Land to the west of Chilgrove Drive, North of Camp Road and adjoining former RAF Upper Heyford, Upper Heyford incorporating former MoD gymnasium: Planning Application reference 14/02025/HYBRID

Supplementary Transport Assessment

EP Barrus

2 June 2015
Final Report Revision A
PB2420

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Date/initials check	02/06/15	JG
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CONTENTS

1 INTRODUCTION

1.1.1 This Supplementary Transport Assessment has been prepared by Royal Haskoning DHV (RHDHV) on behalf of EP Barrus to provide clarification in respect of Highway matters following receipt of comments from Oxfordshire County Council (OCC) to the Transport Assessment which accompanied the submission of Planning Application Reference 14/02025/HYBRID. This document also responds to further questions raised by OCC.

1.1.2 The proposal seeks to provide premises for the relocation of EP Barrus and the buildings provided by the application proposals would allow the firms existing employment operations at Bicester and Upper Heyford to be combined on one site.

1.1.3 This document should be read in conjunction with the Transport Assessment which accompanied the submission of the Planning Application, reference PB2420/R/310026/Egha dated 21 November 2014.

1.1.4 The Planning Application proposed that the First Phase of development would be served via Chilgrove Drive. This would provide B8 storage and distribution facilities. The Second Phase of development would be served via a new junction formed with Camp Road.

1.1.5 Comments to the planning application were received from Oxfordshire County Council (OCC) as Highway Authority by way of their consultation response, dated 20 January 2015. This is provided at Appendix A to this document.

1.1.6 The comments raised by OCC dealt with the following points: -

- Traffic Generation;
- Use of Chilgrove Drive to serve Phase 1 of the development;
- Provision of Roundabout improvement scheme at junction of Camp Road / Chilgrove Drive;
- Provision of financial contribution towards bus infrastructure improvements.

1.1.7 Correspondence dated 17 February 2015 together with supporting enclosures were prepared by RHDHV in response to the comments raised by OCC. These are provided at Appendix B of this document.

1.1.8 In summary, the correspondence dated 17 February 2015 provided the following points of clarification: -

- Calculation of development traffic methodology including a sensitivity test.
- In the event that OCC did not support access to the site via Chilgrove Drive to serve Phase 1, then a new junction to serve the site could be provided with Camp Road to serve both Phase 1 and Phase 2. This would be provided by way of a priority junction. This was shown on drawing PB2420/02 which is also provided at Appendix B.

- It would not be necessary to introduce highway works to the junction of Camp Road / Chilgrove Drive to provide a roundabout configuration in order to make the development proposals acceptable in highway terms.
- Background traffic growth rates adopted for assessment purposes.
- Bus Poles and pedestrian waiting areas could be delivered within the vicinity of the site, adjacent to Camp Road.
- Assumptions made in terms of committed development traffic.
- Sufficient parking could be provided at the development
- The applicant was willing to set aside land in order to allow future connections to be provided for pedestrian routes towards Upper Heyford.

1.1.9 The conclusion of the correspondence was that all transport matters could be satisfactorily resolved.

1.1.10 Further to this submission, OCC provided a further response dated 3 March 2015. This is provided at Appendix C. This clarified that:-

- OCC accepted the sensitivity assessment undertaken in respect of development traffic attraction;
- OCC required further assessment of the level of committed development traffic associated with the Upper Heyford development;
- Sensitivity assessment of growth rates used to uplift background traffic movements was required;
- OCC accepted the principle of the use of single point of access to serve both Phases of the development;
- Additional capacity assessments would be required confirming that the inclusion of the further traffic associated with Upper Heyford would not be to the detriment of the operation of the proposed site access junction or the emerging scheme to convert the junction of Camp Road / Chilgrove Drive to a roundabout;
- Clarification on parking adequacy.

1.1.11 In addition, we understand that the applicant is submitting further plans to the Council which show the proposal to serve both phases of the development.

1.1.12 This document considers these further points.

2 COMMITTED DEVELOPMENT

2.1.1 We have been advised of further details of traffic flows associated with the committed development at Upper Heyford (known as Heyford Park) which should be utilised for assessment purposes. These have been identified from the Arup Transport Assessment dated August 2007 prepared on behalf of North Oxfordshire Consortium for development at Heyford Park. Details of the traffic flows associated with this committed development are provided at Appendix D. The Arup report provides Base traffic flows and Base with Development traffic flows for the morning and evening peak periods. The Base traffic flows have been subtracted from the With Development traffic flows in order to identify the development traffic assignment associated with the Heyford Park scheme. Figure 5A shows the resultant consented traffic flows for the Camp Road / Chilgrove Drive junction within the vicinity of the site. These traffic Figures are also provided at Appendix D and account for a request for an alteration to the level of traffic associated with the Heyford Park scheme. The conclusions of the junction assessments and the relationship with committed developments are considered later within this report.

3 GROWTH RATES

3.1.1 Provided at Appendix E are TEMPRO rates which forecast the following growth traffic rates for roads within the District of Cherwell. Following a request from OCC, it should be noted that the TEMPRO dataset utilised is Data Set 62 which is the most recently available.

Peak Hour	Road Type	Growth Rate – 2013 - 2019
AM Peak Hour	Urban	7.09%
	Rural	7.56%
PM Peak Hour	Urban	7.35%
	Rural	7.82%

Table 1: - TEMPRO Growth Rates

3.1.2 The correspondence dated 17 February clarified that a growth rate of 10.9% had been applied to background traffic flows. Clearly this shows that a robust assessment has been undertaken in comparison to the growth rates presented in Table 1. We understand from OCC that they have identified growth rates of 8.31% and 8.57% for rural roads during the AM and PM peaks respectively, which differ from the figures presented above. However it remains that we have used a robust approach given that a growth rate of 10.9% has been utilised throughout the assessment process.

4 CAPACITY ANALYSIS

4.1.1 Further capacity analysis has been undertaken of the site access junction and the future roundabout junction of Camp Road / Chilgrove Drive in order to establish whether the inclusion of the traffic associated with the scheme can be accommodated, whilst having regard to the further committed development traffic levels.

4.1.2 Provided at Appendix F (shown on Figure 6B) are details of the traffic flows used for analysis. These include the following: -

- Worst case traffic attraction associated with development proposals
- Committed Development associated with Heyford Park.
- Background growth up to 2019.

4.1.3 Consequently, the traffic figures provided at Appendix F are considered robust.

5 SITE ACCESS JUNCTION

5.1.1 Provided at Appendix G is updated PICADY analysis which takes account of the traffic associated with the scheme whilst having regard to the additional traffic associated with the Heyford Park scheme. This analysis shows that the site access would operate within capacity and it would not be necessary to introduce a right turn lane in order to serve the development. Sufficient visibility splays can be provided at the site access in order to provide a safe junction arrangement. Visibility splays of 160 metres can be provided to the west as required due to the speed of traffic using Camp Road. Clear visibility can be provided to the Camp Road / Chilgrove Drive Junction to the east. These visibility splays accord with the requirements of the Design Manual for Roads and Bridges which apply in this case as recorded speeds are beyond 60 kph.

5.1.2 Drawing PB2420/02 shows how the proposed site access junction can provide pedestrian access towards the north as necessary together with providing connections to the future bus waiting areas. Crossing points over Camp Road can be provided by way of dropped kerbs. This can be addressed at the detailed design stage.

5.1.3 Consequently it can be seen that the development as a whole can be served via a single point of access.

6 ROUNDABOUT JUNCTION OF CAMP ROAD / CHILGROVE DRIVE

6.1.1 Provided at Appendix H is ARCADY analysis of the roundabout configuration which will be brought forward as part of the Heyford Park proposals. The ARCADY analysis reflects the traffic flows provided at Appendix F. This analysis shows that this junction would operate within capacity assuming the inclusion of traffic associated with the development proposals and Heyford Park. This analysis shows that the maximum vehicle queue length shown is 6 vehicles on the Camp Road (West) approach. The distance between the roundabout and the proposed access is 60 metres therefore any queuing traffic shown can be accommodated within the section of highway between the two junctions during peak times. Clearly traffic flows would be lower at other times of the day.

6.1.2 It should also be reiterated that there is no requirement for the application proposals to implement the future roundabout junction of Camp Road / Chilgrove Drive.

7 PARKING ADEQUACY

7.1.1 Provided at Appendix I is a parking accumulation exercise which has been undertaken utilising the generic B1/B2/B8 trip rates identified by the TRICS assessment as requested. This shows that the maximum parking demand shown is 108 spaces which

could be accommodated within the 149 spaces proposed by the Phase 2 development plus the further 5 spaces in the service yard.

7.1.2 The above approach had been undertaken as the reasoning behind the application proposal is to provide improved facilities for EP Barrus' operations together with some expansion so the pro rata uplift in traffic based upon floor area alone may not necessarily materialise. However in order to reconcile the trip generation shown with parking demand, we have based an assessment within these parameters. We have had to include trips shown by way of the proposed B8 use identified by the TRICS data within this assessment given the absence of data recorded on site from EP Barrus' existing operations.

7.1.3 Given the above a further parking assessment is provided as a sensitivity test at Appendix I. This shows the anticipated demand shown by way of the pro rata increase in EP Barrus traffic can be accommodated within the main part of the site. However, in terms of the B8 use, there would be a demand for a further 11 spaces. Provided at Appendix J is a layout drawing showing how these 11 spaces could be accommodated within the service yard.

7.1.4 In respect of cycle parking, we understand that the amended plans provide provision for a cycle shed and OCC have previously suggested that this can be secured by condition.

8 FINANCIAL CONTRIBUTION

8.1.1 A request has been made for a financial contribution towards bus improvements within the vicinity of the site. However OCC have not advised of the amount sought at this stage. Whilst the applicant is willing to consider making a financial contribution towards bus improvements, clarification as to the extent of the contribution sought would be required, together with details of the explicit measures that any monies secured would go towards which would be subject to further discussions.

9 OTHER MATTERS

9.1.1 We understand that Cherwell District Council have raised the issue of traffic associated with the development using Middleton Stoney Road. It should be noted that during peak times, the level of traffic heading south from the Camp Road/Chilgrove Drive junction in the general direction of Middleton Stoney Road is shown to amount to a maximum of 39 vehicles per hour. This would occur during the PM peak and would be less at other times of the day. No objection has been received from OCC in respect of the level of traffic which is shown.

9.1.2 In addition, comments have been raised in relation to improvements to Chilgrove Drive given its status as a bridleway and the effect of traffic upon this route. The proposals have been amended such that it is not necessary for traffic to use this route. Consequently, it is not necessary to mitigate any impacts arising from the scheme.

10 SUMMARY AND CONCLUSION

10.1.1 This Supplementary Transport Assessment has demonstrated the following points in relation to the development proposals:-

- The alternative access strategy can be provided in order to serve both phases of development and having regard for further levels of committed development traffic.

- The future roundabout junction of Camp Road / Chilgrove Drive could accommodate the traffic associated with the development proposals together with further committed development traffic.

- Robust growth rates have been applied to background traffic flows for assessment purposes.

- Sufficient parking provision will be made available for the development proposals.

- Pedestrian access provision can be provided.

- S106 obligations can be provided towards Travel Plan monitoring.

- Sufficient provision can be made towards bus infrastructure in order to serve the site, subject to further discussions.

10.1.2 The proposal is considered compliant with National Planning Policy and the Development Plan as it relates to transport matters. In any event the National Planning Policy Framework states at paragraph 32 that "*development should only be prevented or refused on transport grounds where the residual cumulative impact of development are severe*". This document has demonstrated that there will be no severe impacts in transport terms arising from the development proposal.

10.1.3 Consequently, it remains our view that the work undertaken shows that the proposals are acceptable in terms of junction capacity and all other highways and transportation matters.

Appendix A

OXFORDSHIRE COUNTY COUNCIL'S RESPONSE TO CONSULTATION ON THE FOLLOWING DEVELOPMENT PROPOSAL

District: Cherwell
Application no: 14/02025/HYBRID
Proposal: FULL - Phase 1 - 9,844 sq. warehouse; service yard for loading and unloading of HGVs and parking provision for 6 No cars, 4 No HGV lorries, 8 No trailers and a bicycle shelter; new vehicular access at northern end of site off Chilgrove Drive; improved visibility splays onto Camp Road and new landscaping treatment around the boundary of the site; OUTLINE - Phase 2 - 9,137 sq.m. manufacturing and storage facility; 3,000 sq.m. two storey office and training school; new vehicular parking area incorporating car parking, motorcycle spaces and a bicycle shelter and new vehicular access onto Camp Road
Location: OS Parcel 1570 Adjoining And West Of Chilgrove Drive And Adjoining And North Of Camp Road Upper Heyford

This report sets out Oxfordshire County Council's view on the proposal.

Annexes to the report contain officer advice.

The county council is raising objection to this proposal as listed in the sub-section below:

- The submitted Transport Assessment fails to appraise appropriately the traffic impact of the development.

- The pre-application advice offered by the County Council to mitigate the traffic impacts of the development has not been acted on. Details are set out in officer advice.

However, should the District Council minded to approve this application then in addition to mitigate the traffic impacts satisfactorily the development would also require to deliver a number of on-site and off-site infrastructure improvements and provide financial contributions to mitigate the potential impacts from the development.

The detailed requirements for minimum level of infrastructure through S106 contributions that would be expected from the developer to mitigate the impact of this proposal are set out in the Officers response at Annex 1.

Officer's Name: Lisa Michelson
Officer's Title: Locality Manager
Date: 20 January 2015

ANNEX 1

OFFICER ADVICE

RESPONSE TO CONSULTATION ON THE FOLLOWING DEVELOPMENT PROPOSAL

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Transport

Recommendation

Objection

Key issues

- Pre-application advice offered by OCC has not been acted on.
- There is insufficient information and analysis in the Transport Assessment.
- A travel plan will be required.
- The developer will be required to the emerging area transport strategy.
- The developer will be required to provide enhancements to public transport services and infrastructure to meet this development.
- Drainage design is acceptable subject to calculations being submitted.

Legal Agreement required to secure

Section 106 contribution of £2,000 towards the provision of two 'Premium Routes' pole/flag/information case units

Section 106 contribution towards the cost of establishing route 25A as a commercially viable bus service. Discussion is required regarding the specific shift change requirements of this development and the cost of any additional journeys. The developer will need to arrange for bus services at shift change times.

Section 106 contribution of £2,040 to cover the cost of monitoring the Phase 1 Travel Plan, and an additional £1,240 to cover the cost of monitoring the Phase 2 Travel Plan.

Section 278 arrangement to provide two bus stops adjacent to the site on Camp Road. These stops will consist of two hard-standing areas and connecting footway into the site.

Conditions

Should the local planning authority decide to grant planning permission then the following conditions should be applied.

D4 – Access
D5 – Vision splay details
D13 – Turning area details
D19 – Cycle parking provision

Prior to the commencement of the development a Construction Traffic Management Plan prepared in accordance with OCC guidelines must be submitted to and approved in writing by the local planning authority. The construction works must be carried out in accordance with the details approved in the construction traffic management plan.

Prior to the occupation of Phase 1 of the development a Full Travel Plan will need to be developed and implemented. The plan will need to be submitted to the Travel Plan team at Oxfordshire County Council (OCC) for approval.

Prior to the occupation of Phase 2 of the development the Full Travel Plan implemented for Phase 1 will need to be updated and implemented to incorporate Phase 2. The updated plan will need to be submitted to the Travel Plan team at Oxfordshire County Council (OCC) for approval.

Prior to the commencement of the development full drainage calculations should be submitted to and approved by Oxfordshire County Council as the lead flood authority.

Informatives

Prior to commencement of development, separate consent must be obtained from OCC Road Agreements Team for the new highway vehicular accesses and the proposed works on Chilgrove Drive under S278 of the Highway Act. Contact: 01865 815700; RoadAgreements@oxfordshire.gov.uk.

Drainage calculations will need to demonstrate that no flooding occurs for all storm return periods up to and including 1 in 30years plus climate change. 1 in 100 year plus climate change calculations needs to be included with details of how any flooding is being managed should there be any.

Detailed Comments

Transport Assessment

Prior to preparation of the Transport Assessment the developer's transport consultant requested pre-application advice from OCC. This was duly supplied by OCC and has been referred to in the TA and included as an appendix. However, in a number of cases the pre-application advice supplied has not been acted on, and this has rendered the TA inadequate. These instances, together with other short-comings in the TA, are set out below. These are set out in the order in which they appear, or fail to appear, in the TA. OCC pre-application advice is referred to where relevant.

OCC pre-application advice:
Suitable improvements to Chilgrove Drive will need to be made between Camp Road and the access to the Phase 1 Service Yard in order to accommodate the two way passage of goods vehicles. These will need to be demonstrated with vehicle swept path analysis at both access points and on Chilgrove Drive itself.

The TA states that as part of the access arrangements to Phase 1 a carriageway widening would be provided for a distance of 40m. However this is not demonstrated on a plan and proposed distance of 40m is very short and no justification is offered. Similarly visibility at the new phase 2 access is not demonstrated as requested in OCC pre-application advice.

The TA does not state or demonstrate the location or quantity of proposed cycle parking provision.

The car parking proposals are for 147 spaces which is less than half of the maximum permitted under parking standards. This level of provision appears low and will need to be justified as requested in OCC pre-application advice.

OCC pre-application advice:
"Data from the existing premises would be informative, but would need to be compared to suitable data from TRICS with the TRICS data to be used if it implies a higher trip generation. This will ensure a suitable assessment of the generic land use classes being applied for."

Under the heading Traffic Attraction the trip generation has been estimated using known movements at the existing EP Barrus site and has specifically excluded the use of the TRICS trip generation database on the grounds that this is not a speculative development and that the end user is already identified.

However, permission is being sought for B1, B2 and B8 land uses at the site and cannot be attached to an identified user. Therefore, a more robust approach must be taken to assessing the trip generation potential of the site that would take into account the potential for the sale of the site once developed. Such an approach would need to be based on the TRICS database.

It is also felt that using the existing operational EP Barrus sites in a first principles approach to traffic attraction, as is set out in the Transport Assessment is potentially unsafe, as the Launton Road Bicester site could be argued as being more accessible than the Upper Heyford site and could therefore be expected to have a lower traffic generation. In addition, no reference is made to the scale of the existing operational EP Barrus developments and so a comparison cannot be made as to whether a direct replacement is being made or whether there is potential for greater trip generation.

OCC pre-application advice:
"The TA will need to include the traffic flows from the entire committed Heyford Park development in the base traffic case."

In para 5.6.3 the Transport Assessment refers to taking this development into account. However, it is not clear how this has been undertaken since that traffic flow data referred to is 2013 survey data and not Heyford Park committed traffic flows. Cleary some allowance has been made as this is presented in Figure 4 of the TA. However, the source of the traffic flows in Figure 4 is not given and their suitability cannot be reviewed.

In determining future year base traffic cases for assessment the TA applies *"…DfT growth factors…"* but does not state how these were derived and does not present the factors in the report. This information would be required for review.

In the capacity assessment, the junction of Camp Road and Chilgrove drive has been modelled as a priority junction. However, as pointed out in OCC pre-application advice, this will become a roundabout when the Heyford Park development reaches a certain level of occupancy. It should therefore have been modelled as a roundabout in the TA. The

modelled results presented in the TA are only of use for the period before this junction becomes a roundabout.

Transport Strategy

Oxfordshire County Council Transport Strategy team is developing a transport strategy for the area. This includes for the management of traffic movements by deterring traffic travelling south from the Chilgrove Drive/Camp Road junction and encouraging movements east, in order to reduce traffic impact on Middleton Stoney, as a result of the emerging Cherwell Local Plan Modifications. It is expected that development on this site, given its location, will be required to contribute towards this strategy as well as a public transport improvement strategy that is also being developed.

Public Transport

The Council has a policy of encouraging attractive public transport on key routes, such as Upper Heyford to Bicester.

