Technical Note 10

Version 0

Project:	**M7 Naas to Newbridge By-Pass Upgrade Scheme**	Job No:	**60241946**
Subject:	**M7 Interchanges – Capacity Assessment**		
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1.0 Overview

As part of the proposed M7 Naas to Newbridge By-Pass Upgrade Scheme the capacity and operation of the motorway interchanges impacted upon by the scheme were assessed. This note provides an overview of the capacity assessments and junction analysis that was undertaken as part of the overall traffic assessment for the proposed scheme.

The impact of the proposed M7 Osberstown and R407 Sallins Bypass Scheme upon the capacity and operation of the M7 interchanges is also discussed in this note.

2.0 Background

The M7 mainline carriageway between the M7/M9 and Maudlins Interchanges experiences congestion particularly during the morning and evening peak periods. Along this section of the M7 there are three motorway interchanges which are directly impacted upon by the operation of the M7 mainline carriageway. These interchanges are as follows:

- M7/M9 Interchange (J11);
- Newhall Interchange (J10); and
- Maudlins Interchange (J9).

The location of the interchanges is illustrated in Figure 2-1. This note assesses the existing capacity of the three interchanges. It then assesses and discusses the future capacity and operational performance of the interchanges, with and without the proposed M7 Naas to Newbridge By-Pass Upgrade Scheme in place.

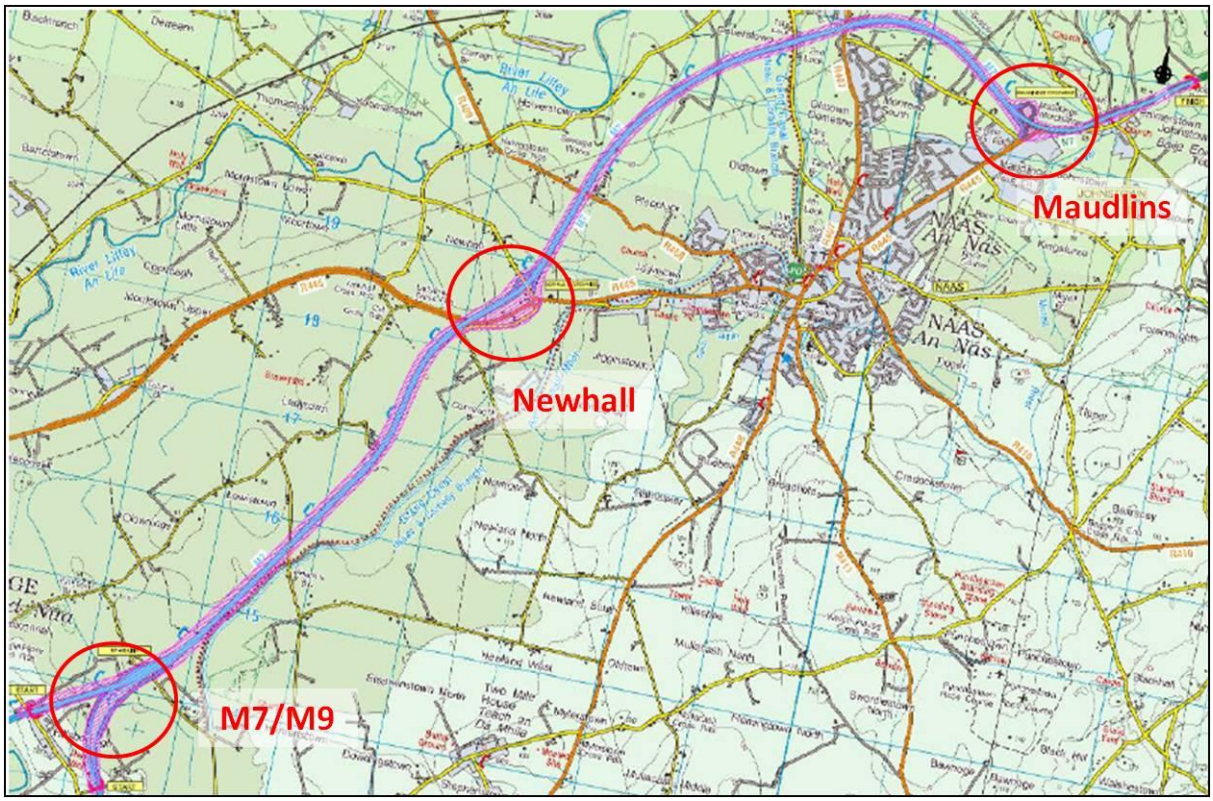


Figure 2-1 Location of Interchanges

3.0 Modelling Tools

In order to assess the operation and capacity of the three M7 interchanges which are impacted upon by the Naas to Newbridge By-Pass Upgrade Scheme a number of modelling tools were utilised. A micro-simulation model of the M7 corridor was developed using the micro-simulation software VISSIM. The extents of the VISSIM modelled network (base year) is shown in Figure 3-1.

One of the most difficult sections of a motorway to analyse is the merging and diverging sections between the mainline carriageway and the motorway interchanges, where the majority of vehicle conflicts and vehicle interaction occur. Micro-simulation models allow the assessment of merging and diverging impacts associated with motorway interchanges to be modelled.

They also allow the interaction of adjacent junctions to be modelled and assessed in terms of their overall operation and relationship. A Traffic Modelling Report (TMR) has been developed as part of this study which outlines the development, calibration and validation of the micro-simulation models and is included as Appendix A to this note.

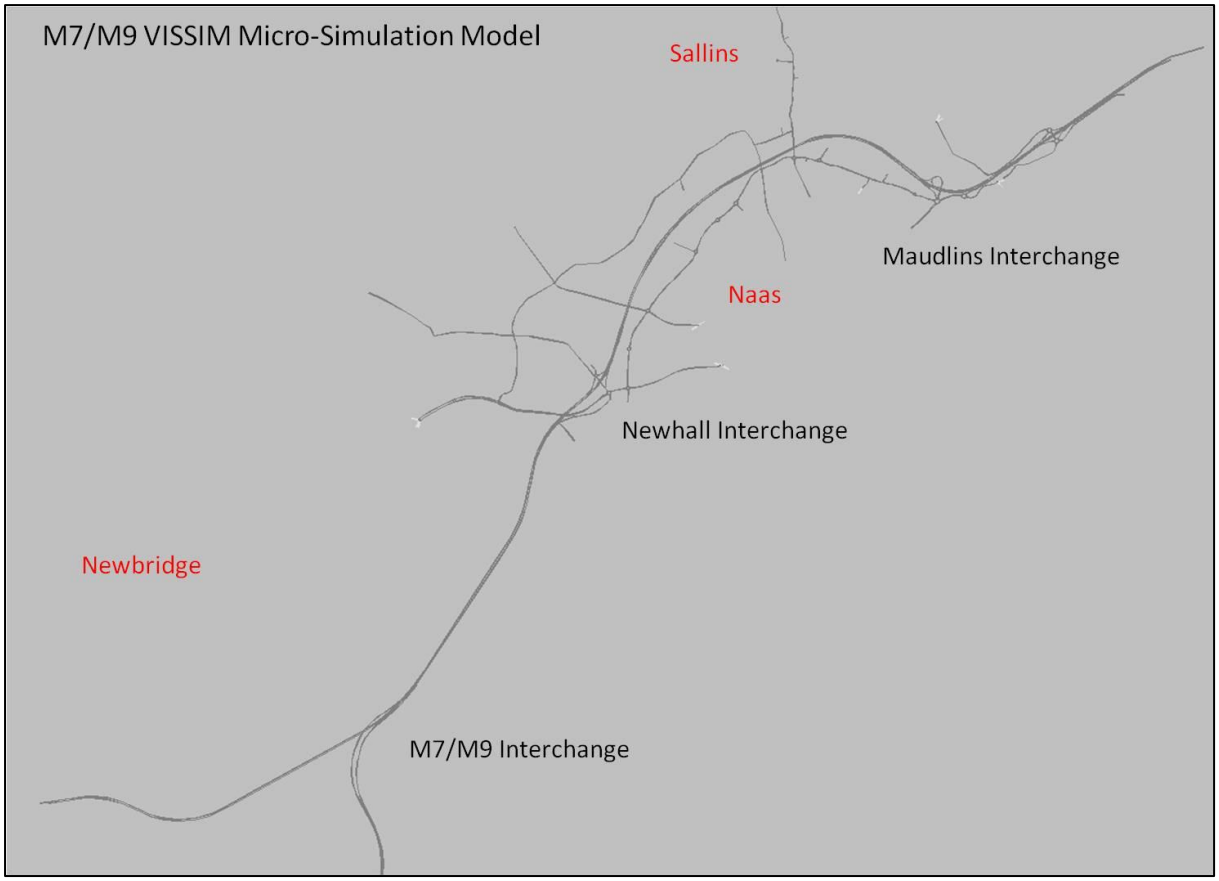


Figure 3-1 Extents of Micro-Simulation Road Network

The individual junction modelling tools ARCADY and PICADY were also used as part of the assessment in order to assess the capacity of the various junctions that form part of the interchanges. ARCADY, which is used to assess the performance of un-signailsed roundabouts and PICADY, which is used to assess the performance of un-signalised priority junctions were used to demonstrate the performance of the existing and proposed junctions.

It should be noted that the ARCADY and PICADY assessments are only intended to be supplementary to the assessment of the capacity of the interchanges. These modelling tools only assess junctions in isolation and therefore take no account of the effect of adjoining junctions.

4.0 M7/M9 Interchange (M7 Junction 11)

4.1 Existing Conditions

The M7/M9 Interchange is illustrated in Figure 4-1, due to its layout there are restricted movements between the M7 and M9. Vehicles cannot travel between the M7 west of the M7/M9 Interchange (Arm 1) and the M9 (Arm 3). The capacity and operation of the junction was assessed using the micro-simulation model as the key issues at this interchange relate to the merging and diverging of traffic during the morning and evening peak hours.

During the AM peak hour (08:00 – 09:00) over 1,200 vehicles from the M9 (Arm 3) merge with over 1,900 vehicles on the M7 (Arm 2), generating a flow of traffic of approximately 3,100 vehicles on the M7 eastbound. It should be noted that this data is taken from the NRA traffic counters on the M7 to the east and west of the M7/M9 Interchange and reflects the average weekday AM peak hour in March 2014.

The theoretical capacity of one motorway lane is approximately 1,600 vehicles[1] per hour operating at a level of service D, with the transition into flow breakdown occurring as low as 1,500 vehicles. Flow breakdown describes the transition from free flowing traffic conditions to congested traffic. Based on this, the capacity of the M7 east of the M7/M9 Interchange in general traffic would be 3,200 vehicles which is at present almost being reached. When the high level of merging traffic is taken into account the flow of traffic at this location in the morning peak can be very turbulent.

Recent works at M7/M9 interchange to improve the merging of traffic from the M9 to the M7 (Arm 3 to 2) saw the introduction of a ‘ghost island merge’ which splits the merging traffic from the M9 and provides two separate merge lanes where traffic from the M9 can merge with mainline traffic on the M7. While these works improved the operation of the merge, the limited capacity of the M7 mainline restricts the full benefits of the ghost island merge.

[1] A Study of Lane Capacity in the Greater Dublin Area, NRA (February 2012) http://www.nra.ie/policy-publications/transport-research-and-in/

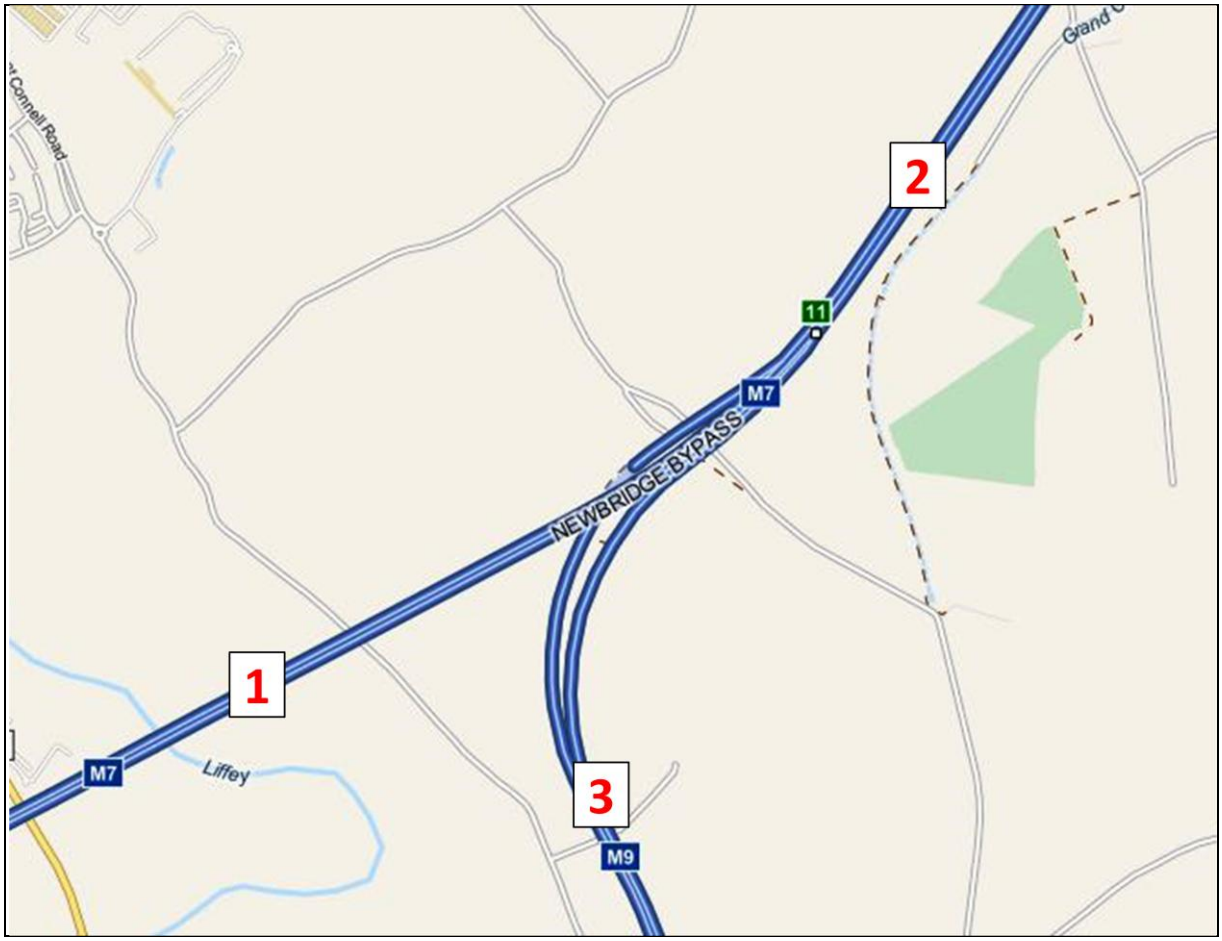


Figure 4-1: M7/M9 Interchange

In the westbound direction during the evening peak hour (17:00 – 18:00) flows of approximately 3,600 vehicles were recorded on the M7 during the average weekday in March 2014. As outlined above this is above the capacity of two lanes of motorway operating under general conditions at a level of service D. With approximately 1,300 of these vehicles trying to diverge onto the M9, the operation and traffic flow on this section of the M7 is severally disrupted.

It is clear from the observed data outlined above that the operation of the M7/M9 Interchange at present is severally impacted upon by the limited capacity of the M7 to the east of the interchange.

4.2 Future Traffic and Capacity Impacts

During the morning peak hour traffic flow in the eastbound carriageway is forecast to increase from 3,100 vehicles per hour in 2014 to 4,000 vehicles per hour in 2030 (Do-Minimum scenario). With the proposed scheme in place (Do-Something scenario) flows are forecast to increase to 4,200 vehicles per hour.

The additional traffic on the M7 with the proposed scheme in place is as a result of traffic rerouting from the regional road network (R445 and R448) due the additional capacity of the motorway. The additional capacity as a result of the proposed widening of the M7 will increase the capacity of the carriageway to approximately 4,800 vehicles per hour in both directions

In the evening peak hour traffic flow on the M7 travelling in the westbound carriageway is forecast to increase from 3,600 vehicles per hour in 2014 to 4,100 vehicles per hour in 2030. With the proposed scheme in place flows on the M7 at this location are forecast to increase to 4,400 vehicles per hour. As outlined above the additional capacity of the M7 as a result of the widening will increase the capacity of this section of the M7 to approximately 4,800 vehicles per hour.

Table 4-1 below illustrates the 2014 observed and the forecast 2030 Do-Minimum and Do-Something peak hour flows on the M7 east of the M7/M9 Interchange.

Table 4-1 Peak Hour Traffic - M7 East of the M7/M9 Interchange

Scenario	M7 Eastbound	M7 Westbound
	AM Peak Hour Vehicles*	PM Peak Hour Vehicles*
2014 Observed	3,100	3,600
2030 Do-Minimum	4,000	4,100
2030 Do-Something	4,200	4,400
2030 Capacity (3 lanes)	4,800	4,800

**Highest Peak Flows in Direction*

The operation of the interchange in 2030, particularly the merging and diverging movements were assessed using the micro-simulation traffic models. The models indicated the there would be no merging or diverging impacts at this location which disrupted the flow of traffic on the M7 mainline carriageway.

The additional capacity at this location in the eastbound and westbound direction associated with the widening of the M7 from 2 lanes to 3 lanes will allow for both the safe merging and diverging of traffic between the M7 and M9.

4.3 Cumulative Impact of M7 Osberstown Interchange and R407 Sallins Bypass Scheme

The traffic modelling process has indicated that the introduction of the Osberstown Interchange will increase flow on the M7 at this location. This is as a result of traffic transferring from the local and regional road network to the M7 due to the improved accessibility to Naas and Sallins that the proposed M7 Osberstown Interchange and R407 Sallins Bypass Scheme delivers.

During the morning peak, flows in the eastbound direction are forecast to increase by 1%. In the westbound direction flows are forecast to increase by 3% in the PM peak. As demonstrated above the additional capacity of the M7 as a result of the widening will readily cater for the additional traffic associated with M7 Osberstown Interchange.

4.4 M7/M9 Interchange Summary

The existing and proposed capacity of the M7/M9 Interchange was assessed using the M7 VISSIM micro-simulation models. The models demonstrated that:

- The existing capacity issue at the interchange are related to the limited capacity of the M7 mainline carriageway to the east M7/M9 Interchange;
- The introduction of a 3rd lane on the M7 eastbound carriageway allows for safer merging of traffic from the M9;

- The additional capacity of the M7 in the westbound direction allows the safe diverging of traffic from the M7 to the M9;
- Average speeds along this section improve during the peak hours as a result of the additional lane; and
- There are no additional capacity issues associated with the M7/M9 Interchange with the proposed M7 Osberstown Interchange and R407 Sallins Bypass in place.

Therefore **no further improvements** beyond the widening of the M7 are required at the M7/M9 Interchange.

5.0 Newhall Interchange (M7 Junction 10)

5.1 Existing Conditions

Newhall Interchange is one of the main access points for traffic accessing Naas and Newbridge via the M7 motorway, the layout of the interchange is illustrated in Figure 5-1. Traffic currently experiences significant delays and queuing during both the morning and evening peak hours, particularly on the M7 off ramps. The main junctions that impact upon the operation of the interchange are as follows:

- Junction 1 – M7 Business Park roundabout;
- Junction 2 – M7 westbound off ramp priority junction; and
- Junction 3 – Bundle of Sticks roundabout.

Due to high traffic volumes during the morning and evening peak hours and the close proximity of these junctions, queuing on one arm of a junction can significantly impact upon the operation of another junction. Owing to the complexity of the interchange and interaction of the various junctions, the main tool for assessing the capacity and operational performance of the interchange was the micro-simulation models.

Figure 5-1: Newhall Interchange

5.1.1 M7 Business Park Roundabout

The M7 Business Park roundabout is a five arm single lane roundabout and is illustrated in Figure 5-2. During the morning peak hour over 1,700 vehicles pass through the roundabout. The priority movement during this peak hour is the right turn movement for the M7 overbridge (Arm C) to the M7 eastbound on ramp (Arm B), where approximately 400 vehicles from Naas and Newbridge travel eastbound towards Dublin.

This priority movement conflicts with the 640 vehicles on the M7 westbound off ramp (Arm D), the majority of which are trying to access Naas and Newbridge via the M7 overbridge (Arm C). This conflict leads to extensive queuing on the off ramp which extends back on the M7 mainline hard shoulder.

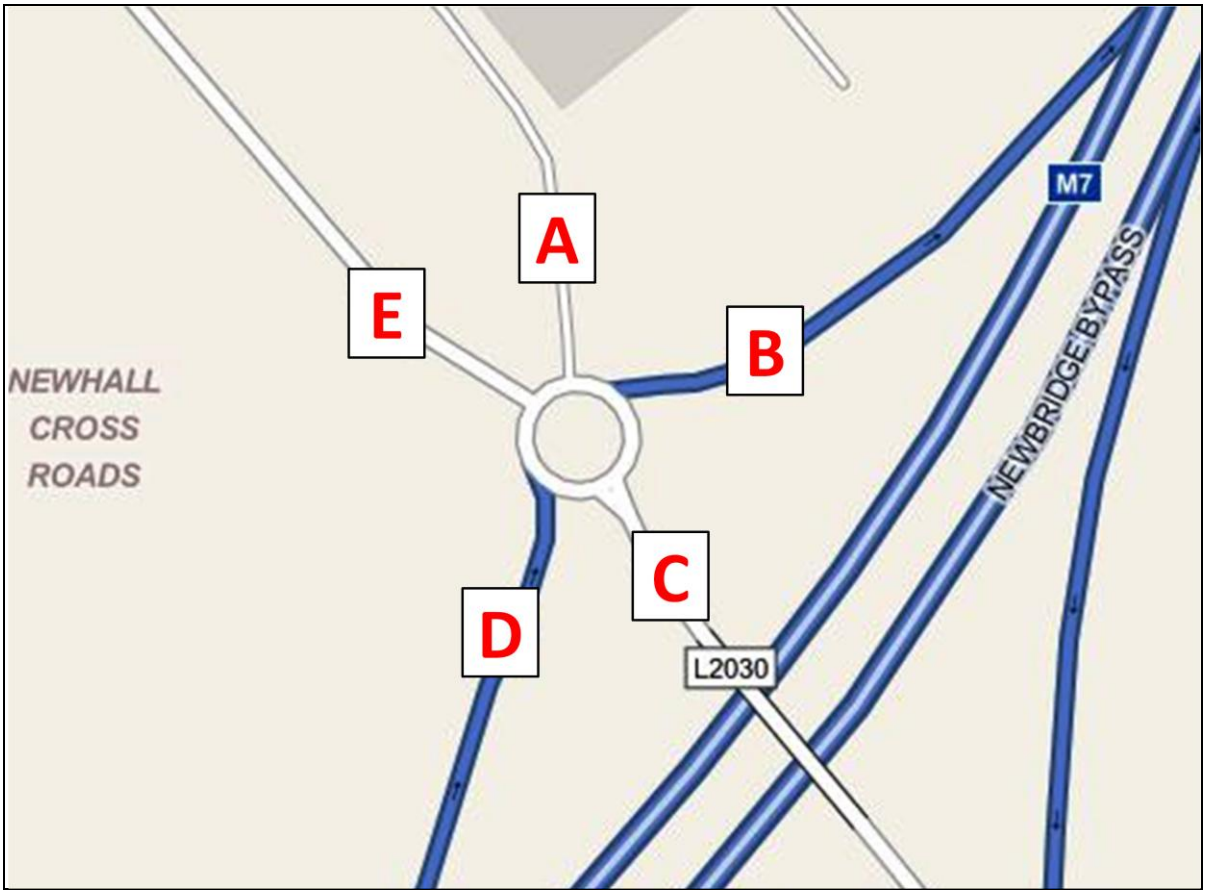


Figure 5-2: M7 Business Park (MBP) Roundabout

The micro-simulation modelling highlighted extensive queuing on both the M7 eastbound off ramp (Arm D) and Rathangan Road (Arm E) of the junction particularly during the AM peak hour. Due to the high demand between the M7 overbridge and M7 eastbound on ramp there are limited gaps in the flow of traffic on the roundabout for vehicle queuing on the M7 eastbound off ramp to access.

In the 2030 Do-Minimum scenario the total traffic passing through the roundabout in the morning peak is forecast to increase by 29% to 2,200 vehicles per hour. In the evening peak flows of 1,900 vehicles per hour are forecast through the roundabout, an increase of 22% over 2012 flows. In 2030 with this increased level of traffic delays and queuing will increase on all arms of the junction.

5.1.2 M7 Westbound Off Ramp Junction

The M7 westbound off ramp (Arm B) of the Newhall Interchange connects to the M7 overbridge via a priority t-junction, the layout of the junction is shown in Figure 5-3. The priority at this junction is for traffic on the M7 overbridge (ARM A-C), therefore traffic on the M7 off ramp has to queue and wait for a gap in the traffic stream on the overbridge. When traffic flow on the overbridge is highest during the morning and evening peak hours queuing on the M7 westbound off ramp can extend back on the M7 mainline carriageway hard shoulder.

Figure 5-3: M7 Westbound Off-Ramp Priority Junction

The micro-simulation modelling highlighted extensive queuing on the M7 westbound off ramp (Arm B) of the junction particularly during the PM peak hour. Due to the flow of traffic on the overbridge, uncontrolled nature of the junction and queuing back from the Bundle of Sticks Roundabout there are limited gaps in the traffic stream on the overbridge for traffic on the off ramp to access. This leads to queuing on the off ramp during peak hours back onto the M7 mainline hard shoulder.

With traffic flows on the M7 westbound off ramp forecast to increase from 460 vehicles per hour in 2012 to 620 vehicles per hour in the 2030 Do-Minimum scenario and on the M7 overbridge from 615 to 940 vehicles per hour, further delays and queuing back onto the M7 mainline hard shoulder are forecast.

The performance of the junction was also modelled in isolation using the junction software package PICADY, which assess the capacity of the various arms of the junction in terms of Ratio

to Flow Capacity (RFC) and queuing. The results of the morning and evening peak hour performance of the junction are outlined below in Table 5-2 based on the flows observed in 2012.

Table 5-2 2012 AM & PM PICADY Results – M7 Westbound Off Ramp Junction

Turning Movement	RFC	Queue length (vehicles)
AM Peak		
B-C: M7 Off-Ramp to L2030 SB	0.85	5
B-A: M7 Off-Ramp to L2030 NB	0.67	2
PM Peak		
B-C: M7 Off-Ramp to L2030 SB	1.18	38
B-A: M7 Off-Ramp to L2030 NB	1.16	20

It should be noted that PICADY does not take into account the queuing of traffic on the M7 overbridge in its calculation of RFC. Nonetheless the results show that the junction is operating above capacity based on 2012 traffic flows in both the morning and evening peak hour. The 2030 Do-Minimum PICADY results are provided in Table 5-3 and show further capacity issues at the junction. Detailed PICADY results are provided in Appendix B of this report.

Table 5-3 2030 Do-Minimum AM & PM PICADY Results – M7 Westbound Off Ramp

Turning Movement	RFC	Queue length (vehicles)
AM Peak		
B-C: M7 Off-Ramp to L2030 SB	1.30	63
B-A: M7 Off-Ramp to L2030 NB	1.27	22
PM Peak		
B-C: M7 Off-Ramp to L2030 SB	2.02	262
B-A: M7 Off-Ramp to L2030 NB	2.01	93

5.1.3 R445 Bundle of Sticks Roundabout

The R445 Bundle of Sticks roundabout is a 4 arm junction and is illustrated below in Figure 5-4. During the morning peak hour over 2,600 vehicles pass through the roundabout, in the evening peak hour this increases to over 2,800 vehicles.

Figure 5-4: Bundle of Sticks (BOS) Roundabout

The micro-simulation modelling demonstrated that there is queuing on the M7 overbridge (Arm A) which impacts upon the operation of the M7 westbound off ramp junction. This is as a result of the limited gaps in the traffic stream on the roundabout due to the high demand along the R445 between Arm D and Arm B. Queuing back on the R445 from the adjacent B&Q roundabout also impacts upon the operation of the Bundle of Sticks roundabout.

In the 2030 Do-Minimum scenario flows through the roundabout are forecast to increase by 16% to over 3,000 vehicles in the morning peak hour. In the evening peak flows are predicted to increase to over 3,350 vehicles, a 19% increase on 2012 flows.

The roundabout was assessed using the peak hour traffic flows recorded in 2012 using ARCADY. The results presented in Table 5-3 demonstrate that the junction is over capacity during both the morning and evening peak hours. As previously discussed ARCADY looks at junctions in isolation and takes no account of the effect of adjoining junctions. Nevertheless the results demonstrate that even when considered in isolation the junction is over capacity at present.

Table 5-4 2012 AM & PM ARCADY Results – Bundle of Sticks Roundabout

ARM	Time Period	RFC	Queue Length (vehicles)
Arm A - L2030 Overbridge	AM Peak	0.97	16
Arm B - R445 East		0.90	8
Arm C - M7 Access Road		0.05	1
Arm D - R445 West		0.4	1
Arm A - L2030 Overbridge	PM Peak	1.01	26
Arm B - R445 East		0.99	22
Arm C - M7 Access Road		0.05	1
Arm D - R445 West		0.35	1

Peak hour traffic flows from the 2030 Do-Minimum scenario were also used to highlight the future capacity issues at this junction. The results of the 2030 AM peak and PM peak hour Do-Minimum scenario ARCADY models are provided in Table 5-5. The detailed ARCADY results are provided in Appendix C.

Table 5-5 2030 AM & PM ARCADY Results – Bundle of Sticks Roundabout

ARM	Time Period	RFC	Queue Length (vehicles)
Arm A - L2030 Overbridge	AM Peak	1.23	142
Arm B - R445 East		0.98	18
Arm C - M7 Access Road		0.07	1
Arm D - R445 West		0.48	1
Arm A - L2030 Overbridge	PM Peak	1.49	304
Arm B - R445 East		1.03	34
Arm C - M7 Access Road		0.04	0
Arm D - R445 West		0.54	1

5.2 *Existing Newhall Interchange - Future Traffic and Capacity Impacts*

As demonstrated above, the junctions that form the Newhall Interchange are operating above capacity at present. With traffic flows through the interchange forecast to increase the existing congestion issues and queuing on the M7 off ramps will be further exacerbated. The junctions were also assessed using the Do-Minimum forecast peak hour flows in 2030. These confirmed that the existing issues will increase overtime and therefore **improvements are required** at the Newhall Interchange.

5.3 Proposed Newhall Interchange - Future Traffic and Capacity Impacts

The two new roundabout junctions on the R445 which are illustrated in Figure 5-5 were also assessed using both the micro-simulation model and ARCADY model. The micro-simulation models demonstrated that both junctions operate well in 2030 with limited queuing. The results of the ARCADY assessments are provided in Tables 5-6 and 5-7 and demonstrate that the proposed junctions operate well below capacity.

