0.546	- -	-	1.2	1.2	17.8
-		0.272					
ARM B	8.10	12.01	0.675	- -	-	2.0	2.0	30.6
-		0.256					
ARM C	9.67	13.53	0.715	- -	-	2.5	2.5	37.0
-		0.259					

AVERAGE DELAY PER ARRIVING

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	1.1	*
08.30	1.2	*
08.45	1.2	*
09.00	1.2	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	2.0	**
08.30	2.0	**
08.45	2.0	**
09.00	2.0	**

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	2.4	**
08.30	2.4	**
08.45	2.5	**
09.00	2.5	**

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	265.2	265.2	68.7	0.26	68.8	0.26
B	486.0	486.0	117.8	0.24	117.9	0.24
C	580.2	580.2	141.5	0.24	141.7	0.24
ALL	1331.4	1331.4	327.9	0.25	328.4	0.25

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* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
program advice and maintenance, contact:

TRL Limited Tel: +44 (0) 1344 770758
Crowthorne House Fax: +44 (0) 1344 770356
Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J7 A143 Lords Croft Lane jw Manor Road\
10173a - J7 A143 jw Manor Road - Rev3 2029R+NW2+NE2 [flat] PM.vai"
(drive-on-the-left) at 14:18:55 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J7 A143 jw Manor Road - Rev3 2029R+NW2+NE2 [flat] PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Manor Road
ARM B - A143 Ehringhausen Way
ARM C - A143 Lord Croft's lane

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

---- T5

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)
G (%)	SLOPE	INTERCEPT (PCU/MIN)				
ARM A	3.00	3.20	0.50	3.00	11.00	6.00
	0.00	0.509	11.917			
ARM B	3.00	3.00	0.00	3.00	12.50	12.00
	0.00	0.515	12.674			
ARM C	3.00	4.00	5.00	3.00	10.00	6.00
	0.00	0.535	14.285			

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS
---- T13

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

TIME PERIOD BEGINS(17.00)AND ENDS(18.00)
.LENGTH OF TIME PERIOD -(60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: as above

DEMAND SET TITLE: as above
---- T33

TIME	FROM/T	TURNING PROPORTIONS / TURNING COUNTS / (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
17.00 - 18.00	ARM A	0.000	0.599	0.401
		0.0	97.0	65.0
		(0.0)%	(0.0)%	(0.0)%
	ARM B	0.179	0.000	0.821
		133.0	0.0	611.0
		(0.0)%	(0.0)%	(0.0)%
	ARM C	0.252	0.748	0.000
		173.0	514.0	0.0
		(0.0)%	(0.0)%	(0.0)%

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	ARM	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15	ARM A	2.71	7.69	0.352	- -	0.0	0.5	7.5
		-	0.198		-			
	ARM B	12.41	12.12	1.024	- -	0.0	15.4	145.6
		-	0.929		-			
	ARM C	11.46	13.20	0.868	- -	0.0	5.3	63.9
		-	0.424		-			
17.15-17.30	ARM A	2.71	7.57	0.358	- -	0.5	0.5	8.2
		-	0.205		-			
	ARM B	12.41	12.12	1.024	- -	15.4	23.6	294.5
		-	1.865		-			
	ARM C	11.46	13.15	0.871	- -	5.3	5.9	85.2
		-	0.550		-			
17.30-17.45	ARM A	2.71	7.56	0.358	- -	0.5	0.6	8.3
		-	0.206		-			
	ARM B	12.41	12.12	1.024	- -	23.6	30.5	406.5
		-	2.461		-			
	ARM C	11.46	13.14	0.872	- -	5.9	6.2	91.1
		-	0.569		-			

TIME SEGMENT	ARM	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00	ARM A	2.71	7.56	0.359	- -	0.6	0.6	8.3
		-	0.207		-			
	ARM B	12.41	12.12	1.024	- -	30.5	36.8	505.6
		-	2.986		-			
	ARM C	11.46	13.14	0.872	- -	6.2	6.3	94.1
		-	0.577		-			

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	0.5	*
17.30	0.5	*
17.45	0.6	*
18.00	0.6	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	15.4	***************
17.30	23.6	************************
17.45	30.5	******************************
18.00	36.8	************************************

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	5.3	*****
17.30	5.9	******
17.45	6.2	******
18.00	6.3	******

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	162.6	162.6	32.3	0.20	32.3	0.20
B	744.6	744.6	1352.2	1.82	1408.2	1.89
C	687.6	687.6	334.2	0.49	335.7	0.49
ALL	1594.8	1594.8	1718.7	1.08	1776.3	1.11

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
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END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

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Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J7 A143 Lords Croft Lane jw Manor Road\10173a - J7 A143 jw Manor Road - Impr Rev3 2029R+NW2+NE2 [flat] PM.vai"
(drive-on-the-left) at 14:19:32 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J7 A143 jw Manor Road - Impr Rev3 2029R+NW2+NE2 [flat] PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Manor Road
ARM B - A143 Ehringhausen Way
ARM C - A143 Lord Croft's lane

.MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	3.20	0.50	3.00	11.00	6.00	0.00	0.509	11.917
ARM B	3.00	6.00	3.00	3.00	12.50	12.00	0.00	0.550	15.186
ARM C	3.00	5.00	5.00	3.00	10.00	6.00	0.00	0.548	15.226

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(17.00)AND ENDS(18.00)
.LENGTH OF TIME PERIOD -(60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: as above

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
17.00 - 18.00				
	ARM A	0.000	0.599	0.401
		0.0	97.0	65.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.179	0.000	0.821
		133.0	0.0	611.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.252	0.748	0.000
		173.0	514.0	0.0
		(0.0)	(0.0)	(0.0)

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

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME
		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)					
17.00-17.15							
ARM A	2.71	7.65	0.354	- -	0.0	0.5	7.6
	-	0.200		-			
ARM B	12.41	14.60	0.850	- -	0.0	4.8	59.6
	-	0.362		-			
ARM C	11.46	14.04	0.816	- -	0.0	3.9	50.0
	-	0.327		-			
17.15-17.30							
ARM A	2.71	7.56	0.358	- -	0.5	0.6	8.2
	-	0.206		-			
ARM B	12.41	14.59	0.851	- -	4.8	5.2	75.7
	-	0.442		-			
ARM C	11.45	14.01	0.817	- -	3.9	4.2	61.3
	-	0.381		-			
17.30-17.45							
ARM A	2.71	7.56	0.358	- -	0.6	0.6	8.3
	-	0.206		-			
ARM B	12.41	14.59	0.851	- -	5.2	5.3	79.2
	-	0.450		-			
ARM C	11.45	14.01	0.817	- -	4.2	4.3	63.5
	-	0.386		-			

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
17.45-18.00							
ARM A	2.71	7.56	0.359	- -	0.6	0.6	8.3
ARM B	12.41	14.59	0.851	- -	5.3	5.4	80.9
ARM C	11.45	14.01	0.817	- -	4.3	4.3	64.5

	AVERAGE DELAY PER ARRIVING (RFC)	
ARM A	0.207	
ARM B	0.452	
ARM C	0.387	

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	0.5	*
17.30	0.6	*
17.45	0.6	*
18.00	0.6	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	4.8	*****
17.30	5.2	*****
17.45	5.3	*****
18.00	5.4	*****

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	3.9	****
17.30	4.2	****
17.45	4.3	****
18.00	4.3	****

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	162.6	162.6	32.4	0.20	32.4	0.20
B	744.6	744.6	295.4	0.40	296.4	0.40
C	687.2	687.2	239.2	0.35	239.9	0.35
ALL	1594.3	1594.3	566.9	0.36	568.6	0.36

* 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.

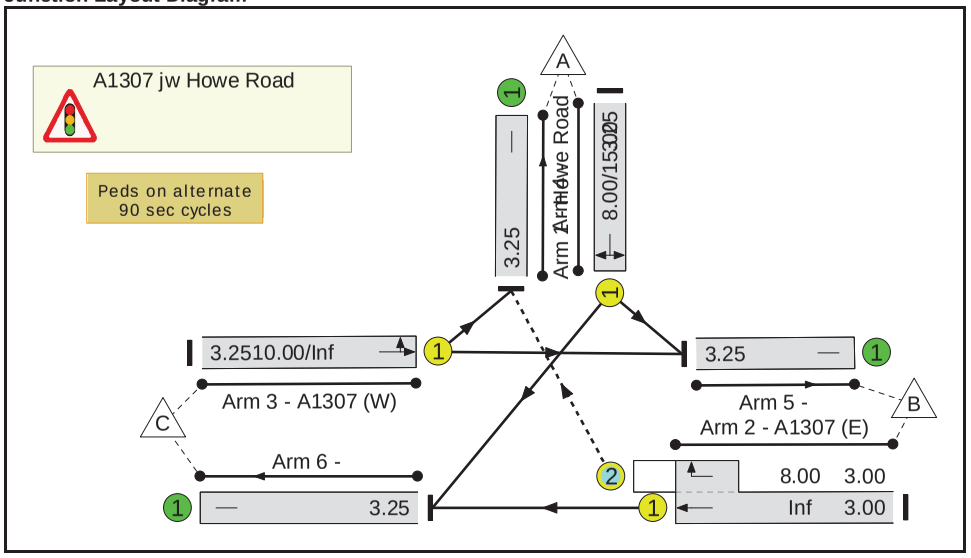
END OF JOB

Linsig Report

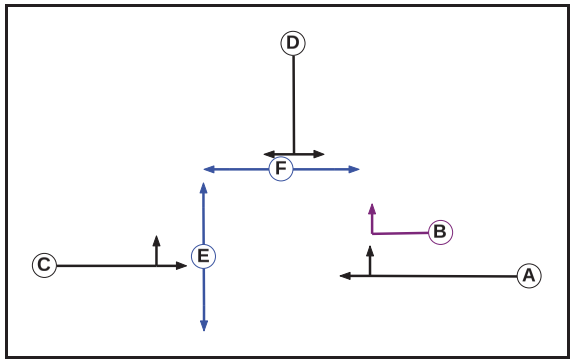
User and Project Details

Project:	**Land at Haverhill**
Title:	**Existing Layout**
Location:	Haverhill
File name:	10173L J8 A1307 jw Howe Road Rev3.lsg3x
Author:	SMT
Company:	Brookbanks Consulting Ltd

Junction Layout Diagram



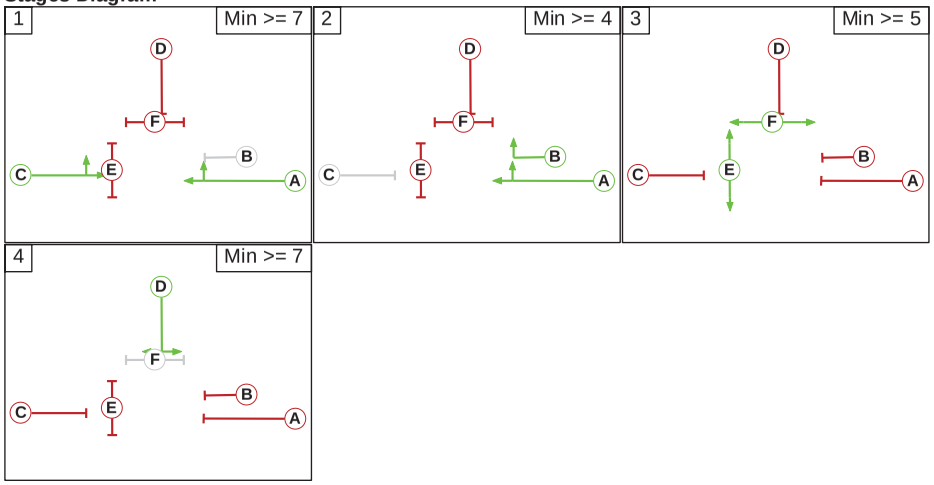
Phase Diagram



Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E	F
A		-	-	6	8	9
B	-		-	6	-	9
C	-	-		6	5	-
D	6	6	6		10	-
E	8	-	8	7		-
F	8	8	-	-	-	

Stages Diagram



Lane Input Data

Junction: A1307 jw Howe Road

Lane	Lane Type	Phases	Start Disp.	End Disp.	Sat Flow Type	Physical Length (PCU)	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (Howe Road)	U	D	2	3	Geom	60.0	-	3.25	0.00	Y	Arm 5 Left	8.00
											Arm 6 Right	15.00
2/1 (A1307 (E))	U	A	2	3	Geom	60.0	-	3.00	0.00	Y	Arm 6 Ahead	Inf
2/2 (A1307 (E))	O	A B	2	3	Geom	3.0	-	3.00	0.00	N	Arm 4 Right	8.00
3/1 (A1307 (W))	U	C	2	3	Geom	60.0	-	3.25	0.00	Y	Arm 4 Left	10.00
											Arm 5 Ahead	Inf

Linsig Report
P:\10173\Traffic\Junctions - Rev3\J8 A1307 jw Howe Road\10173L J8 A1307 jw Howe Road Rev3.lsg3x
Scenario 1: '2014 AM' (FG1: '2014 AM', Plan 1: 'Network Control Plan 1')
Traffic Flows, Actual
Actual Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	176	60	236
	B	58	0	482	540
	C	29	451	0	480
	Tot.	87	627	542	1256

Stage Sequence Diagram

Junction Layout Diagram

Link 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: Existing Layout	-	-	-		-	-	-	-	-	-	**53.6%**	**55**	**1**	**1**	**7.8**	-	-
A1307 jw Howe Road	-	-	-		-	-	-	-	-	-	**53.6%**	**55**	**1**	**1**	**7.8**	-	-
1/1	Howe Road Left Right	U	D		2	46	-	236	1665	444	53.2%	-	-	-	2.4	36.8	5.5
2/1+2/2	A1307 (E) Right Ahead	U+O	A	B	2	93	8	540	1915:1731	899+108	53.6 : 53.6%	55	1	1	2.7	18.3	9.4
3/1	A1307 (W) Left Ahead	U	C		2	85	-	480	1923	929	51.6%	-	-	-	2.7	20.0	8.9

C1 PRC for Signalled Lanes (%): 67.9 Total Delay for Signalled Lanes (pcuHr): 7.83 Cycle Time (s): 180
PRC Over All Lanes (%): 67.9 Total Delay Over All Lanes(pcuHr): 7.83

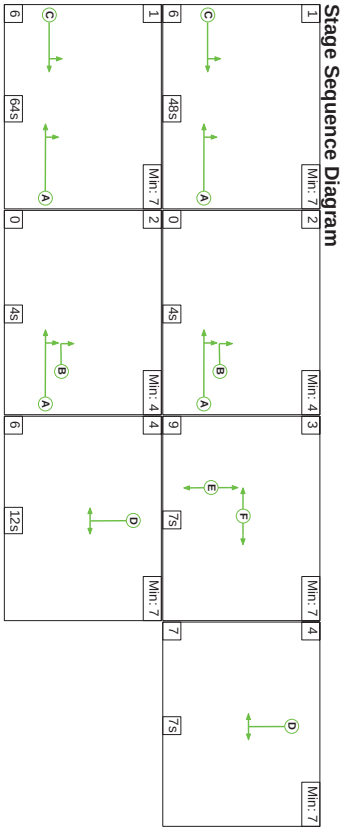
Scenario 2: '2014 PM' (FG2: '2014 PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Actual

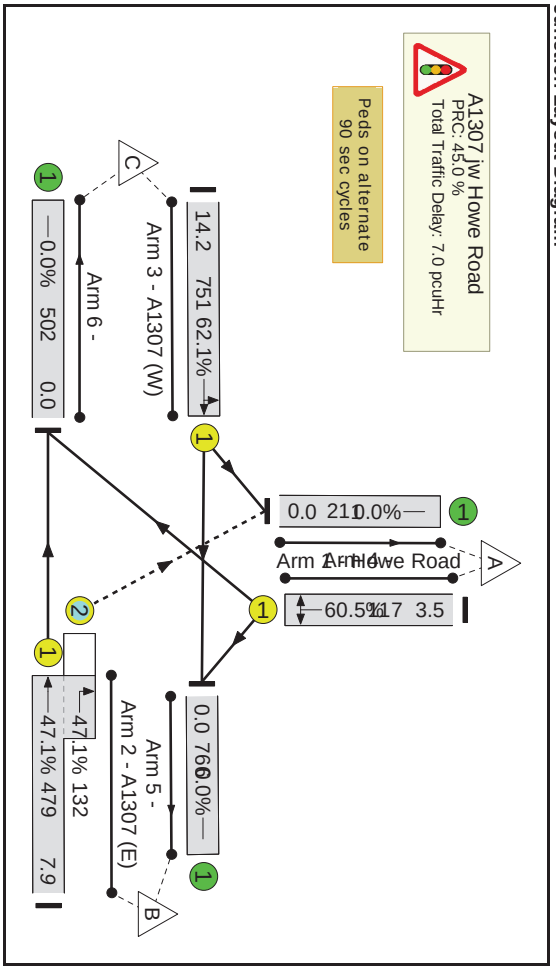
Actual Flow :

Origin \ Destination	A	B	C	Tot.
A	0	94	23	117
B	132	0	479	611
C	79	672	0	751
Tot.	211	766	502	1479

Stage Sequence Diagram



Junction Layout Diagram



Link 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: Existing Layout	-	-	-		-	-	-	-	-	-	**62.1%**	**126**	**3**	**3**	**7.0**	-	-
A1307 jw Howe Road	-	-	-		-	-	-	-	-	-	**62.1%**	**126**	**3**	**3**	**7.0**	-	-
1/1	Howe Road Left Right	U	D		2	19	-	117	1658	193	60.5%	-	-	-	2.0	60.9	3.5
2/1+2/2	A1307 (E) Right Ahead	U+O	A	B	2	120	8	611	1915:1731	1017+280	47.1 : 47.1%	126	3	3	2.0	12.0	7.9
3/1	A1307 (W) Left Ahead	U	C		2	112	-	751	1910	1210	62.1%	-	-	-	3.0	14.2	14.2

C1

PRC for Signalled Lanes (%): 45.0 | Total Delay for Signalled Lanes (pcuHr): 6.98 | Cycle Time (s): 180
PRC Over All Lanes (%): 45.0 | Total Delay Over All Lanes(pcuHr): 6.98

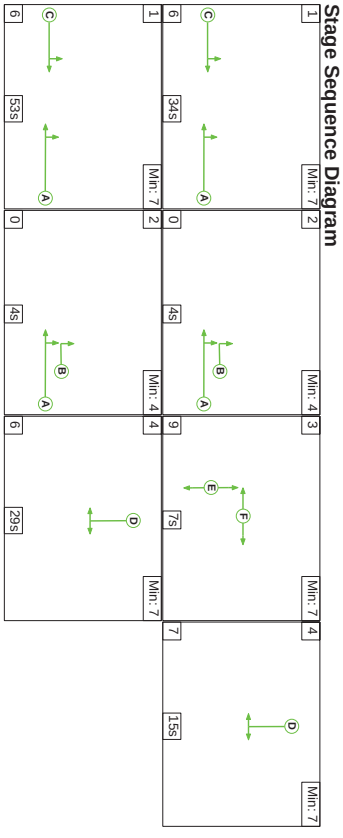
Scenario 3: '2019+Ph1 AM' (FG3: '2019+NW1+NW1 AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Actual

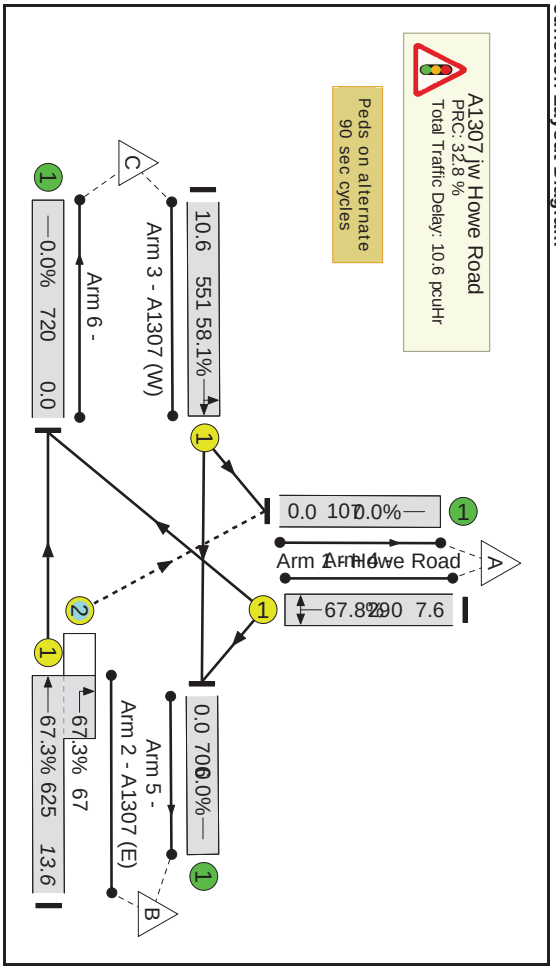
Actual Flow :

Origin \ Destination	A	B	C	Tot.
A	0	195	95	290
B	67	0	625	692
C	40	511	0	551
Tot.	107	706	720	1533

Stage Sequence Diagram



Junction Layout Diagram



Link 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: Existing Layout	-	-	-		-	-	-	-	-	-	**67.8%**	**64**	**1**	**1**	**10.6**	-	-
A1307 jw Howe Road	-	-	-		-	-	-	-	-	-	**67.8%**	**64**	**1**	**1**	**10.6**	-	-
1/1	Howe Road Left Right	U	D		2	44	-	290	1674	428	67.8%	-	-	-	3.5	43.0	7.6
2/1+2/2	A1307 (E) Right Ahead	U+O	A	B	2	95	8	692	1915:1731	928+100	67.3 : 67.3%	64	1	1	4.0	20.9	13.6
3/1	A1307 (W) Left Ahead	U	C		2	87	-	551	1919	949	58.1%	-	-	-	3.2	20.7	10.6