Bus service 25A (Bicester-Upper Heyford-Oxford) operates along Camp Road alongside the site boundary. This service currently operates hourly, but will improve to operate twice per hour as a consequence of a planning agreement with the Dorchester Group at Upper Heyford. However, this arrangement may not be triggered before the development of this site, and it may not provide journeys at times required for shift changes at this site. The developer will be required to provide funding for such journeys, as required.

The 25A bus is an eminently reasonable way of accessing the proposed site, especially for those employees living in the Bicester area. It is therefore disappointing that the developer makes no mention of this bus service in his submission, and the benefits of a proportion of the employees travelling by public transport.

The developer will be expected to provide a pair of bus stops adjacent to the site along Camp Road and to make some financial contribution towards establishing route 25A as a commercially viable bus service.

Rights of Way

Chilgrove Drive is a public road and is a current and potential key access route for walkers, cyclists and equestrians linking to Aves Ditch. The development does not seem to have considered these users' needs in terms of safely accommodating them alongside HGV and other vehicular traffic. Ideally a segregated NMU access route should be created adjacent to Chilgrove Drive by the developer.

This lack of consideration of NMU safety also applies to the junction of Chilgrove Drive with Camp Road – there needs to be a safe crossing facility of that junction to accommodate walkers, cyclists and equestrians until such time as the new roundabout is introduced. At the moment there is no motorised traffic using Chilgrove Drive so any development will significantly impact on NMUs.

A pedestrian access route on the north side of Camp Road is required desired to enable a safe connection between Chilgrove Drive and Upper Heyford. This would benefit users of the development as well as local people. This link formed part of Countryside Access mitigation measures for the wider airfield development and physical provision or at least allocation of a strip of land is something that would be expected.

Officer's Name: Chris Nichols
Officer's Title: Transport Development Control
Date: 14 January 2015

RESPONSE TO CONSULTATION ON THE FOLLOWING DEVELOPMENT PROPOSAL

District: Cherwell
Application no: 14/02025/HYBRID
Proposal: FULL - Phase 1 - 9,844 sq. warehouse; service yard for loading and unloading of HGVs and parking provision for 6 No cars, 4 No HGV lorries, 8 No trailers and a bicycle shelter; new vehicular access at northern end of site off Chilgrove Drive; improved visibility splays onto Camp Road and new landscaping treatment around the boundary of the site; OUTLINE - Phase 2 - 9,137 sq.m. manufacturing and storage facility; 3,000 sq.m. two storey office and training school; new vehicular parking area incorporating car parking, motorcycle spaces and a bicycle shelter and new vehicular access onto Camp Road
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Archaeology

Recommendation:

Select Recommendation

Key issues:

The site is located in an area of archaeological potential adjacent to the prehistoric Aves Ditch and in an area where Anglo Saxon burials and Iron Age settlement has been recorded. The results of an archaeological evaluation will need to be submitted with this application ahead of the determination of any planning permission for the site, as set out in the NPPF para 128, in order that an informed decision can be made regarding the impact of this development on any surviving archaeological features on the site.

Legal Agreement required to secure:

None

Conditions:

Not at this stage.

Informatives:

None

Detailed Comments:

The site is located in an area of archaeological potential adjacent to the line of Aves Ditch, a prehistoric tribal boundary later used as a Roman road. A number of Iron Age banjo enclosures have been recorded along the line of this boundary including one 500m east of this site and another, 300m north of this proposed site, immediately adjacent to Aves Ditch.

Two further banjo enclosures have been recorded to the south of this proposed site. Other Prehistoric features have been identified from aerial photographs in the immediate vicinity.

A Romano-British settlement site has been recorded to the north of this proposal and a series of cropmarks identified as a possible Iron Age or Roman settlement complex have been recorded to the east of the site.

A number of burials have been recorded in the vicinity and a possible Anglo Saxon cemetery has been recorded immediately south of the site. This was recorded in 1865 and the exact location is uncertain but it was either recorded 700m north of the proposed site or 70m to the south. Roman cremations and burials have also been recorded east of the site.

It is therefore possible that significant archaeological deposits could survive on the site and further information in the form of an archaeological evaluation will need to be submitted along with the application in order that the impact of this development on any surviving archaeological deposits can be assessed ahead of the determination of any planning application for the site. This is set out in paragraph 128 of the National Planning Policy Framework (2012).

In accordance with the National Planning Policy Framework (NPPF), we would therefore recommend that, prior to the determination of this application the applicant should therefore be responsible for the implementation of an archaeological field evaluation. This must be carried out by a professionally qualified archaeological organisation and should aim to define the character and extent of the archaeological remains within the application area, and thus indicate the weight which should be attached to their preservation. This information can be used for identifying potential options for minimising or avoiding damage to the archaeology and on this basis, an informed and reasonable decision can be taken.

If the applicant makes contact with us, we shall be pleased to provide information on the procedures involved, draft a brief upon which a costed specification can be based and provide a list of archaeological contracting organisations working in the area.

Officer's Name: Richard Oram
Officer's Title: Planning Archaeologist
Date: 24 December 2014

RESPONSE TO CONSULTATION ON THE FOLLOWING DEVELOPMENT PROPOSAL

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Minerals and Waste

Recommendation:

No objection

Key issues:

The proposed development would affect deposits of limestone but is very unlikely to sterilise a potentially workable mineral resource and therefore would not be contrary to policy on the safeguarding of mineral resources.

Legal Agreement required to secure:

None

Conditions:

None

Informatives:

None

Detailed Comments:

Published BGS mapping shows the application site to be underlain by deposits of limestone, forming part of an extensive outcrop of limestone in the Upper Heyford – Ardley area. The Council is not aware of any detailed geological information on the depth, extent and quality of the limestone deposits within this site, but limestone is currently being worked at Dewars Farm (Ardley) Quarry approximately 2 km to the east.

The proposed development needs to be considered against saved Oxfordshire Minerals and Waste Local Plan policy SD10 on protection of mineral resources. This policy dates from 1996 but it is consistent with the NPPF (paragraph 143, bullet 3). Under policy SD10, development which would sterilise the mineral deposits within this site should not be permitted unless it can be shown that the need for the development outweighs the economic and sustainability considerations relating to the mineral resource.

The application site lies within an area of land between the already developed area at Upper Heyford Airfield (to the north and west) and Chilgrove Drive (to the east) and Camp Road (to the south). The limestone deposits within the application site are therefore isolated from the main area of the limestone outcrop between Upper Heyford and Ardley that lies to the east. It is unlikely that the application site would be of sufficient size or contain sufficient limestone resource for mineral working here to be practicable or viable. Therefore, the proposed development would not be contrary to saved Oxfordshire Minerals and Waste Local Plan policy SD10 on protection of mineral resources and, accordingly no objection should be raised to this planning application on minerals policy grounds.

Officer's Name: Peter Day
Officer's Title: Minerals and Waste Policy Team Leader
Date: 31 December 2014

RESPONSE TO CONSULTATION ON THE FOLLOWING DEVELOPMENT PROPOSAL

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Ecology

Recommendation:

Key issues:

The District Council should be seeking the advice of their in-house ecologist who can advise them on this application, especially because this is an ecologically sensitive site, with potential impacts on a Local Wildlife Site and a large population of Great Crested Newts (a European Protected Species).

In addition, the following guidance document on Biodiversity & Planning in Oxfordshire combines planning policy with information about wildlife sites, habitats and species to help identify where biodiversity should be protected. The guidance also gives advice on opportunities for enhancing biodiversity:
https://www.oxfordshire.gov.uk/cms/content/planning-and-biodiversity

Officer's Name: Tamsin Atley
Officer's Title: Ecologist Planner
Date: 14 January 2015

Appendix B

Royal HaskoningDHV
Enhancing Society Together

HASKONINGDHV UK LIMITED

INFRASTRUCTURE

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Your reference	:	
Our reference	:	PB2420/L01001/310026/Egha
Direct line	:	01784 839110
E-mail	:	ian.fielding@rhdhv.com
Date	:	17 February 2015
Enclosure(s)	:	Yes

Subject : **Land to the west of Chilgrove Drive, North of Camp Road and Adjoining former RAF Upper Heyford incorporating former MoD gymnasium**
Planning Application Reference 14/02025/HYBRID

Dear Mr Nichols

Further to receipt of the consultation response in respect of the above planning application I write to provide further clarification in relation to transport matters. I also refer to our telephone conversations of 2 and 10 February 2015.

We are also aware of the Representations dated 29 January 2015 submitted by Pegasus Group on behalf of The Dorchester Group in respect of this application. The Representations submitted raise a number of issues in respect of Highway matters which we respond to here.

A number of pertinent points have been identified by the consultation response which are used as headings within this correspondence. However, as discussed it would appear that access to the site and traffic attraction matters are the key elements of concern. So you are aware, the applicant is currently considering an alternative access strategy in order to serve the First and ultimately the Second Phase of development and where appropriate, reference is made to this within this correspondence.

Background

To reiterate, the purpose of the planning application is to provide premises for the relocation of EP Barrus, due to current and anticipated expansion of the business, and the resulting pressures on the capacity of the existing Bicester premises. This proposal would also allow the existing operations at Bicester and the rented storage accommodation in Upper Heyford to be combined on one site. I understand that the planning application site would be obtained on a freehold basis as this is one of the applicant's requirements in order to maintain the long term stability of their operations. This has been set out within the Need Assessment for the proposals which accompanies the planning application.

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Further clarification has been sought in respect of the division of floor area that would be introduced by the proposals and this is set out below: -

- B8 Floor space – 9,844 sqm
- B2 Floor space – 9,137 sqm
- B1 (a) Floor space – 1,500 sqm
- Training area – 750 sqm
- Display area / showroom– 750 sqm

The information provided above sets out the division of the 3,000 sqm area which was requested within the Consultation Response. This clearly shows that the key components of the development proposals would be the B2 and B8 elements of the scheme and which collectively amount to some 86% of the floor area proposed.

It is important to recognise that the firms existing premises at Launton Road Bicester do in fact provide elements of B1 office floor space and training facilities within the existing building footprint which we understand to amount to a total floor area of 8,361 sqm. The firm already operates three existing warehouse facilities within Upper Heyford amounting to a total of some 6503 sqm and these are located to the west of the application site.

In respect of the training facilities that are proposed, we understand that typically, the firm will provide training courses on average once per week throughout the year, however, there are some seasonal fluctuations in this regard. Training courses are not operated on a daily basis, and in terms of hours of operation, I have been advised that typically training courses operate between 10am and 4pm in order to allow delegates sufficient time to travel to and from the premises.

In addition, the Launton Road facility also provides an element of floor area set aside as a showroom / display area of the firm's products and this will be considered later within this correspondence.

Traffic Attraction

Within your Consultation response and as confirmed within our telephone conversation, you require the provision of further traffic attraction information in order to test the robustness of the traffic shown by way of the Transport Assessment that accompanied the planning application.

We understand that your concern centres on the possibility that the proposed development could be let to another operator and function as standalone premises. As a sensitivity test, we have considered the possibility of this in order to provide sufficient comfort in this regard and upon your request, we have considered this on the basis of TRICS data.

We have also undertaken a further test which assumes a pro rata uplift in activity on the basis of the existing floor area at EP Barrus' facility at Launton Road in comparison to the future floor areas of the facility. Therefore the following sensitivity tests will be undertaken: -

- **Test 1 – TRICS Analysis**
- **Test 2 – Pro Rata Uplift to existing EP Barrus Activity**

Dealing with each in turn: -

Test 1 – TRICS Traffic Attraction

As discussed above, the existing EP Barrus premises at Launton Road consist of both B2 Industrial floor space and B1 (a) floor space. This is typical of many Industrial operators throughout the UK where B2 land use is the key component of the floor area of a site, but provides supporting office facilities. With this in mind, the TRICS database was interrogated in order to identify details of traffic surveys contained within the "Industrial Unit" sub category that also provide an element of B1 (a) floor space as part of the overall development quantum. Sites located throughout the UK, but excluding Greater London, Ireland and Scotland have been selected and vehicular trip rates per 100 sqm identified. All sites that fall within these assessment parameters have been selected for the trip generation assessment. Details of the TRICS sites selected for this assessment are provided at Annex 1 to this correspondence. A review of these TRICS sites is provided at Annex 1 which also sets out the percentage of B1 (a) floor space relative to the overall floor area of each site identified. This review shows that some Industrial Units contained with within this category of the TRICS database also provide B1 (c) floor space together with elements of B8 floor space. This is typical of how such premises operate and reflects in our judgement a pragmatic approach.

Given the above, it can be seen that in the same way as the development proposals, existing sites provided within the TRICS database by way of the B2 Industrial Category provide elements of supporting B1 Office floor space and which can be used for assessment purposes given that they are comparable with the development proposal.

In relation to B8 floor area, an assessment has been carried out of the Commercial Warehousing category and this has been undertaken on the same assessment parameters as was the case in respect of the B2 Industrial category. However no sites were identified that provided elements of B1 floor space. Trip rates per 100 sqm were also identified, with TRICS output provided at Annex 2.

Provided in Table 1 below are details of the resultant peak hour vehicular trip rates per 100 sqm for B2 and B8 floor space. Also provided are details of the resultant trips arising from the proposed development. In respect of the B2 element of the scheme, this has been calculated on the basis of a floor area of 10,637 sqm (9,137 sqm B2 + 1,500 sqm B1 (a) floor area). The B8 element has been calculated on the basis of the 9,844 sqm quantum proposed.

	B2 & B1		B8		Total	
	In	Out	In	Out	In	Out
AM 0800-0900	49	8	8	5	57	13
PM 1700-1800	5	41	3	9	8	50

On the basis of the traffic attraction assessment undertaken using the TRICS database, the forecast sensitivity test trips would amount to a maximum of 57 arrivals and 13 departures during the AM peak hour.

Given that training events are limited to one a week, but do not commence until 10am and finish at 4pm, there would be no peak hour traffic implications as a consequence of that element of the proposal. The showroom / display area would not be expected to generate peak hour trips as the purpose of this facility is to show case the products of the firm to existing visitors to the premises rather than act in the same way as a car showroom would for example. Therefore it is not necessary to include traffic associated with this element of the development for assessment purposes.

Test 2 – Pro Rata Uplift on Existing EP Barrus Traffic

The final sensitivity test in respect of the development traffic concerns a pro rata uplift in traffic recorded by the 11 September 2014 traffic survey of the Launton Road premises. As specified within the seventh paragraph of this correspondence, the existing EP Barrus facilities provide an element of B1 Office floor space together with training facilities and a showroom/display area with a small element of B8 floor space also present. These elements of the existing facilities are also sought by the development proposals. Leaving aside the B8 element of the proposal, the proposed development would seek floor area of 12,137 sqm. On a pro rata basis, this is a 45% uplift on the existing level of floor area provided at the Launton Road site. Carrying out this assessment incorporates traffic associated with the existing B1 office elements of the EP Barrus premises as well as any activity or traffic associated with training that may have occurred on the day of the survey.

As a worst case, a 45% uplift has been applied to the traffic figures presented at Table 2.2 of the Transport Assessment that accompanied the planning application. These figures are presented in Table 2 below. As the B8 element of the Launton Road facility is limited, the trips previously identified by way of the TRICS assessment have been added to those identified by the pro rata uplift.

	EP Barrus Traffic – Pro Rata Uplift		B8		Total	
	In	Out	In	Out	In	Out
AM 0800-0900	53	6	8	5	61	11
PM 1700-1800	15	77	3	9	18	86

The second sensitivity test shows a higher forecast level of trips than was shown by the TRICS analysis and therefore will be used for further junction capacity assessments which are discussed later within this correspondence.

The Dorchester Group representations also raise the matter of traffic generation and the Sensitivity Tests presented above would also provide clarification on this matter.

However, it needs to be considered that this assessment is very much a worst case assessment as the purpose of the proposal is to provide a better working environment for EP Barrus and to allow them to improve the facilities available to them rather than provide a wholesale expansion.

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Upper Heyford Development Traffic

Provided at Annex 3 to this correspondence are details of the source of the traffic associated with the Upper Heyford development which has been used as part of the cumulative assessment requirements. The trips shown were applied to the highway network on the basis of the agreed 2007 TA distribution. This also clarifies the position as to the levels of traffic assessed as requested by way of the Representations submitted on behalf of The Dorchester Group.

DfT Growth Factor

The DfT growth uplift rate was identified as being 10.9% for the period between 2015 and 2019. This was based upon the results of the National Travel Model and was identified for England as a whole. This growth uplift equates to a per annum increase of 2.18% which is considered robust.

Access

You have advised that should access to the first phase continue to be provided via Chilgrove Drive then the view of the Highway Authority is that this application should deliver the implementation of the emerging roundabout junction of Camp Road and Chilgrove Drive together with further improvements to accommodate pedestrians in order to maintain the existing right of way that exists.

At this stage the applicant is considering their options in this regard, however we have been instructed to consider an alternative access strategy which provides sole access to the development in respect of both phases via a new priority junction with Camp Road. As discussed, we wish to explore this option in conjunction with the Highway Authority and this is now considered further.

A PICADY model had been prepared of the proposed site access junction and accompanied the Transport Assessment that accompanied the planning application. This has been updated in order to reflect higher traffic values arising from the pro rata uplift and the inclusion of traffic associated with the Upper Heyford development. The Traffic flows utilised for this assessment are provided at Annex 4, with a copy of the PICADY model provided at Annex 5. The assessments provided at Annex 5 show that the site access junction would operate satisfactorily during both peak hours with no queues or delays shown to occur. There would be no requirement for a right turn lane in order to serve the site.

Consequently, it can be seen that the proposed site access priority junction with Camp Road could serve both Phases of development as a single point of access if required by the Highway Authority.

Future Roundabout Junction – Camp Road / Chilgrove Drive

A request has also been made that an assessment be undertaken in order to account for the emerging roundabout arrangement that will be introduced at the Camp Road / Chilgrove Drive junction. This point had also been raise by way of The Dorchester Group Representations.

We understand that this junction will be delivered by the Upper Heyford development however we are not aware as to the trigger point of development at the site which would necessitate its implementation. You have supplied a copy of the junction configuration that will be implemented as shown on Woods Hardwick drawing HEYF/5/580 A.

Notwithstanding the above, an assessment has been carried out allowing for both the traffic associated with this application plus the traffic associated with Upper Heyford and an ARCADY model has been prepared on the basis of the supplied drawing.

The assessment has been undertaken, as a sensitivity test, on the basis of the higher traffic flows shown by the pro rata uplift in EP Barrus development traffic and the TRICS B8 traffic. Details of the traffic flows used for this assessment have been provided at Annex 4 of this correspondence. Copies of the ARCADY analysis are provided at Annex 6 to these correspondences which show that the operation of the future roundabout junction would not be compromised by the worst case traffic associated with the planning application proposal.

Finally, an assessment has been undertaken of the existing Camp Road junction configuration to qualify that it is not necessary to implement the roundabout junction in order to mitigate the impact of the development proposal. This assumes

A PICADY model of the Camp Road junction had been provided within the Transport Assessment that accompanied the planning application proposal. This has been updated to reflect the following position:-

- Allowance for worst case Barrus Traffic
- Removal of Upper Heyford Development traffic

Details of the traffic flows utilised for this assessment are provided at Annex 7 and details of the PICADY output are provided at Annex 8.

The results of this assessment show that the existing configuration of the Camp Road junction would operate satisfactorily with the inclusion of the higher level of EP Barrus traffic. Consequently, it would not fall to this planning application to deliver the roundabout improvement works to the Camp Road / Chilgrove Drive junction.

Parking

In respect of parking provision, it remains the view of the applicant that the provision provided is within the maximum standards of the adopted Development Plan. The parking accumulation exercise shown within the application Transport Assessment shows that sufficient provision is available.

Public Transport / Accessibility

In respect of public transport, the TA does make reference to the availability of the 25 Bus Service which can be used by future employees of the development should they require. In terms of providing of funds in order to enhance the viability of the service, it is our view that the demand associated with travel by this mode is likely to be limited to journeys either to or from

work and therefore a better use of funds would be for the applicant to introduce a shuttle bus service to and from Bicester. This can be secured by an appropriate obligation if required.