The capacity of the Bundle of Sticks roundabout was also assessed with the proposed M7 Naas to Newbridge By-Pass Upgrade Scheme in place. Traffic flows from both the 2030 AM and PM Do-Something scenarios were modelled in ARCADY and the results are presented in Table 5-8. The results show that the junction operates over capacity in 2030 during both the morning and

evening peaks. It should be noted that the junction while over capacity, still performs better than in the 2030 Do-Minimum scenario as outlined in section 5-5 of this note.

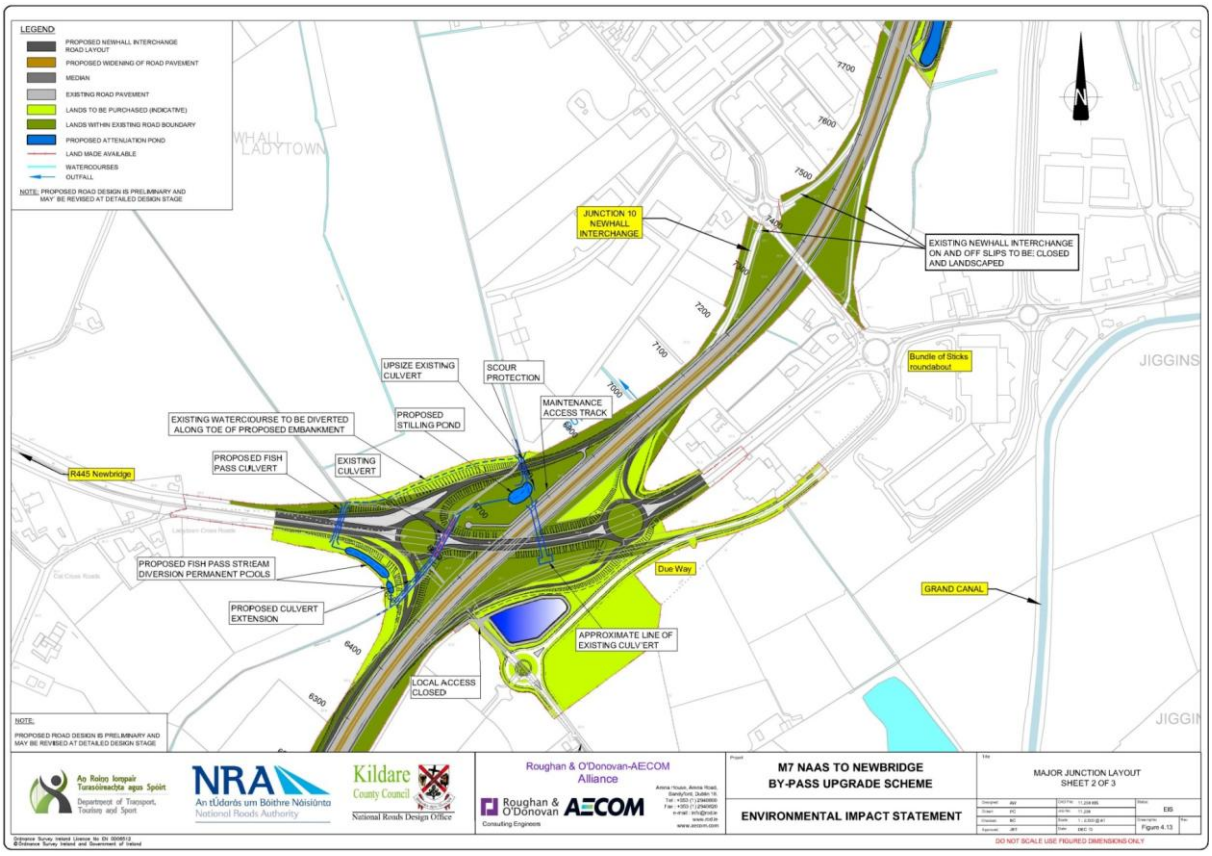


Figure 5-5: Proposed Newhall Junction

Table 5-6 2030 AM & PM Arcady Results – R445 Western Roundabout

ARM	Time Period	RFC	Queue Length (vehicles)
Arm B - R445 East	AM Peak	0.59	2
Arm C - M7 Eastbound Off Ramp		0.55	1
Arm D - R445 West		0.32	1
Arm B - R445 East	PM Peak	0.48	1
Arm C - M7 Eastbound Off Ramp		0.35	1
Arm D - R445 West		0.34	1

Table 5-7 2030 AM & PM Arcady Results – R445 Eastern Roundabout

ARM	Time Period	RFC	Queue Length (vehicles)
Arm A - M7 Westbound Off Ramp	AM Peak	0.42	1
Arm B - R445 East		0.57	1
Arm D - M7 Overbridge		0.50	1
Arm A - M7 Westbound Off Ramp	PM Peak	0.79	4
Arm B - R445 East		0.65	2
Arm D - M7 Overbridge		0.48	1

Table 5-8 2030 AM & PM Arcady Results – Bundle of Sticks Roundabout

ARM	Time Period	RFC	Queue Length (vehicles)
Arm A - L2030 Overbridge	AM Peak	0.41	1
Arm B - R445 East		0.86	6
Arm C - M7 Access Road		0.09	1
Arm D - R445 West		0.61	2
Arm A - L2030 Overbridge	PM Peak	0.66	2
Arm B - R445 East		0.88	7
Arm C - M7 Access Road		0.08	1
Arm D - R445 West		0.81	4

5.4 Cumulative Impact of M7 Osberstown Interchange and R407 Sallins Bypass Scheme

The M7 Osberstown Interchange and R407 Sallins Bypass scheme provides an alternative option for traffic on the M7 which currently uses the Newhall Interchange to access areas of Naas and Sallins. The scheme will increase the flow of traffic on the M7 mainline but reduce the overall demand of traffic through the Newhall Interchange, particularly on the west facing ramps.

To assess the capacity and operation of the existing Newhall Interchange with the M7 Osberstown Interchange and R407 Sallins Bypass Scheme in place, additional micro-simulation models of the road network were developed.

A summary of the micro-simulation assessment demonstrated that:

- The existing Newhall Interchange is currently operating at capacity (2012 flows). Significant queuing occurs on both of the M7 off ramps during peak periods which impacts upon traffic on the M7 mainline carriageway leading to serious safety concerns;
- In the absence of the proposed upgrade of the Newhall Interchange, but with the introduction of the proposed M7 Osberstown Interchange and R407 Sallins Bypass Scheme queuing on the existing M7 eastbound off ramp would reduce both in 2015 and 2030, but significant queuing would still occur which impacts upon the M7 mainline. This queuing is due to the limited capacity of the M7 Business Park Roundabout and the high right turn demand from the M7 overbridge to the M7 eastbound on-ramp; and
- Similarly in the absence of the proposed upgrade of the Newhall Interchange, but with the introduction of the proposed M7 Osberstown Interchange and R407 Sallins Bypass Scheme, queuing on the existing M7 westbound off ramp would reduce, but queuing back onto the M7 mainline still occurs.

The micro-simulation assessment demonstrated that although the overall demand through the Newhall Interchange would reduce if the M7 Osberstown Interchange and R407 Sallins Bypass Scheme were to proceed, significant queuing during peak periods would still occur on both of the existing Newhall off-ramps in the absence of the proposed Newhall Interchange upgrade.

6.0 Maudlins Interchange (M7 Junction 9)

6.1 Existing Conditions

The Maudlins Interchange which is illustrated in Figure 6-1 is one the main access points for traffic accessing Naas and Sallins via the M7. There are two roundabouts which connect the R445 regional road to the interchange slips roads. These are as follows:

- Junction 1 – R445 Maudlins Roundabout; and
- Junction 2 – R445 Johnstown Roundabout.

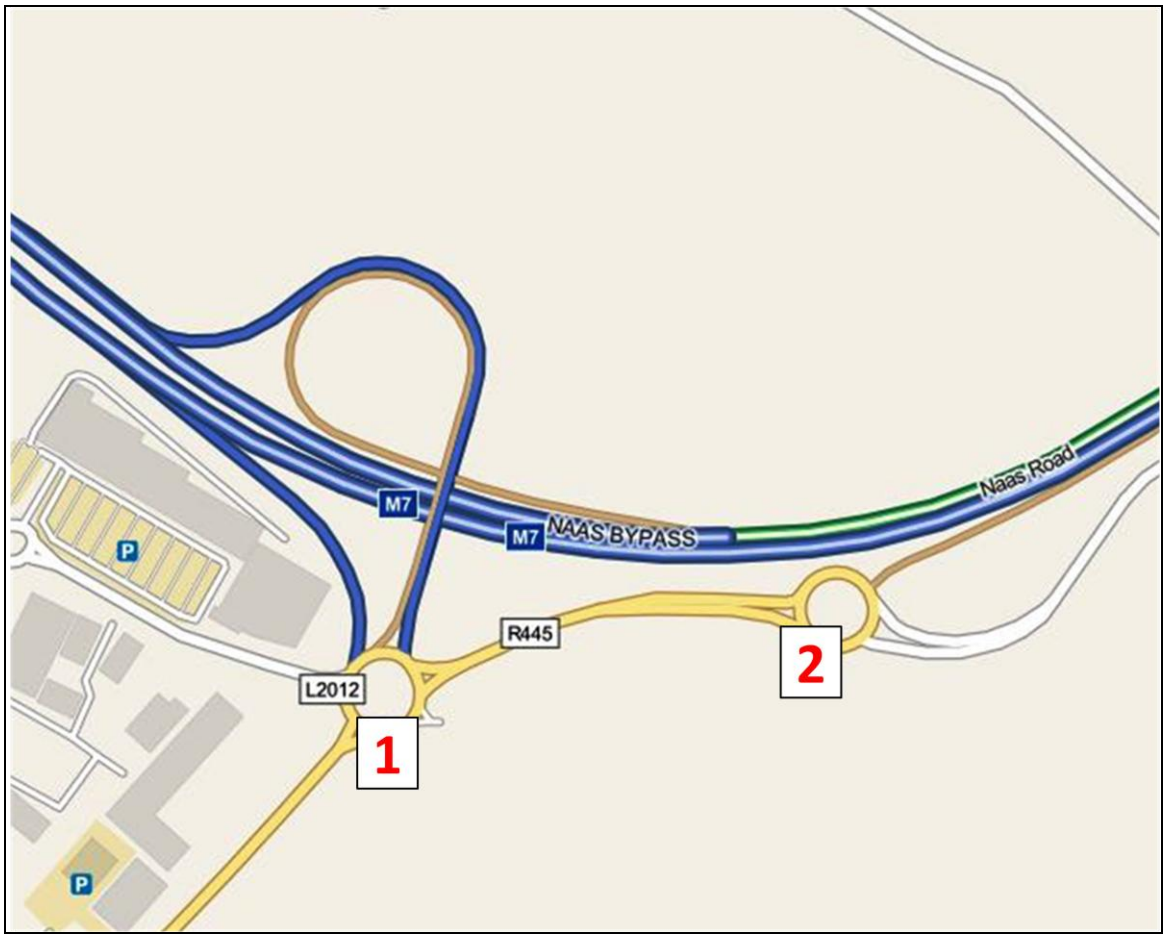


Figure 6-1: Maudlins Interchange

6.1.1 R445 Maudlins Roundabout

The R445 Maudlins Roundabout which is illustrated in Figure 6-2 is a 4 arm roundabout with 2 circulatory lanes. During the morning peak hour over 2,500 vehicles pass through the roundabout, with the dominate flow between Naas/Monread (Arms D&E) and the M7 eastbound towards Dublin (Arm A). In the evening peak the dominant flow is in the opposite direction (via Arm B). Overall 2,850 vehicles pass through the roundabout in the evening peak.

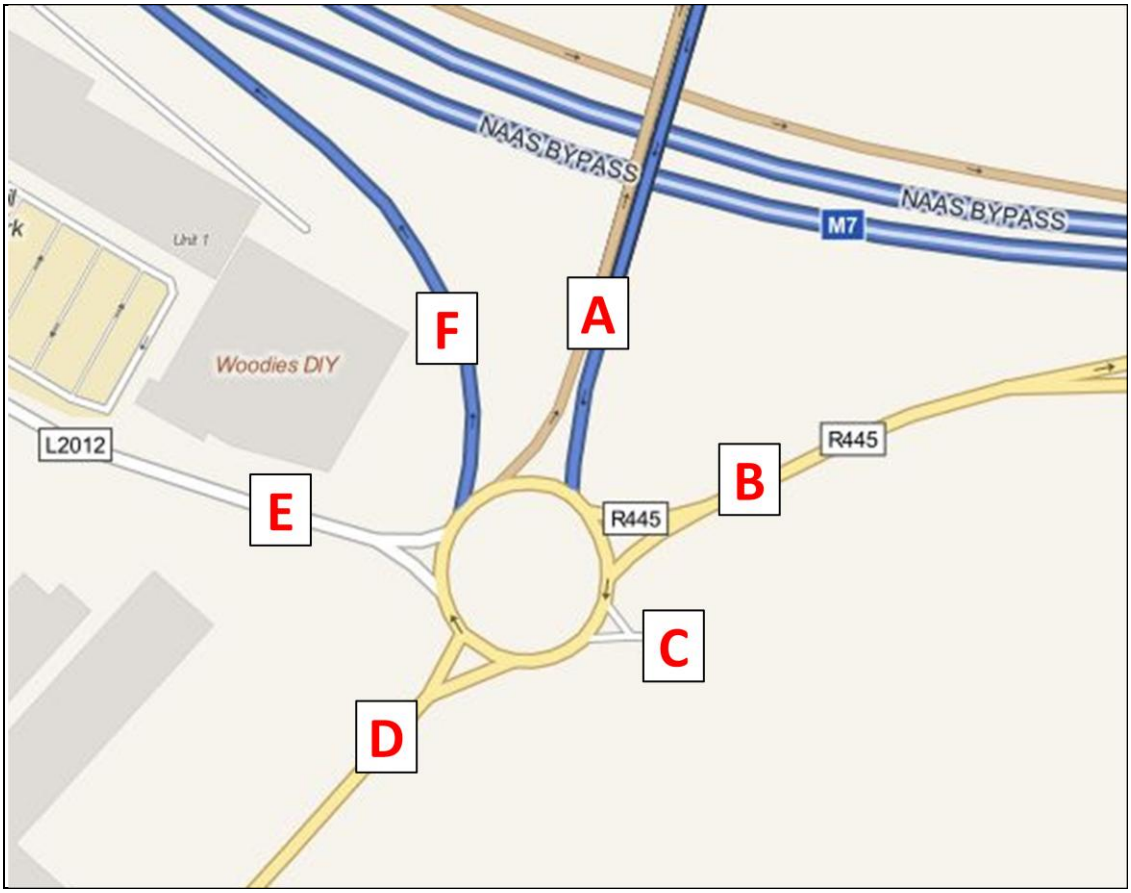


Figure 6-2: R445 Maudlins Roundabout

The micro-simulation models highlighted queuing on the Monread Road (Arm E) and R445 (Arm D) in the morning peak and queuing on the R445 (Arm B) in the evening peak which reflects the dominate flow between Naas/Monread and the M7. The junction was also modelled in ARCADY using the 2012 peak hour traffic volumes. Table 6-1 presents the results of the assessment.

Table 6-1 2012 AM & PM ARCADY Results – R445 Maudlins Roundabout

ARM	Time Period	RFC	Queue Length (vehicles)
Arm A - M7 Flyover	AM Peak	0.20	1
Arm B - R445 East		0.38	1
Arm C - Plant Access		0.01	0
Arm D - R445 Dublin Road		0.51	1
Arm E - L2012 Monread Rd		0.69	2
Arm A - M7 Flyover	PM Peak	0.12	1
Arm B - R445 East		0.75	4
Arm C - Plant Access		0.01	0
Arm D - R445 Dublin Road		0.43	1
Arm E - L2012 Monread Rd		0.65	2

Traffic flows are forecast to increase by 31% to 3,200 vehicles in the 2030 Do-Minimum scenario during the AM peak hour. During the PM peak hour, 3,430 vehicles are predicted to pass through the roundabout an increase of 20% over the 2012 levels.

The results of the 2030 Do-Minimum assessment are presented in Table 6-2 and show that the junction will operate within capacity at the forecast traffic levels, apart from the Monread Road arm of the junction (Arm E) during both peaks and on the R445 (Arm B) during the PM peak . The 2012 and 2030 ARCADY detailed results are provided in Appendix C.

Table 6-2 2030 AM & PM ARCADY Results – R445 Dublin Road Roundabout

ARM	Time Period	RFC	Queue Length (vehicles)
Arm A - M7 Flyover	AM Peak	0.32	1
Arm B - R445 East		0.48	1
Arm C - Plant Access		0.00	0
Arm D - R445 Dublin Road		0.68	2
Arm E - L2012 Monread Rd		1.14	77
Arm A - M7 Flyover	PM Peak	0.14	1
Arm B - R445 East		1.05	62
Arm C - Plant Access		0.00	0
Arm D - R445 Dublin Road		0.37	1
Arm E - L2012 Monread Rd		0.90	8

6.1.2 R445 Johnstown Roundabout

The R445 Johnstown Roundabout which is illustrated in Figure 6-3 is a 3 arm roundabout with 2 circulatory lanes. The roundabout links the M7 westbound off ramp of the Maudlins Interchange to the R445 and also provides the main connection between Naas and Johnstown. During the morning peak hour over 760 vehicles pass through the roundabout. In the evening peak traffic levels increase to 1,370 vehicles the majority of which are between the M7 westbound off slip and the R445.

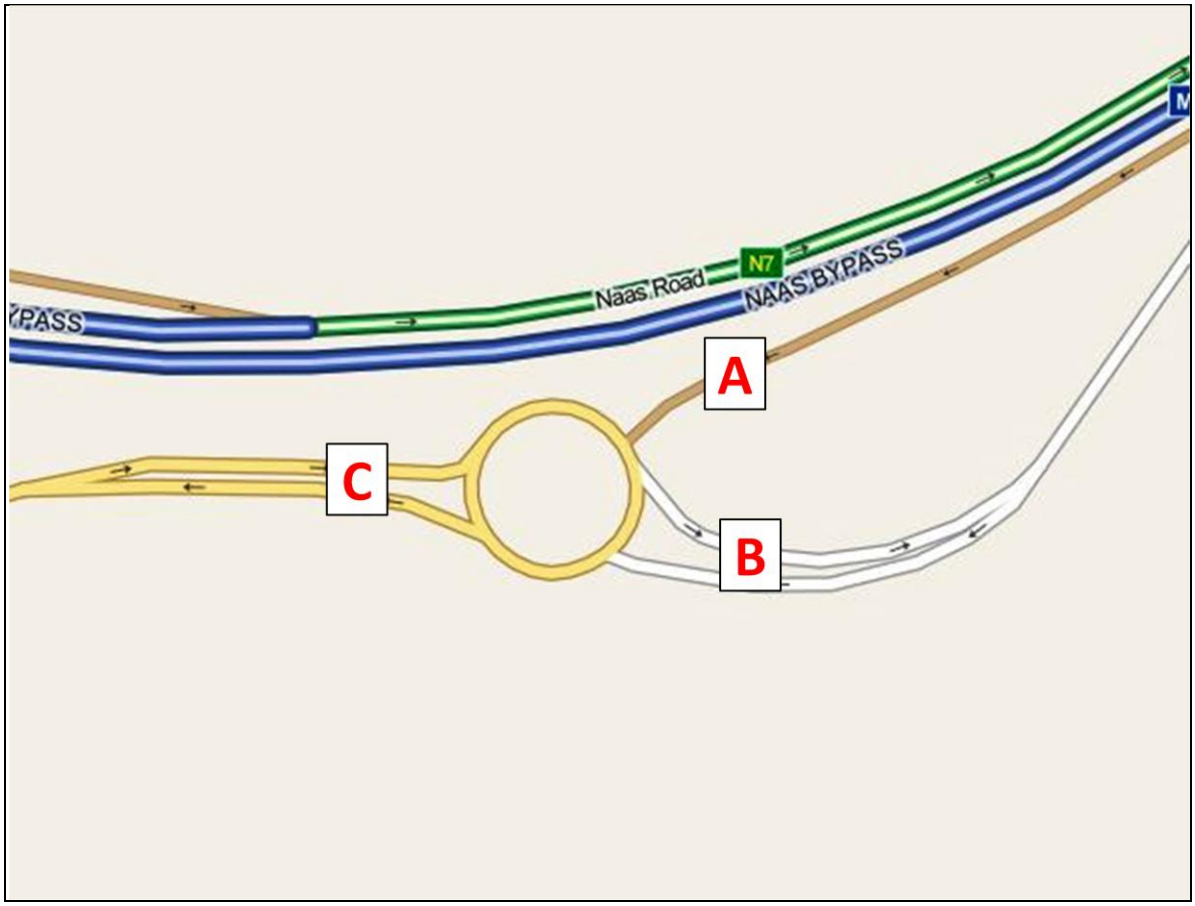


Figure 6-3: R445 Johnstown Roundabout

The micro-simulation models highlighted the capacity issues on the M7 mainline as result of the lane drop between the N7 and M7 at this location, but that the R445 Johnstown Roundabout operates well due to the relatively low amount of traffic that passes through the junction at peak times. Table 6-3 presents the results of the 2012 ARCADY assessment and illustrates that there are no capacity issues associated with the junction based on 2012 peak traffic levels.

Table 6-3 2012 AM & PM ARCADY Results – R445 Johnstown Roundabout

ARM	Time Period	RFC	Queue Length (vehicles)
Arm A - M7 WB Off-Slip	AM Peak	0.26	1
Arm B - R445 Johnstown Rd		0.06	1
Arm C - R445 West		0.09	1
Arm A - M7 WB Off-Slip	PM Peak	0.41	1
Arm B - R445 Johnstown Rd		0.1	1
Arm C - R445 West		0.09	1

In the 2030 Do-Minimum scenario traffic flows through the roundabout are predicted to increase by 53% to 1150 vehicles during the AM Peak. In the PM Peak, 1,920 vehicles are predicted to pass through the roundabout an increase of 40% over the 2012 levels.

The roundabout was again assessed using the 2030 Do-Minimum peak hour flows. The results of the 2030 Do-Minimum assessment are presented in Table 6-4 and show that the junction will have the capacity to cater for the forecast traffic levels in 2030.

Table 6-4 2030 AM & PM ARCADY Results – R445 Johnstown Roundabout

ARM	Time Period	RFC	Queue Length (vehicles)
Arm A - M7 WB Off-Slip	AM Peak	0.35	1
Arm B - R445 Johnstown Rd		0.08	1
Arm C - R445 West		0.33	1
Arm A - M7 WB Off-Slip	PM Peak	0.61	2
Arm B - R445 Johnstown Rd		0.12	1
Arm C - R445 West		0.13	1

6.2 Maudlins Interchange – Future Traffic and Capacity Impacts

Due to the reduction in capacity from 3 lanes on the N7 to 2 lanes on the M7 in the westbound carriageway, delays can be significant particularly in the evening peak hour on the M7 with queuing back as far as the Johnstown Interchange and at times beyond.

In the evening peak traffic levels in the westbound carriageway of the M7 to the east of Maudlins are forecast to increase from over 4,350 vehicles in 2012 to over 5,350 vehicles in 2030 Do-Minimum scenario. Of these 5,350 vehicles approximately 3,800 continue on the M7 westbound during the PM peak hour.

The increase in capacity on the M7 as a result of the proposed widening will remove the bottleneck at this location, providing the additional capacity required to cater for the forecast level of traffic. Traffic which utilised the local road network via Kill and Johnstown to access Naas in order to avoid the congestion on the M7 transfers onto the M7 as a result of the widening.

6.3 Cumulative Impact of M7 Osberstown Interchange and R407 Sallins Bypass Scheme

As previously discussed the M7 Osberstown Interchange and R407 Sallins Bypass Scheme provides an alternative option for traffic on the M7 which currently uses the Maudlins Interchange to access areas of Naas and Sallins. The scheme will increase the flow of traffic on the M7 mainline but reduce the overall demand of traffic through the Maudlins Interchange, particularly on the east facing ramps.

It has been demonstrated that the existing capacity of the Maudlins Interchange can cater for the forecast traffic flows in both the 2030 Do-Minimum and Do-Something scenarios. As the M7 Osberstown Interchange and R407 Sallins Bypass scheme will reduce flows through the interchange, no further assessment of capacity was undertaken.

Therefore **no further improvements** beyond the widening of the M7 are required at the Maudlins Interchange.

7.0 Summary

This Technical Note presents the overall findings of the capacity and operational assessment of the M7 Interchanges (M7/M9, Newhall and Maudlins) with and without the proposed Osberstown Interchange & Sallins Bypass Scheme. The key findings are:

- The assessment has illustrated that there is sufficient capacity at M7/M9 Interchange to cater for the forecast demand with the proposed widening of the M7. The marginal increase in traffic as a result of the M7 Osberstown Interchange & R407 Sallins Bypass will be catered for with the widening of the M7 in place;

- It has been demonstrated that the Newhall Interchange requires an upgrade at present and that existing issues will only be exacerbated as traffic increase over time. The inclusion of the M7 Osberstown Interchange & R407 Sallins Bypass will reduce the overall traffic through the Newhall Interchange, but will not resolve the issue of queuing back onto the M7 from both off ramps of the Newhall Interchange; and
- The assessment has demonstrated that the existing issues of congestion on the M7 in the westbound carriageway during the PM peak will be alleviated by the proposed widening of the M7 mainline. It has also been demonstrated that the existing capacity of the junctions that form part of the Maudlins Interchange can cater for the forecast flows in the scheme design year, although queuing on the Monread Road arm of the Maudlins roundabout is excess. The introduction of the M7 Osberstown Interchange & R407 Sallins Bypass Scheme reduces the flow through the Maudlins Interchange and has a positive impact upon congestion on the Monread Road.

Appendix A

VISSIM Modelling Report

Technical Note 5

Version 1

Project:	**M7 Naas to Newbridge Bypass Upgrade Scheme**	Job No:	**60241946**
Subject:	**M7 VISSIM LAM Development**		
Prepared by:	**Declan Keenan**	Date:	**12th February 2013**
Checked by:	**Philip Shiels**	Date:	**12th February 2013**
Approved by:	**Alan O'Brien**	Date:	**12th February 2013**

1.0 Introduction

This Technical Note discusses the development, calibration and validation of the VISSIM micro-simulation models used to assess the operation of the M7 Naas Bypass and its interchanges, which include:

- M7/M9 interchange (J11);
- Newhall interchange (J10); and
- Maudlins interchange (J9).

The need for this study has arisen as a result of proposals to widen the M7 mainline carriageway from 2 to 3 lanes in both directions between the M7/M9 and Maudlins interchanges. Concerns have been raised as to the impact of the widening scheme upon the capacity and operation of these interchanges. In addition to above, the micro-simulation models are also used to assess the impact of the proposed development of the Osberstown Interchange and Sallins Bypass scheme upon the M7 mainline carriageway and interchanges mentioned above.

Due to the nature of the M7 carriageway, a strategic route between Dublin, Limerick, Cork, Waterford, Kilkenny and Carlow, the corridor experiences significant traffic demand during both the AM and PM periods which can result in considerable congestion and delay on the M7 mainline and interchanges (particularly Newhall) and also within the surrounding road network.

Due to the complexity of the road network, it was deemed necessary to develop a micro-simulation model covering the study area shown in Figure 1-1 below. This Technical Note has been prepared to describe the development of the micro-simulation base year (2012) models using the software VISSIM and is split into the following sections:

- Data collection;
- Network development;
- Matrix development; and
- Model calibration and validation.

Figure 1-1: Study Area

2.0 Baseline Model Development

2.1 Data Collection

A significant amount of traffic count data was collected in order to develop an understanding of the existing traffic patterns in the study area and for use in the development of the traffic models. The following data was applicable to the development of the M7 VISSIM models:

- Manual Classified Counts (MCC) – A total of 10 MCC at key junctions undertaken on 7th of February 2012;
- 8 Automatic Traffic Counts (ATC) undertaken between 6th to 12th February 2012; and
- 3 NRA Automatic Traffic Counters along the M7 carriageway were all utilised in the development of the base models.

The location of the traffic surveys is presented in Figures 2-1 and 2-2 below.