C1 PRC for Signalled Lanes (%): 32.8 Total Delay for Signalled Lanes (pcuHr): 10.64 Cycle Time (s): 180
PRC Over All Lanes (%): 32.8 Total Delay Over All Lanes(pcuHr): 10.64

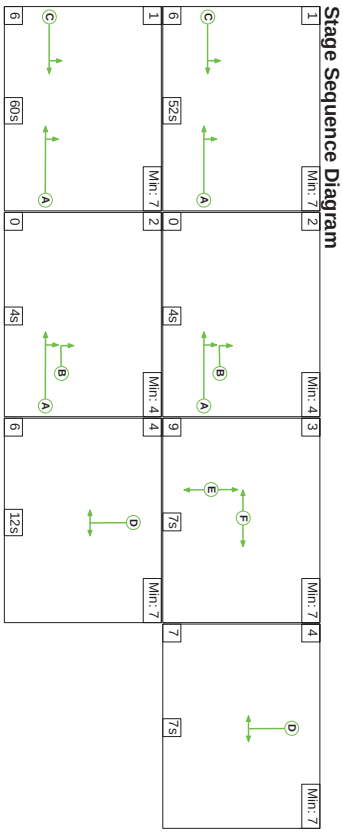
Scenario 4: '2019+Ph1 PM' (FG4: '2019+NW1+NW1 PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Actual

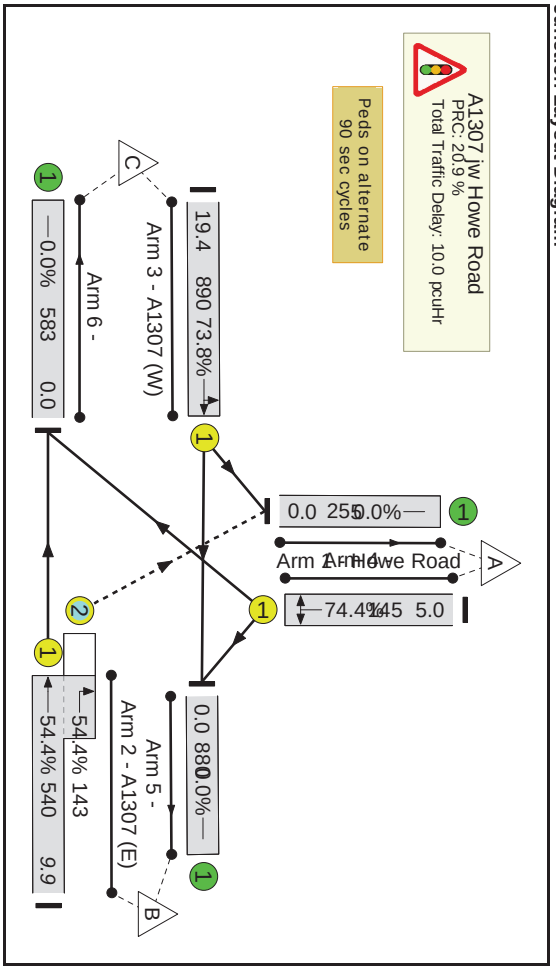
Actual Flow :

Origin \ Destination	A	B	C	Tot.
A	0	102	43	145
B	143	0	540	683
C	112	778	0	890
Tot.	255	880	583	1718

Stage Sequence Diagram



Junction Layout Diagram



Link 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: Existing Layout	-	-	-		-	-	-	-	-	-	**74.4%**	**129**	**11**	**3**	**10.0**	-	-
A1307 jw Howe Road	-	-	-		-	-	-	-	-	-	**74.4%**	**129**	**11**	**3**	**10.0**	-	-
1/1	Howe Road Left Right	U	D		2	19	-	145	1670	195	74.4%	-	-	-	2.9	72.8	5.0
2/1+2/2	A1307 (E) Right Ahead	U+O	A	B	2	120	8	683	1915:1731	993+263	54.4 : 54.4%	129	11	3	2.8	14.7	9.9
3/1	A1307 (W) Left Ahead	U	C		2	112	-	890	1904	1206	73.8%	-	-	-	4.3	17.4	19.4

C1 PRC for Signalled Lanes (%): 20.9 Total Delay for Signalled Lanes (pcuHr): 10.01 Cycle Time (s): 180
PRC Over All Lanes (%): 20.9 Total Delay Over All Lanes(pcuHr): 10.01

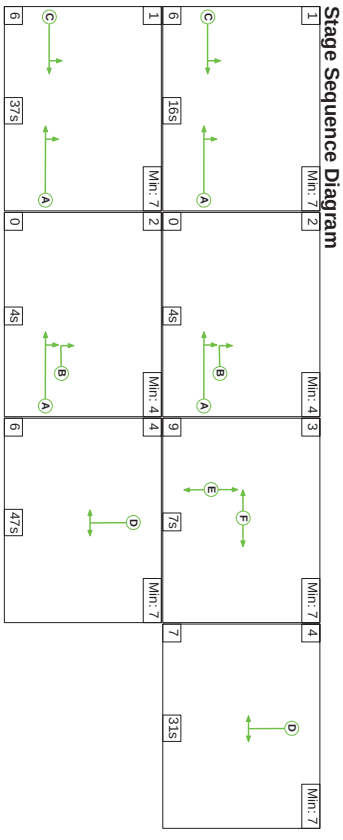
Scenario 5: '2029R+Ph2 AM' (FG5: '2029R+NW2+NE2 AM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Actual

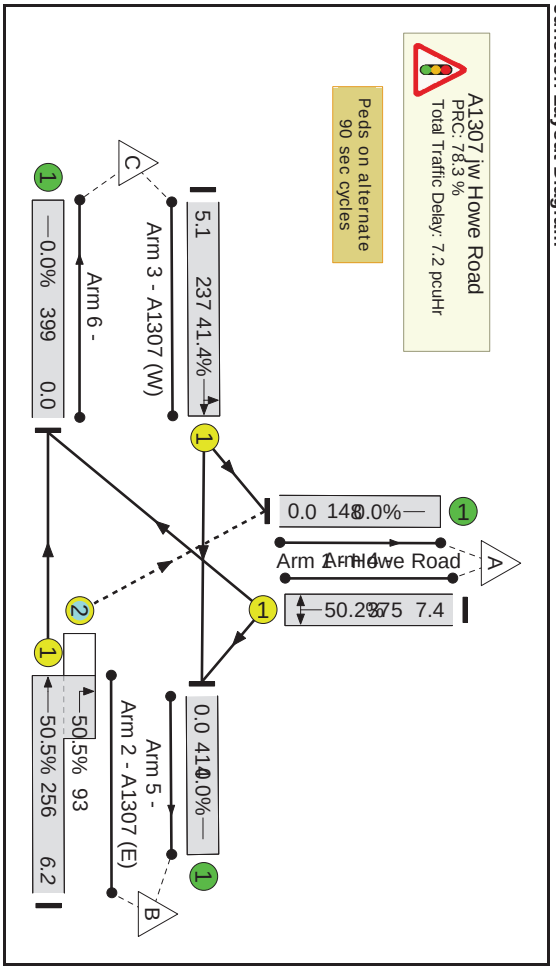
Actual Flow :

Origin \ Destination	A	B	C	Tot.
A	0	232	143	375
B	93	0	256	349
C	55	182	0	237
Tot.	148	414	399	961

Stage Sequence Diagram



Junction Layout Diagram



Link 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: Existing Layout	-	-	-		-	-	-	-	-	-	**50.5%**	**89**	**2**	**2**	**7.2**	-	-
A1307 jw Howe Road	-	-	-		-	-	-	-	-	-	**50.5%**	**89**	**2**	**2**	**7.2**	-	-
1/1	Howe Road Left Right	U	D		2	78	-	375	1681	747	50.2%	-	-	-	2.4	22.7	7.4
2/1+2/2	A1307 (E) Right Ahead	U+O	A	B	2	61	8	349	1915:1731	507+184	50.5 : 50.5%	89	2	2	2.8	28.9	6.2
3/1	A1307 (W) Left Ahead	U	C		2	53	-	237	1875	573	41.4%	-	-	-	2.0	30.2	5.1

C1 PRC for Signalled Lanes (%): 78.3 Total Delay for Signalled Lanes (pcuHr): 7.16 Cycle Time (s): 180
PRC Over All Lanes (%): 78.3 Total Delay Over All Lanes(pcuHr): 7.16

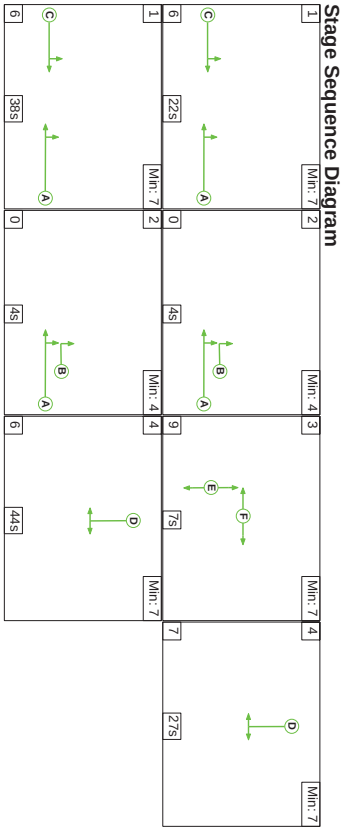
Scenario 6: '2029R+Ph2 PM' (FG6: '2029R+NW2+NE2 PM', Plan 1: 'Network Control Plan 1')

Traffic Flows, Actual

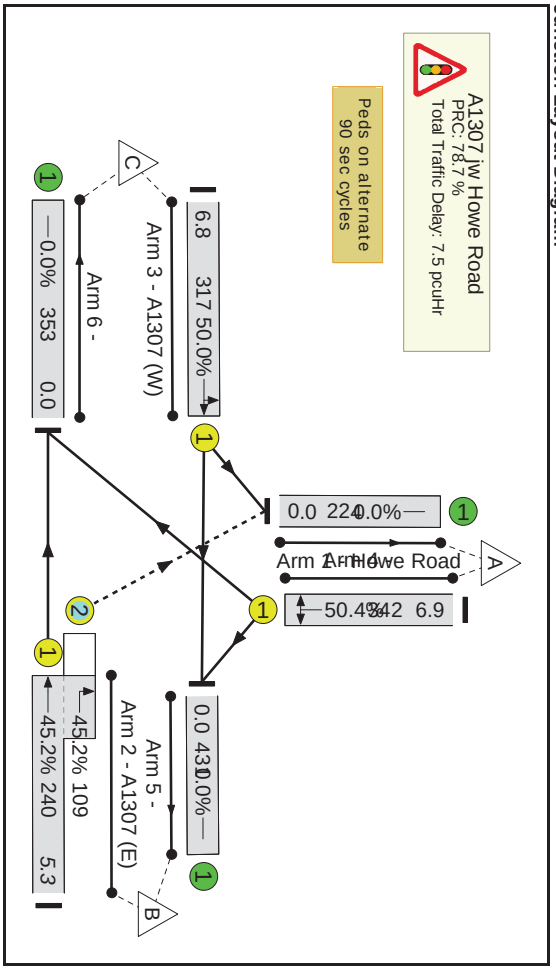
Actual Flow :

Origin \ Destination	A	B	C	Tot.
A	0	229	113	342
B	109	0	240	349
C	115	202	0	317
Tot.	224	431	353	1008

Stage Sequence Diagram



Junction Layout Diagram



Linsig Report
P:\10173\Traffic\Junctions - Rev3\J8 A1307 jw Howe Road\10173L J8 A1307 jw Howe Road Rev3.lsg3x

Link 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: Existing Layout	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**50.4%**	**104**	**2**	**2**	**7.5**	**-**	**-**
A1307 jw Howe Road	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**50.4%**	**104**	**2**	**2**	**7.5**	**-**	**-**
1/1	Howe Road Left Right	U	D		2	71	-	342	1674	679	50.4%	-	-	-	2.4	25.3	6.9
2/1+2/2	A1307 (E) Right Ahead	U+O	A	B	2	68	8	349	1915:1731	531+241	45.2 : 45.2%	104	2	2	2.6	26.4	5.3
3/1	A1307 (W) Left Ahead	U	C		2	60	-	317	1840	634	50.0%	-	-	-	2.6	29.0	6.8

C1 PRC for Signalled Lanes (%): 78.7 Total Delay for Signalled Lanes (pcuHr): 7.52 Cycle Time (s): 180
PRC Over All Lanes (%): 78.7 Total Delay Over All Lanes(pcuHr): 7.52

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011
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Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J12 A1307 jw Queen Street and Relief Road\
10173a - J12 A1307 jw Queen Street - Rev3 2019+NW1+NE1 [flat] AM.vai"
(drive-on-the-left) at 14:34:03 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J12 A1307 jw Queens Street - Rev3 2019+NW1+NE1 [flat] AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Hales Barn Road
ARM B - A1307 Withersfield Road E
ARM C - A1307 Withersfield Road S
ARM D - Queens Street

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	6.00	10.00	20.00	43.00	20.0	0.589	23.674
B	3.20	6.50	12.00	20.00	43.00	20.0	0.616	25.893
C	3.50	6.50	12.00	8.00	43.00	35.0	0.552	23.725
D	3.00	4.50	4.00	20.00	43.00	30.0	0.519	18.593

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(08.00)AND ENDS(09.00)
.LENGTH OF TIME PERIOD -(60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: as above

DEMAND SET TITLE: as above

T33

TIME	FROM/T	TURNING PROPORTIONS / TURNING COUNTS / (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C	ARM D
08.00 - 09.00	ARM A	0.000	0.200	0.648	0.152
		0.0	25.0	81.0	19.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I
	ARM B	0.012	0.000	0.829	0.159
		10.0	0.0	699.0	134.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I
	ARM C	0.052	0.788	0.000	0.160
		32.0	482.0	0.0	98.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I
	ARM D	0.023	0.566	0.411	0.000
		3.0	73.0	53.0	0.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ PER ARRIVING TIME)	AVERAGE DELAY I
I 08.00-08.15									I
I ARM A	2.08	17.73	0.117	- -	-	0.0	0.1	1.9	
	-	0.064	I						
I ARM B	14.05	24.33	0.577	- -	-	0.0	1.3	19.3	
	-	0.096	I						
I ARM C	10.20	22.23	0.459	- -	-	0.0	0.8	12.1	
	-	0.082	I						
I ARM D	2.16	14.09	0.153	- -	-	0.0	0.2	2.6	
	-	0.084	I						
I			I						
I 08.15-08.30									I
I ARM A	2.08	17.70	0.118	- -	-	0.1	0.1	2.0	
	-	0.064	I						
I ARM B	14.05	24.32	0.578	- -	-	1.3	1.4	20.3	
	-	0.097	I						
I ARM C	10.20	22.22	0.459	- -	-	0.8	0.8	12.6	
	-	0.083	I						
I ARM D	2.16	14.06	0.154	- -	-	0.2	0.2	2.7	
	-	0.084	I						
I			I						
I 08.30-08.45									I
I ARM A	2.08	17.70	0.118	- -	-	0.1	0.1	2.0	
	-	0.064	I						
I ARM B	14.05	24.32	0.578	- -	-	1.4	1.4	20.4	
	-	0.097	I						
I ARM C	10.20	22.22	0.459	- -	-	0.8	0.8	12.7	
	-	0.083	I						
I ARM D	2.16	14.06	0.154	- -	-	0.2	0.2	2.7	
	-	0.084	I						
I			I						

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ PER ARRIVING TIME)	AVERAGE DELAY I
I ARM A	2.08	17.70	0.118	- -	-	0.1	0.1	2.0	
	-	0.064	I						
I ARM B	14.05	24.32	0.578	- -	-	1.4	1.4	20.4	
	-	0.097	I						
I ARM C	10.20	22.22	0.459	- -	-	0.8	0.8	12.7	
	-	0.083	I						
I ARM D	2.16	14.06	0.154	- -	-	0.2	0.2	2.7	
	-	0.084	I						
I			I						
I 08.45-09.00									I
I ARM A	2.08	17.70	0.118	- -	-	0.1	0.1	2.0	
	-	0.064	I						
I ARM B	14.05	24.32	0.578	- -	-	1.4	1.4	20.4	
	-	0.097	I						
I ARM C	10.20	22.22	0.459	- -	-	0.8	0.8	12.7	
	-	0.083	I						
I ARM D	2.16	14.06	0.154	- -	-	0.2	0.2	2.7	
	-	0.084	I						
I			I						

.QUEUE AT ARM A

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

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	1.3	*
08.30	1.4	*
08.45	1.4	*
09.00	1.4	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	0.8	*
08.30	0.8	*
08.45	0.8	*
09.00	0.8	*

.QUEUE AT ARM D

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	124.8	124.8	7.9	0.06	7.9	0.06
B	843.0	843.0	80.4	0.10	80.4	0.10
C	612.0	612.0	50.1	0.08	50.1	0.08
D	129.6	129.6	10.8	0.08	10.8	0.08
ALL	1709.4	1709.4	149.2	0.09	149.3	0.09

* 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 JOB

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

For sales and distribution information,
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Tel: +44 (0) 1344 770758
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Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J12 A1307 jw Queen Street and Relief Road\
10173a - J12 A1307 jw Queen Street - Rev3 2019+NW1+NE1 [flat] PM.vai"
(drive-on-the-left) at 14:34:32 on Wednesday, 8 April 2015

.FILE PROPERTIES

RUN TITLE: J12 A1307 jw Queens Street - Rev3 2019+NW1+NE1 [flat] PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA

ARM A - Hales Barn Road
ARM B - A1307 Withersfield Road E
ARM C - A1307 Withersfield Road S
ARM D - Queens Street

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)

```
 I ARM  A I    3.00   I     6.00   I    10.00   I    20.00   I   43.00   I
20.0     I  0.589  I       23.674        I
 I ARM  B I    3.20   I     6.50   I    12.00   I    20.00   I   43.00   I
20.0     I  0.616  I       25.893        I
 I ARM  C I    3.50   I     6.50   I    12.00   I     8.00   I   43.00   I
35.0     I  0.552  I       23.725        I
 I ARM  D I    3.00   I     4.50   I     4.00   I    20.00   I   43.00   I
30.0     I  0.519  I       18.593        I
```

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

IARM	I FLOW SCALE(%) I
I A	I 100 I
I B	I 100 I
I C	I 100 I
I D	I 100 I

TIME PERIOD BEGINS(17.00)AND ENDS(18.00)
.LENGTH OF TIME PERIOD -(60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: as above

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C	ARM D
17.00 - 18.00					
	ARM A	0.000	0.314	0.647	0.039
		0.0	16.0	33.0	2.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM B	0.049	0.000	0.851	0.100
		32.0	0.0	556.0	65.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.073	0.884	0.000	0.043
		71.0	859.0	0.0	42.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM D	0.037	0.631	0.332	0.000
		8.0	135.0	71.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	DEMAND (VEH/MIN) (VEH.MIN/ VEHICLE (MIN)	CAPACITY (VEH/MIN) PER ARRIVING (RFC)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME
17.00-17.15							
ARM A	0.85	13.31	0.064	- -	0.0	0.1	1.0
	-	0.080		-			
ARM B	10.87	24.82	0.438	- -	0.0	0.8	11.2
	-	0.071		-			
ARM C	16.21	22.82	0.710	- -	0.0	2.4	32.9
	-	0.144		-			
ARM D	3.56	10.35	0.344	- -	0.0	0.5	7.4
	-	0.146		-			
17.15-17.30							
ARM A	0.85	13.21	0.064	- -	0.1	0.1	1.0
	-	0.081		-			
ARM B	10.87	24.81	0.438	- -	0.8	0.8	11.6
	-	0.072		-			
ARM C	16.21	22.81	0.711	- -	2.4	2.4	35.9
	-	0.152		-			
ARM D	3.56	10.27	0.347	- -	0.5	0.5	7.8
	-	0.149		-			
17.30-17.45							

```
 I ARM A       0.85     13.21   0.064   - -       -    0.1    0.1        1.0
         -              0.081     I
 I ARM B      10.87     24.81   0.438   - -       -    0.8    0.8       11.7
         -              0.072     I
 I ARM C      16.21     22.81   0.711   - -       -    2.4    2.4       36.3
         -              0.152     I
 I ARM D       3.56     10.27   0.347   - -       -    0.5    0.5        7.9
         -              0.149     I
 I                                 I
```

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-------------------------------------------------------------------------------
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.-------------------------------------------------------------------------------
--------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                                 (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                 -
 I 17.45-18.00                     I
 I ARM A       0.85     13.21   0.064   - -       -    0.1    0.1        1.0
         -              0.081     I
 I ARM B      10.87     24.81   0.438   - -       -    0.8    0.8       11.7
         -              0.072     I
 I ARM C      16.21     22.81   0.711   - -       -    2.4    2.4       36.4
         -              0.152     I
 I ARM D       3.56     10.27   0.347   - -       -    0.5    0.5        7.9
         -              0.149     I
 I                                 I
```