I note the requirement for a Travel Plan and that this can be secured by a condition with full details to be provided prior to occupation.

In terms of wider contributions sought towards the Transport Strategy for this area, it is difficult to comment on this request without seeing details of any specific scheme or the level of funding sought.

In terms of the provision of footways along the site frontage, a protected strip could be provided and funds set aside either by way of a Section 106 Contribution or delivered by way of Section 278 Works. This would provide a wider benefit towards the right of way along Chilgrove Drive.

In addition, the applicant also accepts the provision of two hard standing areas adjacent to Camp Road to accommodate bus stops including the provision of "Premium Route" poles/flag/information case units.

In terms of improvements to the right of way along Chilgrove Drive, we would reserve the right to discuss these further once the matter of the alternative access has been fully considered.

Summary

It is our view that the further work undertaken shows that the submitted proposals are acceptable in terms of junction capacity; specifically there is no requirement for the application to implement the planned roundabout junction of Camp Road / Chilgrove Drive as a consequence of the additional development traffic shown by the development proposals.

In addition, an alternative access strategy could be provided which provides a sole point of access from Camp Road in order to serve both development phases and would also negate the need for the applicant to deliver the roundabout junction at Camp Road / Chilgrove Drive, if required by the Highway Authority.

Given the above, clarification is requested that the additional information submitted is sufficient to address the concerns that you have raised and the alternative access arrangements would be acceptable to the Highway Authority if deemed necessary.

Finally, the Representations submitted on behalf of The Dorchester Group raise Transport matters, all of which have been addressed by way of this correspondence. Therefore the Representations submitted do not raise any valid points of objection as they relate to Transport matters.

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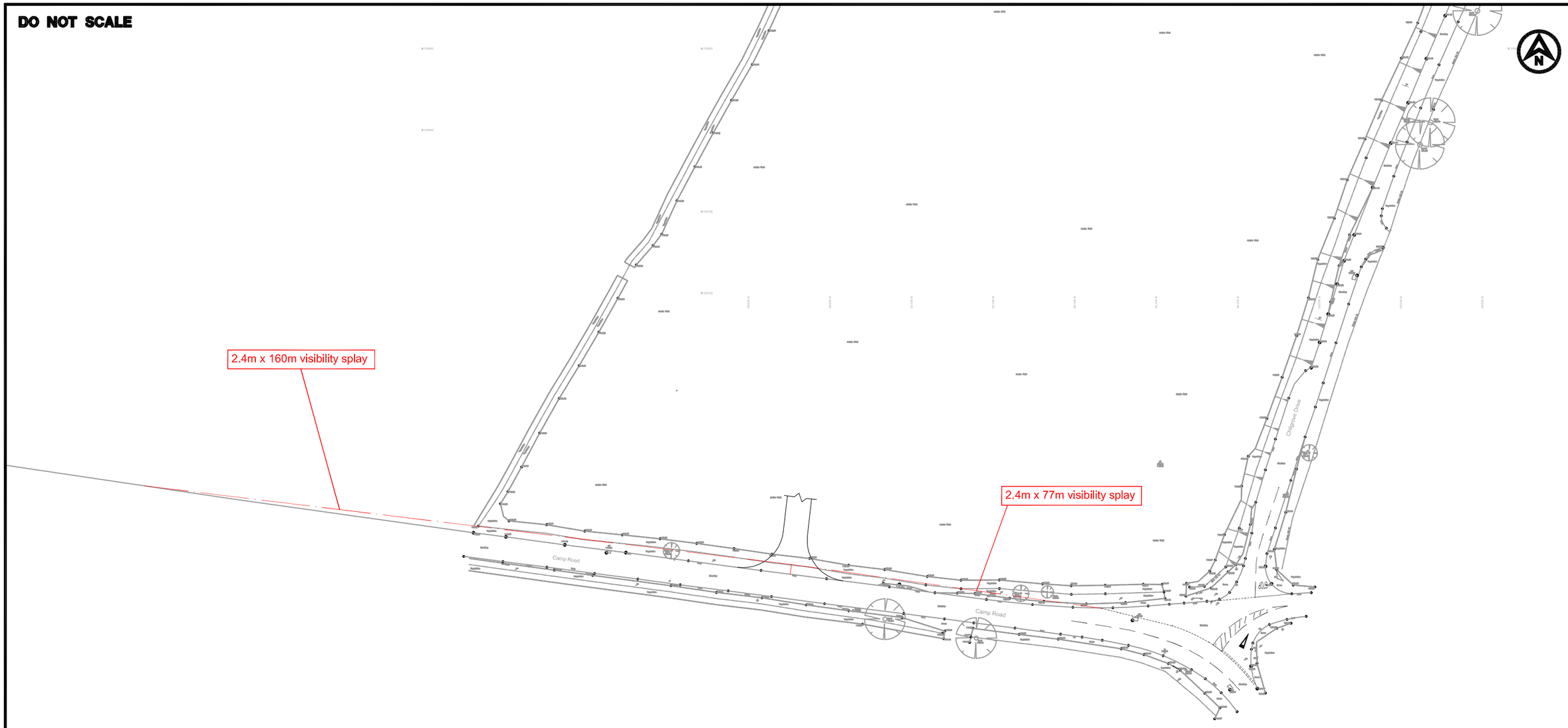
In the meantime, I would be happy to discuss the content of the correspondence with you either over the telephone or at a meeting. What I would say is that the application is still live and the applicant is anxious to resolve matters so a prompt response would be very much appreciated.

Yours sincerely,

Ian Fielding
For Royal HaskoningDHV

Copy to:-	Andrew Lewis	Cherwell District Council
	Geoffrey Arnold	Oxfordshire County Council
	Robert Glen	EP Barrus
	Robert Muir	EP Barrus
	Keryn Clark	EP Barrus
	Chris Goddard	DP9
	Brian Moore	

DO NOT SCALE



This drawing has been based upon survey information supplied by Tower Surveys Ltd, and HaskoningDHV UK Ltd can not guarantee the accuracy of data.

TITLE: VISIBILITY SPLAY PROVISION	PROJECT: PROJECT WINGS	Royal HaskoningDHV *Enhancing Society Together*	JOB No. PB2420	DATE NOV 14	SCALE 1:1000
			DRAWN DH	CHECKED IRF	PASSED IRF
			AUTOCAD REF.	DRG No. PB2420/02	REV P0

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ANNEX 1

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : C - INDUSTRIAL UNIT
VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	HF	HERTFORDSHIRE	1 days
	WS	WEST SUSSEX	1 days
03	SOUTH WEST		
	CW	CORNWALL	1 days
	DV	DEVON	1 days
05	EAST MIDLANDS		
	NR	NORTHAMPTONSHIRE	1 days
06	WEST MIDLANDS		
	HE	HEREFORDSHIRE	1 days
	WM	WEST MIDLANDS	1 days
07	YORKSHIRE & NORTH LINCOLNSHIRE		
	NY	NORTH YORKSHIRE	1 days

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

Filtering Stage 2 selection:

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

Parameter: Gross floor area
Actual Range: 1800 to 20000 (units: sqm)
Range Selected by User: 1800 to 20000 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/06 to 23/01/14

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

Selected survey days:

Tuesday	3 days
Wednesday	1 days
Thursday	4 days

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

Selected survey types:

Manual count	8 days
Directional ATC Count	0 days

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

Selected Locations:

Suburban Area (PPS6 Out of Centre)	1
Edge of Town	5
Neighbourhood Centre (PPS6 Local Centre)	1
Free Standing (PPS6 Out of Town)	1

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

Selected Location Sub Categories:

Industrial Zone	5
Commercial Zone	1
Village	1
Out of Town	1

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

Filtering Stage 3 selection:

Use Class:

B1	4 days
B2	4 days

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

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	3 days
5,001 to 10,000	1 days
10,001 to 15,000	2 days
25,001 to 50,000	1 days

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

Population within 5 miles:

5,001 to 25,000	2 days
50,001 to 75,000	2 days
125,001 to 250,000	4 days

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

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	5 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	7 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 CW-02-C-02 LIGHTING COMPANY CORNWALL
NORMANDY WAY

BODMIN
Edge of Town
Industrial Zone
Total Gross floor area: 17675 sqm
Survey date: WEDNESDAY 06/06/07 Survey Type: MANUAL

2 DV-02-C-01 TUBE MANUFACTURE DEVON
PLYMBRIDGE ROAD
ESTOVER
PLYMOUTH
Edge of Town
Industrial Zone
Total Gross floor area: 20000 sqm
Survey date: TUESDAY 17/07/12 Survey Type: MANUAL

3 HE-02-C-01 METAL. COATINGS HEREFORDSHIRE
COLLEGE ROAD

HEREFORD
Edge of Town
Commercial Zone
Total Gross floor area: 1880 sqm
Survey date: THURSDAY 14/10/10 Survey Type: MANUAL

4 HF-02-C-01 INDUSTRIAL UNIT HERTFORDSHIRE
BRIDGE ROAD EAST

WELWYN GARDEN CITY
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 1800 sqm
Survey date: THURSDAY 17/07/08 Survey Type: MANUAL

5 NR-02-C-01 PAPER COMPANY NORTHAMPTONSHIRE
RHOSILI ROAD
BRACKMILLS
NORTHAMPTON
Edge of Town
Industrial Zone
Total Gross floor area: 11500 sqm
Survey date: THURSDAY 27/11/08 Survey Type: MANUAL

6 NY-02-C-01 FOOD PRODUCTION NORTH YORKSHIRE
FEARBY ROAD

MASHAM
Neighbourhood Centre (PPS6 Local Centre)
Village
Total Gross floor area: 2491 sqm
Survey date: TUESDAY 23/09/08 Survey Type: MANUAL

7 WM-02-C-03 INDUSTRIAL GLASS WEST MIDLANDS
DOWNING STREET

SMETHWICK
Edge of Town
Industrial Zone
Total Gross floor area: 5070 sqm
Survey date: TUESDAY 06/11/12 Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

8 WS-02-C-02 AVIATION COMPANY WEST SUSSEX
MAYDWELL AVENUE
SLINFOLD
NEAR HORSHAM
Free Standing (PPS6 Out of Town)
Out of Town
Total Gross floor area: 11375 sqm
Survey date: THURSDAY 23/01/14 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/C - INDUSTRIAL UNIT
VEHICLES
Calculation factor: 100 sqm
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00	1	11375	0.149	1	11375	0.044	1	11375	0.193
07:00 - 08:00	8	8974	0.371	8	8974	0.057	8	8974	0.428
08:00 - 09:00	8	8974	0.460	8	8974	0.072	8	8974	0.532
09:00 - 10:00	8	8974	0.166	8	8974	0.082	8	8974	0.248
10:00 - 11:00	8	8974	0.093	8	8974	0.082	8	8974	0.175
11:00 - 12:00	8	8974	0.075	8	8974	0.068	8	8974	0.143
12:00 - 13:00	8	8974	0.095	8	8974	0.162	8	8974	0.257
13:00 - 14:00	8	8974	0.201	8	8974	0.125	8	8974	0.326
14:00 - 15:00	8	8974	0.120	8	8974	0.178	8	8974	0.298
15:00 - 16:00	8	8974	0.064	8	8974	0.155	8	8974	0.219
16:00 - 17:00	8	8974	0.079	8	8974	0.358	8	8974	0.437
17:00 - 18:00	8	8974	0.046	8	8974	0.382	8	8974	0.428
18:00 - 19:00	8	8974	0.026	8	8974	0.142	8	8974	0.168
19:00 - 20:00	1	11375	0.044	1	11375	0.132	1	11375	0.176
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			1.989			2.039			4.028

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	1800 - 20000 (units: sqm)
Survey date date range:	01/01/06 - 23/01/14
Number of weekdays (Monday-Friday):	8
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Project Wings - TRICS Land User Class Proportions

TRICS Ref.	B1 (a)	B1 (b)	B1 (c)	B2	B8
CW-02-C-02	15%	0%	50%	50%	35%
DV-02-C-01	5%	15%	0%	80%	0%
HF-02-C-01	20%	0%	80%	0%	0%
NR-02-C-01	20%	0%	0%	80%	0%
NY-02-C-01	10%	20%	0%	70%	0%
WM-02-C-03	22%	0%	78%	0%	0%

ANNEX 2

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : F - WAREHOUSING (COMMERCIAL)
VEHICLES

Selected regions and areas:

02	SOUTH EAST		
	HC	HAMPSHIRE	1 days
	HF	HERTFORDSHIRE	1 days
	SC	SURREY	1 days
03	SOUTH WEST		
	CW	CORNWALL	1 days
04	EAST ANGLIA		
	SF	SUFFOLK	1 days
05	EAST MIDLANDS		
	DS	DERBYSHIRE	1 days
	LN	LINCOLNSHIRE	1 days
06	WEST MIDLANDS		
	WM	WEST MIDLANDS	1 days
08	NORTH WEST		
	LC	LANCASHIRE	1 days
09	NORTH		
	TV	TEES VALLEY	2 days
10	WALES		
	NW	NEWPORT	1 days
	WR	WREXHAM	1 days

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

Filtering Stage 2 selection:

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

Parameter: Gross floor area
Actual Range: 387 to 80066 (units: sqm)
Range Selected by User: 387 to 80066 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/06 to 11/07/13

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

Selected survey days:

Monday	1 days
Tuesday	6 days
Wednesday	2 days
Thursday	2 days
Friday	2 days

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

Selected survey types:

Manual count	13 days
Directional ATC Count	0 days

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

Selected Locations:

Edge of Town Centre	2
Suburban Area (PPS6 Out of Centre)	3
Edge of Town	7
Free Standing (PPS6 Out of Town)	1

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

Selected Location Sub Categories:

Industrial Zone	6
Commercial Zone	2
Residential Zone	1
No Sub Category	4

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

Filtering Stage 3 selection:

Use Class:

B8	12 days

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

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	5 days
10,001 to 15,000	5 days
25,001 to 50,000	2 days

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

Population within 5 miles:

5,001 to 25,000	1 days
25,001 to 50,000	1 days
50,001 to 75,000	2 days
100,001 to 125,000	2 days
125,001 to 250,000	4 days
250,001 to 500,000	2 days
500,001 or More	1 days

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

Car ownership within 5 miles:

0.6 to 1.0	6 days
1.1 to 1.5	7 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	12 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

LIST OF SITES relevant to selection parameters

1 CW-02-F-01 WAREHOUSING CORNWALL
A390
THREEMILESTONE
NEAR TRURO
Edge of Town
No Sub Category
Total Gross floor area: 5150 sqm
Survey date: TUESDAY 18/09/07 Survey Type: MANUAL

2 DS-02-F-01 ARMADILLO S. STORAGE DERBYSHIRE
FORRESTERS BUSINESS P..
SINFIN LANE
DERBY
Edge of Town Centre
Commercial Zone
Total Gross floor area: 1900 sqm
Survey date: TUESDAY 05/07/11 Survey Type: MANUAL

3 HC-02-F-01 WAREHOUSING HAMPSHIRE
MAURETANIA ROAD
NURSLING INDUSTRIAL ESTATE
SOUTHAMPTON
Edge of Town
Industrial Zone
Total Gross floor area: 4000 sqm
Survey date: WEDNESDAY 21/11/07 Survey Type: MANUAL

4 HF-02-F-03 DISTRIBUTION CEN. HERTFORDSHIRE

HATFIELD BUSINESS CEN.
HATFIELD
Edge of Town
Commercial Zone
Total Gross floor area: 80000 sqm
Survey date: THURSDAY 10/07/08 Survey Type: MANUAL

5 LC-02-F-02 WAREHOUSING LANCASHIRE
CHORLEY ROAD
WALTON-LE-DALE
PRESTON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 1200 sqm
Survey date: FRIDAY 22/06/07 Survey Type: MANUAL

6 LN-02-F-01 BOOK SERVICE LINCOLNSHIRE
TRENT ROAD

GRANTHAM
Edge of Town
No Sub Category
Total Gross floor area: 32300 sqm
Survey date: MONDAY 29/11/10 Survey Type: MANUAL

7 NW-02-F-01 LOGISTICS CENTRE NEWPORT
TREDEGAR TERRACE
CROSSKEYS
NEWPORT
Edge of Town
No Sub Category
Total Gross floor area: 16275 sqm
Survey date: FRIDAY 12/10/07 Survey Type: MANUAL

8 SC-02-F-04 WAREHOUSING SURREY
PRETORIA ROAD

CHERTSEY
Edge of Town
No Sub Category
Total Gross floor area: 4460 sqm
Survey date: TUESDAY 27/11/07 Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

9 SF-02-F-02 WAREHOUSING SUFFOLK
WALTON ROAD

FELIXSTOWE
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 22270 sqm
Survey date: THURSDAY 11/07/13 Survey Type: MANUAL

10 TV-02-F-02 ARGOS WAREHOUSE TEES VALLEY
ROUNDHOUSE ROAD
FAVERDALE
DARLINGTON
Edge of Town
Industrial Zone
Total Gross floor area: 80066 sqm
Survey date: TUESDAY 07/10/08 Survey Type: MANUAL

11 TV-02-F-03 ELECTRICAL COMPONENTS TEES VALLEY
UNIT 8,NAVIGATOR COURT

STOCKTON-ON-TEES
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 387 sqm
Survey date: TUESDAY 28/06/11 Survey Type: MANUAL

12 WM-02-F-01 LEGETT LOGIS. WEST MIDLANDS
SAMPSON ROAD NORTH

BIRMINGHAM
Edge of Town Centre
Industrial Zone
Total Gross floor area: 4000 sqm
Survey date: WEDNESDAY 17/06/09 Survey Type: MANUAL

13 WR-02-F-01 WAREHOUSE WREXHAM
UNIT 1-2 PACIFIC PARK
WREXHAM IND. ESTATE
NEAR WREXHAM
Free Standing (PPS6 Out of Town)
Industrial Zone
Total Gross floor area: 9000 sqm
Survey date: TUESDAY 18/10/11 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/F - WAREHOUSING (COMMERCIAL)
VEHICLES
Calculation factor: 100 sqm
Estimated TRIP rate value per 10000 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate
00:00 - 01:00												
01:00 - 02:00												
02:00 - 03:00												
03:00 - 04:00												
04:00 - 05:00												
05:00 - 06:00	1	22270	0.018	1.796	1	22270	0.040	4.041	1	22270	0.058	5.837
06:00 - 07:00	1	22270	0.058	5.837	1	22270	0.063	6.286	1	22270	0.121	12.123
07:00 - 08:00	13	19646	0.087	8.692	13	19646	0.051	5.129	13	19646	0.138	13.821
08:00 - 09:00	13	19646	0.080	8.027	13	19646	0.046	4.581	13	19646	0.126	12.608
09:00 - 10:00	13	19646	0.070	6.970	13	19646	0.052	5.208	13	19646	0.122	12.178
10:00 - 11:00	13	19646	0.052	5.208	13	19646	0.052	5.169	13	19646	0.104	10.377
11:00 - 12:00	13	19646	0.052	5.247	13	19646	0.051	5.051	13	19646	0.103	10.298
12:00 - 13:00	13	19646	0.063	6.265	13	19646	0.063	6.265	13	19646	0.126	12.530
13:00 - 14:00	13	19646	0.100	9.985	13	19646	0.078	7.792	13	19646	0.178	17.777
14:00 - 15:00	13	19646	0.081	8.144	13	19646	0.103	10.259	13	19646	0.184	18.403
15:00 - 16:00	13	19646	0.078	7.753	13	19646	0.097	9.671	13	19646	0.175	17.424
16:00 - 17:00	13	19646	0.064	6.421	13	19646	0.095	9.515	13	19646	0.159	15.936
17:00 - 18:00	13	19646	0.033	3.289	13	19646	0.088	8.810	13	19646	0.121	12.099
18:00 - 19:00	13	19646	0.016	1.566	13	19646	0.048	4.777	13	19646	0.064	6.343
19:00 - 20:00	1	22270	0.036	3.592	1	22270	0.031	3.143	1	22270	0.067	6.735
20:00 - 21:00	1	22270	0.013	1.347	1	22270	0.031	3.143	1	22270	0.044	4.490
21:00 - 22:00	1	22270	0.031	3.143	1	22270	0.018	1.796	1	22270	0.049	4.939
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			0.932	93.282			1.007	100.636			1.939	193.918

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	387 - 80066 (units: sqm)
Survey date date range:	01/01/06 - 11/07/13
Number of weekdays (Monday-Friday):	13
Number of Saturdays:	0
Number of Sundays:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

ANNEX 3

6 Development Impact

6.1.1 This section of the TS provides an overview of the likely vehicular travel demand resulting from the proposed development proposals.