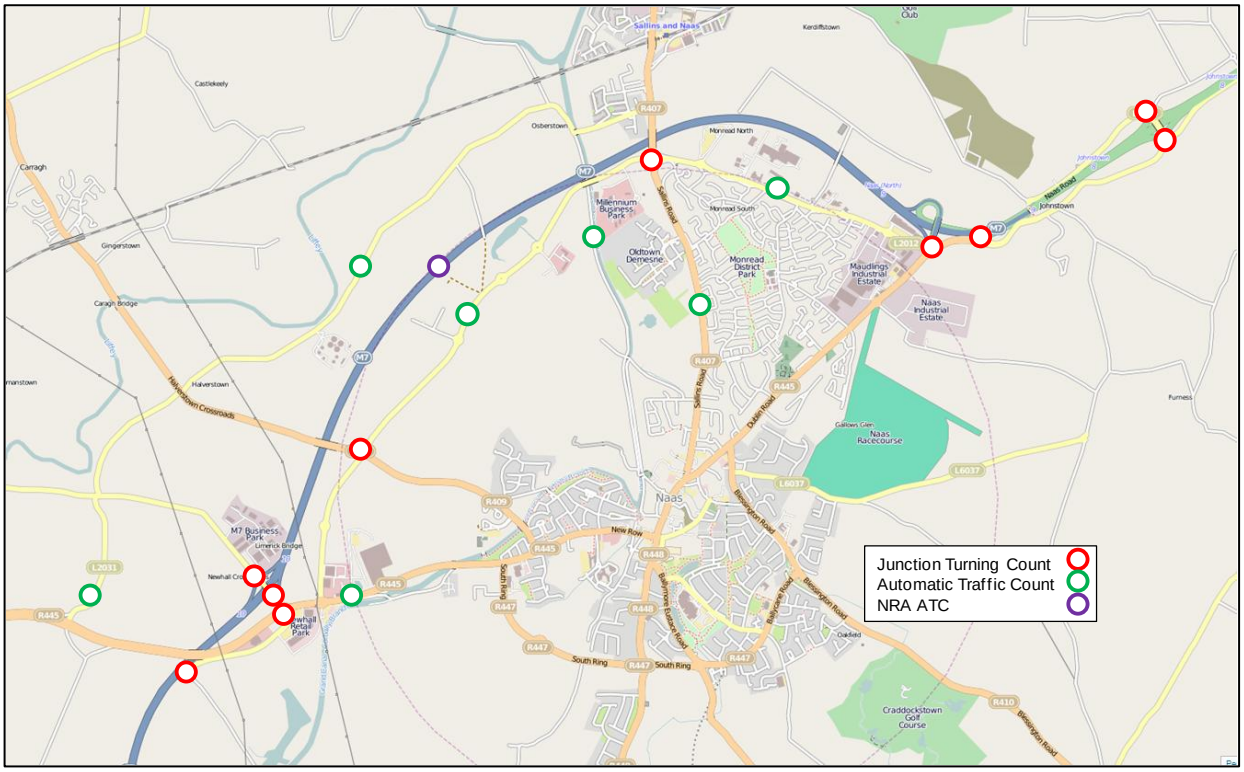


Figure 2-1: Data Collection

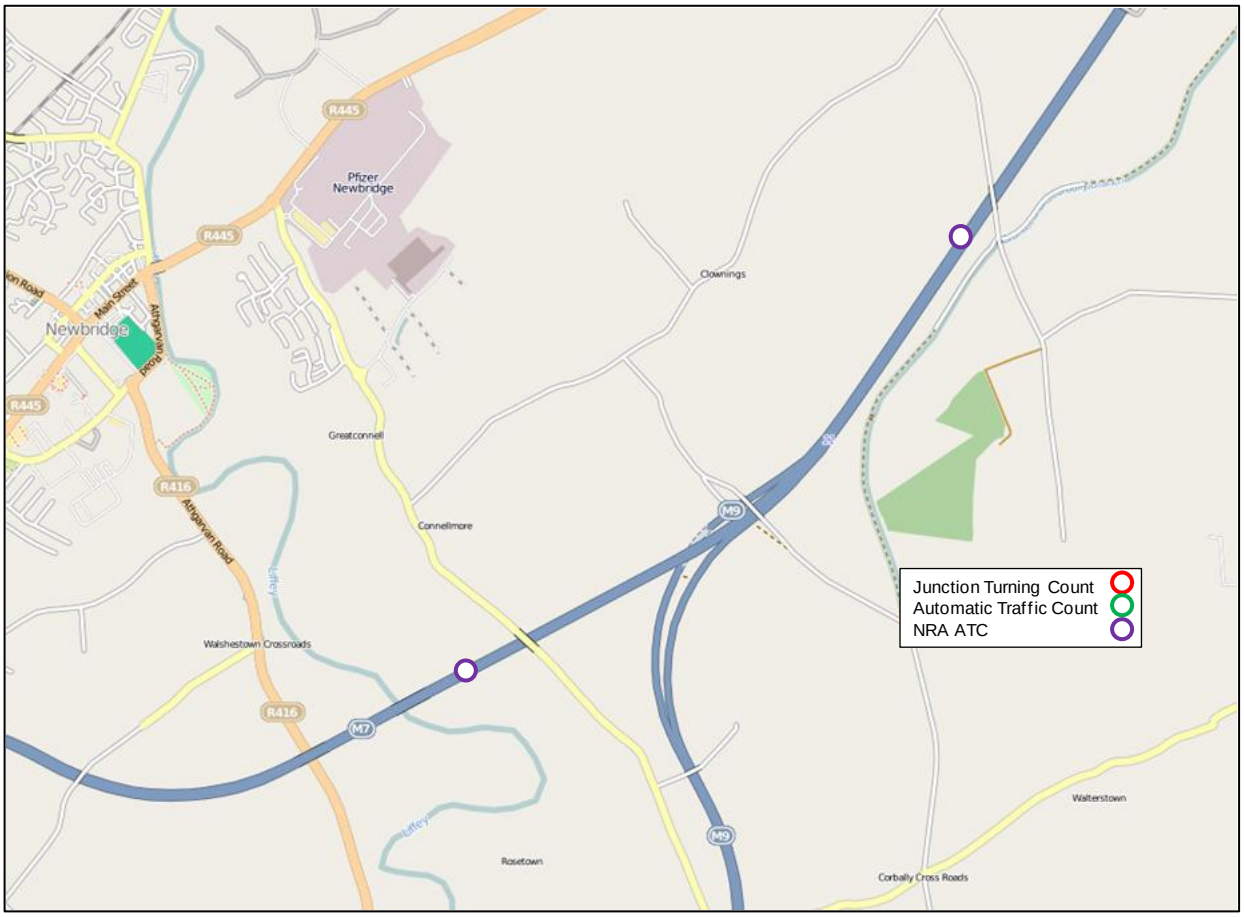


Figure 2-2: Data Collection

2.2 Stage 1 – Development of Refined M7 VISUM models

Initially, a VISUM strategic traffic model was developed as part of the M7 Naas to Newbridge Bypass Upgrade Scheme encompassing the study area shown in the Figure 2-3. This model, known as the M7 LAM, was cordoned out of the NRA National Traffic Model (NTM) from which two models were developed:

- AM peak hour (08:00 – 09:00) model: and
- PM peak hour (17:00 – 18:00) model.

A screenshot of the M7 Local Area Model (LAM) is presented in Figure 2-3 below. More detailed information in relation to the M7 LAM is available in the Traffic Modelling Report.

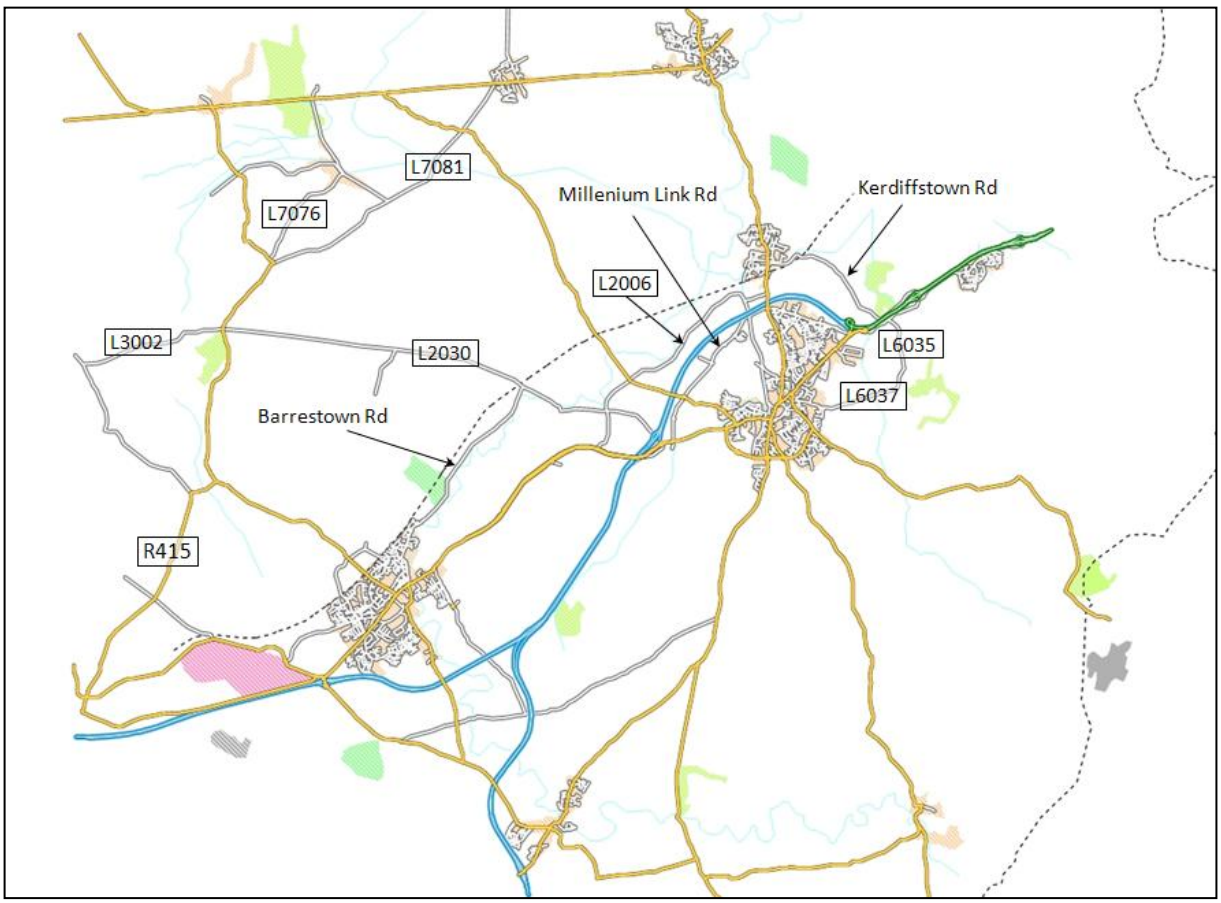


Figure 2-3: 2012 M7 LAM Network

A cordon was then generated in order to develop a VISSIM network that would satisfy the study area shown in Figure 1-1 above. The zoning structure from the M7 LAM models was retained. A screenshot of the resultant VISUM network is shown in Figure 2-4.

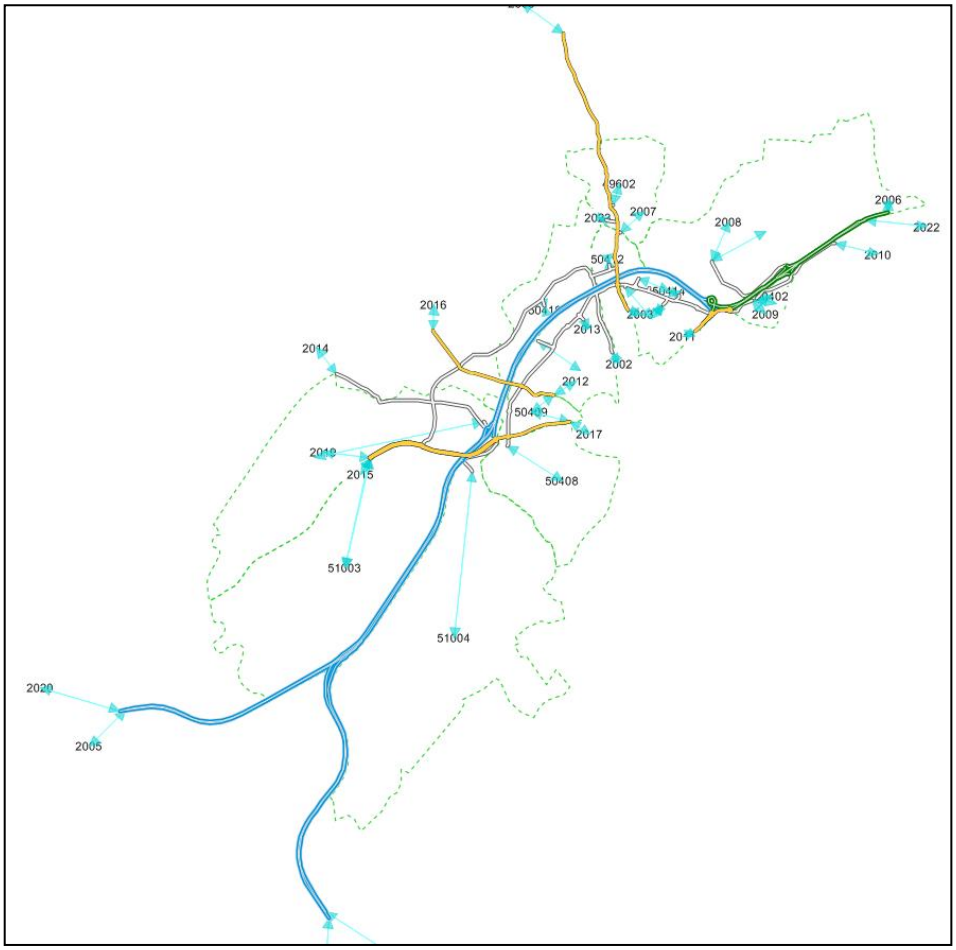


Figure 2-4: Re-cordoned 2012 M7 Network

Both of the cordoned AM and PM peak VISUM models were further refined by adjusting signal timings, road geometry and speeds. Significant processing was undertaken to ensure the correct link and junction geometries were applied through the network.

The VISUM models were then each re-calibrated against the traffic count data for each Peak hour mentioned above in order to ensure that the matrices were fit for purpose. The matrix estimation tool provided within VISUM was also utilised for this purpose. Following this process, the 2012 M7 VISUM network and matrices were exported into the VISSIM microsimulation modelling tool.

2.3 Stage 2 – Development of Refined M7 VISSIM Models

Subsequent to Stage 1 outlined above, the VISUM network and matrices were imported into VISSIM. The resultant M7 VISSIM models were further refined with regards network elements using OS mapping and digital photography. The resultant VISSIM network is shown in Figure 2-5 below.

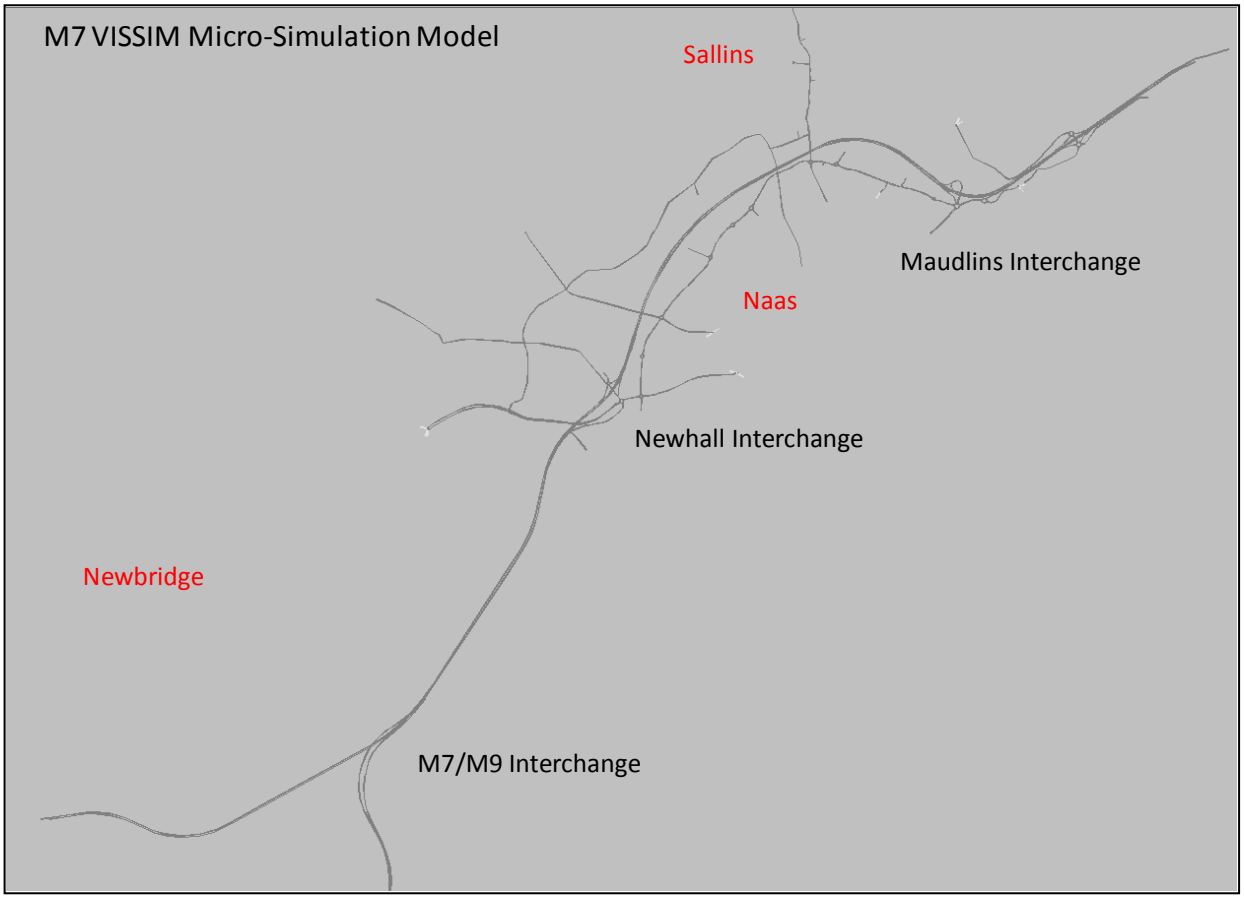


Figure 2-5: 2012 M7 VISSIM Network

Traffic counts at a number of key junctions in the network were examined to identify the proportion of traffic entering the study area over the periods 07:45 – 09:15 and 16:45 – 18:15. Figures 2-6 and 2-7 below highlight the volumetric proportions of traffic entering and exiting the network per 15 minute segment over the AM and PM peaks respectively.

Following this the AM and PM matrices were then split up into 15 minute time segments and loaded into the models separately to ensure that traffic loaded onto the network at the appropriate time. This resulted in the loading of 8 matrices into the VISSIM model comprising of both light and heavy vehicles.

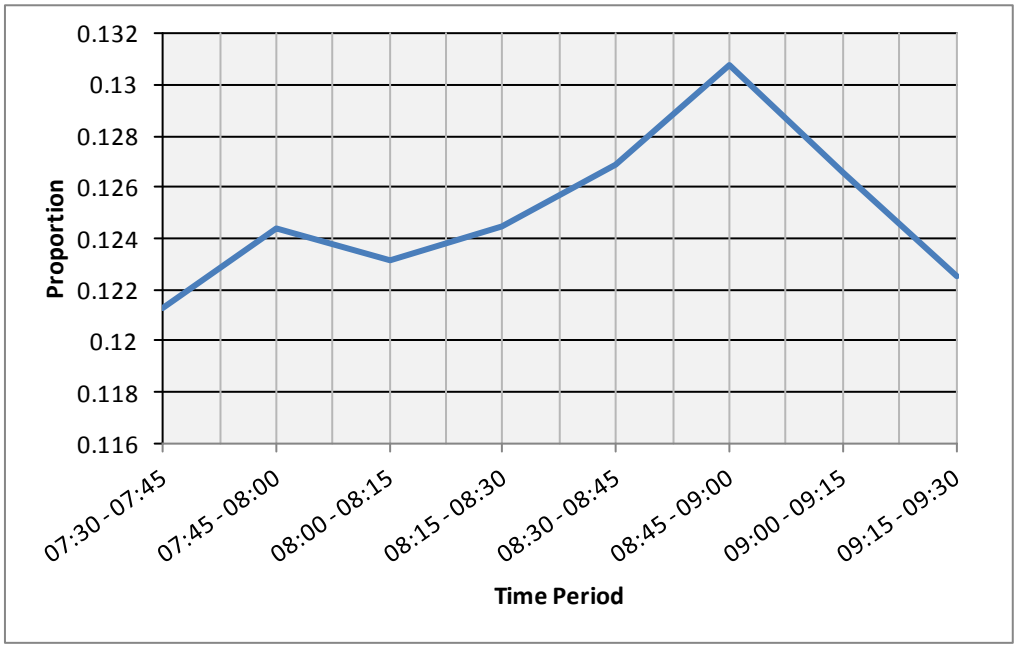


Figure 2-6: Proportions of Traffic Entering Network During AM Period

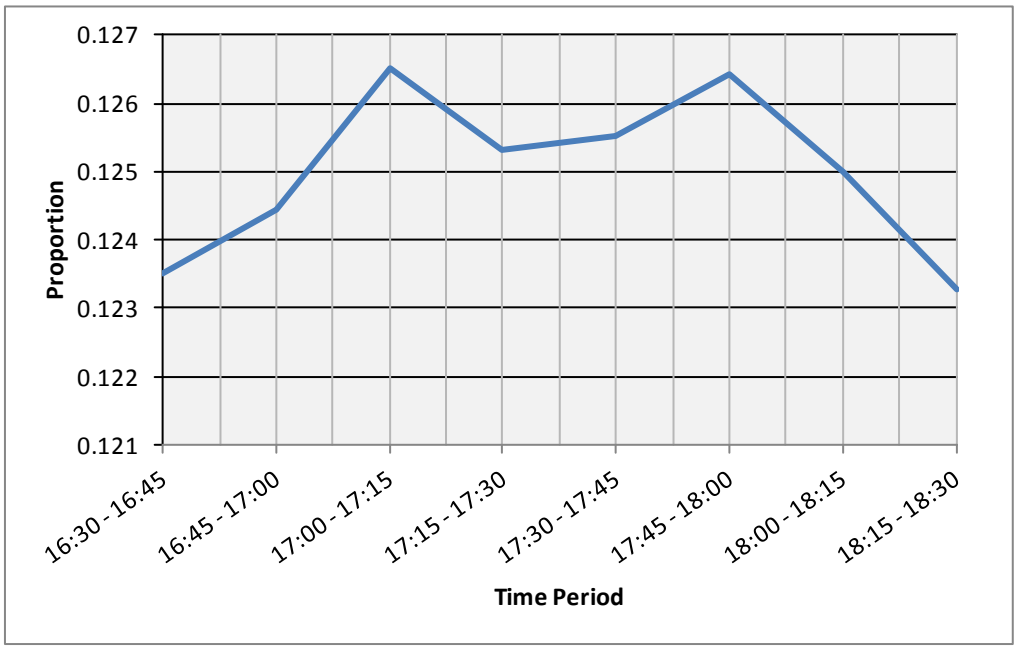


Figure 2-7: Proportions of Traffic Entering Network During PM Period

2.3.1 M7 VISSIM Model Calibration

The calibration process involves the adjustment of parameters within the model to generate a fit between modelled outputs and known observations. These parameters include the capacity and speeds on links, adjustment of trip matrices, gap times and signal timings. The traffic count data outlined above was utilised as part of the calibration process. Model parameters were adjusted based on these counts to create an accurate model replicating observed traffic conditions.

The NRA Project Appraisal Guidelines (PAG) specifies the acceptable values for modelled and observed flow comparisons and suggests how calibration should relate to the magnitude of the values being compared. A summary of these targets is shown in Table 2-1:

Table 2-1: Model Calibration/Validation Criteria: Individual Flows

Criteria and Measures	Guideline
Individual flows within 15% for flows 700 – 2700 vph	> 85% of cases
Individual flows within 100 vph for flows <700 vph	
Individual flows within 400 vph for flows > 2700	

The standard method used to compare modelled values against observations on a link involves the calculation of the Geoff Havers (GEH) statistic (Chi-squared statistic), incorporating both relative and absolute errors. The GEH statistic is a measure of comparability that takes account of not only the difference between the observed and modelled flows, but also the significance of this difference with respect to the size of the observed flow. The GEH statistic is calculated as follows:

$$GEH = \sqrt{\frac{(M-O)^2}{0.5(M+O)}}$$

Where M = Modelled Flow and O = Observed Flow.

Guidance in the Project Appraisal Guidelines sets out the following criteria:

Table 2-2: Model Calibration/Validation Criteria: GEH Values

Criteria and Measures	Guideline	
GEH statistic	Individual flows: GEH < 5	> 85% of cases

The observed and modelled flows were compared at each of the calibration sites in accordance with the criteria above. The permissible difference was calculated for each value (based on the observed figure) and compared with that which had been modelled. Calibration results are included in Appendix A of this Note and are briefly summarised in Table 2-3 below.

Table 2-3: Calibration Results – Link Flows

Time Periods	% of Calibration Sites that meet the following criteria	
08:00 – 09:00	Individual Flows within 15% for flows 700 – 2700 vph Individual flows within 100 vph for flows < 700 vph Individual flows within 400 vph for flows > 2700 vph	83%
	Individual flows: GEH < 5	84%
17:00 – 18:00	Individual Flows within 15% for flows 700 – 2700 vph Individual flows within 100 vph for flows < 700 vph Individual flows within 400 vph for flows > 2700 vph	86%
	Individual flows: GEH < 5	83%

As shown above, the M7 VISSIM models are slightly under the criteria for calibration as set out in PAG. However, as 96% and 94% of the links assessed during the AM and PM peaks respectively demonstrate a GEH value less than 7, the model is regarded as fit for purpose in terms of calibration.

2.3.2 M7 VISSIM Model Validation

Model validation comprises the comparison of calibrated flows against an independent data set which was not used as part of the calibration process. A number of junctions were selected in order to validate junction turning counts. The junction turning count calibration sheets can be seen in Appendix B of this Technical Note. The validation results are briefly summarised in Table 2-4 below.

Table 2-4: Validation Results – Turning Counts

Time Periods	% of Calibration Sites that meet the following criteria	
08:00 – 09:00	Individual Flows within 15% for flows 700 – 2700 vph Individual flows within 100 vph for flows < 700 vph Individual flows within 400 vph for flows > 2700 vph	90%
	Individual flows: GEH < 5	72%
17:00 – 18:00	Individual Flows within 15% for flows 700 – 2700 vph Individual flows within 100 vph for flows < 700 vph Individual flows within 400 vph for flows > 2700 vph	92%
	Individual flows: GEH < 5	76%

The M7 VISSIM models developed are slightly under the criteria for validation in terms of the GEH statistic. However, as 87% and 92% of the turning movements assessed during the AM and PM peaks respectively demonstrate a GEH value less than 7, the model is regarded as fit for purpose in terms of validation.

3.0 Conclusion

The AM and PM Period models both produce levels of traffic that compare well with observed values. Similarly, turning flows at key junctions compare very well with values collected in surveys. Both models therefore reproduce observed traffic well and it is considered that any junction modification tests will be credible.

As well as replicating the levels of vehicle flow in the study area to a very good degree, the models also demonstrate levels of queuing that compare well with levels observed on site visits.

The AM and PM peak micro-simulation models of the M7 Naas Bypass can therefore be considered fit to model the effects of interventions on the traffic conditions within the study area.