```
-------------------------------------------------------------------------------
--------------------------------
```

.QUEUE AT ARM A

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

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	0.8	*
17.30	0.8	*
17.45	0.8	*
18.00	0.8	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	2.4	**
17.30	2.4	**
17.45	2.4	**
18.00	2.4	**

.QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	0.5	*
17.30	0.5	*
17.45	0.5	*
18.00	0.5	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	51.0	51.0	4.1	0.08	4.1	0.08
B	652.2	652.2	46.2	0.07	46.2	0.07
C	972.6	972.6	141.6	0.15	141.7	0.15
D	213.6	213.6	31.0	0.15	31.1	0.15
ALL	1889.4	1889.4	222.9	0.12	223.0	0.12

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011
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_____

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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J12 A1307 jw Queen Street and Relief Road\
10173a - J12 A1307 jw Queen Street - Rev3 2029R+NW2+NE2 [flat] AM.vai"
(drive-on-the-left) at 14:36:35 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J12 A1307 jw Queens Street - Rev3 2029R+NW2+NE2 [flat] AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Hales Barn Road
ARM B - A1307 Withersfield Road E
ARM C - A1307 Withersfield Road S
ARM D - Queens Street

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	6.00	10.00	20.00	43.00	20.0	0.589	23.674
B	3.20	6.50	12.00	20.00	43.00	20.0	0.616	25.893
C	3.50	6.50	12.00	8.00	43.00	35.0	0.552	23.725
D	3.00	4.50	4.00	20.00	43.00	30.0	0.519	18.593

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

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

TIME PERIOD BEGINS(08.00)AND ENDS(09.00)
.LENGTH OF TIME PERIOD -(60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: as above

DEMAND SET TITLE: as above

TIME	FROM/T	ARM A	ARM B	ARM C	ARM D
08.00 - 09.00	ARM A	0.000	0.027	0.890	0.083
		0.0	26.0	849.0	79.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I
	ARM B	0.027	0.000	0.672	0.301
		11.0	0.0	275.0	123.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I
	ARM C	0.696	0.171	0.000	0.133
		546.0	134.0	0.0	104.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I
	ARM D	0.175	0.461	0.364	0.000
		27.0	71.0	56.0	0.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME)	AVERAGE DELAY PER ARRIVING (SEGMENT)
I 08.00-08.15 I									
I ARM A I	15.90	21.12	0.753	- -	-	0.0	2.9	39.4	0.179
I ARM B I	6.81	15.91	0.428	- -	-	0.0	0.7	10.6	0.109
I ARM C I	13.07	21.78	0.600	- -	-	0.0	1.5	20.9	0.112
I ARM D I	2.59	12.66	0.205	- -	-	0.0	0.3	3.7	0.099
I I									

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME)	AVERAGE DELAY PER ARRIVING (SEGMENT)
I 08.15-08.30 I									
I ARM A I	15.90	21.10	0.754	- -	-	2.9	3.0	44.3	0.192
I ARM B I	6.81	15.80	0.431	- -	-	0.7	0.8	11.2	0.111
I ARM C I	13.07	21.77	0.600	- -	-	1.5	1.5	22.2	0.115
I ARM D I	2.59	12.62	0.205	- -	-	0.3	0.3	3.8	0.100
I I									

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME)	AVERAGE DELAY PER ARRIVING (SEGMENT)
I 08.30-08.45 I									
I ARM A I	15.90	21.10	0.754	- -	-	3.0	3.0	44.9	0.192
I ARM B I	6.81	15.79	0.431	- -	-	0.8	0.8	11.3	0.111
I ARM C I	13.07	21.77	0.600	- -	-	1.5	1.5	22.4	0.115
I ARM D I	2.59	12.62	0.205	- -	-	0.3	0.3	3.9	0.100
I I									

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME)	AVERAGE DELAY PER ARRIVING (SEGMENT)
I 08.45-09.00 I									
I ARM A I	15.90	21.10	0.754	- -	-	3.0	3.0	45.2	0.192
I ARM B I	6.81	15.79	0.431	- -	-	0.8	0.8	11.3	0.111
I ARM C I	13.07	21.77	0.600	- -	-	1.5	1.5	22.4	0.115
I ARM D I	2.59	12.62	0.205	- -	-	0.3	0.3	3.9	0.100
I I									

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	2.9	***
08.30	3.0	***
08.45	3.0	***
09.00	3.0	***

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	0.7	*
08.30	0.8	*
08.45	0.8	*
09.00	0.8	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	1.5	*
08.30	1.5	*
08.45	1.5	*
09.00	1.5	*

.QUEUE AT ARM D

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	954.0	954.0	173.8	0.18	174.0	0.18
B	408.6	408.6	44.4	0.11	44.5	0.11
C	784.2	784.2	87.9	0.11	88.0	0.11
D	155.4	155.4	15.3	0.10	15.3	0.10
ALL	2302.2	2302.2	321.4	0.14	321.7	0.14

* 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 JOB

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

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Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J12 A1307 jw Queen Street and Relief Road\10173a - J12 A1307 jw Queen Street - Rev3 2029R+NW2+NE2 [flat] PM.vai"
(drive-on-the-left) at 14:36:25 on Wednesday, 8 April 2015

.FILE PROPERTIES

RUN TITLE: J12 A1307 jw Queens Street - Rev3 2029R+NW2+NE2 [flat] PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA

ARM A - Hales Barn Road
ARM B - A1307 Withersfield Road E
ARM C - A1307 Withersfield Road S
ARM D - Queens Street

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)

```
--------------------------------------------------------------------------------
---------------------------------------
 I ARM  A I    3.00   I     6.00   I    10.00   I    20.00   I   43.00   I
20.0     I  0.589  I       23.674        I
 I ARM  B I    3.20   I     6.50   I    12.00   I    20.00   I   43.00   I
20.0     I  0.616  I       25.893        I
 I ARM  C I    3.50   I     6.50   I    12.00   I     8.00   I   43.00   I
35.0     I  0.552  I       23.725        I
 I ARM  D I    3.00   I     4.50   I     4.00   I    20.00   I   43.00   I
30.0     I  0.519  I       18.593        I

--------------------------------------------------------------------------------
---------------------------------------

 V = approach half-width       L = effective flare length           D =
inscribed circle diameter
 E = entry width               R = entry radius                     PHI = entry
angle


.TRAFFIC DEMAND DATA
 -------------------

 Only sets included in the current run are shown
.SCALING FACTORS
.----------------------- T13
 IARM  I FLOW SCALE(%) I
 -----------------------
 I A   I      100      I
 I B   I      100      I
 I C   I      100      I
 I D   I      100      I
 -----------------------

 TIME PERIOD BEGINS(17.00)AND ENDS(18.00)
.LENGTH OF TIME PERIOD -(  60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: as above


 DEMAND SET TITLE:  as above
.------------------------------------------------------------------------ T33
 I                    I         TURNING PROPORTIONS                    I
 I                    I         TURNING COUNTS                         I
 I                    I        (PERCENTAGE OF H.V.S)                   I
 I                    ----------------------------------------------
 I       TIME         I FROM/T  I  ARM A I  ARM B I  ARM C I  ARM D I
 ---------------------------------------------------------------------
 I   17.00 - 18.00    I         I        I        I        I        I
 I                    I  ARM  A I  0.000 I  0.028 I  0.917 I  0.055 I
 I                    I         I    0.0 I   19.0 I  621.0 I   37.0 I
 I                    I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I        I        I        I        I
 I                    I  ARM  B I  0.038 I  0.000 I  0.749 I  0.213 I
 I                    I         I   11.0 I    0.0 I  215.0 I   61.0 I
 I                    I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I        I        I        I        I
 I                    I  ARM  C I  0.626 I  0.338 I  0.000 I  0.035 I
 I                    I         I  857.0 I  463.0 I    0.0 I   48.0 I
 I                    I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I        I        I        I        I
 I                    I  ARM  D I  0.233 I  0.477 I  0.290 I  0.000 I
 I                    I         I   65.0 I  133.0 I   81.0 I    0.0 I
 I                    I         I (  0.0)I (  0.0)I (  0.0)I (  0.0)I
 I                    I         I        I        I        I        I
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.       QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT
        --------------------------------------------------------
.--------------------------------------------------------------------------------
---------------------------------- T70
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                -
 I 17.00-17.15                    I
 I ARM A      11.29     17.31   0.652   - -       -    0.0    1.8       25.3
         -              0.160     I
 I ARM B       4.78     18.40   0.260   - -       -    0.0    0.3        5.1
         -              0.073     I
 I ARM C      22.81     22.73   1.004   - -       -    0.0   18.6      182.1
         -             -0.044     I
 I ARM D       4.65      7.70   0.604   - -       -    0.0    1.4       19.5
         -              0.309     I
 I                                I
                                  I

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.--------------------------------------------------------------------------------
---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                -
 I 17.15-17.30                    I
 I ARM A      11.29     17.14   0.659   - -       -    1.8    1.9       28.0
         -              0.171     I
 I ARM B       4.78     18.32   0.261   - -       -    0.3    0.4        5.3
         -              0.074     I
 I ARM C      22.81     22.72   1.004   - -       -   18.6   27.0      345.0
         -              1.174     I
 I ARM D       4.65      7.36   0.632   - -       -    1.4    1.6       23.7
         -              0.364     I
 I                                I
                                  I

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---------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                              (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                -
 I 17.30-17.45                    I
```

```
 I ARM A      11.29     17.11   0.660   - -       -    1.9    1.9       28.5
         -              0.172     I
 I ARM B       4.78      18.31   0.261   - -       -    0.4    0.4        5.3
         -              0.074     I
 I ARM C      22.81      22.72   1.004   - -       -   27.0   33.5      455.0
         -              1.485     I
 I ARM D       4.65       7.30   0.637   - -       -    1.6    1.7       25.1
         -              0.375     I
 I                                I
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.-------------------------------------------------------------------------------
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 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                               -
 I 17.45-18.00                   I
 I ARM A      11.29     17.10   0.660   - -       -    1.9    1.9       28.7
         -              0.172     I
 I ARM B       4.78      18.31   0.261   - -       -    0.4    0.4        5.3
         -              0.074     I
 I ARM C      22.81      22.72   1.004   - -       -   33.5   39.2      546.1
         -              1.738     I
 I ARM D       4.65       7.27   0.640   - -       -    1.7    1.7       25.7
         -              0.381     I
 I                                I
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.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	1.8	**
17.30	1.9	**
17.45	1.9	**
18.00	1.9	**

.QUEUE AT ARM B

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

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	18.6	******************
17.30	27.0	**************************
17.45	33.5	********************************
18.00	39.2	**

.QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	1.4	*
17.30	1.6	**
17.45	1.7	**
18.00	1.7	**

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	677.4	677.4	110.5	0.16	110.6	0.16
B	286.8	286.8	20.9	0.07	20.9	0.07
C	1368.6	1368.6	1528.2	1.12	1562.0	1.14
D	279.0	279.0	94.0	0.34	94.2	0.34
ALL	2611.8	2611.8	1753.6	0.67	1787.7	0.68

* 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 JOB

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011
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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J12 A1307 jw Queen Street and Relief Road\
10173a - J12 A1307 jw Queen Street - Impr Rev3 2029R+NW2+NE2 [flat] AM.vai"
(drive-on-the-left) at 14:37:31 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: J12 A1307 jw Queens Street - Impr Rev3 2029R+NW2+NE2 [flat] AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - Hales Barn Road
ARM B - A1307 Withersfield Road E
ARM C - A1307 Withersfield Road S
ARM D - Queens Street

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.00	6.00	10.00	20.00	43.00	20.0	0.589	23.674
B	3.20	6.50	12.00	20.00	43.00	20.0	0.616	25.893
C	3.50	10.00	15.00	8.00	43.00	35.0	0.610	28.578
D	3.00	4.50	4.00	20.00	43.00	30.0	0.519	18.593

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

IARM	I FLOW SCALE(%) I
A	100
B	100
C	100
D	100

TIME PERIOD BEGINS(08.00)AND ENDS(09.00)
.LENGTH OF TIME PERIOD -(60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: as above

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C	ARM D
08.00 - 09.00	ARM A	0.000	0.027	0.890	0.083
		0.0	26.0	849.0	79.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I
	ARM B	0.027	0.000	0.672	0.301
		11.0	0.0	275.0	123.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I
	ARM C	0.696	0.171	0.000	0.133
		546.0	134.0	0.0	104.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I
	ARM D	0.175	0.461	0.364	0.000
		27.0	71.0	56.0	0.0
		(0.0)I	(0.0)I	(0.0)I	(0.0)I

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME)	AVERAGE DELAY PER ARRIVING (MIN) I
I 08.00-08.15									I
I ARM A	15.90	21.11	0.753	- -	-	0.0	2.9	39.4	
-		0.179	I						
I ARM B	6.81	15.91	0.428	- -	-	0.0	0.7	10.6	
-		0.109	I						
I ARM C	13.07	26.43	0.494	- -	-	0.0	1.0	14.0	
-		0.074	I						
I ARM D	2.59	12.65	0.205	- -	-	0.0	0.3	3.7	
-		0.099	I						
I			I						
I 08.15-08.30									I
I ARM A	15.90	21.10	0.754	- -	-	2.9	3.0	44.3	
-		0.192	I						
I ARM B	6.81	15.80	0.431	- -	-	0.7	0.8	11.2	
-		0.111	I						
I ARM C	13.07	26.41	0.495	- -	-	1.0	1.0	14.6	
-		0.075	I						
I ARM D	2.59	12.62	0.205	- -	-	0.3	0.3	3.8	
-		0.100	I						
I			I						
I 08.30-08.45									I

I ARM A	15.90	21.10	0.754	- -	-	3.0	3.0	44.9	
-		0.192	I						
I ARM B	6.81	15.79	0.431	- -	-	0.8	0.8	11.3	
-		0.111	I						
I ARM C	13.07	26.41	0.495	- -	-	1.0	1.0	14.6	
-		0.075	I						
I ARM D	2.59	12.62	0.205	- -	-	0.3	0.3	3.9	
-		0.100	I						
I			I						

I TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME)	AVERAGE DELAY PER ARRIVING (MIN) I
I 08.45-09.00									I
I ARM A	15.90	21.10	0.754	- -	-	3.0	3.0	45.2	
-		0.192	I						
I ARM B	6.81	15.79	0.431	- -	-	0.8	0.8	11.3	
-		0.111	I						
I ARM C	13.07	26.41	0.495	- -	-	1.0	1.0	14.6	
-		0.075	I						
I ARM D	2.59	12.62	0.205	- -	-	0.3	0.3	3.9	
-		0.100	I						
I			I						

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	2.9	***
08.30	3.0	***
08.45	3.0	***
09.00	3.0	***

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	0.7	*
08.30	0.8	*
08.45	0.8	*
09.00	0.8	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	1.0	*
08.30	1.0	*
08.45	1.0	*
09.00	1.0	*

.QUEUE AT ARM D

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	954.0	954.0	173.8	0.18	174.0	0.18
B	408.6	408.6	44.4	0.11	44.5	0.11
C	784.2	784.2	57.9	0.07	57.9	0.07
D	155.4	155.4	15.3	0.10	15.3	0.10
ALL	2302.2	2302.2	291.4	0.13	291.7	0.13

* 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 JOB

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J12 A1307 jw Queen Street and Relief Road\10173a - J12 A1307 jw Queen Street - Impr Rev3 2029R+NW2+NE2 [flat] PM.vai"
(drive-on-the-left) at 14:38:15 on Wednesday, 8 April 2015

.FILE PROPERTIES

RUN TITLE: J12 A1307 jw Queens Street - Impr Rev3 2029R+NW2+NE2 [flat] PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA

ARM A - Hales Barn Road
ARM B - A1307 Withersfield Road E
ARM C - A1307 Withersfield Road S
ARM D - Queens Street

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)

```
 I ARM  A I    3.00   I     6.00   I    10.00   I    20.00   I   43.00   I
20.0     I  0.589  I       23.674        I
 I ARM  B I    3.20   I     6.50   I    12.00   I    20.00   I   43.00   I
20.0     I  0.616  I       25.893        I
 I ARM  C I    3.50   I    10.00   I    15.00   I     8.00   I   43.00   I
35.0     I  0.610  I       28.578        I
 I ARM  D I    3.00   I     4.50   I     4.00   I    20.00   I   43.00   I
30.0     I  0.519  I       18.593        I
```

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

IARM	I FLOW SCALE(%) I
I A	I 100 I
I B	I 100 I
I C	I 100 I
I D	I 100 I

TIME PERIOD BEGINS(17.00)AND ENDS(18.00)
.LENGTH OF TIME PERIOD -(60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE INPUT DIRECTLY.
.DEMAND SET TITLE: as above

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C	ARM D
17.00 - 18.00					
	ARM A	0.000	0.028	0.917	0.055
		0.0	19.0	621.0	37.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM B	0.038	0.000	0.749	0.213
		11.0	0.0	215.0	61.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.626	0.338	0.000	0.035
		857.0	463.0	0.0	48.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM D	0.233	0.477	0.290	0.000
		65.0	133.0	81.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	DEMAND (VEH/MIN) (VEH.MIN/ VEHICLE (MIN)	CAPACITY (VEH/MIN) PER ARRIVING (RFC)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME
17.00-17.15							
ARM A	11.29	17.14	0.659	- -	-	0.0	1.9	25.9
	-	0.164						
ARM B	4.78	18.40	0.260	- -	-	0.0	0.3	5.1
	-	0.073						
ARM C	22.81	27.48	0.830	- -	-	0.0	4.5	59.7
	-	0.191						
ARM D	4.65	7.23	0.643	- -	-	0.0	1.7	22.3
	-	0.358						

T70

TIME SEGMENT	DEMAND (VEH/MIN) (VEH.MIN/ VEHICLE (MIN)	CAPACITY (VEH/MIN) PER ARRIVING (RFC)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME
17.15-17.30							
ARM A	11.29	17.03	0.663	- -	-	1.9	1.9	28.6
	-	0.174						
ARM B	4.78	18.31	0.261	- -	-	0.3	0.4	5.3
	-	0.074						
ARM C	22.81	27.47	0.830	- -	-	4.5	4.7	69.5
	-	0.212						
ARM D	4.65	7.09	0.656	- -	-	1.7	1.8	26.6
	-	0.406						

T70

TIME SEGMENT	DEMAND (VEH/MIN) (VEH.MIN/ VEHICLE (MIN)	CAPACITY (VEH/MIN) PER ARRIVING (RFC)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME
17.30-17.45							

```
 I ARM A      11.29     17.03   0.663   - -       -    1.9    1.9       29.0
         -              0.174     I
 I ARM B       4.78      18.31   0.261   - -       -    0.4    0.4        5.3
         -              0.074     I
 I ARM C      22.81      27.47   0.830   - -       -    4.7    4.8       71.0
         -              0.213     I
 I ARM D       4.65       7.08   0.657   - -       -    1.8    1.9       27.6
         -              0.410     I
 I
                                  I

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.--------------------------------------------------------------------------------
--------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                                (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -
                                  -
 I 17.45-18.00
                                  I
 I ARM A      11.29     17.03   0.663   - -       -    1.9    1.9       29.2
         -              0.174     I
 I ARM B       4.78      18.31   0.261   - -       -    0.4    0.4        5.3
         -              0.074     I
 I ARM C      22.81      27.47   0.830   - -       -    4.8    4.8       71.7
         -              0.214     I
 I ARM D       4.65       7.08   0.657   - -       -    1.9    1.9       27.9
         -              0.411     I
 I
                                  I

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--------------------------------

.QUEUE AT ARM A
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.15           1.9  **
    17.30           1.9  **
    17.45           1.9  **
    18.00           1.9  **


.QUEUE AT ARM B
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.15           0.3
    17.30           0.4
    17.45           0.4
    18.00           0.4


.QUEUE AT ARM C
 --------------
```



```
  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.15           4.5  *****
    17.30           4.7  *****
    17.45           4.8  *****
    18.00           4.8  *****


.QUEUE AT ARM D
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.15           1.7  **
    17.30           1.8  **
    17.45           1.9  **
    18.00           1.9  **

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
                  -----------------------------------------

 --------------------------------------------------------------------------------
T75
 I  ARM  I   TOTAL DEMAND  I     * QUEUEING *    I  * INCLUSIVE QUEUEING *  I
 I       I                 I      * DELAY *      I          * DELAY *        I
 I       I-------------------------------------------------------------------I
 I       I  (VEH)  (VEH/H) I  (MIN)    (MIN/VEH) I    (MIN)      (MIN/VEH)  I
 --------------------------------------------------------------------------------
 I   A   I  677.4 I  677.4 I   112.8 I    0.17   I     112.9  I     0.17     I
 I   B   I  286.8 I  286.8 I    20.9 I    0.07   I      20.9  I     0.07     I
 I   C   I 1368.6 I 1368.6 I   272.0 I    0.20   I     272.4  I     0.20     I
 I   D   I  279.0 I  279.0 I   104.4 I    0.37   I     104.7  I     0.38     I
 --------------------------------------------------------------------------------
 I  ALL  I 2611.8 I 2611.8 I   510.0 I    0.20   I     510.8  I     0.20     I
 --------------------------------------------------------------------------------
 * 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 JOB
```

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
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Tel: +44 (0) 1344 770758
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Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J13 A143 jw Relief Road\
10173 J13 A143 jw Relief Road Roundabout - Rev3 2029R+NW2+NE2 AM.vai"
(drive-on-the-left) at 12:36:41 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: 10173 J13 A143 jw Relief Road Roundabout - Rev3 2029+NW2+NE2 AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT:
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - A143 Haverhill Road (N)
ARM B - A143 Haverhill Road (S)
ARM C - NWGAR Development
ARM D - Relief Road

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.40	10.00	28.00	20.00	57.00	20.0	0.680	37.424
B	3.60	6.50	10.00	25.00	57.00	10.0	0.590	27.817
C	3.20	6.80	14.00	15.00	57.00	22.0	0.556	26.433
D	3.60	10.00	20.00	50.00	57.00	24.0	0.668	35.861

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
	TO RISE	IS REACHED	FALLING			
A	15.00	45.00	75.00	15.48	23.21	15.48
B	15.00	45.00	75.00	2.78	4.16	2.78
C	15.00	45.00	75.00	1.13	1.69	1.13
D	15.00	45.00	75.00	7.00	10.50	7.00

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C	ARM D
		TURNING PROPORTIONS / TURNING COUNTS / (PERCENTAGE OF H.V.S)			
07.45 - 09.15	ARM A	0.000	0.445	0.002	0.553

		0.0	551.0	3.0	684.0
		(0.0)	(0.0)	(0.0)	(0.0)
ARM B	0.896	0.000	0.068	0.036	
	199.0	0.0	15.0	8.0	
	(0.0)	(0.0)	(0.0)	(0.0)	
ARM C	0.111	0.533	0.000	0.356	
	10.0	48.0	0.0	32.0	
	(0.0)	(0.0)	(0.0)	(0.0)	
ARM D	0.938	0.045	0.018	0.000	
	525.0	25.0	10.0	0.0	
	(0.0)	(0.0)	(0.0)	(0.0)	