6.2 Consented Vehicular Trip Rates

6.2.1 The ARUP TA included trip rates that were agreed with Oxfordshire County Council for the traffic generation of the consented residential development. The agreed residential trip rates that were used to calculate traffic generated by the total 1075 dwellings are presented in Section 9.1 of the Arup 2007 TA. The trip rates used and the resultant vehicle trips are detailed in **Table 3.1** below:

Table 6.1: Arup TA Residential Trip Rates and Resultant Trips

Peak Hour Period	Trip Rates (per dwelling)			Number of Trips		
	Arrivals	Departures	Total	Arrivals	Departures	Total
AM	0.17	0.63	0.80	183	677	860
PM	0.51	0.29	0.80	548	312	860

6.3 Proposed Development Vehicular Impact

6.3.1 It is considered appropriate for robustness that the agreed residential trip rates associated with the consented scheme are used to determine the traffic impact of the current proposals.

6.3.2 The resultant vehicle trips that could be associated with the proposed residential redevelopment of the site for 60 dwellings are shown in **Table 6.2** below.

Table 6.2: Proposed Development Residential Trip Rates and Resultant Trips

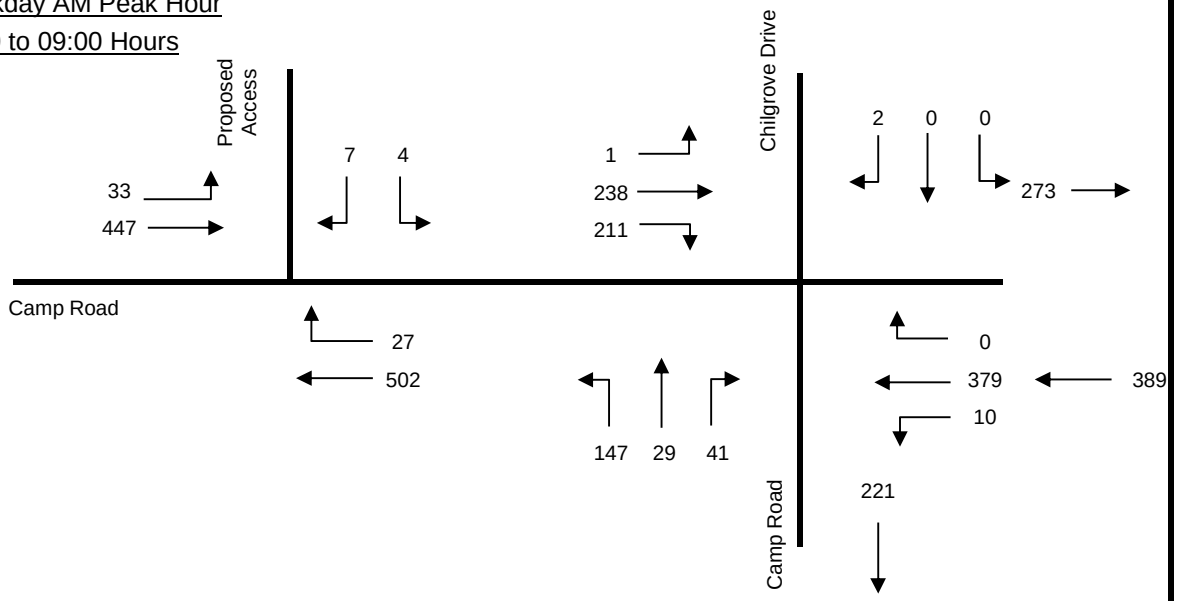
Peak Hour Period	Trip Rates (per dwelling) Agreed with the 2007 TA			Number of Trips		
	Arrivals	Departures	Total	Arrivals	Departures	Total
AM	0.17	0.63	0.80	10	38	48
PM	0.51	0.29	0.80	31	17	48

6.3.3 The trip rate results table above predicts that the proposals for 60 dwellings will generate 48 two way vehicle trips in the AM peak and in the PM peak.

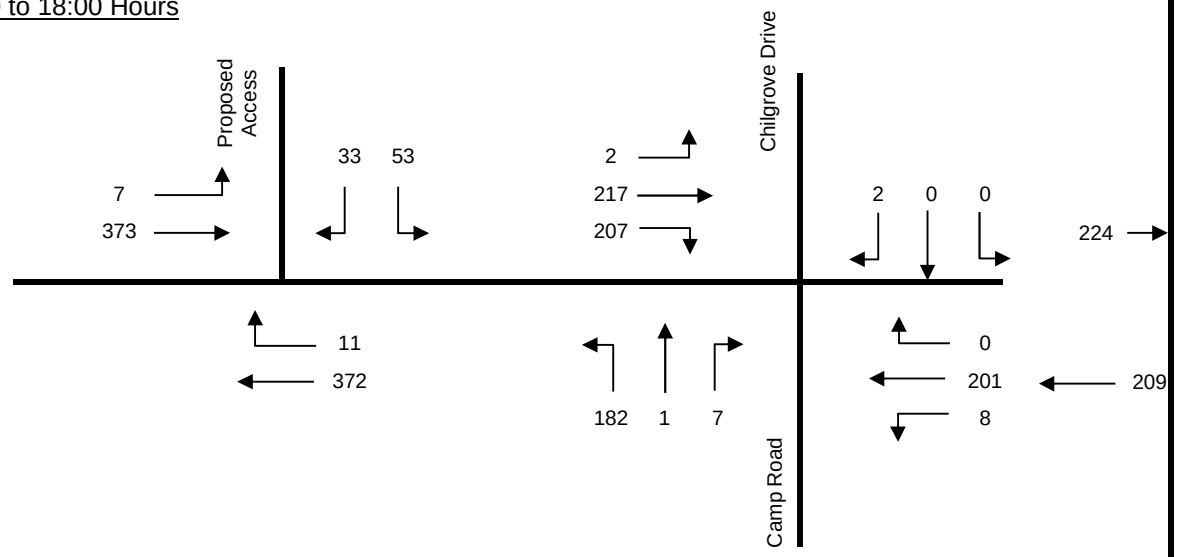
6.3.4 In order to demonstrate the impact of the proposals across the study area, the proposed development traffic has been distributed in accordance with the 2007 TA. The resultant junction by junction impact is shown below in **Table 6.3**, the figures represent total additional movements at the junction.

ANNEX 4

Weekday AM Peak Hour
08:00 to 09:00 Hours



Weekday PM Peak Hour
17:00 to 18:00 Hours



Royal HaskoningDHV Enhancing Society Together	Project Wings		Revised Base + Development Cumulative Flows Weekday AM & PM Peak Hours	
	Date: Feb-15	Job No: PB2420	Author: 310037	Figure: **6A**

ANNEX 5

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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PROGRAM ADVICE AND MAINTENANCE CONTACT:
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EMAIL: software@trl.co.uk

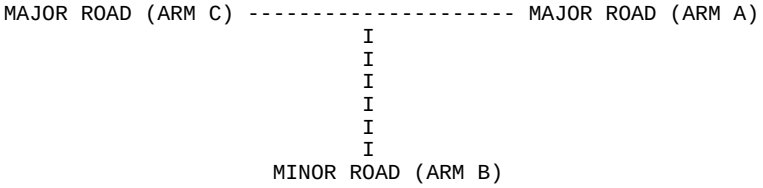
Run with file:-
"I:\PB2420\Technical_Data\Calculations\PICADY\Proposed Access Jct\
Revised Base + Development Cumulative Traffic Flows AM Peak 0800_0900.vpi"
(drive-on-the-left) at 11:22:02 on Friday, 6 February 2015

RUN INFORMATION

RUN TITLE	: Revised Base + Development Cumulative Traffic AM Peak 08:00-09:00
LOCATION	:
DATE	: 21/11/14
CLIENT	:
ENUMERATOR	: 310037 [L06146]
JOB NUMBER	: PB2420
STATUS	:
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Camp Road (W)
ARM B IS New Access
ARM C IS Camp Road (E)

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) 6.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)150.00 M.
- BLOCKS TRAFFIC (SPACES)	YES (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 76.0 M.
- VISIBILITY TO RIGHT	(VB-A) 160.0 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 Opposing STREAM A-C	Slope For Opposing STREAM A-B
724.66	0.28	0.11

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
582.80	0.27	0.11	0.17	0.38

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
660.83	0.26	0.26

(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: Revised Base + Development Cumulative Traffic AM Peak 08:00-09:00

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
ARM A	15.00	45.00	75.00	6.00	9.00	6.00	
ARM B	15.00	45.00	75.00	0.14	0.21	0.14	
ARM C	15.00	45.00	75.00	6.61	9.92	6.61	

Demand set: Revised Base + Development Cumulative Traffic AM Peak 08:00-09:00

TIME	FROM/TO	ARM A	ARM B	ARM C
07.45 - 09.15				
	ARM A	0.000	0.069	0.931
		0.0	33.0	447.0
		(0.0)	(10.0)	(10.0)
	ARM B	0.636	0.000	0.364
		7.0	0.0	4.0
		(10.0)	(0.0)	(10.0)
	ARM C	0.949	0.051	0.000
		502.0	27.0	0.0
		(10.0)	(10.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-AC	0.14	6.97	0.020		0.00	0.02	0.3		0.15
C-AB	0.62	12.63	0.049		0.00	0.07	1.1		0.08
C-A	6.02								
A-B	0.41								
A-C	5.61								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-AC	0.16	6.46	0.026		0.02	0.03	0.4		0.16
C-AB	0.90	13.36	0.067		0.07	0.11	1.7		0.08
C-A	7.03								
A-B	0.49								
A-C	6.70								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-AC	0.20	5.74	0.035		0.03	0.04	0.5		0.18
C-AB	1.32	14.18	0.093		0.11	0.19	2.8		0.08
C-A	8.39								
A-B	0.61								
A-C	8.20								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-AC	0.20	5.74	0.035		0.04	0.04	0.5		0.18
C-AB	1.32	14.18	0.093		0.19	0.19	2.8		0.08
C-A	8.38								
A-B	0.61								
A-C	8.20								

TRL TRL Viewer 3.2 AG I:\.. \Proposed Access Jct\Revised Base + Development Cumulative Traffic Flows AM Peak

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
B-AC	0.16	6.46	0.026		0.04	0.03	0.4		0.16
C-AB	0.90	13.36	0.067		0.19	0.12	1.8		0.08
C-A	7.03								
A-B	0.49								
A-C	6.70								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
B-AC	0.14	6.97	0.020		0.03	0.02	0.3		0.15
C-AB	0.62	12.64	0.049		0.12	0.08	1.1		0.08
C-A	6.01								
A-B	0.41								
A-C	5.61								

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	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0
09.15	0.0

QUEUE FOR STREAM C-AB

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

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	15.1	10.1	2.5	0.16	2.5	0.16
C-AB	85.3	56.9	11.4	0.13	11.4	0.13
C-A	642.8	428.5				
A-B	45.4	30.3				
A-C	615.3	410.2				
ALL	1404.0	936.0	13.8	0.01	13.8	0.01

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

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

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

Printed at 11:22:11 on 06/02/2015]

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

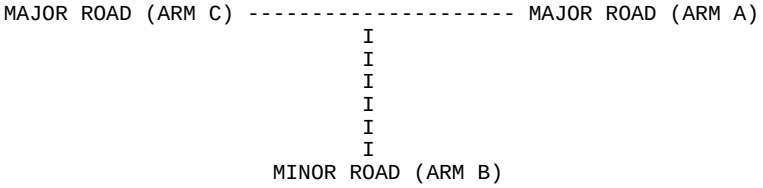
Run with file:-
"I:\PB2420\Technical_Data\Calculations\PICADY\Proposed Access Jct\
Revised Base + Development Cumulative Traffic Flows PM Peak 1700_1800.vpi"
(drive-on-the-left) at 11:23:07 on Friday, 6 February 2015

RUN INFORMATION

RUN TITLE	: Revised Base + Development Cumulative Traffic PM Peak 17:00-18:00
LOCATION	:
DATE	: 21/11/14
CLIENT	:
ENUMERATOR	: 310037 [L06146]
JOB NUMBER	: PB2420
STATUS	:
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Camp Road (W)
ARM B IS New Access
ARM C IS Camp Road (E)

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) 6.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)150.00 M.
- BLOCKS TRAFFIC (SPACES)	YES (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 76.0 M.
- VISIBILITY TO RIGHT	(VB-A) 160.0 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 Opposing STREAM A-C	Slope For Opposing STREAM A-B
724.66	0.28	0.11

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
582.80	0.27	0.11	0.17	0.38

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
660.83	0.26	0.26

(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: Revised Base + Development Cumulative Traffic PM Peak 17:00-18:00

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	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	4.75	7.13	4.75
ARM B	15.00	45.00	75.00	1.08	1.61	1.08
ARM C	15.00	45.00	75.00	4.79	7.18	4.79

Demand set: Revised Base + Development Cumulative Traffic PM Peak 17:00-18:00

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15				
	ARM A	0.000	0.018	0.982
		0.0	7.0	373.0
		(0.0)	(10.0)	(10.0)
	ARM B	0.384	0.000	0.616
		33.0	0.0	53.0
		(10.0)	(0.0)	(10.0)
	ARM C	0.971	0.029	0.000
		372.0	11.0	0.0
		(10.0)	(10.0)	(0.0)

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

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-AC	1.08	8.27	0.130		0.00	0.15	2.1		0.14
C-AB	0.22	11.88	0.018		0.00	0.02	0.3		0.09
C-A	4.59								
A-B	0.09								
A-C	4.68								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-AC	1.29	7.92	0.163		0.15	0.19	2.8		0.15
C-AB	0.28	12.25	0.023		0.02	0.03	0.4		0.08
C-A	5.45								
A-B	0.10								
A-C	5.59								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-AC	1.58	7.41	0.213		0.19	0.27	3.9		0.17
C-AB	0.39	12.77	0.031		0.03	0.04	0.6		0.08
C-A	6.64								
A-B	0.13								
A-C	6.84								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-AC	1.58	7.41	0.213		0.27	0.27	4.0		0.17
C-AB	0.39	12.77	0.031		0.04	0.04	0.6		0.08
C-A	6.64								
A-B	0.13								
A-C	6.84								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-AC	1.29	7.92	0.163		0.27	0.20	3.0		0.15
C-AB	0.29	12.25	0.023		0.04	0.03	0.4		0.08
C-A	5.45								
A-B	0.10								
A-C	5.59								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-AC	1.08	8.27	0.130		0.20	0.15	2.3		0.14
C-AB	0.22	11.88	0.018		0.03	0.02	0.3		0.09
C-A	4.59								
A-B	0.09								
A-C	4.68								

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	0.3
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	0.0
17.15	0.0
17.30	0.0
17.45	0.0
18.00	0.0
18.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	118.4	78.9	18.2	0.15	18.2	0.15
C-AB	26.9	17.9	2.7	0.10	2.7	0.10
C-A	500.3	333.5				
A-B	9.6	6.4				
A-C	513.4	342.3				
ALL	1168.6	779.1	20.9	0.02	21.0	0.02

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

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

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

Printed at 11:23:16 on 06/02/2015]

ANNEX 6

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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For sales and distribution information,
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TRL Limited Tel: +44 (0) 1344 770758
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Nine Mile Ride Email: software@trl.co.uk
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RG40 3GA,UK

Run with file:-
"i:\PB2420\Technical_Data\Calculations\ARCADY\PB2420 Revised Base + Development Cumulative Weekday AM Peak.vai"
(drive-on-the-left) at 11:50:30 on Friday, 6 February 2015

FILE PROPERTIES
****

RUN TITLE: PB2420 Revised Base + Development Cumulative Flows Weekday AM Peak
LOCATION:
DATE: 04/02/15
CLIENT:
ENUMERATOR: 310037 [L06146]
JOB NUMBER: PB2420
STATUS:
DESCRIPTION:

INPUT DATA
****
ARM A - Camp Road (W)
ARM B - Chilgrove Drive
ARM C - Unnamed Road
ARM D - Camp Road (S)

GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	4.50	6.00	16.00	28.00	50.0	0.504	17.778
ARM B	3.10	4.50	3.00	10.00	28.00	50.0	0.475	16.303
ARM C	3.00	4.60	7.00	20.00	28.00	40.0	0.536	19.129
ARM D	3.00	4.50	4.20	21.00	28.00	38.0	0.527	18.210

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: PB2420 Revised Base + Development Cumulative Flows Weekday AM Peak

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 PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
	TO RISE	IS REACHED	FALLING			
ARM A	15.00	45.00	75.00	5.63	8.44	5.63
ARM B	15.00	45.00	75.00	0.03	0.04	0.03
ARM C	15.00	45.00	75.00	4.86	7.29	4.86
ARM D	15.00	45.00	75.00	2.71	4.07	2.71

DEMAND SET TITLE: PB2420 Revised Base + Development Cumulative Flows Weekday AM Peak

T33

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

TIME	FROM/T	ARM A	ARM B	ARM C	ARM D
07.45 - 09.15	ARM A	0.000	0.002	0.529	0.469
		0.0	1.0	238.0	211.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	1.000	0.000	0.000	0.000
		2.0	0.0	0.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.974	0.000	0.000	0.026
		379.0	0.0	0.0	10.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.677	0.134	0.189	0.000
		147.0	29.0	41.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
ARM A	5.65	15.72	0.359	- - -	0.0	0.6	8.0	-	0.099
ARM B	0.03	11.92	0.002	- - -	0.0	0.0	0.0	-	0.084
ARM C	4.88	15.97	0.306	- - -	0.0	0.4	6.3	-	0.090
ARM D	2.72	14.05	0.194	- - -	0.0	0.2	3.5	-	0.088

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
ARM A	6.74	15.63	0.431	- - -	0.6	0.7	10.9	-	0.112
ARM B	0.03	11.34	0.003	- - -	0.0	0.0	0.0	-	0.088
ARM C	5.83	15.68	0.372	- - -	0.4	0.6	8.6	-	0.101
ARM D	3.25	13.55	0.240	- - -	0.2	0.3	4.6	-	0.097

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
ARM A	8.26	15.52	0.532	- - -	0.7	1.1	16.1	-	0.137
ARM B	0.04	10.56	0.003	- - -	0.0	0.0	0.1	-	0.095
ARM C	7.14	15.30	0.466	- - -	0.6	0.9	12.5	-	0.122
ARM D	3.98	12.88	0.309	- - -	0.3	0.4	6.5	-	0.112

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
ARM A	8.26	15.51	0.532	- - -	1.1	1.1	16.8	-	0.138
ARM B	0.04	10.55	0.003	- - -	0.0	0.0	0.1	-	0.095
ARM C	7.14	15.30	0.467	- - -	0.9	0.9	13.0	-	0.123
ARM D	3.98	12.87	0.309	- - -	0.4	0.4	6.7	-	0.112

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.45-09.00									
ARM A	6.74	15.63	0.431	- - -	1.1	0.8	11.9	-	0.113
ARM B	0.03	11.32	0.003	- - -	0.0	0.0	0.0	-	0.089
ARM C	5.83	15.67	0.372	- - -	0.9	0.6	9.2	-	0.102
ARM D	3.25	13.54	0.240	- - -	0.4	0.3	4.9	-	0.097

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
09.00-09.15									
ARM A	5.65	15.72	0.359	- - -	0.8	0.6	8.7	-	0.100
ARM B	0.03	11.89	0.002	- - -	0.0	0.0	0.0	-	0.084
ARM C	4.88	15.96	0.306	- - -	0.6	0.4	6.8	-	0.090
ARM D	2.72	14.03	0.194	- - -	0.3	0.2	3.7	-	0.088