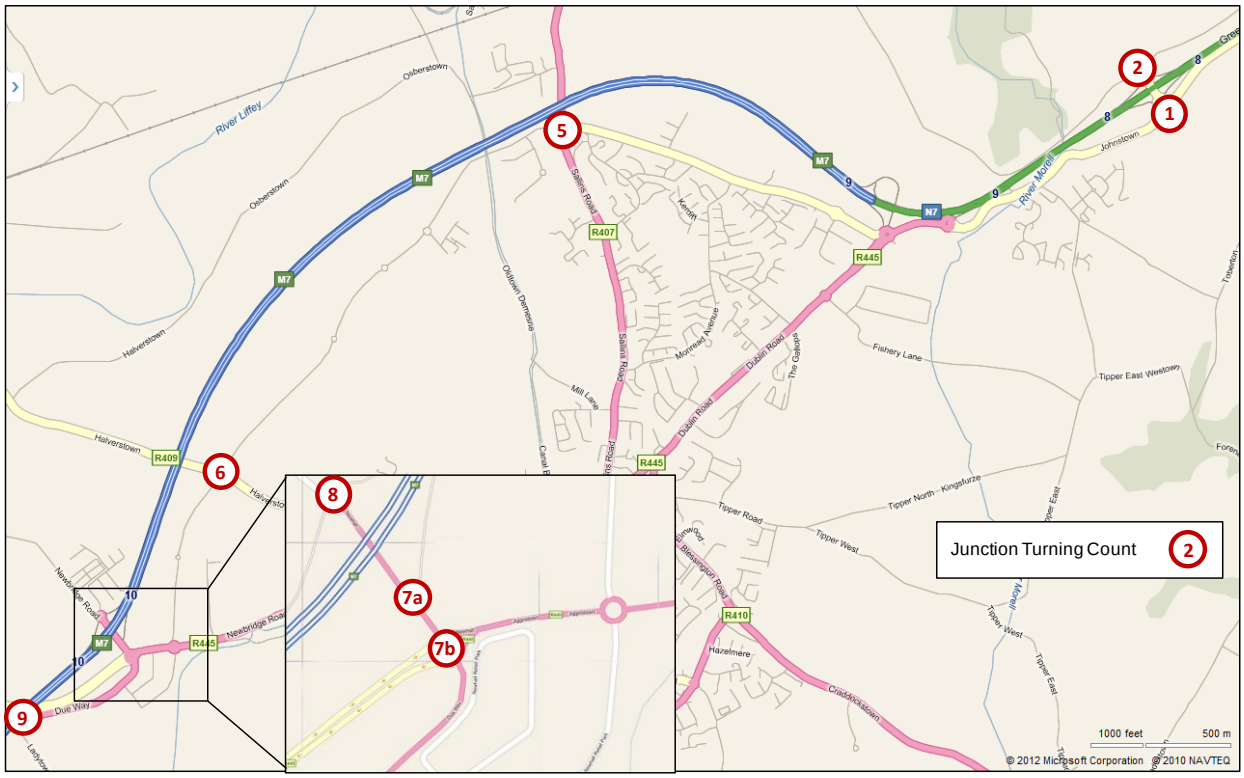
APPENDIX A – MODEL CALIBRATION

AM Peak Calibration 08:00 - 09:00

Data Collection Point	Location	AECOM Data No.	AM Surveyed Data (08-09)	AM Modelled	Difference	GEH	COUNT	GEH TEST	CLASS TEST	TARGET DIFFERENCE	FLOW TEST	ACTUAL DIFFERENCE	GEH or FLOW TEST
1	Osberstown Rd EB	ATC No. 4	80	42	-38	4.895	1	1	1	100	1	-38	1
2	Osberstown Rd EB		80	45	-35	4.485	1	1	1	100	1	-35	1
3	Western Distributor NB	ATC No. 3	593	598	5	0.189	1	1	1	100	1	5	1
4	Western Distributor SB		510	658	148	6.124	1	0	1	100	0	148	0
5	Canal Bank NB	ATC No. 5	18	17	-1	0.288	1	1	1	100	1	-1	1
6	Canal Bank SB		168	150	-18	1.460	1	1	1	100	1	-18	1
7	R407 NB	ATC No. 2	540	519	-21	0.930	1	1	1	100	1	-21	1
8	R407 SB		461	303	-158	8.073	1	0	1	100	0	-158	0
9	Monread Rd WB	ATC No. 1	527	549	22	0.957	1	1	1	100	1	22	1
11	R445 Newbridge Rd EB	ATC No. 6	536	446	-90	4.043	1	1	1	100	1	-90	1
12	R445 Newbridge Rd WB		699	577	-122	4.847	1	1	1	100	0	-122	1
13	Naas Bypass NB	NRA ATC 3	3332	3375	43	0.736	1	1	2	500	1	43	1
14													
15	Naas Bypass SB		2027	2048	21	0.465	1	1	2	304	1	21	1
16													
21	Great Connell NB	NRA ATC 1	1879	2022	143	3.229	1	1	2	282	1	143	1
22													
23	Great Connell SB		1116	1090	-26	0.771	1	1	2	167	1	-26	1
24													
25	Lewistown NB	NRA ATC 2	3327	3462	135	2.310	1	1	2	499	1	135	1
26													
27	Lewistown SB		2053	1974	-79	1.770	1	1	2	308	1	-79	1
28													
29	Newhall NB	ATC No. 7	96	82	-14	1.506	1	1	1	100	1	-14	1
30	Newhall SB		397	295	-102	5.472	1	0	1	100	0	-102	0
31	Unnamed Road NB	JTC No. 9	33	44	11	1.833	1	1	1	100	1	11	1
32	Unnamed Road SB		22	17	-5	1.181	1	1	1	100	1	-5	1
33	M7 Access Rd WB		459	513	54	2.449	1	1	1	100	1	54	1
34	M7 Access Rd EB		27	36	9	1.604	1	1	1	100	1	9	1
35	M7 On Slip		443	504	61	2.821	1	1	1	100	1	61	1
36	R409 West EB	JTC No. 6	583	545	-38	1.617	1	1	1	100	1	-38	1
37	R409 West WB		199	198	-1	0.071	1	1	1	100	1	-1	1
38	Distributor Rd South NB		392	549	157	7.255	1	0	1	100	0	157	0
39	Distributor Rd South SB		538	657	119	4.884	1	1	1	100	0	119	1
40	R409 East WB		238	306	68	4.112	1	1	1	100	1	68	1
41	R409 East EB		336	487	151	7.426	1	0	1	100	0	151	0
42	Distributor Rd North SB		511	699	188	7.643	1	0	1	100	0	188	0
43	Distributor Rd North NB		651	640	-11	0.417	1	1	1	100	1	-11	1
44	R407 North SB	JTC No. 5	874	608	-266	9.756	1	0	2	131	0	-266	0
45	R407 North NB		676	646	-30	1.175	1	1	1	100	1	-30	1
46	Distributor Rd West EB		468	595	127	5.501	1	0	1	100	0	127	0
47	Distributor Rd West WB		713	668	-45	1.728	1	1	2	107	1	-45	1
48	Distributor Rd East EB		664	738	74	2.802	1	1	1	100	1	74	1
49	Distributor Rd East WB		523	637	114	4.741	1	1	1	100	0	114	1
50	R407 South NB		522	514	-8	0.343	1	1	1	100	1	-8	1
51	R407 South SB		334	303	-31	1.760	1	1	1	100	1	-31	1
52	Johnstown EB	JTC No. 1	141	168	27	2.203	1	1	1	100	1	27	1
53	Johnstown WB		158	168	10	0.752	1	1	1	100	1	10	1
55	Main Street EB		131	139	8	0.655	1	1	1	100	1	8	1
56	N7 On Slip WB		72	116	44	4.502	1	1	1	100	1	44	1
57	N7 Off Slip WB		102	92	-10	0.974	1	1	1	100	1	-10	1
58	Link Road NB		197	177	-20	1.478	1	1	1	100	1	-20	1
59													
60	Link Road SB		98	135	37	3.462	1	1	1	100	1	37	1
61													
62	N7 Off Slip EB	JTC No. 2	81	121	40	3.998	1	1	1	100	1	40	1
63	N7 On Slip EB		281	275	-6	0.336	1	1	1	100	1	-6	1
64	Johnstown Road EB		156	200	44	3.312	1	1	1	100	1	44	1
65	Johnstown Road WB		39	87	48	6.047	1	0	1	100	1	48	1
66	R445 South NB	JTC No. 4	894	843	-51	1.744	1	1	2	134	1	-51	1
67													
68	R445 South SB		593	579	-14	0.595	1	1	1	100	1	-14	1
69	Monread Road EB		726	650	-76	2.897	1	1	2	109	1	-76	1
70	Monread Road WB		563	608	45	1.876	1	1	1	100	1	45	1
71	M7 On Slip WB		183	257	74	5.014	1	0	1	100	1	74	1
72	N7 On Slip EB		1074	1040	-34	1.058	1	1	2	161	1	-34	1
73	M7 Off Slip SB		302	334	32	1.773	1	1	1	100	1	32	1
74	R445 East EB		124	217	93	7.149	1	0	1	100	1	93	1
75	R445 East WB		612	874	262	9.619	1	0	1	100	0	262	0
76													
81	Newhall - M7 Off Slip WB	JTC 7	467	440	-27	1.268	1	1	1	100	1	-27	1
82	Newhall - R445 North NB		644	706	62	2.401	1	1	1	100	1	62	1
83	Newhall - R445 North SB		646	703	57	2.195	1	1	1	100	1	57	1
86	Newhall - R445 West EB		689	721	32	1.213	1	1	1	100	1	32	1
87													
88	Newhall - R445 West WB		746	679	-67	2.502	1	1	2	112	1	-67	1
89													
90	Newhall - M7 Access Road NB		37	36	-1	0.199	1	1	1	100	1	-1	1
91	Newhall - M7 Access Road SB		498	512	14	0.605	1	1	1	100	1	14	1
92	Newhall - R445 East WB		896	989	93	3.023	1	1	2	134	1	93	1
93	Newhall - R445 East EB		861	985	124	4.069	1	1	2	129	1	124	1
94	Newhall - M7 Off Slip EB	JTC 8	641	732	91	3.458	1	1	1	100	1	91	1
95	Newhall - M7 On Slip EB		658	728	70	2.644	1	1	1	100	1	70	1
96	Newhall - Business Park NB		221	225	4	0.295	1	1	1	100	1	4	1
97	Newhall - Business Park SB		48	49	1	0.115	1	1	1	100	1	1	1
98	Newhall - Unnamed Road NB		217	210	-7	0.479	1	1	1	100	1	-7	1
99	Newhall - Unnamed Road SB		410	383	-27	1.346	1	1	1	100	1	-27	1
			41851	43331	1480	7.173	76	64			63		66
								84.21%			82.89%		86.84%
					AVERAGE GEH	2.786							

PM Peak Calibration 17:00 - 18:00														
Data Collection Point	Location	AECOM Data No.	PM Surveyed Data (17-18)	PM Modelled	Difference	GEH	COUNT	GEH TEST	CLASS TEST	TARGET DIFFERENC	FLOW TEST	ACTUAL DIFFERENCE	GEH or FLOW
1	Osberstown Rd EB	ATC No. 4	78	101.2	23.2	2.451	1	1	1	100	1	23.2	1
2	Osberstown Rd WB		91	177.8	86.8	7.487	1	0	1	100	1	86.8	1
3	Western Distributor NB	ATC No. 3	475	436.2	-38.8	1.818	1	1	1	100	1	-38.8	1
4	Western Distributor SB		665	505.2	-159.8	6.606	1	0	1	100	0	-159.8	0
5	Canal Bank NB	ATC No. 5	58	46.4	-11.6	1.606	1	1	1	100	1	-11.6	1
6	Canal Bank SB		24	30.2	6.2	1.191	1	1	1	100	1	6.2	1
7	R407 NB	ATC No. 2	566	473.4	-92.6	4.062	1	1	1	100	1	-92.6	1
8	R407 SB		454	428.4	-25.6	1.219	1	1	1	100	1	-25.6	1
9	Monread Rd WB	ATC No. 1	712	581	-131	5.152	1	0	2	107	0	-131	0
12	R445 Newbridge Rd EB	ATC No. 6	627	536	-90.8	3.765	1	1	1	100	1	-90.8	1
11	R445 Newbridge Rd WB		537	451	-86	3.869	1	1	1	100	1	-86	1
13	Naas Bypass NB	NRA ATC 3	1978	2160.6	182.6	4.014	1	1	2	297	1	182.6	1
14													
15	Naas Bypass SB		3619	3532.4	-86.6	1.448	1	1	2	543	1	-86.6	1
16													
21	Great Connell NB	NRA ATC 1	1361	1354.4	-6.6	0.179	1	1	2	204	1	-6.6	1
22													
23	Great Connell SB		1880	1884.2	4.2	0.097	1	1	2	282	1	4.2	1
24													
25	Lewistown NB	NRA ATC 2	1903	2029.8	126.8	2.859	1	1	2	285	1	126.8	1
26													
27	Lewistown SB		3744	3648.6	-95.4	1.569	1	1	2	562	1	-95.4	1
28													
29	Newhall NB	ATC No. 7	207	215	8	0.551	1	1	1	100	1	8	1
30	Newhall SB		109	121.8	12.8	1.192	1	1	1	100	1	12.8	1
31	Unnamed Road NB	JTC No. 9	26	36.6	10.6	1.895	1	1	1	100	1	10.6	1
32	Unnamed Road SB		16	22.4	6.4	1.461	1	1	1	100	1	6.4	1
33	M7 Access Rd WB		736	805.4	69.4	2.500	1	1	2	110	1	69.4	1
34	M7 Access Rd EB		16	25.8	9.8	2.144	1	1	1	100	1	9.8	1
35	M7 On Slip		730	793.8	63.8	2.311	1	1	2	110	1	63.8	1
36	R409 West EB	JTC No. 6	258	254.6	-3.4	0.212	1	1	1	100	1	-3.4	1
37	R409 West WB		584	450.2	-133.8	5.884	1	0	1	100	0	-133.8	0
38	Distributor Rd South NB		476	418.2	-57.8	2.734	1	1	1	100	1	-57.8	1
39	Distributor Rd South SB		451	477.6	26.6	1.234	1	1	1	100	1	26.6	1
40	R409 East WB		398	444.2	46.2	2.251	1	1	1	100	1	46.2	1
41	R409 East EB		311	398	87	4.621	1	1	1	100	1	87	1
42	Distributor Rd North SB		686	405.8	-280.2	11.993	1	0	1	100	0	-280.2	0
43	Distributor Rd North NB		472	612.8	140.8	6.046	1	0	1	100	0	140.8	0
44	R407 North SB	JTC No. 5	690	697.6	7.6	0.289	1	1	1	100	1	7.6	1
45	R407 North NB		937	715	-222	7.724	1	0	2	141	0	-222	0
46	Distributor Rd West EB		626	447.4	-178.6	7.709	1	0	1	100	0	-178.6	0
47	Distributor Rd West WB		532	504.8	-27.2	1.195	1	1	1	100	1	-27.2	1
48	Distributor Rd East EB		607	668.4	61.4	2.431	1	1	1	100	1	61.4	1
49	Distributor Rd East WB		701	696.4	-4.6	0.174	1	1	2	105	1	-4.6	1
50	R407 South NB		464	476.2	12.2	0.563	1	1	1	100	1	12.2	1
51	R407 South SB		405	428.4	23.4	1.146	1	1	1	100	1	23.4	1
52	Johnstown EB	JTC No. 1	126	125.2	-0.8	0.071	1	1	1	100	1	-0.8	1
53	Johnstown WB		219	240.2	21.2	1.399	1	1	1	100	1	21.2	1
55	Main Street EB		235	208.6	-26.4	1.773	2	1	1	100	1	-26.4	1
56	N7 On Slip WB		106	145	39	3.481	1	1	1	100	1	39	1
57	N7 Off Slip WB		271	296.2	25.2	1.496	1	1	1	100	1	25.2	1
58	Link Road NB		235	201.8	-33.2	2.247	1	1	1	100	1	-33.2	1
59													
60	Link Road SB		140	160	20	1.633	1	1	1	100	1	20	1
61													
62	N7 Off Slip EB	JTC No. 2	92	118.8	26.8	2.610	1	1	1	100	1	26.8	1
63	N7 On Slip EB		111	91.4	-19.6	1.948	1	1	1	100	1	-19.6	1
64	Johnstown Road EB		66	105	39	4.218	1	1	1	100	1	39	1
65	Johnstown Road WB		167	171.8	4.8	0.369	1	1	1	100	1	4.8	1
66	R445 South NB	JTC No. 4	723	645.8	-77.2	2.951	1	1	2	108	1	-77.2	1
67													
68	R445 South SB		1001	809.4	-191.6	6.368	1	0	2	150	0	-191.6	0
69	Monread Road EB		728	706.4	-21.6	0.807	1	1	2	109	1	-21.6	1
70	Monread Road WB		682	827.6	145.6	5.300	1	0	1	100	0	145.6	0
71	M7 On Slip WB		331	342.8	11.8	0.643	1	1	1	100	1	11.8	1
72	N7 On Slip EB		652	666.4	14.4	0.561	1	1	1	100	1	14.4	1
73	M7 Off Slip SB		171	265.2	94.2	6.379	1	0	1	100	1	94.2	1
74	R445 East EB		183	232	49	3.402	1	1	1	100	1	49	1
75	R445 East WB		1225	1268.6	43.6	1.235	1	1	2	184	1	43.6	1
76													
81	Newhall - M7 Off Slip WB	JTC 7	614	667.6	53.6	2.117	1	1	1	100	1	53.6	1
82	Newhall - R445 North NB		733	732	-1	0.037	1	1	2	110	1	-1	1
83	Newhall - R445 North SB		593	678	85	3.372	1	1	1	100	1	85	1
86	Newhall - R445 West EB		829	798	-31	1.087	1	1	2	124	1	-31	1
87													
88	Newhall - R445 West WB		683	595.2	-87.8	3.473	1	1	1	100	1	-87.8	1
89													
90	Newhall - M7 Access Road NB		40	26.6	-13.4	2.322	1	1	1	100	1	-13.4	1
91	Newhall - M7 Access Road SB		745	803.6	58.6	2.106	1	1	2	112	1	58.6	1
92	Newhall - R445 East WB		957	864.4	-92.6	3.068	1	1	2	144	1	-92.6	1
93	Newhall - R445 East EB		863	901.8	38.8	1.306	1	1	2	129	1	38.8	1
94	Newhall - M7 Off Slip EB	JTC 8	412	417.2	5.2	0.255	1	1	1	100	1	5.2	1
95	Newhall - M7 On Slip EB		516	565.8	49.8	2.141	1	1	1	100	1	49.8	1
96	Newhall - Business Park NB		52	52.4	0.4	0.055	1	1	1	100	1	0.4	1
97	Newhall - Business Park SB		240	267.6	27.6	1.732	1	1	1	100	1	27.6	1
98	Newhall - Unnamed Road NB		430	402.2	-27.8	1.363	1	1	1	100	1	-27.8	1
99	Newhall - Unnamed Road SB		194	284.6	90.6	5.857	1	0	1	100	1	90.6	1
			45225	44879	-346	1.632	77	64			66		66
								83.12%			85.71%		85.71%
					AVERAGE GEH	2.624							

APPENDIX B – MODEL VALIDATION


Junction Turning Count 2
1
2
5
6
7a
7b
8
9
M7
N7
R445
R407
R409
R410
River Liffey
River Morell
Oldtown
Johnstown
Halverstown
Fishery Lane
Tipper West
Tipper East
Tipper Road
Dublin Road
Hazelmere
Newbridge Road
Due Way
1000 feet
500 m
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AM Peak Validation 08:00 - 09:00

Junction No.	Movement From	Movement To	AM Surveyed Data (08-09)	AM Modelled	Difference	GEH	COUNT	GEH TEST	CLASS TEST	TARGET DIFFERENCE	FLOW TEST	ACTUAL DIFFERENCE	GEH or FLOW TEST
Jctn No. 1	M7 Off Slip	Overbridge	19	22	3	0.705	1	1	1	100	1	3.2	1
	M7 Off Slip	Johnstown	78	72	-6	0.716	1	1	1	100	1	-6.2	1
	M7 Off Slip	Mainstreet	5	0	-5	3.162	1	1	1	100	1	-5	1
	Overbridge	Mainstreet	79	99	20	2.120	1	1	1	100	1	20	1
	Overbridge	Johnstown	16	0	-16	5.552	1	0	1	100	1	-15.8	1
	Overbridge	M7 On Slip	3	36	33	7.473	1	0	1	100	1	33	1
	Johnstown	M7 On Slip	3	0	-3	2.449	1	1	1	100	1	-3	1
	Johnstown	Overbridge	90	129	39	3.744	1	1	1	100	1	39.2	1
	Johnstown	Mainstreet	47	39	-8	1.252	1	1	1	100	1	-8.2	1
	Main Street	Johnstown	64	96	32	3.537	1	1	1	100	1	31.6	1
	Main Street	M7 On Slip	66	80	14	1.661	1	1	1	100	1	14.2	1
	Main Street	Overbridge	88	26	-62	8.280	1	0	1	100	1	-62.4	1
Jctn No. 2	Johnstown Road	N7 On Slip	116	152	36	3.110	1	1	1	100	1	36	1
	Johnstown Road	Overbridge	38	47	9	1.410	1	1	1	100	1	9.2	1
	N7 Off Slip	Johnstown Road	10	33	23	5.023	1	0	1	100	1	23.4	1
	N7 Off Slip	Overbridge	59	88	29	3.383	1	1	1	100	1	29	1
	Overbridge	Johnstown Road	29	54	25	3.828	1	1	1	100	1	24.6	1
	Overbridge	N7 On Slip	164	152	-12	0.955	1	1	1	100	1	-12	1
Jctn No. 5	R407 North	Distributor Rd West	308	222	-86	5.310	1	0	1	100	1	-86.4	1
	R407 North	R407 South	225	190	-35	2.415	1	1	1	100	1	-34.8	1
	R407 North	Distributor Rd East	341	197	-144	8.780	1	0	1	100	0	-144	0
	Distributor Rd West	R407 North	196	88	-108	9.043	1	0	1	100	0	-107.8	0
	Distributor Rd West	Distributor Rd East	226	447	221	12.038	1	0	1	100	0	220.8	0
	Distributor Rd West	R407 South	46	59	13	1.768	1	1	1	100	1	12.8	1
	R407 South	Distributor Rd West	168	183	15	1.103	1	1	1	100	1	14.6	1
	R407 South	R407 North	257	238	-19	1.221	1	1	1	100	1	-19.2	1
	R407 South	Distributor Rd East	97	94	-3	0.328	1	1	1	100	1	-3.2	1
	Distributor Rd East	R407 South	63	54	-9	1.177	1	1	1	100	1	-9	1
	Distributor Rd East	Distributor Rd West	237	264	27	1.681	1	1	1	100	1	26.6	1
	Distributor Rd East	R407 North	223	320	97	5.865	1	0	1	100	1	96.6	1
Jctn No. 6	Distributor Rd North	Local Road West	54	49	-5	0.754	1	1	1	100	1	-5.4	1
	Distributor Rd North	Distributor Rd South	352	548	196	9.223	1	0	1	100	0	195.6	0
	Distributor Rd North	Local Road East	105	43	-62	7.151	1	0	1	100	1	-61.6	1
	Local Road West	Distributor Rd North	210	123	-87	6.707	1	0	1	100	1	-86.6	1
	Local Road West	Local Road East	222	402	180	10.190	1	0	1	100	0	180	0
	Local Road West	Distributor Rd South	151	20	-131	14.167	1	0	1	100	0	-131	0
	Distributor Rd South	Local Road West	77	72	-5	0.626	1	1	1	100	1	-5.4	1
	Distributor Rd South	Distributor Rd North	306	437	131	6.806	1	0	1	100	0	131.2	0
	Distributor Rd South	Local Road East	9	41	32	6.400	1	0	1	100	1	32	1
	Local Road East	Distributor Rd South	35	90	55	6.937	1	0	1	100	1	54.8	1
	Local Road East	Local Road West	68	78	10	1.170	1	1	1	100	1	10	1
	Local Road East	Distributor Rd North	135	139	4	0.308	1	1	1	100	1	3.6	1
Jctn No. 7	M7 Off Slip	R445 East	56	143	87	8.737	1	0	1	100	1	87.2	1
	M7 Off Slip	M7 Access Road		0									
	M7 Off Slip	R445 West	285	219	-66	4.158	1	1	1	100	1	-66	1
	M7 Off Slip	R445 North	126	73	-53	5.291	1	0	1	100	1	-52.8	1
	R445 East	M7 Access Road	388	411	23	1.131	1	1	1	100	1	22.6	1
	R445 East	R445 West	308	285	-23	1.324	1	1	1	100	1	-22.8	1
	R445 East	R445 North	200	290	90	5.761	1	0	1	100	1	90.2	1
	M7 Access Road	R445 West	6	2	-4	1.877	1	1	1	100	1	-3.8	1
	M7 Access Road	R445 North	15	10	-5	1.414	1	1	1	100	1	-5	1
	M7 Access Road	R445 East	16	24	8	1.749	1	1	1	100	1	7.8	1
	R445 West	R445 North	286	334	48	2.715	1	1	1	100	1	47.8	1
	R445 West	R445 East	336	337	1	0.076	1	1	1	100	1	1.4	1
	R445 West	M7 Access Road	64	52	-12	1.603	1	1	1	100	1	-12.2	1
	R445 North	R445 East	453	477	24	1.122	1	1	1	100	1	24.2	1
	R445 North	M7 Access Road	46	49	3	0.407	1	1	1	100	1	2.8	1
	R445 North	R445 West	147	172	25	1.980	1	1	1	100	1	25	1
Jctn No. 8	Business Park	M7 On Slip	21	4	-17	4.884	1	1	1	100	1	-17.2	1
	Business Park	R445	25	43	18	3.146	1	1	1	100	1	18.4	1
	Business Park	Rathangan Rd	2	1	-1	0.632	1	1	1	100	1	-0.8	1
	R445	Rathangan Rd	134	105	-29	2.672	1	1	1	100	1	-29.2	1
	R445	Business Park	122	146	24	2.040	1	1	1	100	1	23.6	1
	R445	M7 On Slip	385	457	72	3.500	1	1	1	100	1	71.8	1
	M7 Off Slip	Rathangan Rd	81	104	23	2.391	1	1	1	100	1	23	1
	M7 Off Slip	Business Park	60	50	-10	1.292	1	1	1	100	1	-9.6	1
	M7 Off Slip	R445	497	570	73	3.144	1	1	1	100	1	72.6	1
Jctn No. 9	Local Road	M7 On Slip	6	8	2	0.826	1	1	1	100	1	2.2	1
	Local Road	M7 Access Road	27	36	9	1.604	1	1	1	100	1	9	1
	M7 Access Road	Local Road	22	17	-5	1.181	1	1	1	100	1	-5.2	1
	M7 Access Road	M7 On Slip	437	496	59	2.741	1	1	1	100	1	59.2	1
			9636	10436	799	7.982	70	50			63		63
								71.43%			90.00%		90.00%
					AVERAGE GEH	3.556							

PM Peak Validation 17:00 - 18:00

Junction No.	Movement From	Movement To	AM Surveyed Data (08-09)	AM Modelled	Difference	GEH	COUNT	GEH TEST	CLASS TEST	TARGET DIFFERENCE	FLOW TEST	ACTUAL DIFFERENCE	GEH or FLOW TEST
Jctn No. 1	M7 Off Slip	Overbridge	83	64	-19	2.241	1	1	1	100	1	-19.2	1
	M7 Off Slip	Johnstown	167	221	54	3.850	1	1	1	100	1	53.6	1
	M7 Off Slip	Mainstreet	20	10	-10	2.582	1	1	1	100	1	-10	1
	Overbridge	Mainstreet	84	129	45	4.326	1	1	1	100	1	44.6	1
	Overbridge	Johnstown	52	3	-49	9.455	1	0	1	100	1	-49.4	1
	Overbridge	M7 On Slip	4	29	25	6.155	1	0	1	100	1	25	1
	Johnstown	M7 On Slip	0	0	0								
	Johnstown	Overbridge	52	62	10	1.350	1	1	1	100	1	10.2	1
	Johnstown	Mainstreet	74	61	-13	1.582	1	1	1	100	1	-13	1
	Main Street	Johnstown	34	17	-17	3.367	1	1	1	100	1	-17	1
	Main Street	M7 On Slip	101	115	14	1.366	1	1	1	100	1	14.2	1
	Main Street	Overbridge	100	73	-27	2.857	1	1	1	100	1	-26.6	1
Jctn No. 2	Johnstown Road	N7 On Slip	28	36	8	1.414	1	1	1	100	1	8	1
	Johnstown Road	Overbridge	36	69	33	4.554	1	1	1	100	1	33	1
	N7 Off Slip	Johnstown Road	11	27	16	3.743	1	1	1	100	1	16.4	1
	N7 Off Slip	Overbridge	76	91	15	1.662	1	1	1	100	1	15.2	1
	Overbridge	Johnstown Road	152	144	-8	0.674	1	1	1	100	1	-8.2	1
	Overbridge	N7 On Slip	71	92	21	2.285	1	1	1	100	1	20.6	1
Jctn No. 5	R407 North	Distributor Rd West	196	154	-42	3.191	1	1	1	100	1	-42.2	1
	R407 North	R407 South	236	163	-73	5.137	1	0	1	100	1	-72.6	1
	R407 North	Distributor Rd East	258	379	121	6.800	1	0	1	100	0	121.4	0
	Distributor Rd West	R407 North	279	90	-189	13.951	1	0	1	100	0	-189.4	0
	Distributor Rd West	Distributor Rd East	271	224	-47	2.974	1	1	1	100	1	-46.8	1
	Distributor Rd West	R407 South	76	134	58	5.694	1	0	1	100	1	58.4	1
	R407 South	Distributor Rd West	110	67	-43	4.595	1	1	1	100	1	-43.2	1
	R407 South	R407 North	276	344	68	3.884	1	1	1	100	1	68.4	1
	R407 South	Distributor Rd East	78	64	-14	1.612	1	1	1	100	1	-13.6	1
	Distributor Rd East	R407 South	93	131	38	3.573	1	1	1	100	1	37.8	1
	Distributor Rd East	Distributor Rd West	226	284	58	3.620	1	1	1	100	1	57.8	1
	Distributor Rd East	R407 North	382	281	-101	5.535	1	0	1	100	0	-100.8	0
Jctn No. 6	Distributor Rd North	Local Road West	176	116	-60	4.947	1	1	1	100	1	-59.8	1
	Distributor Rd North	Distributor Rd South	359	390	31	1.592	1	1	1	100	1	30.8	1
	Distributor Rd North	Local Road East	151	107	-44	3.912	1	1	1	100	1	-44.4	1
	Local Road West	Distributor Rd North	66	17	-49	7.566	1	0	1	100	1	-48.8	1
	Local Road West	Local Road East	132	219	87	6.541	1	0	1	100	1	86.6	1
	Local Road West	Distributor Rd South	60	19	-41	6.524	1	0	1	100	1	-41	1
	Distributor Rd South	Local Road West	150	13	-137	15.238	1	0	1	100	0	-137.4	0
	Distributor Rd South	Distributor Rd North	298	333	35	1.992	1	1	1	100	1	35.4	1
	Distributor Rd South	Local Road East	28	73	45	6.332	1	0	1	100	1	45	1
	Local Road East	Distributor Rd South	32	69	37	5.207	1	0	1	100	1	37	1
	Local Road East	Local Road West	258	321	63	3.692	1	1	1	100	1	62.8	1
	Local Road East	Distributor Rd North	108	55	-53	5.845	1	0	1	100	1	-52.8	1
Jctn No. 7	M7 Off Slip	R445 East	108	197	89	7.193	1	0	1	100	1	88.8	1
	M7 Off Slip	M7 Access Road	13	4	-9	3.001	2	1	1	100	1	-8.8	1
	M7 Off Slip	R445 West	284	274	-10	0.575	1	1	1	100	1	-9.6	1
	M7 Off Slip	R445 North	209	192	-17	1.186	1	1	1	100	1	-16.8	1
	R445 East	M7 Access Road	526	465	-61	2.731	1	1	1	100	1	-60.8	1
	R445 East	R445 West	271	234	-37	2.315	1	1	1	100	1	-36.8	1
	R445 East	R445 North	160	163	3	0.220	1	1	1	100	1	2.8	1
	M7 Access Road	R445 West	9	5	-4	1.426	1	1	1	100	1	-3.8	1
	M7 Access Road	R445 North	15	6	-9	2.629	1	1	1	100	1	-8.6	1
	M7 Access Road	R445 East	15	15	0	0.052	1	1	1	100	1	-0.2	1
	R445 West	R445 North	355	367	12	0.632	1	1	1	100	1	12	1
	R445 West	R445 East	363	310	-53	2.878	1	1	1	100	1	-52.8	1
	R445 West	M7 Access Road	108	119	11	1.069	1	1	1	100	1	11.4	1
	R445 North	R445 East	377	381	4	0.185	1	1	1	100	1	3.6	1
	R445 North	M7 Access Road	97	215	118	9.435	1	0	1	100	0	117.8	0
	R445 North	R445 West	119	82	-37	3.734	1	1	1	100	1	-37.4	1
Jctn No. 8	Business Park	M7 On Slip	46	74	28	3.660	1	1	1	100	1	28.4	1
	Business Park	R445	146	146	0	0.000	1	1	1	100	1	0	1
	Business Park	Rathangan Rd	48	47	-1	0.145	1	1	1	100	1	-1	1
	R445	Rathangan Rd	294	246	-48	2.921	1	1	1	100	1	-48	1
	R445	Business Park	38	33	-5	0.804	1	1	1	100	1	-4.8	1
	R445	M7 On Slip	399	449	50	2.438	1	1	1	100	1	50.2	1
	M7 Off Slip	Rathangan Rd	88	109	21	2.135	1	1	1	100	1	21.2	1
	M7 Off Slip	Business Park	7	18	11	3.022	1	1	1	100	1	10.6	1
	M7 Off Slip	R445	316	291	-25	1.447	1	1	1	100	1	-25.2	1
Jctn No. 9	Local Road	M7 On Slip	10	11	1	0.248	1	1	1	100	1	0.8	1
	Local Road	M7 Access Road	16	26	10	2.144	1	1	1	100	1	9.8	1
	M7 Access Road	Local Road	16	22	6	1.461	1	1	1	100	1	6.4	1
	M7 Access Road	M7 On Slip	720	783	63	2.298	1	1	2	108	1	63	1
			10617	10575	-42	0.406	71	54			65		65
								76.06%			91.55%		91.55%
					AVERAGE GEH	3.506							

Appendix B

PICADY Results

M7 OFF-RAMP

TRL LIMITED

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

PICADY 4.1 ANALYSIS PROGRAM
RELEASE 3.0 (MAR 2001)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
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Run with file:- "h:\Training\M7_Slip_AM.vpi" at 12:18:33 on Monday, 19 May 2014

RUN TITLE
****
M7 Newhall Off-Ramp Southbound-2012 AM BASE

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

INPUT DATA

MAJOR ROAD (ARM C) ---------- MAJOR ROAD (ARM A)
I
I
I
I
I
I
MINOR ROAD (ARM B)

ARM A IS L2030 Overbridge
ARM B IS M7 Off Slip
ARM C IS R445 to Bundle of Sticks

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)	14.00 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.
- VISIBILITY	(VC-B)	0.0 M.
- BLOCKS TRAFFIC		NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	12.0 M.
- VISIBILITY TO RIGHT	(VB-A)	12.0 M.
- LANE 1 WIDTH	(WB-C)	-
- LANE 2 WIDTH	(WB-A)	-
- WIDTH AT 0 M FROM JUNC.		10.00 M.
- WIDTH AT 5 M FROM JUNC.		9.00 M.
- WIDTH AT 10 M FROM JUNC.		8.00 M.
- WIDTH AT 15 M FROM JUNC.		5.00 M.