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
07.45-08.00								
	ARM A	15.53	36.72	0.423	- -	-	0.0	0.7	10.7
	ARM B	2.79	22.68	0.123	- -	-	0.0	0.1	2.1
	ARM C	1.13	20.23	0.056	- -	-	0.0	0.1	0.9
	ARM D	7.03	33.72	0.208	- -	-	0.0	0.3	3.9
08.00-08.15								
	ARM A	18.55	36.58	0.507	- -	-	0.7	1.0	15.0
	ARM B	3.33	21.67	0.154	- -	-	0.1	0.2	2.7
	ARM C	1.35	19.01	0.071	- -	-	0.1	0.1	1.1
	ARM D	8.39	33.29	0.252	- -	-	0.3	0.3	5.0

TIME SEGMENT		DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
08.15-08.30								
	ARM A	22.72	36.39	0.624	- -	-	1.0	1.6	23.8
	ARM B	4.07	20.29	0.201	- -	-	0.2	0.2	3.7
	ARM C	1.65	17.35	0.095	- -	-	0.1	0.1	1.5
	ARM D	10.28	32.72	0.314	- -	-	0.3	0.5	6.7
08.30-08.45								
	ARM A	22.72	36.39	0.624	- -	-	1.6	1.7	24.7
	ARM B	4.07	20.28	0.201	- -	-	0.2	0.3	3.8
	ARM C	1.65	17.34	0.095	- -	-	0.1	0.1	1.6
	ARM D	10.28	32.71	0.314	- -	-	0.5	0.5	6.8
08.45-09.00								
	ARM A	18.55	36.58	0.507	- -	-	1.7	1.0	15.9
	ARM B	3.33	21.65	0.154	- -	-	0.3	0.2	2.8

```
          -             0.055     I
 I ARM C       1.35      18.99    0.071   - -       -    0.1    0.1        1.2
          -             0.057     I
 I ARM D       8.39      33.29    0.252   - -       -    0.5    0.3        5.1
          -             0.040     I
 I
                                 I

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.------------------------------------------------------------------------------
--------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                               (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                               -
 I 09.00-09.15                   I
 I ARM A      15.53      36.72   0.423   - -       -    1.0    0.7       11.3
          -             0.047     I
 I ARM B       2.79      22.65   0.123   - -       -    0.2    0.1        2.1
          -             0.050     I
 I ARM C       1.13      20.20   0.056   - -       -    0.1    0.1        0.9
          -             0.052     I
 I ARM D       7.03      33.71   0.208   - -       -    0.3    0.3        4.0
          -             0.037     I
 I
                                 I

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--------------------------------

.QUEUE AT ARM A
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    08.00          0.7  *
    08.15          1.0  *
    08.30          1.6  **
    08.45          1.7  **
    09.00          1.0  *
    09.15          0.7  *


.QUEUE AT ARM B
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    08.00          0.1
    08.15          0.2
    08.30          0.2
    08.45          0.3
    09.00          0.2
    09.15          0.1


.QUEUE AT ARM C
 --------------
```



```
  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    08.00          0.1
    08.15          0.1
    08.30          0.1
    08.45          0.1
    09.00          0.1
    09.15          0.1


.QUEUE AT ARM D
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    08.00          0.3
    08.15          0.3
    08.30          0.5
    08.45          0.5
    09.00          0.3
    09.15          0.3

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
                  ------------------------------------------

 ------------------------------------------------------------------------------
T75
 I  ARM  I   TOTAL DEMAND  I     * QUEUEING *    I  * INCLUSIVE QUEUEING *  I
 I       I                 I      * DELAY *      I         * DELAY *        I
 I       I-------------------------------------------------------------------I
 I       I  (VEH)  (VEH/H) I  (MIN)    (MIN/VEH) I    (MIN)      (MIN/VEH)  I
 ------------------------------------------------------------------------------
 I   A   I 1704.0 I 1136.0 I   101.4 I    0.06   I     101.4  I     0.06     I
 I   B   I  305.6 I  203.7 I    17.1 I    0.06   I      17.1  I     0.06     I
 I   C   I  123.9 I   82.6 I     7.2 I    0.06   I       7.2  I     0.06     I
 I   D   I  770.8 I  513.9 I    31.6 I    0.04   I      31.6  I     0.04     I
 ------------------------------------------------------------------------------
 I  ALL  I 2904.3 I 1936.2 I   157.3 I    0.05   I     157.3  I     0.05     I
 ------------------------------------------------------------------------------
 * 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 JOB
```

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
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Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J13 A143 jw Relief Road\
10173 J13 A143 jw Relief Road Roundabout - Rev3 2029R+NW2+NE2 PM.vai"
(drive-on-the-left) at 12:36:52 on Wednesday, 8 April 2015

.FILE PROPERTIES
****

RUN TITLE: 10173 J13 A143 jw Relief Road Roundabout - Rev3 2029R+NW2+NE2 PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT:
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA
****
ARM A - A143 Haverhill Road (N)
ARM B - A143 Haverhill Road (S)
ARM C - NWGAR Development
ARM D - Relief Road

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.40	10.00	28.00	20.00	57.00	20.0	0.680	37.424
B	3.60	6.50	10.00	25.00	57.00	10.0	0.590	27.817
C	3.20	6.80	14.00	15.00	57.00	22.0	0.556	26.433
D	3.60	10.00	20.00	50.00	57.00	24.0	0.668	35.861

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
	TO RISE	IS REACHED	FALLING			
A	15.00	45.00	75.00	11.10	16.65	11.10
B	15.00	45.00	75.00	6.97	10.46	6.97
C	15.00	45.00	75.00	0.69	1.03	0.69
D	15.00	45.00	75.00	9.27	13.91	9.27

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C	ARM D
		TURNING PROPORTIONS / TURNING COUNTS / (PERCENTAGE OF H.V.S)			
16.45 - 18.15	ARM A	0.000	0.357	0.011	0.632

		0.0	317.0	10.0	561.0
		(0.0)	(0.0)	(0.0)	(0.0)
ARM B	0.860	0.000	0.091	0.048	
	480.0	0.0	51.0	27.0	
	(0.0)	(0.0)	(0.0)	(0.0)	
ARM C	0.109	0.527	0.000	0.364	
	6.0	29.0	0.0	20.0	
	(0.0)	(0.0)	(0.0)	(0.0)	
ARM D	0.933	0.020	0.047	0.000	
	692.0	15.0	35.0	0.0	
	(0.0)	(0.0)	(0.0)	(0.0)	

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN))
16.45-17.00							
ARM A	11.14	36.75	0.303	- -	-	0.0	0.4	6.4
	-	0.039					
ARM B	7.00	23.35	0.300	- -	-	0.0	0.4	6.2
	-	0.061					
ARM C	0.69	19.00	0.036	- -	-	0.0	0.0	0.6
	-	0.055					
ARM D	9.31	31.56	0.295	- -	-	0.0	0.4	6.1
	-	0.045					
17.00-17.15							
ARM A	13.30	36.62	0.363	- -	-	0.4	0.6	8.4
	-	0.043					
ARM B	8.36	22.47	0.372	- -	-	0.4	0.6	8.6
	-	0.071					
ARM C	0.82	17.54	0.047	- -	-	0.0	0.0	0.7
	-	0.060					
ARM D	11.12	30.71	0.362	- -	-	0.4	0.6	8.3
	-	0.051					

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN))
17.15-17.30							
ARM A	16.30	36.44	0.447	- -	-	0.6	0.8	11.8
	-	0.050					
ARM B	10.24	21.27	0.481	- -	-	0.6	0.9	13.4
	-	0.090					
ARM C	1.01	15.55	0.065	- -	-	0.0	0.1	1.0
	-	0.069					
ARM D	13.62	29.56	0.461	- -	-	0.6	0.8	12.4
	-	0.063					
17.30-17.45							
ARM A	16.30	36.44	0.447	- -	-	0.8	0.8	12.1
	-	0.050					
ARM B	10.24	21.26	0.482	- -	-	0.9	0.9	13.8
	-	0.091					
ARM C	1.01	15.53	0.065	- -	-	0.1	0.1	1.0
	-	0.069					
ARM D	13.62	29.55	0.461	- -	-	0.8	0.9	12.7
	-	0.063					
17.45-18.00							
ARM A	13.30	36.62	0.363	- -	-	0.8	0.6	8.7
	-	0.043					
ARM B	8.36	22.46	0.372	- -	-	0.9	0.6	9.2

```
          -             0.071     I
 I ARM C       0.82     17.51   0.047   - -       -    0.1    0.0        0.8
          -             0.060     I
 I ARM D      11.12     30.70   0.362   - -       -    0.9    0.6        8.7
          -             0.051     I
 I                                I
                                  I
--------------------------------------------------------------------------------
--------------------------------
.-------------------------------------------------------------------------------
--------------------------------
 I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY
 GEOMETRIC DELAY   AVERAGE DELAY I
 I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/
    (VEH.MIN/      PER ARRIVING  I
 I                                (RFC)    (PEDS/MIN) (VEHS) (VEHS)  TIME
SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
 -                                -
 I 18.00-18.15                    I
 I ARM A      11.14     36.75   0.303   - -       -    0.6    0.4        6.6
          -             0.039     I
 I ARM B       7.00     23.33   0.300   - -       -    0.6    0.4        6.6
          -             0.061     I
 I ARM C       0.69     18.97   0.036   - -       -    0.0    0.0        0.6
          -             0.055     I
 I ARM D       9.31     31.54   0.295   - -       -    0.6    0.4        6.4
          -             0.045     I
 I                                I
                                  I
--------------------------------------------------------------------------------
--------------------------------

.QUEUE AT ARM A
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00          0.4
    17.15          0.6  *
    17.30          0.8  *
    17.45          0.8  *
    18.00          0.6  *
    18.15          0.4


.QUEUE AT ARM B
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00          0.4
    17.15          0.6  *
    17.30          0.9  *
    17.45          0.9  *
    18.00          0.6  *
    18.15          0.4


.QUEUE AT ARM C
 --------------
```



```
  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00          0.0
    17.15          0.0
    17.30          0.1
    17.45          0.1
    18.00          0.0
    18.15          0.0


.QUEUE AT ARM D
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00          0.4
    17.15          0.6  *
    17.30          0.8  *
    17.45          0.9  *
    18.00          0.6  *
    18.15          0.4

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
                 ------------------------------------------

 --------------------------------------------------------------------------------
T75
 I  ARM  I   TOTAL DEMAND  I     * QUEUEING *    I  * INCLUSIVE QUEUEING *  I
 I       I                 I      * DELAY *      I         * DELAY *        I
 I       I-------------------------------------------------------------------I
 I       I  (VEH)  (VEH/H) I  (MIN)    (MIN/VEH) I    (MIN)      (MIN/VEH)  I
 --------------------------------------------------------------------------------
 I   A   I 1222.3 I  814.8 I    54.1 I    0.04   I      54.1  I     0.04     I
 I   B   I  768.0 I  512.0 I    57.8 I    0.08   I      57.8  I     0.08     I
 I   C   I   75.7 I   50.5 I     4.7 I    0.06   I       4.7  I     0.06     I
 I   D   I 1021.3 I  680.9 I    54.8 I    0.05   I      54.8  I     0.05     I
 --------------------------------------------------------------------------------
 I  ALL  I 3087.3 I 2058.2 I   171.4 I    0.06   I     171.4  I     0.06     I
 --------------------------------------------------------------------------------
 * 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 JOB
```

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
program advice and maintenance, contact:

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Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J14 A143 jw Access North\
10173a - J14 A143 jw Access North - Rev3 2019+NW1+NE1 AM.vai"
(drive-on-the-left) at 12:35:44 on Wednesday, 8 April 2015

.FILE PROPERTIES

RUN TITLE: J13 A143 jw Access North - Rev3 2019+NW1+NE1 PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA

ARM A - A143 North
ARM B - Access North
ARM C - A143 South

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252
B	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252
C	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown
.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF FLOW STARTS	MINUTES FROM START TO TOP OF PEAK	WHEN FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
	TO RISE	IS REACHED	FALLING			
A	15.00	45.00	75.00	8.46	12.69	8.46
B	15.00	45.00	75.00	1.08	1.61	1.08
C	15.00	45.00	75.00	5.97	8.96	5.97

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
07.45 - 09.15		TURNING PROPORTIONS		
		TURNING COUNTS (PERCENTAGE OF H.V.S)		
	ARM A	0.000	0.016	0.984
		0.0	11.0	666.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.302	0.000	0.698
		26.0	0.0	60.0

		(0.0)	(0.0)	(0.0)
	ARM C	0.948	0.052	0.000
		453.0	25.0	0.0
		(0.0)	(0.0)	(0.0)

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY PER ARRIVING (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME
07.45-08.00								
ARM A	8.49	27.05	0.314	- -	-	0.0	0.5	6.7
	-	0.054						
ARM B	1.08	21.86	0.049	- -	-	0.0	0.1	0.8
	-	0.048						
ARM C	6.00	27.04	0.222	- -	-	0.0	0.3	4.2
	-	0.047						
08.00-08.15								
ARM A	10.14	27.01	0.376	- -	-	0.5	0.6	8.8
	-	0.059						
ARM B	1.29	20.80	0.062	- -	-	0.1	0.1	1.0
	-	0.051						
ARM C	7.16	27.00	0.265	- -	-	0.3	0.4	5.3
	-	0.050						

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY PER ARRIVING (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME
08.15-08.30								
ARM A	12.42	26.96	0.461	- -	-	0.6	0.8	12.4
	-	0.069						
ARM B	1.58	19.35	0.082	- -	-	0.1	0.1	1.3
	-	0.056						
ARM C	8.77	26.94	0.326	- -	-	0.4	0.5	7.1
	-	0.055						
08.30-08.45								
ARM A	12.42	26.96	0.461	- -	-	0.8	0.9	12.7
	-	0.069						
ARM B	1.58	19.34	0.082	- -	-	0.1	0.1	1.3
	-	0.056						
ARM C	8.77	26.94	0.326	- -	-	0.5	0.5	7.2
	-	0.055						
08.45-09.00								
ARM A	10.14	27.01	0.376	- -	-	0.9	0.6	9.3
	-	0.059						
ARM B	1.29	20.78	0.062	- -	-	0.1	0.1	1.0
	-	0.051						
ARM C	7.16	27.00	0.265	- -	-	0.5	0.4	5.5
	-	0.050						

```
 I 09.00-09.15                          -
                                        I
 I ARM A       8.49     27.05   0.314   - -       -    0.6    0.5        7.0
         -              0.054    I
 I ARM B       1.08     21.83   0.049   - -       -    0.1    0.1        0.8
         -              0.048    I
 I ARM C       6.00     27.04   0.222   - -       -    0.4    0.3        4.3
         -              0.048    I
 I
                                        I
```

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	
08.15	0.6	*
08.30	0.8	*
08.45	0.9	*
09.00	0.6	*
09.15	0.5	

.QUEUE AT ARM B

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

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.3
08.15	0.4
08.30	0.5
08.45	0.5
09.00	0.4
09.15	0.3

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

A	931.8	621.2	57.0	0.06	57.0	0.06
B	118.4	78.9	6.2	0.05	6.2	0.05
C	657.9	438.6	33.7	0.05	33.7	0.05
ALL	1708.1	1138.8	96.8	0.06	96.8	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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
program advice and maintenance, contact:

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RG40 3GA,UK

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Fax: +44 (0) 1344 770356
Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J14 A143 jw Access North\
10173a - J14 A143 jw Access North - Rev3 2019+NW1+NE1 PM.vai"
(drive-on-the-left) at 12:35:53 on Wednesday, 8 April 2015

.FILE PROPERTIES

RUN TITLE: J13 A143 jw Access North - Rev3 2019+NW1+NE1 PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA

ARM A - A143 North
ARM B - Access North
ARM C - A143 South

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252
B	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252
C	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
A	15.00	45.00	75.00	6.36	9.54	6.36
B	15.00	45.00	75.00	0.65	0.97	0.65
C	15.00	45.00	75.00	8.16	12.24	8.16

DEMAND SET TITLE: as above

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

T33

TIME	FROM/T	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.049	0.951
		0.0	25.0	484.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.308	0.000	0.692
		16.0	0.0	36.0

		I (0.0)I (0.0)I (0.0)I		
		I I I I		
	ARM C	I 0.911 I 0.089 I 0.000 I		
		I 595.0 I 58.0 I 0.0 I		
		I (0.0)I (0.0)I (0.0)I		
		I I I I		

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY PER ARRIVING (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME
16.45-17.00								
ARM A	6.39	26.78	0.238	- -	-	0.0	0.3	4.6
	-	0.049						
ARM B	0.65	23.33	0.028	- -	-	0.0	0.0	0.4
	-	0.044						
ARM C	8.19	27.12	0.302	- -	-	0.0	0.4	6.3
	-	0.053						
17.00-17.15								
ARM A	7.63	26.69	0.286	- -	-	0.3	0.4	5.9
	-	0.052						
ARM B	0.78	22.56	0.035	- -	-	0.0	0.0	0.5
	-	0.046						
ARM C	9.78	27.10	0.361	- -	-	0.4	0.6	8.3
	-	0.058						

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY PER ARRIVING (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME
17.15-17.30								
ARM A	9.34	26.56	0.352	- -	-	0.4	0.5	7.9
	-	0.058						
ARM B	0.95	21.51	0.044	- -	-	0.0	0.0	0.7
	-	0.049						
ARM C	11.98	27.06	0.443	- -	-	0.6	0.8	11.6
	-	0.066						
17.30-17.45								
ARM A	9.34	26.56	0.352	- -	-	0.5	0.5	8.1
	-	0.058						
ARM B	0.95	21.50	0.044	- -	-	0.0	0.0	0.7
	-	0.049						
ARM C	11.98	27.06	0.443	- -	-	0.8	0.8	11.9
	-	0.066						
17.45-18.00								
ARM A	7.63	26.69	0.286	- -	-	0.5	0.4	6.1
	-	0.053						
ARM B	0.78	22.55	0.035	- -	-	0.0	0.0	0.5
	-	0.046						
ARM C	9.78	27.10	0.361	- -	-	0.8	0.6	8.7
	-	0.058						

```
 I 18.00-18.15                          -
                                        I
 I ARM A       6.39     26.78   0.238   - -       -    0.4    0.3        4.8
         -              0.049    I
 I ARM B       0.65     23.32   0.028   - -       -    0.0    0.0        0.4
         -              0.044    I
 I ARM C       8.19     27.12   0.302   - -       -    0.6    0.4        6.6
         -              0.053    I
 I
                                        I
```

.QUEUE AT ARM A

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

.QUEUE AT ARM 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	

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.4	
17.15	0.6	*
17.30	0.8	*
17.45	0.8	*
18.00	0.6	*
18.15	0.4	

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

A	700.6	467.1	37.4	0.05	37.4	0.05
B	71.6	47.7	3.3	0.05	3.3	0.05
C	898.8	599.2	53.4	0.06	53.4	0.06
ALL	1671.0	1114.0	94.1	0.06	94.1	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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

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Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J14 A143 jw Access North\
10173a - J14 A143 jw Access North - Rev3 2029R+NW2+NE2 AM.vai"
(drive-on-the-left) at 12:36:07 on Wednesday, 8 April 2015

.FILE PROPERTIES

RUN TITLE: J13 A143 jw Access North - Rev3 2029R+NW2+NE2 AM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA

ARM A - A143 North
ARM B - Access North
ARM C - A143 South

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252
B	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252
C	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252

V = approach half-width
E = entry width
L = effective flare length
R = entry radius
D = inscribed circle diameter
PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(07.45)AND ENDS(09.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE TO RISE	AT TOP IS REACHED	AFTER FALLING	PEAK	OF PEAK	PEAK
A	15.00	45.00	75.00	9.69	14.53	9.69			
B	15.00	45.00	75.00	8.25	12.38	8.25			
C	15.00	45.00	75.00	9.16	13.74	9.16			

DEMAND SET TITLE: as above

T33

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

TIME	FROM/T	ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.084	0.916
		0.0	65.0	710.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.202	0.000	0.798
		133.0	0.0	527.0

		I (0.0)I (0.0)I (0.0)I		
	ARM C I	0.660 I	0.340 I	0.000 I
		I 484.0 I	249.0 I	0.0 I
		I (0.0)I (0.0)I (0.0)I		

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME
I 07.45-08.00								
I ARM A	9.72	25.24	0.385	- -	-	0.0	0.6	9.1
-		0.064						
I ARM B	8.28	21.51	0.385	- -	-	0.0	0.6	9.0
-		0.075						
I ARM C	9.20	26.18	0.351	- -	-	0.0	0.5	7.9
-		0.059						
I 08.00-08.15								
I ARM A	11.61	24.84	0.467	- -	-	0.6	0.9	12.7
-		0.075						
I ARM B	9.89	20.37	0.485	- -	-	0.6	0.9	13.6
-		0.095						
I ARM C	10.98	25.96	0.423	- -	-	0.5	0.7	10.7
-		0.067						
I 08.15-08.30								
I ARM A	14.22	24.30	0.585	- -	-	0.9	1.4	20.1
-		0.099						
I ARM B	12.11	18.83	0.643	- -	-	0.9	1.8	24.9
-		0.146						
I ARM C	13.45	25.68	0.524	- -	-	0.7	1.1	15.9
-		0.081						

I TIME SEGMENT)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)	GEOMETRIC DELAY (VEH.MIN/ TIME
I 08.30-08.45								
I ARM A	14.22	24.29	0.585	- -	-	1.4	1.4	20.9
-		0.099						
I ARM B	12.11	18.81	0.644	- -	-	1.8	1.8	26.6
-		0.149						
I ARM C	13.45	25.67	0.524	- -	-	1.1	1.1	16.4
-		0.082						
I 08.45-09.00								
I ARM A	11.61	24.83	0.468	- -	-	1.4	0.9	13.7
-		0.076						
I ARM B	9.89	20.34	0.486	- -	-	1.8	1.0	14.9
-		0.097						
I ARM C	10.98	25.95	0.423	- -	-	1.1	0.7	11.4
-		0.067						

```
                                  -
 I 09.00-09.15                                                                  
                                  I
 I ARM A       9.72     25.23   0.385   - -       -    0.9    0.6        9.7
         -                0.065     I
 I ARM B       8.28     21.47   0.386   - -       -    1.0    0.6        9.7
         -                0.076     I
 I ARM C       9.20     26.17   0.351   - -       -    0.7    0.5        8.3
         -                0.059     I
 I
                                  I
```