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.6	*
08.15	0.7	*
08.30	1.1	*
08.45	1.1	*
09.00	0.8	*
09.15	0.6	*

QUEUE AT ARM B

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

QUEUE AT ARM C

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 D

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 (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	619.4	412.9	72.5	0.12	72.5	0.12
B	2.8	1.8	0.2	0.09	0.2	0.09
C	535.4	357.0	56.4	0.11	56.5	0.11
D	298.7	199.1	29.8	0.10	29.8	0.10
ALL	1456.3	970.8	159.0	0.11	159.1	0.11

* 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

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

Printed at 11:50:43 on 06/02/2015]

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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For sales and distribution information,
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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:-
"i:\PB2420\Technical_Data\Calculations\ARCADY\PB2420 Revised Base + Development Cumulative Weekday PM Peak.vai"
(drive-on-the-left) at 11:52:18 on Friday, 6 February 2015

FILE PROPERTIES

RUN TITLE: PB2420 Revised Base + Development Cumulative Flows Weekday PM Peak
LOCATION:
DATE: 04/02/15
CLIENT:
ENUMERATOR: 310037 [L06146]
JOB NUMBER: PB2420
STATUS:
DESCRIPTION:

INPUT DATA

ARM A - Camp Road (W)
ARM B - Chilgrove Drive
ARM C - Arm C
ARM D - Camp Road (S)

GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	4.50	6.00	16.00	28.00	50.0	0.504	17.778
ARM B	3.10	4.50	3.00	10.00	28.00	50.0	0.475	16.303
ARM C	3.00	4.60	7.00	20.00	28.00	40.0	0.536	19.129
ARM D	3.00	4.50	4.20	21.00	28.00	38.0	0.527	18.210

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: PB2420 Revised Base + Development Cumulative Flows Weekday PM Peak

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
ARM A	15.00	45.00	75.00	5.32	7.99	5.32
ARM B	15.00	45.00	75.00	0.03	0.04	0.03
ARM C	15.00	45.00	75.00	2.61	3.92	2.61
ARM D	15.00	45.00	75.00	2.38	3.56	2.38

DEMAND SET TITLE: PB2420 Revised Base + Development Cumulative Flows Weekday PM Peak

T33

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

TIME	FROM/T	ARM A	ARM B	ARM C	ARM D
16.45 - 18.15	ARM A	0.000	0.005	0.509	0.486
		0.0	2.0	217.0	207.0
		(0.0)	(0.0)	(3.0)	(3.0)
	ARM B	1.000	0.000	0.000	0.000
		2.0	0.0	0.0	0.0
		(1.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.962	0.000	0.000	0.038
		201.0	0.0	0.0	8.0
		(3.0)	(0.0)	(0.0)	(0.0)
	ARM D	0.958	0.005	0.037	0.000
		182.0	1.0	7.0	0.0
		(9.0)	(0.0)	(0.0)	(0.0)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
ARM A	5.35	17.21	0.311	- - -	0.0	0.4	6.5	-	
ARM B	0.03	13.54	0.002	- - -	0.0	0.0	0.0	-	
ARM C	2.62	17.19	0.153	- - -	0.0	0.2	2.6	-	
ARM D	2.38	15.50	0.154	- - -	0.0	0.2	2.6	-	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
ARM A	6.38	17.20	0.371	- - -	0.4	0.6	8.6	-	
ARM B	0.03	13.02	0.002	- - -	0.0	0.0	0.0	-	
ARM C	3.13	16.92	0.185	- - -	0.2	0.2	3.3	-	
ARM D	2.85	15.25	0.187	- - -	0.2	0.2	3.4	-	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
ARM A	7.82	17.19	0.455	- - -	0.6	0.8	12.0	-	
ARM B	0.04	12.32	0.003	- - -	0.0	0.0	0.0	-	
ARM C	3.84	16.54	0.232	- - -	0.2	0.3	4.4	-	
ARM D	3.49	14.91	0.234	- - -	0.2	0.3	4.5	-	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
ARM A	7.82	17.19	0.455	- - -	0.8	0.8	12.4	-	
ARM B	0.04	12.31	0.003	- - -	0.0	0.0	0.0	-	
ARM C	3.84	16.54	0.232	- - -	0.3	0.3	4.5	-	
ARM D	3.49	14.90	0.234	- - -	0.3	0.3	4.6	-	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	6.38	17.20	0.371	- - -	0.8	0.6	9.2	-	
ARM B	0.03	13.01	0.002	- - -	0.0	0.0	0.0	-	
ARM C	3.13	16.91	0.185	- - -	0.3	0.2	3.5	-	
ARM D	2.85	15.24	0.187	- - -	0.3	0.2	3.5	-	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	5.35	17.21	0.311	- - -	0.6	0.5	7.0	-	
ARM B	0.03	13.52	0.002	- - -	0.0	0.0	0.0	-	
ARM C	2.62	17.18	0.153	- - -	0.2	0.2	2.8	-	
ARM D	2.38	15.49	0.154	- - -	0.2	0.2	2.8	-	

QUEUE AT ARM A

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	0.5	

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	0.2
17.15	0.2
17.30	0.3
17.45	0.3
18.00	0.2
18.15	0.2

QUEUE AT ARM D

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

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	586.4	390.9	55.6	0.09	55.6	0.09
B	2.8	1.8	0.2	0.08	0.2	0.08
C	287.7	191.8	21.1	0.07	21.1	0.07
D	261.5	174.3	21.3	0.08	21.3	0.08
ALL	1138.3	758.9	98.3	0.09	98.3	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.

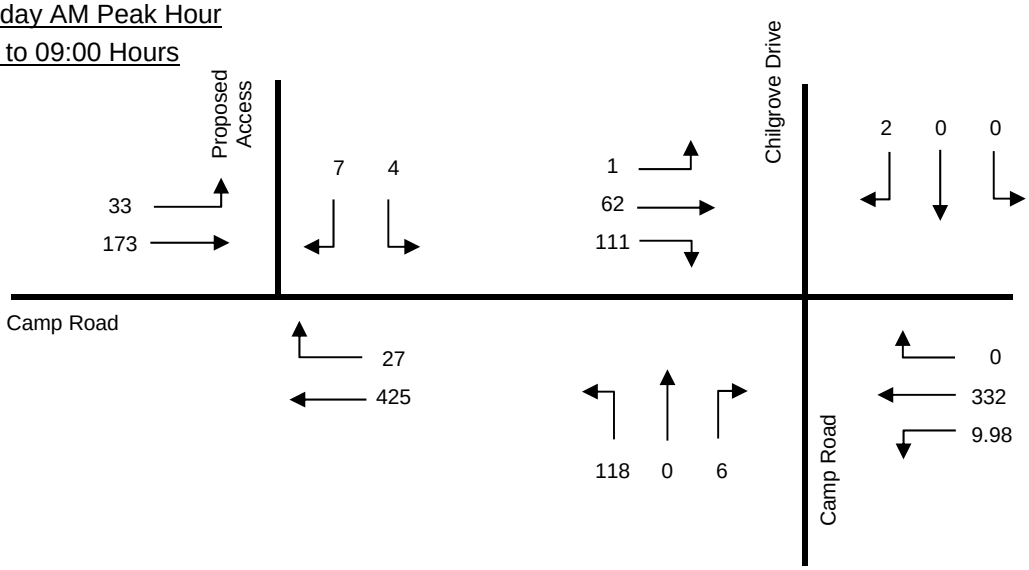
END OF JOB

****** ARCADY 6 run completed.
========== end of file ==========

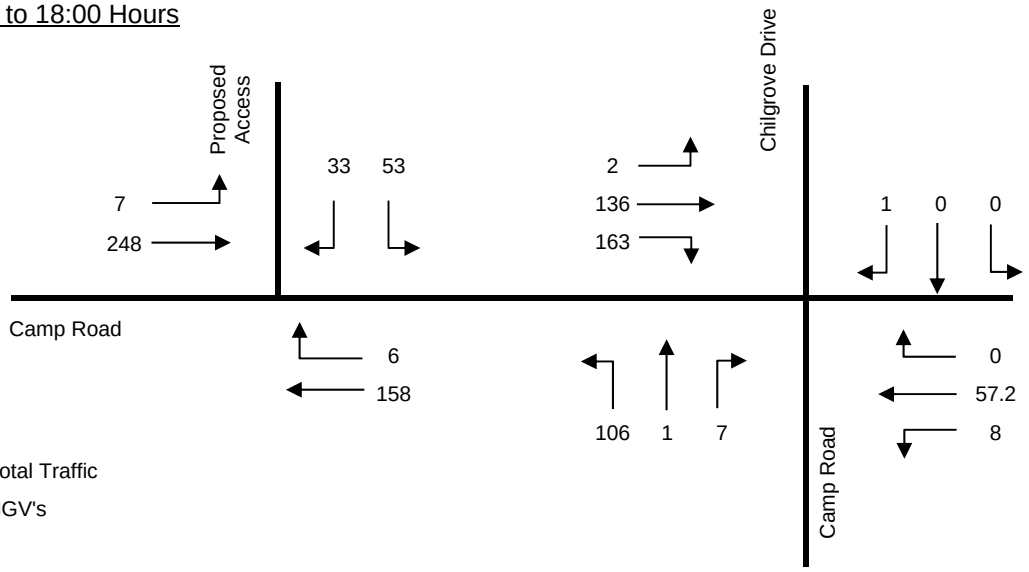
Printed at 11:52:27 on 06/02/2015]

ANNEX 7

Weekday AM Peak Hour
08:00 to 09:00 Hours



Weekday PM Peak Hour
17:00 to 18:00 Hours



Key:

12 Total Traffic

(34) HGV's

Royal HaskoningDHV Enhancing Society Together	Project Wings	Revised 2019 Base + Development Flows Weekday AM & PM Peak Hours	
Date: Feb-15	Job No: PB2420	Author: 310037	Figure: **3A**

ANNEX 8

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

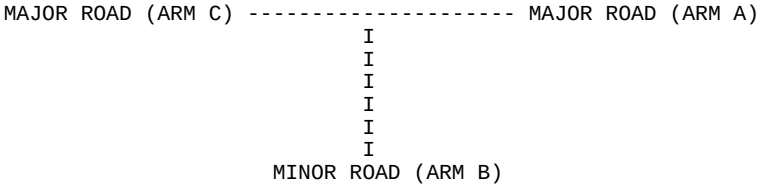
Run with file:-
"I:\PB2420\Technical_Data\Calculations\PICADY\Camp Rd\
2019 Base + Development Traffic Flows AM Peak 0800_0900.vpi"
(drive-on-the-left) at 11:30:42 on Friday, 6 February 2015

RUN INFORMATION

RUN TITLE	: Base + Development Traffic AM Peak 08:00-09:00
LOCATION	:
DATE	: 21/11/14
CLIENT	:
ENUMERATOR	: 310037 [L06146]
JOB NUMBER	: PB2420
STATUS	:
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Camp Road (W)
ARM B IS Unnamed Road
ARM C IS Camp Road (S)

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) 7.95 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)150.00 M.
- BLOCKS TRAFFIC (SPACES)	YES (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 160.0 M.
- VISIBILITY TO RIGHT	(VB-A) 160.0 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 Opposing STREAM A-C	Slope For Opposing STREAM A-B
724.66	0.26	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
613.54	0.26	0.10	0.16	0.37

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
660.83	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: Base + Development Traffic Flows AM Peak 08:00-09:00

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
ARM A	15.00	45.00	75.00	2.16	3.24	2.16
ARM B	15.00	45.00	75.00	4.28	6.41	4.28
ARM C	15.00	45.00	75.00	1.55	2.32	1.55

Demand set: Base + Development Traffic Flows AM Peak 08:00-09:00

TIME	FROM/TO	ARM A	ARM B	ARM C
07.45 - 09.15				
	ARM A	0.000	0.358	0.642
		0.0	62.0	111.0
		(0.0)%	(0.0)%	(0.0)%
	ARM B	0.971	0.000	0.029
		332.0	0.0	10.0
		(0.0)%	(0.0)%	(0.0)%
	ARM C	0.952	0.048	0.000
		118.0	6.0	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	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-AC	4.29	9.57	0.448		0.00	0.80	11.2		0.19
C-AB	0.09	11.47	0.008		0.00	0.01	0.1		0.09
C-A	1.47								
A-B	0.78								
A-C	1.39								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-AC	5.12	9.43	0.543		0.80	1.15	16.4		0.23
C-AB	0.11	11.56	0.009		0.01	0.01	0.1		0.09
C-A	1.75								
A-B	0.93								
A-C	1.66								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-AC	6.28	9.24	0.679		1.15	1.99	27.4		0.32
C-AB	0.13	11.69	0.012		0.01	0.01	0.2		0.09
C-A	2.14								
A-B	1.14								
A-C	2.04								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.30-08.45									
B-AC	6.28	9.24	0.679		1.99	2.05	30.4		0.34
C-AB	0.13	11.69	0.012		0.01	0.01	0.2		0.09
C-A	2.14								
A-B	1.14								
A-C	2.04								

TIME (08.45-09.00)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
B-AC	5.12	9.43	0.543		2.05	1.23	19.6		0.24
C-AB	0.11	11.56	0.009		0.01	0.01	0.2		0.09
C-A	1.75								
A-B	0.93								
A-C	1.66								

TIME (09.00-09.15)	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
B-AC	4.29	9.57	0.448		1.23	0.83	13.1		0.19
C-AB	0.09	11.47	0.008		0.01	0.01	0.1		0.09
C-A	1.47								
A-B	0.78								
A-C	1.39								

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	0.8	*
08.15	1.2	*
08.30	2.0	**
08.45	2.0	**
09.00	1.2	*
09.15	0.8	*

QUEUE FOR STREAM C-AB

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

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	470.7	313.8	118.0	0.25	118.1	0.25
C-AB	9.8	6.5	0.9	0.09	0.9	0.09
C-A	160.9	107.3				
A-B	85.3	56.9				
A-C	152.8	101.9				
ALL	879.5	586.4	119.0	0.14	119.0	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 RUN*******

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

Printed at 11:30:51 on 06/02/2015]

TRL LIMITED

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

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 5.0 (JUNE 2010)

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

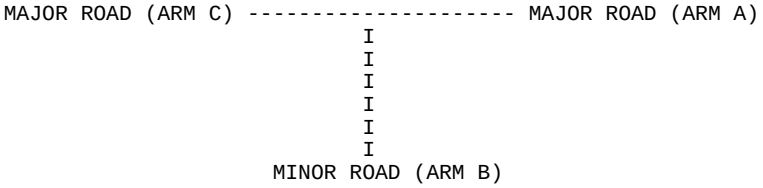
Run with file:-
"I:\PB2420\Technical_Data\Calculations\PICADY\Camp Rd\
2019 Base + Development Traffic Flows PM Peak 1700_1800.vpi"
(drive-on-the-left) at 11:32:46 on Friday, 6 February 2015

RUN INFORMATION

RUN TITLE	: 2019 Base + Development Traffic PM Peak 17:00-18:00
LOCATION	:
DATE	: 21/11/14
CLIENT	:
ENUMERATOR	: 310037 [L06146]
JOB NUMBER	: PB2420
STATUS	:
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Camp Road (W)
ARM B IS Unnamed Road
ARM C IS Camp Road (S)

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) 7.95 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)150.00 M.
- BLOCKS TRAFFIC (SPACES)	YES (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 160.0 M.
- VISIBILITY TO RIGHT	(VB-A) 160.0 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 Opposing STREAM A-C	Slope For Opposing STREAM A-B
724.66	0.26	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
613.54	0.26	0.10	0.16	0.37

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
660.83	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: 2019 Base + Development Traffic Flows PM Peak 17:00-18:00

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	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00		3.74	5.61	3.74
ARM B	15.00	45.00	75.00		0.81	1.22	0.81
ARM C	15.00	45.00	75.00		1.41	2.12	1.41

Demand set: 2019 Base + Development Traffic Flows PM Peak 17:00-18:00

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15				
	ARM A	0.000	0.455	0.545
		0.0	136.0	163.0
		(0.0)%	(0.0)%	(0.0)%
	ARM B	0.877	0.000	0.123
		57.0	0.0	8.0
		(0.0)%	(0.0)%	(0.0)%
	ARM C	0.938	0.062	0.000
		106.0	7.0	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	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-AC	0.82	9.49	0.086		0.00	0.09	1.4		0.12
C-AB	0.10	11.01	0.009		0.00	0.01	0.1		0.09
C-A	1.32								
A-B	1.71								
A-C	2.05								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-AC	0.97	9.31	0.105		0.09	0.12	1.7		0.12
C-AB	0.12	11.02	0.011		0.01	0.01	0.2		0.09
C-A	1.57								
A-B	2.04								
A-C	2.44								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-AC	1.19	9.06	0.132		0.12	0.15	2.2		0.13
C-AB	0.16	11.04	0.014		0.01	0.02	0.2		0.09
C-A	1.92								
A-B	2.50								
A-C	2.99								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-AC	1.19	9.06	0.132		0.15	0.15	2.3		0.13
C-AB	0.16	11.04	0.014		0.02	0.02	0.2		0.09
C-A	1.92								
A-B	2.50								
A-C	2.99								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-AC	0.97	9.31	0.105		0.15	0.12	1.8		0.12
C-AB	0.12	11.02	0.011		0.02	0.01	0.2		0.09
C-A	1.57								
A-B	2.04								
A-C	2.44								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-AC	0.82	9.49	0.086		0.12	0.09	1.5		0.12
C-AB	0.10	11.01	0.009		0.01	0.01	0.1		0.09
C-A	1.32								
A-B	1.71								
A-C	2.05								

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	0.1
17.30	0.2
17.45	0.2
18.00	0.1
18.15	0.1

QUEUE FOR STREAM C-AB

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

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	89.5	59.6	10.8	0.12	10.8	0.12
C-AB	11.3	7.5	1.1	0.10	1.1	0.10
C-A	144.2	96.1				
A-B	187.2	124.8				
A-C	224.4	149.6				
ALL	656.6	437.7	11.9	0.02	11.9	0.02

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

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

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

Printed at 11:32:55 on 06/02/2015]

Appendix C

Land to the west of Chilgrove Drive, and adjoining former RAF Upper Heyford Incorporating former MoD gymnasium. Planning application reference: 14/02025/HYBRID

Response to Royal HaskoningDHV letter of 17 February 2015. Reference: PB2420/L01001/310026/Egha

Oxfordshire County Council Transport Development Control 3 March 2015

This note sets out Oxfordshire County Council's (OCC) position regarding the above letter. The letter is in response to OCCs consultation response to Cherwell District Council. Reference to that consultation response is also made where relevant. OCCs position is presented in the order of the headings on the letter.

Traffic Attraction

Approach accepted

Test 1 – TRICS Traffic Attraction

Accepted.

Test 2 – Pro Rata Uplift on Existing EP Barrus Traffic

Accepted.

Upper Heyford Development Traffic

This section makes reference to Annex 3 as containing *"..details of the source of traffic associated with the Upper Heyford development which has been used as part of the cumulative assessment requirements."* Annex 3 contains a single page extract from a Transport Statement for a development of 60 dwellings at Heyford Park. The extract refers to the original Transport Assessment for the Heyford Park development as the source of trip rates agreed with OCC.

The extract at Annex 3 only presents residential trip generation rates and trips. Reference to the original Transport Assessment for Heyford Park (Arup, August 2007) reveals that are also a substantial amount of employment generated trips (Tables 9.2 – 9.10) which need to be included in any assessment that takes into account the full permitted Heyford Park development.

Clarification needs to be provided as to whether the Upper Heyford development traffic in the analysis presented in the E P Barrus submissions includes employment trips. If it does not then this adjustment will need to be made.

DfT Growth Factor

It is not clear what methodology or dataset has been used here. The growth factor should be calculated using a combination NTEM and Tempro, to tailor growth factors to local circumstances. The prescribed methodology is set out in Section 9 of DfT TAG UNIT M4 Forecasting and Uncertainty.