I	- WIDTH AT 20 M FROM JUNC.	I 4.00 M. I
I	- LENGTH OF FLARED SECTION	I 2 VEHS I

.TRAFFIC DEMAND DATA

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 TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	8.07	12.11	8.07
ARM B	15.00	45.00	75.00	5.84	8.76	5.84
ARM C	15.00	45.00	75.00	6.26	9.39	6.26

TIME	FROM/TO	ARM A	ARM B	ARM C
07.45 - 09.15				
	ARM A	0.000	0.000	1.000
		0.0	0.0	646.0
		(0.0)	(10.0)	(10.0)
	ARM B	0.270	0.000	0.730
		126.0	0.0	341.0
		(10.0)	(0.0)	(10.0)
	ARM C	1.000	0.000	0.000
		501.0	0.0	0.0
		(10.0)	(10.0)	(0.0)

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

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)
07.45-08.00								
B-C	4.26	8.95	0.476		0.0	0.9	12.4	
B-A	1.58	5.63	0.280		0.0	0.4	5.3	
C-A	6.26							
C-B	0.00	7.53	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	8.07							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.085	0.010			0.010
B-A	0.062	0.013	0.019	0.004	0.006
C-B	0.090	0.009		0.008	

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)
08.00-08.15								
B-C	5.09	8.40	0.606		0.9	1.5	20.5	
B-A	1.88	5.01	0.375		0.4	0.6	8.3	
C-A	7.48							
C-B	0.00	7.30	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	9.64							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.081	0.012			0.009
B-A	0.058	0.016	0.019	0.004	0.006
C-B	0.087	0.010		0.008	

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)
08.15-08.30								
B-C	6.23	7.45	0.837		1.5	4.1	50.2	
B-A	2.30	3.62	0.637		0.6	1.6	20.2	
C-A	9.16							
C-B	0.00	6.98	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	11.81							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.075	0.014			0.009
B-A	0.053	0.020	0.019	0.004	0.005
C-B	0.084	0.013		0.008	

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)
08.30-08.45								
B-C	6.23	7.37	0.846		4.1	4.7	66.2	
B-A	2.30	3.42	0.673		1.6	1.8	26.1	
C-A	9.16							
C-B	0.00	6.98	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	11.81							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.074	0.014			0.009
B-A	0.053	0.020	0.019	0.004	0.005
C-B	0.084	0.013		0.008	

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)
08.45-09.00								
B-C	5.09	8.32	0.612		4.7	1.7	28.9	
B-A	1.88	4.90	0.384		1.8	0.6	10.8	
C-A	7.48							
C-B	0.00	7.30	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	9.64							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL	LANE WIDTH	MAJOR RD. WIDTH	CENT RES WIDTH	VIS TO LEFT (AHEAD FOR MAJOR)	VISIBILITY TO RIGHT

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)	
B-C	0.080	0.012			0.009	
B-A	0.058	0.016	0.019	0.004	0.006	
C-B	0.087	0.010		0.008		

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)
09.00-09.15								
B-C	4.26	8.92	0.478		1.7	0.9	15.0	
B-A	1.58	5.61	0.281		0.6	0.4	6.3	
C-A	6.26							
C-B	0.00	7.53	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	8.07							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)	
B-C	0.085	0.010			0.010	
B-A	0.062	0.013	0.019	0.004	0.006	
C-B	0.090	0.009		0.008		

WARNING THE JUNCTION MODELLED CAN CARRY HIGH-SPEED MAJOR ROAD TRAFFIC. (AG23 REF. 8.4.2(v)).

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.9	*
08.15	1.5	*
08.30	4.1	****
08.45	4.7	*****
09.00	1.7	**
09.15	0.9	*

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.6	*
08.30	1.6	**
08.45	1.8	**
09.00	0.6	*
09.15	0.4	

QUEUE FOR STREAM C-B

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

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	467.6	311.7	193.2	0.41	193.2	0.41
B-A	172.8	115.2	77.1	0.45	77.1	0.45
C-A	687.0	458.0				
C-B	0.0	0.0	0.0	0.00	0.0	0.00

A-B	0.0	0.0					
A-C	885.8	590.5					
ALL	2213.1	1475.4	270.3	0.12	270.3	0.12	

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

END OF JOB

****** PICADY 4 run completed.

TRL LIMITED

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

PICADY 4.1 ANALYSIS PROGRAM
RELEASE 3.0 (MAR 2001)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
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Run with file:- "h:\Training\M7_Slip_PM.vpi" at 16:56:17 on Monday, 19 May 2014

RUN TITLE
****
M7 Newhall Off-Ramp Southbound 2012 PM BASE

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

INPUT DATA

MAJOR ROAD (ARM C) ---------- MAJOR ROAD (ARM A)
I
I
I
I
I
I
MINOR ROAD (ARM B)

ARM A IS R445 Overbridge
ARM B IS M7 Off Slip
ARM C IS R445 to Bundle of Sticks

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) 15.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B) 0.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 12.0 M.
- VISIBILITY TO RIGHT	(VB-A) 12.0 M.
- LANE 1 WIDTH	(WB-C) -
- LANE 2 WIDTH	(WB-A) -
- WIDTH AT 0 M FROM JUNC.	10.00 M.
- WIDTH AT 5 M FROM JUNC.	9.00 M.
- WIDTH AT 10 M FROM JUNC.	8.00 M.
- WIDTH AT 15 M FROM JUNC.	6.00 M.
- WIDTH AT 20 M FROM JUNC.	4.00 M.
- LENGTH OF FLARED SECTION	2 VEHS

.

.TRAFFIC DEMAND DATA

 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 TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	7.41	11.12	7.41
ARM B	15.00	45.00	75.00	7.68	11.51	7.68
ARM C	15.00	45.00	75.00	6.63	9.94	6.63

.

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.000	1.000
		0.0	0.0	593.0
		(0.0)	(10.0)	(10.0)
	ARM B	0.340	0.000	0.660
		209.0	0.0	405.0
		(10.0)	(0.0)	(10.0)
	ARM C	1.000	0.000	0.000
		530.0	0.0	0.0
		(10.0)	(10.0)	(0.0)

 TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

 DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

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)
16.45-17.00								
B-C	5.06	8.59	0.589		0.0	1.4	18.7	
B-A	2.61	5.76	0.454		0.0	0.8	11.0	
C-A	6.63							
C-B	0.00	7.69	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	7.41							

 EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.083	0.009			0.010
B-A	0.064	0.013	0.019	0.004	0.007
C-B	0.092	0.008		0.009	

.

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)

17.00-17.15							
B-C	6.05	7.63	0.792	1.4	3.3	41.8	
B-A	3.12	4.74	0.658	0.8	1.7	23.0	
C-A	7.91						
C-B	0.00	7.50	0.000	0.0	0.0	0.0	
A-B	0.00						
A-C	8.85						

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.078	0.010			0.009
B-A	0.061	0.016	0.019	0.004	0.006
C-B	0.090	0.009		0.008	

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)
17.15-17.30								
B-C	7.40	6.48	1.143		3.3	20.1	183.6	
B-A	3.82	3.35	1.142		1.7	11.8	108.8	
C-A	9.69							
C-B	0.00	7.23	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	10.84							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.071	0.012			0.008
B-A	0.056	0.019	0.019	0.004	0.006
C-B	0.087	0.012		0.008	

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)
17.30-17.45								
B-C	7.40	6.27	1.181		20.1	37.7	434.8	
B-A	3.82	3.30	1.157		11.8	20.4	241.9	
C-A	9.69							
C-B	0.00	7.23	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	10.84							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.069	0.012			0.008
B-A	0.056	0.019	0.019	0.004	0.006
C-B	0.087	0.012		0.008	

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)
17.45-18.00								
B-C	6.05	6.73	0.898		37.7	30.0	508.2	
B-A	3.12	3.52	0.886		20.4	16.8	278.7	
C-A	7.91							
C-B	0.00	7.50	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	8.85							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.073	0.010			0.009

I	B-A	0.061	0.016	0.019	0.004	0.006	I
I	C-B	0.090	0.009		0.008		I

I 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)	I
I 18.00-18.15									I
I B-C	5.06	7.27	0.697		30.0	3.1	230.6		I
I B-A	2.61	3.99	0.655		16.8	2.5	126.7		I
I C-A	6.63								I
I C-B	0.00	7.69	0.000		0.0	0.0	0.0		I
I A-B	0.00								I
I A-C	7.41								I

I EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN: I

I MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)	I
I B-C	0.079	0.009			0.009	I
I B-A	0.064	0.013	0.019	0.004	0.007	I
I C-B	0.092	0.008		0.009		I

WARNING THE JUNCTION MODELLED CAN CARRY HIGH-SPEED MAJOR ROAD TRAFFIC. (AG23 REF. 8.4.2(v)).

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.4	*
17.15	3.3	***
17.30	20.1	********************
17.45	37.7	*************************************
18.00	30.0	******************************
18.15	3.1	***

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.8	*
17.15	1.7	**
17.30	11.8	************
17.45	20.4	********************
18.00	16.8	*****************
18.15	2.5	**

QUEUE FOR STREAM C-B

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

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

I STREAM I	TOTAL DEMAND (VEH)	(VEH/H)	* QUEUEING * DELAY (MIN)	(MIN/VEH)	* INCLUSIVE QUEUEING * DELAY (MIN)	(MIN/VEH)	I
I B-C I	555.3	370.2	1417.7	2.55	1418.4	2.55	I
I B-A I	286.6	191.1	790.0	2.76	790.8	2.76	I
I C-A I	726.7	484.5					I
I C-B I	0.0	0.0	0.0	0.00	0.0	0.00	I
I A-B I	0.0	0.0					I
I A-C I	813.1	542.1					I

I ALL	I 2381.8	I 1587.9	I 2207.7	I 0.93	I 2209.1	I 0.93 I

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

END OF JOB

****** PICADY 4 run completed.

TRL LIMITED

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

PICADY 4.1 ANALYSIS PROGRAM
RELEASE 3.0 (MAR 2001)

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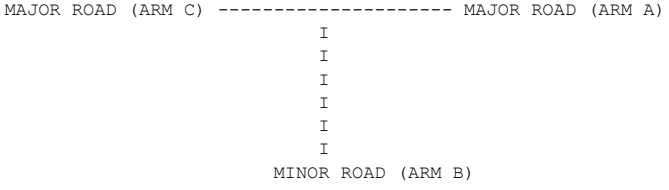
Run with file:- "h:\Training\M7_Slip_AM-2030DM.vpi" at 16:41:05 on Friday, 16 May 2014

RUN TITLE
****
M7 Newhall Off-Ramp Southbound-2030 AM Do-Minimum

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

INPUT DATA



ARM A IS L2030 Overbridge
ARM B IS M7 Off Slip
ARM C IS R445 to Bundle of Sticks

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) 15.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B) 0.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 12.0 M.
- VISIBILITY TO RIGHT	(VB-A) 12.0 M.
- LANE 1 WIDTH	(WB-C) -
- LANE 2 WIDTH	(WB-A) -
- WIDTH AT 0 M FROM JUNC.	10.00 M.
- WIDTH AT 5 M FROM JUNC.	9.00 M.
- WIDTH AT 10 M FROM JUNC.	8.00 M.
- WIDTH AT 15 M FROM JUNC.	6.00 M.
- WIDTH AT 20 M FROM JUNC.	4.00 M.
- LENGTH OF FLARED SECTION	2 VEHS

.

.TRAFFIC DEMAND DATA

 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 TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	9.49	14.23	9.49
ARM B	15.00	45.00	75.00	7.76	11.64	7.76
ARM C	15.00	45.00	75.00	8.09	12.13	8.09

.

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.000	1.000
		0.0	0.0	759.0
		(0.0)	(10.0)	(10.0)
	ARM B	0.250	0.000	0.750
		155.0	0.0	466.0
		(10.0)	(0.0)	(10.0)
	ARM C	1.000	0.000	0.000
		647.0	0.0	0.0
		(10.0)	(10.0)	(0.0)

 TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

 DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

.

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)
07.45-08.00								
B-C	5.82	8.55	0.681		0.0	2.0	26.3	
B-A	1.94	4.86	0.399		0.0	0.6	8.8	
C-A	8.09							
C-B	0.00	7.41	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	9.49							

 EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.082	0.012			0.010
B-A	0.059	0.016	0.019	0.004	0.006
C-B	0.089	0.010		0.008	

.

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)

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)
08.00-08.15								
B-C	6.96	7.72	0.902		2.0	5.9	68.8	
B-A	2.31	3.18	0.728		0.6	2.2	26.6	
C-A	9.66							
C-B	0.00	7.16	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	11.33							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.077	0.014			0.009
B-A	0.055	0.019	0.019	0.004	0.006
C-B	0.086	0.012		0.008	

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)
08.15-08.30								
B-C	8.52	6.81	1.251		5.9	32.8	294.0	
B-A	2.83	2.28	1.245		2.2	12.2	111.9	
C-A	11.83							
C-B	0.00	6.82	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	13.88							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.069	0.016			0.008
B-A	0.049	0.024	0.019	0.003	0.005
C-B	0.082	0.015		0.008	

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)
08.30-08.45								
B-C	8.52	6.55	1.301		32.8	62.5	715.3	
B-A	2.83	2.23	1.271		12.2	21.6	253.9	
C-A	11.83							
C-B	0.00	6.82	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	13.88							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.066	0.015			0.008
B-A	0.049	0.024	0.019	0.003	0.005
C-B	0.082	0.015		0.008	

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)
08.45-09.00								
B-C	6.96	7.07	0.983		62.5	62.5	938.0	
B-A	2.31	2.39	0.969		21.6	21.7	325.0	
C-A	9.66							
C-B	0.00	7.16	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	11.33							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.071	0.013			0.008

B-A	0.055	0.019	0.019	0.004	0.006		
C-B	0.086	0.012		0.008			

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)
09.00-09.15								
B-C	5.82	7.58	0.768		62.5	37.9	753.4	
B-A	1.94	2.57	0.754		21.7	13.9	267.5	
C-A	8.09							
C-B	0.00	7.41	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	9.49							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.076	0.011			0.009
B-A	0.059	0.016	0.019	0.004	0.006
C-B	0.089	0.010		0.008	

WARNING THE JUNCTION MODELLED CAN CARRY HIGH-SPEED MAJOR ROAD TRAFFIC. (AG23 REF. 8.4.2(v)).

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	2.0	**
08.15	5.9	******
08.30	32.8	**********
08.45	62.5	**********
09.00	62.5	**********
09.15	37.9	**********

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.6	*
08.15	2.2	**
08.30	12.2	**********
08.45	21.6	**********
09.00	21.7	**********
09.15	13.9	**********

QUEUE FOR STREAM C-B

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

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-C	639.0	426.0	2795.9	4.38	2890.8	4.52
B-A	212.5	141.7	993.6	4.67	1031.4	4.85
C-A	887.2	591.4				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	0.0	0.0				
A-C	1040.7	693.8				

I ALL	I 2779.4	I 1853.0	I 3789.5	I 1.36	I 3922.2	I 1.41 I

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

END OF JOB

****** PICADY 4 run completed.

TRL LIMITED

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

PICADY 4.1 ANALYSIS PROGRAM
RELEASE 3.0 (MAR 2001)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
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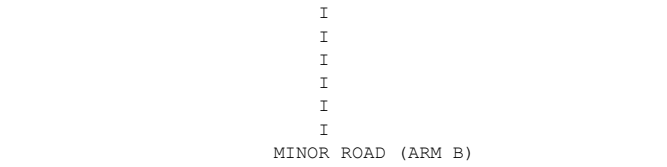
Run with file:- "h:\Training\M7_Slip_PM-2030DM.vpi" at 08:54:49 on Tuesday, 20 May 2014

RUN TITLE
****
M7 Newhall Off-Ramp Southbound 2030 PM DO-MINIMUM

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

INPUT DATA



ARM A IS R445 Overbridge
ARM B IS M7 Off Slip
ARM C IS R445 to Bundle of Sticks

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)	15.00 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	2.20 M.
- VISIBILITY	(VC-B)	0.0 M.
- BLOCKS TRAFFIC		NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	12.0 M.
- VISIBILITY TO RIGHT	(VB-A)	12.0 M.
- LANE 1 WIDTH	(WB-C)	-
- LANE 2 WIDTH	(WB-A)	-
- WIDTH AT 0 M FROM JUNC.		10.00 M.
- WIDTH AT 5 M FROM JUNC.		9.00 M.
- WIDTH AT 10 M FROM JUNC.		8.00 M.
- WIDTH AT 15 M FROM JUNC.		6.00 M.
- WIDTH AT 20 M FROM JUNC.		4.00 M.
- LENGTH OF FLARED SECTION		2 VEHS

.

.TRAFFIC DEMAND DATA

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 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	8.84	13.26	8.84
ARM B	15.00	45.00	75.00	11.76	17.64	11.76
ARM C	15.00	45.00	75.00	6.53	9.79	6.53

.

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.000	1.000
		0.0	0.0	707.0
		(0.0)	(10.0)	(10.0)
	ARM B	0.261	0.000	0.739
		246.0	0.0	695.0
		(10.0)	(0.0)	(10.0)
	ARM C	1.000	0.000	0.000
		522.0	0.0	0.0
		(10.0)	(10.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

DEFAULT PROPORTIONS OF HEAVY VEHICLES ARE USED

.

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)
16.45-17.00								
B-C	8.69	7.80	1.114		0.0	19.2	165.4	
B-A	3.07	2.76	1.114		0.0	8.9	79.4	
C-A	6.53							
C-B	0.00	7.50	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	8.84							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.079	0.011			0.009
B-A	0.062	0.014	0.019	0.004	0.006
C-B	0.090	0.009		0.008	

.

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

			(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME SEGMENT)	TIME SEGMENT)
17.00-17.15								
	B-C	10.37	7.02	1.478	19.2	69.6	666.6	
	B-A	3.67	2.57	1.428	8.9	25.8	261.0	
	C-A	7.79						
	C-B	0.00	7.27	0.000	0.0	0.0	0.0	
	A-B	0.00						
	A-C	10.55						

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.071	0.012			0.008
B-A	0.058	0.017	0.019	0.004	0.006
C-B	0.087	0.011		0.008	

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)
17.15-17.30								
B-C	12.71	6.29	2.019		69.6	165.9	1766.4	
B-A	4.50	2.25	1.995		25.8	59.5	639.6	
C-A	9.54							
C-B	0.00	6.95	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	12.92							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.063	0.013			0.007
B-A	0.053	0.021	0.019	0.004	0.005
C-B	0.083	0.014		0.008	

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)
17.30-17.45								
B-C	12.71	6.30	2.018		165.9	262.0	3208.9	
B-A	4.50	2.24	2.005		59.5	93.3	1145.8	
C-A	9.54							
C-B	0.00	6.95	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	12.92							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.063	0.013			0.007
B-A	0.053	0.021	0.019	0.004	0.005
C-B	0.083	0.014		0.008	

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)
17.45-18.00								
B-C	10.37	6.64	1.563		262.0	318.1	4350.4	
B-A	3.67	2.36	1.557		93.3	113.0	1547.4	
C-A	7.79							
C-B	0.00	7.27	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	10.55							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)

	B-C	0.066	0.011			0.008	
	B-A	0.058	0.017	0.019	0.004	0.006	
	C-B	0.087	0.011		0.008		

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)
18.00-18.15								
B-C	8.69	6.88	1.263		318.1	345.2	4974.7	
B-A	3.07	2.44	1.260		113.0	122.5	1766.8	
C-A	6.53							
C-B	0.00	7.50	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	8.84							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)	
B-C	0.068	0.009			0.008	
B-A	0.062	0.014	0.019	0.004	0.006	
C-B	0.090	0.009		0.008		

WARNING THE JUNCTION MODELLED CAN CARRY HIGH-SPEED MAJOR ROAD TRAFFIC. (AG23 REF. 8.4.2(v)).

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	19.2	******************
17.15	69.6	**********
17.30	165.9	**********
17.45	262.0	**********
18.00	318.1	**********
18.15	345.2	**********

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	8.9	*********
17.15	25.8	*************************
17.30	59.5	**********
17.45	93.3	**********
18.00	113.0	**********
18.15	122.5	**********

QUEUE FOR STREAM C-B

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

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-C	953.0	635.3	15132.4	15.88	23799.1	24.97
B-A	337.3	224.9	5440.0	16.13	8516.7	25.25
C-A	715.8	477.2				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	0.0	0.0				
A-C	969.4	646.3				

I ALL	I 2975.5	I 1983.7	I 20572.4	I 6.91 I	32315.8 I 10.86 I

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

END OF JOB

****** PICADY 4 run completed.

Appendix C

ARCADY Results

BUNDLE OF STICKS

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

_____

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Run with file:- "h:\Training\BOS AM.vai" (drive-on-the-left) at 11:47:32 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Bundle of Sticks-2012 AM Base
LOCATION: Newhall Interchange, Naas
DATE: 15/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - L2030 Overbridge
ARM B - R445 East
ARM C - M7 Access Road
ARM D - R445 West

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.20	6.20	5.00	22.90	67.50	44.0	0.470	24.553
ARM B	3.90	6.50	5.00	28.50	67.50	25.0	0.497	25.410
ARM C	3.70	5.50	5.00	22.60	67.50	36.0	0.458	22.561
ARM D	7.10	8.30	2.50	30.50	67.50	41.0	0.600	37.429

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	I	100
B	I	100
C	I	100
D	I	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: Bundle of Sticks-AM

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	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
	TO RISE					
ARM A	15.00	45.00	75.00	12.34	18.51	12.34
ARM B	15.00	45.00	75.00	11.20	16.80	11.20
ARM C	15.00	45.00	75.00	0.46	0.69	0.46
ARM D	15.00	45.00	75.00	8.57	12.86	8.57

DEMAND SET TITLE: Bundle of Sticks-AM

T33

TIME	FROM/TO	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C	ARM D
07.45 - 09.15	ARM A	0.000	0.516	0.047	0.438
		0.0	509.0	46.0	432.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.223	0.000	0.433	0.344
		200.0	0.0	388.0	308.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.405	0.432	0.000	0.162
		15.0	16.0	0.0	6.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.417	0.490	0.093	0.000
		286.0	336.0	64.0	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	12.38	19.87	0.623	- -	0.0	1.6	22.8	-	0.130
ARM B	11.24	19.75	0.569	- -	0.0	1.3	18.5	-	0.115
ARM C	0.46	15.16	0.031	- -	0.0	0.0	0.5	-	0.068
ARM D	8.61	32.30	0.266	- -	0.0	0.4	5.3	-	0.042

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	14.79	19.39	0.763	- -	1.6	3.0	41.9	-	0.209
ARM B	13.42	19.09	0.703	- -	1.3	2.3	32.1	-	0.172
ARM C	0.55	14.10	0.039	- -	0.0	0.0	0.6	-	0.074

ARM D	10.28	31.96	0.322	- -	-	0.4	0.5	7.0	-	0.046

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	18.11	18.73	0.967	- -	-	3.0	12.3	135.6	-	0.616
ARM B	16.44	18.31	0.898	- -	-	2.3	6.9	85.0	-	0.411
ARM C	0.68	12.82	0.053	- -	-	0.0	0.1	0.8	-	0.082
ARM D	12.59	31.53	0.399	- -	-	0.5	0.7	9.7	-	0.053

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	18.11	18.73	0.967	- -	-	12.3	15.6	212.0	-	0.904
ARM B	16.44	18.21	0.903	- -	-	6.9	7.9	112.3	-	0.512
ARM C	0.68	12.68	0.054	- -	-	0.1	0.1	0.8	-	0.083
ARM D	12.59	31.49	0.400	- -	-	0.7	0.7	9.9	-	0.053

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	14.79	19.39	0.763	- -	-	15.6	3.4	76.0	-	0.313
ARM B	13.42	18.87	0.711	- -	-	7.9	2.6	44.9	-	0.209
ARM C	0.55	13.81	0.040	- -	-	0.1	0.0	0.6	-	0.075
ARM D	10.28	31.90	0.322	- -	-	0.7	0.5	7.3	-	0.046

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	12.38	19.86	0.623	- -	-	3.4	1.7	26.9	-	0.138
ARM B	11.24	19.69	0.571	- -	-	2.6	1.4	21.3	-	0.121
ARM C	0.46	15.07	0.031	- -	-	0.0	0.0	0.5	-	0.068
ARM D	8.61	32.28	0.267	- -	-	0.5	0.4	5.5	-	0.042

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.6	**
08.15	3.0	***
08.30	12.3	************
08.45	15.6	****************
09.00	3.4	***
09.15	1.7	**

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.3	*
08.15	2.3	**
08.30	6.9	*******
08.45	7.9	********
09.00	2.6	***
09.15	1.4	*

.QUEUE AT ARM C

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

.QUEUE AT ARM D

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *		T75
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)	
A	1358.5	905.7	515.2	0.38	515.3	0.38	
B	1233.3	822.2	314.1	0.25	314.1	0.25	
C	50.9	34.0	3.9	0.08	3.9	0.08	
D	944.2	629.5	44.8	0.05	44.8	0.05	
ALL	3587.0	2391.3	878.0	0.24	878.1	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

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

_____

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Run with file:- "h:\Training\BOS PM.vai" (drive-on-the-left) at 16:01:20 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Bundle of Sticks-2012 PM Base
LOCATION: Newhall Interchange, Naas
DATE: 15/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - L2030 Overbridge
ARM B - R445 East
ARM C - M7 Access Road
ARM D - R445 West

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.20	6.20	5.00	22.90	67.50	44.0	0.470	24.553
ARM B	3.90	6.50	5.00	28.50	67.50	25.0	0.497	25.410
ARM C	3.70	5.50	5.00	22.60	67.50	36.0	0.458	22.561
ARM D	7.10	8.30	2.50	30.50	67.50	41.0	0.600	37.429

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

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

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

```
I D   I      100      I
-----------------------
```

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: Bundle of Sticks-AM

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	12.48	18.71	12.48
ARM B	15.00	45.00	75.00	11.96	17.94	11.96
ARM C	15.00	45.00	75.00	0.49	0.73	0.49
ARM D	15.00	45.00	75.00	10.21	15.32	10.21

DEMAND SET TITLE: Bundle of Sticks-AM

T33

TIME	FROM/TO	TURNING PROPORTIONS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C	ARM D
16.45 - 18.15	ARM A	0.000	0.486	0.110	0.404
		0.0	485.0	110.0	403.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.167	0.000	0.550	0.283
		160.0	0.0	526.0	271.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.385	0.385	0.000	0.231
		15.0	15.0	0.0	9.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.424	0.444	0.132	0.000
		346.0	363.0	108.0	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)
16.45-17.00									
ARM A	12.52	19.46	0.643	- -	-	0.0	1.8	24.6	-	0.139
ARM B	12.01	19.26	0.623	- -	-	0.0	1.6	22.7	-	0.134
ARM C	0.49	15.76	0.031	- -	-	0.0	0.0	0.5	-	0.065
ARM D	10.25	32.61	0.314	- -	-	0.0	0.5	6.7	-	0.045

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	14.95	18.90	0.791	- -	-	1.8	3.5	47.9	-	0.239
ARM B	14.34	18.51	0.775	- -	-	1.6	3.2	44.1	-	0.228
ARM C	0.58	14.84	0.039	- -	-	0.0	0.0	0.6	-	0.070
ARM D	12.24	32.33	0.379	- -	-	0.5	0.6	9.0	-	0.050

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	18.31	18.13	1.010	- - -	3.5	18.0	181.7	-	0.825
ARM B	17.56	17.69	0.993	- - -	3.2	15.2	158.7	-	0.750
ARM C	0.72	13.85	0.052	- - -	0.0	0.1	0.8	-	0.076
ARM D	14.99	32.02	0.468	- - -	0.6	0.9	12.8	-	0.059

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	18.31	18.13	1.010	- - -	18.0	26.2	334.5	-	1.412
ARM B	17.56	17.58	0.999	- - -	15.2	21.9	281.6	-	1.252
ARM C	0.72	13.70	0.052	- - -	0.1	0.1	0.8	-	0.077
ARM D	14.99	31.98	0.469	- - -	0.9	0.9	13.2	-	0.059

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	14.95	18.89	0.792	- - -	26.2	4.2	140.8	-	0.573
ARM B	14.34	18.10	0.792	- - -	21.9	4.2	119.0	-	0.513
ARM C	0.58	14.28	0.041	- - -	0.1	0.0	0.7	-	0.073
ARM D	12.24	32.20	0.380	- - -	0.9	0.6	9.4	-	0.050

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	12.52	19.45	0.644	- - -	4.2	1.9	29.9	-	0.151
ARM B	12.01	19.19	0.626	- - -	4.2	1.7	27.7	-	0.146
ARM C	0.49	15.66	0.031	- - -	0.0	0.0	0.5	-	0.066
ARM D	10.25	32.58	0.315	- - -	0.6	0.5	7.0	-	0.045

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.8	**
17.15	3.5	****
17.30	18.0	******************
17.45	26.2	**************************
18.00	4.2	****
18.15	1.9	**

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.6	**
17.15	3.2	***
17.30	15.2	***************
17.45	21.9	**********************
18.00	4.2	****
18.15	1.7	**

.QUEUE AT ARM C

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

.QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.5	
17.15	0.6	*
17.30	0.9	*
17.45	0.9	*
18.00	0.6	*
18.15	0.5	

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

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T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1373.7	915.8	759.6	0.55	759.7	0.55
B	1317.2	878.2	653.9	0.50	654.0	0.50
C	53.7	35.8	3.8	0.07	3.8	0.07
D	1124.5	749.7	58.1	0.05	58.1	0.05
ALL	3869.1	2579.4	1475.4	0.38	1475.6	0.38

* 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 5.0 (JANUARY 2009)

_____

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

TRL Limited Tel: +44 (0) 1344 770758
Crowthorne House Fax: +44 (0) 1344 770356
Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:- "h:\Training\BOS AM-2030.vai" (drive-on-the-left) at 12:53:34 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Bundle of Sticks-2030 AM Do-Minimum
LOCATION: Newhall Interchange, Naas
DATE: 15/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - L2030 Overbridge
ARM B - R445 East
ARM C - M7 Access Road
ARM D - R445 West

.GEOMETRIC DATA

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	4.20	I	6.20	I	5.00	I	22.90	I	67.50	I	44.0	I	0.470	I	24.553	I
I ARM B	I	3.90	I	6.50	I	5.00	I	28.50	I	67.50	I	25.0	I	0.497	I	25.410	I
I ARM C	I	3.70	I	5.50	I	5.00	I	22.60	I	67.50	I	36.0	I	0.458	I	22.561	I
I ARM D	I	7.10	I	8.30	I	2.50	I	30.50	I	67.50	I	41.0	I	0.600	I	37.429	I

T5

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

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

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

T13

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I D   I      100      I
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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: Bundle of Sticks-AM

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	15.32	22.99	15.32
ARM B	15.00	45.00	75.00	11.69	17.53	11.69
ARM C	15.00	45.00	75.00	0.56	0.84	0.56
ARM D	15.00	45.00	75.00	10.10	15.15	10.10