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.6	*
08.15	0.9	*
08.30	1.4	*
08.45	1.4	*
09.00	0.9	*
09.15	0.6	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.6	*
08.15	0.9	*
08.30	1.8	**
08.45	1.8	**
09.00	1.0	*
09.15	0.6	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.5	*
08.15	0.7	*
08.30	1.1	*
08.45	1.1	*
09.00	0.7	*
09.15	0.5	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1066.7	711.2	86.2	0.08	86.2	0.08
B	908.4	605.6	98.7	0.11	98.7	0.11
C	1008.9	672.6	70.5	0.07	70.5	0.07
ALL	2984.1	1989.4	255.4	0.09	255.4	0.09

* 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 JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)
Patch 15 Apr 2011

_____

For sales and distribution information,
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Email: software@trl.co.uk
Web: www.trlsoftware.co.uk

Run with file:-
"p:\10173\Traffic\Junctions - Rev3\J14 A143 jw Access North\
10173a - J14 A143 jw Access North - Rev3 2029R+NW2+NE2 PM.vai"
(drive-on-the-left) at 12:36:18 on Wednesday, 8 April 2015

.FILE PROPERTIES

RUN TITLE: J13 A143 jw Access North - Rev3 2029R+NW2+NE2 PM
LOCATION: Haverhill
DATE: 08/04/15
CLIENT: Hallam
ENUMERATOR: sue.tadman [BCL25]
JOB NUMBER: 10173
STATUS: Preliminary
DESCRIPTION:

.INPUT DATA

ARM A - A143 North
ARM B - Access North
ARM C - A143 South

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
A	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252
B	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252
C	3.50	8.00	10.00	25.00	30.00	30.0	0.648	27.252

V = approach half-width L = effective flare length D = inscribed circle diameter
E = entry width R = entry radius PHI = entry angle

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

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

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)
.LENGTH OF TIME PERIOD -(90) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: as above

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK	FLOW STOPS	RATE OF FLOW (VEH/MIN) BEFORE	AT TOP	AFTER
	TO RISE	IS REACHED	FALLING	PEAK	OF PEAK	PEAK
A	15.00	45.00	75.00	8.63	12.94	8.63
B	15.00	45.00	75.00	5.09	7.63	5.09
C	15.00	45.00	75.00	14.73	22.09	14.73

DEMAND SET TITLE: as above

T33

TIME	FROM/T	ARM A	ARM B	ARM C
16.45 - 18.15		TURNING PROPORTIONS		
		TURNING COUNTS		
		(PERCENTAGE OF H.V.S)		
	ARM A	0.000	0.183	0.817
		0.0	126.0	564.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.204	0.000	0.796
		83.0	0.0	324.0

		I (0.0)I (0.0)I (0.0)I	
	ARM C	I 0.576 I 0.424 I 0.000 I	
		I 678.0 I 500.0 I 0.0 I	
		I (0.0)I (0.0)I (0.0)I	

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
16.45-17.00							
ARM A	8.66	23.21	0.373	- -	-	0.0	0.6	8.6
	-	0.068					
ARM B	5.11	22.69	0.225	- -	-	0.0	0.3	4.2
	-	0.057					
ARM C	14.78	26.58	0.556	- -	-	0.0	1.2	17.8
	-	0.084					
17.00-17.15							
ARM A	10.34	22.41	0.461	- -	-	0.6	0.8	12.4
	-	0.083					
ARM B	6.10	21.79	0.280	- -	-	0.3	0.4	5.7
	-	0.064					
ARM C	17.65	26.45	0.667	- -	-	1.2	2.0	28.1
	-	0.112					

TIME SEGMENT	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ VEHICLE (MIN)
17.15-17.30							
ARM A	12.66	21.35	0.593	- -	-	0.8	1.4	20.6
	-	0.114					
ARM B	7.47	20.57	0.363	- -	-	0.4	0.6	8.3
	-	0.076					
ARM C	21.62	26.27	0.823	- -	-	2.0	4.3	58.5
	-	0.202					
17.30-17.45							
ARM A	12.66	21.31	0.594	- -	-	1.4	1.4	21.6
	-	0.115					
ARM B	7.47	20.55	0.363	- -	-	0.6	0.6	8.5
	-	0.076					
ARM C	21.62	26.27	0.823	- -	-	4.3	4.5	66.3
	-	0.213					
17.45-18.00							
ARM A	10.34	22.36	0.462	- -	-	1.4	0.9	13.5
	-	0.084					
ARM B	6.10	21.76	0.280	- -	-	0.6	0.4	6.0
	-	0.064					
ARM C	17.65	26.45	0.667	- -	-	4.5	2.1	32.7
	-	0.118					

```
                                  -
 I 18.00-18.15                                                                  
                                  I
 I ARM A       8.66     23.17   0.374   - -       -    0.9    0.6        9.2
         -              0.069     I
 I ARM B       5.11     22.66   0.225   - -       -    0.4    0.3        4.5
         -              0.057     I
 I ARM C      14.78     26.58   0.556   - -       -    2.1    1.3       19.7
         -              0.086     I
 I                                                                              
                                  I

--------------------------------------------------------------------------------
---------------------------------

.QUEUE AT ARM A
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00           0.6  *
    17.15           0.8  *
    17.30           1.4  *
    17.45           1.4  *
    18.00           0.9  *
    18.15           0.6  *


.QUEUE AT ARM B
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00           0.3
    17.15           0.4
    17.30           0.6  *
    17.45           0.6  *
    18.00           0.4
    18.15           0.3


.QUEUE AT ARM C
 --------------

  TIME SEGMENT NO. OF
   ENDING      VEHICLES
               IN QUEUE

    17.00           1.2  *
    17.15           2.0  **
    17.30           4.3  ****
    17.45           4.5  ****
    18.00           2.1  **
    18.15           1.3  *

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
                 -----------------------------------------

 --------------------------------------------------------------------------------
T75
 I  ARM  I   TOTAL DEMAND  I     * QUEUEING *    I  * INCLUSIVE QUEUEING *  I
 I       I                 I      * DELAY *      I         * DELAY *        I
 I       I-------------------------------------------------------------------I
 I       I  (VEH)  (VEH/H) I  (MIN)    (MIN/VEH) I    (MIN)      (MIN/VEH)  I
```



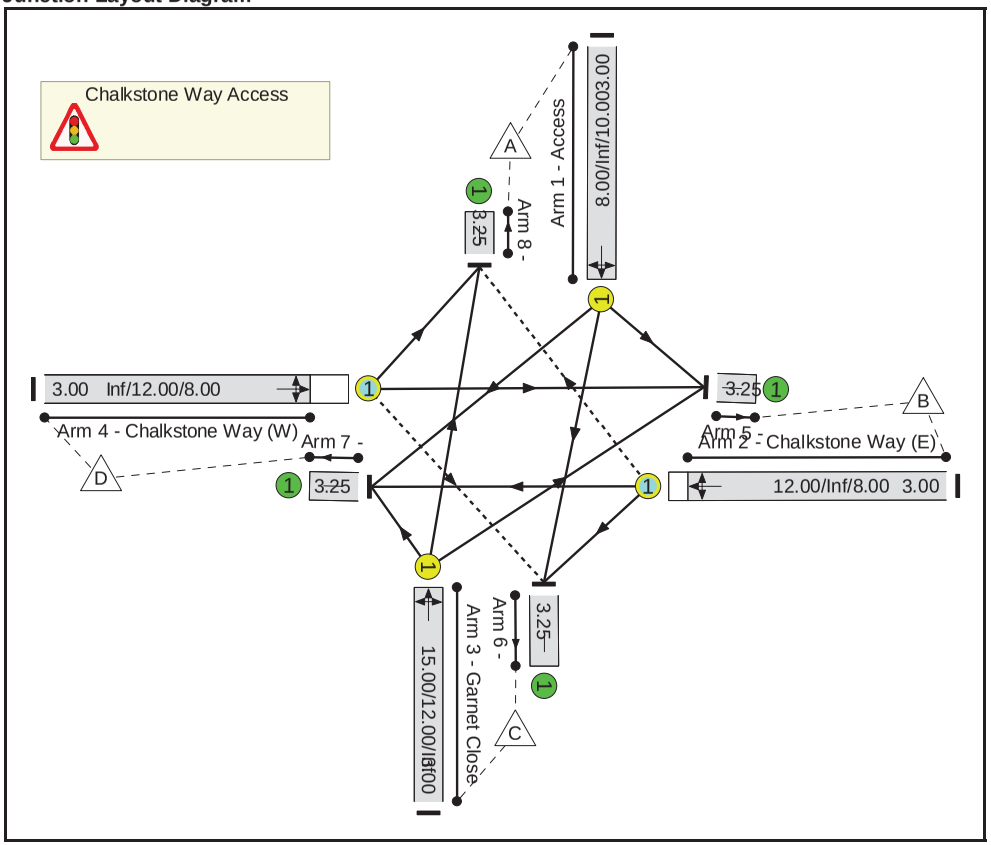
```
 ---------------------------------------------------------------------------
 I   A   I  949.7 I  633.2 I    85.9 I    0.09   I      85.9  I     0.09    I
 I   B   I  560.2 I  373.5 I    37.2 I    0.07   I      37.2  I     0.07    I
 I   C   I 1621.4 I 1081.0 I   223.2 I    0.14   I     223.2  I     0.14    I
 ---------------------------------------------------------------------------
 I  ALL  I 3131.4 I 2087.6 I   346.2 I    0.11   I     346.3  I     0.11    I
 ---------------------------------------------------------------------------
 * 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 JOB
```

Linsig Report

User and Project Details

Project:	**Haverhill**
Title:	**Chalkstone Way Access**
Location:	
File name:	10173 Chalkstone Way Access - Signals HL-02E with Peds.lsg3x
Author:	SMT
Company:	Brookbanks Consulting Ltd

Junction Layout Diagram



Linsig Report
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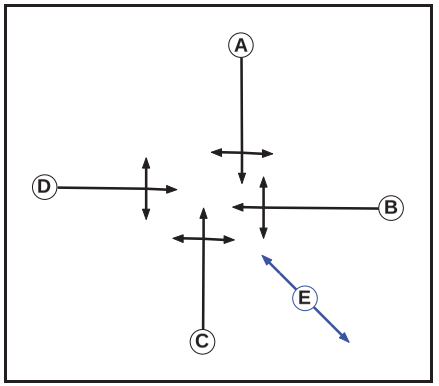
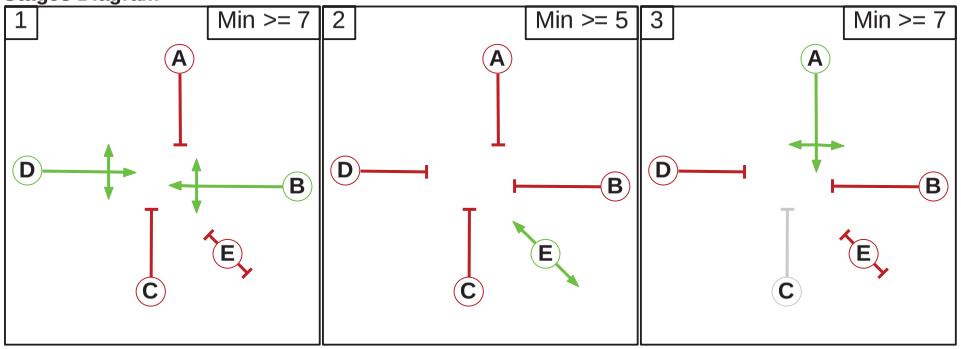
Phase Diagram



Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E
A		5	-	5	6
B	5		5	-	6
C	-	5		5	6
D	5	-	5		6
E	8	8	8	8	

Stages Diagram



Linsig Report
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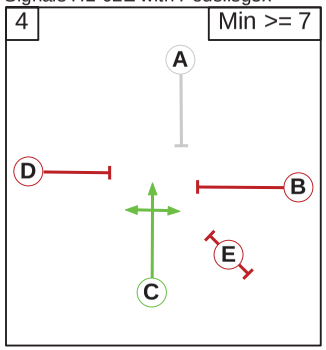

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Lane Input Data

Junction: Chalkstone Way Access

Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (Access)	U	A	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Left	8.00
											Arm 6 Ahead	Inf
											Arm 7 Right	10.00
2/1 (Chalkstone Way (E))	O	B	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 6 Left	12.00
											Arm 7 Ahead	Inf
											Arm 8 Right	8.00
3/1 (Garnet Close)	U	C	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Right	15.00
											Arm 7 Left	12.00
											Arm 8 Ahead	Inf
4/1 (Chalkstone Way (W))	O	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	12.00
											Arm 8 Left	8.00

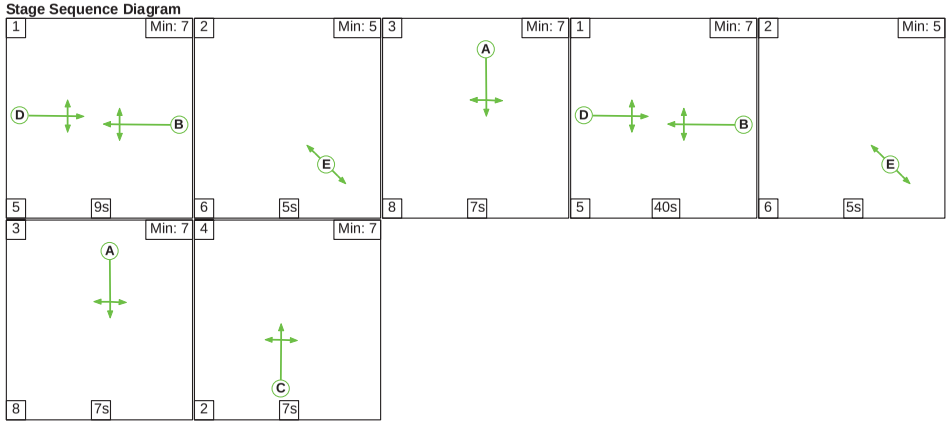
Scenario 1: '2019+Dev Ph1 AM' (FG1: '2019+NW1+NE1 AM', Plan 1: '3-stage')

Traffic Flows, Actual

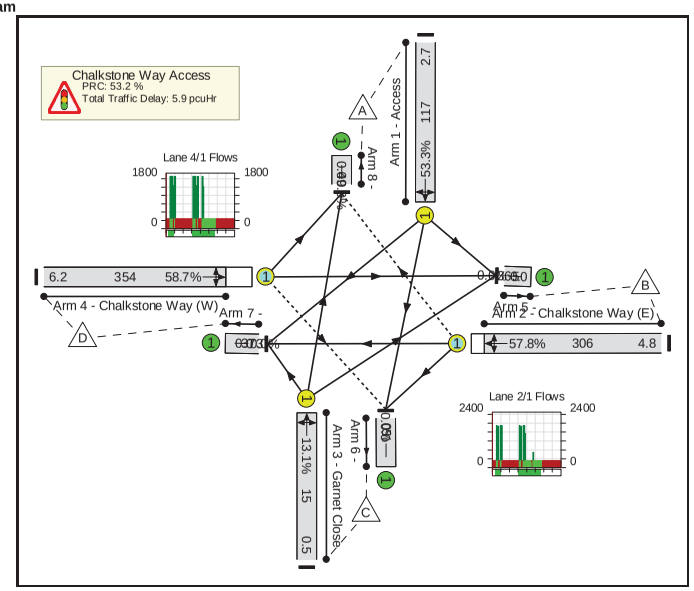
Actual Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	41	0	76	117
	B	17	0	2	287	306
	C	0	5	0	10	15
	D	32	319	3	0	354
	Tot.	49	365	5	373	792

Stage Sequence Diagram



Junction Layout Diagram



Link 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: Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**58.7%**	**18**	**0**	**2**	**5.9**	-	-
Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**58.7%**	**18**	**0**	**2**	**5.9**	-	-
1/1	Access Left Ahead Right	U	A		2	14	-	117	1646	219	53.3%	-	-	-	1.4	42.7	2.7
2/1	Chalkstone Way (E) Left Ahead Right	O	B		2	49	-	306	1894	530	57.8%	16	0	1	2.0	23.3	4.8
3/1	Garnet Close Right Left Ahead	U	C		1	7	-	15	1715	114	13.1%	-	-	-	0.3	70.8	0.5
4/1	Chalkstone Way (W) Ahead Right Left	O	D		2	49	-	354	1881	603	58.7%	2	0	1	2.3	23.1	6.2

C1 PRC for Signalled Lanes (%): 53.2 Total Delay for Signalled Lanes (pcuHr): 5.94 Cycle Time (s): 120
PRC Over All Lanes (%): 53.2 Total Delay Over All Lanes(pcuHr): 5.94

Linsig Report
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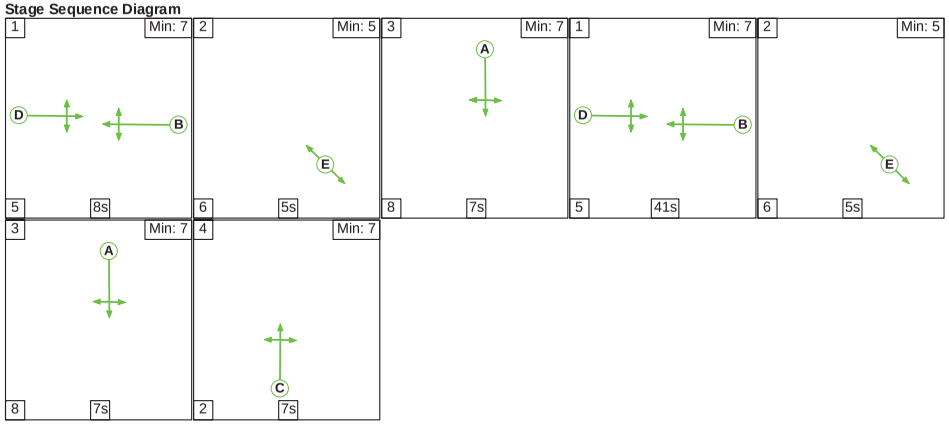
Scenario 2: '2019+Dev Ph1 PM' (FG2: '2019+NW1+NE1 PM', Plan 1: '3-stage')

Traffic Flows, Actual

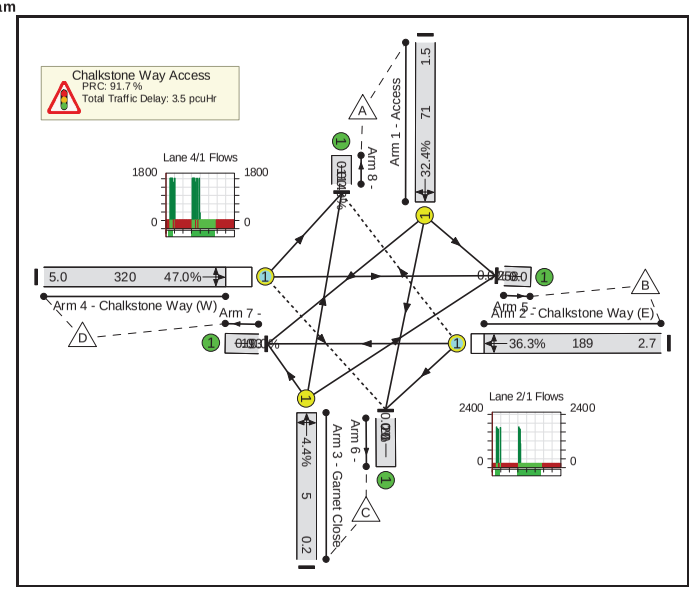
Actual Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	25	0	46	71
	B	40	0	5	144	189
	C	0	2	0	3	5
	D	74	231	15	0	320
	Tot.	114	258	20	193	585

Stage Sequence Diagram



Junction Layout Diagram



Linsig Report
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Link 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: Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**47.0%**	**52**	**0**	**3**	**3.5**	-	-
Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**47.0%**	**52**	**0**	**3**	**3.5**	-	-
1/1	Access Left Ahead Right	U	A		2	14	-	71	1646	219	32.4%	-	-	-	0.7	36.9	1.5
2/1	Chalkstone Way (E) Left Ahead Right	O	B		2	49	-	189	1836	521	36.3%	39	0	1	0.9	17.3	2.7
3/1	Garnet Close Right Left Ahead	U	C		1	7	-	5	1717	114	4.4%	-	-	-	0.1	69.2	0.2
4/1	Chalkstone Way (W) Ahead Right Left	O	D		2	49	-	320	1825	682	47.0%	13	0	2	1.8	20.5	5.0

C1 PRC for Signalled Lanes (%): 91.7 Total Delay for Signalled Lanes (pcuHr): 3.55 Cycle Time (s): 120
PRC Over All Lanes (%): 91.7 Total Delay Over All Lanes(pcuHr): 3.55