Access

This section does not address the OCCs stated concern that the proposed improvements to Chilgrove Drive are neither demonstrated nor adequate.

The alternative access strategy via a priority junction with Camp Road is acceptable. However, it may be necessary to update the PICADY analysis to include Heyford Park employment trips in the base case as discussed above. A plan of that proposed access would also be required for review.

Future Roundabout Junction – Camp Road / Chilgrove Drive

Similarly, it may be necessary to update the ARCADY analysis to include Heyford Park employment trips in the base case as discussed above.

Parking

Parking accumulation should be demonstrated assuming generic B1, B2 and B8 land uses before parking provision can be deemed adequate.

Public Transport / Accessibility

OCC considers that enhancement of the 25 bus service would give better access to Upper Heyford and the development site in general, as opposed to a shuttle bus which would specifically be aimed at workers during peak hours only. The Heyford Park development is already committed to making such a contribution and the contribution required from this development would be worked out on a proportional basis.

Appendix D

North Oxfordshire Consortium

Heyford Park

Transport Assessment

ARUP

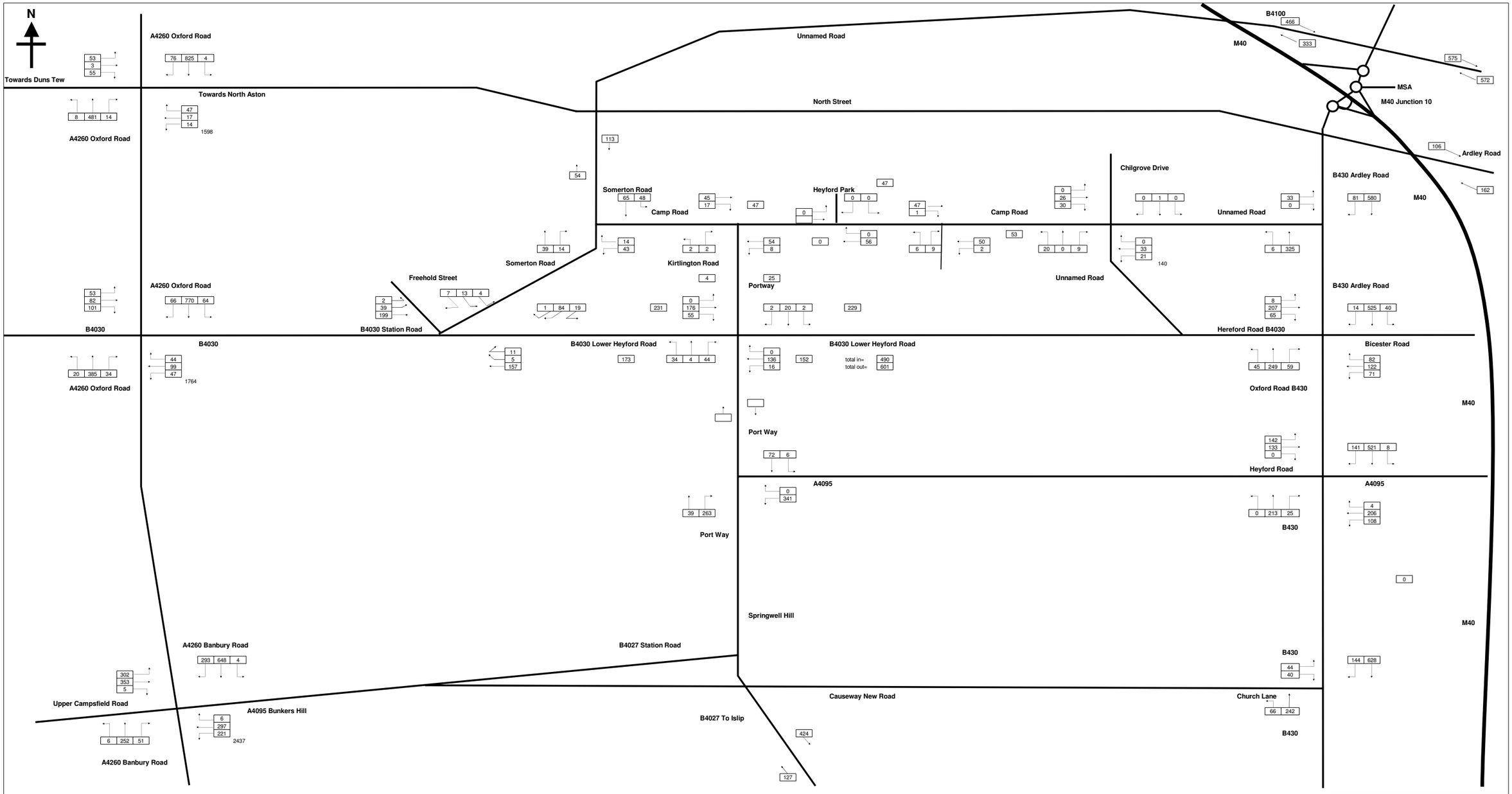


FIGURE 9

AVE WEEKDAY 2013 BASE AM FLOWS

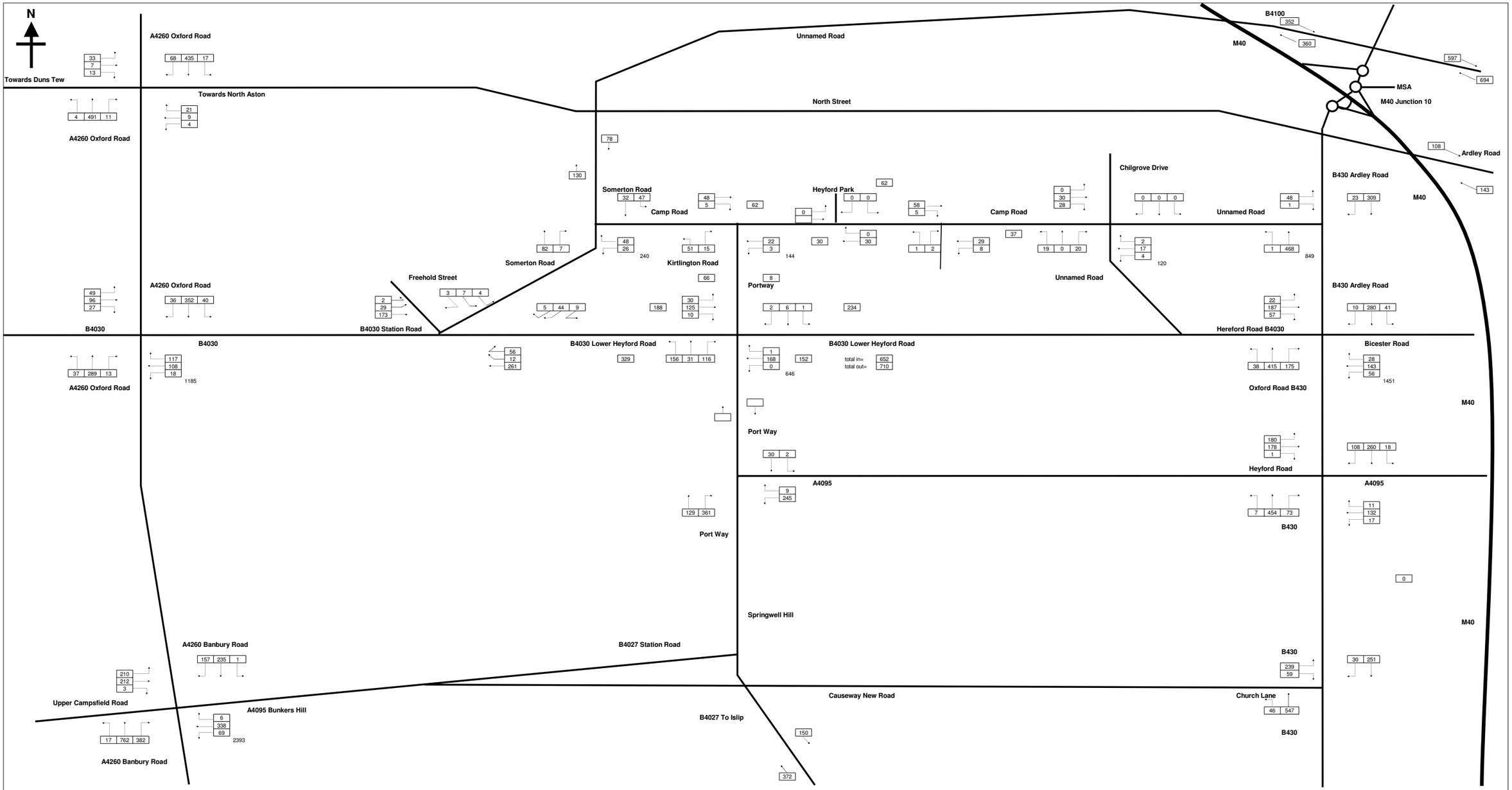


FIGURE 10

AVE WEEKDAY 2013 BASE PM FLOWS

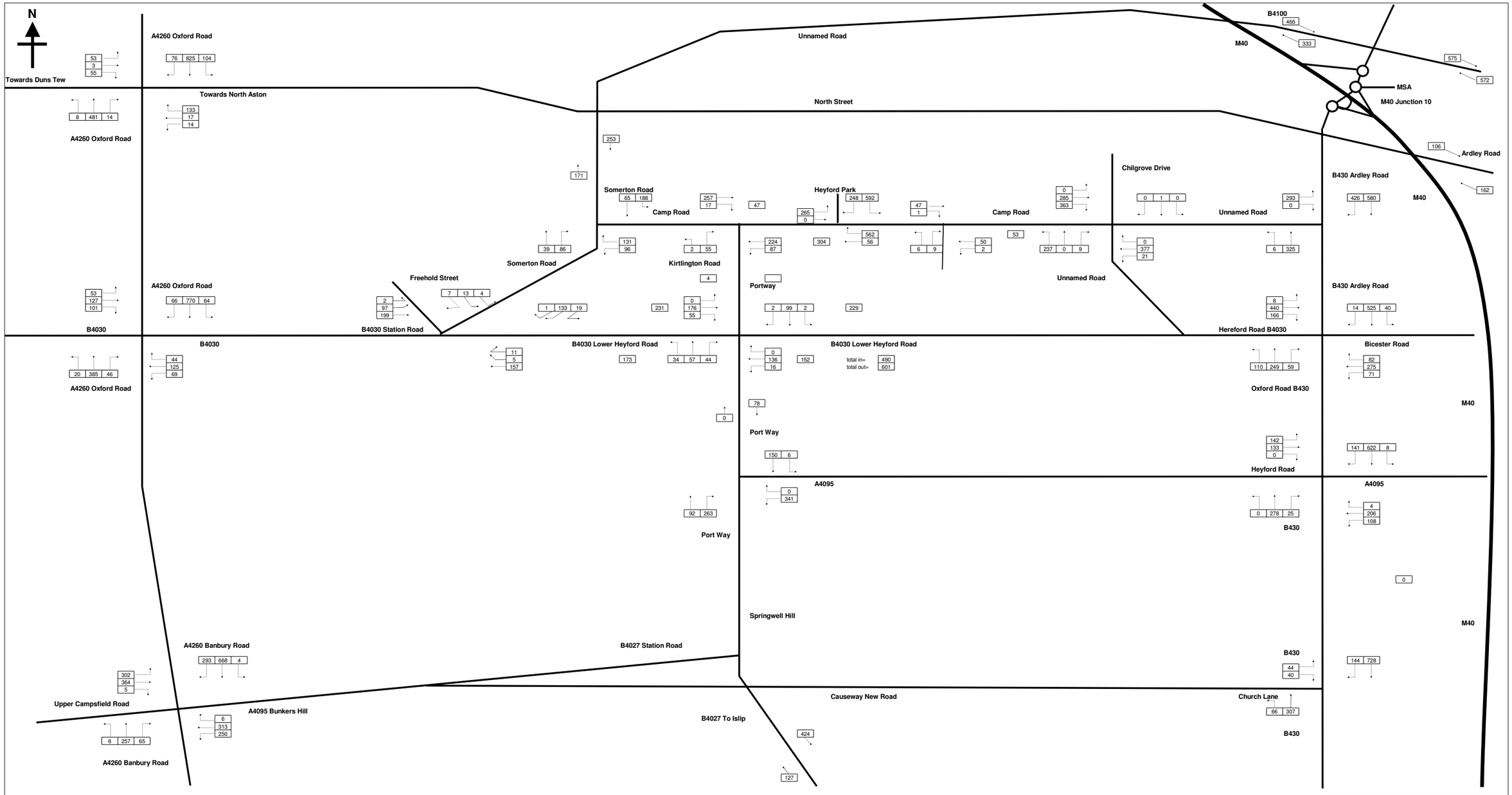


FIGURE 11

AVE WEEKDAY 2013 BASE & GENERATED AM FLOWS

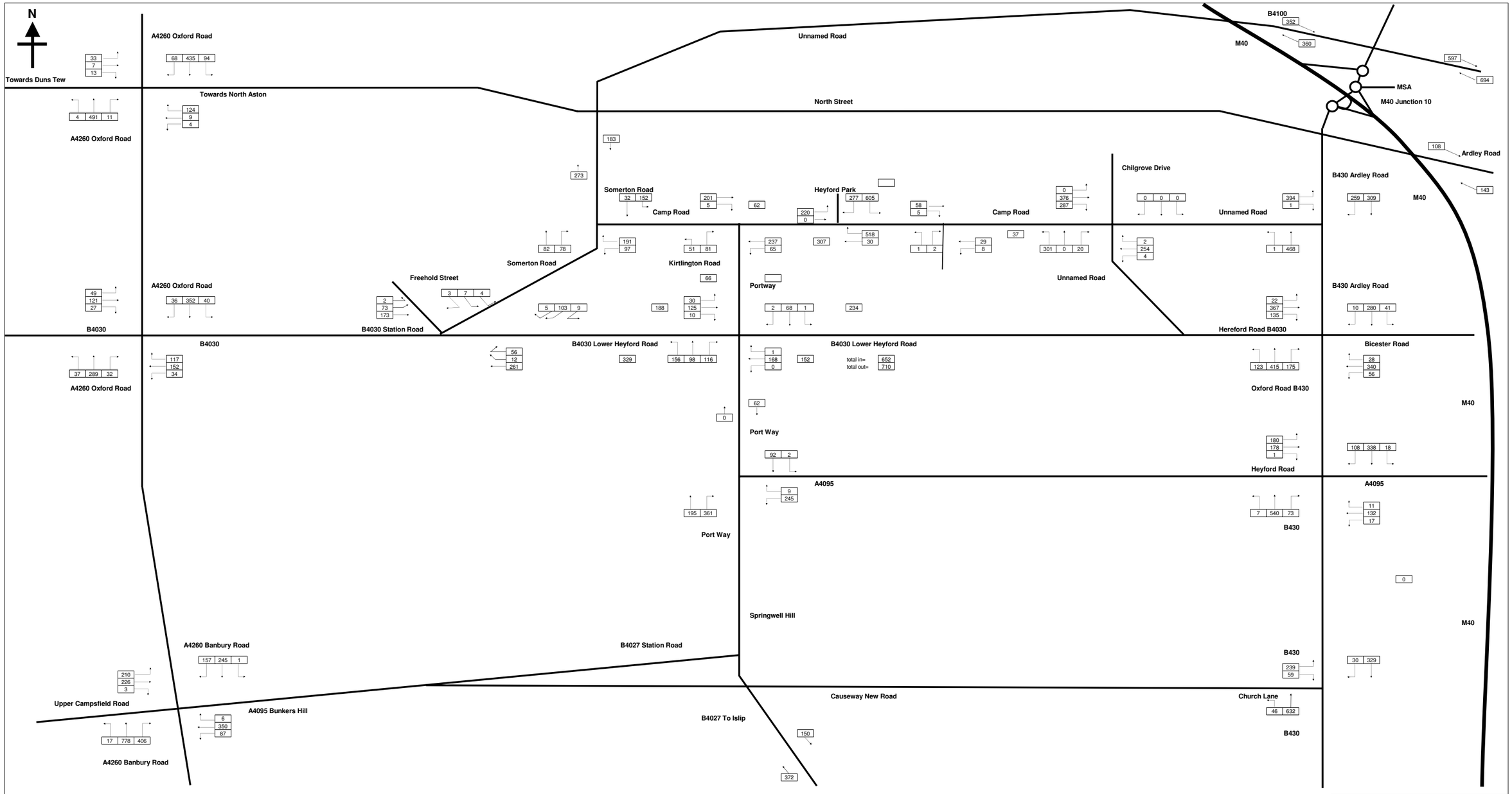
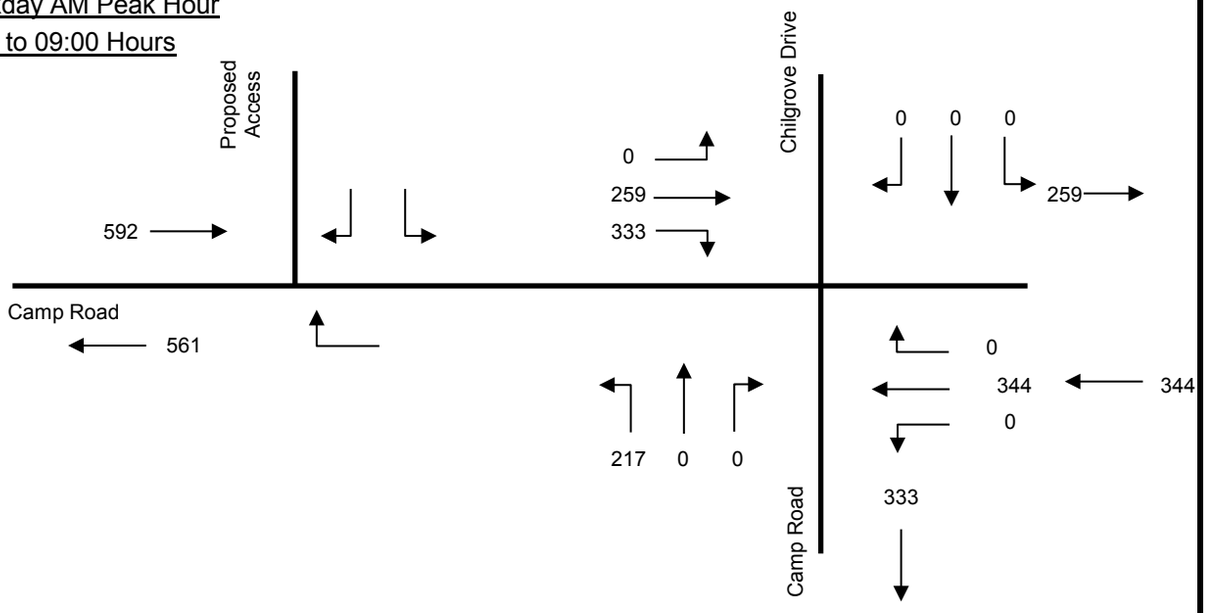