DEMAND SET TITLE: Bundle of Sticks-AM

T33

TIME	FROM/TO	TURNING PROPORTIONS / TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C	ARM D
07.45 - 09.15	ARM A	0.000	0.454	0.066	0.480
		0.0	557.0	81.0	588.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.295	0.000	0.430	0.275
		276.0	0.0	402.0	257.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.222	0.600	0.000	0.178
		10.0	27.0	0.0	8.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.447	0.465	0.088	0.000
		361.0	376.0	71.0	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	15.38	19.53	0.788	- -	-	0.0	3.5	45.9	-	0.219
ARM B	11.73	18.55	0.632	- -	-	0.0	1.7	23.5	-	0.142
ARM C	0.56	14.15	0.040	- -	-	0.0	0.0	0.6	-	0.074
ARM D	10.14	31.69	0.320	- -	-	0.0	0.5	6.9	-	0.046

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	18.37	18.98	0.968	- -	-	3.5	12.5	138.9	-	0.627
ARM B	14.01	17.76	0.789	- -	-	1.7	3.5	46.9	-	0.251
ARM C	0.67	12.99	0.052	- -	-	0.0	0.1	0.8	-	0.081
ARM D	12.11	31.24	0.388	- -	-	0.5	0.6	9.3	-	0.052

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	22.50	18.24	1.234	- -	12.5	77.5	678.7	-	2.651
ARM B	17.16	17.53	0.979	- -	3.5	13.4	145.4	-	0.706
ARM C	0.83	12.22	0.068	- -	0.1	0.1	1.1	-	0.088
ARM D	14.83	30.70	0.483	- -	0.6	0.9	13.6	-	0.063

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	22.50	18.23	1.234	- -	77.5	141.6	1643.1	-	6.062
ARM B	17.16	17.51	0.980	- -	13.4	17.7	236.5	-	1.072
ARM C	0.83	12.11	0.068	- -	0.1	0.1	1.1	-	0.089
ARM D	14.83	30.63	0.484	- -	0.9	0.9	14.0	-	0.063

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	18.37	18.98	0.968	- -	141.6	134.5	2070.7	-	7.279
ARM B	14.01	17.46	0.802	- -	17.7	4.5	105.6	-	0.480
ARM C	0.67	12.49	0.054	- -	0.1	0.1	0.9	-	0.085
ARM D	12.11	31.06	0.390	- -	0.9	0.6	9.8	-	0.053

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	15.38	19.52	0.788	- -	134.5	74.6	1568.2	-	5.422
ARM B	11.73	17.41	0.674	- -	4.5	2.1	34.7	-	0.186
ARM C	0.56	13.15	0.043	- -	0.1	0.0	0.7	-	0.080
ARM D	10.14	31.64	0.320	- -	0.6	0.5	7.2	-	0.047

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	3.5	***
08.15	12.5	*************
08.30	77.5	**********
08.45	141.6	**********
09.00	134.5	**********
09.15	74.6	**********

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.7	**
08.15	3.5	***
08.30	13.4	*************
08.45	17.7	******************
09.00	4.5	****
09.15	2.1	**

.QUEUE AT ARM C

TIME SEGMENT ENDING | NO. OF VEHICLES IN QUEUE

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

.QUEUE AT ARM D

TIME SEGMENT ENDING | NO. OF VEHICLES IN QUEUE

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

.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	1687.5	1125.0	6145.5	3.64	6288.0	3.73
B	1287.0	858.0	592.7	0.46	592.8	0.46
C	61.9	41.3	5.1	0.08	5.1	0.08
D	1112.2	741.4	60.8	0.05	60.8	0.05
ALL	4148.5	2765.7	6804.1	1.64	6946.8	1.67

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END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

_____

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Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:- "h:\Training\BOS PM-2030DM.vai" (drive-on-the-left) at 16:16:16 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Bundle of Sticks-2030 PM Do-Minimum
LOCATION: Newhall Interchange, Naas
DATE: 15/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - L2030 Overbridge
ARM B - R445 East
ARM C - M7 Access Road
ARM D - R445 West

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.20	6.20	5.00	22.90	67.50	44.0	0.470	24.553
ARM B	3.90	6.50	5.00	28.50	67.50	25.0	0.497	25.410
ARM C	3.70	5.50	5.00	22.60	67.50	36.0	0.458	22.561
ARM D	7.10	8.30	2.50	30.50	67.50	41.0	0.600	37.429

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

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I D   I      100      I
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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: Bundle of Sticks-AM

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	17.49	26.23	17.49
ARM B	15.00	45.00	75.00	12.51	18.77	12.51
ARM C	15.00	45.00	75.00	0.41	0.62	0.41
ARM D	15.00	45.00	75.00	11.76	17.64	11.76

DEMAND SET TITLE: Bundle of Sticks-AM

T33

TIME	FROM/TO	TURNING PROPORTIONS / TURNING COUNTS / (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C	ARM D
16.45 - 18.15	ARM A	0.000	0.549	0.107	0.345
		0.0	768.0	149.0	482.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.143	0.000	0.553	0.304
		143.0	0.0	554.0	304.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.182	0.515	0.000	0.303
		6.0	17.0	0.0	10.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.396	0.438	0.166	0.000
		373.0	412.0	156.0	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)
16.45-17.00									
ARM A	17.55	18.88	0.930	- -	-	0.0	8.9	100.4	-	0.437
ARM B	12.56	18.33	0.685	- -	-	0.0	2.1	29.0	-	0.165
ARM C	0.41	15.30	0.027	- -	-	0.0	0.0	0.4	-	0.067
ARM D	11.81	32.79	0.360	- -	-	0.0	0.6	8.2	-	0.047

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)
17.00-17.15									
ARM A	20.96	18.20	1.152	- -	-	8.9	52.4	466.9	-	1.915
ARM B	15.00	17.90	0.838	- -	-	2.1	4.6	60.6	-	0.310
ARM C	0.49	14.63	0.034	- -	-	0.0	0.0	0.5	-	0.071
ARM D	14.10	32.55	0.433	- -	-	0.6	0.8	11.2	-	0.054

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	25.67	17.28	1.486	- - -	52.4	178.4	1731.7	-	6.801
ARM B	18.37	17.81	1.031	- - -	4.6	21.8	214.7	-	0.978
ARM C	0.61	14.26	0.042	- - -	0.0	0.0	0.7	-	0.073
ARM D	17.27	32.30	0.535	- - -	0.8	1.1	16.6	-	0.066

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	25.67	17.27	1.486	- - -	178.4	304.4	3621.3	-	13.706
ARM B	18.37	17.81	1.031	- - -	21.8	33.6	417.3	-	1.753
ARM C	0.61	14.19	0.043	- - -	0.0	0.0	0.7	-	0.074
ARM D	17.27	32.27	0.535	- - -	1.1	1.1	17.1	-	0.067

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	20.96	18.19	1.152	- - -	304.4	346.0	4878.1	-	17.848
ARM B	15.00	17.86	0.840	- - -	33.6	6.5	254.9	-	1.114
ARM C	0.49	14.21	0.035	- - -	0.0	0.0	0.6	-	0.073
ARM D	14.10	32.38	0.435	- - -	1.1	0.8	11.9	-	0.055

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	17.55	18.86	0.931	- - -	346.0	327.1	5048.6	-	17.903
ARM B	12.56	17.91	0.701	- - -	6.5	2.4	41.4	-	0.206
ARM C	0.41	14.92	0.028	- - -	0.0	0.0	0.4	-	0.069
ARM D	11.81	32.75	0.360	- - -	0.8	0.6	8.6	-	0.048

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	8.9	*********
17.15	52.4	**
17.30	178.4	**********
17.45	304.4	**********
18.00	346.0	**********
18.15	327.1	**********

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	2.1	**
17.15	4.6	*****
17.30	21.8	**********
17.45	33.6	**********
18.00	6.5	*******
18.15	2.4	**

.QUEUE AT ARM C

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 D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.6	*
17.15	0.8	*
17.30	1.1	*
17.45	1.1	*
18.00	0.8	*
18.15	0.6	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

.---

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1925.6	1283.7	15847.0	8.23	18683.7	9.70
B	1377.8	918.5	1017.9	0.74	1018.1	0.74
C	45.4	30.3	3.2	0.07	3.2	0.07
D	1295.2	863.5	73.7	0.06	73.7	0.06
ALL	4644.1	3096.0	16941.9	3.65	19778.8	4.26

T75

* 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 5.0 (JANUARY 2009)

_____

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Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:- "h:\Training\BOS AM-2030-DS.vai" (drive-on-the-left) at 12:55:17 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Bundle of Sticks-2030 AM Do-Something
LOCATION: Newhall Interchange, Naas
DATE: 15/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - L2030 Overbridge
ARM B - R445 East
ARM C - M7 Access Road
ARM D - R445 West

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.20	6.20	5.00	22.90	67.50	44.0	0.470	24.553
ARM B	3.90	6.50	5.00	28.50	67.50	25.0	0.497	25.410
ARM C	3.70	5.50	5.00	22.60	67.50	36.0	0.458	22.561
ARM D	7.10	8.30	2.50	30.50	67.50	41.0	0.600	37.429

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

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I D   I      100      I
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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: Bundle of Sticks-AM

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	4.34	6.51	4.34
ARM B	15.00	45.00	75.00	12.51	18.77	12.51
ARM C	15.00	45.00	75.00	0.68	1.01	0.68
ARM D	15.00	45.00	75.00	13.32	19.99	13.32

DEMAND SET TITLE: Bundle of Sticks-AM

T33

TIME	FROM/TO	TURNING PROPORTIONS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C	ARM D
07.45 - 09.15	ARM A	0.000	0.467	0.006	0.527
		0.0	162.0	2.0	183.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.136	0.000	0.002	0.862
		136.0	0.0	2.0	863.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.278	0.352	0.000	0.370
		15.0	19.0	0.0	20.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.269	0.715	0.016	0.000
		287.0	762.0	17.0	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	4.35	17.63	0.247	- -	-	0.0	0.3	4.8	-	0.075
ARM B	12.56	21.85	0.575	- -	-	0.0	1.3	19.0	-	0.106
ARM C	0.68	13.77	0.049	- -	-	0.0	0.1	0.8	-	0.076
ARM D	13.38	32.76	0.408	- -	-	0.0	0.7	10.1	-	0.051

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	5.20	16.70	0.311	- -	-	0.3	0.4	6.6	-	0.087
ARM B	15.00	21.60	0.694	- -	-	1.3	2.2	31.2	-	0.149
ARM C	0.81	12.43	0.065	- -	-	0.1	0.1	1.0	-	0.086
ARM D	15.97	32.50	0.491	- -	-	0.7	1.0	14.1	-	0.060

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	6.37	15.45	0.412	- - -	0.4	0.7	10.1	-	0.110
ARM B	18.37	21.26	0.864	- - -	2.2	5.5	71.6	-	0.301
ARM C	0.99	10.69	0.093	- - -	0.1	0.1	1.5	-	0.103
ARM D	19.56	32.17	0.608	- - -	1.0	1.5	22.2	-	0.079

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	6.37	15.43	0.413	- - -	0.7	0.7	10.4	-	0.110
ARM B	18.37	21.26	0.864	- - -	5.5	5.9	86.3	-	0.336
ARM C	0.99	10.59	0.094	- - -	0.1	0.1	1.5	-	0.104
ARM D	19.56	32.16	0.608	- - -	1.5	1.5	23.1	-	0.079

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	5.20	16.68	0.312	- - -	0.7	0.5	7.0	-	0.087
ARM B	15.00	21.59	0.695	- - -	5.9	2.3	38.8	-	0.163
ARM C	0.81	12.29	0.066	- - -	0.1	0.1	1.1	-	0.087
ARM D	15.97	32.48	0.492	- - -	1.5	1.0	15.0	-	0.061

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	4.35	17.61	0.247	- - -	0.5	0.3	5.1	-	0.076
ARM B	12.56	21.84	0.575	- - -	2.3	1.4	21.6	-	0.109
ARM C	0.68	13.69	0.049	- - -	0.1	0.1	0.8	-	0.077
ARM D	13.38	32.74	0.409	- - -	1.0	0.7	10.6	-	0.052

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.3	
08.15	0.4	
08.30	0.7	*
08.45	0.7	*
09.00	0.5	
09.15	0.3	

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.3	*
08.15	2.2	**
08.30	5.5	******
08.45	5.9	******
09.00	2.3	**
09.15	1.4	*

.QUEUE AT ARM C

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

.QUEUE AT ARM D

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

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T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	477.6	318.4	43.9	0.09	43.9	0.09
B	1377.8	918.5	268.4	0.19	268.4	0.19
C	74.3	49.6	6.7	0.09	6.7	0.09
D	1467.3	978.2	95.0	0.06	95.0	0.06
ALL	3397.0	2264.7	414.0	0.12	414.1	0.12

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

END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

_____

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Run with file:- "h:\Training\BOS PM-2030-DS.vai" (drive-on-the-left) at 16:16:44 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Bundle of Sticks-2030 PM Do-Something
LOCATION: Newhall Interchange, Naas
DATE: 15/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - L2030 Overbridge
ARM B - R445 East
ARM C - M7 Access Road
ARM D - R445 West

.GEOMETRIC DATA

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	4.20	I	6.20	I	5.00	I	22.90	I	67.50	I	44.0	I	0.470	I	24.553	I
I ARM B	I	3.90	I	6.50	I	5.00	I	28.50	I	67.50	I	25.0	I	0.497	I	25.410	I
I ARM C	I	3.70	I	5.50	I	5.00	I	22.60	I	67.50	I	36.0	I	0.458	I	22.561	I
I ARM D	I	7.10	I	8.30	I	2.50	I	30.50	I	67.50	I	41.0	I	0.600	I	37.429	I

T5

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

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

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

T13

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I D   I      100      I
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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: Bundle of Sticks-AM

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	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
	TO RISE					
ARM A	15.00	45.00	75.00	5.70	8.55	5.70
ARM B	15.00	45.00	75.00	12.29	18.43	12.29
ARM C	15.00	45.00	75.00	0.55	0.83	0.55
ARM D	15.00	45.00	75.00	17.86	26.79	17.86

DEMAND SET TITLE: Bundle of Sticks-AM

T33

TIME	FROM/TO	TURNING PROPORTIONS (PERCENTAGE OF H.V.S) TURNING COUNTS ARM A	ARM B	ARM C	ARM D
16.45 - 18.15	ARM A	0.000	0.386	0.009	0.605
		0.0	176.0	4.0	276.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.125	0.000	0.007	0.868
		123.0	0.0	7.0	853.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.068	0.386	0.000	0.545
		3.0	17.0	0.0	24.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.225	0.764	0.010	0.000
		322.0	1092.0	15.0	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)
16.45-17.00									
ARM A	5.72	15.72	0.364	- -	-	0.0	0.6	8.2	-	0.099
ARM B	12.33	21.27	0.580	- -	-	0.0	1.4	19.3	-	0.110
ARM C	0.55	13.37	0.041	- -	-	0.0	0.0	0.6	-	0.078
ARM D	17.93	32.96	0.544	- -	-	0.0	1.2	17.1	-	0.066

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	6.83	14.42	0.474	- -	-	0.6	0.9	12.8	-	0.131
ARM B	14.73	20.91	0.704	- -	-	1.4	2.3	32.5	-	0.158
ARM C	0.66	11.96	0.055	- -	-	0.0	0.1	0.9	-	0.088
ARM D	21.41	32.75	0.654	- -	-	1.2	1.9	26.8	-	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)
17.15-17.30									
ARM A	8.37	12.67	0.660	- - -	0.9	1.9	25.9	-	0.225
ARM B	18.04	20.43	0.883	- - -	2.3	6.3	79.6	-	0.346
ARM C	0.81	10.14	0.080	- - -	0.1	0.1	1.3	-	0.107
ARM D	26.22	32.47	0.808	- - -	1.9	4.0	54.9	-	0.154

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	8.37	12.62	0.663	- - -	1.9	1.9	28.5	-	0.235
ARM B	18.04	20.41	0.884	- - -	6.3	6.8	99.3	-	0.402
ARM C	0.81	10.01	0.081	- - -	0.1	0.1	1.3	-	0.109
ARM D	26.22	32.46	0.808	- - -	4.0	4.1	60.8	-	0.160

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	6.83	14.35	0.476	- - -	1.9	0.9	14.6	-	0.135
ARM B	14.73	20.88	0.705	- - -	6.8	2.5	41.8	-	0.178
ARM C	0.66	11.77	0.056	- - -	0.1	0.1	0.9	-	0.090
ARM D	21.41	32.72	0.654	- - -	4.1	1.9	30.4	-	0.091

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	5.72	15.67	0.365	- - -	0.9	0.6	9.0	-	0.101
ARM B	12.33	21.25	0.580	- - -	2.5	1.4	22.1	-	0.114
ARM C	0.55	13.28	0.042	- - -	0.1	0.0	0.7	-	0.079
ARM D	17.93	32.94	0.544	- - -	1.9	1.2	18.6	-	0.067

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.6	*
17.15	0.9	*
17.30	1.9	**
17.45	1.9	**
18.00	0.9	*
18.15	0.6	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.4	*
17.15	2.3	**
17.30	6.3	******
17.45	6.8	*******
18.00	2.5	**
18.15	1.4	*

.QUEUE AT ARM C

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

.QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.2	*
17.15	1.9	**
17.30	4.0	****
17.45	4.1	****
18.00	1.9	**
18.15	1.2	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

.---

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	627.7	418.4	98.9	0.16	98.9	0.16
B	1353.0	902.0	294.6	0.22	294.6	0.22
C	60.6	40.4	5.6	0.09	5.6	0.09
D	1966.9	1311.3	208.7	0.11	208.7	0.11
ALL	4008.2	2672.1	607.8	0.15	607.8	0.15

T75

* 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

PROSPOSED NEW INTERCHANGE

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

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Run with file:- "h:\Training\M7 DS Western Roundabout AM 2030.vai" (drive-on-the-left) at 14:09:12 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: 2030 AM M7 Do-Something Western roundabout
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 Northbound On-Ramp
ARM B - R445 Overbridge
ARM C - M7 Northbound off-Ramp
ARM D - R445 Newbridge Road

.GEOMETRIC DATA

ARM A IS JUNCTION EXIT ONLY

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM B	6.90	7.00	7.50	25.00	75.00	30.0	0.555	35.675
ARM C	4.00	10.00	7.00	25.00	75.00	30.0	0.491	28.572
ARM D	6.80	7.00	5.00	21.00	75.00	30.0	0.550	35.317

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

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

IARM	FLOW SCALE(%)

A	I	100
B	I	100
C	I	100
D	I	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: M7 Do-Something Western roundabout

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
	TO RISE					
ARM B	15.00	45.00	75.00	13.05	19.58	13.05
ARM C	15.00	45.00	75.00	6.24	9.36	6.24
ARM D	15.00	45.00	75.00	4.84	7.26	4.84

DEMAND SET TITLE: M7 Do-Something Western roundabout

T33

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
07.45 - 09.15					
	ARM B	0.428	0.000	0.000	0.572
		447.0	0.0	0.0	597.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.000	1.000	0.000	0.000
		0.0	499.0	0.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.000	1.000	0.000	0.000
		0.0	387.0	0.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)

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

. 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 B	13.10	32.43	0.404	- -	-	0.0	0.7	9.9	-	0.051
ARM C	6.26	19.57	0.320	- -	-	0.0	0.5	6.8	-	0.075
ARM D	4.86	25.60	0.190	- -	-	0.0	0.2	3.4	-	0.048

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 B	15.64	32.43	0.482	- -	-	0.7	0.9	13.6	-	0.059
ARM C	7.48	18.31	0.408	- -	-	0.5	0.7	10.0	-	0.092
ARM D	5.80	24.32	0.238	- -	-	0.2	0.3	4.6	-	0.054

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

			(RFC)	(PEDS/MIN)	(VEHS)	(VEHS)	TIME SEGMENT)	TIME SEGMENT)	VEHICLE (MIN)
08.15-08.30									
ARM B	19.16	32.43	0.591	- - -	0.9	1.4	20.8	-	0.075
ARM C	9.16	16.59	0.552	- - -	0.7	1.2	17.3	-	0.133
ARM D	7.10	22.58	0.314	- - -	0.3	0.5	6.7	-	0.064

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 B	19.16	32.43	0.591	- - -	1.4	1.4	21.5	-	0.075
ARM C	9.16	16.57	0.552	- - -	1.2	1.2	18.2	-	0.135
ARM D	7.10	22.56	0.315	- - -	0.5	0.5	6.9	-	0.065

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 B	15.64	32.43	0.482	- - -	1.4	0.9	14.4	-	0.060
ARM C	7.48	18.28	0.409	- - -	1.2	0.7	10.8	-	0.093
ARM D	5.80	24.28	0.239	- - -	0.5	0.3	4.8	-	0.054

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 B	13.10	32.43	0.404	- - -	0.9	0.7	10.4	-	0.052
ARM C	6.26	19.54	0.320	- - -	0.7	0.5	7.3	-	0.075
ARM D	4.86	25.56	0.190	- - -	0.3	0.2	3.6	-	0.048

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.7	*
08.15	0.9	*
08.30	1.4	*
08.45	1.4	*
09.00	0.9	*
09.15	0.7	*

.QUEUE AT ARM C

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

.QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
08.00	0.2

08.15	0.3
08.30	0.5
08.45	0.5
09.00	0.3
09.15	0.2

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
.--

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B	1437.0	958.0	90.5	0.06	90.5	0.06
C	686.8	457.9	70.5	0.10	70.5	0.10
D	532.7	355.1	30.0	0.06	30.0	0.06
ALL	2656.5	1771.0	191.0	0.07	191.0	0.07

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

END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

_____

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

TRL Limited Tel: +44 (0) 1344 770758
Crowthorne House Fax: +44 (0) 1344 770356
Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:- "h:\Training\M7 DS Western Roundabout PM 2030.vai" (drive-on-the-left) at 16:17:14 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: 2030 PM M7 Do-Something Western roundabout
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 Northbound On-Ramp
ARM B - R445 Overbridge
ARM C - M7 Northbound off-Ramp
ARM D - R445 Newbridge Road

.GEOMETRIC DATA

ARM A IS JUNCTION EXIT ONLY

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM B	6.90	7.00	7.50	25.00	75.00	30.0	0.555	35.675
ARM C	4.00	10.00	7.00	25.00	75.00	30.0	0.491	28.572
ARM D	6.80	7.00	5.00	21.00	75.00	30.0	0.550	35.317

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

```
I C   I      100      I
I D   I      100      I
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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: M7 Do-Something Western roundabout

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 B	15.00	45.00	75.00	10.59	15.88	10.59
ARM C	15.00	45.00	75.00	4.36	6.54	4.36
ARM D	15.00	45.00	75.00	6.21	9.32	6.21

DEMAND SET TITLE: M7 Do-Something Western roundabout

T33

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

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
16.45 - 18.15	ARM B	0.217	0.000	0.000	0.783
		184.0	0.0	0.0	663.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.000	1.000	0.000	0.000
		0.0	349.0	0.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.000	1.000	0.000	0.000
		0.0	497.0	0.0	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)
16.45-17.00									
ARM B	10.63	32.43	0.328	- -	0.0	0.5	7.1	-	0.046
ARM C	4.38	20.78	0.211	- -	0.0	0.3	3.9	-	0.061
ARM D	6.24	28.44	0.219	- -	0.0	0.3	4.1	-	0.045

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)
17.00-17.15									
ARM B	12.69	32.43	0.391	- -	0.5	0.6	9.4	-	0.051
ARM C	5.23	19.75	0.265	- -	0.3	0.4	5.3	-	0.069
ARM D	7.45	27.72	0.269	- -	0.3	0.4	5.4	-	0.049

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)
17.15-17.30									

ARM B	15.54	32.43	0.479	- -	-	0.6	0.9	13.4	-	0.059
ARM C	6.40	18.36	0.349	- -	-	0.4	0.5	7.8	-	0.084
ARM D	9.12	26.73	0.341	- -	-	0.4	0.5	7.6	-	0.057

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 B	15.54	32.43	0.479	- -	-	0.9	0.9	13.7	-	0.059
ARM C	6.40	18.35	0.349	- -	-	0.5	0.5	8.0	-	0.084
ARM D	9.12	26.73	0.341	- -	-	0.5	0.5	7.7	-	0.057

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 B	12.69	32.43	0.391	- -	-	0.9	0.6	9.9	-	0.051
ARM C	5.23	19.74	0.265	- -	-	0.5	0.4	5.6	-	0.069
ARM D	7.45	27.70	0.269	- -	-	0.5	0.4	5.6	-	0.049

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 B	10.63	32.43	0.328	- -	-	0.6	0.5	7.5	-	0.046
ARM C	4.38	20.75	0.211	- -	-	0.4	0.3	4.1	-	0.061
ARM D	6.24	28.42	0.219	- -	-	0.4	0.3	4.3	-	0.045

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.5	
17.15	0.6	*
17.30	0.9	*
17.45	0.9	*
18.00	0.6	*
18.15	0.5	

.QUEUE AT ARM C

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

.QUEUE AT ARM D

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

18.00	0.4
18.15	0.3

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
.---

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B	1165.8	777.2	61.1	0.05	61.1	0.05
C	480.4	320.2	34.6	0.07	34.6	0.07
D	684.1	456.1	34.8	0.05	34.8	0.05
ALL	2330.3	1553.5	130.4	0.06	130.4	0.06

T75

* 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 5.0 (JANUARY 2009)

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For sales and distribution information,
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Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:- "h:\Training\M7 DS Eastern Roundabout AM 2030.vai" (drive-on-the-left) at 16:17:54 on Monday, 19 May 2014

.FILE PROPERTIES

RUN TITLE: 2030 AM M7 Do-Something Eastern Roundabout
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA

ARM A - M7 Southbound Off-Ramp
ARM B - R445 East
ARM C - M7 Southbound On-Ramp
ARM D - R445 Overbridge

.GEOMETRIC DATA

ARM C IS JUNCTION EXIT ONLY

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.40	14.00	20.00	21.00	75.00	30.0	0.606	41.433
ARM B	7.50	9.00	10.00	30.00	75.00	30.0	0.629	43.694
ARM D	6.80	7.00	7.00	30.00	75.00	30.0	0.558	35.840

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: M7 Do-Something Interchange 2030

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	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
	TO RISE					
ARM A	15.00	45.00	75.00	7.94	11.91	7.94
ARM B	15.00	45.00	75.00	13.32	19.99	13.32
ARM D	15.00	45.00	75.00	11.09	16.63	11.09

DEMAND SET TITLE: M7 Do-Something Interchange 2030

T33

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

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D
07.45 - 09.15					
	ARM A	0.000	0.391	0.000	0.609
		0.0	248.0	0.0	387.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.000	0.000	0.384	0.616
		0.0	0.0	409.0	657.0
		(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.000	0.922	0.078	0.000
		0.0	818.0	69.0	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	7.97	30.95	0.257	- -	0.0	0.3	5.1	-	0.043
ARM B	13.38	36.13	0.370	- -	0.0	0.6	8.6	-	0.044
ARM D	11.13	32.58	0.342	- -	0.0	0.5	7.6	-	0.046

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	9.51	29.62	0.321	- -	0.3	0.5	7.0	-	0.050
ARM B	15.97	35.43	0.451	- -	0.6	0.8	12.0	-	0.051
ARM D	13.29	32.58	0.408	- -	0.5	0.7	10.1	-	0.052

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	11.65	27.82	0.419	- -	-	0.5	0.7	10.5	-	0.062
ARM B	19.56	34.46	0.568	- -	-	0.8	1.3	19.0	-	0.067
ARM D	16.28	32.58	0.500	- -	-	0.7	1.0	14.5	-	0.061

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	11.65	27.81	0.419	- -	-	0.7	0.7	10.8	-	0.062
ARM B	19.56	34.46	0.568	- -	-	1.3	1.3	19.6	-	0.067
ARM D	16.28	32.58	0.500	- -	-	1.0	1.0	14.9	-	0.061

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	9.51	29.60	0.321	- -	-	0.7	0.5	7.3	-	0.050
ARM B	15.97	35.41	0.451	- -	-	1.3	0.8	12.7	-	0.052
ARM D	13.29	32.58	0.408	- -	-	1.0	0.7	10.6	-	0.052

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	7.97	30.92	0.258	- -	-	0.5	0.3	5.3	-	0.044
ARM B	13.38	36.12	0.370	- -	-	0.8	0.6	9.0	-	0.044
ARM D	11.13	32.58	0.342	- -	-	0.7	0.5	7.9	-	0.047

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.3	
08.15	0.5	
08.30	0.7	*
08.45	0.7	*
09.00	0.5	
09.15	0.3	

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.6	*
08.15	0.8	*
08.30	1.3	*
08.45	1.3	*
09.00	0.8	*
09.15	0.6	*

.QUEUE AT ARM D

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

09.00	0.7 *
09.15	0.5 *

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
.---

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	874.0	582.7	45.9	0.05	45.9	0.05
B	1467.3	978.2	80.8	0.06	80.8	0.06
D	1220.9	813.9	65.6	0.05	65.7	0.05
ALL	3562.2	2374.8	192.4	0.05	192.4	0.05

T75

* 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

Run with file:- "h:\Training\M7 DS Eastern Roundabout PM 2030.vai" (drive-on-the-left) at 14:06:29 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: 2030 PM M7 Do-Something Eastern Roundabout
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 Southbound Off-Ramp
ARM B - R445 East
ARM C - M7 Southbound On-Ramp
ARM D - R445 Overbridge

.GEOMETRIC DATA

ARM C IS JUNCTION EXIT ONLY

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.40	14.00	20.00	21.00	75.00	30.0	0.606	41.433
ARM B	7.50	9.00	10.00	30.00	75.00	30.0	0.629	43.694
ARM D	6.80	7.00	7.00	30.00	75.00	30.0	0.558	35.840

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

```
I C   I      100      I
I D   I      100      I
-----------------------
```

```
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: M7 Do-Something Interchange 2030
-------------------------------------------------------------------------------- T15
I        I   NUMBER OF MINUTES FROM START WHEN    I   RATE OF FLOW (VEH/MIN) I
I  ARM   I FLOW STARTS I TOP OF PEAK I FLOW STOPS I BEFORE I AT TOP  I AFTER I
I        I             I            I            I        I         I       I
I        I   TO RISE   I  IS REACHED I FALLING    I  PEAK  I OF PEAK I PEAK  I
--------------------------------------------------------------------------------
I ARM  A I     15.00   I     45.00   I    75.00   I 15.24  I  22.86  I 15.24 I
I ARM  B I     15.00   I     45.00   I    75.00   I 14.41  I  21.62  I 14.41 I
I ARM  D I     15.00   I     45.00   I    75.00   I 10.56  I  15.84  I 10.56 I
--------------------------------------------------------------------------------
```