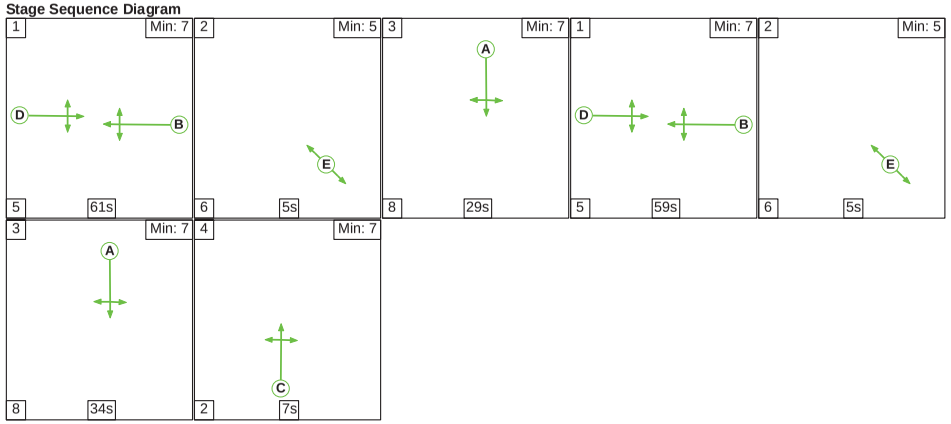
Scenario 3: '2029R+Dev Ph2 AM' (FG3: '2029R+NW2+NE2 AM', Plan 1: '3-stage')

Traffic Flows, Actual

Actual Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	214	0	177	391
	B	109	0	2	314	425
	C	0	5	0	10	15
	D	85	357	3	0	445
	Tot.	194	576	5	501	1276

Stage Sequence Diagram



Linsig Report
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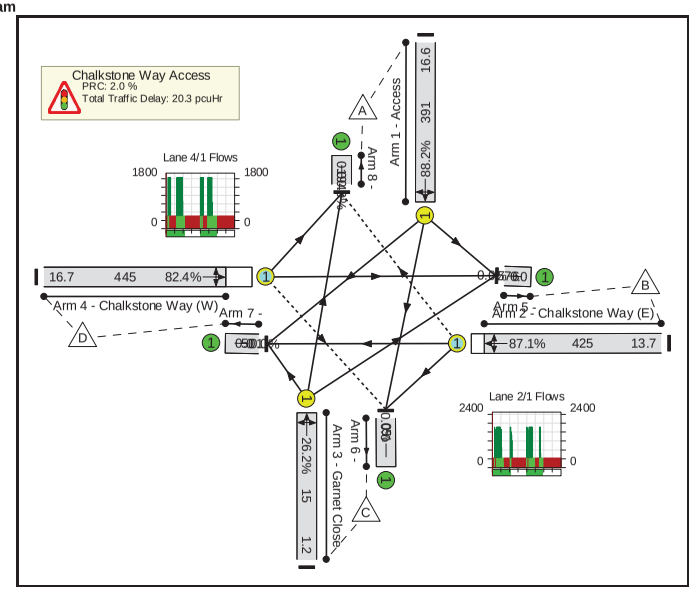
Junction Layout Diagram



Link 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: Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**88.2%**	**108**	**0**	**4**	**20.3**	-	-
Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**88.2%**	**108**	**0**	**4**	**20.3**	-	-
1/1	Access Left Ahead Right	U	A		2	63	-	391	1636	443	88.2%	-	-	-	7.9	72.7	16.6
2/1	Chalkstone Way (E) Left Ahead Right	O	B		2	120	-	425	1826	488	87.1%	105	0	4	5.8	49.0	13.7
3/1	Garnet Close Right Left Ahead	U	C		1	7	-	15	1715	57	26.2%	-	-	-	0.6	155.5	1.2
4/1	Chalkstone Way (W) Ahead Right Left	O	D		2	120	-	445	1847	540	82.4%	3	0	0	5.9	48.0	16.7

C1 PRC for Signalled Lanes (%): 2.0 Total Delay for Signalled Lanes (pcuHr): 20.26 Cycle Time (s): 240
PRC Over All Lanes (%): 2.0 Total Delay Over All Lanes(pcuHr): 20.26

Linsig Report
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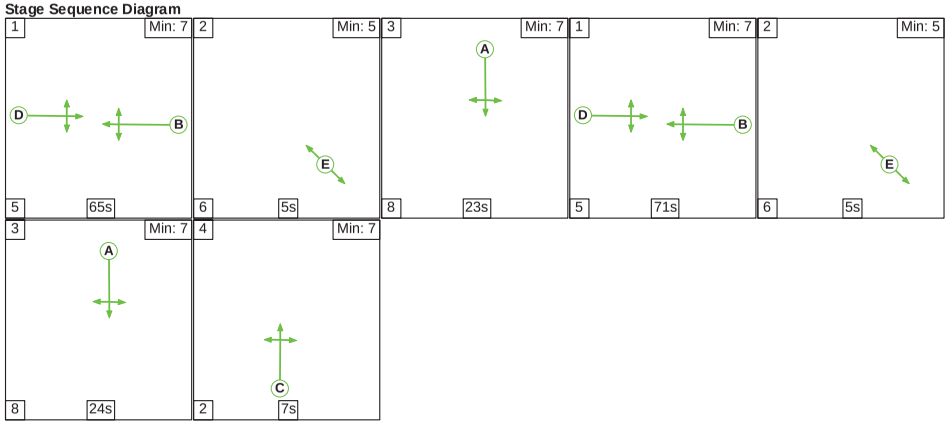
Scenario 4: '2029R+Dev Ph 2 PM' (FG4: '2029R+NW2+NE2 PM', Plan 1: '3-stage')

Traffic Flows, Actual

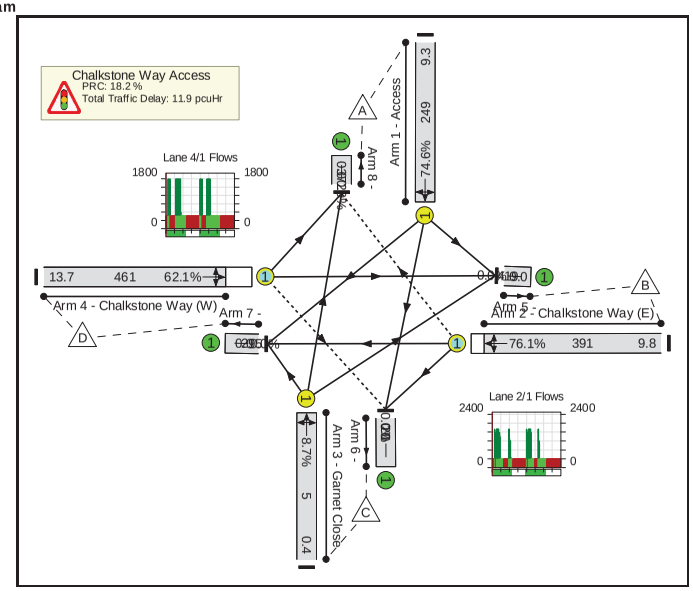
Actual Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	139	0	110	249
	B	204	0	5	182	391
	C	0	2	0	3	5
	D	168	278	15	0	461
	Tot.	372	419	20	295	1106

Stage Sequence Diagram



Junction Layout Diagram



Link 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: Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**76.1%**	**217**	**0**	**2**	**11.9**	-	-
Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**76.1%**	**217**	**0**	**2**	**11.9**	-	-
1/1	Access Left Ahead Right	U	A		2	47	-	249	1635	334	74.6%	-	-	-	4.5	65.4	9.3
2/1	Chalkstone Way (E) Left Ahead Right	O	B		2	136	-	391	1742	513	76.1%	202	0	2	3.5	32.5	9.8
3/1	Garnet Close Right Left Ahead	U	C		1	7	-	5	1717	57	8.7%	-	-	-	0.2	147.0	0.4
4/1	Chalkstone Way (W) Ahead Right Left	O	D		2	136	-	461	1786	742	62.1%	15	0	0	3.7	28.6	13.7

C1 PRC for Signalled Lanes (%): 18.2 Total Delay for Signalled Lanes (pcuHr): 11.92 Cycle Time (s): 240
PRC Over All Lanes (%): 18.2 Total Delay Over All Lanes(pcuHr): 11.92

Appendix H – Road Safety Audit Designer's Responses

Great Wilsey Park, Haverhill

Designers Response to Road Safety Audits for Access Strategy

5th February 2016

1 Introduction

Brookbanks Consulting Limited is appointed by Hallam Land Management and Mrs. Pelly to provide transportation advice for a proposed mixed-use development on land at Great Wilsey Park in Haverhill, Suffolk. This has included the production of a Transport Assessment that has assessed the potential implications. A range of highway interventions has been subsequently identified. Discussions with Suffolk County Council have identified the need to carry out a Stage One Road Safety Audit (RSA) on the off-site junction improvements and the means of access to the development.

As part of the accessibility strategy, junctions are proposed off the A143 Haverhill Road and Chalkstone Way, as shown below in Figure 1a:

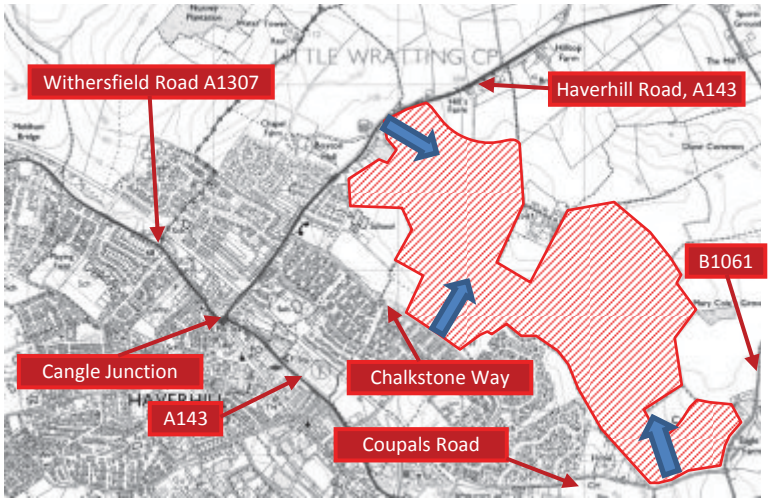


Figure 1a: Proposed Junction Locations

As part of the site accesses, works are proposed at the following locations:

- A143 Haverhill Road – Northern Roundabout Access; and
- Chalkstone Way – Traffic Signals Access.

The proposed interventions suggested within the Transport Assessment produced to support the Planning Application have been subject to a Road Safety Audit dated January 2016 produced by Head Mann Associates. This note represents the Designers Response to the Stage 1 Audit.

2 Designers Response: Chalkstone Way Access

The proposed solution to access the site from the south is a signal-controlled junction consisting of four arms with localised improvements to Chalkstone Way and Gannet Close, as indicated below in Figure 2a:

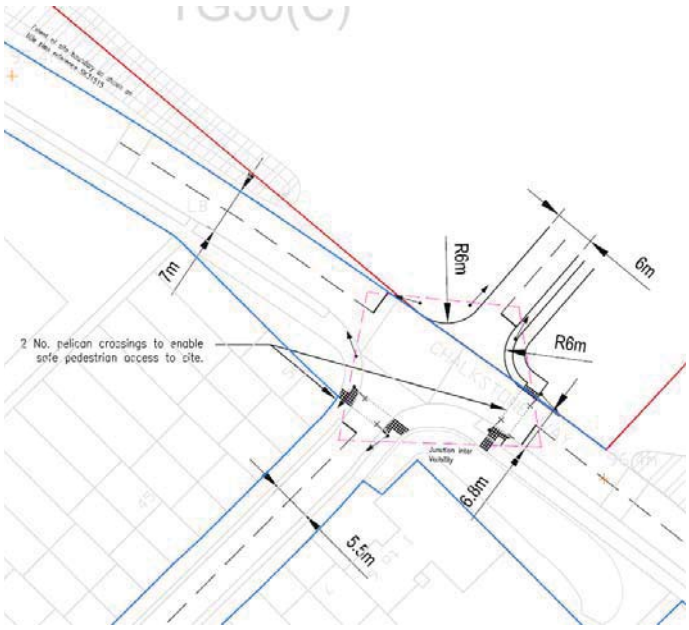


Figure 2a: Chalkstone Way Access

The Designers Response should be read in conjunction with the Road Safety Audit (ref R/462/1).

Problem 1: Corner radius

Location: Northern and eastern junction quadrants.
Summary: The 6m radius kerb might give manoeuvre problems for long vehicles that might consequently strike roadside furniture or other vehicles or pedestrians/cyclists standing at the controlled crossings.

The approx. 6m kerb radii at the Access Road connection with Chalkstone Way would be too tight for longer vehicles (inc. construction vehicles used through the lengthy build period) to negotiate without transgressing the centrelines of the other roads or even colliding with vehicles waiting at the 'Stop' lines of adjacent arms.

The recommendation is that Swept-path analyses should be carried out to determine corner radii and 'Stop' line positioning and design adjustments made as necessary.

Designer's Response: *The main entrance to the site will be via the proposed roundabout to the north east of this junction. It is anticipated that the majority of long vehicles will utilise the roundabout in preference to this junction. Swept path analysis has been carried out and refuse vehicles can negotiate this junction layout without clipping the kerbs.*

Problem 2: Signals layout

Location: The signal-controlled junction and approaches.
Summary: Inadequate design and assessment of NMU activities could lead to queueing driver frustrations with risks of aggressive driver behaviour and potential collisions.

The drawings indicate signal-controlled crossings of the Chalkstone Way (east) and Gannett Close roads. Junction performance assessments as carried out to date suggest typical peak hour queues on both Chalkstone Way arms could be around 12 vehicles long. The project Transport Assessment junction performance assessments omit any use of the NMU facilities (i.e. traffic queues on Chalkstone Way, particularly, could be greater than reported and lead to driver frustrations and inadvisable manoeuvres).

The pedestrian crossing facilities are misdefined as 'Pelican' crossings whereas that crossing type is a 'stand alone' facility so the proposed crossings would actually be just pedestrian call-up facilities within a traffic signal controlled junction.

The primary signal heads adjacent to the pedestrian crossing facilities have been drawn in incorrect locations and the intervisibility zones drawn incorrectly. Secondary signal heads might be better-placed on the opposite sides of the junction. Although the foregoing are, perhaps, more matters of detail that might be expected to be considered at detail design stage the Auditors are concerned that when drawn correctly the intervisibility zones would appear to cross over what might be third-party lands.

The Auditors note that the Gannet Close approach is on a steep uphill gradient – an undesirable feature, though no different than the current situation where vehicles on the minor arm have to make 'hill starts' to enter and pass through the existing priority junction. However, vehicles will be slow moving-off and clearing the junction, perhaps requiring adjustment of signals timings.

The Auditors have concerns that with NMU crossing facilities as at the signalised junction there would be inconsistencies with raised table courtesy/Zebra crossings provisions elsewhere along Chalkstone Way. There would also be risks that pedestrians might cross 'against' vehicular 'green light' movements at times of lower traffic flows. Later 'Comment 4' relates.

The recommendations are that:

- The signals assessments should be re-run to include pedestrian/cyclist call-ups ;
- Interactions of queueing traffic with other traffic should be assessed/re-assessed and addressed as necessary; and
- The Designer should consider junction layout details and verify availability of land and vehicle/vehicle and vehicle/NMU intervisibility zones at the earliest opportunity.

Designer's Response: *The signal assessments have been re-run to incorporate the pedestrian call-ups and demonstrate that motorists will not be subjected to significant delay as a result of the implementation of the traffic signals, these results are attached in the appendices. The drawing has been modified to show the intervisibility zone correctly. Land is fully available for the design in its current layout and there are no design constraints presented by third party land ownership.*

Problem 3: NMUs

Location: NMU paths to/from/at the signal-controlled junction.
Summary: Inadequate assessment and provision of NMU facilities could lead to NMU conflicts and/or NMUs making crossings of roads at inadvisable locations with risks of slips, trips and falls injuries.

The paths leading to/from the junction vary in width but are, typically, no wider than 2m – inadequate for catering for pedestrians and cyclists together.

The Auditors note that the project Transport Assessment is 'strong' on sustainable travel. The Auditors acknowledge that the scheme is at an early stage of preparation but would support the provision of cyclist/cycling facilities within the development and at connections with existing roads and enhanced facilities along existing roads where feasible – such provisions to be 'future-proofed' to accommodate potential enhanced use in years to come.

The recommendation is that the Designer should review NMU, particularly cyclist, facilities/provisions and provide works to encourage sustainable travel.

Designer's Response: *The existing footways which run to the south of Chalkstone Way are 2m which is adequate width for pedestrians, they have been considered and incorporated into the design. All internal NMU routes are incorporated within the parameters plan and road hierarchy, which will be developed in detail as part of the detailed application. The footways shown replicate the existing footway alongside Chalkstone Way. Cycling infrastructure will be developed within the site as part of the detailed design stage. However, cycling facilities cannot be achieved at the junction within the highway boundary. In addition, cycle trips are currently carried out on the carriageway with no specific road safety issues being identified.*

Comment 4: Junction style

Location: The junction, generally.
Summary: Inappropriate/inconsistent route junction styles could lead to vehicle driver and NMU frustrations.

There are no other signal-controlled junctions in the northern part of Haverhill. Chalkstone Way has a particular range of facilities/provisions that encourages an ambience of NMU priorities. The introduction of a signal-controlled junction where vehicles would have a distinct priority and dominance that might encourage higher traffic speeds on the section of road through the junction would be a completely alien feature in the local road network.

Whilst with the adoption of the road safety 'Recommendations' contained in this report the currently proposed junction style shortcomings would be mitigated the Auditors would encourage the Designer to consider the alternative of, say, a 'Compact Roundabout' as being more 'in keeping' with the area. Such a junction could, perhaps, be located more into the development site and give a better Gannet Close entry into what will be quite a busy junction.

Designer's Response: *A number of design options were considered, one of which was a mini roundabout. However, due to design constraints posed by third party land ownership issues and the siting of the mini roundabout to be safe and compliant with the required DMRB standards, this design option was not viable. It was agreed with Suffolk County Council that the most suitable access strategy was via a signalled junction.*

3 Designers Response: A143 Haverhill Road Access

The proposed solution to access the site from the north is a roundabout consisting of three arms with localised improvements to the A143 Haverhill Road as indicated below in Figure 3a:

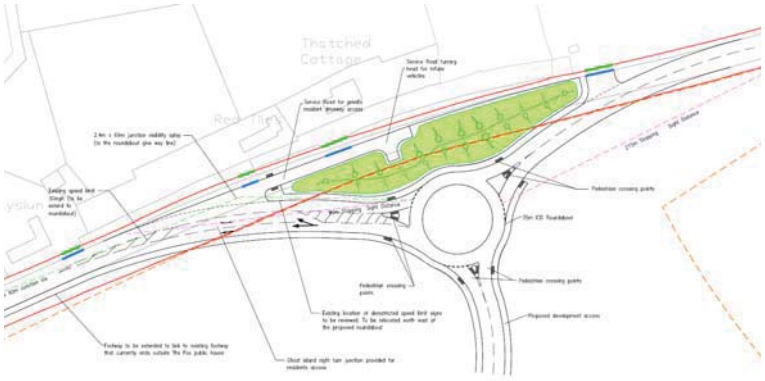


Figure 3a: A143 Haverhill Road Access

The Designers Response should be read in conjunction with the Road Safety Audit (ref R/462/2) and attached drawing 10173-HL-04E.

Problem 1: Roundabout geometry

Location: The roundabout generally.
Summary: HGVs could have difficulties in negotiating the roundabout without overrunning kerblines and damaging traffic signs (the absence of which could pose risks to other users).

There is the prospect of another roundabout (by others) some 300m west of the proposed roundabout junction. From the project Transport Assessment Appendix G the Auditors note that with all area-wide developments completed daily traffic flows on the link between the two roundabouts are forecast to grow to over 25,000 vehicles (two-way flow) by year 2029.

The drawings suggest that the roundabout ICD is to be 35m. However, scaling from the drawing it appears that the roundabout ICD is only some 29m. Further, the circulatory carriageway is no wider than the approx. 3.6m entry widths. The Auditors have concerns over use of the roundabout by long vehicles that might require a wider circulatory carriageway.

The roundabout style, with single lane entries and dimensions as above, would appear to be that of a 'Compact Roundabout'. Notwithstanding the Transport Assessment performance assessments, however, the Auditors would report that in DMRB TD16 'Compact Roundabouts' are not recommended on roads where traffic flows exceed 8,000 AADT (two-way flow), a figure exceeded by even current traffic flows.

The recommendations are that:

- The roundabout dimensions should be verified; and
- The Designer should carry out HGV swept-path assessments on the roundabout and if any alterations are found necessary then the Designer should re-check vehicle entry path deflections for any revised layout – the Auditors would expect a full re-design to a greater ICD to be necessary.

Designer's Response: *The roundabout has been modelled and the level of queuing coupled with ratio of flow to capacity suggests that the roundabout will operate efficiently with the ultimate scenario. However, the comment about the ICD has been noted duly and the roundabout alignment has been repositioned to achieve the correct ICD and the required deflection.*

Problem 2: Roundabout exit forward visibility

Location: Roundabout exit to A143 westbound.
Summary: Risks of inadequate visibility to stationary traffic or obstacles in the road could lead to sudden braking and/or shunt type collisions.

Forward visibility around the inside of the bend could be limited by either site development or trees/landscaping planting to the extent that desirable Stopping Sight Distance related to speed limit or potential traffic speed might not be achieved (potentially exacerbated in the event of verge grass growth that might not be mown/maintained to preferable heights).

The recommendation is that the Designer should verify the appropriate Stopping Sight Distance in relation to speed limit/Design Speed and indicate the same on the drawings to ensure that an appropriate visibility envelope is safeguarded against visibility obstructions.

Designer's Response: *There is sufficient land available to provide the required Stopping Sight Distance on approach to the roundabout and acceptable forward visibility on the A143 exits. This will be shown on the updated plan.*

Problem 3: Roundabout approach forward visibility

Location: Access Road approach to the roundabout.
Summary: Lack of adequate forward visibility could cause surprises for drivers with sudden braking and risks of shunt type collisions.

The drawings do not indicate any forward visibility splay on approach to the roundabout 'Give Way' line. Without such parameters, details of the development works could compromise available forward visibility to, for example, stationary traffic or obstructions on the road surface.

The recommendation is that the Designer should verify the appropriate Stopping Sight Distance to the 'Give Way' line in relation to speed limit/Design Speed and indicate the same on the drawings to ensure that an appropriate visibility envelope is safeguarded against visibility obstructions.