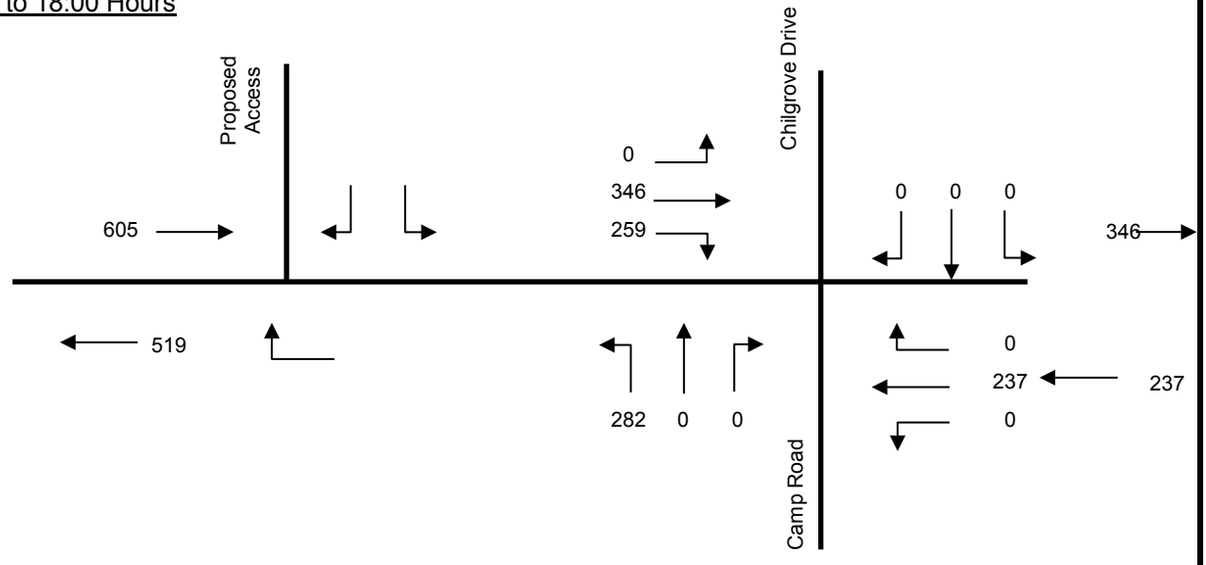
FIGURE 12

AVE WEEKDAY 2013 BASE & GENERATED PM FLOWS

Weekday AM Peak Hour
08:00 to 09:00 Hours



Weekday PM Peak Hour
17:00 to 18:00 Hours



Royal HaskoningDHV Enhancing Society Together	Project Wings		Revised Cumulative Flows Weekday AM & PM Peak Hours	
	Date: Feb-15	Job No: PB2420	Author: 310037	Figure: **5A**

Appendix E

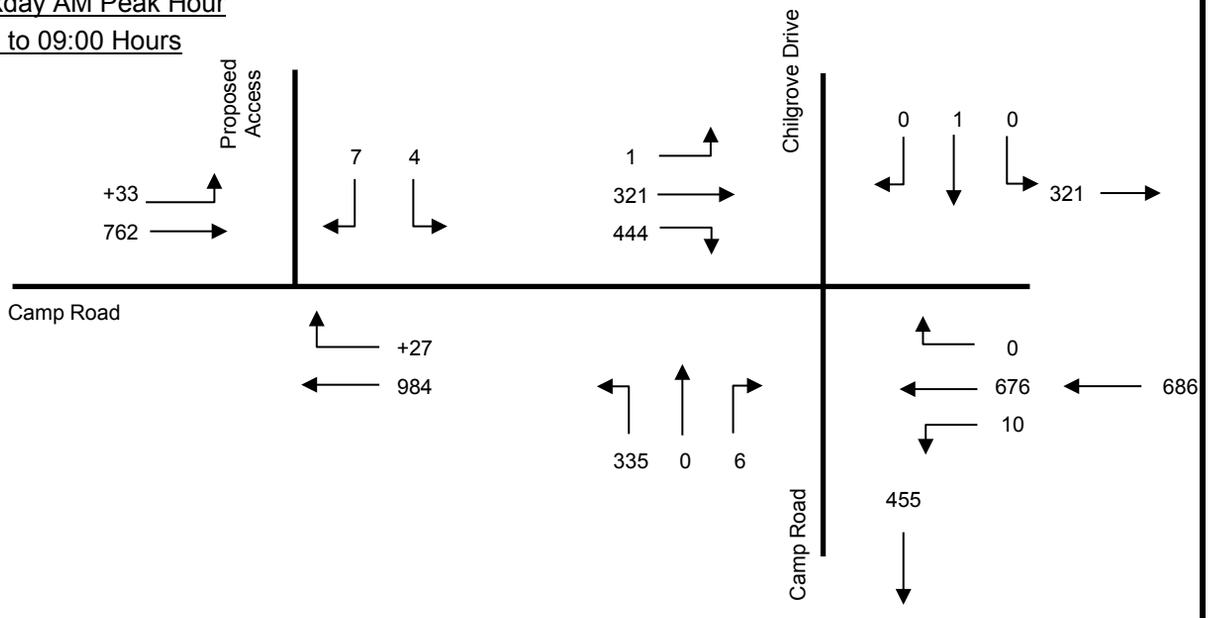
Growth factors

TAG UNIT M4 - Simpler traffic forecasting approach

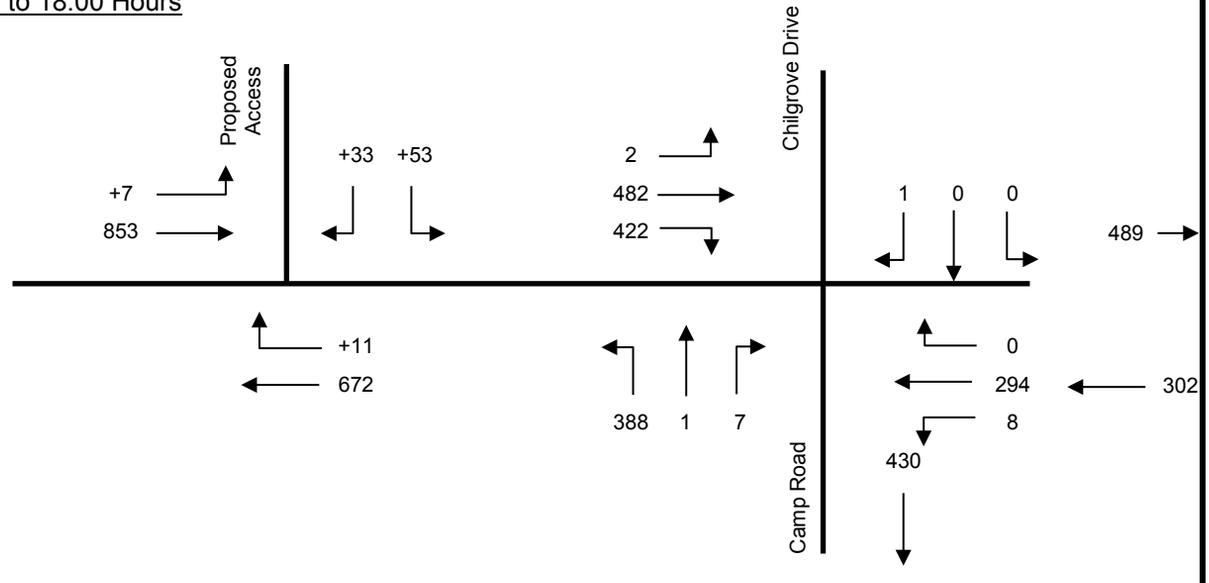
TEMPro Dataset	Years to and from	Time period	Transport Mode	Area definition	NTM dataset	Area type	Road type	Local growth figure
62	2013 - 2019	Weekday AM peak (7 – 10)	Car driver	Cherwell	AF09	Urban	Minor	1.0709
						Rural		1.0756
		Weekday PM peak (16 – 19)	Car driver	Cherwell	AF09	Urban	Minor	1.0735
						Rural		1.0782

Appendix F

Weekday AM Peak Hour
08:00 to 09:00 Hours



Weekday PM Peak Hour
17:00 to 18:00 Hours



Royal HaskoningDHV Enhancing Society Together	Project Wings		Revised Base + Development Cumulative Flows Weekday AM & PM Peak Hours	
	Date: Mar-15	Job No: PB2420	Author: 310037	Figure: **6B**

Appendix G

Junctions 8

PICADY 8 - Priority Intersection Module

Version: 8.0.4.487 [15039,24/03/2014]

For sales and distribution information, program advice and maintenance, contact TRL:
Tel: +44 (0)1344 770758 email: software@trl.co.uk Web: http://www.trlsoftware.co.uk

Filename: Import of Revised Base + Development Cumulative Traffic Flows AM Peak 0800_0900.arc8
Path: C:\Users\304567\Documents\ARCADY
Report generation date: 12/03/2015 10:33:23

Summary of junction performance

	AM			
	Queue (Veh)	Delay (s)	RFC	LOS
Scenario 1				

Stream B-AC	0.09	26.98	0.08	D
Stream C-AB	0.85	4.08	0.22	A
Stream C-A	-	-	-	-
Stream A-B	-	-	-	-
Stream A-C	-	-	-	-

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - Scenario 1, AM " model duration: 07:45 - 09:15

Run using Junctions 8.0.4.487 at 12/03/2015 10:33:22

File summary

Title	Revised Base + Development Cumulative Traffic AM Peak 08:00-09:00
Location	
Site Number	
Date	21/11/2014
Version	
Status	

Identifier	
Client	
Jobnumber	PB2420
Enumerator	310037 [L06146]
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	RFC Threshold	Average Delay Threshold (s)	Queue Threshold (PCU)
5.75			N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	Veh	Veh	perMin	s	-Min	perMin

Scenario 1, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
	N/A		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Scenario 1, AM	Scenario 1	AM	Revised Base + Development Cumulative Traffic AM Peak 08:00-09:00	Varies by Arm	07:45	09:15	90	15				✓		

Junction Network

Junctions

Junction	Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way	A,B,C		5.49	A

Junction Network Options

Driving Side	Lighting

Left	Normal/unknown

Arms

Arms

Arm	Arm	Name	Description	Arm Type
A	A	Camp Road (W)		Major
B	B	New Access		Minor
C	C	Camp Road (E)		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
C	6.00		0.00		2.20	150.00	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.00										76	160

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/min)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	9.713	0.106	0.268	0.169	0.383
1	B-C	12.078	0.111	0.281	-	-
1	C-B	11.014	0.256	0.256	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
✓			✓	HV Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/min)	Flow Scaling Factor (%)
A	ONE HOUR	✓	13.25	100.000
B	ONE HOUR	✓	0.18	100.000
C	ONE HOUR	✓	16.85	100.000

Turning Proportions

Turning Counts / Proportions (Veh/min) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.550	12.700
	B	0.117	0.000	0.067
	C	16.400	0.450	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
From		A	B	C

	A	0.00	0.04	0.96
	B	0.64	0.00	0.36
	C	0.97	0.03	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	**B**	**C**
From	**A**	1.100	1.100	1.100
	B	1.100	1.100	1.100
	C	1.100	1.100	1.100

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	**B**	**C**
From	**A**	10.0	10.0	10.0
	B	10.0	10.0	10.0

	C	10.0	10.0	10.0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/min)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
B-AC	0.08	26.98	0.09	D	0.17	15.20	4.77	18.82	0.05	4.77	18.82
C-AB	0.22	4.08	0.85	A	2.56	230.62	37.83	9.84	0.42	37.83	9.84
C-A	-	-	-	-	12.90	1160.95	-	-	-	-	-
A-B	-	-	-	-	0.50	45.42	-	-	-	-	-
A-C	-	-	-	-	11.65	1048.84	-	-	-	-	-

Main Results for each time segment

Main results: (07:45-08:00)

Stream	Total Demand	Junction Arrivals	Entry Flow	Pedestrian Demand	Capacity	RFC	Start Queue	End Queue	Delay	LOS

	(Veh/min)	(Veh)	(Veh/min)	(Ped/min)	(Veh/min)		(Veh)	(Veh)	(s)	
B-AC	0.14	2.08	0.14	0.00	4.93	0.028	0.00	0.03	12.507	B
C-AB	1.20	18.02	1.19	0.00	15.95	0.075	0.00	0.14	4.065	A
C-A	11.48	172.27	11.48	0.00	-	-	-	-	-	-
A-B	0.41	6.21	0.41	0.00	-	-	-	-	-	-
A-C	9.56	143.42	9.56	0.00	-	-	-	-	-	-

Main results: (08:00-08:15)

Stream	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
B-AC	0.17	2.48	0.16	0.00	3.93	0.042	0.03	0.04	15.924	C
C-AB	2.03	30.51	2.03	0.00	17.49	0.116	0.14	0.27	3.882	A
C-A	13.11	196.71	13.11	0.00	-	-	-	-	-	-
A-B	0.49	7.42	0.49	0.00	-	-	-	-	-	-
A-C	11.42	171.26	11.42	0.00	-	-	-	-	-	-

Main results: (08:15-08:30)

Stream	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS

B-AC	0.20	3.04	0.20	0.00	2.43	0.083	0.04	0.09	26.813	D
C-AB	4.42	66.33	4.38	0.00	19.92	0.222	0.27	0.84	3.872	A
C-A	14.13	211.95	14.13	0.00	-	-	-	-	-	-
A-B	0.61	9.08	0.61	0.00	-	-	-	-	-	-
A-C	13.98	209.74	13.98	0.00	-	-	-	-	-	-

Main results: (08:30-08:45)

Stream	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
B-AC	0.20	3.04	0.20	0.00	2.43	0.084	0.09	0.09	26.983	D
C-AB	4.45	66.82	4.45	0.00	19.94	0.223	0.84	0.85	3.894	A
C-A	14.10	211.46	14.10	0.00	-	-	-	-	-	-
A-B	0.61	9.08	0.61	0.00	-	-	-	-	-	-
A-C	13.98	209.74	13.98	0.00	-	-	-	-	-	-

Main results: (08:45-09:00)

Stream	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
B-AC	0.17	2.48	0.17	0.00	3.92	0.042	0.09	0.04	15.996	C

C-AB	2.05	30.78	2.09	0.00	17.52	0.117	0.85	0.28	3.903	A
C-A	13.10	196.44	13.10	0.00	-	-	-	-	-	-
A-B	0.49	7.42	0.49	0.00	-	-	-	-	-	-
A-C	11.42	171.26	11.42	0.00	-	-	-	-	-	-

Main results: (09:00-09:15)

Stream	Total Demand (Veh/min)	Junction Arrivals (Veh)	Entry Flow (Veh/min)	Pedestrian Demand (Ped/min)	Capacity (Veh/min)	RFC	Start Queue (Veh)	End Queue (Veh)	Delay (s)	LOS
B-AC	0.14	2.08	0.14	0.00	4.93	0.028	0.04	0.03	12.538	B
C-AB	1.21	18.16	1.22	0.00	15.96	0.076	0.28	0.14	4.075	A
C-A	11.47	172.12	11.47	0.00	-	-	-	-	-	-
A-B	0.41	6.21	0.41	0.00	-	-	-	-	-	-
A-C	9.56	143.42	9.56	0.00	-	-	-	-	-	-

Queueing Delay Results for each time segment

Queueing Delay results: (07:45-08:00)

Stream	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-AC	0.41	0.03	12.507	B	B

C-AB	2.00	0.13	4.065	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

Queueing Delay results: (08:00-08:15)

Stream	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-AC	0.62	0.04	15.924	C	B
C-AB	3.98	0.27	3.882	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

Queueing Delay results: (08:15-08:30)

Stream	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-AC	1.24	0.08	26.813	D	C
C-AB	12.42	0.83	3.872	A	A
C-A	-	-	-	-	-

A-B	-	-	-	-	-
A-C	-	-	-	-	-

Queueing Delay results: (08:30-08:45)

Stream	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-AC	1.33	0.09	26.983	D	C
C-AB	12.97	0.86	3.894	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

Queueing Delay results: (08:45-09:00)

Stream	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-AC	0.71	0.05	15.996	C	B
C-AB	4.34	0.29	3.903	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

Queueing Delay results: (09:00-09:15)

Stream	Queueing Total Delay (Veh-min)	Queueing Rate Of Delay (Veh-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
B-AC	0.46	0.03	12.538	B	B
C-AB	2.12	0.14	4.075	A	A
C-A	-	-	-	-	-
A-B	-	-	-	-	-
A-C	-	-	-	-	-

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

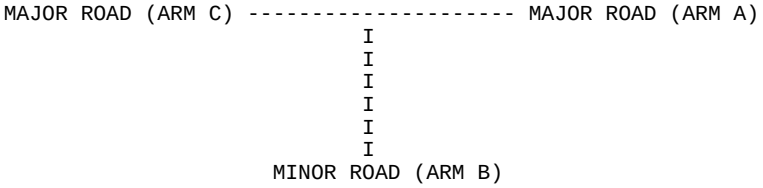
Run with file:-
"I:\PB2420\Technical_Data\Calculations\PICADY\Proposed Access Jct\
Revised Base + Development Cumulative Traffic Flows PM Peak 1700_1800_2.vpi"
(drive-on-the-left) at 16:24:57 on Thursday, 14 May 2015

RUN INFORMATION

RUN TITLE	: Revised Base + Development Cumulative Traffic PM Peak 17:00-18:00
LOCATION	:
DATE	: 21/11/14
CLIENT	:
ENUMERATOR	: 310037 [L06146]
JOB NUMBER	: PB2420
STATUS	:
DESCRIPTION	:

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Camp Road (W)
ARM B IS New Access
ARM C IS Camp Road (E)

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) 6.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B)150.00 M.
- BLOCKS TRAFFIC (SPACES)	YES (0)
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 76.0 M.
- VISIBILITY TO RIGHT	(VB-A) 160.0 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 Opposing STREAM A-C	Slope For Opposing STREAM A-B
724.66	0.28	0.11

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
582.80	0.27	0.11	0.17	0.38

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
660.83	0.26	0.26

(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: Revised Base + Development Cumulative Traffic PM Peak 17:00-18:00

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	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00		4.75	7.13	4.75
ARM B	15.00	45.00	75.00		1.08	1.61	1.08
ARM C	15.00	45.00	75.00		8.54	12.81	8.54

Demand set: Revised Base + Development Cumulative Traffic PM Peak 17:00-18:00

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.018	0.982
		0.0	7.0	373.0
		(0.0)	(10.0)	(10.0)
	ARM B	0.384	0.000	0.616
		33.0	0.0	53.0
		(10.0)	(0.0)	(10.0)
	ARM C	0.984	0.016	0.000
		672.0	11.0	0.0
		(10.0)	(10.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-AC	1.08	7.88	0.137		0.00	0.16	2.3		0.15
C-AB	0.29	14.12	0.021		0.00	0.02	0.4		0.07
C-A	8.28								
A-B	0.09								
A-C	4.68								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-AC	1.29	7.43	0.173		0.16	0.21	3.0		0.16
C-AB	0.39	14.84	0.026		0.02	0.03	0.5		0.07
C-A	9.84								
A-B	0.10								
A-C	5.59								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-AC	1.58	6.77	0.233		0.21	0.30	4.3		0.19
C-AB	0.67	16.38	0.041		0.03	0.06	0.9		0.06
C-A	11.87								
A-B	0.13								
A-C	6.84								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-AC	1.58	6.77	0.233		0.30	0.30	4.5		0.19
C-AB	0.67	16.39	0.041		0.06	0.06	0.9		0.06
C-A	11.86								
A-B	0.13								
A-C	6.84								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-AC	1.29	7.43	0.173		0.30	0.21	3.3		0.16
C-AB	0.39	14.84	0.026		0.06	0.03	0.5		0.07
C-A	9.84								
A-B	0.10								
A-C	5.59								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-AC	1.08	7.88	0.137		0.21	0.16	2.5		0.15
C-AB	0.29	14.12	0.021		0.03	0.03	0.4		0.07
C-A	8.28								
A-B	0.09								
A-C	4.68								

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	0.0
17.15	0.0
17.30	0.1
17.45	0.1
18.00	0.0
18.15	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-AC	118.4	78.9	19.9	0.17	19.9	0.17
C-AB	40.6	27.0	3.5	0.09	3.5	0.09
C-A	899.5	599.7				
A-B	9.6	6.4				
A-C	513.4	342.3				
ALL	1581.5	1054.3	23.4	0.01	23.4	0.01

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

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

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

Printed at 16:25:16 on 14/05/2015]