```
DEMAND SET TITLE:  M7 Do-Something Interchange 2030
.------------------------------------------------------------------- T33
I                    I         TURNING PROPORTIONS                 I
I                    I         TURNING COUNTS                      I
I                    I        (PERCENTAGE OF H.V.S)                I
I                    ---------------------------------------------
I       TIME         I FROM/TO I  ARM A I  ARM B I  ARM C I  ARM D I
.-------------------------------------------------------------------
I   16.45 - 18.15    I         I        I        I        I        I
I                    I  ARM  A I  0.000 I  0.656 I  0.000 I  0.344 I
I                    I         I    0.0 I  800.0 I    0.0 I  419.0 I
I                    I         I ( 10.0)I ( 10.0)I ( 10.0)I ( 10.0)I
I                    I         I        I        I        I        I
I                    I  ARM  B I  0.000 I  0.000 I  0.630 I  0.370 I
I                    I         I    0.0 I    0.0 I  726.0 I  427.0 I
I                    I         I ( 10.0)I ( 10.0)I ( 10.0)I ( 10.0)I
I                    I         I        I        I        I        I
I                    I  ARM  D I  0.000 I  0.743 I  0.257 I  0.000 I
I                    I         I    0.0 I  628.0 I  217.0 I    0.0 I
I                    I         I ( 10.0)I ( 10.0)I ( 10.0)I ( 10.0)I
I                    I         I        I        I        I        I
.-------------------------------------------------------------------
```

```
.       QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT
        ---------------------------------------------------------
.------------------------------------------------------------------------------------------------------------------------------- T70
I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY     GEOMETRIC DELAY   AVERAGE DELAY I
I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/      (VEH.MIN/      PER ARRIVING  I
I                             (RFC)     (PEDS/MIN) (VEHS) (VEHS)  TIME SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
-                                                                                                                 -
I 16.45-17.00                                                                                                     I
I ARM A      15.30     31.26   0.489   - -       -    0.0    1.0       13.8             -             0.062     I
I ARM B      14.47     34.72   0.417   - -       -    0.0    0.7       10.4             -             0.049     I
I ARM D      10.60     32.58   0.325   - -       -    0.0    0.5        7.1             -             0.045     I
I                                                                                                                 I
-------------------------------------------------------------------------------------------------------------------------------
.------------------------------------------------------------------------------------------------------------------------------
I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY     GEOMETRIC DELAY   AVERAGE DELAY I
I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/      (VEH.MIN/      PER ARRIVING  I
I                             (RFC)     (PEDS/MIN) (VEHS) (VEHS)  TIME SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
-                                                                                                                 -
I 17.00-17.15                                                                                                     I
I ARM A      18.26     30.00   0.609   - -       -    1.0    1.5       22.2             -             0.085     I
I ARM B      17.28     33.73   0.512   - -       -    0.7    1.0       15.3             -             0.061     I
I ARM D      12.66     32.58   0.389   - -       -    0.5    0.6        9.3             -             0.050     I
I                                                                                                                 I
-------------------------------------------------------------------------------------------------------------------------------
.------------------------------------------------------------------------------------------------------------------------------
I  TIME      DEMAND  CAPACITY  DEMAND/   PEDESTRIAN  START   END       DELAY     GEOMETRIC DELAY   AVERAGE DELAY I
I         (VEH/MIN) (VEH/MIN) CAPACITY      FLOW     QUEUE  QUEUE    (VEH.MIN/      (VEH.MIN/      PER ARRIVING  I
I                             (RFC)     (PEDS/MIN) (VEHS) (VEHS)  TIME SEGMENT)  TIME SEGMENT)    VEHICLE (MIN) I
-                                                                                                                 -
I 17.15-17.30                                                                                                     I
```

I ARM A	22.37	28.29	0.791	- -	-	1.5	3.6	49.5	-	0.162	I
I ARM B	21.16	32.41	0.653	- -	-	1.0	1.8	26.6	-	0.088	I
I ARM D	15.51	32.58	0.476	- -	-	0.6	0.9	13.2	-	0.058	I

I 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)	I
I 17.30-17.45										I
I ARM A	22.37	28.27	0.791	- -	-	3.6	3.7	54.8	-	0.169	I
I ARM B	21.16	32.38	0.653	- -	-	1.8	1.9	27.9	-	0.089	I
I ARM D	15.51	32.58	0.476	- -	-	0.9	0.9	13.6	-	0.059	I

I 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)	I
I 17.45-18.00										I
I ARM A	18.26	29.99	0.609	- -	-	3.7	1.6	24.9	-	0.087	I
I ARM B	17.28	33.69	0.513	- -	-	1.9	1.1	16.4	-	0.061	I
I ARM D	12.66	32.58	0.389	- -	-	0.9	0.6	9.8	-	0.050	I

I 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)	I
I 18.00-18.15										I
I ARM A	15.30	31.24	0.490	- -	-	1.6	1.0	14.9	-	0.063	I
I ARM B	14.47	34.69	0.417	- -	-	1.1	0.7	11.0	-	0.050	I
I ARM D	10.60	32.58	0.325	- -	-	0.6	0.5	7.4	-	0.046	I

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.0	*
17.15	1.5	**
17.30	3.6	****
17.45	3.7	****
18.00	1.6	**
18.15	1.0	*

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.7	*
17.15	1.0	*
17.30	1.8	**
17.45	1.9	**
18.00	1.1	*
18.15	0.7	*

.QUEUE AT ARM D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.5	
17.15	0.6	*
17.30	0.9	*
17.45	0.9	*

18.00	0.6 *
18.15	0.5

.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	1677.9	1118.6	180.1	0.11	180.2	0.11	
B	1587.0	1058.0	107.6	0.07	107.6	0.07	
D	1163.1	775.4	60.3	0.05	60.3	0.05	
ALL	4428.0	2952.0	348.1	0.08	348.1	0.08	

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

END OF JOB

MAUDLINS ROUNDABOUT

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

_____

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Run with file:- "h:\Training\2012 Maudlins AM Base.vai" (drive-on-the-left) at 21:13:04 on Monday, 19 May 2014

.FILE PROPERTIES

RUN TITLE: Maudlins-2012 AM BASE
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA

ARM A - M7 EB On/Off Ramp
ARM B - R445 East
ARM C - Plant Access
ARM D - R445 Dublin Road
ARM E - Monread Road
ARM F - M7 On-Slip WB

.GEOMETRIC DATA

ARM F IS JUNCTION EXIT ONLY

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.20	8.00	20.00	18.00	80.00	37.0	0.499	32.159
ARM B	6.50	7.25	10.00	32.00	80.00	29.0	0.550	36.662
ARM C	6.40	6.40	0.00	26.00	80.00	40.0	0.495	31.563
ARM D	6.40	9.10	11.00	27.00	80.00	32.0	0.578	40.186
ARM E	4.20	6.20	20.00	29.00	80.00	39.0	0.469	28.398

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
E	100
F	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: Maudlins

---------- 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	3.78	5.66	3.78
ARM B	15.00	45.00	75.00	7.65	11.48	7.65
ARM C	15.00	45.00	75.00	0.09	0.13	0.09
ARM D	15.00	45.00	75.00	11.18	16.76	11.18
ARM E	15.00	45.00	75.00	9.07	13.61	9.07

DEMAND SET TITLE: Maudlins

.---------- T33

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D	ARM E	ARM F
07.45 - 09.15	ARM A	0.000	0.083	0.007	0.407	0.497	0.007
		0.0	25.0	2.0	123.0	150.0	2.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.003	0.000	0.002	0.565	0.408	0.021
		2.0	0.0	1.0	346.0	250.0	13.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.000	0.000	0.000	0.857	0.143	0.000
		0.0	0.0	0.0	6.0	1.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.661	0.064	0.000	0.000	0.181	0.094
		591.0	57.0	0.0	0.0	162.0	84.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM E	0.663	0.058	0.001	0.163	0.000	0.116
		481.0	42.0	1.0	118.0	0.0	84.0
		(10.0)	(10.0)	(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	3.79	27.88	0.136	- -	0.0	0.2	2.3	-	0.041
ARM B	7.68	30.60	0.251	- -	0.0	0.3	4.9	-	0.044
ARM C	0.09	22.47	0.004	- -	0.0	0.0	0.1	-	0.045

I ARM D	11.22	33.51	0.335	- -	-	0.0	0.5	7.4	-	0.045 I
I ARM E	9.11	21.42	0.425	- -	-	0.0	0.7	10.6	-	0.081 I

I 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) I
I 08.00-08.15									I
I ARM A	4.52	27.61	0.164	- -	-	0.2	0.2	2.9	-	0.043 I
I ARM B	9.17	30.07	0.305	- -	-	0.3	0.4	6.5	-	0.048 I
I ARM C	0.10	21.25	0.005	- -	-	0.0	0.0	0.1	-	0.047 I
I ARM D	13.39	32.92	0.407	- -	-	0.5	0.7	10.1	-	0.051 I
I ARM E	10.88	20.56	0.529	- -	-	0.7	1.1	16.1	-	0.103 I

I 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) I
I 08.15-08.30									I
I ARM A	5.54	27.25	0.203	- -	-	0.2	0.3	3.8	-	0.046 I
I ARM B	11.23	29.34	0.383	- -	-	0.4	0.6	9.1	-	0.055 I
I ARM C	0.13	19.58	0.007	- -	-	0.0	0.0	0.1	-	0.051 I
I ARM D	16.41	32.10	0.511	- -	-	0.7	1.0	15.2	-	0.064 I
I ARM E	13.32	19.38	0.688	- -	-	1.1	2.1	29.9	-	0.162 I

I 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) I
I 08.30-08.45									I
I ARM A	5.54	27.24	0.203	- -	-	0.3	0.3	3.8	-	0.046 I
I ARM B	11.23	29.33	0.383	- -	-	0.6	0.6	9.3	-	0.055 I
I ARM C	0.13	19.57	0.007	- -	-	0.0	0.0	0.1	-	0.051 I
I ARM D	16.41	32.10	0.511	- -	-	1.0	1.0	15.6	-	0.064 I
I ARM E	13.32	19.37	0.688	- -	-	2.1	2.2	32.3	-	0.165 I

I 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) I
I 08.45-09.00									I
I ARM A	4.52	27.60	0.164	- -	-	0.3	0.2	3.0	-	0.043 I
I ARM B	9.17	30.05	0.305	- -	-	0.6	0.4	6.7	-	0.048 I
I ARM C	0.10	21.23	0.005	- -	-	0.0	0.0	0.1	-	0.047 I
I ARM D	13.39	32.91	0.407	- -	-	1.0	0.7	10.6	-	0.051 I
I ARM E	10.88	20.54	0.530	- -	-	2.2	1.1	17.9	-	0.105 I

I 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) I
I 09.00-09.15									I
I ARM A	3.79	27.87	0.136	- -	-	0.2	0.2	2.4	-	0.042 I
I ARM B	7.68	30.59	0.251	- -	-	0.4	0.3	5.1	-	0.044 I
I ARM C	0.09	22.45	0.004	- -	-	0.0	0.0	0.1	-	0.045 I
I ARM D	11.22	33.50	0.335	- -	-	0.7	0.5	7.7	-	0.045 I
I ARM E	9.11	21.40	0.426	- -	-	1.1	0.7	11.5	-	0.082 I

.QUEUE AT ARM A

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

08.45	0.3
09.00	0.2
09.15	0.2

.QUEUE AT ARM B

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

.QUEUE AT ARM C

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 D

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

.QUEUE AT ARM E

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.7	*
08.15	1.1	*
08.30	2.1	**
08.45	2.2	**
09.00	1.1	*
09.15	0.7	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	415.7	277.1	18.2	0.04	18.2	0.04
B	842.4	561.6	41.6	0.05	41.6	0.05
C	9.6	6.4	0.5	0.05	0.5	0.05
D	1230.5	820.4	66.5	0.05	66.5	0.05
E	999.3	666.2	118.3	0.12	118.3	0.12

ALL	3497.5	2331.7	245.0	0.07	245.0	0.07

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

END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

_____

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RG40 3GA,UK

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

Run with file:- "h:\Training\2012 Maudlins PM Base.vai" (drive-on-the-left) at 21:13:22 on Monday, 19 May 2014

.FILE PROPERTIES

RUN TITLE: Maudlins-2012 PM BASE
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA

ARM A - M7 EB On/Off Ramp
ARM B - R445 East
ARM C - Plant Access
ARM D - R445 Dublin Road
ARM E - Monread Road
ARM F - M7 On-Slip WB

.GEOMETRIC DATA

ARM F IS JUNCTION EXIT ONLY

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.20	8.00	20.00	18.00	80.00	37.0	0.499	32.159
ARM B	6.50	7.25	10.00	32.00	80.00	29.0	0.550	36.662
ARM C	6.40	6.40	0.00	26.00	80.00	40.0	0.495	31.563
ARM D	6.40	9.10	11.00	27.00	80.00	32.0	0.578	40.186
ARM E	4.20	6.20	20.00	29.00	80.00	39.0	0.469	28.398

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

ARM	FLOW SCALE(%)
A	100
B	100
C	100
D	100
E	100
F	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: Maudlins

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	2.14	3.21	2.14
ARM B	15.00	45.00	75.00	15.30	22.95	15.30
ARM C	15.00	45.00	75.00	0.10	0.15	0.10
ARM D	15.00	45.00	75.00	9.04	13.56	9.04
ARM E	15.00	45.00	75.00	9.06	13.59	9.06

DEMAND SET TITLE: Maudlins

T33

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

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D	ARM E	ARM F
16.45 - 18.15	ARM A	0.000	0.135	0.012	0.386	0.468	0.000
		0.0	23.0	2.0	66.0	80.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.002	0.000	0.001	0.605	0.355	0.038
		2.0	0.0	1.0	741.0	434.0	46.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.125	0.000	0.000	0.750	0.125	0.000
		1.0	0.0	0.0	6.0	1.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.467	0.116	0.000	0.000	0.231	0.185
		338.0	84.0	0.0	0.0	167.0	134.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM E	0.428	0.105	0.000	0.259	0.000	0.208
		310.0	76.0	0.0	188.0	0.0	151.0
		(10.0)	(10.0)	(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)
16.45-17.00									
ARM A	2.15	27.06	0.079	- - -	0.0	0.1	1.3	-	0.040
ARM B	15.36	31.02	0.495	- - -	0.0	1.0	14.1	-	0.063
ARM C	0.10	19.05	0.005	- - -	0.0	0.0	0.1	-	0.053
ARM D	9.07	32.46	0.279	- - -	0.0	0.4	5.7	-	0.043
ARM E	9.10	22.27	0.409	- - -	0.0	0.7	10.0	-	0.075

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	2.56	26.64	0.096	- - -	0.1	0.1	1.6	-	0.042
ARM B	18.34	30.56	0.600	- - -	1.0	1.5	21.5	-	0.081
ARM C	0.12	17.16	0.007	- - -	0.0	0.0	0.1	-	0.059
ARM D	10.83	31.66	0.342	- - -	0.4	0.5	7.7	-	0.048
ARM E	10.86	21.57	0.504	- - -	0.7	1.0	14.6	-	0.093

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	3.14	26.06	0.120	- - -	0.1	0.1	2.0	-	0.044
ARM B	22.46	29.94	0.750	- - -	1.5	2.9	40.8	-	0.130
ARM C	0.15	14.59	0.010	- - -	0.0	0.0	0.1	-	0.069
ARM D	13.27	30.57	0.434	- - -	0.5	0.8	11.2	-	0.058
ARM E	13.30	20.62	0.645	- - -	1.0	1.8	25.3	-	0.135

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	3.14	26.05	0.120	- - -	0.1	0.1	2.0	-	0.044
ARM B	22.46	29.94	0.750	- - -	2.9	3.0	44.0	-	0.133
ARM C	0.15	14.54	0.010	- - -	0.0	0.0	0.2	-	0.069
ARM D	13.27	30.55	0.434	- - -	0.8	0.8	11.5	-	0.058
ARM E	13.30	20.61	0.646	- - -	1.8	1.8	26.8	-	0.137

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	2.56	26.62	0.096	- - -	0.1	0.1	1.6	-	0.042
ARM B	18.34	30.55	0.600	- - -	3.0	1.5	23.8	-	0.083
ARM C	0.12	17.08	0.007	- - -	0.0	0.0	0.1	-	0.059
ARM D	10.83	31.63	0.343	- - -	0.8	0.5	8.0	-	0.048
ARM E	10.86	21.56	0.504	- - -	1.8	1.0	16.0	-	0.094

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	2.15	27.05	0.079	- - -	0.1	0.1	1.3	-	0.040
ARM B	15.36	31.00	0.495	- - -	1.5	1.0	15.2	-	0.064
ARM C	0.10	18.99	0.005	- - -	0.0	0.0	0.1	-	0.053
ARM D	9.07	32.43	0.280	- - -	0.5	0.4	5.9	-	0.043
ARM E	9.10	22.25	0.409	- - -	1.0	0.7	10.7	-	0.076

QUEUE AT ARM A

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

18.15	0.1

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.0	*
17.15	1.5	*
17.30	2.9	***
17.45	3.0	***
18.00	1.5	**
18.15	1.0	*

.QUEUE AT ARM C

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 D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.4	
17.15	0.5	*
17.30	0.8	*
17.45	0.8	*
18.00	0.5	*
18.15	0.4	

.QUEUE AT ARM E

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.7	*
17.15	1.0	*
17.30	1.8	**
17.45	1.8	**
18.00	1.0	*
18.15	0.7	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	235.4	156.9	9.8	0.04	9.8	0.04
B	1684.7	1123.2	159.4	0.09	159.5	0.09
C	11.0	7.3	0.7	0.06	0.7	0.06
D	995.2	663.4	49.9	0.05	49.9	0.05
E	997.9	665.3	103.4	0.10	103.4	0.10
ALL	3924.2	2616.1	323.3	0.08	323.3	0.08

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* 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 5.0 (JANUARY 2009)

_____

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RG40 3GA,UK

Run with file:- "h:\Training\2030 Maudlins AM DM.vai" (drive-on-the-left) at 21:13:51 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Maudlins-2030 AM DO-MINIMUM
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 EB On/Off Ramp
ARM B - R445 East
ARM C - Plant Access
ARM D - R445 Dublin Road
ARM E - Monread Road
ARM F - M7 On-Slip WB

.GEOMETRIC DATA

ARM F IS JUNCTION EXIT ONLY

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.20	8.00	20.00	18.00	80.00	37.0	0.499	32.159
ARM B	6.50	7.25	10.00	32.00	80.00	29.0	0.550	36.662
ARM C	6.40	6.40	0.00	26.00	80.00	40.0	0.495	31.563
ARM D	6.40	9.10	11.00	27.00	80.00	32.0	0.578	40.186
ARM E	4.20	6.20	20.00	29.00	80.00	39.0	0.469	28.398

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
I E	I 100 I
I F	I 100 I

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: Maudlins

T15

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	5.35	8.02	5.35
ARM B	15.00	45.00	75.00	9.36	14.04	9.36
ARM C	15.00	45.00	75.00	0.00	0.00	0.00
ARM D	15.00	45.00	75.00	13.82	20.74	13.82
ARM E	15.00	45.00	75.00	12.55	18.83	12.55

DEMAND SET TITLE: Maudlins

T33

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D	ARM E	ARM F
07.45 - 09.15	ARM A	0.000	0.079	0.000	0.614	0.306	0.000
		0.0	34.0	0.0	263.0	131.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.000	0.000	0.000	0.339	0.633	0.028
		0.0	0.0	0.0	254.0	474.0	21.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.000	0.000	0.000	0.000	0.000	0.000
		0.0	0.0	0.0	0.0	0.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.651	0.255	0.000	0.000	0.003	0.091
		720.0	282.0	0.0	0.0	3.0	101.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM E	0.576	0.201	0.000	0.077	0.000	0.146
		578.0	202.0	0.0	77.0	0.0	147.0
		(10.0)	(10.0)	(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	5.37	25.74	0.209	- - -	0.0	0.3	3.9	-	0.049
ARM B	9.40	30.09	0.312	- - -	0.0	0.5	6.6	-	0.048
ARM C	0.00	23.25	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	13.88	32.01	0.434	- - -	0.0	0.8	11.1	-	0.055
ARM E	12.60	19.22	0.655	- - -	0.0	1.8	25.8	-	0.146

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	6.41	25.07	0.256	- - -	0.3	0.3	5.1	-	0.054
ARM B	11.22	29.46	0.381	- - -	0.5	0.6	9.0	-	0.055
ARM C	0.00	21.62	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	16.57	31.12	0.533	- - -	0.8	1.1	16.5	-	0.069
ARM E	15.04	17.93	0.839	- - -	1.8	4.6	60.4	-	0.308

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	7.85	24.45	0.321	- - -	0.3	0.5	6.9	-	0.060
ARM B	13.74	28.68	0.479	- - -	0.6	0.9	13.4	-	0.067
ARM C	0.00	19.48	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	20.30	29.90	0.679	- - -	1.1	2.1	29.6	-	0.103
ARM E	18.42	16.17	1.139	- - -	4.6	41.9	360.8	-	1.667

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	7.85	24.42	0.322	- - -	0.5	0.5	7.1	-	0.060
ARM B	13.74	28.67	0.479	- - -	0.9	0.9	13.7	-	0.067
ARM C	0.00	19.46	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	20.30	29.89	0.679	- - -	2.1	2.1	31.2	-	0.104
ARM E	18.42	16.14	1.142	- - -	41.9	76.6	889.1	-	3.775

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	6.41	24.67	0.260	- - -	0.5	0.4	5.4	-	0.055
ARM B	11.22	29.33	0.383	- - -	0.9	0.6	9.5	-	0.055
ARM C	0.00	21.48	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	16.57	31.10	0.533	- - -	2.1	1.2	17.8	-	0.069
ARM E	15.04	17.89	0.841	- - -	76.6	37.4	855.1	-	3.261

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	5.37	25.39	0.212	- - -	0.4	0.3	4.1	-	0.050
ARM B	9.40	29.97	0.314	- - -	0.6	0.5	7.0	-	0.049
ARM C	0.00	23.11	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	13.88	31.99	0.434	- - -	1.2	0.8	11.8	-	0.055
ARM E	12.60	19.19	0.657	- - -	37.4	2.0	134.3	-	0.402

QUEUE AT ARM A

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

09.15	0.3

.QUEUE AT ARM B

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

.QUEUE AT ARM C

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 D

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

.QUEUE AT ARM E

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.8	**
08.15	4.6	*****
08.30	41.9	**
08.45	76.6	**
09.00	37.4	*************************************
09.15	2.0	**

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	589.1	392.7	32.4	0.06	32.4	0.06
B	1030.9	687.3	59.3	0.06	59.3	0.06
C	0.0	0.0	0.0	0.00	0.0	0.00
D	1522.3	1014.9	118.1	0.08	118.1	0.08
E	1381.9	921.3	2325.4	1.68	2325.5	1.68
ALL	4524.3	3016.2	2535.2	0.56	2535.4	0.56

---

* 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 5.0 (JANUARY 2009)

_____

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:- "h:\Training\2030 Maudlins PM DM.vai" (drive-on-the-left) at 21:12:02 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Maudlins-2030 PM DO-MINIMUM
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 EB On/Off Ramp
ARM B - R445 East
ARM C - Plant Access
ARM D - R445 Dublin Road
ARM E - Monread Road
ARM F - M7 On-Slip WB

.GEOMETRIC DATA

ARM F IS JUNCTION EXIT ONLY

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	4.20	I	8.00	I	20.00	I	18.00	I	80.00	I	37.0	I	0.499	I	32.159	I
I ARM B	I	6.50	I	7.25	I	10.00	I	32.00	I	80.00	I	29.0	I	0.550	I	36.662	I
I ARM C	I	6.40	I	6.40	I	0.00	I	26.00	I	80.00	I	40.0	I	0.495	I	31.563	I
I ARM D	I	6.40	I	9.10	I	11.00	I	27.00	I	80.00	I	32.0	I	0.578	I	40.186	I
I ARM E	I	4.20	I	6.20	I	20.00	I	29.00	I	80.00	I	39.0	I	0.469	I	28.398	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
I E	I	100	I
I F	I	100	I

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: Maudlins

T15

I ARM	I NUMBER OF MINUTES FROM START WHEN I FLOW STARTS TO RISE	I TOP OF PEAK IS REACHED	I FLOW STOPS FALLING	I RATE OF FLOW (VEH/MIN) I BEFORE PEAK	I AT TOP OF PEAK	I AFTER PEAK
I ARM A	I 15.00	I 45.00	I 75.00	I 2.40	I 3.60	I 2.40
I ARM B	I 15.00	I 45.00	I 75.00	I 20.99	I 31.48	I 20.99
I ARM C	I 15.00	I 45.00	I 75.00	I 0.00	I 0.00	I 0.00
I ARM D	I 15.00	I 45.00	I 75.00	I 6.36	I 9.54	I 6.36
I ARM E	I 15.00	I 45.00	I 75.00	I 13.20	I 19.80	I 13.20

DEMAND SET TITLE: Maudlins

T33

I TIME	I FROM/TO	I ARM A	I ARM B	I ARM C	I ARM D	I ARM E	I ARM F
I 16.45 - 18.15	I ARM A	I 0.000	I 0.391	I 0.000	I 0.229	I 0.380	I 0.000
	I	I 0.0	I 75.0	I 0.0	I 44.0	I 73.0	I 0.0
	I	I (10.0)	I (10.0)	I (10.0)	I (10.0)	I (10.0)	I (10.0)
	I ARM B	I 0.000	I 0.000	I 0.000	I 0.378	I 0.606	I 0.016
	I	I 0.0	I 0.0	I 0.0	I 635.0	I 1017.0	I 27.0
	I	I (10.0)	I (10.0)	I (10.0)	I (10.0)	I (10.0)	I (10.0)
	I ARM C	I 0.000	I 0.000	I 0.000	I 0.000	I 0.000	I 0.000
	I	I 0.0	I 0.0	I 0.0	I 0.0	I 0.0	I 0.0
	I	I (10.0)	I (10.0)	I (10.0)	I (10.0)	I (10.0)	I (10.0)
	I ARM D	I 0.599	I 0.077	I 0.000	I 0.000	I 0.084	I 0.240
	I	I 305.0	I 39.0	I 0.0	I 0.0	I 43.0	I 122.0
	I	I (10.0)	I (10.0)	I (10.0)	I (10.0)	I (10.0)	I (10.0)
	I ARM E	I 0.441	I 0.122	I 0.000	I 0.272	I 0.000	I 0.165
	I	I 466.0	I 129.0	I 0.0	I 287.0	I 0.0	I 174.0
	I	I (10.0)	I (10.0)	I (10.0)	I (10.0)	I (10.0)	I (10.0)

. QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

I 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)
I 16.45-17.00									
I ARM A	2.41	26.40	0.091	- - -	0.0	0.1	1.5	-	0.042
I ARM B	21.07	30.55	0.690	- - -	0.0	2.2	30.7	-	0.103
I ARM C	0.00	17.41	0.000	- - -	0.0	0.0	0.0	-	0.000
I ARM D	6.39	28.49	0.224	- - -	0.0	0.3	4.2	-	0.045
I ARM E	13.25	22.92	0.578	- - -	0.0	1.3	19.3	-	0.102

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	2.88	25.84	0.111	- - -	0.1	0.1	1.9	-	0.044
ARM B	25.16	30.01	0.838	- - -	2.2	4.8	64.9	-	0.192
ARM C	0.00	14.66	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	7.63	26.92	0.283	- - -	0.3	0.4	5.8	-	0.052
ARM E	15.82	22.36	0.708	- - -	1.3	2.3	33.1	-	0.150

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	3.52	25.13	0.140	- - -	0.1	0.2	2.4	-	0.046
ARM B	30.81	29.30	1.052	- - -	4.8	36.2	331.4	-	0.879
ARM C	0.00	11.91	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	9.34	25.43	0.367	- - -	0.4	0.6	8.5	-	0.062
ARM E	19.38	21.59	0.897	- - -	2.3	7.1	87.9	-	0.356

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	3.52	25.08	0.141	- - -	0.2	0.2	2.4	-	0.046
ARM B	30.81	29.26	1.053	- - -	36.2	61.6	735.7	-	1.807
ARM C	0.00	11.66	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	9.34	25.29	0.369	- - -	0.6	0.6	8.7	-	0.063
ARM E	19.38	21.58	0.898	- - -	7.1	7.8	112.2	-	0.426

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	2.88	25.76	0.112	- - -	0.2	0.1	1.9	-	0.044
ARM B	25.16	29.94	0.840	- - -	61.6	6.6	450.9	-	1.115
ARM C	0.00	12.50	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	7.63	25.54	0.299	- - -	0.6	0.4	6.5	-	0.056
ARM E	15.82	22.32	0.709	- - -	7.8	2.5	43.2	-	0.171

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	2.41	26.37	0.091	- - -	0.1	0.1	1.5	-	0.042
ARM B	21.07	30.53	0.690	- - -	6.6	2.3	37.3	-	0.112
ARM C	0.00	17.15	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	6.39	28.33	0.225	- - -	0.4	0.3	4.4	-	0.046
ARM E	13.25	22.91	0.578	- - -	2.5	1.4	21.8	-	0.105

QUEUE AT ARM A

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 AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	2.2	**
17.15	4.8	*****
17.30	36.2	**********
17.45	61.6	**********
18.00	6.6	*******
18.15	2.3	**

.QUEUE AT ARM C

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 D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.3	
17.15	0.4	
17.30	0.6	*
17.45	0.6	*
18.00	0.4	
18.15	0.3	

.QUEUE AT ARM E

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.3	*
17.15	2.3	**
17.30	7.1	*******
17.45	7.8	********
18.00	2.5	***
18.15	1.4	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	264.3	176.2	11.6	0.04	11.6	0.04
B	2311.0	1540.7	1650.9	0.71	1650.9	0.71
C	0.0	0.0	0.0	0.00	0.0	0.00
D	700.6	467.1	38.2	0.05	38.2	0.05
E	1453.5	969.0	317.6	0.22	317.7	0.22
ALL	4729.4	3152.9	2018.3	0.43	2018.5	0.43

* 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 5.0 (JANUARY 2009)

_____

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program advice and maintenance, contact:

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Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:- "h:\Training\2030 Maudlins AM DS.vai" (drive-on-the-left) at 21:14:16 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Maudlins-2030 AM DO-SOMETHING
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 EB On/Off Ramp
ARM B - R445 East
ARM C - Plant Access
ARM D - R445 Dublin Road
ARM E - Monread Road
ARM F - M7 On-Slip WB

.GEOMETRIC DATA

ARM F IS JUNCTION EXIT ONLY

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.20	8.00	20.00	18.00	80.00	37.0	0.499	32.159
ARM B	6.50	7.25	10.00	32.00	80.00	29.0	0.550	36.662
ARM C	6.40	6.40	0.00	26.00	80.00	40.0	0.495	31.563
ARM D	6.40	9.10	11.00	27.00	80.00	32.0	0.578	40.186
ARM E	4.20	6.20	20.00	29.00	80.00	39.0	0.469	28.398

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
I E	I 100 I
I F	I 100 I

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: Maudlins

T15

I ARM I	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
I ARM A I	15.00	45.00	75.00	7.57	11.36	7.57
I ARM B I	15.00	45.00	75.00	9.63	14.44	9.63
I ARM C I	15.00	45.00	75.00	0.00	0.00	0.00
I ARM D I	15.00	45.00	75.00	13.48	20.21	13.48
I ARM E I	15.00	45.00	75.00	11.65	17.47	11.65

DEMAND SET TITLE: Maudlins

T33

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D	ARM E	ARM F
07.45 - 09.15	ARM A	0.000	0.058	0.000	0.521	0.421	0.000
		0.0	35.0	0.0	316.0	255.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.000	0.000	0.000	0.336	0.632	0.031
		0.0	0.0	0.0	259.0	487.0	24.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.000	0.000	0.000	0.000	0.000	0.000
		0.0	0.0	0.0	0.0	0.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.663	0.214	0.000	0.000	0.002	0.121
		715.0	231.0	0.0	0.0	2.0	130.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM E	0.535	0.177	0.000	0.089	0.000	0.198
		499.0	165.0	0.0	83.0	0.0	185.0
		(10.0)	(10.0)	(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	7.60	26.25	0.290	- - -	0.0	0.4	6.0	-	0.054
ARM B	9.66	28.83	0.335	- - -	0.0	0.5	7.4	-	0.052
ARM C	0.00	21.86	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	13.53	31.00	0.436	- - -	0.0	0.8	11.2	-	0.057
ARM E	11.69	19.36	0.604	- - -	0.0	1.5	21.1	-	0.127

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	9.08	25.67	0.354	- - -	0.4	0.5	8.0	-	0.060
ARM B	11.54	27.95	0.413	- - -	0.5	0.7	10.3	-	0.061
ARM C	0.00	19.95	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	16.15	29.91	0.540	- - -	0.8	1.2	17.0	-	0.072
ARM E	13.96	18.10	0.772	- - -	1.5	3.2	43.2	-	0.230

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	11.12	25.02	0.444	- - -	0.5	0.8	11.6	-	0.072
ARM B	14.13	26.79	0.527	- - -	0.7	1.1	16.1	-	0.079
ARM C	0.00	17.41	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	19.78	28.42	0.696	- - -	1.2	2.2	31.8	-	0.114
ARM E	17.10	16.38	1.044	- - -	3.2	22.3	211.0	-	1.031

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	11.12	24.97	0.445	- - -	0.8	0.8	12.0	-	0.072
ARM B	14.13	26.77	0.528	- - -	1.1	1.1	16.6	-	0.079
ARM C	0.00	17.37	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	19.78	28.41	0.696	- - -	2.2	2.3	33.8	-	0.116
ARM E	17.10	16.35	1.046	- - -	22.3	36.3	441.6	-	1.982

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	9.08	25.36	0.358	- - -	0.8	0.6	8.6	-	0.062
ARM B	11.54	27.82	0.415	- - -	1.1	0.7	10.9	-	0.062
ARM C	0.00	19.81	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	16.15	29.89	0.540	- - -	2.3	1.2	18.4	-	0.074
ARM E	13.96	18.05	0.774	- - -	36.3	3.8	205.6	-	0.857

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	7.60	26.21	0.290	- - -	0.6	0.4	6.3	-	0.054
ARM B	9.66	28.80	0.335	- - -	0.7	0.5	7.7	-	0.052
ARM C	0.00	21.81	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	13.53	30.97	0.437	- - -	1.2	0.8	12.0	-	0.058
ARM E	11.69	19.33	0.605	- - -	3.8	1.6	25.2	-	0.136

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.4	
08.15	0.5	*
08.30	0.8	*
08.45	0.8	*
09.00	0.6	*
09.15	0.4	

.QUEUE AT ARM B

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

.QUEUE AT ARM C

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 D

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	0.8	*
08.15	1.2	*
08.30	2.2	**
08.45	2.3	**
09.00	1.2	*
09.15	0.8	*

.QUEUE AT ARM E

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
08.00	1.5	*
08.15	3.2	***
08.30	22.3	**********
08.45	36.3	**********
09.00	3.8	****
09.15	1.6	**

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	834.1	556.1	52.4	0.06	52.4	0.06
B	1059.8	706.6	69.0	0.07	69.0	0.07
C	0.0	0.0	0.0	0.00	0.0	0.00
D	1483.8	989.2	124.2	0.08	124.2	0.08
E	1282.8	855.2	947.7	0.74	947.8	0.74
ALL	4660.6	3107.1	1193.3	0.26	1193.4	0.26

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

END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

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For sales and distribution information,
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Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:- "h:\Training\2030 Maudlins PM DS.vai" (drive-on-the-left) at 21:15:08 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Maudlins-2030 PM DO-SOMETHING
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 EB On/Off Ramp
ARM B - R445 East
ARM C - Plant Access
ARM D - R445 Dublin Road
ARM E - Monread Road
ARM F - M7 On-Slip WB

.GEOMETRIC DATA

ARM F IS JUNCTION EXIT ONLY

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	4.20	8.00	20.00	18.00	80.00	37.0	0.499	32.159
ARM B	6.50	7.25	10.00	32.00	80.00	29.0	0.550	36.662
ARM C	6.40	6.40	0.00	26.00	80.00	40.0	0.495	31.563
ARM D	6.40	9.10	11.00	27.00	80.00	32.0	0.578	40.186
ARM E	4.20	6.20	20.00	29.00	80.00	39.0	0.469	28.398

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
I E	I	100	I
I F	I	100	I

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: Maudlins

T15

I ARM I	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
I ARM A I	15.00	45.00	75.00	3.08	4.61	3.08
I ARM B I	15.00	45.00	75.00	19.66	29.49	19.66
I ARM C I	15.00	45.00	75.00	0.00	0.00	0.00
I ARM D I	15.00	45.00	75.00	8.14	12.21	8.14
I ARM E I	15.00	45.00	75.00	11.50	17.25	11.50

DEMAND SET TITLE: Maudlins

T33

TIME	FROM/TO	ARM A	ARM B	ARM C	ARM D	ARM E	ARM F
16.45 - 18.15	TURNING PROPORTIONS						
	TURNING COUNTS						
	(PERCENTAGE OF H.V.S)						
	ARM A	0.000	0.301	0.000	0.346	0.354	0.000
		0.0	74.0	0.0	85.0	87.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM B	0.000	0.000	0.000	0.359	0.621	0.020
		0.0	0.0	0.0	565.0	977.0	31.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM C	0.000	0.000	0.000	0.000	0.000	0.000
		0.0	0.0	0.0	0.0	0.0	0.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM D	0.482	0.061	0.000	0.000	0.052	0.404
		314.0	40.0	0.0	0.0	34.0	263.0
		(10.0)	(10.0)	(10.0)	(10.0)	(10.0)	(10.0)
	ARM E	0.465	0.141	0.000	0.032	0.000	0.362
		428.0	130.0	0.0	29.0	0.0	333.0
		(10.0)	(10.0)	(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)
16.45-17.00									
ARM A	3.09	28.00	0.110	- - -	0.0	0.1	1.8	-	0.040
ARM B	19.74	31.95	0.618	- - -	0.0	1.6	22.9	-	0.081
ARM C	0.00	19.49	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	8.17	28.63	0.285	- - -	0.0	0.4	5.8	-	0.049
ARM E	11.54	22.01	0.524	- - -	0.0	1.1	15.6	-	0.094

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	3.69	27.75	0.133	- - -	0.1	0.2	2.3	-	0.042
ARM B	23.57	31.67	0.744	- - -	1.6	2.8	39.9	-	0.121
ARM C	0.00	17.12	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	9.75	27.08	0.360	- - -	0.4	0.6	8.2	-	0.058
ARM E	13.78	21.27	0.648	- - -	1.1	1.8	25.7	-	0.132

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	4.51	27.43	0.165	- - -	0.2	0.2	2.9	-	0.044
ARM B	28.87	31.30	0.922	- - -	2.8	9.3	113.9	-	0.310
ARM C	0.00	14.06	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	11.95	25.08	0.476	- - -	0.6	0.9	13.2	-	0.076
ARM E	16.88	20.25	0.834	- - -	1.8	4.5	59.7	-	0.269

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	4.51	27.41	0.165	- - -	0.2	0.2	2.9	-	0.044
ARM B	28.87	31.30	0.922	- - -	9.3	10.3	148.2	-	0.378
ARM C	0.00	13.86	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	11.95	24.94	0.479	- - -	0.9	0.9	13.6	-	0.077
ARM E	16.88	20.24	0.834	- - -	4.5	4.8	70.0	-	0.293

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	3.69	27.73	0.133	- - -	0.2	0.2	2.3	-	0.042
ARM B	23.57	31.67	0.744	- - -	10.3	3.0	52.3	-	0.139
ARM C	0.00	16.81	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	9.75	26.87	0.363	- - -	0.9	0.6	8.8	-	0.059
ARM E	13.78	21.25	0.649	- - -	4.8	1.9	30.8	-	0.141

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	3.09	27.98	0.110	- - -	0.2	0.1	1.9	-	0.040
ARM B	19.74	31.94	0.618	- - -	3.0	1.6	25.6	-	0.083
ARM C	0.00	19.38	0.000	- - -	0.0	0.0	0.0	-	0.000
ARM D	8.17	28.56	0.286	- - -	0.6	0.4	6.1	-	0.049
ARM E	11.54	22.00	0.525	- - -	1.9	1.1	17.4	-	0.097

QUEUE AT ARM A

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

.QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.6	**
17.15	2.8	***
17.30	9.3	*********
17.45	10.3	**********
18.00	3.0	***
18.15	1.6	**

.QUEUE AT ARM C

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 D

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

.QUEUE AT ARM E

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.1	*
17.15	1.8	**
17.30	4.5	*****
17.45	4.8	*****
18.00	1.9	**
18.15	1.1	*

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	338.6	225.7	14.2	0.04	14.2	0.04
B	2165.1	1443.4	402.8	0.19	402.8	0.19
C	0.0	0.0	0.0	0.00	0.0	0.00
D	896.1	597.4	55.8	0.06	55.8	0.06
E	1266.3	844.2	219.2	0.17	219.2	0.17
ALL	4666.1	3110.7	691.9	0.15	692.0	0.15

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

END OF JOB

JOHNSTOWN ROUNDABOUT

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

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For sales and distribution information,
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Run with file:- "h:\Training\2012 Johnstown Roundabout AM.vai" (drive-on-the-left) at 17:50:29 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Johnstown Roundabout-2012 AM BASE
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 Westbound Off-Ramp
ARM B - R445 East
ARM C - R445 West

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	7.60	10.00	7.00	20.00	70.00	35.0	0.644	43.393
ARM B	6.80	8.20	7.00	15.00	70.00	42.0	0.568	36.412
ARM C	3.60	7.82	22.00	30.00	70.00	29.0	0.545	32.006

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

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

IARM	FLOW SCALE(%)
A	100
B	100