Designer's Response: *There is sufficient land available to provide forward visibility on the A143 approaches. This will be shown on the updated plan.*

Problem 4: Forward visibility at the roundabout

Location: A143 westbound approach and development Access Road approach.
Summary: Lack of adequate forward visibility around the roundabout 'corners' (from an entry approach to the next exit) could obscure views to pedestrians/cyclists at the uncontrolled crossings or to stationary traffic or obstacles in the road and could lead to sudden braking and/or shunt type collisions.

Forward visibilities around roundabout 'corners' are not indicated. Without such parameters, details of access road and development works could compromise available forward visibility to, for example, stationary traffic, obstructions on the road surface or to pedestrians crossing the roundabout arms at the various splitter islands.

The recommendation is that appropriate visibility splays around the junction 'corners' should be shown on the drawings.

Designer's Response: *There is no requirement to provide visibility around the corners of a junction. The provision of too much visibility might encourage greater speeds. Full visibility on the approach and exit of the roundabout will be provided. The verge and footway will provide sufficient visibility around the periphery of the junction.*

Problem 5: 'Service Road' entry and exit manoeuvres

Location: The 'service road' junction.
Summary: Vehicles would have difficulties in manoeuvring into or out of the 'service road' without transgressing lane markings separating opposing traffic flows such that there would be risks of head-on collisions.

Westbound entry to the 'service road' would be from a right-turn centre lane. The turn centreline radius would be a tight 4.5m approx. – vehicles might not make the turn in one movement and have to reverse back into Haverhill Road in the face of oncoming traffic. Eastbound exit from the 'service road' would require vehicles to make a manoeuvre with a turn centreline radius of only 3m approx. if such turning vehicles are not to transgress into opposing traffic lanes/flows. In summary, the junction geometry is too tight.

The recommendation is that the Designer should carry out vehicle swept-path assessments (cars, lights and refuse vehicles as a minimum) for all turns at the 'service road' junction and amend the road/junction layout as necessary.

Designer's Response: *Swept paths have now been produced to demonstrate that a refuse vehicle can pass through the service road without clipping the kerbs.*

Problem 6: 'Service Road' provision/alignment

Location: Eastbound approach to the 'service road'.
Summary: Through-visibility along redundant road could lead to drivers misinterpreting the road layout leading to collisions with roadside furniture.

Whilst an earth bund is proposed in the northern quadrant of the roundabout, continuation of the existing Haverhill Road northern-side footway and re-use of part of the future redundant carriageway would leave a through-view along the line of the stopped-up road.

The recommendation is that the eastbound approach to the 'service road' should be provided with a 'build-out' to form a more 'standard' bell-mouth access and define the through-road channel and bollards placed in the build-out to guide traffic along the correct major road through-path.

Designer's Response: *A build-out has been incorporated into the design which complies with the requirements of Manual for Streets. In addition, swept paths have now been produced to demonstrate that a refuse vehicle can pass through the service road without clipping the kerbs.*

Problem 7: Refuse vehicles turning-head size

Location: The 'service road' cul-de-sac turning-head.
Summary: Refuse vehicles and other large vehicles would have difficulties in negotiating the turning head that might lead to vehicles mounting the footway to the surprise of pedestrians and risks of pedestrian collisions.

The drawings show a turning-head that scales only 8m overall stub-end dimension – insufficient for its indicated function. Use of the approx. 3.5m wide service road would also be compromised by any vehicle parking.

The recommendations are that:

- The turning-head dimensions should be increased; and
- The design should be modified to provide for car parking along the service road.

Designer's Response: *The turning head dimensions have been increased and swept paths have been produced to demonstrate that a refuse vehicle can pass through the service road without clipping the kerbs.*

Problem 8: Uncontrolled crossings

Location: Splitter islands.
Summary: Insufficiently wide splitter island refuge for NMUs could lead to users being struck by passing vehicles.

The drawings show splitter islands of varying sizes, however, the selected/shown routes for crossing movements appear to use locations on the splitter islands where the islands would be insufficiently wide to accommodate NMUs (cyclists or pedestrians with wheelchairs) in safety without risks of being struck by vehicles.

The recommendation is that the crossing points should be made at least 2.1m wide with splitter islands amended to suit.

Designer's Response: *The splitter islands to accommodate the crossing points have all been revised and are now a minimum of 2.1m in width.*

Problem 9: Street lighting

Location: The junction area, generally.
Summary: Absence of lighting increases risk of collisions at junctions, particularly with NMUs.

There are no indications of any street lighting at the roundabout. The Auditors acknowledge that the scheme is at an early stage of preparation but would advise that the existing street lighting should be extended to cover the whole of the new roundabout and its approaches.

The recommendation is that the town's street lighting scheme should be extended to encompass the junction and its approaches.

Designer's Response: *The decision to have lighting along the entire length of the A143 would be a decision for the Highway Authority.*

Comment 10: Provisions for cyclists

Location: The junction area, generally.
Summary: Absence of NMU provisions increases risk of NMU collisions at junctions, particularly.

The Auditors note the absence of any specific provisions for cyclists despite the project Transport Assessment being 'strong' on sustainable travel. The Auditors acknowledge that the scheme is at an early stage of preparation but would advise the provision of cyclist/cycling facilities within the development and at connections with existing roads and along existing roads where feasible – such provisions to be 'future-proofed' to accommodate potential enhanced use in years to come.

Designer's Response: *The possibility of an advisory cycling lane has been noted and can be considered at the detailed design stage.*

Comment 11: Traffic flows

Location: A143 west of the proposed roundabout.
Summary: Accommodation of traffic volumes and turning movements might have consequential effects on the scale of roundabout provision.

There is the prospect of another roundabout (by others) some 300m west of the proposed roundabout junction. From the project Transport Assessment Appendix G the Auditors note that with all area-wide developments completed the daily traffic flows on the link between the two roundabouts are forecast to grow to over 25,000 vehicles (two-way flow) by year 2029. The link layout might require a multi-lane arrangement of some sort to cater for through-traffic volumes and accesses to existing properties along Haverhill Road. Any multi-lane arrangement might have consequential effects on entry/exit layout of the western side of the proposed roundabout. See also earlier 'Problem 1'.

Designer's Response: *The traffic flow modelling considers the ultimate traffic level scenario including the traffic generated by the adjacent Haverhill Northern Relief Road. It demonstrates that the roundabout will operate satisfactorily with the additional traffic generated by both the proposed development and committed flows.*

4 Conclusions and Limitations

The technical note has addressed the Road Safety Audit (Stage 1) from Head Mann Associates concerning the design for the roundabout and signalised junction access proposed on the A143 Haverhill Road and Chalkstone Way respectively, for the development at Great Wilsey Park at Haverhill in Suffolk.

The designer's responses highlighted above are limited to the general availability of background information and the planned usage of the site.

Third party information has been used in the preparation of this report, which Brookbanks Consulting Ltd, by necessity assumes is correct at the time of writing. While all reasonable checks have been made on data sources and the accuracy of data, Brookbanks Consulting Ltd accepts no liability for same.

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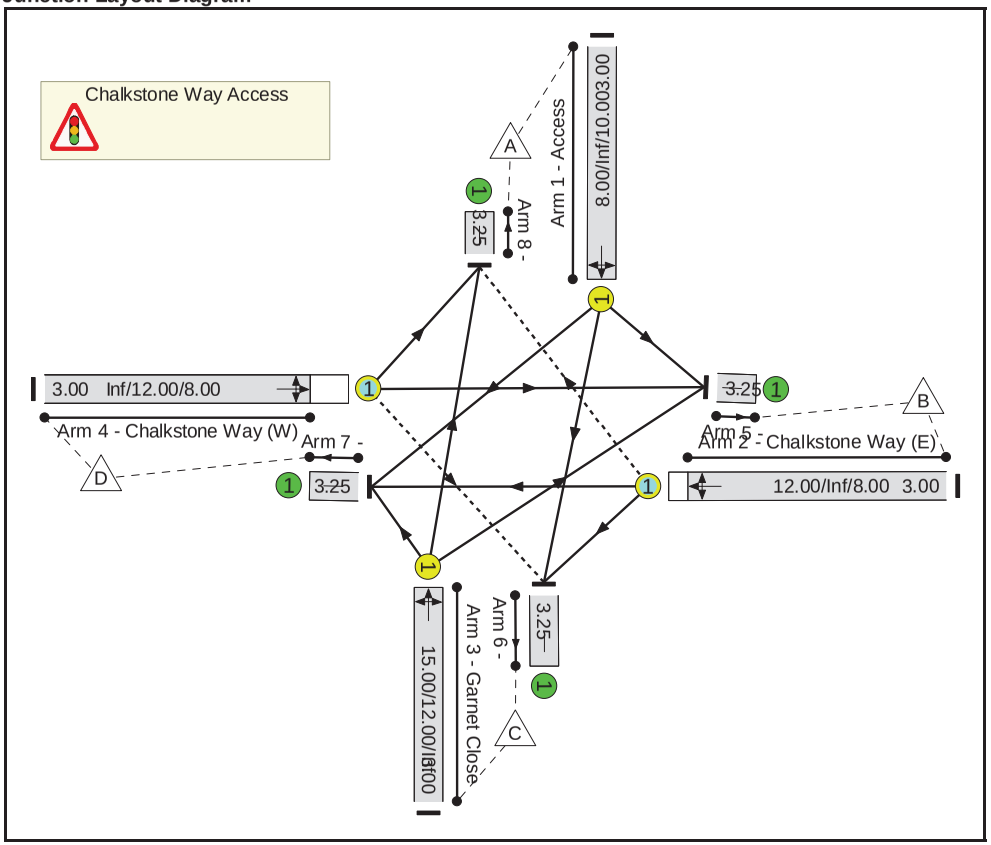
Appendices – Model Results and Amended Design Drawings for Accesses

Linsig Report

User and Project Details

Project:	**Haverhill**
Title:	**Chalkstone Way Access**
Location:	
File name:	10173 Chalkstone Way Access - Signals HL-02E with Peds.lsg3x
Author:	SMT
Company:	Brookbanks Consulting Ltd

Junction Layout Diagram



Linsig Report
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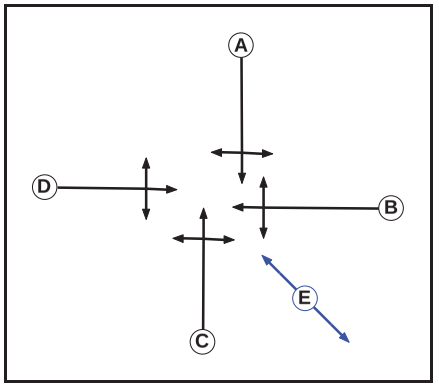
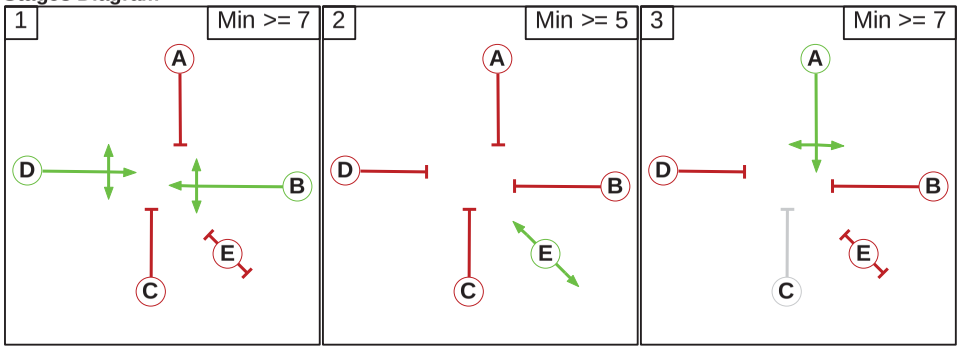
Phase Diagram



Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E
A		5	-	5	6
B	5		5	-	6
C	-	5		5	6
D	5	-	5		6
E	8	8	8	8	

Stages Diagram



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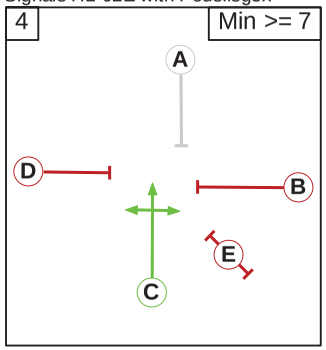

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Lane Input Data

Junction: Chalkstone Way Access

Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (Access)	U	A	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Left	8.00
											Arm 6 Ahead	Inf
											Arm 7 Right	10.00
2/1 (Chalkstone Way (E))	O	B	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 6 Left	12.00
											Arm 7 Ahead	Inf
											Arm 8 Right	8.00
3/1 (Garnet Close)	U	C	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Right	15.00
											Arm 7 Left	12.00
											Arm 8 Ahead	Inf
4/1 (Chalkstone Way (W))	O	D	2	3	60.0	Geom	-	3.00	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	12.00
											Arm 8 Left	8.00

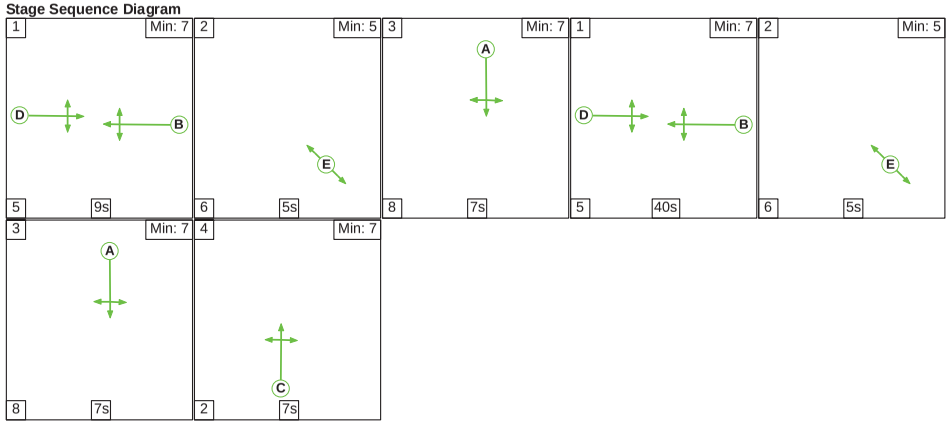
Scenario 1: '2019+Dev Ph1 AM' (FG1: '2019+NW1+NE1 AM', Plan 1: '3-stage')

Traffic Flows, Actual

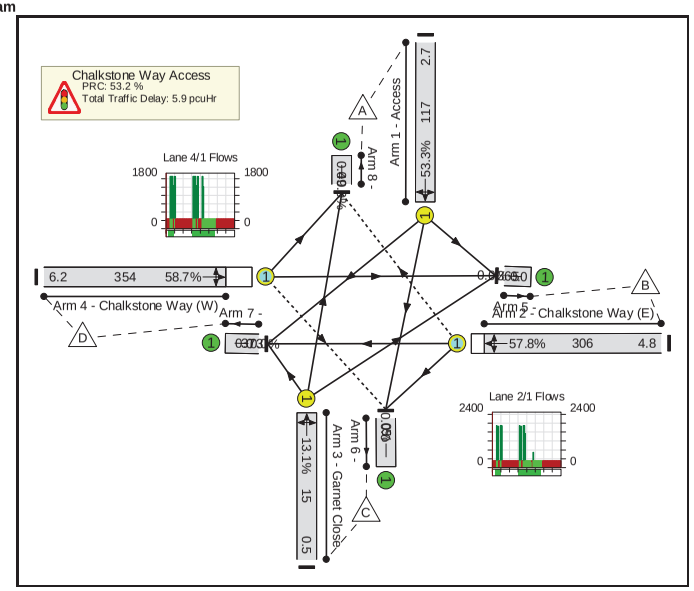
Actual Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	41	0	76	117
	B	17	0	2	287	306
	C	0	5	0	10	15
	D	32	319	3	0	354
	Tot.	49	365	5	373	792

Stage Sequence Diagram



Junction Layout Diagram



Link 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: Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**58.7%**	**18**	**0**	**2**	**5.9**	-	-
Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**58.7%**	**18**	**0**	**2**	**5.9**	-	-
1/1	Access Left Ahead Right	U	A		2	14	-	117	1646	219	53.3%	-	-	-	1.4	42.7	2.7
2/1	Chalkstone Way (E) Left Ahead Right	O	B		2	49	-	306	1894	530	57.8%	16	0	1	2.0	23.3	4.8
3/1	Garnet Close Right Left Ahead	U	C		1	7	-	15	1715	114	13.1%	-	-	-	0.3	70.8	0.5
4/1	Chalkstone Way (W) Ahead Right Left	O	D		2	49	-	354	1881	603	58.7%	2	0	1	2.3	23.1	6.2

C1 PRC for Signalled Lanes (%): 53.2 Total Delay for Signalled Lanes (pcuHr): 5.94 Cycle Time (s): 120
PRC Over All Lanes (%): 53.2 Total Delay Over All Lanes(pcuHr): 5.94

Linsig Report
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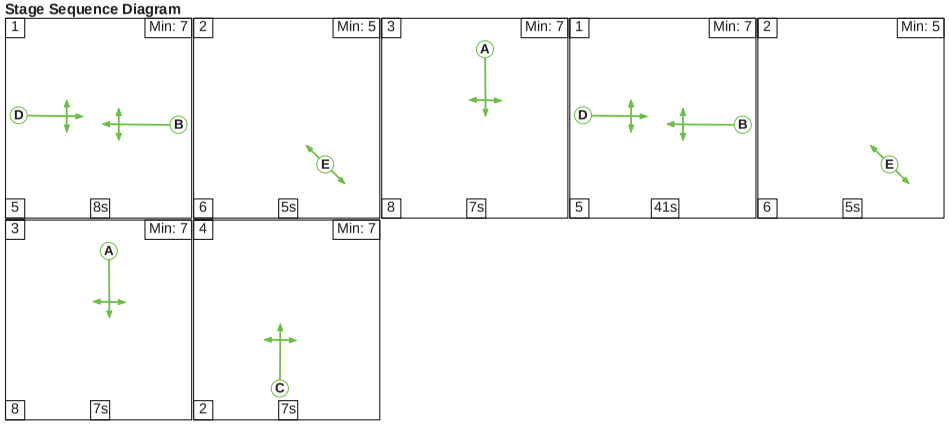
Scenario 2: '2019+Dev Ph1 PM' (FG2: '2019+NW1+NE1 PM', Plan 1: '3-stage')

Traffic Flows, Actual

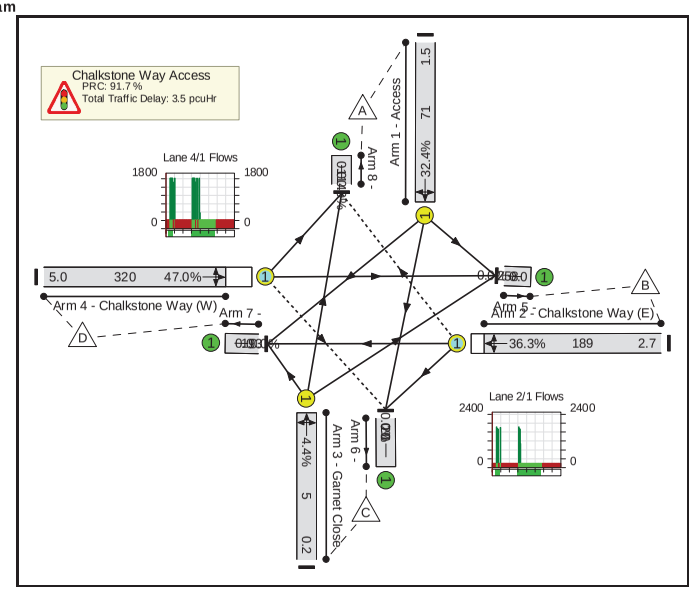
Actual Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	25	0	46	71
	B	40	0	5	144	189
	C	0	2	0	3	5
	D	74	231	15	0	320
	Tot.	114	258	20	193	585

Stage Sequence Diagram



Junction Layout Diagram



Linsig Report
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Link 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: Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**47.0%**	**52**	**0**	**3**	**3.5**	-	-
Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**47.0%**	**52**	**0**	**3**	**3.5**	-	-
1/1	Access Left Ahead Right	U	A		2	14	-	71	1646	219	32.4%	-	-	-	0.7	36.9	1.5
2/1	Chalkstone Way (E) Left Ahead Right	O	B		2	49	-	189	1836	521	36.3%	39	0	1	0.9	17.3	2.7
3/1	Garnet Close Right Left Ahead	U	C		1	7	-	5	1717	114	4.4%	-	-	-	0.1	69.2	0.2
4/1	Chalkstone Way (W) Ahead Right Left	O	D		2	49	-	320	1825	682	47.0%	13	0	2	1.8	20.5	5.0

C1 PRC for Signalled Lanes (%): 91.7 Total Delay for Signalled Lanes (pcuHr): 3.55 Cycle Time (s): 120
PRC Over All Lanes (%): 91.7 Total Delay Over All Lanes(pcuHr): 3.55

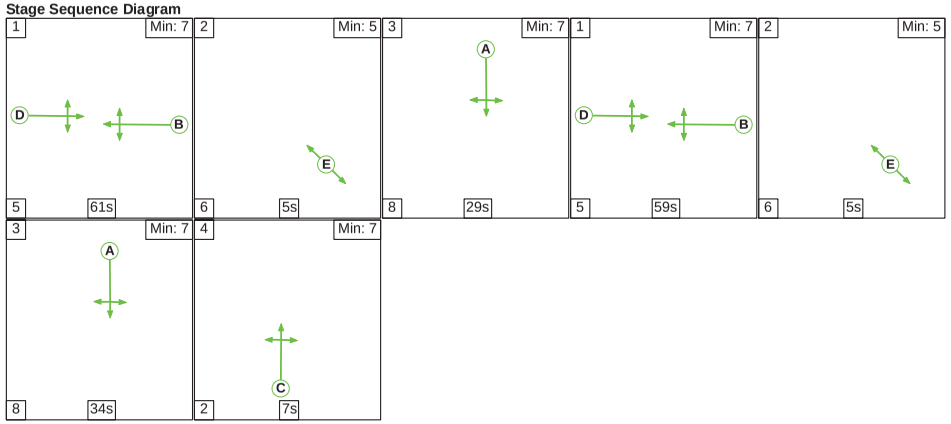
Scenario 3: '2029R+Dev Ph2 AM' (FG3: '2029R+NW2+NE2 AM', Plan 1: '3-stage')