Appendix H

```
                    _____ 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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                    Wokingham, Berks.      Web:   www.trlsoftware.co.uk
                    RG40 3GA,UK

 -------------------------------------------------------------------------------
  THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
  IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS  OF THE SOLUTION
 -------------------------------------------------------------------------------

 Run with file:-
 "i:\PB2420\Technical_Data\Calculations\ARCADY\WDAM.FLAT.PB2420.vai"
(drive-on-the-left ) at 17:34:28 on Monday, 16 March 2015


.FILE PROPERTIES
 ***************

    RUN TITLE: PB2420 Revised Base + Development Cumulative Flows Weekday AM Peak
     LOCATION:
         DATE: 04/02/15
       CLIENT:
  ENUMERATOR: 310037 [L06146]
  JOB NUMBER: PB2420
       STATUS:
 DESCRIPTION:

.INPUT DATA
 **********
 ARM A - Camp Road (W)
 ARM B - Chilgrove Drive
 ARM C - Unnamed Road
 ARM D - Camp Road (S)

.GEOMETRIC DATA
 --------------


 ------------------------------------------------------------------------------------------------------------------------
----- T5
 I ARM    I   V (M)   I    E (M)   I    L (M)   I    R (M)   I     D (M) I   PHI (DEG)  I  SLOPE  I INTERCEPT
(PCU/MIN) I
 ------------------------------------------------------------------------------------------------------------------------
-----
 I ARM  A I    3.00   I     4.50   I     6.00   I    16.00   I   28.00   I     50.0     I  0.504  I       17.778
I
 I ARM  B I    3.10   I     4.50   I     3.00   I    10.00   I   28.00   I     50.0     I  0.475  I       16.303
I
 I ARM  C I    3.00   I     4.60   I     7.00   I    20.00   I   28.00   I     40.0     I  0.536  I       19.129
I
 I ARM  D I    3.00   I     4.50   I     4.20   I    21.00   I   28.00   I     38.0     I  0.527  I       18.210
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(08.00)AND ENDS(09.00)
.LENGTH OF TIME PERIOD -(  60) MINUTES
.LENGTH OF TIME SEGMENT - (15) MINUTES

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE FOLLOWING INPUT DATA -


.DEMAND SET TITLE: PB2420 Revised Base + Development Cumulative Flows Weekday AM Peak
 ---------------------------------------------------------------------------------------------------------
 I        I TIME WHEN         I TIME WHEN         I  TIME WHEN       I   RATE OF FLOW (VEH/MIN)          I
 I  ARM   I FLOW STARTS       I TOP OF PEAK       I FLOW STOPS       I BEFORE      IAT TOP    I AFTER    I
 I        I   TO RISE         I IS REACHED        I FALLING          I  PEAK       I OF PEAK  I PEAK     I
 ---------------------------------------------------------------------------------------------------------
 I ARM  A I        08.00      I        08.15      I        08.45     I 12.76      I  12.77    I 12.76    I
 I ARM  B I        08.00      I        08.15      I        08.45     I  0.01      I   0.02    I  0.01    I
```

I ARM C I	08.00	I	08.15	I	08.45	I 11.42 I 11.43 I 11.42 I
I ARM D I	08.00	I	08.15	I	08.45	I 5.67 I 5.68 I 5.67 I

DEMAND SET TITLE: PB2420 Revised Base + Development Cumulative Flows Weekday AM Peak

T33

TIME	FROM/T	ARM A	ARM B	ARM C	ARM D
08.00 - 09.00					
	ARM A	0.000	0.001	0.419	0.580
		0.0	1.0	321.0	444.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM B	0.000	0.000	0.000	1.000
		0.0	0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.985	0.000	0.000	0.015
		676.0	0.0	0.0	10.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM D	0.982	0.000	0.018	0.000
		335.0	0.0	6.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
ARM A	12.77	17.73	0.720	- -	0.0	2.5	33.5	-	0.189
ARM B	0.02	10.28	0.002	- -	0.0	0.0	0.0	-	0.097
ARM C	11.43	15.21	0.751	- -	0.0	2.8	37.7	-	0.241
ARM D	5.68	12.37	0.459	- -	0.0	0.8	11.8	-	0.147
08.15-08.30									
ARM A	12.77	17.73	0.720	- -	2.5	2.5	37.4	-	0.201
ARM B	0.02	10.20	0.002	- -	0.0	0.0	0.0	-	0.098
ARM C	11.43	15.16	0.754	- -	2.8	3.0	43.6	-	0.266
ARM D	5.68	12.28	0.463	- -	0.8	0.9	12.7	-	0.151
08.30-08.45									
ARM A	12.76	17.73	0.720	- -	2.5	2.5	37.9	-	0.201
ARM B	0.01	10.20	0.001	- -	0.0	0.0	0.0	-	0.098
ARM C	11.42	15.16	0.754	- -	3.0	3.0	44.6	-	0.268
ARM D	5.67	12.28	0.462	- -	0.9	0.9	12.8	-	0.151
08.45-09.00									
ARM A	12.76	17.73	0.720	- -	2.5	2.5	38.1	-	0.201
ARM B	0.01	10.20	0.001	- -	0.0	0.0	0.0	-	0.098
ARM C	11.42	15.16	0.753	- -	3.0	3.0	44.9	-	0.267
ARM D	5.67	12.28	0.462	- -	0.9	0.9	12.8	-	0.151

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	2.5	**
08.30	2.5	***
08.45	2.5	***
09.00	2.5	***

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE

08.15	0.0	
08.30	0.0	
08.45	0.0	
09.00	0.0	

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.15	2.8	***
08.30	3.0	***
08.45	3.0	***
09.00	3.0	***

.QUEUE AT ARM D

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

.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	765.9	765.9	146.8	0.19	147.0	0.19
B	0.9	0.9	0.1	0.10	0.1	0.10
C	685.5	685.5	170.8	0.25	171.1	0.25
D	340.5	340.5	50.1	0.15	50.1	0.15
ALL	1792.8	1792.8	367.8	0.21	368.3	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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RG40 3GA,UK

Run with file:-
"i:\PB2420\Technical_Data\Calculations\ARCADY\16 March 2015\WDPM.FLAT.PB2420.vai"
(drive-on-the-left) at 15:57:26 on Thursday, 14 May 2015

FILE PROPERTIES

RUN TITLE: PB2420 Revised Base + Development Cumulative Flows Weekday PM Peak
LOCATION:
DATE: 04/02/15
CLIENT:
ENUMERATOR: 310037 [L06146]
JOB NUMBER: PB2420
STATUS:
DESCRIPTION:

INPUT DATA

ARM A - Camp Road (W)
ARM B - Chilgrove Drive
ARM C - Unnamed Road
ARM D - Camp Road (S)

GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.00	4.50	6.00	16.00	28.00	50.0	0.504	17.778
ARM B	3.10	4.50	3.00	10.00	28.00	50.0	0.475	16.303
ARM C	3.00	4.60	7.00	20.00	28.00	40.0	0.536	19.129
ARM D	3.00	4.50	4.20	21.00	28.00	38.0	0.527	18.210

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(17.00)AND ENDS(18.00)

LENGTH OF TIME PERIOD -(60) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE FOLLOWING INPUT DATA -

DEMAND SET TITLE: PB2420 Revised [2] Base + Development Cumulative Flows Weekday AM Peak

ARM	TIME WHEN FLOW STARTS TO RISE	TIME WHEN TOP OF PEAK IS REACHED	TIME WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	17.00	17.15	17.45	15.09	15.10	15.09
ARM B	17.00	17.15	17.45	0.01	0.02	0.01
ARM C	17.00	17.15	17.45	5.02	5.03	5.02
ARM D	17.00	17.15	17.45	6.59	6.60	6.59

DEMAND SET TITLE: PB2420 Revised [2] Base + Development Cumulative Flows Weekday AM Peak

T33

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

TIME	FROM/T	ARM A	ARM B	ARM C	ARM D
17.00 - 18.00	ARM A	0.000	0.002	0.532	0.466
		0.0	2.0	482.0	422.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM B	1.000	0.000	0.000	0.000
		0.0	0.0	0.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM C	0.974	0.000	0.000	0.026
		294.0	0.0	0.0	8.0
		(0.0)	(0.0)	(0.0)	(0.0)
	ARM D	0.980	0.003	0.018	0.000
		388.0	1.0	7.0	0.0
		(0.0)	(0.0)	(0.0)	(0.0)

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME	ARM	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15										
	ARM A	15.10	17.71	0.852	- -	0.0	5.0	62.7	-	0.310
	ARM B	0.02	9.25	0.002	- -	0.0	0.0	0.0	-	0.108
	ARM C	5.03	15.44	0.326	- -	0.0	0.5	6.9	-	0.096
	ARM D	6.60	15.64	0.422	- -	0.0	0.7	10.4	-	0.109
17.15-17.30										
	ARM A	15.10	17.71	0.853	- -	5.0	5.3	78.2	-	0.373
	ARM B	0.02	9.10	0.002	- -	0.0	0.0	0.0	-	0.110
	ARM C	5.03	15.36	0.327	- -	0.5	0.5	7.2	-	0.097
	ARM D	6.60	15.62	0.423	- -	0.7	0.7	10.9	-	0.111
17.30-17.45										
	ARM A	15.09	17.71	0.852	- -	5.3	5.5	81.3	-	0.375
	ARM B	0.01	9.10	0.001	- -	0.0	0.0	0.0	-	0.110
	ARM C	5.02	15.36	0.327	- -	0.5	0.5	7.3	-	0.097
	ARM D	6.59	15.62	0.422	- -	0.7	0.7	10.9	-	0.111
17.45-18.00										
	ARM A	15.09	17.71	0.852	- -	5.5	5.5	82.6	-	0.378
	ARM B	0.01	9.10	0.001	- -	0.0	0.0	0.0	-	0.110
	ARM C	5.02	15.36	0.327	- -	0.5	0.5	7.3	-	0.097
	ARM D	6.59	15.63	0.422	- -	0.7	0.7	10.9	-	0.111

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	5.0	*****
17.30	5.3	*****
17.45	5.5	*****
18.00	5.5	******

QUEUE AT ARM B

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

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.15	0.5
17.30	0.5
17.45	0.5
18.00	0.5

QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.15	0.7	*
17.30	0.7	*
17.45	0.7	*
18.00	0.7	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *		T75
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)	
A	905.7	905.7	304.7	0.34	305.6	0.34	
B	0.9	0.9	0.1	0.11	0.1	0.11	
C	301.5	301.5	28.7	0.10	28.7	0.10	
D	395.7	395.7	43.1	0.11	43.1	0.11	
ALL	1603.8	1603.8	376.6	0.23	377.5	0.24	

* 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

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

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Appendix I

Project Wings
Development Traffic - Sensitivity Test

Floor Area

10637 sqm B2
9844 sqm B8

	B2 & B1 Floor Area						B8 Floor Area						Total			Parking
	Trip Rates			Trips			Trip Rates			Trips						
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
05:00-06:00	0	0	0	0	0	0	0.018	0.04	0.058	2	4	6	2	4	6	0
06:00-07:00	0.149	0.044	0.193	16	5	21	0.058	0.063	0.121	6	6	12	22	11	32	11
07:00-08:00	0.371	0.057	0.428	39	6	46	0.087	0.051	0.138	9	5	14	48	11	59	48
08:00-09:00	0.46	0.072	0.532	49	8	57	0.08	0.046	0.126	8	5	12	57	12	69	92
09:00-10:00	0.166	0.082	0.248	18	9	26	0.07	0.052	0.122	7	5	12	25	14	38	103
10:00-11:00	0.093	0.082	0.175	10	9	19	0.052	0.052	0.104	5	5	10	15	14	29	104
11:00-12:00	0.075	0.068	0.143	8	7	15	0.052	0.051	0.103	5	5	10	13	12	25	105
12:00-13:00	0.095	0.162	0.257	10	17	27	0.063	0.063	0.126	6	6	12	16	23	40	98
13:00-14:00	0.201	0.125	0.326	21	13	35	0.1	0.078	0.178	10	8	18	31	21	52	108
14:00-15:00	0.12	0.178	0.298	13	19	32	0.081	0.103	0.184	8	10	18	21	29	50	100
15:00-16:00	0.064	0.155	0.219	7	16	23	0.078	0.097	0.175	8	10	17	14	26	41	88
16:00-17:00	0.079	0.358	0.437	8	38	46	0.064	0.095	0.159	6	9	16	15	47	62	55
17:00-18:00	0.046	0.382	0.428	5	41	46	0.033	0.088	0.121	3	9	12	8	49	57	14
18:00-19:00	0.026	0.142	0.168	3	15	18	0.016	0.048	0.064	2	5	6	4	20	24	0
19:00-20:00	0.044	0.132	0.176	5	14	19	0.036	0.031	0.067	4	3	7	8	17	25	0
20:00-21:00	0	0	0	0	0	0	0.013	0.031	0.044	1	3	4	1	3	4	0
21:00-22:00	0	0	0	0	0	0	0.031	0.018	0.049	3	2	5	3	2	5	1
Daily Trip Rates:	1.989	2.039	4.028	212	217	428	1	1	2	90	95	185	302	312	614	

EP Barrus - Upper Heyford
Parking Accumulation - Based on Survey of Existing Site

	Trips In	Trips Out	Accumulation	Utilisation	Pro rata Uplift			B8 Trips		
					Trips In	Trips Out	Accumulation	Trips In	Trips Out	Accumulation
0700-0800	21	2	19	13%	30	3	28	9	5	4
0800-0900	37	4	52	35%	54	6	75	8	5	7
0900-1000	50	9	93	62%	73	13	135	7	5	9
1000-1100	16	9	100	67%	23	13	145	5	5	9
1100-1200	2	10	92	62%	3	15	133	5	5	9
1200-1300	4	15	81	54%	6	22	117	6	6	9
1300-1400	19	21	79	53%	28	30	115	10	8	11
1400-1500	21	21	79	53%	30	30	115	8	10	9
1500-1600	11	16	74	50%	16	23	107	8	10	7
1600-1700	5	12	67	45%	7	17	97	6	9	4
1700-1800	10	53	24	16%	15	77	35	3	9	-2

spaces= 149 Main Site
11 Service Yard

APPENDIX J

A1

13087 / P-20 - D

Client
EP BARRUS LTD

C:\Revit\local\2015\13087_Site_Plan (central)_jandrewhall552.rvt

Index	Revision	Date	Int	Chk'd
D	Phase1 warehouse parking amended	15/05/14	AH	-

Phase 2

indicitive only - subject to reserved matters

Phase 1

bus stop

Balancing Pond

CAMP ROAD

Motorcycle spaces

visibility splay

Bicycle shelter 11 stands (22 cycles)

landscaping as HED's drawings

Offices & Training School

over two floors
3,000 m²
32,293 ft²

Production
9,137 m²
98,350 ft²

rainwater storage tanks

Means of escape and maintenance access path

Warehouse
9,844 m²
105,960 ft²

IN

ground mounted photo-voltaic panels

Generator & incoming services

Service Yard

CHILGROVE DRIVE

Legend

- Phase 1
- Phase 2

N

0 5 20m
1:500

APPROXIMATE NORTH

LYONS+SLEEMAN+HOARE | **Architects**

Nero Brewery, Cricket Green, Hartley Wintney, Hants RG27 8QA
Tel: 01252 844144 Fax: 01252 844800 Web: www.lsharch.co.uk

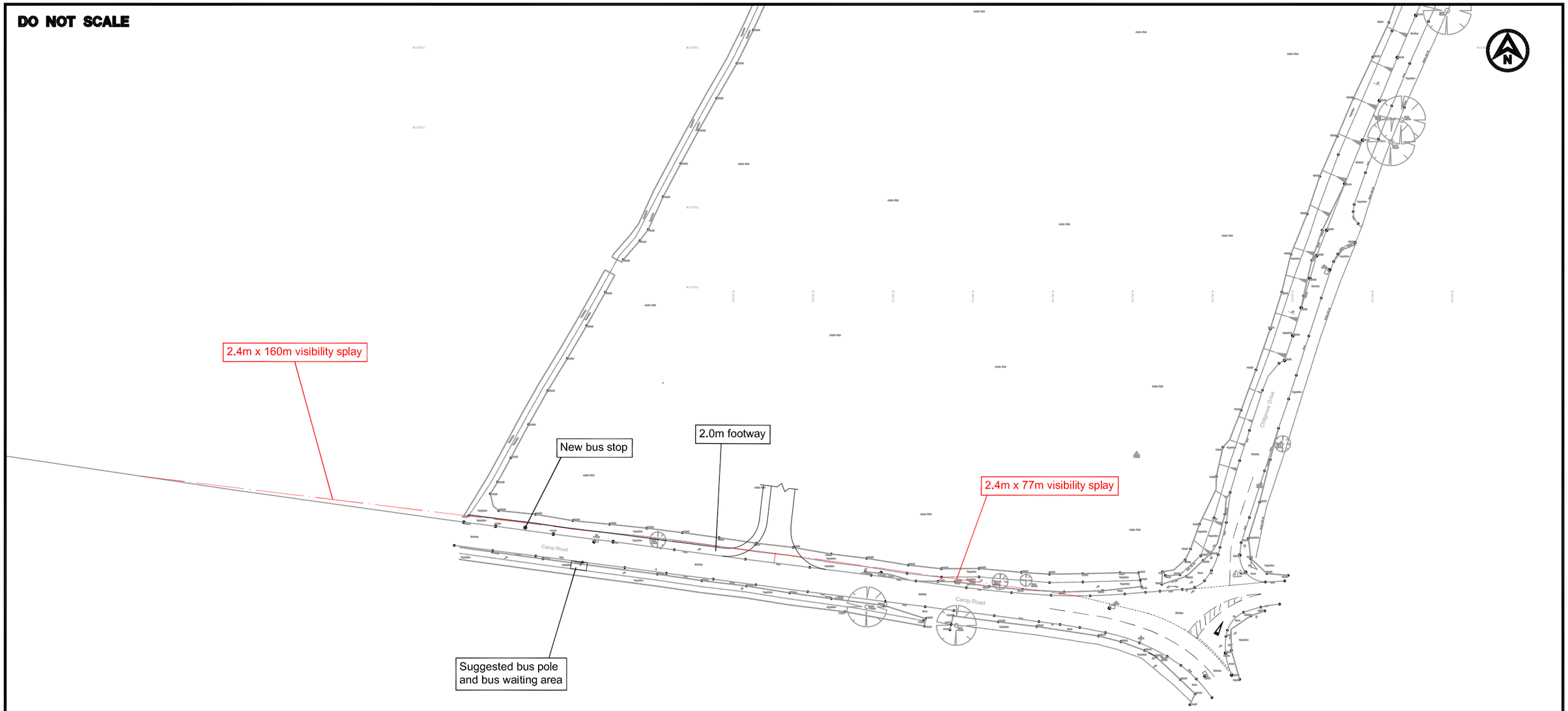
Land to the West of Chilgrove Drive & North of Camp Road, Upper Heyford

Job N	Drg N	Rev	Scale	Status	Job
13087	P-20	D	1 : 500	PLANNING	Land to the West of Chilgrove Drive & North of Camp Road, Upper Heyford
Date		**Director**	**Author**	**Check**	**Drawing**
09/12/14		SA	LF	AH	PROPOSED SITE PLAN - PHASES 1 AND 2

NOTE: All figures are approximate and have been measured and expressed in a manner as defined by the current edition of the RICS/SVA Code of Measuring Practice. Figures relate to the current stage of the project and any development decisions to be made on the basis of this information should include due allowance for the increases and decreases inherent in the design and building processes. Reproduced from Ordnance Survey mapping under Licence Numbers AR1523/78 & 100020449

This drawing may be scaled or cross referenced to the scale bar for Planning Application purposes only. Do not scale for any other purpose, use figured dimensions only. Subject to site survey and all necessary consents. All dimensions to be checked by the user and any discrepancies, errors or omissions to be reported to the Architect before work commences. This drawing is to be read in conjunction with all other relevant materials.

DO NOT SCALE



This drawing has been based upon survey information supplied by Tower Surveys Ltd, and HaskoningDHV UK Ltd can not guarantee the accuracy of data.

TITLE: VISIBILITY SPLAY PROVISION	PROJECT: PROJECT WINGS	Royal HaskoningDHV Enhancing Society Together	JOB No. PB2420	DATE MAR 15	SCALE 1:1000
			DRAWN DH	CHECKED IRF	PASSED IRF
			AUTOCAD REF.	DRG No. PB2420/02	REV P1

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