```
I C   I      100      I
-----------------------
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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: Johnstown Roundabout

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	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
	TO RISE					
ARM A	15.00	45.00	75.00	6.68	10.01	6.68
ARM B	15.00	45.00	75.00	1.04	1.56	1.04
ARM C	15.00	45.00	75.00	1.81	2.72	1.81

DEMAND SET TITLE: Johnstown Roundabout

T33

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.002	0.998
		0.0	1.0	533.0
		(10.0)	(10.0)	(10.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	83.0
		(10.0)	(10.0)	(10.0)
	ARM C	0.000	1.000	0.000
		0.0	145.0	0.0
		(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	6.70	38.28	0.175	- -	-	0.0	0.2	3.1	-	0.032
ARM B	1.04	29.30	0.036	- -	-	0.0	0.0	0.5	-	0.035
ARM C	1.82	29.10	0.063	- -	-	0.0	0.1	1.0	-	0.037
08.00-08.15									
ARM A	8.00	38.05	0.210	- -	-	0.2	0.3	3.9	-	0.033
ARM B	1.24	28.56	0.044	- -	-	0.0	0.0	0.7	-	0.037
ARM C	2.17	29.10	0.075	- -	-	0.1	0.1	1.2	-	0.037
08.15-08.30									
ARM A	9.80	37.74	0.260	- -	-	0.3	0.3	5.2	-	0.036

ARM B	1.52	27.55	0.055	- -	-	0.0	0.1	0.9	-	0.038	
ARM C	2.66	29.10	0.091	- -	-	0.1	0.1	1.5	-	0.038	

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	9.80	37.74	0.260	- -	-	0.3	0.4	5.2	-	0.036	
ARM B	1.52	27.55	0.055	- -	-	0.1	0.1	0.9	-	0.038	
ARM C	2.66	29.10	0.091	- -	-	0.1	0.1	1.5	-	0.038	

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	8.00	38.05	0.210	- -	-	0.4	0.3	4.0	-	0.033	
ARM B	1.24	28.55	0.044	- -	-	0.1	0.0	0.7	-	0.037	
ARM C	2.17	29.10	0.075	- -	-	0.1	0.1	1.2	-	0.037	

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	6.70	38.27	0.175	- -	-	0.3	0.2	3.2	-	0.032	
ARM B	1.04	29.29	0.036	- -	-	0.0	0.0	0.6	-	0.035	
ARM C	1.82	29.10	0.063	- -	-	0.1	0.1	1.0	-	0.037	

.QUEUE AT ARM A

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

.QUEUE AT ARM B

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

.QUEUE AT ARM C

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

.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	735.0	490.0	24.8	0.03	24.8	0.03
B	114.2	76.2	4.2	0.04	4.2	0.04
C	199.6	133.1	7.4	0.04	7.4	0.04
ALL	1048.8	699.2	36.4	0.03	36.4	0.03

* 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 5.0 (JANUARY 2009)

_____

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

TRL Limited Tel: +44 (0) 1344 770758
Crowthorne House Fax: +44 (0) 1344 770356
Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:- "h:\Training\2012 Johnstown Roundabout PM.vai" (drive-on-the-left) at 19:36:07 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Johnstown Roundabout-2012 PM BASE
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 Westbound Off-Ramp
ARM B - R445 East
ARM C - R445 West

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	7.60	10.00	7.00	20.00	70.00	35.0	0.644	43.393
ARM B	6.80	8.20	7.00	15.00	70.00	42.0	0.568	36.412
ARM C	3.60	7.82	22.00	30.00	70.00	29.0	0.545	32.006

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

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

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

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

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: Johnstown Roundabout

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	13.01	19.52	13.01
ARM B	15.00	45.00	75.00	2.01	3.02	2.01
ARM C	15.00	45.00	75.00	2.13	3.19	2.13

DEMAND SET TITLE: Johnstown Roundabout

T33

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.003	0.997
		0.0	3.0	1038.0
		(10.0)	(10.0)	(10.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	161.0
		(10.0)	(10.0)	(10.0)
	ARM C	0.000	1.000	0.000
		0.0	170.0	0.0
		(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)
16.45-17.00									
ARM A	13.06	38.08	0.343	- -	-	0.0	0.5	7.7	-	0.040
ARM B	2.02	25.72	0.079	- -	-	0.0	0.1	1.3	-	0.042
ARM C	2.13	29.10	0.073	- -	-	0.0	0.1	1.2	-	0.037
17.00-17.15									
ARM A	15.60	37.81	0.413	- -	-	0.5	0.7	10.3	-	0.045
ARM B	2.41	24.27	0.099	- -	-	0.1	0.1	1.6	-	0.046
ARM C	2.55	29.10	0.088	- -	-	0.1	0.1	1.4	-	0.038
17.15-17.30									
ARM A	19.10	37.44	0.510	- -	-	0.7	1.0	15.2	-	0.054
ARM B	2.95	22.30	0.133	- -	-	0.1	0.2	2.3	-	0.052
ARM C	3.12	29.10	0.107	- -	-	0.1	0.1	1.8	-	0.038

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	19.10	37.44	0.510	- - -	1.0	1.0	15.5	-	0.054
ARM B	2.95	22.28	0.133	- - -	0.2	0.2	2.3	-	0.052
ARM C	3.12	29.10	0.107	- - -	0.1	0.1	1.8	-	0.038
17.45-18.00									
ARM A	15.60	37.81	0.413	- - -	1.0	0.7	10.8	-	0.045
ARM B	2.41	24.26	0.099	- - -	0.2	0.1	1.7	-	0.046
ARM C	2.55	29.10	0.088	- - -	0.1	0.1	1.5	-	0.038
18.00-18.15									
ARM A	13.06	38.07	0.343	- - -	0.7	0.5	8.0	-	0.040
ARM B	2.02	25.70	0.079	- - -	0.1	0.1	1.3	-	0.042
ARM C	2.13	29.10	0.073	- - -	0.1	0.1	1.2	-	0.037

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.5	*
17.15	0.7	*
17.30	1.0	*
17.45	1.0	*
18.00	0.7	*
18.15	0.5	*

.QUEUE AT ARM B

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 AT ARM C

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
.---

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1432.9	955.2	67.5	0.05	67.5	0.05
B	221.6	147.7	10.4	0.05	10.4	0.05
C	234.0	156.0	8.8	0.04	8.8	0.04
ALL	1888.5	1259.0	86.7	0.05	86.7	0.05

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
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END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

_____

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Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:- "h:\Training\2030 Johnstown Roundabout AM DM.vai" (drive-on-the-left) at 19:01:07 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Johnstown Roundabout- 2030 AM DO-MINIMUM
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 Westbound Off-Ramp
ARM B - R445 East
ARM C - R445 West

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	7.60	10.00	7.00	20.00	70.00	35.0	0.644	43.393
ARM B	6.80	8.20	7.00	15.00	70.00	42.0	0.568	36.412
ARM C	3.60	7.82	22.00	30.00	70.00	29.0	0.545	32.006

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

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

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

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

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: Johnstown Roundabout

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	7.88	11.81	7.88
ARM B	15.00	45.00	75.00	1.51	2.27	1.51
ARM C	15.00	45.00	75.00	6.47	9.71	6.47

DEMAND SET TITLE: Johnstown Roundabout

T33

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.002	0.998
		0.0	1.0	629.0
		(10.0)	(10.0)	(10.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	121.0
		(10.0)	(10.0)	(10.0)
	ARM C	0.000	1.000	0.000
		0.0	518.0	0.0
		(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	7.90	35.27	0.224	- - -	0.0	0.3	4.3	-	0.036
ARM B	1.52	28.62	0.053	- - -	0.0	0.1	0.8	-	0.037
ARM C	6.50	29.10	0.223	- - -	0.0	0.3	4.2	-	0.044
08.00-08.15									
ARM A	9.44	34.46	0.274	- - -	0.3	0.4	5.6	-	0.040
ARM B	1.81	27.75	0.065	- - -	0.1	0.1	1.0	-	0.039
ARM C	7.76	29.10	0.267	- - -	0.3	0.4	5.4	-	0.047
08.15-08.30									
ARM A	11.56	33.34	0.347	- - -	0.4	0.5	7.8	-	0.046
ARM B	2.22	26.55	0.084	- - -	0.1	0.1	1.4	-	0.041
ARM C	9.51	29.10	0.327	- - -	0.4	0.5	7.1	-	0.051

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	11.56	33.33	0.347	- - -	0.5	0.5	7.9	-	0.046
ARM B	2.22	26.55	0.084	- - -	0.1	0.1	1.4	-	0.041
ARM C	9.51	29.10	0.327	- - -	0.5	0.5	7.3	-	0.051

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	9.44	34.45	0.274	- - -	0.5	0.4	5.8	-	0.040
ARM B	1.81	27.74	0.065	- - -	0.1	0.1	1.1	-	0.039
ARM C	7.76	29.10	0.267	- - -	0.5	0.4	5.6	-	0.047

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	7.90	35.25	0.224	- - -	0.4	0.3	4.4	-	0.037
ARM B	1.52	28.60	0.053	- - -	0.1	0.1	0.9	-	0.037
ARM C	6.50	29.10	0.223	- - -	0.4	0.3	4.4	-	0.044

.QUEUE AT ARM A

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

.QUEUE AT ARM B

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

.QUEUE AT ARM C

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
.---

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	867.1	578.1	35.7	0.04	35.7	0.04
B	166.5	111.0	6.5	0.04	6.5	0.04
C	713.0	475.3	33.9	0.05	33.9	0.05
ALL	1746.7	1164.5	76.1	0.04	76.2	0.04

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
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* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

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

Run with file:- "h:\Training\2030 Johnstown Roundabout PM DM.vai" (drive-on-the-left) at 19:37:06 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Johnstown Roundabout- 2030 PM DO-MINIMUM
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 Westbound Off-Ramp
ARM B - R445 East
ARM C - R445 West

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	7.60	10.00	7.00	20.00	70.00	35.0	0.644	43.393
ARM B	6.80	8.20	7.00	15.00	70.00	42.0	0.568	36.412
ARM C	3.60	7.82	22.00	30.00	70.00	29.0	0.545	32.006

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

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

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

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

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: Johnstown Roundabout

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	18.91	28.37	18.91
ARM B	15.00	45.00	75.00	2.08	3.11	2.08
ARM C	15.00	45.00	75.00	3.05	4.57	3.05

DEMAND SET TITLE: Johnstown Roundabout

T33

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.000	1.000
		0.0	0.0	1513.0
		(10.0)	(10.0)	(10.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	166.0
		(10.0)	(10.0)	(10.0)
	ARM C	0.000	1.000	0.000
		0.0	244.0	0.0
		(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)
16.45-17.00									
ARM A	18.98	37.48	0.506	- -	-	0.0	1.0	14.9	-	0.054
ARM B	2.08	22.36	0.093	- -	-	0.0	0.1	1.5	-	0.049
ARM C	3.06	29.10	0.105	- -	-	0.0	0.1	1.7	-	0.038
17.00-17.15									
ARM A	22.67	37.10	0.611	- -	-	1.0	1.6	22.6	-	0.069
ARM B	2.49	20.25	0.123	- -	-	0.1	0.1	2.1	-	0.056
ARM C	3.66	29.10	0.126	- -	-	0.1	0.1	2.1	-	0.039
17.15-17.30									
ARM A	27.76	36.57	0.759	- -	-	1.6	3.1	43.2	-	0.111
ARM B	3.05	17.39	0.175	- -	-	0.1	0.2	3.1	-	0.070
ARM C	4.48	29.10	0.154	- -	-	0.1	0.2	2.7	-	0.041

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	27.76	36.57	0.759	- - -	3.1	3.1	46.3	-	0.113
ARM B	3.05	17.33	0.176	- - -	0.2	0.2	3.2	-	0.070
ARM C	4.48	29.10	0.154	- - -	0.2	0.2	2.7	-	0.041

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	22.67	37.09	0.611	- - -	3.1	1.6	24.7	-	0.070
ARM B	2.49	20.17	0.123	- - -	0.2	0.1	2.2	-	0.057
ARM C	3.66	29.10	0.126	- - -	0.2	0.1	2.2	-	0.039

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	18.98	37.48	0.507	- - -	1.6	1.0	15.9	-	0.054
ARM B	2.08	22.30	0.093	- - -	0.1	0.1	1.6	-	0.049
ARM C	3.06	29.10	0.105	- - -	0.1	0.1	1.8	-	0.038

.QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.0	*
17.15	1.6	**
17.30	3.1	***
17.45	3.1	***
18.00	1.6	**
18.15	1.0	*

.QUEUE AT ARM B

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 AT ARM C

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
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T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	2082.5	1388.4	167.6	0.08	167.6	0.08
B	228.5	152.3	13.6	0.06	13.6	0.06
C	335.8	223.9	13.2	0.04	13.2	0.04
ALL	2646.9	1764.6	194.5	0.07	194.5	0.07

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

END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

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

TRL Limited Tel: +44 (0) 1344 770758
Crowthorne House Fax: +44 (0) 1344 770356
Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:- "h:\Training\2030 Johnstown Roundabout AM DS.vai" (drive-on-the-left) at 19:18:00 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Johnstown Roundabout-2030 AM DO-SOMETHING
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 Westbound Off-Ramp
ARM B - R445 East
ARM C - R445 West

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	7.60	10.00	7.00	20.00	70.00	35.0	0.644	43.393
ARM B	6.80	8.20	7.00	15.00	70.00	42.0	0.568	36.412
ARM C	3.60	7.82	22.00	30.00	70.00	29.0	0.545	32.006

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

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

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

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

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: Johnstown Roundabout

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	8.11	12.17	8.11
ARM B	15.00	45.00	75.00	1.51	2.27	1.51
ARM C	15.00	45.00	75.00	5.40	8.10	5.40

DEMAND SET TITLE: Johnstown Roundabout

T33

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.45 - 09.15	ARM A	0.000	0.000	1.000
		0.0	0.0	649.0
		(10.0)	(10.0)	(10.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	121.0
		(10.0)	(10.0)	(10.0)
	ARM C	0.000	1.000	0.000
		0.0	432.0	0.0
		(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	8.14	35.96	0.226	- - -	0.0	0.3	4.3	-	0.036
ARM B	1.52	28.48	0.053	- - -	0.0	0.1	0.8	-	0.037
ARM C	5.42	29.10	0.186	- - -	0.0	0.2	3.4	-	0.042
08.00-08.15									
ARM A	9.72	35.29	0.276	- - -	0.3	0.4	5.6	-	0.039
ARM B	1.81	27.58	0.066	- - -	0.1	0.1	1.0	-	0.039
ARM C	6.47	29.10	0.222	- - -	0.2	0.3	4.2	-	0.044
08.15-08.30									
ARM A	11.91	34.35	0.347	- - -	0.4	0.5	7.8	-	0.045
ARM B	2.22	26.34	0.084	- - -	0.1	0.1	1.4	-	0.041
ARM C	7.93	29.10	0.272	- - -	0.3	0.4	5.5	-	0.047

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	11.91	34.35	0.347	- - -	0.5	0.5	7.9	-	0.045
ARM B	2.22	26.34	0.084	- - -	0.1	0.1	1.4	-	0.041
ARM C	7.93	29.10	0.272	- - -	0.4	0.4	5.6	-	0.047

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	9.72	35.28	0.276	- - -	0.5	0.4	5.8	-	0.039
ARM B	1.81	27.57	0.066	- - -	0.1	0.1	1.1	-	0.039
ARM C	6.47	29.10	0.222	- - -	0.4	0.3	4.4	-	0.044

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	8.14	35.95	0.227	- - -	0.4	0.3	4.5	-	0.036
ARM B	1.52	28.46	0.053	- - -	0.1	0.1	0.9	-	0.037
ARM C	5.42	29.10	0.186	- - -	0.3	0.2	3.5	-	0.042

.QUEUE AT ARM A

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

.QUEUE AT ARM B

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

.QUEUE AT ARM C

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
.---

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	893.3	595.5	35.9	0.04	35.9	0.04
B	166.5	111.0	6.5	0.04	6.5	0.04
C	594.6	396.4	26.6	0.04	26.6	0.04
ALL	1654.5	1103.0	69.0	0.04	69.0	0.04

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END OF JOB

_____ A R C A D Y 6 _____

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 5.0 (JANUARY 2009)

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For sales and distribution information,
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TRL Limited Tel: +44 (0) 1344 770758
Crowthorne House Fax: +44 (0) 1344 770356
Nine Mile Ride Email: software@trl.co.uk
Wokingham, Berks. Web: www.trlsoftware.co.uk
RG40 3GA,UK

Run with file:- "h:\Training\2030 Johnstown Roundabout PM DS.vai" (drive-on-the-left) at 19:37:33 on Monday, 19 May 2014

.FILE PROPERTIES
****

RUN TITLE: Johnstown Roundabout-2030 PM DO-SOMETHING
LOCATION: Naas
DATE: 19/05/14
CLIENT:
ENUMERATOR: murphya5 [IEDBL2PC22262]
JOB NUMBER:
STATUS:
DESCRIPTION:

.INPUT DATA
****
ARM A - M7 Westbound Off-Ramp
ARM B - R445 East
ARM C - R445 West

.GEOMETRIC DATA

T5

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	7.60	10.00	7.00	20.00	70.00	35.0	0.644	43.393
ARM B	6.80	8.20	7.00	15.00	70.00	42.0	0.568	36.412
ARM C	3.60	7.82	22.00	30.00	70.00	29.0	0.545	32.006

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

.TRAFFIC DEMAND DATA

Only sets included in the current run are shown

.SCALING FACTORS

T13

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

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

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

.DEMAND SET TITLE: Johnstown Roundabout

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	17.88	26.81	17.88
ARM B	15.00	45.00	75.00	1.86	2.79	1.86
ARM C	15.00	45.00	75.00	3.05	4.57	3.05

DEMAND SET TITLE: Johnstown Roundabout

T33

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.000	1.000
		0.0	0.0	1430.0
		(10.0)	(10.0)	(10.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	149.0
		(10.0)	(10.0)	(10.0)
	ARM C	0.000	1.000	0.000
		0.0	244.0	0.0
		(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)
16.45-17.00									
ARM A	17.94	37.48	0.479	- -	-	0.0	0.9	13.3	-	0.051
ARM B	1.87	22.94	0.081	- -	-	0.0	0.1	1.3	-	0.047
ARM C	3.06	29.10	0.105	- -	-	0.0	0.1	1.7	-	0.038
17.00-17.15									
ARM A	21.43	37.10	0.578	- -	-	0.9	1.4	19.8	-	0.064
ARM B	2.23	20.95	0.107	- -	-	0.1	0.1	1.8	-	0.053
ARM C	3.66	29.10	0.126	- -	-	0.1	0.1	2.1	-	0.039
17.15-17.30									
ARM A	26.24	36.57	0.718	- -	-	1.4	2.5	35.5	-	0.096
ARM B	2.73	18.24	0.150	- -	-	0.1	0.2	2.6	-	0.064
ARM C	4.48	29.10	0.154	- -	-	0.1	0.2	2.7	-	0.041

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	26.24	36.57	0.718	- - -	2.5	2.5	37.5	-	0.097
ARM B	2.73	18.20	0.150	- - -	0.2	0.2	2.6	-	0.065
ARM C	4.48	29.10	0.154	- - -	0.2	0.2	2.7	-	0.041

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	21.43	37.09	0.578	- - -	2.5	1.4	21.4	-	0.064
ARM B	2.23	20.89	0.107	- - -	0.2	0.1	1.8	-	0.054
ARM C	3.66	29.10	0.126	- - -	0.2	0.1	2.2	-	0.039

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	17.94	37.48	0.479	- - -	1.4	0.9	14.2	-	0.051
ARM B	1.87	22.89	0.082	- - -	0.1	0.1	1.4	-	0.048
ARM C	3.06	29.10	0.105	- - -	0.1	0.1	1.8	-	0.038

.QUEUE AT ARM A

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

.QUEUE AT ARM B

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 AT ARM C

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

.QUEUEING DELAY INFORMATION OVER WHOLE PERIOD
.---

T75

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1968.3	1312.2	141.7	0.07	141.7	0.07
B	205.1	136.7	11.5	0.06	11.5	0.06
C	335.8	223.9	13.2	0.04	13.2	0.04
ALL	2509.2	1672.8	166.4	0.07	166.5	0.07

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
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END OF JOB