Traffic Flows, Actual

Actual Flow :

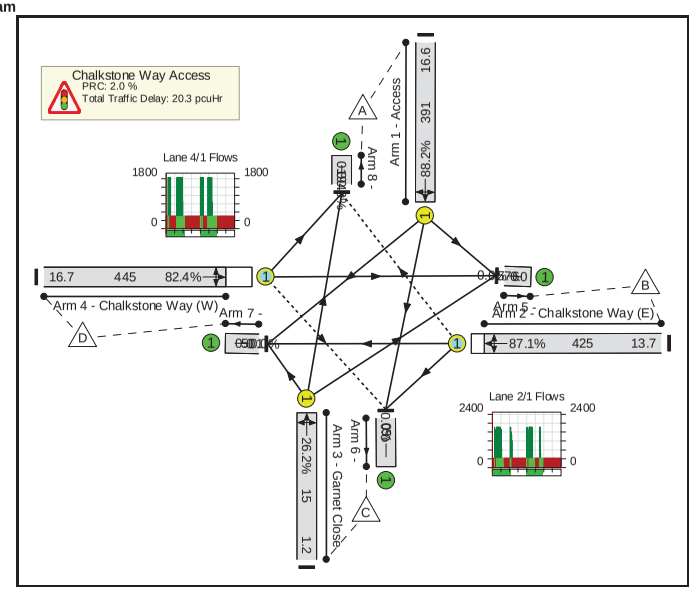
		Destination				
		A	B	C	D	Tot.
Origin	A	0	214	0	177	391
	B	109	0	2	314	425
	C	0	5	0	10	15
	D	85	357	3	0	445
	Tot.	194	576	5	501	1276

Stage Sequence Diagram



Linsig Report
P:\10173\Traffic\Junctions - Rev3\J15 Chalkstone Way jw Access South\Signals\10173 Chalkstone Way Access - Signals HL-02E with Peds.lsg3x

Junction Layout Diagram



Link 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: Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**88.2%**	**108**	**0**	**4**	**20.3**	-	-
Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**88.2%**	**108**	**0**	**4**	**20.3**	-	-
1/1	Access Left Ahead Right	U	A		2	63	-	391	1636	443	88.2%	-	-	-	7.9	72.7	16.6
2/1	Chalkstone Way (E) Left Ahead Right	O	B		2	120	-	425	1826	488	87.1%	105	0	4	5.8	49.0	13.7
3/1	Garnet Close Right Left Ahead	U	C		1	7	-	15	1715	57	26.2%	-	-	-	0.6	155.5	1.2
4/1	Chalkstone Way (W) Ahead Right Left	O	D		2	120	-	445	1847	540	82.4%	3	0	0	5.9	48.0	16.7

C1 PRC for Signalled Lanes (%): 2.0 Total Delay for Signalled Lanes (pcuHr): 20.26 Cycle Time (s): 240
PRC Over All Lanes (%): 2.0 Total Delay Over All Lanes(pcuHr): 20.26

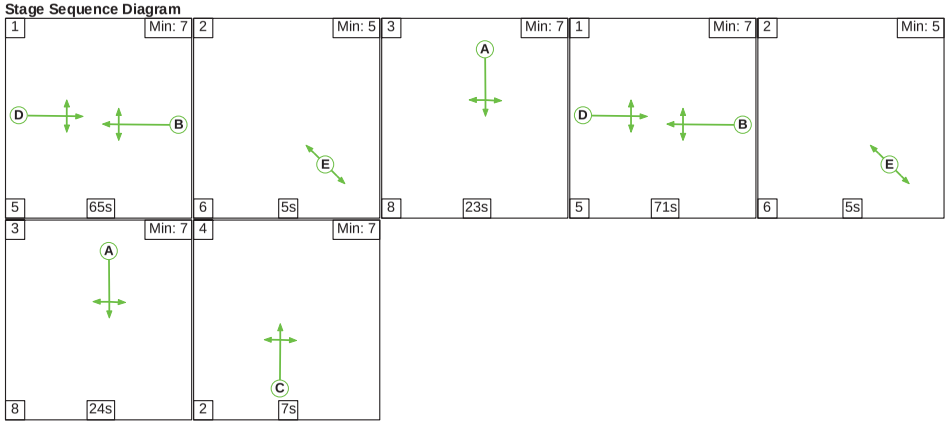
Linsig Report
P:\10173\Traffic\Junctions - Rev3\J15 Chalkstone Way jw Access South\Signals\10173 Chalkstone Way Access - Signals HL-02E with Peds.lsg3x
Scenario 4: '2029R+Dev Ph 2 PM' (FG4: '2029R+NW2+NE2 PM', Plan 1: '3-stage')

Traffic Flows, Actual

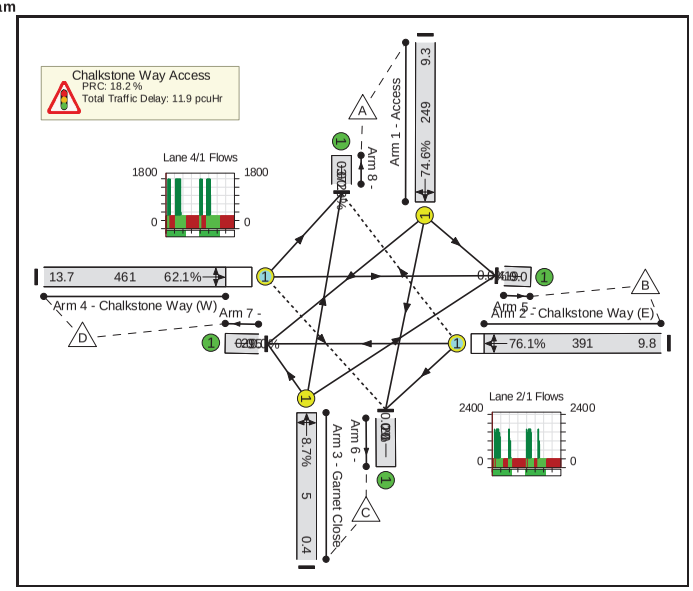
Actual Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	139	0	110	249
	B	204	0	5	182	391
	C	0	2	0	3	5
	D	168	278	15	0	461
	Tot.	372	419	20	295	1106

Stage Sequence Diagram



Junction Layout Diagram

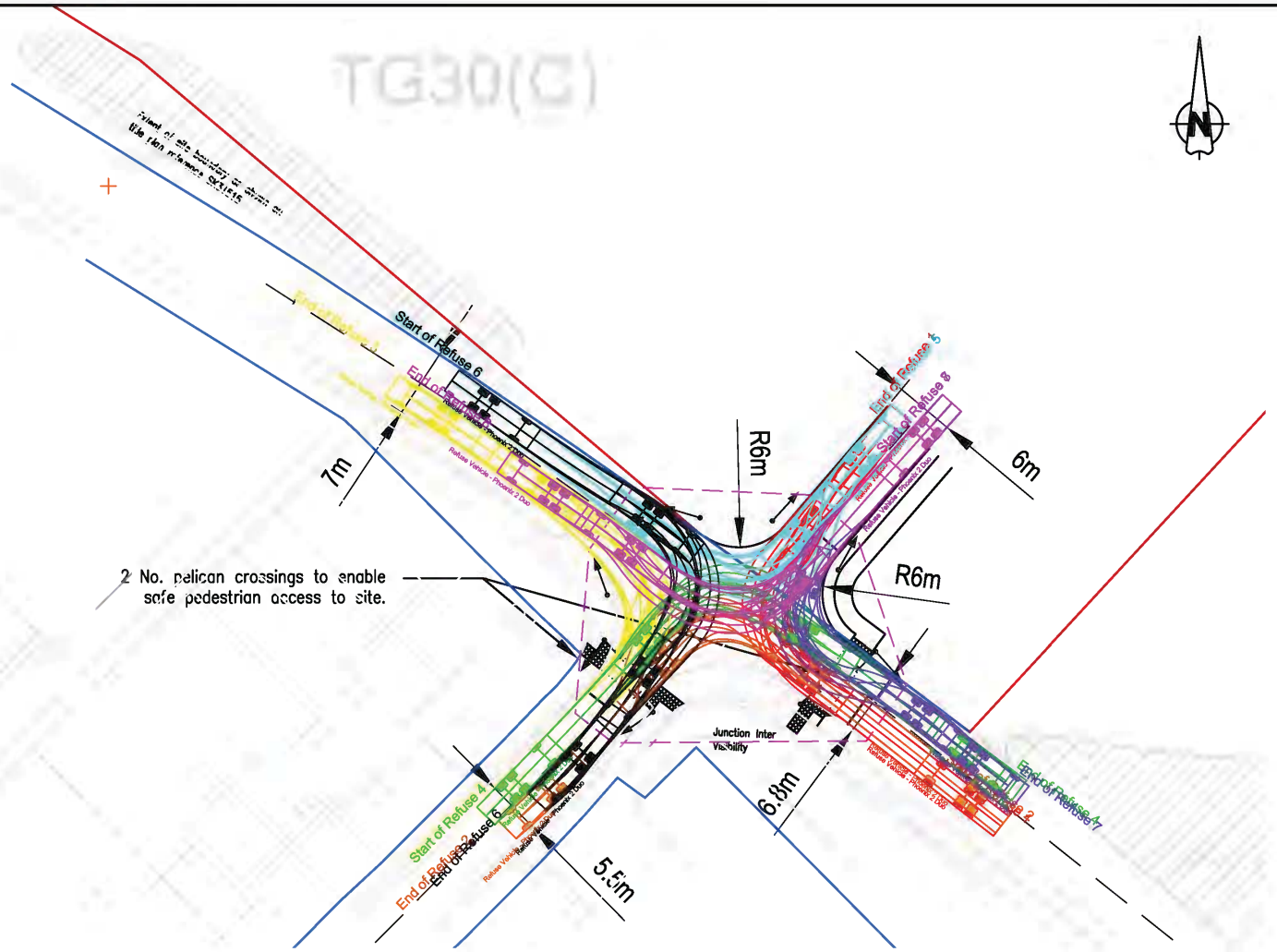


Link Results

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: Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**76.1%**	**217**	**0**	**2**	**11.9**	-	-
Chalkstone Way Access	-	-	-		-	-	-	-	-	-	**76.1%**	**217**	**0**	**2**	**11.9**	-	-
1/1	Access Left Ahead Right	U	A		2	47	-	249	1635	334	74.6%	-	-	-	4.5	65.4	9.3
2/1	Chalkstone Way (E) Left Ahead Right	O	B		2	136	-	391	1742	513	76.1%	202	0	2	3.5	32.5	9.8
3/1	Garnet Close Right Left Ahead	U	C		1	7	-	5	1717	57	8.7%	-	-	-	0.2	147.0	0.4
4/1	Chalkstone Way (W) Ahead Right Left	O	D		2	136	-	461	1786	742	62.1%	15	0	0	3.7	28.6	13.7

C1 PRC for Signalled Lanes (%): 18.2 Total Delay for Signalled Lanes (pcuHr): 11.92 Cycle Time (s): 240
PRC Over All Lanes (%): 18.2 Total Delay Over All Lanes(pcuHr): 11.92

Original Drawing Size A3



Notes:

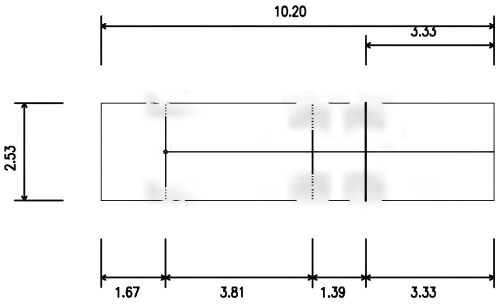
1. Do not scale from this drawing.
2. This drawing has been based on survey date provided by a third party. Brookbanks Consulting Ltd cannot be held responsible for the accuracy of this information.
3. The junction and links have been designed in accordance with the relevant DMRB standards TD 9/93 and TD 42/95.
4. The markings have been designed in accordance with the Traffic Signs Manual Chapter 5.

KEY

Application Boundary

Highway Boundary

REFUSE VEHICLE – PHOENIX 2 DUO – SWEPT PATH AROUND ROUNDABOUT



Vehicle name : Refuse Vehicle – Phoenix 2 Duo
Overall length : 10.20
Overall width : 2.53
Max. track width : 2.50
Kerb to kerb radius :7.80

Rev	Revision Details	Drawn	Checked	Approved	Date
G	Consideration of Road Safety Audit.	MM	LW	PB	13.1.16
F	Highway boundary/signal head modified.	MM	LW	PB	24.9.15
E	Highway boundary/signal head modified.	MM	LW	PB	17.9.15
D	Highway boundary modified	MM	LW	PB	16.9.15
C	Highway boundary added	MM	LW	PB	30.4.15
B	Additional information and requirements.	MM	LW	PB	08.1.15
A	Land boundaries updated. Access design revised.	RM	PB	PB	06.9.12
	PRELIMINARY				28/08/12
	Issue Status			Approved	Date
	Drawn RM	Checked PAB		Date 28/08/12	

Hallam Land Management Ltd
and Mrs Pelly

GREAT WILSEY PARK
HAVERHILL

Development Access
CHALKSTONE WAY

Brookbanks Consulting
6150 Knights Court Solihull Parkway Birmingham B37 7WY
Tel (0121) 329 4330 Fax (0121) 329 4331
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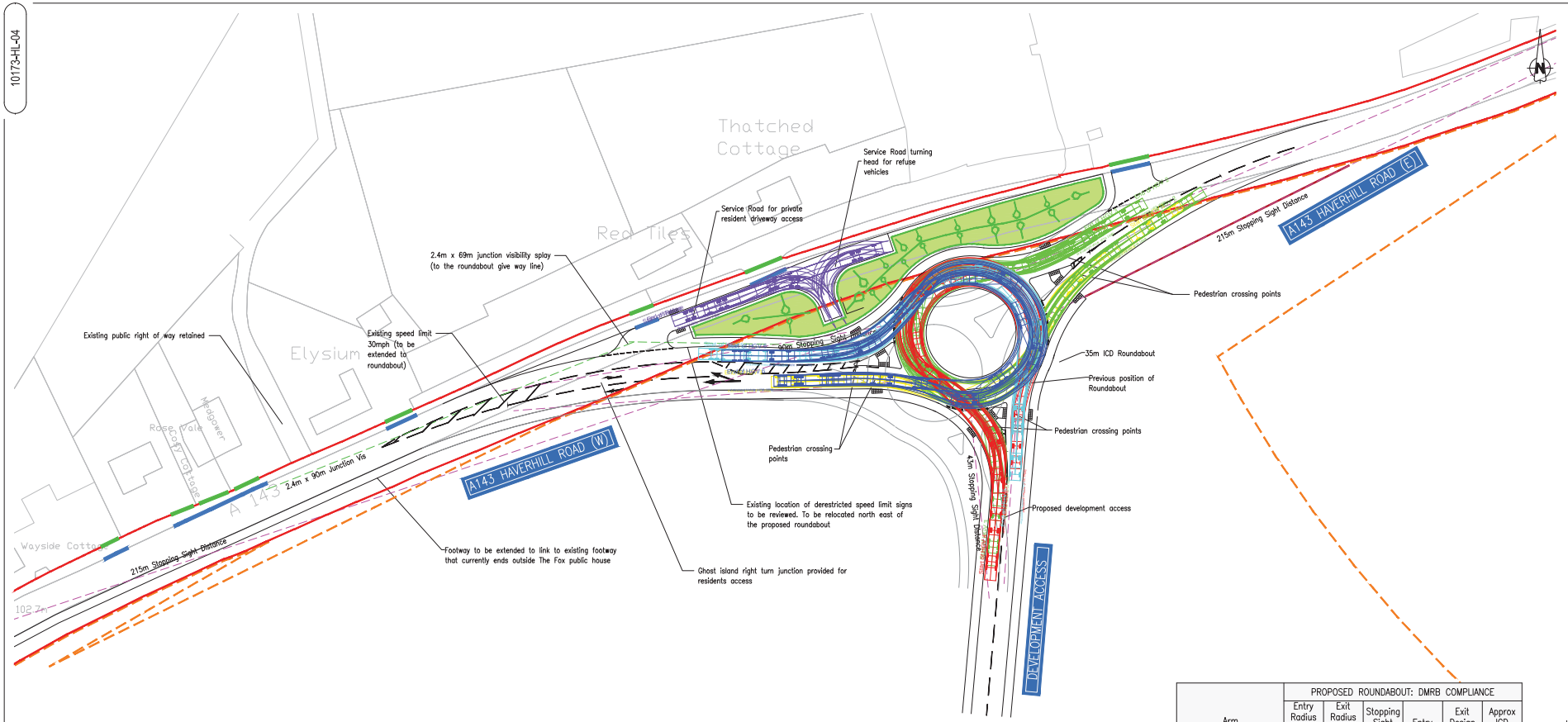
Scale at A3	Drawing No.	Rev.
1:500	10173/HL/02	G

10173-HL-04



Notes:

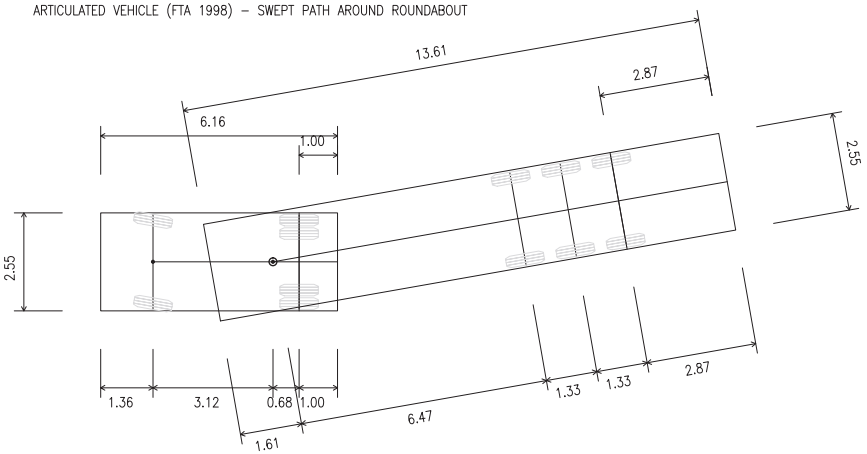
1. This drawing is to be read in conjunction with 10208-HL-01, 02, 03, 04, 05 and 07.
2. Do not scale from this drawing.
3. This drawing has been based on survey data provided by a third party. Brookbanks Consulting Ltd cannot be held responsible for the accuracy of this information.
4. The junctions, roundabouts and links have been designed in accordance with the following DMRB standards:
   - TA 23/81: Junctions and Accesses – Determination of Size of Roundabouts and Major-Minor Junctions
   - TD 9/93: Highway Link Design
   - TD 16/07: Geometric Design of Roundabouts
   - TD 42/95. Geometric Design of Major-Minor Priority Junctions.
5. The markings have been designed in accordance with the Traffic Signs Manual Chapter 5.
6. The road signs have been designed and position in accordance with the Traffic Signs Manual Chapters 3 and 7.

KEY

- Highway Boundary
- Development Boundary
- Forward Visibility Splay
- Junction Visibility Splay
- Existing Private Driveway
- Proposed Dropped Vehicular Crossing
- Area of landscaping bund (to be planted)

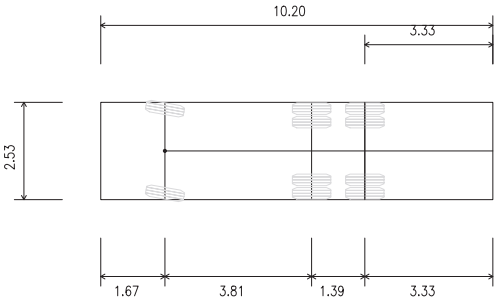
Arm	PROPOSED ROUNDABOUT: DMRB COMPLIANCE					
	Entry Radius Into Rotary (m)	Exit Radius From Rotary (m)	Stopping Sight Distance (m)	Entry Angle (°)	Exit Design Speed (mph)	Approx ICD Across Arm (m)
A143 Haverhill Road (W)	32	40	90	46	30	35
			215		60	
A143 Haverhill Road (E)	35	32	215	49	60	35
Development Access	20	20	43 (MfS)	47	30	35

ARTICULATED VEHICLE (FTA 1998) – SWEPT PATH AROUND ROUNDABOUT



Vehicle name : Articulated Vehicle (FTA 1998)
Overall length : 16.48
Overall width : 2.55
Max. track width : 2.47
Kerb to kerb radius :6.55
Max. articulation : 90.00

REFUSE VEHICLE – PHOENIX 2 DUO – SWEPT PATH AROUND ROUNDABOUT



Vehicle name : Refuse Vehicle – Phoenix 2 Duo
Overall length : 10.20
Overall width : 2.53
Max. track width : 2.50
Kerb to kerb radius :7.80

Rev.	Revision Details	Drawn	Checked	Approved	Date
F	Land ownership issues addressed	MM	LW	PAB	Feb 16
E	RSA comments addressed	MM	LW	PAB	Jan 16
D	Roundabout relocated	MM	LW	PAB	Aug 15
C	Roundabout relocated and drawing frame changed	MM	LW	PAB	Jul 15
	For Application				Jul 2015
	Issue Status			Approved	Date
	Drawn MM	Checked LW		Date	JUL 2015

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Hallam Land Management Ltd and Mrs Pelly

Great Wilsey Park
Haverhill

Development Access
HAVERHILL ROAD

Scale at A1	Drawing No.	Rev.
1:500	10173-HL-04	F

Original Drawing Size A1